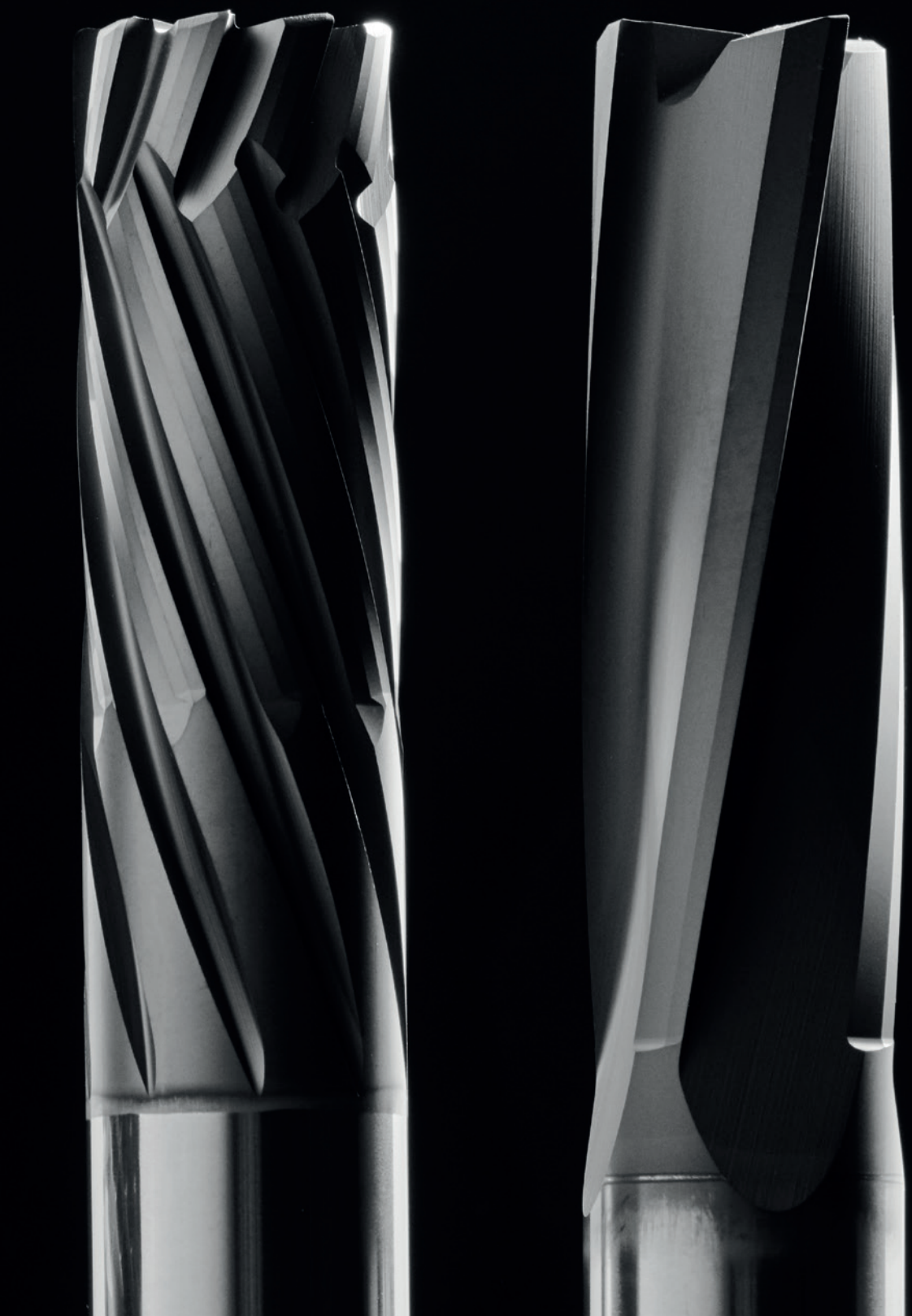
Materiali Compositi
Composite Materials



31
UNV
Universali
Universal Line

53
HPC
Alto Rendimento
High Performance

75
HRC
Stampi
Molds

113
TIS
Titainox e Superleghe
Titainox & Superalloys

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ALU
Leghe Leggere
Light Alloys

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CMP
Materiali Compositi
Composite Materials

Materiali Compositi
Composite Materials

Per maggiori informazioni scarica la brochure digitale.

