

*Quality People. Building Solutions.*

Comfort Systems USA (Arkansas), Inc.  
P.O. Box 16620  
Little Rock, AR 72231  
Phone 501-834-3320  
Fax 501-834-5416

**Date:** 10/3/2023

**Return Request:** 10/13/2023

**Project:** Regions HNTB

**Supplier:** Comfort Systems USA (Arkansas), Inc.

**Manufacturer:** Various

**Submittal:** Plumbing Piping

**Submittal Number:** 22 00 00-04

**Drawing # and Installation:** Plumbing Drawings

**ARCHITECT**

DLR Group  
2525 McKinnon St. Suite 800  
Dallas, TX 75067  
214-747-2511

**ENGINEER**

Pettit & Pettit  
201 East Markham, Suite 400  
Little Rock, AR 72201  
501-374-3731

**GENERAL CONTRACTOR**

Baldwin & Shell  
1000 W. Capitol Ave.  
Little Rock, AR 72201  
501-374-8677

**MECHANICAL SUBCONTRACTOR**

Comfort Systems USA (Arkansas), Inc.  
9924 Landers Rd.  
N. Little Rock, AR 72117  
501-834-3320

Notes:

**CSUSA PROJECT NO.**

**23-2014**

**[chowell@comfortar.com](mailto:chowell@comfortar.com)**

| Pipe Valve & Fitting Schedule - Regions HNTB |              |  |  |   |
|--|--------------|--|--|---|
| System                                       | Spec Section | Pipe                                   | Fittings                               | Joint                                       |
| Domestic Water - Above Grade                 |              | Type L Hard Copper; ASTM B88           | Wrought Copper; ASME B.16.22           | Lead-Free Solder; ASTM B32                  |
| Sanitary Sewer - Above Grade                 |              | Hubless Cast Iron; ASTM A888/CISPI 301 | Hubless Cast Iron; ASTM A888/CISPI 301 | Standard Hubless Band; ASTM C1277/CISPI 310 |
| Sanitary Sewer - Below Grade                 |              | Hubless Cast Iron; ASTM A888/CISPI 301 | Hubless Cast Iron; ASTM A888/CISPI 301 | Standard Hubless Band; ASTM C1277/CISPI 310 |

# Lead-Free Bronze Ball Valves

**Features:** Silicon Performance Bronze® Alloy • Two-Piece Body • Full Port • Blowout-Proof Stem

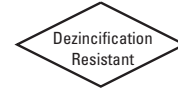
**Approvals:** MSS SP-110/145 • IAPMO/ANSI Z1157 • NSF/ANSI 61/372-8 Commercial Hot 180°F

**Size range:** ¼" - 3"

**Pressure rating:** 600 PSI non-shock cold working pressure

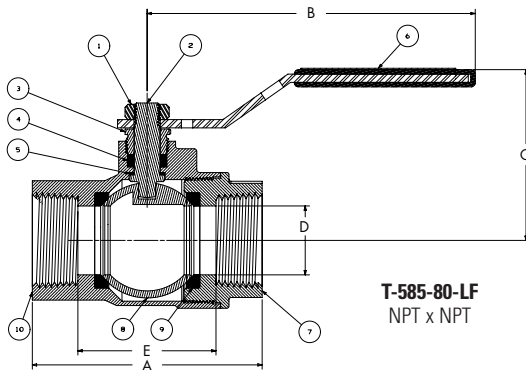
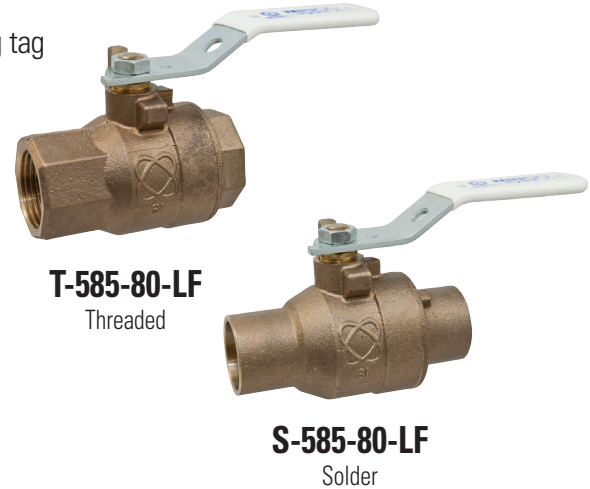
**Maximum pressure / temperature:** 100 PSI at 300° F

Lead-free markings: Double oval in body casting, white handle and blue hang tag

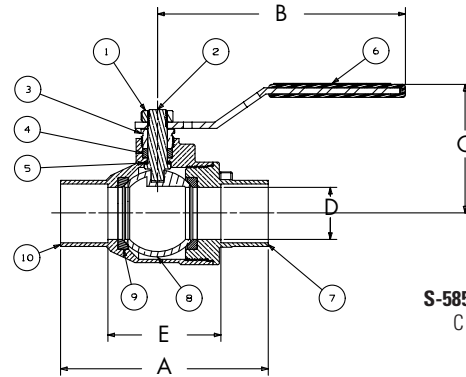


## MATERIAL LIST

| PART              | SPECIFICATION   |
|-------------------|---|
| 1. Handle Nut     | Zinc Plated Steel   |
| 2. Stem           | Silicon Bronze ASTM B371 Alloy C69300   |
| 3. Pack Gland     | Brass ASTM B16 Alloy C36000   |
| 4. Packing, Stem  | Virgin PTFE   |
| 5. Washer, Thrust | Reinforced PTFE   |
| 6. Handle         | Zinc Plated Steel Clear Chromate Plastisol Coated   |
| 7. End Piece      | Silicon Bronze ASTM B584 Alloy C87600   |
| 8. Seat Ring (2)  | Reinforced PTFE   |
| 9. Ball           | DZR Brass SAE J461 C46500 (¼"-1")<br>Stainless Steel ASTM A276 S31600 or ASTM A351CF8M (1¼"-3") |
| 10. Body          | Silicon Bronze ASTM B584 Alloy C87600   |



**T-585-80-LF**  
NPT x NPT

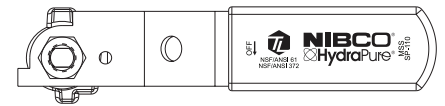


**S-585-80-LF**  
C x C

## DIMENSIONS—WEIGHTS—QUANTITIES

### Dimensions

| SIZE | T-585-80-LF |      | S-585-80-LF |      | T-585-80-LF |      | S-585-80-LF |      | T-585-80-LF |      | S-585-80-LF |      | T-585-80-LF |      | S-585-80-LF |       | Master Ctn. Qty. |       |      |    |
|------|-------------|------|-------------|------|-------------|------|-------------|------|-------------|------|-------------|------|-------------|------|-------------|-------|------------------|-------|------|----|
|      | A           | A    | B           | C    | D           | E    | E           | Lbs. | Kg.         | Lbs. | Kg.         | Lbs. | Kg.         | Lbs. | Kg.         |       |                  |       |      |    |
| ¼    | 8           | 1.78 | 45          | 1.83 | 46          | 3.96 | 101         | 1.86 | 47          | 0.31 | 8           | 1.00 | 25          | 1.21 | 31          | 0.43  | 0.19             | 0.40  | 0.18 | 24 |
| ⅜    | 10          | 1.79 | 45          | 1.97 | 50          | 3.96 | 101         | 1.85 | 47          | 0.38 | 10          | 1.80 | 46          | 1.21 | 31          | 0.44  | 0.20             | 0.41  | 0.19 | 24 |
| ½    | 15          | 2.23 | 57          | 2.4  | 61          | 3.96 | 101         | 1.96 | 50          | 0.5  | 13          | 1.16 | 29          | 1.40 | 36          | 0.65  | 0.30             | 0.56  | 0.25 | 80 |
| ¾    | 20          | 2.78 | 71          | 3.16 | 80          | 4.76 | 121         | 2.28 | 58          | 0.75 | 19          | 1.68 | 43          | 1.66 | 42          | 1.20  | 0.55             | 1.02  | 0.46 | 60 |
| 1    | 25          | 3.34 | 85          | 3.99 | 101         | 4.76 | 121         | 2.48 | 63          | 1    | 25          | 2.00 | 51          | 2.17 | 55          | 1.63  | 0.74             | 1.50  | 0.68 | 40 |
| 1¼   | 32          | 3.75 | 95          | 4.13 | 105         | 6.75 | 171         | 3.10 | 79          | 1.25 | 32          | 2.39 | 61          | 2.19 | 56          | 2.87  | 1.30             | 2.41  | 1.09 | 20 |
| 1½   | 40          | 4.26 | 108         | 4.97 | 126         | 6.75 | 171         | 3.32 | 84          | 1.5  | 38          | 2.89 | 73          | 2.79 | 71          | 3.83  | 1.74             | 3.62  | 1.64 | 10 |
| 2    | 50          | 4.80 | 122         | 6.02 | 153         | 6.75 | 171         | 3.56 | 90          | 2    | 51          | 3.40 | 86          | 3.34 | 85          | 5.57  | 2.53             | 5.54  | 2.51 | 6  |
| 2½   | 65          | 6.00 | 152         | 7.21 | 183         | 8.06 | 205         | 4.40 | 112         | 2.50 | 64          | 4.12 | 105         | 4.27 | 108         | 13.70 | 6.21             | 12.80 | 5.80 | 2  |
| 3    | 76          | 6.5  | 165         | 8    | 202         | 8.06 | 205         | 4.65 | 118         | 2.95 | 75          | 4.46 | 113         | 4.62 | 117         | 14.30 | 6.49             | 12.50 | 5.67 | 2  |



**Handle Markings**

### Handle Options:

- Stainless Steel Lever
- NIB-Seal®
- NIB-Seal® Locking Lever
- Locking Lever
- Stainless Steel Locking Lever
- Memory Stop
- Extended Lever w/ Memory Stop
- Round
- Wing
- Horizontal and Vertical Chain



**WARNING:** This product can expose you to chemicals including lead, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).

LEAD-FREE: Weighted average lead content ≤ 0.25%

## Adjustable Clevis Hanger Fig. 260 (Formerly Afcon Fig. 371)

**Size Range:** ½" through 30"

**Material:** Carbon Steel

**Finish:** Plain, 8" & Smaller: Zinc Plated (Hot-Dip Galvanized optional), 10" & Larger: Hot-Dip Galvanized with Zinc Plated Bolts & Nuts, or Primed, also available in Plastic or Epoxy Coated.

**Service:** Recommended for the suspension of stationary pipe lines.

**Maximum Temperature:** Plain 650° F, Galvanized and Epoxy 450° F

**Approvals:** Complies with Federal Specification A-A-1192A (Type 1), WW-H-171-E (Type 1), ANSI/MSS SP-69 and MSS SP-58 (Type 1). FM Approved (Sizes ¾" through 8"), UL and ULC Listed (Sizes ½" through 8").

**Installation:** Hanger load nut above clevis must be tightened securely to assure proper hanger performance.

**Adjustment:** Vertical adjustment without removing pipe may be made from ¾" through 5/8", varying with the size of clevis. Tighten upper nut after adjustment.

**Features:**

- Design has yoke on outside of lower U-strap so yoke cannot slide toward center of bolt, thus bending of bolt is minimized.
- Sizes 5" and up have rod and two nuts instead of bolt and nut; thread length on clevis rod is such that the thread locks the nuts in place, and threads are not in shear plane.

**Ordering:**

Specify pipe size, figure number, name and finish.

**Notes:**

- Punched forming holes may be present on certain sizes of this clevis hanger. These holes are solely for the purpose of manufacturing, and do not effect the structural integrity or load carrying capacities of these hangers.
- For insulated line options without shields, see Figures 260 ISS and Figure 300. For insulated line options with shields, see Figures 167 and 168. For ductile iron pipe sizes, see Figure 590.
- Fig. 260F (Felt lined) – available for use for suspension of copper (or other material) so as to prevent electrolysis between the dissimilar metals of the hanger and the pipe, tube or conduit.

