ANVIL INTERNATIONAL, INC.

Formerly Grinnell

PIPE HANGERS Your Most Visible Means of Support

Catalog PH-2004

www.anvilintl.com

PIPE HANGERS and SUPPO

HISTORY

Our roots can be traced to the mid-1800's and to the founding father of our company, Frederick J. Grinnell - a time when blacksmiths used their hands to form steel into usable hanger products. Today our state-of-the-art equipment cuts, forms, mills, welds and tests our hanger and support products with just as much pride in quality, but with far greater precision. We're known for the quality of our products, quality that our customers demand and on which they continue to rely to this present day.

Our long, successful history has proven our products and validated our latest advances in pipe hanger and support technology. Since April of 2000, Anvil has been our new name, but our record of design excellence, quality products, selection and customer support afford us our position as the world leader in pipe hangers and supports.

Our hangers and supports can be found all over the world!

WHY CHOOSE ANVIL?

Anvil Pipe Hangers and Supports are the result of many years of engineering and testing. We continue to upgrade our hanger and support designs and manufacturing to take advantage of the latest technologies

Our designs provide the most accurate supporting loads for your pipe throughout the full range of its movement, along with the simplest load adjustment of any manufacturer in the industry today. It is not uncommon for our staff to provide technical assistance for Anvil products that have been in service for 50 years.

Commitment

The employees of Anvil are committed to produce and service a package of quality Hanger products unmatched by any other single manufacturer. Our commitment extends to the full requirements of the ISO Customer Satisfaction Standard and is constantly monitored to assure we achieve our goals.

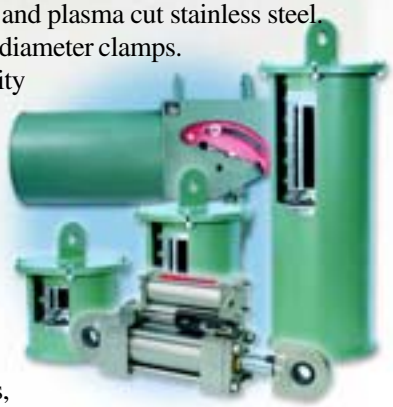
Our U.S. made Pipe Hangers and Supports can be found the world over in applications ranging from power plants to refining to manufacturing to on-board ships. Simply, Anvil is the most experienced manufacturer of Pipe Hanger and Supports in America. For service, capability and quality, Anvil should be your first choice for all of your Pipe Support requirements.

RTS

MANUFACTURING EXCELLENCE

Anvil Pipe Hangers and Supports are manufactured in three primary U.S. locations: North Kingstown, Rhode Island; Henderson, Tennessee and Columbia, Pennsylvania, each with its own unique capabilities.

At 122,000 square feet, our Pipe Support design and fabrication facility in North Kingstown, Rhode Island is the industry leader in the Engineered Hanger Market for experience and in house manufacturing capability. Our equipment can accommodate any project since we have the capability to machine, saw and flame cut up to 3" thick carbon and alloy steel and plasma cut stainless steel. We thread rod through 4" in diameter and we hot form small to large diameter clamps. Our facility also has complete in house blasting and painting capability and we perform complete in house Non-Destructive Examination including X-Ray, PT, UT and Magnetic Particle testing. This expertise is supported by our total quality programs including our ASME “NPT” and "NS" Nuclear Certificates of Authorization, ISO 9001 certification and audited by NUPIC.



Our manufacturing facility in Henderson, Tennessee has over 175,000 square feet of manufacturing capability dedicated to producing a complete line of commercial, light industrial and industrial Pipe Hangers and Supports. These include clamps, braces, inserts, rods and attachments, slides and guides to exacting industry standards and certified to ISO 9000 quality. The products manufactured in Henderson are designed for use in a wide variety of rigid Pipe Hanger or Support applications, in markets including fire protection, electrical, water and waste water treatment, petrochemical, seismic, industrial and commercial. Special fabrication is available from our Henderson facility as well.

