

Belt Conveyor Design

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

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

Overall assessment: PASS

Inputs

Mass flow ?	??? t/h
Belt speed v	??? m/s
Conveying length L (horizontally projected)	??? m
Conveying height H	??? m
Belt mass m_G'	??? kg/m
Idler mass m_R' (carrying + return side)	??? kg/m
Main resistance coefficient f	???
Length surcharge factor C	???
Drive efficiency eta	???

Conveyed material and incline

Conveyed material mass m_L' = $\gamma/(3.6 \cdot v)$	??? kg/m
Incline angle $\delta = \arctan(H/L)$	??? °
cos delta	???

Resistances and driving force

Main resistance F_H	??? N
Gradient resistance F_St	??? N
Driving force $F_U = C \cdot F_H + F_{St}$	??? N

Drive power

Pulley power $P_T = F_U \cdot v$	??? kW
Motor power $P_M = P_T/\eta$	??? kW

Evaluation criteria

Criterion	Value	Limit	Status
Belt speed v (guideline range)	??? m/s	??? m/s	● PASS
Incline delta (guideline maximum)	??? °	??? °	● PASS
Main resistance coefficient f (guideline range)	???	???	● PASS

Notes and calculation basis

Simplified main resistance method per DIN 22101: the mass flow gives the conveyed material mass per metre, the conveying height and length give the incline angle. The main resistance lumps idler rolling friction, belt indentation resistance and belt bending resistance into the fictitious friction coefficient f, the gradient resistance follows from lifting the conveyed material. The length surcharge factor C (approximation $C \sim 1 + 60/L$, min. ??) approximates the secondary resistances, the driving force at the drive pulley is $F_U = C \cdot F_H + F_{St}$, the drive power $P_T = F_U \cdot v$ and the motor power $P_M = P_T/\eta$. Simplifications: start-up/braking cases, pulley friction and the troughing resistance in detail are not part of this calculation; for trough screw conveyors and the associated drive sizing see the screw conveyor and drive sizing calculators.

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.