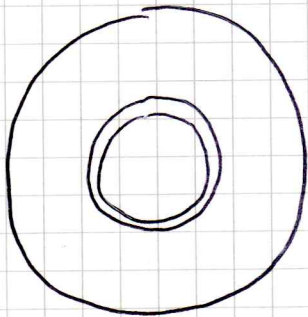


$$\textcircled{Q3} \quad \dot{Q} = \frac{\Delta T}{R} \rightarrow \Delta T = \dot{Q} R$$

$$T_{\text{Pint}} = T_{\text{int}} - \dot{Q} R = 90^\circ\text{C} - 83,3 \text{ W} \cdot 2,14 \cdot 10^{-3} \frac{\text{K}}{\text{W}} = 89,82^\circ\text{C}$$

$$T_{\text{Pext}} = 89,8^\circ\text{C} - 83,3 \text{ W} \cdot 6,84 \cdot 10^{-4} \frac{\text{K}}{\text{W}} = 89,76^\circ\text{C}$$



$$k_{\text{iso}} = 0,045 \frac{\text{W}}{\text{mK}}$$

$$D_{\text{ext,iso}} = 110 \text{ mm}$$

$$\textcircled{Q4} \quad R_{\text{iso}} = \frac{1}{2\pi \cdot 0,045 \frac{\text{W}}{\text{mK}} \cdot 1 \text{ m}} \cdot \ln \frac{110}{38} = 3,76 \frac{\text{K}}{\text{W}}$$

$\textcircled{Q5}$ R_1 et R_2 n'ont pas changé, mais R_3 si.

$$R_3 = \frac{1}{10 \frac{\text{W}}{\text{m}^2\text{K}} \cdot \pi \cdot 110 \cdot 10^{-3} \text{ m} \cdot 1 \text{ m}} = 0,289 \frac{\text{K}}{\text{W}}$$

$$R_{\text{eq}} = R_1 + R_2 + R_{\text{iso}} + R_3 = 4,05 \frac{\text{K}}{\text{W}}$$

$$\dot{Q}_{\text{tot}} = \frac{70^\circ\text{C}}{4,05 \frac{\text{K}}{\text{W}}} = 17,3 \text{ W (par 1 mètre)}$$

$$L = \frac{0,581 \frac{\text{J}}{\text{s}} \cdot 4187,6 \frac{\text{J}}{\text{kgK}} \cdot 1^\circ\text{K}}{17,3 \frac{\text{W}}{\text{m}}} = 141 \text{ m}$$

$$\textcircled{Q6} \quad T_{\text{Pint}} = 90^\circ\text{C} - 17,3 \text{ W} \cdot 2,14 \cdot 10^{-3} \frac{\text{K}}{\text{W}} = 89,96^\circ\text{C}$$

$$T_{\text{Pext}} = 89,96^\circ\text{C} - 17,3 \text{ W} \cdot 6,84 \cdot 10^{-4} \frac{\text{K}}{\text{W}} = 89,95^\circ\text{C}$$

$$T_{\text{ext,iso}} = 89,95^\circ\text{C} - 17,3 \text{ W} \cdot 3,76 \frac{\text{K}}{\text{W}} = 24,90^\circ\text{C}$$