Dilatación:

Es el aumento de volumen debido al aumento de temperatura.

Anomalía del agua:

4°C → $(D_{agua})_{máximo} = 1000 kg/m^3$

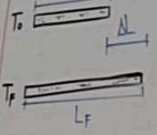
Dilatación ↑

Contracción ↓

0°C

Tipos de dilatación:

1) Dilatación lineal



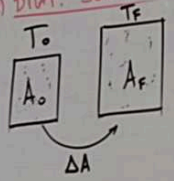
$\Delta L = L_F - L_o$

$\Delta L = L_o . \alpha . \Delta T$

$L_F = L_o(1 + \alpha . \Delta T)$

α: coef. dilat. lineal $(°C^{-1})$

2) Dilat. Superficial



$\Delta A = A_F - A_o$

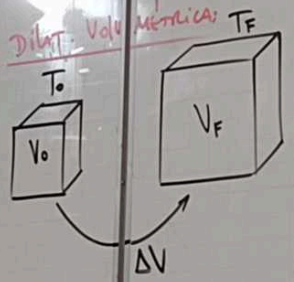
$\Delta A = A_o . \beta . \Delta T$

$A_F = A_o(1 + \beta . \Delta T)$

β: coef. dilat. superficial $(°C^{-1})$

$\beta = 2\alpha$

3) Dilat. Volumétrica:



$\Delta V = V_F - V_o$

$\Delta V = V_o . \gamma . \Delta T$

$V_F = V_o(1 + \gamma . \Delta T)$

γ: coef. dilat. volumétrica $(°C^{-1})$

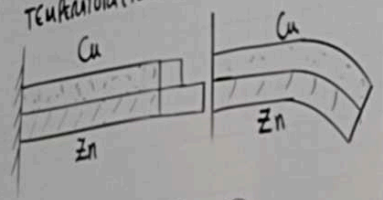
$\gamma = 3\alpha$

Densidad (D) v.s Temperatura (T)

$$D_{Final} = \frac{D_{inicial}}{1 + \gamma . \Delta T}$$

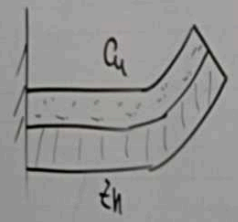
$\alpha_{Cu} < \alpha_{Zn}$

③ TEMPERATURA (T=0°C)

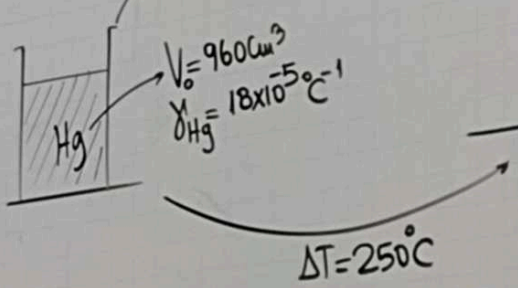


1) $T<0°C$ $\Delta L = L_0 \alpha \Delta T$

2) $T>0°C$ $\Delta L = L_0 \alpha \Delta T$



④



$V_{RECIPIENTE} = 1000 Cm^3$

$\gamma_{RECIPIENTE} = 128 \times 10^{-7} °C^{-1}$

$V_0 = 960 Cm^3$

$\gamma_{Hg} = 18 \times 10^{-5} °C^{-1}$

$\Delta T = 250°C$

$V_{F\,RECIP.} = V_0(1 + \gamma \cdot \Delta T) = 1000(1 + 128 \times 10^{-7} \times 250)$

$= 1000 + 32000000 \times 10^{-7}$

$= 1003{,}2 Cm^3$

$V_{F\,Hg} = V_0(1 + \gamma \cdot \Delta T) = 960(1 + 18 \times 10^{-5} \times 250) =$

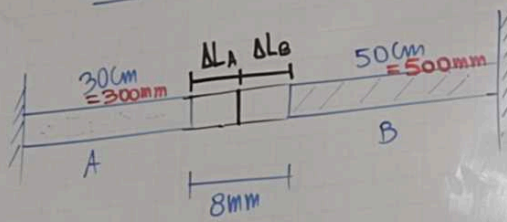
$= 960 + 4320000 \times 10^{-5}$

$= 1003{,}2 Cm^3$

$\alpha_{LATÓN} = 1{,}8\times10^{-5}\,°C^{-1}$; $\alpha_{Fe} = 1{,}2\times10^{-5}\,°C^{-1}$

