Doppel Helix
Diamant beschichtet

4 bis 8 Schneiden je nach Abmessung
für bessere Oberflächengüte

Hochwertiges Substrat für
ein langes Werkzeugleben

Diamantbeschichtung
mit excellenter
Abriebfestigkeit

Doppel Helix
reduziert Ablösung
(Delamination) und
Gratbildung

Ideal für Materialgruppe

0

VHM Fräser für Verbundmaterialien CFK GFK und Graphit

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Web: www.clarkson.de

Anwendungsleitfaden

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●: Excellent **O**: Good

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CFK GFK Schaftfräser

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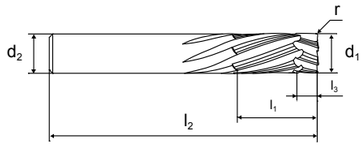
Mehrschneider Doppel Helix Eckenradius

MG HM | 20°/20° | FLUTE 4-8 | PLAIN

Series No. 172390

▶ cutting conditions : p.252



Bearbeitung von Verbundmaterialien CFK GFK
Diamant beschichtet
Vermindert Ablösung (Delamination)
und Gratbildung

CODE	CUTTING DIAMETER d_1	CORNER RADIUS r	SHANK DIAMETER d_2	LENGTH OF CUT l_1	LENGTH OF CUT l_3	OVERALL LENGTH l_2	NO. OF FLUTE z
1723900600	**6.0**	0.5	6	12.0	3.0	65	4
1723900800	**8.0**	0.5	8	16.0	4.0	70	6
1723901000	**10.0**	0.5	10	20.0	5.0	80	6
1723901200	**12.0**	0.5	12	24.0	6.0	90	8

MILL DIA TOLERANCE	SHANK DIA TOLERANCE
0~-0.03	h6

●: Excellent **O**: Good

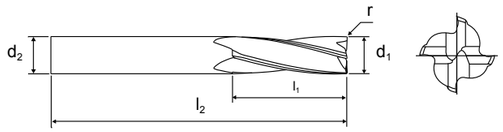
P		H	M		K		S			N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
														●	

Vierschneider 15° Spirale Eckenradius

MG HM | 15° | FLUTE 4 | PLAIN

Series No. 172490

▶ cutting conditions : p.253



Bearbeitung von Verbundmaterialien CFK GFK
Diamant beschichtet
Vermindert Ablösung (Delamination)
und Gratbildung

CODE	CUTTING DIAMETER d_1	CORNER RADIUS r	SHANK DIAMETER d_2	LENGTH OF CUT l_1	OVERALL LENGTH l_2
1724900600	**6.0**	0.2	6	18.0	65
1724900800	**8.0**	0.2	8	24.0	70
1724901000	**10.0**	0.3	10	30.0	80
1724901200	**12.0**	0.3	12	36.0	100

MILL DIA TOLERANCE	SHANK DIA TOLERANCE
0~-0.03	h6

●: Excellent **O**: Good

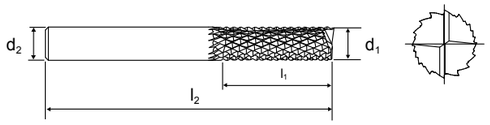
P		H	M		K		S			N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
														●	

Microverzahnter Fräser

MG HM | PLAIN

Series No. 172590

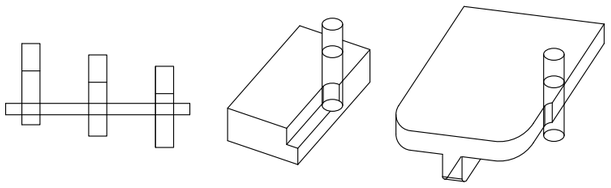
▶ cutting conditions : p.254



Bearbeitung von Verbundmaterial CFK GFK
Diamant beschichtet.
Vermindert Ablösung (Delimination)
und Gratbildung

CODE	CUTTING DIAMETER d_1	SHANK DIAMETER d_2	LENGTH OF CUT l_1	OVERALL LENGTH l_2
1725900300	**3.0**	3	9.0	50
1725900400	**4.0**	4	12.0	50
1725900500	**5.0**	5	15.0	50
1725900600	**6.0**	6	18.0	65
1725900800	**8.0**	8	24.0	75
1725901000	**10.0**	10	30.0	85
1725901200	**12.0**	12	36.0	100

MILL DIA TOLERANCE	SHANK DIA TOLERANCE
-0.02~-0.08	h6



●: Excellent **O**: Good

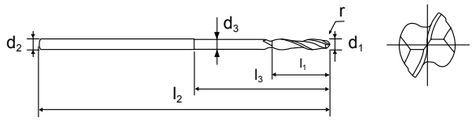
P		H	M		K		S			N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
														●	

