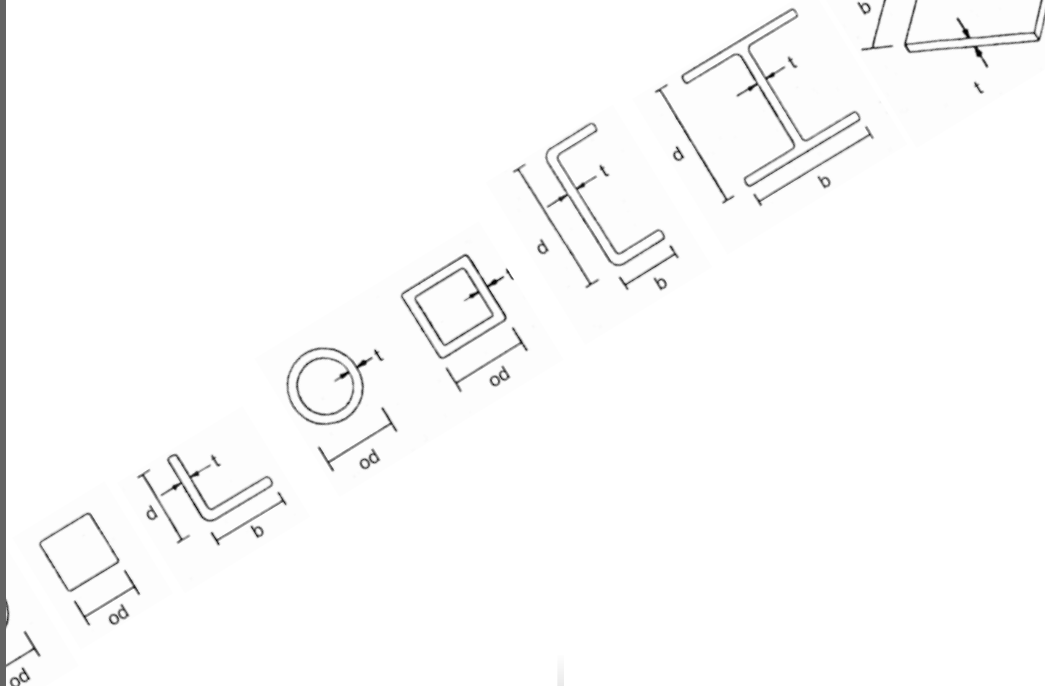


Design Guide

Dynaform® FRP Structural Shapes



Building the World to Last®

HIGH PERFORMANCE COMPOSITE SOLUTIONS

U.S. Customary Units

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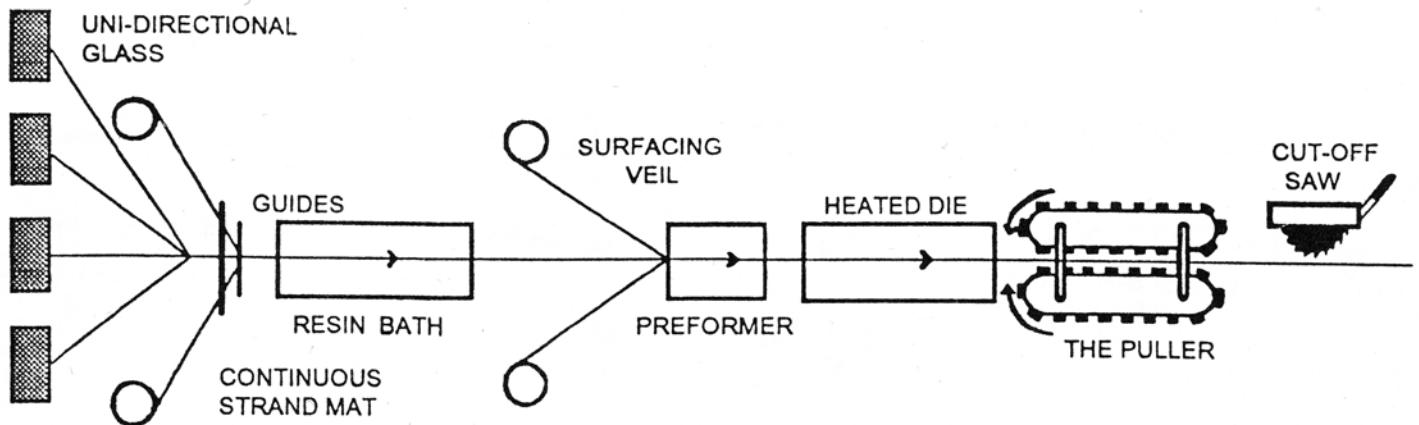
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Pultrusion Process



Pultrusion is a continuous process of raw materials, typically resin and reinforcing materials, forming profiles of constant cross section in continuous length.

Pultrusion gets its name from the method by which the profiles are made. Raw materials are literally pulled by what we call "the puller." "The puller" is the machine made up of pulling pads, which grip the product, and a drive system which keeps the product moving. "The puller" is located just before the final cut-off saw.

The process starts with the reinforcements. Typically, unidirectional glass roving is the fiber that runs along the length of the profile. Second, the fiberglass mat is added in, which is multidirectional reinforcement. Third is the resin, typically polyester or vinylester. The glass is "wet-out" with the liquid resin and pulled into a heated die. Just before all the material enters the die, surface veil may be added which enhances the final product's surface.

Now that all the reinforcements have been "wet-out" and pulled into a heated die, the curing takes place. All the resins used in the pultrusion process have a catalyst or hardener added when the resin is mixed. This catalyst activated at about 200°F. Consequently, as the "wet-out" reinforcement pass through the heated die, the product changes from liquid to a solid profile with all the reinforcement laminated within.

The product exiting the die is pulled by "the puller", which upon exiting can be cut to the desired length.

Standard Resin Systems for Structural Shapes

Standard Polyester (ISO or PN) Resin System

The STANDARD POLYESTER RESIN SYSTEM refers to a NON FLAME RETARDANT isophthalic polyester resin system. This resin system is manufactured in olive green and incorporates ultraviolet inhibitors. Polyester resins exhibit good corrosion resistance, good electrical properties, low thermal conductivity and excellent mechanical properties.

Flame Retardant Polyester (ISOFR or PF) Resin System

This resin system exhibits the same characteristics as the Standard Polyester resin system PLUS a flame spread rating of 25 or less when tested in accordance with ASTM E-84. The FLAME RETARDANT resin system is manufactured in gray and yellow.

Flame Retardant Vinyl Ester (VEFR or VF) Resin System

This resin system is manufactured from vinyl ester resin which exhibits higher strength, improved strength and stiffness retention at elevated temperatures, and improved corrosion resistance. This system also meets a maximum flame spread rating of 25 and is produced in beige and yellow.

Elevated Temperature Effects

The approximate retention of mechanical properties at elevated temperatures are:

| | <u>TEMPERATURE</u> | <u>ISO(PN)/ISOFR(PF)</u> | <u>VEFR(VF)</u> |
|------------------------------|--------------------|--------------------------|-----------------|
| Ultimate Stress | 100° F | 85% | 90% |
| | 125° F | 70% | 80% |
| | 150° F | 50% | 80% |
| | 175° F | Not Recommended | 75% |
| | 200° F | Not Recommended | 50% |
| Modulus of Elasticity | 100° F | 100% | 100% |
| | 125° F | 90% | 95% |
| | 150° F | 85% | 90% |
| | 175° F | Not Recommended | 88% |
| | 200° F | Not Recommended | 85% |

Chemical Resistance Guide - Structural Shapes

The data in this chemical resistance guide is based on field service performance, laboratory testing and extrapolated values from our resin manufacturers' recommendation. Data shown is intended as a guide only. It is recommended that for a specific application, testing be done in the actual chemical environment.

The following conditions will effect the suitability of a specific resin laminate:

- Periodic changes in temperature
- Temperature spikes
- Changes in chemical concentrations
- Combinations of chemicals
- Exposure to vapors only
- Exposure to frequent splashes and spills
- Exposure to intermittent splashes and spills
- Frequency of maintenance wash down
- Load bearing or non-load bearing requirements

| Chemical Environment | Maximum Recommended Service Temperatures, °F | | Chemical Environment | Maximum Recommended Service Temperatures, °F | |
|------------------------------|--|-----------|-------------------------------|--|-----------|
| | VEFR | ISO/ISOFR | | VEFR | ISO/ISOFR |
| Acetic Acid, to 10% | 170 | 80 | Butyl Acetate | NR | NR |
| Acetic Acid, to 50% | 180 | NR | Butyl Alcohol | 80 | NR |
| Acetic Acid, Glacial | NR | NR | Calcium Carbonate | 170 | 120 |
| Acetone | NR | NR | Calcium Hydroxide | 140 | 120 |
| Aluminum Chloride | 170 | 120 | Calcium Hypochlorite | 120 | NR |
| Aluminum Hydroxide | 140 | 120 | Calcium Nitrate | 170 | 120 |
| Aluminum Nitrate | 140 | 120 | Calcium Sulfate | 170 | 120 |
| Aluminum Sulfate | 170 | 120 | Carbon Disulfide | NR | NR |
| Ammonium Chloride | 170 | 120 | Carbon Monoxide Gas | 170 | 160 |
| Ammonium Hydroxide, 5% | 140 | NR | Carbon Dioxide Gas | 170 | 160 |
| Ammonium Nitrate, to 50% | 170 | 120 | Carbon Tetrachloride | | |
| Ammonium Nitrate, Saturated | 170 | NR | Liquid or Vapor | 110 | NR |
| Ammonium Persulfate, to 25% | 140 | 90 | Chlorine, Dry Gas | 170 | NR |
| Ammonium Phosphate | 170 | 120 | Chlorine, Wet Gas | 170 | NR |
| Ammonium Sulfate | 170 | 120 | Chlorine Water | 140 | NR |
| Amyl Alcohol | 80 | NR | Chloroform | NR | NR |
| Barium Carbonate | 170 | 120 | Chromic Acid, to 5% | 110 | NR |
| Barium Chloride | 170 | 120 | Chromous Sulfate | 140 | 120 |
| Barium Sulfate | 170 | 120 | Citric Acid | 170 | 120 |
| Benzene | NR | NR | Copper Chloride | 170 | 170 |
| Benzene Sulfonic Acid 50% | 110 | NR | Copper Cyanide | 170 | 170 |
| Benzoic Acid | 170 | 120 | Copper Nitrate | 170 | 170 |
| Benzyl Alcohol | NR | NR | Crude Oil, Sour | 170 | 170 |
| Borax | 170 | 120 | Cyclohexane, Liquid and Vapor | 170 | NR |
| Brine (Sodium Chloride Sol.) | 170 | 120 | Diesel Fuel | 140 | 90 |
| Bromine, Liquid or Vapor | NR | NR | Ethyl Acetate | NR | NR |
| Ethyl Alcohol | NR | NR | Phosphoric Acid, Vapor | 170 | 120 |
| Ethylene Glycol | 170 | 120 | Potassium Aluminum Sulfate | 170 | 120 |
| Fatty Acids | 170 | 80 | Potassium Bicarbonate | 110 | 100 |
| Ferric Chloride | 170 | 100 | Potassium Carbonate, to 10% | 110 | NR |
| Ferric Sulfate | 170 | 110 | Potassium Chloride | 170 | 120 |
| Formaldehyde | 110 | NR | Potassium Hydroxide | 140 | NR |
| Fuel Oil | 140 | 80 | Potassium Nitrate | 170 | 120 |
| Gasoline, Aviation and Ethyl | 140 | 80 | Potassium Sulfate | 170 | 120 |

Chemical Resistance Guide - Structural Shapes

| Chemical Environment | Maximum Recommended Service Temperatures, °F | | Chemical Environment | Maximum Recommended Service Temperatures, °F | |
|---------------------------------|--|-----------|---------------------------------|--|-----------|
| | VEFR | ISO/ISOFR | | VEFR | ISO/ISOFR |
| Glucose | 170 | 100 | Propylene Glycol | 170 | 120 |
| Glycerine | 170 | 100 | Sodium Acetate | 170 | 120 |
| Hexane | 120 | 90 | Sodium Benzoate | 140 | 120 |
| Hydraulic Fluid (Glycol Based) | 140 | NR | Sodium Bicarbonate | 140 | 120 |
| Hydraulic Fluid Skydraul | 140 | NR | Sodium Bisulfate | 170 | 120 |
| Hydrobromic Acid | 110 | NR | Sodium Bisulfite | 170 | 120 |
| Hydrochloric Acid, up to 15% | 140 | 80 | Sodium Borate | 170 | 120 |
| Hydrochloric Acid, Concentrated | 110 | NR | Sodium Bromide | 170 | 120 |
| Hydrogen Bromide, Dry Gas | 140 | 80 | Sodium Carbonate, to 10% | 140 | 70 |
| Hydrogen Bromine, Wet Gas | 140 | NR | Sodium Chloride | 170 | 120 |
| Hydrogen Chloride, Dry Gas | 170 | 80 | Sodium Cyanide | 170 | 120 |
| Hydrogen Chloride, Wet Gas | 170 | 80 | Sodium Dichromate | 170 | 120 |
| Hydrogen Flouride, Sol or Vapor | 140 | NR | Sodium Diphosphate | 170 | 120 |
| Hydrogen Peroxide, to 10% | 110 | NR | Sodium Hydroxide, 10% | 140 | NR |
| Hydrogen Sulfide, Dry Gas | 140 | 80 | Sodium Hypochlorite, to 5-1/4% | 110 | 70 |
| Hydrogen Sulfide, Wet Gas | 140 | 80 | Sodium Monophosphate | 170 | 120 |
| Isopropyl Alcohol | 80 | NR | Sodium Nitrate | 170 | 120 |
| JP-4 | 140 | 80 | Sodium Nitrite | 170 | 120 |
| Kerosene | 140 | 110 | Sodium Sulfate | 170 | 120 |
| Lactic Acid | 170 | 120 | Sodium Tetraborate | 140 | 120 |
| Lead Acetate | 170 | 120 | Sodium Thiosulfate | 140 | 120 |
| Linseed Oil | 170 | 100 | Soy Oil | 170 | 100 |
| Lithium Chloride | 170 | 120 | Stearic Acid | 170 | 120 |
| Magnesium Carbonate | 170 | 120 | Styrene | NR | NR |
| Magnesium Chloride | 170 | 120 | Sulfamic Acid | 170 | 120 |
| Magnesium Hydroxide | 170 | 100 | Sulfated Detergents | NR | 120 |
| Magnesium Nitrate | 170 | 120 | Sulfite Liquor | 160 | 100 |
| Magnesium Sulfate | 170 | 120 | Sulfur Dioxide, gas-dry | 170 | 120 |
| Mercuric Chloride | 170 | 120 | Sulfur Dioxide, gas-wet | 170 | 70 |
| Mercury Metal | 170 | 120 | Sulfur Trioxide, gas-wet or dry | 170 | NR |
| Methyl Ethyl Ketone | NR | NR | Sulfuric Acid, to 25% | 170 | 80 |
| Mineral Oil | 170 | 120 | Tartaric Acid | 170 | 120 |
| Monochlorobenzene | NR | NR | Tetrachloroethylene | NR | NR |
| Naphtha | 140 | 120 | Toluene | NR | NR |
| Nickel Chloride | 170 | 120 | Trichloroethylene vapor | NR | NR |
| Nitric Acid, to 5% | 110 | 100 | Trisodium Phosphate | 170 | NR |
| Nitric Acid, Concentrated | NR | NR | Urea, 35% | 110 | NR |
| Nitric Acid, Vapor | 140 | 100 | Vinegar | 170 | 150 |
| Oleic Acid | 170 | 120 | Water, Distilled | 180 | 150 |
| Oxalic Acid | 170 | 120 | Water, Tap | 180 | 120 |
| Paper Mill Liquor | 100 | 100 | Zinc Chloride | 170 | 120 |
| Phenol Solution or Vapor | NR | NR | Zinc Nitrate | 170 | 120 |
| Phosphoric Acid | 170 | 100 | Zinc Sulfate | 170 | 120 |
| Phosphoric Acid, Salts thereof | 170 | 120 | | | |

Chemical Resistance Guide - Vinyl Ester Threaded Rods

| SOLUTION | MAXIMUM RECOMMENDED TEMPERATURE F°/C° |
|---|--|
| H ₂ SO ₄ - 25 % | 210/99 |
| HCl - 20% | 210/99 |
| HNO ₃ - Gas | 100/38 |
| Acetic Acid - 25% | 210/99 |
| Phosphoric Acid - 100% | 210/99 |
| NaOH - 50% | 180/82 |
| Sodium Carbonate - 35% | 180/82 |
| NaCl - Saturated | 180/82 |
| Ethanol - 10% | 120/49 |
| Sodium Hypochlorate - 10% | 120/49 |
| All AlK (SO ₄) ₂ | 210/99 |
| Perochloroethylene - 100% | 80/27 |
| n-Heptane - 100% | 210/99 |
| Kerosene - 100% | 180/82 |
| Toluene - 100% | 80/27 |
| H ₂ O ₂ - 30% | 150/65 |
| Distilled Water | 180/82 |

NOTE: Threads of threaded rods are cut into specially manufactured pultruded rods. Therefore, after installation of threaded rods and fiberglass nuts in a corrosive environment, the threads are to be sealed with a vinyl ester resin.

Coupon Properties - Structural Shapes

The values listed below are test results from coupon tests performed in accordance with the noted ASTM Test.

| MECHANICAL PROPERTIES | ASTM | UNITS | VALUE |
|--------------------------|--------------|---------------------|--------|
| Tensile Stress, LW | D-638 | psi | 30,000 |
| Tensile Stress, CW | D-638 | psi | 7,000 |
| Tensile Modulus, LW | D-638 | 10 ⁶ psi | 2.5 |
| Tensile Modulus, CW | D-638 | 10 ⁶ psi | 0.8 |
| Compressive Stress, LW | D-695 | psi | 30,000 |
| Compressive Stress, CW | D-695 | psi | 15,000 |
| Compressive Modulus, LW | D-695 | 10 ⁶ psi | 2.5 |
| Compressive Modulus, CW | D-695 | 10 ⁶ psi | 1.0 |
| Flexural Stress, LW | D-790 | psi | 30,000 |
| Flexural Stress, CW | D-790 | psi | 10,000 |
| Flexural Modulus, LW | D-790 | 10 ⁶ psi | 1.8 |
| Flexural Modulus, CW | D-790 | 10 ⁶ psi | 0.8 |
| Modulus of Elasticity, E | Full Section | 10 ⁶ psi | 2.8 |
| Shear Modulus | --- | 10 ⁶ psi | 0.450 |
| Short Beam Shear | D-2344 | psi | 4,500 |
| Punch Shear | D-732 | psi | 10,000 |
| Bearing Stress, LW | D-953 | psi | 30,000 |
| Notched Izod Impact, LW | D-256 | ft-lbs/in | 25 |
| Notched Izod Impact, CW | D-256 | ft-lbs/in | 4 |

| PHYSICAL PROPERTIES | ASTM | UNITS | VALUE |
|--------------------------------------|--------|---------------------------|-----------|
| Barcol Hardness | D-2583 | --- | 45 |
| 24 Hour Water Absorption | D-570 | % max | 0.45 |
| Density | D-792 | lbs/in ³ | .062-.070 |
| Coefficient of Thermal Expansion, LW | D-696 | 10 ⁻⁶ in/in/°F | 4.4 |

| ELECTRICAL PROPERTIES | ASTM | UNITS | VALUE |
|-------------------------|-------|-----------|-------|
| Arc Resistance, LW | D-495 | seconds | 120 |
| Dielectric Strength, LW | D-149 | kv/in | 35 |
| Dielectric Strength, PF | D-149 | volts/mil | 200 |
| Dielectric Constant, PF | D-150 | @60hz | 5 |

ISOFR and VEFR Fire Retardant Structural Profiles:

| FLAMMABILITY PROPERTIES | ASTM | UNITS | VALUE |
|-------------------------|-------|--------------|-------------|
| Tunnel Test | E-84 | Flame Spread | 25 max |
| Flammability | D-635 | --- | Non burning |

LW = Lengthwise CW = Crosswise PF = Perpendicular to Laminate Face

Coupon Properties - Pultruded Flat Sheets

Below are the test results for typical coupon properties of ISO, ISOFR and VEFR Flat Sheet. Properties are derived per the ASTM test method shown. Synthetic surfacing veil and ultraviolet inhibitors are standard.

| MECHANICAL PROPERTIES | ASTM | UNITS | THICKNESS | | | | | |
|--------------------------------|--------|---------------------|-------------|------------|---------|--------|------------|---------|
| | | | ISO & ISOFR | | | VEFR | | |
| | | | 1/8" | 3/16"-1/4" | 3/8"-1" | 1/8" | 3/16"-1/4" | 3/8"-1" |
| Tensile Stress, LW | D-638 | psi | 24,000 | 24,000 | 24,000 | 24,000 | 24,000 | 24,000 |
| Tensile Stress, CW | D-638 | psi | 7,500 | 10,000 | 10,000 | 7,500 | 10,000 | 10,000 |
| Tensile Modulus, LW | D-638 | 10 ⁶ psi | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Tensile Modulus, CW | D-638 | 10 ⁶ psi | 1.0 | 1.1 | 1.4 | 1.0 | 1.1 | 1.4 |
| Compressive Stress, LW | D-695 | psi | 24,000 | 24,000 | 24,000 | 24,000 | 24,000 | 24,000 |
| Compressive Stress, CW | D-695 | psi | 15,500 | 16,500 | 16,500 | 16,500 | 17,500 | 17,500 |
| Compressive Modulus, LW | D-695 | 10 ⁶ psi | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 |
| Compressive Modulus, CW | D-695 | 10 ⁶ psi | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Flexural Stress, LW | D-790 | psi | 35,000 | 35,000 | 30,000 | 35,000 | 35,000 | 30,000 |
| Flexural Stress, CW | D-790 | psi | 15,000 | 15,000 | 18,000 | 15,000 | 15,000 | 18,000 |
| Flexural Modulus, LW | D-790 | 10 ⁶ psi | 1.6 | 2.0 | 2.0 | 1.6 | 2.0 | 2.0 |
| Flexural Modulus, CW | D-790 | 10 ⁶ psi | 0.9 | 1.1 | 1.4 | 0.9 | 1.1 | 1.4 |
| Perpendicular Shear Stress, LW | D-3846 | psi | 6,000 | 6,000 | 6,000 | 6,000 | 6,000 | 6,000 |
| Perpendicular Shear Stress, CW | D-3846 | psi | 6,000 | 6,000 | 6,000 | 6,000 | 6,000 | 6,000 |
| Bearing Stress, LW | D-953 | psi | 32,000 | 32,000 | 32,000 | 32,000 | 32,000 | 32,000 |
| Notched Izod Impact, LW | D-256 | ft-lbs/in | 18.5 | 20 | 20 | 18.5 | 20 | 20 |
| Notched Izod Impact, CW | D-256 | ft-lbs/in | 5 | 5 | 5 | 5 | 5 | 5 |

| PHYSICAL PROPERTIES | ASTM | UNITS | 1/8" | 3/16"-1/4" | 3/8"-1" | 1/8" | 3/16"-1/4" | 3/8"-1" |
|-----------------------------------|--------|--------------------------|----------|------------|----------|----------|------------|----------|
| Barcol Hardness | D-2583 | ---- | 40 | 40 | 40 | 40 | 40 | 40 |
| 24 Hour Water Absorption | D-570 | % max | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| Density | D-792 | lbs./in. ³ | .062-070 | .062-070 | .062-070 | .062-070 | .062-070 | .062-070 |
| Coefficient Thermal Expansion, LW | D-696 | 10 ⁶ in/in/°F | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 |

| ELECTRICAL PROPERTIES | ASTM | UNITS | 1/8" | 3/16"-1/4" | 3/8"-1" | 1/8" | 3/16"-1/4" | 3/8"-1" |
|-------------------------|-------|------------|------|------------|---------|------|------------|---------|
| Arc Resistance, LW | D-495 | seconds | 120 | 120 | 120 | 120 | 120 | 120 |
| Dielectric Strength, LW | D-149 | kv./in. | 35 | 35 | 35 | 35 | 35 | 35 |
| Dielectric Strength, PF | D-149 | volts/mil. | 200 | | | 200 | | |

| FLAMMABILITY PROPERTIES FOR ISOFR & VEFR FLAT SHEET | | |
|---|-------|-----------------------|
| Tunnel Test | E-84 | Flame Spread 25 max. |
| Flammability | D-635 | Non burning |
| UL | 94 | VO |
| NBS Smoke Chamber | E-662 | Smoke Density 600-700 |

LW = Lengthwise

CW = Crosswise

PF = Perpendicular to Laminate Face

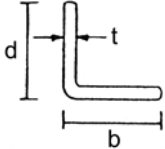
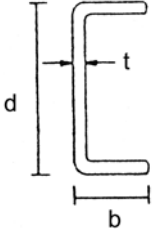
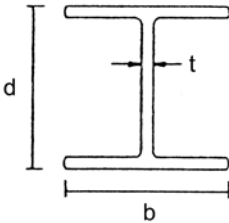
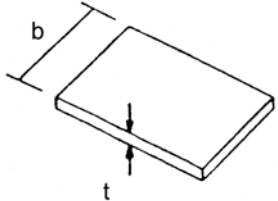
Coupon Properties - Threaded Rods & Nuts

Threaded rod and nuts are manufactured using premium vinyl ester resin containing UV inhibitors. The properties listed below are the result of the ASTM test method indicated.

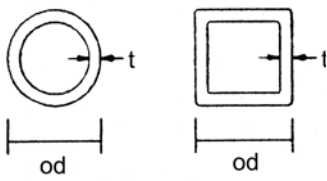
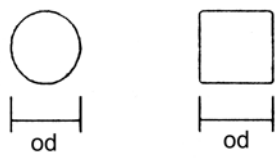
| PROPERTIES | ASTM | UNITS | VALUE Diameter- Threads per Inch (UNC) | | | | |
|---|-------|---------------------------|--|----------|-----------|-----------|-----------|
| | | | 3/8-16 | 1/2-13 | 5/8-11 | 3/4-10 | 1-8 |
| Ultimate Transverse Shear (Double Shear) | B-565 | lb | 4,200 | 6,800 | 10,000 | 13,400 | 24,000 |
| Longitudinal Compressive Strength | D-695 | psi | 50,000 | 50,000 | 50,000 | 50,000 | 50,000 |
| Flexural Strength | D-790 | psi | 70,000 | 70,000 | 70,000 | 70,000 | 70,000 |
| Flexural Modulus | D-790 | 10 ⁶ psi | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 psi |
| Flammability | D-635 | | Self-extinguishing for all | | | | |
| Fire Retardant | E-84 | | Class 1 | Class 1 | Class 1 | Class 1 | Class 1 |
| Water Absorption 24 hr. Immersion | D-570 | % max | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 |
| Longitudinal Coefficient of Thermal Expansion | D-696 | 10 ⁻⁶ in/in/°F | 6 | 6 | 6 | 6 | 6 |
| Ultimate Thread Shear using fiberglass nut | ---- | lb | 1,200 | 2,400 | 3,600 | 4,000 | 8,200 |
| Ultimate Torque Strength fiberglass nut lubricated with SAE 10W30 motor oil | ---- | ft-lb | 12 | 18 | 35 | 50 | 110 |
| Rod Weight | ---- | lb/ft | .07 | .14 | .20 | .30 | .53 |
| Nut Weight | ---- | lb | .01 | .02 | .04 | .06 | .14 |
| Nut Dimensions | ---- | in (sq) x in (thick) | .68 x.45 | .86 x.56 | 1.06 x.69 | 1.24 x.82 | 1.63 x1.1 |
| Color | | | Gray | Gray | Gray | Gray | Gray |

NOTE: Threads of threaded rods are cut into specifically manufactured pultruded rods. Therefore, after installation of threaded rods and fiberglass nuts in a corrosive environment, the threads are to be sealed with a vinyl ester resin.

