Your technology partner for cost-effective machining

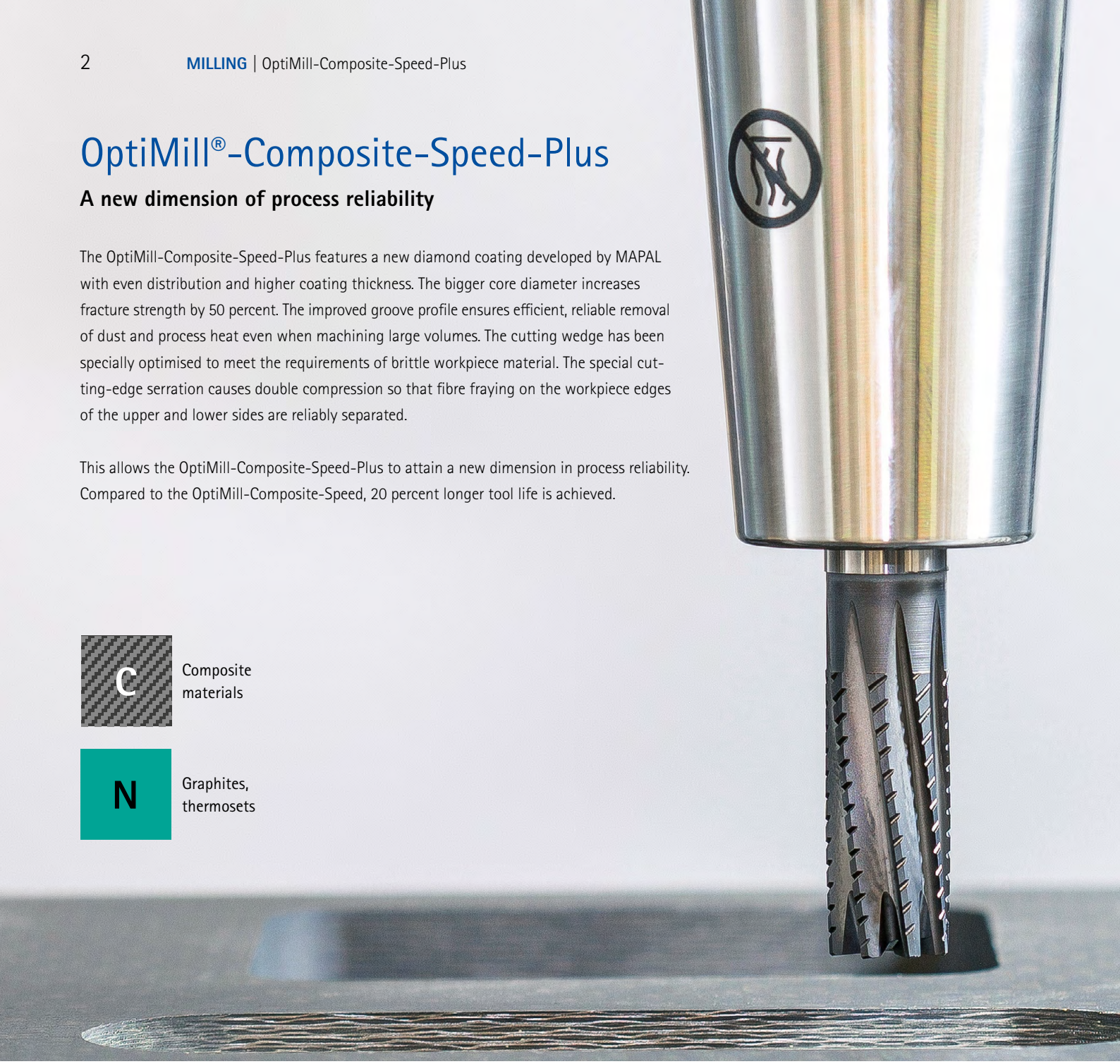
OptiMill®-Composite-Speed-Plus

OptiMill®-Composite-Speed-Plus

A new dimension of process reliability

The OptiMill-Composite-Speed-Plus features a new diamond coating developed by MAPAL with even distribution and higher coating thickness. The bigger core diameter increases fracture strength by 50 percent. The improved groove profile ensures efficient, reliable removal of dust and process heat even when machining large volumes. The cutting wedge has been specially optimised to meet the requirements of brittle workpiece material. The special cutting-edge serration causes double compression so that fibre fraying on the workpiece edges of the upper and lower sides are reliably separated.

