

# 3M™ Cubitron™ II Vitrified Grinding Wheels for Bevel Gear Grinding

Gearings on bevel gears are subject to special requirements: efficient and reproducible production processes, smooth running, and low-maintenance operation — while meeting highest operating safety requirements — these are important properties to be mentioned.

3M™ Cubitron™ II Vitrified Grinding Wheels are designed for bevel gear pinions and ring gears and meet highest tolerance requirements of only a few micrometers while achieving the required surface finish and minimal wear — and all that almost free of grinding abuse.

3M™ Cubitron™ II Vitrified Grinding Wheels are suited both for grinding hardened components and for preliminary gearing (creep-feed grinding) of soft materials.

#### Application examples:

Various sizes of bevel gear pinions and ring gears in:

- Drive systems (e.g. vehicles and helicopters)
- Steering systems (e.g. shipbuilding)
- Agricultural and industrial machines



#### The advantages at a glance:

- Reduced grinding time by approximately 20–30%
- Doubled service life through reduced dressing amounts or longer intervals between dressing cycles
- Very low wear
- The risk of grinding abuse is virtually zero
- Significant increase of dressing roll service life



## Application recommendation

Cutting speed ( $v_c$ )	20–23 m/s
Feed rate ( $v_f$ )	Immersion: 120–150 mm/min Generation grinding: 24–30°/s

Dressing	Infeed: 0.04 mm
	Feed rate concave: 155 mm/min
	Feed rate convex: 155 mm/min
	Feed rate tip: 185 mm/min
Dressing after every 1st to 3rd component	

## Specification recommendation

Product Code	Specification	PSG	$v_c$ Max.	Structure	Comment
92VJ	93DA80/80 H12VP601	30%	32 m/s	porous	Universal <12
93VL	99DA80/80 H12VP901	100%	32 m/s	porous	Universal >=12"
	99DA80/80 K11VP901	100%	32 m/s	narrow	

## Service life and cost calculation bevel gear grinding

### Gearing Data

Specification	93A80 J11VP601	93DA80/80 H12VP601
Dimensions grinding wheel	225×95 W = 20	225×95 W = 20
Normal module (mm)	4 mm	4 mm
Number of teeth (z)	51	51
Pressure angle (alpha)	20°	20°
Helix angle ( $\beta_{m1}$ )	24°	24°
Pitch circle ( $d_{e2}$ )	246.70 mm	246.70 mm
Tooth width ( $z_b$ )	43 mm	43 mm
Tooth height ( $z_h$ )	11.10 mm	11.10 mm
Cutting speed ( $v_c$ )	25 m/s	22 m/s
Unclamping width ( $b_{s2}$ )	22 mm	22 mm
Original price grinding wheel	\$244.26	\$341.96
Machine-hour rate	\$122.13	\$122.13

### 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

Dressing infeed ( $a_e$ )	0.12 mm	0.04 mm
Number of parts between dressing cycles	1x	1x

### Evaluation

	93A80 J11VP601	93DA80/80 L7V901
Total material removal	0.42 mm	0.42 mm
Total running time	00:02:27 h:m:s	00:01:52 h:m:s
Total wheel wear per part	0.12 mm	0.04 mm
Cost share wheel	\$0.39/workpiece	\$0.182/workpiece
Number of workpieces per wheel	625 pcs.	1,875 pcs.
Total costs machine-hour rate	\$1.98/workpiece	\$3.80/workpiece
Total overall costs	\$5.37/workpiece	\$3.98/workpiece



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