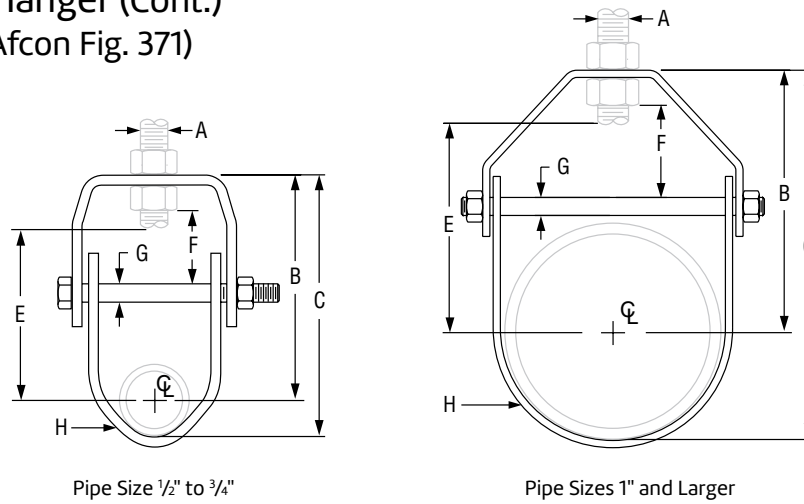
**Caution:**

When an oversize clevis is used, a pipe spacer or multispacer should be placed over clevis bolt to ensure that the lower U-strap will not move in on the bolt.



| PROJECT INFORMATION | APPROVAL STAMP    |
|---------------------|-------------------|
| Project:            | Approved          |
| Address:            | Approved as noted |
| Contractor:         | Not approved      |
| Engineer:           | Remarks:          |
| Submittal Date:     |                   |
| Notes 1:            |                   |
| Notes 2:            |                   |

## Adjustable Clevis Hanger (Cont.) Fig. 260 (Formerly Afcon Fig. 371)



**Fig. 260: Dimensions (in) • Loads (lbs) • Weight (lbs)**

| Pipe Size | Max Load | Span Ft. | Weight | Rod Size A | B                                | C                                | Rod Take Out E                   | Adjust. F                       | G   | H Width Lower |                                  |                                 |
|-----------|----------|----------|--------|------------|----------------------------------|----------------------------------|----------------------------------|---------------------------------|-----|---------------|----------------------------------|---------------------------------|
| 1/2       | 610      | 7*       | 0.34   | 3/8        | 2 <sup>3</sup> / <sub>16</sub>   | 2 <sup>11</sup> / <sub>16</sub>  | 1 <sup>1</sup> / <sub>2</sub>    | 5/8                             | 1/4 | 1             |                                  |                                 |
| 3/4       |          |          | 0.34   |            | 2                                |                                  | 1 <sup>5</sup> / <sub>16</sub>   |                                 |     |               |                                  |                                 |
| 1         |          |          | 0.35   |            | 2 <sup>5</sup> / <sub>16</sub>   |                                  | 3                                |                                 |     |               | 1 <sup>5</sup> / <sub>8</sub>    |                                 |
| 1 1/4     | 730      | 9*       | 0.40   | 1/2        | 2 <sup>3</sup> / <sub>8</sub>    | 3 <sup>13</sup> / <sub>16</sub>  | 1 <sup>11</sup> / <sub>16</sub>  | 7/8                             | 3/8 | 1 1/4         |                                  |                                 |
| 1 1/2     |          |          | 0.45   |            | 2 <sup>13</sup> / <sub>16</sub>  |                                  | 2 <sup>1</sup> / <sub>8</sub>    |                                 |     |               |                                  |                                 |
| 2         |          |          | 0.50   |            | 3 <sup>5</sup> / <sub>16</sub>   |                                  | 4 <sup>1</sup> / <sub>2</sub>    |                                 |     |               | 2 <sup>5</sup> / <sub>8</sub>    |                                 |
| 2 1/2     | 1,350    | 11*      | 0.65   | 5/8        | 4 <sup>1</sup> / <sub>16</sub>   | 5 <sup>1</sup> / <sub>2</sub>    | 3 <sup>3</sup> / <sub>16</sub>   | 1 <sup>5</sup> / <sub>16</sub>  | 3/8 | 1 3/4         |                                  |                                 |
| 3         |          |          | 0.85   |            | 4 <sup>3</sup> / <sub>4</sub>    |                                  | 4 <sup>1</sup> / <sub>16</sub>   |                                 |     |               | 1 <sup>5</sup> / <sub>8</sub>    |                                 |
| 3 1/2     |          |          | 1.10   |            | 5 <sup>1</sup> / <sub>16</sub>   |                                  | 7 <sup>1</sup> / <sub>16</sub>   |                                 |     |               | 4 <sup>3</sup> / <sub>16</sub>   | 1 <sup>13</sup> / <sub>16</sub> |
| 4         | 1,430    | 13*      | 1.51   | 3/4        | 5 <sup>9</sup> / <sub>16</sub>   | 7 <sup>13</sup> / <sub>16</sub>  | 4 <sup>1</sup> / <sub>2</sub>    | 1 <sup>11</sup> / <sub>16</sub> | 3/8 | 1 3/4         |                                  |                                 |
| 5         |          |          | 1.70   |            | 6 <sup>9</sup> / <sub>16</sub>   |                                  | 8 <sup>15</sup> / <sub>16</sub>  |                                 |     |               | 5 <sup>1</sup> / <sub>2</sub>    | 1 <sup>15</sup> / <sub>16</sub> |
| 6         |          |          | 3.10   |            | 6 <sup>15</sup> / <sub>16</sub>  |                                  | 10 <sup>1</sup> / <sub>4</sub>   |                                 |     |               | 5 <sup>3</sup> / <sub>4</sub>    | 1 <sup>11</sup> / <sub>16</sub> |
| 8         | 2,000    | 16*      | 4.75   | 7/8        | 8 <sup>3</sup> / <sub>8</sub>    | 12 <sup>11</sup> / <sub>16</sub> | 7 <sup>3</sup> / <sub>16</sub>   | 2                               | 1/2 | 1 7/8         |                                  |                                 |
| 10        |          |          | 8.60   |            | 9 <sup>7</sup> / <sub>8</sub>    |                                  | 15 <sup>1</sup> / <sub>4</sub>   |                                 |     |               | 8 <sup>7</sup> / <sub>16</sub>   | 2 <sup>1</sup> / <sub>8</sub>   |
| 12        |          |          | 11.20  |            | 11 <sup>9</sup> / <sub>16</sub>  |                                  | 17 <sup>15</sup> / <sub>16</sub> |                                 |     |               | 10 <sup>1</sup> / <sub>8</sub>   | 2 <sup>13</sup> / <sub>16</sub> |
| 14        | 3,600    | 19*      | 12.50  | 1          | 12 <sup>9</sup> / <sub>16</sub>  | 19 <sup>9</sup> / <sub>16</sub>  | 10 <sup>11</sup> / <sub>16</sub> | 2 <sup>11</sup> / <sub>16</sub> | 5/8 | 2             |                                  |                                 |
| 16        |          |          | 19.85  |            | 14                               |                                  | 22                               |                                 |     |               | 12                               | 2 <sup>3</sup> / <sub>4</sub>   |
| 18        |          |          | 22.25  |            | 15 <sup>15</sup> / <sub>16</sub> |                                  | 24 <sup>15</sup> / <sub>16</sub> |                                 |     |               | 13 <sup>15</sup> / <sub>16</sub> | 3 <sup>13</sup> / <sub>16</sub> |
| 20        | 4,800    | 22*      | 40.33  | 3/4        | 17 <sup>9</sup> / <sub>16</sub>  | 27 <sup>9</sup> / <sub>16</sub>  | 15 <sup>3</sup> / <sub>16</sub>  | 3 <sup>7</sup> / <sub>8</sub>   | 1/4 | 3             |                                  |                                 |
| 24**      |          |          | 49.83  |            | 19 <sup>13</sup> / <sub>16</sub> |                                  | 31 <sup>13</sup> / <sub>16</sub> |                                 |     |               | 17 <sup>5</sup> / <sub>16</sub>  | 7 <sup>5</sup> / <sub>8</sub> * |
| 30***     |          |          | 70.18  |            | 24 <sup>3</sup> / <sub>16</sub>  |                                  | 39 <sup>3</sup> / <sub>16</sub>  |                                 |     |               | 21 <sup>9</sup> / <sub>16</sub>  | 5 <sup>1</sup> / <sub>8</sub>   |

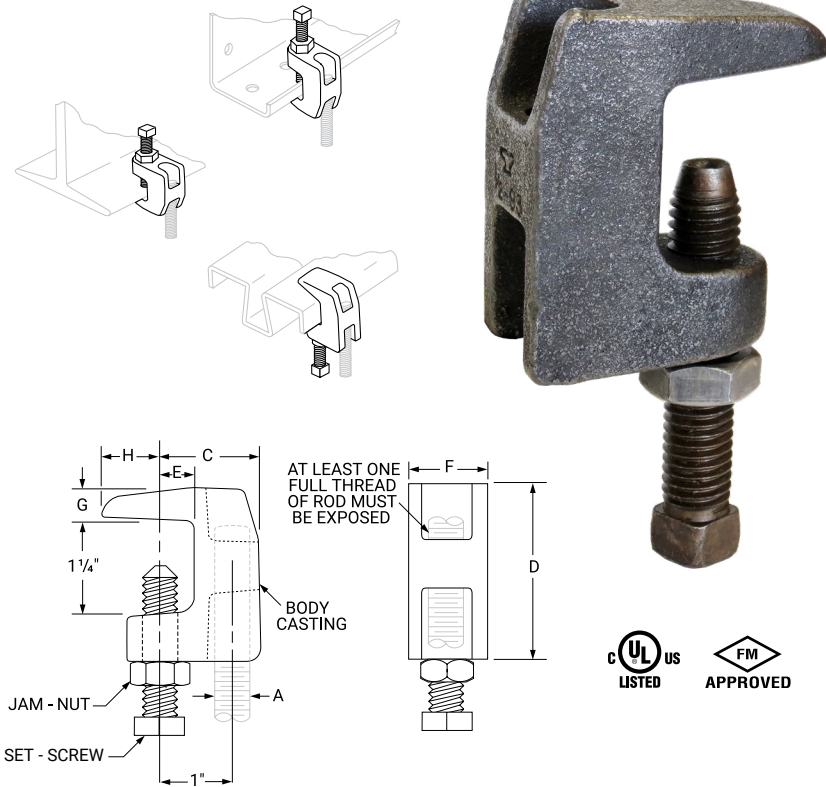
"Span" represents the maximum recommended distance between hangers on a continuous and straight run of horizontal standard weight steel pipe filled with water. In all cases, verify that chosen location of hangers does not subject hangers to a load greater than the maximum recommended load shown above.

\*Indicates that span represents the maximum span for water filled pipe.

\*\*The 24" pipe size assembly includes a 1 1/4" SCH 40 pipe spacer over the 7/8" threaded rod.

\*\*\*The 30" pipe size assembly includes a 1 1/4" SCH 40 pipe spacer over the 1 1/4" threaded rod. When assembled, the U-strap sits outside of the yoke.

## Universal C-type Clamp (Wide Throat) Fig. 93 (Formerly Afcon Fig. 105)



### Material Specifications

**Size Range**  
3/8" and 1/2"

**Material**  
Ductile iron, hardened steel cup point set screw and locknut.

**Finish**  
Plain  
Zinc Plated (Hot-Dip Galvanized optional)

**Service**  
Recommended for use under roof installations with bar joist type construction, or for attachment to the top or bottom flange of structural shapes where the vertical hanger rod is required to be offset from the edge of the flange and where the thickness of joist or flange does not exceed 1 1/4".

