

# HANGER ROD ATTACHMENTS

## Hanger Rod Structure Attachments

### Selection Procedure

- 1) Determine structure type to attach hanger rod
  - A) Concrete
  - B) Wood Beam
  - C) Structural Steel
- 2) Reference rod size and hanger rod load from Appendix 1 & 2.
- 3) Select a hanger rod attachment detail with a load capacity that meets the hanger rod load

### General Notes For Concrete Attachments

- 1) The "minimum embedment" values given on pages 40 - 43 provide the anchor capacity to reach the design loads shown, but may be considered by the 1997 UBC to be "shallow" anchors (embedment less than 8 times the anchor diameter). Using "shallow" anchors may increase the design seismic force, depending on the building code used. As an alternative, consider using the following values to avoid "shallow anchor" issues:

Anchor Bolt Dia.	"8x" Embedment
3/8"	3" (76mm)
1/2"	4" (101mm)
5/8"	5" (127mm)
3/4"	6" (152mm)

- 2) Size and number of expansion anchors is based on "without special inspection" values given in ICBO (International Conference of Building Officials) Report No. 1385 dated September 1, 2004, Hilti Kwik Bolt 3 Carbon Steel Allowable Tension and Shear Values.
- 3) Other anchors may be used providing they are listed in an ICBO ES Evaluation Report, which was tested in accordance with AC01, including the seismic qualification tests of AC01 Section 5.6. These values must meet or exceed the values provided in ICBO Report No. 1385, and are approved by the structural engineer of record. OSHPD change order is required for California hospitals.
- 4) For California hospitals and schools, 50% of the expansion type anchor (alternate anchors in a group) shall be proof tested per Appendix 3. Other projects may have similar requirements, check local codes and ordinances.
- 5) Cast in place concrete anchors require special inspection as indicated in the building code for the local jurisdiction.
- 6) When slab thickness is less than the minimum allowable, but in excess of the minimum anchor embedment, a thru bolt approach may be used if approved by the site engineer.
- 7) When installing drill-in anchors in existing non-prestressed reinforced concrete, use care and caution to avoid cutting or damaging the existing reinforcing bars. When installing them into existing prestressed concrete (pre- or post-tensioned), locate the prestressed tendons by using a non-destructive method prior to installation. Exercise extreme care and caution to avoid cutting or damaging the tendons during installation. Maintain a minimum clearance of 1 inch (25mm) between the reinforcement and the drilled-in anchor.



# B-Line

**COOPER B-Line**  
509 West Monroe Street  
Highland, Illinois 62249  
Phone: 800-851-7415  
Fax: 618-654-1917

Date:

6 - 2 - 06

Page No.

39

Sheet Number:

\_\_\_ of \_\_\_

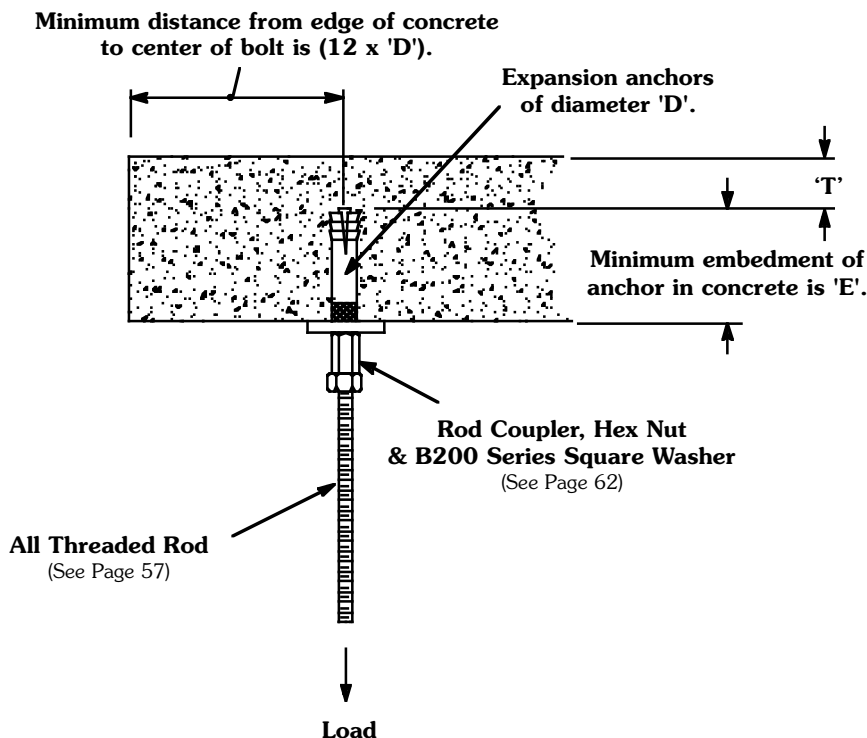


Raafat S. Aboulhoss  
Structural Engineer

S 3913

# HANGER ROD ATTACHMENTS

## Concrete Attachments To Slab



Diameter 'D'		Allowable Load ** (In Tension)		Minimum Embedment 'E'		Minimum Concrete Coverage 'T'	
in.	(mm)	lbs.	(kN)	in.	(mm)	in.	(mm)
3/8"	(9)	712	(3.17)	2 1/2"	(63)	1 1/4"	(31.7)
1/2"	(13)	1024	(4.56)	3 1/2"	(89)	1 3/4"	(44.4)
5/8"	(16)	1402	(6.24)	4"	(101)	2"	(50.8)
3/4"	(19)	1978	(8.80)	4 3/4"	(120)	2 3/8"	(60.3)

\* Hilti Kwik Bolt 3 in 3000 psi (20.7 MPa) minimum normal weight concrete.

\*\* See important notes on page 39.

Note: See B446 & B446C on page 56 for a flexible connection which may be used when seismic bracing is not required.



Raafat S. Aboulhosa  
Structural Engineer S 3913

# B-Line

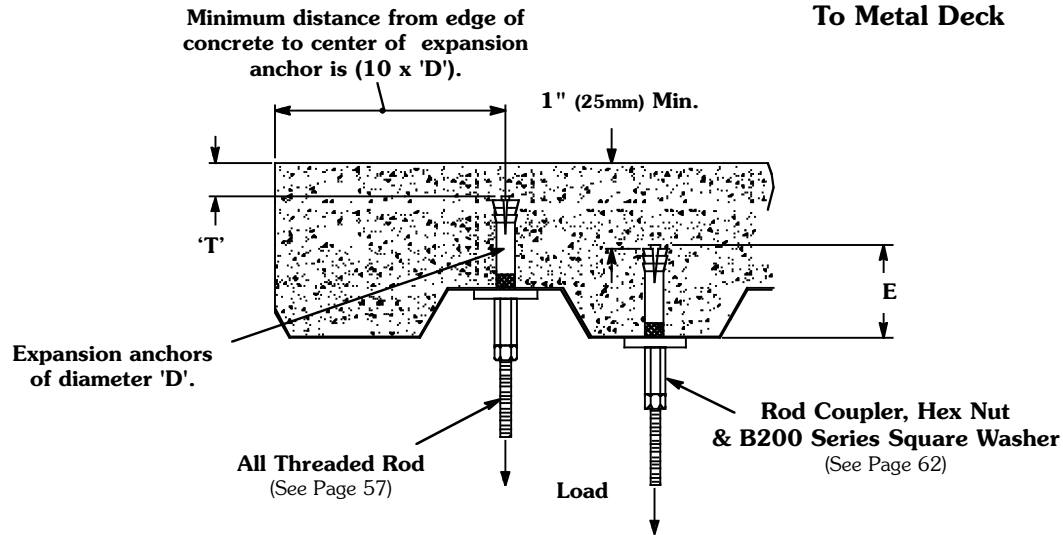
**COOPER B-Line**  
509 West Monroe Street  
Highland, Illinois 62249  
Phone: 800-851-7415  
Fax: 618-654-1917

Date: 6 - 2 - 06  
Page No: 40  
Sheet Number: \_\_\_ of \_\_\_



# HANGER ROD ATTACHMENTS

## Concrete Attachments



### Light Weight Concrete

Diameter 'D'		Allowable Load ** (In Tension)		Minimum Embedment 'E'		Minimum Concrete Coverage 'T'	
in.	(mm)	lbs.	(kN)	in.	(mm)	in.	(mm)
3/8"	(9)	508	(2.26)	2 1/2"	(63.5)	1 1/4"	(31.7)
1/2"	(13)	738	(3.28)	3 1/2"	(88.9)	1 3/4"	(44.4)
5/8"	(16)	1101	(4.90)	4"	(101.6)	2"	(50.8)

\* Hilti Kwik Bolt 3 in 3000 psi (20.7 MPa) minimum light weight concrete.

\*\* See important notes on page 39.

### Normal Weight Concrete

Diameter 'D'		Allowable Load ** (In Tension)		Minimum Embedment 'E'		Minimum Concrete Coverage 'T'	
in.	(mm)	lbs.	(kN)	in.	(mm)	in.	(mm)
3/8"	(9)	712	(3.17)	2 1/2"	(63.5)	1 1/4"	(31.7)
1/2"	(13)	1024	(4.56)	3 1/2"	(88.9)	1 3/4"	(44.4)
5/8"	(16)	1402	(6.24)	4"	(101.6)	2"	(50.8)
3/4"	(19)	1978	(8.80)	4 3/4"	(120.6)	2 3/8"	(60.3)

\* Hilti Kwik Bolt 3 in 3000 psi (20.7 MPa) minimum normal weight concrete.

\*\* See important notes on page 39.

Note: See B446 & B446C on page 56 for a flexible connection which may be used when seismic bracing is not required.



# B-Line

**COOPER B-Line**  
509 West Monroe Street  
Highland, Illinois 62249  
Phone: 800-851-7415  
Fax: 618-654-1917

Date:

6 - 2 - 06

Page No.

41

Sheet Number:

\_\_\_ of \_\_\_



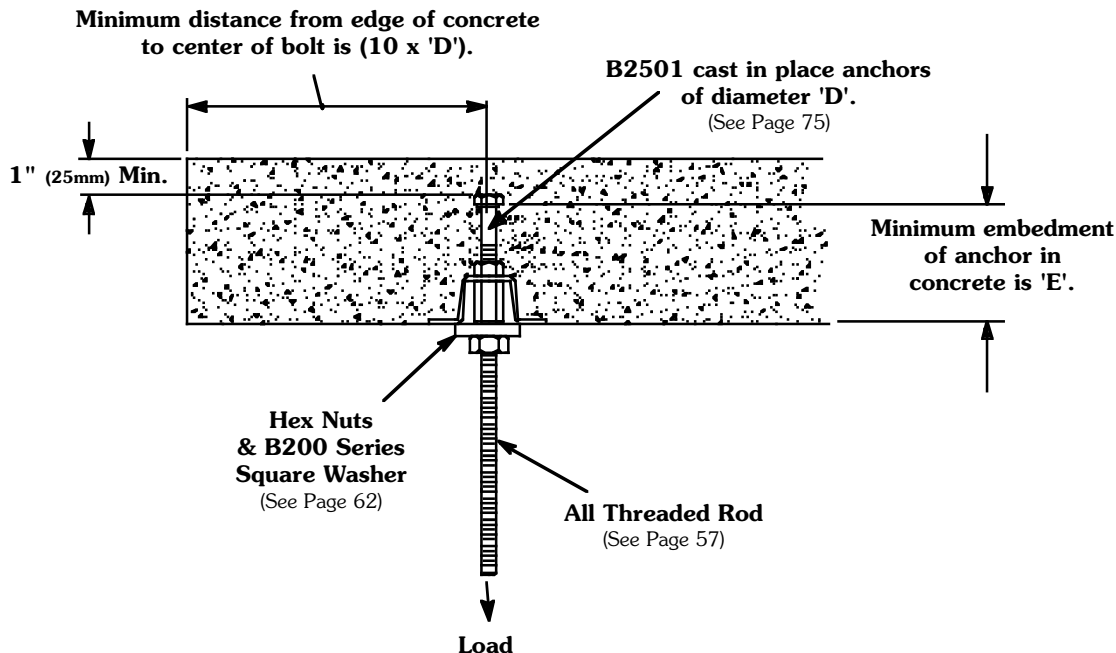
Raafat S. Aboulhosh  
Structural Engineer

S 3913

# HANGER ROD ATTACHMENTS

## Concrete Attachments

To Slab



Anchor Part Number	Rod Size		Allowable Load ** (In Tension)		Minimum Embedment 'E'	
	in.	(mm)	lbs.	(kN)	in.	(mm)
B2501-3/8	3/8"	(9)	610	(2.71)	3"	(76)
B2501-1/2	1/2"	(13)	1130	(5.02)	4"	(101)

\* B-Line Figure B2501 in 3000 psi (20.7 MPa) minimum normal weight concrete.

