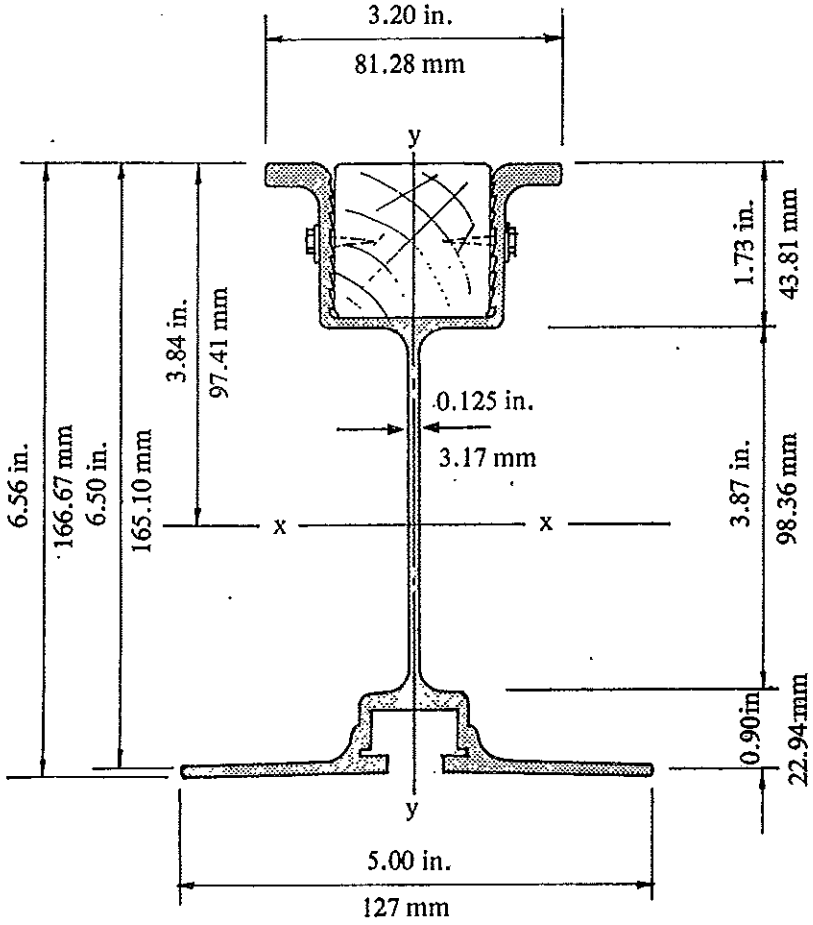
Aluma Beam-Structural Properties



Standard Lengths

Imperial	Metric
10 ft. 6 in.	3.20 m
12 ft. 0 in.	3.66 m
14 ft. 0 in.	4.27 m
16 ft. 0 in.	4.88 m
18 ft. 0 in.	5.49 m
21 ft. 0 in.	6.40 m

	Imperial	Metric
Overall height	6.50 in.	165 mm
Base width	5.00 in.	127 mm
Width, inverted top hat section	3.20 in.	81.28 mm
Cross sectional area (excluding 2" x 2" nailing strip)	2.67 $in.^2$	1721 mm^2
Nominal weight (excluding 2" x 2" nailing strip)	3.18 lb/ft	4.77 kg/m
(including 2" x 2" nailing strip)	4 lb/ft	6 kg/m
Distance of neutral axis from top	3.84 in.	97.41 mm
Moment of Intertia Ixx	17.0 in^4	7.075E6 mm^4
Moment of Inertia Iyy	2.65 $in.^4$	1.103E6 mm^4
Section Modulus Sxx max	6.23 $in.^3$	102.15E3 mm^3
Sxx min	4.43 $in.^3$	72.63E3 mm^3
Section Modulus Syy	1.06 $in.^3$	17.37E3 mm^3
Radius of Gyration rx	2.52 in.	64.11 mm
Radius of Gyration ry	1.00 in.	25.32 mm
Torsion Constant J	0.027 $in.^4$	1.124E4 mm^4
Warping Constant H	28.0 $in.^6$	7519.E6 mm^4
Modulus of Elasticity E	10.2E6 psi	70.3E3 N/mm^2

Aluma Beam Design Data

	Imperial	Metric
Ult. Tensile Stress	Fu = 40.7ksi	280 N/mm²
Yield Stress	Fy = 37.6ksi	259 N/mm²
Yield Stress (Shear)	Fsy = 21.0ksi	145 N/mm²
Ult. Bearing Stress	Fb = 75.4ksi	520 N/mm²
Local Buckling Bottom Flange Slenderness ratio $\frac{mb}{t}$ m = 4.0	λ = 40	λ = 40
Maximum Buckling Stress	Fc = 29.4 ksi	203.0 N/mm²
Ultimate Bending Moment	M = 183.20 k-in	20.70 kNm
Allowable Bending Moment (F.O.S.2.2)	M = 83.27 k-in	9.41 kNm
Local Buckling Top Flange Slenderness ratio	λ = 6.4	λ = 6.4
Maximum Buckling Stress	Fc = 37.6 ksi	259.0 N/mm²
Ultimate Bending Moment	M = 166.53 k-in	18.81 kNm
Allowable Bending Moment (F.O.S.2.2)	M = 75.70 k-in	8.55 kNm

ALLOWABLE BENDING MOMENT = 66.61 KIN w/ 2.5 to 1

Allowable Reaction, Shear

Based on Alcan, (Strength of Aluminum) 4th Edition

Interior Reaction (Full Brg.)		End Reaction (Partial Brg.)		Concentrated Load		Shear	
kips	kN	kips	kN	kips	kN	kips	kN
10.68	47.50	5.34	23.75	10.68	47.50	5.90	26.25

(1) Interior Reaction: Length of bearing 5 ins. (127 mm)
(2) End Reaction: Length of bearing 2-5 ins. (63 mm) (2 beams butted in U-Head)
(3) All F.O.S.: 2.2:1.0