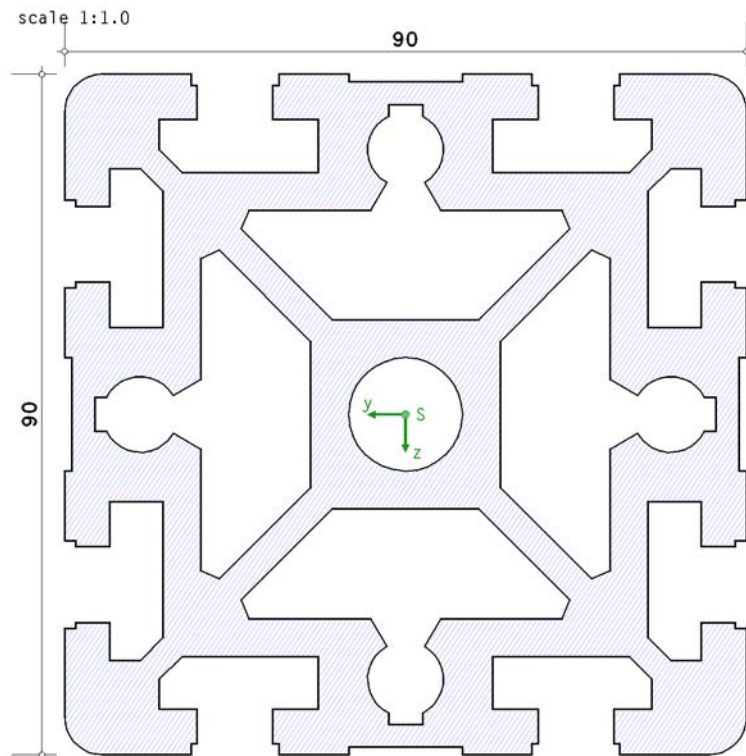


POS. 5: SPEZIAL, S235, STRESS PLANE

verification of cross-section EC 3-1-8 (12.10), NA: Deutschland

1. input report



steel

steel grade S235

material safety factor

resistance of cross-sections $\gamma_{M0} = 1.00$

geometry

section depth, width $h = 90.0$ mm, $b = 90.0$ mm

centroid $y_s = -45.0$ mm, $z_s = 45.0$ mm

cross-sectional area $A = 38.43$ cm²

second moment of area $I_y = 299.88$ cm⁴, $I_z = 299.89$ cm⁴

torsional moment of inertia $I_T = 152.12$ cm⁴

warping moment of inertia $I_\omega = 110.36$ cm⁶

resistance

elastic verification, calculation with the stress plane (without shear)

valid normal stress: $\sigma_{x,Rd} = 235.0$ N/mm²,

internal forces and moments referring to local axes of cross-section

σ -generating forces (N, M) work at centroid, τ -generating forces (V, T_t) work at shear center

Lk 1: $N_{Ed} = 100.00$ kN, $M_{y,Ed} = 500.00$ kNcm, $M_{z,Ed} = 800.00$ kNcm

notes

buckling is not investigated.

2. Lk 1

2.1. verification of cross-section

2.1.1. elastic verification

elastic verification for $N = 100.00$ kN, $M_y = 5.00$ kNm, $M_z = 8.00$ kNm

stress plane $\sigma_x = 26.02 + -2.668 \cdot y + 1.667 \cdot z$

min./max. normal stress $\sigma_{x,max} = 212.76$ N/mm², $\sigma_{x,min} = -160.72$ N/mm²

verification $U_\sigma = \sigma_{Ed}/\sigma_{Rd} = 0.905 < 1$ **ok**

3. final result

maximum utilization: resistance $\max U = 0.905 < 1$ **ok**

verification succeeded