

Belt Friction Verification (Euler-Eytelwein)

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: not OK - the transmissible circumferential force is not sufficient for the required useful force, the rope slips.

Input

Friction coefficient μ	0.3
Wrap angle α	180 deg
Wraps	0.5
Specified tight-side force F_1	1,000 N
Required circumferential force $F_{t,req}$	500 N
Required safety S_{req}	1.5

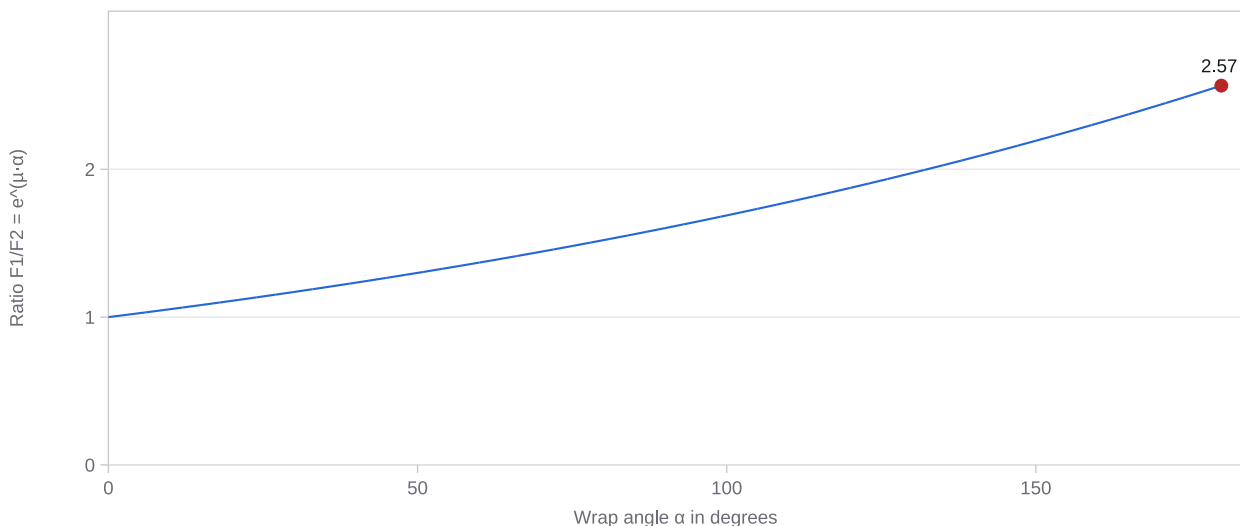
Results

Force ratio $e^{(\mu \cdot \alpha)}$	2.5663
Tight-side force F_1 (larger force)	1,000 N
Slack-side force F_2 (holding force)	389.66 N
Transmissible circumferential force $F_1 - F_2$	610.34 N

Anti-slip safety

Criterion	Value	Limit	Status
Safety $S = F_t / F_{t,req}$	1.22	1.5	● not OK

Force ratio over the wrap angle



Calculation basis

Belt (capstan) friction per Euler-Eytelwein: between the taut tight-side force F_1 and the slack-side force F_2 , at impending slip, $F_1/F_2 = e^{(\mu \cdot \alpha)}$ holds, with the friction coefficient μ and the wrap angle α in radians. The transmissible circumferential force is $F_1 - F_2$. The ratio grows exponentially with the wrap angle and is independent of the drum diameter. The limiting case of incipient slipping is calculated (Coulomb friction, perfectly flexible, inextensible rope); centrifugal forces and belt elasticity are not taken into account.

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.