

# Seismic bracing products

for fire protection solutions,  
and mechanical, electrical &  
plumbing systems



*Powering Business Worldwide*

# For fire protection solutions



**Fig. 828**  
Universal Sway  
Brace Attachment  
to Steel  
Pages 3 & 4



**AWS Series**  
Powers Stud+ SD2  
Seismic Wedge Anchors  
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**Fig. 980**  
Universal Swivel  
Sway Brace  
Attachment  
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**Fig. 4L**  
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**Fig. 77**  
CPVC System Piping  
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# For mechanical, electrical & plumbing systems



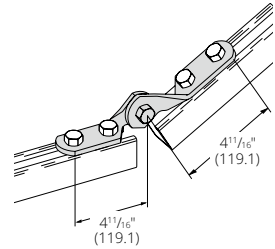
**Fig. 828**  
Universal Sway  
Brace Attachment  
to Steel  
Pages 3 & 4



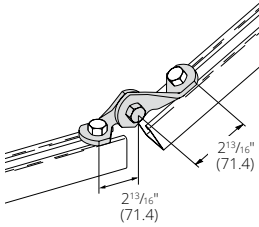
**AWS Series**  
Powers Stud+ SD2  
Seismic Wedge Anchors  
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**Fig. 980**  
Universal Swivel  
Sway Brace  
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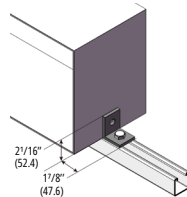
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**Figure 98B**  
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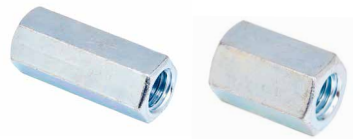
**9ZN-1205 & 9ZN-1208**  
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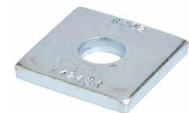
**9ZN-1241**  
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**B655**  
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# Seismic Bracing

## TOLCO Fig. 828 - universal sway brace attachment to steel (UL listed)

**Size Range:** One size accommodates all Fig. 900 Series sway brace attachments. Fits from  $\frac{3}{8}$ " (9.4mm) to  $\frac{7}{8}$ " (22.2mm) thick steel structure. For thicknesses less than  $\frac{3}{8}$ " (9.4mm) refer to Fig. 825 and Fig. 825A.

**Material:** Steel

**Function:** To attach sway bracing and/or hangers to various types of steel structural members.

**Features:** Permits secure non-friction connection without drilling or welding. Unique design allows offset placement on wide flange beam, C-channel, open web, welded steel trusses, etc. Secures brace to structure either across or along the beam. Break-off set bolts allow for visual verification of proper installation torque.

**Approvals:** Underwriters Laboratories Listed in the USA and Canada (cULus). Included in our Seismic Engineering Guidelines approved by the State of California Office of Statewide Health Planning and Development (OSHPD). For additional load, spacing and placement information relating to OSHPD projects, please refer to our Seismic Engineering Guidelines, OPM-0052-13.

**Installation Instructions:** The Fig. 828 is the structural attachment component of a longitudinal or lateral sway brace assembly. It is intended to be combined with a TOLCO transitional attachment, "bracing pipe" and a TOLCO "braced pipe" attachment to form a complete bracing assembly. NFPA 13 guidelines should be followed.

**To Install:** Slide the Fig. 828 on the flange of the beam, truss, or girder. Be sure the attachment is fully engaged to the rear of the opening. Tighten the cone point set screws until the heads break off. Remove the flange nut from the carriage bolt. Install a TOLCO swivel fitting (Fig. 909, 910, 980, \*986). Use flange nut to secure the swivel fitting.

\*Not UL listed when used in combination with Fig. 986

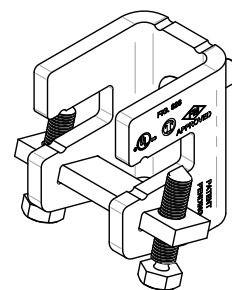
**Finish:** Plain or Electro-Galvanized

**Approx. Weight/100:** 341 Lbs. (154.7 kg)

**Order By:** Figure number and finish

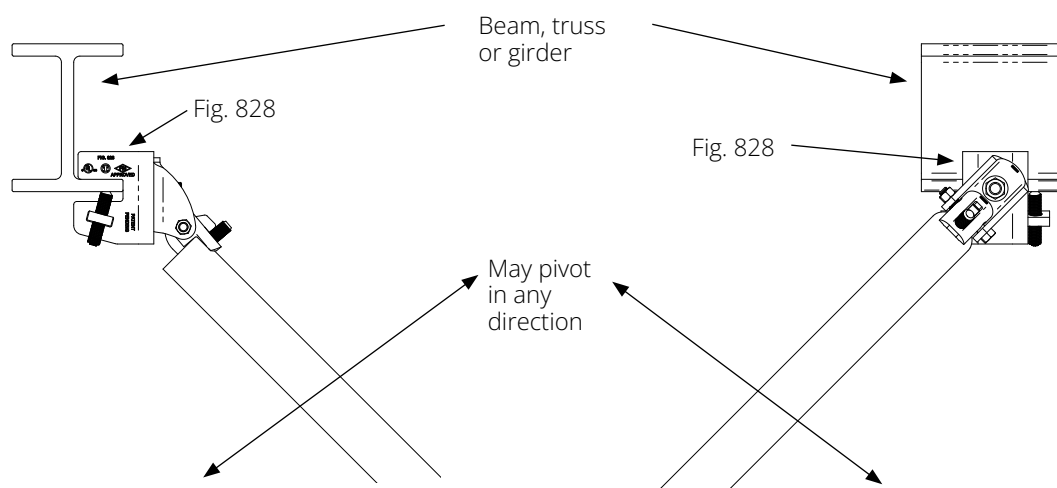
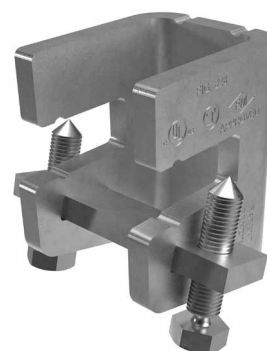
*Patent Pending*

**Note:** Retaining strap not required.



Set Screws  
and  
 $\frac{1}{2}$ " Attachment  
Bolt and Nut  
Included

Flange thickness	Maximum UL Rated load
.375" – .499"	1090 lbs. (4.84kN)
.500" – .875"	1370 lbs. (6.09kN)



Eaton's B-Line series seismic bracing components are designed to be compatible only with other B-Line series bracing components, resulting in a listed seismic bracing assembly. Eaton B-Line Division warranty for seismic bracing components will be the warranty provided in Eaton B-Line Division standard terms and conditions of sale made available by Eaton, except that, in addition to the other exclusions from Eaton B-Line Division warranty, Eaton makes no warranty relating to B-Line series seismic bracing components that are combined with products not provided by Eaton.

# Seismic Bracing

## TOLCO Fig. 828 - Universal sway brace attachment to steel (FM approved)

**Size Range:** One size accommodates all Fig. 900 Series sway brace attachments. Fits from  $\frac{3}{8}$ " (9.4mm) to  $\frac{7}{8}$ " (22.2mm) thick steel structure. For thicknesses less than  $\frac{3}{8}$ " (9.4mm) refer to Fig. 825.

**Material:** Steel

**Function:** To attach sway bracing and/or hangers to various types of steel structural members.

**Features:** Permits secure non-friction connection without drilling or welding. Unique design allows offset placement on wide flange beam, C-channel, open web, welded steel trusses, etc. Secures brace to structure either across or along the beam. Break-off set bolts allow for visual verification of proper installation torque.

**Approvals:** Factory Mutual Approved (FM). Included in our Seismic Engineering Guidelines approved by the State of California Office of Statewide Health Planning and Development (OSHPD). For additional load, spacing and placement information relating to OSHPD projects, please refer to our Seismic Engineering Guidelines, OPM-0052-13.

**Installation Instructions:** The Fig. 828 is the structural attachment component of a longitudinal or lateral sway brace assembly. It is intended to be combined with a TOLCO™ transitional attachment, "bracing pipe" and a TOLCO "braced pipe" attachment to form a complete bracing assembly. NFPA 13 or FM guidelines should be followed.

**To Install:** Slide the Fig. 828 on the flange of the beam, truss, or girder. Be sure the attachment is fully engaged to the rear of the opening. Tighten the cone point set screws until the heads break off. Remove the flange nut from the carriage bolt. Install a TOLCO swivel fitting (Fig. 909, 910, 980, \*986). Use flange nut to secure the swivel fitting.

\*Not UL listed when used in combination with Fig. 986

**Finish:** Plain or Electro-Galvanized

**Approx. Weight/100:** 341 Lbs. (154.7kg)

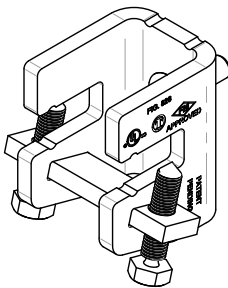
**Order By:** Figure number and finish

*Patent Pending*

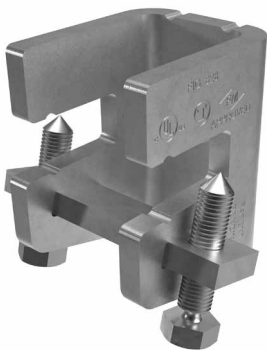
Designed to meet or exceed requirements of FM DS 2-8.

**Note:** Retaining strap not required.

OPM



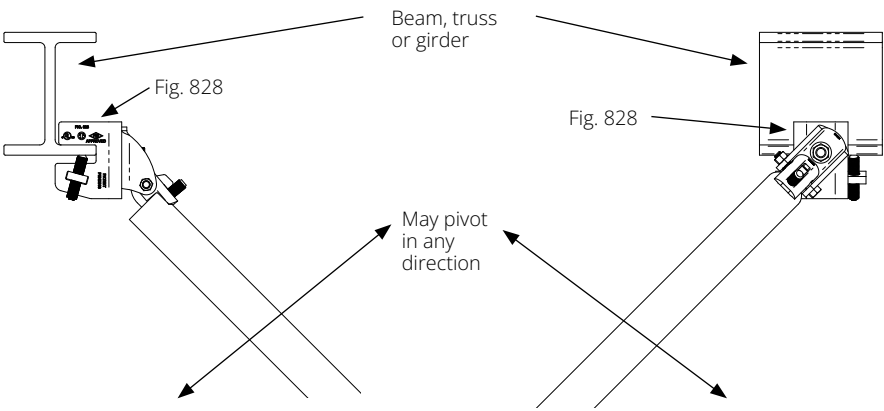
Set Screws  
and  
 $\frac{1}{2}$ " Attachment  
Bolt and Nut  
Included



FM Approved Allowable Horizontal Load With Brace Perpendicular To Beam				
Brace Angle (degrees from vertical)				
30°-44°	45°-59°	60°-74°	75°-90°	
980	2220	3340	4040	
(4.350kN)	(9.780kN)	(14.850kN)	(17.970kN)	

FM Approved Allowable Horizontal Load With Brace Parallel To Beam				
Brace Angle (degrees from vertical)				
30°-44°	45°-59°	60°-74°	75°-90°	
820	1270	1490	1650	
(3.640kN)	(5.640kN)	(6.620kN)	(7.330kN)	



FM Approved design loads are based on ASD design method.

Eaton's B-Line series seismic bracing components are designed to be compatible only with other B-Line series bracing components, resulting in a listed seismic bracing assembly. Eaton B-Line Division warranty for seismic bracing components will be the warranty provided in Eaton B-Line Division standard terms and conditions of sale made available by Eaton, except that, in addition to the other exclusions from Eaton B-Line Division warranty, Eaton makes no warranty relating to B-Line series seismic bracing components that are combined with products not provided by Eaton.

# Seismic Structural Attachments

## AWSD series - Power Stud+<sup>®†</sup> SD2 seismic wedge anchors

### Features:

- Fully threaded, torque-controlled, wedge anchor which is designed for consistent performance in cracked and uncracked concrete.
- For use in concrete, structural sand lightweight concrete, and concrete over metal deck.
- Nominal drill bit size is the same as the anchor diameter.
- ICC-ES listed, ESR-2502, Category 1
- Zinc plated carbon steel body with stainless steel expansion clip from premium performance.
- Qualified for seismic and wind loading.

**Approvals:** Included in our Seismic Engineering Guidelines approved by the State of California Office of Statewide Health Planning and Development (OSHPD). For additional load, spacing and placement information relating to OSHPD projects, please refer to our Seismic Engineering Guidelines, OPM-0052-13.

**ICC-ES** Certified. See ICC-ESR-2502

**UL** (Underwriters Laboratories) Listed

**FM** (Factory Mutual) Approved

Refer to pages 11-20 through 11-23 in Seismic Engineering Guidelines OPM-0052-13 for approval OSHPD structural attachment data.

**Order By:** Part number



**OPM**



Seismic Wedge Anchor - Data	3/8"-16	1/2"-13	5/8"-11	3/4"-10
ANSI Drill Bit Size (in. - mm)	3/8" - (9.5mm)	1/2" - (12.7mm)	5/8" - (15.9mm)	3/4" - (19.0mm)
Fixture Clearance Hole (in. - mm)	7/16" - (11.1mm)	9/16" - (14.3mm)	11/16" - (17.5mm)	13/16" - (20.6mm)
Minimum Hole Depth (in. - mm)	2 5/8" - (66.7mm)	2 3/4" - (69.8mm)	4 1/4" - (107.9mm)	5" - (127.0mm)
Minimum Concrete Thickness (in. - mm)	4" - (101.6mm)	4 1/2" - (114.3mm)	5 3/4" - (146.0mm)	7" - (177.8mm)
Max. Tightening Torque (lbs•ft - N•m)	20 lbs•ft - (27.1N•m)	40 lbs•ft - (54.2N•m)	60 lbs•ft - (81.3N•m)	110 lbs•ft - (149.1N•m)
Min. Embedment Depth (in. - mm)	2 3/8" - (60.3mm)	2 1/2" - (63.5mm)	3 7/8" - (98.4mm)	4 1/2" - (114.3mm)

For loading information, refer to the ICC-ES ESR-2502 evaluation report.

