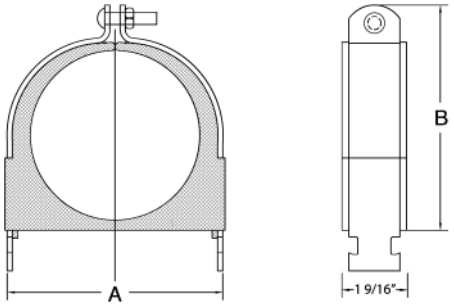
# data sheet

## STRUT CUSHION CLAMPS




**SIZE:**

3/8" thru 4 1/8"

**FINISH:**

Yellow di-chromate

**FUNCTION:**

Fits any standard 1 5/8" wide strut channel

**FEATURES:**

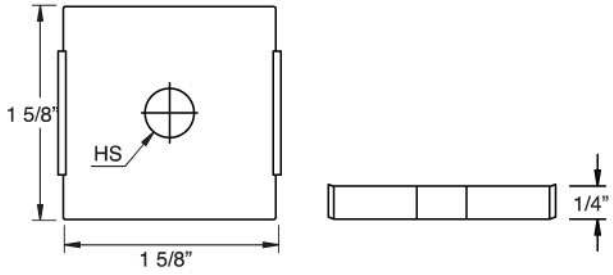
- Ideal for multiple runs while absorbing shock and vibration, reducing unwanted noise and preventing galvanic corrosion
- Interlock edges and channel locator legs help ensure that the cushion remains in place
- Temperature range: -65F to 275F

### Cushion Clamp: Loads (LBS) · Weights (LBS) · Dimensions (IN)

| ITEM CODE | COPPER TUBE SIZE (O.D.) | MAX LOAD | WEIGHT | I.D. | A | B |
|---|---|---|---|---|---|---|
| STCC-037YZ | ⅜ | 400 | 0.11 | 0.34 | 0.85 | 1.16 |
| STCC-050YZ | ½ | 400 | 0.13 | 0.53 | 0.97 | 1.37 |
| STCC-062YZ | ⅝ | 400 | 0.14 | 0.60 | 1.05 | 1.54 |
| STCC-075YZ | ¾ | 600 | 0.14 | 0.78 | 1.23 | 1.71 |
| STCC-087YZ | ⅞ | 600 | 0.15 | 1.15 | 1.30 | 1.89 |
| STCC-112YZ | 1⅛ | 600 | 0.18 | 1.08 | 1.52 | 2.14 |
| STCC-137YZ | 1⅜ | 600 | 0.20 | 1.31 | 1.80 | 2.31 |
| STCC-162YZ | 1⅝ | 600 | 0.25 | 1.65 | 2.10 | 2.63 |
| STCC-212YZ | 2⅛ | 800 | 0.46 | 2.05 | 2.71 | 3.31 |
| STCC-262YZ | 2⅝ | 800 | 0.51 | 2.51 | 3.17 | 3.90 |
| STCC-312YZ | 3⅛ | 800 | 0.60 | 3.01 | 3.66 | 4.43 |
| STCC-412YZ | 4⅛ | 1000 | 0.94 | 4.02 | 4.85 | 5.68 |

# STRUT PLATES

**STRUT WASHER**
**No Turn**
**Finish: Electro-Galvanized**




| ITEM # | SIZE | HS | WEIGHT |
|---|---|---|---|
| 2550575 | 1/4" | 7/16" | 0.08 |
| 2550576 | 1/2" | 9/16 | 0.10 |
| 2550577 | 3/8" | 11/16" | 0.20 |
| 2550578 | 3/4" | 13/16" | 0.20 |