At our Columbia, Pennsylvania Foundry, where we manufacture malleable fittings, cast iron fittings and our Gruvlok® products, we also manufacture our malleable and ductile iron Hanger Products such as beam clamps, numerous types of pipe clamps, concrete inserts, ceiling flanges and different types of rod attachments. With over 600,000 square feet of manufacturing floor space under roof, our foundry has an annual pouring capacity of 100,000 tons. Columbia is ISO 9000 certified and is a quality manufacturer of malleable, ductile and cast iron products.

In addition to these three facilities Anvil also has Hanger fabrication facilities in Houston, Texas to service the Gulf Coast Engineered Hanger requirements.

Customer Service

With five key stocking locations throughout North America, you can count on getting all of the product you need - when you need it. When you have installation questions our solid customer service personnel are there to answer all of you questions, backed by our designers or engineers we are there for you - on site if needed.

ENGINEERED HANGERS PRODUCT LINE

- Variable Springs
- Constant Supports
- Hydraulic Snubbers
- Vibration Sway Braces
- Sway Struts
- Limit Stops

We also provide:

- Special Fabrication/ Miscellaneous Structural Steel Fabrication
- Special Design Products Per Customer Specifications
- Domestic Manufactured Product Line

ANVIL MARKETS

- Nuclear Power
- Fossil Power
- Co-generation
- Petro Chemical
- Refinery
- Pulp & Paper
- Marine
- Waste Water, Water Treatment
- Industrial
- Mechanical HVAC/ Plumbing
- Fire Protection
- AWWA

DESIGN SERVICES

Either on or off-site, Anvil Design Services helps you maximize the efficiency of your pipe support systems. These services include:

- Pipe Hanger Design & Engineering
- Manual & Computer-Aided Drafting
- System Analysis
- Pipe Stress Analysis
- Product Qualification Testing (environmental static and cycling loads, flow and leak)
- Supervision of Client Design Personnel

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Anvil reserves the right to make specification changes without notice.

While every effort has been made to assure the accuracy of information contained in this catalog at the time of publication, we cannot accept responsibility for inaccuracies resulting from undetected errors or omissions.

The blue color used in the artwork indicates items that are not included with that individual part.

Rod load ratings shown in this catalog are based upon the pending edition of the MSS-SP-58.

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Fig. CT-69 — Adjustable Swivel Ring

Size Range: ½" through 4"

Material: Carbon steel

Finish: Copper plated, also available in yellow dichromate.

Service: Recommended for suspension of non-insulated **stationary** copper tube.

Approvals: Complies with Federal Specification A-A-1192A (Type 10) *WW-H-171-E (Type 10)* and MSS-SP-69 (Type 10).

Features:

- Threads are countersunk so that they cannot become burred or damaged.
- Knurled swivel nut provides vertical adjustment after piping is in place.
- Captured swivel nut will not fall off.

Ordering: Specify nominal tube size, figure number, name and finish.

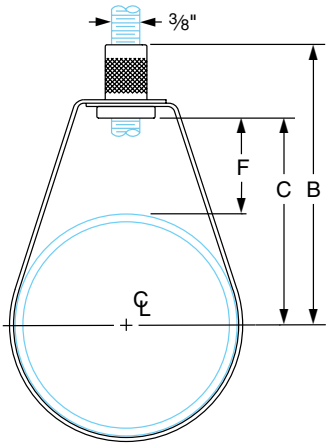


Fig. CT-69: Loads (lbs) • Weight (lbs) • Dimensions (in)

Tube Size	Max Load	Weight	B	C	F
1/2	300	0.10	3	2 3/16	1 7/8
3/4		0.10	2 13/16	2	1 9/16
1		0.10	2 11/16	1 13/16	1 1/4
1 1/4		0.10	2 1/2	1 5/8	15/16
1 1/2		0.10	2 11/16	1 13/16	1
2		0.11	3 7/16	2 1/2	1 1/2
2 1/2	525	0.25	3 13/16	2 15/16	1 11/16
3		0.27	4 1/4	3 3/8	1 7/8
4	650	0.48	4 3/8	3 1/2	1 1/2

Fig. CT-65 — Light Weight Adjustable Clevis

Size Range: ½" through 4"

Material: Carbon steel

Finish: Copper plated, also available in yellow dichromate and plastic coated.

Service: Recommended for suspension of non-insulated, **stationary** copper tube.

Approvals: Complies with Federal Specification WW-H-171-E (Type 12).