Part No.	Anchor Size					
	Diameter in. (mm)	Length in. (mm)	Thread Length in. (mm)		Wt./100 lbs. (kg)	
AWSD-37-300	3/8" (9.5)	3" (76.2)	1 3/4" (44.4)		11.4	(5.2)
AWSD-37-350	3/8" (9.5)	3 1/2" (88.9)	2 1/4" (57.1)		12.2	(5.5)
AWSD-37-375	3/8" (9.5)	3 3/4" (95.2)	2 1/2" (63.5)		13.2	(6.0)
AWSD-37-500	3/8" (9.5)	5" (127.0)	3 3/4" (95.2)		16.0	(7.2)
AWSD-50-375	1/2" (12.7)	3 3/4" (95.2)	2 1/8" (54.0)		23.0	(10.4)
AWSD-50-450	1/2" (12.7)	4 1/2" (114.3)	2 7/8" (73.0)		26.6	(12.0)
AWSD-50-550	1/2" (12.7)	5 1/2" (139.7)	3 7/8" (98.4)		34.0	(15.4)
AWSD-50-700	1/2" (12.7)	7" (177.8)	5 3/8" (136.5)		38.0	(17.2)
AWSD-62-475	5/8" (15.9)	4 3/4" (120.6)	2 7/8" (73.0)		50.3	(22.8)
AWSD-62-500	5/8" (15.9)	5" (127.0)	3 1/8" (79.4)		52.0	(23.6)
AWSD-62-600	5/8" (15.9)	6" (152.4)	4 1/8" (104.8)		58.8	(26.7)
AWSD-62-700	5/8" (15.9)	7" (177.8)	5 1/8" (130.2)		65.2	(29.6)
AWSD-75-550	3/4" (19.0)	5 1/2" (139.7)	3 1/4" (82.5)		81.5	(36.9)
AWSD-75-625	3/4" (19.0)	6 1/4" (158.7)	4" (101.6)		94.0	(42.6)
AWSD-75-700	3/4" (19.0)	7" (177.8)	4 3/4" (120.6)		106.5	(48.3)

Power Stud+<sup>®</sup> SD2 is a registered trademark used by DeWalt.

# Seismic Bracing

## Fig. 980 - TOLCO Universal swivel sway brace attachment - $\frac{3}{8}$ "-16 to $\frac{3}{4}$ "-10 rods Fig. 980H - TOLCO Universal swivel sway brace attachment - $\frac{7}{8}$ "-9 to $1\frac{1}{4}$ "-7

**Size Range:** One size fits bracing pipe 1" (25mm) thru 2" (50mm), B-Line series 12 gauge (2.6mm) channel.

**Material:** Carbon steel

**Function:** Multi-functional attachment to structure or braced pipe fitting.

**Features:** This product's design incorporates a concentric attachment opening which is critical to the performance of structural seismic connections and in accordance with NFPA 13, 2019 Section 18.5.11.5. The Fig. 980 mounts to any surface angle and the break off bolt head assures verification of proper installation.

**Installation:** Fig.980 is the structural or transitional attachment component of a longitudinal or lateral sway brace assembly. It is intended to be combined with the "bracing pipe" and TOLCO™ "braced pipe" attachment, Fig. 1001, 2002, 3000, 4L or approved attachment to pipe to form a complete bracing assembly. NFPA 13 guidelines should be followed.

**To Install:** Place the Fig. 980 onto the "bracing pipe". Tighten the set bolt until the head breaks off. Attachment can pivot for adjustment to proper brace angle.

**Approvals:** —Underwriters Laboratories Listed in the USA (UL) and Canada (cUL). UL Listed for the following brace member type pipes: Sch. 40, KSD 3562. Ask the factory for additional information as it may vary by product size. Included in our Seismic Engineering Guidelines approved by the State of California Office of Statewide Health Planning and Development (OSHDP). For additional load, spacing and placement information relating to OSHDP projects, please refer to our Seismic Engineering Guidelines, OPM-0052-13.

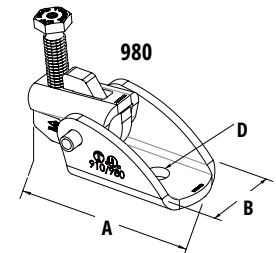
**Note:** Fig. 980 Swivel Attachment and Fig. 1001, 2002, 3000, 4L, or approved attachment to pipe make up a sway brace system of UL Listed attachments and bracing materials which satisfies the requirements of Underwriters Laboratories and the National Fire Protection Association (NFPA)

**Finish:** Plain, Electro-Galvanized or Stainless Steel.

Contact customer service for alternative finishes.

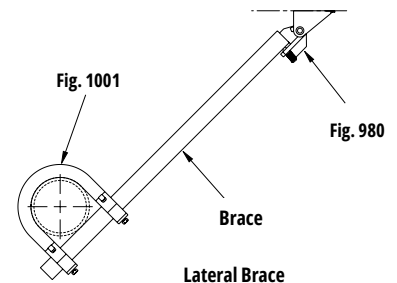
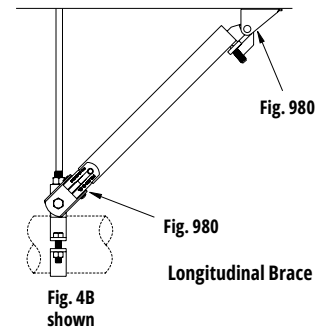
**Order By:** Figure number and finish.

Pat. #6,273,372, Pat. #6,517,030, Pat. #6,953,174,  
Pat. #6,708,930, Pat. #7,191,987, Pat. #7,441,730,  
Pat. #7,669,806



Set Bolt  
Included

Mounting Hardware  
Is Not Included



Catalog #	A in. (mm)	B in. (mm)	D** in. (mm)	Max. Design Load (cULus) lbs./ (kN)	Approx.Wt./100 lbs. (kg)
*980- $\frac{3}{8}$			$\frac{7}{16}$ (11.1)	1600 (7.12)	149 (67.6)
*980- $\frac{1}{2}$	$\frac{4}{16}$ (114.9)	$\frac{2}{16}$ (52.4)	$\frac{9}{16}$ (14.3)	2100 (9.34)	148 (67.1)
*980- $\frac{5}{8}$			$\frac{11}{16}$ (17.5)	2100 (9.34)	147 (66.7)
*980- $\frac{3}{4}$			$\frac{13}{16}$ (20.6)	2100 (9.34)	146 (66.2)
980H- $\frac{7}{8}$			$\frac{15}{16}$ (23.8)		402 (182.3)
980H-1	$\frac{6}{4}$ (171.4)	$\frac{3}{2}$ (88.9)	$1\frac{1}{16}$ (27.0)	Fig. 980H is not UL Listed or FM Approved	400 (181.4)
980H- $1\frac{1}{8}$			$1\frac{3}{16}$ (30.2)		397 (180.1)
980H- $1\frac{1}{4}$			$1\frac{5}{16}$ (33.3)		390 (176.9)

\* Sizes available in stainless steel (980S- $\frac{3}{8}$ , 980S- $\frac{1}{2}$ , 980S- $\frac{5}{8}$ , and 980S- $\frac{3}{4}$ ) and have the same UL rating as what is listed.

\*\* Mounting attachment hole size.

Eaton's B-Line series seismic bracing components are designed to be compatible only with other B-Line series bracing components, resulting in a listed seismic bracing assembly. Eaton B-Line Division warranty for seismic bracing components will be the warranty provided in Eaton B-Line Division standard terms and conditions of sale made available by Eaton, except that, in addition to the other exclusions from Eaton B-Line Division warranty, Eaton makes no warranty relating to B-Line series seismic bracing components that are combined with products not provided by Eaton.

# Seismic Bracing

**Fig. 980 - TOLCO Universal swivel sway brace attachment -  $\frac{3}{8}$ "-16 to  $\frac{3}{4}$ "-10 rods**  
**Fig. 980H - TOLCO Universal swivel sway brace attachment -  $\frac{7}{8}$ "-9 to  $1\frac{1}{4}$ "-7**

**Size Range:** One size fits bracing pipe 1" (25mm) thru 2" (50mm), B-Line series 12 gauge (2.6mm) channel.

**Material:** Carbon steel

**Function:** Multi-functional attachment to structure or braced pipe fitting.

**Features:** This product's design incorporates a concentric attachment opening which is critical to the performance of structural seismic connections and in accordance with NFPA 13, 2019 Section 18.5.11.5. The Fig. 980 mounts to any surface angle and the break off bolt head assures verification of proper installation.

**Installation:** Fig.980 is the structural or transitional attachment component of a longitudinal or lateral sway brace assembly. It is intended to be combined with the "bracing pipe" and TOLCO™ "braced pipe" attachment, Fig. 1000, 1001, 3000 (OPM only), 4L, or other TOLCO approved attachment to pipe to form a complete bracing assembly. NFPA 13 guidelines should be followed.

**To Install:** Place the Fig. 980 onto the "bracing pipe". Tighten the set bolt until the head breaks off. Attachment can pivot for adjustment to proper brace angle.

**Approvals:** —Approved by Factory Mutual Engineering (FM). Included in our Seismic Engineering Guidelines approved by the State of California Office of Statewide Health Planning and Development (OSHDP). For additional load, spacing and placement information relating to OSHDP projects, please refer to our Seismic Engineering Guidelines, OPM-0052-13.

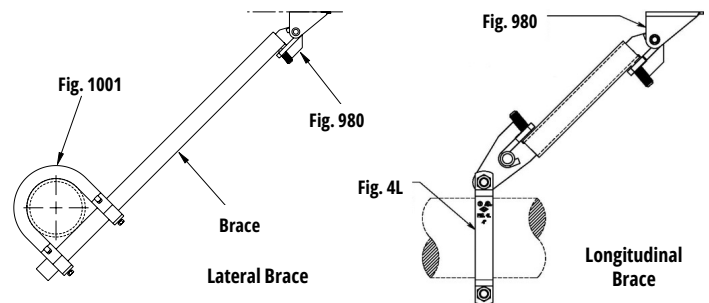
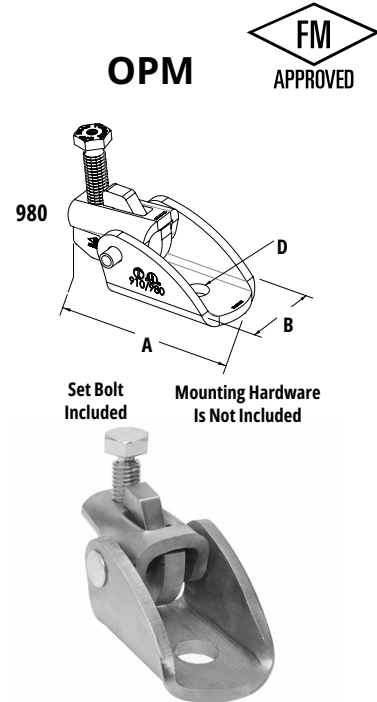
**Note:** Fig. 980 Swivel Attachment and Fig. 1000, 1001, 4L or other TOLCO approved attachment to pipe that make up a sway brace system of bracing materials which satisfies the requirements of Factory Mutual Engineering and the National Fire Protection Association (NFPA)

**Finish:** Plain, Electro-Galvanized or Stainless Steel.  
Contact customer service for alternative finishes.

**Order By:** Figure number and finish.

Pat. #6,273,372, Pat. #6,517,030, Pat. #6,953,174,  
Pat. #6,708,930, Pat. #7,191,987, Pat. #7,441,730,  
Pat. #7,669,806

Designed to meet or exceed requirements of FM DS 2-8.



Catalog #	A in. (mm)	B in. (mm)	D** in. (mm)	Max. Design Load*** (FM)				Approx.Wt./100	
				30°-44° lbs./ (kN)	45°-59° lbs./ (kN)	60°-74° lbs./ (kN)	75°-90° lbs./ (kN)	lbs.	(kg)
980- $\frac{3}{8}$	$4\frac{9}{16}$ (114.9)	$2\frac{1}{16}$ (52.4)	$\frac{7}{16}$ (11.1)					149	(67.6)
980- $\frac{1}{2}$			$\frac{9}{16}$ (14.3)	2370 (10.54)	2790 (12.41)	3360 (14.94)	3750 (16.68)	148	(67.1)
980- $\frac{5}{8}$			$\frac{11}{16}$ (17.5)					147	(66.7)
980- $\frac{3}{4}$	$6\frac{3}{4}$ (171.4)	$3\frac{1}{2}$ (88.9)	$\frac{13}{16}$ (20.6)					146	(66.2)
980H- $\frac{7}{8}$			$\frac{15}{16}$ (23.8)	Fig. 980H is not UL Listed or FM Approved				402	(182.3)
980H-1			$1\frac{1}{16}$ (27.0)					400	(181.4)
980H- $1\frac{1}{8}$			$\frac{13}{16}$ (30.2)					397	(180.1)
980H- $1\frac{1}{4}$			$1\frac{5}{16}$ (33.3)					390	(176.9)

\*\* Mounting attachment hole size.

\*\*\* Installed with 1" or  $1\frac{1}{4}$ " schedule 40 brace pipe.

