WIND LOADING FOR HEAT SHIELD PANELS

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

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

With

F	force expressed in	N
ρ	mass density of air	(1.226 Kg.m^3)
Cs	shield coefficient	(1)
A	wind surface in m^2	(Effective Area of Heat Shielding)

U(zt) 1 min mean wind speed expressed in m.s^{-1} at the considered elevation.

Wind Load Calculation taken at centre of Heatshield Panel at Elevation 54.22m

$U(zt) \text{ at cog} = U(z) \times [1-0.41 \times Iu(z) \times \ln(t/to)]$

Where

to = 3600 sec.

$Uz = Uo \times [1+C \times \ln(z/10)]$

$Uo = 45.3 m.s^{-1}$

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

$C = 5.73 \times 10^{-2} \times (1 + 0.0457 \times 45.3)^{1/2}$
$= 0.1$

Therefore $Uz = 45.3 \times [1 + 0.1 \ln 5.422]$
$= 52.95 ms^{-1}$

Iu(z) Turbulence intensity at elevation 54.22m

$Iu(z) = 0.06 \times [1 + 0.0131 \times Uo] \times (z/10)^{-0.22}$
$= 0.06 \times [1 + 0.0131 \times 45.3] \times (5.422)^{-0.22}$
$= 0.066$

Therefore $Uzt = 52.95 \times [1 - 0.41 \times 0.066 \times \ln 60/3600]$
$= 58.82 m.s^{-1}$

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Effective Area of Wind Shield = 5.26m²

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

Wind Force F = 1.226 / 2 x 1 x 5.26 x 58.82²
= 11.156 kN

Wind Loading / m² = 2.12 kN/m²