**Approvals**  
Complies with Federal Specification A-A-1192A (Type 19 & 23), WW-H-171-E (Type 23), ANSI/MSS SP-69 and MSS SP-58 (Type 19 & 23).  
UL, ULC Listed and FM Approved.

**How to size**  
Size of clamp is determined by size of rod to be used.

**Installation**  
Follow recommended set screw torque values per MSS-SP-69.

- Features**
- They may be attached to horizontal flanges of structural members in either the top beam or bottom beam positions.
  - Secured in place by a cup-pointed Set Screw tightened against the flange. A Jam Nut is provided for tightening the Set Screw against the Body Casting.
  - Thru tapping of the body casting permits extended adjustment of the threaded rod.
  - Wider throat for attaching to flange with up to 1 1/4" thickness.

**Ordering**  
Specify rod size, figure number, name of clamp and finish.

Available with oversized tapped rod hole for Hot Dip Galvanized finish.

### Dimensions (In) - Load (Lbs) - Torque (In-Lbs) - Weight (Lbs)

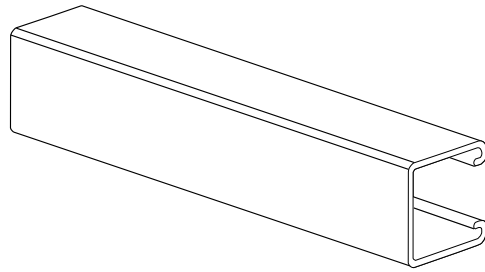
| Rod Size<br>A | Set<br>Screw<br>Size | Torque<br>Value | Max Loads ■ |        | Weight | C      | D       | E    | F      | G    | H     |
|---------------|----------------------|-----------------|-------------|--------|--------|--------|---------|------|--------|------|-------|
|               |                      |                 | Top         | Bottom |        |        |         |      |        |      |       |
| 3/8           | 3/8                  | 60              | 500         | 250    | 0.41   | 1 5/16 | 2 5/32  | 9/16 | 13/16  | 3/8  | 5/8   |
| 1/2           | 1/2                  | 125             | 950         | 760    | 0.75   | 1 3/8  | 2 11/32 | 1/2  | 1 1/16 | 7/16 | 13/16 |

**Note:**  
■ Maximum temperature of 450° F



| PROJECT INFORMATION | APPROVAL STAMP    |
|---------------------|-------------------|
| Project:            | Approved          |
| Address:            | Approved as noted |
| Contractor:         | Not approved      |
| Engineer:           | Remarks:          |
| Submittal Date:     |                   |
| Notes 1:            |                   |
| Notes 2:            |                   |

## Channel Fig. AS 200

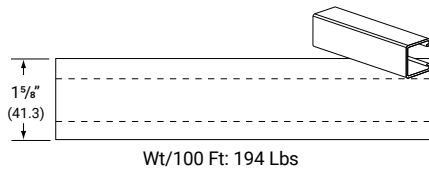


### Description

Anvil-Strut channels are manufactured by a series of forming dies, or rolls, which progressively cold work the strip steel into the desired channel configuration. This method produces a cross section of uniform dimensions within a tolerance of plus or minus 0.015", on outside dimensions.

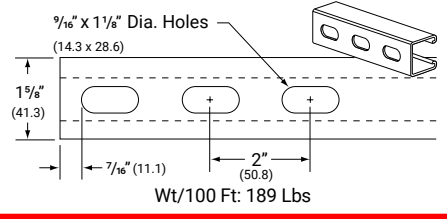
### Solid AS 200

PL, GR, PG, SS, ZTC, HG



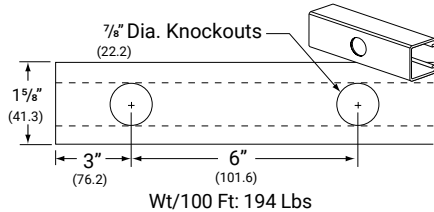
### With Elongated Holes AS 200EH

PL, GR, PG, SS, ZTC, HG



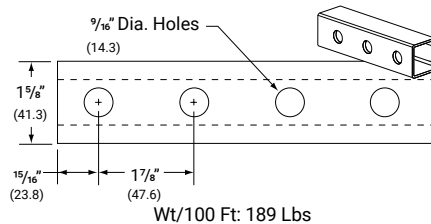
### With Knock Out AS 200KO

PL, GR, PG, Other



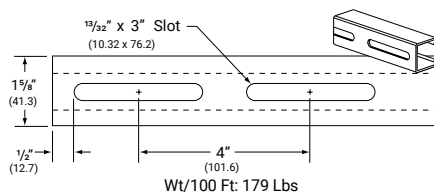
### With Holes AS 200H

PL, GR, PG, Other



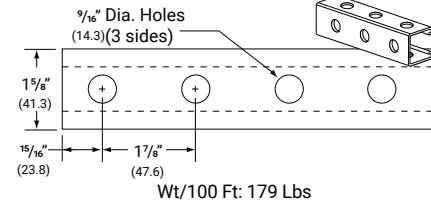
### With Long Slots AS 200S

PL, GR, PG, Other



### With Holes on 3 Sides AS 200H3

PL, GR, PG, Other



### Specifications

#### Size:

1 5/8" X 1 5/8" (41.3 x 41.3mm)

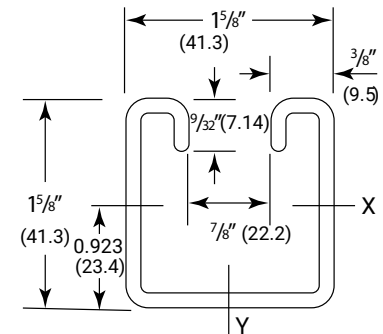
12 Gauge Channel • wt./100 ft. - 194 lbs.

#### Materials:

Carbon Steel  
Stainless Steel  
Aluminum

#### Finishes

Pre-Galvanized  
Hot Dip Galvanized - Post Fabrication  
Supr-Green Powder Coated  
Zinc Trivalent Chromium  
PVC



#### LEGEND:

GR: Powder Coated Supr-Green  
EG: Electro-Galvanized  
PG: Pre-Galvanized  
AL: Aluminum  
HG: Hot Dipped Galvanized  
PL: Plain  
SS: Stainless Steel  
ZTC: Zinc Trivalent Chromium Stainless Steel (SS), Zinc Trivalent Chromium (ZTC) and Hot Dipped Galvanized (HG) are specialty finishes. Pricing is located in the Specialty Strut Section of the Anvil-Strut price book.



| PROJECT INFORMATION | APPROVAL STAMP    |
|---------------------|-------------------|
| Project:            | Approved          |
| Address:            | Approved as noted |
| Contractor:         | Not approved      |
| Engineer:           | Remarks:          |
| Submittal Date:     |                   |
| Notes 1:            |                   |
| Notes 2:            |                   |

## Channel Fig. AS 200

1<sup>5</sup>/<sub>8</sub>" X 1<sup>5</sup>/<sub>8</sub>" (41.3 x 41.3mm)  
 12 Gauge Channel • wt./100 ft. – 194 lbs  
 Stocked in pre-galvanized, plain, powder coated  
 Supr-Green, zinc trivalent chromium, and hot dipped  
 galvanized, in 10 & 20 ft. lengths. Note: Also available in  
 Stainless Steel 304 & 316 Alloys. Other materials, finishes  
 & lengths are available upon request.

### Properties of Section

| Catalog Number | Wt./Ft. |     | Area of Selection |        | X-X Axis          |                   |                   |                   |       |       | Y-Y Axis          |                   |                   |                   |       |       |
|----------------|---------|-----|-------------------|--------|-------------------|-------------------|-------------------|-------------------|-------|-------|-------------------|-------------------|-------------------|-------------------|-------|-------|
|                | Lbs.    | Kg. | Sq. In.           | Sq. CM | I in <sup>4</sup> | I cm <sup>4</sup> | S in <sup>3</sup> | S cm <sup>3</sup> | r in  | r cm  | I in <sup>4</sup> | I cm <sup>4</sup> | S in <sup>3</sup> | S cm <sup>3</sup> | r in  | r cm  |
| AS 200         | 1.94    | 2.9 | 0.552             | 3.561  | 0.188             | 7.825             | 0.208             | 3.409             | 0.584 | 1.483 | 0.236             | 9.823             | 0.290             | 4.752             | 0.654 | 1.661 |

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

### Beam and Column Loads

| Span or Unbraced Height | Static Beam Load (X-X Axis) |                            |                            |                     |                     |                   |                                  | Column Loading Data              |        |        |        |     |
|-------------------------|-----------------------------|----------------------------|----------------------------|---------------------|---------------------|-------------------|----------------------------------|----------------------------------|--------|--------|--------|-----|
|                         | Max Allowable Uniform Load  | Deflection at Uniform Load | Uniform Load at Deflection |                     |                     |                   | Max. Allowable Load at Slot Face | Max. Column Load Applied at C.G. |        |        |        |     |
|                         |                             |                            | Span/180 Deflection        | Span/240 Deflection | Span/360 Deflection | Weight of Channel |                                  | k=.65                            | k=.80  | k=1.0  | k=1.2  |     |
| In                      | Lbs                         | In                         | Lbs                        | Lbs                 | Lbs                 | Lbs               | Lbs                              | Lbs                              | Lbs    | Lbs    | Lbs    | Lbs |
| 12                      | 3,480                       | 0.01                       | 3,480                      | 3,480               | 3,480               | 1.9               | 3,850                            | 12,240                           | 11,940 | 11,480 | 10,960 |     |
| 18                      | 2,320                       | 0.03                       | 2,320                      | 2,320               | 2,320               | 2.9               | 3,710                            | 11,540                           | 10,960 | 10,130 | 9,290  |     |
| 24                      | 1,740                       | 0.06                       | 1,740                      | 1,740               | 1,740               | 3.9               | 3,530                            | 10,690                           | 9,850  | 8,740  | 7,710  |     |
| 30                      | 1,390                       | 0.09                       | 1,390                      | 1,390               | 1,310               | 4.9               | 3,330                            | 9,780                            | 8,740  | 7,470  | 6,380  |     |
| 36                      | 1,160                       | 0.13                       | 1,160                      | 1,160               | 910                 | 5.8               | 3,120                            | 8,880                            | 7,710  | 6,380  | 5,310  |     |
| 42                      | 990                         | 0.17                       | 990                        | 990                 | 670                 | 6.8               | 2,910                            | 8,020                            | 6,800  | 5,470  | 4,430  |     |
| 48                      | 870                         | 0.23                       | 870                        | 770                 | 510                 | 7.8               | 2,710                            | 7,240                            | 6,000  | 4,690  | 3,810  |     |
| 60                      | 700                         | 0.35                       | 660                        | 490                 | 330                 | 9.7               | 2,340                            | 5,910                            | 4,690  | 3,630  | 2,960  |     |
| 72                      | 580                         | 0.51                       | 460                        | 340                 | 230                 | 11.6              | 2,040                            | 4,840                            | 3,810  | 2,960  | 2,400  |     |
| 84                      | 500                         | 0.69                       | 340                        | 250                 | 170                 | 13.6              | 1,800                            | 4,040                            | 3,200  | 2,480  | 1,980  |     |
| 96                      | 430                         | 0.90                       | 260                        | 190                 | 130                 | 15.5              | 1,600                            | 3,480                            | 2,750  | 2,110  | 1,670  |     |
| 108                     | 390                         | 1.14                       | 200                        | 150                 | 100                 | 17.5              | 1,440                            | 3,050                            | 2,400  | 1,820  | **     |     |
| 120                     | 350                         | 1.41                       | 160                        | 120                 | 80                  | 19.4              | 1,290                            | 2,700                            | 2,110  | **     | **     |     |
| 144                     | 290                         | 2.03                       | 110                        | 90                  | 60                  | 23.3              | 1,060                            | 2,180                            | 1,670  | **     | **     |     |
| 168                     | 250                         | 2.77                       | 80                         | 60                  | 40                  | 27.2              | **                               | 1,790                            | **     | **     | **     |     |
| 180                     | 230                         | 3.18                       | 70                         | 50                  | 40                  | 29.1              | **                               | **                               | **     | **     | **     |     |
| 192                     | 220                         | 3.61                       | 60                         | 50                  | NR                  | 31.6              | **                               | **                               | **     | **     | **     |     |
| 216                     | 190                         | 4.57                       | 50                         | 40                  | NR                  | 34.9              | **                               | **                               | **     | **     | **     |     |
| 240                     | 170                         | 5.65                       | 40                         | NR                  | NR                  | 38.8              | **                               | **                               | **     | **     | **     |     |

# Bearing Load may limit load  
 \*\* Not recommended - KL/r exceeds 200

- Notes
- The beam capacities shown above include the weight of the strut beam. The beam weight must be subtracted from these capacities to arrive at the net beam capacity.
  - Allowable beam loads are based on a uniformly loaded, simply supported beam. For capacities of a beam loaded at midspan at a single point, multiply the beam capacity by 50% and deflection by 80%.
  - The above chart shows beam capacities for strut without holes. For strut with holes, multiply by the following:  
 EH by 88%,      S by 90%,  
 H (3/16 holes) by 88%,      KO by 82%.
  - Refer to the Anvil-Strut Catalog for reduction factors for unbraced lengths.





