



DEVELOPED
& DESIGNED



IN ITALY

BOOSTER

HFRM HIGH FEED REMOVE MATERIAL

WWW.TTETEC.EU

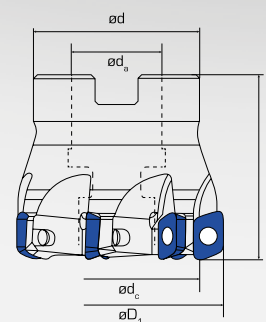


2019.2 IT-ENG

C300A / ATTACCO A MANICOTTO / FACE MILL TYPE A

FRESA AD ALTO AVANZAMENTO / HIGH FEED CUTTING

Cod.	ϕd_c	ϕD_1	h	ϕd	ϕd_a	z
C300A-40R06-07	29	40	40	35	16	6
C300A-50R07-07	39	50	40	41	22	7
C300A-52R07-07	41	52	40	41	22	7
C300A-63R08-07	52	63	50	60	22	8
C300A-66R08-07	55	66	50	60	27	8
C300A-80R09-07	69	80	50	60	27	9

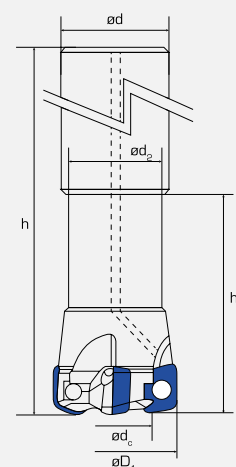


Esempio d'ordine / How to order
C300A-40R06-07

C300C / ATTACCO CILINDRICO / ENDMILL TYPE C

FRESA AD ALTO AVANZAMENTO / HIGH FEED CUTTING

Cod.	ϕd_c	ϕD_1	h	ϕd	ϕd_2	h_1	z
C300C-16R02-07	5	16	160	16	14	30	2
C300C-20R03-07	9	20	200	20	18	32	3
C300C-25R04-07	14	25	200	25	23	40	4
C300C-32R05-07	21	32	250	32	30	51	5

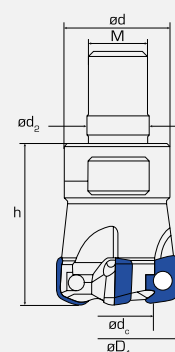


Esempio d'ordine / How to order
C300C-16R02-07

C300G / ATTACCO FILETTATO / THREAD CUTTER TYPE G

FRESA AD ALTO AVANZAMENTO / HIGH FEED CUTTING

Cod.	ϕd_c	ϕD_1	h	ϕd	ϕd_2	M	z
C300G-16R02-07	5	16	23	13	8,5	8	2
C300G-20R03-07	9	20	30	18	10,5	10	3
C300G-22R03-07	11	22	30	18	10,5	10	3
C300G-25R04-07	14	25	35	21	12,5	12	4
C300G-32R05-07	21	32	40	29	17	16	5
C300G-35R05-07	24	35	40	29	17	16	5
C300G-42R06-07	31	42	40	29	17	16	6



Esempio d'ordine / How to order
C300G-16R02-07

PARTI DI RICAMBIO / SPARE PARTS

FORZA SERRAGGIO / TIGHTENING FORCE 1,2 Nm

Cod.	M	l	N _m	Tx plus
V0300800	3	8	1,2	TX 08

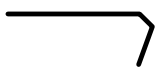
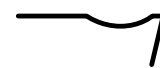
Esempio d'ordine / How to order
V0300800

EPHW / EPHT

					P	H	M	K	S
					Acciai Steel	Acciai Temprati Hardened Steel	Acciai Inox Stainless Steel	Chise Cast Iron	Super Leghe Heat Res. Alloys
Cod.	l	s	r	L ₁					
New EPHW-070315-TTW	11	3,35	8,5	7	P615	P615	P615	P615	
EPHW-070315-TT	11	3,35	8,5	7		P615		P615	
EPHT-070315-ST	11	3,35	8,5	7	PP35				
EPHT-070315-XT	11	3,35	8,5	7			PM40 C535 C540		C535 C540
EPHT-070315-HTM	11	3,35	8,5	7	PP35				
EPHT-070315-XTM	11	3,35	8,5	7			C540		C540