For further information download the digital brochure.

silmax.it/cmp

Materiale polimerico rinforzato con fibre di carbonio

Dal punto di vista strutturale, il materiale composito è caratterizzato da proprietà meccaniche elevatissime (resistenza alla corrosione, isolamento termico e buone proprietà ignifughe). Per contro, la struttura interna risulta non-omogenea e di difficile lavorabilità.

Polymeric material reinforced with fiberglass

From a structural point of view, this material is characterised by very high mechanical qualities (corrosion-resistance, thermal isolation and good fireproof properties). On the contrary, the internal structure is not consistent and of difficult machinability.

Materiale polimerico rinforzato con fibra di vetro (comunemente chiamato Fiberglass)

Dal punto di vista strutturale, il materiale è caratterizzato da elevate proprietà meccaniche come resistenza, flessione e di impermeabilità. Il materiale viene impiegato nella costruzione di aerei ultraleggeri e scafi di piccole imbarcazioni.

Polymeric material reinforced with fiberglass (commonly called Fiberglass)

From a structural point of view, this material is characterised by high mechanical qualities, such as resistance, flexibility and impermeability. This material is employed in the construction of ultra-light airplanes and hulls of small boats.

Materiale polimerico rinforzato con fibra aramidica (Kevlar)

La fibra di Kevlar è una fibra sintetica aramidica che ha come caratteristica principale l'alta resistenza meccanica alla trazione. Per le sue caratteristiche di resistenza viene utilizzata come fibra di rinforzo per la costruzione di giubbotti antiproiettile, di attrezzature per gli sport estremi e per componenti usati in aeromobili, imbarcazioni e vetture da competizione

Polymeric material reinforced with aramid fiber (Kevlar)

Kevlar fiber is a synthetic aramid fiber, having high mechanical tensile strength as its main feature. Due to its characteristics of resistance, it is used as a reinforcing fiber for the production of bulletproof jackets, equipment for extreme sports and components used in aircrafts, watercrafts and racing vehicles.

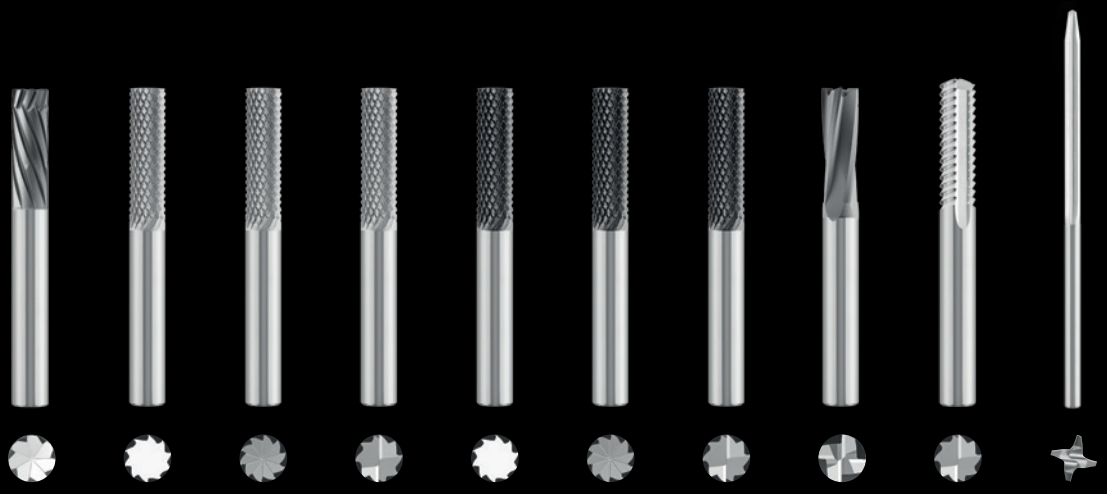
SIL SERVICE

L'esperienza Silmax dimostra che un utensile correttamente affilato ha un rendimento uguale a quello nuovo.

Silmax experience shows that a properly sharpened tool grants the same performances of a new tool.

