

Beam Calculations for Top and Bottom Cross Members

Applied Force = **1000 lbs**

Length = 32 in

Tube width = 2 in

Tube height = 4 in

Tube thickness = 0.25 in

Material Modulus = 30000000 psi

Cross sectional area = 2.75 in²

2nd Moment of area = 5.3073 in⁴

Maximum Bending Moment = 8000 in-lb

Maximum Shear Force = 500 lbs

Maximum Deflection = -0.0042876 in

Maximum Stress due to Bending = 3014.7203 psi

Maximum Stress due to Shear = 181.8182 psi

Beam Calculations for Vertical Legs

Applied Force = **500 lbs**

Length = 77 in

Tube width = 3 in

Tube height = 2 in

Tube thickness = 0.1875 in

Material Modulus = 30000000 psi

Cross sectional area = 1.7344 in²

2nd Moment of area = 1.0613 in⁴

Maximum Bending Moment = 9625 in-lb

Maximum Shear Force = 250 lbs

Maximum Deflection = -0.14936 in

Maximum Stress due to Bending = 9068.7216 psi

Maximum Stress due to Shear = 144.1441 psi

Beam Calculations for Lift Bar

Applied Force = **1000 lbs**

Length = 28 in

Tube width = 2 in

Tube height = 3 in

Tube thickness = 0.1875 in

Material Modulus = 30000000 psi

Cross sectional area = 1.7344 in²

2nd Moment of area = 2.0506 in⁴

Maximum Bending Moment = 7000 in-lb

Maximum Shear Force = 500 lbs

Maximum Deflection = -0.0074341 in

Maximum Stress due to Bending = 5120.4572 psi

Maximum Stress due to Shear = 288.2883 psi