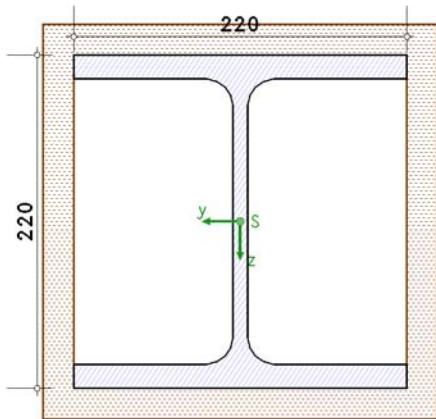


POS. 8: FIRE DESIGN EX. 4.5

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

1. input report



steel

steel grade S235

geometry

section HE220B

cross-section temperature

thermal action due to the standard curve, fire resistance time $t = 99$ min

section all sides flamed

thermal insulation protection by Gipskarton-plated structures:

thermal conductivity $\lambda_p = 0.20$ W/(m·K), specific heat capacity $c_p = 1700$ J/(kg·K), maximum density $\rho_p = 800$ kg/m³

moisture content $p_p = 20.0$ %

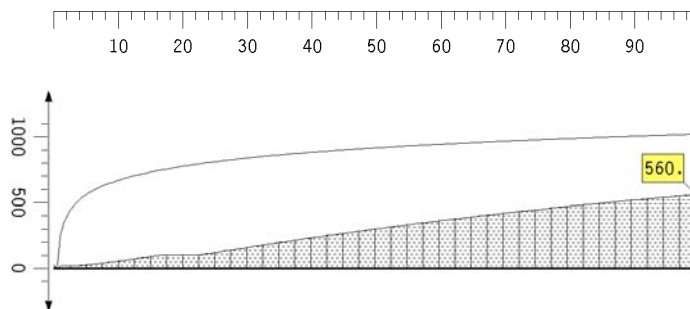
thickness of insulating material $d_p = 20.0$ mm

2. cross-section temperature

internal development of the fire-stressed box $A_p = 880.0$ mm²/mm

section factor of the protected component $A_p/V = 880.0 / 9104.1 \cdot 10^3 = 96.7$ 1/m

temperature development:



temperature in °C
fire time in min
max $T_a = 560.1$ °C
max $t = 100$ min

time saving due to moisture content of insulating material $t_v = (\rho_p \cdot p_p \cdot d_p^2) / (5 \cdot \lambda_p) = 6.4$ min

cross-section temperature acc. to $t = 99$ min: $T_a = 560.1$ °C