tte
technical tools and equipment

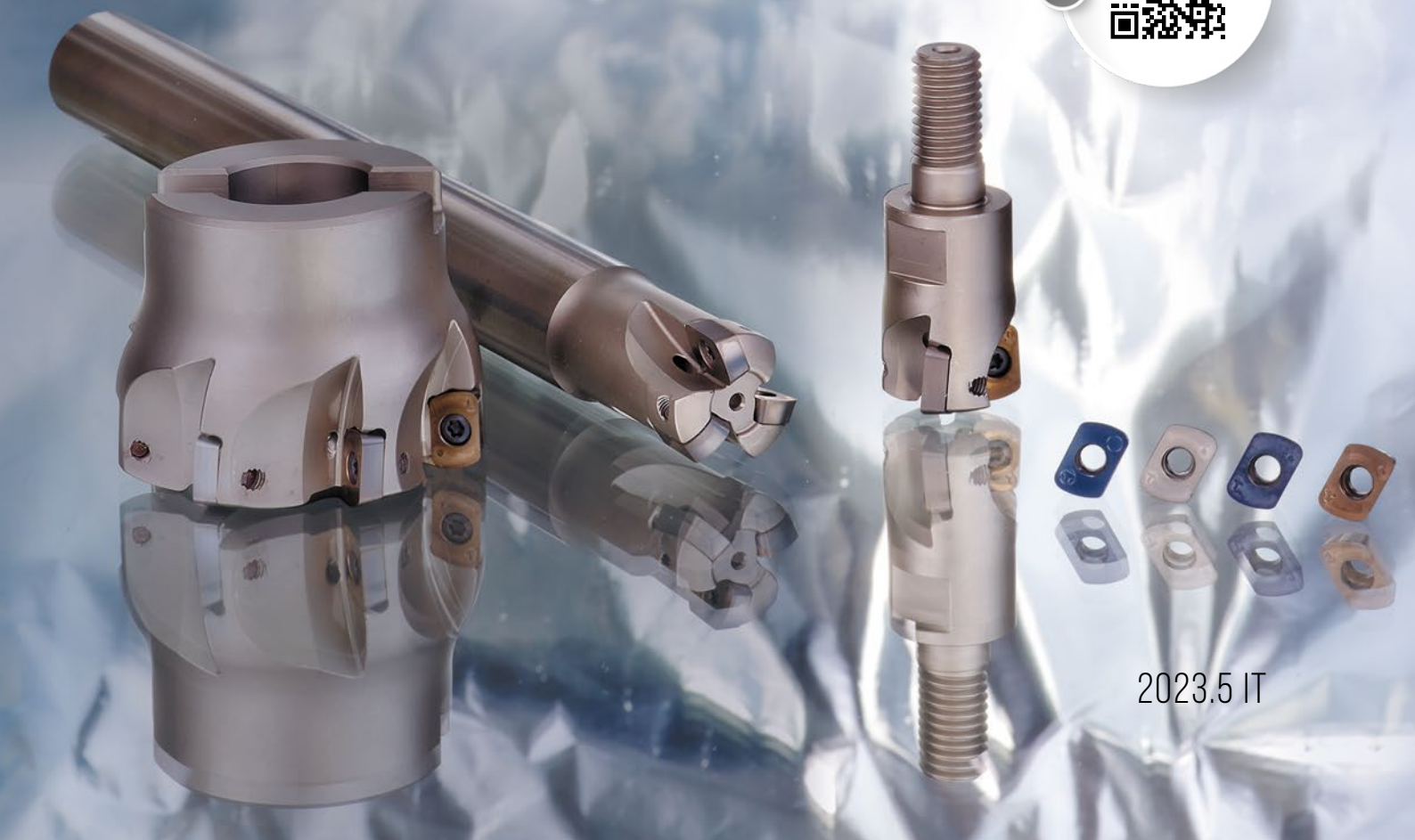
SVILUPPATO
& PROGETTATO
IN ITALIA

NEW 2023

MINI BOOSTER & BOOSTER

HFRM HIGH FEED REMOVE MATERIAL

WWW.TTETEC.EU



2023.5 IT

MINI BOOSTER NEW

HFRM High Feed Remove Material

LA NOSTRA PROPOSTA PER LA SGROSSATURA DI ACCIAI, ACCIAI INOSSIDABILI E SUPER LEGHE.

AFFIDABILE

RENDE **STABILE** LA LAVORAZIONE DI SGROSSATURA.

NON CI SONO ROTTURE IMPREVISTE ANCHE A FORTI AVANZAMENTI.

BASSE FORZE DI TAGLIO

FORZE RIDOTTE SUL PEZZO.

BASSE VIBRAZIONI.

LAVORA PEZZI CON **STAFFAGGIO PRECARIO**.

BASSA RUMOROSITÀ.

GEOMETRIA DI TAGLIO INNOVATIVA

ROMPITRUCIOLI A **GEOMETRIA VARIABILE**.

DIVERSI ROMPITRUCIOLI/DUREZZE PER LAVORARE SEMPRE IN CONDIZIONI DI **SICUREZZA**.

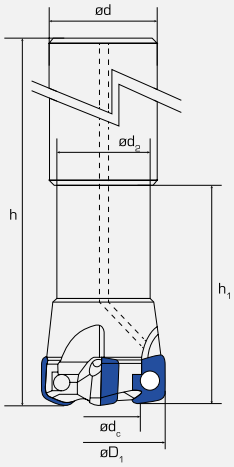
USURA DELL'INSERTO **CONTROLLATA E OMOGENEA**.

