Spur Gear Geometry with Profile Shift

Project: _____ Part/Position: _____ Prepared by: _____

Sample document - numeric values are only included in the purchased Pro export.

Overall assessment: PASS

Inputs

Tooth counts z1 / z2	– – –
Normal module mn	– – – mm
Normal pressure angle alphan	– – – °
Helix angle beta	– – – °
Face width b	– – – mm
Specified via	– – –
Addendum modification k	– – –

Gearing geometry

Gear ratio u = z2/z1	– – –
Transverse module mt = mn/cos beta	– – – mm
Transverse pressure angle alphat	– – – °
Operating pressure angle alphawt	– – – °
Involute function inv alphawt	– – –

Profile shift and centre distance

Profile shift coefficient x1	– – –
Profile shift coefficient x2	– – –
Sum of profile shifts Sigmax	– – –
Profile shift V1 = x1·mn	– – – mm
Profile shift V2 = x2·mn	– – – mm
Reference centre distance ad	– – – mm
Operating centre distance a	– – – mm
Addendum modification k	– – – mm
Tip clearance c	– – – mm

Gear diameters

Pitch circles d1 / d2	– – – mm
Tip circles da1 / da2	– – – mm
Root circles df1 / df2	– – – mm
Base circles db1 / db2	– – – mm
Operating pitch circles dw1 / dw2	– – – mm
Normal tooth thicknesses sn1 / sn2 (pitch circle)	– – – mm

Contact ratio

Transverse contact ratio epsilonalpha	– – –
Overlap ratio epsilonbeta	– – –
Total contact ratio epsilongamma	– – –

Evaluation criteria

Criterion	Value	Limit	Status
Transverse contact ratio epsilonalpha (>= 1.25 recommended)	– – –	– – –	● PASS
Smallest margin x - x_limit (undercut)	– – –	– – –	● PASS
Tip clearance c (basic rack profile 0.25·mn)	– – – mm	– – – mm	● PASS

Notes and calculation basis

External involute spur/helical gear pair per Roloff/Matek ch. – – – and – – –, basic rack profile DIN 867 (addendum factor 1, tip clearance factor – – –). Calculation path: transverse module and transverse pressure angle from the helix angle, operating pressure angle via the involute function inv alphawt = 2·Sigmax/(z1+z2)·tan alphan + inv alphat (inverted by Newton iteration, stopping at 1e-12 rad) or, for a given centre distance, via cos alphawt = cos alphat·ad/a with back-calculation of the sum of profile shifts and its split per DIN 3992, then centre distance, pitch, base, tip, root and operating pitch circles, addendum modification with tip clearance as well as transverse, overlap and total contact ratio. Not included: internal gearing (annulus), tooth thickness allowances and backlash, tip tooth thickness or pointing limit, and the load capacity per ISO 6336.