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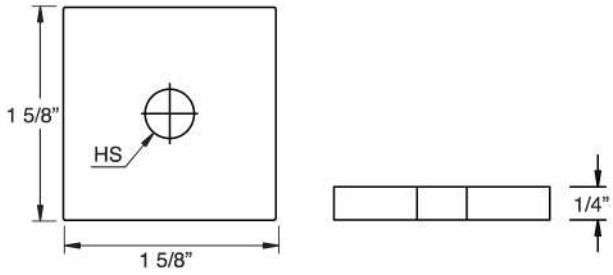
**STRUT WASHER**
**One Hole**
**Finish: Electro-Galvanized**




| ITEM # | SIZE | HS | WEIGHT |
|---|---|---|---|
| 2550579 | 1/4" | 7/16" | 0.08 |
| 2550580 | 1/2" | 9/16 | 0.10 |
| 2550581 | 3/8" | 11/16" | 0.20 |
| 2550583 | 3/4" | 13/16" | 0.20 |
| 2550584 | 7/8" | 1" | 0.20 |

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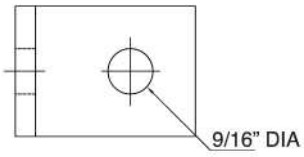
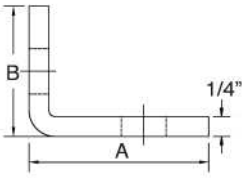
# STRUT FITTINGS

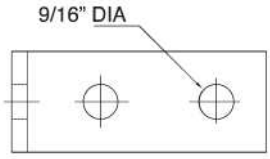
**90° ANGLE**
**Two Hole**
**Finish: Electro-Galvanized**

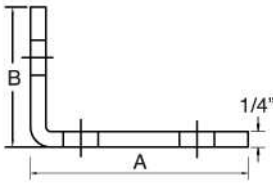



| ITEM # | A | B | WEIGHT |
|---|---|---|---|
| 2550585 | 1-3/4" | 1-5/8" | 0.58 |
| 2550585A | 2-1/4" | 1-7/8" | 0.58 |
| 2550585B | 2" | 1-5/8" | 0.58 |
| 2550585C | 3" | 2-1/2" | 0.58 |

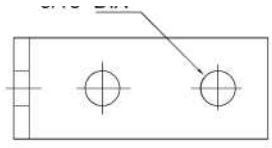
**90° ANGLE**
**Three Hole**
**Finish: Electro-Galvanized**

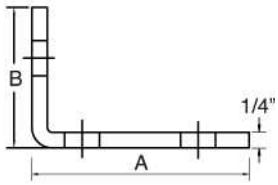



| ITEM # | A | B | WEIGHT |
|---|---|---|---|
| 2550586 | 3-9/16" | 1-5/8" | 0.58 |
| 2550586A | 3-7/8" | 1-7/8" | 0.58 |
| 2550586B | 4-1/8" | 1-5/8" | 0.58 |
| 2550586C | 3-1/2" | 2-1/2" | 0.58 |

**90° ANGLE**
**Four Hole**
**Finish: Electro-Galvanized**






| ITEM # | A | B | WEIGHT |
|---|---|---|---|
| 2550587 | 3-7/8" | 3-5/16" | 0.78 |
| 2550587A | 4-1/8" | 3-1/2" | 0.78 |

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# data sheet

## STRUT/CHANNEL

### STRUT SPECIFICATIONS

ARGCO's strut channels are built for durability, accountability and reusability. Each channel is manufactured from cold rolled high quality carbon steel of varying gage and depth. Our products have a cross-section of accurate dimensions with a minimum tolerance limit from these technical processes.

| GAGE | MATERIAL | ASTM STAND RED |
|---|---|---|
| 12 &14 | PRE-GALVANIZED | A-653 |
| 12 &14 | PLAIN - STEEL | A-1011SS |
| 12 &14 | STAINLESS - STEEL | A-240 |
| 12 &14 | HOT DIP GALVANIZED | A-123 , A-153 |

### LENGTH INFORMATION

ELiTESTRUT channels are available in 10 and 20 foot sizes with the tolerance of about 1/8". Customized lengths will also be produced upon special request.

### WELDING

Spot welding technique is being used to combine two or more ELiTESTRUT channels to fabricate various combinations. Evenly spaced spot welds are placed on centers along the length of the multiple channel sections.