Zweischneider Vollradius

MG HM | 30° | DIAMOND COATED | FLUTE 2 | PLAIN

Series No. 113325

▶ cutting conditions : p.254



Zur Bearbeitung von Graphit
Diamant beschichtet

CODE	CUTTING DIAMETER d_1	RADIUS r	SHANK DIAMETER d_2	LENGTH OF CUT l_1	EFFECTIVE LENGTH l_3	OVERALL LENGTH l_2	NECK DIAMETER d_3
1133250200	**2.0**	1.0	4	10.0	20.0	80	1.95
1133250300	**3.0**	1.5		15.0	25.0		2.9
1133250400	**4.0**	2.0		20.0	30.0		3.9
1133250500	**5.0**	2.5	6	30.0	50.0	100	4.9
1133250600	**6.0**	3.0		30.0	50.0		5.5
1133250800	**8.0**	4.0	8	40.0	60.0	110	7.5
1133251000	**10.0**	5.0	10	50.0	70.0	120	9.5
1133251200	**12.0**	6.0	12	55.0	75.0	130	11.5

MILL DIA TOLERANCE(mm)	RADIUS r TOLERANCE	SHANK DIA TOLERANCE
0~-0.03	±0.010	h6

●: Excellent **O**: Good

P		H	M		K		S			N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
13	14	16	23		33	34	51	52	53	71	72	73	74	83	

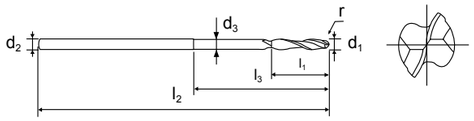
Zweischneider Vollradius Extra Lang

MG HM | 30° | DIAMOND COATED | FLUTE 2 | PLAIN

Series No. 114325

▶ cutting conditions : p.254

Zur Bearbeitung von Graphit
Diamant beschichtet



CODE	CUTTING DIAMETER d_1	RADIUS r	SHANK DIAMETER d_2	LENGTH OF CUT l_1	EFFECTIVE LENGTH l_3	OVERALL LENGTH l_2	NECK DIAMETER d_3
1143250200	**2.0**	1.0	4	10.0	20.0	100	1.95
1143250300	**3.0**	1.5		15.0	25.0		2.9
1143250400	**4.0**	2.0		20.0	30.0		3.9
1143250500	**5.0**	2.5	6	30.0	50.0	120	4.9
1143250600	**6.0**	3.0		30.0	50.0	150	5.5
1143250800	**8.0**	4.0	8	40.0	60.0		7.5

MILL DIA TOLERANCE(mm)	RADIUS r TOLERANCE	SHANK DIA TOLERANCE
0~-0.03	±0.010	h6

●: Excellent **O**: Good

P		H	M		K		S			N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
13	14	16	23		33	34	51	52	53	71	72	73	74	83	

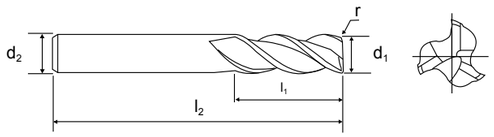
Dreischneider 40° Spirale Eckenradius

MG HM | 40º | FLUTE 3 | PLAIN

Series No. 118325

▶ cutting conditions : p.255

Zur Bearbeitung von Graphit
Diamant beschichtet



CODE	CUTTING DIAMETER d_1	CORNER RADIUS r	SHANK DIAMETER d_2	LENGTH OF CUT l_1	OVERALL LENGTH l_2
1183250200	**2.0**	0.15	3	6.0	40
1183250300	**3.0**	0.15	3	12.0	40
1183250400	**4.0**	0.2	4	14.0	50
1183250500	**5.0**	0.3	5	16.0	50
1183250600	**6.0**	0.3	6	20.0	65
1183250800	**8.0**	0.5	8	20.0	65
1183251000	**10.0**	0.5	10	25.0	75
1183251200	**12.0**	0.5	12	25.0	75

MILL DIA TOLERANCE	SHANK DIA TOLERANCE
0~-0.03	h6

●: Excellent **O**: Good

P		H	M		K		S			N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
13	14	16	23		33	34	51	52	53	71	72	73	74	83	