ELEVATI STANDARD QUALITATIVI PER GARANTIRE LA **MASSIMA PRODUTTIVITÀ**.

CORPO FRESA MILLING BODY C300C / ATTACCO CILINDRICO TIPO C / ENDMILL TYPE C

FRESA AD ALTO AVANZAMENTO HIGH FEED CUTTING

Cod.	ød$_c$	øD$_1$	h	ød	ød$_2$	h$_1$	z
C300C-10R02-04	8	10	150	10	9	25	2
C300C-12R03-04	10	12	150	12	11	25	3
C300C-14R03-04	12	14	150	14	13	25	3
C300C-16R04-04	14	16	150	16	15	25	4
C300C-18R04-04	16	18	150	18	17	25	4
C300C-20R05-04	18	20	150	20	19	25	5



Esempio d'ordine How to order
C300C-16R04-04

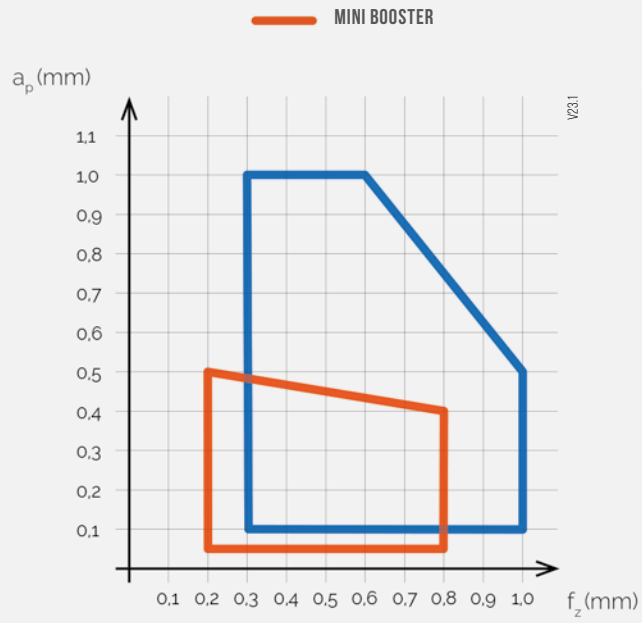
PARTI DI RICAMBIO SPARE PARTS

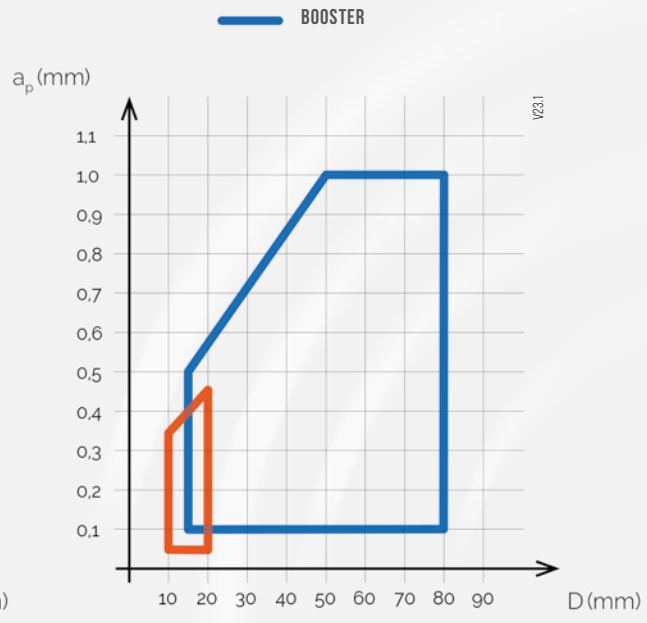
FORZA SERRAGGIO / TIGHTENING FORCE **1 Nm**

Cod.	M	l	N$_m$
V0180420	1,8	4,2	1

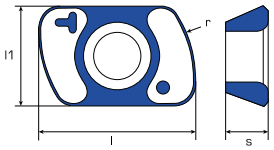
Esempio d'ordine How to order
V0180420

CAMPI APPLICATIVI MINI BOOSTER E BOOSTER





INSERTO INSERT EPMT



Cod.	l	s	r	l_1	P Acciai Steel	H Acciai Temprati Hardened Steel	M Acciai Inox Stainless Steel	K Ghise Cast Iron	S Super Leghe Heat Res.Alloys
New EPMT-040215-XTM	6,8	2,6	1,5	4,2					C540
New EPMT-040215-HTM	6,8	2,6	1,5	4,2	PP35				
New EPMT-040215-ST	6,8	2,6	1,5	4,2			PM40		
New EPMW-040215-TT	6,8	2,6	1,5	4,2		P615			

