1. DONNÉES DE BASE

Incendie survenant sur une flaque de benzène suite au déversement de 28.3 m3 de liquide avec une épaisseur de 2 cm.

$m = \rho \cdot V = 882 \times 28.3 = 24960$ kg
$u_W = 5$ m/s
$m_\infty'' = 0.085$ kg/m²·s (from table 6.2)
$k \times \beta = 2.7$ m^{-1}
υ = kinematic viscosity of air at 15 °C, $7.5133 \cdot 10^{-6}$ m²/s
$g = 9.80665$ m/s

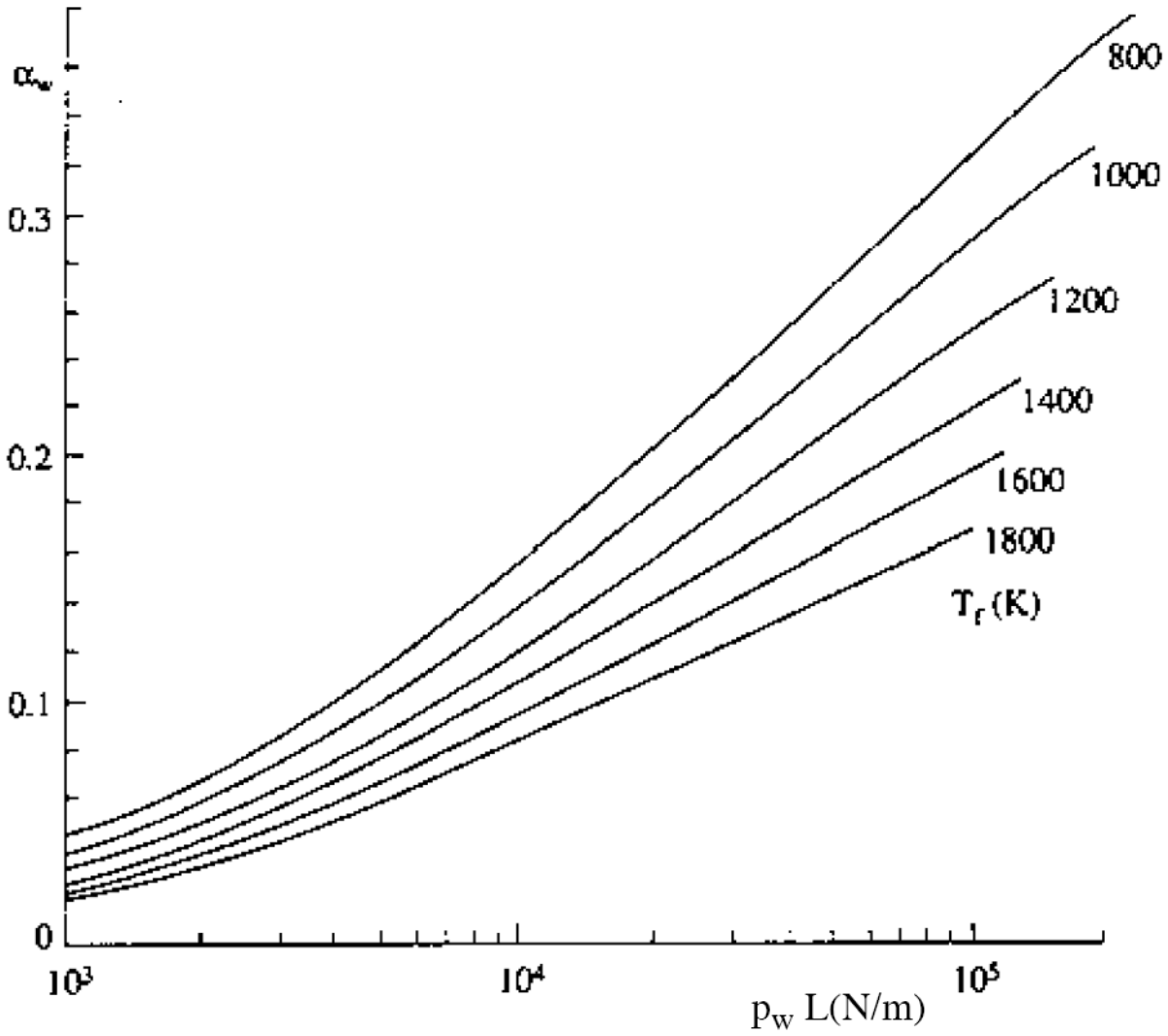
$RH = 0.7 = 70\%$
$p_w^o = 1705$ N/m^2 (RH = 1) at 15 °C
$p_c = 30.3975$ N/m^2 in air (0.03% CO_2 in atmosphere)
T_a = Ambient temperature 15 °C = 288.15 K
$\varsigma = 0.8 = 80\%$
$\Delta H_c = 4.015 \cdot 10^7$ J/kg
$T_b = 80.056$ °C (= 353.206 K)
$\rho_{air} = 1.2243$ kg/m^3
$x = 100$ m (from centre of pool)
$SEP_{soot} = 20 \cdot 10^3$ J/m²·s