Cross Sectional Tolerances

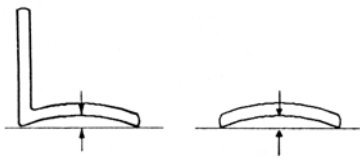
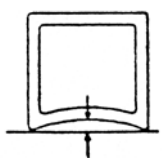
| SHAPE | DIMENSION | TOLERANCE | MAXIMUM OR MINIMUM TOLERANCES |
|---|------------------|-----------|------------------------------------|
| ANGLES  | t = thickness | ± 10% | ± 0.010" minimum |
| | b = flange width | ± 5% | ± 0.094" maximum |
| | d = depth | ± 5% | ± 0.094" maximum |
| CHANNELS  | t = thickness | ± 10% | ± 0.010" minimum |
| | b = flange width | ± 5% | ± 0.094" maximum |
| | d = depth | ± 5% | ± 0.094" maximum |
| WIDE FLANGE, I SHAPES  | t = thickness | ± 10% | ± 0.010" minimum |
| | b = flange width | ± 5% | ± 0.094" maximum |
| | d = depth | ± 5% | ± 0.094" maximum |
| FLAT SHEET  | t = thickness | ± 10% | ± 0.040" maximum |
| | b = width | ± 3% | ± 0.094" maximum 0.187" minimum |

Cross Sectional Tolerances

| SHAPE | DIMENSION | OUTSIDE DIMENSION CONDITION | TOLERANCES |
|---|------------------------|-----------------------------|------------|
| ROUND & SQUARE TUBE  | t = thickness | Under 1" | ± 20% |
| | | 1" and up | ± 15 % |
| | od = outside dimension | Under 2" | ± 0.020" |
| | | 2" and up | ± 0.040" |
| ROUND ROD & SQUARE BAR  | od = outside dimension | Up to 3" | ± 0.010" |

FLATNESS

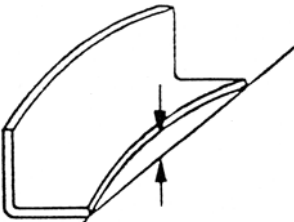
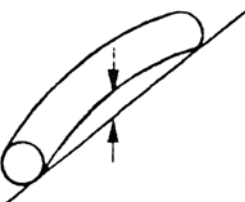
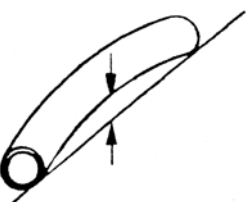
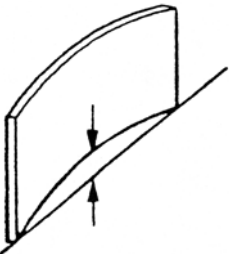
Flatness is measured in the center with the weight of the profile minimizing the deviation by contact with a flat surface.

| STRUCTURAL SHAPES RODS, BARS, & SHEET  | Allowable deviation from flat | | |
|---|-------------------------------|-------------------------------|------------------------------|
| | Width | All Thicknesses | |
| | Up to 1" | 0.008" | |
| | Over 1" | 0.008"/inch | |
| HOLLOW SHAPES  | Allowable deviation from flat | | |
| | Width | Thickness 0.125" to 0.188" | Thickness 0.189" and over |
| | Up to 1" | 0.012" | 0.008" |
| | Over 1" | 0.012"/inch | 0.008"/inch |

Cross Sectional Tolerances

Straightness

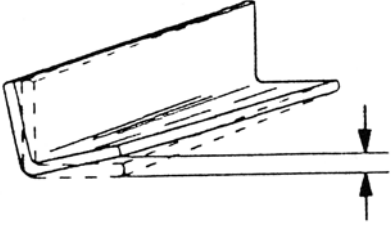
Straightness is measured in the center with the weight of the pultrusion minimizing the deviation by contact with a flat surface.

| | | |
|---|---|------------------------|
| <p>ANGLE, BEAM AND CHANNEL</p>  | <p>Allowable deviation from straight</p> | |
| | <p>All widths</p> | <p>0.050"/foot</p> |
| <p>RODS AND BARS</p>  | <p>Allowable deviation from straight</p> | |
| | <p>Diameter/Depth</p> | <p>Per Foot</p> |
| | <p>Up to 1"</p> | <p>0.020"</p> |
| | <p>Over 1"</p> | <p>0.040"</p> |
| <p>ROUND, SQUARE, AND RECTANGULAR TUBE</p>  | <p>Allowable deviation from straight</p> | |
| | <p>Diameter/Depth</p> | <p>Per Foot</p> |
| | <p>Up to 2"</p> | <p>0.020"</p> |
| | <p>Over 2"</p> | <p>0.030"</p> |
| <p>SHEET AND PLATE</p>  | <p>Allowable deviation from straight</p> | |
| | <p>All thicknesses and widths</p> | <p>0.025"/foot</p> |

Cross Sectional Tolerances

TWIST

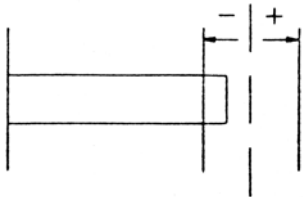
Twist is measured with the weight of the pultrusion minimizing the twist.

| ALL PROFILES  | Allowable twist | | |
|---|------------------------|--------------------------------------|------------------------------------|
| | Width/Depth | Per Foot | Per Piece Max |
| | Up to 1.499" | $\tan 1^\circ \times \text{width}$ | $\tan 7^\circ \times \text{width}$ |
| | 1.500" to 2.999" | $\tan 1/2^\circ \times \text{width}$ | $\tan 5^\circ \times \text{width}$ |
| | 3.000" and over | $\tan 1/3^\circ \times \text{width}$ | $\tan 3^\circ \times \text{width}$ |

ANGULARITY

| ALL PROFILES | Allowable deviation from specific angle | |
|---------------------|--|--|
| | thickness up to 3/4" | $\tan 1-1/2^\circ \times \text{width of flange in inches}$ |

CUT LENGTHS

| ALL PROFILES  | Allowable deviation from specific length | |
|--|---|-------------|
| | Up to 20' | -0", + 1/2" |
| Over 20' to 50' | -0", + 1" | |

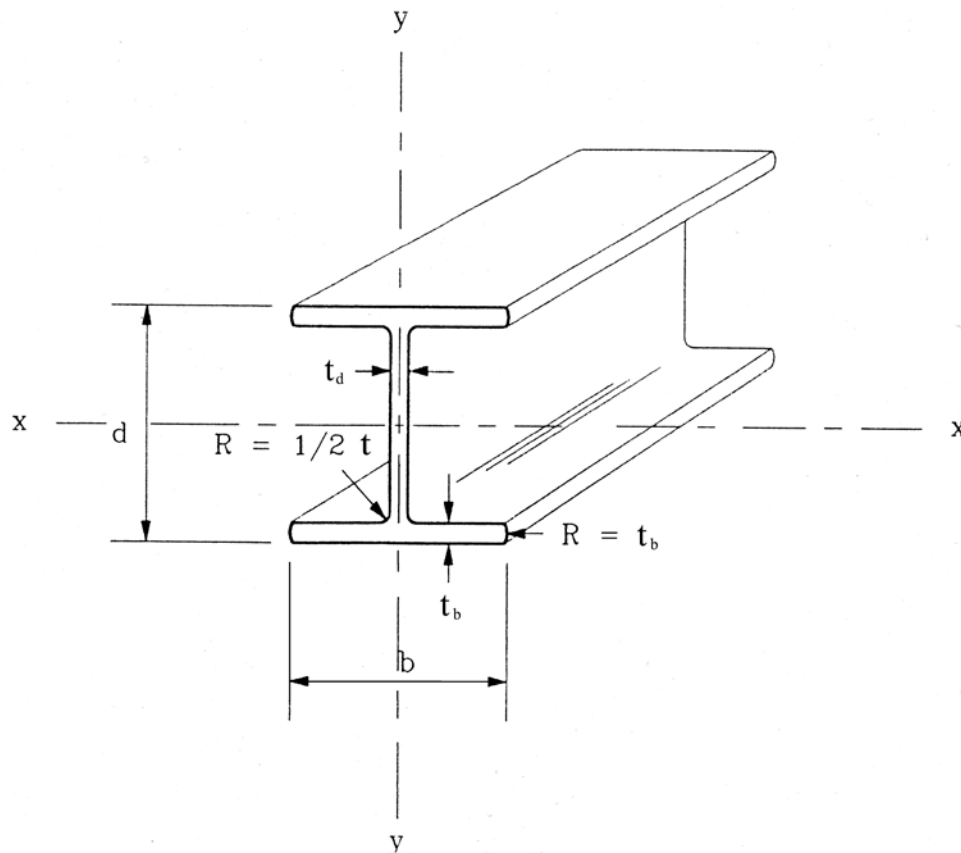
SQUARENESS OF ENDCUT

| ALL PROFILES | Allowable deviation from square | |
|---------------------|--|--|
| | All thicknesses | $\tan 1^\circ \times \text{width in inches}$ |

Section Properties

WIDE FLANGE SHAPES

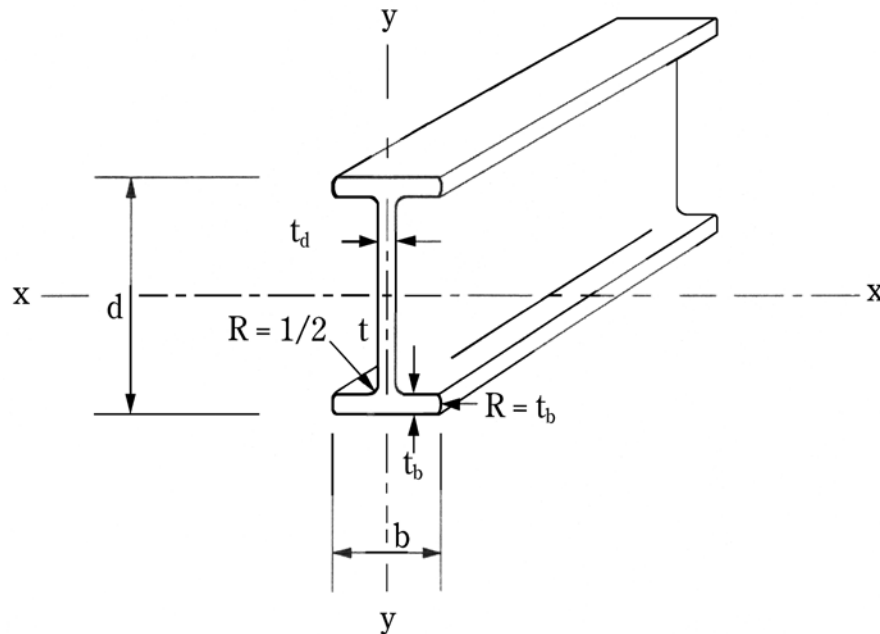
| SECTION DIMENSIONS | | | | | SECTION PROPERTIES | | | | | |
|--------------------|-----|-----|------------------|---------|--------------------|------------------|------|------------------|------------------|------|
| | | | | | X - X | | | Y - Y | | |
| d | b | t | A | Wt. | I | S | r | I | S | r |
| in. | in. | in. | in. ² | lb./ft. | in. ⁴ | in. ³ | in. | in. ⁴ | in. ³ | in. |
| 3 | 3 | 1/4 | 2.13 | 1.64 | 3.17 | 2.11 | 1.22 | 1.13 | 0.75 | 0.73 |
| 4 | 4 | 1/4 | 2.89 | 2.15 | 7.94 | 3.97 | 1.66 | 2.67 | 1.34 | 0.96 |
| 6 | 6 | 1/4 | 4.39 | 3.40 | 28.28 | 9.43 | 2.54 | 9.01 | 3.00 | 1.43 |
| 6 | 6 | 3/8 | 6.48 | 4.90 | 40.17 | 13.39 | 2.49 | 13.52 | 4.51 | 1.44 |
| 8 | 8 | 3/8 | 8.73 | 6.49 | 99.19 | 24.80 | 3.37 | 32.03 | 8.01 | 1.92 |
| 8 | 8 | 1/2 | 11.51 | 8.70 | 126.96 | 31.74 | 3.32 | 42.74 | 10.69 | 1.93 |
| 10 | 10 | 3/8 | 11.06 | 8.74 | 198.53 | 39.71 | 4.24 | 62.54 | 12.51 | 2.38 |
| 10 | 10 | 1/2 | 14.51 | 10.90 | 256.20 | 51.24 | 4.21 | 83.42 | 16.68 | 2.40 |
| 12 | 12 | 1/2 | 17.51 | 13.20 | 452.45 | 75.45 | 5.08 | 144.11 | 24.02 | 2.87 |



Section Properties

I SHAPES

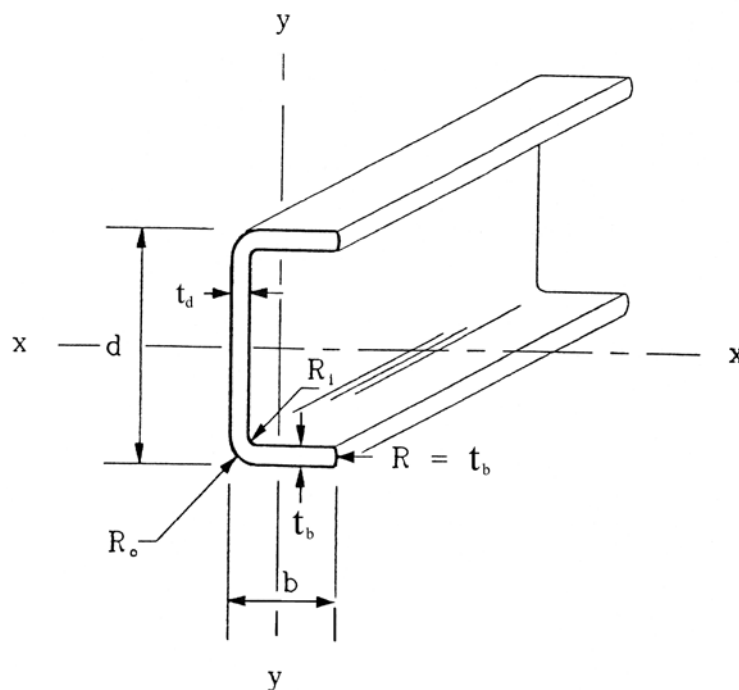
| SECTION DIMENSIONS | | | | | SECTION PROPERTIES | | | | | |
|--------------------|-------|-----------|------------------|---------|--------------------|------------------|------|------------------|------------------|------|
| | | | | | X - X | | | Y - Y | | |
| d | b | t | A | Wt. | I | S | r | I | S | r |
| in. | in. | in. | in. ² | lb./ft. | in. ⁴ | in. ³ | in. | in. ⁴ | in. ³ | in. |
| 3 | 1-1/2 | 1/4 | 1.38 | 1.10 | 1.75 | 1.17 | 1.13 | 0.14 | 0.19 | 0.32 |
| 4 | 2 | 1/4 | 1.88 | 1.50 | 4.41 | 2.21 | 1.53 | 0.34 | 0.34 | 0.43 |
| 6 | 3 | 1/4 | 2.88 | 2.20 | 16.99 | 5.66 | 2.43 | 1.13 | 0.75 | 0.63 |
| 6 | 3 | 3/8 | 4.23 | 3.20 | 22.35 | 7.45 | 2.30 | 1.71 | 1.14 | 0.64 |
| 8 | 4 | 3/8 | 5.73 | 4.30 | 55.55 | 13.89 | 3.11 | 4.03 | 2.02 | 0.84 |
| 8 | 4 | 1/2 | 7.51 | 5.70 | 70.62 | 17.66 | 3.07 | 5.40 | 2.70 | 0.85 |
| 10 | 5 | 3/8 | 7.22 | 5.78 | 111.63 | 22.33 | 3.93 | 7.85 | 3.14 | 1.04 |
| 10 | 5 | 1/2 | 9.51 | 7.20 | 143.29 | 28.66 | 3.88 | 10.51 | 4.21 | 1.05 |
| 12 | 6 | 1/2 | 11.51 | 8.70 | 253.96 | 42.33 | 4.70 | 18.11 | 6.04 | 1.26 |
| 18 | 4-1/2 | 3/8 - 1/2 | 10.92 | 8.70 | 498.15 | 55.35 | 6.75 | 7.66 | 3.40 | 0.84 |
| 24 | 7-1/2 | 3/8 - 3/4 | 19.90 | 15.20 | 1877.00 | 156.42 | 9.76 | 52.83 | 14.09 | 1.64 |



Section Properties

CHANNELS

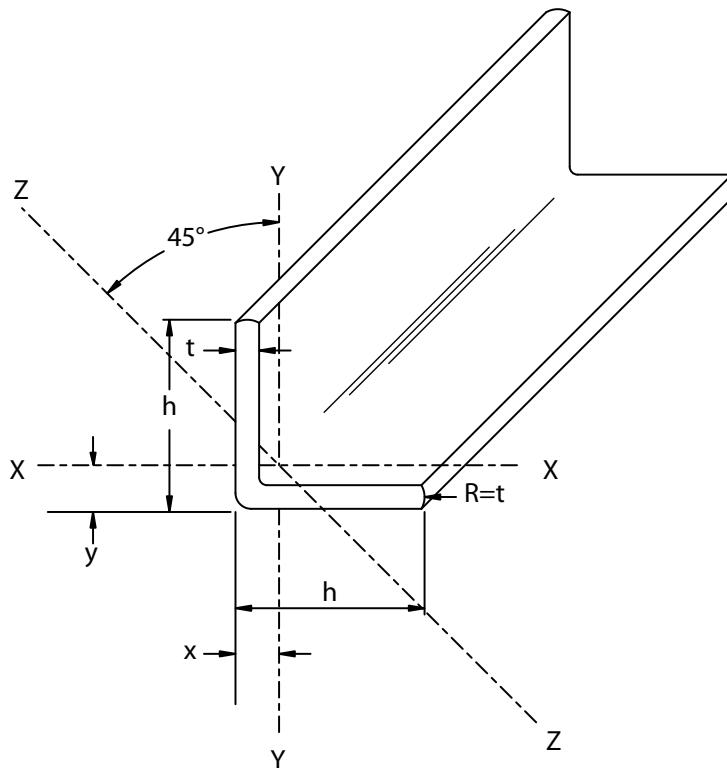
| SECTION DIMENSIONS | | | | | | | | SECTION PROPERTIES | | | | | |
|--------------------|---------|----------------|----------------|------------------|---------|----------------|----------------|--------------------|------------------|------|------------------|------------------|------|
| | | | | | | | | X - X | | | Y - Y | | |
| d | b | t _d | t _b | A | Wt. | R _i | R _o | I | S | r | I | S | r |
| in. | in. | in. | in. | in. ² | lb./ft. | in. | in. | in. ⁴ | in. ³ | in. | in. ⁴ | in. ³ | in. |
| 3 | 13/16 | 1/8 | 1/8 | 0.55 | 0.43 | 1/16 | 3/16 | 0.64 | 0.43 | 1.08 | 0.03 | 0.04 | 0.22 |
| 3 | 1 | 1/4 | 1/4 | 1.08 | 0.79 | 1/8 | 3/8 | 1.27 | 0.85 | 1.09 | 0.06 | 0.09 | 0.24 |
| 3 | 1-1/2 | 1/4 | 1/4 | 1.33 | 1.01 | 1/8 | 3/8 | 1.75 | 1.16 | 1.15 | 0.26 | 0.25 | 0.44 |
| 3-1/2 | 1-3/16 | 1/8 | 3/16 | 0.88 | 0.67 | 1/8 | 3/16 | 1.54 | 0.88 | 1.32 | 0.11 | 0.13 | 0.36 |
| 3-1/2 | 1-1/2 | 3/16 | 3/16 | 1.11 | 0.86 | 1/8 | 5/16 | 1.92 | 1.10 | 1.31 | 0.22 | 0.21 | 0.44 |
| 4 | 1-1/8 | 1/4 | 1/4 | 1.38 | 1.05 | 1/8 | 3/8 | 2.87 | 1.44 | 1.44 | 0.13 | 0.16 | 0.31 |
| 4 | 1 1/2 | 3/8 | 3/8 | 2.29 | 1.74 | 3/32 | 5/16 | 4.60 | 2.30 | 1.42 | 0.39 | 0.38 | 0.41 |
| 4 | 1-3/8 | 3/16 | 3/16 | 1.16 | 0.88 | 1/8 | 5/16 | 2.62 | 1.31 | 1.50 | 0.19 | 0.18 | 0.40 |
| 5-1/2 | 1-1/2 | 1/4 | 1/4 | 1.95 | 1.49 | 1/8 | 3/8 | 7.38 | 2.68 | 1.95 | 0.32 | 0.29 | 0.41 |
| 6 | 1-5/8 | 1/4 | 1/4 | 2.13 | 1.67 | 1/8 | 3/8 | 10.18 | 3.39 | 2.19 | 0.43 | 0.35 | 0.45 |
| 6 | 1-11/16 | 3/8 | 3/8 | 3.23 | 2.60 | 1/8 | 1/8 | 14.55 | 4.85 | 2.12 | 0.52 | 0.45 | 0.45 |
| 8 | 2-3/16 | 3/8 | 3/8 | 4.23 | 3.20 | 3/16 | 9/16 | 35.77 | 8.94 | 2.88 | 1.52 | 0.91 | 0.60 |
| 10 | 2-3/4 | 1/2 | 1/2 | 7.02 | 5.30 | 1/4 | 3/4 | 92.49 | 18.50 | 3.63 | 3.97 | 1.92 | 0.75 |
| 11-1/2 | 2-3/4 | 1/2 | 1/2 | 7.78 | 6.07 | 1/4 | 3/4 | 124.60 | 21.67 | 4.00 | 4.06 | 1.93 | 0.72 |



Section Properties

EQUAL LEG ANGLES

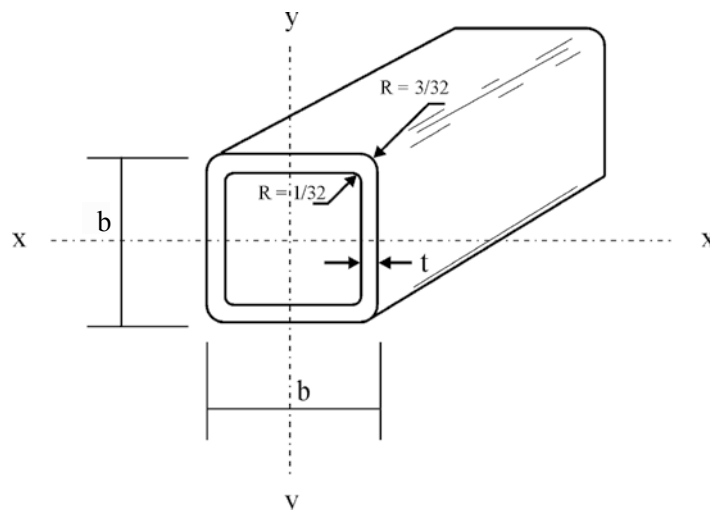
| SECTION DIMENSIONS | | | | SECTION PROPERTIES | | | | | |
|--------------------|------|------------------|---------|--------------------|------------------|------|--------|------------------|------|
| DEPTH | | WALL | | X - X / Y - Y | | | | Z - Z | |
| h | t | A | Wt. | I | S | r | x or y | I | r |
| in. | in. | in. ² | lb./ft. | in. ⁴ | in. ³ | in. | in. | in. ⁴ | in. |
| 1 | 1/8 | 0.23 | 0.18 | 0.02 | 0.05 | 0.31 | 0.29 | 0.01 | 0.19 |
| 1-1/4 | 1/8 | 0.29 | 0.22 | 0.04 | 0.05 | 0.38 | 0.36 | 0.02 | 0.24 |
| 1-1/2 | 3/16 | 0.52 | 0.40 | 0.11 | 0.10 | 0.46 | 0.44 | 0.04 | 0.29 |
| 1-1/2 | 1/4 | 0.67 | 0.54 | 0.14 | 0.13 | 0.45 | 0.47 | 0.06 | 0.29 |
| 2 | 1/4 | 0.92 | 0.70 | 0.33 | 0.23 | 0.59 | 0.59 | 0.14 | 0.38 |
| 3 | 1/4 | 1.42 | 1.08 | 1.24 | 0.58 | 0.93 | 0.84 | 0.49 | 0.58 |
| 3 | 3/8 | 2.09 | 1.61 | 1.76 | 0.83 | 0.91 | 0.89 | 0.70 | 0.58 |
| 3 | 1/2 | 2.70 | 2.11 | 2.22 | 1.07 | 0.91 | 0.93 | 0.94 | 0.59 |
| 4 | 1/4 | 1.92 | 1.45 | 3.04 | 1.04 | 1.26 | 1.09 | 1.21 | 0.79 |
| 4 | 3/8 | 2.84 | 2.18 | 4.35 | 1.52 | 1.24 | 1.14 | 1.75 | 0.78 |
| 4 | 1/2 | 3.70 | 2.89 | 5.56 | 1.97 | 1.23 | 1.18 | 2.29 | 0.78 |
| 6 | 3/8 | 4.34 | 3.03 | 15.23 | 3.49 | 1.87 | 1.64 | 6.07 | 1.18 |
| 6 | 1/2 | 5.70 | 4.45 | 19.91 | 4.60 | 1.87 | 1.68 | 7.92 | 1.17 |



Section Properties

SQUARE TUBES

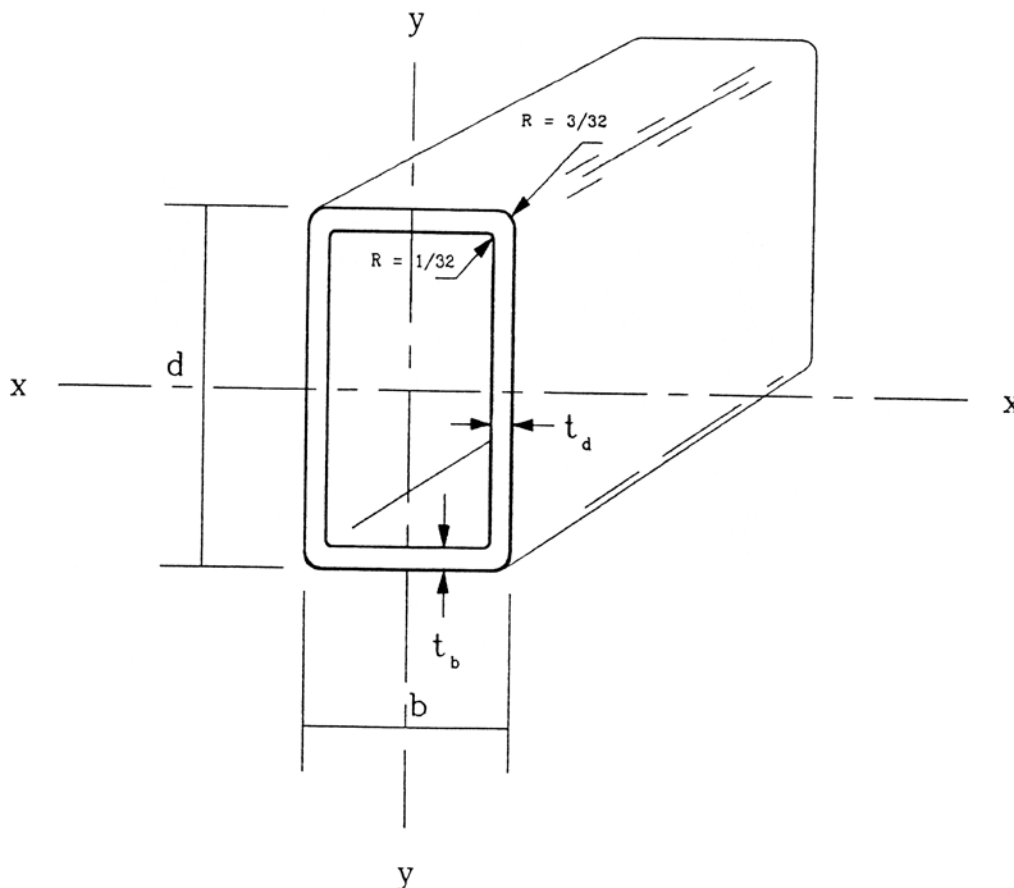
| SECTION DIMENSIONS | | | | SECTION PROPERTIES | | |
|--------------------|------|------------------|---------|--------------------|------------------|------|
| b | t | A | Wt. | I | S | r |
| in. | in. | in. ² | lb./ft. | in. ⁴ | in. ³ | in. |
| 1 | 1/8 | 0.43 | 0.32 | 0.06 | 0.11 | 0.36 |
| 1 | 1/4 | 0.74 | 0.55 | 0.08 | 0.16 | 0.33 |
| 1-1/4 | 1/8 | 0.56 | 0.41 | 0.12 | 0.19 | 0.46 |
| 1-1/4 | 1/4 | 0.99 | 0.75 | 0.18 | 0.28 | 0.42 |
| 1-1/2 | 1/8 | 0.68 | 0.50 | 0.22 | 0.29 | 0.56 |
| 1-1/2 | 1/4 | 1.24 | 0.98 | 0.34 | 0.45 | 0.52 |
| 1-3/4 | 1/8 | 0.81 | 0.61 | 0.36 | 0.41 | 0.67 |
| 1-3/4 | 1/4 | 1.49 | 1.13 | 0.58 | 0.66 | 0.62 |
| 2 | 1/8 | 0.93 | 0.70 | 0.55 | 0.55 | 0.77 |
| 2 | 1/4 | 1.74 | 1.32 | 0.91 | 0.91 | 0.73 |
| 2 | 3/8 | 2.44 | 1.85 | 1.13 | 1.13 | 0.68 |
| 2-1/8 | 3/16 | 1.45 | 1.10 | 0.91 | 0.85 | 0.79 |
| 2-1/4 | 1/8 | 1.06 | 0.81 | 0.80 | 0.71 | 0.87 |
| 2-1/4 | 1/4 | 1.99 | 1.51 | 1.35 | 1.20 | 0.83 |
| 2-1/2 | 1/4 | 2.25 | 1.79 | 1.92 | 1.54 | 0.92 |
| 3 | 1/8 | 1.43 | 1.08 | 1.98 | 1.32 | 1.18 |
| 3 | 1/4 | 2.74 | 2.07 | 3.50 | 2.33 | 1.13 |
| 3-1/2 | 1/4 | 3.24 | 2.49 | 5.73 | 3.27 | 1.32 |
| 4 | 1/4 | 3.74 | 2.83 | 8.82 | 4.41 | 1.53 |
| 4 | 3/8 | 5.43 | 4.24 | 12.03 | 6.01 | 1.48 |



