

ANEXO A. MEMORIA DE CÁLCULO EVALUACIÓN DEL RIESGO DE INCENDIO Y EXPLOSIÓN

Factor de confianza para el control de pérdidas

Diésel

$$C1 = 0.98$$

$$C2 = 0.94$$

$$C3 = 0.97 \quad CT = 0.94$$

Petróleo

$$C1 = 0.98$$

$$C2 = 0.85$$

$$C3 = 0.88 \quad CT = 0.82$$

$$\text{Ec. 1} \quad 939.76\text{m}^3 \times 850 \text{ kg/m}^3 = 798.79 \text{ kg Diésel} \times \text{Tk}$$

$$\text{Ec. 2} \quad 10.3 \text{ Mcal/kg} \times 789.79 \text{ kg} = \mathbf{8,134,837 \text{ Mcal}}$$

$$\text{Ec. 3} \quad \mathbf{a} = 29 \times \text{beq}^{07} \times \text{m}^{0.6}$$

$$\mathbf{a = 45.52}$$

Diésel

$$\mathbf{m} = k \frac{hc}{hv} \times 10^{-3}$$

$$\mathbf{m} = \frac{41870}{233} \times 10^{-3}$$

$$\mathbf{m = 0.19}$$

Petróleo

$$m = k \frac{hc}{hv} \times 10^{-3}$$

$$m = \frac{47000}{233} \times 10^{-3}$$

$$m = 0.14$$

Radio equivalente

Tanque Diésel

$$b_{eq} = 7.31$$

$$\text{Ec. 4.} \quad b_{eq} = \sqrt{\frac{bp}{\pi}}$$

$$b_{eq} = \sqrt{\frac{24 \times 7}{\pi}}$$

$$b_{eq} = \sqrt{\frac{168}{\pi}}$$

Tanque Petróleo

$$\text{Ec. 5.} \quad b_{eq} = \sqrt{\frac{bp}{\pi}}$$

$$b_{eq} = \sqrt{\frac{70 \times 45}{\pi}}$$

$$b_{eq} = \sqrt{\frac{9900}{\pi}}$$

$$b_{eq} = 56.1$$

Altura de la llama

$$\text{Ec. 6} \quad k = \frac{h_v}{C_p \Delta T + h_v} \times 10^{-3}$$

$$k = \frac{41,870}{(157 - 25) + 233}$$

$$k = 0.11$$

$$\text{Ec. 7} \quad k = \frac{h_v}{C_p \Delta T + h_v} \times 10^{-3}$$

$$k = \frac{47,000}{2.09(150 - 25) + (335)} \times 10^{-3}$$

$$k = 0.076$$

Diésel

Petróleo

$$\text{Ec. 8} \quad a = 29 \times b_{eq} \times m^{0.6}$$

$$\text{Ec. 9} \quad a = 29 \times b_{eq} \times m^{0.6}$$

$$a = 29 \times 7.35 \times (0.11)^{0.6}$$

$$a = 57 \text{ m de altura}$$

$$a = 29 \times 30.52 \times (0.07)^{0.6}$$

$$a = 179 \text{ m de altura}$$

Diésel

$$\text{Ec. 10} \quad d = 2.02 (P_v \times X)^{-0.09}$$

$$d = 2.02 (246,400 \times 27)^{-0.09}$$

$$d = 0.49$$

$$P_v = P_s \times H$$

$$P_v = 3,520 \times 70 \%$$

Petróleo

$$\text{Ec. 11} \quad d = 2.02 (P_v \times X)^{-0.09}$$

$$d = 0.43$$

Radio

Diésel

$$\text{Ec.12} \quad b \times p = \pi \times b_{eq}^2$$

$$\text{Ec 13.} \quad b_{eq} = (b \times p / \pi)^{1/2}$$

$$b_{eq} = ((24 \times 7) / \pi)^{1/2}$$

$$b_{eq} = 7.31$$

$$\text{Ec. 14} \quad m = \frac{hc}{C_p \Delta T + h_v} 10^{-3}$$