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# Seismic Bracing

## TOLCO Fig. 4L - sway brace attachment (UL listed)

**Size Range:** 1" (25mm) through 8" (200mm) IPS. 10" (250mm) and 12" (300mm) not UL listed

**Material:** Steel and stainless steel.

**Function:** For bracing pipe against sway and seismic disturbance.

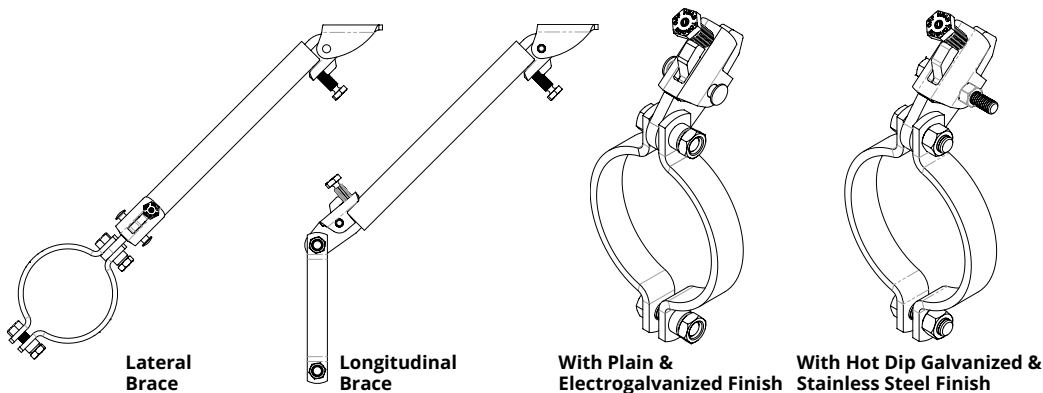
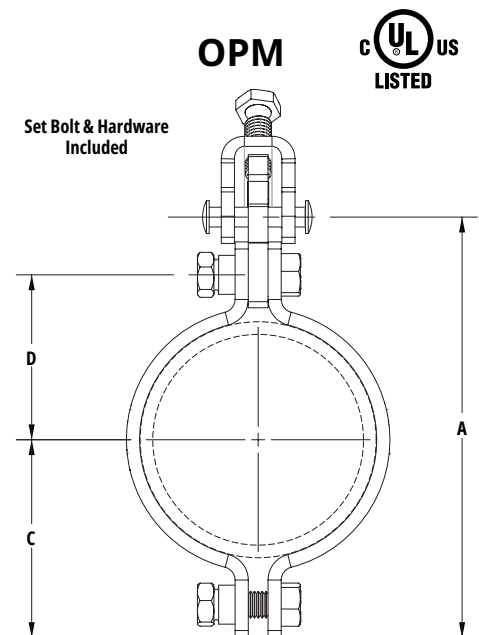
**Approvals:** Underwriters Laboratories Listed in the USA (UL) and Canada (cUL) 1" (25mm) through 8" (200mm) pipe. UL Listed for the following sprinkler type pipes: Sch. 40, Sch. 10, Bull Moose Eddy Flow, Wheatland Mega Flow, DIN 2448, KSD 3562, KSD 3507. Ask the factory for additional information as it may vary by product size. Included in our Seismic Engineering Guidelines approved by the State of California Office of Statewide Health Planning and Development (OSHPD). For additional load, spacing and placement information relating to OSHPD projects, please refer to our Seismic Engineering Guidelines, OPM-0052-13.

**Installation Instructions:** Fig. 4L is the "braced pipe" attachment component of a longitudinal and lateral sway brace assembly. It is intended to be combined with the "bracing pipe" and TOLCO structural attachment component to form a complete bracing assembly. NFPA 13 guidelines should be followed. (For complete detailed instructions see instruction sheet [IL309015EN](#)).

**To Install:** Place the Fig. 4L over the pipe to be braced and tighten bolts. Then engage "bracing pipe" into jaw opening and tighten set bolt until head snaps off. Jaw attachment can pivot for adjustment to proper brace angle.

**Finish:** Plain, Electrogalvanized, Hot Dip Galvanized or Stainless Steel (only for 4" & 6" sizes).

**Order By:** Figure number, pipe size and finish.



Part No.	Nom Pipe Size		A (Max) in.	C in.	D in.	Bolt Size in.	UL Max. Rec. Load		PLN & EG. Approx. Wt./100 lbs.
	in.	(mm)					Logitudinal lbs.	Lateral lbs.	
4L-1	1	(25)	5	2	1 <sup>3</sup> / <sub>8</sub>	1/2-13	1000	1000	176
4L-1 <sup>1</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>4</sub>	(32)	5 <sup>1</sup> / <sub>7</sub>	2 <sup>1</sup> / <sub>16</sub>	1 <sup>5</sup> / <sub>9</sub>	1/2-13	1000	1000	182
4L-1 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>2</sub>	(40)	5 <sup>1</sup> / <sub>2</sub>	2 <sup>1</sup> / <sub>3</sub>	1 <sup>2</sup> / <sub>3</sub>	1/2-13	1000	1000	187
4L-2	2	(50)	6 <sup>2</sup> / <sub>7</sub>	2 <sup>2</sup> / <sub>3</sub>	2	1/2-13	1600	1000	204
4L-2 <sup>1</sup> / <sub>2</sub>	2 <sup>1</sup> / <sub>2</sub>	—	6 <sup>7</sup> / <sub>9</sub>	3	2 <sup>1</sup> / <sub>3</sub>	1/2-13	2000	1000	217
4L-65mm	—	(65)	6 <sup>7</sup> / <sub>9</sub>	3	2 <sup>1</sup> / <sub>3</sub>	1/2-13	700	1000	214
4L-3	3	(80)	7 <sup>3</sup> / <sub>7</sub>	3 <sup>1</sup> / <sub>4</sub>	2 <sup>5</sup> / <sub>8</sub>	1/2-13	2000	1000	323
4L-3 <sup>1</sup> / <sub>2</sub>	3 <sup>1</sup> / <sub>2</sub>	(90)	8	3 <sup>1</sup> / <sub>2</sub>	2 <sup>7</sup> / <sub>8</sub>	1/2-13	2000	1000	343
4L-4***	4	(100)	8 <sup>7</sup> / <sub>7</sub>	3 <sup>3</sup> / <sub>4</sub>	3 <sup>1</sup> / <sub>8</sub>	1/2-13	2000**	1000	253
4L-5	5	—	9 <sup>5</sup> / <sub>9</sub>	4 <sup>3</sup> / <sub>8</sub>	3 <sup>5</sup> / <sub>8</sub>	1/2-13	2000**	1600*	314
4L-125mm	—	(125)	9 <sup>5</sup> / <sub>9</sub>	4 <sup>3</sup> / <sub>8</sub>	3 <sup>5</sup> / <sub>8</sub>	1/2-13	1200	1600*	314
4L-6***	6	—	11 <sup>3</sup> / <sub>7</sub>	5 <sup>1</sup> / <sub>3</sub>	4 <sup>4</sup> / <sub>7</sub>	1/2-13	2000	1600*	540
4L-150mm	—	(150)	11 <sup>3</sup> / <sub>7</sub>	5 <sup>1</sup> / <sub>3</sub>	4 <sup>4</sup> / <sub>7</sub>	1/2-13	1200	1600*	538
4L-8	8	—	13 <sup>3</sup> / <sub>5</sub>	6 <sup>2</sup> / <sub>5</sub>	5 <sup>2</sup> / <sub>3</sub>	1/2-13	2000	2100*	645
4L-200mm	—	(200)	13 <sup>3</sup> / <sub>5</sub>	6 <sup>2</sup> / <sub>5</sub>	5 <sup>2</sup> / <sub>3</sub>	1/2-13	1400	2100*	643
4L-10****	10	(254)	17 <sup>3</sup> / <sub>5</sub>	8 <sup>1</sup> / <sub>4</sub>	7 <sup>1</sup> / <sub>4</sub>	1/2-13	NA	NA	1349
4L-12****	12	(300)	19 <sup>3</sup> / <sub>5</sub>	9 <sup>1</sup> / <sub>4</sub>	8 <sup>1</sup> / <sub>4</sub>	1/2-13	NA	NA	1526

\* Only UL listed as a lateral brace for use with a 1" (25mm) pipe as the brace member.

\*\* Only UL listed as a longitudinal brace for use with a 1" (25mm) thru 1<sup>1</sup>/<sub>2</sub>" (40mm) pipe as the brace member.

\*\*\* Fig 4L-4 and Fig 4L-6 are only sizes available in stainless steel 316.

\*\*\*\* FM approved not UL listed.

Eaton's B-Line series seismic bracing components are designed to be compatible only with other B-Line series bracing components, resulting in a listed seismic bracing assembly. Eaton B-Line Division warranty for seismic bracing components will be the warranty provided in Eaton B-Line Division standard terms and conditions of sale made available by Eaton, except that, in addition to the other exclusions from Eaton B-Line Division warranty, Eaton makes no warranty relating to B-Line series seismic bracing components that are combined with products not provided by Eaton.

All dimensions in charts and on drawings are in inches. Dimensions shown in parentheses are in millimeters unless otherwise specified.

# Seismic Bracing

## TOLCO Fig. 4L - sway brace attachment (FM approved)

**Size Range:** 1" (25mm) through 12" (300mm) IPS.

**Material:** Steel.

**Function:** For bracing pipe against sway and seismic disturbance.

**Approvals:** Approved by Factory Mutual Engineering (FM), 1" (25mm) through 12" (300mm) pipe. Included in our Seismic Engineering Guidelines approved by the State of California Office of Statewide Health Planning and Development (OSHPD). For additional load, spacing and placement information relating to OSHPD projects, please refer to our Seismic Engineering Guidelines, OPM-0052-13.

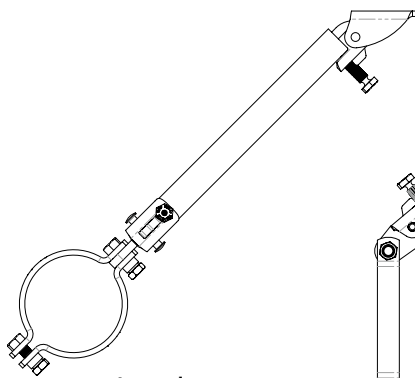
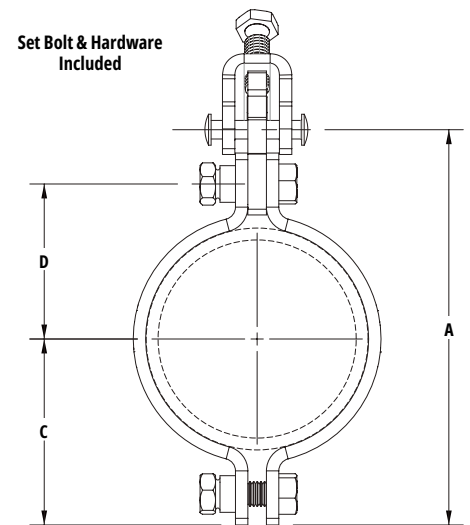
**Installation Instructions:** Fig. 4L is the "braced pipe" attachment component of a longitudinal and lateral sway brace assembly. It is intended to be combined with the "bracing pipe" and TOLCO™ structural attachment component to form a complete bracing assembly. NFPA 13 and/or FM guidelines should be followed.

**To Install:** Place the Fig. 4L over the pipe to be braced and tighten bolts. Then engage "bracing pipe" into jaw opening and tighten set bolt until head snaps off. Jaw attachment can pivot for adjustment to proper brace angle. (For complete detailed instructions see instruction sheet [IL309015EN](#)).

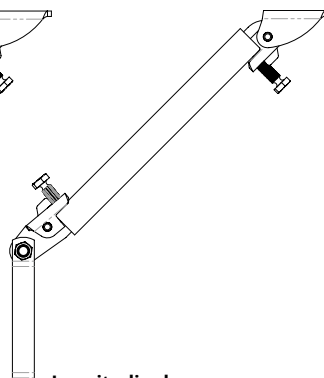
**Finish:** Plain, Electrogalvanized.

**Order By:** Figure number, pipe size and finish.

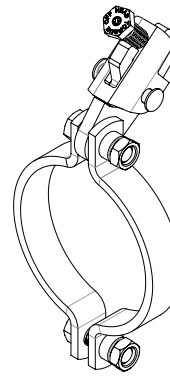
Designed to meet or exceed requirements of FM DS 2-8.



Lateral  
Brace



Longitudinal  
Brace



With Plain &  
Electrogalvanized Finish



Part No.	Nom Pipe Size in. (mm)		A (Max) in.	C in.	D in.	Bolt Size in.	FM Max. Rec. Load Logitudinal				FM Max. Rec. Load Lateral				Approx. Wt./100 lbs.
							30°-44° lbs. (kN)	45°-59° lbs. (kN)	60°-74° lbs. (kN)	75°-90° lbs. (kN)	30°-44° lbs. (kN)	45°-59° lbs. (kN)	60°-74° lbs. (kN)	75°-90° lbs. (kN)	
4L-1	1	(25)	5	2	1 3/8	1/2-13	1060 (4.72)	1160 (5.16)	1400 (6.23)	1500 (6.68)	1370 (6.10)	1940 (8.63)	2380 (10.59)	2650 (11.79)	176
4L-1 1/4	1 1/4	(32)	5 1/2	2 1/16	1 5/8	1/2-13	1060 (4.72)	1160 (5.16)	1400 (6.23)	1500 (6.68)	1370 (6.10)	1940 (8.63)	2380 (10.59)	2650 (11.79)	182
4L-1 1/2	1 1/2	(40)	5 1/2	2 1/3	1 3/4	1/2-13	740 (3.30)	1020 (4.54)	1250 (5.57)	920 (4.10)	1370 (6.10)	1940 (8.63)	2380 (10.59)	2650 (11.79)	187
4L-2	2	(50)	6 7/8	2 2/3	2	1/2-13	740 (3.30)	1020 (4.54)	1250 (5.57)	920 (4.10)	1420 (6.32)	1990 (8.86)	2440 (10.86)	2720 (12.10)	204
4L-2 1/2	2 1/2	—	6 7/8	3	2 1/3	1/2-13	520 (2.32)	650 (2.90)	790 (3.52)	1040 (4.63)	1410 (6.28)	1990 (8.86)	2440 (10.86)	2720 (12.10)	220
4L-65mm	—	(65)	6 7/8	3	2 1/3	1/2-13	520 (2.32)	650 (2.90)	790 (3.52)	1040 (4.63)	1410 (6.28)	1990 (8.86)	2440 (10.86)	2720 (12.10)	218
4L-3	3	(80)	7 3/4	3 1/4	2 5/8	1/2-13	520 (2.32)	650 (2.90)	790 (3.52)	1040 (4.63)	1410 (6.28)	1990 (8.86)	2440 (10.86)	2720 (12.10)	323
4L-3 1/2	3 1/2	(90)	8	3 1/2	2 7/8	1/2-13	520 (2.32)	650 (2.90)	790 (3.52)	1040 (4.63)	1410 (6.28)	1990 (8.86)	2440 (10.86)	2720 (12.10)	343
4L-4	4	(100)	8 3/4	3 3/4	3 1/8	1/2-13	520 (2.32)	650 (2.90)	790 (3.52)	1040 (4.63)	1410 (6.28)	1990 (8.86)	2440 (10.86)	2720 (12.10)	253
4L-5	5	—	9 5/8	4 3/8	3 5/8	1/2-13	520 (2.32)	650 (2.90)	790 (3.52)	1040 (4.63)	1410 (6.28)	1990 (8.86)	2440 (10.86)	2720 (12.10)	313
4L-125mm	—	(125)	9 5/8	4 3/8	3 5/8	1/2-13	520 (2.32)	650 (2.90)	790 (3.52)	1040 (4.63)	1410 (6.28)	1990 (8.86)	2440 (10.86)	2720 (12.10)	312
4L-6	6	—	11 3/8	5 1/3	4 7/8	1/2-13	870 (3.87)	1200 (5.34)	1460 (6.50)	1630 (7.26)	1560 (6.94)	2210 (9.84)	2710 (12.06)	3020 (13.44)	540
4L-150mm	—	(150)	11 3/8	5 1/3	4 7/8	1/2-13	870 (3.87)	1200 (5.34)	1460 (6.50)	1630 (7.26)	1560 (6.94)	2210 (9.84)	2710 (12.06)	3020 (13.44)	538
4L-8	8	—	13 3/5	6 2/5	5 1/2	1/2-13	1190 (5.30)	1440 (6.41)	1580 (7.03)	1750 (7.79)	1560 (6.94)	2210 (9.84)	2710 (12.06)	3020 (13.44)	645
4L-200mm	—	(200)	13 3/5	6 2/5	5 1/2	1/2-13	1190 (5.30)	1440 (6.41)	1580 (7.03)	1750 (7.79)	1560 (6.94)	2210 (9.84)	2710 (12.06)	3020 (13.44)	643
4L-10	10	(254)	17 3/5	8 1/4	7 1/4	1/2-13	1620 (7.21)	1660 (7.38)	1570 (6.98)	1740 (7.74)	1620 (7.21)	2300 (10.23)	2820 (12.54)	3140 (13.97)	1349
4L-12	12	(300)	19 3/5	9 1/4	8 1/4	1/2-13	1620 (7.21)	1660 (7.38)	1570 (6.98)	1740 (7.74)	1620 (7.21)	2300 (10.23)	2820 (12.54)	3140 (13.97)	1526