 **Esempio d'ordine** How to order
EPHT-070315-HTM PP35

GEOMETRIA / GEOMETRY

TT-TTW		HTM		ST		XT		XTM	
									
H	Acciai Temprati Hardened Steel	P	Acciai Steel	P	Acciai Steel	S	Super Leghe Heat Res. Alloys	S	Super Leghe Heat Res. Alloys
				M	Acciai Inox Stainless Steel	M	Acciai Inox Stainless Steel		

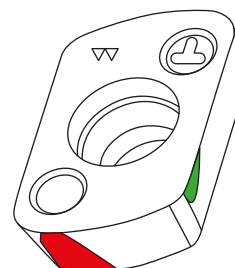
QUALITÀ MD / GRADE DESIGNATION

Qualità Grade	Dim. Grano Grain Size	Rivestimento Coating	Hv 30	Utilizzo Use		Tenacità Toughness	Res. Usura Wear Resistance	Impiego Type of Use
				Umido Wet	Secco Dry			
P615	0,4 μ		1730		✓	6	7	ACCIAI TEMPRATI HARDENED STEEL
PP35	1-2 μ		1400	✓	✓	8	7	ACCIAI STEEL
PM40	1 μ		1380	✓	✓	9	8	ACCIAI INOSSIDABILI STAINLESS STEEL
C535	2 μ		1330		✓	5	7	ACCIAI INOSSIDABILI E LEGHE RESISTENTI AL CALORE STAINLESS STEEL AND HEAT RES. ALLOYS
C540	2 μ		1330	✓	✓	7	7	TITANIO E LEGHE RESISTENTI AL CALORE TITANIUM AND HEAT RES. ALLOYS

Materiale Material			Resistenza Mechanical Strength (N/mm²)	GR	PP35 / P135		PM40 / P235		P615		C535		C540	
					Secco Dry	Emul. Wet	Secco Dry	Emul. Wet	Secco Dry	Emul. Wet	Secco Dry	Emul. Wet	Secco Dry	Emul. Wet
					V _c (m/min)		V _c (m/min)		V _c (m/min)		V _c (m/min)		V _c (m/min)	
P	Acciai Steel	Non Legati Non-Alloy	600-800	1-2-3	300 / 160	190 / 140								
		Basso Legati Low-Alloy	800-1000	4-5-6	250 / 120	150 / 100								
		Medio Legati Medium-Alloy	1000-1200	7-9	200 / 100	140 / 80								
		Alto Legati High-Alloy	1200-1300	10	180 / 100	160 / 80								
			1400-1500	11	120 / 80	100 / 60			160 / 80					
M	Acciai Inox Stainless Steel	Martensitico Martensitic	700-800	12			300 / 150	180 / 120						
		Austenitico Austenitic	600-700	13			250 / 130	150 / 110					250 / 140	140 / 80
		Inox-Duplex Duplex	800-900	14			140 / 80				250 / 140		250 / 140	140 / 80
		Inox-Super Duplex Super Duplex	900-1100	14,1			110 / 60				200 / 120		200 / 100	
S	Super Leghe Heat Res. Alloy	Fe	600-900	31-32							85 / 45		80 / 45	
		Ni-Co	900-1000	34-35									70 / 45	
			1200	36									40 / 20	
		Leghe Titanio Titanium Alloy	α β	37									85 / 60	
H	Acciai Temprati Hardened Steel		45-50 Hrc	38					200 / 150					
			50-55 Hrc	39					150 / 100					
			> 55 Hrc	40					80 / 60					
K	Ghise Cast Iron		≤ 200 HB	15					250 / 150					

INSERTO BOOSTER PER SEMIFINITURA / BOOSTER INSERT FOR SEMI-FINISHING OPERATION

Materiale Material			Resistenza Mechanical Strength (N/mm²)	GR	V _c (m/min)	
					Secco Dry	Emul. Wet
					V _c (m/min)	
P	Acciai Steel	Basso Legati Low-Alloy	800-1000	4-5-6	250	-
		Medio Legati Medium-Alloy	1000-1200	7-9		
		Alto Legati High-Alloy	1200-1300	10	120	-
			1400-1500	11		
M	Acciai Inox Stainless Steel	Martensitico Martensitic	700-800	12	250	-
		Austenitico Austenitic	600-700	13		
		Inox-Duplex Duplex	800-900	14	140	-
		Inox-Super Duplex Super Duplex	900-1100	14,1		
H	Acciai Temprati Hardened Steel		< 55 Hrc	38	150	-
				39		
			> 55 Hrc	40	80	-



