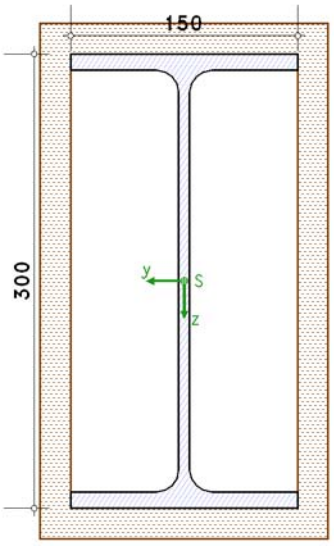
POS. 9: FIRE DESIGN EX. 4.6

fire design EC 3-1-2 (12.10), NA: Deutschland

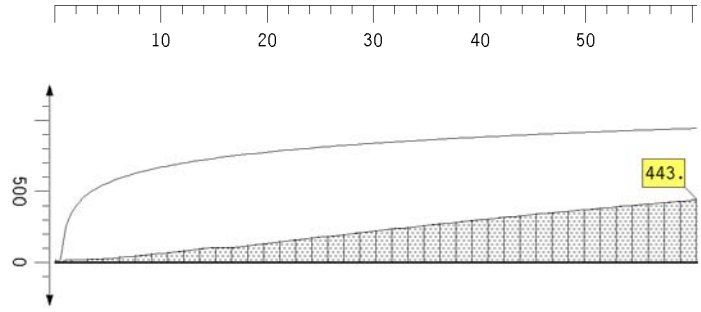
1. input report



steel
steel grade S235
geometry
section IPE300
cross-section temperature
thermal action due to the standard curve, fire resistance time t = 60 min
section all sides flamed
thermal insulation protection by Faser-Zement-plated structures:
thermal conductivity λ_p = 0.15 W/(m·K), specific heat capacity c_p = 1200 J/(kg·K), maximum density ρ_p = 800 kg/m³
moisture content p_p = 5.0 %
thickness of insulating material d_p = 20.0 mm

2. cross-section temperature

internal development of the fire-stressed box A_p = 900.0 mm²/mm
section factor of the protected component A_p/V = 900.0 / 5381.2 ·10³ = 167.2 1/m
temperature development:



temperature in °C
fire time in min
max T_a = 443.1°C
max t = 61 min

time saving due to moisture content of insulating material $t_v = (p_p \cdot \rho_p \cdot d_p^2)/(5 \cdot \lambda_p)$ = 2.1 min
cross-section temperature acc. to t = 60 min: T_a = 443.1 °C