\*\* See important notes on page 39.

Note: See B446 & B446C on page 56 for a flexible connection which may be used when seismic bracing is not required.

Note: Pre-cast anchors must be accurately secured prior to pouring concrete.



Raafat S. Aboulhosh  
Structural Engineer S 3913

# B-Line

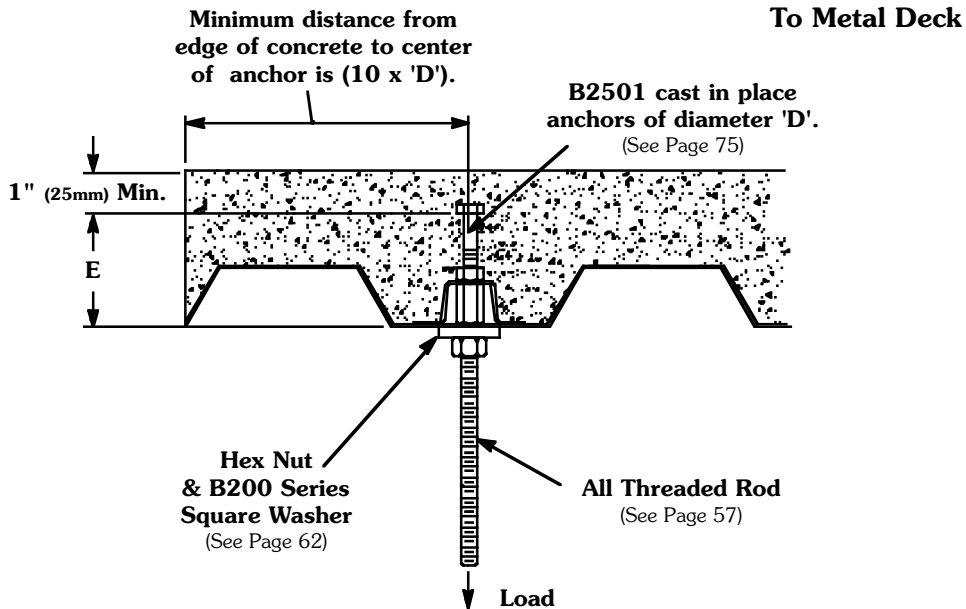
**COOPER B-Line**  
509 West Monroe Street  
Highland, Illinois 62249  
Phone: 800-851-7415  
Fax: 618-654-1917

Date: 6 - 2 - 06  
Page No. 42  
Sheet Number: \_\_\_ of \_\_\_



# HANGER ROD ATTACHMENTS

## Concrete Attachments



### Light Weight Concrete

Anchor Part Number	Rod Size 'D'		Allowable Load **		Minimum Embedment 'E'	
	in.	(mm)	lbs.	(kN)	in.	(mm)
B2501-3/8	3/8"	(9)	610	(2.71)	3"	(76)
B2501-1/2	1/2"	(13)	653	(2.90)	4"	(101)

\* B-Line Figure B2501 in 3000 psi (20.7 MPa) minimum light weight concrete.

\*\* See important notes on page 39.

Note: See B446 & B446C on page 56 for a flexible connection which may be used when seismic bracing is not required.

### Normal Weight Concrete

Anchor Part Number	Rod Size 'D'		Allowable Load **		Minimum Embedment 'E'	
	in.	(mm)	lbs.	(kN)	in.	(mm)
B2501-3/8	3/8"	(9)	610	(2.71)	3"	(76)
B2501-1/2	1/2"	(13)	871	(3.87)	4"	(101)

\* B-Line Figure B2501 in 3000 psi (20.7 MPa) minimum normal weight concrete.

\*\* See important notes on page 39.

Note: See B446 & B446C on page 56 for a flexible connection which may be used when seismic bracing is not required.

Note: Pre-cast anchors must be accurately secured prior to pouring concrete.



# B-Line

**COOPER B-Line**  
509 West Monroe Street  
Highland, Illinois 62249  
Phone: 800-851-7415  
Fax: 618-654-1917

Date:

6 - 2 - 06

Page No.

43

Sheet Number:

\_\_\_ of \_\_\_



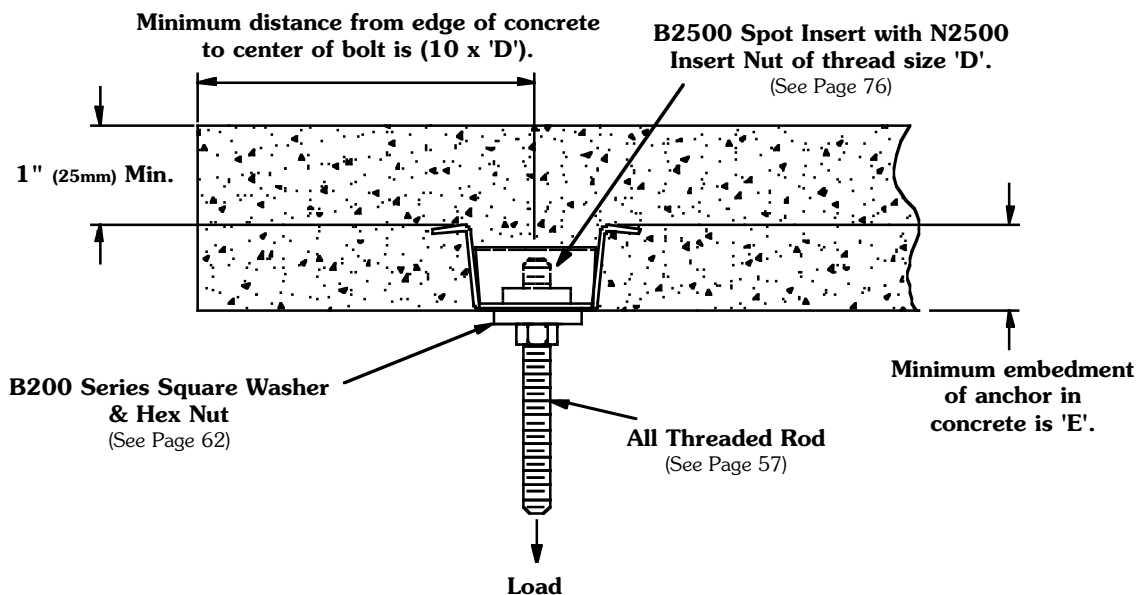
Raafat S. Aboulhosa  
Structural Engineer

S 3913

# HANGER ROD ATTACHMENTS

## Concrete Attachments

To Slab



Square Nut Part Number	Allowable Load ** (In Tension)		Thread Size 'D'	Minimum Insert Embedment 'E'		Minimum Distance Between Anchors	
	lbs.	(kN)		in.	(mm)	in.	(mm)
N2500-3/8	529	(2.35)	3/8"-16	1 9/16"	(40)	4 1/2"	(114)
N2500-1/2	529	(2.35)	1/2"-13	1 9/16"	(40)	6"	(152)
N2500-5/8	529	(2.35)	5/8"-11	1 9/16"	(40)	6"	(152)
N2500-3/4	529	(2.35)	3/4"-10	1 9/16"	(40)	6"	(152)
N2500-7/8	529	(2.35)	7/8"-9	1 9/16"	(40)	6"	(152)

\* B-Line Figure B2500 in 3000 psi (20.7 MPa) minimum normal weight concrete.

\*\* See important notes on page 39.

Note: See B446 & B446C on page 56 for a flexible connection which may be used when seismic bracing is not required.

Note: Pre-cast anchors must be accurately secured prior to pouring concrete.



Raafat S. Aboulhosh  
Structural Engineer S 3913

# B-Line

**COOPER B-Line**  
509 West Monroe Street  
Highland, Illinois 62249  
Phone: 800-851-7415  
Fax: 618-654-1917

Date:

6 - 2 - 06

Page No.

44

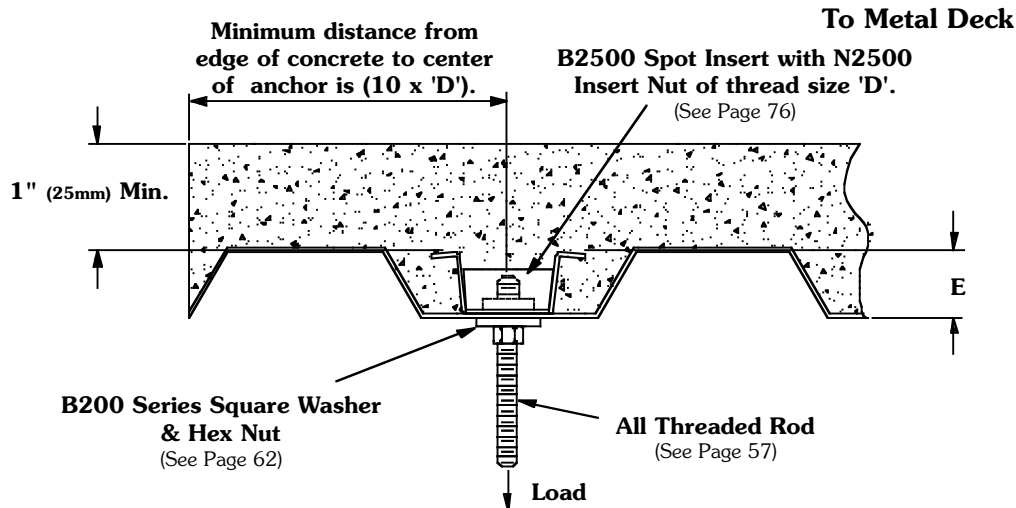
Sheet Number:

\_\_\_ of \_\_\_



# HANGER ROD ATTACHMENTS

## Concrete Attachments



**Light Weight Concrete**

Square Nut Part Number	Allowable Load ** (In Tension)		Thread Size 'D'	Minimum Insert Embedment 'E'		Minimum Distance Between Anchors	
	lbs.	(kN)		in.	(mm)	in.	(mm)
N2500-3/8	397	(1.76)	3/8"-16	1 9/16"	(40)	4 1/2"	(114)
N2500-1/2	397	(1.76)	1/2"-13	1 9/16"	(40)	4 1/2"	(114)
N2500-5/8	397	(1.76)	5/8"-11	1 9/16"	(40)	4 1/2"	(114)
N2500-3/4	397	(1.76)	3/4"-10	1 9/16"	(40)	4 1/2"	(114)
N2500-7/8	397	(1.76)	7/8"-9	1 9/16"	(40)	4 1/2"	(114)

\* B-Line Figure B2500 in 3000 psi (20.7 MPa) minimum light weight concrete.

\*\* See important notes on page 39.