This allows the OptiMill-Composite-Speed-Plus to attain a new dimension in process reliability. Compared to the OptiMill-Composite-Speed, 20 percent longer tool life is achieved.

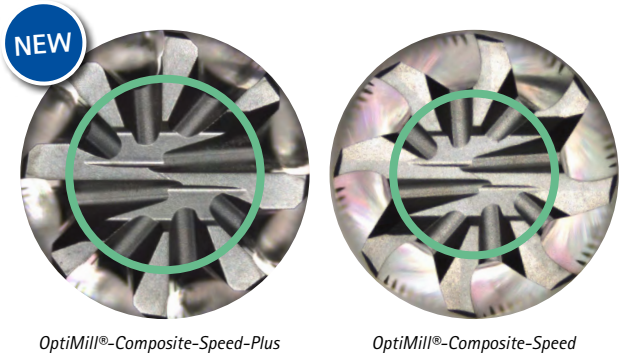


C Composite materials

N Graphites, thermosets

PROCESS RELIABILITY

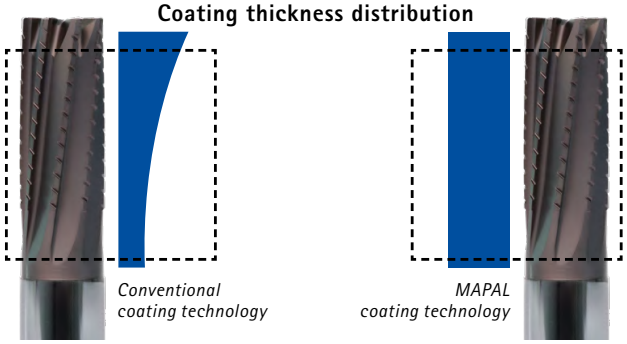
Increased fracture strength



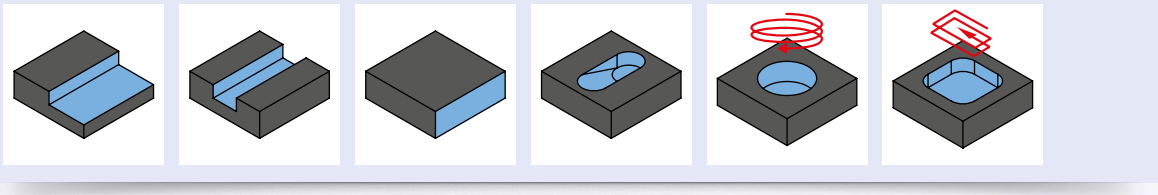
OptiMill®-Composite-Speed-Plus *OptiMill®-Composite-Speed*

- Bigger core diameter
- New dimensions with adjusted cutting length in accordance with DIN6527

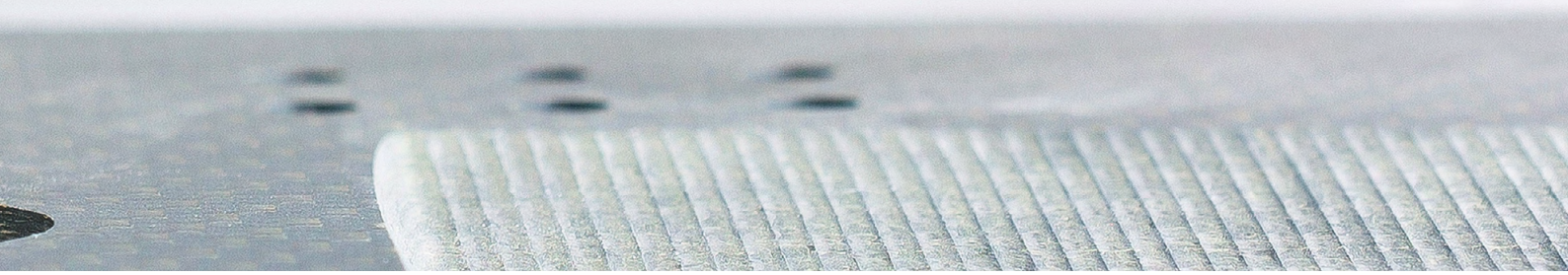
MAPAL coating



- Optimized distribution of coating thickness
- Increased diamond coating for maximum tool life