Installation:

(1) Adjustment may be made either before or after tubing is in place without temporary support of pipe.

(2) Hanger rod and nuts may be locked into position after adjustment by use of the upper nut.

Features: Provides for adjustment up to 1 7/8".

Ordering: Specify nominal tube size, figure number, name and finish

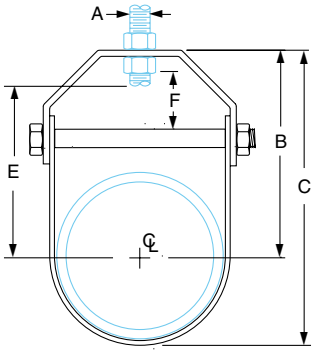


Fig. CT-65: Loads (lbs) • Weight (lbs) • Dimensions (in)

Tube Size	Max Load	Weight	Rod Size A	B	C	D	Rod Take Out - E	Adjustment F
1/2	150	0.09	3/8	1 1/2	1 27/32	1 7/16	1 1/16	5/16
3/4		0.10		1 11/16	2 3/32	1 9/16	1 1/4	7/16
1	250	0.17		1 7/8	2 13/32	1 5/8	1 7/16	1/2
1 1/4		0.18		2 5/32	2 13/16	1 3/4	1 11/16	5/8
1 1/2		0.21		2 17/32	3 3/8	1 15/16	2 1/16	13/16
2		0.26		3 11/32	4 17/32	2 5/16	2 7/8	1 3/16
2 1/2	350	0.48		3 27/32	5 9/32	2 3/4	3 1/4	1 5/16
3		0.55		4 15/32	6 7/32	3	3 7/8	1 5/8
4	400	0.60		4 31/32	6 31/32	3 1/4	4 3/8	1 7/8

Fig. CT-99 Adjustable Tubing Ring
Fig. CT-99C Adjustable Tubing Ring (Plastic Coated)

Fig. CT-99: Adjustable Tubing Ring

Size Range: 1/2" through 4"

Material: Carbon steel ring and malleable iron adjusting nut.

Finish: Copper plated

Service: Recommended for suspension of non-insulated **stationary** copper tube.

Approvals: Complies with Federal Specification A-A-1192A (Type 9) *WW-H-171-E (Type 9)* and MSS-SP-69 (Type 9).

Installation: Full load carrying capacity is reached when the rod is screwed to the bottom of the opening in the nut.

Features:

- Large sight hole provides means of assuring thread engagement.
- Sized for copper tubing.
- Greater vertical adjustability.
- Nut may be attached to rod before pipe is picked up in band and snapped into position.
- Competitively priced.

Ordering: Specify nominal tube size, figure number, name.

Fig. CT-99C: Coated Adjustable Tubing Ring

Size Range: 1/2" through 4"

Material: Carbon steel ring and malleable iron adjusting nut.

Finish: Copper plated with the band plastic coated.

Features: Eliminates possibility of galvanic action between hanger and copper tubing.

Ordering: Specify nominal tube size, figure number, name.

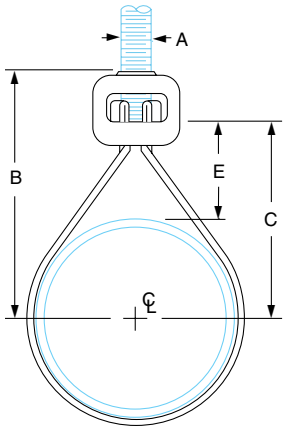


Fig. CT-99, Fig. CT-99C: Loads (lbs) • Weight (lbs) • Dimensions (in)

Tube Size	Max Load	Weight	Rod Size A	B	C	Adjustment E
1/2	400	0.14	3/8	2 1/2	1 3/4	1 7/16
3/4		0.15		2 5/8	1 7/8	
1		0.15		2 3/4	2	
1 1/4		0.16		3	2 1/4	1 9/16
1 1/2		0.17		3 1/8	2 3/8	
2		0.17		3 5/16	2 9/16	1 1/2
2 1/2	650	0.33	1/2	3 7/8	3	1 11/16
3		0.36		4 1/4	3 3/8	1 13/16
4		0.41		5 1/16	4 3/16	2 1/8

Fig. CT-109 Split Tubing Ring (Ring Only)

Size Range: ½" through 3"

Material: Malleable iron

Finish: Copper plated

Service: Recommended for suspension of non-insulated **stationary** copper tube. May be used with rod socket Fig. 110R or turnbuckle adjuster Fig. 114

Approvals: Complies with Federal Specification A-A-1192A (Type 11) *WW-H-171-E (Type 11)* and MSS-SP-69 (Type 11).

