$T_c \rightarrow T_f$

Ley de Newton

$$\boxed{\frac{dQ}{dt} = h \cdot A \left(T_c - T_f\right)}$$

Coeficiente de transferencia de calor

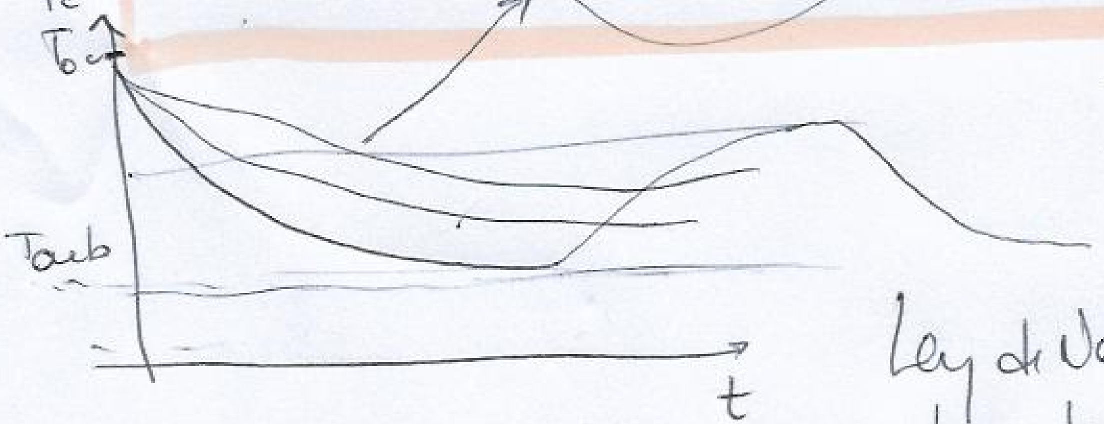
$$[h] = \frac{W}{m^2 K}$$

$$\boxed{\frac{dT_c(t)}{dt} = \frac{h \cdot A}{m_c \cdot c_c} \cdot \left(T_c(t) - T_f(t)\right)}$$

fuente

↓

$T_f = cte$

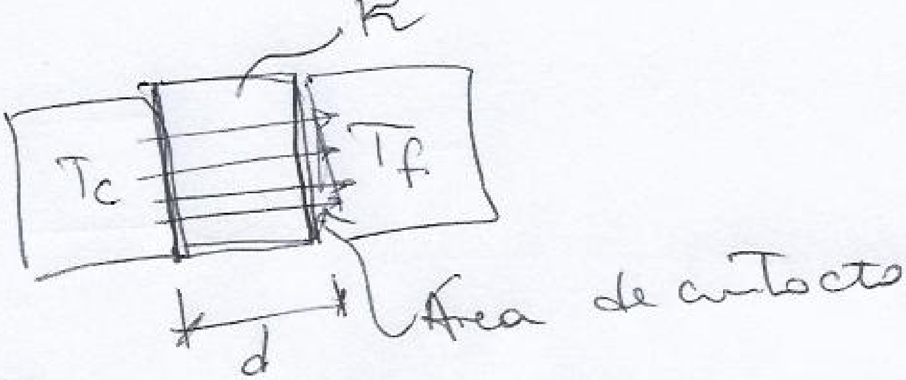


Ley de Newton para la temperatura

Conducción

↳ Convección

Radiación



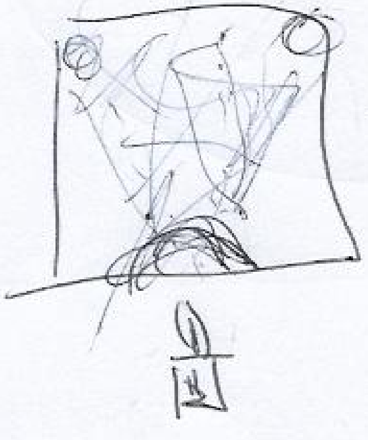
$$\dot{Q} = \frac{dQ}{dt} = \frac{K}{d} A \left(T_c - T_f\right) \qquad h = \frac{K}{d}.$$

$$[K] = \frac{[W]}{m^2 K} \qquad K = \frac{W}{mK}$$ conductividad térmica.

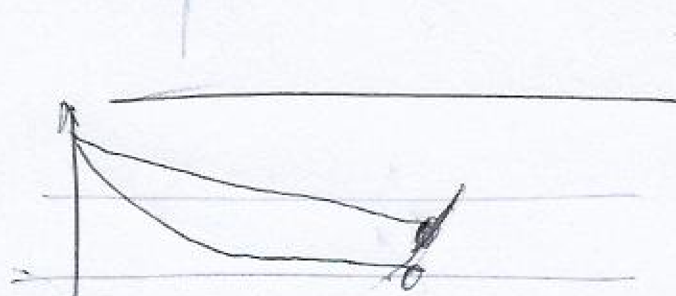
K ↑ mejor conductor. $K > 10\ W/mK$.

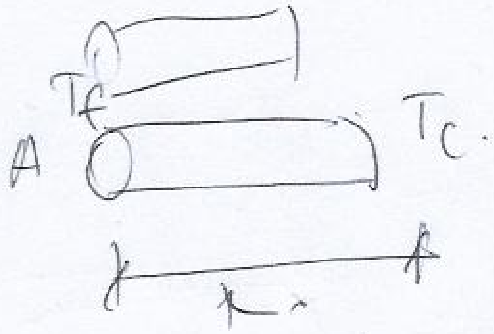
K ↓ mejor aislante. $K < 1\ W/mK$

Aislante ter.



