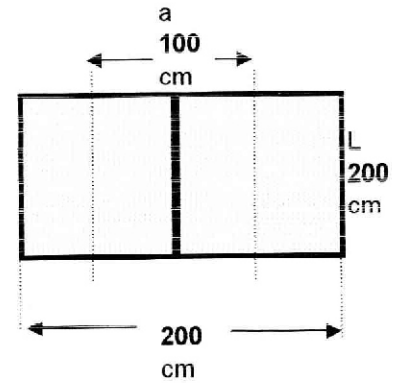


Properties of profile :

$I_{x'x}$	19	CM ⁴
$I_{x'x}/V$	9	CM ³

Parameters :

Free span length	200 cm	(L)
Horizontal Distance	100 cm	(a)
Young Modulus	720000 kg/cm ²	(E)
Wind Speed	130 km/h	(V)
Topogray	1.00	(S1)
Ground roughness	0.83	(S2)
Security factor	1.00	(S3)



$$\text{Wind Speed m/s} = \frac{130 * 1000}{3600} = 36.1 \text{ m/s (V)}$$

$$\text{Deflector Factor} = \frac{L}{200} = \frac{200}{200} = 1.00 \text{ cm (d)}$$

Wind Load Calculations

$$V_s \text{ Design Wind Speed} = V \times S1 \times S2 \times S3 = 36.11 \times 1.0 \times 0.83 \times 1.00 = 29.972 \text{ m/s} = (Vs)$$

$$q \text{ Design Wind Pressure} = K \times V_s^2 = 0.0625 \times 898 = 56.1 \text{ KG/M}^2$$

$$C_p \text{ Pressure Factor} = 1.1$$

$$Q \text{ Design Wind Pressure} = C_p \times q = 1.1 \times 56.1 = 61.8 \text{ KG/M}^2$$

$$w \text{ Load} = Q \times a = 61.8 \times 1 = 61.8 \text{ KG/M} = 0.618 \text{ KG/CM}$$

$$\text{Moment of inertia REQUIRE} = \frac{5 \times w \times L^4}{384 \times E \times d} = \frac{5 \times 0.618 \times 200 \times 200 \times 200 \times 200}{384 \times 720000 \times 1.00}$$

$$= 17.9 \text{ CM}^4 \quad 5$$

$$\text{REQUIERED Moment of inertia} = 17.9 \text{ CM}^4$$

$$\text{Moment of inertia provided} = 19 \text{ CM}^4 \text{ Standards}$$

Stress Calculations

$$\text{Maximum Wind Moment } M_{\max} : \frac{W \times L^2}{8} =$$

$$\frac{61.8 \times 2 \times 2}{8} = \begin{matrix} 30.88 \text{ KG-M} \\ 3088 \text{ KG-CM} \end{matrix}$$

Yield Stress of Aluminium **160 N/mm² = 1631 kg/cm²**

$$\text{Allowable Stress } f_y = \text{Yield Stress} / \text{Fat. Of Safety}$$

$$1631 / 1.35 = \begin{matrix} 1208 \text{ kg/cm}^2 \\ f_y \end{matrix}$$

$$(\text{Z req}) \text{ Section Modulus Required } \frac{M_{\max}}{f_y} = \frac{3088}{1208} = \begin{matrix} 2.556 \text{ CM}^3 \end{matrix}$$

Section Modulus Provided **9 CM³**

Standards

Building height above ground , factor S2

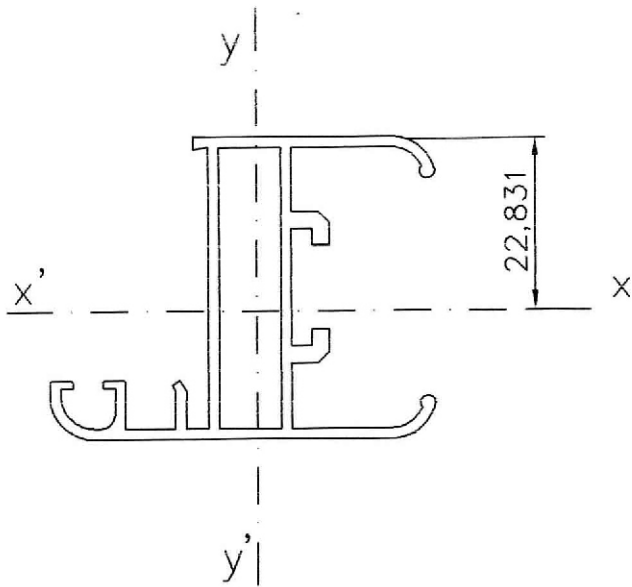
Open country with
no obstructions

Open country with
windbreaks

Country with many
windbreaks
Small town

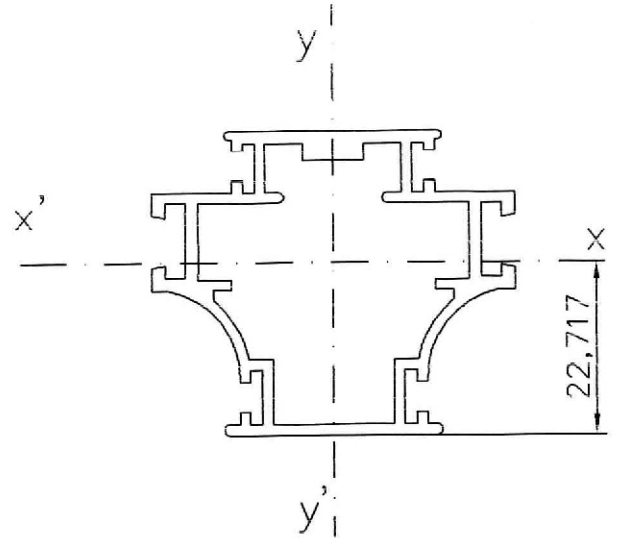
Surface with large
and frequent obstructions
e.g.city center

