

Chain Conveyor Design (Trough/Scraper Chain Conveyor)

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

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

Overall assessment: PASS

Inputs

Mass flow $\dot{m}$	?? ? t/h
Conveying speed v	?? ? m/s
Conveying length L	?? ? m
Conveying height H	?? ? m
Chain mass per metre and strand m_K'	?? ? kg/m
Material/trough friction coefficient μ_G	?? ?
Chain/rail friction coefficient μ_K	?? ?
Secondary resistance factor C	?? ?
Drive efficiency η	?? ?

Conveyed material and incline

Conveyed material mass $m_{L'} = \dot{m}/(3.6 \cdot v)$	?? ? kg/m
Incline angle δ	?? ? °

Resistances and driving force

Horizontal resistance material F_{material}	?? ? N
Horizontal resistance chain F_{chain}	?? ? N
Main resistance $F_H = F_{\text{material}} + F_{\text{chain}}$	?? ? N
Gradient resistance F_{grade}	?? ? N
Driving force $F_U = C \cdot F_H + F_{\text{grade}}$	?? ? N

Drive power and chain tension

Drive power $P = F_U \cdot v / (\eta \cdot 1000)$	?? ? kW
Chain tension $F_{\text{chain,max}} \sim F_U$	?? ? N

Evaluation criteria

Criterion	Value	Limit	Status
Conveying speed v (guideline range)	?? ? m/s	?? ? m/s	● PASS
Incline δ (guideline maximum)	?? ? °	?? ? °	● PASS

Notes and calculation basis

Simplified resistance method for trough/scraper chain conveyors: the mass flow gives the conveyed material mass per metre, and via the material/trough (μ_G) and chain/rail (μ_K) friction coefficients the horizontal resistances of the material and the chain (carrying and return strand) follow, giving the main resistance. The gradient resistance conservatively covers only lifting the conveyed material; the opposing contribution of the chain is neglected. Via the secondary resistance factor C , the driving force at the drive shaft follows, the drive power $P = F_U \cdot v / (\eta \cdot 1000)$ and - approximated without pretension - the chain tension $F_{\text{chain,max}} \sim F_U$. If an allowable chain tension from the chain catalogue is known, the utilisation $F_{\text{chain,max}}/F_{\text{allow}}$ is checked. Simplifications: no start-up/wear or sprocket polygon effect; for belt and screw conveyors see the belt conveyor and screw conveyor calculators, for the chain selection itself see the chain drive calculator.

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.