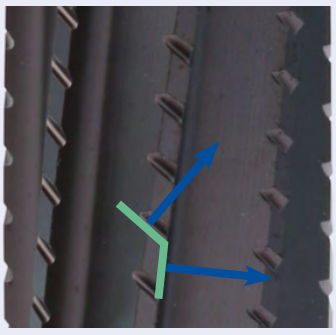


WIDE RANGE OF APPLICATIONS



QUALITY

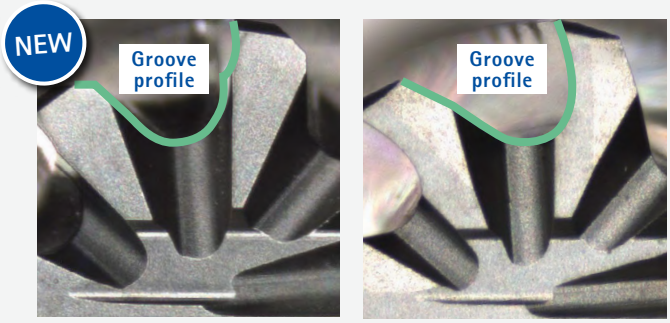
Excellent cutting quality



- Special cutting-edge serration causes double compression
- Reliable separation of fibre fraying on workpiece edges
- Extremely sharp cutting edges

WEAR AND TEAR

Maximum tool life



OptiMill®-Composite-Speed-Plus *OptiMill®-Composite-Speed*

- High cutting stability due to reinforced cutting wedge
- Optimised groove profile and double point thinning for better dust removal
- Improved coating adhesion properties

OptiMill®-Composite-Speed-Plus

Uncoated

Performance LINE

Performance Line:
High-performance tools, broad field of application, greater productivity in series manufacturing

NEW TOOL DESIGN FOR MORE PRODUCTIVITY

Compared to previous router tools, the OptiMill-Composite-Speed-Plus markedly improves quiet running and increases tool life.

NEW

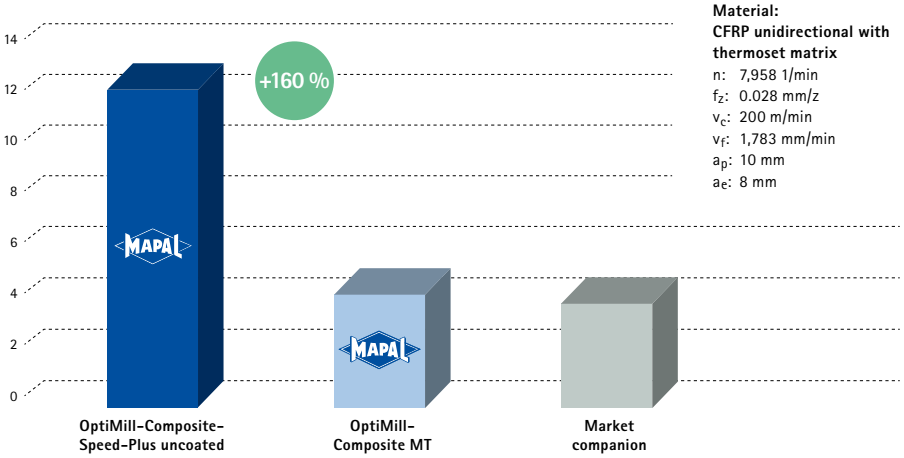
OptiMill-Composite MT | Router tools

Increased productivity

Tool life	●●○○
Quiet running	●●●○
Productivity	●●●○
Cutting quality	●●●●

OptiMill-Composite-Speed-Plus, uncoated

COMPARISON TOOL LIFE [m]



Material:
CFRP unidirectional with thermoset matrix
n: 7,958 1/min
f_z: 0.028 mm/z
v_c: 200 m/min
v_f: 1,783 mm/min
a_p: 10 mm
a_e: 8 mm

AT A GLANCE

- First choice in unfavourable process conditions
- Extremely sharp cutting edge for optimum cutting quality
- Ideal for workpiece material with low abrasiveness

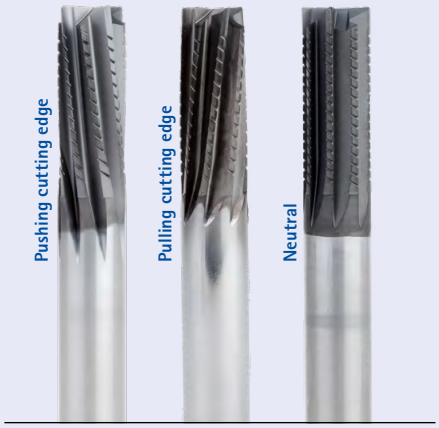
OptiMill®-Composite-Speed-Plus

Coated

Expert Line:
Specialist tools for selected applications, maximum precision and productivity

FURTHER DEVELOPMENT REDUCES AXIAL FORCES

Axial forces for the OptiMill-Composite-Speed-Plus are reduced by 40 percent compared to the OptiMill-Composite-Speed. A neutral series is not required for this reason.