$$m = \frac{41870}{(157-25)+233} \times 10^{-3}$$

$$m = 0.11$$

Diésel

FVH

Diésel

$$\frac{a}{b} = \frac{57}{24} = 2.37 \quad \frac{c}{b} = \frac{68}{24} = 2.83$$

FVV

$$\frac{b}{c} = \frac{24}{68} = 0.35 \quad \frac{a}{c} = \frac{57}{27} = 2.11$$

Factor visión horizontal para $\frac{a}{b}=2.37$ $\frac{c}{b}=2.83$

$$F_h = 0.0355$$

Factor visión horizontal para $\frac{b}{c}=0.35$ $\frac{a}{c}=2.11$

$$F_h = 0.0581$$

Petróleo

$$b_{eq} = (b \times p / \pi)^{1/2}$$

$$b_{eq} = (65 \times 45 / \pi)^{1/2}$$

$$b_{eq} = 30.52$$

Petróleo

Diésel

Quemaduras mortales (protegidos con ropa)

$$Pr = -37.23 + 2.56 \ln (t l^{4/3})$$

$$Pr = -37.23 + 2.56 \ln (5 \times 80^{4/3})$$

$$Pr = 5.42$$

Quemaduras mortales (protegidos sin ropa)

$$Pr = -36.38 + 2.56 \ln (t l^{4/3})$$

$$Pr = -36.38 + 2.56 \ln (5 \times 80^{4/3})$$

$$Pr = 6.27$$

$$\text{Ec. 15 } m = \frac{hc}{C_p \Delta T + h_v}$$

$$m = \frac{47000}{2.09(150-25)+235} \times 10^{-3}$$

$$m = 0.076$$

Petróleo

FVH

$$\frac{a}{b} = \frac{179}{65} = 2.75 \quad \frac{c}{b} = \frac{112}{65} = 1.72$$

FVV

$$\frac{b}{c} = \frac{65}{112} = 0.58 \quad \frac{a}{c} = \frac{179}{112} = 1.59$$

Factor visión horizontal para $\frac{a}{b}=2.75$ $\frac{c}{b}=1.72$

$$F_h = 0.0572$$

Factor visión horizontal para $\frac{c}{b}=0.58$ $\frac{a}{c}=1.59$

$$F_h = 0.1068$$

Quemaduras 2° grado

$$Pr = -43.14 + 3.0188 \ln (t l^{4/3})$$

$$Pr = -43.14 + 3.0188 \ln (5 \times 80^{4/3})$$

$$Pr = 7.16$$

Quemaduras 1° grado

$$Pr = -39.83 + 3.0186 \ln (t l^{4/3})$$

$$Pr = -39.83 + 3.0186 \ln (5 \times 80^{4/3})$$

$$Pr = 10.46$$

Petróleo

Quemaduras mortales (protegidos con ropa)

$$Pr = -37.23 + 2.56 \ln (t l^{4/3})$$

$$Pr = -37.23 + 2.56 \ln (5 \times 20,000^{4/3})$$

$$Pr = 0.69$$

Quemaduras mortales (protegidos sin ropa)

$$Pr = -36.38 + 2.56 \ln (t l^{4/3})$$

$$Pr = -36.38 + 2.56 \ln (5 \times 20,000^{4/3})$$

$$Pr = 1.54$$

Quemaduras 2° grado

$$Pr = -43.14 + 3.0188 \ln (t l^{4/3})$$

$$Pr = -43.14 + 3.0188 \ln (5 \times 20,000^{4/3})$$

$$Pr = 1.58$$

Quemaduras 1° grado

$$Pr = -39.83 + 3.0186 \ln (t l^{4/3})$$

$$Pr = -39.83 + 3.0186 \ln (5 \times 20,000^{4/3})$$

$$Pr = 4.88$$

Masa equivalente

$$W = \frac{n \times M \times Ec}{E_{CTNT}}$$

$$W = \frac{(0.10)(2369.37)841870}{4520}$$

$$W = 2194.8 \text{ kg de TNT}$$