- Riaffilatura e rigenerazione / Resharpening and Reconditioning
- Esecuzione perfetta / Perfect Execution
- Rivestimento PVD / PVD Coating
- Trattamento 4S / 4S Treatment
- Consegna rapida / Fast Delivery

Scelta dell'utensile
Cutting tool selection



	HMD 740	HM0 750	HM0 751	HM0 752	HMD 750	HMD 751	HMD 752	HMD 760	HM0 770	HM0 780
Tipo utensile Cutting Tool Type	Cr	90°	90°	90°	90°	90°	90°	Cr	90°	
Dimensioni Dimensions	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
	inch	inch	inch	inch	inch	inch	inch	inch	inch	inch
Diamante Diamond	●	-	-	-	●	●	●	●	-	-
Uncoated Non rivestito	-	●	●	●	-	-	-	-	●	●
Tipo di lavorazione Application										-
	-	-	-	-	-	-	-	-		
										-
CFRP — CFRP	●	○	○	○	●	●	●	●	-	●
CFRP — CFRP Sandwich (Al)	●	○	○	○	●	●	●	●	-	●
CFRP — CFRP Sandwich (Ti)	●	○	○	○	●	●	●	-	-	●
CFRP — CFRP Honeycomb	-	○	○	○	○	○	○	●	●	●
AFRP — Kevlar	-	-	-	-	-	-	-	-	●	●
GFRP — GRP	●	○	○	○	●	●	●	●	-	●
GFRP — GRP Sandwich (Al)	●	○	○	○	●	●	●	●	-	●
GFRP — GRP Sandwich (Ti)	●	○	○	○	●	●	●	-	-	●
GFRP — GRP Honeycomb	-	○	○	○	○	○	○	-	●	●

● Scelta consigliata / Recommended choice ○ Alternativa / Alternative

31 UNV Universali Universal Line
53 HPC Alto Rendimento High Performance
75 HRC Stampi Molds
113 TIS Titainox e Superleghe Titainox & Superalloys
137 ALU Leghe Leggere Light Alloys
155 CMP Materiali Compositi Composite Materials

Caratteristiche Geometriche

La geometria a tagli incrociati determina forze di taglio dirette verso l'interno del pannello, eliminando il fenomeno della delaminazione su entrambi i lati.

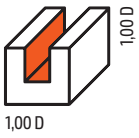
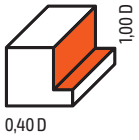
Geometrical Features

Its cross-cut geometry generates cutting forces directed to the inside of the panel, thus preventing delamination on both sides.

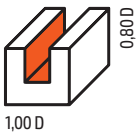
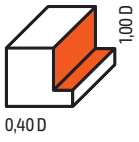
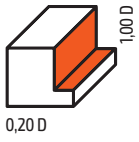
740

Parametri di lavoro / Working Parameters

CFRP

Diametro Diameter	CFRP / CFRP Sandwich (Al) / CFRP Sandwich (Ti)								
	 1,00 D / 1,00 D			 0,40 D / 1,00 D			0,02 D / 1,00 D		
m/min	Vc=100			Vc=150			Vc=200		
D mm	**fz** mm/z	**F** mm/min	**n** rpm	**fz** mm/z	**F** mm/min	**n** rpm	**fz** mm/z	**F** mm/min	**n** rpm
6,0	0,018	380	5310	0,036	1145	7960	0,048	2035	10610
8,0	0,024	575	3980	0,048	1720	5970	0,064	3055	7960
10,0	0,030	670	3180	0,060	2005	4770	0,080	3565	6370
12,0	0,036	860	2650	0,072	2580	3980	0,096	4590	5310

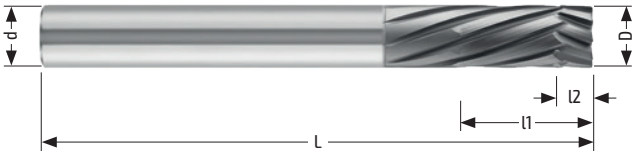
GRP

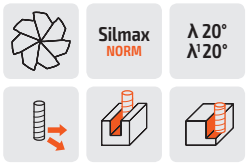
Diametro Diameter	GRP / GRP Sandwich (Al) / GRP Sandwich (Ti)								
	 1,00 D / 0,80 D			 0,40 D / 1,00 D			 0,20 D / 1,00 D		
m/min	Vc=50			Vc=75			Vc=100		
D mm	**fz** mm/z	**F** mm/min	**n** rpm	**fz** mm/z	**F** mm/min	**n** rpm	**fz** mm/z	**F** mm/min	**n** rpm
6,0	0,018	190	2650	0,024	380	3980	0,036	765	5310
8,0	0,024	285	1990	0,032	570	2980	0,048	1145	3980
10,0	0,030	285	1590	0,040	670	2390	0,060	1335	3180
12,0	0,036	430	1330	0,048	860	1990	0,072	1715	2650

