

Thread Engagement - Stripping Strength

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

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

Overall assessment: fail - the thread strips before the bolt fractures, the required engagement depth is not reached.

Inputs

Thread ? ? ?
Bolt strength class ? ? ?
Tensile strength R_m , bolt ? ? ? N/mm²
Nut material ? ? ?
Tensile strength R_m , nut material ? ? ? N/mm²
Shear strength factor c ? ? ?
existing engagement depth l_e ? ? ? mm
required safety factor S against stripping ? ? ?

Results

Stress area A_S ? ? ? mm²
Bolt breaking force $F_S = R_m \cdot A_S$? ? ? N
Nut material shear strength $\tau_B = c \cdot R_m$? ? ? N/mm²
required engagement depth $l_{e,req}$? ? ? mm
Ratio $l_{e,req} / d$? ? ?

Stripping verification

effective engagement depth $l_{e,eff} = l_e - 0.8 \cdot P$? ? ? mm
strippable force F_{strip} ? ? ? N

Stripping verification

Criterion	Value	Limit	Status
$F_{strip} \geq S \cdot F_S$	???	???	● FAIL

Notes

Required engagement depth above ? ? ?·d: unfavorable material combination, consider a thread insert (e.g. Helicoil) or a stronger nut material.

Calculation basis

Simplified method (Roloff/Matek approximation) against internal thread stripping, not an exact calculation per VDI 2230 Part 1/2, Section ? ? ?. The bolt fractures at $F_S = R_m \cdot A_S$; the internal thread strips once the shear strength $\tau_B = c \cdot R_m$ is exceeded (typical values for c : steel ? ? ?, cast iron ? ? ?, aluminum ? ? ?, brass ? ? ?). The strippable force $F_{strip}(l_e) = \tau_B \cdot \pi \cdot d \cdot ? \cdot C \cdot (l_e - ? \cdot P)$ grows linearly with the effective engagement depth (thread engagement factor $C \sim ? \cdot ?$); the ? ? ·P deduction accounts for the chamfer and thread lead-in. Applies to metric coarse threads under static load. The exact VDI 2230 calculation distinguishes nut-thread and bolt-thread stripping separately, uses load-case-dependent factors C_1 to C_3 and the actual flank overlap, and accounts for thread tolerance position.

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.