



VERTICAL MULLION – WIND LOAD CALCULATION REPORT

For preliminary sizing; final design must be checked by a competent engineer in accordance with the relevant standards.

Project	Sample Project
Subject	Vertical Mullion Structural Design
Prepared by	Civil Engineer
Approved by	Senior Civil Engineer
Date	18/10/2026

1) Inputs

q (kN/m ²)	1.100 (Pressure (positive))	B (cm)	120
L (cm)	320	E (GPa)	70
Material	Aluminum	Note	Aluminum X.X
f _y (MPa)	160	σ _{allow,d} (ULS) MPa	145.5 (γ _M =1.1)
W (cm ³)	50	I (cm ⁴)	300

2) SLS — Deflection (Serviceability)

w (kN/m)	1.320	L (m)	3.200
E (GPa)	70	f _{limit} (mm)	15.67
I _{req} (cm ⁴)	164.34 I _{req} = 5 · w · L ⁴ / (384 · E · f _{limit})		
Δ _{max} (mm)	8.58	Compliance	✓ OK (Δ _{max} /f _{limit} = 55%)

Internal forces (SLS): R = 2.112 kN, V_{max} = 2.112 kN, M_{max} = 1.690 kN·m [R = w·L/2, V = R, M = w·L²/8]

3) ULS — Strength (Ultimate Limit State)

Y _{Q,wind}	1.5	w _d (kN/m)	1.980 = γ _Q · w
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M_d (kN·m)	2.534	σ_d (MPa)	50.69 = M _d / W
Allowable (MPa)	145.45 = f _y / γ _{M1}	Compliance	✅ OK (σ _d /allowable = 35%)

4) Formulas Used

$w = |q| \cdot B$ (kN/m) ; $L_{req} = 5 w L^4 / (384 E f_{limit})$

Simple beam (2 supports, pinned): $R = wL/2$, $V_{max} = R$, $M_{max} = wL^2/8$

ULS: $w_d = \gamma_Q \cdot w$; $\sigma_d = M_d / W$

Deflection limit (EN 13830 5.7–5.8): $L \leq 3 \text{ m} \rightarrow L/200$; $3\text{--}7.5 \text{ m} \rightarrow 5 \text{ mm} + L/300$; $L \geq 7.5 \text{ m} \rightarrow L/250$