### SURFACE FINISH

The performance of ELiTESTRUT channels have been improvised by pre-galvanizing and superior resistance coating. Pre-galvanized and Green Powder coated channels are available in stock. (Please refer to the technical section for further details.)

### ELiTESTRUT BEAM AND COLUMN LOADING APPLICATION

Calculations of load, the support conditions, cross-sectional shape, material and nature of loading applied to beam and column strut applications with and without hole are taken from '*Machinery's Handbook, 27th edition*'.

### SURFACE FINISH

**PRE-GALVNIZED:** Prior to fabrication mill galvanized coating is produced by passing steel sheets continuously through the molten Zinc in accordance with ASTM A-653. The steel is then recoiled and processed to give various configurations and sizes of ELiTESTRUT. Thickness of Zn coating conforms to ASTM G90 which will be 0.45oz./sq.ft of surface area. Pre-galvanized steel should be able to stand with severe corrosive indoor as well as outdoor applications. Zinc near uncoated metal surface (slitting and fabrication) provides sufficient protection to exposed areas.

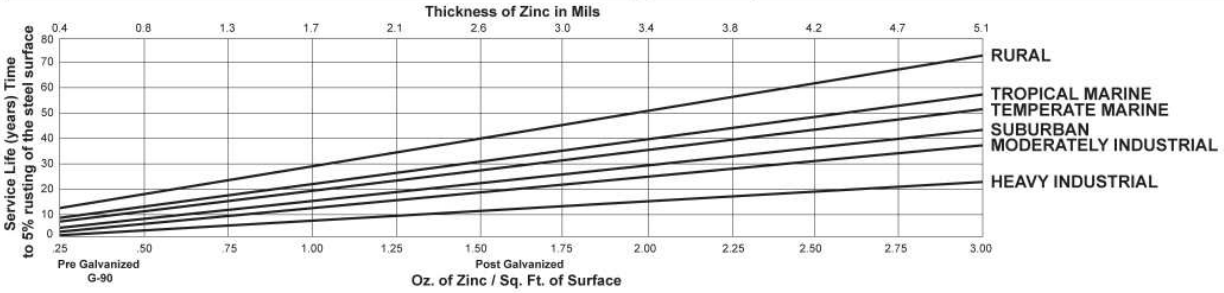
**HOT-DIP GALVANIZED:** Finished UNIQUESTRUT channels are completely immersed into the bath of molten Zinc to completely cover all exposed area with the thickness of 1.5oz./sq.ft of surface area in accordance with ASTM A-123. This coating will ensure the channels from prolonged outdoor corrosive atmosphere.

**GREEN POWDER COATED:** Polyurethane powder coating is applied electrostatically after the fabrication of ELiTESTRUT. Prior to coating the channel is pre treated and properly cleaned and end through the baking process establishing a bond in between. 1.5 mil thickness of coating provides good resistance to wear and tear.

**PLAIN STEEL:** As the name designate, ELiTESTRUT plain steel channel does not have any kind of coating. It does retain an oily surface applied prior to the rolling process and offers no protection from corrosive conditions.

**ZINC COATING:** From the graph you can very well expect that the life of ELiTESTRUT almost becomes twice as the thickness of Zn coating becomes double. Excellent engineering and quality services gives ELiTESTRUT a cutting edge over the other manufacturers.

**Life of Protection vs. Thickness of Zinc and Type of Atmospheres**

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# STRUT/CHANNEL

## DESIGN BASICS

### BEAMS:

ELiTESTRUT channels are capable of withstanding load primarily by resisting the bending. The bending force induced into ELiTESTRUT channels as result of external (perpendicular) loads, own weight and external reaction to these loads. The load carrying ability of ELiTESTRUT channel beam depends upon various factors such as:

1). Nature of Loading.
2). Amount of Load applied.
3). Support conditions and the stiffness of the beam.