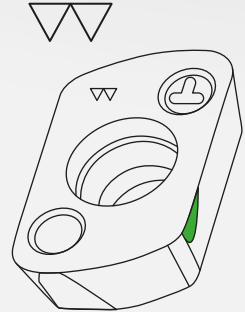
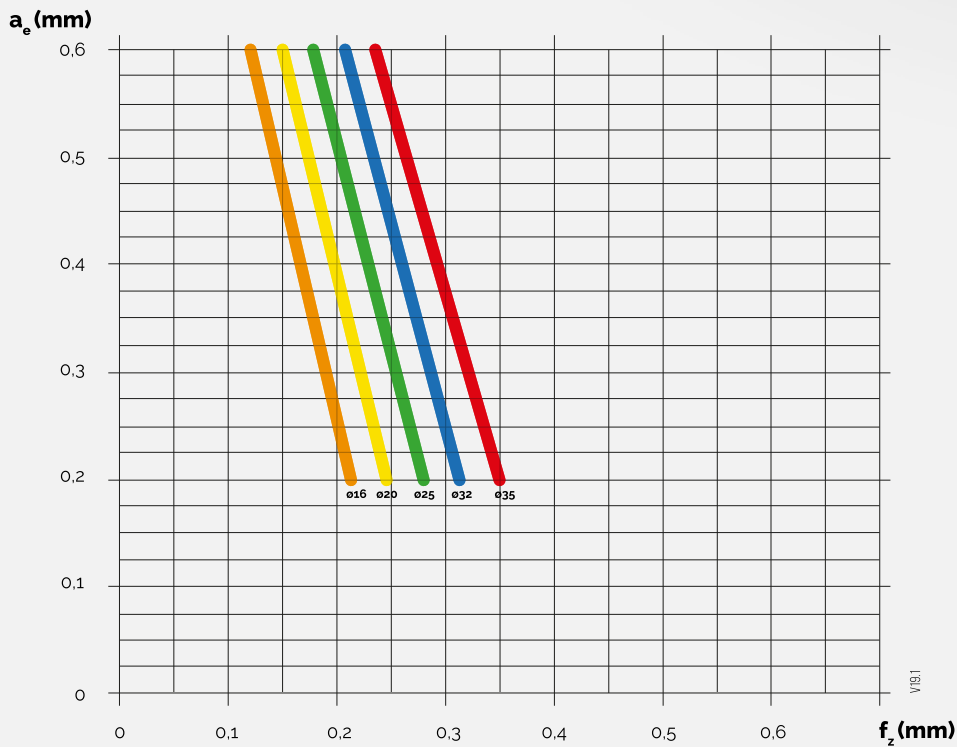
EPBW070315-TTW-P615



