



Cutting data for milling

RAKU[®] TOOL SB-0351



formula for calculating speed (spindle)

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

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

formula for calculating axis feed rate

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

24000 [mm/min] = 15000 [rpm] x 0,800 [mm] x 2 [number]

recommended cutting data for roughing

| parameter | symbol | unit |
|------------------|--------|----------|
| radial infeed: | a_e | [mm] |
| axial infeed: | a_p | [mm] |
| number of teeth: | z_n | [number] |

| roughing recommendation | | |
|-------------------------|--------------------------------|--------------|
| min. | ideal | max. |
| - x D_c | 0,50 x D_c | 0,80 x D_c |
| 0,10 x D_c | 1,00 x D_c | 5,00 x D_c |
| 1 | 1 | 2 |

recommended cutting data for finishing

| parameter | symbol | unit |
|------------------|--------|----------|
| radial infeed: | a_e | [mm] |
| axial infeed: | a_p | [mm] |
| number of teeth: | z_n | [number] |

| finishing recommendation | | |
|--------------------------|--------------------------------|--------------|
| min. | ideal | max. |
| - x D_c | 0,10 x D_c | 0,80 x D_c |
| - x D_c | 0,50 x D_c | 1,00 x D_c |
| 1 | 1 | 2 |

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 | 820 | 0,800 | 13.057 | 20.892 | 10,00 | 20,00 | 86,0 | 20,0 |
| torus | 12,0 | 2 | 520 | 0,750 | 13.800 | 20.701 | 6,00 | 12,00 | 55,0 | 16,0 |
| torus | 6,0 | 2 | 280 | 0,700 | 14.862 | 20.807 | 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 | 650 | 1,000 | 10.350 | 20.701 | 2,00 | 10,00 | 67,0 | 17,0 |
| ball | 12,0 | 2 | 390 | 1,000 | 10.350 | 20.701 | 1,20 | 6,00 | 52,0 | 10,5 |
| ball | 6,0 | 2 | 195 | 1,000 | 10.350 | 20.701 | 0,60 | 3,00 | 23,0 | 10,0 |

| parameter | symbol | unit |
|----------------|--------|---------|
| cutting speed: | V_c | [m/min] |
| feed/tooth: | f_z | [mm] |

| user specifications | |
|--------------------------|--|
| selection in the diagram | |
| selection in the diagram | |

| | | |
|------------------|-------|----------|
| speed (spindle): | n | [rpm] |
| axis feed rate: | V_f | [mm/min] |

| | |
|---------------------|--|
| calculation by user | |
| calculation by user | |

| | | |
|-------------------------|-------|------|
| cutting diameter: | D_c | [mm] |
| tool total length: | L_0 | [mm] |
| tool unclamping length: | L_1 | [mm] |
| tool cutting length: | L_2 | [mm] |

| | |
|---------------------|--|
| processing specific | |
| processing specific | |
| processing specific | |
| processing specific | |

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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 relationship, nor are any protected third party rights what's ever affected thereby.