### STRESSES AND DEFLECTION:

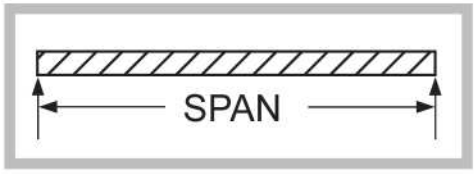
The following equations for load distribution are referenced from *'Machinery's Handbook, 27th edition.'* Extensive list of formulas for stresses and deflection in beams is given below:

***Types of Loading:***

A sequence point loads can act as uniform loading. There can be different combinations in which point load and uniform load can act together.

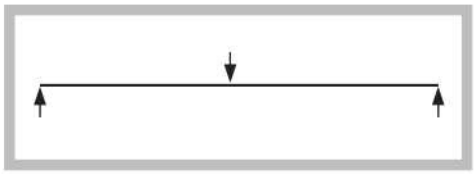
**UNIFORM LOAD**

Evenly distributed load spread over the entire length of the beam from support to support is 'Uniform Load'.




**POINT LOAD**

Point load is the concentrated load that is applied perpendicularly onto a very small length of the beam.

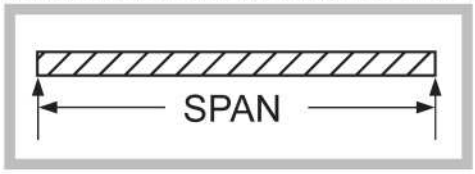


***Types of Support Conditions:***

A sequence point loads can act as uniform loading. There can be different combinations in which point load and uniform load can act together.

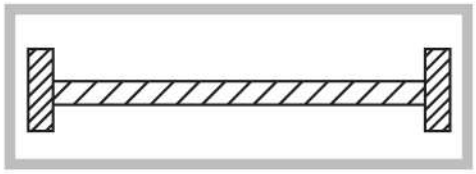
**SIMPLE BEAM**

A simple beam is supported at both of its ends, restricts the motion in horizontal and vertical direction, but allows it to bend into an estimated deflected profile. Majority of ELiTESTRUT channels connections are generated in proximity with simple beams. Loading charts and tables presented in this catalog are based on detailed analysis of simple beams.



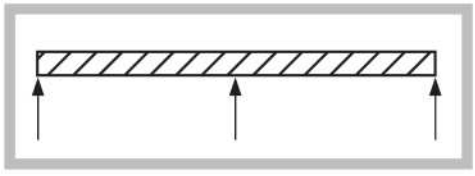

**FIXED BEAM**

Fixed beam is welded in, general, at both of its ends and even restricts its natural deflection under normal loading conditions. Greater stiffness provided because of its rigid ends gives an increased load capacity as compared with equivalent simple beam.



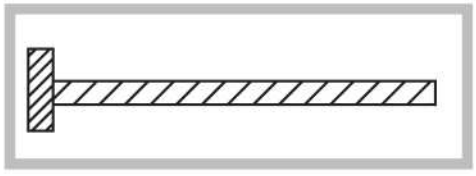
**CONTINOUS BEAM**

Continuous beam is supported at more than two supports. These beams acts as simple beams on the outside spans and as a fixed beam approximately in a manner on the inside spans.



**CANTILEVER BEAM**

Cantilever beam is a fixed end beam supported at one end while the other end is unsupported. ELiTESTRUT brackets are the good examples for cantilever beam loading.



# data sheet

## STRUT/CHANNEL

### DEFLECTION:

Under normal loading conditions, all beams will deflect. The extent of deflection depends upon the following reasons:
1). Total amount of load (beam load and applied load.)
2). Nature of load distribution.
3). Manner by which beam is supported.
4). Beam's cross-sectional stiffness.
5). Beam's material stiffness.
'Moment of Inertia', "I" defines the stiffness of the structure. For greater value of I, the smaller is its deflection. Altering the value of I for both major and minor axis can greatly affect its structural stiffness.
'Modulus of elasticity',"E" defines the stiffness of the material for beams. Similarly for greater value of E, the smaller is its deflection. Strength of a material depends upon various other factors and E is one of them, so necessarily the strength must not be confused with E.
For most of the cases, maximum deflection determines the loading capacity of the ELiTE STRUT channels. Detailed analysis of the data is provided in this catalog.