Section Properties

RECTANGULAR TUBES

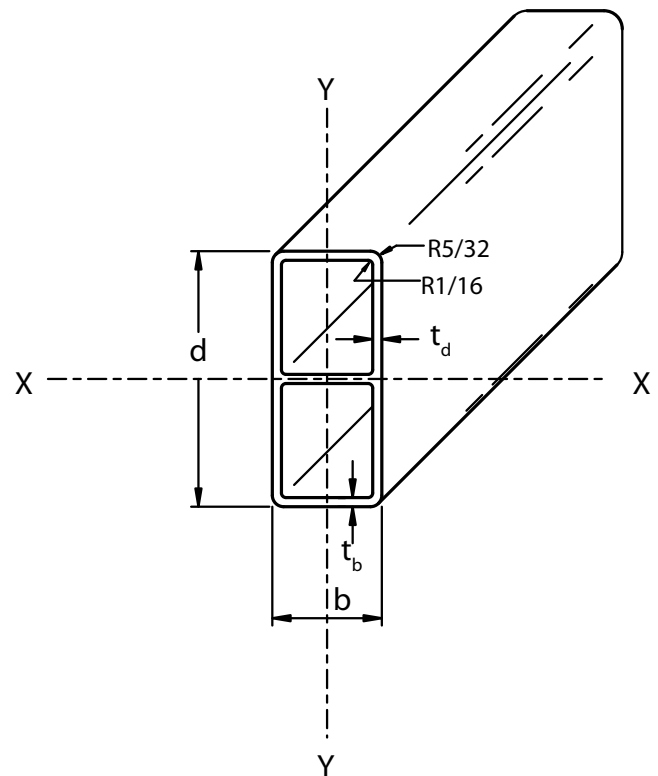
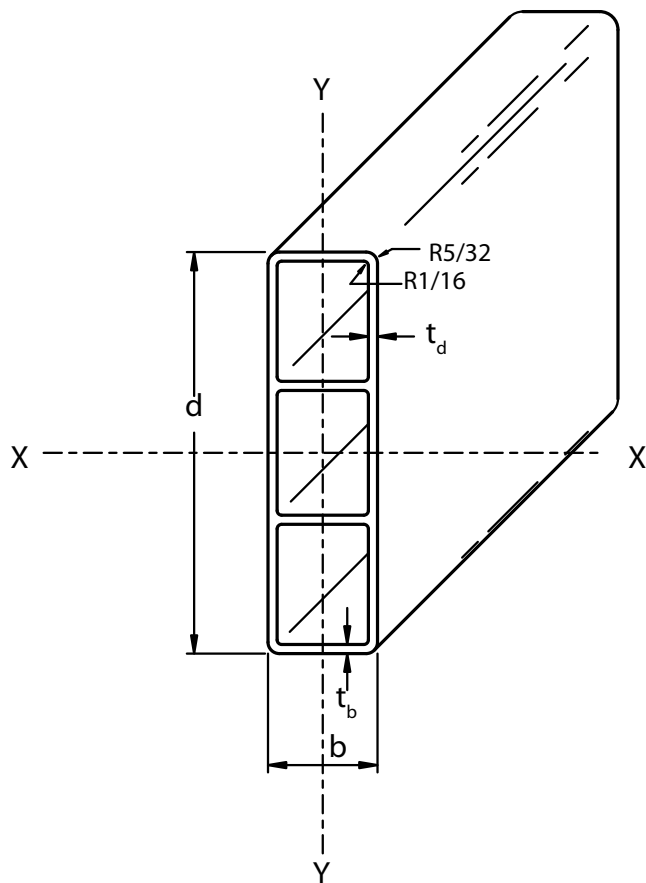
| SECTION DIMENSIONS | | | | | | SECTION PROPERTIES | | | | | |
|--------------------|-------|----------------|----------------|------------------|---------|--------------------|------------------|------|------------------|------------------|------|
| | | | | | | X - X | | | Y - Y | | |
| d | b | t _d | t _b | A | Wt. | I | S | r | I | S | r |
| in. | in. | in. | in. | in. ² | lb./ft. | in. ⁴ | in. ³ | in. | in. ⁴ | in. ³ | in. |
| 1-1/2 | 3/4 | 1/8 | 1/8 | 0.50 | 0.39 | 0.13 | 0.17 | 0.51 | 0.04 | 0.11 | 0.32 |
| 1-1/2 | 1 | 1/8 | 1/8 | 0.56 | 0.44 | 0.16 | 0.21 | 0.53 | 0.08 | 0.16 | 0.40 |
| 2 | 1/2 | 1/8 | 1/8 | 0.56 | 0.44 | 0.22 | 0.89 | 0.63 | 0.02 | 0.07 | 0.18 |
| 2 | 1 | 1/8 | 1/8 | 0.69 | 0.54 | 0.33 | 0.33 | 0.69 | 0.11 | 0.21 | 0.39 |
| 4 | 1 | 1/8 | 1/8 | 1.19 | 0.90 | 2.04 | 1.02 | 1.31 | 0.20 | 0.40 | 0.42 |
| 4 | 2 | 1/8 | 1/4 | 1.87 | 1.46 | 4.38 | 2.19 | 1.53 | 1.09 | 1.09 | 0.76 |
| 4-3/8 | 1-3/8 | 1/8 | 3/16 | 1.52 | 1.18 | 3.60 | 1.64 | 1.54 | 0.47 | 0.69 | 0.79 |
| 4-1/2 | 1-3/4 | 1/8 | 3/16 | 1.69 | 1.29 | 4.52 | 2.07 | 1.64 | 0.85 | 0.97 | 0.71 |
| 5 | 2 | 1/8 | 1/8 | 1.69 | 1.32 | 5.20 | 2.08 | 1.76 | 1.21 | 1.21 | 0.85 |
| 6 | 4 | 1/4 | 1/4 | 4.68 | 3.80 | 22.89 | 7.63 | 2.21 | 12.09 | 6.05 | 1.61 |



Section Properties

RECTANGULAR TUBES WITH INTERNAL WEBS

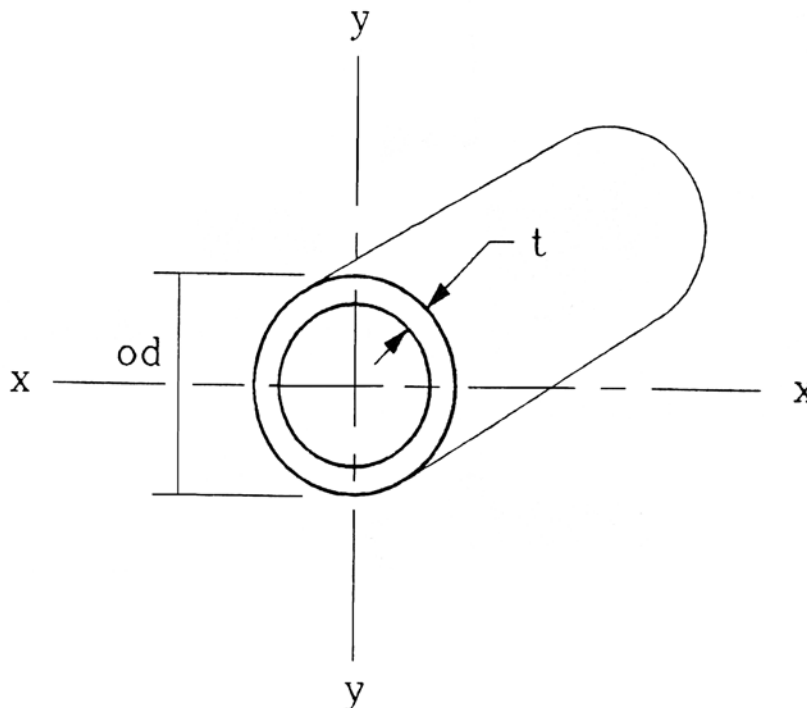
| SECTION DIMENSIONS | | | | | | SECTION PROPERTIES | | | | | |
|--------------------|-------|----------------|----------------|------------------|---------|--------------------|------------------|------|------------------|------------------|------|
| | | | | | | X - X | | | Y - Y | | |
| d | b | t _d | t _b | A | Wt. | I | S | r | I | S | r |
| in. | in. | in. | in. | in. ² | lb./ft. | in. ⁴ | in. ³ | in. | in. ⁴ | in. ³ | in. |
| 3-1/2 | 1-1/2 | 1/8 | 1/8 | 1.33 | 1.10 | 1.73 | 0.99 | 1.14 | 0.47 | 0.62 | 0.59 |
| 5-1/2 | 1-1/2 | 1/8 | 1/8 | 1.99 | 1.60 | 5.86 | 2.13 | 1.72 | 0.73 | 0.97 | 0.60 |



Section Properties

ROUND TUBES

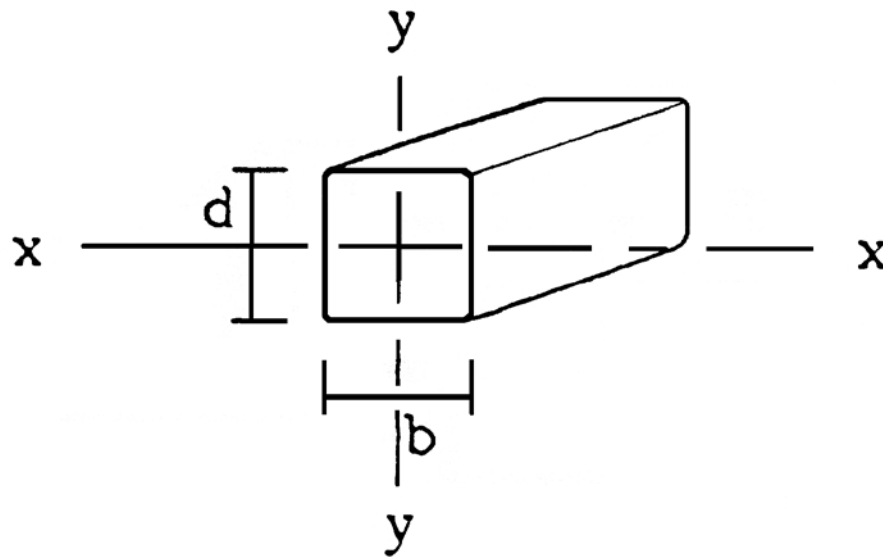
| SECTION DIMENSIONS | | | | SECTION PROPERTIES | | |
|--------------------|------|------------------|---------|--------------------|------------------|------|
| od | t | A | Wt. | I | S | r |
| in. | in. | in. ² | lb./ft. | in. ⁴ | in. ³ | in. |
| 1 | 3/32 | 0.27 | 0.22 | 0.03 | 0.06 | 0.32 |
| 1 | 1/8 | 0.34 | 0.25 | 0.03 | 0.07 | 0.31 |
| 1-1/8 | 1/8 | 0.39 | 0.33 | 0.05 | 0.09 | 0.36 |
| 1-1/4 | 3/32 | 0.34 | 0.27 | 0.06 | 0.09 | 0.41 |
| 1-1/4 | 1/8 | 0.44 | 0.32 | 0.07 | 0.11 | 0.40 |
| 1-1/4 | 1/4 | 0.79 | 0.61 | 0.10 | 0.17 | 0.36 |
| 1-1/2 | 1/8 | 0.54 | 0.45 | 0.13 | 0.17 | 0.49 |
| 1-1/2 | 1/4 | 0.98 | 0.79 | 0.20 | 0.27 | 0.45 |
| 1-3/4 | 1/8 | 0.64 | 0.51 | 0.21 | 0.24 | 0.58 |
| 1-3/4 | 1/4 | 1.18 | 0.94 | 0.34 | 0.39 | 0.54 |
| 1-7/8 | 3/16 | 0.99 | 0.88 | 0.36 | 0.38 | 0.60 |
| 2 | 1/4 | 1.37 | 1.08 | 0.54 | 0.54 | 0.62 |
| 3 | 1/4 | 2.16 | 1.70 | 2.06 | 1.37 | 0.98 |
| 3 | 1/2 | 3.93 | 2.98 | 3.19 | 2.13 | 0.90 |



Section Properties

SQUARE BARS

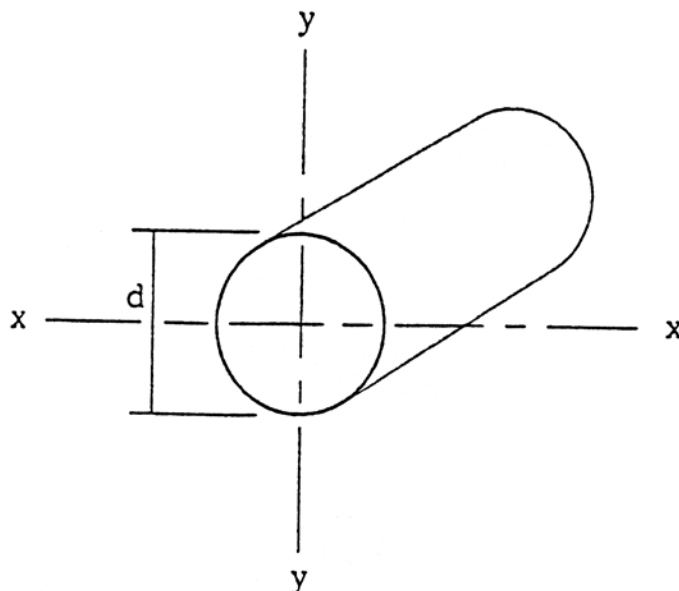
| SECTION DIMENSIONS | | | | SECTION PROPERTIES | | | | | |
|--------------------|-------|------------------|---------|--------------------|------------------|------|------------------|------------------|------|
| | | | | X - X | | | Y - Y | | |
| d | b | A | Wt. | I | S | r | I | S | r |
| in. | in. | in. ² | lb./ft. | in. ⁴ | in. ³ | in. | in. ⁴ | in. ³ | in. |
| 1 | 1 | 1.00 | 0.88 | 0.08 | 0.17 | 0.29 | 0.08 | 0.17 | 0.29 |
| 1-1/4 | 1-1/4 | 1.56 | 1.37 | 0.20 | 0.33 | 0.36 | 0.20 | 0.33 | 0.36 |
| 1-1/2 | 1-1/2 | 2.25 | 1.98 | 0.42 | 0.56 | 0.43 | 0.42 | 0.56 | 0.43 |



Section Properties

SOLID ROUNDS

| SECTION DIMENSIONS | | | SECTION PROPERTIES | | |
|--------------------|------------------|---------|--------------------|------------------|--------|
| d | A | Wt. | I | S | r |
| in. | in. ² | lb./ft. | in. ⁴ | in. ³ | in. |
| 0.2500 | 0.049 | 0.044 | 0.0002 | 0.0016 | 0.0625 |
| 0.3000 | 0.071 | 0.062 | 0.0004 | 0.0027 | 0.0750 |
| 0.3125 | 0.077 | 0.067 | 0.0005 | 0.0030 | 0.0781 |
| 0.3500 | 0.096 | 0.083 | 0.0007 | 0.0042 | 0.0875 |
| 0.3750 | 0.110 | 0.095 | 0.0010 | 0.0052 | 0.0938 |
| 0.4375 | 0.150 | 0.133 | 0.0018 | 0.0082 | 0.1094 |
| 0.4720 | 0.175 | 0.150 | 0.0024 | 0.0103 | 0.1180 |
| 0.4800 | 0.181 | 0.160 | 0.0026 | 0.0109 | 0.1200 |
| 0.5000 | 0.196 | 0.172 | 0.0031 | 0.0123 | 0.1250 |
| 0.6250 | 0.307 | 0.270 | 0.0075 | 0.0240 | 0.1563 |
| 0.7500 | 0.442 | 0.397 | 0.0156 | 0.0414 | 0.1875 |
| 0.8125 | 0.518 | 0.460 | 0.0214 | 0.0527 | 0.2031 |
| 0.8750 | 0.601 | 0.534 | 0.0288 | 0.0658 | 0.2188 |
| 1.0000 | 0.785 | 0.697 | 0.0491 | 0.0982 | 0.2500 |
| 1.2500 | 1.227 | 1.094 | 0.1198 | 0.1917 | 0.3125 |
| 1.5000 | 1.766 | 1.571 | 0.2485 | 0.3313 | 0.3750 |



Beams - Allowable Uniform Load Tables

TABLE NOTATION

A_w - Area of web (in²)

Δ - Deflection (in)

E - Modulus of Elasticity (psi)

F_b - Maximum Allowable Flexural Stress for Laterally Supported Beam (psi)

F_v - Maximum Allowable Shear Stress for Laterally Supported Beam (psi)

G - Shear Modulus (psi)

I - Moment of Inertia (in⁴)

L - Span Length (in)

S - Section Modulus (in³)

V - Vertical Shear (lbs)

w - Uniform Load (lbs/in)

M - Maximum Moment (in-lb)

The allowable uniform load tables were generated using the results from tests and the following formulas, properties and assumptions. The deflection formula reflects that the deflection is the result of both flexural and shear stresses.

$$\Delta = \frac{5wL^4}{384EI} + \frac{wL^2}{4A_wG}$$

$$F_v = \frac{V}{A_w}$$

$$F_b = \frac{M}{S}$$

$$E = 2.8 \times 10^6 \text{ psi}$$

$$G = 450,000 \text{ psi}$$

$$F_b = 10,000 \text{ psi}$$

$$F_v = 1,500 \text{ psi}$$

Adequate lateral support is provided (full lateral support for channels).

| LATERAL SUPPORT REQUIREMENTS - FRP STRUCTURAL SHAPES | | | |
|--|-------------------------|-------------|-------------------------|
| MEMBER | LATERAL SUPPORT SPACING | MEMBER | LATERAL SUPPORT SPACING |
| C6" x 1/4" | 48" | W4" x 1/4" | 60" |
| C8" x 3/8" | 60" | W6" x 1/4" | 84" |
| C10" x 1/2" | 60" | W6" x 3/8" | 96" |
| 14" x 1/4" | 24" | W8" x 3/8" | 108" |
| 16" x 1/4" | 36" | W10" x 3/8" | 156" |
| 18" x 3/8" | 48" | W12" x 1/2" | 168" |
| I10" x 3/8" | 60" | | |
| I12" x 1/2" | 84" | | |

Load is applied perpendicular to major axis. Beam simply supported at both ends. The part weight has been deducted in the following tables.

Beams - Allowable Uniform Load Tables (lbs/ft)

3 x 3 x 1/4 WIDE FLANGE BEAM

Laterally Supported

$$A_w = 0.625 \text{ in}^2$$

$$I_x = 3.17 \text{ in}^4$$

$$S_x = 2.11 \text{ in}^3$$

$$\text{Wt.} = 1.64 \text{ lbs./ft.}$$

| SPAN FEET | MAXIMUM LOAD | | DEFLECTION | | | | |
|-----------|--------------|-------|------------|-------|-------|-------|-------|
| | | | L/100 | L/150 | L/180 | L/240 | L/360 |
| 3 | 623 | F_v | --- | --- | --- | 496 | 330 |
| 4 | 467 | F_v | --- | 388 | 323 | 242 | 161 |
| 5 | 373 | F_v | 322 | 214 | 178 | 133 | 88 |
| 6 | 311 | F_v | 194 | 129 | 107 | 80 | 53 |
| 7 | 266 | F_v | 125 | 83 | 69 | 51 | 33 |
| 8 | 218 | F_b | 85 | 56 | 46 | 34 | 22 |
| 9 | 172 | F_b | 60 | 39 | 32 | 24 | 15 |
| 10 | 139 | F_b | 43 | 28 | 23 | 17 | 11 |

The part weight has been deducted in the above table.

4 x 4 x 1/4 WIDE FLANGE BEAM

Laterally Supported

$$A_w = 0.875 \text{ in}^2$$

$$I_x = 7.94 \text{ in}^4$$

$$S_x = 3.97 \text{ in}^3$$

$$\text{Wt.} = 2.15 \text{ lbs./ft.}$$

| SPAN FEET | MAXIMUM LOAD | | DEFLECTION | | | | |
|-----------|--------------|-------|------------|-------|-------|-------|-------|
| | | | L/100 | L/150 | L/180 | L/240 | L/360 |
| 3 | 872 | F_v | --- | --- | --- | --- | 661 |
| 4 | 653 | F_v | --- | --- | --- | 522 | 347 |
| 5 | 522 | F_v | --- | 483 | 402 | 301 | 200 |
| 6 | 435 | F_v | --- | 300 | 249 | 186 | 123 |
| 7 | 372 | F_v | 297 | 197 | 163 | 122 | 80 |
| 8 | 325 | F_v | 204 | 135 | 112 | 83 | 55 |
| 9 | 289 | F_v | 146 | 96 | 80 | 59 | 38 |
| 10 | 260 | F_v | 107 | 71 | 58 | 43 | 28 |
| 11 | 216 | F_b | 81 | 53 | 44 | 32 | 20 |
| 12 | 181 | F_b | 62 | 40 | 33 | 24 | 15 |
| 13 | 154 | F_b | 49 | 31 | 26 | 19 | 11 |

The part weight has been deducted in the above table.

Beams - Allowable Uniform Load Tables (lbs/ft)

6 x 6 x 1/4 WIDE FLANGE BEAM

Laterally Supported

$$A_w = 1.375 \text{ in}^2$$

$$I_x = 28.28 \text{ in}^4$$

$$S_x = 9.43 \text{ in}^3$$

$$\text{Wt.} = 3.40 \text{ lbs./ft.}$$

| SPAN FEET | MAXIMUM LOAD | | DEFLECTION | | | | |
|-----------|--------------|-------|------------|-------|-------|-------|-------|
| | | | L/100 | L/150 | L/180 | L/240 | L/360 |
| 5 | 821 | F_v | --- | --- | --- | --- | 554 |
| 6 | 684 | F_v | --- | --- | --- | 549 | 364 |
| 7 | 585 | F_v | --- | --- | 503 | 377 | 250 |
| 8 | 512 | F_v | --- | 430 | 358 | 267 | 177 |
| 9 | 454 | F_v | --- | 315 | 262 | 195 | 129 |
| 10 | 409 | F_v | 357 | 237 | 196 | 146 | 96 |
| 11 | 371 | F_v | 274 | 181 | 150 | 112 | 73 |
| 12 | 340 | F_v | 215 | 142 | 117 | 87 | 57 |
| 13 | 313 | F_v | 171 | 112 | 93 | 69 | 44 |
| 14 | 291 | F_v | 138 | 90 | 75 | 55 | 35 |
| 15 | 271 | F_v | 112 | 74 | 61 | 44 | 28 |

The part weight has been deducted in the above table.

6 x 6 x 3/8 WIDE FLANGE BEAM

Laterally Supported

$$A_w = 1.969 \text{ in}^2$$

$$I_x = 40.17 \text{ in}^4$$

$$S_x = 13.39 \text{ in}^3$$

$$\text{Wt.} = 4.90 \text{ lbs./ft.}$$

| SPAN FEET | MAXIMUM LOAD | | DEFLECTION | | | | |
|-----------|--------------|-------|------------|-------|-------|-------|-------|
| | | | L/100 | L/150 | L/180 | L/240 | L/360 |
| 5 | 1176 | F_v | --- | --- | --- | --- | 790 |
| 6 | 980 | F_v | --- | --- | --- | 782 | 520 |
| 7 | 839 | F_v | --- | --- | 717 | 537 | 356 |
| 8 | 733 | F_v | --- | 613 | 510 | 381 | 252 |
| 9 | 651 | F_v | --- | 449 | 373 | 279 | 184 |
| 10 | 586 | F_v | 508 | 337 | 280 | 209 | 138 |
| 11 | 532 | F_v | 390 | 259 | 215 | 160 | 105 |
| 12 | 487 | F_v | 306 | 202 | 168 | 124 | 81 |
| 13 | 449 | F_v | 243 | 160 | 133 | 98 | 64 |
| 14 | 417 | F_v | 196 | 129 | 107 | 79 | 51 |
| 15 | 389 | F_v | 160 | 105 | 87 | 64 | 41 |

The part weight has been deducted in the above table.

Beams - Allowable Uniform Load Tables (lbs/ft)

8 x 8 x 3/8 WIDE FLANGE BEAM

Laterally Supported

$$A_w = 2.719 \text{ in}^2$$

$$I_x = 99.19 \text{ in}^4$$

$$S_x = 24.80 \text{ in}^3$$

$$\text{Wt.} = 6.49 \text{ lbs./ft.}$$

| SPAN FEET | MAXIMUM LOAD | | DEFLECTION | | | | |
|-----------|--------------|-------|------------|-------|-------|-------|-------|
| | | | L/100 | L/150 | L/180 | L/240 | L/360 |
| 6 | 1353 | F_v | --- | --- | --- | --- | 1028 |
| 7 | 1158 | F_v | --- | --- | --- | 1105 | 735 |
| 8 | 1013 | F_v | --- | --- | --- | 811 | 539 |
| 9 | 899 | F_v | --- | --- | 815 | 609 | 404 |
| 10 | 809 | F_v | --- | 751 | 625 | 467 | 309 |
| 11 | 735 | F_v | --- | 586 | 488 | 364 | 240 |
| 12 | 673 | F_v | --- | 465 | 387 | 288 | 190 |
| 13 | 620 | F_v | 565 | 374 | 311 | 231 | 152 |
| 14 | 576 | F_v | 461 | 305 | 253 | 188 | 123 |
| 15 | 537 | F_v | 380 | 251 | 208 | 154 | 100 |
| 16 | 503 | F_v | 316 | 209 | 173 | 128 | 83 |
| 17 | 473 | F_v | 266 | 175 | 145 | 107 | 69 |
| 18 | 446 | F_v | 225 | 148 | 122 | 90 | 58 |
| 19 | 422 | F_v | 192 | 126 | 104 | 76 | 48 |
| 20 | 401 | F_v | 165 | 108 | 89 | 65 | 41 |
| 21 | 368 | F_b | 143 | 93 | 76 | 55 | 35 |
| 22 | 335 | F_b | 124 | 80 | 66 | 48 | 29 |
| 23 | 306 | F_b | 108 | 70 | 57 | 41 | 25 |
| 24 | 280 | F_b | 95 | 61 | 50 | 35 | 21 |
| 25 | 258 | F_b | 83 | 53 | 43 | 31 | 18 |

The part weight has been deducted in the above table.

Beams - Allowable Uniform Load Tables (lbs/ft)

8 x 8 x 1/2 WIDE FLANGE BEAM

Laterally Supported

$$A_w = 3.5 \text{ in}^2$$

$$I_x = 126.96 \text{ in}^4$$

$$S_x = 31.74 \text{ in}^3$$

$$\text{Wt.} = 8.70 \text{ lbs./ft.}$$

| SPAN FEET | MAXIMUM LOAD | | DEFLECTION | | | | |
|-----------|--------------|----------------|------------|-------|-------|-------|-------|
| | | | L/100 | L/150 | L/180 | L/240 | L/360 |
| 6 | 1741 | F _v | --- | --- | --- | --- | 1319 |
| 7 | 1491 | F _v | --- | --- | --- | 1418 | 942 |
| 8 | 1304 | F _v | --- | --- | --- | 1040 | 691 |
| 9 | 1158 | F _v | --- | --- | 1044 | 781 | 518 |
| 10 | 1041 | F _v | --- | 963 | 801 | 598 | 396 |
| 11 | 946 | F _v | --- | 751 | 625 | 466 | 308 |
| 12 | 866 | F _v | --- | 596 | 495 | 369 | 243 |
| 13 | 799 | F _v | 724 | 479 | 398 | 296 | 194 |
| 14 | 741 | F _v | 590 | 390 | 324 | 241 | 157 |
| 15 | 691 | F _v | 486 | 321 | 266 | 197 | 129 |
| 16 | 647 | F _v | 405 | 267 | 221 | 164 | 106 |
| 17 | 609 | F _v | 341 | 224 | 185 | 137 | 88 |
| 18 | 574 | F _v | 288 | 189 | 156 | 115 | 74 |
| 19 | 544 | F _v | 246 | 161 | 133 | 97 | 62 |
| 20 | 516 | F _v | 211 | 138 | 113 | 83 | 52 |
| 21 | 471 | F _b | 183 | 119 | 97 | 71 | 44 |
| 22 | 428 | F _b | 159 | 103 | 84 | 61 | 38 |
| 23 | 391 | F _b | 138 | 89 | 73 | 52 | 32 |
| 24 | 358 | F _b | 121 | 78 | 63 | 45 | 27 |
| 25 | 330 | F _b | 107 | 68 | 55 | 39 | 23 |

The part weight has been deducted in the above table.