	Nome Name	GR	DIN	UNI	AISI /ASTM	N° Materiale N° Material	Note Notes
P	C 15	1	C 15	C 15		1,0401	
	15 CrMo5	6		15 CrMo5		1,7262	
	C45	3	C45	C45		1,0503	
	38NCD5	9		40NiCrMo6		1,6565	
	1,2311	9	40 CrMgMo 7	40 CrMgMo 7		1,2311	Bonificato Hardened and Tempered Steel
	1,2312	9					
	1,2714	9					
	1,2738	9		40 CrMnNi Mo 8 6 1		1,2738	
	1,2738 HH	11				1,2738 HH	Bonificato Hardened and Tempered Steel
	1,2343	11				1,2343	
	1,2344	11					
	1,2083 STAVAX	11					
	1,2365	11					
	1,2367	11					
	100Cr 6	9		100Cr6		1,2067	
	36 CrNiMo4	9		36 CrNiMo4		1,6511	
	21 NiCrMo2	9		21 NiCrMo2		1,6523	
	X100CrMoV5 1	11		X100CrMoV5 1		1,2363	Bonificato Hardened and Tempered Steel
	NIMAX	9				1,2738/P20	
	DAC MAGIC	9					
	W 300	11				1,2343	
	IMPAX	11					
	1,2080	10					
	K110	10				1,2379	
	K720	11				1,2842	
	K390	11					
	K890	11					
	M4-HSS	11			M4		
M	AISI 304	13		X 5Cr Ni 18 10	630	1,4301	
	304LN	14		XCrNiN	304LN	1	
	AISI 316L	13		X 2 Cr Ni Mo 17 12 2	316L	1,4404	
	FA6	13					
	AISI 420	12		X 30Cr 13	420	1,4028	
	AISI 904L	13		X1NiCrMoCu25 20 5	904L	1,4539	
	17-4PH	14					
	15-5PH	14					
	F53	14,1		X 2 Cr Ni Mo 25 7 4	F53	1,4410	
	F51	14					
	F44	14,1					
	F55	14,1					
S	NIMONIC 80 A	34				2,4631	
	MONEL K500	34				2,4375	
	INCONEL 625	35				2,4856	
	INCONEL 718	36				2,4668	
	INCONEL 718 INVECCHIATO / AGED	36				2,4668	Invecchiato /Aged
H	TITANIO / TITANIUM	37	TiAl6V4			3,7165	
	1,2738	38		40 CrMnNi Mo 8 6 1		1,2738	
	1,2738 HH	39				1,2738 HH	
	1,2343	38				1,2343	45 / 50
	1,2344	38					
	1,2083 STAVAX	40				1	
	1,2365	39					50 / 55
	1,2367	39					
	TOOLOX 33	39					33
	TOOLOX 44	39					44
	DAC MAGIC	39					48
	W 300	38				1,2343	45 / 50
	IMPAX	39					50 / 55
	1,2080	39					50 / 60
	K110	40				1,2379	
	K720	40				1,2842	
	K390	40					
	K890	40					
	M4-HSS	40			M4		
K	G25 GHISA / CAST IRON	15	GG25	G25		0,6025	

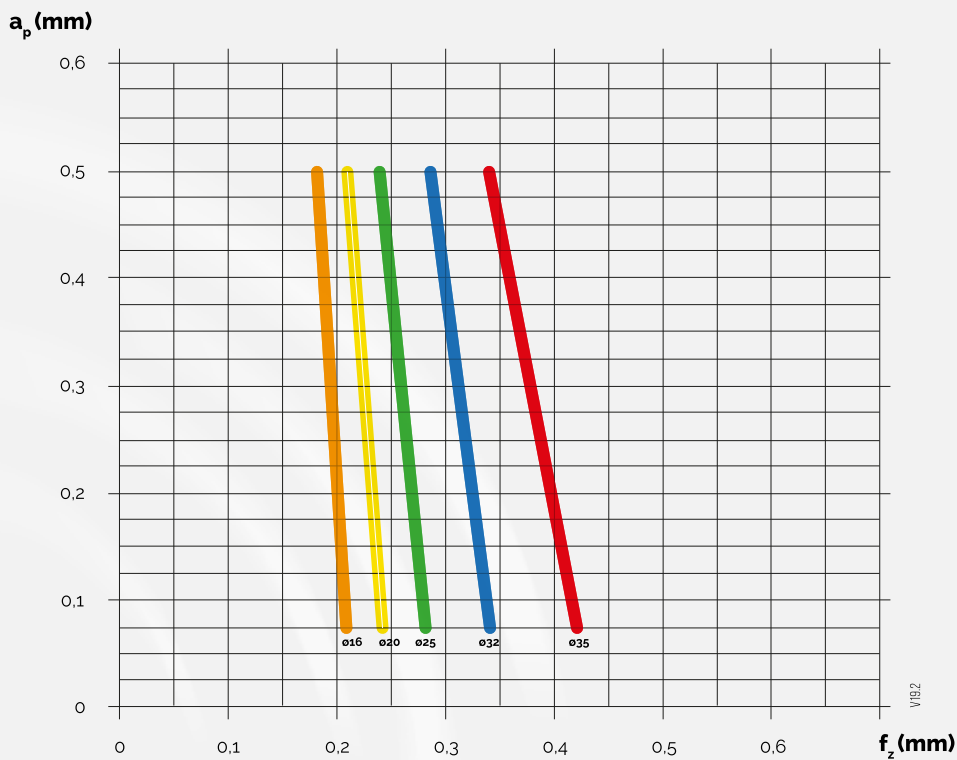


SPALLAMENTO DI SEMIFINITURA /SEMI-FINISHING SHOULDER



- Orange line: $D_1 16 / a_p = 2.00$ mm max
- Yellow line: $D_1 20 / a_p = 2.00$ mm max
- Green line: $D_1 25 / a_p = 2.00$ mm max
- Blue line: $D_1 32 / a_p = 2.00$ mm max
- Red line: $D_1 35 / a_p = 2.00$ mm max

