



## **MONSTERMILL FRP / FRP CR**

Solid carbide milling cutters for machining  
of carbon-fibre reinforced plastics

TEAM CUTTING TOOLS



**KOMET**



**klenk**

CERATIZIT is a high-technology engineering group specialised in cutting tools and hard material solutions.

**Tooling the Future**

[www.ceratizit.com](http://www.ceratizit.com)



**In times of growing awareness regarding the subject of energy, energy savings and energy efficiency, the lightweight construction segment is becoming increasingly important.**

Composite materials are gaining larger market shares at a rapid pace. However, outstanding material properties also present challenges for precision tool manufacturers. The extreme tensile strength and complex structure of the materials pose new challenges in terms of the tools: the high abrasiveness means tool lives of only a few metres are achieved during conventional milling.





This demand has resulted in the

## **MonsterMill FRP / FRP CR milling range**

for machining carbon-fibre reinforced plastics, featuring an innovative geometry for optimum process security, cutting quality and performance.

Find our product range on our website and in our online shop.







## MonsterMill FRP CR

Solid carbide milling cutter with special diamond coating and length-independent compression zone for machining carbon-fibre reinforced plastics such as CFRP and GFRP.

The patent-pending geometry of the MonsterMill FRP CR delivers compression across the entire cutting length (length-independent compression zone).

### This results in:

- ▲ Reduction in delamination
- ▲ Prevention of projecting fibres
- ▲ Increase in tool life
- ▲ Multiple use option
- ▲ Optimum cutting quality due to large chip flutes and excellent dust removal
- ▲ Simpler and more economical programming of the machine

## Advantages of length-independent fibre compression

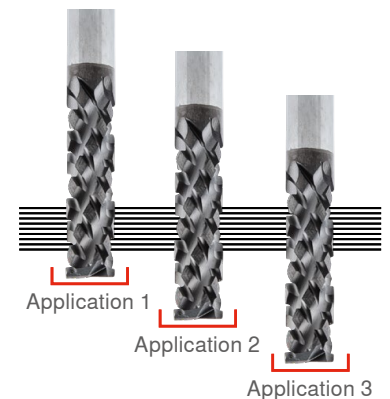
### Clean cutting edges in all fibre directions

The unique geometry with regular left and right-hand cuts on each cutting element and the accompanying fibre compression across the entire cutting length result in fibres being cut off cleanly in all directions, without damaging the component.



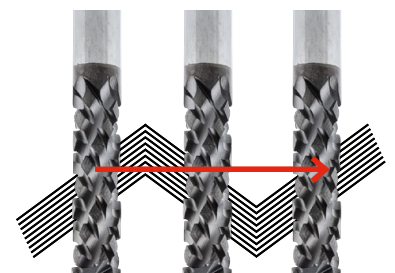
### Maximum utilisation of the cutting length

Depending on the component thickness and the fixture, you can use our MonsterMill FRP CR multiple times. You therefore receive the best cost-benefit ratio for the tool.



### Less time and effort spent programming your machining centre

When it comes to programming, save time and money compared to conventional milling cutters that have only one compression zone. In the case of formed components, thanks to our patent-pending length-independent compression geometry you do not have to align the milling cutter on the component.



## MonsterMill FRP

The MonsterMill FRP's fine chip breakers enhance the quiet running and therefore also the component quality. The large grooves safely clear away any dust that may develop, permitting an optimal process temperature to prevent damage such as smearing on the cutting edge. A special diamond coating ensures a long tool life despite the high abrasiveness of carbon-fibre reinforced plastics.



