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Technical operating parameters

The table below provides information on the performance values Q'_w, relevant to the process that can be used as an aid at the start of the grinding process and can be considered recommended values. Using the individually defined feed increment a_e, which specifies the profile depth of the workpiece, you define the optimal grinding process for your application, which is characterized by numerous grinding parameters, for a given recommended feed rate V_f.
The optimal feed rate is dependent on the diameter of the workpiece, the helix angle, the width of the flutes, as well as the cooling lubricant used and the machine performance available.

For the cutting speed V_c, we recommend a standard value of 18-20 m/s for flute grinding with our grinding wheels.

Formula:

$$Q'_w = \frac{a_e \cdot V_f}{60} \qquad V_f = \frac{Q'_w \cdot 60}{a_e}$$

Process parameters for grinding flutes on tungsten carbide drill bits and milling cutters

Based on values obtained from experience, you can start a flute grinding process with the following highlighted values. The parameters can then be optimized after that according to the individual requirements of the corresponding machine environment.

Profile depth a_e [mm] \ Feed V_f [mm/min]	30	40	50	60	70	80	90	100	120	140	160	180	200	220	240
3.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0
3.2	1.6	2.1	2.7	3.2	3.7	4.3	4.8	5.3	6.4	7.5	8.5	9.6	10.7	11.7	12.8
3.4	1.7	2.3	2.8	3.4	4.0	4.5	5.1	5.7	6.8	7.9	9.1	10.2	11.3	12.5	13.6
3.6	1.8	2.4	3.0	3.6	4.2	4.8	5.4	6.0	7.2	8.4	9.6	10.8	12.0	13.2	14.4
3.8	1.9	2.5	3.2	3.8	4.4	5.1	5.7	6.3	7.6	8.9	10.1	11.4	12.7	13.9	15.2
4.0	2.0	2.7	3.3	4.0	4.7	5.3	6.0	6.7	8.0	9.3	10.7	12.0	13.3	14.7	16.0
4.2	2.1	2.8	3.5	4.2	4.9	5.6	6.3	7.0	8.4	9.8	11.2	12.6	14.0	15.4	16.8
4.4	2.2	2.9	3.7	4.4	5.1	5.9	6.6	7.3	8.8	10.3	11.7	13.2	14.7	16.1	17.6
4.6	2.3	3.1	3.8	4.6	5.4	6.1	6.9	7.7	9.2	10.7	12.3	13.8	15.3	16.9	18.4
4.8	2.4	3.2	4.0	4.8	5.6	6.4	7.2	8.0	9.6	11.2	12.8	14.4	16.0	17.6	19.2
5.0	2.5	3.3	4.2	5.0	5.8	6.7	7.5	8.3	10.0	11.7	13.3	15.0	16.7	18.3	20.0
5.2	2.6	3.5	4.3	5.2	6.1	6.9	7.8	8.7	10.4	12.1	13.9	15.6	17.3	19.1	20.8
5.4	2.7	3.6	4.5	5.4	6.3	7.2	8.1	9.0	10.8	12.6	14.4	16.2	18.0	19.8	21.6
5.6	2.8	3.7	4.7	5.6	6.5	7.5	8.4	9.3	11.2	13.1	14.9	16.8	18.7	20.5	22.4
5.8	2.9	3.9	4.8	5.8	6.8	7.7	8.7	9.7	11.6	13.5	15.5	17.4	19.3	21.3	23.2
6.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	12.0	14.0	16.0	18.0	20.0	22.0	24.0

Start parameters for D46 | Start parameters for D54 | Start parameters for D64

Application examples:

In case you have any questions regarding the application technology, please contact us – our specialists are there for you to provide comprehensive advice on-site!

	Application Example 1
Workpiece	HM EMT 210UF, milling cutter Ø 12 mm with 4 flutes, 20° helix angle, flute depth 2.8 mm, flute length 40 mm, exposed length 58 mm
Grinding tool	3M™ 6PHN B10A-100×6×10-D46NFMAX-20-1A1
Grinding machine	EMAG Reinecker RS12
Cooling lubricant	Oil
	Grinding Parameters
Feed	v_f = 200 mm/min
Feed increment	a_e = 2.8 mm
Cutting speed	v_c = 18 m/s
Spec. material removal rate	Q_w = 9.3 $mm^3/mm \cdot s$

	Application Example 2
Workpiece	HM AF 40UF, milling cutter Ø 20 mm with 4 flutes, 20° helix angle, flute depth 5 mm, flute length 40 mm, exposed length 58 mm
Grinding tool	3M™ 6PHN B10A-100×6×10-D46NF-20-1A1
Grinding machine	Anca TX7+
Cooling lubricant	Oil
	Grinding Parameters
Feed	v_f = 110 mm/min
Feed increment	a_e = 5 mm
Cutting speed	v_c = 18 m/s
Spec. material removal rate	Q_w = 9.16 $mm^3/mm \cdot s$

	Application Example 3
Workpiece	Ceratizit CTS18D, milling cutter Ø 12 mm with 4 flutes, 20° helix angle, flute depth 2.4 mm, flute length 40 mm, exposed length 58 mm
Grinding tool	3M™ 6PHN B10A-100×6×10-D46NF-20-1A1
Grinding machine	Walter Helitronic Power
Cooling lubricant	Oil
	Grinding Parameters
Feed	v_f = 230 mm/min
Feed increment	a_e = 2.4 mm
Cutting speed	v_c = 18 m/s
Spec. material removal rate	Q_w = 9.2 $mm^3/mm \cdot s$

Wendt GmbH
3M Abrasives
Fritz-Wendt-Str. 1
40670 Meerbusch
Germany
Tel.: +49 2159 671-0

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