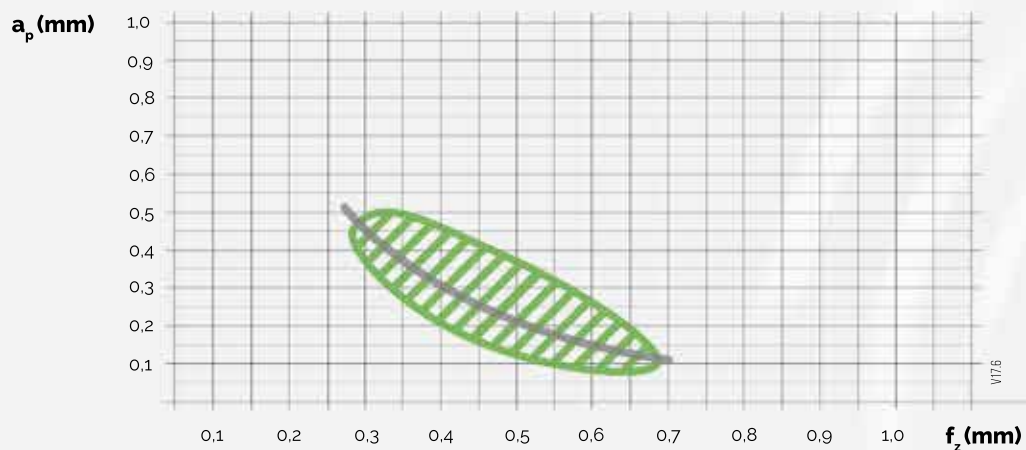
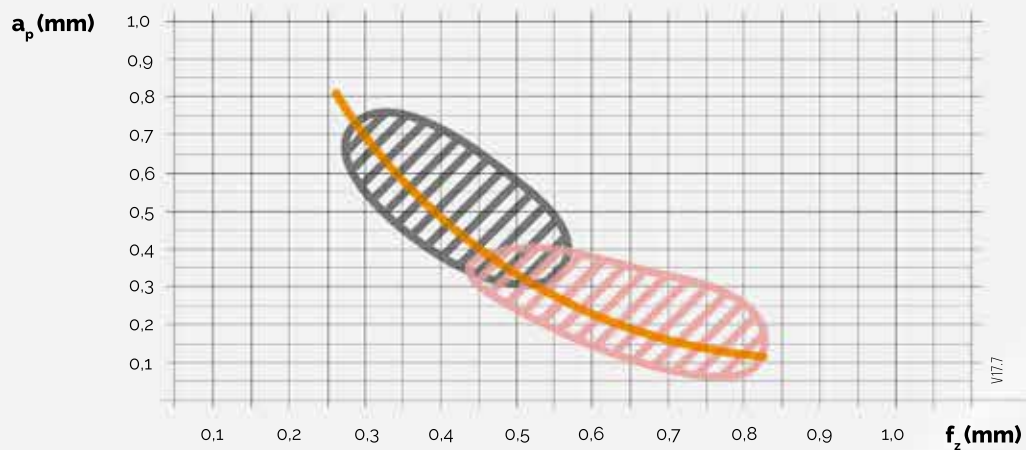
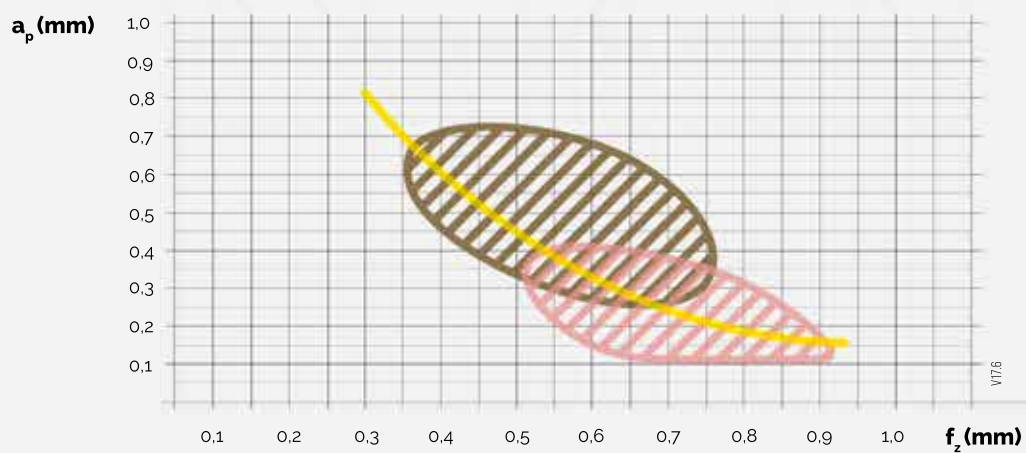
