



**HEATSHIELDING LIMITED**



**WIND LOADING FOR WIND SHIELD PANELS**

Wind Force to be applied are calculated in accordance with API Recommended Practice 2A-WSD

$$F = \rho/2 \times C_s \times A \times U^2(z t)$$

With

- F force expressed in N
- $\rho$  mass density of air (1.226Kg.m<sup>3</sup>)
- C<sub>s</sub> shield coefficient (1)
- A wind surface in m<sup>2</sup> (Effective Area of Weat Shielding)
- U(z,t) 1 min mean wind speed expressed in m.s<sup>-1</sup> at the considered elevation.

**Wind Load Calculation taken at centre of Panel Elevation 40.53m**

$$U(z,t) \text{ at cog} = U(z) \times [1 - 0.41 \times I_u(z) \times \ln(t/t_0)]$$

Where

$$t_0 = 3600 \text{ sec.}$$

$$U_z = U_0 \times [1 + C \times \ln(z/10) ]$$

$$U_0 = 55.5 \text{ m.s}^{-1} \quad \text{Extrapolated from table 4.4}$$

$$C = 5.73 \times 10^{-2} \times (1 + 0.0457 \times U_0)^{1/2}$$

$$C = 5.73 \times 10^{-2} \times (1 + 0.0457 \times 55.5)^{1/2} \\ = 0.1078$$

$$\text{Therefore } U_z = 55.5 \times [1 + 0.1078 \ln 4.053] \\ = 63.873 \text{ ms}^{-1}$$

I<sub>u</sub>(z) Turbulence intensity at elevation 40.53m

$$I_u(z) = 0.06 \times [1 + 0.0131 \times U_0] \times (z/10)^{-0.22} \\ = 0.06 \times [1 + 0.0131 \times 55.5] \times (4.053)^{-0.22} \\ = 0.076$$

$$\text{Therefore } U_{zt} = 63.873 \times [1 - 0.41 \times 0.076 \times \ln 60/3600] \\ = 72.02 \text{ m.s}^{-1}$$

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Effective Area of Wind Shield P02 = 1.321m<sup>2</sup>

(Assuming all wind shielding is at 90° to applied wind force)

$$\begin{aligned} \text{Wind Force } F &= 1.226/2 \times 1 \times 1.321 \times 72.02^2 \\ &= 4.2\text{kN} \end{aligned}$$

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