## Channel Fig. AS 200

### Beam and Column Loads – Metric

| Span or Unbraced Height | Static Beam Load (X-X Axis) |                            |                            |                     |                     |                   |                                  | Column Loading Data              |       |       |       |
|-------------------------|-----------------------------|----------------------------|----------------------------|---------------------|---------------------|-------------------|----------------------------------|----------------------------------|-------|-------|-------|
|                         | Max Allowable Uniform Load  | Deflection at Uniform Load | Uniform Load at Deflection |                     |                     |                   | Max. Allowable Load at Slot Face | Max. Column Load Applied at C.G. |       |       |       |
|                         |                             |                            | Span/180 Deflection        | Span/240 Deflection | Span/360 Deflection | Weight of Channel |                                  | k=.65                            | k=.80 | k=1.0 | k=1.2 |
| mm                      | Kn                          | mm                         | Kn                         | Kn                  | Kn                  | Kg                | Kn                               | Kn                               | Kn    | Kn    | Kn    |
| 305                     | 15.5                        | 0.3                        | 15.5                       | 15.5                | 15.5                | 0.9               | 17.1                             | 54.4                             | 53.1  | 51.1  | 48.8  |
| 457                     | 10.3                        | 0.8                        | 10.3                       | 10.3                | 10.3                | 1.3               | 16.5                             | 51.3                             | 48.8  | 45.1  | 41.3  |
| 610                     | 7.7                         | 1.5                        | 7.7                        | 7.7                 | 7.7                 | 1.8               | 15.7                             | 47.6                             | 43.8  | 38.9  | 34.3  |
| 762                     | 6.2                         | 2.3                        | 6.2                        | 6.2                 | 5.8                 | 2.2               | 14.8                             | 43.5                             | 38.9  | 33.2  | 28.4  |
| 914                     | 5.2                         | 3.3                        | 5.2                        | 5.2                 | 4.0                 | 2.6               | 13.9                             | 39.5                             | 34.3  | 28.4  | 23.6  |
| 1,067                   | 4.4                         | 4.3                        | 4.4                        | 4.4                 | 3.0                 | 3.1               | 12.9                             | 35.7                             | 30.2  | 24.3  | 19.7  |
| 1,219                   | 3.9                         | 5.8                        | 3.9                        | 3.4                 | 2.3                 | 3.5               | 12.1                             | 32.2                             | 26.7  | 20.9  | 16.9  |
| 1,524                   | 3.1                         | 8.9                        | 2.9                        | 2.2                 | 1.5                 | 4.4               | 10.4                             | 26.3                             | 20.9  | 16.1  | 13.2  |
| 1,829                   | 2.6                         | 13.0                       | 2.0                        | 1.5                 | 1.0                 | 5.3               | 9.1                              | 21.5                             | 16.9  | 13.2  | 10.7  |
| 2,134                   | 2.2                         | 17.5                       | 1.5                        | 1.1                 | 0.8                 | 6.2               | 8.0                              | 18.0                             | 14.2  | 11.0  | 8.8   |
| 2,438                   | 1.9                         | 22.9                       | 1.2                        | 0.8                 | 0.6                 | 7.0               | 7.1                              | 15.5                             | 12.2  | 9.4   | 7.4   |
| 2,743                   | 1.7                         | 29.0                       | 0.9                        | 0.7                 | 0.4                 | 7.9               | 6.4                              | 13.6                             | 10.7  | 8.1   | **    |
| 3,048                   | 1.6                         | 35.8                       | 0.7                        | 0.5                 | 0.4                 | 8.8               | 5.7                              | 12.0                             | 9.4   | **    | **    |
| 3,658                   | 1.3                         | 51.6                       | 0.5                        | 0.4                 | 0.3                 | 10.6              | 4.7                              | 9.7                              | 7.4   | **    | **    |
| 4,267                   | 1.1                         | 70.4                       | 0.4                        | 0.3                 | 0.2                 | 12.3              | **                               | 8.0                              | **    | **    | **    |
| 4,572                   | 1.0                         | 80.8                       | 0.3                        | 0.2                 | 0.2                 | 13.2              | **                               | **                               | **    | **    | **    |
| 4,877                   | 1.0                         | 91.7                       | 0.3                        | 0.2                 | **                  | 14.1              | **                               | **                               | **    | **    | **    |
| 5,486                   | 0.8                         | 116.1                      | 0.2                        | 0.2                 | **                  | 15.8              | **                               | **                               | **    | **    | **    |
| 6,096                   | 0.8                         | 143.5                      | 0.2                        | **                  | **                  | 17.6              | **                               | **                               | **    | **    | **    |

## Channel Fig. AS 200

### Materials

**Carbon Steel:** Channels are formed from high-quality, structural grade carbon steel which has been manufactured in accordance with ASTM A-1011-04- SS Grade 33 (hot rolled), or ASTM 366 (cold rolled), with mechanical properties of 33 ksi minimum yield and 52 ksi minimum tensile strength. The precision roll-forming process by which the channels are formed “cold works” the steel, thereby increasing its mechanical properties.

**Stainless Steel:** Channels are formed from chromium-nickel stainless steel sheet manufactured in accordance with ASTM A-240 specification, offered in both AISI Type 304 and 316 material to provide protection in varying corrosive conditions.

**Aluminum:** Extruded aluminum channel is produced from 6063-T6 alloy, and fittings are produced from 5052-H32 alloy, both in accordance with ASTM B-221 specifications. Aluminum is suitable for use in various corrosive environments.

### Finishes

**Pre-Galvanized:** Hot dip, mill galvanized coating produced through a process of continuously passing the steel through a bath of molten zinc. This process is performed in accordance with ASTM A-653. The thickness of the zinc coating conforms with ASTM G-90 which represents a coating thickness of .90 ounces of zinc per square foot. This coating is applied to the steel master coils prior to slitting and fabrication.

**Hot Dip Galvanized - Post Fabrication:** The finished channel is completely immersed in a bath of molten zinc, resulting in the complete coating of all surfaces of the product, including edges and welds. Strut channels that are hot dip galvanized, have a total coating weight of 3.0 ounces of zinc per square foot in accordance with ASTM A-123 specification. This coating provides superior results in applications calling for prolonged outdoor exposure.

**Supr-Green Powder Coating:** Strut channels are coated after fabrication with polyester powder finish. This coating is applied using an electrostatic spray process, beginning with cleaning and phosphating, through a bonderite pretreatment process, and ending with oven curing. The resulting finish provides a high quality appearance and durability. Powder Coating is in accordance with ASTM B-117 (standard practice for operating salt spray (fog) apparatus) to 500 hours with less than 1/8” scribe creep.

**Zinc Trivalent Chromium:** The finished channel undergoes a multi-step process consisting of electrogalvanizing, in accordance with ASTM B-633-85, followed by an application of zinc trivalent chromium, which provides the distinctive gold coloration of the finish. All surfaces are coated because the process is performed after fabrication.

**PVC:** A corrosive resistant PVC (polyvinyl chloride) coating is applied over the completed strut channel. The coating process consists of surface pretreatment, followed by preheating of the part, which is then passed through a fluidized bed of vinyl plastic powder. The powder melts onto the heated channel forming a smooth coating which undergoes a final heat curing.

## Cushion Clamp Assembly Figs. AS 0040D through AS 106P



### Specifications

**Materials:**

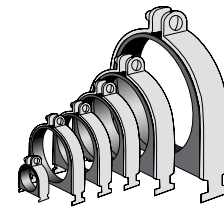
Clamp: 1008-1018 Carbon Steel  
Cushion: High Strength TPE  
Locknut: Nylon Insert

**Service Temperature:**

-65°F to 275°F

**Approvals:**

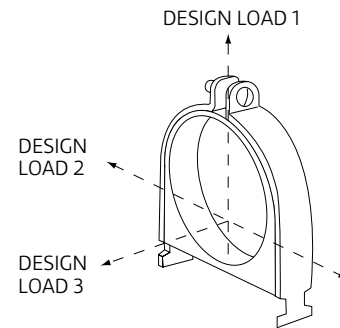
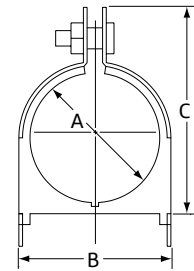
UL 2043 Fire Test for Heat and Visible Smoke Release  
25/50 Flame Spread/Smoke Development Index



### Description

Anvil-Strut Pipe Clamps are all manufactured to fit into the standard openings of 1<sup>5</sup>/<sub>8</sub>" channel to support runs of piping where desired, to secure the pipe in place.

