

Timing Belt Drive Design

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

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

Overall assessment: PASS

Inputs

Profile ???
Tooth counts z_1 / z_2 ???
Belt tooth count z_R (given) ???
Small pulley speed n_1 ??? min⁻¹
Load ???

Geometry and kinematics

Pitch p ??? mm
Pitch diameter d_1 ??? mm
Pitch diameter d_2 ??? mm
Ratio $i = z_2/z_1$???
Large pulley speed n_2 ??? min⁻¹
Belt speed v ??? m/s

Belt length and centre distance

Belt tooth count z_R (selected) ???
Belt length $L = z_R \cdot p$??? mm
Centre distance a (back-calculated) ??? mm
Wrap angle β_{a1} (small pulley) ??? °
Teeth in mesh z_{e1} (small pulley) ???

Forces

Working force F_t ??? N
Pre-tension guideline per span F_v ??? N

Evaluation criteria

Criterion	Value	Limit	Status
Teeth in mesh z_{e1} (≥ 6 recommended)	???	???	● PASS
Belt speed v (≤ 40 m/s guideline)	??? m/s	??? m/s	● PASS
Tooth count z_1 against profile guideline	???	???	● PASS

Notes and calculation basis

Pre-tension per span given as a guideline range (??? ... ??? times the working force) - the exact pre-tension is manufacturer-specific (belt type, operating conditions).

Open two-pulley timing belt drive, trapezoidal profiles T/AT per DIN 7721 / ISO 5296 or HTD profiles per ISO 13050. Calculation path: pitch diameter $d = z \cdot p / \pi$, ratio and kinematics, belt length/centre distance either from the desired centre distance (approximation formula, back-calculated to a whole belt tooth count with the exact centre distance) or directly from the belt tooth count, wrap angle and teeth in mesh on the small pulley, belt speed, and optionally the working force and a pre-tension guideline range. Simplifications: tooth load capacity and the required belt width remain manufacturer-specific (catalogue) and are not part of this calculation; the pre-tension is a rough guideline, the exact value remains manufacturer-specific.

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.