## Optimum product selection

Application	Material thickness	FRP CR fine pitched	FRP CR coarse pitched	FRP
Reduction in delamination		○	○	●
Reduction in projecting fibres		●	○	○
Tool life optimisation		●	●	○
Thin components	< 0,5 x D	○	○	●
Thick components	0,5 – 1,0 x D	●	○	○
Extremely thick components	1,0 – 1,5 x D	○	●	○

● suitable

○ suitable under certain circumstances

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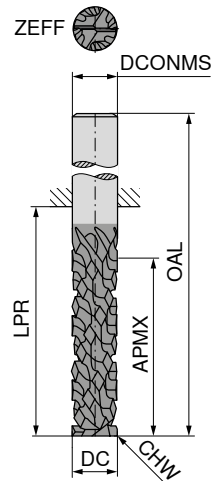
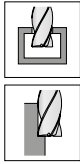
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Please contact us if other tool dimensions are required.  
Special tools can be offered upon request.

## MonsterMill – FRP CR fine pitched

- ▲ Compression zone across the entire cutting length
- ▲ right-hand cutting
- ▲ fine cross-pitched version
- ▲ Two effective end cutting edges
- ▲  $\leq \varnothing$  DC 10 mm: four cutting edges 30° right-hand helix / six cutting edges 35° left-hand helix
- ▲  $\geq \varnothing$  DC 12 mm: six cutting edges 30° right-hand helix / eight cutting edges 35° left-hand helix



NEW



Factory standard

HA

52 598 ...

DC <sub>h11</sub> mm	APMX mm	LPR mm	OAL mm	DCONMS <sub>h6</sub> mm	CHW mm	ZEFF	
6,000	18	23,5	60	6,000	0,1	2	06000
6,350	18	23,5	60	6,350	0,1	2	06350
8,000	26	33,0	70	8,000	0,1	2	08000
9,525	30	40,0	80	9,525	0,1	2	09525
10,000	30	40,0	80	10,000	0,1	2	10000
12,000	30	41,0	85	12,000	0,1	2	12000
12,700	30	41,0	85	12,700	0,1	2	12700

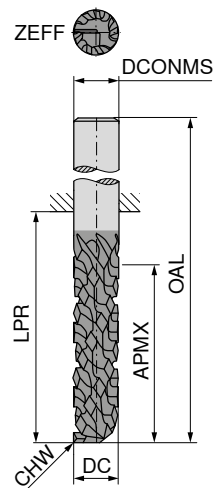
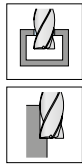
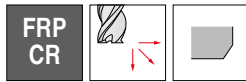
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For the MonsterMill FRP CR cutters, the feed rate must be selected in mm/rev.

## MonsterMill – FRP CR coarse pitched

- ▲ Compression zone across the entire cutting length
- ▲ right-hand cutting
- ▲ coarse cross-pitched version
- ▲ One effective end cutting edge
- ▲ Four cutting edges 30° right-hand helix / five cutting edges 35° left-hand helix



NEW



Factory standard

HA

52 599 ...

DC <sub>h11</sub> mm	APMX mm	LPR mm	OAL mm	DCONMS <sub>h6</sub> mm	CHW mm	ZE FF	
6,000	18	23,5	60	6,000	0,1	1	06000
6,350	18	23,5	60	6,350	0,1	1	06350
8,000	26	33,0	70	8,000	0,1	1	08000
9,525	30	40,0	80	9,525	0,1	1	09525
10,000	30	40,0	80	10,000	0,1	1	10000
12,000	30	41,0	85	12,000	0,1	1	12000
12,700	30	41,0	85	12,700	0,1	1	12700

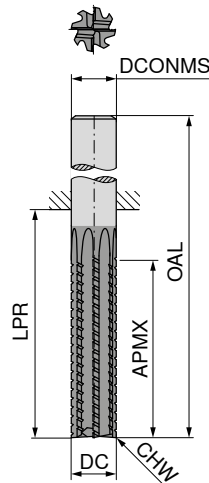
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For the MonsterMill FRP CR cutters, the feed rate must be selected in mm/rev.

# MonsterMill – FRP

- ▲ optimal removal of CFK dust
- ▲ right-hand cutting
- ▲ straight-fluted
- ▲ Four end cutting edges / two central cutting edges



NEW



Factory standard

HA

52 595 ...