Notes

740

Fresa ad eliche incrociate
Left / right helix end mill





9

Cr

D h10	d h6	L	l1 ap1	l2 ap2	r	Z	Diamond
6,00	6,00	64	12,0	3,0	0,50	4	HMD740060
6,35	6,35	64	13,0	3,2	0,40	4	HMD740063
8,00	8,00	78	20,0	4,0	0,50	6	HMD740080
9,53	9,53	78	19,0	4,8	0,40	7	HMD740095
10,00	10,00	85	20,0	5,0	0,50	7	HMD740100
12,00	12,00	104	24,0	6,0	0,50	9	HMD740120
12,70	12,70	104	26,0	6,4	0,40	9	HMD740127

1 Acciaio Steel | 2 Ghise Cast Iron | 3 Acciai Temprati Hardened Steel | 4 Acciaio Inox Stainless Steel | 5 Titanio Titanium | 6 Leghe Leggere Light Alloys | 7 PH Duplex | 8 Superleghe Superalloys | 9 Compositi Composite Materials | → 16 Guida alla lettura Reading guide | → 18 Legenda Legend

Caratteristiche Geometriche

Fresa multi tagliente sviluppata per la lavorazione di pannelli CFRP. La sua geometria di taglio consente l'eliminazione dei fenomeni di delaminazione e sfilacciamento.

Geometrical Features

Multi-flute end mill developed for machining CFRP panels. Its cutting geometry prevents delamination and unravelling.

750/751/752

Parametri di lavoro / Working Parameters

CFRP

Diametro Diameter	CFRP / CFRP Sandwich (Al) / CFRP Sandwich (Ti)						Honeycomb					
m/min	Vc=100			Vc=200			Vc=150			Vc=200		
D mm	**fz** mm/z	**F** mm/min	**n** rpm	**fz** mm/z	**F** mm/min	**n** rpm	**fz** mm/z	**F** mm/min	**n** rpm	**fz** mm/z	**F** mm/min	**n** rpm
4,0	-	510	7960	-	1530	15920	-	765	11940	-	1530	15920
5,0	-	635	6370	-	1910	12730	-	955	9550	-	1910	12730
6,0	-	765	5310	-	2290	10610	-	1145	7960	-	2290	10610
8,0	-	890	3980	-	2675	7960	-	1335	5970	-	2675	7960
10,0	-	1020	3180	-	3060	6370	-	1525	4770	-	3070	6370
12,0	-	1145	2650	-	3440	5310	-	1720	3980	-	3440	5310

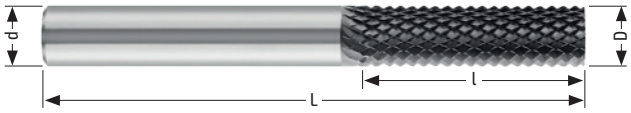
GRP

Diametro Diameter	GRP / GRP Sandwich (Al) / GRP Sandwich (Ti)						Honeycomb					
m/min	Vc=50			Vc=100			Vc=150			Vc=200		
D mm	**fz** mm/z	**F** mm/min	**n** rpm	**fz** mm/z	**F** mm/min	**n** rpm	**fz** mm/z	**F** mm/min	**n** rpm	**fz** mm/z	**F** mm/min	**n** rpm
4,0	-	255	3980	-	765	7960	-	765	11940	-	1530	15920
5,0	-	320	3180	-	955	6370	-	955	9550	-	1910	12730
6,0	-	380	2650	-	1145	5310	-	1145	7960	-	2290	10610
8,0	-	445	1990	-	1335	3980	-	1335	5970	-	2675	7960
10,0	-	510	1590	-	1525	3180	-	1525	4770	-	3060	6370
12,0	-	575	1330	-	1715	2650	-	1720	3980	-	3440	5310

1 Acciaio Steel | 2 Ghise Cast Iron | 3 Acciai Temprati Hardened Steel | 4 Acciaio Inox Stainless Steel | 5 Titanio Titanium | 6 Leghe Leggere Light Alloys | 7 PH Duplex | 8 Superleghe Superalloys | 9 Compositi Composite Materials | → 16 Guida alla lettura Reading guide | → 18 Legenda Legend

