Cutting data for milling
RAKU® TOOL   SB-0140

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formula for calculating speed (spindle)

$$n = \frac{V_c \times 1000}{D_c \times \pi}$$

$$14968 \ [rpm] = \frac{940 \ [m/min] \times 1000}{20{,}0 \ [mm] \times 3{,}14}$$

formula for calculating axis feed rate

$$V_f = n \times f_z \times z_n$$

$$30000 \ [mm/min] = 15000 \ [rpm] \times 1{,}000 \ [mm] \times 2 \ [number]$$

validated cutting data for roughing

Type	D_c [mm]	z_n [number]	V_c [m/min]	f_z [mm]	n [rpm]	V_f [mm/min]	a_e [mm]	a_p [mm]	L_1 [mm]	L_2 [mm]
torus	20,0	2	650	1,000	10.350	20.701	10,00	20,00	86,0	20,0
torus	12,0	2	390	1,000	10.350	20.701	6,00	12,00	55,0	16,0
torus	6,0	2	195	1,000	10.350	20.701	3,00	6,00	23,0	8,0

validated cutting data for finishing

Type	D_c [mm]	z_n [number]	V_c [m/min]	f_z [mm]	n [rpm]	V_f [mm/min]	a_e [mm]	a_p [mm]	L_1 [mm]	L_2 [mm]
ball	20,0	2	500	1,300	7.962	20.701	2,00	10,00	67,0	17,0
ball	12,0	2	300	1,300	7.962	20.701	1,20	6,00	52,0	10,5
ball	6,0	2	140	1,300	7.431	19.321	0,60	3,00	23,0	10,0

recommended cutting data for roughing

parameter	symbol	unit	roughing recommendation min.	ideal	max.
radial infeed:	a_e	[mm]	- x D_c	**0,50 x D_c**	0,80 x D_c
axial infeed:	a_p	[mm]	0,10 x D_c	**1,00 x D_c**	5,00 x D_c
number of teeth:	z_n	[number]	1	**1**	2

recommended cutting data for finishing

parameter	symbol	unit	finishing recommendation min.	ideal	max.
radial infeed:	a_e	[mm]	- x D_c	**0,10 x D_c**	0,80 x D_c
axial infeed:	a_p	[mm]	- x D_c	**0,50 x D_c**	1,00 x D_c
number of teeth:	z_n	[number]	1	**1**	2

parameter	symbol	unit	user specifications
cutting speed:	V_c	[m/min]	selection in the diagram
feed/tooth:	f_z	[mm]	selection in the diagram
speed (spindle):	n	[rpm]	calculation by user
axis feed rate:	V_f	[mm/min]	calculation by user
cutting diameter:	D_c	[mm]	processing specific
tool total length:	L_0	[mm]	processing specific
tool unclamping length:	L_1	[mm]	processing specific
tool cutting length:	L_2	[mm]	processing specific

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Cutting data diagram for milling
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feed/tooth f_z [mm]

roughing
finishing

V_c 195 V_c 390 V_c 650

1,300   1,300   1,300

1,000   1,000   1,000

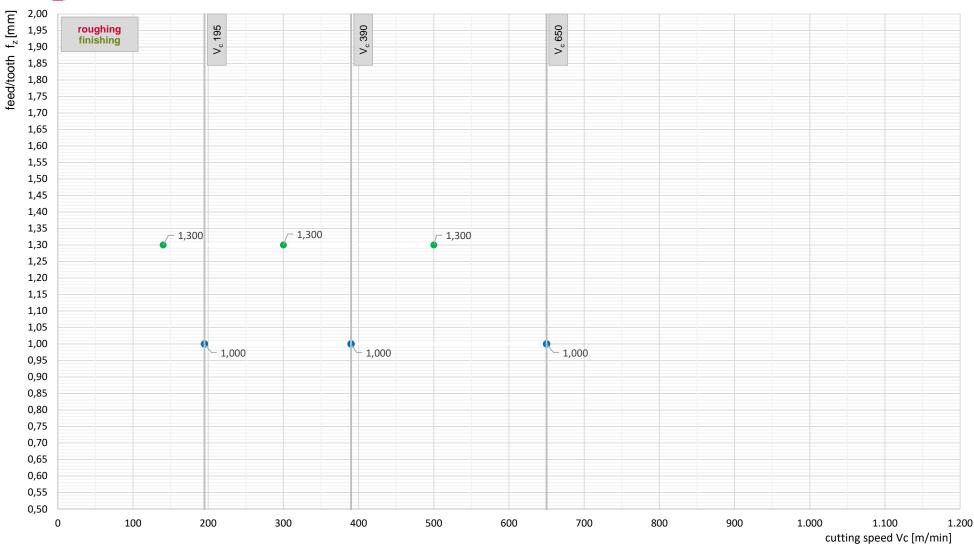cutting speed Vc [m/min]

Our recommendations on the use of the material are based on many years of experience and current scientific and practical knowledge. They are, however, provided without any obligation on our part and do not relieve the buyer of the need for suitability tests. They do not constitute a legal reationship, nor are any protected third party rights what´s ever affected thereby.

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Practical application of the cutting data
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cutting data used on the demonstrator

sequence of processing	processing strategy	a_e	a_p	offset	f_z	V_c
roughing torus D6	vol. roughing following contour	3,00	6,00	0,60	1,00	195
roughing torus D12	vol. roughing following contour	6,00	12,00	0,12	1,00	390
roughing torus D20	vol. roughing following contour	10,00	20,00	2,00	1,00	650
finishing ball D6	zigzag stroke milling	0,60	3,00	0,00	1,30	140
finishing ball D12	zigzag stroke milling	1,20	6,00	0,00	1,30	300
finishing ball D20	zigzag stroke milling	2,00	10,00	0,00	1,30	500

tools used on the demonstrator

tool manufacturer	tool type	D_c	L_0	L_1	L_2	z_n
hufschmied-tools.com/de/	PROTO-LINE / Torus	6,0	60,0	23,0	8,0	2
hufschmied-tools.com/de/	PROTO-LINE / Torus	12,0	100,0	55,0	16,0	2
hufschmied-tools.com/de/	PROTO-LINE / Torus	20,0	104,0	86,0	20,0	2
hufschmied-tools.com/de/	PROTO-LINE / Kugel	6,0	60,0	23,0	10,0	2
hufschmied-tools.com/de/	PROTO-LINE / Kugel	12,0	83,0	52,0	10,5	2
hufschmied-tools.com/de/	PROTO-LINE / Kugel	20,0	104,0	68,0	17,0	2

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