Beams - Allowable Uniform Load Tables (lbs/ft)

10 x 10 x 3/8 WIDE FLANGE BEAM

Laterally Supported

$$A_w = 3.469 \text{ in}^2$$

$$I_x = 198.53 \text{ in}^4$$

$$S_x = 39.71 \text{ in}^3$$

$$\text{Wt.} = 8.74 \text{ lbs./ft.}$$

| SPAN FEET | MAXIMUM LOAD | | DEFLECTION | | | | |
|-----------|--------------|----------------|------------|-------|-------|-------|-------|
| | | | L/100 | L/150 | L/180 | L/240 | L/360 |
| 6 | 1725 | F _v | --- | --- | --- | --- | 1635 |
| 7 | 1478 | F _v | --- | --- | --- | --- | 1210 |
| 8 | 1292 | F _v | --- | --- | --- | --- | 914 |
| 9 | 1147 | F _v | --- | --- | --- | 1059 | 703 |
| 10 | 1032 | F _v | --- | --- | --- | 829 | 549 |
| 11 | 937 | F _v | --- | --- | 880 | 658 | 435 |
| 12 | 858 | F _v | --- | 851 | 708 | 529 | 349 |
| 13 | 791 | F _v | --- | 693 | 576 | 430 | 284 |
| 14 | 734 | F _v | --- | 571 | 474 | 353 | 233 |
| 15 | 685 | F _v | --- | 475 | 394 | 293 | 192 |
| 16 | 641 | F _v | 602 | 398 | 330 | 245 | 161 |
| 17 | 603 | F _v | 509 | 337 | 279 | 207 | 135 |
| 18 | 569 | F _v | 434 | 287 | 237 | 176 | 114 |
| 19 | 539 | F _v | 373 | 246 | 203 | 150 | 97 |
| 20 | 511 | F _v | 322 | 212 | 175 | 129 | 83 |
| 21 | 487 | F _v | 280 | 184 | 152 | 111 | 71 |
| 22 | 464 | F _v | 245 | 160 | 132 | 97 | 61 |
| 23 | 443 | F _v | 215 | 140 | 115 | 84 | 53 |
| 24 | 425 | F _v | 189 | 123 | 101 | 74 | 46 |
| 25 | 407 | F _v | 167 | 109 | 89 | 64 | 40 |

The part weight has been deducted in the above table.

Beams - Allowable Uniform Load Tables (lbs/ft)

10 x 10 x 1/2 WIDE FLANGE BEAM

Laterally Supported

$$A_w = 4.50 \text{ in}^2$$

$$I_x = 256.20 \text{ in}^4$$

$$S_x = 51.24 \text{ in}^3$$

$$\text{Wt.} = 10.90 \text{ lbs./ft.}$$

| SPAN FEET | MAXIMUM LOAD | | DEFLECTION | | | | |
|-----------|--------------|----------------|------------|-------|-------|-------|-------|
| | | | L/100 | L/150 | L/180 | L/240 | L/360 |
| 7 | 1918 | F _v | --- | --- | --- | --- | 1567 |
| 8 | 1677 | F _v | --- | --- | --- | --- | 1183 |
| 9 | 1489 | F _v | --- | --- | --- | 1370 | 910 |
| 10 | 1339 | F _v | --- | --- | --- | 1072 | 711 |
| 11 | 1216 | F _v | --- | --- | 1138 | 850 | 563 |
| 12 | 1114 | F _v | --- | 1100 | 915 | 684 | 452 |
| 13 | 1027 | F _v | --- | 896 | 745 | 556 | 367 |
| 14 | 953 | F _v | --- | 738 | 613 | 457 | 301 |
| 15 | 889 | F _v | --- | 614 | 510 | 379 | 249 |
| 16 | 833 | F _v | 778 | 515 | 427 | 318 | 208 |
| 17 | 783 | F _v | 658 | 435 | 361 | 268 | 175 |
| 18 | 739 | F _v | 562 | 371 | 307 | 228 | 148 |
| 19 | 700 | F _v | 482 | 318 | 263 | 195 | 126 |
| 20 | 664 | F _v | 417 | 274 | 227 | 167 | 108 |
| 21 | 632 | F _v | 362 | 238 | 196 | 144 | 93 |
| 22 | 603 | F _v | 316 | 207 | 171 | 125 | 80 |
| 23 | 576 | F _v | 278 | 181 | 149 | 109 | 69 |
| 24 | 552 | F _v | 245 | 160 | 131 | 96 | 60 |
| 25 | 529 | F _v | 217 | 141 | 115 | 84 | 52 |
| 26 | 494 | F _b | 192 | 125 | 102 | 74 | 46 |
| 27 | 458 | F _b | 172 | 111 | 90 | 65 | 40 |
| 28 | 425 | F _b | 153 | 99 | 80 | 57 | 35 |
| 29 | 395 | F _b | 138 | 88 | 72 | 51 | 30 |

The part weight has been deducted in the above table.

Beams - Allowable Uniform Load Tables (lbs/ft)

12 x 12 x 1/2 WIDE FLANGE BEAM

Laterally Supported

$$A_w = 5.50 \text{ in}^2$$

$$I_x = 452.45 \text{ in}^4$$

$$S_x = 75.45 \text{ in}^3$$

$$\text{Wt.} = 13.20 \text{ lbs./ft.}$$

| SPAN FEET | MAXIMUM LOAD | | DEFLECTION | | | | |
|-----------|--------------|----------------|------------|-------|-------|-------|-------|
| | | | L/100 | L/150 | L/180 | L/240 | L/360 |
| 7 | 2343 | F _v | --- | --- | --- | --- | 2273 |
| 8 | 2049 | F _v | --- | --- | --- | --- | 1760 |
| 9 | 1819 | F _v | --- | --- | --- | --- | 1383 |
| 10 | 1636 | F _v | --- | --- | --- | --- | 1102 |
| 11 | 1486 | F _v | --- | --- | --- | 1338 | 888 |
| 12 | 1361 | F _v | --- | --- | --- | 1091 | 723 |
| 13 | 1255 | F _v | --- | --- | 1203 | 899 | 595 |
| 14 | 1165 | F _v | --- | --- | 1001 | 747 | 493 |
| 15 | 1086 | F _v | --- | 1010 | 839 | 626 | 413 |
| 16 | 1017 | F _v | --- | 854 | 710 | 529 | 348 |
| 17 | 957 | F _v | --- | 728 | 604 | 450 | 295 |
| 18 | 903 | F _v | --- | 624 | 518 | 385 | 252 |
| 19 | 854 | F _v | 814 | 538 | 446 | 331 | 216 |
| 20 | 811 | F _v | 707 | 467 | 387 | 287 | 186 |
| 21 | 772 | F _v | 618 | 407 | 337 | 249 | 161 |
| 22 | 736 | F _v | 542 | 357 | 295 | 218 | 140 |
| 23 | 703 | F _v | 478 | 314 | 259 | 191 | 123 |
| 24 | 674 | F _v | 423 | 277 | 229 | 168 | 107 |
| 25 | 646 | F _v | 376 | 246 | 203 | 148 | 94 |
| 26 | 621 | F _v | 335 | 219 | 180 | 131 | 83 |
| 27 | 597 | F _v | 300 | 195 | 160 | 117 | 73 |
| 28 | 575 | F _v | 269 | 175 | 143 | 104 | 65 |
| 29 | 555 | F _v | 242 | 157 | 128 | 93 | 57 |
| 30 | 536 | F _v | 219 | 141 | 115 | 83 | 51 |

The part weight has been deducted in the above table.

Beams - Allowable Uniform Load Tables (lbs/ft)

3 x 1-1/2 x 1/4 I BEAM

Laterally Supported

$$A_w = 0.625 \text{ in}^2$$

$$I_x = 1.75 \text{ in}^4$$

$$S_x = 1.17 \text{ in}^3$$

$$\text{Wt.} = 1.10 \text{ lbs./ft.}$$

| SPAN FEET | MAXIMUM LOAD | | DEFLECTION | | | | |
|-----------|--------------|-------|------------|-------|-------|-------|-------|
| | | | L/100 | L/150 | L/180 | L/240 | L/360 |
| 3 | 623 | F_v | --- | 511 | 425 | 319 | 212 |
| 4 | 467 | F_v | 355 | 236 | 196 | 147 | 97 |
| 5 | 310 | F_b | 189 | 126 | 104 | 78 | 51 |
| 6 | 215 | F_b | 112 | 74 | 61 | 45 | 30 |
| 7 | 157 | F_b | 71 | 46 | 38 | 28 | 18 |
| 8 | 120 | F_b | 47 | 31 | 25 | 19 | 12 |
| 9 | 94 | F_b | 33 | 21 | 17 | 13 | 8 |
| 10 | 76 | F_b | 24 | 15 | 12 | 9 | 5 |

The part weight has been deducted in the above table.

4 x 2 x 1/4 I BEAM

Laterally Supported

$$A_w = 0.875 \text{ in}^2$$

$$I_x = 4.41 \text{ in}^4$$

$$S_x = 2.21 \text{ in}^3$$

$$\text{Wt.} = 1.50 \text{ lbs./ft.}$$

| SPAN FEET | MAXIMUM LOAD | | DEFLECTION | | | | |
|-----------|--------------|-------|------------|-------|-------|-------|-------|
| | | | L/100 | L/150 | L/180 | L/240 | L/360 |
| 3 | 873 | F_v | --- | --- | --- | 692 | 461 |
| 4 | 654 | F_v | --- | 542 | 451 | 338 | 225 |
| 5 | 523 | F_v | 449 | 299 | 249 | 186 | 123 |
| 6 | 407 | F_b | 271 | 180 | 150 | 112 | 74 |
| 7 | 299 | F_b | 175 | 116 | 96 | 72 | 47 |
| 8 | 228 | F_b | 119 | 78 | 65 | 48 | 32 |
| 9 | 180 | F_b | 84 | 55 | 46 | 34 | 22 |
| 10 | 145 | F_b | 61 | 40 | 33 | 24 | 16 |
| 11 | 120 | F_b | 46 | 30 | 25 | 18 | 11 |
| 12 | 100 | F_b | 35 | 23 | 19 | 13 | 8 |

The part weight has been deducted in the above table.

Beams - Allowable Uniform Load Tables (lbs/ft)

6 x 3 x 1/4 I BEAM

Laterally Supported

$$A_w = 1.375 \text{ in}^2$$

$$I_x = 16.99 \text{ in}^4$$

$$S_x = 5.66 \text{ in}^3$$

$$\text{Wt.} = 2.20 \text{ lbs./ft.}$$

| SPAN FEET | MAXIMUM LOAD | | DEFLECTION | | | | |
|-----------|--------------|----------------|------------|-------|-------|-------|-------|
| | | | L/100 | L/150 | L/180 | L/240 | L/360 |
| 5 | 822 | F _v | --- | --- | 797 | 597 | 397 |
| 6 | 685 | F _v | --- | 607 | 505 | 378 | 251 |
| 7 | 586 | F _v | --- | 405 | 337 | 252 | 167 |
| 8 | 513 | F _v | 424 | 282 | 234 | 175 | 116 |
| 9 | 455 | F _v | 306 | 203 | 169 | 126 | 83 |
| 10 | 374 | F _b | 227 | 150 | 125 | 93 | 61 |
| 11 | 309 | F _b | 173 | 114 | 95 | 70 | 46 |
| 12 | 259 | F _b | 134 | 88 | 73 | 54 | 35 |
| 13 | 220 | F _b | 106 | 70 | 57 | 42 | 27 |
| 14 | 189 | F _b | 85 | 56 | 46 | 34 | 21 |
| 15 | 165 | F _b | 69 | 45 | 37 | 27 | 17 |

The part weight has been deducted in the above table.

6 x 3 x 3/8 I BEAM

Laterally Supported

$$A_w = 1.969 \text{ in}^2$$

$$I_x = 22.35 \text{ in}^4$$

$$S_x = 7.45 \text{ in}^3$$

$$\text{Wt.} = 3.20 \text{ lbs./ft.}$$

| SPAN FEET | MAXIMUM LOAD | | DEFLECTION | | | | |
|-----------|--------------|----------------|------------|-------|-------|-------|-------|
| | | | L/100 | L/150 | L/180 | L/240 | L/360 |
| 6 | 981 | F _v | --- | 813 | 676 | 506 | 336 |
| 7 | 840 | F _v | 812 | 540 | 449 | 336 | 223 |
| 8 | 734 | F _v | 564 | 375 | 312 | 233 | 154 |
| 9 | 609 | F _b | 406 | 269 | 224 | 167 | 110 |
| 10 | 493 | F _b | 301 | 199 | 165 | 123 | 81 |
| 11 | 406 | F _b | 229 | 151 | 125 | 93 | 61 |
| 12 | 341 | F _b | 177 | 117 | 97 | 72 | 46 |
| 13 | 290 | F _b | 140 | 92 | 76 | 56 | 36 |
| 14 | 249 | F _b | 112 | 73 | 60 | 44 | 28 |
| 15 | 217 | F _b | 91 | 59 | 49 | 36 | 22 |
| 16 | 190 | F _b | 75 | 48 | 40 | 29 | 18 |
| 17 | 168 | F _b | 62 | 40 | 33 | 23 | 14 |
| 18 | 149 | F _b | 52 | 33 | 27 | 19 | 11 |

The part weight has been deducted in the above table.

Beams - Allowable Uniform Load Tables (lbs/ft)

8 x 4 x 3/8 I BEAM

Laterally Supported

$$A_w = 2.719 \text{ in}^2$$

$$I_x = 55.55 \text{ in}^4$$

$$S_x = 13.89 \text{ in}^3$$

$$\text{Wt.} = 4.30 \text{ lbs./ft.}$$

| SPAN FEET | MAXIMUM LOAD | | DEFLECTION | | | | |
|-----------|--------------|-------|------------|-------|-------|-------|-------|
| | | | L/100 | L/150 | L/180 | L/240 | L/360 |
| 6 | 1355 | F_v | --- | --- | --- | 1083 | 720 |
| 7 | 1160 | F_v | --- | --- | 993 | 744 | 494 |
| 8 | 1015 | F_v | --- | 849 | 707 | 529 | 351 |
| 9 | 901 | F_v | --- | 622 | 518 | 387 | 256 |
| 10 | 811 | F_v | 704 | 468 | 389 | 291 | 192 |
| 11 | 737 | F_v | 542 | 359 | 299 | 223 | 147 |
| 12 | 638 | F_b | 425 | 281 | 234 | 174 | 114 |
| 13 | 543 | F_b | 338 | 224 | 186 | 138 | 90 |
| 14 | 467 | F_b | 273 | 181 | 150 | 111 | 72 |
| 15 | 407 | F_b | 224 | 147 | 122 | 90 | 58 |
| 16 | 357 | F_b | 185 | 122 | 101 | 74 | 48 |
| 17 | 315 | F_b | 154 | 101 | 84 | 61 | 39 |
| 18 | 281 | F_b | 130 | 85 | 70 | 51 | 33 |
| 19 | 251 | F_b | 111 | 72 | 59 | 43 | 27 |
| 20 | 226 | F_b | 94 | 61 | 50 | 36 | 23 |

The part weight has been deducted in the above table.

Beams - Allowable Uniform Load Tables (lbs/ft)

8 x 4 x 1/2 I BEAM

Laterally Supported

$$A_w = 3.50 \text{ in}^2$$

$$I_x = 70.62 \text{ in}^4$$

$$S_x = 17.66 \text{ in}^3$$

$$\text{Wt.} = 5.70 \text{ lbs./ft.}$$

| SPAN FEET | MAXIMUM LOAD | | DEFLECTION | | | | |
|-----------|--------------|-------|------------|-------|-------|-------|-------|
| | | | L/100 | L/150 | L/180 | L/240 | L/360 |
| 6 | 1744 | F_v | --- | --- | --- | 1383 | 920 |
| 7 | 1494 | F_v | --- | --- | 1267 | 949 | 631 |
| 8 | 1307 | F_v | --- | 1082 | 901 | 674 | 448 |
| 9 | 1161 | F_v | --- | 793 | 660 | 494 | 327 |
| 10 | 1044 | F_v | 897 | 596 | 496 | 370 | 245 |
| 11 | 949 | F_v | 690 | 458 | 381 | 284 | 187 |
| 12 | 812 | F_b | 541 | 358 | 298 | 222 | 146 |
| 13 | 691 | F_b | 431 | 285 | 237 | 176 | 115 |
| 14 | 595 | F_b | 348 | 230 | 191 | 142 | 92 |
| 15 | 517 | F_b | 285 | 188 | 156 | 115 | 75 |
| 16 | 454 | F_b | 236 | 155 | 128 | 95 | 61 |
| 17 | 401 | F_b | 197 | 129 | 107 | 79 | 50 |
| 18 | 357 | F_b | 166 | 109 | 90 | 66 | 42 |
| 19 | 320 | F_b | 141 | 92 | 76 | 55 | 35 |
| 20 | 288 | F_b | 121 | 78 | 64 | 47 | 29 |

The part weight has been deducted in the above table.

Beams - Allowable Uniform Load Tables (lbs/ft)

10 x 5 x 3/8 I BEAM

Laterally Supported

$$A_w = 3.469 \text{ in}^2$$

$$I_x = 111.63 \text{ in}^4$$

$$S_x = 22.33 \text{ in}^3$$

$$\text{Wt.} = 5.78 \text{ lbs./ft.}$$

| SPAN FEET | MAXIMUM LOAD | | DEFLECTION | | | | |
|-----------|--------------|-------|------------|-------|-------|-------|-------|
| | | | L/100 | L/150 | L/180 | L/240 | L/360 |
| 6 | 1728 | F_v | --- | --- | --- | --- | 1225 |
| 7 | 1481 | F_v | --- | --- | --- | 1305 | 868 |
| 8 | 1295 | F_v | --- | --- | 1270 | 951 | 632 |
| 9 | 1150 | F_v | --- | 1141 | 949 | 711 | 472 |
| 10 | 1035 | F_v | --- | 871 | 725 | 542 | 359 |
| 11 | 940 | F_v | --- | 678 | 564 | 422 | 279 |
| 12 | 861 | F_v | 808 | 537 | 446 | 333 | 220 |
| 13 | 794 | F_v | 649 | 431 | 358 | 267 | 176 |
| 14 | 737 | F_v | 529 | 350 | 291 | 217 | 143 |
| 15 | 656 | F_b | 436 | 288 | 239 | 178 | 117 |
| 16 | 575 | F_b | 363 | 240 | 199 | 148 | 96 |
| 17 | 509 | F_b | 305 | 201 | 167 | 123 | 80 |
| 18 | 453 | F_b | 258 | 170 | 141 | 104 | 67 |
| 19 | 406 | F_b | 220 | 145 | 120 | 88 | 57 |
| 20 | 366 | F_b | 189 | 124 | 103 | 75 | 48 |
| 21 | 332 | F_b | 164 | 107 | 88 | 65 | 41 |
| 22 | 302 | F_b | 142 | 93 | 76 | 56 | 35 |
| 23 | 275 | F_b | 124 | 81 | 66 | 48 | 30 |
| 24 | 252 | F_b | 109 | 71 | 58 | 42 | 26 |
| 25 | 232 | F_b | 96 | 62 | 51 | 37 | 22 |

The part weight has been deducted in the above table.

Beams - Allowable Uniform Load Tables (lbs/ft)

10 x 5 x 1/2 I BEAM

Laterally Supported

$$A_w = 4.50 \text{ in}^2$$

$$I_x = 143.29 \text{ in}^4$$

$$S_x = 28.66 \text{ in}^3$$

$$\text{Wt.} = 7.20 \text{ lbs./ft.}$$

| SPAN FEET | MAXIMUM LOAD | | DEFLECTION | | | | |
|-----------|--------------|-------|------------|-------|-------|-------|-------|
| | | | L/100 | L/150 | L/180 | L/240 | L/360 |
| 6 | 2242 | F_v | --- | --- | --- | --- | 1579 |
| 7 | 1921 | F_v | --- | --- | --- | 1681 | 1118 |
| 8 | 1680 | F_v | --- | --- | 1635 | 1225 | 814 |
| 9 | 1492 | F_v | --- | 1468 | 1222 | 914 | 607 |
| 10 | 1342 | F_v | --- | 1120 | 932 | 697 | 462 |
| 11 | 1219 | F_v | --- | 872 | 725 | 542 | 359 |
| 12 | 1117 | F_v | 1038 | 690 | 573 | 428 | 283 |
| 13 | 1030 | F_v | 834 | 554 | 460 | 343 | 226 |
| 14 | 956 | F_v | 679 | 450 | 374 | 278 | 183 |
| 15 | 841 | F_b | 559 | 370 | 307 | 228 | 150 |
| 16 | 738 | F_b | 466 | 308 | 255 | 189 | 124 |
| 17 | 653 | F_b | 391 | 258 | 214 | 158 | 103 |
| 18 | 582 | F_b | 331 | 218 | 180 | 133 | 86 |
| 19 | 521 | F_b | 283 | 186 | 153 | 113 | 73 |
| 20 | 470 | F_b | 243 | 159 | 131 | 97 | 62 |
| 21 | 425 | F_b | 210 | 137 | 113 | 83 | 53 |
| 22 | 387 | F_b | 183 | 119 | 98 | 71 | 45 |
| 23 | 353 | F_b | 160 | 104 | 85 | 62 | 39 |
| 24 | 324 | F_b | 140 | 91 | 74 | 54 | 33 |
| 25 | 298 | F_b | 123 | 80 | 65 | 47 | 28 |

The part weight has been deducted in the above table.

Beams - Allowable Uniform Load Tables (lbs/ft)

12 x 6 x 1/2 I BEAM

Laterally Supported

$$A_w = 5.50 \text{ in}^2$$

$$I_x = 253.96 \text{ in}^4$$

$$S_x = 42.33 \text{ in}^3$$

$$\text{Wt.} = 8.70 \text{ lbs./ft.}$$

| SPAN FEET | MAXIMUM LOAD | | DEFLECTION | | | | |
|-----------|--------------|----------------|------------|-------|-------|-------|-------|
| | | | L/100 | L/150 | L/180 | L/240 | L/360 |
| 6 | 2741 | F _v | --- | --- | --- | --- | 2354 |
| 7 | 2348 | F _v | --- | --- | --- | --- | 1715 |
| 8 | 2054 | F _v | --- | --- | --- | 1922 | 1278 |
| 9 | 1824 | F _v | --- | --- | --- | 1463 | 972 |
| 10 | 1641 | F _v | --- | --- | 1514 | 1134 | 753 |
| 11 | 1491 | F _v | --- | 1434 | 1193 | 893 | 592 |
| 12 | 1366 | F _v | --- | 1147 | 954 | 713 | 473 |
| 13 | 1260 | F _v | --- | 929 | 773 | 577 | 382 |
| 14 | 1170 | F _v | 1147 | 762 | 633 | 473 | 312 |
| 15 | 1091 | F _v | 951 | 631 | 524 | 391 | 258 |
| 16 | 1022 | F _v | 796 | 528 | 438 | 327 | 215 |
| 17 | 962 | F _v | 673 | 445 | 370 | 275 | 180 |
| 18 | 862 | F _b | 573 | 379 | 314 | 122 | 153 |
| 19 | 773 | F _b | 491 | 324 | 269 | 199 | 130 |
| 20 | 696 | F _b | 424 | 279 | 231 | 171 | 111 |
| 21 | 631 | F _b | 368 | 242 | 200 | 148 | 96 |
| 22 | 574 | F _b | 321 | 211 | 174 | 129 | 83 |
| 23 | 524 | F _b | 282 | 185 | 152 | 112 | 72 |
| 24 | 481 | F _b | 248 | 162 | 134 | 98 | 62 |
| 25 | 442 | F _b | 220 | 143 | 118 | 86 | 55 |
| 26 | 408 | F _b | 195 | 127 | 104 | 76 | 48 |
| 27 | 378 | F _b | 174 | 113 | 93 | 67 | 42 |
| 28 | 351 | F _b | 156 | 101 | 83 | 60 | 37 |
| 29 | 327 | F _b | 140 | 90 | 74 | 53 | 32 |
| 30 | 305 | F _b | 126 | 81 | 66 | 74 | 28 |

The part weight has been deducted in the above table.

Beams - Allowable Uniform Load Tables (lbs/ft)

18 x 3/8 x 4-1/2 x 1/2 I BEAM

Laterally Supported

$$A_w = 6.375 \text{ in}^2$$

$$I_x = 498.15 \text{ in}^4$$

$$S_x = 55.35 \text{ in}^3$$

$$\text{Wt.} = 8.70 \text{ lbs./ft.}$$

| SPAN FEET | MAXIMUM LOAD | | DEFLECTION | | | | |
|-----------|--------------|----------------|------------|-------|-------|-------|-------|
| | | | L/100 | L/150 | L/180 | L/240 | L/360 |
| 8 | 2382 | F _v | --- | --- | --- | --- | 1996 |
| 9 | 2116 | F _v | --- | --- | --- | --- | 1565 |
| 10 | 1904 | F _v | --- | --- | --- | 1872 | 1245 |
| 11 | 1730 | F _v | --- | --- | --- | 1507 | 1002 |
| 12 | 1585 | F _v | --- | --- | --- | 1228 | 816 |
| 13 | 1462 | F _v | --- | --- | 1351 | 1011 | 671 |
| 14 | 1357 | F _v | --- | 1349 | 1123 | 840 | 557 |
| 15 | 1266 | F _v | --- | 1132 | 942 | 704 | 466 |
| 16 | 1186 | F _v | --- | 957 | 796 | 595 | 394 |
| 17 | 1116 | F _v | --- | 815 | 678 | 506 | 335 |
| 18 | 1054 | F _v | --- | 700 | 581 | 434 | 286 |
| 19 | 998 | F _v | 910 | 604 | 502 | 374 | 246 |
| 20 | 913 | F _b | 791 | 524 | 436 | 324 | 213 |
| 21 | 828 | F _b | 691 | 458 | 380 | 283 | 186 |
| 22 | 753 | F _b | 607 | 402 | 333 | 248 | 162 |
| 23 | 688 | F _b | 536 | 354 | 294 | 218 | 142 |
| 24 | 632 | F _b | 475 | 313 | 260 | 193 | 125 |
| 25 | 581 | F _b | 422 | 279 | 231 | 171 | 111 |
| 26 | 537 | F _b | 377 | 248 | 206 | 152 | 98 |
| 27 | 497 | F _b | 338 | 222 | 184 | 136 | 87 |
| 28 | 462 | F _b | 304 | 200 | 165 | 121 | 78 |
| 29 | 430 | F _b | 274 | 180 | 148 | 109 | 70 |
| 30 | 401 | F _b | 248 | 162 | 134 | 98 | 62 |

The part weight has been deducted in the above table.

Beams - Allowable Uniform Load Tables (lbs/ft)

24 x 3/8 x 7-1/2 x 3/4 I BEAM

Laterally Supported

$$A_w = 8.44 \text{ in}^2$$

$$I_x = 1877.00 \text{ in}^4$$

$$S_x = 156.42 \text{ in}^3$$

$$\text{Wt.} = 15.20 \text{ lbs./ft.}$$

| SPAN FEET | MAXIMUM LOAD | | DEFLECTION | | | | |
|-----------|--------------|----------------|------------|-------|-------|-------|-------|
| | | | L/100 | L/150 | L/180 | L/240 | L/360 |
| 35 | 707 | F _v | 552 | 363 | 300 | 221 | 142 |
| 36 | 687 | F _v | 510 | 335 | 276 | 203 | 130 |
| 37 | 668 | F _v | 472 | 309 | 255 | 187 | 119 |
| 38 | 650 | F _v | 437 | 286 | 236 | 173 | 110 |
| 39 | 633 | F _v | 405 | 265 | 218 | 160 | 101 |
| 40 | 617 | F _v | 377 | 246 | 202 | 148 | 93 |
| 41 | 602 | F _v | 350 | 228 | 188 | 137 | 86 |
| 42 | 575 | F _b | 327 | 212 | 174 | 127 | 79 |
| 43 | 548 | F _b | 305 | 198 | 162 | 118 | 73 |
| 44 | 523 | F _b | 284 | 184 | 151 | 109 | 67 |
| 45 | 499 | F _b | 266 | 172 | 141 | 101 | 62 |
| 46 | 477 | F _b | 249 | 161 | 131 | 94 | 58 |
| 47 | 456 | F _b | 233 | 150 | 122 | 88 | 53 |
| 48 | 437 | F _b | 219 | 140 | 114 | 82 | 49 |
| 49 | 418 | F _b | 205 | 131 | 107 | 76 | 45 |
| 50 | 401 | F _b | 193 | 123 | 100 | 71 | 42 |
| 51 | 385 | F _b | 181 | 116 | 94 | 66 | 39 |
| 52 | 370 | F _b | 171 | 108 | 88 | 62 | 36 |
| 53 | 355 | F _b | 161 | 102 | 82 | 58 | 33 |
| 54 | 342 | F _b | 151 | 96 | 77 | 54 | 31 |
| 55 | 329 | F _b | 143 | 90 | 72 | 50 | 28 |
| 56 | 316 | F _b | 135 | 84 | 68 | 47 | 26 |
| 57 | 305 | F _b | 127 | 79 | 64 | 44 | 24 |

The part weight has been deducted in the above table.