Service: The split tubing ring Fig. CT-109 is used for suspension of tubing on many installations where it is necessary to specify universally adaptable parts. May be used with rod socket Fig. 110R or turnbuckle adjuster Fig. 114.

Ordering: Specify nominal tube size, figure number, name.

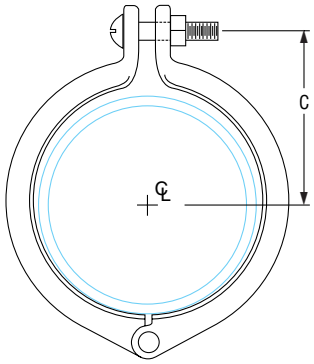


Fig. CT-109: Loads (lbs) • Weight (lbs) • Dimensions (in)

Tube Size	Max Load	Weight	C	Bolt Size
1/2	200	0.07	3/4	#10 x 3/4
3/4	300	0.09	7/8	1/4 x 1
1		0.12	1 1/8	
1 1/4		0.13	1 1/4	
1 1/2		0.18	1 3/8	
2		0.24	1 11/16	1/4 x 1 1/4
2 1/2	450	0.35	1 15/16	
3		0.46	1 1/4	

Fig. CT-138R Extension Split Tubing Clamp (Rod Threaded)

Size Range: ½" through 2"

Material: Malleable iron

Finish: Copper plated

Service: Recommended for suspension of non-insulated **stationary** copper tube.

Approvals: Complies with Federal Specification A-A-1192A (Type 12) *WW-H-171-E (Type 25)* and MSS-SP-69 (Type 12).

Installation:

- Permanent installation of clamp may be made before the tubing is placed in position.
- Final installation is attained by swinging the lower portion of the hinged clamp up under the tubing and inserting a single screw securely.

Features:

- Hinged design provides for economical installation.
- Designed to provide a tight fit on copper tubing.

Ordering: Specify nominal tube size, figure number, name.

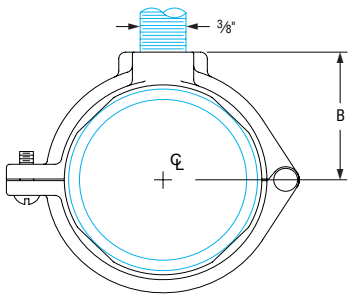


Fig. CT-138R: Loads (lbs) • Weight (lbs) • Dimensions (in)

Tube Size	Max Load	Weight	B
1/2	180	0.10	3/4
3/4		0.12	7/8
1		0.14	1
1 1/4		0.18	1 1/8
1 1/2		0.22	1 1/4
2		0.36	1 9/16

Fig. CT-121 — Copper Tubing Riser Clamp

Size Range: ½" through 4"

Material: Carbon steel

Finish: Copper plated, also available in yellow dichromate.

Service: Recommended for support and steadying of copper tube risers, either insulated or non-insulated. This product is not intended for use with hanger rods.

Approvals: Complies with Federal Specification A-A-1192A (Type 8) *WW-H-171-E (Type 8)* and MSS-SP-69 (Type 8).

Service: For support and steadying of copper tubing risers.

Installation: Clamp is fitted and bolted preferably below a coupling or fitting on the tubing. Do not over tighten bolts.

Features: Rounded ears provide greater safety for personnel.

Ordering: Specify tube size, figure number, name.