Note: See B446 & B446C on page 56 for a flexible connection which may be used when seismic bracing is not required.

**Normal Weight Concrete**

Square Nut Part Number	Allowable Load ** (In Tension)		Thread Size 'D'	Minimum Insert Embedment 'E'		Minimum Distance Between Anchors	
	lbs.	(kN)		in.	(mm)	in.	(mm)
N2500-3/8	529	(2.35)	3/8"-16	1 9/16"	(40)	4 1/2"	(114)
N2500-1/2	529	(2.35)	1/2"-13	1 9/16"	(40)	4 1/2"	(114)
N2500-5/8	529	(2.35)	5/8"-11	1 9/16"	(40)	4 1/2"	(114)
N2500-3/4	529	(2.35)	3/4"-10	1 9/16"	(40)	4 1/2"	(114)
N2500-7/8	529	(2.35)	7/8"-9	1 9/16"	(40)	4 1/2"	(114)

\* B-Line Figure B2500 in 3000 psi (20.7 MPa) minimum normal weight concrete.

\*\* See important notes on page 39.

Note: See B446 & B446C on page 56 for a flexible connection which may be used when seismic bracing is not required.

Note: Pre-cast anchors must be accurately secured prior to pouring concrete.



# B-Line

**COOPER B-Line**  
509 West Monroe Street  
Highland, Illinois 62249  
Phone: 800-851-7415  
Fax: 618-654-1917

Date:

6 - 2 - 06

Page No.

45

Sheet Number:

\_\_\_ of \_\_\_



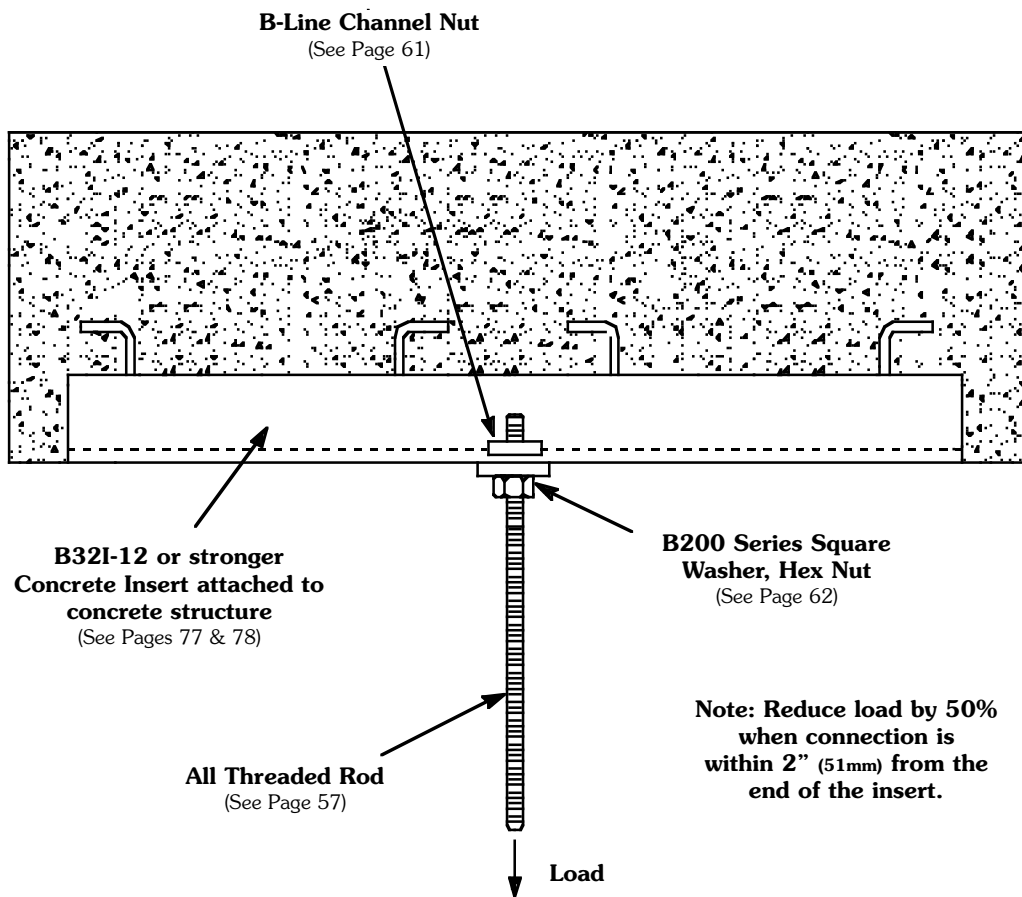
Raafat S. Aboulhosn  
Structural Engineer

S 3913

# HANGER ROD ATTACHMENTS

## Concrete Attachments

To Slab



Note: Reduce load by 50% when connection is within 2" (51mm) from the end of the insert.

ATR Size	Channel Nut Part Number	Allowable Load (In Tension)	
		lbs.	(kN)
3/8"-16	N228 Series	610	(2.71)
1/2"-13	N225 Series	1130	(5.02)
5/8"-11	N255 Series	1810	(8.05)
3/4"-10	N275 Series	2000	(8.89)
7/8"-9	N278 Series	2000	(8.89)

Note: See B446 & B446C on page 56 for a flexible connection which may be used when seismic bracing is not required.  
 Note: Pre-cast anchors must be accurately secured prior to pouring concrete.



Raafat S. Aboulhosh  
Structural Engineer S 3913

# B-Line

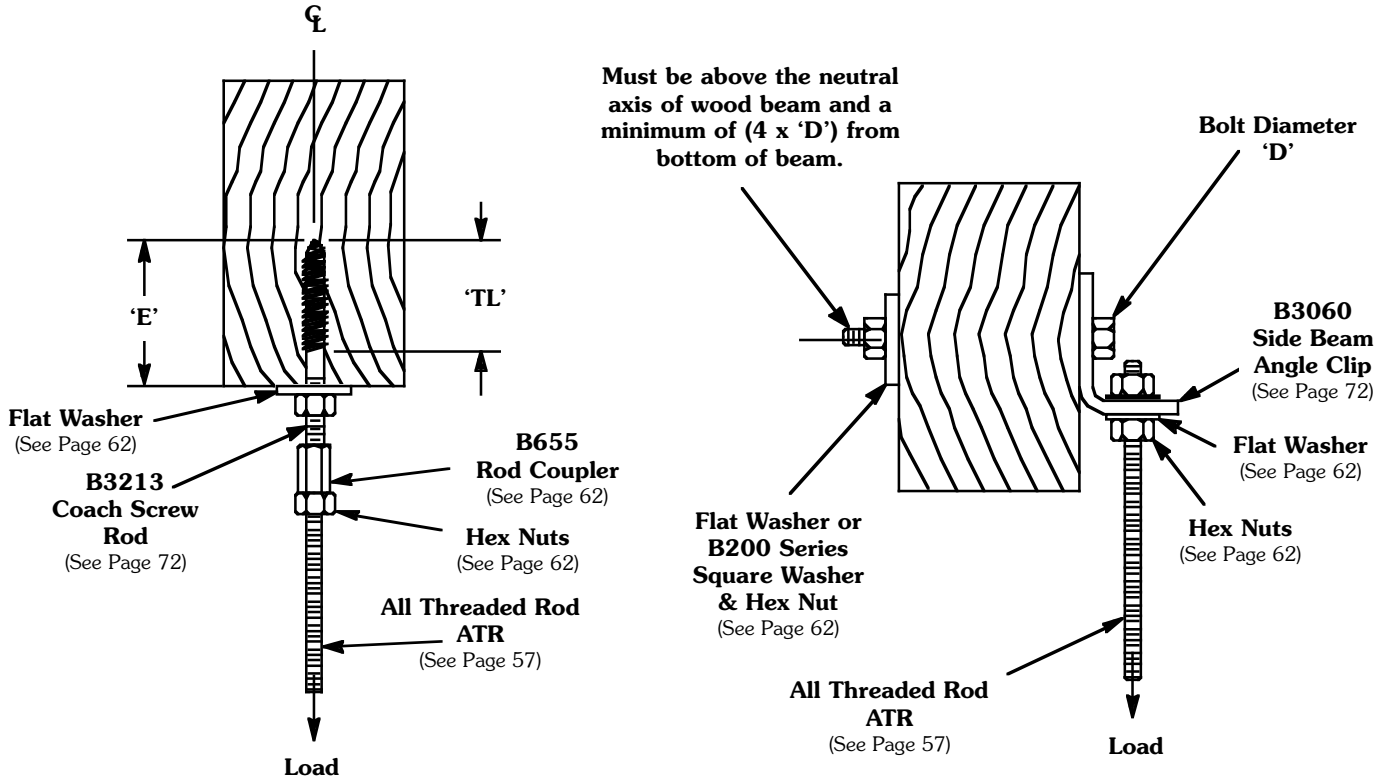
**COOPER B-Line**  
 509 West Monroe Street  
 Highland, Illinois 62249  
 Phone: 800-851-7415  
 Fax: 618-654-1917

Date:	Page No.	Sheet Number:
6 - 2 - 06	46	___ of ___



# HANGER ROD ATTACHMENTS

## Wood Attachments



Part Number	Rod Size	Design Load		Minimum Embedment 'E'		Thread Length 'TL'	
		lbs.	(kN)	in.	(mm)	in.	(mm)
<b>B3213-3/8</b>	3/8"-16	559	(2.48)	3"	(76)	2"	(51)
<b>B3213-1/2</b>	1/2"-13	659	(2.93)	3"	(76)	2 1/2"	(63)

Note: See B446 & B446C on page 56 for a flexible connection which may be used when seismic bracing is not required.

ATR Rod	Bolt Diameter 'D'	Allowable Load for Beam Thickness			
		1 1/2" (38mm) Minimum		3 1/2" (89mm) Minimum	
		lbs.	(kN)	lbs.	(kN)
3/8"-16	3/8"-16	200	(.89)	250	(1.11)
1/2"-13	1/2"-13	300	(1.33)	460	(2.04)
5/8"-11	5/8"-11	360	(1.60)	700	(3.11)
3/4"-10	3/4"-10	420	(1.87)	870	(3.87)

Note: See B446 & B446C on page 56 for a flexible connection which may be used when seismic bracing is not required.



# B-Line

**COOPER B-Line**  
509 West Monroe Street  
Highland, Illinois 62249  
Phone: 800-851-7415  
Fax: 618-654-1917

Date:

6 - 2 - 06

Page No.

47

Sheet Number:

\_\_\_ of \_\_\_



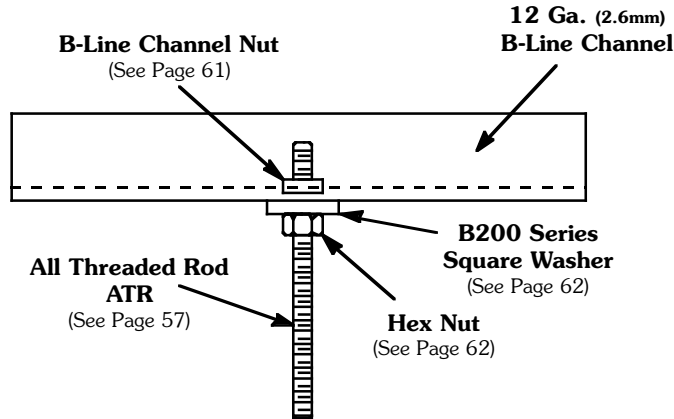
Raafat S. Aboulhosa  
Structural Engineer

S 3913

# HANGER ROD ATTACHMENTS

## Strut Attachments

### Typical All Thread Rod Attachment to Strut



Channel nuts, square washers, and hex nuts shall be sized to fit all threaded rod.