Beams - Allowable Uniform Load Tables (lbs/ft)

3 x 1-3/16 x 1/8 CHANNEL

Laterally Supported

$$A_w = 0.344 \text{ in}^2$$

$$I_x = 0.64 \text{ in}^4$$

$$S_x = 0.43 \text{ in}^3$$

$$\text{Wt.} = 0.43 \text{ lbs./ft.}$$

| SPAN FEET | MAXIMUM LOAD | | DEFLECTION | | | | |
|-----------|--------------|-------|------------|-------|-------|-------|-------|
| | | | L/100 | L/150 | L/180 | L/240 | L/360 |
| 3 | 317 | F_b | 301 | 200 | 167 | 125 | 83 |
| 4 | 178 | F_b | 135 | 90 | 75 | 56 | 37 |
| 5 | 114 | F_b | 71 | 47 | 39 | 29 | 19 |
| 6 | 79 | F_b | 41 | 27 | 23 | 17 | 11 |
| 7 | 57 | F_b | 26 | 17 | 14 | 10 | 7 |
| 8 | 44 | F_b | 17 | 11 | 9 | 7 | 4 |
| 9 | 34 | F_b | 12 | 8 | 6 | 4 | 3 |
| 10 | 28 | F_b | 8 | 5 | 4 | 3 | 2 |

The part weight has been deducted in the above table.

3 x 1 x 1/4 CHANNEL

Laterally Supported

$$A_w = 0.625 \text{ in}^2$$

$$I_x = 1.27 \text{ in}^4$$

$$S_x = 0.85 \text{ in}^3$$

$$\text{Wt.} = 0.85 \text{ lbs./ft.}$$

| SPAN FEET | MAXIMUM LOAD | | DEFLECTION | | | | |
|-----------|--------------|-------|------------|-------|-------|-------|-------|
| | | | L/100 | L/150 | L/180 | L/240 | L/360 |
| 3 | 624 | F_v | 591 | 393 | 328 | 246 | 163 |
| 4 | 353 | F_b | 267 | 178 | 148 | 111 | 73 |
| 5 | 226 | F_b | 141 | 94 | 78 | 58 | 38 |
| 6 | 156 | F_b | 83 | 55 | 46 | 34 | 22 |
| 7 | 115 | F_b | 52 | 35 | 29 | 21 | 14 |
| 8 | 88 | F_b | 35 | 23 | 19 | 14 | 9 |
| 9 | 69 | F_b | 24 | 16 | 13 | 10 | 6 |
| 10 | 56 | F_b | 18 | 11 | 9 | 7 | 4 |

The part weight has been deducted in the above table.

Beams - Allowable Uniform Load Tables (lbs/ft)

3 x 1-1/2 x 1/4 CHANNEL

Laterally Supported

$$A_w = 0.625 \text{ in}^2$$

$$I_x = 1.75 \text{ in}^4$$

$$S_x = 1.16 \text{ in}^3$$

$$\text{Wt.} = 1.01 \text{ lbs./ft.}$$

| SPAN FEET | MAXIMUM LOAD | | DEFLECTION | | | | |
|--------------|--------------|-------|------------|-------|-------|-------|-------|
| | | | L/100 | L/150 | L/180 | L/240 | L/360 |
| 3 | 623 | F_v | --- | 511 | 425 | 319 | 212 |
| 4 | 467 | F_v | 355 | 236 | 196 | 147 | 97 |
| 5 | 307 | F_b | 189 | 126 | 104 | 78 | 51 |
| 6 | 213 | F_b | 112 | 74 | 61 | 45 | 30 |
| 7 | 156 | F_b | 71 | 46 | 38 | 28 | 18 |
| 8 | 119 | F_b | 47 | 31 | 25 | 19 | 12 |
| 9 | 93 | F_b | 33 | 21 | 17 | 13 | 8 |
| 10 | 75 | F_b | 24 | 15 | 12 | 9 | 5 |

The part weight has been deducted in the above table.

3-1/2 x 1-3/16 x 1/8 x 3/16 CHANNEL

Laterally Supported

$$A_w = 0.406 \text{ in}^2$$

$$I_x = 1.54 \text{ in}^4$$

$$S_x = 0.88 \text{ in}^3$$

$$\text{Wt.} = 0.67 \text{ lbs./ft.}$$

| SPAN FEET | MAXIMUM LOAD | | DEFLECTION | | | | |
|--------------|--------------|-------|------------|-------|-------|-------|-------|
| | | | L/100 | L/150 | L/180 | L/240 | L/360 |
| 3 | 623 | F_v | --- | 511 | 425 | 319 | 212 |
| 4 | 467 | F_v | 355 | 236 | 196 | 147 | 97 |
| 5 | 307 | F_b | 189 | 126 | 104 | 78 | 51 |
| 6 | 213 | F_b | 112 | 74 | 61 | 45 | 30 |
| 7 | 156 | F_b | 71 | 46 | 38 | 28 | 18 |
| 8 | 119 | F_b | 47 | 31 | 25 | 19 | 12 |
| 9 | 93 | F_b | 33 | 21 | 17 | 13 | 8 |
| 10 | 75 | F_b | 24 | 15 | 12 | 9 | 5 |

The part weight has been deducted in the above table.

Beams - Allowable Uniform Load Tables (lbs/ft)

3-1/2 x 1-1/2 x 3/16 CHANNEL

Laterally Supported

$$A_w = 0.54 \text{ in}^2$$

$$I_x = 1.92 \text{ in}^4$$

$$S_x = 1.10 \text{ in}^3$$

$$\text{Wt.} = 0.86 \text{ lbs./ft.}$$

| SPAN FEET | MAXIMUM LOAD | | DEFLECTION | | | | |
|--------------|-----------------|-------|------------|-------|-------|-------|-------|
| | | | L/100 | L/150 | L/180 | L/240 | L/360 |
| 3 | 539 | F_v | --- | 532 | 443 | 332 | 221 |
| 4 | 404 | F_v | 377 | 251 | 209 | 157 | 104 |
| 5 | 291 | F_b | 204 | 136 | 113 | 84 | 56 |
| 6 | 202 | F_b | 122 | 81 | 67 | 50 | 33 |
| 7 | 148 | F_b | 78 | 52 | 43 | 32 | 21 |
| 8 | 113 | F_b | 53 | 35 | 29 | 21 | 14 |
| 9 | 89 | F_b | 37 | 24 | 20 | 15 | 10 |
| 10 | 72 | F_b | 27 | 18 | 14 | 11 | 7 |
| 11 | 59 | F_b | 20 | 13 | 11 | 8 | 5 |
| 12 | 50 | F_b | 15 | 10 | 8 | 6 | 4 |

The part weight has been deducted in the above table.

Beams - Allowable Uniform Load Tables (lbs/ft)

4 x 1-1/8 x 1/4 CHANNEL

Laterally Supported

$$A_w = 0.875 \text{ in}^2$$

$$I_x = 2.87 \text{ in}^4$$

$$S_x = 1.44 \text{ in}^3$$

$$\text{Wt.} = 1.05 \text{ lbs./ft.}$$

| SPAN FEET | MAXIMUM LOAD | | DEFLECTION | | | | |
|-----------|--------------|-------|------------|-------|-------|-------|-------|
| | | | L/100 | L/150 | L/180 | L/240 | L/360 |
| 3 | 873 | F_v | --- | 811 | 675 | 506 | 337 |
| 4 | 598 | F_b | 570 | 380 | 316 | 236 | 157 |
| 5 | 382 | F_b | 307 | 204 | 170 | 127 | 84 |
| 6 | 265 | F_b | 182 | 121 | 100 | 75 | 49 |
| 7 | 194 | F_b | 116 | 77 | 64 | 47 | 31 |
| 8 | 148 | F_b | 78 | 52 | 43 | 31 | 20 |
| 9 | 117 | F_b | 55 | 36 | 30 | 22 | 14 |
| 10 | 94 | F_b | 40 | 26 | 21 | 15 | 10 |

The part weight has been deducted in the above table.

4 x 1-3/8 x 3/16 CHANNEL

Laterally Supported

$$A_w = 0.680 \text{ in}^2$$

$$I_x = 2.62 \text{ in}^4$$

$$S_x = 1.31 \text{ in}^3$$

$$\text{Wt.} = 0.88 \text{ lbs./ft.}$$

| SPAN FEET | MAXIMUM LOAD | | DEFLECTION | | | | |
|-----------|--------------|-------|------------|-------|-------|-------|-------|
| | | | L/100 | L/150 | L/180 | L/240 | L/360 |
| 3 | 679 | F_v | --- | --- | 593 | 445 | 296 |
| 4 | 509 | F_v | 509 | 339 | 282 | 211 | 141 |
| 5 | 348 | F_b | 277 | 184 | 153 | 115 | 76 |
| 6 | 242 | F_b | 165 | 110 | 91 | 68 | 45 |
| 7 | 177 | F_b | 106 | 70 | 58 | 44 | 29 |
| 8 | 135 | F_b | 72 | 48 | 39 | 29 | 19 |
| 9 | 107 | F_b | 51 | 33 | 28 | 21 | 13 |
| 10 | 86 | F_b | 37 | 24 | 20 | 15 | 10 |

The part weight has been deducted in the above table.

Beams - Allowable Uniform Load Tables (lbs/ft)

5-1/2 x 1-1/2 x 1/4 CHANNEL

Laterally Supported

$$A_w = 1.3125 \text{ in}^2$$

$$I_x = 7.38 \text{ in}^4$$

$$S_x = 2.68 \text{ in}^3$$

$$\text{Wt.} = 1.49 \text{ lbs./ft.}$$

| SPAN FEET | MAXIMUM LOAD | | DEFLECTION | | | | |
|--------------|-----------------|-------|------------|-------|-------|-------|-------|
| | | | L/100 | L/150 | L/180 | L/240 | L/360 |
| 3 | 1311 | F_v | --- | --- | --- | 1118 | 745 |
| 4 | 982 | F_v | --- | 887 | 739 | 554 | 368 |
| 5 | 714 | F_b | --- | 493 | 411 | 308 | 204 |
| 6 | 495 | F_b | 450 | 299 | 249 | 186 | 123 |
| 7 | 363 | F_b | 291 | 194 | 161 | 120 | 79 |
| 8 | 278 | F_b | 199 | 132 | 109 | 82 | 54 |
| 9 | 219 | F_b | 141 | 93 | 77 | 58 | 38 |
| 10 | 177 | F_b | 103 | 68 | 56 | 42 | 27 |
| 11 | 146 | F_b | 78 | 51 | 42 | 31 | 20 |
| 12 | 122 | F_b | 60 | 39 | 32 | 24 | 15 |
| 13 | 104 | F_b | 47 | 31 | 25 | 18 | 12 |
| 14 | 89 | F_b | 37 | 24 | 20 | 14 | 9 |
| 15 | 78 | F_b | 30 | 19 | 16 | 11 | 7 |

The part weight has been deducted in the above table.

Beams - Allowable Uniform Load Tables (lbs/ft)

6 x 1-5/8 x 1/4 CHANNEL

Laterally Supported

$$A_w = 1.375 \text{ in}^2$$

$$I_x = 10.18 \text{ in}^4$$

$$S_x = 3.39 \text{ in}^3$$

$$\text{Wt.} = 1.67 \text{ lbs./ft.}$$

| SPAN FEET | MAXIMUM LOAD | | DEFLECTION | | | | |
|-----------|--------------|-------|------------|-------|-------|-------|-------|
| | | | L/100 | L/150 | L/180 | L/240 | L/360 |
| 5 | 823 | F_v | --- | 649 | 540 | 405 | 269 |
| 6 | 626 | F_b | 599 | 399 | 332 | 249 | 165 |
| 7 | 459 | F_b | 392 | 261 | 217 | 162 | 107 |
| 8 | 351 | F_b | 269 | 179 | 149 | 111 | 73 |
| 9 | 277 | F_b | 192 | 127 | 106 | 79 | 52 |
| 10 | 224 | F_b | 141 | 93 | 78 | 58 | 38 |
| 11 | 185 | F_b | 107 | 70 | 58 | 43 | 28 |
| 12 | 155 | F_b | 82 | 54 | 45 | 33 | 21 |
| 13 | 132 | F_b | 65 | 43 | 35 | 26 | 17 |
| 14 | 113 | F_b | 52 | 34 | 28 | 20 | 13 |
| 15 | 98 | F_b | 42 | 27 | 22 | 16 | 10 |

The part weight has been deducted in the above table.

6 x 1-11/16 x 3/8 CHANNEL

Laterally Supported

$$A_w = 1.969 \text{ in}^2$$

$$I_x = 14.55 \text{ in}^4$$

$$S_x = 4.85 \text{ in}^3$$

$$\text{Wt.} = 2.39 \text{ lbs./ft.}$$

| SPAN FEET | MAXIMUM LOAD | | DEFLECTION | | | | |
|-----------|--------------|-------|------------|-------|-------|-------|-------|
| | | | L/100 | L/150 | L/180 | L/240 | L/360 |
| 5 | 1178 | F_v | --- | 928 | 773 | 579 | 385 |
| 6 | 895 | F_b | 857 | 570 | 475 | 355 | 236 |
| 7 | 657 | F_b | 560 | 372 | 310 | 232 | 153 |
| 8 | 502 | F_b | 384 | 255 | 212 | 158 | 105 |
| 9 | 396 | F_b | 274 | 182 | 151 | 112 | 74 |
| 10 | 320 | F_b | 202 | 133 | 111 | 82 | 54 |
| 11 | 264 | F_b | 152 | 101 | 83 | 62 | 40 |
| 12 | 222 | F_b | 118 | 77 | 64 | 47 | 31 |
| 13 | 188 | F_b | 92 | 61 | 50 | 37 | 24 |
| 14 | 162 | F_b | 74 | 48 | 40 | 29 | 18 |
| 15 | 141 | F_b | 60 | 39 | 32 | 23 | 14 |

The part weight has been deducted in the above table.

Beams - Allowable Uniform Load Tables (lbs/ft)

8 x 2-3/16 x 3/8 CHANNEL

Laterally Supported

$$A_w = 2.719 \text{ in}^2$$

$$I_x = 35.77 \text{ in}^4$$

$$S_x = 8.94 \text{ in}^3$$

$$\text{Wt.} = 3.20 \text{ lbs./ft.}$$

| SPAN FEET | MAXIMUM LOAD | | DEFLECTION | | | | |
|--------------|--------------|-------|------------|-------|-------|-------|-------|
| | | | L/100 | L/150 | L/180 | L/240 | L/360 |
| 5 | 1627 | F_v | --- | --- | --- | 1235 | 822 |
| 6 | 1356 | F_v | --- | 1261 | 1050 | 787 | 523 |
| 7 | 1161 | F_v | --- | 845 | 704 | 527 | 350 |
| 8 | 927 | F_b | 887 | 590 | 491 | 367 | 244 |
| 9 | 732 | F_b | 642 | 426 | 355 | 265 | 175 |
| 10 | 592 | F_b | 478 | 317 | 264 | 197 | 130 |
| 11 | 489 | F_b | 364 | 241 | 201 | 149 | 98 |
| 12 | 410 | F_b | 283 | 188 | 156 | 116 | 76 |
| 13 | 349 | F_b | 224 | 148 | 123 | 91 | 59 |
| 14 | 300 | F_b | 180 | 119 | 98 | 73 | 47 |
| 15 | 261 | F_b | 147 | 97 | 80 | 59 | 38 |
| 16 | 229 | F_b | 121 | 79 | 65 | 48 | 31 |
| 17 | 202 | F_b | 101 | 66 | 54 | 40 | 25 |
| 18 | 180 | F_b | 85 | 55 | 45 | 33 | 21 |
| 19 | 161 | F_b | 72 | 46 | 38 | 27 | 17 |
| 20 | 145 | F_b | 61 | 39 | 32 | 23 | 14 |

The part weight has been deducted in the above table.

Beams - Allowable Uniform Load Tables (lbs/ft)

10 x 2-3/4 x 1/2 CHANNEL

Laterally Supported

$$A_w = 4.50 \text{ in}^2$$

$$I_x = 92.49 \text{ in}^4$$

$$S_x = 18.50 \text{ in}^3$$

$$\text{Wt.} = 5.30 \text{ lbs./ft.}$$

| SPAN FEET | MAXIMUM LOAD | | DEFLECTION | | | | |
|-----------|--------------|-------|------------|-------|-------|-------|-------|
| | | | L/100 | L/150 | L/180 | L/240 | L/360 |
| 6 | 2244 | F_v | --- | --- | --- | 1802 | 1199 |
| 7 | 1923 | F_v | --- | --- | 1654 | 1239 | 824 |
| 8 | 1682 | F_v | --- | 1414 | 1177 | 882 | 586 |
| 9 | 1494 | F_v | --- | 1037 | 864 | 646 | 429 |
| 10 | 1227 | F_b | 1174 | 781 | 650 | 486 | 322 |
| 11 | 1013 | F_b | 904 | 600 | 499 | 373 | 247 |
| 12 | 850 | F_b | 709 | 470 | 391 | 292 | 193 |
| 13 | 724 | F_b | 565 | 375 | 311 | 232 | 153 |
| 14 | 623 | F_b | 457 | 303 | 251 | 187 | 123 |
| 15 | 542 | F_b | 374 | 248 | 205 | 153 | 100 |
| 16 | 476 | F_b | 310 | 205 | 170 | 126 | 82 |
| 17 | 421 | F_b | 259 | 171 | 141 | 105 | 68 |
| 18 | 375 | F_b | 219 | 144 | 119 | 88 | 56 |
| 19 | 336 | F_b | 186 | 122 | 101 | 74 | 47 |
| 20 | 302 | F_b | 160 | 104 | 86 | 63 | 40 |
| 21 | 274 | F_b | 138 | 90 | 74 | 54 | 34 |
| 22 | 249 | F_b | 119 | 78 | 64 | 46 | 29 |
| 23 | 227 | F_b | 104 | 67 | 55 | 40 | 25 |
| 24 | 208 | F_b | 91 | 59 | 48 | 34 | 21 |
| 25 | 191 | F_b | 80 | 51 | 42 | 30 | 18 |

The part weight has been deducted in the above table.

Beams - Allowable Uniform Load Tables (lbs/ft)

11-1/2 x 2-3/4 x 1/2 CHANNEL

Laterally Supported

$$A_w = 5.25 \text{ in}^2$$

$$I_x = 124.6 \text{ in}^4$$

$$S_x = 21.67 \text{ in}^3$$

$$\text{Wt.} = 6.07 \text{ lbs./ft.}$$

| SPAN FEET | MAXIMUM LOAD | | DEFLECTION | | | | |
|-----------|--------------|----------------|------------|-------|-------|-------|-------|
| | | | L/100 | L/150 | L/180 | L/240 | L/360 |
| 6 | 2618 | F _v | --- | --- | --- | 2313 | 1540 |
| 7 | 2243 | F _v | --- | --- | 2143 | 1605 | 1068 |
| 8 | 1962 | F _v | --- | 1846 | 1537 | 1151 | 765 |
| 9 | 1743 | F _v | --- | 1362 | 1134 | 849 | 563 |
| 10 | 1438 | F _b | --- | 1029 | 857 | 641 | 425 |
| 11 | 1187 | F _b | --- | 795 | 661 | 494 | 327 |
| 12 | 996 | F _b | 940 | 625 | 519 | 368 | 256 |
| 13 | 848 | F _b | 752 | 499 | 414 | 309 | 204 |
| 14 | 730 | F _b | 609 | 404 | 335 | 250 | 164 |
| 15 | 635 | F _b | 500 | 331 | 275 | 204 | 134 |
| 16 | 557 | F _b | 415 | 274 | 227 | 169 | 110 |
| 17 | 493 | F _b | 348 | 229 | 190 | 141 | 91 |
| 18 | 439 | F _b | 294 | 194 | 160 | 118 | 77 |
| 19 | 393 | F _b | 250 | 164 | 136 | 100 | 64 |
| 20 | 354 | F _b | 215 | 141 | 116 | 85 | 55 |
| 21 | 321 | F _b | 185 | 121 | 100 | 73 | 46 |
| 22 | 291 | F _b | 161 | 105 | 86 | 63 | 40 |
| 23 | 266 | F _b | 140 | 91 | 75 | 54 | 34 |
| 24 | 244 | F _b | 123 | 80 | 65 | 47 | 29 |
| 25 | 224 | F _b | 108 | 70 | 57 | 41 | 25 |

The part weight has been deducted in the above table.

Beams - Allowable Uniform Load Tables (lbs/ft)

3 x 1/4 SQUARE TUBE

Laterally Supported

$$A_w = 1.25 \text{ in}^2$$

$$I_x = 3.50 \text{ in}^4$$

$$S_x = 2.33 \text{ in}^3$$

$$\text{Wt.} = 2.07 \text{ lbs./ft.}$$

| SPAN FEET | MAXIMUM LOAD | | DEFLECTION | | | | |
|-----------|--------------|-------|------------|-------|-------|-------|-------|
| | | | L/100 | L/150 | L/180 | L/240 | L/360 |
| 4 | 935 | F_v | 710 | 472 | 393 | 294 | 195 |
| 5 | 618 | F_b | 380 | 252 | 210 | 156 | 103 |
| 6 | 428 | F_b | 224 | 149 | 123 | 92 | 60 |
| 7 | 314 | F_b | 142 | 94 | 78 | 58 | 37 |
| 8 | 240 | F_b | 96 | 63 | 52 | 38 | 24 |
| 9 | 189 | F_b | 67 | 43 | 36 | 26 | 16 |
| 10 | 152 | F_b | 48 | 31 | 25 | 18 | 11 |
| 11 | 125 | F_b | 36 | 23 | 18 | 13 | 8 |
| 12 | 105 | F_b | 27 | 17 | 14 | 9 | 5 |

The part weight has been deducted in the above table.

3-1/2 x 1/4 SQUARE TUBE

Laterally Supported

$$A_w = 1.5 \text{ in}^2$$

$$I_x = 5.73 \text{ in}^4$$

$$S_x = 3.27 \text{ in}^3$$

$$\text{Wt.} = 2.49 \text{ lbs./ft.}$$

| SPAN FEET | MAXIMUM LOAD | | DEFLECTION | | | | |
|-----------|--------------|-------|------------|-------|-------|-------|-------|
| | | | L/100 | L/150 | L/180 | L/240 | L/360 |
| 4 | 1122 | F_v | 1113 | 741 | 617 | 462 | 307 |
| 5 | 869 | F_b | 605 | 402 | 335 | 250 | 166 |
| 6 | 602 | F_b | 361 | 240 | 199 | 149 | 98 |
| 7 | 442 | F_b | 231 | 153 | 127 | 95 | 62 |
| 8 | 338 | F_b | 156 | 103 | 85 | 63 | 41 |
| 9 | 266 | F_b | 110 | 72 | 60 | 44 | 28 |
| 10 | 215 | F_b | 80 | 52 | 43 | 32 | 20 |
| 11 | 177 | F_b | 60 | 39 | 32 | 23 | 14 |
| 12 | 148 | F_b | 45 | 29 | 24 | 17 | 10 |
| 13 | 126 | F_b | 35 | 22 | 18 | 13 | 8 |
| 14 | 108 | F_b | 28 | 17 | 14 | 10 | 6 |

The part weight has been deducted in the above table.

Beams - Allowable Uniform Load Tables (lbs/ft)

4 x 1/4 SQUARE TUBE

Laterally Supported

$A_w = 1.75 \text{ in}^2$

$I_x = 8.82 \text{ in}^4$

$S_x = 4.41 \text{ in}^3$

$\text{Wt.} = 2.83 \text{ lbs./ft.}$

| SPAN FEET | MAXIMUM LOAD | | DEFLECTION | | | | |
|-----------|--------------|-------|------------|-------|-------|-------|-------|
| | | | L/100 | L/150 | L/180 | L/240 | L/360 |
| 4 | 1310 | F_v | --- | 1085 | 903 | 677 | 450 |
| 5 | 1047 | F_v | 900 | 599 | 499 | 373 | 248 |
| 6 | 814 | F_b | 543 | 361 | 301 | 225 | 149 |
| 7 | 597 | F_b | 351 | 233 | 194 | 144 | 95 |
| 8 | 456 | F_b | 238 | 158 | 131 | 98 | 64 |
| 9 | 360 | F_b | 169 | 112 | 92 | 69 | 45 |
| 10 | 291 | F_b | 123 | 81 | 67 | 50 | 32 |
| 11 | 240 | F_b | 93 | 61 | 50 | 37 | 24 |
| 12 | 201 | F_b | 71 | 46 | 38 | 28 | 18 |
| 13 | 171 | F_b | 56 | 36 | 30 | 21 | 13 |
| 14 | 147 | F_b | 44 | 28 | 23 | 17 | 10 |
| 15 | 128 | F_b | 35 | 23 | 18 | 13 | 8 |

The part weight has been deducted in the above table.

4 x 3/8 SQUARE TUBE

Laterally Supported

$A_w = 2.44 \text{ in}^2$

$I_x = 12.03 \text{ in}^4$

$S_x = 6.01 \text{ in}^3$

$\text{Wt.} = 4.24 \text{ lbs./ft.}$

| SPAN FEET | MAXIMUM LOAD | | DEFLECTION | | | | |
|-----------|--------------|-------|------------|-------|-------|-------|-------|
| | | | L/100 | L/150 | L/180 | L/240 | L/360 |
| 5 | 1459 | F_v | 1230 | 818 | 681 | 510 | 338 |
| 6 | 1108 | F_b | 742 | 493 | 410 | 306 | 202 |
| 7 | 813 | F_b | 478 | 317 | 264 | 196 | 129 |
| 8 | 621 | F_b | 325 | 215 | 178 | 132 | 87 |
| 9 | 490 | F_b | 230 | 151 | 125 | 93 | 60 |
| 10 | 396 | F_b | 168 | 110 | 91 | 67 | 43 |
| 11 | 326 | F_b | 126 | 82 | 68 | 49 | 31 |
| 12 | 273 | F_b | 96 | 62 | 51 | 37 | 23 |
| 13 | 232 | F_b | 75 | 48 | 39 | 28 | 17 |
| 14 | 199 | F_b | 59 | 38 | 31 | 22 | 13 |
| 15 | 173 | F_b | 47 | 30 | 24 | 17 | 10 |
| 16 | 151 | F_b | 38 | 24 | 19 | 13 | 7 |
| 17 | 134 | F_b | 31 | 19 | 15 | 10 | 5 |
| 18 | 119 | F_b | 25 | 15 | 12 | 8 | 3 |
| 19 | 106 | F_b | 21 | 12 | 9 | 6 | 2 |
| 20 | 95 | F_b | 17 | 10 | 7 | 4 | 1 |

The part weight has been deducted in the above table.

Beams - Allowable Uniform Load Tables (lbs/ft)

4 x 1/8 X 2 X 1/4 RECTANGULAR TUBE

Laterally Supported

$$A_w = 0.44 \text{ in}^2$$

$$I_x = 4.38 \text{ in}^4$$

$$S_x = 2.19 \text{ in}^3$$

$$\text{Wt.} = 1.46 \text{ lbs./ft.}$$

| SPAN FEET | MAXIMUM LOAD | | DEFLECTION | | | | |
|-----------|--------------|-------|------------|-------|-------|-------|-------|
| | | | L/100 | L/150 | L/180 | L/240 | L/360 |
| 5 | 262 | F_v | --- | 260 | 217 | 162 | 107 |
| 6 | 218 | F_b | --- | 162 | 135 | 101 | 66 |
| 7 | 187 | F_b | 161 | 107 | 89 | 66 | 43 |
| 8 | 163 | F_b | 111 | 73 | 61 | 45 | 29 |
| 9 | 145 | F_b | 79 | 52 | 43 | 32 | 21 |
| 10 | 130 | F_b | 58 | 38 | 32 | 23 | 15 |
| 11 | 118 | F_b | 44 | 29 | 24 | 17 | 11 |
| 12 | 99 | F_b | 34 | 22 | 18 | 13 | 8 |

The part weight has been deducted in the above table.