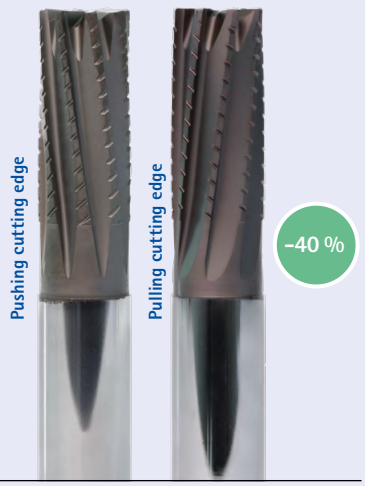


OptiMill-Composite-Speed

Lower axial forces

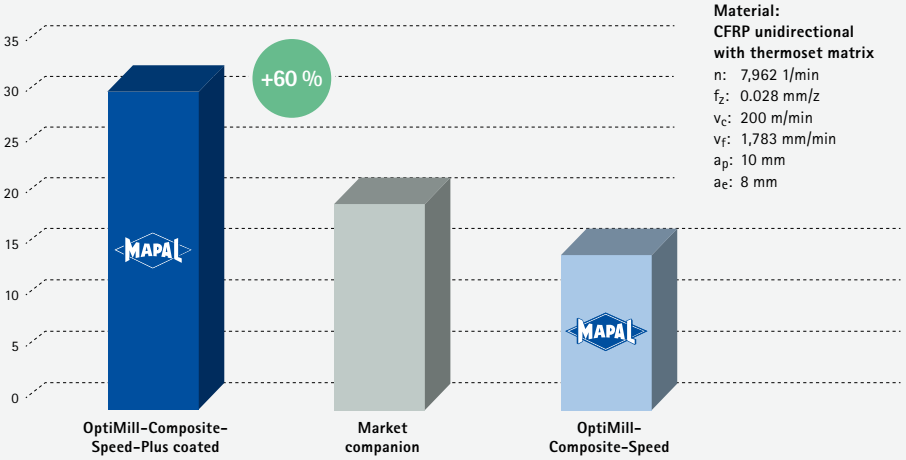
Tool life	●●●●
Quiet running	●●●
Productivity	●●●●
Cutting quality	●●●●

NEW



OptiMill-Composite-Speed-Plus, coated

COMPARISON TOOL LIFE [m]



Material:
CFRP unidirectional with thermoset matrix
n: 7,962 1/min
f_z: 0.028 mm/z
v_c: 200 m/min
v_f: 1,783 mm/min
a_p: 10 mm
a_e: 8 mm

AT A GLANCE

- First choice in good process conditions
- Even MAPAL uniform diamond coating thickness distribution for increased process reliability
- Increased coating thickness for maximum tool life
- Highest productivity

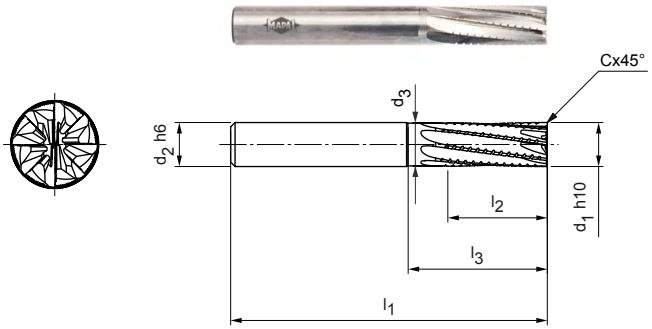
OptiMill®-Composite-Speed-Plus

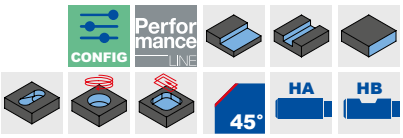
Shoulder milling cutter, uncoated, design with pulling cutting edge
SCM982

Design:

Diameter of milling cutter:	4.00 - 20.00 mm
Cutting material:	HU610
Number of cutting edges:	8
Helix angle:	8°
Special features:	Without coating, extremely sharp cutting edge

Application:
Roughing and finishing of CFRP in one machining step. Pulling cutting edge for better removal of the chips/dust (e.g. on milling pockets and slots). Particularly suitable for difficult to machine surface layers (e.g. UD or copper mesh) to prevent delamination on the lower edge of the part.