ATR Size	Channel Nut Part Number	Square Washer
3/8"-16	N228, N228WO TN228, FN228	B201
1/2"-13	N225, N225WO TN225	B202
5/8"-11	N255, N255WO	B202-1
3/4"-10	N275, N275WO	B202-2
7/8"-9	N278, N278WO	B202-3

Allowable load determined by the lowest value:

- 1). Channel Nut Pullout (page 61)
- 2). Channel Concentrated Load Capacity (page 22)
- 3). Channel Attachment To Structure (pages 49 - 51)

Note: See B446 & B446C on page 56 for a flexible connection which may be used when seismic bracing is not required.



Raafat S. Aboulhosh  
Structural Engineer S 3913

# B-Line

**COOPER B-Line**  
509 West Monroe Street  
Highland, Illinois 62249  
Phone: 800-851-7415  
Fax: 618-654-1917

Date:

6 - 2 - 06

Page No.

48

Sheet Number:

\_\_\_ of \_\_\_



# HANGER ROD ATTACHMENTS & APPROVED COMPONENTS

**SEISMIC APPROVAL:** To be used as a vertical ATR support. **Not** usable as a structural attachment for seismic brace.

Sold in Pieces

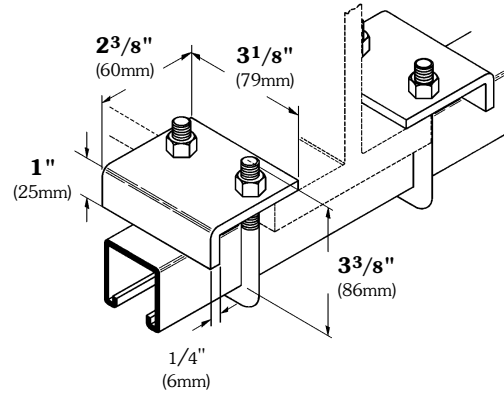
Design Load:  
1200 Lbs. (5.34 kN)  
when used in pairs

Recommended Torque:  
150 in.-lbs. (16.9 N•m)

ATR Size	Allowable Load	
	lbs.	(kN)
3/8"-16	610	(2.71)
1/2"-13	1130	(5.02)
5/8"-11	1200	(5.34)
3/4"-10	1200	(5.34)
7/8"-9	1200	(5.34)

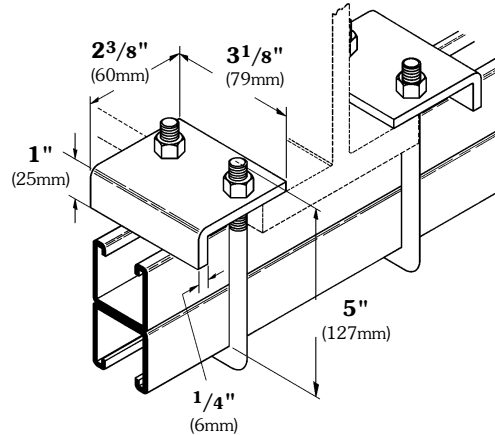
## B441-22 BEAM CLAMP

For use with 1 5/8" (41mm) high channel.



## B441-22A BEAM CLAMP

For use with 2 7/16" (62mm) to 3 1/4" (82mm) high channel.

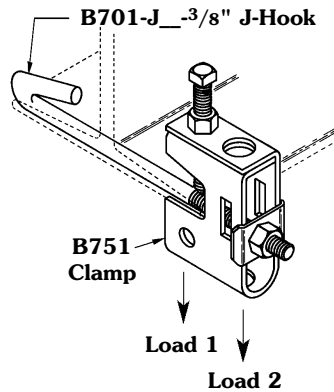


**SEISMIC APPROVAL:** To be used as a vertical ATR support. **Not** usable as a structural attachment for seismic brace.

**Includes:**

- 1 pc. B751 Beam Clamp
- 1 pc. B701 Type J-Hook only
- 1 pc. SA203-158 Clip
- 1 pc. 3/8"-16 Hex Nut

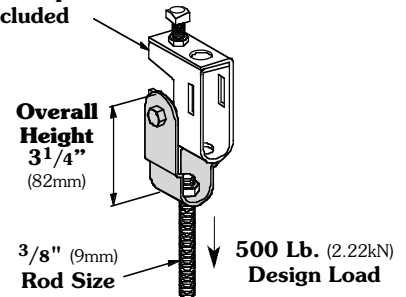
Part No.	For Flange Width	
	in.	(mm)
B751-J4-3/8	3" - 6"	(76 - 152)
B751-J6-3/8	5" - 9"	(127 - 228)
B751-J9-3/8	8" - 12"	(203 - 305)
B751-J12-3/8	11" - 15"	(279 - 381)



## B751-J\_-3/8 Series BEAM CLAMP ASSEMBLY

ATR Size	Allowable Load 1		Allowable Load 2	
	lbs.	(kN)	lbs.	(kN)
3/8"-16	500	(2.22)	300	(1.33)

## B751 Clamp Not Included



- Includes:**
- 1 pc. B752 Swivel Body
  - 1 pc. 5/16"-18 x 1 3/4" HHCS
  - 1 pc. 5/16"-18 Hex Nut

Note: Eliminates bending moment in threaded rod support for a flexible connection. Can be used when seismic bracing is not required.

## B752 BEAM CLAMP SWIVEL



# B-Line

**COOPER B-Line**  
509 West Monroe Street  
Highland, Illinois 62249  
Phone: 800-851-7415  
Fax: 618-654-1917

Date: \_\_\_\_\_ Page No. \_\_\_\_\_ Sheet Number: \_\_\_\_\_

6 - 2 - 06

49

\_\_\_ of \_\_\_



Raafat S. Aboulhosn  
Structural Engineer

S 3913

# HANGER ROD ATTACHMENTS & APPROVED COMPONENTS

**SEISMIC APPROVAL:** To be used as a vertical ATR support. **Not** usable as a structural attachment for seismic brace.

Part No.	For Flange Width		ATR Length	
	in.	(mm)	in.	(mm)
<b>B761-22-4</b>	4" - 5 <sup>7</sup> / <sub>8</sub> "	(101-149)	4"	(101)
<b>B761-22-6</b>	6" - 8 <sup>7</sup> / <sub>8</sub> "	(152-225)	6"	(152)
<b>B761-22-9</b>	9" - 11 <sup>7</sup> / <sub>8</sub> "	(228-301)	9"	(228)
<b>B761-22-12</b>	12" - 14 <sup>7</sup> / <sub>8</sub> "	(305-378)	12"	(305)

Includes:

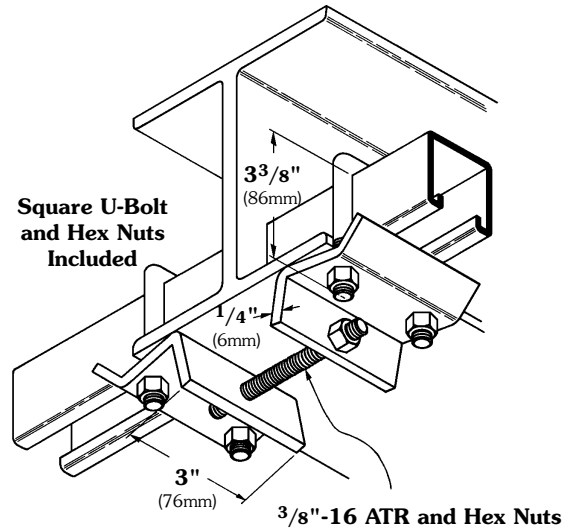
- 2 pcs. B760 Plate
- 2 pcs. B500-3<sup>3</sup>/<sub>8</sub>" U-Bolts only
- 1 pc. 3/8-16 ATR (Length)
- 6 pcs. 3/8"-16 Hex Nuts

Recommended Torque:

- 'U-Bolt' Nuts 150 in.-lbs. (16.9 N•m)
- ATR Nuts 60 in.-lbs. (6.8 N•m)

For use with 1<sup>5</sup>/<sub>8</sub>" (41mm) high channel.

ATR Size	Allowable Load	
	lbs.	(kN)
3/8"-16	610	(2.71)
1/2"-13	1130	(5.02)
5/8"-11	1810	(8.05)
3/4"-10	2000	(8.89)
7/8"-9	2000	(8.89)



**B761-22 Series  
BEAM CLAMP**

**SEISMIC APPROVAL:** To be used as a vertical ATR support. **Not** usable as a structural attachment for seismic brace.

Part No.	For Flange Width		ATR Length	
	in.	(mm)	in.	(mm)
<b>B761-22A-4</b>	4" - 5 <sup>7</sup> / <sub>8</sub> "	(101-149)	4"	(101)
<b>B761-22A-6</b>	6" - 8 <sup>7</sup> / <sub>8</sub> "	(152-225)	6"	(152)
<b>B761-22A-9</b>	9" - 11 <sup>7</sup> / <sub>8</sub> "	(228-301)	9"	(228)
<b>B761-22A-12</b>	12" - 14 <sup>7</sup> / <sub>8</sub> "	(305-378)	12"	(305)

Includes:

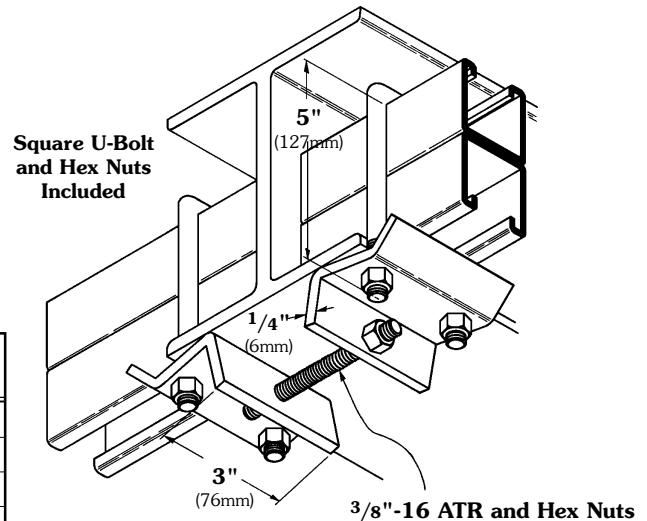
- 2 pcs. B760 Plate
- 2 pcs. B500-5" U-Bolts only
- 1 pc. 3/8-16 ATR (Length)
- 6 pcs. 3/8"-16 Hex Nuts

Recommended Torque:

- 'U-Bolt' Nuts 150 in.-lbs. (16.9 N•m)
- ATR Nuts 60 in.-lbs. (6.8 N•m)

For use with 2<sup>7</sup>/<sub>16</sub>" (62mm) to 3<sup>1</sup>/<sub>4</sub>" (41mm) high channel.

ATR Size	Allowable Load	
	lbs.	(kN)
3/8"-16	610	(2.71)
1/2"-13	1130	(5.02)
5/8"-11	1810	(8.05)
3/4"-10	2000	(8.89)
7/8"-9	2000	(8.89)



**B761-22A Series  
BEAM CLAMP**



Raafat S. Aboulhosh  
Structural Engineer S 3913

**B-Line**

**COOPER B-Line**  
509 West Monroe Street  
Highland, Illinois 62249  
Phone: 800-851-7415  
Fax: 618-654-1917

Date:

6 - 2 - 06

Page No.