Beams - Allowable Uniform Load Tables (lbs/ft)

6 x 4 x 1/4 RECTANGULAR TUBE

MAJOR AXIS

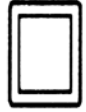
Laterally Supported

$$A_w = 2.42 \text{ in}^2$$

$$I_x = 22.89 \text{ in}^4$$

$$S_x = 7.63 \text{ in}^3$$

$$\text{Wt.} = 3.80 \text{ lbs./ft.}$$



| SPAN FEET | MAXIMUM LOAD | | DEFLECTION | | | | |
|-----------|--------------|-------|------------|-------|-------|-------|-------|
| | | | L/100 | L/150 | L/180 | L/240 | L/360 |
| 6 | 1004 | F_v | --- | 862 | 718 | 537 | 357 |
| 7 | 1033 | F_b | 855 | 569 | 473 | 354 | 235 |
| 8 | 791 | F_b | 591 | 392 | 326 | 244 | 161 |
| 9 | 624 | F_b | 423 | 281 | 233 | 174 | 115 |
| 10 | 505 | F_b | 313 | 207 | 172 | 128 | 84 |
| 11 | 416 | F_b | 237 | 157 | 130 | 96 | 63 |
| 12 | 349 | F_b | 184 | 121 | 100 | 74 | 48 |
| 13 | 297 | F_b | 145 | 95 | 79 | 58 | 37 |
| 14 | 255 | F_b | 116 | 76 | 63 | 46 | 29 |
| 15 | 222 | F_b | 94 | 61 | 50 | 37 | 23 |
| 16 | 195 | F_b | 77 | 50 | 41 | 30 | 18 |

The part weight has been deducted in the above table.

MINOR AXIS

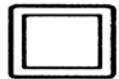
Laterally Supported

$$A_w = 1.54 \text{ in}^2$$

$$I_x = 12.09 \text{ in}^4$$

$$S_x = 6.05 \text{ in}^3$$

$$\text{Wt.} = 3.80 \text{ lbs./ft.}$$



| SPAN FEET | MAXIMUM LOAD | | DEFLECTION | | | | |
|-----------|--------------|-------|------------|-------|-------|-------|-------|
| | | | L/100 | L/150 | L/180 | L/240 | L/360 |
| 6 | 638 | F_v | --- | 468 | 389 | 291 | 193 |
| 7 | 546 | F_b | 461 | 306 | 254 | 190 | 125 |
| 8 | 477 | F_b | 316 | 209 | 174 | 129 | 85 |
| 9 | 424 | F_b | 225 | 149 | 123 | 92 | 60 |
| 10 | 381 | F_b | 166 | 109 | 90 | 67 | 43 |
| 11 | 329 | F_b | 125 | 82 | 68 | 50 | 32 |
| 12 | 276 | F_b | 96 | 63 | 52 | 38 | 24 |
| 13 | 235 | F_b | 75 | 49 | 40 | 29 | 18 |
| 14 | 202 | F_b | 60 | 38 | 31 | 23 | 14 |
| 15 | 175 | F_b | 48 | 31 | 25 | 18 | 10 |
| 16 | 154 | F_b | 39 | 25 | 20 | 14 | 8 |

Beams - Allowable Uniform Load Tables (lbs/ft)

3-1/2 x 1-1/2 x 1/8 RECTANGULAR TUBE WITH INTERNAL WEBS

MAJOR AXIS

Laterally Supported

$$A_w = 0.81 \text{ in}^2$$

$$I_x = 1.73 \text{ in}^4$$

$$S_x = 0.99 \text{ in}^3$$

$$\text{Wt.} = 1.1 \text{ lbs./ft.}$$

| SPAN FEET | MAXIMUM LOAD | | DEFLECTION | | | | |
|--------------|--------------|-------|------------|-------|-------|-------|-------|
| | | | L/100 | L/150 | L/180 | L/240 | L/360 |
| 3 | 731 | F_b | --- | 532 | 443 | 332 | 221 |
| 4 | 411 | F_b | 362 | 241 | 200 | 150 | 99 |
| 5 | 263 | F_b | 192 | 127 | 106 | 79 | 52 |
| 6 | 182 | F_b | 112 | 74 | 62 | 46 | 30 |
| 7 | 133 | F_b | 71 | 47 | 39 | 29 | 19 |
| 8 | 102 | F_b | 48 | 31 | 26 | 19 | 12 |

The part weight has been deducted in the above table.

MINOR AXIS

Laterally Supported

$$A_w = 0.47 \text{ in}^2$$

$$I_x = 0.47 \text{ in}^4$$

$$S_x = 0.62 \text{ in}^3$$

$$\text{Wt.} = 1.1 \text{ lbs./ft.}$$

| SPAN FEET | MAXIMUM LOAD | | DEFLECTION | | | | |
|--------------|--------------|-------|------------|-------|-------|-------|-------|
| | | | L/100 | L/150 | L/180 | L/240 | L/360 |
| 3 | 461 | F_b | 235 | 156 | 130 | 97 | 64 |
| 4 | 259 | F_b | 102 | 68 | 56 | 42 | 27 |
| 5 | 165 | F_b | 52 | 34 | 28 | 21 | 13 |
| 6 | 114 | F_b | 30 | 19 | 16 | 12 | --- |

The part weight has been deducted in the above table.

Beams - Allowable Uniform Load Tables (lbs/ft)

5-1/2 x 1-1/2 x 1/8 RECTANGULAR TUBE WITH INTERNAL WEBS

MAJOR AXIS

Laterally Supported

$$A_w = 1.31 \text{ in}^2$$

$$I_x = 5.86 \text{ in}^4$$

$$S_x = 2.13 \text{ in}^3$$

$$\text{Wt.} = 1.60 \text{ lbs./ft.}$$

| SPAN FEET | MAXIMUM LOAD | | DEFLECTION | | | | |
|--------------|--------------|-------|------------|-------|-------|-------|-------|
| | | | L/100 | L/150 | L/180 | L/240 | L/360 |
| 3 | 1311 | F_v | --- | --- | 1274 | 955 | 636 |
| 4 | 886 | F_b | --- | 738 | 615 | 461 | 306 |
| 5 | 567 | F_b | --- | 404 | 337 | 252 | 167 |
| 6 | 393 | F_b | 365 | 243 | 202 | 151 | 100 |
| 7 | 288 | F_b | 235 | 156 | 130 | 97 | 64 |
| 8 | 220 | F_b | 159 | 106 | 88 | 65 | 43 |
| 9 | 174 | F_b | 113 | 74 | 62 | 46 | 30 |
| 10 | 140 | F_b | 82 | 54 | 45 | 33 | 21 |

The part weight has been deducted in the above table.

MINOR AXIS

Laterally Supported

$$A_w = 0.63 \text{ in}^2$$

$$I_x = 0.73 \text{ in}^4$$

$$S_x = 0.97 \text{ in}^3$$

$$\text{Wt.} = 1.60 \text{ lbs./ft.}$$

| SPAN FEET | MAXIMUM LOAD | | DEFLECTION | | | | |
|--------------|--------------|-------|------------|-------|-------|-------|-------|
| | | | L/100 | L/150 | L/180 | L/240 | L/360 |
| 3 | 623 | F_v | 361 | 240 | 199 | 149 | 99 |
| 4 | 402 | F_b | 158 | 104 | 87 | 64 | 42 |
| 5 | 257 | F_b | 81 | 54 | 44 | 33 | 21 |
| 6 | 178 | F_b | 47 | 30 | 25 | 18 | 11 |

The part weight has been deducted in the above table.

Structural Connections

BEARING ON FRP

Bolt Allowable for Given FRP Plate Thickness (1)

| MATERIAL THICKNESS | BOLT DIAMETER | | | | |
|--------------------|---------------|------|------|------|-------|
| | 3/8" | 1/2" | 5/8" | 3/4" | 1" |
| 1/8" | 469 | 625 | 781 | 938 | 1250 |
| 1/4" | 938 | 1250 | 1563 | 1875 | 2500 |
| 3/8" | 1406 | 1875 | 2344 | 2813 | 3750 |
| 1/2" | 1875 | 2500 | 3125 | 3750 | 5000 |
| 3/4" | 2813 | 3750 | 4688 | 5625 | 7500 |
| 1" | 3750 | 5000 | 6250 | 7500 | 10000 |

(1) BEARING on FRP plate or web controls (Factor of Safety = 3.0; $F_p=10,000$ psi)
 The designer must confirm that no other component of connection controls.

BOLT SHEAR

Bolt Allowable for Given Bolt Diameter (2)

| BOLT TYPE & APPLICATION | BOLT DIAMETER | | | | |
|--------------------------------------|---------------|------|------|-------|-------|
| | 3/8" | 1/2" | 5/8" | 3/4" | 1" |
| 316SS- single shear (3) | 1408 | 2503 | 3912 | 5633 | 10014 |
| 316SS- double shear | 2816 | 5007 | 7823 | 11265 | 20027 |
| FRP threaded rod (4) single shear | 300 | 600 | 900 | 1000 | 2050 |
| FRP threaded rod - double shear | 600 | 1200 | 1800 | 2000 | 4100 |

(2) The designer must confirm that no other component of connection controls.
 (3) SHEAR of bolt controls. $F_v=0.17*F_U = 0.17*75,000$ psi = 12,750 psi
 (4) SHEAR of FRP threaded rod controls (Factor of Safety = 4.0).
 Ultimate values from Dynaform® Design Guide

RATIO OF EDGE DISTANCE TO FASTENER DIAMETER

| | RANGE | RECOMMENDED |
|----------------------------------|---------|-------------|
| Edge Distance - cl* bolt to END | 2.0-4.0 | 3.0 |
| Edge Distance - cl* bolt to SIDE | 1.5-3.5 | 2.5 |
| Bolt Pitch - cl* to cl* | 4.0-5.0 | 5.0 |

* - "cl" is centerline

Stringer Design Tables - OSHA

Stringer Design Table - OSHA Design Criteria

Notes:

1. Slope range is 30 to 50 degrees.
2. OSHA does not limit the maximum rise.
3. Design is for a 1000 lb stair load, 500 lb point load/
stringer L/D ≥ 180 .
4. C8 = C 8" x 2-3/16" x 3/8"; C10 = C 10" x 2-3/4" x 1/2".

| | | Horizontal Run in Feet | | | | | | | | | | | | | | | | | | | | | |
|-----------------------|----|------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | |
| Vertical Rise in Feet | 1 | C8 | | | | | | | | | | | | | | | | | | | | | |
| | 2 | | C8 | C8 | | | | | | | | | | | | | | | | | | | |
| | 3 | | | C8 | C8 | C8 | | | | | | | | | | | | | | | | | |
| | 4 | | | | C8 | C8 | C8 | | | | | | | | | | | | | | | | |
| | 5 | | | | | C8 | C8 | C8 | C8 | | | | | | | | | | | | | | |
| | 6 | | | | | | C8 | C8 | C8 | C8 | C8 | | | | | | | | | | | | |
| | 7 | | | | | | | C8 | C8 | C8 | C8 | C8 | C8 | | | | | | | | | | |
| | 8 | | | | | | | | C8 | C8 | C8 | C8 | C8 | C8 | | | | | | | | | |
| | 9 | | | | | | | | | C8 | C8 | C8 | C8 | C8 | C8 | | | | | | | | |
| | 10 | | | | | | | | | | C8 | C8 | C8 | C8 | C8 | C8 | C8 | | | | | | |
| | 11 | | | | | | | | | | | C8 | C8 | C8 | C8 | C8 | C8 | C10 | C10 | C10 | | | |
| | 12 | | | | | | | | | | | | C8 | C8 | C8 | C8 | C8 | C8 | C10 | C10 | C10 | C10 | |
| | 13 | | | | | | | | | | | | | C8 | C8 | C8 | C8 | C10 | C10 | C10 | C10 | C10 | C10 |
| | 14 | | | | | | | | | | | | | | C8 | C8 | C10 | C10 | C10 | C10 | C10 | C10 | C10 |
| | 15 | | | | | | | | | | | | | | | | C10 | C10 | C10 | C10 | C10 | C10 | C10 |
| | 16 | | | | | | | | | | | | | | | | | C10 | C10 | C10 | C10 | C10 | C10 |
| | 17 | | | | | | | | | | | | | | | | | | C10 | C10 | C10 | C10 | C10 |
| | 18 | | | | | | | | | | | | | | | | | | | C10 | C10 | C10 | C10 |

Stringers below double lines require lateral bracing. See detail.

Stringers below heavy black lines are longer than 20'-0". These require a splice or pull to length.

Stringer Design Tables - IBC

| Stringer Design Table - IBC Design Criteria (3'-0" Wide Stair Only) | | Horizontal Run in Feet | | | | | | | | | | | | | | | | | | |
|--|----|------------------------|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| Vertical Rise in Feet | 1 | | C8 | | | | | | | | | | | | | | | | | |
| | 2 | | | C8 | C8 | C8 | | | | | | | | | | | | | | |
| | 3 | | | | | C8 | C8 | C8 | C8 | | | | | | | | | | | |
| | 4 | | | | | | | C8 | C8 | C8 | C8 | C8 | | | | | | | | |
| | 5 | | | | | | | | C8 | C8 | C8 | C8 | C10 | C10 | | | | | | |
| | 6 | | | | | | | | | C8 | C8 | C10 | C10 | C10 | C10 | C8* | | | | |
| | 7 | | | | | | | | | | C10 | C10 | C10 | C10 | C10 | C8* | C8* | C8* | C8* | |
| | 8 | | | | | | | | | | | | C10 | C10 | C10 | C8* | C8* | C8* | C8* | |
| | 9 | | | | | | | | | | | | | | | C8* | C8* | C8* | C8* | |
| | 10 | | | | | | | | | | | | | | | | C8* | C8* | C8* | C8* |
| | 11 | | | | | | | | | | | | | | | | | | C8* | C8* |
| | 12 | | | | | | | | | | | | | | | | | | | C8* |

- Notes:**
1. Slope range is 20 to 32.5 degrees.
 2. Landings are required every 12' of rise.
 3. Design is for a 100 psf uniform load, L/D ≥ 180.
 4. C8 = C 8" x 2-3/16" x 3/8"; C10 = C 10" x 2-3/4" x 1/2".

Stringers below heavy black lines are longer than 20'-0".

Stringers below double lines require lateral bracing. See detail.

*Indicates that C8 stringers can be used if columns are installed at midspan of stringer. C10 will not work.

| Stringer Design Table - IBC Design Criteria (4'-0" Wide Stair Only) | | Horizontal Run in Feet | | | | | | | | | | | | | | | | | | |
|--|----|------------------------|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| Vertical Rise in Feet | 1 | | C8 | | | | | | | | | | | | | | | | | |
| | 2 | | | C8 | C8 | C8 | | | | | | | | | | | | | | |
| | 3 | | | | | C8 | C8 | C8 | C8 | | | | | | | | | | | |
| | 4 | | | | | | | C8 | C8 | C8 | C8 | C10 | | | | | | | | |
| | 5 | | | | | | | | C8 | C8 | C8 | C10 | C10 | C10 | | | | | | |
| | 6 | | | | | | | | | | C10 | C10 | C10 | C10 | C10 | C8* | C8* | | | |
| | 7 | | | | | | | | | | | C10 | C10 | C10 | C8* | C8* | C8* | C8* | C8* | C8* |
| | 8 | | | | | | | | | | | | C10 | C8* | C8* | C8* | C8* | C8* | C8* | C8* |
| | 9 | | | | | | | | | | | | | | | C8* | C8* | C8* | C8* | C8* |
| | 10 | | | | | | | | | | | | | | | | C8* | C8* | C8* | C8* |
| | 11 | | | | | | | | | | | | | | | | | | C8* | C8* |
| | 12 | | | | | | | | | | | | | | | | | | | C8* |

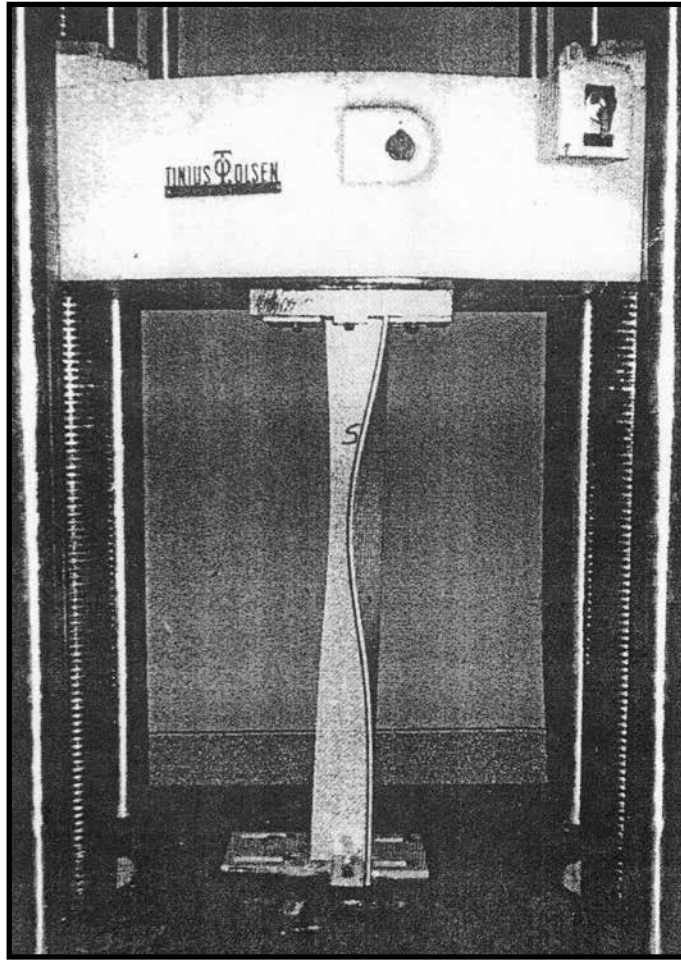
- Notes:**
1. Slope range is 20 to 32.5 degrees.
 2. Landings are required every 12' of rise.
 3. Design is for a 100 psf uniform load, L/D ≥ 180.
 4. C8 = C 8" x 2-3/16" x 3/8"; C10 = C 10" x 2-3/4" x 1/2".

Stringers below heavy black lines are longer than 20'-0".

Stringers below double lines require lateral bracing. See detail.

*Indicates that C8 stringers can be used if columns are installed at midspan of stringer. C10 will not work.

Columns - Allowable Axial Load Tables



8' long - 6" x 6" x 1/2" Angle

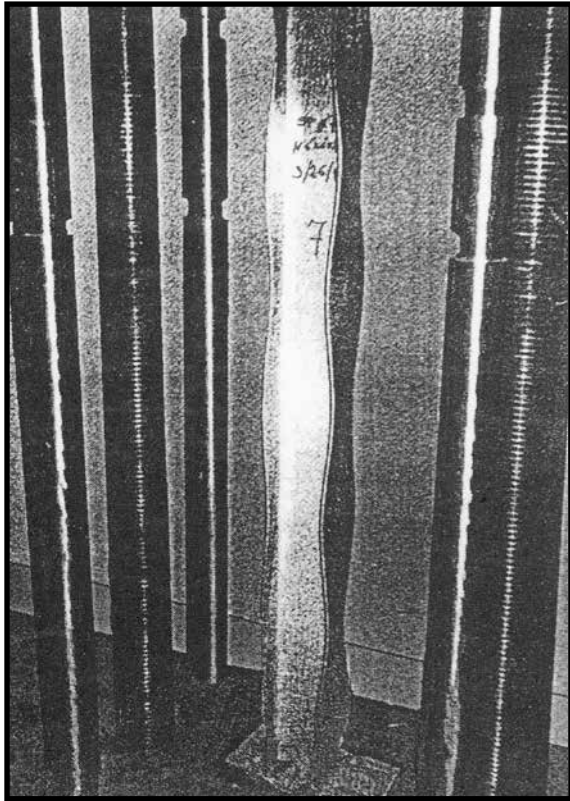
Full section column testing was conducted on equal leg angles, I and Wide Flange Shapes and Square Tubes. Ultimate values were generated through testing of elements with square cut ends placed between the table and the upper, moving platen of a universal testing machine. This test procedure closely simulates how FRP columns will generally be used in practice.

Comparison of test data versus theoretical Euler buckling capacity suggests that the "K" value as tested is approximately 0.70, representing a fixed-pinned condition. The values in the tables represent an FS = 3.0 for the tested condition. Should you feel, however, that your column end conditions closely approximate a pinned-pinned condition ("rounded" column ends are somewhat difficult to achieve in practice) we recommend you multiply the allowable values shown in the tables by the following values:

| SHAPE | To Obtain FS = 2.0 multiply by: | To Obtain FS = 3.0 multiply by: |
|---------------|------------------------------------|------------------------------------|
| I, W or Angle | 0.75 | 0.50 |
| Square Tube | 0.50 | 0.33 |

Columns - Allowable Axial Load Tables

Allowable Concentric Axial Stresses and Loads



NOTATION

| | |
|-------|--|
| A | area (in ²) |
| b | width of flange/leg/wall (in) |
| t | thickness of flange (in) |
| r | minimum radius gyration (in) |
| l | length (in) |
| K | effective column length factor |
| F_a | allowable column concentric axial stress (psi) |
| P_a | allowable column centric axial load (lbs) |

8' long - 6" x 3/8" WIDE FLANGE SHAPE

ANGLE



Maximum Allowable Stress:

| | |
|--------------|-----------|
| $b/t \leq 8$ | 4,862 psi |
| $b/t = 10.7$ | 4,194 psi |
| $b/t = 12$ | 3,620 psi |
| $b/t = 16$ | 2,758 psi |

SQUARE TUBE (1/4" wall)



Maximum Allowable Stress:

| | |
|---------------|------------|
| $b/t \leq 10$ | 10,000 psi |
| $b/t = 12$ | 8,880 psi |
| $b/t = 16$ | 6,595 psi |



WIDE FLANGE & I SHAPES

Maximum Allowable Stress:

| | |
|---------------|------------------------|
| $b/t \leq 12$ | 10,000 psi |
| $b/t = 13.3$ | 8,747 psi |
| $t = 1/4"$ | $b/t = 16$ 7,208 psi |
| $t > 1/4"$ | $b/t = 16$ 6,233 psi |
| | $b/t = 20$ 4,920 psi |
| | $b/t = 21.3$ 4,483 psi |
| $t = 1/4"$ | $b/t = 24$ 4,167 psi |
| $t > 1/4"$ | $b/t = 24$ 3,608 psi |
| | $b/t = 26.7$ 2,732 psi |

Columns - Allowable Axial Load Tables

2 x 2 x 1/4 ANGLE

Allowable Concentric Axial Stresses and Loads

$A = 0.92 \text{ in.}^2$ $r = 0.38 \text{ in.}$ $b/t = 8$

| True Length (ft) | F_a (psi) | P_a (lbs) |
|------------------|-------------|-------------|
| 0.5 | 4,862 | 4,473 |
| 1.0 | 2,807 | 2,582 |
| 1.5 | 2,077 | 1,911 |
| 2.0 | 1,684 | 1,549 |
| 2.5 | 1,416 | 1,303 |
| 3.0 | 1,211 | 1,114 |
| 3.5 | 1,079 | 993 |
| 4.0 | 988 | 909 |
| 4.5 | 891 | 820 |
| 5.0 | 833 | 766 |
| 5.5 | 752 | 692 |
| 6.0 | 667 | 614 |

The effective "K" value is 0.70. See page 60 for additional information.



Columns - Allowable Axial Load Tables

3 x 3 x 1/4 ANGLE

Allowable Concentric Axial Stresses and Loads

A = 1.42 in.² r = 0.58 in. b/t = 12

| True Length (ft) | F _a (psi) | P _a (lbs) |
|------------------|----------------------|----------------------|
| 0.5 | 3,620 | 5,140 |
| 1.0 | 3,620 | 5,140 |
| 1.5 | 2,933 | 4,165 |
| 2.0 | 2,277 | 3,233 |
| 2.5 | 1,968 | 2,795 |
| 3.0 | 1,736 | 2,465 |
| 3.5 | 1,538 | 2,184 |
| 4.0 | 1,391 | 1,975 |
| 4.5 | 1,249 | 1,774 |
| 5.0 | 1,146 | 1,627 |
| 5.5 | 1,070 | 1,519 |
| 6.0 | 1,010 | 1,434 |
| 6.5 | 952 | 1,352 |
| 7.0 | 889 | 1,262 |
| 7.5 | 849 | 1,206 |
| 8.0 | 815 | 1,157 |
| 8.5 | 757 | 1,075 |
| 9.0 | 708 | 1,005 |
| 9.5 | 665 | 944 |

The effective "K" value is 0.70. See page 60 for additional information.



Columns - Allowable Axial Load Tables

3 x 3 x 3/8 ANGLE

Allowable Concentric Axial Stresses and Loads

A = 2.09 in.² r = 0.58 in. b/t = 8

| True Length (ft) | F _a (psi) | P _a (lbs) |
|------------------|----------------------|----------------------|
| 0.5 | 4,862 | 10,162 |
| 1.0 | 4,862 | 10,162 |
| 1.5 | 2,933 | 6,130 |
| 2.0 | 2,277 | 4,759 |
| 2.5 | 1,968 | 4,113 |
| 3.0 | 1,736 | 3,628 |
| 3.5 | 1,538 | 3,214 |
| 4.0 | 1,391 | 2,907 |
| 4.5 | 1,249 | 2,610 |
| 5.0 | 1,146 | 2,395 |
| 5.5 | 1,070 | 2,236 |
| 6.0 | 1,010 | 2,111 |
| 6.5 | 952 | 1,990 |
| 7.0 | 889 | 1,858 |
| 7.5 | 849 | 1,774 |
| 8.0 | 815 | 1,703 |
| 8.5 | 757 | 1,582 |
| 9.0 | 708 | 1,480 |
| 9.5 | 665 | 1,390 |

The effective "K" value is 0.70. See page 60 for additional information.



Columns - Allowable Axial Load Tables

3 x 3 x 1/2 ANGLE

Allowable Concentric Axial Stresses and Loads

A = 2.70 in.² r = 0.59 in. b/t = 6

| True Length (ft) | F _a (psi) | P _a (lbs) |
|------------------|----------------------|----------------------|
| 0.5 | 4,862 | 13,127 |
| 1.0 | 4,862 | 13,127 |
| 1.5 | 2,933 | 7,919 |
| 2.0 | 2,277 | 6,148 |
| 2.5 | 1,968 | 5,314 |
| 3.0 | 1,736 | 4,687 |
| 3.5 | 1,538 | 4,153 |
| 4.0 | 1,391 | 3,756 |
| 4.5 | 1,249 | 3,372 |
| 5.0 | 1,146 | 3,094 |
| 5.5 | 1,070 | 2,889 |
| 6.0 | 1,010 | 2,727 |
| 6.5 | 952 | 2,570 |
| 7.0 | 889 | 2,400 |
| 7.5 | 849 | 2,292 |
| 8.0 | 815 | 2,201 |
| 8.5 | 757 | 2,044 |
| 9.0 | 708 | 1,912 |
| 9.5 | 665 | 1,796 |

The effective "K" value is 0.70. See page 60 for additional information.



Columns - Allowable Axial Load Tables

4 x 4 x 1/4 ANGLE

Allowable Concentric Axial Stresses and Loads

A = 1.92 in.² r = 0.79 in. b/t = 16

| True Length (ft) | F _a (psi) | P _a (lbs) |
|------------------|----------------------|----------------------|
| 0.5 | 2,758 | 5,295 |
| 1.0 | 2,758 | 5,295 |
| 1.5 | 2,758 | 5,295 |
| 2.0 | 2,758 | 5,295 |
| 2.5 | 2,393 | 4,595 |
| 3.0 | 2,133 | 4,095 |
| 3.5 | 1,914 | 3,675 |
| 4.0 | 1,760 | 3,379 |
| 4.5 | 1,603 | 3,078 |
| 5.0 | 1,482 | 2,845 |
| 5.5 | 1,379 | 2,648 |
| 6.0 | 1,283 | 2,463 |
| 6.5 | 1,187 | 2,279 |
| 7.0 | 1,123 | 2,156 |
| 7.5 | 1,064 | 2,043 |
| 8.0 | 1,020 | 1,958 |
| 8.5 | 980 | 1,882 |
| 9.0 | 933 | 1,791 |
| 9.5 | 889 | 1,707 |
| 10.0 | 860 | 1,651 |
| 10.5 | 834 | 1,601 |
| 11.0 | 802 | 1,540 |
| 11.5 | 759 | 1,457 |
| 12.0 | 727 | 1,396 |
| 12.5 | 693 | 1,331 |
| 13.0 | 660 | 1,267 |

The effective "K" value is 0.70. See page 60 for additional information.