AS 0040D Thru AS 106P EG, 304SS, 316SS, ZTC



**LEGEND:**

**GR:** Powder Coated Supr-Green **EG:** Electro-Galvanized **PG:** Pre-Galvanized **AL:** Aluminum  
**HG:** Hot Dipped Galvanized **PL:** Plain SS: Stainless Steel  
**ZTC:** Zinc Trivalent Chromium Stainless Steel (**SS**), Zinc Trivalent Chromium (**ZTC**) and Hot Dipped Galvanized (**HG**) are specialty finishes. Pricing is located in the Specialty Strut Section of the Anvil-Strut price book.



| PROJECT INFORMATION | APPROVAL STAMP    |
|---------------------|-------------------|
| Project:            | Approved          |
| Address:            | Approved as noted |
| Contractor:         | Not approved      |
| Engineer:           | Remarks:          |
| Submittal Date:     |                   |
| Notes 1:            |                   |
| Notes 2:            |                   |

## Cushion Clamp Assembly Figs. AS 004OD through AS 106P

### Tube Series

| Part Number | O.D. Size | A    | B    | C    | Std Pkg | Wt/100 pcs |
|-------------|-----------|------|------|------|---------|------------|
| AS 004OD    | 1/4"      | 0.25 | 0.62 | 0.98 | 25      | 10         |
| AS 006ODN   | 3/8"      | 0.37 | 0.82 | 1.13 | 25      | 11         |
| AS 008ODN   | 1/2"      | 0.50 | 0.94 | 1.34 | 25      | 13         |
| AS 010ODN   | 5/8"      | 0.62 | 1.06 | 1.54 | 25      | 14         |
| AS 012ODN   | 3/4"      | 0.75 | 1.20 | 1.68 | 25      | 14         |
| AS 014ODN   | 7/8"      | 0.87 | 1.31 | 1.82 | 25      | 15         |
| AS 016OD    | 1"        | 1.00 | 1.44 | 1.95 | 25      | 17         |
| AS 018ODN   | 1 1/8"    | 1.12 | 1.57 | 2.08 | 20      | 18         |
| AS 020OD    | 1 1/4"    | 1.25 | 1.70 | 2.21 | 20      | 18         |
| AS 022ODN   | 1 3/8"    | 1.37 | 1.82 | 2.34 | 20      | 20         |
| AS 024OD    | 1 1/2"    | 1.50 | 1.95 | 2.47 | 20      | 33         |
| AS 026ODN   | 1 5/8"    | 1.62 | 2.07 | 2.60 | 20      | 35         |
| AS 028OD    | 1 3/4"    | 1.75 | 2.20 | 2.73 | 20      | 37         |
| AS 032OD    | 2"        | 2.00 | 2.45 | 3.04 | 10      | 41         |
| AS 034OD    | 2 1/8"    | 2.12 | 2.57 | 3.23 | 10      | 46         |
| AS 040OD    | 2 1/2"    | 2.50 | 2.94 | 3.79 | 10      | 49         |
| AS 042OD    | 2 5/8"    | 2.62 | 3.07 | 3.92 | 5       | 51         |
| AS 048OD    | 3"        | 3.00 | 3.57 | 4.42 | 5       | 57         |
| AS 050OD    | 3 1/8"    | 3.12 | 3.57 | 4.42 | 5       | 60         |
| AS 058OD    | 3 5/8"    | 3.62 | 4.20 | 5.11 | 5       | 70         |
| AS 066OD    | 4 1/8"    | 4.12 | 4.57 | 5.54 | 5       | 94         |
| AS 082OD    | 5 1/8"    | 5.12 | 5.57 | 6.54 | 5       | 125        |
| AS 098OD    | 6 1/8"    | 6.12 | 6.57 | 7.54 | 5       | 130        |

Std Pkg & Wt/100 pcs: See charts above.

### Specifications

#### Materials:

Clamp: 1008-1018 Carbon Steel

Cushion: High Strength TPE

Locknut: Nylon Insert

#### Service Temperature:

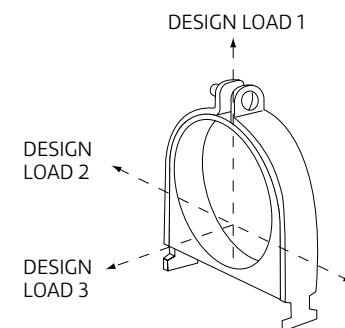
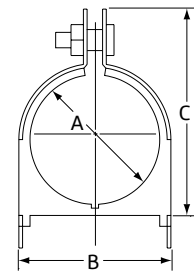
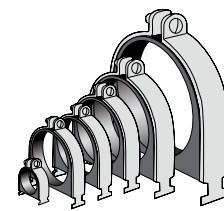
-65°F to 275°F

#### Approvals:

UL 2043 Fire Test for Heat and

Visible Smoke Release

25/50 Flame Spread/Smoke Development Index



## Cushion Clamp Assembly Figs. AS 0040D through AS 106P

### Tube Series

| Copper & Steel Tube<br>O.D. Size | Design Load<br>1 (lbs) | Design Load<br>2 (lbs) | Design Load<br>3 (lbs) |
|----------------------------------|------------------------|------------------------|------------------------|
| 1/4"                             | 400                    | 50                     | 50                     |
| 3/8"                             | 400                    | 50                     | 50                     |
| 1/2"                             | 400                    | 50                     | 50                     |
| 5/8"                             | 400                    | 50                     | 50                     |
| 3/4"                             | 600                    | 75                     | 75                     |
| 7/8"                             | 600                    | 75                     | 75                     |
| 1"                               | 600                    | 75                     | 75                     |
| 1 1/8"                           | 600                    | 75                     | 75                     |
| 1 1/4"                           | 600                    | 75                     | 75                     |
| 1 3/8"                           | 600                    | 75                     | 75                     |
| 1 1/2"                           | 600                    | 75                     | 75                     |
| 1 5/8"                           | 600                    | 75                     | 75                     |
| 1 3/4"                           | 800                    | 125                    | 125                    |
| 1 7/8"                           | 800                    | 125                    | 125                    |
| 2"                               | 800                    | 125                    | 125                    |
| 2 1/8"                           | 800                    | 125                    | 125                    |
| 2 1/4"                           | 800                    | 125                    | 125                    |
| 2 3/8"                           | 800                    | 125                    | 125                    |
| 2 1/2"                           | 800                    | 125                    | 125                    |
| 2 5/8"                           | 800                    | 125                    | 125                    |
| 3"                               | 800                    | 125                    | 125                    |
| 3 1/8"                           | 800                    | 125                    | 125                    |
| 3 5/8"                           | 1000                   | 200                    | 150                    |
| 4 1/8"                           | 1000                   | 200                    | 150                    |
| 6 1/8"                           | 1000                   | 200                    | 150                    |

Std Pkg & Wt/100 pcs: See charts above.

### Specifications

**Materials:**

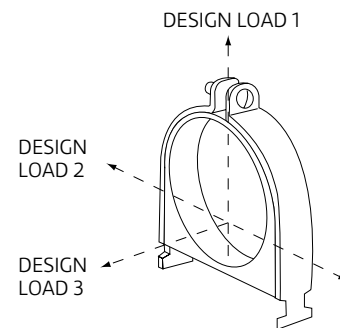
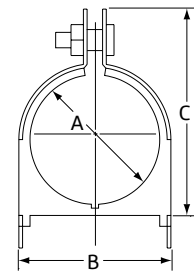
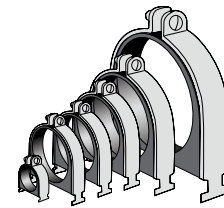
Clamp: 1008-1018 Carbon Steel  
Cushion: High Strength TPE  
Locknut: Nylon Insert

**Service Temperature:**

-65°F to 275°F

**Approvals:**

UL 2043 Fire Test for Heat and Visible Smoke Release  
25/50 Flame Spread/Smoke Development Index



## Cushion Clamp Assembly Figs. AS 004OD through AS 106P

### Pipe Series

| Part Number | O.D. Size   | A    | B    | C    | Std Pkg | Wt/100 pcs |
|-------------|-------------|------|------|------|---------|------------|
| AS 009P     | 1/4" Pipe   | 0.54 | 0.98 | 1.34 | 25      | 13         |
| AS 011P     | 3/8" Pipe   | 0.67 | 1.13 | 1.54 | 25      | 14         |
| AS 014P     | 1/2" Pipe   | 0.84 | 1.29 | 1.82 | 25      | 15         |
| AS 017P     | 3/4" Pipe   | 1.05 | 1.50 | 2.08 | 20      | 17         |
| AS 021P     | 1" Pipe     | 1.31 | 1.76 | 2.34 | 20      | 19         |
| AS 027P     | 1 1/4" Pipe | 1.66 | 2.17 | 2.73 | 20      | 35         |
| AS 030ODP   | 1 1/2" Pipe | 1.90 | 2.35 | 2.86 | 20      | 39         |
| AS 038ODP   | 2" Pipe     | 2.37 | 2.82 | 3.67 | 10      | 47         |
| AS 046ODP   | 2 1/2" Pipe | 2.87 | 3.32 | 4.17 | 5       | 55         |
| AS 056ODP   | 3" Pipe     | 3.50 | 3.95 | 4.79 | 5       | 55         |
| AS 064ODP   | 3 1/2" Pipe | 4.00 | 4.45 | 5.42 | 5       | 88         |
| AS 072ODP   | 4" Pipe     | 4.50 | 4.95 | 5.92 | 5       | 110        |
| AS 089P     | 5" Pipe     | 5.56 | 6.01 | 6.92 | 5       | 130        |
| AS 106P     | 6" Pipe     | 6.62 | 7.07 | 8.23 | 5       | 140        |

### Pipe Series

| Pipe Sizes (Nominal) | Design Load 1 (lbs) | Design Load 2 (lbs) | Design Load 3 (lbs) |
|----------------------|---------------------|---------------------|---------------------|
| 1/4"                 | 400                 | 50                  | 50                  |
| 3/8"                 | 600                 | 75                  | 75                  |
| 1/2"                 | 600                 | 75                  | 75                  |
| 3/4"                 | 600                 | 75                  | 75                  |
| 1"                   | 600                 | 75                  | 75                  |
| 1 1/4"               | 800                 | 125                 | 125                 |
| 1 1/2"               | 800                 | 125                 | 125                 |
| 2"                   | 800                 | 125                 | 125                 |
| 2 1/2"               | 800                 | 125                 | 125                 |
| 3"                   | 1000                | 200                 | 150                 |
| 3 1/2"               | 1000                | 200                 | 150                 |
| 4"                   | 1000                | 200                 | 150                 |
| 5"                   | 1000                | 200                 | 150                 |
| 6"                   | 1000                | 200                 | 150                 |

Std Pkg & Wt/100 pcs: See charts above.

### Specifications

#### Materials:

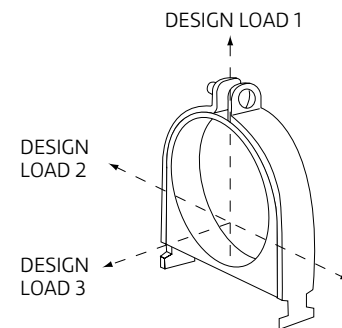
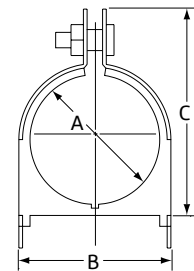
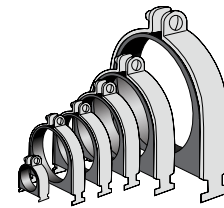
Clamp: 1008-1018 Carbon Steel  
Cushion: High Strength TPE  
Locknut: Nylon Insert

#### Service Temperature:

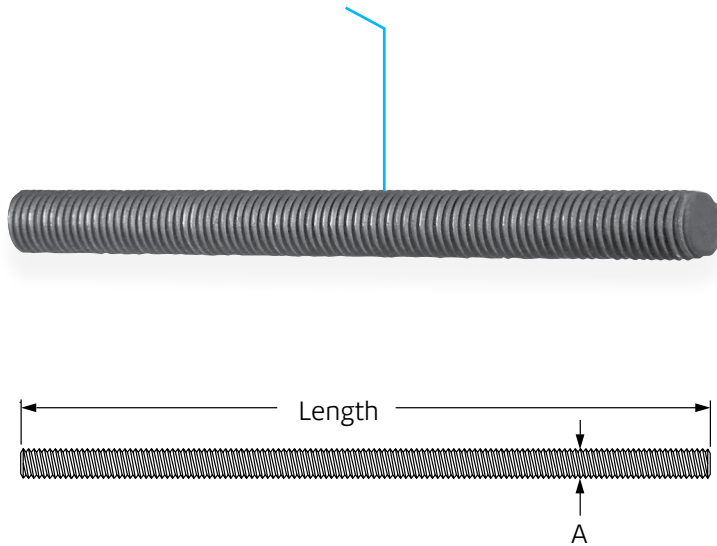
-65°F to 275°F

#### Approvals:

UL 2043 Fire Test for Heat and Visible Smoke Release  
25/50 Flame Spread/Smoke Development Index



## Continuous Threaded Rod Fig. 146 (Formerly Afcon Fig. 650)



**Size Range:** ¼" through 1½" stocked in six, ten, and twelve foot lengths. Other even foot lengths can be furnished to order.