50

Sheet Number:

\_\_\_ of \_\_\_



# HANGER ROD ATTACHMENTS & APPROVED COMPONENTS

**SEISMIC APPROVAL:** To be used as a vertical ATR support. Not usable as a structural attachment for seismic brace.

Part No.	For Flange Width	
	in.	(mm)
<b>B760-22-4</b>	4" - 5 <sup>7</sup> / <sub>8</sub> "	(101-149)
<b>B760-22-6</b>	6" - 8 <sup>7</sup> / <sub>8</sub> "	(152-225)
<b>B760-22-9</b>	9" - 11 <sup>7</sup> / <sub>8</sub> "	(228-301)
<b>B760-22-12</b>	12" - 14 <sup>7</sup> / <sub>8</sub> "	(305-378)

Includes:

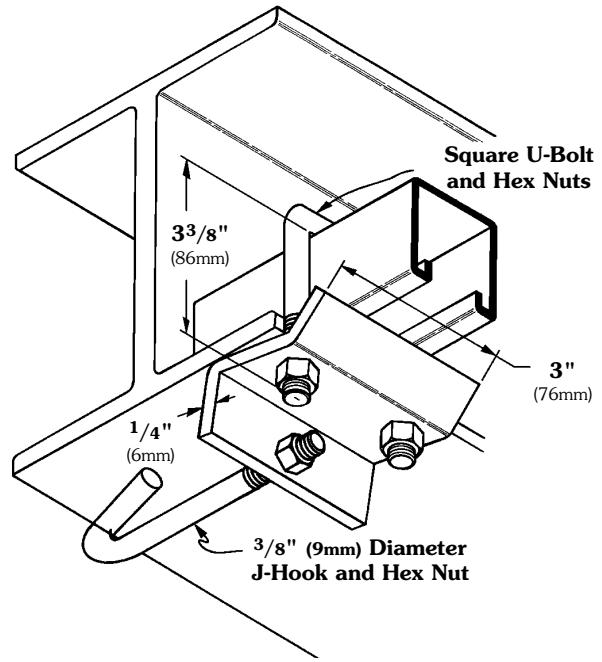
- 1 pc. B760 Plate
- 1 pc. B701 Type J-Hook only
- 1 pc. B500-3<sup>3</sup>/<sub>8</sub>" U-Bolt only
- 3 pcs. 3/8"-16 Hex Nuts

Recommended Torque:

- 'U-Bolt' Nuts 150 in.-lbs. (16.9 N•m)
- ATR Nuts 60 in.-lbs. (6.8 N•m)

For use with 1<sup>5</sup>/<sub>8</sub>" (41mm) high channel.

ATR Size	Allowable Load	
	lbs.	(kN)
3/8"-16	610	(2.71)
1/2"-13	1130	(5.02)
5/8"-11	1810	(8.05)
3/4"-10	2000	(8.89)
7/8"-9	2000	(8.89)



**B760-22 Series  
BEAM CLAMP**

**SEISMIC APPROVAL:** To be used as a vertical ATR support. Not usable as a structural attachment for seismic brace.

Part No.	For Flange Width	
	in.	(mm)
<b>B760-22A-4</b>	4" - 5 <sup>7</sup> / <sub>8</sub> "	(101-149)
<b>B760-22A-6</b>	6" - 8 <sup>7</sup> / <sub>8</sub> "	(152-225)
<b>B760-22A-9</b>	9" - 11 <sup>7</sup> / <sub>8</sub> "	(228-301)
<b>B760-22A-12</b>	12" - 14 <sup>7</sup> / <sub>8</sub> "	(305-378)

Includes:

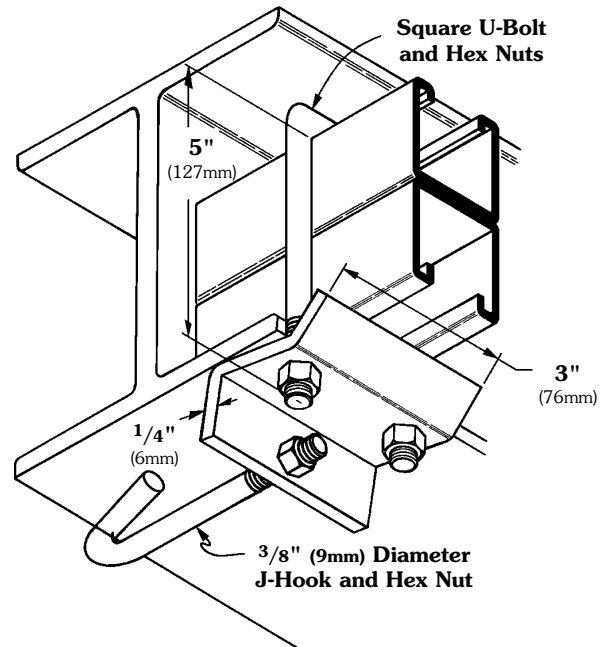
- 1 pc. B760 Plate
- 1 pc. B701 Type J-Hook only
- 1 pc. B500-5" U-Bolt only
- 3 pcs. 3/8"-16 Hex Nuts

Recommended Torque:

- 'U-Bolt' Nuts 150 in.-lbs. (16.9 N•m)
- ATR Nuts 60 in.-lbs. (6.8 N•m)

For use with 2<sup>7</sup>/<sub>16</sub>" (62mm) to 3<sup>1</sup>/<sub>4</sub>" (41mm) high channel.

ATR Size	Allowable Load	
	lbs.	(kN)
3/8"-16	610	(2.71)
1/2"-13	1130	(5.02)
5/8"-11	1810	(8.05)
3/4"-10	2000	(8.89)
7/8"-9	2000	(8.89)



**B760-22A Series  
BEAM CLAMP**



## B-Line

**COOPER B-Line**  
509 West Monroe Street  
Highland, Illinois 62249  
Phone: 800-851-7415  
Fax: 618-654-1917



Date: Page No. Sheet Number:

6 - 2 - 06

51

\_\_\_ of \_\_\_

Raafat S. Aboulhoss  
Structural Engineer

S 3913

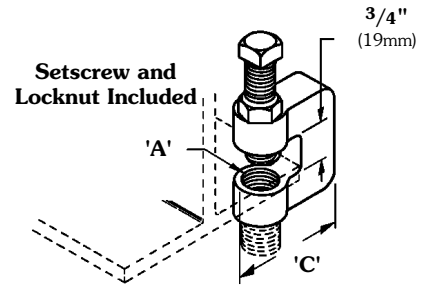
# HANGER ROD ATTACHMENTS & APPROVED COMPONENTS

**SEISMIC APPROVAL:** To be used as a vertical ATR support. Not usable as a structural attachment for seismic brace.

Part No.	Rod Size 'A'	'C'		Design Load	
		in.	(mm)	lbs.	(kN)
B3036L-3/8	3/8"-16	1 3/4"	(44)	300	(0.89)
B3036L-1/2	1/2"-13	1 3/4"	(44)	380	(1.69)
B3036L-5/8	5/8"-11	1 7/8"	(47)	530	(2.36)

Setscrew Torque: 1/4" = 4 ft•lbs    3/8" = 5 ft•lbs    1/2" = 11 ft•lbs

Retaining Strap is required, order B3362 thru B3365 separately.



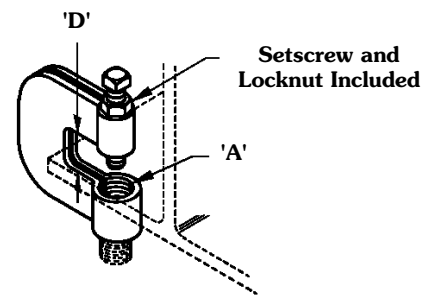
**B3036L Series  
MALLEABLE IRON C-CLAMP  
WITH LOCKNUT**

**SEISMIC APPROVAL:** To be used as a vertical ATR support. Not usable as a structural attachment for seismic brace.

Part No.	Rod Size 'A'	'D'		Design Load	
		in.	(mm)	lbs.	(kN)
B351L-3/8	3/8"-16	3/4"	(19)	300	(0.89)
B351L-1/2	1/2"-13	3/4"	(19)	380	(1.71)
B351L-5/8	5/8"-11	3/4"	(19)	550	(2.47)
B351L-3/4	3/4"-10	3/4"	(19)	630	(2.83)
B351L-7/8	7/8"-9	1"	(25)	1200	(5.34)

Setscrew Torque: 1/4" = 4 ft•lbs    3/8" = 5 ft•lbs    1/2" = 11 ft•lbs

Retaining Strap is required, order B3362 thru B3365 separately.



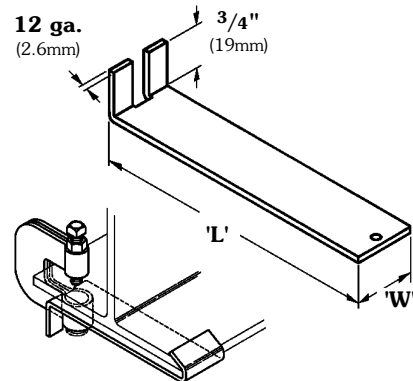
**B351L Series  
STEEL C-CLAMP WITH LOCKNUT**

**SEISMIC APPROVAL:** To be used as a vertical ATR support. Not usable as a structural attachment for seismic brace.

Part No.	For Use With	'W'	
		in.	(mm)
B3362-L	B351L-3/8" & 1/2"	1 1/4"	(32)
B3363-L	B351L-5/8" & 3/4" - B3036L-3/8" & 1/2"	1 1/4"	(32)
B3364-L	B3036L-5/8" & 3/4"	1 1/4"	(32)
B3365-L	B351L-7/8"	1 1/2"	(38)

\* Do not bend strap more than once.

When ordering specify 'L' (Length) as a suffix to the part number.  
'L' = 6" (152mm), 8" (203mm), 10" (254mm), 12" (305mm)



**B3362 thru B3365\*  
RETAINING STRAP**



Raafat S. Aboulhosh  
Structural Engineer S 3913

**B-Line**

**COOPER B-Line**  
509 West Monroe Street  
Highland, Illinois 62249  
Phone: 800-851-7415  
Fax: 618-654-1917

Date:	Page No.	Sheet Number:
6 - 2 - 06	52	___ of ___

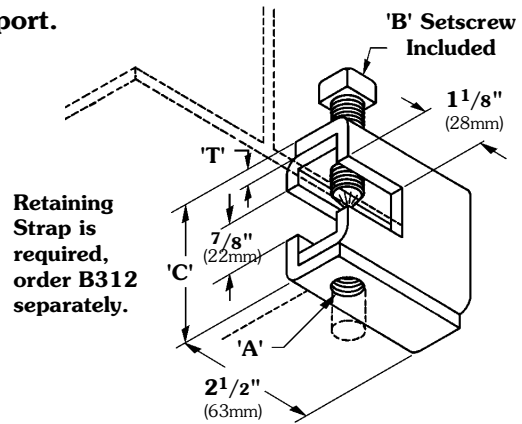


# HANGER ROD ATTACHMENTS & APPROVED COMPONENTS

**SEISMIC APPROVAL:** To be used as a vertical ATR support.  
**Not usable as a structural attachment for seismic brace.**

Part No.	Rod Size	Setscrew 'B'	'C'		'T'		Design Load	
			in.	(mm)	in.	(mm)	lbs.	(kN)
B303	1/4"-20	3/8"-16	25/16"	(59)	11 Ga.	(3)	400	(1.78)
B304	5/16"-18	3/8"-16	25/16"	(59)	11 Ga.	(3)	600	(2.67)
B305	3/8"-16	3/8"-16	25/16"	(59)	11 Ga.	(3)	600	(2.67)
B306	3/8"-16	1/2"-13	27/16"	(62)	7 Ga.	(4)	1100	(4.89)
B307	1/2"-13	1/2"-13	27/16"	(62)	7 Ga.	(4)	1100	(4.89)
B308	1/2"-13	1/2"-13	29/16"	(65)	1/4"	(6)	1500	(6.67)
B309	5/8"-11	1/2"-13	29/16"	(65)	1/4"	(6)	1500	(6.67)