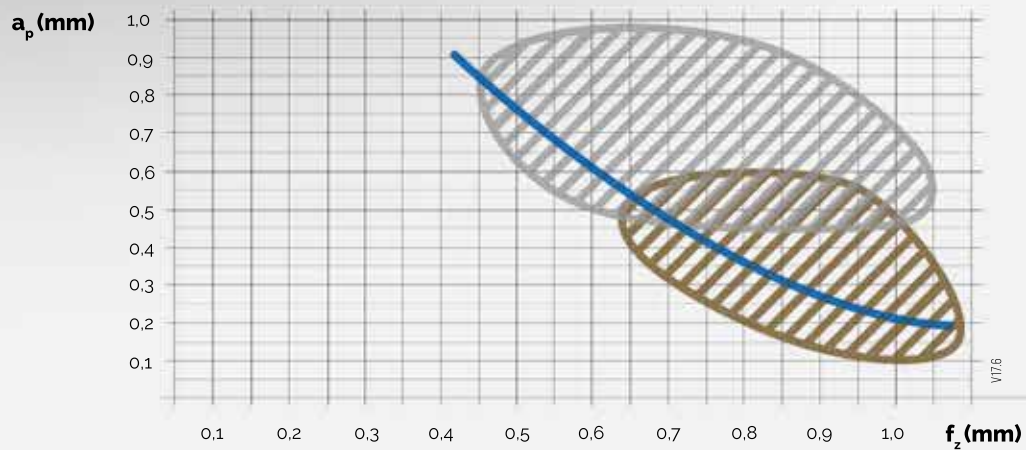
SPIANATURA DI SEMIFINITURA /SEMI-FINISHING FACING