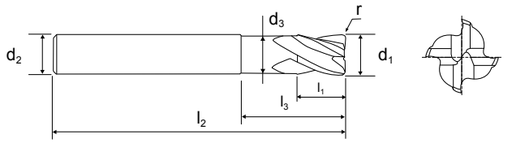
Vierschneider Eckenradius

Clarkson

MG HM | 30º | FLUTE 4 | PLAIN

Series No. 141325

▶ cutting conditions : p.255



Zur Bearbeitung von Graphit
Diamant beschichtet

CODE	CUTTING DIAMETER d_1	RADIUS r	SHANK DIAMETER d_2	LENGTH OF CUT l_1	EFFECTIVE LENGTH l_3	OVERALL LENGTH l_2	NECK DIAMETER d_3
1413250600	**6.0**	0.5	6	10.0	40.0	80	5.9
1413250800	**8.0**	0.5	8	10.0	40.0	80	7.8
1413250901	**8.0**	1.0	8	10.0	60.0	100	7.8
1413251000	**10.0**	0.5	10	25.0	-	75	-
1413250902	**10.0**	0.5	10	12.0	40.0	80	9.8
1413250903	**10.0**	1.0	10	12.0	40.0	80	9.8
1413250904	**10.0**	0.5	10	12.0	80.0	125	9.8
1413251200	**12.0**	0.5	12	25.0	-	80	-
1413250905	**12.0**	0.5	12	15.0	40.0	80	11.8
1413250906	**12.0**	1.0	12	15.0	40.0	80	11.8
1413250907	**12.0**	1.0	12	15.0	80.0	125	11.8

MILL DIA TOLERANCE	SHANK DIA TOLERANCE
0~-0.03	h6

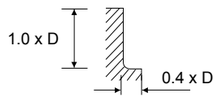
●: Excellent **O**: Good

P		H	M		K		S			N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
13	14	16	23		33	34	51	52	53	71	72	73	74	83	

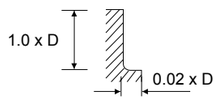
CFK GFK & GRAPHIT Schnittdaten

172390 (Multiflute Dual Helix, Corner Radius)

MATERIAL GROUP		MATERIAL TYPE		Size (mm)			
				6.0	**8.0**	**10.0**	**12.0**
O	83	CFK	v_c (m/min)	150	150	150	150
			n	7950	5960	4770	6970
			f_z	0.035	0.045	0.055	0.065
			f (mm/min)	1115	1610	1575	2065
	83	GFK	v_c (m/min)	80	80	80	80
			n	4240	3180	2540	2120
			f_z	0.025	0.031	0.037	0.043
			f (mm/min)	425	590	565	730



MATERIAL GROUP		MATERIAL TYPE		Size (mm)			
				6.0	**8.0**	**10.0**	**12.0**
O	83	CFK	v_c (m/min)	200	200	200	200
			n	10610	7950	6360	5300
			f_z	0.047	0.062	0.077	0.092
			f (mm/min)	1995	2955	2940	3900
	83	GFK	v_c (m/min)	100	100	100	100
			n	5300	3970	3180	2650
			f_z	0.035	0.04	0.045	0.05
			f (mm/min)	740	955	860	1060



v_c - cutting speed (m/min)
n - RPM (rev/min)
f_z - feed rate (mm/tooth)
f - feed rate (mm/rev)
z - No. of teeth
a_p - axial depth of cut
a_e - radial depth of cut

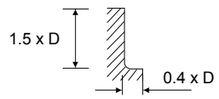
To calculate RPM from cutting speed: $n = \frac{v_c * 1000}{\pi * ø}$

To calculate cutting speed from RPM: $v_c = \frac{n * \pi * ø}{1000}$

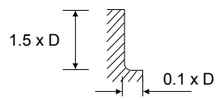
All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up. The recommendations for speeds, feeds and other parameters presented in this chart are nominal recommendations and should be considered only as good starting points.

172490 (4 Flute 15º Helix, Corner Radius)

MATERIAL GROUP		MATERIAL TYPE		Size (mm)			
				6.0	**8.0**	**10.0**	**12.0**
O	83	CFK	v_c (m/min)	200	200	200	200
			n	10610	7950	6360	5300
			f_z	0.035	0.045	0.055	0.065
			f (mm/min)	1485	1430	1400	1380
	83	GFK	v_c (m/min)	100	100	100	100
			n	5300	3970	3180	2650
			f_z	0.025	0.031	0.037	0.043
			f (mm/min)	530	490	470	455