### BENDING MOMENT:

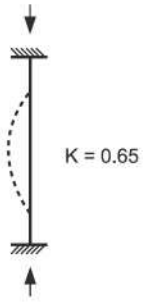
Additional Load bearing capacity of the beam to support its own weight, anticipated loads and variations in applied load is the key factor in designing. This extended capacity is called 'Factor of Safety' and governed by various design codes and standards. Most common technique to determine the beam's capacity is allowable stress method in which the beams maximum allowable stress is calculated in pound per sq. inch (psi). The data for the maximum allowable uniform loads presented in this catalog conforms to AISI "Specification for the Design of Cold-Formed Steel Structural Members". We have used the common methodology of dividing the bending moment by the section modulus 'S' to get the value of maximum allowable stress. It is to be noted that there may be a situation where the deflection or sagging will be appreciable and can be visualized, but this should not be confused with wrong designed beam installation.

### COLUMN LOADING:

ELiTE STRUT channels are designed to bear the compressive loads (i.e. when the load acts parallel to the length of the channels). Generally, all structural members that are subjected to vertical compression loads, such as diagonal brace, considered as Column.
**Buckling** is a failure mode characterized by a sudden failure of a structural member subjected to high compressive stresses, where the actual compressive stress at the point of failure is less than the ultimate compressive stresses that the material is capable of withstanding. Allowable column loading depends upon various factors such as:
1). **Total length of Column:** Length of the column is considered as the distance between the two braces.
2). **Nature of Loading:**
a). **Concentric Loading:** In this type of loading, the load is applied at the cross-sectional center of gravity of the column such as, load that rests on the top of a column.
b). **Eccentric Loading:** Loading that has not been applied as concentric is considered as eccentric loading. The eccentricity plays a vital role in load carrying capacity of a column. ELiTE FIXINGS bolted to the strut channel slot will transmit the eccentricity. Most of the data that is being produced is concentric loading.
3). **Support Conditions:** End support conditions for columns are mathematically represented by their 'K' value.

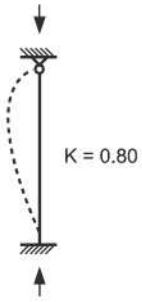
a). **Fixed Top – Fixed Bottom:**

Both the ends are restrained against rotation and any other lateral movements.



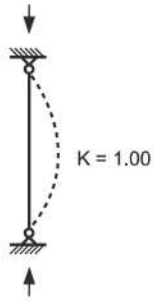

b). **Pinned Top – Fixed Bottom:**

Top end is restricted to the translational movements but is allowed to deform (rotate). The bottom end is restrained against both rotational and translational movements.




c). **Pinned Top – Pinned Bottom:**

Both of the ends are restrained to their translational movements but are allowed to rotate.




4). **Cross-Sectional Shape:** Radius of gyration 'r' is used to describe the distribution of cross sectional area in a column around its centroidal axis. Column with larger 'r'value are stiffer than those with smaller values.

### BOLT TORQUE:

In order to ensure proper bolt tension between ELiTE STRUT and framing components, specific torque values are recommended. It is important to note that in a manner, there is direct relation between torque and bolt tension. Greater tension in the bolt might lead to its early failure and too loose will prevent it from its full load capacity. Factors affecting this relationship are presence or lack of lubricant and metal finish. Too much lubrication between the threads will cause the over-tightening of the bolts for the same amount of torque. These values are developed for properly using a calibrated torque wrench with a clean dry ELiTE STRUT fitting, bolt and nut.

| BOLT TORQUE | | | | | | |
|---|---|---|---|---|---|---|
| BOLT SIZE | 1/4" -20 | 5/16" -18 | 3/8" -16 | 1/2" -13 | 5/8" -11 | 3/4" -10 |
| Rec. Torque Ft/Lbs (N.m) | 6 (8) | 11 (15) | 19 (26) | 50 (68) | 100 (136) | 125 (170) |
| Max Torque Ft/Lbs (N.m) | 7 (9) | 15 (20) | 25 (34) | 70 (95) | 125 (170) | 135 (183) |