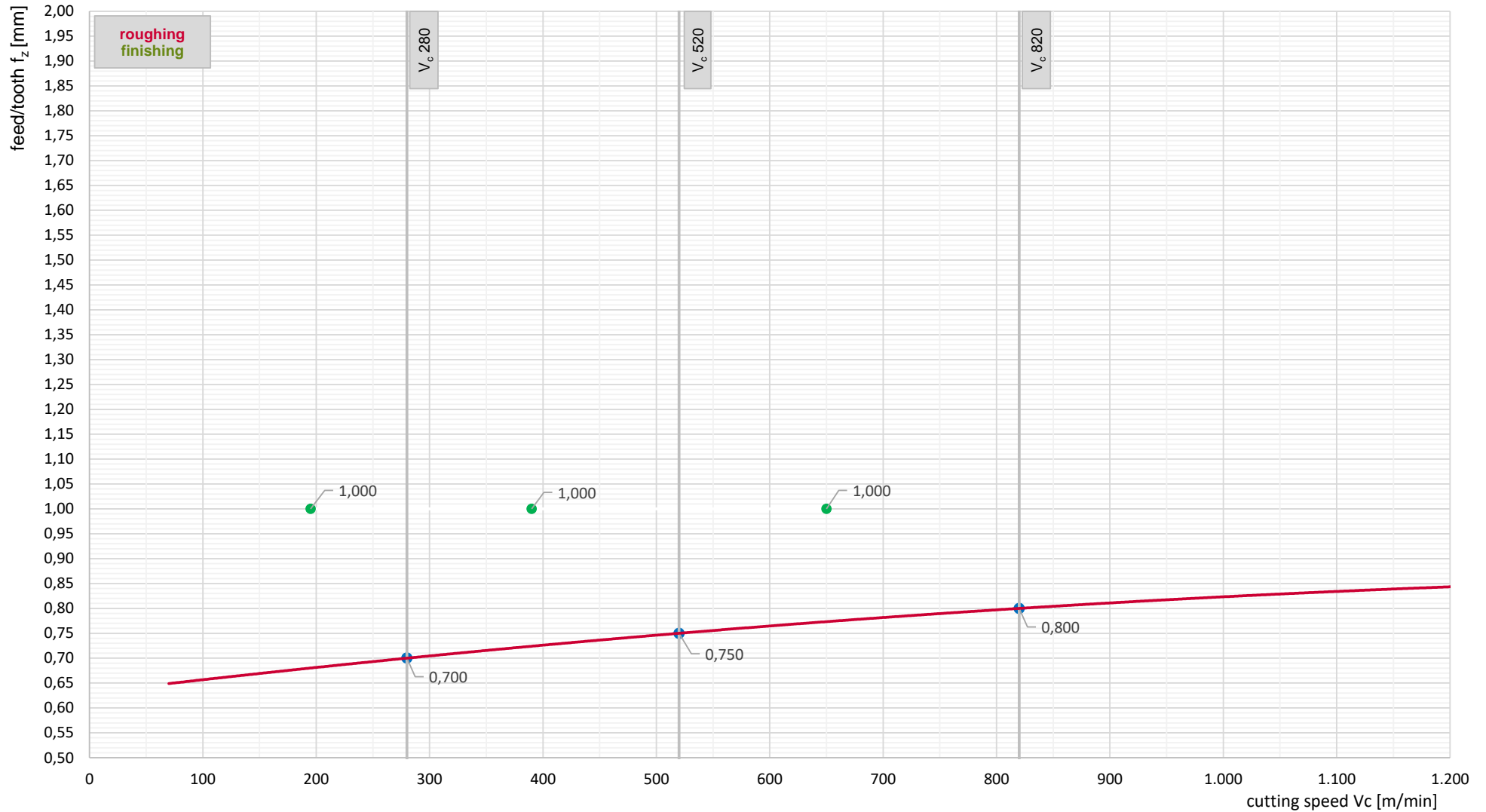
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Cutting data diagram for milling RAKU[®] TOOL SB-0351



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Practical application of the cutting data

RAKU[®] TOOL SB-0351



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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 | 0,70 | 280 |
| roughing torus D12 | vol. roughing following contour | 6,00 | 12,00 | 1,20 | 0,75 | 520 |
| roughing torus D20 | vol. roughing following contour | 10,00 | 20,00 | 2,00 | 0,80 | 820 |
| finishing ball D6 | zigzag stroke milling | 0,60 | 3,00 | 0,00 | 1,00 | 195 |
| finishing ball D12 | zigzag stroke milling | 1,20 | 6,00 | 0,00 | 1,00 | 390 |
| finishing ball D20 | zigzag stroke milling | 2,00 | 10,00 | 0,00 | 1,00 | 650 |

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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