MATERIAL GROUP		MATERIAL TYPE		Size (mm)			
				6.0	**8.0**	**10.0**	**12.0**
O	83	CFK	v_c (m/min)	200	200	200	200
			n	10610	7950	6360	5300
			f_z	0.028	0.036	0.044	0.052
			f (mm/min)	1190	1145	1120	1100
	83	GFK	v_c (m/min)	100	100	100	100
			n	5300	3970	3180	2650
			f_z	0.025	0.028	0.032	0.035
			f (mm/min)	530	445	405	370



v_c - cutting speed (m/min)
n - RPM (rev/min)
f_z - feed rate (mm/tooth)
f - feed rate (mm/rev)
z - No. of teeth
a_p - axial depth of cut
a_e - radial depth of cut

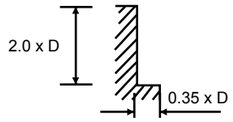
To calculate RPM from cutting speed: $n = \frac{v_c * 1000}{\pi * ø}$

To calculate cutting speed from RPM: $v_c = \frac{n * \pi * ø}{1000}$

All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up. The recommendations for speeds, feeds and other parameters presented in this chart are nominal recommendations and should be considered only as good starting points.

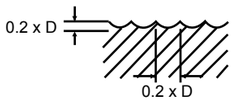
172590 (Router, End Mill Type)

MATERIAL GROUP		MATERIAL TYPE		Size (mm)						
				3.0	4.0	5.0	6.0	8.0	10.0	12.0
O	83	CFRP	v_c (m/min)	200	200	200	200	200	200	200
			n	21220	15910	12730	10610	7950	6360	5300
			f (mm/min)	1270	1430	1910	2225	2620	3080	3390
	83	GFK	v_c (m/min)	100	100	100	100	100	100	100
			n	10610	7950	6360	5300	3970	3180	2650
			f (mm/min)	635	715	950	1110	1310	1525	1695



113325, 114325 (2 Flute Ball Nose, Extended Neck)

MATERIAL GROUP		MATERIAL TYPE		Size (mm)							
				2.0	3.0	4.0	5.0	6.0	8.0	10.0	12.0
O		GRAPHIT	v_c (m/min)	100	150	200	245	285	325	360	395
			n	16000	16000	16000	15500	15000	13000	11500	10500
			f_z	0.025	0.045	0.066	0.082	0.098	0.115	0.133	0.15
			f (mm/min)	800	1450	2100	2550	2950	3000	3050	3150



▶ The feed rate for long and long reach tools should be reduced by up to 50%

v_c - cutting speed (m/min)
n - RPM (rev/min)
f_z - feed rate (mm/tooth)
f - feed rate (mm/rev)
z - No. of teeth
a_p - axial depth of cut
a_e - radial depth of cut

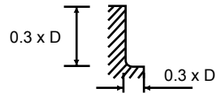
To calculate RPM from cutting speed: $n = \frac{v_c * 1000}{\pi * ø}$

To calculate cutting speed from RPM: $v_c = \frac{n * \pi * ø}{1000}$

All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up. The recommendations for speeds, feeds and other parameters presented in this chart are nominal recommendations and should be considered only as good starting points.

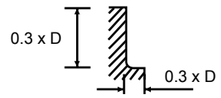
118325 (3 Flute 40º Helix, Corner Radius)

MATERIAL GROUP		MATERIAL TYPE		Size (mm)							
				2.0	3.0	4.0	5.0	6.0	8.0	10.0	12.0
O		GRAPHIT	v_c (m/min)	250	375	505	630	755	805	815	790
			n	40000	40000	40000	40000	40000	32000	26000	21000
			f_z	0.025	0.036	0.05	0.06	0.07	0.088	0.11	0.13
			f (mm/min)	3000	4200	6000	7200	8400	8400	8600	8200



141325 (4 Flute Extended Neck, Corner Radius)

MATERIAL GROUP		MATERIAL TYPE		Size (mm)			
				6.0	8.0	10.0	12.0
O		GRAPHIT	v_c (m/min)	755	805	815	790
			n	40000	32000	26000	21000
			f_z	0.035	0.044	0.055	0.065
			f (mm/min)	5600	5600	5700	5450



▶ The data shown is based on medial length tools. Please adjust machining conditions according to length.

v_c - cutting speed (m/min)
n - RPM (rev/min)
f_z - feed rate (mm/tooth)
f - feed rate (mm/rev)
z - No. of teeth
a_p - axial depth of cut
a_e - radial depth of cut

To calculate RPM from cutting speed: $n = \frac{v_c * 1000}{\pi * ø}$

To calculate cutting speed from RPM: $v_c = \frac{n * \pi * ø}{1000}$

All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up. The recommendations for speeds, feeds and other parameters presented in this chart are nominal recommendations and should be considered only as good starting points.