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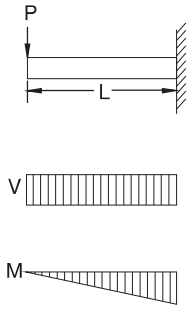
# data sheet

## BEAM SUPPORT CONDITIONS

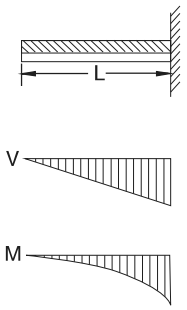
### Cantilever Beams




$V_{max.} = P$

$M_{max.} = PL$

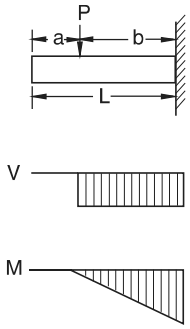
$\Delta_{max.} = \frac{PL^3}{3EI}$




$V_{max.} = W$

$M_{max.} = \frac{WL}{2}$

$\Delta_{max.} = \frac{WL^3}{8EI}$

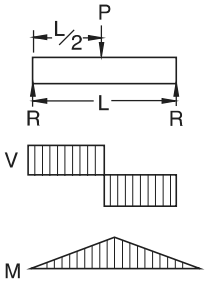



$V_{max.} = P$

$M_{max.} = Pb$

$\Delta_{max.} = \frac{Pb^2(3L-b)}{6EI}$

### Simple Beams

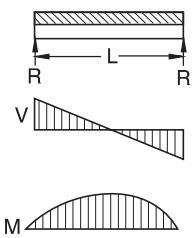



$R = \frac{P}{2}$

$V_{max.} = \frac{P}{2}$

$M_{max.} = \frac{PL}{4}$

$\Delta_{max.} = \frac{PL^3}{48EI}$

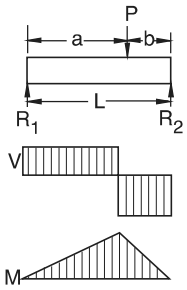



$R = \frac{W}{2}$

$V_{max.} = \frac{W}{2}$

$M_{max.} = \frac{WL}{8}$

$\Delta_{max.} = \frac{5WL^3}{384EI}$




$R_1 = \frac{Pb}{L}$

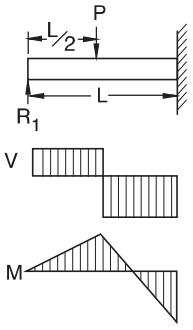
$R_2 = \frac{Pa}{L}$

$V_{max.} = \frac{Pa}{L}$

$M_{max.} = \frac{Pab}{L}$

$\Delta_{max.} = \frac{Pab(a+2b)\sqrt{3a(a+2b)}}{27EIL}$

### Beams Fixed At One End & Supported At The Other



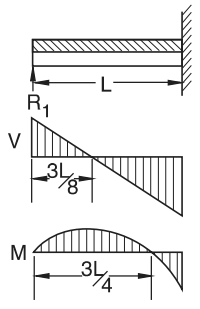

$R_1 = \frac{5P}{16}$

$V_{max.} = \frac{11P}{16}$

$M_{max.} = \frac{3PL}{16}$

$\Delta_{max.}$ at $x = 0.447L$

$\Delta_{max.} = 0.009317\frac{PL^3}{EI}$



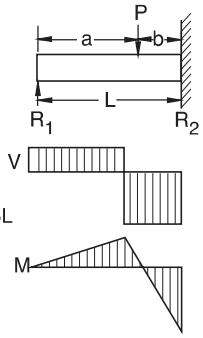

$R_1 = \frac{3W}{8}$

$V_{max.} = \frac{5W}{8}$

$M_{max.} = \frac{WL}{8}$

$\Delta_{max.}$ at $x = 0.4215L$

$\Delta_{max.} = \frac{WL^3}{185EI}$



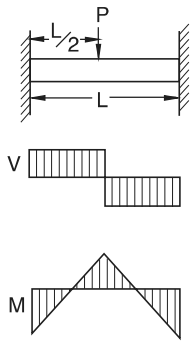

$R_1 = \frac{Pb^2}{2L^3}(a+2L)$

$R_2 = \frac{Pa}{2L^3}(3L^2-a^2)$

$M$ at point of load $= R_1 a$

$M$ at fixed end $= \frac{Pab}{2L^3}(a+L)$

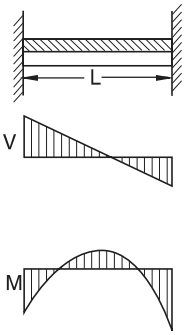
### Beams Fixed At Both Ends




$V_{max.} = \frac{P}{2}$

$M_{max.} = \frac{PL}{8}$