Eaton's B-Line series seismic bracing components are designed to be compatible only with other B-Line series bracing components, resulting in a listed seismic bracing assembly. Eaton B-Line Division warranty for seismic bracing components will be the warranty provided in Eaton B-Line Division standard terms and conditions of sale made available by Eaton, except that, in addition to the other exclusions from Eaton B-Line Division warranty, Eaton makes no warranty relating to B-Line series seismic bracing components that are combined with products not provided by Eaton.

# Seismic Bracing

## TOLCO Fig. 1001 - sway brace attachment (UL listed)

**Size Range:** Pipe size to be braced: 1" (25mm) thru 8" (200mm) IPS.  
Pipe size used for bracing: 1" (25mm) and 1 1/4" (32mm) Schedule 40 IPS.

**Material:** Steel

**Function:** For bracing pipe against sway and seismic disturbance. The pipe attachment component of a sway brace system: Fig. 1001 is used in conjunction with a Fig. 900 Series fitting and joined together with bracing pipe per NFPA 13, forming a complete sway brace assembly.

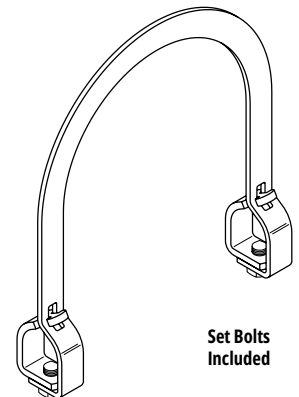
**Features:** Can be used to brace schedule 7 through schedule 40 IPS. Field adjustable, making critical pre-engineering of bracing pipe length unnecessary. Unique design requires no threading of bracing pipe. Comes assembled and ready for installation. Fig. 1001 has built-in visual verification of correct installation. See installation note below.

**Installation Note:** Position Fig. 1001 over the pipe to be braced and tighten two hex head cone point set bolts until heads bottom out. A minimum of 1" (25mm) pipe extension is recommended. Brace pipe can be installed on top or bottom of pipe to be braced.

**Approvals:** Underwriters Laboratories Listed in the USA (UL) and Canada (cUL). UL Listed for the following sprinkler type pipes: Sch. 40 (and as brace member), Sch. 10, Bull Moose Eddy Flow, Wheatland Mega Flow, DIN 2448, KSD 3562 (and as brace member), KSD 3507. Ask the factory for additional information as it may vary by product size. Included in our Seismic Engineering Guidelines approved by the State of California Office of Statewide Health Planning and Development (OSHPD). For additional load, spacing and placement information relating to OSHPD projects, please refer to our Seismic Engineering Guidelines, OPM-0052-13.

**Finish:** Plain, Electro-Galvanized or Hot Dip Galvanized. Contact customer service for alternative finishes and materials.

**Order By:** Order by figure number, pipe size to be braced, followed by pipe size used for bracing (1" (25mm) or 1 1/4" (32mm)), and finish.



Set Bolts Included



Pipe Size in. (mm)	Part Number & Approx. Wt./100				Design Load - Lbs.		
	1" (25mm) Brace Pipe		1 1/4" (32mm) Brace Pipe		For Brace Pipe Size 1" / 1 1/4"		
		Lbs. (kg)		Lbs. (kg)	Sch. 7 1" / 1 1/4"	Sch. 10 1" / 1 1/4"	Sch. 40 1" / 1 1/4"
1" (25)	1001-1 X 1	104.6 (47.4)	1001-1 X 1 1/4	122.2 (55.4)	— / —	— / —	1000 / 1000
1 1/4" (32)	1001-1 1/4 X 1	105.2 (47.7)	1001-1 1/4 X 1 1/4	122.6 (55.6)	1000 / 1000	1000 / 1000	1000 / 1000
1 1/2" (40)	1001-1 1/2 X 1	107.0 (48.5)	1001-1 1/2 X 1 1/4	124.7 (56.6)	1500 / 1500	1500 / 1500	1500 / 1500
2" (50)	1001-2 X 1	112.6 (51.1)	1001-2 X 1 1/4	129.2 (58.6)	1500 / 1500	1500 / 1500	1500 / 1500
*2 1/2" (65)	1001-2 1/2 X 1*	136.3 (61.8)	1001-2 1/2 X 1 1/4*	154.4 (70.0)	2000 / 2000	2000 / 2000	2000 / 2000
3" (80)	1001-3 X 1	145.0 (65.8)	1001-3 X 1 1/4	163.1 (74.0)	2000 / 2000	2000 / 2000	2000 / 2000
4" (100)	1001-4 X 1	158.6 (71.9)	1001-4 X 1 1/4	176.7 (80.1)	2000 / 2000	2000 / 2000	2000 / 2000
5" (100)	1001-5 X 1	173.2 (78.6)	1001-5 X 1 1/4	191.4 (86.8)	— / —	2000 / 2000	2000 / 2000
*6" (150)	1001-6 X 1*	190.0 (85.2)	1001-6 X 1 1/4*	206.0 (93.4)	2000 / 2000	2000 / 2000	2000 / 2000
*8" (200)	1001-8 X 1*	217.4 (111.5)	1001-8 X 1 1/4*	265.3 (120.3)	— / —	2000 / 2000	2000 / 2000

\*Note: Metric sizes available for 65mm, 150mm, 200mm pipe size with 25mm and 32mm brace pipe size. Contact the factory.

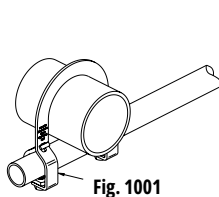
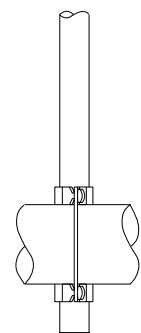
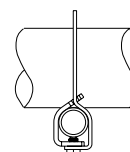
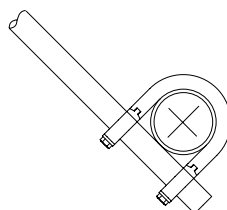


Fig. 1001



# Seismic Bracing

## TOLCO Fig. 1001 - sway brace attachment (FM approved)

**Size Range:** Pipe size to be braced: 1" (25mm) thru 8" (200mm) IPS. Pipe size used for bracing: 1" (25mm) and 1 1/4" (32mm) Schedule 40 IPS.

**Material:** Steel

**Function:** For bracing pipe against sway and seismic disturbance. The pipe attachment component of a sway brace system: Fig. 1001 is used in conjunction with a Fig. 900 Series fitting and joined together with bracing pipe per NFPA 13, forming a complete sway brace assembly.

**Features:** Can be used to brace schedule 7 through schedule 40 IPS. Field adjustable, making critical pre-engineering of bracing pipe length unnecessary. Unique design requires no threading of bracing pipe. Can be used as a component of a four-way riser brace. Comes assembled and ready for installation. Fig. 1001 has built-in visual verification of correct installation. See installation note below.

**Installation Note:** Position Fig. 1001 over the pipe to be braced and tighten two hex head cone point set bolts until heads bottom out. A minimum of 1" (25mm) pipe extension is recommended. Brace pipe can be installed on top or bottom of pipe to be braced.

**Approvals:** Approved by Factory Mutual Engineering (FM). Included in our Seismic Engineering Guidelines approved by the State of California Office of Statewide Health Planning and Development (OSHPD). For additional load, spacing and placement information relating to OSHPD projects, please refer to our Seismic Engineering Guidelines, OPM-0052-13.

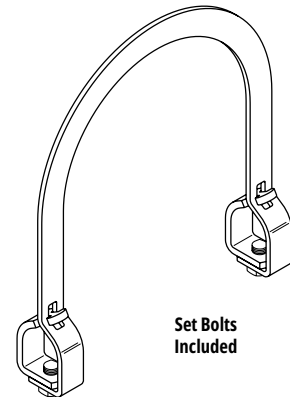
**Finish:** Plain, Electro-Galvanized or Hot Dip Galvanized. Contact customer service for alternative finishes and materials.

**Order By:** Order by figure number, pipe size to be braced, followed by pipe size used for bracing (1" (25mm) or 1 1/4" (32mm)), and finish.

**Important Note:** Fig. 1001 is precision manufactured to perform its function as a critical component of a complete bracing assembly. To ensure performance, the FM Approval requires that Fig. 1001 must be used only with other TOLCO™ bracing products. **The Fig. 1001 is not intended for use with the Fig. 907 4-way Longitudinal Brace Attachment.**

Designed to meet or exceed requirements of FM DS 2-8.

OPM



Set Bolts  
Included



Pipe Size in. (mm)	Part Number & Approx. Wt./100				Design Load - For Sch. 7, Sch. 10, & Sch. 40 Pipe Allowable Horizontal Capacity (lbf) Per Installation <sup>1,2,3</sup>							
	1" (25mm) Brace Pipe		1 1/4" (32mm) Brace Pipe		30°-44°		45°-59°		60°-74°		75°-90°	
	Lbs.	(kg)	Lbs.	(kg)	Lbs.	(kN)	Lbs.	(kN)	Lbs.	(kN)	Lbs.	(kN)
1" (25)	<b>1001-1 X 1</b>	104.6 (47.4)	<b>1001-1 X 1 1/4</b>	122.2 (55.4)	1800 (8.01)		2550 (11.34)		3120 (13.88)		3490 (15.52)	
1 1/4" (32)	<b>1001-1 1/4 X 1</b>	105.2 (47.7)	<b>1001-1 1/4 X 1 1/4</b>	122.6 (55.6)	1230 (5.47)		1740 (7.74)		2140 (9.52)		2380 (10.59)	
1 1/2" (40)	<b>1001-1 1/2 X 1</b>	107.0 (48.5)	<b>1001-1 1/2 X 1 1/4</b>	124.7 (56.6)	1230 (5.47)		1740 (7.74)		2140 (9.52)		2380 (10.59)	
2" (50)	<b>1001-2 X 1</b>	112.6 (51.1)	<b>1001-2 X 1 1/4</b>	129.2 (58.6)	1230 (5.47)		1740 (7.74)		2140 (9.52)		2380 (10.59)	
*2 1/2" (65)	<b>1001-2 1/2 X 1*</b>	136.3 (61.8)	<b>1001-2 1/2 X 1 1/4*</b>	154.4 (70.0)	800 (3.56)		1130 (5.03)		1380 (6.14)		1540 (6.85)	
3" (80)	<b>1001-3 X 1</b>	145.0 (65.8)	<b>1001-3 X 1 1/4</b>	163.1 (74.0)	850 (3.78)		1200 (5.34)		1470 (6.54)		1640 (7.30)	
4" (100)	<b>1001-4 X 1</b>	158.6 (71.9)	<b>1001-4 X 1 1/4</b>	176.7 (80.1)	850 (3.78)		1200 (5.34)		1470 (6.54)		1640 (7.30)	
5" (100)	<b>1001-5 X 1</b>	173.2 (78.6)	<b>1001-5 X 1 1/4</b>	191.4 (86.8)	510 (2.27)		730 (3.25)		890 (3.96)		990 (4.40)	
*6" (150)	<b>1001-6 X 1*</b>	190.0 (85.2)	<b>1001-6 X 1 1/4*</b>	206.0 (93.4)	510 (2.27)		730 (3.25)		890 (3.96)		990 (4.40)	
*8" (200)	<b>1001-8 X 1*</b>	217.4 (111.5)	<b>1001-8 X 1 1/4*</b>	265.3 (120.3)	510 (2.27)		730 (3.25)		890 (3.96)		990 (4.40)	

<sup>1</sup> FM Approved when used with 1 or 1 1/4 inch NPS Schedule 40 GB/T 3091, EN 10255H, or JIS G3451 steel pipe as the brace member.

<sup>2</sup> Load rating for LW above refers to FM Approved Lightwall Pipe commonly referred to as "Schedule 7". These ratings may also be applied when EN 10220 and GB/T 8163 steel pipe.

<sup>3</sup> Load rating for Schedule 10 above may be applied to GB/T 3092, EN 10255M and H, or JIS proved Thinwall, or Schedule 40 steel pipes.

Note: See UL load ratings in UL Listed Design Load chart shown under drawing.

\*Note: Metric sizes available for 65mm, 150mm, 200mm pipe size with 25mm and 32mm brace pipe size. Contact the factory.