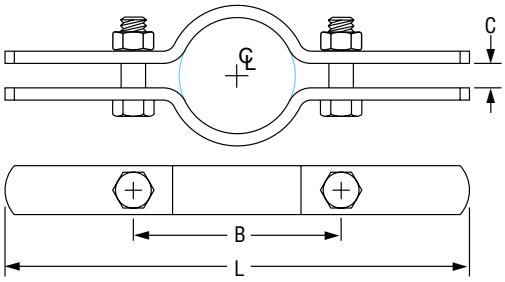


Fig. CT-121: Loads (lbs) • Weight (lbs) • Dimensions (in)

Tube Size	Max Load	Weight	L	Stock Width	Bolt Size
½	75	0.52	6½	1	5/16
¾		0.56	7		
1	120	0.94	9⅜	1¼	⅜
1¼	150	0.98	9⅝		
1½		1.50	10		
2		1.50	10⅜		
2½	300	1.70	11 13/16		
3		1.80	11½		
3½		1.90	12		
4		2.60	13	1½	½

Fig. CT-121C — Copper Tubing Riser Clamp (Plastic Coated)

Size Range: ½" through 4"

Material: Carbon steel

Finish: Copper plated with formed portion plastic coated. Also available in yellow dichromate.

Features: Eliminates possibility of galvanic action between hanger and copper tubing

Ordering: Specify tube size, figure number, name.

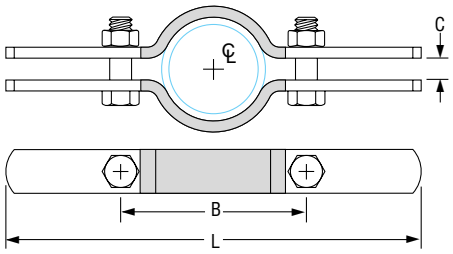


Fig. CT-121: Loads (lbs) • Weight (lbs) • Dimensions (in)

Tube Size	Max Load	Weight	L	Stock Width	Bolt Size
½	75	0.52	6½	1	5/16
¾		0.56	7		
1	120	0.94	9⅜	1¼	⅜
1¼	150	0.98	9⅝		
1½		1.50	10		
2		1.50	10⅜		
2½	300	1.70	11 13/16		
3		1.80	11½		
3½		1.90	12		
4		2.60	13	1½	½

Fig. CT-128R — Rod Threaded Ceiling Flange

Size Range: 3/8" and 1/2"
Material: Malleable iron
Finish: Copper plated
Service: Recommended for attachment to wood beams or ceiling.
Ordering: Specify rod size, figure number, name.

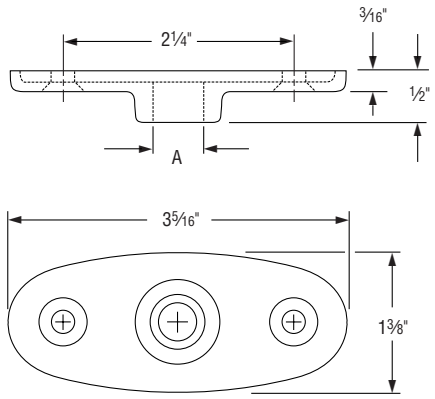


Fig. CT-128R: Loads (lbs) • Weight (lbs) • Dimensions (in)

Rod Size A	Max Load	Weight	Screws	
			Quantity	Size No.
3/8	180	0.16	2	12
1/2				

Fig. CT-255 Copper Tubing Alignment Guide

Size Range: 1" through 4"

Material: Carbon steel

Finish: Plain or Galvanized with copper plated finish on spider

Service: For maintaining alignment of tubing through its axial expansion and contraction cycles. Normally, two or more pipe alignment guides are used on a single tubing run to avoid a pivoting effect within the tubing system. Consult the Expansion Joint Manufacturers Association or the Copper Tube Manufacturers for additional guidelines of spacing requirements of intermediate guides. Supports are usually required between intermediate guides to comply with standard support practices.

Maximum Temperature: 400° F

Installation:

(1) Attach outer housing to structure by bolting or welding.
(2) Remove upper selection of housing to open position.
(3) Attach spider clamp to tube and completely insulate.
(4) Set tube and spider clamp into outer housing.
(5) Replace upper section of housing to closed position and secure.

Note: Spider attachments to tube must be properly located during installation to insure that a minimum of one-half the spider width remains within the length of the outer housing for all conditions of operation. If larger travels are required, special guides can be furnished to special order.