Recommended Setscrew Torque:  
 3/8"-16 150 in.-lbs. (16.9 N•m)  
 1/2"-13 350 in.-lbs. (39.5 N•m)



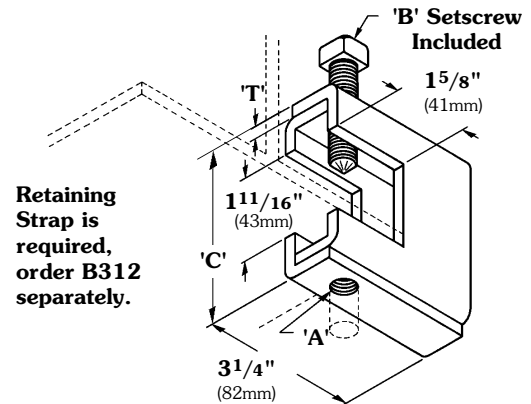
**B303 Thru B309  
BEAM CLAMP**

**SEISMIC APPROVAL:** To be used as a vertical ATR support. **Not usable as a structural attachment for seismic brace.**

Part No.	Rod Size	Setscrew 'B'	'C'		'T'		Design Load	
			in.	(mm)	in.	(mm)	lbs.	(kN)
B321-1	3/8"-16	1/2"-13	39/16"	(92)	1/4"	(6)	1300	(5.78)
B321-2	1/2"-13	1/2"-13	39/16"	(92)	1/4"	(6)	1400	(6.23)
B321-3	5/8"-11	1/2"-13	39/16"	(92)	1/4"	(6)	1600	(7.12)
B321-4	5/8"-11	5/8"-11	323/32"	(94)	5/16"	(8)	1800	(8.00)
B321-5	3/4"-13	5/8"-11	323/32"	(94)	5/16"	(8)	2000	(8.89)

Recommended Setscrew Torque:  
 3/8"-16 150 in.-lbs. (16.9 N•m)  
 1/2"-13 350 in.-lbs. (39.5 N•m)

Minimum Flange Thickness:  
 B321-1 thru B321-3 3/8" (9mm)  
 B321-4 and B321-5 5/8" (16mm)



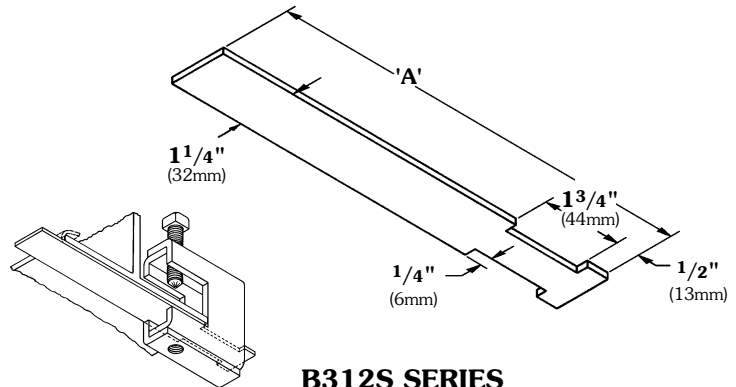
**B321 SERIES  
BEAM CLAMP**

**SEISMIC APPROVAL:** To be used as a vertical ATR support. **Not usable as a structural attachment for seismic brace.**

Part No.	For Flange Width		'A'	
	in.	(mm)	in.	(mm)
B312S-6	6"	(152)	95/8"	(244)
B312S-9	9"	(228)	125/8"	(320)
B312S-12	12"	(305)	155/8"	(397)
B312S-15	15"	(381)	185/8"	(473)

For maximum beam thickness of 3/4" (19mm).  
 For thicker beams step up one flange width size.

Material: 12 Gauge (2.7mm)



**B312S SERIES  
ANCHOR STRAP FOR USE WITH  
B303 thru B309 and B321 SERIES**



**B-Line**

**COOPER B-Line**  
 509 West Monroe Street  
 Highland, Illinois 62249  
 Phone: 800-851-7415  
 Fax: 618-654-1917

Date: Page No. Sheet Number:

6 - 2 - 06

53

\_\_\_ of \_\_\_



Raafat S. Aboulhosa  
 Structural Engineer

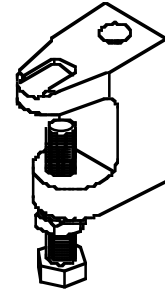
S 3913

# HANGER ROD ATTACHMENTS & APPROVED COMPONENTS

**SEISMIC APPROVAL:** To be used as a vertical ATR support. **Not** usable as a structural attachment for seismic brace.

Part No.	Rod Size 'A'	Throat Opening		Design Load	
		in.	(mm)	lbs.	(kN)
B3033-3/8	3/8"-16	1 1/4"	(32)	500	(2.22)
B3033-1/2	1/2"-13	1 1/4"	(32)	810	(3.60)
B3033-5/8	5/8"-11	1 5/16"	(33)	1000	(4.45)
B3033-3/4	3/4"-10	1 5/16"	(33)	1400	(6.23)

Retaining  
Strap is  
required,  
order B3367  
separately.



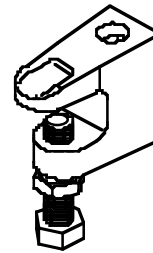
Setscrew Torque: 1/4" = 4 ft•lbs    3/8" = 5 ft•lbs    1/2" = 11 ft•lbs

**B3033**  
**REVERSABLE BEAM CLAMP**

**SEISMIC APPROVAL:** To be used as a vertical ATR support. **Not** usable as a structural attachment for seismic brace.

Part No.	Rod Size 'A'	Throat Opening		Design Load	
		in.	(mm)	lbs.	(kN)
B3034-3/8	3/8"-16	3/4"	(19)	560	(2.49)
B3034-1/2	1/2"-13	3/4"	(19)	810	(360)

Retaining  
Strap is  
required,  
order B3367  
separately.

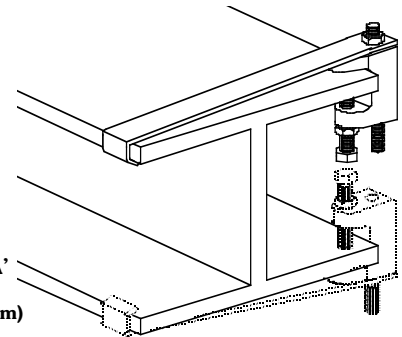
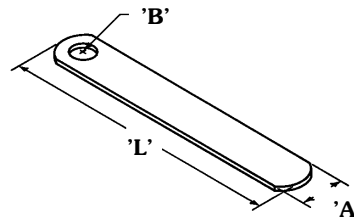


Setscrew Torque: 1/4" = 4 ft•lbs    3/8" = 5 ft•lbs

**B3034**  
**REVERSABLE BEAM CLAMP**

**SEISMIC APPROVAL:** To be used as a vertical ATR support. **Not** usable as a structural attachment for seismic brace.

Part No.	'A' Width		'B' Diameter	
	in.	(mm)	in.	(mm)
B3367-3/8	1 1/4"	(32)	7/16"	(11)
B3367-1/2	1 1/4"	(32)	9/16"	(14)
B3367-5/8	1 1/4"	(32)	11/16"	(17)
B3367-3/4	1 1/4"	(32)	13/16"	(20)



**Material Thickness: 11 Ga. (3.0mm)**  
Specify 'L' Length  
(add 2" (51mm) to flange width)

**B3367 SERIES**  
**ANCHOR STRAP FOR USE WITH B3033 and B3034 SERIES**



Raafat S. Aboulhosh  
Structural Engineer    S 3913

**B-Line**

**COOPER B-Line**  
509 West Monroe Street  
Highland, Illinois 62249  
Phone: 800-851-7415  
Fax: 618-654-1917

Date:

6 - 2 - 06

Page No.

54

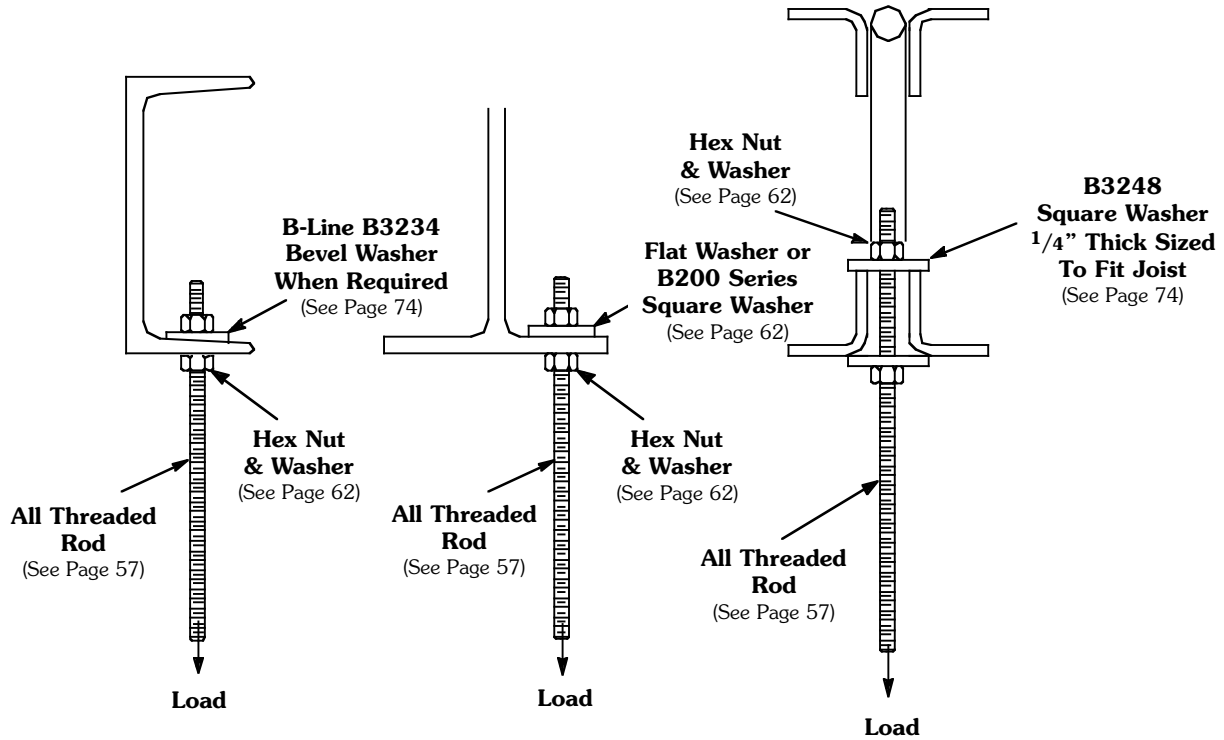
Sheet Number:

\_\_\_ of \_\_\_



# HANGER ROD ATTACHMENTS

## Structural Steel



ATR Size	Allowable Load*	
	lbs.	(kN)
3/8"-16	610	(2.71)
1/2"-13	1130	(5.02)
5/8"-11	1810	(8.05)
3/4"-10	2710	(12.05)
7/8"-9	3770	(16.77)

\* Maximum load allowed for ATR, actual load may be determined by structural steel capacity.



# B-Line

**COOPER B-Line**  
509 West Monroe Street  
Highland, Illinois 62249  
Phone: 800-851-7415  
Fax: 618-654-1917

Date:

6 - 2 - 06

Page No.