**Material:** Carbon steel or Stainless Steel Gr 304

**Threads:** National Coarse (USS), rod threaded complete length.

**Finish:** Plain or Zinc Plated (Hot-Dip Galvanized optional)

**Maximum Temperature:** Zinc Plated 450°F, Stainless Steel 650°F

**Approvals:** Complies with MSS SP-58.

**Ordering:** Specify rod diameter and length, figure number, name and finish.

**Note:** The acceptability of galvanized coatings at temperatures above 450°F is at the discretion of the end user.

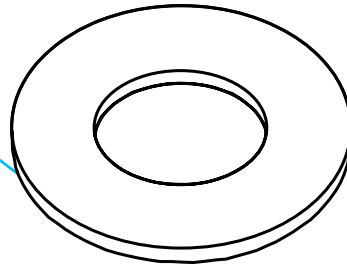


Fig. 146: Dimensions (in) • Loads (lbs) • Weight (lbs)

| Rod Size A | Threads per Inch | Max Load |      | Weight per Ft. |
|------------|------------------|----------|------|----------------|
|            |                  | 650° F   |      |                |
| ¼          | 20               | 240      | 0.12 |                |
| ⅜          | 16               | 730      | 0.30 |                |
| ½          | 13               | 1,350    | 0.53 |                |
| ⅝          | 11               | 2,160    | 0.84 |                |
| ¾          | 10               | 3,230    | 1.20 |                |
| ⅞          | 9                | 4,480    | 1.70 |                |
| 1          | 8                | 5,900    | 2.30 |                |
| 1¼         | 7                | 9,500    | 3.60 |                |
| 1½         | 6                | 13,800   | 5.10 |                |

| PROJECT INFORMATION | APPROVAL STAMP    |
|---------------------|-------------------|
| Project:            | Approved          |
| Address:            | Approved as noted |
| Contractor:         | Not approved      |
| Engineer:           | Remarks:          |
| Submittal Date:     |                   |
| Notes 1:            |                   |
| Notes 2:            |                   |

**Flat Washer**  
**Figs. AS 209, AS 3500,**  
**AS 211, AS 83, AS 209,**  
**AS 6108, AS 230**

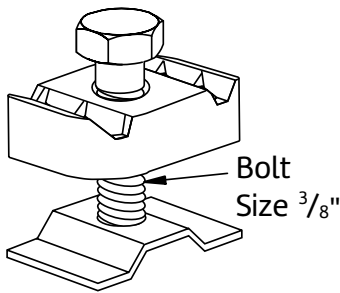


## Description

Anvil-Strut Hardware, when used in conjunction with Anvil-Strut Channel and Nuts, provides a superior grip between channels and fittings.

## Seismic Rod Stiffener

AS 3500 EG, ZTC

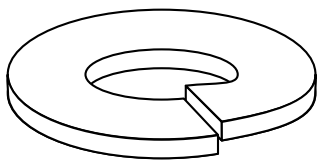


| Size        | Wt./100 Pcs. |
|-------------|--------------|
| 3/8" – 5/8" | 16           |

Std Pkg: 25 · Wt/100 pcs: See chart above.

## Lock Washer

AS 211 EG



| Size | Wt./100 Pcs. |
|------|--------------|
| 1/4" | 0.3          |
| 3/8" | 0.7          |
| 1/2" | 1.5          |

Std Pkg: 100 · Wt/100 pcs: See chart above.

### LEGEND:

**GR:** Powder Coated Supr-Green **EG:** Electro-Galvanized **PG:** Pre-Galvanized **AL:** Aluminum  
**HG:** Hot Dipped Galvanized **PL:** Plain **SS:** Stainless Steel  
**ZTC:** Zinc Trivalent Chromium Stainless Steel (**SS**), Zinc Trivalent Chromium (**ZTC**) and Hot Dipped Galvanized (**HG**) are specialty finishes. Pricing is located in the Specialty Strut Section of the Anvil-Strut price book.



| PROJECT INFORMATION | APPROVAL STAMP    |
|---------------------|-------------------|
| Project:            | Approved          |
| Address:            | Approved as noted |
| Contractor:         | Not approved      |
| Engineer:           | Remarks:          |
| Submittal Date:     |                   |
| Notes 1:            |                   |
| Notes 2:            |                   |

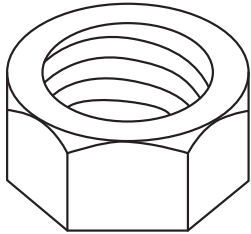


## Flat Washer

**Figs. AS 209, AS 3500, AS 211, AS 83, AS 209, AS 6108, AS 230**

## Hexagon Nut

AS 83 EG

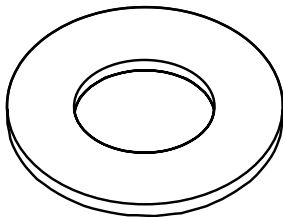


| Size | Std. Pkg. | Wt./100 Pcs. |
|------|-----------|--------------|
| 1/4" | 500       | 0.6          |
| 3/8" | 500       | 1.6          |
| 1/2" | 100       | 4.8          |
| 5/8" | 50        | 7.0          |
| 3/4" | 50        | 12.0         |

Std Pkg & Wt/100 pcs: See chart above.

## Flat Washer

AS 209 EG

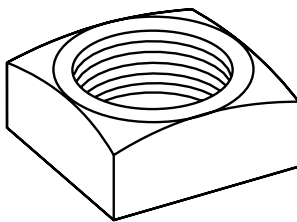


| Size | Std. Pkg. | Wt./100 Pcs. |
|------|-----------|--------------|
| 1/4" | 200       | 0.7          |
| 3/8" | 100       | 1.5          |
| 1/2" | 100       | 3.5          |
| 5/8" | 100       | 8.0          |
| 3/4" | 100       | 11.0         |

Std Pkg & Wt/100 pcs: See chart above.

## Square Nut

AS 6108 EG

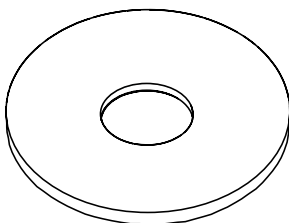


| Size  | Std. Pkg. | Wt./100 Pcs. |
|-------|-----------|--------------|
| 1/4"  | 100       | 0.9          |
| 5/16" | 100       | 1.6          |
| 3/8"  | 100       | 2.7          |
| 1/2"  | 100       | 5.8          |

Std Pkg & Wt/100 pcs: See chart above.

## Square Nut

AS 230 EG



| Size | Std. Pkg. | Wt./100 Pcs. |
|------|-----------|--------------|
| 1/4" | 100       | 3.3          |
| 3/8" | 100       | 3.0          |
| 1/2" | 100       | 2.8          |

Std Pkg & Wt/100 pcs: See chart above.

### LEGEND:

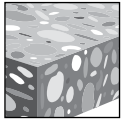
**GR:** Powder Coated Supr-Green **EG:** Electro-Galvanized **PG:** Pre-Galvanized **AL:** Aluminum  
**HG:** Hot Dipped Galvanized **PL:** Plain **SS:** Stainless Steel  
**ZTC:** Zinc Trivalent Chromium Stainless Steel (**SS**), Zinc Trivalent Chromium (**ZTC**) and Hot Dipped Galvanized (**HG**) are specialty finishes. Pricing is located in the Specialty Strut Section of the Anvil-Strut price book.

### 3.3.12 HDI+, HDI-L+, AND HDI DROP IN ANCHORS

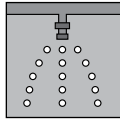
#### PRODUCT DESCRIPTION

##### HDI+, HDI-L+, and HDI Drop-in anchors

| Anchor System | Features and Benefits  |
|---------------|--|
|               | <ul style="list-style-type: none"> <li>Anchor, setting tool and Hilti drill bit form a matched tolerance system to provide reliable fastenings</li> <li>Allows shallow embedment without sacrificing performance</li> <li>Lip allows accurate flush surface setting, independent of hole depth for the HDI-L+</li> <li>Ideal for repetitive fastenings with threaded rods of equal length</li> </ul> |
|               | <ul style="list-style-type: none"> <li>HDI+ and HDI-L+ have an innovative stepped plug that reduces number of hammer blows by up to 50%</li> <li>HDI+ and HDI-L+ can be installed with the new HDI+ Setting Tool system (stop drill bit and machine setting tool) for improved productivity</li> </ul>   |



Uncracked concrete



Fire sprinkler listings

| Approvals/Listings                   |   |
|--------------------------------------|---|
| FM (Factory Mutual)                  | Pipe hanger components for automatic sprinkler systems HDI+ 3/8, HDI-L+ 3/8, HDI+1/2, HDI-L+ 1/2, HDI 5/8 and HDI 3/4 |
| UL and cUL (Underwriters Laboratory) | Pipe hanger equipment for fire protection services HDI+ 3/8, HDI-L+ 3/8, HDI+1/2, HDI-L+ 1/2, HDI 5/8 and HDI 3/4     |



#### INSTALLATION PARAMETERS

**Table 1 - Hilti HDI+, HDI-L+ and HDI specifications<sup>1</sup>**

| Setting Information    | Symbol     | Units         | HDI+ and HDI-L+ |               |               | HDI            |                |
|------------------------|------------|---------------|-----------------|---------------|---------------|----------------|----------------|
|                        |            |               | 1/4             | 3/8           | 1/2           | 5/8            | 3/4            |
| Insert thread          | d          | UNC           | 1/4-20          | 3/8-16        | 1/2-13        | 5/8-11         | 3/4-10         |
| Nominal bit diameter   | $d_{bit}$  | in.           | 3/8             | 1/2           | 5/8           | 27/32          | 1              |
| Nominal embedment      | $h_{nom}$  | in.           | 1               | 1-9/16        | 2             | 2-9/16         | 3-3/16         |
| Anchor length          | $l$        | (mm)          | (25)            | (40)          | (51)          | (65)           | (81)           |
| Hole depth             | $h_o$      |               |                 |               |               |                |                |
| Useable thread length  | $l_{th}$   | in.<br>(mm)   | 7/16<br>(11)    | 5/8<br>(15)   | 11/16<br>(17) | 7/8<br>(22)    | 1-3/8<br>(34)  |
| Installation torque    | $T_{inst}$ | ft-lb<br>(Nm) | 4<br>(5)        | 11<br>(15)    | 22<br>(30)    | 37<br>(50)     | 80<br>(109)    |
| Minimum slab thickness | h          | in.<br>(mm)   | 3<br>(76)       | 3-1/8<br>(79) | 4<br>(102)    | 5-1/8<br>(130) | 6-3/8<br>(162) |

<sup>1</sup> HDI+ and HDI-L+ are available in 1/4-, 3/8- and 1/2-in. The HDI is available in 5/8- and 3/4-in.