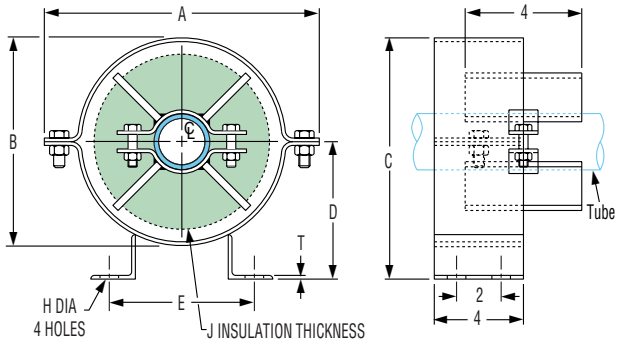
How to size: Size by nominal tube size and insulation thickness in accordance with the selection table.

Ordering: Specify size number, tube size, insulation thickness, figure number, name and finish.

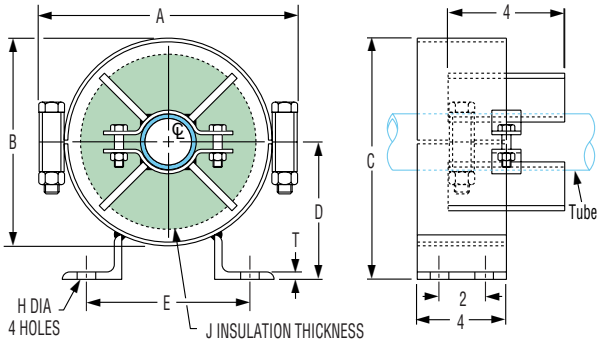
Caution: Guides are designed to carry 20% of dead weight load. Dead weight load is defined as maximum span of water filled pipe.

Tube Size (in)	L (in)	Maximum Movement
1" to 4"	4	4

Fig. CT-255 — Copper Tubing Alignment Guide (cont.)



COPPER TUBING ALIGNMENT GUIDE, FIGURE CT-255, SIZE A & B



COPPER TUBING ALIGNMENT GUIDE, FIGURE CT-255, SIZE C THRU D

Guide Size No.	Dimensions (in)						
	A	B	C	D	E	H	T
A	8 13/16	6 3/4	8	4 5/8	5 3/4	5/8	1/4
B	10 13/16	8 3/4	10	5 3/8	7		
C	13 5/16	11 1/4	12 7/16	6 5/8	7 3/4		
D	15 7/8	13 3/8	14 13/16	7 15/16	9 3/4	3/4	5/16

Tube Size	Guide Size Number / Insulation Thickness (in)					
	1	1½	2	2½	3	4
½	A	A	A	A	–	–
¾	A	A	A	A	–	–
1	A	A	A	A	C	C
1¼	A	A	A	C	C	C
1½	A	A	A	C	C	C
2	B	B	B	B	C	C
2½	B	B	B	B	C	C
3	B	B	B	B	D	D
3½	B	B	B	D	D	D
4	B	B	B	D	D	D

Fig. 108 Split Pipe Ring

Size Range: 3/8" through 8"

Material: Malleable iron

Finish: Plain

Service: Recommended for suspension of non-insulated **stationary** pipe lines or conduit. May be used with rod socket Fig. 110R or turnbuckle adjuster Fig. 114.

Maximum Temperature: 450° F

Approvals: Complies with Federal Specification A-A-1192A (Type 11) *WW-H-171-E (Type 11)* and MSS-SP-69 (Type 11).

Features:

- Permits installation before or after pipe is in place.
- Provides economical installation.
- Permits use of universally adaptable parts.

Ordering: Specify pipe size, figure number, name.

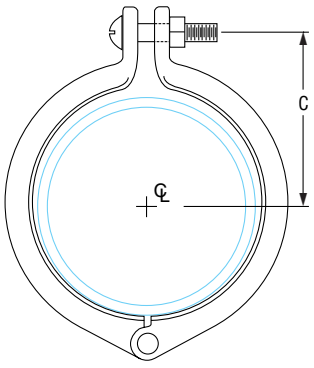


Figure 108: Loads (lbs) • Weight (lbs) • Dimensions (in)