2. QUESTION

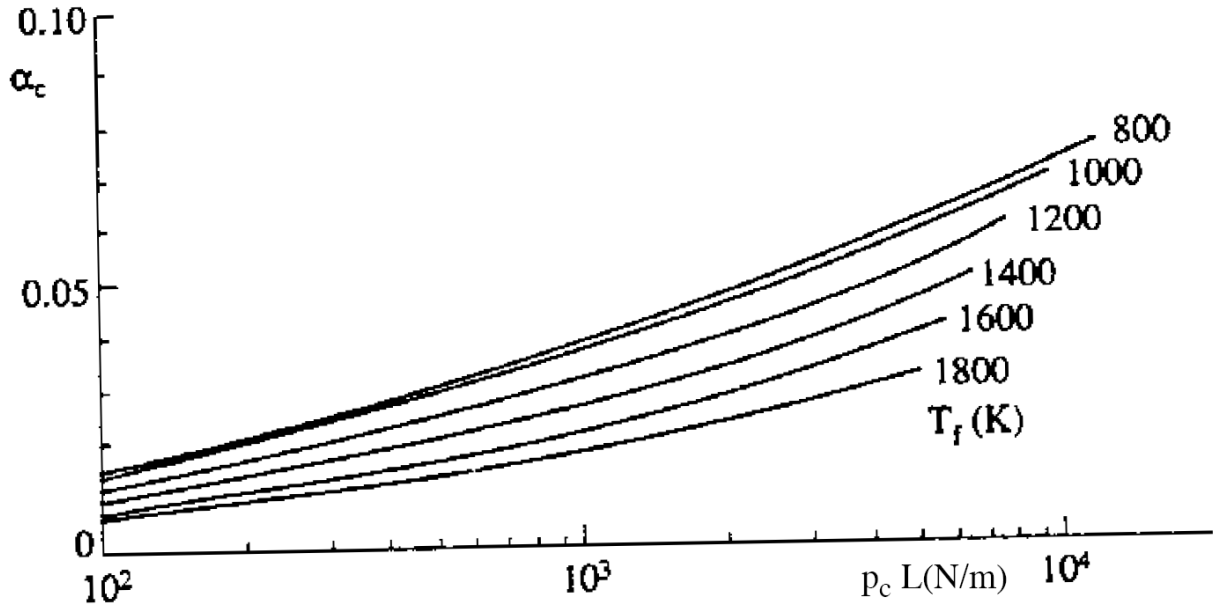
Calculer le flux thermique à une distance de 100 mètres du centre du feu de flaque.

