

Convección exterior

$$I \quad \dot{Q} = \alpha \cdot A \cdot (T_{aext} - T_{pex}) = 20 \frac{W}{m^2 K} \cdot 32 m^2 (29,5^\circ C - T_{pex})$$

Convección interior

$$II \quad \dot{Q} = \alpha \cdot A (T_{pint} - T_{aint}) = 20 \frac{W}{m^2 K} \cdot 32 m^2 (T_{pint} - 7,5^\circ C)$$

Conducción pared

$$III \quad \dot{Q} = \frac{\lambda \cdot A (T_{pex} - T_{pint})}{x} = \frac{0,5 \frac{W}{m K} \cdot 32 m^2 (T_{pex} - T_{pint})}{0,1 m}$$

$$I = II \quad 29,5^\circ C - T_{pex} = T_{pint} - 7,5^\circ C$$

$$IV \quad T_{pint} = 37^\circ C - T_{pex} \rightarrow T_{pint} = 37^\circ C - 18,9^\circ C = 18,1^\circ C$$

$$IV \text{ en } III \quad \dot{Q} = 160 \frac{W}{K} (T_{pex} - (37^\circ C - T_{pex}))$$

$$V \quad \dot{Q} = 160 \frac{W}{K} (2 \cdot T_{pex} - 37^\circ C)$$

$$V = I \quad 160 \frac{W}{K} (2 \cdot T_{pex} - 37^\circ C) = 640 \frac{W}{K} (29,5^\circ C - T_{pex})$$

$$\rightarrow 320 \frac{W}{K} T_{pex} - 5920 W = 18880 W - 640 \frac{W}{K} T_{pex}$$

$$\rightarrow T_{pex} = 18,9^\circ C$$