Preferred series available from stock

Dimensions							z	Specification	Order no.
d_1 h10	d_2 h6	d_3	l_1	l_2	l_3	Cx45°			
4,00	6	3,90	57	11	–	0,08	8	SCM982-0400Z08R-F0008HA-HU610	31237353
5,00	6	4,90	57	13	–	0,10	8	SCM982-0500Z08R-F0010HA-HU610	31237354
6,00	6	5,80	57	13	19	0,12	8	SCM982-0600Z08R-F0012HA-HU610	31237355
6,00	6	5,80	65	21	27	0,12	8	SCM982-0600Z08R-F0012HA-HU610	31237356
8,00	8	7,80	63	19	25	0,16	8	SCM982-0800Z08R-F0016HA-HU610	31237357
8,00	8	7,80	70	22	32	0,16	8	SCM982-0800Z08R-F0016HA-HU610	31237358
10,00	10	9,70	72	22	30	0,20	8	SCM982-1000Z08R-F0020HA-HU610	31237359
12,00	12	11,60	83	26	36	0,24	8	SCM982-1200Z08R-F0024HA-HU610	31237380
16,00	16	15,50	92	32	42	0,32	8	SCM982-1600Z08R-F0032HA-HU610	31237381

Available on request

20,00	20	19,40	104	38	52	0,40	8	SCM982-2000Z08R-F0040HA-HU610	31237382

Configurable features

Shank form:
Shank form: HB

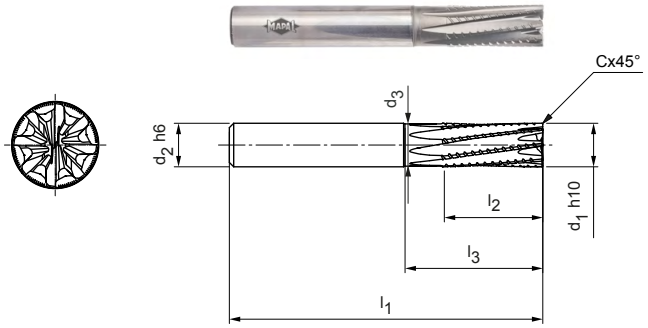
Specification:
SCM982-0400Z08R-F0008**[shank form]**-HU610

Example:
SCM982-0400Z08R-F0008**HB**-HU610
Shank form HB

Dimensions in mm.
For cutting data recommendation, see pages 10/11.
Special designs and other coatings available upon request.

OptiMill®-Composite-Speed-Plus

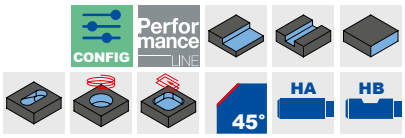
Shoulder milling cutter, uncoated, design with pushing cutting edge
SCM992



Design:

Diameter of milling cutter:	4.00 - 20.00 mm
Cutting material:	HU610
Number of cutting edges:	8
Helix angle:	-8°
Special features:	Without coating, extremely sharp cutting edge

Application:
Roughing and finishing of CFRP in one machining step. Pushing cutting edge, where the material is pressed onto the base (e.g. very suitable for vacuum clamping). Particularly suitable for difficult to machine surface layers (e.g. UD or copper mesh) to prevent delamination on the upper edge of the part.



Preferred series available from stock

Dimensions							z	Specification	Order no.
d_1 h10	d_2 h6	d_3	l_1	l_2	l_3	Cx45°			
4,00	6	3,90	57	11	–	0,08	8	SCM992-0400Z08R-F0008HA-HU610	31242585
5,00	6	4,90	57	13	–	0,10	8	SCM992-0500Z08R-F0010HA-HU610	31242586
6,00	6	5,80	57	13	19	0,12	8	SCM992-0600Z08R-F0012HA-HU610	31242587
6,00	6	5,80	65	21	27	0,12	8	SCM992-0600Z08R-F0012HA-HU610	31242588
8,00	8	7,80	63	19	25	0,16	8	SCM992-0800Z08R-F0016HA-HU610	31242589
8,00	8	7,80	70	22	32	0,16	8	SCM992-0800Z08R-F0016HA-HU610	31242590
10,00	10	9,70	72	22	30	0,20	8	SCM992-1000Z08R-F0020HA-HU610	31242591
12,00	12	11,60	83	26	36	0,24	8	SCM992-1200Z08R-F0024HA-HU610	31242592
16,00	16	15,50	92	32	42	0,32	8	SCM992-1600Z08R-F0032HA-HU610	31242593