Esempio d'ordine How to order
EPMW-040215-TT P615

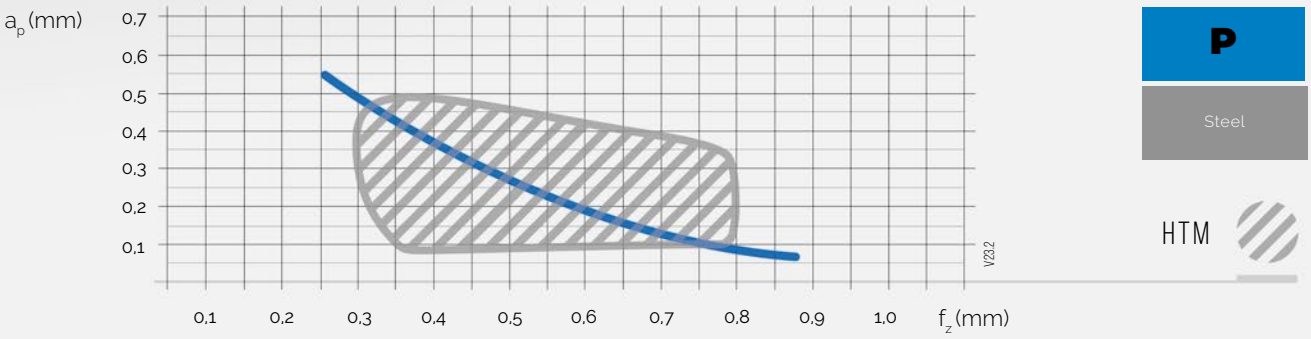
GEOMETRIA / GEOMETRY

TT		HTM		ST		XT	
H	Acciai Temprati Hardened Steel	P	Acciai Steel	P	Acciai Steel	S	Super Leghe Heat Res.Alloys
				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	Scala da 1 a 10 Standard from 1 to 10		
PP35	1-2 µ	PDV	1400	✓	✓	8	7	ACCIAI STEEL
PM40	1 µ		1380	✓	✓	9	8	ACCIAI INOSSIDABILI STAINLESS STEEL
C540	2 µ	CVD	1330	✓	✓	7	7	TITANIO E LEGHE RESISTENTI AL CALORE TITANIUM AND HEAT RES. ALLOYS
P615	0,4 µ	PDV	1730		✓	6	7	ACCIAI TEMPRATI HARDENED STEEL