$\rho = 1/K$





$$\rho = \frac{1}{\cancel{\rho} K}$$

$$I_q = \left(\frac{kA}{L}\right) \cdot \Delta T$$

$1/R$

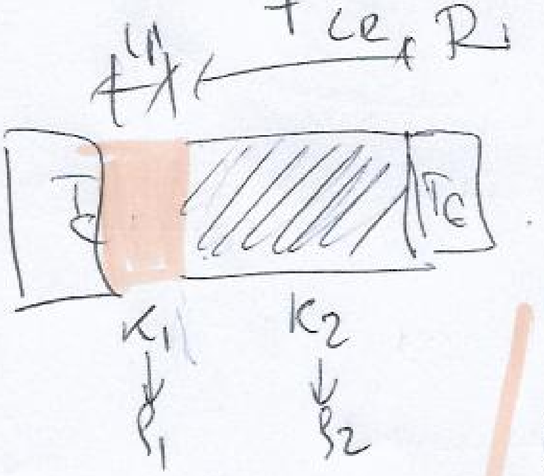
Resist. eléctrica.

$$R = \frac{L}{KA} \Rightarrow R = \frac{\rho \cdot L}{A}$$

$$\rho = \frac{1}{K}$$ Resistividad.

$$\lambda \leftarrow K = \frac{1}{\rho}$$ Conductividad

$$I_q = \frac{\Delta T}{R_{eq}} \Rightarrow \boxed{\Delta T = I_q R.}$$



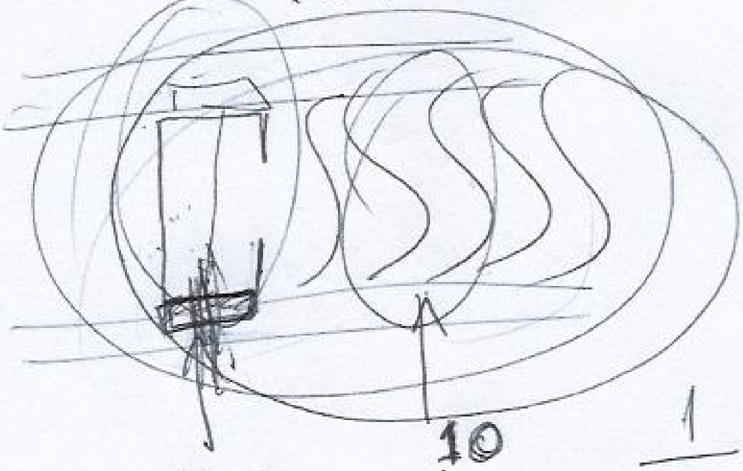
$$R_i = \frac{\rho_i L_i}{A_i} = \frac{L_i}{k_i A_i}$$

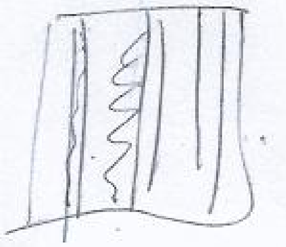
$$\boxed{R_{eq} = \sum_{i=1}^{N} R_i}$$

$$R_i = \frac{L_i}{k_i A_i} = \frac{L_i \rho_i}{A_i}$$

Resist. térmicas paralelo

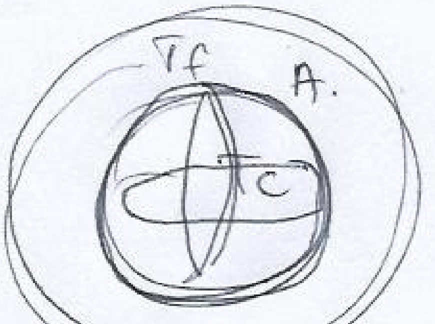
$$R_{eq} = \frac{1}{\sum_{i=1}^{N} 1/R_i} \Rightarrow \boxed{\frac{1}{R_{eq}} = \sum_{i=1}^{N} \frac{1}{R_i}}$$





$$\frac{1}{R_{eq}} = \frac{1}{10} + \frac{1}{1} = 1,1$$

$$R_{eq} = \frac{1}{1,1} = 0,9$$



$$\frac{dQ_c}{dt} = \sigma A \left(T_c^4 - T_f^4\right)$$

$$\frac{dQ_f}{dt} = -\sigma A \left(T_f^4 - T_c^4\right)$$

$$\frac{dQ_c}{dt} = -\sigma A_c \left(T_c^4 - T_f^4\right)$$

$$= -\sigma A_c \left((T_c^2)^2 - (T_f^2)^2\right)$$

$$= -\sigma A_c \left[\left(T_c^2 - T_f^2\right)\left(T_c^2 + T_f^2\right)\right]$$

T_f constante.

$$\frac{dQ}{dt} \neq h A . \Delta T$$

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$$\frac{dQ}{dt} = -\sigma A_c \left[\underbrace{\left(T_c^2 + T_f^2\right)}_{\simeq 2T_f^2} \underbrace{\left(T_c + T_f\right)}_{\simeq 2T_f} \underbrace{\left(T_c - T_f\right)}_{\Delta T} \right]$$

$$\frac{dQ}{dt} \simeq -\sigma A_c 4 T_f^3 \Delta T$$

$$\frac{dQ}{dt} \simeq -\underbrace{\left(\sigma 4 T_f^3\right)}_{h} A_c \Delta T$$

Ley de radiación
en temperaturas
$T_c \simeq T_f$
↓
Ley de Newton.