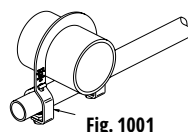
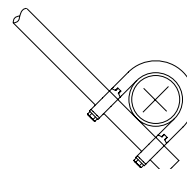
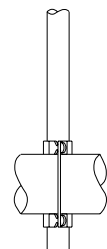
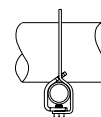


Fig. 1001



G3454, FM Ap-





# CPVC Clamps

**Fig. 74 - TOLCO structural attachment for branch line restraint assembly (UL listed)**

**Size Range:**  $\frac{3}{8}$ " and  $\frac{1}{2}$ " all threaded rod (ATR)

**Material:** Steel

**Function:** Structural attachment for restraint (sway brace) or hanger assembly

**Features:** The Fig. 74 has multiple sized fastener holes to accommodate multiple types of fasteners for various types of structures (concrete, wood and steel) see table below. Barrel rolls freely to allow installation angles from 0° to 90° from the mounting surface. Multiple holes to allow various fasteners to attach to the structure. Larger hole accommodates  $\frac{3}{8}$ " (9.5mm) fastener, and smaller hole accommodates  $\frac{1}{4}$ " (6.4mm) or #10 fasteners. It is UL listed both as a restraint and as a hanger attachment for up to 4" (IPS) pipe size.

**Installation Instructions:** Install all threaded rod (ATR), (brace member) to TOLCO™ Fig. 74 structural attachment. Bottom out  $\frac{1}{2}$ " ATR in barrel nut or thread  $\frac{3}{8}$ " ATR through to back side of barrel nut for proper engagement. Install Fig. 74 structural attachment to the building structure. Follow fastener manufacturer and NFPA 13 guidelines to install appropriate fastener for the structural type (i.e. concrete, wood, steel). For more information visit our website for the most up to date instructions sheets.

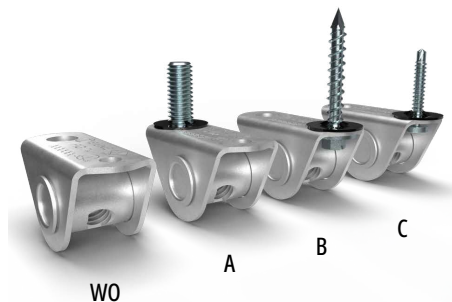
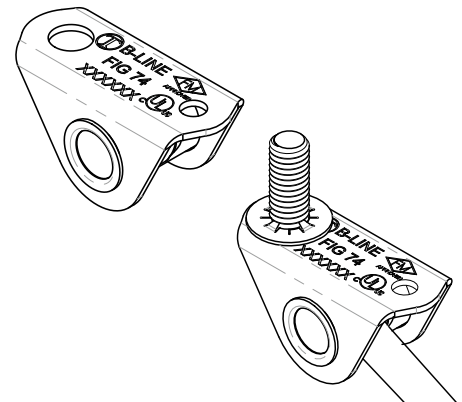
**Approvals:** Underwriters Laboratories Listed in the USA (UL) and Canada (cUL).

**Finish:** Zinc plated.

**Order By:** Figure number.



**Structural Attachment for Restraint (Sway Brace)**



	Part No.	Description
WO	FIG 74 WO	Without screws
A	FIG 74 A	Hex bolt
B	FIG 74 B	Concrete anchor
C	FIG 74 C	Steel, self

## UL listed maximum allowable loads (horizontal)

Product	Sch. 10, Sch. 40, Dynaflow & CPVC $\frac{3}{8}$ " Rod (9.5mm)	$\frac{1}{2}$ " Rod (12.7mm)
Fig. 74 (sway brace)	300 lbs. (1.344 kN)	300 lbs. (1.344 kN)
Fig. 74 (hanger)	1500 lbs. (6.672 kN)	1500 lbs. (6.672 kN)

## Fasteners to use with Fig 74 (Up to 2" IPS pipe size) per NFPA 13

Structure Type	Fastener Type	Fastener Diameter	Fastener Embedment	NFPA 13 (2013 & 2016) Reference
Concrete	Through Bolt	$\frac{3}{8}$ "	N/A	9.1.3.10.1
Concrete	Post Installed Anchors	Various	Various	9.1.3 - 9.1.3.8
Steel	Through Bolt	$\frac{3}{8}$ "	N/A	9.1.4.5.1
Steel	Beam Clamp	$\frac{3}{8}$ "	N/A	UL Listed Beam Clamp with Retaining Strap
Wood	(1) $\frac{3}{8}$ " lag screw	$\frac{3}{8}$ "	2 $\frac{1}{2}$ "	9.1.5.3.1
Wood	(2) #10 wood screws	#10	1"	

## All Thread Rod Maximum Restraint Lengths

Rod Size (in)	Root Dia. (in)	Least Radius of Gyration r (in)	Maximum Unbraced Length L - (in.)				Max. Horizontal Load @ 45° (lbs.)**			
			L/r=100	L/r=200	L/r=300	L/r=400†	L/r=100	L/r=200	L/r=300	L/r=400†
$\frac{3}{8}$	0.300	0.075	7	14	22	30	300	186	82	44
$\frac{1}{2}$	0.404	0.101	10	20	30	40	300‡	300‡	152	85

† L/r = 400 NFPA 13 2010, Sec 9.3.6.1 (5)

† L/r = 400 NFPA 13 2013 & 2016, Sec 9.3.6.1 (5) & NFPA (2016) TABLE 9.3.11.8(a)(b)(c)(d)(e)(f)

\*\*Per NFPA 13 (2013) Table 9.3.5.11.8 (a)(b)(c), consult for maximum allowable load information on ATR.

‡Max load governed by Fig. 74/77 Max horizontal load.

Eaton's B-Line series seismic bracing components are designed to be compatible only with other B-Line series bracing components, resulting in a listed seismic bracing assembly. Eaton B-Line Division warranty for seismic bracing components will be the warranty provided in Eaton B-Line Division standard terms and conditions of sale made available by Eaton, except that, in addition to the other exclusions from Eaton B-Line Division warranty, Eaton makes no warranty relating to B-Line series seismic bracing components that are combined with products not provided by Eaton.

# CPVC Clamps

**Fig. 74 - TOLCO structural attachment for sway brace assembly (FM approved)**

**Size Range:**  $\frac{3}{8}$ " and  $\frac{1}{2}$ " all threaded rod (ATR)

**Material:** Steel

**Function:** Structural attachment for restraint (sway brace) assembly

**Features:** The Fig. 74 has multiple sized fastener holes to accommodate multiple types of fasteners for various types of structures (concrete, wood and steel) see table below. Barrel rolls freely to allow installation angles from 0° to 90° from the mounting surface. Multiple holes to allow various fasteners to attach to the structure. Larger hole accommodates  $\frac{3}{8}$ " (9.5mm) fastener, and smaller hole accommodates  $\frac{1}{4}$ " (6.4mm) or #10 fasteners. It is UL listed both as a restraint and as a hanger attachment for up to 4" (IPS) pipe size.

**Installation Instructions:** Install all threaded rod (ATR), (brace member) to TOLCO™ Fig. 74 structural attachment. Bottom out  $\frac{1}{2}$ " ATR in barrel nut or thread  $\frac{3}{8}$ " ATR through to back side of barrel nut for proper engagement. Install Fig. 74 structural attachment to the building structure. Follow fastener manufacturer and NFPA 13 guidelines to install appropriate fastener for the structural type (i.e. concrete, wood, steel). For more information visit our website for the most up to date instructions sheets.

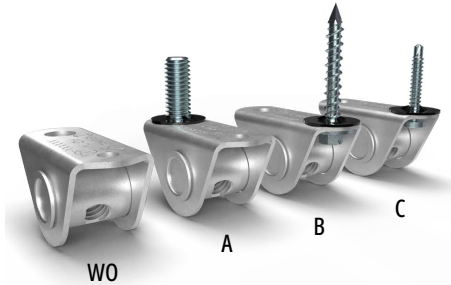
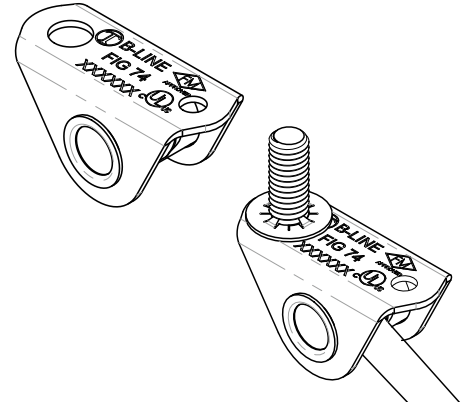
**Approvals:** Approved by FM.

**Finish:** Zinc plated.

**Order By:** Figure number.



**Structural Attachment for Restraint (Sway Brace)**



	Part No.	Description
—	FIG 74 WO	Without screws
A	FIG 74 A	Hex bolt
B	FIG 74 B	Concrete anchor
C	FIG 74 C	Steel, self

## Maximum Allowable Loads (FM Approved)

Part No.	30°-44°		45°-59°		60°-74°		75°-90°	
	$\frac{3}{8}$ " Rod lbs.	$\frac{1}{2}$ " Rod lbs.	$\frac{3}{8}$ " Rod lbs.	$\frac{1}{2}$ " Rod lbs.	$\frac{3}{8}$ " Rod lbs.	$\frac{1}{2}$ " Rod lbs.	$\frac{3}{8}$ " Rod lbs.	$\frac{1}{2}$ " Rod lbs.
<b>Fig. 74</b>	790	790	810	810	620	620	680	680

Loads shown are axial ASD loads.

## Fasteners to use with Fig 74 (Up to 2" IPS pipe size) per NFPA 13

Structure Type	Fastener Type	Fastener Diameter	Fastener Embedment	NFPA 13 (2013 & 2016) Reference
Concrete	Through Bolt	$\frac{3}{8}$ "	N/A	9.1.3.10.1
Concrete	Post Installed Anchors	Various	Various	9.1.3 - 9.1.3.8
Steel	Through Bolt	$\frac{3}{8}$ "	N/A	9.1.4.5.1
Steel	Beam Clamp	$\frac{3}{8}$ "	N/A	FM Approved Beam Clamp with Retaining Strap
Wood	(1) $\frac{3}{8}$ " lag screw	$\frac{3}{8}$ "	2 $\frac{1}{2}$ "	9.1.5.3.1
Wood	(2) #10 wood screws	#10	1"	

## All Thread Rod Maximum Restraint Lengths

Rod Size (in)	Root Dia. (in)	Least Radius of Gyration r (in)	Maximum Unbraced Length L - (in.)				Max. Horizontal Load @ 45° (lbs.)**			
			I/r=100	I/r=200	I/r=300	I/r=400†	I/r=100	I/r=200	I/r=300	I/r=400†
$\frac{3}{8}$	0.300	0.075	7	14	22	30	300	186	82	44
$\frac{1}{2}$	0.404	0.101	10	20	30	40	300‡	300‡	152	85

† I/r = 400 NFPA 13 2010, Sec 9.3.6.1 (5)

† I/r = 400 NFPA 13 2013 & 2016, Sec 9.3.6.1 (5) & NFPA (2016) TABLE 9.3.11.8(a)(b)(c)(d)(e)(f)

\*\*Per NFPA 13 (2013) Table 9.3.5.11.8 (a)(b)(c), consult for maximum allowable load information on ATR.

‡Max load governed by Fig. 74/77 Max horizontal load.

Eaton's B-Line series seismic bracing components are designed to be compatible only with other B-Line series bracing components, resulting in a listed seismic bracing assembly. Eaton B-Line Division warranty for seismic bracing components will be the warranty provided in Eaton B-Line Division standard terms and conditions of sale made available by Eaton, except that, in addition to the other exclusions from Eaton B-Line Division warranty, Eaton makes no warranty relating to B-Line series seismic bracing components that are combined with products not provided by Eaton.

# CPVC Clamps

## TOLCO Fig. 77 - System Piping Attachment for Restraint Assembly (UL Listed) For CPVC & Steel Pipe

**Size Range:** 3/8" and 1/2" all threaded rod (ATR)

**Material:** Steel

**Function:** System attachment for restraint (sway brace) assembly

**Features:** The Fig. 77 is UL Listed to be used with both (IPS) steel and CPVC fire sprinkler pipe, in 1" through 2" diameters. It fits multiple rod diameters allowing for field adjustment if longer brace material is needed. Its sturdy break-off bolt will not strip and verifies proper installation. Its snap on design has many advantages. It can be installed with one-hand, can easily position the brace all thread rod over the top of the pipe being braced or underneath the pipe being braced to accommodate the desired brace angle. It can be fixed in place or moved to a new location by sliding along the pipe or snapping on or off and relocating. An entire prefabricated assembly (Fig. 74 & 77 joined with ATR) can be pre-assembled to save time and labor and later be field installed and adjusted to fit.

**Installation Instructions:** Install TOLCO™ Fig. 77 system attachment to sprinkler pipe branch line to be restrained. You can position with the rod engagement either above or below the sprinkler pipe. Rod must extend a min. of 1" (25.4) past the edge of the Fig. 77. The attachment can be slid along the pipe to position close to where the Fig. 74 structural attachment will be fastened to the structure. The snap on design allows maximum adjustability during this stage of the installation process. Engage ATR (previously attached to the Fig. 74 structural attachment to the rod engagement portion of the Fig. 77 system attachment. Tighten set bolt on Fig. 77 system attachment until head breaks off verifying proper installation torque. For more information visit our website for the most up to date instructions sheets.

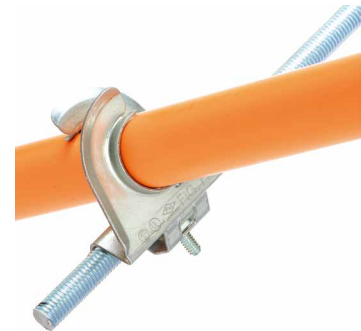
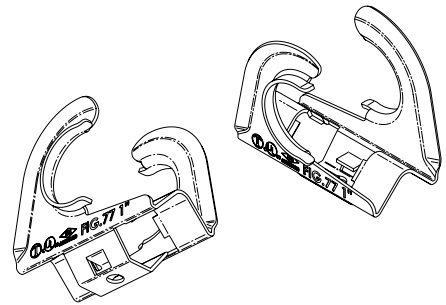
**Approvals:** Underwriters Laboratories Listed in the USA (UL) and Canada (cUL).