DC <sub>h11</sub> mm	APMX mm	LPR mm	OAL mm	DCONMS <sub>h6</sub> mm	CHW mm	ZFP	
6,000	25	35	70	6,000	0,1	8	06000
6,350	25	35	70	6,350	0,1	8	06350
8,000	30	40	80	8,000	0,1	8	08000
9,525	32	44	85	9,525	0,1	8	09525
10,000	32	45	85	10,000	0,1	8	10000
12,000	32	46	95	12,000	0,1	8	12000
12,700	32	46	95	12,700	0,1	8	12700

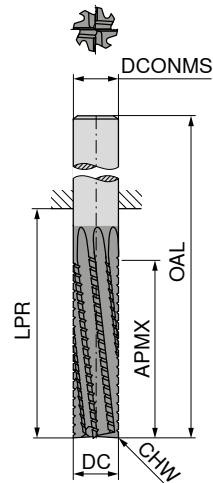
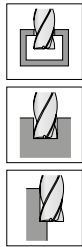
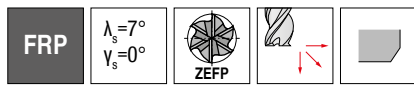
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## MonsterMill – FRP left-hand helix

- ▲ optimal removal of CFK dust
- ▲ right-hand cutting
- ▲ slightly left-fluted, pulling cut
- ▲ Four end cutting edges / two central cutting edges



NEW



Factory standard

HA

52 596 ...

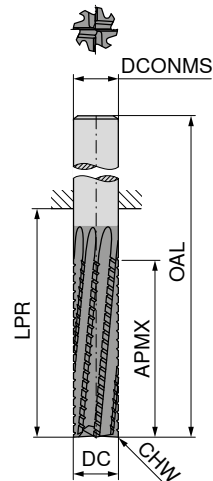
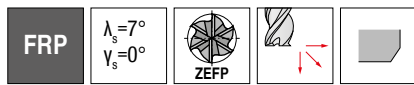
DC <sub>h11</sub> mm	APMX mm	LPR mm	OAL mm	DCONMS <sub>h6</sub> mm	CHW mm	ZEFP	
6,000	25	38	70	6,000	0,1	8	06000
6,350	25	39	70	6,350	0,1	8	06350
8,000	30	43	80	8,000	0,1	8	08000
9,525	32	48	85	9,525	0,1	8	09525
10,000	32	49	85	10,000	0,1	8	10000
12,000	32	53	95	12,000	0,1	8	12000
12,700	32	54	95	12,700	0,1	8	12700

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# MonsterMill – FRP right-hand helix

- ▲ optimal removal of CFK dust
- ▲ right-hand cutting
- ▲ slightly right-fluted, pushing cut
- ▲ Four end cutting edges / two central cutting edges



NEW



Factory standard

HA

52 597 ...

DC <sub>h11</sub> mm	APMX mm	LPR mm	OAL mm	DCONMS <sub>h6</sub> mm	CHW mm	ZFP	
6,000	25	35	70	6,000	0,1	8	06000
6,350	25	35	70	6,350	0,1	8	06350
8,000	30	40	80	8,000	0,1	8	08000
9,525	32	44	85	9,525	0,1	8	09525
10,000	32	45	85	10,000	0,1	8	10000
12,000	32	49	95	12,000	0,1	8	12000
12,700	32	49	95	12,700	0,1	8	12700

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## Material examples referring to the cutting data tables

	Material sub-group	Index	Composition / Structure / Heat treatment	Strength N/mm <sup>2</sup> / HB / HRC	Material number	Material- designation	Material number	Material- designation
O	Non-metal materials	0.1.1	Plastics, duroplastic	≤ 150 N/mm <sup>2</sup>				
		0.1.2	Plastics, thermoplastic	≤ 100 N/mm <sup>2</sup>				
		0.2.1	Aramid fibre-reinforced	≤ 1000 N/mm <sup>2</sup>				
		0.2.2	Glass/carbon-fibre reinforced	≤ 1000 N/mm <sup>2</sup>				
		0.3.1	Graphite					