Pipe Size	Max Load	Weight	C	Bolt Size
3/8	200	0.06	3/4	#10 x 7/8
1/2		0.09	15/16	1/4 x 1
3/4	300	0.11	1 1/8	
1		0.13	1 1/4	
1 1/4		0.18	1 9/16	
1 1/2		0.26	1 11/16	1/4 x 1 1/4
2		0.33	2 1/16	
2 1/2	450	0.44	2 1/4	
3		0.63	2 3/4	
3 1/2		0.81	3 1/8	
4	520	0.97	3 5/8	3/8 x 2
5		1.50	4 1/2	
6	1,300	2.60	5 7/16	1/2 x 2
8	1,800	5.20	6 3/8	

Fig. 138R (Rod Threaded) — Extension Split Pipe Clamp

Size Range: 3/8" through 3"

Material: Malleable iron

Finish: Plain or Galvanized

Service: Recommended for non-insulated **stationary** pipe lines.

Maximum Temperature: 450° F

Approvals: Complies with Federal Specification A-A-1192A (Type 12) *WW-H-171-E (Type 25)* and MSS-SP-69 (Type 12).

Features:

- Rapid installation assured by hinged design and single closure screw.
- When used with nipple this clamp is particularly adaptive for use on refrigeration or compressor piping subject to vibration.
- Interior design provides firm grip on pipe.
- Inside of ring tapered to prevent entrapment of condensed moisture.

Ordering: Specify pipe size, figure number, name and finish.

Fig. 138R

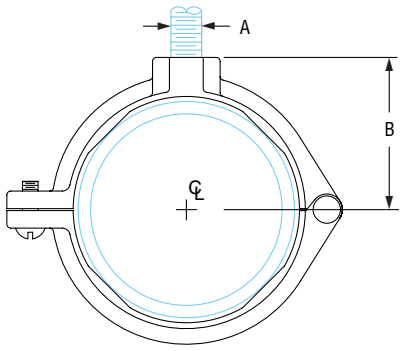


Fig. 138R

Fig. 138R: Loads (lbs) • Weight (lbs) • Dimensions (in)				
Pipe Size	Max Load	Weight	Rod Size A	B
3/8	180	0.10	3/8	13/16
1/2		0.13		7/8
3/4		0.14		1
1		0.16		1 1/8
1 1/4		0.22		1 5/16
1 1/2		0.24		1 7/16
2		0.31		1 11/16
2 1/2	300	0.60	1/2	2 1/8
3		0.74		2 7/16

Fig. 104 — Adjustable Swivel Ring, Split Ring Type

Size Range: 3/4" through 8"

Material: Malleable iron, carbon steel

Finish: Plain or Galvanized

Service: Recommended for suspension of non-insulated **stationary** pipe lines.

Maximum Temperature: 450° F

Approvals: Complies with Federal Specification A-A-1192A (Type 6) *WW-H-171-E (Type 6)* and MSS-SP-69 (Type 6).

Features:

- Labor-saving features in installation completely outweigh slight additional cost.
- Hanger may be installed prior to suspension of pipe.
- Off-center hinge provides seating for pipe during installation.
- Wedge-type locking pin is inseparably cast into hinged section, sizes 2½" and larger.
- Adjustable swivel ring is self-locking; prevents loosening due to vibration; maintains proper pitch of pipe.
- Wire retaining ring prevents separation of swivel shank from pipe ring before installation.

Ordering: Specify pipe size, figure number, name and finish.

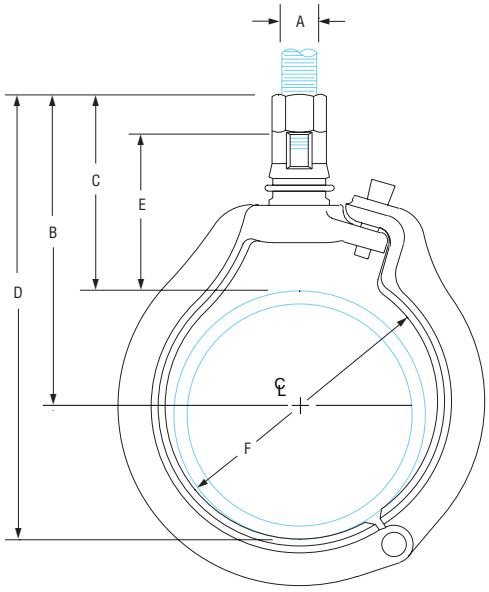


Fig. 104: Loads (lbs) • Weight (lbs) • Dimensions (in)