DATO: $3\alpha_A + 5\alpha_B = 2\times10^{-4}\,°C^{-1}$

⑤



$\Delta L_A + \Delta L_B = 8\,mm$

$(L_o.\alpha.\Delta T)_A + (L_o.\alpha.\Delta T)_B = 8$

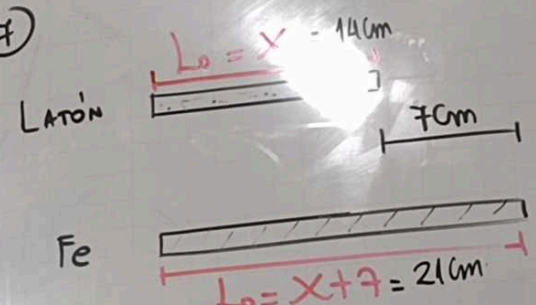
$300\alpha_A.\Delta T + 500.\alpha_B.\Delta T = 8$

$100\Delta T(3\alpha_A + 5\alpha_B) = 8$

$100\Delta T.\ 2\times10^{-4} = 8$

$\Delta T = 4\times10^{2} = 400°C$

⑦



$\Delta L_{LATÓN} = \Delta L_{Fe}$

$(L_o.\alpha.\Delta T)_{LATÓN} = (L\ \alpha.\Delta T)_{Fe}$

$X.1{,}8.10^{-5}.\Delta T = (X+7).1{,}2.10^{-5}.\Delta T$

$1{,}8X = 1{,}2X + 8{,}4$

$0{,}6X = 8{,}4 \rightarrow \boxed{X = 14Cm}$

$\alpha_{Fe} = 12 \times 10^{-6} °C^{-1} \rightarrow \gamma = 3\alpha = 36 \times 10^{-6} °C^{-1}$

(16) $T = 0°C \rightarrow D_0 = 7,85 g/cm^3$

$T = 100°C \rightarrow D_F = ?$

$$D_F = \frac{D_0}{1 + \gamma \cdot \Delta T}$$

$$D_F = \frac{7,85}{1 + 36 \times 10^{-6} \times 100}$$

$$D_F = \frac{7,85}{1 + 0,0036}$$

$$D_F = \frac{7,85}{1,0036} = 7,822 g/cm^3$$

$\alpha_{Cu} = 17 \times 10^{-6} °C^{-1}$

(17) $L_0 = 100cm$

$T_0 = 20°C$

$\Delta L = ?$

$T_F = 100°C$

$$\Delta L = L_0 \cdot \alpha \cdot \Delta T$$

$$\Delta L = 100 (17 \times 10^{-6})(80)$$

$$\Delta L = 136 \times 10^{-3}$$

$$\Delta L = 0,136 cm$$

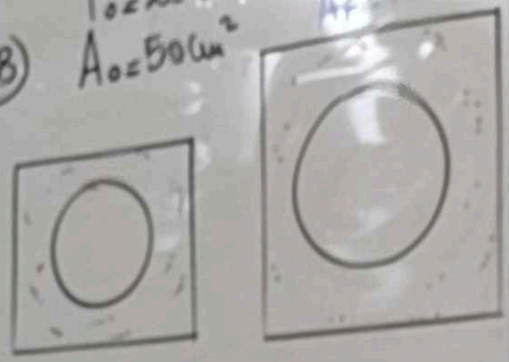
$\alpha = 17 \times 10^{-6}$

$T_0 = 20°C$

(18) $A_0 = 50 cm^2$

$T_F = 120°C$

$A_F = ?$



$$A_F = A_0 (1 + \beta \cdot \Delta T)$$

$$A_F = 50 (1 + 34 \times 10^{-6} \times 100)$$

$$A_F = 50 + 170000 \times 10^{-6}$$

$$A_F = 50 + 0,17$$

$$A_F = 50,17 cm^2$$

(5)