#### MATERIAL SPECIFICATIONS

HDI+, HDI-L and HDI anchors are manufactured from mild carbon steel. Anchor bodies are zinc plated in accordance with ASTM B633, AC 1, Type III

HDI stainless steel anchors are manufactured from AISI Type 303 stainless steel

## DESIGN DATA IN CONCRETE USING ALLOWABLE STRESS DESIGN

**Table 2 - Hilti HDI+, HDI-L+ and HDI carbon steel allowable loads in concrete<sup>1,2</sup>**

| Anchor type | Nominal anchor diameter in. | $f'_c = 2,000$   |        |                |        | $f'_c = 4,000$   |        |                |        | $f'_c = 6,000$   |        |                |        |
|-------------|-----------------------------|------------------|--------|----------------|--------|------------------|--------|----------------|--------|------------------|--------|----------------|--------|
|             |                             | Tension, lb (kN) |        | Shear, lb (kN) |        | Tension, lb (kN) |        | Shear, lb (kN) |        | Tension, lb (kN) |        | Shear, lb (kN) |        |
| HDI+        | 1/4                         | 385              | (1.7)  | 450            | (2.0)  | 510              | (2.3)  | 625            | (2.8)  | 640              | (2.8)  | 700            | (3.1)  |
|             | 3/8                         | 635              | (2.8)  | 965            | (4.3)  | 920              | (4.1)  | 1,250          | (5.6)  | 1,260            | (5.6)  | 1,500          | (6.7)  |
|             | 1/2                         | 945              | (4.2)  | 1,500          | (6.7)  | 1,605            | (7.1)  | 2,125          | (9.5)  | 1,950            | (8.7)  | 2,500          | (11.1) |
| HDI+        | 5/8                         | 1,875            | (8.3)  | 2,500          | (11.1) | 2,920            | (13.0) | 3,250          | (14.5) | 3,715            | (16.5) | 3,750          | (16.7) |
|             | 3/4                         | 2,500            | (11.1) | 3,875          | (17.2) | 4,065            | (18.1) | 5,000          | (22.2) | 5,565            | (24.8) | 5,500          | (24.5) |

**Table 3 - Hilti HDI+, HDI-L+ and HDI carbon steel ultimate loads in concrete<sup>1</sup>**

| Anchor type | Nominal anchor diameter in. | $f'_c = 2,000$   |        |                |        | $f'_c = 4,000$   |        |                |        | $f'_c = 6,000$   |        |                |        |
|-------------|-----------------------------|------------------|--------|----------------|--------|------------------|--------|----------------|--------|------------------|--------|----------------|--------|
|             |                             | Tension, lb (kN) |        | Shear, lb (kN) |        | Tension, lb (kN) |        | Shear, lb (kN) |        | Tension, lb (kN) |        | Shear, lb (kN) |        |
| HDI+        | 1/4                         | 1,535            | (6.8)  | 1,800          | (8.0)  | 2,040            | (9.1)  | 2,500          | (11.1) | 2,555            | (11.4) | 2,800          | (12.5) |
|             | 3/8                         | 2,540            | (11.3) | 3,850          | (17.1) | 3,685            | (16.4) | 5,000          | (22.2) | 5,035            | (22.4) | 6,000          | (26.7) |
|             | 1/2                         | 3,780            | (16.8) | 6,000          | (26.7) | 6,425            | (28.6) | 8,500          | (37.8) | 7,810            | (34.7) | 10,000         | (44.5) |
| HDI+        | 5/8                         | 7,500            | (33.4) | 10,000         | (44.5) | 11,685           | (52.0) | 13,000         | (57.8) | 14,865           | (66.1) | 15,000         | (66.7) |
|             | 3/4                         | 10,000           | (44.5) | 15,500         | (68.9) | 16,260           | (72.3) | 20,000         | (89.0) | 22,250           | (99.0) | 22,000         | (97.9) |

- The shear tests were conducted with SAE Grade 5 bolts with minimum yield strength of 85 ksi and minimum tension strength of 120 ksi. Shear testing for the 1/4-in. models were conducted with SAE Grade 8 bolts with minimum yield strength of 120 ksi and minimum tension strength of 150 ksi in 6,000 psi concrete. High-strength bolts were used to force concrete failure modes. When using steel bolts with a lower tensile strength, steel failure must be considered.
- Allowable loads calculated with a factor of safety of 4.

**Table 4 - Hilti HDI+, HDI-L+ and HDI carbon steel allowable loads in lightweight concrete and lightweight concrete poured over metal deck<sup>1,2,3,4</sup>**

| Anchor type | Nominal anchor diameter in. | 3,000 psi lightweight concrete over metal deck |       |                |        |                  |       |                |       |                  |       |                |       |
|-------------|-----------------------------|--|-------|----------------|--------|------------------|-------|----------------|-------|------------------|-------|----------------|-------|
|             |                             | 3,000 psi lightweight concrete                 |       |                |        | Upper flute      |       |                |       | Lower flute      |       |                |       |
|             |                             | Tension, lb (kN)                               |       | Shear, lb (kN) |        | Tension, lb (kN) |       | Shear, lb (kN) |       | Tension, lb (kN) |       | Shear, lb (kN) |       |
| HDI+        | 1/4                         | 465  | (2.1) | 340            | (1.5)  | 530              | (2.4) | 335            | (1.5) | 375              | (1.7) | 250            | (1.1) |
|             | 3/8                         | 720  | (3.2) | 940            | (4.2)  | 810              | (3.6) | 1,010          | (4.5) | 500              | (2.2) | 500            | (2.2) |
|             | 1/2                         | 1,035  | (4.6) | 1,700          | (7.6)  | 1,035            | (4.6) | 1,755          | (7.8) | 625              | (2.8) | 750            | (3.3) |
| HDI+        | 5/8                         | 1,465  | (6.5) | 2,835          | (12.6) | -                | -     | -              | -     | 875              | (3.9) | 875            | (3.9) |
|             | 3/4                         | 2,075  | (9.2) | 3,680          | (16.4) | -                | -     | -              | -     | 1,250            | (5.6) | 1,000          | (4.4) |

- The shear tests were conducted with SAE Grade 5 bolts with minimum yield strength of 85 ksi and minimum tension strength of 120 ksi. Shear testing for the 1/4-in. models were conducted with SAE Grade 8 bolts with minimum yield strength of 120 ksi and minimum tension strength of 150 ksi in 6,000 psi concrete. High-strength bolts were used to force concrete failure modes. When using steel bolts with a lower tensile strength, steel failure must be considered.
- Minimum compressive strength of structural lightweight concrete is 3,000 psi.
- See figure 1 for typical details.
- Allowable loads calculated with a factor of safety of 4.

**Table 5 - Hilti HDI stainless steel allowable loads in concrete<sup>1,2,3</sup>**

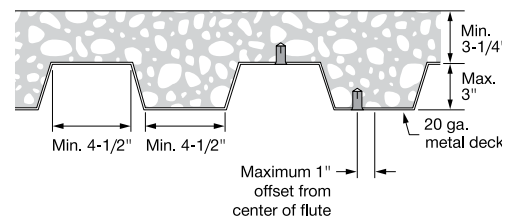
| Nominal anchor diameter in. | Nominal anchor | $f'_c = 4,000$   |        |                |        | $f'_c = 6,000$   |        |                |        |
|-----------------------------|----------------|------------------|--------|----------------|--------|------------------|--------|----------------|--------|
|                             |                | Tension, lb (kN) |        | Shear, lb (kN) |        | Tension, lb (kN) |        | Shear, lb (kN) |        |
| HDI+                        | 1/4            | 480              | (2.1)  | 600            | (2.7)  | 740              | (3.3)  | 600            | (2.7)  |
|                             | 3/8            | 1,040            | (4.6)  | 1,230          | (5.5)  | 1,460            | (6.5)  | 1,230          | (5.5)  |
|                             | 1/2            | 1,840            | (8.2)  | 2,760          | (12.3) | 2,410            | (10.7) | 2,760          | (12.3) |
| HDI+                        | 5/8            | 2,630            | (11.7) | 4,510          | (20.1) | 3,770            | (16.8) | 4,510          | (20.1) |
|                             | 3/4            | 3,830            | (17.0) | 5,580          | (24.8) | 5,030            | (22.4) | 5,580          | (24.8) |

**Table 6 - Hilti HDI stainless steel ultimate loads in concrete<sup>1,2</sup>**

| Nominal anchor diameter in. | Nominal anchor | $f'_c = 4,000$   |        |                |        | $f'_c = 6,000$   |        |                |        |
|-----------------------------|----------------|------------------|--------|----------------|--------|------------------|--------|----------------|--------|
|                             |                | Tension, lb (kN) |        | Shear, lb (kN) |        | Tension, lb (kN) |        | Shear, lb (kN) |        |
| HDI+                        | 1/4            | 1,930            | (8.6)  | 2,400          | (10.7) | 2,950            | (13.1) | 2,400          | (10.7) |
|                             | 3/8            | 4,170            | (18.5) | 4,920          | (21.9) | 5,850            | (26.0) | 4,920          | (21.9) |
|                             | 1/2            | 7,350            | (32.7) | 11,040         | (49.1) | 9,630            | (42.8) | 11,040         | (49.1) |
| HDI+                        | 5/8            | 10,540           | (46.9) | 18,040         | (80.2) | 15,100           | (67.2) | 18,040         | (80.2) |
|                             | 3/4            | 15,340           | (68.2) | 22,320         | (99.3) | 20,130           | (89.5) | 22,320         | (99.3) |

- Stainless steel models available in HDI version only.
- Shear testing conducted with 18-8 stainless steel bolts.
- Allowable loads calculated with a factor of safety of 4.

**Figure 1 - Installation of Hilti HDI+ and HDI drop-in anchor in the soffit of concrete over metal deck floor and roof assemblies W – deck**



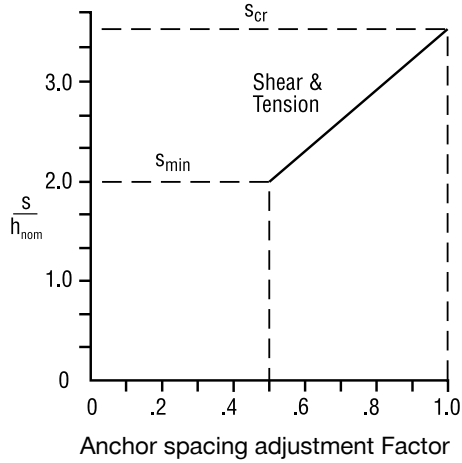
**Combined shear and tension loading**

$$\left( \frac{N_d}{N_{rec}} \right)^{5/3} + \left( \frac{V_d}{V_{rec}} \right)^{5/3} \leq 1.0$$

## Anchor spacing and edge distance guidelines

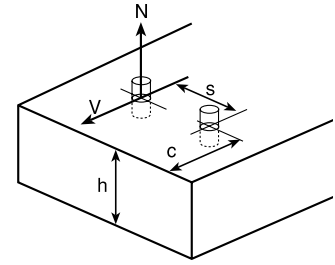
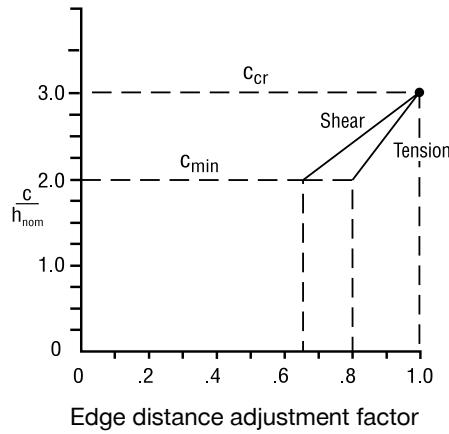
### Anchor spacing adjustment factors

- $s$  = Actual Spacing
- $s_{min} = 2.0 h_{nom}$
- $s_{cr} = 3.5 h_{nom}$



### Edge distance adjustment factors

- $c$  = Actual edge distance
- $c_{min} = 2.0 h_{nom}$
- $c_{cr} = 3.0 h_{nom}$



**Influence of anchor spacing and edge distance  $f_A$  and  $f_R$**

| Anchor Size |        | $h_{nom}$ |      |
|-------------|--------|-----------|------|
| in.         | (mm)   | in.       | (mm) |
| 1/4         | (6.4)  | 1         | (25) |
| 3/8         | (9.5)  | 1-9/16    | (40) |
| 1/2         | (12.7) | 2         | (51) |
| 5/8         | (15.8) | 2-9/16    | (65) |
| 3/4         | (19.1) | 3-3/16    | (81) |