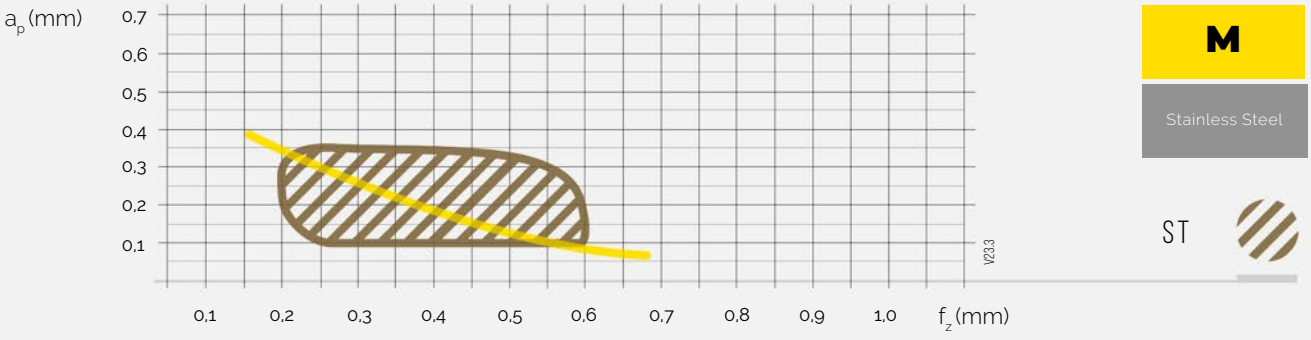
PARAMETRI DI LAVORO CUTTING DATA



P

Steel

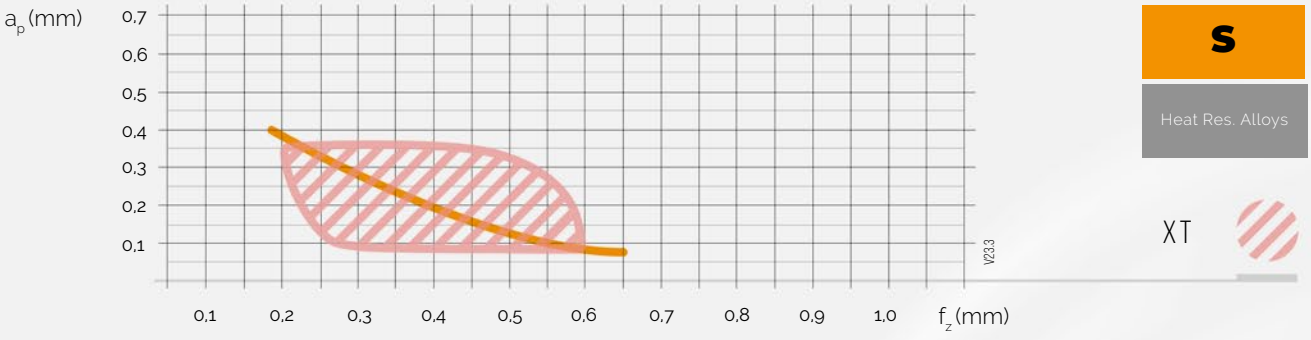
HTM



M

Stainless Steel

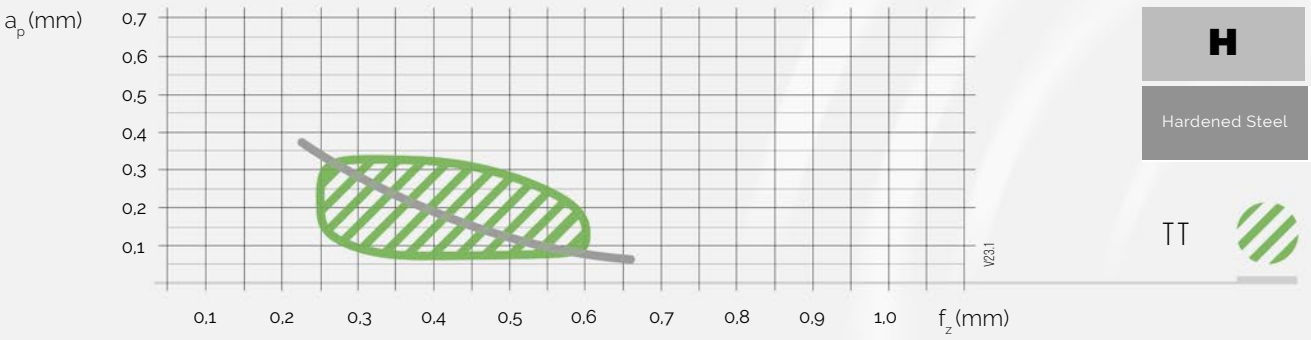
ST



S

Heat Res. Alloys

XT



H

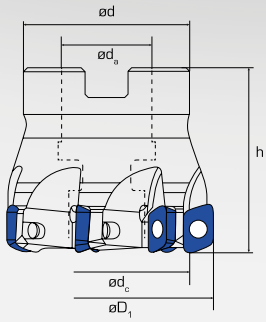
Hardened Steel

TT

CORPO FRESA MILLING BODY **C300A** / ATTACCO A MANICOTTO TIPO A / FACE MILL TYPE A

FRESA AD ALTO AVANZAMENTO HIGH FEED CUTTING

Cod.	$ød_c$	$øD_1$	h	ød	$ød_a$	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

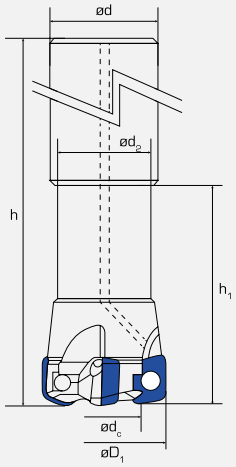


Esempio d'ordine How to order
C300A-40R06-07

CORPO FRESA MILLING BODY **C300C** / ATTACCO CILINDRICO TIPO C / ENDMILL TYPE C

FRESA AD ALTO AVANZAMENTO HIGH FEED CUTTING

Cod.	$ød_c$	$øD_1$	h	ød	$ød_2$	h_1	z
C300C-16R02-07	5	16	160	16	14	30	2
C300C-20R03-07	9	20	200	20	18	32	3
New C300C-25R03-07	14	25	200	25	23	40	3
C300C-25R04-07	14	25	200	25	23	40	4
New C300C-32R04-07	21	32	250	32	30	51	4
C300C-32R05-07	21	32	250	32	30	51	5

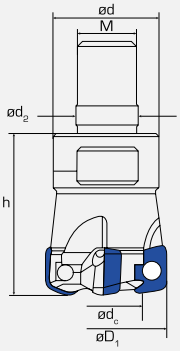


Esempio d'ordine How to order
C300C-16R02-07

CORPO FRESA MILLING BODY **C300G** / ATTACCO FILETTATO TIPO G / THREAD CUTTER TYPE G

FRESA AD ALTO AVANZAMENTO HIGH FEED CUTTING

Cod.	$ød_c$	$øD_1$	h	ød	$ød_2$	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

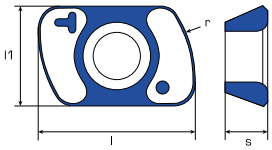
PARTI DI RICAMBIO SPARE PARTS

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

INSERTO INSERT EPHW / EPHT



Cod.	l	s	r	l_1	P Acciai Steel	H Acciai Temprati Hardened Steel	M Acciai Inox Stainless Steel	K Ghise Cast Iron	S Super Leghe Heat Res.Alloys
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		PM40		
EPHT-070315-XT	11	3,35	8,5	7			C535		C535
							C540		C540
EPHT-070315-HTM	11	3,35	8,5	7	PP35				
EPHT-070315-XTM	11	3,35	8,5	7			C540		C540
New EPMT-070315-ST	11	3,35	8,5	7	PP35				

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

GEOMETRIA / GEOMETRY

H	Acciai Temprati Hardened Steel	P	Acciai Steel	P	Acciai Steel	S	Super Leghe Heat Res.Alloys
				M	Acciai Inox Stainless Steel	M	Acciai Inox Stainless Steel