Columns - Allowable Axial Load Tables

4 x 4 x 3/8 ANGLE

Allowable Concentric Axial Stresses and Loads

A = 2.84 in.² r = 0.78 in. b/t = 10.7

| True Length (ft) | F _a (psi) | P _a (lbs) |
|------------------|----------------------|----------------------|
| 0.5 | 4,194 | 11,911 |
| 1.0 | 4,194 | 11,911 |
| 1.5 | 4,194 | 11,911 |
| 2.0 | 2,947 | 8,369 |
| 2.5 | 2,367 | 6,722 |
| 3.0 | 2,113 | 6,001 |
| 3.5 | 1,896 | 5,385 |
| 4.0 | 1,741 | 4,944 |
| 4.5 | 1,586 | 4,504 |
| 5.0 | 1,461 | 4,149 |
| 5.5 | 1,364 | 3,874 |
| 6.0 | 1,260 | 3,578 |
| 6.5 | 1,177 | 3,343 |
| 7.0 | 1,113 | 3,161 |
| 7.5 | 1,048 | 2,976 |
| 8.0 | 1,012 | 2,874 |
| 8.5 | 969 | 2,752 |
| 9.0 | 922 | 2,618 |
| 9.5 | 878 | 2,494 |
| 10.0 | 853 | 2,423 |
| 10.5 | 828 | 2,352 |
| 11.0 | 791 | 2,246 |
| 11.5 | 745 | 2,116 |
| 12.0 | 712 | 2,022 |
| 12.5 | 680 | 1,931 |
| 13.0 | 652 | 1,852 |

The effective "K" value is 0.70. See page 60 for additional information.



Columns - Allowable Axial Load Tables

4 x 4 x 1/2 ANGLE

Allowable Concentric Axial Stresses and Loads

A = 3.70 in.² r = 0.78 in. b/t = 8

| True Length (ft) | F _a (psi) | P _a (lbs) |
|------------------|----------------------|----------------------|
| 0.5 | 4,862 | 17,989 |
| 1.0 | 4,862 | 17,989 |
| 1.5 | 4,862 | 17,989 |
| 2.0 | 2,904 | 10,745 |
| 2.5 | 2,350 | 8,695 |
| 3.0 | 2,098 | 7,763 |
| 3.5 | 1,884 | 6,971 |
| 4.0 | 1,724 | 6,379 |
| 4.5 | 1,570 | 5,809 |
| 5.0 | 1,446 | 5,350 |
| 5.5 | 1,350 | 4,995 |
| 6.0 | 1,234 | 4,565 |
| 6.5 | 1,167 | 4,318 |
| 7.0 | 1,095 | 4,051 |
| 7.5 | 1,036 | 3,833 |
| 8.0 | 1,005 | 3,719 |
| 8.5 | 959 | 3,548 |
| 9.0 | 912 | 3,374 |
| 9.5 | 872 | 3,226 |
| 10.0 | 847 | 3,134 |
| 10.5 | 821 | 3,038 |
| 11.0 | 777 | 2,875 |
| 11.5 | 735 | 2,720 |
| 12.0 | 704 | 2,605 |

The effective "K" value is 0.70. See page 60 for additional information.



Columns - Allowable Axial Load Tables

6 x 6 x 3/8 ANGLE

Allowable Concentric Axial Stresses and Loads

A = 4.33 in.² r = 1.18 in. b/t = 16

| True Length (ft) | F _a (psi) | P _a (lbs) |
|------------------|----------------------|----------------------|
| 0.5 | 2,758 | 11,942 |
| 1.0 | 2,758 | 11,942 |
| 1.5 | 2,758 | 11,942 |
| 2.0 | 2,758 | 11,942 |
| 2.5 | 2,758 | 11,942 |
| 3.0 | 2,758 | 11,942 |
| 3.5 | 2,427 | 10,509 |
| 4.0 | 2,229 | 9,652 |
| 4.5 | 2,060 | 8,920 |
| 5.0 | 1,911 | 8,275 |
| 5.5 | 1,802 | 7,803 |
| 6.0 | 1,684 | 7,292 |
| 6.5 | 1,585 | 6,863 |
| 7.0 | 1,503 | 6,508 |
| 7.5 | 1,416 | 6,131 |
| 8.0 | 1,354 | 5,863 |
| 8.5 | 1,289 | 5,581 |
| 9.0 | 1,211 | 5,244 |
| 9.5 | 1,167 | 5,053 |

| True Length (ft) | F _a (psi) | P _a (lbs) |
|------------------|----------------------|----------------------|
| 10.0 | 1,121 | 4,854 |
| 10.5 | 1,079 | 4,672 |
| 11.0 | 1,041 | 4,508 |
| 11.5 | 1,015 | 4,395 |
| 12.0 | 988 | 4,278 |
| 12.5 | 955 | 4,135 |
| 13.0 | 922 | 3,992 |
| 13.5 | 892 | 3,862 |
| 14.0 | 872 | 3,776 |
| 14.5 | 851 | 3,685 |
| 15.0 | 833 | 3,607 |
| 15.5 | 813 | 3,520 |
| 16.0 | 782 | 3,386 |
| 16.5 | 752 | 3,256 |
| 17.0 | 729 | 3,157 |
| 17.5 | 706 | 3,057 |
| 18.0 | 680 | 2,944 |
| 18.5 | 660 | 2,858 |

The effective "K" value is 0.70. See page 60 for additional information.



Columns - Allowable Axial Load Tables

6 x 6 x 1/2 ANGLE

Allowable Concentric Axial Stresses and Loads

A = 5.70 in.² r = 1.17 in. b/t = 12

| True Length (ft) | F _a (psi) | P _a (lbs) |
|------------------|----------------------|----------------------|
| 0.5 | 3,620 | 20,634 |
| 1.0 | 3,620 | 20,634 |
| 1.5 | 3,620 | 20,634 |
| 2.0 | 3,620 | 20,634 |
| 2.5 | 3,620 | 20,634 |
| 3.0 | 2,960 | 16,872 |
| 3.5 | 2,512 | 14,318 |
| 4.0 | 2,290 | 13,053 |
| 4.5 | 2,120 | 12,084 |
| 5.0 | 1,984 | 11,309 |
| 5.5 | 1,844 | 10,511 |
| 6.0 | 1,748 | 9,964 |
| 6.5 | 1,642 | 9,359 |
| 7.0 | 1,548 | 8,824 |
| 7.5 | 1,469 | 8,373 |
| 8.0 | 1,397 | 7,963 |
| 8.5 | 1,337 | 7,621 |
| 9.0 | 1,267 | 7,222 |
| 9.5 | 1,202 | 6,851 |
| 10.0 | 1,157 | 6,595 |

| True Length (ft) | F _a (psi) | P _a (lbs) |
|------------------|----------------------|----------------------|
| 10.5 | 1,117 | 6,367 |
| 11.0 | 1,076 | 6,133 |
| 11.5 | 1,033 | 5,888 |
| 12.0 | 1,015 | 5,786 |
| 12.5 | 989 | 5,637 |
| 13.0 | 958 | 5,461 |
| 13.5 | 927 | 5,284 |
| 14.0 | 896 | 5,107 |
| 14.5 | 873 | 4,976 |
| 15.0 | 855 | 4,874 |
| 15.5 | 839 | 4,782 |
| 16.0 | 822 | 4,685 |
| 16.5 | 794 | 4,526 |
| 17.0 | 765 | 4,361 |
| 17.5 | 737 | 4,201 |
| 18.0 | 717 | 4,087 |
| 18.5 | 699 | 3,984 |
| 19.0 | 672 | 3,830 |
| 19.5 | 655 | 3,734 |

The effective "K" value is 0.70. See page 60 for additional information.



Columns - Allowable Axial Load Tables

3 x 1 1/2 x 1/4 I SHAPE

Allowable Concentric Axial Stresses and Loads

A = 1.38 in.² r = .32 in. b/t = 6

| True Length (ft) | F _a (psi) | P _a (lbs) |
|------------------|----------------------|----------------------|
| 0.5 | 10,000 | 13,800 |
| 1.0 | 8,121 | 11,207 |
| 1.5 | 5,155 | 7,114 |
| 2.0 | 3,583 | 4,945 |
| 2.5 | 2,462 | 3,398 |
| 3.0 | 1,683 | 2,323 |
| 3.5 | 1,278 | 1,764 |
| 4.0 | 1,027 | 1,417 |
| 4.5 | 843 | 1,163 |
| 5.0 | 652 | 900 |

The effective "K" value is 0.70. See page 60 for additional information.

4 x 2 x 1/4 I SHAPE

Allowable Concentric Axial Stresses and Loads

A = 1.88 in.² r = 0.43 in. b/t = 8

| True Length (ft) | F _a (psi) | P _a (lbs) |
|------------------|----------------------|----------------------|
| 0.5 | 10,000 | 18,800 |
| 1.0 | 10,000 | 18,800 |
| 1.5 | 7,107 | 13,361 |
| 2.0 | 5,206 | 9,787 |
| 2.5 | 4,061 | 7,635 |
| 3.0 | 3,017 | 5,672 |
| 3.5 | 2,248 | 4,226 |
| 4.0 | 1,717 | 3,228 |
| 4.5 | 1,373 | 2,581 |
| 5.0 | 1,147 | 2,156 |
| 5.5 | 992 | 1,865 |
| 6.0 | 854 | 1,606 |
| 6.5 | 713 | 1,340 |
| 7.0 | 567 | 1,066 |

The effective "K" value is 0.70. See page 60 for additional information.



Columns - Allowable Axial Load Tables

6 x 3 x 1/4 I SHAPE

Allowable Concentric Axial Stresses and Loads

A = 2.88 in.² r = 0.63 in. b/t = 12

| True Length (ft) | F _a (psi) | P _a (lbs) |
|------------------|----------------------|----------------------|
| 0.5 | 10,000 | 28,800 |
| 1.0 | 10,000 | 28,800 |
| 1.5 | 10,000 | 28,800 |
| 2.0 | 7,944 | 22,879 |
| 2.5 | 6,127 | 17,646 |
| 3.0 | 5,083 | 14,639 |
| 3.5 | 4,255 | 12,254 |
| 4.0 | 3,486 | 10,040 |
| 4.5 | 2,886 | 8,312 |
| 5.0 | 2,380 | 6,854 |
| 5.5 | 1,974 | 5,685 |
| 6.0 | 1,623 | 4,674 |
| 6.5 | 1,403 | 4,041 |
| 7.0 | 1,245 | 3,586 |
| 7.5 | 1,105 | 3,182 |
| 8.0 | 1,003 | 2,889 |
| 8.5 | 908 | 2,615 |
| 9.0 | 817 | 2,353 |
| 9.5 | 717 | 2,065 |
| 10.0 | 615 | 1,771 |
| 10.5 | 520 | 1,498 |

The effective "K" value is 0.70. See page 60 for additional information.



Columns - Allowable Axial Load Tables

6 x 3 x 3/8 I SHAPE

Allowable Concentric Axial Stresses and Loads

A = 4.23 in.² r = 0.64 in. b/t = 8

| True Length (ft) | F _a (psi) | P _a (lbs) |
|------------------|----------------------|----------------------|
| 0.5 | 10,000 | 42,300 |
| 1.0 | 10,000 | 42,300 |
| 1.5 | 10,000 | 42,300 |
| 2.0 | 7,700 | 32,571 |
| 2.5 | 5,415 | 22,905 |
| 3.0 | 4,237 | 17,923 |
| 3.5 | 3,450 | 14,594 |
| 4.0 | 2,833 | 11,984 |
| 4.5 | 2,297 | 9,716 |
| 5.0 | 1,843 | 7,796 |
| 5.5 | 1,563 | 6,611 |
| 6.0 | 1,347 | 5,698 |
| 6.5 | 1,169 | 4,945 |
| 7.0 | 1,050 | 4,442 |
| 7.5 | 923 | 3,904 |
| 8.0 | 800 | 3,384 |
| 8.5 | 721 | 3,050 |
| 9.0 | 647 | 2,737 |
| 9.5 | 586 | 2,479 |
| 10.0 | 525 | 2,221 |
| 10.5 | 479 | 2,026 |

The effective "K" value is 0.70. See page 60 for additional information.



Columns - Allowable Axial Load Tables

8 x 4 x 3/8 I SHAPE

Allowable Concentric Axial Stresses and Loads

A = 5.73 in.² r = 0.84 in. b/t = 10.7

| True Length (ft) | F _a (psi) | P _a (lbs) |
|------------------|----------------------|----------------------|
| 0.5 | 10,000 | 57,300 |
| 1.0 | 10,000 | 57,300 |
| 1.5 | 10,000 | 57,300 |
| 2.0 | 10,000 | 57,300 |
| 2.5 | 8,370 | 47,960 |
| 3.0 | 6,182 | 35,423 |
| 3.5 | 4,917 | 28,174 |
| 4.0 | 4,157 | 23,820 |
| 4.5 | 3,558 | 20,387 |
| 5.0 | 3,063 | 17,551 |
| 5.5 | 2,598 | 14,887 |
| 6.0 | 2,232 | 12,789 |
| 6.5 | 1,888 | 10,818 |
| 7.0 | 1,667 | 9,552 |
| 7.5 | 1,461 | 8,372 |
| 8.0 | 1,311 | 7,512 |
| 8.5 | 1,176 | 6,738 |
| 9.0 | 1,085 | 6,217 |
| 9.5 | 997 | 5,713 |
| 10.0 | 888 | 5,088 |
| 10.5 | 800 | 4,584 |
| 11.0 | 741 | 4,246 |
| 11.5 | 680 | 3,896 |
| 12.0 | 630 | 3,610 |
| 12.5 | 582 | 3,335 |
| 13.0 | 535 | 3,066 |
| 13.5 | 498 | 2,854 |
| 14.0 | 467 | 2,676 |

The effective "K" value is 0.70. See page 60 for additional information.



Columns - Allowable Axial Load Tables

8 x 4 x 1/2 I SHAPE

Allowable Concentric Axial Stresses and Loads

A = 7.51 in.² r = 0.85 in. b/t = 8

| True Length (ft) | F _a (psi) | P _a (lbs) |
|------------------|----------------------|----------------------|
| 0.5 | 10,000 | 75,100 |
| 1.0 | 10,000 | 75,100 |
| 1.5 | 10,000 | 75,100 |
| 2.0 | 10,000 | 75,100 |
| 2.5 | 8,597 | 64,563 |
| 3.0 | 6,303 | 47,336 |
| 3.5 | 5,016 | 37,670 |
| 4.0 | 4,217 | 31,670 |
| 4.5 | 3,620 | 27,186 |
| 5.0 | 3,103 | 23,304 |
| 5.5 | 2,660 | 19,977 |
| 6.0 | 2,282 | 17,138 |
| 6.5 | 1,943 | 14,592 |
| 7.0 | 1,697 | 12,744 |
| 7.5 | 1,485 | 11,152 |
| 8.0 | 1,340 | 10,063 |
| 8.5 | 1,200 | 9,012 |
| 9.0 | 1,102 | 8,276 |
| 9.5 | 1,015 | 7,623 |
| 10.0 | 914 | 6,864 |
| 10.5 | 822 | 6,173 |
| 11.0 | 755 | 5,670 |
| 11.5 | 697 | 5,234 |
| 12.0 | 644 | 4,836 |
| 12.5 | 596 | 4,476 |
| 13.0 | 549 | 4,123 |
| 13.5 | 510 | 3,830 |
| 14.0 | 476 | 3,575 |

The effective "K" value is 0.70. See page 60 for additional information.



Columns - Allowable Axial Load Tables

10 x 5 x 3/8 I SHAPE

Allowable Concentric Axial Stresses and Loads

A = 7.22 in.² r = 1.04 in. b/t = 13.3

| True Length (ft) | F _a (psi) | P _a (lbs) |
|------------------|----------------------|----------------------|
| 0.5 | 8,747 | 63,153 |
| 1.0 | 8,747 | 63,153 |
| 1.5 | 8,747 | 63,153 |
| 2.0 | 8,747 | 63,153 |
| 2.5 | 8,747 | 63,153 |
| 3.0 | 8,747 | 63,153 |
| 3.5 | 6,814 | 49,197 |
| 4.0 | 5,520 | 39,854 |
| 4.5 | 4,711 | 34,013 |
| 5.0 | 4,097 | 29,580 |
| 5.5 | 3,620 | 26,136 |
| 6.0 | 3,186 | 23,003 |
| 6.5 | 2,833 | 20,454 |
| 7.0 | 2,470 | 17,833 |
| 7.5 | 2,188 | 15,797 |
| 8.0 | 1,918 | 13,848 |
| 8.5 | 1,714 | 12,375 |

| True Length (ft) | F _a (psi) | P _a (lbs) |
|------------------|----------------------|----------------------|
| 9.0 | 1,540 | 11,119 |
| 9.5 | 1,404 | 10,137 |
| 10.0 | 1,288 | 9,299 |
| 10.5 | 1,179 | 8,512 |
| 11.0 | 1,103 | 7,964 |
| 11.5 | 1,033 | 7,458 |
| 12.0 | 954 | 6,888 |
| 12.5 | 869 | 6,274 |
| 13.0 | 800 | 5,776 |
| 13.5 | 751 | 5,422 |
| 14.0 | 704 | 5,083 |
| 14.5 | 658 | 4,751 |
| 15.0 | 619 | 4,469 |
| 15.5 | 581 | 4,195 |
| 16.0 | 543 | 3,920 |
| 16.5 | 511 | 3,689 |
| 17.0 | 482 | 3,480 |

The effective "K" value is 0.70. See page 60 for additional information.



Columns - Allowable Axial Load Tables

10 x 5 x 1/2 I SHAPE

Allowable Concentric Axial Stresses and Loads

A = 9.51 in.² r = 1.05 in. b/t = 10

| True Length (ft) | F _a (psi) | P _a (lbs) |
|------------------|----------------------|----------------------|
| 0.5 | 10,000 | 95,100 |
| 1.0 | 10,000 | 95,100 |
| 1.5 | 10,000 | 95,100 |
| 2.0 | 10,000 | 95,100 |
| 2.5 | 10,000 | 95,100 |
| 3.0 | 9,163 | 87,140 |
| 3.5 | 6,917 | 65,781 |
| 4.0 | 5,605 | 53,304 |
| 4.5 | 4,765 | 45,315 |
| 5.0 | 4,157 | 39,533 |
| 5.5 | 3,666 | 34,864 |
| 6.0 | 3,227 | 30,689 |
| 6.5 | 2,880 | 27,389 |
| 7.0 | 2,517 | 23,937 |
| 7.5 | 2,232 | 21,226 |
| 8.0 | 1,963 | 18,668 |
| 8.5 | 1,739 | 16,538 |
| 9.0 | 1,564 | 14,874 |

| True Length (ft) | F _a (psi) | P _a (lbs) |
|------------------|----------------------|----------------------|
| 9.5 | 1,429 | 13,590 |
| 10.0 | 1,311 | 12,468 |
| 10.5 | 1,200 | 11,412 |
| 11.0 | 1,120 | 10,651 |
| 11.5 | 1,049 | 9,976 |
| 12.0 | 975 | 9,272 |
| 12.5 | 889 | 8,484 |
| 13.0 | 818 | 7,779 |
| 13.5 | 764 | 7,266 |
| 14.0 | 717 | 6,819 |
| 14.5 | 669 | 6,362 |
| 15.0 | 630 | 5,991 |
| 15.5 | 592 | 5,630 |
| 16.0 | 554 | 5,269 |
| 16.5 | 520 | 4,945 |
| 17.0 | 491 | 4,669 |
| 17.5 | 467 | 4,441 |

The effective "K" value is 0.70. See page 60 for additional information.



Columns - Allowable Axial Load Tables

12 x 6 x 1/2 I SHAPE

Allowable Concentric Axial Stresses and Loads

$A = 11.51 \text{ in.}^2$ $r = 1.26 \text{ in.}$ $b/t = 12$

| True Length (ft) | F_a (psi) | P_a (lbs) |
|------------------|-------------|-------------|
| 0.5 | 10,000 | 115,100 |
| 1.0 | 10,000 | 115,100 |
| 1.5 | 10,000 | 115,100 |
| 2.0 | 10,000 | 115,100 |
| 2.5 | 10,000 | 115,100 |
| 3.0 | 10,000 | 115,100 |
| 3.5 | 9,800 | 112,798 |
| 4.0 | 7,512 | 86,348 |
| 4.5 | 6,182 | 71,155 |
| 5.0 | 5,310 | 61,118 |
| 5.5 | 4,653 | 53,556 |
| 6.0 | 4,157 | 47,847 |
| 6.5 | 3,741 | 43,059 |
| 7.0 | 3,364 | 38,720 |
| 7.5 | 3,063 | 35,255 |
| 8.0 | 2,753 | 31,687 |
| 8.5 | 2,458 | 28,292 |
| 9.0 | 2,232 | 25,690 |
| 9.5 | 2,008 | 23,112 |
| 10.0 | 1,793 | 20,637 |

| True Length (ft) | F_a (psi) | P_a (lbs) |
|------------------|-------------|-------------|
| 10.5 | 1,667 | 19,187 |
| 11.0 | 1,513 | 17,415 |
| 11.5 | 1,411 | 16,241 |
| 12.0 | 1,311 | 15,090 |
| 12.5 | 1,217 | 14,008 |
| 13.0 | 1,144 | 13,167 |
| 13.5 | 1,084 | 12,477 |
| 14.0 | 1,025 | 11,798 |
| 14.5 | 960 | 11,050 |
| 15.0 | 888 | 10,221 |
| 15.5 | 828 | 9,530 |
| 16.0 | 780 | 8,978 |
| 16.5 | 741 | 8,529 |
| 17.0 | 701 | 8,069 |
| 17.5 | 662 | 7,620 |
| 18.0 | 630 | 7,251 |
| 18.5 | 598 | 6,883 |
| 19.0 | 567 | 6,526 |
| 19.5 | 535 | 6,158 |
| 20.0 | 510 | 5,870 |

The effective "K" value is 0.70. See page 60 for additional information.



Columns - Allowable Axial Load Tables

3 x 3 x 1/4 WIDE FLANGE SHAPE

Allowable Concentric Axial Stresses and Loads

A = 2.13 in.² r = 0.73 in. b/t = 12

| True Length (ft) | F _a (psi) | P _a (lbs) |
|------------------|----------------------|----------------------|
| 0.5 | 10,000 | 21,300 |
| 1.0 | 10,000 | 21,300 |
| 1.5 | 10,000 | 21,300 |
| 2.0 | 10,000 | 21,300 |
| 2.5 | 7,271 | 15,487 |
| 3.0 | 5,915 | 12,599 |
| 3.5 | 5,046 | 10,748 |
| 4.0 | 4,318 | 9,197 |
| 4.5 | 3,667 | 7,811 |
| 5.0 | 3,105 | 6,614 |
| 5.5 | 2,647 | 5,638 |
| 6.0 | 2,208 | 4,703 |
| 6.5 | 1,907 | 4,062 |
| 7.0 | 1,597 | 3,402 |
| 7.5 | 1,412 | 3,008 |
| 8.0 | 1,274 | 2,714 |
| 8.5 | 1,145 | 2,439 |
| 9.0 | 1,048 | 2,232 |
| 9.5 | 965 | 2,055 |
| 10.0 | 883 | 1,881 |
| 10.5 | 803 | 1,710 |
| 11.0 | 719 | 1,531 |
| 11.5 | 633 | 1,348 |
| 12.0 | 547 | 1,165 |

The effective "K" value is 0.70. See page 60 for additional information.



Columns - Allowable Axial Load Tables

4 x 4 x 1/4 WIDE FLANGE SHAPE

Allowable Concentric Axial Stresses and Loads

A = 2.89 in.² r = 0.96 in. b/t = 16

| True Length (ft) | F _a (psi) | P _a (lbs) |
|------------------|----------------------|----------------------|
| 0.5 | 7,208 | 20,831 |
| 1.0 | 7,208 | 20,831 |
| 1.5 | 7,208 | 20,831 |
| 2.0 | 7,208 | 20,831 |
| 2.5 | 7,208 | 20,831 |
| 3.0 | 7,208 | 20,831 |
| 3.5 | 6,697 | 19,354 |
| 4.0 | 5,838 | 16,872 |
| 4.5 | 5,155 | 14,898 |
| 5.0 | 4,621 | 13,355 |
| 5.5 | 4,050 | 11,705 |
| 6.0 | 3,583 | 10,355 |
| 6.5 | 3,163 | 9,141 |
| 7.0 | 2,792 | 8,069 |
| 7.5 | 2,452 | 7,115 |
| 8.0 | 2,150 | 6,214 |
| 8.5 | 1,923 | 5,557 |
| 9.0 | 1,683 | 4,864 |
| 9.5 | 1,503 | 4,344 |
| 10.0 | 1,383 | 3,997 |
| 10.5 | 1,278 | 3,693 |
| 11.0 | 1,174 | 3,393 |
| 11.5 | 1,095 | 3,165 |
| 12.0 | 1,027 | 2,968 |
| 12.5 | 964 | 2,786 |
| 13.0 | 902 | 2,607 |
| 13.5 | 843 | 2,436 |
| 14.0 | 777 | 2,246 |
| 14.5 | 714 | 2,063 |
| 15.0 | 652 | 1,884 |
| 15.5 | 582 | 1,682 |
| 16.0 | 520 | 1,503 |

The effective "K" value is 0.70. See page 60 for additional information.



Columns - Allowable Axial Load Tables

6 x 6 x 1/4 WIDE FLANGE SHAPE

Allowable Concentric Axial Stresses and Loads

A = 4.39 in.² r = 1.43 in. b/t = 24

| True Length (ft) | F _a (psi) | P _a (lbs) |
|------------------|----------------------|----------------------|
| 0.5 | 4,167 | 18,293 |
| 1.0 | 4,167 | 18,293 |
| 1.5 | 4,167 | 18,293 |
| 2.0 | 4,167 | 18,293 |
| 2.5 | 4,167 | 18,293 |
| 3.0 | 4,167 | 18,293 |
| 3.5 | 4,167 | 18,293 |
| 4.0 | 4,167 | 18,293 |
| 4.5 | 4,167 | 18,293 |
| 5.0 | 4,167 | 18,293 |
| 5.5 | 4,167 | 18,293 |
| 6.0 | 4,167 | 18,293 |
| 6.5 | 4,167 | 18,293 |
| 7.0 | 3,997 | 17,547 |
| 7.5 | 3,666 | 16,094 |
| 8.0 | 3,334 | 14,636 |
| 8.5 | 3,068 | 13,469 |
| 9.0 | 2,800 | 12,292 |
| 9.5 | 2,534 | 11,124 |
| 10.0 | 2,322 | 10,194 |

| True Length (ft) | F _a (psi) | P _a (lbs) |
|------------------|----------------------|----------------------|
| 10.5 | 2,097 | 9,206 |
| 11.0 | 1,917 | 8,416 |
| 11.5 | 1,754 | 7,700 |
| 12.0 | 1,644 | 7,217 |
| 12.5 | 1,510 | 6,629 |
| 13.0 | 1,419 | 6,229 |
| 13.5 | 1,332 | 5,847 |
| 14.0 | 1,244 | 5,461 |
| 14.5 | 1,171 | 5,141 |
| 15.0 | 1,118 | 4,908 |
| 15.5 | 1,066 | 4,680 |
| 16.0 | 1,013 | 4,447 |
| 16.5 | 954 | 4,188 |
| 17.0 | 891 | 3,911 |
| 17.5 | 834 | 3,661 |
| 18.0 | 792 | 3,477 |
| 18.5 | 756 | 3,319 |
| 19.0 | 722 | 3,170 |
| 19.5 | 687 | 3,016 |
| 20.0 | 655 | 2,875 |

The effective "K" value is 0.70. See page 60 for additional information.