$h_{nom}$  = nominal embedment depth

**Table 7 - Load adjustment factors for Hilti HDI drop-in anchors in concrete**

| Load adjustment factors for anchor spacing $f_A$ |       |                 |     |     |     |     | Load adjustment factors for edge distance $f_R$ |       |                 |     |     |                |     |                 |     |     |     |     |
|--|-------|-----------------|-----|-----|-----|-----|---|-------|-----------------|-----|-----|----------------|-----|-----------------|-----|-----|-----|-----|
| Tension/shear loads                              |       |                 |     |     |     |     | Tension $f_{RN}$                                |       |                 |     |     | Shear $f_{RV}$ |     |                 |     |     |     |     |
| Spacing $s$                                      |       | Anchor diameter |     |     |     |     | Edge distance $c$                               |       | Anchor diameter |     |     |                |     | Anchor diameter |     |     |     |     |
| in.  | (mm)  | 1/4             | 3/8 | 1/2 | 5/8 | 3/4 | in.   | (mm)  | 1/4             | 3/8 | 1/2 | 5/8            | 3/4 | 1/4             | 3/8 | 1/2 | 5/8 | 3/4 |
| 2  | ( 51) | .50             |     |     |     |     | 2   | ( 51) | .80             |     |     |                |     | .65             |     |     |     |     |
| 2-1/2  | ( 64) | .67             |     |     |     |     | 2-1/2   | ( 64) | .90             |     |     |                |     | .83             |     |     |     |     |
| 3  | ( 76) | .83             | .50 |     |     |     | 3   | ( 76) | 1.0             | .80 |     |                |     | 1.0             | .65 |     |     |     |
| 3-1/2  | ( 89) | 1.0             | .58 |     |     |     | 3-1/2   | ( 89) |                 | .85 |     |                |     |                 | .73 |     |     |     |
| 4  | (102) |                 | .69 | .50 |     |     | 4   | (102) |                 | .91 | .80 |                |     |                 | .85 | .65 |     |     |
| 4-1/2  | (114) |                 | .79 | .58 |     |     | 4-1/2   | (114) |                 | .98 | .85 |                |     |                 | .96 | .74 |     |     |
| 5  | (127) |                 | .90 | .67 | .50 |     | 5   | (127) |                 | 1.0 | .90 | .80            |     |                 | 1.0 | .83 | .65 |     |
| 5-1/2  | (140) |                 | 1.0 | .75 | .55 |     | 5-1/2   | (140) |                 |     | .95 | .83            |     |                 |     | .91 | .70 |     |
| 6  | (152) |                 |     | .83 | .61 | .50 | 6   | (152) |                 |     | 1.0 | .87            |     |                 |     | 1.0 | .77 |     |
| 7  | (178) |                 |     | 1.0 | .74 | .57 | 6-1/2   | (165) |                 |     |     | .91            | .80 |                 |     |     | .84 | .65 |
| 8  | (203) |                 |     |     | .87 | .67 | 7   | (178) |                 |     |     | .95            | .84 |                 |     |     | .91 | .72 |
| 9  | (229) |                 |     |     | 1.0 | .77 | 8   | (203) |                 |     |     | 1.0            | .90 |                 |     |     | 1.0 | .83 |
| 10   | (254) |                 |     |     |     | .88 | 9   | (229) |                 |     |     |                | .96 |                 |     |     |     | .94 |
| 11   | (279) |                 |     |     |     | .98 | 10  | (254) |                 |     |     |                | 1.0 |                 |     |     |     | 1.0 |
| 12   | (305) |                 |     |     |     | 1.0 |   |       |                 |     |     |                |     |                 |     |     |     |     |

$$s_{min} = 2.0 h_{nom} \quad s_{cr} = 3.5 h_{nom}$$

$$f_A = 0.33 \frac{s}{h_{nom}} - 0.17$$

$$\text{for } s_{cr} > s > s_{min}$$

$$c_{min} = 2.0 h_{nom} \quad c_{cr} = 3.0 h_{nom}$$

$$f_{RN} = 0.2 \frac{c}{h_{nom}} + 0.4$$

$$\text{for } c_{cr} > c > c_{min}$$

$$c_{min} = 2.0 h_{nom} \quad c_{cr} = 3.0 h_{nom}$$

$$f_{RV} = 0.35 \frac{c}{h_{nom}} - 0.05$$

$$\text{for } c_{cr} > c > c_{min}$$

## INSTALLATION INSTRUCTIONS

Manufacturer's Printed Installation Instructions (MPII) are included with each product package. They can also be viewed or downloaded at [www.hilti.com](http://www.hilti.com). Because of the possibility of changes, always verify that downloaded MPII are current when used. Proper installation is critical to achieve full performance. Training is available on request. Contact Hilti Technical Services for applications and conditions not addressed in the MPII.

## ORDERING INFORMATION<sup>1</sup>

### HDI+, HDI-L+ and HDI

#### Carbon steel (Interior Use)

| Description | Description | Anchor thread size | Qty / box |
|-------------|-------------|--------------------|-----------|
| HDI+ 1/4    | HDI-L+ 1/4  | 1/4                | 100       |
| HDI+ 3/8    | HDI-L+ 3/8  | 3/8                | 50        |
| HDI+ 1/2    | HDI-L+ 1/2  | 1/2                | 50        |
| HDI 5/8     | -           | 5/8                | 25        |
| HDI 3/4     | -           | 3/4                | 25        |

### HDI-SS anchors

#### Stainless steel (Exterior Use)

| Description   | Anchor thread size | Qty / box |
|---------------|--------------------|-----------|
| HDI 1/4 SS303 | 1/4                | 100       |
| HDI 3/8 SS303 | 3/8                | 50        |
| HDI 1/2 SS303 | 1/2                | 50        |
| HDI 5/8 SS303 | 5/8                | 25        |
| HDI 3/4 SS303 | 3/4                | 25        |

### Setting tools for HDI and HDI-SS anchors

| Description          | Anchor thread size |
|----------------------|--------------------|
| HST 5/8 Setting Tool | 5/8                |
| HST 3/4 Setting Tool | 3/4                |



3.3.12

### Setting Tools for HDI+ and HDI-L+

| Anchor thread size | Description   |
|--------------------|---|
| 1/4                | HST 1/4 Setting tool                                      |
|                    | HSD-MM 1/4 (TE-C-24D6 1/4 Setting tool)                   |
|                    | HDI+ Setting Tool includes a TE-CX 3/8x1 carbide bit      |
| 3/8                | HST 3/8 Setting tool                                      |
|                    | HSD-MM 3/8 (TE-C-24SD10 3/8 Setting tool)                 |
|                    | HDI+ Setting Tool includes a TE-CX 1/2x1-9/16 carbide bit |
| 1/2                | HST 1/2 Setting tool                                      |
|                    | HSD-MM 1/2 (TE-C-24SD12 1/2 Setting tool)                 |
|                    | HDI+ Setting Tool includes a TE-CX 5/8x2 carbide bit      |






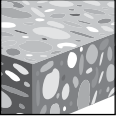
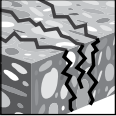
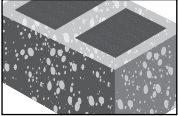
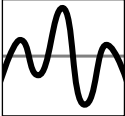


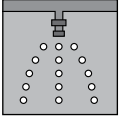
<sup>1</sup> All dimensions in inches

### 3.3.5 KWIK BOLT TZ EXPANSION ANCHOR

#### PRODUCT DESCRIPTION

##### KWIK Bolt TZ carbon steel and stainless steel anchors

| Anchor System   | Features and Benefits  |
|---|--|
|  <p data-bbox="181 789 379 814">Carbon Steel KB-TZ</p>   |  <p data-bbox="552 800 766 825">Stainless Steel KB-TZ</p> |
|  <p data-bbox="97 1186 828 1211">Hilti SIW-6AT-A22 impact wrench and the SI-AT-A22 Adaptive Torque Module</p>   |  |
| <ul style="list-style-type: none"> <li>• Used with Hilti Dust Removal System (DRS) for dustless drilling and installation (compliant with Table 1 of OSHA 1926.1153 regulations for silica dust exposure).</li> <li>• Accurate SafeSet™ installation when using the Hilti SIW-6AT-A22 impact wrench and the SI-AT-A22 Adaptive Torque Module</li> <li>• Product and length identification marks facilitate quality control after installation.</li> <li>• Through fixture installation and variable thread lengths improve productivity and accommodate various base plate thicknesses.</li> <li>• Type 316 stainless steel wedges provide superior performance in cracked concrete.</li> </ul> |  |
| <ul style="list-style-type: none"> <li>• Ridges on expansion wedges provide increased reliability.</li> <li>• Mechanical expansion allows immediate load application.</li> <li>• Raised impact section (dog point) prevents thread damage during installation.</li> <li>• Bolt meets ductility requirements of ACI 318-14 Section 2.3.</li> <li>• ACI 349-01 Nuclear Design Guide is available. Call Hilti Technical Support.</li> </ul>  |  |

|  |   |   |   |  |   |   |
|--|---|---|---|--|---|---|
|  |  |  |  |  |  |  |
| Un-cracked concrete  | Cracked concrete  | Grout-filled concrete masonry   | Seismic Design Categories A-F   | Hollow Drill Bit with Adaptive Torque Tool (AT)                                      | Profis Anchor design software   | Fire sprinkler listings   |

| Approvals/Listings  |   |
|---|---|
| ICC-ES (International Code Council)<br>- 2018 International Building Code / International Residential Code (IBC/IRC)<br>- 2015 National Building Code of Canada (NBC-C) | ESR-1917 in concrete per ACI 318-14 Ch. 17 / ACI 355.2/ ICC-ES AC193<br>ESR-3785 in grout-filled CMU per ICC-ES AC01<br>ELC-1917 in concrete per CSA A23.3-14 / ACI 355.2 |
| City of Los Angeles   | 2017 LABC Supplement (within ESR-1917)<br>RR 26057 grout-filled CMU   |
| Florida Building Code   | 2010 FBC with HVHZ  |
| FM (Factory Mutual)   | Pipe hanger components for automatic sprinkler systems 3/8 through 3/4  |
| UL and cUL (Underwriters Laboratory)  | Pipe hanger equipment for fire protection services for 3/8 through 3/4  |



## MATERIAL SPECIFICATIONS

### Carbon steel with electroplated zinc

Carbon steel KB-TZ anchors have the following minimum bolt fracture loads.<sup>1</sup>

| Anchor diameter (in.) | Shear (lb) | Tension (lb) |
|-----------------------|------------|--------------|
| 3/8                   | NA         | 6,744        |
| 1/2                   | 7,419      | 11,240       |
| 5/8                   | 11,465     | 17,535       |
| 3/4                   | 17,535     | 25,853       |

Carbon steel anchor components plated in accordance with ASTM B633 to a minimum thickness of 5 µm.

Nuts conform to the requirements of ASTM A563, Grade A, Hex.

Washers meet the requirements of ASTM F844.

Expansion sleeves (wedges) are manufactured from type 316 stainless steel

### Stainless steel

Stainless steel KB-TZ anchors are made of type 304 or 316 material and have the following minimum bolt fracture loads.<sup>1</sup>

| Anchor diameter (in.) | Shear (lb) | Tension (lb) |
|-----------------------|------------|--------------|
| 3/8                   | 5,058      | 6,519        |
| 1/2                   | 8,543      | 12,364       |
| 5/8                   | 13,938     | 19,109       |
| 3/4                   | 22,481     | 24,729       |

All nuts and washers for type 304 anchors are made from type 304 stainless.

All nuts and washers for type 316 anchors are made from type 316 stainless.

Nuts meet the dimensional requirements of ASTM F594.

Washers meet the dimensional requirements of ANSI B18.22.1, Type A, plain.

Expansion sleeve (wedges) are made from type 316 stainless steel.

<sup>1</sup> Bolt fracture loads are determined by testing in a universal tensile machine for quality control at the manufacturing facility. These loads are not intended for design purposes. See tables 4 and 16 for the steel design strengths of carbon steel and stainless steel, respectively.

## INSTALLATION PARAMETERS

Figure 1 - Hilti KWIK Bolt TZ specifications