Available on request

20,00	20	19,40	104	38	52	0,40	8	SCM992-2000Z08R-F0040HA-HU610	31242594

Configurable features

Shank form:
Shank form: HB

Specification:
SCM992-0400Z08R-F0008**[shank form]**-HU610

Example:
SCM992-0400Z08R-F0008**HB**-HU610
Shank form HB

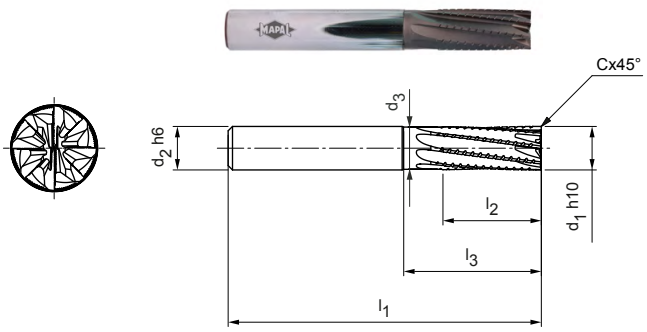
Dimensions in mm.
For cutting data recommendation, see pages 10/11.
Special designs and other coatings available upon request.

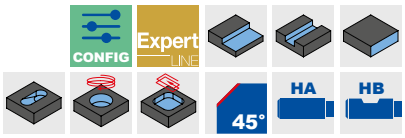
OptiMill®-Composite-Speed-Plus

Shoulder milling cutter, coated, design with pulling cutting edge
SCM980, follow-up product of SCM460

Design:
Diameter of milling cutter: 4.00 - 20.00 mm
Cutting material: HC633
Number of cutting edges: 8
Helix angle: 8°
Special features: Diamond coating

Application:
Roughing and finishing of CFRP in one machining step. Pulling cutting edge for better removal of the chips/dust (e.g. on milling pockets and slots). Particularly suitable for difficult to machine surface layers (e.g. UD or copper mesh) to prevent delamination on the lower edge of the part.





Preferred series available from stock

Dimensions							z	Specification	Order no.
d_1 h10	d_2 h6	d_3	l_1	l_2	l_3	Cx45°			
4,00	6	3,90	57	11	–	0,08	8	SCM980-0400Z08R-F0008HA-HC633	31223245
5,00	6	4,90	57	13	–	0,10	8	SCM980-0500Z08R-F0010HA-HC633	31223246
6,00	6	5,80	57	13	19	0,12	8	SCM980-0600Z08R-F0012HA-HC633	31223247
6,00	6	5,80	65	21	27	0,12	8	SCM980-0600Z08R-F0012HA-HC633	31223248
8,00	8	7,80	63	19	25	0,16	8	SCM980-0800Z08R-F0016HA-HC633	31223249
8,00	8	7,80	70	22	32	0,16	8	SCM980-0800Z08R-F0016HA-HC633	31223260
10,00	10	9,70	72	22	30	0,20	8	SCM980-1000Z08R-F0020HA-HC633	31223261
12,00	12	11,60	83	26	36	0,24	8	SCM980-1200Z08R-F0024HA-HC633	31223262
16,00	16	15,50	92	32	42	0,32	8	SCM980-1600Z08R-F0032HA-HC633	31223263

Available on request

20,00	20	19,40	104	38	52	0,40	8	SCM980-2000Z08R-F0040HA-HC633	31223264

Configurable features

Shank form:
Shank form: HB

Specification:
SCM980-0400Z08R-F0008**[shank form]**-HC633

Example:
SCM980-0400Z08R-F0008**HB**-HC633
Shank form HB

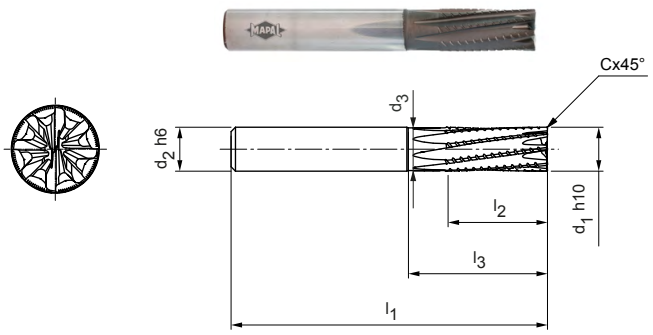
Dimensions in mm.
For cutting data recommendation, see pages 10/11.
Special designs and other coatings available upon request.