**Finish:** Pre-Galvanized.

**Order By:** Figure number and pipe size.



Pipe Attachment for Branch Line Restraint  
US Patent No. 9,797,527



Part No.	Pipe Size in. (mm)	Max.Design Loads (UL Listed)	
		3/8" Rod lbs. (kN)	1/2" Rod lbs. (kN)
77-1	1 (25)		
77-1 1/4	1 1/4 (32)	300 (1.33)	300 (1.33)
77-1 1/2	1 1/2 (40)		
77-2	2 (50)		

\* These loads apply to IPS steel, Sch.10, Sch. 40, engineered lightwall piping, and CPVC plastic pipe. Loads shown are axial ASD loads.

§ All other trademarks are property of their respective owners.

### All Thread Rod Maximum Restraint Lengths

Rod Size in.	Root Dia. in. (mm)	Least Radius of Gyration r in. (mm)	Maximum Unbraced Length L - (in.)				Max. Horizontal Load @ 45° (lbs.)**			
			I/r=100 in. (mm)	I/r=200 in. (mm)	I/r=300 in. (mm)	I/r=400† in. (mm)	I/r=100 lbs. (kN)	I/r=200 lbs. (kN)	I/r=300 lbs. (kN)	I/r=400† lbs. (kN)
3/8-16	0.300 (7.6)	0.075 (1.9)	7 (177.8)	14 (355.6)	22 (558.8)	30 (763.0)	300 (1.33)	186 (0.82)	82 (0.36)	44 (0.19)
1/2-13	0.404 (10.2)	0.101 (2.5)	10 (254.0)	20 (508.0)	30 (762.0)	40 (1016.0)	300† (1.33)‡	300† (1.33)‡	152 (0.67)	85 (0.38)

† I/r = 400 NFPA 13 2010, Sec 9.3.6.1 (5)

† I/r = 400 NFPA 13 2013 & 2016, Sec 9.3.6.1 (5) & NFPA (2016) TABLE 9.3.11.8(a)(b)(c)(d)(e)(f)

\*\*Per NFPA 13 (2013) Table 9.3.5.11.8 (a)(b)(c), consult for maximum allowable load information on ATR.

‡Max load governed by Fig. 74/77 Max horizontal load.

Eaton's B-Line series seismic bracing components are designed to be compatible only with other B-Line series bracing components, resulting in a listed seismic bracing assembly. Eaton B-Line Division warranty for seismic bracing components will be the warranty provided in Eaton B-Line Division standard terms and conditions of sale made available by Eaton, except that, in addition to the other exclusions from Eaton B-Line Division warranty, Eaton makes no warranty relating to B-Line series seismic bracing components that are combined with products not provided by Eaton.

# CPVC Clamps

## TOLCO Fig. 77 - System Piping Attachment for Sway Brace Assembly (FM Approved) For CPVC & Steel Pipe

**Size Range:** 3/8" and 1/2" all threaded rod (ATR)

**Material:** Steel

**Function:** System attachment for restraint

**Features:** The Fig. 77 is to be used with both (IPS) steel and CPVC fire sprinkler pipe, in 1" through 2" diameters. It fits multiple rod diameters allowing for field adjustment if longer brace material is needed. Its sturdy break-off bolt will not strip and verifies proper installation. Its snap on design has many advantages. It can be installed with one-hand, can easily position the brace all thread rod over the top of the pipe being braced or underneath the pipe being braced to accommodate the desired brace angle. It can be fixed in place or moved to a new location by sliding along the pipe or snapping on or off and relocating. An entire prefabricated assembly (Fig. 74 & 77 joined with ATR) can be pre-assembled to save time and labor and later be field installed and adjusted to fit.

**Installation Instructions:** Install TOLCO™ Fig. 77 system attachment to sprinkler pipe branch line to be restrained. It can be positioned with the rod engagement either above or below the sprinkler pipe. Rod must extend a min. of 1" past the edge of the Fig. 77. The attachment can be slid along the pipe to position close to where the Fig. 74 structural attachment will be fastened to the structure. The snap on design allows maximum adjustability during this stage of the installation process. Engage ATR (previously attached to the Fig. 74 structural attachment to the rod engagement portion of the Fig. 77 system attachment. Tighten set bolt on Fig. 77 system attachment until head breaks off verifying proper installation torque. For more information visit our website for the most up to date instructions sheets.

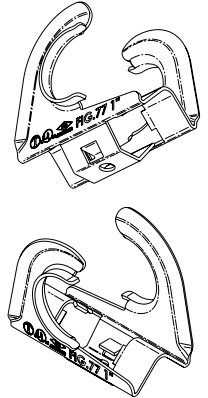
**Approvals:** Approved by FM.

**Finish:** Pre-Galvanized.

**Order By:** Figure number and pipe size.



Pipe Attachment for Restraint (Sway Brace)  
US Patent No. 9,797,527



Part No.	Pipe Size in. (mm)	Maximum Allowable Loads (FM Approved)*							
		30°-44°		45°-59°		60°-74°		75°-90°	
		3/8" Rod lbs. (kN)	1/2" Rod lbs. (kN)	3/8" Rod lbs. (kN)	1/2" Rod lbs. (kN)	3/8" Rod lbs. (kN)	1/2" Rod lbs. (kN)	3/8" Rod lbs. (kN)	1/2" Rod lbs. (kN)
77-1	1 (25)	140 (0.62)	160 (0.71)	200 (0.89)	230 (1.02)	250 (1.11)	280 (1.24)	280 (1.24)	320 (1.42)
77-1 1/4	1 1/4 (32)	140 (0.62)	170 (0.75)	200 (0.89)	250 (1.11)	250 (1.11)	300 (1.33)	280 (1.24)	340 (1.51)
77-1 1/2	1 1/2 (40)	130 (0.58)	160 (0.62)	190 (0.84)	230 (1.02)	230 (1.02)	280 (1.24)	260 (1.15)	320 (1.42)
77-2	2 (50)	120 (0.53)	150 (0.67)	170 (0.75)	210 (0.93)	210 (0.93)	260 (1.15)	240 (1.07)	290 (1.29)

\* Loads shown are axial ASD loads.

### All Thread Rod Maximum Restraint Lengths

Rod Size in.	Root Dia. in. (mm)	Least Radius of Gyration r in. (mm)	Maximum Unbraced Length L - (in.)				Max. Horizontal Load @ 45° (lbs.)**			
			l/r=100 in. (mm)	l/r=200 in. (mm)	l/r=300Δ in. (mm)	l/r=400†Δ in. (mm)	l/r=100 lbs. (kN)	l/r=200 lbs. (kN)	l/r=300Δ lbs. (kN)	l/r=400†Δ lbs. (kN)
3/8-16	0.300 (7.6)	0.075 (1.9)	7 (177.8)	14 (355.6)	22 (558.8)	30 (763.0)	300 (1.33)	186 (0.82)	82 (0.36)	44 (0.19)
1/2-13	0.404 (10.2)	0.101 (2.5)	10 (254.0)	20 (508.0)	30 (762.0)	40 (1016.0)	300† (1.33)†	300† (1.33)†	152 (0.67)	85 (0.38)

† l/r = 400 NFPA 13 2010, Sec 9.3.6.1 (5) † l/r = 400 NFPA 13 2013 & 2016, Sec 9.3.6.1 (5) & NFPA (2016) TABLE 9.3.11.8(a)(b)(c)(d)(e)(f)

\*\*Per NFPA 13 (2013) Table 9.3.5.11.8 (a)(b)(c), consult for maximum allowable load information on ATR.

‡Max load governed by Fig. 74/77 Max horizontal load.

Δ l/r = 300 for bracing

Δ l/r = 400 for restraint

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# Seismic Transitional Attachments

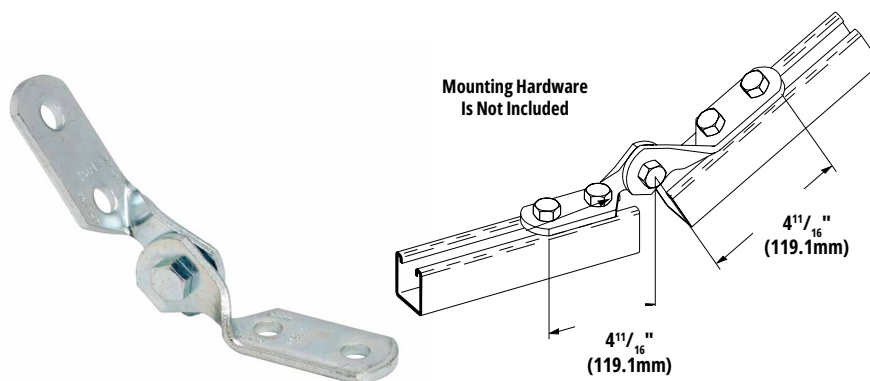
## B335 - Four hole adjustable hinge

**Function:** For bracing strut channel trapeze supports. Torque to 50 lbs•ft (68N•m)

**Finish:** Zinc Plated or Dura-Green™ paint.

**Weight:** Approx. Wt./100 - 110 lbs. (49.9kg)

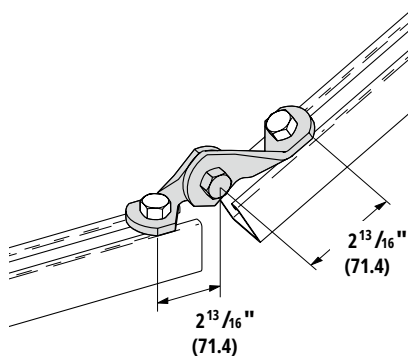
**Order By:** Part number and finish.



## B335-1

### Two Hole Adjustable Hinge

- Standard finishes: ZN, GRN
- Wt./C 78 Lbs. (35.4 kg)



# Seismic System Attachments

**TOLCO® Fig. 981 - Fast Attach – Universal Swivel Sway Brace Attachment**

**Size Range:** Fits bracing pipe 1" (25mm) thru 2" (50mm), 12 gauge (2.6mm) channel and all structural steel up to 1/4" (6.3mm) thick.

Fig. 981-S fits rod sizes 3/8" thru 5/8".

Fig. 981-L fits rod sizes 3/4" thru 7/8".

**Material:** Steel

**Function:** Multi-functional attachment to hanger rod, trapeze rod, structure or braced pipe fitting.

**Features:** Fits multiple sizes of bracing pipe, strut or structural steel. Swivel allows adjustment to various surface angles. Breakaway bolt heads assure verification of proper installation torque. Unique "fast attach" yoke design fits multiple rod sizes; 3/8" thru 5/8" and 3/4" thru 7/8". "Stackable" design allows installation of both lateral and longitudinal braces to be easily installed on a single hanger rod, with no disassembly.

**Approvals:** Included in our Seismic Engineering Guidelines approved by the State of California Office of Statewide Health Planning and Development (OSHPD). For additional load, spacing and placement information relating to OSHPD projects, please refer to our Seismic Engineering Guidelines, OPM-0052-13.

**Installation:** Fig. 981 is the "braced pipe" attachment component of a lateral or longitudinal brace assembly. It is intended to be combined with the pipe hanger, all-thread rod, "bracing pipe" and our transitional and structural attachment component(s) to form a complete bracing assembly. NFPA 13 and/or OSHPD guidelines should be followed.

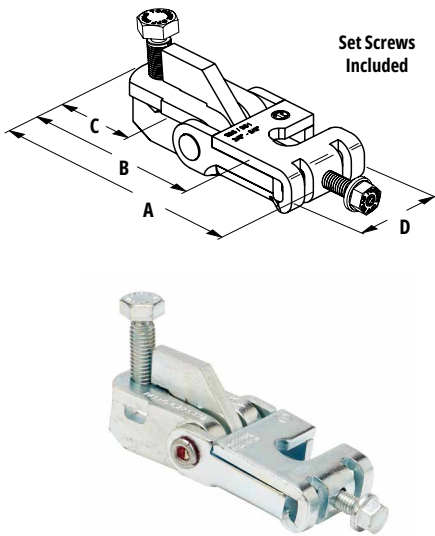
**To Install:** Spin nut on top of hanger counterclockwise to loosen the nut and raise it above the top of the hanger. Attach Fig. 981 by slipping the open side of the Fig. 981 yoke onto the all threaded rod above the top of the hanger. Tighten 3/8" cone point set screw on yoke until head breaks-off to ensure proper installation torque. Spin the hex nut clockwise and tighten securely. Insert brace pipe into the jaw of Fig. 981 and tighten the cone point set screw until the head breaks off ensuring proper installation torque. Pivot brace pipe to proper angle and attach to structure using our swivel structural attachment.

**Finish:** Electro-Galvanized

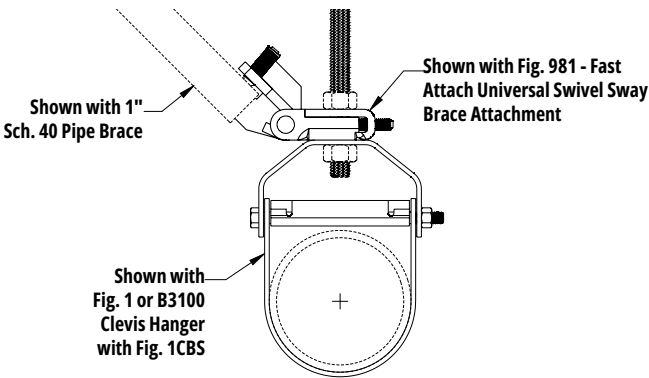
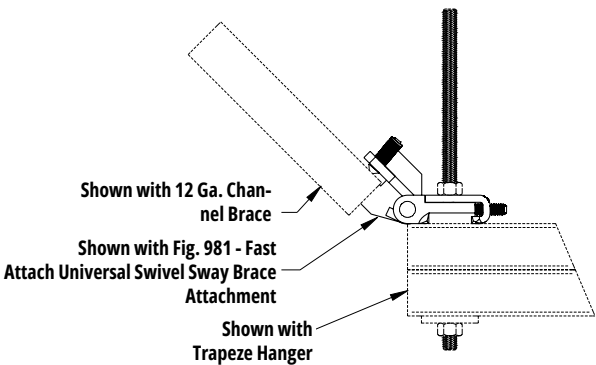
**Order By:** Part number and finish.