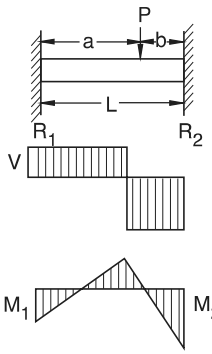
$\Delta_{max.} = \frac{PL^3}{192EI}$




$V_{max.} = \frac{W}{2}$

$M_{max.} = \frac{WL}{12}$

$\Delta_{max.} = \frac{WL^3}{384EI}$




$R_1 = \frac{Pb^2}{L^3}(3a+b)$

$R_2 = \frac{Pa^2}{L^3}(a+3b)$

$M_1 = \frac{Pab^2}{L^2}$

$M_2 = \frac{Pa^2b}{L^2}$

| | | |
|---|---|---|
| R – Reaction | W – Total Uniform Load | $\Delta$ – Deflection |
| M – Moment | V – Shear | E – Modulus of Elasticity |
| P – Concentrated Load | L – Length | I – Moment of Inertia |

**FOR MORE INFORMATION CALL ARGCO AT 800-854-1015**
**OR LOG ONTO ARGCO.COM**

## STRUT 1 5/8" x 1 5/8"

### BEAM LOADING 14 GAUGE

| BEAM SPAN (IN.) | MAX. ALLOWABLE UNIFORM LOAD (lbs) at 25000 psi. | Deflection at 25,000 psi (In.) | UNIFORM LOADING (lbs) AT DEFLECTION = SPAN /240 |
|---|---|---|---|
| 24 | 1316 | 0.056 | 1316 |
| 36 | 900 | 0.13 | 900 |
| 48 | 658 | 0.224 | 587 |
| 60 | 526 | 0.35 | 376 |
| 72 | 439 | 0.504 | 261 |
| 84 | 376 | 0.687 | 192 |
| 96 | 329 | 0.897 | 147 |
| 108 | 292 | 1.135 | 116 |
| 120 | 263 | 1.4 | 94 |
| 144 | 230 | 2.09 | 70 |
| 168 | 190 | 2.75 | 50 |
| 192 | 170 | 3.67 | 40 |
| 216 | 150 | 4.61 | 30 |
| 240 | 132 | 5.605 | 23 |

### COLUMN LOADING 14 GAUGE

| COLUMN LOADING UNBRACED HEIGHT (IN.) | MAX. LOAD (lbs) of COLUMN LOADED at C.G. | COLUMN EFFECTIVE LENGTH FACTOR | | | |
|---|---|---|---|---|---|
| | | K = 0.65 | K = 0.80 | K = 1.0 | K = 1.2 |
| 24 | 2800 | 8040 | 7330 | 6360 | 5430 |
| 36 | 2410 | 6480 | 5430 | 4190 | 3210 |
| 48 | 1940 | 4990 | 3830 | 2760 | 2160 |
| 60 | 1550 | 3740 | 2760 | 2050 | 1640 |
| 72 | 1290 | 2860 | 2160 | 1640 | 1320 |
| 84 | 1100 | 2310 | 1780 | 1370 | 1110 |
| 96 | 950 | 1950 | 1500 | 1180 | 950 |
| 108 | 840 | 1690 | 1320 | 1030 | ** |
| 120 | 760 | 1490 | 1180 | ** | ** |
| 144 | 630 | 1210 | 950 | ** | ** |