55

Sheet Number:

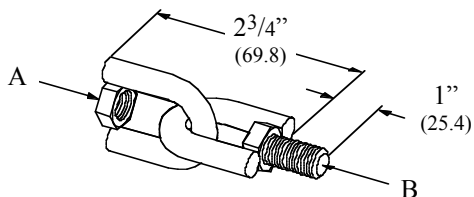
\_\_\_ of \_\_\_



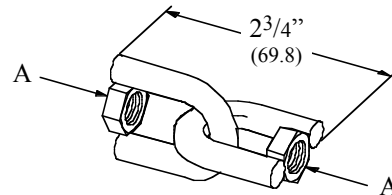
Raafat S. Aboulhosn  
Structural Engineer

S 3913

# HANGER ROD SWIVEL ATTACHMENTS

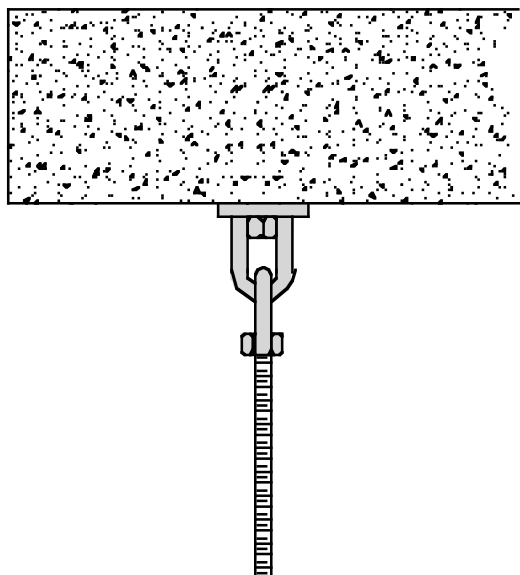


**B446  
SWIVEL HANGER  
(FEMALE-MALE)**



**B446C  
SWIVEL HANGER  
(FEMALE-FEMALE)**

Note: Eliminates bending moment in threaded rod support for a flexible connection. Can be used when seismic bracing is not required.



Part No.		A	B	Design Load	
				lbs.	(kN)
<b>B446-3/8</b>	<b>B446C-3/8</b>	3/8"-16 HN	3/8"-16 HHCS	610	(2.71)
<b>B446-1/2</b>	<b>B446C-1/2</b>	1/2"-13 HN	1/2"-13 HHCS	1130	(5.02)



Raafat S. Aboulhosh  
Structural Engineer S 3913

**B-Line** 

**COOPER B-Line**  
509 West Monroe Street  
Highland, Illinois 62249  
Phone: 800-851-7415  
Fax: 618-654-1917

Date:

6 - 2 - 06

Page No.

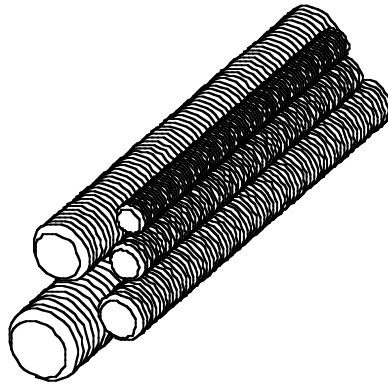
56

Sheet Number:

\_\_\_ of \_\_\_



# THREADED ROD (ATR)



**TABLE 5**

Rod Size	Allowable Loads	
	lbs.	(kN)
3/8"-16	610	(2.71)
1/2"-13	1130	(5.02)
5/8"-11	1810	(8.05)
3/4"-10	2710	(12.05)
7/8"-9	3770	(16.77)

\* Anchor capacity may be lower than all threaded rod.

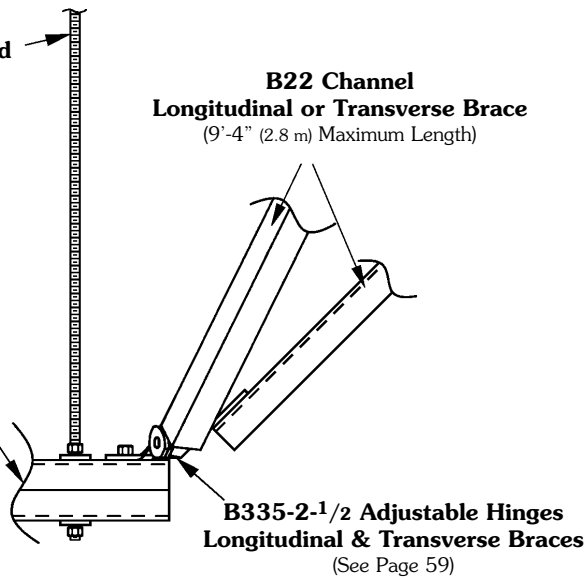
**ALL THREADED ROD - ATR**

# THREADED ROD - MAXIMUM LENGTH WITHOUT STIFFENER

ATR  
All Threaded Rod  
Table 5

**B22 Channel**  
Longitudinal or Transverse Brace  
(9'-4" (2.8 m) Maximum Length)

**B-Line Channel**  
Size as Required  
(See Page 22)



**TABLE 6**

ATR Size	Max. Rod Length Without Rod Stiffener	
	in.	(mm)
3/8"-16	19"	(482.6)
1/2"-13	25"	(635.0)
5/8"-11	31"	(787.4)
3/4"-10	37"	(939.8)
7/8"-9	43"	(1092.2)

Note: If rod stiffener is required see Table 7 - page 58



## B-Line

**COOPER B-Line**  
509 West Monroe Street  
Highland, Illinois 62249  
Phone: 800-851-7415  
Fax: 618-654-1917

Date:

6 - 2 - 06

Page No.

57

Sheet Number:

\_\_\_ of \_\_\_

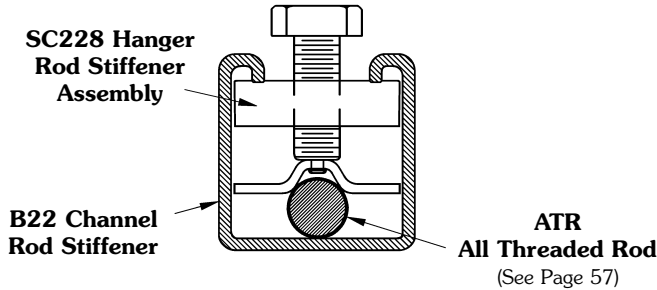


**Raafat S. Aboulhosn**  
Structural Engineer

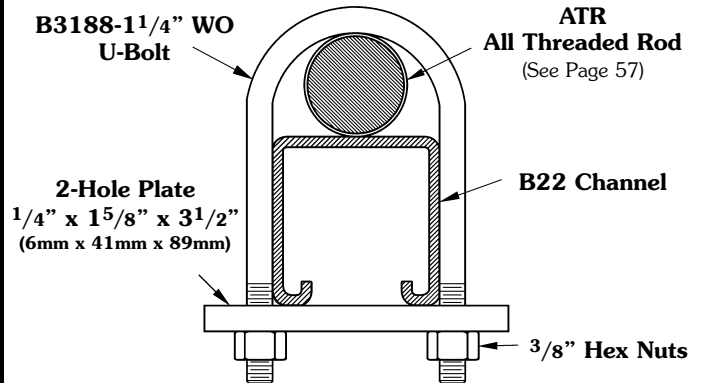
S 3913

# APPROVED COMPONENTS

## SC228 HANGER ROD STIFFENER ASSEMBLY For 3/8" thru 5/8" ATR (Order B22 Channel Separately)



## SC-UB HANGER ROD STIFFENER ASSEMBLY For 3/4" & 7/8" ATR (Order B22 Channel Separately)



Note: SC-UB assembly includes U-Bolt, 2-Hole Plate & 3/8"-16 Hex Nuts.

# APPROVED COMPONENTS

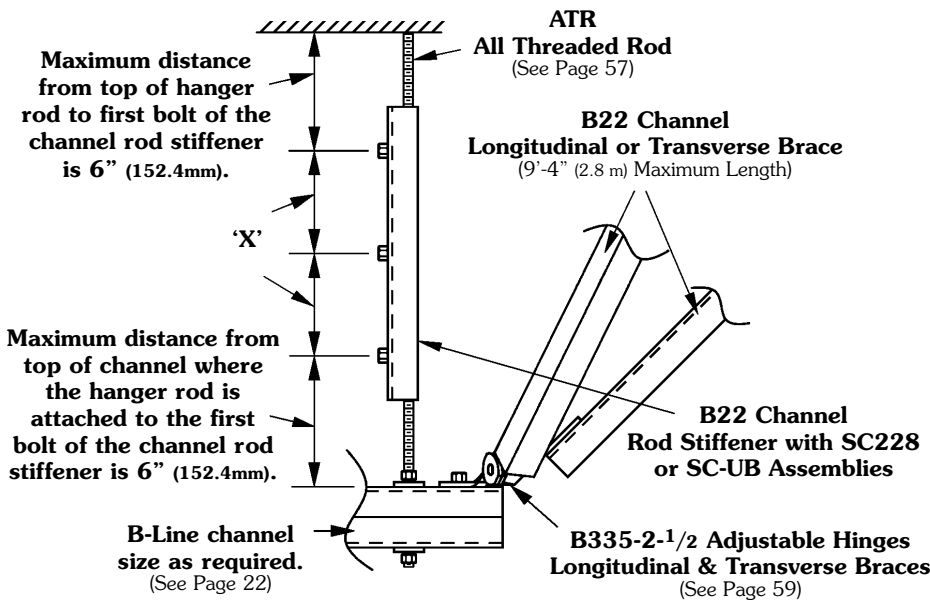


TABLE 7  
ROD STIFFENER CHART

ATR Size	X Max. Spacing Between SC-228 or SC-UB	
	in.	(mm)
3/8"-16	13"	(330.2)
1/2"-13	18"	(457.2)
5/8"-11	23"	(584.2)
3/4"-10	28"	(711.2)
7/8"-9	33"	(838.2)

Note: Minimum of (2) - SC228 or SC-UB are required per rod.

Rod Stiffeners required only on hanger rods that have seismic bracing attached to the hanger or trapeze.



Raafat S. Aboulhosh  
Structural Engineer S 3913

# B-Line

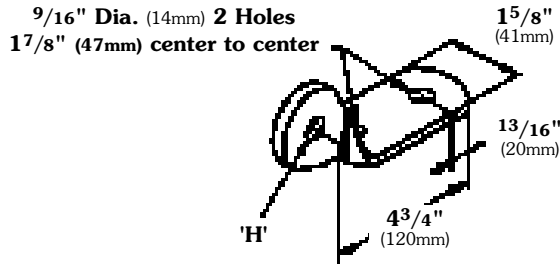
**COOPER B-Line**  
509 West Monroe Street  
Highland, Illinois 62249  
Phone: 800-851-7415  
Fax: 618-654-1917

Date: 6 - 2 - 06  
Page No. 58  
Sheet Number: \_\_\_ of \_\_\_



# APPROVED COMPONENTS

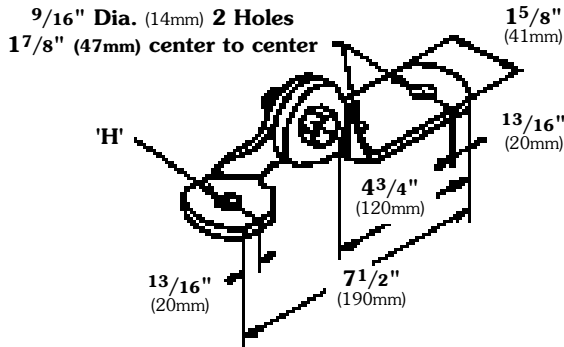
## SEISMIC APPROVAL: Longitudinal and Transverse Brace Attachments



Part No.	Hole Dia. 'H'	
	in.	(mm)
B335V-1/2	9/16"	(14)
B335V-5/8	11/16"	(17)
B335V-3/4	13/16"	(20)

Material Thickness: 1/4" (6 mm)