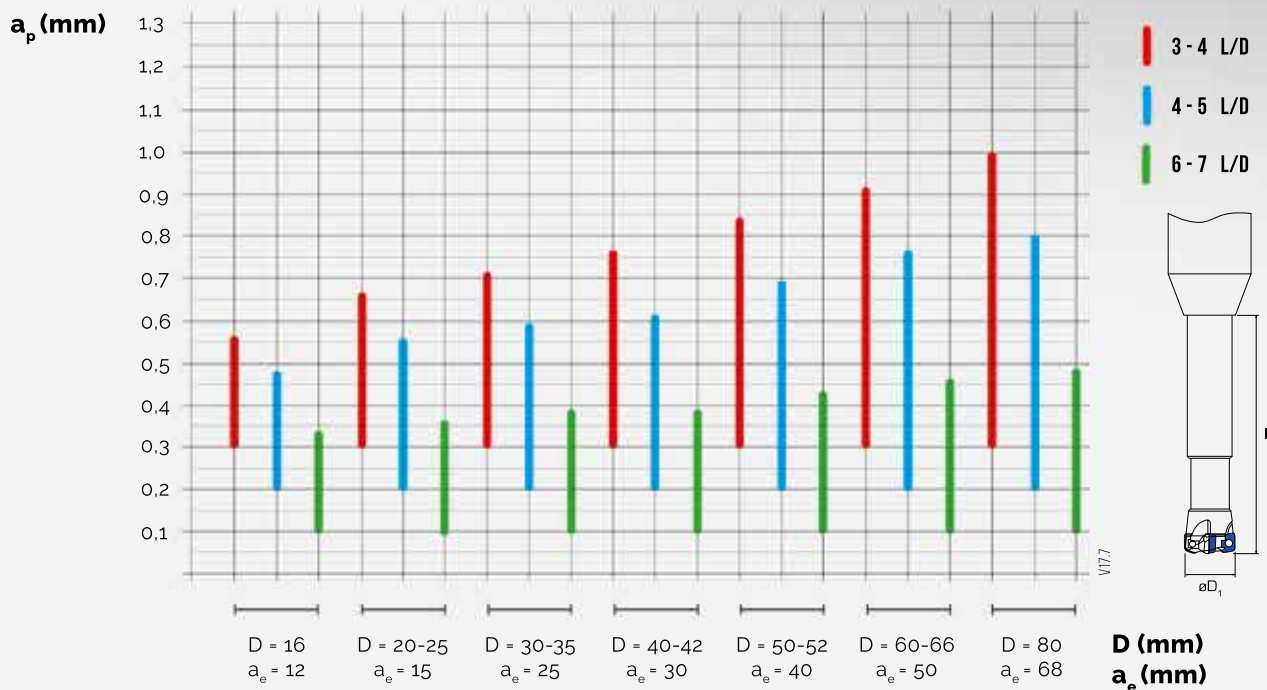


- Orange line: $D_1 = 16 / a_e = 6$ mm max
- Yellow line: $D_1 = 20 / a_e = 10$ mm max
- Green line: $D_1 = 25 / a_e = 15$ mm max
- Blue line: $D_1 = 32 / a_e = 22$ mm max
- Red line: $D_1 = 35 / a_e = 25$ mm max

PARAMETRI DI LAVORO CUTTING DATA

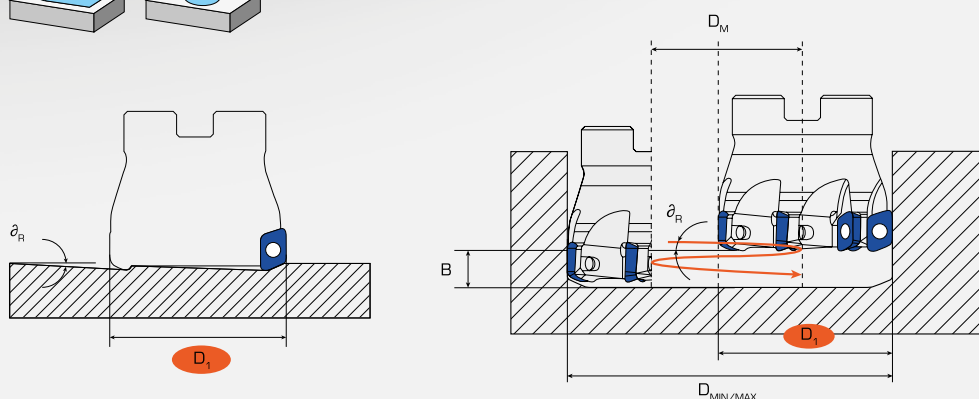
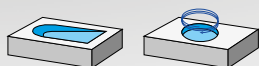
HFRM High Feed Remove Material