750

Fresa multitagliente
Multi-flute end mill



Silmax NORM
λ 25°
λ' 27°

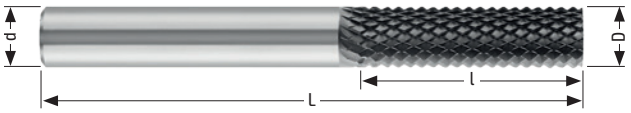
9

90°

D h10	d h6	L	l ap	Non rivestito Uncoated	Diamond
3,00	3,00	50	9,0	HM0750030	HMD750030
4,00	4,00	50	12,0	HM0750040	HMD750040
5,00	5,00	50	15,0	HM0750050	HMD750050
6,00	6,00	64	18,0	HM0750060	HMD750060
6,35	6,35	64	19,0	HM0750063	HMD750063
8,00	8,00	75	24,0	HM0750080	HMD750080
9,53	9,53	89	29,0	HM0750095	HMD750095
10,00	10,00	85	30,0	HM0750100	HMD750100
12,00	12,00	104	36,0	HM0750120	HMD750120
12,70	12,70	104	38,0	HM0750127	HMD750127

751

Fresa multitagliente con frontale a lamare
Multi-flute end mill with spot-facing end



Silmax NORM
λ 25°
λ' 27°

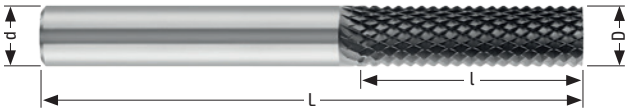
9

90°

D h10	d h6	L	l ap	Non rivestito Uncoated	Diamond
3,00	3,00	50	9,0	HM0751030	HMD751030
4,00	4,00	50	12,0	HM0751040	HMD751040
5,00	5,00	50	15,0	HM0751050	HMD751050
6,00	6,00	64	18,0	HM0751060	HMD751060
6,35	6,35	64	19,0	HM0751063	HMD751063
8,00	8,00	75	24,0	HM0751080	HMD751080
9,53	9,53	89	29,0	HM0751095	HMD751095
10,00	10,00	85	30,0	HM0751100	HMD751100
12,00	12,00	104	36,0	HM0751120	HMD751120
12,70	12,70	104	38,0	HM0751127	HMD751127

752

Fresa multitagliente con frontale a forare
Multi-flute end mill with drilling end



Silmax NORM
λ 25°
λ' 27°

9

90°

D h10	d h6	L	l ap	Non rivestito Uncoated	Diamond
3,00	3,00	50	9,0	HM0752030	HMD752030
4,00	4,00	50	12,0	HM0752040	HMD752040
5,00	5,00	50	15,0	HM0752050	HMD752050
6,00	6,00	64	18,0	HM0752060	HMD752060
6,35	6,35	64	19,0	HM0752063	HMD752063
8,00	8,00	75	24,0	HM0752080	HMD752080
9,53	9,53	89	29,0	HM0752095	HMD752095
10,00	10,00	85	30,0	HM0752100	HMD752100
12,00	12,00	104	36,0	HM0752120	HMD752120
12,70	12,70	104	38,0	HM0752127	HMD752127

Caratteristiche Geometriche

Geometria a taglio continuo con basso valore di elica sviluppata per la lavorazione in contornatura e per l'apertura di tasche.

Geometrical Features

Continuous-cut geometry with low helix value for front and side milling and pocketing.

760

Parametri di lavoro / Working Parameters

CFRP

Diametro Diameter	CFRP / CFRP Sandwich (Al) / CFRP Sandwich (Ti)								
	1,00 D / 1,00 D			0,40 D / 2,00 D			0,10 D / 2,00 D		
m/min	Vc=100			Vc=200			Vc=200		
D mm	**fz** mm/z	**F** mm/min	**n** rpm	**fz** mm/z	**F** mm/min	**n** rpm	**fz** mm/z	**F** mm/min	**n** rpm
6,0	0,036	765	5310	0,036	1530	10610	0,030	1275	10610
8,0	0,048	765	3980	0,048	1530	7960	0,040	1275	7960
10,0	0,060	765	3180	0,060	1530	6370	0,050	1275	6370
12,0	0,072	765	2650	0,072	1530	5310	0,060	1275	5310
16,0	0,096	765	1990	0,096	1530	3980	0,080	1275	3980
20,0	0,120	765	1590	0,120	1525	3180	0,100	1270	3180