\* Tensile strength

## Cutting data standard values – MonsterMill – FRP CR fine pitched

52 598 ...										
Index	Compressed air	long	Ø DC > Ø 5 mm ≤ Ø 6 mm	Ø DC > Ø 6 mm ≤ Ø 8 mm	Ø DC > Ø 8 mm ≤ Ø 10 mm	Ø DC > Ø 10 mm ≤ Ø 12 mm	Ø DC > Ø 12 mm ≤ Ø 14 mm	● 1st choice ○ suitable		
			$a_p$ 0,6–1,0 x DC	$a_p$ 0,6–1,0 x DC	$a_p$ 0,6–1,0 x DC	$a_p$ 0,6–1,0 x DC	$a_p$ 0,6–1,0 x DC	Emulsion	Compressed air	MMS
			$f$ (mm/rev)	$f$ (mm/rev)	$f$ (mm/rev)	$f$ (mm/rev)	$f$ (mm/rev)			
0.1.1										
0.1.2										
0.2.1										
0.2.2	200	1,0	0,125	0,150	0,175	0,200	0,225		●	
0.3.1										

## Cutting data standard values – MonsterMill – FRP CR coarse pitched

52 599 ...										
Index	Compressed air	long	Ø DC > Ø 5 mm ≤ Ø 6 mm	Ø DC > Ø 6 mm ≤ Ø 8 mm	Ø DC > Ø 8 mm ≤ Ø 10 mm	Ø DC > Ø 10 mm ≤ Ø 12 mm	Ø DC > Ø 12 mm ≤ Ø 14 mm	● 1st choice ○ suitable		
			$a_p$ 0,6–1,0 x DC	$a_p$ 0,6–1,0 x DC	$a_p$ 0,6–1,0 x DC	$a_p$ 0,6–1,0 x DC	$a_p$ 0,6–1,0 x DC	Emulsion	Compressed air	MMS
			$f$ (mm/rev)	$f$ (mm/rev)	$f$ (mm/rev)	$f$ (mm/rev)	$f$ (mm/rev)			
0.1.1										
0.1.2										
0.2.1										
0.2.2	200	1,5	0,100	0,120	0,140	0,160	0,180		●	
0.3.1										



For the MonsterMill FRP CR cutters, the feed rate must be selected in mm/rev.

## Cutting data standard values – MonsterMill – FRP

52 595 ... / 52 596 ... / 52 597 ...										
Index	Compressed air	long	Ø DC > Ø 5 mm ≤ Ø 6 mm	Ø DC > Ø 6 mm ≤ Ø 8 mm	Ø DC > Ø 8 mm ≤ Ø 10 mm	Ø DC > Ø 10 mm ≤ Ø 12 mm	Ø DC > Ø 12 mm ≤ Ø 14 mm	● 1st choice ○ suitable		
			$a_p$ 0,6–1,0 x DC	$a_p$ 0,6–1,0 x DC	$a_p$ 0,6–1,0 x DC	$a_p$ 0,6–1,0 x DC	$a_p$ 0,6–1,0 x DC	Emulsion	Compressed air	MMS
			$f_z$ mm	$f_z$ mm	$f_z$ mm	$f_z$ mm	$f_z$ mm			
0.1.1										
0.1.2										
0.2.1										
0.2.2	200	1,0	0,018	0,022	0,026	0,03	0,034		●	
0.3.1										



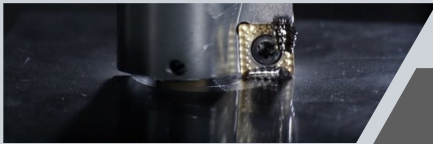
The optimum usage recommendations may differ from those provided here depending on the machining process and application. Please get in touch with your contact at CERATIZIT to determine the best recommendation for your application.

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