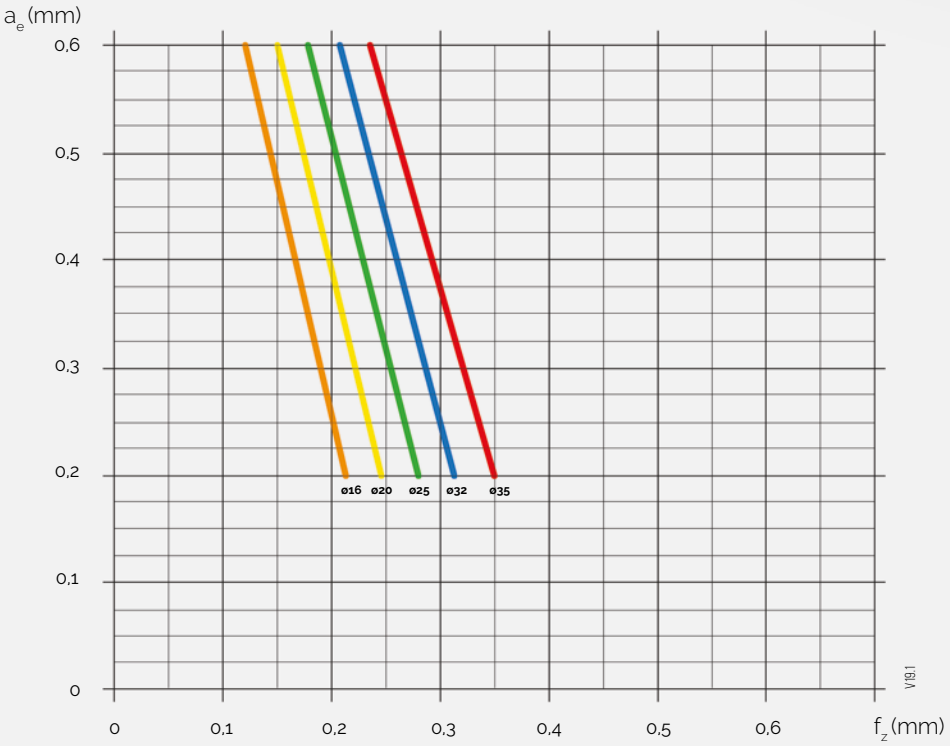
S	Super Leghe Heat Res.Alloys		

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	Scala da 1 a 10 Standard from 1 to 10		
P615	0,4 µ		1730		✓	6	7	ACCIAI TEMPRATI HARDENED STEEL
PP35	1-2 µ	PDV	1400	✓	✓	8	7	ACCIAI STEEL
PM40	1 µ		1380	✓	✓	9	8	ACCIAI INOSSIDABILI STAINLESS STEEL
C535	2 µ	CVD	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

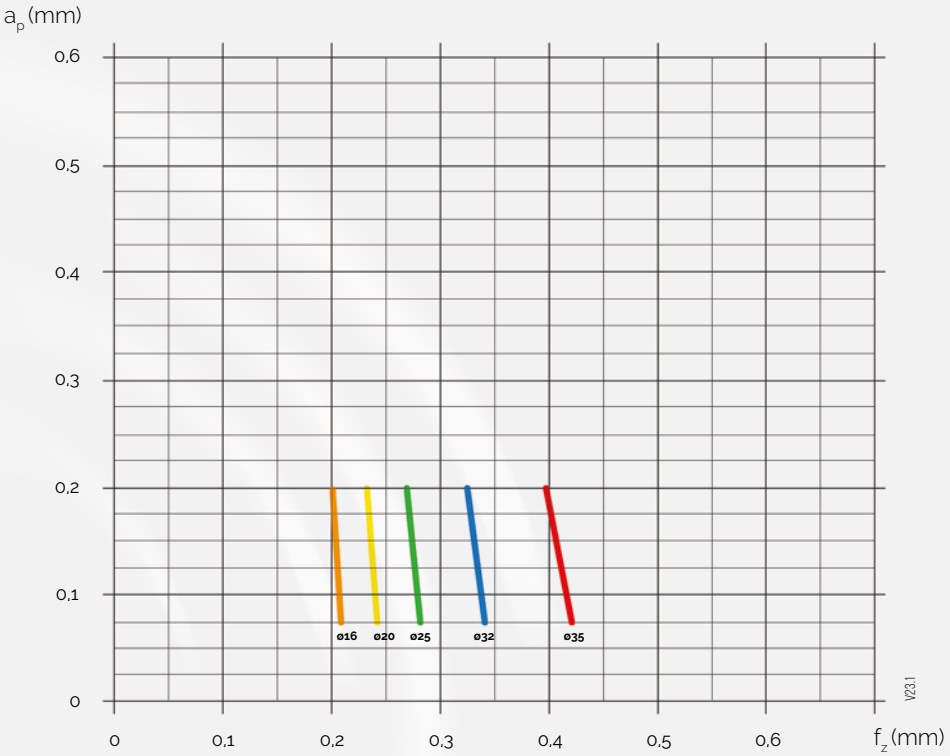
PARAMETRI DI LAVORO CUTTING DATA

SPALLAMENTO DI SEMIFINITURA / SEMI-FINISHING SHOULDER

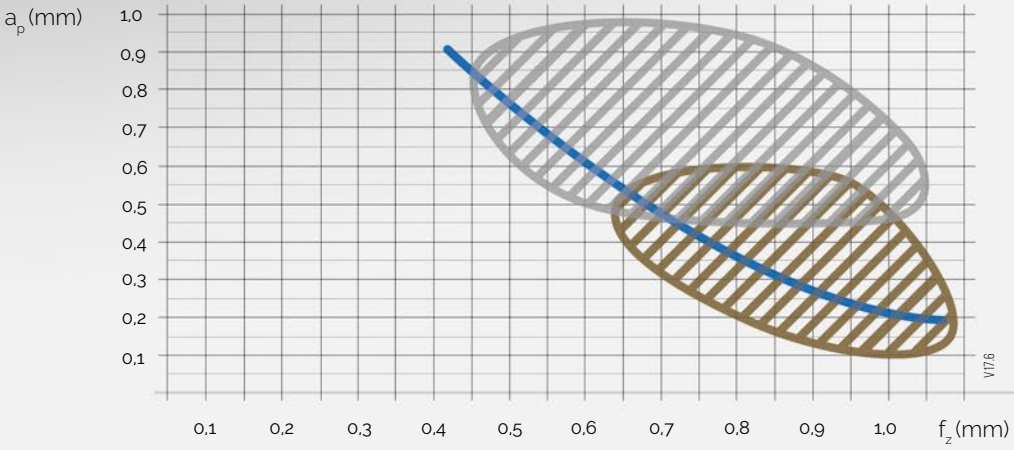


- D_1 16 / a_p = 2,00 mm max
- D_1 20 / a_p = 2,00 mm max
- D_1 25 / a_p = 2,00 mm max
- D_1 32 / a_p = 2,00 mm max
- D_1 35 / a_p = 2,00 mm max