US Patent # 6,273,372, Pat. # 7,097,141, Pat. # 7,654,043, Pat. # 7,654,043 B2

**OPM**



Part No.	Rod Size Range	A	B	C	D	Max. Horizontal Design Load lbf (kN)	Approx. Wt./100 lbs. (kg)
		in. (mm)	in. (mm)	in. (mm)	in. (mm)		
981-S	3/8" thru 5/8"	5 1/8" (130.2)	4 1/8" (104.8)	1 1/4" (31.7)	2 1/4" (57.1)	2015 (8.96)	88 (39.9)
981-L	3/4" & 7/8"	5 1/8" (130.2)	4 1/8" (104.8)	1 1/4" (31.7)	2 1/4" (57.1)	2015 (8.96)	82 (37.2)



# Seismic System Attachments

## B22, B22A & B24 - Solid strut bracing materials

OPM

**Size Range:** Available in 10 ft (3.05m) and 20 ft. (6.1m) lengths

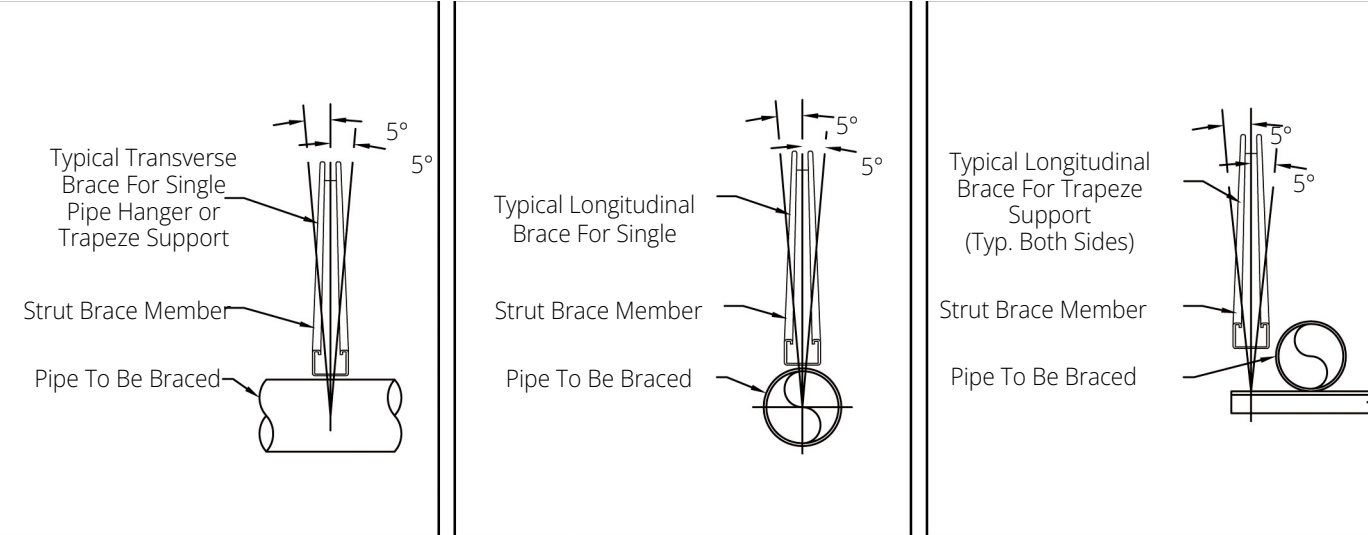
**Material:** Steel, Stainless 304 & 316, and Aluminum

**Function:** Designed to be used as the bracing member for a rigid bracing system.

**Approvals:** Included in our Seismic Engineering Guidelines approved by the State of California Office of Statewide Health Planning and Development (**OSHPD**). For additional load, spacing and placement information relating to OSHPD projects, please refer to our Seismic Engineering Guidelines, OPM-0052-13.

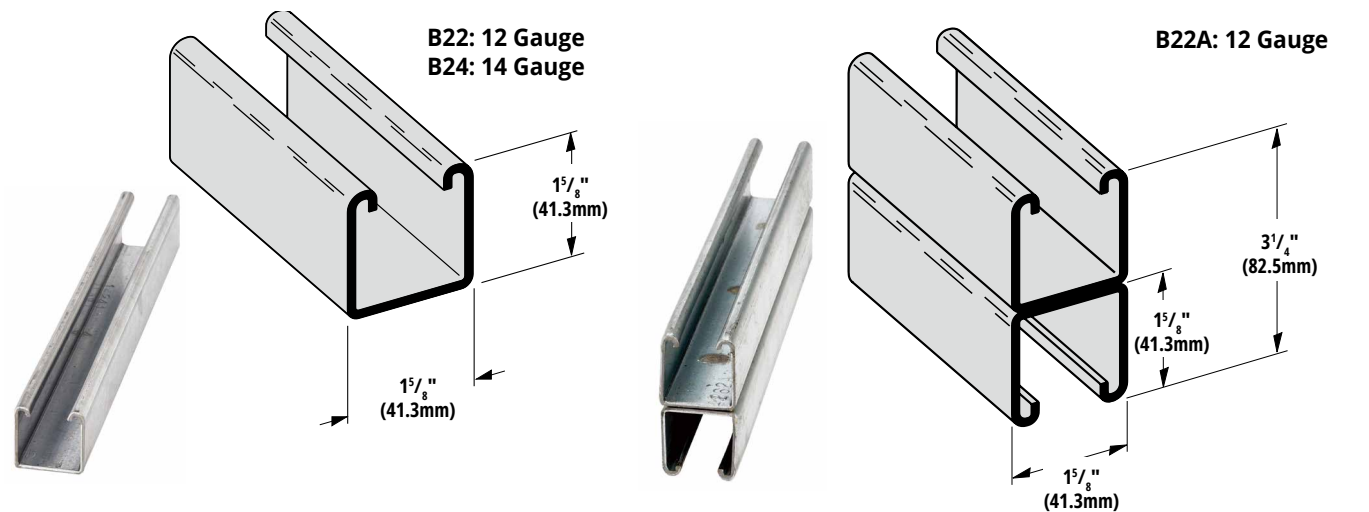
**Finish:** Plain, Dura-Green™, Pre-Galvanized, and Hot-Dipped Galvanized Steel.

**Order By:** Part number and finish.



Strut Type Part No.	Maximum Brace Length		Allowable Horizontal Seismic Load w/Brace at 45°
	ft.-in.	(m)	lbf (kN)
B22	9'-6"	(2.89)	1552 (6.90)
B22A	14'-9"	(4.49)	1710 (7.60)
B24	9'-6"	(2.89)	1215 (5.40)

- Notes:**
- 1.) Maximum allowable lengths and concentric loads when L/R = 200
  - 2.) When using strut as a brace material, it must be solid strut. Slotted or punched are not acceptable.
  - 3.) For more details on B-Line strut, please refer to Eaton's Strut Systems catalog.



# Seismic System Attachments

## ATR - All threaded rod - 120" (3.05m) lengths TOLCO Fig. 99 - all threaded rod cut to length

OPM

**Size Range:** 1/4"-20 thru 7/8"-9 rod in 120" lengths or cut to length

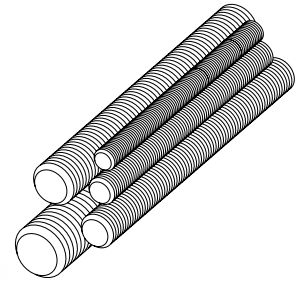
**Material:** Steel

**Maximum Temperature:** 750°F (399°C)

**Approvals:** Included in our Seismic Engineering Guidelines approved by the State of California Office of Statewide Health Planning and Development (OSHPD). For additional load, spacing and placement information relating to OSHPD projects, please refer to our Seismic Engineering Guidelines, OPM-0052-13.

**Finish:** Plain or Electro-Galvanized. Contact customer service for alternative finishes and materials.

**Order By:** Part number (with rod size and length) and finish



Part No. - Size x Length		Threads Per Inch	Recommended Load		Approx. Wt.	
ATR	Fig. 99		lbf	(kN)	lbs./100 ft	(kg/30m)
ATR 1/4" x 120	99-1/4" x length	20	240	(1.07)	12	(5.44)
ATR 3/8" x 120	99-3/8" x length	16	730	(3.24)	29	(13.15)
ATR 1/2" x 120	99-1/2" x length	13	1350	(6.00)	53	(24.04)
ATR 5/8" x 120	99-5/8" x length	11	2160	(9.60)	89	(40.37)
ATR 3/4" x 120	99-3/4" x length	10	3230	(14.37)	123	(55.79)
ATR 7/8" x 120	99-7/8" x length	9	4480	(19.93)	170	(77.11)

For larger sizes consult full line pipe hanger catalog.



# Seismic Bracing

## TOLCO Fig. 98B - Rod Stiffener with Break-Off Bolt Head

**Size Range:** Secures  $\frac{3}{8}$ "-16 thru  $\frac{7}{8}$ "-9 hanger rod

**Material:** Steel

**Function:** Secures channel to hanger rod for vertical seismic bracing.

**Approvals:** Included in our Seismic Engineering Guidelines approved by the State of California Office of Statewide Health Planning and Development (**OSHPD**). For additional load, spacing and placement information relating to OSHPD projects, please refer to our Seismic Engineering Guidelines OPM-0052-13.

**Finish:** Electro Galvanized. Contact customer service for alternative finishes and materials.

**Weight:** Approx. Wt./100: Fig. 98 - 11.8 Lbs. (5.3kg)  
Fig. 98B - 12.7 Lbs. (5.7kg)

**Order By:** Figure number

OPM

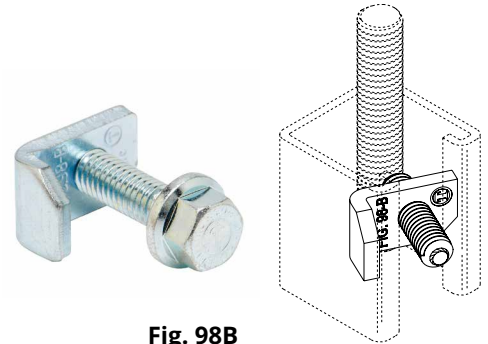
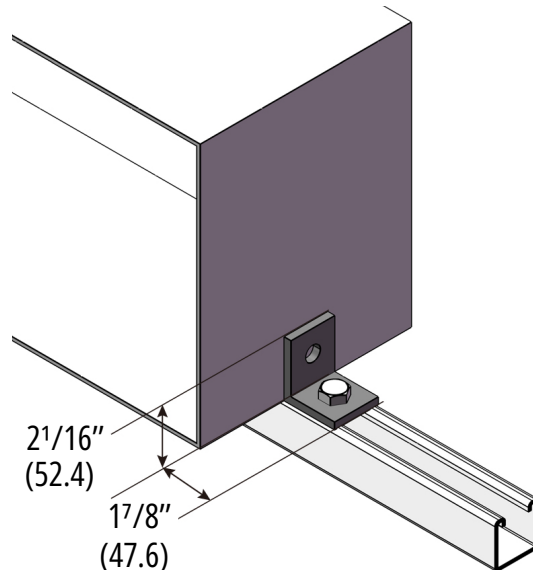


Fig. 98B

# Seismic Bracing

- Standard finishes: ZN, GRN, HDG, SS4, AL
- Wt./C 37 Lbs. (16.8 kg)



# Seismic Accessories

## B2400 Series - Standard Pipe Strap

**Size Range:** 1/2" (15mm) thru 24" (600mm) pipe

**Material:** Steel

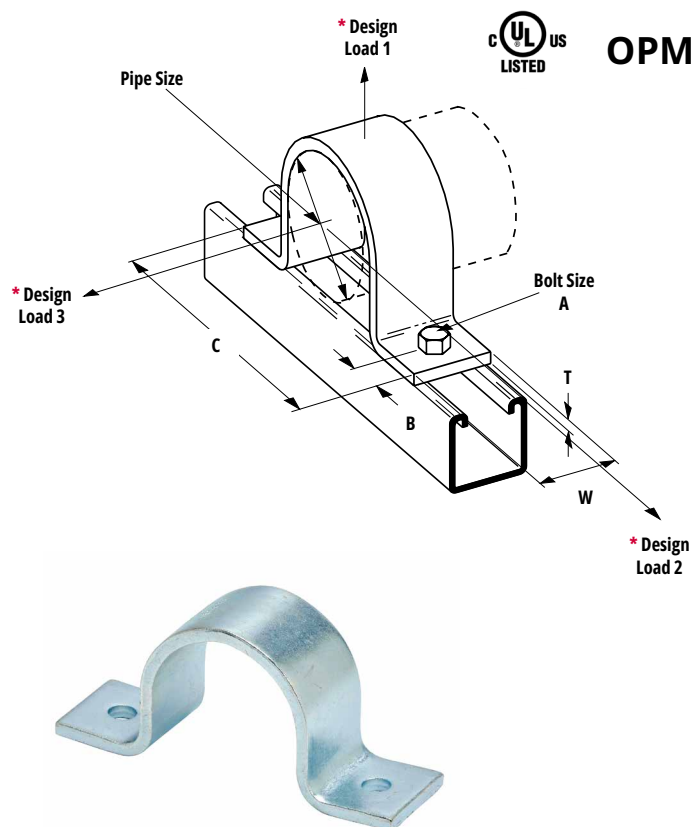
**Function:** Designed for supporting pipe runs from strut supports.