Columns - Allowable Axial Load Tables

6 x 6 x 3/8 WIDE FLANGE SHAPE

Allowable Concentric Axial Stresses and Loads

A = 6.48 in.² r = 1.44 in. b/t = 16

| True Length (ft) | F _a (psi) | P _a (lbs) |
|------------------|----------------------|----------------------|
| 0.5 | 6,233 | 40,390 |
| 1.0 | 6,233 | 40,390 |
| 1.5 | 6,233 | 40,390 |
| 2.0 | 6,233 | 40,390 |
| 2.5 | 6,233 | 40,390 |
| 3.0 | 6,233 | 40,390 |
| 3.5 | 6,233 | 40,390 |
| 4.0 | 6,233 | 40,390 |
| 4.5 | 6,233 | 40,390 |
| 5.0 | 6,233 | 40,390 |
| 5.5 | 5,586 | 36,197 |
| 6.0 | 4,917 | 31,862 |
| 6.5 | 4,447 | 28,817 |
| 7.0 | 4,037 | 26,160 |
| 7.5 | 3,695 | 23,944 |
| 8.0 | 3,365 | 21,805 |
| 8.5 | 3,093 | 20,043 |
| 9.0 | 2,833 | 18,358 |
| 9.5 | 2,563 | 16,608 |
| 10.0 | 2,345 | 15,196 |

| True Length (ft) | F _a (psi) | P _a (lbs) |
|------------------|----------------------|----------------------|
| 10.5 | 2,123 | 13,757 |
| 11.0 | 1,948 | 12,623 |
| 11.5 | 1,774 | 11,496 |
| 12.0 | 1,667 | 10,802 |
| 12.5 | 1,528 | 9,901 |
| 13.0 | 1,436 | 9,305 |
| 13.5 | 1,347 | 8,729 |
| 14.0 | 1,260 | 8,165 |
| 14.5 | 1,206 | 7,815 |
| 15.0 | 1,129 | 7,316 |
| 15.5 | 1,076 | 6,972 |
| 16.0 | 1,025 | 6,642 |
| 16.5 | 969 | 6,279 |
| 17.0 | 906 | 5,871 |
| 17.5 | 845 | 5,476 |
| 18.0 | 800 | 5,184 |
| 18.5 | 765 | 4,957 |
| 19.0 | 731 | 4,737 |
| 19.5 | 696 | 4,510 |
| 20.0 | 662 | 4,290 |

The effective "K" value is 0.70. See page 60 for additional information.



Columns - Allowable Axial Load Tables

8 x 8 x 3/8 WIDE FLANGE SHAPE

Allowable Concentric Axial Stresses and Loads

A = 8.73 in.² r = 1.92 in. b/t = 21.3

| True Length (ft) | F _a (psi) | P _a (lbs) |
|------------------|----------------------|----------------------|
| 0.5 | 4,483 | 39,137 |
| 1.0 | 4,483 | 39,137 |
| 1.5 | 4,483 | 39,137 |
| 2.0 | 4,483 | 39,137 |
| 2.5 | 4,483 | 39,137 |
| 3.0 | 4,483 | 39,137 |
| 3.5 | 4,483 | 39,137 |
| 4.0 | 4,483 | 39,137 |
| 4.5 | 4,483 | 39,137 |
| 5.0 | 4,483 | 39,137 |
| 5.5 | 4,483 | 39,137 |
| 6.0 | 4,483 | 39,137 |
| 6.5 | 4,483 | 39,137 |
| 7.0 | 4,483 | 39,137 |
| 7.5 | 4,483 | 39,137 |
| 8.0 | 4,483 | 39,137 |
| 8.5 | 4,483 | 39,137 |
| 9.0 | 4,237 | 36,989 |
| 9.5 | 3,927 | 34,283 |
| 10.0 | 3,695 | 32,257 |

| True Length (ft) | F _a (psi) | P _a (lbs) |
|------------------|----------------------|----------------------|
| 10.5 | 3,450 | 30,119 |
| 11.0 | 3,213 | 28,049 |
| 11.5 | 3,038 | 26,522 |
| 12.0 | 2,833 | 24,732 |
| 12.5 | 2,627 | 22,934 |
| 13.0 | 2,442 | 21,319 |
| 13.5 | 2,297 | 20,053 |
| 14.0 | 2,129 | 18,586 |
| 14.5 | 2,003 | 17,486 |
| 15.0 | 1,843 | 16,089 |
| 15.5 | 1,744 | 15,225 |
| 16.0 | 1,667 | 14,553 |
| 16.5 | 1,563 | 13,645 |
| 17.0 | 1,477 | 12,894 |
| 17.5 | 1,413 | 12,335 |
| 18.0 | 1,348 | 11,768 |
| 18.5 | 1,283 | 11,201 |
| 19.0 | 1,220 | 10,651 |
| 19.5 | 1,169 | 10,205 |
| 20.0 | 1,129 | 9,856 |

The effective "K" value is 0.70. See page 60 for additional information.



Columns - Allowable Axial Load Tables

8 x 8 x 1/2 WIDE FLANGE SHAPE

Allowable Concentric Axial Stresses and Loads

A = 11.51 in.² r = 1.93 in. b/t = 16

| True Length (ft) | F _a (psi) | P _a (lbs) |
|------------------|----------------------|----------------------|
| 0.5 | 6,233 | 71,742 |
| 1.0 | 6,233 | 71,742 |
| 1.5 | 6,233 | 71,742 |
| 2.0 | 6,233 | 71,742 |
| 2.5 | 6,233 | 71,742 |
| 3.0 | 6,233 | 71,742 |
| 3.5 | 6,233 | 71,742 |
| 4.0 | 6,233 | 71,742 |
| 4.5 | 6,233 | 71,742 |
| 5.0 | 6,233 | 71,742 |
| 5.5 | 6,233 | 71,742 |
| 6.0 | 6,233 | 71,742 |
| 6.5 | 6,233 | 71,742 |
| 7.0 | 6,037 | 69,486 |
| 7.5 | 5,460 | 62,845 |
| 8.0 | 4,966 | 57,159 |
| 8.5 | 4,606 | 53,015 |
| 9.0 | 4,267 | 49,133 |
| 9.5 | 3,957 | 45,545 |
| 10.0 | 3,718 | 42,794 |

| True Length (ft) | F _a (psi) | P _a (lbs) |
|------------------|----------------------|----------------------|
| 10.5 | 3,475 | 39,997 |
| 11.0 | 3,240 | 37,292 |
| 11.5 | 3,058 | 35,198 |
| 12.0 | 2,860 | 32,919 |
| 12.5 | 2,653 | 30,536 |
| 13.0 | 2,470 | 28,430 |
| 13.5 | 2,321 | 26,715 |
| 14.0 | 2,158 | 24,839 |
| 14.5 | 2,023 | 23,285 |
| 15.0 | 1,868 | 21,501 |
| 15.5 | 1,757 | 20,223 |
| 16.0 | 1,679 | 19,325 |
| 16.5 | 1,580 | 18,186 |
| 17.0 | 1,491 | 17,161 |
| 17.5 | 1,425 | 16,402 |
| 18.0 | 1,360 | 15,654 |
| 18.5 | 1,296 | 14,917 |
| 19.0 | 1,231 | 14,169 |
| 19.5 | 1,179 | 13,570 |
| 20.0 | 1,137 | 13,087 |

The effective "K" value is 0.70. See page 60 for additional information.



Columns - Allowable Axial Load Tables

10 x 10 x 3/8 WIDE FLANGE SHAPE

Allowable Concentric Axial Stresses and Loads

A = 11.06 in.² r = 2.38 in. b/t = 26.7

| True Length (ft) | F _a (psi) | P _a (lbs) |
|------------------|----------------------|----------------------|
| 0.5 | 2,732 | 30,216 |
| 1.0 | 2,732 | 30,216 |
| 1.5 | 2,732 | 30,216 |
| 2.0 | 2,732 | 30,216 |
| 2.5 | 2,732 | 30,216 |
| 3.0 | 2,732 | 30,216 |
| 3.5 | 2,732 | 30,216 |
| 4.0 | 2,732 | 30,216 |
| 4.5 | 2,732 | 30,216 |
| 5.0 | 2,732 | 30,216 |
| 5.5 | 2,732 | 30,216 |
| 6.0 | 2,732 | 30,216 |
| 6.5 | 2,732 | 30,216 |
| 7.0 | 2,732 | 30,216 |
| 7.5 | 2,732 | 30,216 |
| 8.0 | 2,732 | 30,216 |
| 8.5 | 2,732 | 30,216 |
| 9.0 | 2,732 | 30,216 |
| 9.5 | 2,732 | 30,216 |
| 10.0 | 2,732 | 30,216 |

| True Length (ft) | F _a (psi) | P _a (lbs) |
|------------------|----------------------|----------------------|
| 10.5 | 2,732 | 30,216 |
| 11.0 | 2,732 | 30,216 |
| 11.5 | 2,732 | 30,216 |
| 12.0 | 2,732 | 30,216 |
| 12.5 | 2,732 | 30,216 |
| 13.0 | 2,732 | 30,216 |
| 13.5 | 2,732 | 30,216 |
| 14.0 | 2,732 | 30,216 |
| 14.5 | 2,732 | 30,216 |
| 15.0 | 2,732 | 30,216 |
| 15.5 | 2,621 | 28,988 |
| 16.0 | 2,476 | 27,385 |
| 16.5 | 2,349 | 25,980 |
| 17.0 | 2,232 | 24,686 |
| 17.5 | 2,093 | 23,149 |
| 18.0 | 1,993 | 22,043 |
| 18.5 | 1,868 | 20,660 |
| 19.0 | 1,773 | 19,609 |
| 19.5 | 1,709 | 18,902 |
| 20.0 | 1,640 | 18,138 |

The effective "K" value is 0.70. See page 60 for additional information.



Columns - Allowable Axial Load Tables

10 x 10 x 1/2 WIDE FLANGE SHAPE

Allowable Concentric Axial Stresses and Loads

A = 14.51 in.² r = 2.4 in. b/t = 20

| True Length (ft) | F _a (psi) | P _a (lbs) |
|------------------|----------------------|----------------------|
| 0.5 | 4,920 | 71,389 |
| 1.0 | 4,920 | 71,389 |
| 1.5 | 4,920 | 71,389 |
| 2.0 | 4,920 | 71,389 |
| 2.5 | 4,920 | 71,389 |
| 3.0 | 4,920 | 71,389 |
| 3.5 | 4,920 | 71,389 |
| 4.0 | 4,920 | 71,389 |
| 4.5 | 4,920 | 71,389 |
| 5.0 | 4,920 | 71,389 |
| 5.5 | 4,920 | 71,389 |
| 6.0 | 4,920 | 71,389 |
| 6.5 | 4,920 | 71,389 |
| 7.0 | 4,920 | 71,389 |
| 7.5 | 4,920 | 71,389 |
| 8.0 | 4,920 | 71,389 |
| 8.5 | 4,920 | 71,389 |
| 9.0 | 4,920 | 71,389 |
| 9.5 | 4,920 | 71,389 |
| 10.0 | 4,917 | 71,346 |

| True Length (ft) | F _a (psi) | P _a (lbs) |
|------------------|----------------------|----------------------|
| 10.5 | 4,641 | 67,341 |
| 11.0 | 4,367 | 63,365 |
| 11.5 | 4,117 | 59,738 |
| 12.0 | 3,867 | 56,110 |
| 12.5 | 3,695 | 53,614 |
| 13.0 | 3,500 | 50,785 |
| 13.5 | 3,304 | 47,941 |
| 14.0 | 3,133 | 45,460 |
| 14.5 | 2,999 | 43,515 |
| 15.0 | 2,833 | 41,107 |
| 15.5 | 2,966 | 38,815 |
| 16.0 | 2,517 | 36,522 |
| 16.5 | 2,379 | 34,519 |
| 17.0 | 2,267 | 32,894 |
| 17.5 | 2,129 | 30,892 |
| 18.0 | 2,033 | 29,499 |
| 18.5 | 1,908 | 27,685 |
| 19.0 | 1,800 | 26,118 |
| 19.5 | 1,729 | 25,088 |
| 20.0 | 1,667 | 24,188 |

The effective "K" value is 0.70. See page 60 for additional information.



Columns - Allowable Axial Load Tables

12 x 12 x 1/2 WIDE FLANGE SHAPE

Allowable Concentric Axial Stresses and Loads

A = 17.51 in.² r = 2.87 in. b/t = 24

| True Length (ft) | F _a (psi) | P _a (lbs) |
|------------------|----------------------|----------------------|
| 0.5 | 3,608 | 63,176 |
| 1.0 | 3,608 | 63,176 |
| 1.5 | 3,608 | 63,176 |
| 2.0 | 3,608 | 63,176 |
| 2.5 | 3,608 | 63,176 |
| 3.0 | 3,608 | 63,176 |
| 3.5 | 3,608 | 63,176 |
| 4.0 | 3,608 | 63,176 |
| 4.5 | 3,608 | 63,176 |
| 5.0 | 3,608 | 63,176 |
| 5.5 | 3,608 | 63,176 |
| 6.0 | 3,608 | 63,176 |
| 6.5 | 3,608 | 63,176 |
| 7.0 | 3,608 | 63,176 |
| 7.5 | 3,608 | 63,176 |
| 8.0 | 3,608 | 63,176 |
| 8.5 | 3,608 | 63,176 |
| 9.0 | 3,608 | 63,176 |
| 9.5 | 3,608 | 63,176 |
| 10.0 | 3,608 | 63,176 |

| True Length (ft) | F _a (psi) | P _a (lbs) |
|------------------|----------------------|----------------------|
| 10.5 | 3,608 | 63,176 |
| 11.0 | 3,608 | 63,176 |
| 11.5 | 3,608 | 63,176 |
| 12.0 | 3,608 | 63,176 |
| 12.5 | 3,608 | 63,176 |
| 13.0 | 3,608 | 63,176 |
| 13.5 | 3,608 | 63,176 |
| 14.0 | 3,608 | 63,176 |
| 14.5 | 3,608 | 63,176 |
| 15.0 | 3,608 | 63,176 |
| 15.5 | 3,516 | 61,565 |
| 16.0 | 3,349 | 58,641 |
| 16.5 | 3,200 | 56,032 |
| 17.0 | 3,078 | 53,896 |
| 17.5 | 2,954 | 51,725 |
| 18.0 | 2,813 | 49,256 |
| 18.5 | 2,673 | 46,804 |
| 19.0 | 2,552 | 44,686 |
| 19.5 | 2,429 | 42,532 |
| 20.0 | 2,333 | 40,851 |

The effective "K" value is 0.70. See page 60 for additional information.



Columns - Allowable Axial Load Tables

2 x 2 x 1/4 SQUARE TUBE

Allowable Concentric Axial Stresses and Loads

A = 1.74 in.² r = 0.73 in. b/t = 8

| True Length (ft) | F _a (psi) | P _a (lbs) |
|------------------|----------------------|----------------------|
| 0.5 | 10,000 | 17,400 |
| 1.0 | 10,000 | 17,400 |
| 1.5 | 10,000 | 17,400 |
| 2.0 | 9,850 | 17,139 |
| 2.5 | 8,650 | 15,051 |
| 3.0 | 7,450 | 12,963 |
| 3.5 | 6,491 | 11,294 |
| 4.0 | 5,684 | 9,890 |
| 4.5 | 5,000 | 8,700 |
| 5.0 | 4,253 | 7,400 |
| 5.5 | 3,726 | 6,483 |
| 6.0 | 3,188 | 5,547 |
| 6.5 | 2,786 | 4,848 |
| 7.0 | 2,454 | 4,270 |
| 7.5 | 2,111 | 3,673 |
| 8.0 | 1,895 | 3,297 |
| 8.5 | 1,722 | 2,996 |
| 9.0 | 1,585 | 2,758 |
| 9.5 | 1,448 | 2,520 |
| 10.0 | 1,370 | 2,384 |
| 10.5 | 1,276 | 2,220 |
| 11.0 | 1,189 | 2,069 |
| 11.5 | 1,079 | 1,877 |
| 12.0 | 957 | 1,665 |

The effective "K" value is 0.70. See page 60 for additional information.



Columns - Allowable Axial Load Tables

2-1/2 x 2-1/2 x 1/4 SQUARE TUBE

Allowable Concentric Axial Stresses and Loads

A = 2.24 in.² r = 0.92 in. b/t = 10

| True Length (ft) | F _a (psi) | P _a (lbs) |
|------------------|----------------------|----------------------|
| 0.5 | 10,000 | 22,400 |
| 1.0 | 10,000 | 22,400 |
| 1.5 | 10,000 | 22,400 |
| 2.0 | 10,000 | 22,400 |
| 2.5 | 9,900 | 22,176 |
| 3.0 | 8,816 | 19,748 |
| 3.5 | 7,842 | 17,566 |
| 4.0 | 7,078 | 15,855 |
| 4.5 | 6,351 | 14,226 |
| 5.0 | 5,733 | 12,842 |
| 5.5 | 5,192 | 11,630 |
| 6.0 | 4,675 | 10,472 |
| 6.5 | 4,146 | 9,287 |
| 7.0 | 3,673 | 8,228 |
| 7.5 | 3,246 | 7,271 |
| 8.0 | 2,904 | 6,505 |
| 8.5 | 2,629 | 5,889 |
| 9.0 | 2,358 | 5,282 |
| 9.5 | 2,087 | 4,675 |
| 10.0 | 1,923 | 4,308 |
| 10.5 | 1,825 | 4,088 |
| 11.0 | 1,641 | 3,676 |
| 11.5 | 1,533 | 3,434 |
| 12.0 | 1,445 | 3,237 |
| 12.5 | 1,387 | 3,107 |
| 13.0 | 1,320 | 2,957 |
| 13.5 | 1,239 | 2,775 |
| 14.0 | 1,163 | 2,605 |
| 14.5 | 1,077 | 2,412 |
| 15.0 | 977 | 2,188 |

The effective "K" value is 0.70. See page 60 for additional information.



Columns - Allowable Axial Load Tables

3 x 3 x 1/4 SQUARE TUBE

Allowable Concentric Axial Stresses and Loads

A = 2.74 in.² r = 1.13 in. b/t = 12

| True Length (ft) | F _a (psi) | P _a (lbs) |
|------------------|----------------------|----------------------|
| 0.5 | 8,880 | 24,331 |
| 1.0 | 8,880 | 24,331 |
| 1.5 | 8,880 | 24,331 |
| 2.0 | 8,880 | 24,331 |
| 2.5 | 8,880 | 24,331 |
| 3.0 | 8,880 | 24,331 |
| 3.5 | 8,880 | 24,331 |
| 4.0 | 8,237 | 22,668 |
| 4.5 | 7,573 | 20,750 |
| 5.0 | 6,976 | 19,114 |
| 5.5 | 6,386 | 17,498 |
| 6.0 | 5,857 | 16,048 |
| 6.5 | 5,416 | 14,840 |
| 7.0 | 4,977 | 13,637 |
| 7.5 | 4,566 | 12,511 |
| 8.0 | 4,133 | 11,324 |
| 8.5 | 3,732 | 10,226 |
| 9.0 | 3,397 | 9,308 |

| True Length (ft) | F _a (psi) | P _a (lbs) |
|------------------|----------------------|----------------------|
| 9.5 | 3,046 | 8,346 |
| 10.0 | 2,821 | 7,730 |
| 10.5 | 2,604 | 7,135 |
| 11.0 | 2,383 | 6,529 |
| 11.5 | 2,163 | 5,927 |
| 12.0 | 2,013 | 5,516 |
| 12.5 | 1,865 | 5,110 |
| 13.0 | 1,748 | 4,790 |
| 13.5 | 1,643 | 4,502 |
| 14.0 | 1,565 | 4,288 |
| 14.5 | 1,467 | 4,020 |
| 15.0 | 1,428 | 3,913 |
| 15.5 | 1,367 | 3,746 |
| 16.0 | 1,308 | 3,584 |
| 16.5 | 1,248 | 3,420 |
| 17.0 | 1,193 | 3,269 |
| 17.5 | 1,121 | 3,072 |
| 18.0 | 1,052 | 2,882 |

The effective "K" value is 0.70. See page 60 for additional information.



Columns - Allowable Axial Load Tables

3-1/2 x 1/4 SQUARE TUBE

Allowable Concentric Axial Stresses and Loads

A = 3.24 in.² r = 1.53 in.

| True Length (ft) | F _a (psi) | P _a (lbs) |
|------------------|----------------------|----------------------|
| 1.0 | 7,575 | 24,543 |
| 1.5 | 7,575 | 24,543 |
| 2.0 | 7,575 | 24,543 |
| 2.5 | 7,575 | 24,543 |
| 3.0 | 7,575 | 24,543 |
| 3.5 | 7,575 | 24,543 |
| 4.0 | 7,575 | 24,543 |
| 4.5 | 7,575 | 24,543 |
| 5.0 | 7,575 | 24,543 |
| 5.5 | 7,333 | 23,759 |
| 6.0 | 6,595 | 21,368 |
| 6.5 | 6,304 | 20,425 |
| 7.0 | 5,866 | 19,006 |
| 7.5 | 5,483 | 17,765 |
| 8.0 | 5,109 | 16,553 |
| 8.5 | 4,753 | 15,400 |
| 9.0 | 4,313 | 13,974 |
| 9.5 | 4,034 | 13,070 |
| 10.0 | 3,697 | 11,978 |
| 10.5 | 3,400 | 11,016 |
| 11.0 | 3,083 | 9,989 |
| 11.5 | 2,896 | 9,383 |
| 12.0 | 2,689 | 8,712 |
| 12.5 | 2,516 | 8,152 |
| 13.0 | 2,325 | 7,533 |

The effective "K" value is 0.70. See page 60 for additional information.



Columns - Allowable Axial Load Tables

4 x 4 x 1/4 SQUARE TUBE

Allowable Concentric Axial Stresses and Loads

A = 3.74 in.² r = 1.53 in. b/t = 16

| True Length (ft) | F _a (psi) | P _a (lbs) |
|------------------|----------------------|----------------------|
| 0.5 | 6,595 | 24,665 |
| 1.0 | 6,595 | 24,665 |
| 1.5 | 6,595 | 24,665 |
| 2.0 | 6,595 | 24,665 |
| 2.5 | 6,595 | 24,665 |
| 3.0 | 6,595 | 24,665 |
| 3.5 | 6,595 | 24,665 |
| 4.0 | 6,595 | 24,665 |
| 4.5 | 6,595 | 24,665 |
| 5.0 | 6,595 | 24,665 |
| 5.5 | 6,595 | 24,665 |
| 6.0 | 6,595 | 24,665 |
| 6.5 | 6,595 | 24,665 |
| 7.0 | 6,595 | 24,665 |
| 7.5 | 6,349 | 23,745 |
| 8.0 | 5,941 | 22,219 |
| 8.5 | 5,608 | 20,974 |
| 9.0 | 5,283 | 19,758 |
| 9.5 | 4,962 | 18,558 |
| 10.0 | 4,666 | 17,451 |

| True Length (ft) | F _a (psi) | P _a (lbs) |
|------------------|----------------------|----------------------|
| 10.5 | 4,306 | 16,104 |
| 11.0 | 4,025 | 15,054 |
| 11.5 | 3,738 | 13,980 |
| 12.0 | 3,493 | 13,064 |
| 12.5 | 3,233 | 12,091 |
| 13.0 | 3,000 | 11,220 |
| 13.5 | 2,836 | 10,607 |
| 14.0 | 2,672 | 9,993 |
| 14.5 | 2,511 | 9,391 |
| 15.0 | 2,350 | 8,789 |
| 15.5 | 2,225 | 8,322 |
| 16.0 | 2,052 | 7,674 |
| 16.5 | 1,948 | 7,286 |
| 17.0 | 1,850 | 6,919 |
| 17.5 | 1,767 | 6,609 |
| 18.0 | 1,687 | 6,309 |
| 18.5 | 1,631 | 6,100 |
| 19.0 | 1,558 | 5,827 |
| 19.5 | 1,484 | 5,550 |
| 20.0 | 1,441 | 5,389 |

The effective "K" value is 0.70. See page 60 for additional information.



Columns - Allowable Axial Load Tables

4 x 4 x 3/8 SQUARE TUBE

Allowable Concentric Axial Stresses and Loads

A = 5.23 in.² r = 1.48 in.

| True Length (ft) | F _a (psi) | P _a (lbs) |
|------------------|----------------------|----------------------|
| 1.0 | 6,595 | 34,492 |
| 1.5 | 6,595 | 34,492 |
| 2.0 | 6,595 | 34,492 |
| 2.5 | 6,595 | 34,492 |
| 3.0 | 6,595 | 34,492 |
| 3.5 | 6,595 | 34,492 |
| 4.0 | 6,595 | 34,492 |
| 4.5 | 6,595 | 34,492 |
| 5.0 | 6,595 | 34,492 |
| 5.5 | 6,595 | 34,492 |
| 6.0 | 6,595 | 34,492 |
| 6.5 | 6,318 | 33,043 |
| 7.0 | 5,895 | 30,831 |
| 7.5 | 5,490 | 28,713 |
| 8.0 | 5,175 | 27,065 |
| 8.5 | 4,874 | 25,491 |
| 9.0 | 4,576 | 23,932 |
| 9.5 | 4,298 | 22,479 |
| 10.0 | 3,960 | 20,711 |
| 10.5 | 3,712 | 19,414 |
| 11.0 | 3,420 | 17,887 |
| 11.5 | 3,209 | 16,783 |
| 12.0 | 2,961 | 15,486 |
| 12.5 | 2,719 | 14,220 |
| 13.0 | 2,566 | 13,420 |
| 13.5 | 2,411 | 12,610 |
| 14.0 | 2,268 | 11,862 |
| 14.5 | 2,113 | 11,051 |
| 15.0 | 1,964 | 10,272 |

The effective "K" value is 0.70. See page 60 for additional information.



Columns - Allowable Axial Load Tables

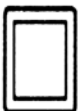
6 x 4 x 1/4 RECTANGULAR TUBE

Allowable Concentric Axial Stresses and Loads

A = 4.68 in.² r = 1.61 in.

| True Length (ft) | F _a (psi) | P _a (lbs) |
|------------------|----------------------|----------------------|
| 1.0 | 5,935 | 27,776 |
| 1.5 | 5,935 | 27,776 |
| 2.0 | 5,935 | 27,776 |
| 2.5 | 5,935 | 27,776 |
| 3.0 | 5,935 | 27,776 |
| 3.5 | 5,935 | 27,776 |
| 4.0 | 5,935 | 27,776 |
| 4.5 | 5,935 | 27,776 |
| 5.0 | 5,935 | 27,776 |
| 5.5 | 5,935 | 27,776 |
| 6.0 | 5,935 | 27,776 |
| 6.5 | 5,935 | 27,776 |
| 7.0 | 5,935 | 27,776 |
| 7.5 | 5,935 | 27,776 |
| 8.0 | 5,620 | 26,302 |
| 8.5 | 5,295 | 24,781 |
| 9.0 | 5,017 | 23,480 |
| 9.5 | 4,710 | 22,043 |
| 10.0 | 4,466 | 20,901 |
| 10.5 | 4,208 | 19,693 |
| 11.0 | 3,899 | 18,247 |
| 11.5 | 3,678 | 17,213 |
| 12.0 | 3,415 | 15,982 |
| 12.5 | 3,220 | 15,070 |
| 13.0 | 2,976 | 13,928 |
| 13.5 | 2,753 | 12,884 |
| 14.0 | 2,614 | 12,234 |
| 14.5 | 2,442 | 11,429 |
| 15.0 | 2,313 | 10,825 |
| 15.5 | 2,194 | 10,268 |
| 16.0 | 2,054 | 9,613 |

The effective "K" value is 0.70. See page 60 for additional information.



Columns - Allowable Axial Load Tables

3 x 1/2 ROUND TUBE

Allowable Concentric Axial Stresses and Loads

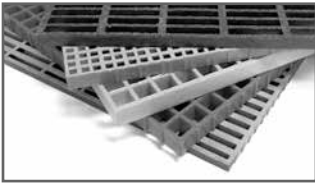
A = 3.93 in.² r = 0.9 in.

| True Length (ft) | F _a (psi) | P _a (lbs) |
|------------------|----------------------|----------------------|
| 1.0 | 7,992 | 31,409 |
| 1.5 | 7,992 | 31,409 |
| 2.0 | 7,992 | 31,409 |
| 2.5 | 7,992 | 31,409 |
| 3.0 | 7,800 | 30,654 |
| 3.5 | 6,944 | 27,290 |
| 4.0 | 6,255 | 24,582 |
| 4.5 | 5,580 | 21,929 |
| 5.0 | 5,047 | 19,835 |
| 5.5 | 4,553 | 17,893 |
| 6.0 | 4,079 | 16,030 |
| 6.5 | 3,605 | 14,168 |
| 7.0 | 3,191 | 12,541 |
| 7.5 | 2,774 | 10,902 |
| 8.0 | 2,513 | 9,876 |
| 8.5 | 2,276 | 8,945 |
| 9.0 | 2,025 | 7,958 |

The effective "K" value is 0.70. See page 60 for additional information.



Fibergrate Products & Services



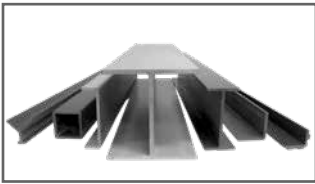
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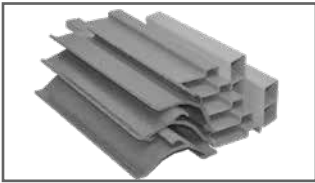
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