SPIANATURA DI SEMIFINITURA / SEMI-FINISHING FACING



- D_1 = 16 / a_e = 6 mm max
- D_1 = 20 / a_e = 10 mm max
- D_1 = 25 / a_e = 15 mm max
- D_1 = 32 / a_e = 22 mm max
- D_1 = 35 / a_e = 25 mm max

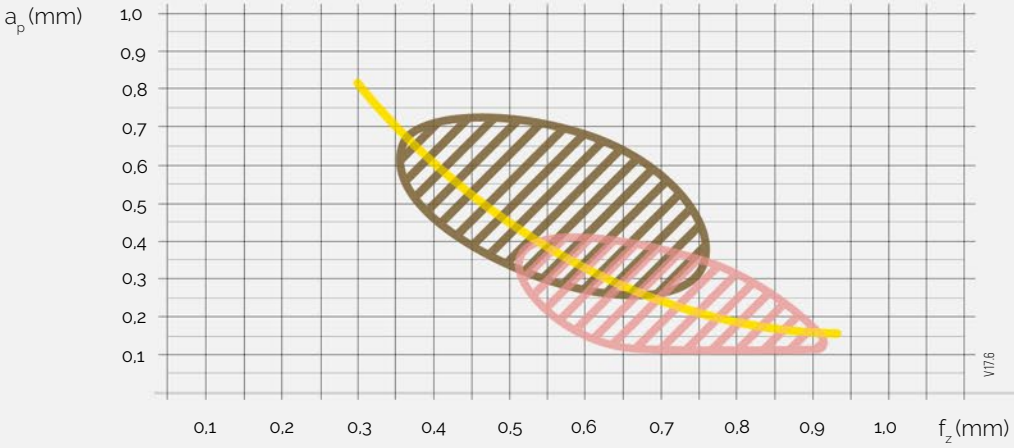


P

Steel

HTM

ST

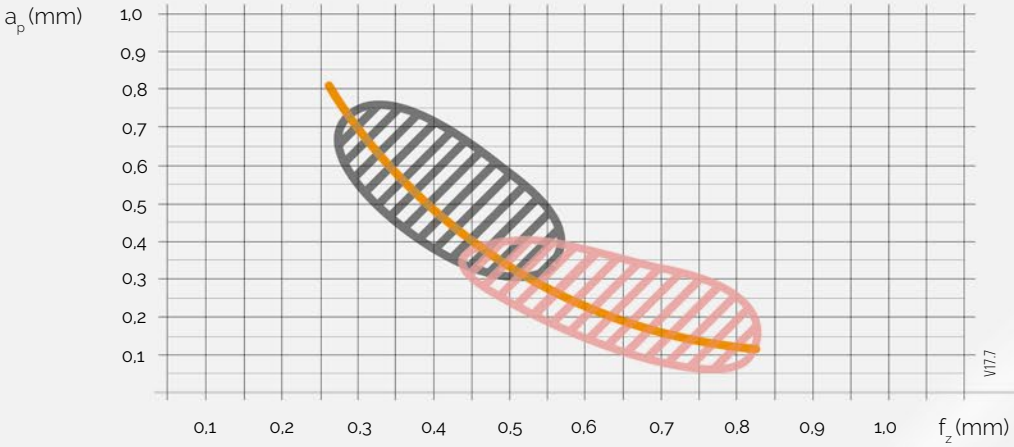


M

Stainless Steel

ST

XT

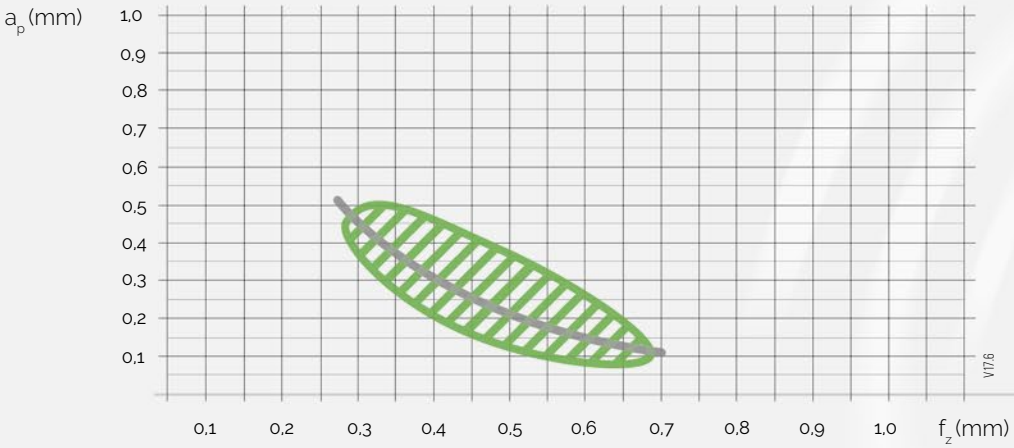


S

Heat Res. Alloys

XTM

XT



H

Hardened Steel

TT

Materiale Material			Resistenza Mechanical Strength (N/mm²)	GR	PP35		PM40		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	120	-
		Alto Legati High-Alloy	1200-1300	10		
			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	-