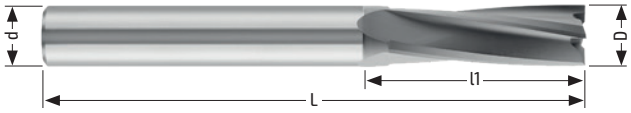
GRP

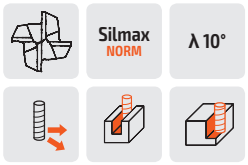
Diametro Diameter	GRP / GRP Sandwich (Al) / GRP Sandwich (Ti)								
	1,00 D / 0,70 D			0,30 D / 2,00 D			0,10 D / 2,00 D		
m/min	Vc=50			Vc=100			Vc=100		
D mm	**fz** mm/z	**F** mm/min	**n** rpm	**fz** mm/z	**F** mm/min	**n** rpm	**fz** mm/z	**F** mm/min	**n** rpm
6,0	0,024	255	2650	0,024	510	5310	0,018	380	5310
8,0	0,032	255	1990	0,032	510	3980	0,024	380	3980
10,0	0,040	255	1590	0,040	510	3180	0,030	380	3180
12,0	0,048	255	1330	0,048	510	2650	0,036	380	2650
16,0	0,064	255	990	0,064	510	1990	0,048	380	1990
20,0	0,080	255	800	0,080	510	1590	0,060	380	1590

Notes

760

Fresa con geometria a taglio continuo
End mill with continuous cutting geometry





9

Cr

D h10	d h6	L	l1 ap	Cr	Z	Diamond
6,00	6,00	64	18,0	0,20	4	HMD760060
8,00	8,00	78	24,0	0,20	4	HMD760080
10,00	10,00	78	30,0	0,20	4	HMD760100
12,00	12,00	104	36,0	0,20	4	HMD760120
16,00	16,00	104	48,0	0,20	4	HMD760160
20,00	20,00	134	60,0	0,20	4	HMD760200

1 Acciaio Steel | 2 Ghise Cast Iron | 3 Acciai Temprati Hardened Steel | 4 Acciaio Inox Stainless Steel | 5 Titanio Titanium | 6 Leghe Leggere Light Alloys | 7 PH Duplex | 8 Superleghe Superalloys | 9 Compositi Composite Materials | → 16 Guida alla lettura Reading guide | → 18 Legenda Legend

Caratteristiche Geometriche

Affilatura progettata con un'innovativa geometria di taglio combinato. Studiata specificatamente per la lavorazione dei materiali AFRP e le strutture a nido d'ape.

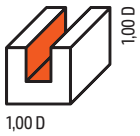
Geometrical Features

Sharpening designed with an innovative combined-cut geometry. Specifically developed for machining AFRP materials and honeycomb structures.

770

Parametri di lavoro / Working Parameters

CFRP

Diametro Diameter	Honeycomb					
	 1,00 D / 1,00 D			2,00 D / 0,35 D		
m/min	Vc=200			Vc=250		
D mm	fz mm/z	F mm/min	n rpm	fz mm/z	F mm/min	n rpm
5,0	-	1146	12739	-	2292	145987
6,0	-	1374	10616	-	2748	121656
8,0	-	1602	7962	-	3210	91242
10,0	-	1830	6369	-	3684	72994
12,0	-	2064	5308	-	4128	60828

GRP

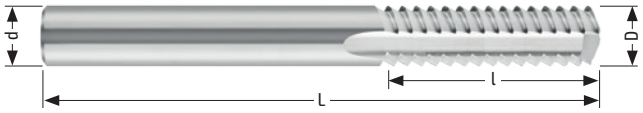
Diametro Diameter	Honeycomb					
	1,00 D / 1,00 D			2,00 D / 0,35 D		
m/min	Vc=200			Vc=250		
D mm	fz mm/z	F mm/min	n rpm	fz mm/z	F mm/min	n rpm
5,0	-	1146	12739	-	2292	145987
6,0	-	1374	10616	-	2748	121656
8,0	-	1602	7962	-	3210	91242
10,0	-	1830	6369	-	3684	72994
12,0	-	2064	5308	-	4128	60828