**Approvals:** Underwriters Laboratories Listed in the USA Canada (cULus) for B2400-3/4" thru B2400-8" for Design Load 1 only. Conforms to Federal Specification WW-H-171E & A-A-1192A, Type 26 and Manufacturers Standardization Society ANSI/MSS SP-69 & SP-58, Type 26. Included in our Seismic Engineering Guidelines approved by the State of California Office of Statewide Health Planning and Development (OSHPD). For additional load, spacing and placement information relating to OSHPD projects, please refer to our Seismic Engineering Guidelines OPM-0052-13

**Finish:** Electro-Galvanized. Contact customer service for alternative finishes and materials.

**Order By:** Part number and finish

**Note:** Ductile iron sizes available.  
Special "B" dimensions available on request, consult factory.



Part No.	Pipe Size in. (mm)	A in. (mm)	B in. (mm)	C in. (mm)	T in. (mm)	W in. (mm)	Approx. Wt./100 lbs. (kg)
B2400-1/2	1/2" (15)	5/16" (7.9)	7/16" (11.1)	2 13/16" (71.4)	10 Ga. (3.4)	1 5/8" (41.3)	23 (10.4)
B2400-3/4	3/4" (20)	5/16" (7.9)	7/16" (11.1)	3" (76.2)	10 Ga. (3.4)	1 5/8" (41.3)	26 (11.8)
B2400-1	1" (25)	5/16" (7.9)	7/16" (11.1)	3 17/32" (89.7)	10 Ga. (3.4)	1 5/8" (41.3)	31 (14.0)
B2400-1 1/4	1 1/4" (32)	5/16" (7.9)	7/16" (11.1)	3 3/4" (95.2)	10 Ga. (3.4)	1 5/8" (41.3)	36 (16.3)
B2400-1 1/2	1 1/2" (40)	5/16" (7.9)	7/16" (11.1)	4 1/16" (103.2)	10 Ga. (3.4)	1 5/8" (41.3)	39 (17.7)
B2400-2	2" (50)	7/16" (11.1)	1 1/16" (17.4)	5 21/32" (143.6)	1/4" (6.3)	1 5/8" (41.3)	93 (42.2)
B2400-2 1/2	2 1/2" (65)	7/16" (11.1)	1 1/16" (17.4)	6 5/32" (156.3)	1/4" (6.3)	1 5/8" (41.3)	106 (48.1)
B2400-3	3" (80)	7/16" (11.1)	1 1/16" (17.4)	6 25/32" (172.2)	1/4" (6.3)	1 5/8" (41.3)	132 (59.9)
B2400-3 1/2	3 1/2" (90)	7/16" (11.1)	1 1/16" (17.4)	7 9/32" (184.9)	1/4" (6.3)	1 5/8" (41.3)	151 (68.5)
B2400-4	4" (100)	9/16" (14.3)	1 1/16" (17.4)	7 25/32" (197.6)	1/4" (6.3)	1 5/8" (41.3)	160 (72.6)
B2400-5	5" (125)	9/16" (14.3)	1 1/16" (17.4)	8 7/8" (225.4)	1/4" (6.3)	1 5/8" (41.3)	192 (87.1)
B2400-6	6" (150)	9/16" (14.3)	1 1/16" (17.4)	9 15/16" (252.4)	1/4" (6.3)	1 5/8" (41.3)	219 (99.3)
B2400-8	8" (200)	9/16" (14.3)	1 1/16" (17.4)	11 31/32" (304.0)	1/4" (6.3)	1 5/8" (41.3)	297 (134.7)

For larger sizes, consult the full line pipe hanger catalog.

\* See OPM-0052-13 for design loads.

# Seismic Accessories

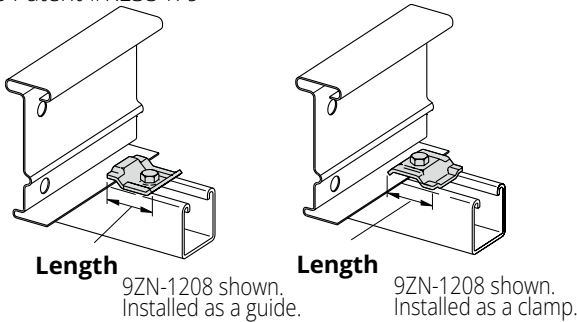
## Cable Tray Clamp/Guide

### Features:

- No-twist design.
- Has four times the strength of the traditional design.
- Each side is labeled to ensure proper installation.
- Furnished in pairs, with or without hardware.
- Not recommended for vertical support.

**Order By:** Part number

US Patent #RE35479



**OPM**

Note: For heavy duty or vertical applications see 9ZN-1241

Part No.		Overall Length in. (mm)	Hardware Size in.	Finish
Without Hardware	With Hardware			
9ZN-1208	9ZN-1208NB	2 1/4" (57)	3/8"	G90
9ZN-1205	9ZN-1205NB	2 1/4" (57)	1/2"	G90

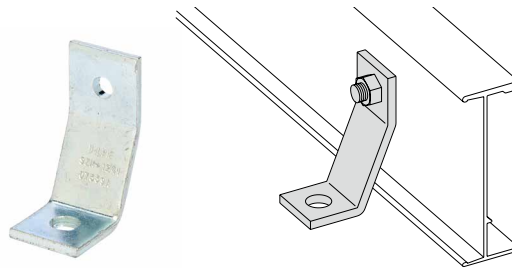
When installing this device as an expansion guide on the outside flange of *Steel Side Rail*, use the Catalog No. **B202** Square Washer in order to properly elevate the guide.

## Heavy Duty Hold Down Bracket

### Features:

- Design load is 2000 lbs (8.89kN) per pair.
- Two bolt design.
- Sold in pairs.
- 3/8" cable tray attachment hardware provided.
- 3/8" support attachment hardware **not** provided.
- Recommended for support of vertical trays.

**Order By:** Part number



**OPM**

Part No.

9ZN-1241

## N\_\_\_WO - Channel Nuts

**Size Range:** 3/8"-16 thru 7/8"-9 thread sizes

**Material:** Steel

**Approvals:** Included in our Seismic Engineering Guidelines approved by the State of California Office of Statewide Health Planning and Development (**OSHPD**). For additional load, spacing and placement information relating to OSHPD projects, please refer to our Seismic Engineering Guidelines, OPM-0052-13.

**Finish:** Electro-Galvanized. Contact customer service for alternative finishes and materials.

**Order By:** Part number and finish



**OPM**

Part No.	Thread Size	Fits Channel Sizes	Nut Thickness in. (mm)	Slip lbf (kN)	Pull-Out lbf (kN)	Wt./100 lbs. kg
N224WO	1/4"-20	B22I, B32I, B52I	1/4" (6.3)	300 (1.33)	450 (2.00)	6.7 (3.04)
N223WO	5/16"-18	B22I, B32I, B52I	1/4" (6.3)	450 (2.00)	750 (3.33)	6.7 (3.04)
N228WO	3/8"-16	B22I, B32I, B52I	3/8" (9.5)	800 (3.56)	1100 (4.89)	9.3 (4.22)
N225WO	1/2"-13	B22I, B32I	1/2" (12.7)	1500 (6.67)	2000 (8.90)	11.6 (5.26)
N525WO	1/2"-13	B52I	3/8" (9.5)	1500 (6.67)	1500 (6.67)	8.8 (3.99)
N255WO	5/8"-11	B22I, B32I	1/2" (12.7)	1500 (6.67)	2000 (8.90)	16.4 (7.44)
N555WO	5/8"-11	B52I	3/8" (9.5)	1500 (6.67)	1500 (6.67)	10.2 (4.62)
N275WO	3/4"-10	B22I, B32I	1/2" (12.7)	1500 (6.67)	2000 (8.90)	14.5 (6.58)
N575WO	3/4"-10	B52I	3/8" (9.5)	1500 (6.67)	1500 (6.67)	8.8 (3.99)
N278WO	7/8"-9	B22I, B32I	1/2" (12.7)	1500 (6.67)	1500 (6.67)	12.5 (5.67)

# Seismic Accessories

## B655 Series - Steel Rod Coupling B656 Series - Steel Reducing Rod Coupling

OPM

**Size Range:** 1/4"-20 thru 1"-8 rod

**Material:** Steel

**Function:** Used for coupling two threaded rods together of equal or reduced rod sizes, with or without inspection hole.

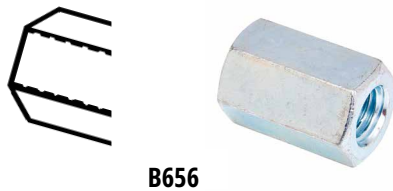
**Approvals:** Included in our Seismic Engineering Guidelines approved by the State of California Office of Statewide Health Planning and Development (OSHPD). For additional load, spacing and placement information relating to OSHPD projects, please refer to our Seismic Engineering Guidelines, OPM-0052-13.

**Finish:** Electro-Galvanized. Contact customer service for alternative finishes and materials.

**Order By:** Part number and finish



B655



B656

Part No.	For Rod Size	Length in. (mm)	Design Load lbf (kN)	Approx. Wt./100 lbs. (kg)
B655-1/4	1/4"-20	7/8" (22.2)	300 (1.33)	1.9 (0.86)
B655-3/8	3/8"-16	1 1/8" (28.6)	730 (3.25)	3.6 (1.63)
B655-1/2	1/2"-13	1 3/4" (44.4)	1350 (6.00)	11.3 (5.12)
B655-5/8	5/8"-11	2 1/8" (54.0)	2160 (9.61)	17.6 (7.98)
B655-3/4	3/4"-10	2 1/4" (57.1)	3230 (14.37)	28.1 (12.74)
B655-7/8	7/8"-9	2 1/2" (63.5)	4480 (19.93)	57.2 (25.94)
B655-1	1"-8	2 3/4" (69.8)	5900 (26.24)	73.7 (33.43)

Part No.	For Rod Size	Length in. (mm)	Design Load lbf (kN)	Approx. Wt./100 lbs. (kg)
B656-3/8 x 1/4	3/8"-16 & 1/4"-20	1" (25.4)	300 (1.33)	3.7 (1.68)
B656-1/2 x 3/8	1/2"-13 & 3/8"-16	1 1/4" (31.7)	730 (3.25)	6.6 (2.99)
B656-5/8 x 1/2	5/8"-11 & 1/2"-13	1 1/4" (31.7)	1350 (6.00)	11.6 (5.26)
B656-3/4 x 5/8	3/4"-10 & 5/8"-11	1 1/2" (38.1)	2160 (9.61)	20.6 (9.34)
B656-7/8 x 3/4	7/8"-9 & 3/4"-10	1 3/4" (44.4)	3230 (14.37)	39.4 (17.87)

## B200 Series - Series Square Washer

**Material:** Steel

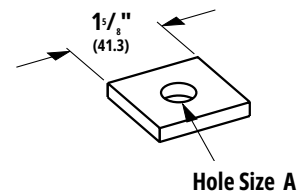
**Approvals:** Included in our Seismic Engineering Guidelines approved by the State of California Office of Statewide Health Planning and Development (OSHPD). For additional load, spacing and placement information relating to OSHPD projects, please refer to our Seismic Engineering Guidelines, OPM-0052-13.

**Finish:** Electro-Galvanized

**Service:** Designed as a washer to suspend hanger rods.

**Order by:** Part number and finish.

OPM



Hole Size A



Part No.	Hole Size A in. (mm)	Bolt Size	Thickness in. (mm)	Approx. Wt./100 lbs. (kg)
B200	3/8" (9.5)	5/16"-18	1/4" (6.3)	18 (8.1)
B201	7/16" (11.1)	3/8"-16	1/4" (6.3)	18 (8.1)
B202	9/16" (14.2)	1/2"-13	1/4" (6.3)	17 (7.7)
B202-1	1 1/16" (17.4)	5/8"-11	1/4" (6.3)	16 (7.2)
B202-2	1 3/16" (20.6)	3/4"-10	1/4" (6.3)	15 (6.8)



# Seismic Accessories

## HN - Standard Hex Nut

**Size Range:** 1/4"-20 thru 7/8"-9

**Material:** Steel

**Approvals:** Included in our Seismic Engineering Guidelines approved by the State of California Office of State-wide Health Planning and Development (**OSHPD**). For additional load, spacing and placement information relating to OSHPD projects, please refer to our Seismic Engineering Guidelines, OPM-0052-13.

**Finish:** Plain or Electro-Galvanized.

Contact customer service for alternative finishes and materials.

**Order By:** Part number and finish

**OPM**



Part No.	For Rod Size	Width Across Flats		Width Across Points		Thickness		Approx. Wt./100	
		in.	(mm)	in.	(mm)	in.	(mm)	lbs.	(kg)
HN-1/4	1/4"-20	7/16"	(11.1)	1/2"	(12.7)	7/32"	(5.7)	0.7	(0.3)
HN-3/8	3/8"-16	9/16"	(14.3)	21/32"	(16.6)	21/64"	(8.3)	1.6	(0.7)
HN-1/2	1/2"-13	3/4"	(19.0)	55/64"	(21.8)	7/16"	(11.1)	3.7	(1.7)
HN-5/8	5/8"-11	15/16"	(23.8)	13/32"	(27.8)	35/64"	(13.9)	7.3	(3.3)
HN-3/4	3/4"-10	1 1/8"	(28.6)	1 5/16"	(33.3)	41/64"	(16.3)	12.0	(5.4)
HN-7/8	7/8"-9	1 5/16"	(33.3)	1 33/64"	(38.5)	3/4"	(19.0)	19.0	(8.6)

## FW Series - Flat Washer

**Size Range:** 1/4"-20 thru 1"-8 rods

**Material:** Steel

**Approvals:** Included in our Seismic Engineering Guidelines approved by the State of California Office of State-wide Health Planning and Development (**OSHPD**). For additional load, spacing and placement information relating to OSHPD projects, please refer to our Seismic Engineering Guidelines, OPM-0052-13.

**Finish:** Plain or Electro-Galvanized.

Contact customer service for alternative finishes and materials.

**Order By:** Part number and finish

**OPM**



Part No.	For Rod Size	Outside Diameter		Approx. Wt./100	
		in.	(mm)	lbs.	(kg)
FW-1/4	1/4"-20	3/4"	(19.0)	0.7	(0.3)
FW-3/8	3/8"-16	1"	(25.4)	3.9	(1.7)
FW-1/2	1/2"-13	1 3/8"	(34.9)	6.7	(3.0)
FW-5/8	5/8"-11	1 3/4"	(44.4)	7.3	(3.3)
FW-3/4	3/4"-10	2"	(50.8)	11.0	(5.0)
FW-7/8	7/8"-9	2 1/4"	(57.1)	19.0	(8.6)
FW-1	1"-8	2 1/2"	(69.8)	22.0	(10.0)

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## Middle East

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FAX: 971 4 8894813  
[chmesales@eaton.com](mailto:chmesales@eaton.com)

## China

86-21-2899-3611  
[echsales@eaton.com](mailto:echsales@eaton.com)

## Korea

82 2 6380 4033  
82 51 744 5033  
[echsales@eaton.com](mailto:echsales@eaton.com)

## Singapore

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**Eaton**  
1000 Eaton Boulevard  
Cleveland, OH 44122  
United States  
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