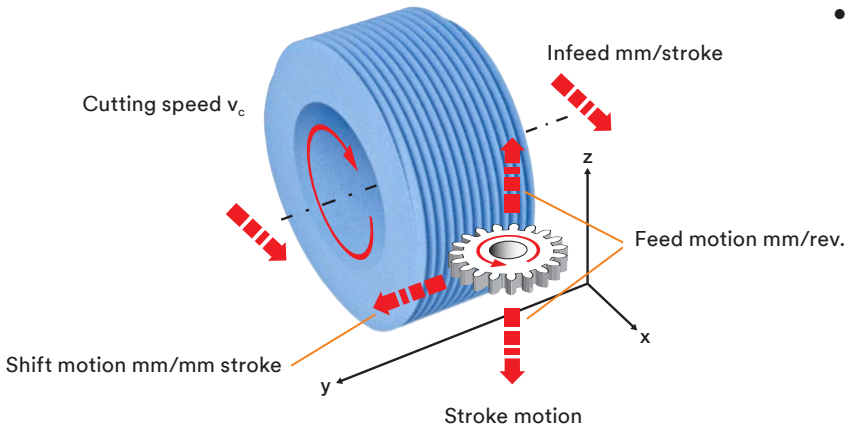
3M™ Cubitron™ II Vitrified Grinding Wheels for Continuous Generating Grinding

Gear grinding makes high demands on dimensional and contouring accuracy as well as the surface layer properties of the component. Despite the high contact areas, no thermal load (risk of grinding abuse) arises between the workpiece and the component.

Application examples:

- Spur gears
- Pinions/pinion shafts

3M™ Cubitron™ II grinding worm movement



The advantages at a glance:

- Risk of grinding abuse is virtually zero
- Up to 50% shorter grinding cycles
- Two times reduced dressing amount
- Grinding wheel service life twice as long
- Continuously constant grinding power
- Significantly higher grinding parameters than with standard tools

CUBITRON™ II

Recommended application data

Product Codes	3M™ Cubitron™ II 92VJ		3M™ Cubitron™ II 93VL	
Operating Parameters/Specifications	**93DA80/120 J18 VPLF29/601W**	**93DA80/80 J18 VPLF29/601W**	**99DA80/80 H8 V 901W**	**99DA120/60 H15 VPMF901W**
Applicable for module size	0.9–2.5 mm	1.8–10 mm	1.5–10 mm	4–16 mm
Cutting speed v_c (m/s VE-4)	80	80	80	63
Feed rate v_f (RPM)	2.5–4.0 / GG	2.5– 4.0 / GG	2.5–4.0 / GG	2.5–4.0 / GG
at 3gg	0.8–1.3	0.8–1.3	0.8–1.3	0.8–1.3
at 5gg	0.5–0.8	0.5–0.8	0.5–0.8	0.5–0.8
at 7gg	0.35–0.60	0.35–0.60	0.35–0.60	0.35–0.60
Infeed (a_e)	1 roughing stroke: a_e = a-0.02 mm/flank 2 roughing strokes: a_{e1} = (a-0.02 mm/flank)* 0.6 a_{e2} = (a-0.02 mm/flank)* 0.4 a = total grinding stock			
Theoretical mean chip thickness (h_{mom})	0.2–0.7µm	0.2–0.7µm	0.2–0.7µm	0.2–0.7µm
Shifting	• 30% reduction versus standard values (Reishauer machines, etc.) • With Liebherr machines increase of achievable grinding distance by 30% • Shift speed between 0.0.15 and 0.035 mm/mm stroke			
Cutting strategy	• For case-hardened steel: 1 x roughing stroke and 1 x finishing stroke • For low-performance machines: 2 x roughing stroke with extremely increased feed rates			

Dimensions by machine type

Various dimensions available for conventional machine types. Profiling as specified: module m, mobility gg, pressure angle

Reishauer	Liebherr	Gleason	Kapp	Höfler
275×125×160	195×200×90	220×180×90	240×125×115	400×280×160
275×160×160	240×230×110	240×125×120	280×160×115	
300×125×160	320×230×110		320×125×115	
300×145×160				

Service life and cost calculation generation grinding

Gearing Data		
Specification	Standard Aluminum Oxide	93DA80/80 J18VPLF29/601W
Grinding worm dimensions	300×125×160 mm	300×125×160 mm
Normal module	3 mm	3 mm
Number of teeth	55	55
Pressure angle	20°	20°
Helix angle (ß)	15.00°	15.00°
Cutting speed (vc)	63 m/s	63 m/s
Tooth width	32 mm	32 mm
Addendum modification coefficient (x)	0.157	0.157
Number of starts (gg)	3	3
Unclamping diameter (ds2)	185 mm	185 mm
Price for new grinding worm	$610.65	$977.04
Machine-hour rate	$170.98	$170.98

Operating Parameters		
Total radial infeed ($a_{e\ ges.}$)	0.42 mm	0.42 mm
Total flank infeed ($a_{e\ ges.}$)	0.14 mm	0.14 mm

Dressing		
Total dressing amount (a_e)	0.30 mm	0.30 mm
Number of parts between dressing cycles	30 x	50 x

Productivity Result	Standard Aluminum Oxide	93DA80/80 J18VPLF29/601W
Total removal	0.42 mm	0.42 mm
Total running time	00:03:00 h:m:s	00:01:30 h:m:s
Total wear of grinding worm per part	0.0200 mm	0.0120 mm
Grinding worm portion of cost	$0.106	$0.063
Number of workpieces/grinding worm	5750	9583
Total costs	$8.66	$4.33

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