EPHW070315-TTW-P615

RIMANI AGGIORNATO CON PIÙ INFO
GET LATEST INFO TECH ON THIS PRODUCT

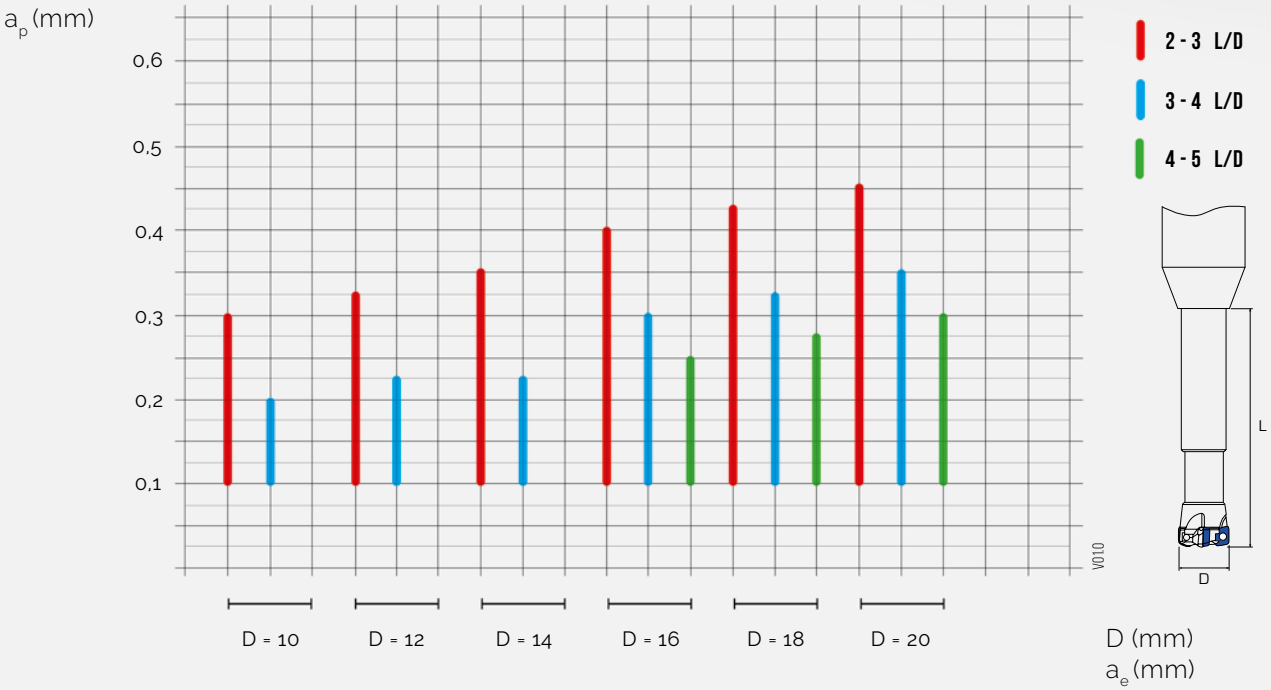
	Nome / Name	GR	DIN	UNI	AISI / ASTM	N° Materiale / N° Material	Note / Notes
P	C 15	1	C 15	C 15		1,0401	
	15 CrMo5	6		15 CrMo5		1,7262	
	C45	3	C45	C45		1,0503	
	38NCD5	9		40NiCrMo6		1,6565	**Bonificato** Hardened and Tempered Steel
	1,2311	9	40 CrMgMo 7	40 CrMgMo 7		1,2311	
	1,2312	9					
	1,2714	9					
	1,2738	9		40 CrMnNi Mo 8 6 1		1,2738	**Bonificato** Hardened and Tempered Steel
	1,2738 HH	11				1,2738 HH	
	1,2343	11				1,2343	
	1,2344	11					
	1,2083 STAVAX	11					
	1,2365	11					
	1,2367	11					
	100Cr 6	9		100Cr6		1,2067	**Bonificato** Hardened and Tempered Steel
	36 CrNiMo4	9		36 CrNiMo4		1,6511	
	21 NiCrMo2	9		21 NiCrMo2		1,6523	
	X100CrMoV5 1	11		X100CrMoV5 1		1,2363	
	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
	TITANIO / TITANIUM	37	TiAl6V4			3,7165	
H	1,2738	38		40 CrMnNi Mo 8 6 1		1,2738	**Temprato Hrc** Hardened Steel Hrc — 45 / 50
	1,2738 HH	39				1,2738 HH	
	1,2343	38				1,2343	
	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					58 / 63
	K890	40					
	M4-HSS	40			M4		
K	G25 GHISA / CAST IRON	15	GG25	G25		0,6025	