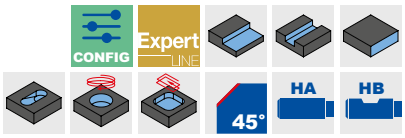
OptiMill®-Composite-Speed-Plus

Shoulder milling cutter, coated, design with pushing cutting edge
SCM990, follow-up product of SCM470

Design:
Diameter of milling cutter: 4.00 - 20.00 mm
Cutting material: HC633
Number of cutting edges: 8
Helix angle: -8°
Special features: Diamond coating

Application:
Roughing and finishing of CFRP in one machining step. Pushing cutting edge, where the material is pressed onto the base (e.g. very suitable for vacuum clamping). Particularly suitable for difficult to machine surface layers (e.g. UD or copper mesh) to prevent delamination on the upper edge of the part.





Preferred series available from stock

Dimensions							z	Specification	Order no.
d_1 h10	d_2 h6	d_3	l_1	l_2	l_3	Cx45°			
4,00	6	3,90	57	11	–	0,08	8	SCM990-0400Z08R-F0008HA-HC633	31223265
5,00	6	4,90	57	13	–	0,10	8	SCM990-0500Z08R-F0010HA-HC633	31223266
6,00	6	5,80	57	13	19	0,12	8	SCM990-0600Z08R-F0012HA-HC633	31223267
6,00	6	5,80	65	21	27	0,12	8	SCM990-0600Z08R-F0012HA-HC633	31223268
8,00	8	7,80	63	19	25	0,16	8	SCM990-0800Z08R-F0016HA-HC633	31223269
8,00	8	7,80	70	22	32	0,16	8	SCM990-0800Z08R-F0016HA-HC633	31223270
10,00	10	9,70	72	22	30	0,20	8	SCM990-1000Z08R-F0020HA-HC633	31223271
12,00	12	11,60	83	26	36	0,24	8	SCM990-1200Z08R-F0024HA-HC633	31223272
16,00	16	15,50	92	32	42	0,32	8	SCM990-1600Z08R-F0032HA-HC633	31223273

Available on request

20,00	20	19,40	104	38	52	0,40	8	SCM990-2000Z08R-F0040HA-HC633	31223274

Configurable features

Shank form:
Shank form: HB

Specification:
SCM990-0400Z08R-F0008**[shank form]**-HC633

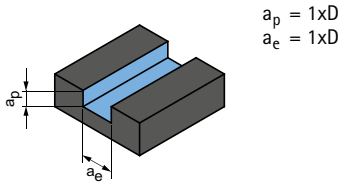
Example:
SCM990-0400Z08R-F0008**HB**-HC633
Shank form HB

Dimensions in mm.
For cutting data recommendation, see pages 10/11.
Special designs and other coatings available upon request.

Cutting data recommendations for shoulder milling cutters

Feed and cutting speed

Groove milling



OptiMill-Composite-Speed-Plus, uncoated | SCM982, 992

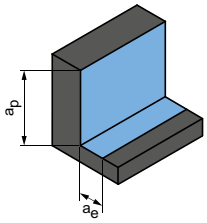
MMG*			Workpiece material	Strength/ hardness [N/mm²] [HRC]	Cooling			v_c [m/min]	f_z [mm]						
									Diameter of milling cutter [mm]						
					MQL/Air	Dry	KSS		4.00	6.00	8.00	10.00	12.00	16.00	20.00
N	N4	N4.1	Plastic, thermoplastics		✓	✓	✓								
		N4.2	Plastic, duroplastics		✓	✓	✓	**125**	0.020	0.029	0.038	0.045	0.052	0.063	0.072
		N4.3	Plastic, foam materials		✓	✓									
C	C1	C1.1	Plastic range, reinforced with aramid fibre (AFK)		✓	✓	✓								
		C1.2	Plastic range (duroplastic), CFK/GFK		✓	✓	✓	**120**	0.021	0.026	0.031	0.035	0.038	0.042	0.043
		C1.3	Plastic range (thermoplastic), CFK/GFK		✓	✓	✓	**80**	0.021	0.026	0.031	0.035	0.038	0.042	0.043
	C2	C2.1	Carbon range, reinforced with carbon fibre (CFC)		✓	✓	✓	**120**	0.018	0.023	0.027	0.031	0.033	0.037	0.038
	C4	C4.1	Sandwich construction, honeycomb core (Honeycomb)		✓	✓		**165**	0.012	0.015	0.017	0.019	0.021	0.023	0.024
		C4.2	Sandwich construction, foam core		✓	✓		**125**	0.019	0.024	0.028	0.032	0.035	0.039	0.041