### SECTIONAL PROPERTIES

| Channel Part No. | Weight lbs/ft | Area of Section ($in^3$) | * AXIS X - X | | | * AXIS Y - Y | | |
|---|---|---|---|---|---|---|---|---|
| | | | $I(in^4)$ | $S(in^3)$ | r(in.) | $I(in^4)$ | $S(in^3)$ | r(in.) |
| A14 | 1.45 | 0.407 | 0.143 | 0.158 | 0.593 | 0.179 | 0.221 | 0.664 |
| A14BTB | 2.9 | 0.814 | 0.706 | 0.445 | 0.931 | 0.359 | 0.441 | 0.664 |

**I = Moment of Inertia** **S = Section Modulus** **r = Radius of Gyration.**

* Please refer to page 72 for axial information.

# data sheet

## STRUT 1 5/8" x 13/16"
### BEAM LOADING 14 GAUGE

| BEAM SPAN (IN.) | MAX. ALLOWABLE UNIFORM LOAD (lbs) at 25000 psi. | Deflection at 25,000 psi (In.) | UNIFORM LOADING (lbs) AT DEFLECTION = SPAN /240 |
|---|---|---|---|
| 24 | 444 | 0.106 | 416 |
| 36 | 296 | 0.24 | 185 |
| 48 | 222 | 0.427 | 104 |
| 60 | 177 | 0.667 | 66 |
| 72 | 148 | 0.96 | 46 |
| 84 | 127 | 1.037 | 34 |
| 96 | 111 | 1.707 | 26 |
| 108 | 99 | 2.16 | 21 |
| 120 | 89 | 2.668 | 17 |
| 144 | 80 | 4.09 | NA |
| 168 | 60 | 4.88 | NA |
| 192 | 60 | 7.28 | NA |
| 216 | 50 | 8.64 | NA |
| 240 | 50 | 11.85 | NA |

### COLUMN LOADING 14 GAUGE

| COLUMN LOADING UNBRACED HEIGHT (IN.) | MAX. LOAD (lbs) of COLUMN LOADED at C.G. | COLUMN EFFECTIVE LENGTH FACTOR | | | |
|---|---|---|---|---|---|
| | | K = 0.65 | K = 0.80 | K = 1.0 | K = 1.2 |
| 24 | 1840 | 5610 | 5210 | 4570 | 3850 |
| 36 | 1640 | 4660 | 3850 | 2800 | 1960 |
| 48 | 1310 | 3490 | 2480 | 1590 | 1100 |
| 60 | 1000 | 2400 | 1590 | ** | ** |
| 72 | 770 | 1670 | 1100 | ** | ** |
| 84 | ** | ** | ** | ** | ** |
| 96 | ** | ** | ** | ** | ** |
| 108 | ** | ** | ** | ** | ** |
| 120 | ** | ** | ** | ** | ** |
| 144 | ** | ** | ** | ** | ** |

### SECTIONAL PROPERTIES

| Channel Part No. | Weight lbs/ft | Area of Section($in^3$) | *AXIS X - X | | | *AXIS Y - Y | | |
|---|---|---|---|---|---|---|---|---|
| | | | I($in^4$) | S($in^3$) | r(in.) | I($in^4$) | S($in^3$) | r(in.) |
| C14 | 1.03 | 0.286 | 0.025 | 0.053 | 0.298 | 0.106 | 0.131 | 0.61 |
| C14BTB | 2.06 | 0.571 | 0.115 | 0.149 | 0.449 | 0.213 | 0.262 | 0.61 |

**I = Moment of Inertia  S = Section Modulus  r = Radius of Gyration.**

* Please refer to page 72 for axial information.

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