ELENCO COMPLETO MATERIALI/GRUPPI
GO TO COMPLETE LIST OF MATERIALS TO WORK

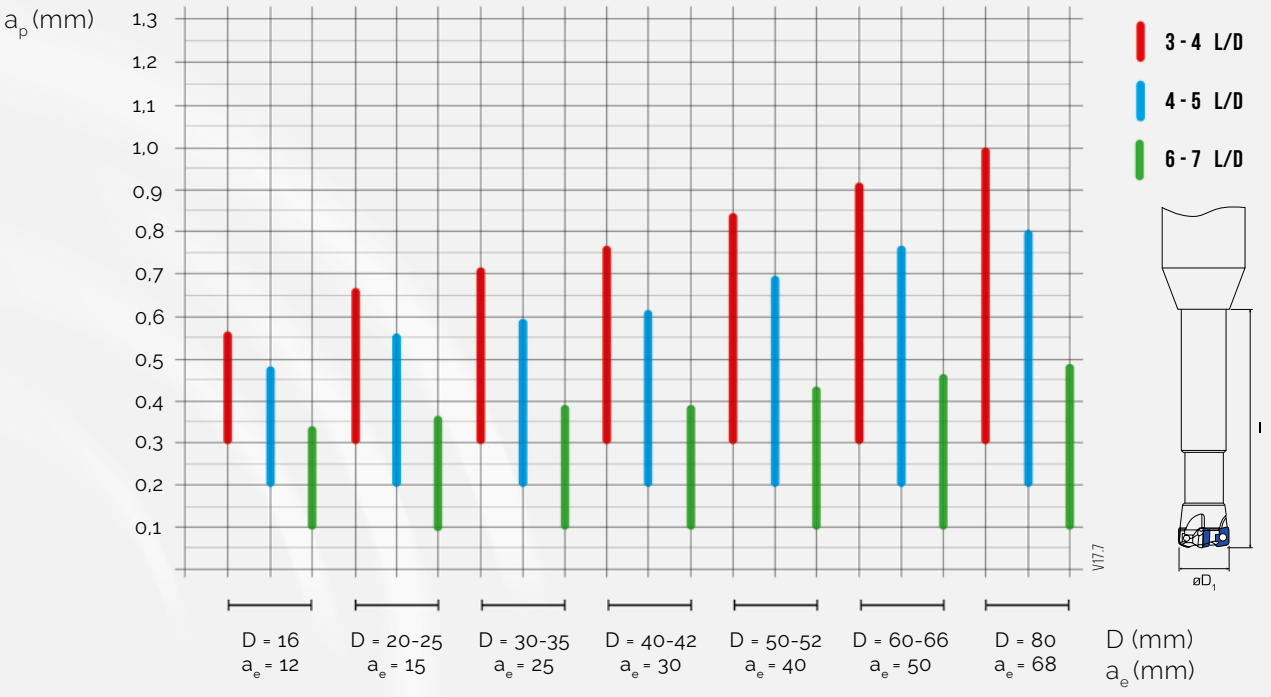
CORREZIONE a_p IN FUNZIONE DELLA SPORGENZA UTENSILE L/D

CORREZIONE a_p IN FUNZIONE DELLA SPORGENZA UTENSILE L/D

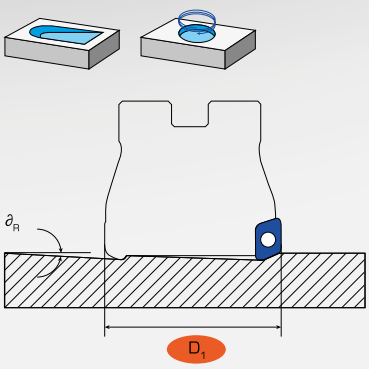
EP 04

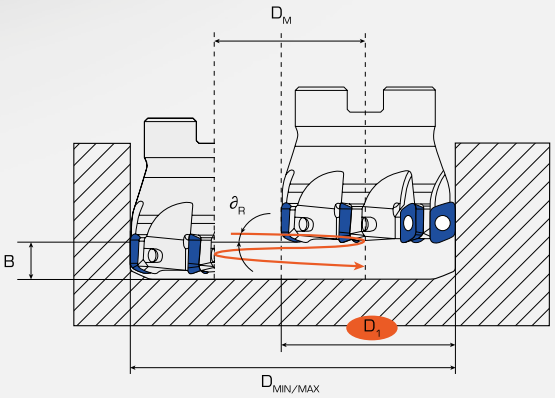


EP 07



PENETRAZIONE AD INTERPOLAZIONE ELICOIDALE ELICOIDAL RAMPING





$$B\,[mm] = D_M \times \pi \times \tan \partial_R$$

D_1		10	12	14	16	18	20			
EP 04	D_{MIN}	15	19	21	27	28	35			
	D_{MAX}	18	22	24	30	32	38			
	∂_R [°]	2	1	1	0,7	0,7	0,7			

D_1		16	20	25	32	35	40/42	50/52	63/66	80
EP 07	D_{MIN}	20	28	38	52	58	68	92	120	140
	D_{MAX}	30	38	48	62	68	85	102	130	160
	∂_R [°]	2	2	2	2	2	1,5	1,5	1	0,5

Note / Notes

∂_R valore massimo consentito. / ∂_R maximum value allowed.

APPROCCI E METODI DI LAVORAZIONE HOW TO APPROACH

SI RACCOMNADA / IT IS RECOMMENDED

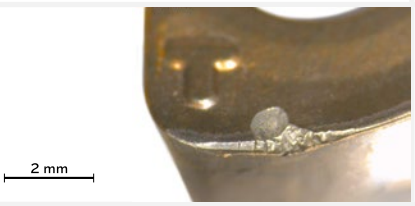
1. **INGRESSO E USCITA CON V_f RIDOTTA 50%**
   COMPONENT APPROACH, REDUCE FEED 50%
2. **LAVORAZIONE CONCORDE**
   UP MILLING MACHINING
3. **INSERIRE RACCORDI XY RAGGIATI**
   USE SMOOTHING MILLING
4. **UTILIZZO ARIA O EMULSIONE INTERNA**
   USE INTERNAL COOLING OR AIR
5. **QUANDO SI LAVORA TITANIO, 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
EP 04	0,8	1	0,16	2°
EP 07	1,2	2	0,69	2°

R = raggio di programmazione
program radius

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 TAGLIENTE **INTERNAL WEAR** SOLUTION: - MUST BE INCREASED FEED RATE
VOLUME TRUCIOLO PER UNITÀ DI TEMPO CHIP VOLUME (cm^3/min) $Q = \frac{a_p \cdot a_e \cdot V_f}{1000}$	 **TAGLIENTE DI RIPORTO** 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

NOTE NOTES

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