Formule Formula Collection	Tipi di usure Wear Type	
VELOCITÀ DI TAGLIO CUTTING SPEED (m/min) $V_c = \frac{D_1 \cdot \pi \cdot n}{1000}$		USURA DI CRATERIZZAZIONE SOLUZIONE: - IMPIEGARE QUALITÀ DI METALLO DURO PIÙ RESISTENTE ALL'USURA - RIDURRE LA VELOCITÀ DI TAGLIO CRATERING WEAR SOLUTION: - MUST BE USED CEMENTED CARBIDE GRADE WITH MORE WEAR RESISTANCE - REDUCE CUTTING SPEED
NUMERO DI GIRI DEL MANDRINO RPM (min ⁻¹) $n = \frac{V_c \cdot 1000}{D_1 \cdot \pi}$		SCHEGGIATURA ESTERNA SOLUZIONE: - RIDURRE LA PROFONDITÀ DI TAGLIO MANTENENDO COSTANTE L'AVANZAMENTO - ABBASSARE L'AVANZAMENTO MANTENENDO COSTANTE LA PROFONDITÀ DI TAGLIO EXTERNAL CHIPPING SOLUTION: - REDUCE DEEP OF CUT, MAINTAINING SAME FEED - REDUCE FEED, MAINTAINING SAME DEEP OF CUT
AVANZAMENTO FEED RATE (mm/min) $V_f = f_z \cdot n \cdot z$		USURA INTERNA SOLUZIONE: - AUMENTARE L'AVANZAMENTO TAGLIANTE INTERNAL WEAR SOLUTION: - MUST BE INCREASED FEED RATE
VOLUME TRUCIOLO PER UNITÀ DI TEMPO CHIP VOLUME (cm ³ /min) $Q = \frac{a_p \cdot a_e \cdot V_f}{1000}$		TAGLIANTE DI RIPOERTO SOLUZIONE: - AUMENTARE LA VELOCITÀ DI TAGLIO - IMPIEGARE QUALITÀ DI METALLO DURO CON RICOPERTURA ANTIFRIZIONE C540 BUILT UP EDGE SOLUTION: - MUST BE INCREASED CUTTING SPEED - MUST BE USED A CARBIDE GRADE WITH ANTIFRICTION COATING, C540
AVANZAMENTO AL DENTE FEED PER TOOTH (mm) $f_z = h_m \cdot \sqrt{\frac{D_1}{a_e}}$		MICRO FESSURAZIONI A PETTINE SOLUZIONE: - NON IMPIEGARE EMULSIONE MA ARIA PERPENDICULAR MICROCRACKS SOLUTION: - DO NOT USE COOLANT, USE AIR

PENETRAZIONE AD INTERPOLAZIONE ELICOIDALE ELICOIDAL RAMPING



$$B [mm] = D_M \times \pi \times \tan \alpha_R$$

D ₁		16	20	25	32	35	40 / 42	50 / 52	63 / 66	80
 EP07	D _{MIN}	20	28	38	52	58	68	92	120	140
	D _{MAX}	30	38	48	62	68	85	102	130	160
	α _R [°]	2	2	2	2	2	1,5	1,5	1	0,5

Note / Notes

α_R valore massimo consentito. / α_R maximum value allowed.

APPROCCI E METODI DI LAVORAZIONE HOW TO APPROACH

SI RACCOMANDA / IT IS RECOMMENDED

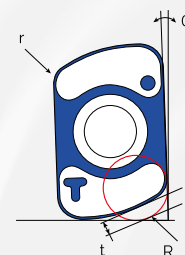
- INGRESSO E USCITA CON V_f RIDOTTA 50%**
COMPONENT APPROACH, REDUCE FEED 50%
- LAVORAZIONE CONCORDE**
UP MILLING MACHINING
- INSERIRE RACCORDI XY RAGGIATI**
USE SMOOTHING MILLING
- UTILIZZO ARIA O EMULSIONE INTERNA**
USE INTERNAL COOLING OR AIR
- QUANDO SI LAVORA TITANIO, DUPLEX, SUPER-DUPLEX USARE % OLIO ≥ 10%**
WHILE WORKING TITANIUM, DUPLEX, SUPER DUPLEX MUST USE % OF OIL ≥ 10 %

PROGRAMMAZIONE CAM CAM PROGRAM

NELLA PROGRAMMAZIONE CAM IL RAGGIO TEORICO DOVREBBE ESSERE IMPOSTATO R = 2,0 mm
SE VIENE IMPOSTATO UN RAGGIO MAGGIORE SI VERIFICHERÀ UN'ASPORTAZIONE DI MATERIALE IN ECCESSO.

IN PROGRAMMING CAM THE THEORETICAL RADIUS MUST BE R = 2,0 mm.
IF BY MISTAKE YOU USE A BIGGER RADIUS YOU WILL HAVE A HIGHER CHIP REMOVAL.

r	R	t	α
1,2	2	0,69	2°



R = raggio di programmazione
program radius



NOTE NOTES

A series of horizontal lines for taking notes, spanning the width of the page below the 'NOTE NOTES' header.

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tte srl Via Trebbia, 41/A - 23868 Valmadrera (Lecco) - Tel. +39 0341 207108 - Fax. +39 0341 202940

E-mail: info@ttetec.it - www.ttetec.eu