

Bevel Gear Geometry and Preliminary Sizing

Sample document with complete example values. It shows the report the purchased export produces for YOUR input - it is not itself a report for any part.

Project: Sample project

Part/Position: no real part

Prepared by: Sample, not released

Overall assessment: OK - geometry plausible (no undercut, face width within the reference range).

Input

Number of teeth, pinion z_1	20
Number of teeth, gear z_2	40
Outer module m	4 mm
Shaft angle Σ	90 deg
Face width b	25 mm
Pinion torque T_1	100 Nm

Bevel gear geometry

Gear ratio $i = z_2/z_1$	2
Pitch cone angle, pinion δ_1	26.565 deg
Pitch cone angle, gear δ_2	63.435 deg
Pitch diameter, pinion d_1	80 mm
Pitch diameter, gear d_2	160 mm
Mean diameter, pinion dm_1	68.82 mm
Mean diameter, gear dm_2	137.64 mm
Outer cone distance R_e	89.44 mm
Mean cone distance R_m	76.94 mm
Mean module mm	3.441 mm

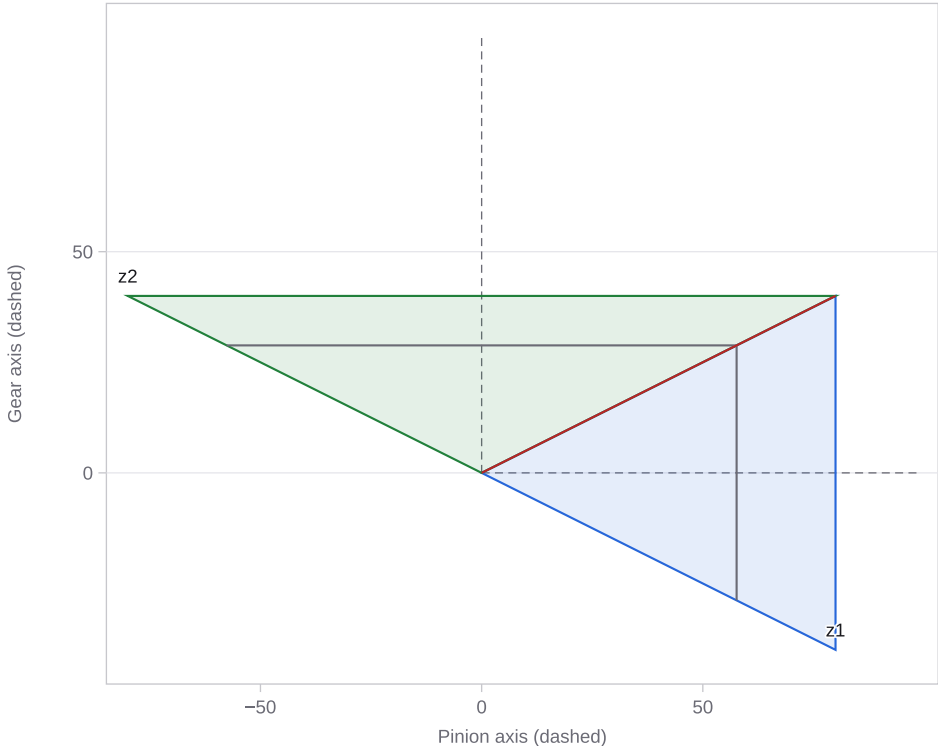
Equivalent gearing and force

Equivalent number of teeth, pinion z_{v1}	22.36
Equivalent number of teeth, gear z_{v2}	89.44
Limiting number of teeth z_g ($\alpha_n = 20^\circ$)	17.1
Tangential force $F_t = 2 \cdot T_1 / dm_1$	2,906.15 N

Geometric criteria

Criterion	Value	Limit	Status
Undercut: $z_{v,min}$ versus limiting number of teeth	22.36	17.1	● OK
Face width b/R_e versus reference value	0.28	0.333	● within guideline

Pitch cones (axial section)



Schematic axial section: cone apex at the axis intersection, dashed the two gear axes, red the common pitch cone line; the inner lines mark the face width b .

Calculation basis

Straight-tooth bevel gear geometry from closed-form equations: pitch cone angle $\delta_1 = \text{atan}(\sin \Sigma / (z_2/z_1 + \cos \Sigma))$ and $\delta_2 = \Sigma - \delta_1$, pitch diameter $d = m \cdot z$, outer cone distance $R_e = d_2 / (2 \cdot \sin \delta_2)$, mean diameter $d_m = d - b \cdot \sin \delta$ and equivalent number of teeth $z_v = z / \cos \delta$ for the virtual spur gearing. The tangential force $F_t = 2 \cdot T_1 / d_{m1}$ refers to the mean pitch circle of the pinion. The tool provides geometry and preliminary sizing; the full load-carrying capacity of bevel gears per ISO 10300 (tooth root, flank, load and geometry factors) is not included.

About this sample

All values on these pages come from a freely chosen example calculation and belong to no real part. The purchased export contains the same sections with your input, your header data (project, part, prepared by) and as searchable text. Pricing and scope: maschinenbaurechner.de/en/pricing

Note: The results are design and orientation aids. They do not replace independent verification, calculation and approval by a qualified person. The terms of use at maschinenbaurechner.de apply.