

Wire/Tube Drawing Check (Drawing Force per Siebel)

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: OK - the drawing stress stays below the flow stress at the die exit, the draw is feasible.

Input

Mean flow stress k_f_m	500 N/mm ²
Initial diameter d_0	10 mm
Final diameter d_1	8 mm
Friction coefficient μ	0.05
Half die angle α	6 °
Flow stress at exit k_f_m,end	500 N/mm ²

Geometry and forming

Initial cross-section A_0	78.54 mm ²
Final cross-section A_1	50.27 mm ²
Cross-section reduction $(A_0 - A_1)/A_0$	36 %
Degree of deformation $\varphi = \ln(A_0/A_1)$	0.4463

Results

Ideal forming component $k_f_m \cdot \varphi$	223.1 N/mm ²
Friction component $k_f_m \cdot \varphi \cdot \mu / \alpha$	106.5 N/mm ²
Shear component $(2/3) \cdot k_f_m \cdot \alpha$	34.9 N/mm ²
Drawing stress σ_z	364.6 N/mm ²
Drawing force $F = \sigma_z \cdot A_1$	18,326 N
Forming efficiency η	61.2 %

Drawing limit check

Criterion	Value	Limit	Status
Utilization $\sigma_z / k_f_m,end$	0.729	1.000	● OK

Notes

Area reduction above 35 %: unusually high for a single pass. Splitting over several passes is usually required.

Calculation basis

The drawing force follows Siebel's approximation equation for wire and tube drawing: $\sigma_z = k_f_m \cdot \varphi \cdot (1 + \mu/\alpha) + (2/3) \cdot k_f_m \cdot \alpha$, with the degree of deformation $\varphi = \ln(A_0/A_1) = 2 \cdot \ln(d_0/d_1)$ and the half die angle α in radians. The first term captures the ideal forming work and the friction component in the die zone, the second the shear work from the redirection at the cone. The drawing force follows from $F = \sigma_z \cdot A_1$. The draw is only feasible as long as σ_z stays below the flow stress at the die exit k_f_m,end ; at $\sigma_z \geq k_f_m,end$ the wire breaks behind the die (drawing limit). Back-pull, counter-tension, and temperature- and speed-dependent effects 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.