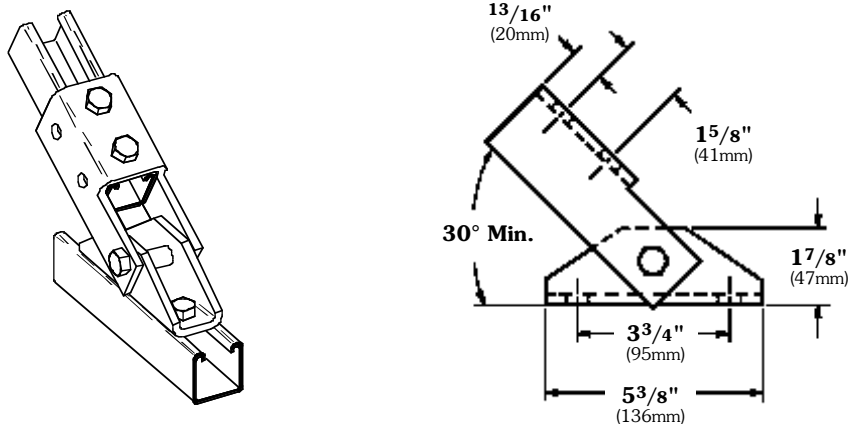
### B335V SERIES THREE HOLE ADJUSTABLE HALF HINGE



Part No.	Hole Dia. 'H'	
	in.	(mm)
B335-2-3/8	7/16"	(11)
B335-2-1/2	9/16"	(14)
B335-2-5/8	11/16"	(17)
B335-2-3/4	13/16"	(20)

Material Thickness: 1/4" (6 mm)

### B335-2 SERIES THREE HOLE ADJUSTABLE HINGE



### B634 SINGLE CHANNEL ADJUSTABLE HINGE

1/2" Channel Nuts & Bolts not included - order separately (see pages 61 & 62)

**Note: See Page 60 for alternate hinge types.**



# B-Line

**COOPER B-Line**  
509 West Monroe Street  
Highland, Illinois 62249  
Phone: 800-851-7415  
Fax: 618-654-1917

Date:

6 - 2 - 06

Page No.

59

Sheet Number:

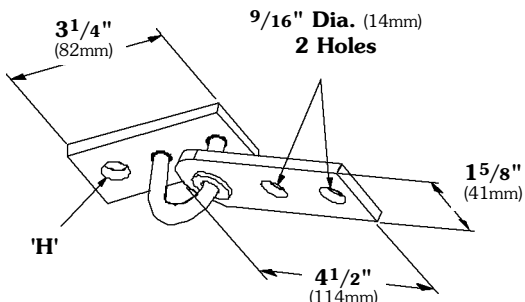
\_\_\_ of \_\_\_



Raafat S. Aboulhosn  
Structural Engineer

S 3913

**NOTE: B633 can be substituted for B335-2, in any detail, provided the hole diameter 'H' remains the same.**



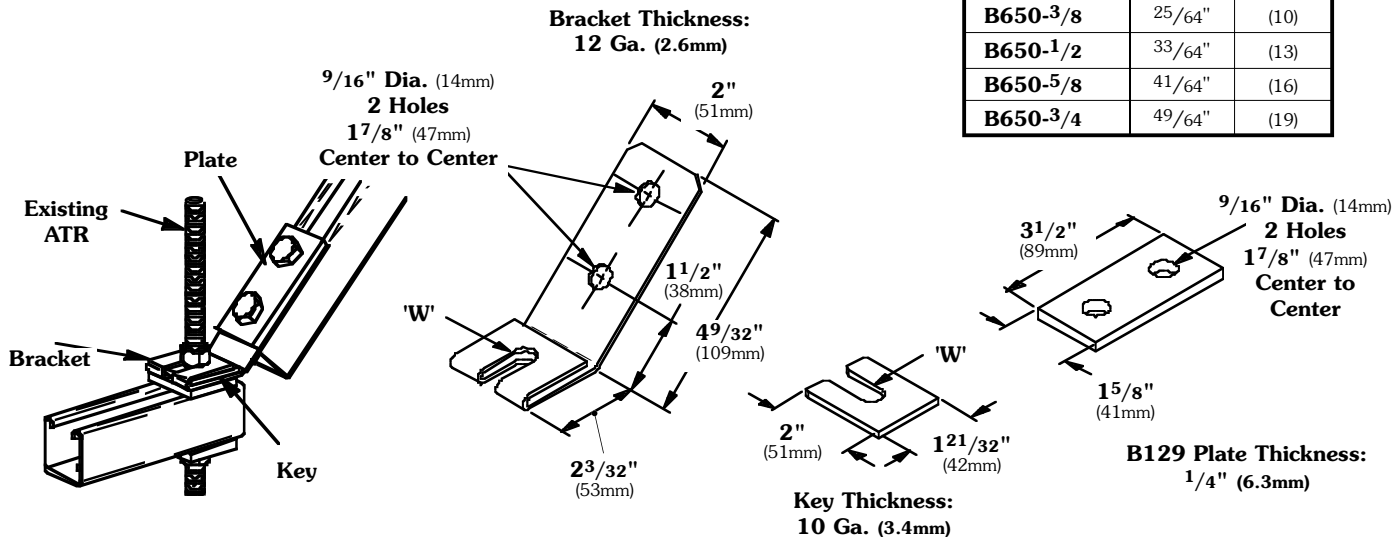
**SEISMIC APPROVAL:  
Longitudinal and Transverse  
Brace Attachments**

Part No.	Hole Dia. 'H'	
	in.	(mm)
B633-1/2	9/16"	(14)
B633-5/8	11/16"	(17)
B633-3/4	13/16"	(20)
B633-7/8	15/16"	(24)

Material Thickness: 1/4" (6 mm)

## B633 SERIES ADJUSTABLE SEISMIC HINGE FITTING

**NOTE: B650 can be substituted for B335-2, in any detail, provided the slot width 'W' remains the same as the 'H' of the B335-2.**



Part No.	Hole Dia. 'W'	
	in.	(mm)
B650-3/8	25/64"	(10)
B650-1/2	33/64"	(13)
B650-5/8	41/64"	(16)
B650-3/4	49/64"	(19)

**B129 Plate Thickness:  
1/4" (6.3mm)**

## B650 SERIES RETROFIT 45° SEISMIC BRACE FITTING



Raafat S. Aboulhosh  
Structural Engineer S 3913

# B-Line

**COOPER B-Line**  
509 West Monroe Street  
Highland, Illinois 62249  
Phone: 800-851-7415  
Fax: 618-654-1917

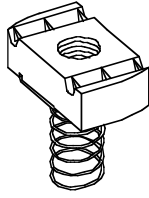
Date: 6 - 2 - 06	Page No. 60	Sheet Number: ___ of ___
---------------------	----------------	-----------------------------



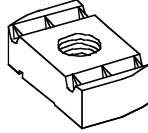
# APPROVED COMPONENTS

## Channel Nuts

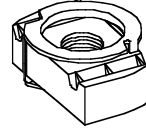
**SEISMIC APPROVAL:  
Longitudinal and Transverse  
Brace Attachments**



**Spring Nut  
(Nxxx)**



**Nut Without Spring  
(NxxxWO)**



**Twirl Nut  
(TNxxx)**

### Resistance to Slip

Thread Size	Nut Part Numbers	Resistance To Slip * In Channel				Nut Thickness	
		12 Ga. (2.6mm)		14 Ga. (1.9mm)		in.	(mm)
		lbs.	(kN)	lbs.	(kN)		
3/8"-16	<b>N228, N228WO, TN228</b>	800	(3.56)	600	(2.67)	3/8"	(9)
1/2"-13	<b>N225, N225WO, TN225</b>	1500	(6.67)	1000	(4.45)	1/2"	(13)
5/8"-11	<b>N255, N255WO</b>	1500	(6.67)	1000	(4.45)	1/2"	(13)
3/4"-10	<b>N275, N275WO</b>	1500	(6.67)	1000	(4.45)	1/2"	(13)
7/8"-9	<b>N278, N278WO</b>	1500	(6.67)	1000	(4.45)	1/2"	(13)

### Pull-Out Strength

Thread Size	Nut Part Numbers	Pull-Out Strength * In Channel				Nut Thickness	
		12 Ga. (2.6mm)		14 Ga. (1.9mm)		in.	(mm)
		lbs.	(kN)	lbs.	(kN)		
3/8"-16	<b>N228, N228WO, TN228</b>	1100	(4.89)	1000	(4.45)	3/8"	(9)
1/2"-13	<b>N225, N225WO, TN225</b>	2000	(8.90)	1400	(6.23)	1/2"	(13)
5/8"-11	<b>N255, N255WO</b>	2000	(8.90)	1400	(6.23)	1/2"	(13)
3/4"-10	<b>N275, N275WO</b>	2000	(8.90)	1400	(6.23)	1/2"	(13)
7/8"-9	<b>N278, N278WO</b>	2000	(8.90)	1400	(6.23)	1/2"	(13)

\* With a Safety Factor of 3.

Note: Required bolt torque shown in note D) page 9.



# B-Line

**COOPER B-Line**  
509 West Monroe Street  
Highland, Illinois 62249  
Phone: 800-851-7415  
Fax: 618-654-1917

Date:

6 - 2 - 06

Page No.

61

Sheet Number:

\_\_\_ of \_\_\_



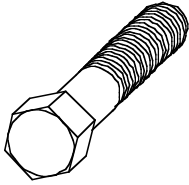
**Raafat S. Aboulhosn**  
Structural Engineer

S 3913

# APPROVED COMPONENTS

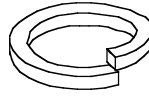
## Hardware

### SEISMIC APPROVAL: Longitudinal and Transverse Brace Attachments



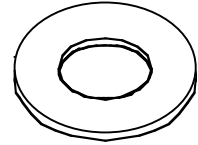
**HHCS - HEX HEAD CAP SCREWS**

(Example - HHCS 1/2 x 1 1/4)



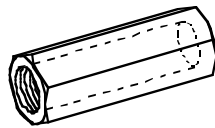
**LW - LOCK WASHERS**

(Example - LW 1/2)



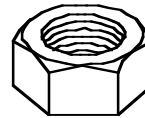
**FW - FLAT WASHERS**

(Example - FW 1/2)



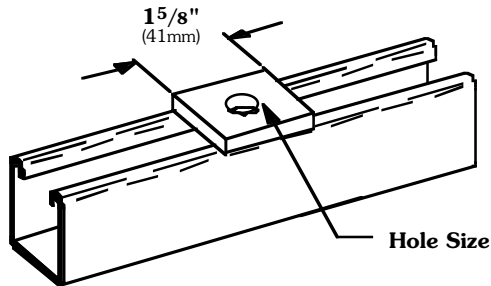
**B655 - ROD COUPLINGS**

(Example - B655-1/2)



**HN - HEX NUTS**

(Example - HN 1/2)



**B200 Series Square Washers**

Part No.	Hole Size		Bolt Size	
	in.	(mm)	in.	(mm)
<b>B200</b>	3/8"	(9)	5/16"	(8)
<b>B201</b>	7/16"	(11)	3/8"	(9)
<b>B202</b>	9/16"	(14)	1/2"	(13)
<b>B202-1</b>	11/16"	(17)	5/8"	(16)
<b>B202-2</b>	13/16"	(20)	3/4"	(19)
<b>B202-3</b>	15/16"	(24)	7/8"	(22)



Raafat S. Aboulhosh  
Structural Engineer S 3913

# B-Line

**COOPER B-Line**  
509 West Monroe Street  
Highland, Illinois 62249  
Phone: 800-851-7415  
Fax: 618-654-1917

Date:

6 - 2 - 06

Page No.

62

Sheet Number:

\_\_\_ of \_\_\_