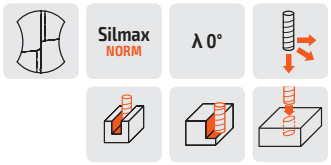
AFRP

Diametro Diameter	Kevlar					
	1,00 D / 1,00 D			2,00 D / 0,35 D		
m/min	Vc=200			Vc=250		
D mm	fz mm/z	F mm/min	n rpm	fz mm/z	F mm/min	n rpm
5,0	-	1242	15924	-	2483	22293
6,0	-	1489	13270	-	2977	18577
8,0	-	1736	9952	-	3478	13933
10,0	-	1983	7962	-	3978	11146
12,0	-	2236	6635	-	4472	9289

770

Fresa a geometria di taglio combinata
End mill with combined cutting edge geometry





9

90°

D h10	d h6	L	l ap	Z	Non rivestito Uncoated
4,76	4,76	75	25,0	2	HM0770047
5,00	5,00	75	25,0	2	HM0770050
6,00	6,00	75	30,0	2	HM0770060
6,35	6,35	75	30,0	2	HM0770063
8,00	8,00	75	30,0	2	HM0770080
9,53	9,53	75	30,0	2	HM0770095
10,00	10,00	75	30,0	2	HM0770100
12,00	12,00	75	30,0	2	HM0770120
12,70	12,70	75	30,0	2	HM0770127

1 Acciaio Steel
2 Ghise Cast Iron
3 Acciai Temprati Hardened Steel
4 Acciaio Inox Stainless Steel
5 Titanio Titanium
6 Leghe Leggere Light Alloys
7 PH Duplex
8 Superleghe Superalloys
9 Compositi Composite Materials
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Caratteristiche Geometriche

Geometria frontale sviluppata in particolare per la foratura manuale. Garantisce un grado di finitura eccezionale eliminando i fenomeni di delaminazione. Utensile particolarmente indicato per la lavorazione dei materiali compositi a base di carbonio di difficile lavorabilità.

Geometrical Features

Front geometry specifically developed for manual drilling. It ensures an exceptional finishing grade, preventing delamination. A tool that is particularly suitable for machining carbon-based composite materials of difficult machinability.

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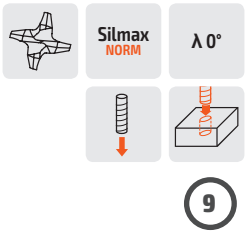
Punta a geometria frontale
Front geometry drill



D h6	d h6	L	l2 ap	Z	Non rivestito Uncoated
2,00	2,00	100	50,0	4	HM0780020
2,48	2,48	100	50,0	4	HM0780024
3,00	3,00	100	50,0	4	HM0780030
3,17	3,17	100	50,0	4	HM0780031
4,00	4,00	100	50,0	4	HM0780040
4,21	4,21	100	50,0	4	HM0780042
4,82	4,82	100	50,0	4	HM0780048
5,05	5,05	100	50,0	4	HM0780050
5,53	5,53	100	50,0	4	HM0780055
6,00	6,00	100	50,0	4	HM0780060
6,35	6,35	100	50,0	4	HM0780063
6,60	6,60	100	50,0	4	HM0780066
7,00	7,00	100	50,0	4	HM0780070
7,92	7,92	100	50,0	4	HM0780079
8,00	8,00	100	50,0	4	HM0780080
8,63	8,63	100	50,0	4	HM0780086
9,00	9,00	100	50,0	4	HM0780090
10,00	10,00	100	50,0	4	HM0780100
12,00	12,00	100	50,0	4	HM0780120

1 Acciaio Steel | 2 Ghise Cast Iron | 3 Acciai Temprati Hardened Steel | 4 Acciaio Inox Stainless Steel | 5 Titanio Titanium | 6 Leghe Leggere Light Alloys | 7 PH Duplex | 8 Superleghe Superalloys | 9 Compositi Composite Materials | → 16 Guida alla lettura Reading guide | → 18 Legenda Legend

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Universali
Universal Line

53 HPC
Alto Rendimento
High Performance

75 HRC
Stampi
Molds

113 TIS
Titainox e Superleghe
Titainox & Superalloys

137 ALU
Leghe Leggere
Light Alloys

155 CMP
Materiali Compositi
Composite Materials