OptiMill-Composite-Speed-Plus, coated | SCM980, 990

MMG*			Workpiece material	Strength/ hardness [N/mm²] [HRC]	Cooling			v_c [m/min]	f_z [mm]						
									Diameter of milling cutter [mm]						
					MQL/Air	Dry	KSS		4.00	6.00	8.00	10.00	12.00	16.00	20.00
C	C1	C1.1	Plastic range, reinforced with aramid fibre (AFK)		✓	✓	✓								
		C1.2	Plastic range (duroplastic), CFK/GFK		✓	✓	✓	**145**	0.021	0.026	0.031	0.035	0.038	0.042	0.043
		C1.3	Plastic range (thermoplastic), CFK/GFK		✓	✓	✓	**100**	0.021	0.026	0.031	0.035	0.038	0.042	0.043
	C2	C2.1	Carbon range, reinforced with carbon fibre (CFC)		✓	✓	✓	**145**	0.018	0.023	0.027	0.031	0.033	0.037	0.038
	C4	C4.1	Sandwich construction, honeycomb core (Honeycomb)		✓	✓		**195**	0.012	0.015	0.017	0.019	0.021	0.023	0.024
		C4.2	Sandwich construction, foam core		✓	✓		**150**	0.019	0.024	0.028	0.032	0.035	0.039	0.041

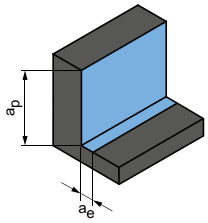
* MAPAL machining groups

Roughing



a_p = 1.5xD
a_e = 0.25xD

Finishing



a_p = 1.5xD
a_e = 0.1xD

v_c [m/min]	f_z [mm] Diameter of milling cutter [mm]							v_c [m/min]	f_z [mm] Diameter of milling cutter [mm]						
	4.00	6.00	8.00	10.00	12.00	16.00	20.00		4.00	6.00	8.00	10.00	12.00	16.00	20.00
190	0.029	0.041	0.053	0.063	0.072	0.089	0.101	**230**	0.040	0.057	0.073	0.088	0.101	0.123	0.141
200	0.021	0.026	0.031	0.035	0.038	0.042	0.043	**295**	0.021	0.026	0.031	0.035	0.038	0.042	0.043
135	0.021	0.026	0.031	0.035	0.038	0.042	0.043	**195**	0.021	0.026	0.031	0.035	0.038	0.042	0.043
200	0.018	0.023	0.027	0.031	0.033	0.037	0.038	**295**	0.018	0.023	0.027	0.031	0.033	0.037	0.038
270	0.012	0.015	0.017	0.019	0.021	0.023	0.024	**395**	0.012	0.015	0.017	0.019	0.021	0.023	0.024
200	0.019	0.024	0.028	0.032	0.035	0.039	0.041	**300**	0.019	0.024	0.028	0.032	0.035	0.039	0.041

v_c [m/min]	f_z [mm] Diameter of milling cutter [mm]							v_c [m/min]	f_z [mm] Diameter of milling cutter [mm]						
	4.00	6.00	8.00	10.00	12.00	16.00	20.00		4.00	6.00	8.00	10.00	12.00	16.00	20.00
240	0.021	0.026	0.031	0.035	0.038	0.042	0.043	**355**	0.021	0.026	0.031	0.035	0.038	0.042	0.043
160	0.021	0.026	0.031	0.035	0.038	0.042	0.043	**235**	0.021	0.026	0.031	0.035	0.038	0.042	0.043
240	0.018	0.023	0.027	0.031	0.033	0.037	0.038	**355**	0.018	0.023	0.027	0.031	0.033	0.037	0.038
325	0.012	0.015	0.017	0.019	0.021	0.023	0.024	**480**	0.012	0.015	0.017	0.019	0.021	0.023	0.024
245	0.019	0.024	0.028	0.032	0.035	0.039	0.041	**360**	0.019	0.024	0.028	0.032	0.035	0.039	0.041

The specified machining values are guide values.
The optimum data for the respective machining task should be determined during the test or machining.

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