PAG. 634 N 16

$\ell_0 = 25{,}47\ km$

$t_0 = 12{,}5\ °C$

$t = 55{,}0\ °C$

$\Delta t = t - t_0 = 42{,}5\ °C$

$\Delta \ell = \ell_0 \lambda \Delta t$

$\ell = \ell_0 (1 + \lambda \Delta t)$

$\ell = (25{,}47\ km)(1 + 23{,}1 \times 10^{-6} \times 42{,}5)$

$= 25{,}4950\ldots\ km$

$\simeq 25{,}50\ km$

17)

$l_0 = 55\ cm \qquad t_0 = 20\ °C \qquad \lambda = 16{,}5 \times 10^{-6}\ °C^{-1}$

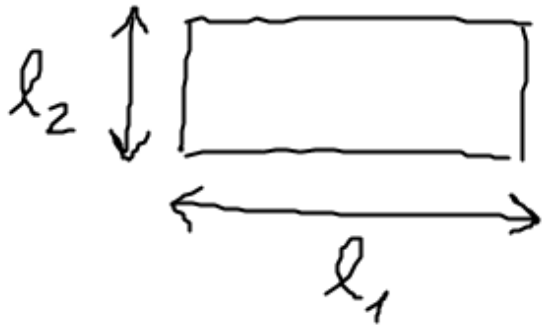
$d = 1{,}5\ mm = \Delta l$

$$\Delta l = l_0 \lambda \Delta t \Longrightarrow \Delta t = \frac{\Delta l}{l_0 \lambda} =$$

$$= \frac{0{,}15\ \cancel{cm}}{(55\ \cancel{cm})(16{,}5 \times 10^{-6})}\ °C =$$

$$= 165{,}289\ldots\ °C$$

$$t_{FINALE} = 20\ °C + 165{,}289\ldots\ °C \simeq 185\ °C$$



$$A = \ell_1 \cdot \ell_2$$

$\Delta t \longrightarrow$

$$\ell_{2\,FIN.} = \ell_2 (1 + \lambda \Delta t)$$

$$\ell_{1\,FIN.} = \ell_1 (1 + \lambda \Delta t)$$

$$A_{FIN.} = \ell_{1\,FIN.}\, \ell_{2\,FIN} = \ell_1 \ell_2 (1 + \lambda \Delta t)^2$$

$$(1 + \lambda \Delta t)^2 = 1 + 2\lambda \Delta t + \cancel{\lambda^2 \Delta t^2} = 1 + 2\lambda \Delta t$$

$\cancel{\lambda^2 \Delta t^2} \approx 0$

$$A_{FIN.} = A (1 + 2\lambda \Delta t)$$

COEFF. DI DILATAZ. SUPERF.

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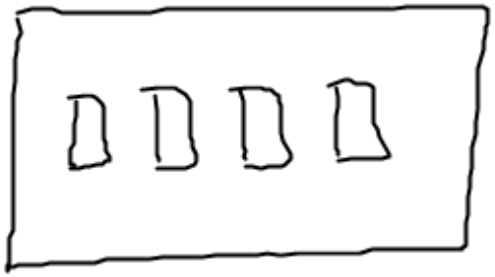

$l_1 = 140\ mm$

$l_2 = 105\ mm$

$15\ mm \times 30\ mm$

$\Delta t = 5\ °C$

$\lambda = 1{,}9 \times 10^{-5}\ °C^{-1}$

$$A_{INIZ.} = \left[140 \times 105 - 4(15 \times 30)\right] mm^2$$

$$A_{FIN.} = A_{INIZ.}(1 + 2\lambda\Delta t)$$

$$A_{FIN.} = A_{INIZ.} + A_{INIZ.} 2\lambda\Delta t$$

$$\Delta A = A_{INIZ.} 2\lambda\Delta t$$

$$\frac{\Delta A}{A_{INIZ.}} = 2\lambda\Delta t = 2 \cdot 1{,}9 \times 10^{-5} \times 5 \simeq 0{,}00019$$

$$= 0{,}02\ \%$$