height	CLASS			CLASS			CLASS			CLASS		
	A	B	C	A	B	C	A	B	C	A	B	C
3	0.83	0.78	0.73	0.72	0.67	0.63	0.64	0.60	0.55	0.56	0.52	0.47
5	0.88	0.83	0.78	0.79	0.74	0.70	0.70	0.65	0.60	0.60	0.55	0.50
10	1.00	0.95	0.90	0.93	0.88	0.83	0.78	0.74	0.69	0.67	0.62	0.58
15	1.03	0.99	0.94	1.00	0.95	0.91	0.88	0.83	0.78	0.74	0.69	0.54
20	1.06	1.01	0.96	1.03	0.98	0.94	0.95	0.90	0.85	0.79	0.75	0.70
30	1.09	1.05	1.00	1.07	1.03	0.98	1.01	0.97	0.92	0.90	0.85	0.79
40	1.12	1.08	1.03	1.10	1.06	1.01	1.05	1.01	0.96	0.97	0.93	0.89
50	1.14	1.10	1.06	1.12	1.08	1.04	1.08	1.04	1.00	1.02	0.98	0.94
60	1.15	1.12	1.08	1.14	1.10	1.06	1.10	1.06	1.02	1.05	1.02	0.98
80	1.18	1.15	1.11	1.17	1.13	1.09	1.13	1.10	1.06	1.10	1.07	1.03
100	1.20	1.17	1.13	1.19	1.16	1.12	1.16	1.12	1.09	1.13	1.10	1.07
120	1.22	1.19	1.15	1.21	1.18	1.14	1.18	1.15	1.11	1.15	1.13	1.10
140	1.24	1.20	1.17	1.22	1.19	1.16	1.20	1.17	1.13	1.17	1.15	1.12
160	1.25	1.22	1.19	1.24	1.21	1.18	1.21	1.18	1.15	1.19	1.17	1.14
180	1.26	1.23	1.20	1.25	1.22	1.19	1.23	1.20	1.17	1.20	1.19	1.16
200	1.27	1.24	1.21	1.26	1.24	1.21	1.24	1.21	1.18	1.22	1.21	1.18



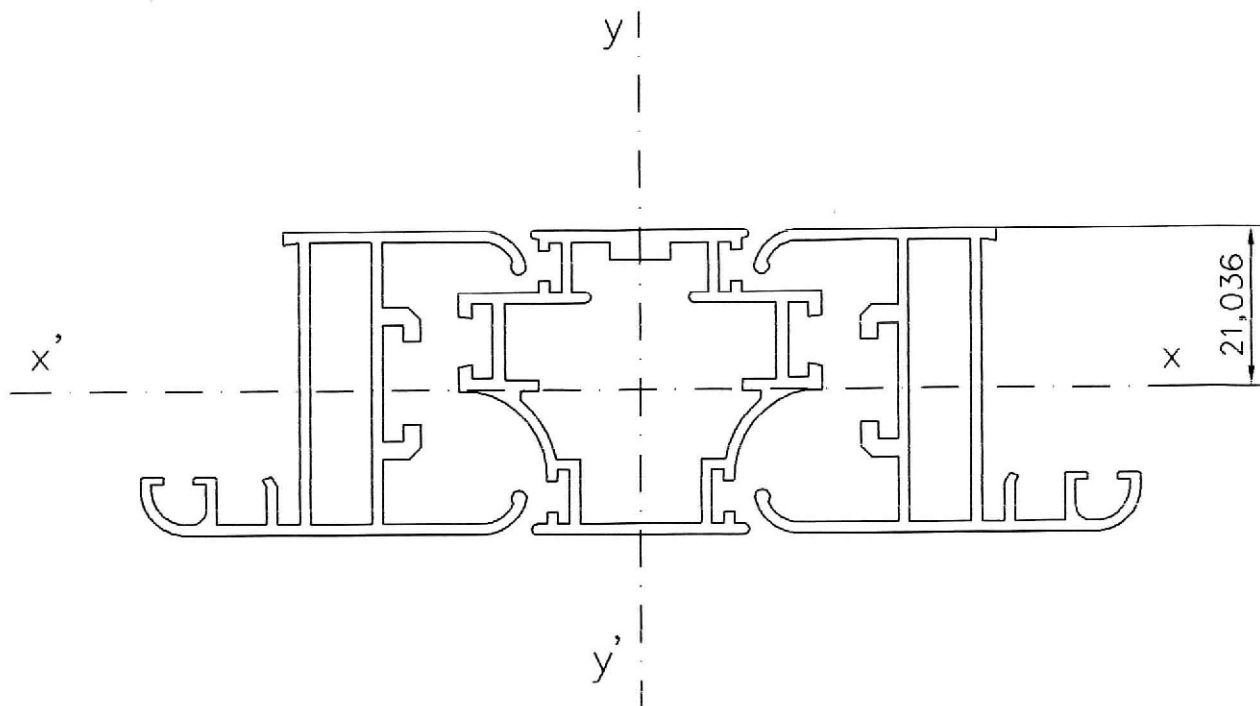
$$I_{x'x} = 7 \text{ cm}^4$$

$$I_{y'y} = 3.2 \text{ cm}^4$$



$$I_{x'x} = 5.9 \text{ cm}^4$$

$$I_{y'y} = 6.5 \text{ cm}^4$$



$$I_{x'x} = 19 \text{ cm}^4 \quad \frac{I_{x'x}}{V} = 9 \text{ cm}^3$$