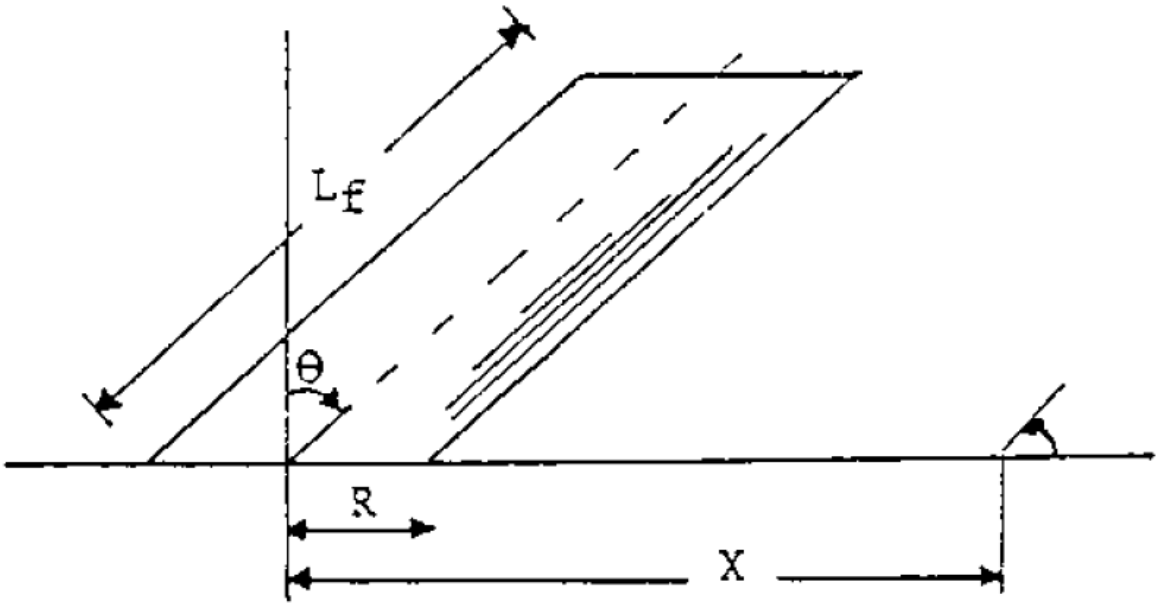
3. DONNÉES SUPPLÉMENTAIRES

Alpha H2O



Alpha CO2





Paramètres déduits :

$a = L/R\ (L_b/R \text{ or } L_f/R)$

$b = X/R$

$A = \sqrt{(a^2 + (b+1)^2 - 2 \times a \times (b+1) \times \sin\theta)}$

$B = \sqrt{(a^2 + (b-1)^2 - 2 \times a \times (b-1) \times \sin\theta)}$

$C = \sqrt{(1 + (b^2 - 1) \times \cos^2\theta)}$

$D = \sqrt{((b-1)/(b+1))}$

$E = (a \times \cos\theta)/(b - a \times \sin\theta)$

$F = \sqrt{(b^2 - 1)}$

Facteur de forme (Fv et Fh)

$$\pi F_v = -E \tan^{-1} D + E\left[\frac{a^2 + (b+1)^2 - 2b(1 + a \sin\theta)}{AB}\right]\tan^{-1}\left(\frac{AD}{B}\right)$$

$$+ \frac{\cos\theta}{C} \times \left[\tan^{-1}\left(\frac{ab - F^2 \sin\theta}{FC}\right) + \tan^{-1}\left(\frac{F^2 \sin\theta}{FC}\right)\right]$$

$$\pi F_h = \tan^{-1}\left(\frac{1}{D}\right) + \frac{\sin\theta}{C}\left[\tan^{-1}\left(\frac{ab - F^2 \sin\theta}{FC}\right) + \tan^{-1}\left(\frac{F^2 \sin\theta}{FC}\right)\right]$$

$$- \left[\frac{a^2 + (b+1)^2 - 2(b + 1 + ab \sin\theta)}{AB}\right]\tan^{-1}\left(\frac{AD}{B}\right)$$

Facteur de forme maximum

$$F_{max} = \sqrt{(F_v^2 + F_h^2)}$$