

Wind Loading

Calculation of the Wind Surface and the Wind Load of Antennas



1. EXPLANATION OF TERMS:

L : Length [m]	c : Shape Factor
D : Diameter [m]	v : Wind Speed short-time mean value (gust speed) [ms ⁻¹]
A _P : »Projected« Area (or effective »frontal area«) [m ²]	q : Dynamic Wind Pressure [Nm ⁻²]
A _W : Wind Surface [m ²]	F : Wind Load [N]

2. WIND SURFACE:

The projected area for e.g. a cylindrical antenna rod is calculated simply as:

$$A_P = L \cdot D \text{ [m}^2\text{]}$$

For round antenna whips, shape factor $c = 1.2$, and the wind surface is calculated as:

$$A_W = c \cdot A_P = 1.2 \cdot A_P \text{ [m}^2\text{]}$$

3. WIND LOAD:

The wind load F is determined by: $F = q \cdot A_W$

– where the dynamic wind pressure $q = 0.64 \cdot v^2$

@ $v = 150 \text{ km/h}$, F is given by:

$$F = 1111 \cdot A_W \text{ or } F = 1333 \cdot A_P \text{ [N]}$$

@ $v = 160 \text{ km/h}$, F is given by:

$$F = 1264 \cdot A_W \text{ or } F = 1533 \cdot A_P \text{ [N]}$$

(As v is the short-time mean value wind speed, a gust factor is not included).

4. SURVIVAL WIND SPEED

The majority of the antennas are rated at a survival wind speed of $v = 160 \text{ km/h}$ with a safety margin of at least 30%.

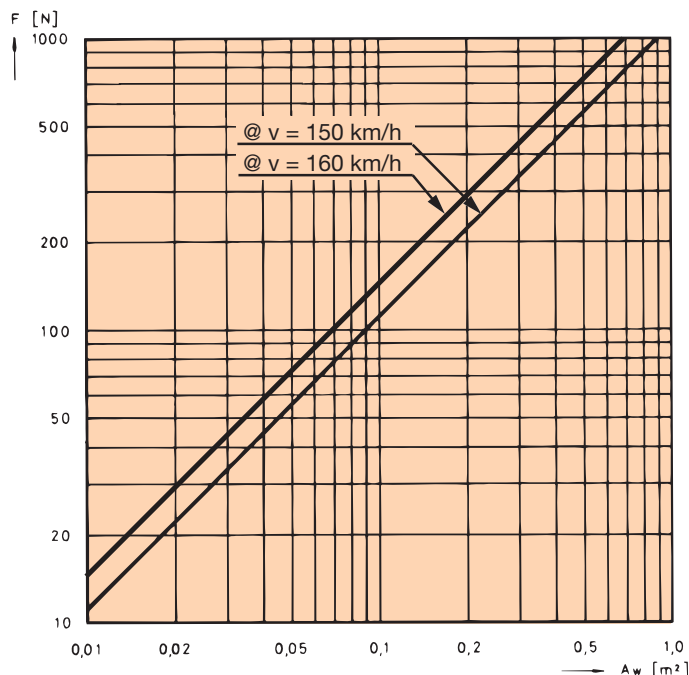
5. ICE LOADING

With radial ice the maximum survival wind speed will be reduced and is calculated assuming the same wind loading F as:

$$v_{MAX} = 150 \sqrt{\frac{A_W}{A_{W, ICE}}} \text{ [km h}^{-1}\text{]}$$

$$v_{MAX} = 160 \sqrt{\frac{A_W}{A_{W, ICE}}} \text{ [km h}^{-1}\text{]}$$

– where $A_{W, ICE}$ is the new wind surface including the ice layer.



PROCOM A/S reserve the right to amend specifications without prior notice.