Pipe Size	Max Load	Weight	Rod Size A	B	C	D	E	Inside Dia. of Ring – F
3/4	300	0.31	3/8	2 7/8	2 3/8	3 7/16	1 15/16	1 3/16
1		0.32			2 1/4	3 9/16	1 3/4	1 7/16
1 1/4		0.34		3	2 3/16	3 7/8	1 11/16	1 13/16
1 1/2		0.41		3 1/8		4 1/8		2 1/16
2		0.48		3 1/2	2 5/16	4 11/16	1 13/16	2 1/2
2 1/2	500	0.58	1/2	3 15/16	2 1/2	5 3/8	1 7/8	3
3		1.00		4 3/8	2 5/8	6 1/8	2	3 3/4
4	900	1.70	5/8	5 13/16	3 9/16	8 1/16	2 7/8	4 13/16
5		2.50		6 3/8	3 5/8	9 3/16	2 15/16	5 15/16
6	1,300	3.80	3/4	7 5/8	4 5/16	10 15/16	3 1/2	7 1/16
8	1,800	6.10	7/8	9 1/8	4 7/8	13 1/2	3 7/8	9 1/16

Fig. 97, Fig 97C (Plastic Coated) — Adjustable Pipe Ring

Size Range: ½" through 4"

Material: Malleable iron adjusting nut; carbon steel band.

Finish: Plain adjusting nut; Galvanized steel band

Service: Recommended for suspension of non-insulated **stationary** pipe lines or conduit.

Maximum Temperature: 450° F

Approvals: Complies with Federal Specification A-A-1192A (Type 9) *WW-H-171-E (Type 9)* and MSS-SP-69 (Type 9). UL Listed and FM Approved.

Installation: Full load rating is obtained when rod is screwed to the bottom of the opening in the nut.

Features:

- Large sight hole provides means of ascertaining proper thread engagement.
- Design of band provides greater load carrying capacity.
- Nut may be attached to rod before pipe is picked up in band and snapped into position.
- Greater vertical adjustability.

Ordering: Specify pipe size, figure number, name and finish.

Fig. 97C: Plastic coated

Size Range: ¾ through 4".

Material: Malleable iron adjusting nut; plastic coated carbon steel band.

Service: Recommended for suspension of fiberglass, copper, brass and aluminum pipe.

Maximum Temperature: 225° F

Feature: No metal surface in contact with pipe.

Ordering: Specify pipe size, figure number, name.

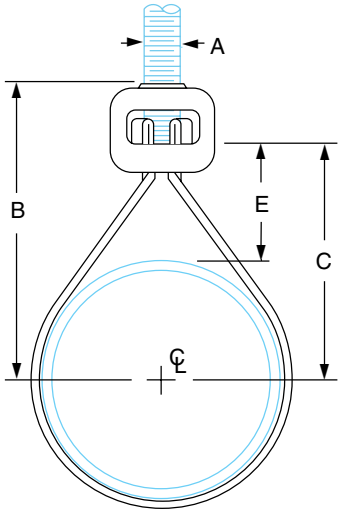


Fig. 97, Fig. 97C: Loads (lbs) • Weight (lbs) • Dimensions (in)

Pipe Size	Max Load	Weight	Rod Size A	B	C	Adjustment E
½	400	0.14	⅜	2½	1¾	1⅜
¾		0.15		2⅝	1⅞	
1		0.15		2¾	2	
1¼		0.16		3	2¼	
1½		0.17		3⅛	2⅜	
2		0.18		3 5/16	2 9/16	
2½	650	0.35	½	3⅞	3	1 9/16
3		0.37		4¼	3⅜	1⅝
4	1,300	0.82	⅝	5 7/16	4 5/16	2 1/16

Fig. 69 Adjustable Swivel Ring, Tapped Per NFPA Standards

Size Range: 1/2" through 8"
Material: Carbon steel
Finish: Galvanized
Service: Recommended for suspension of non-insulated **stationary** pipe line.
Maximum Temperature: 650° F
Approvals: Complies with Federal Specification A-A-1192A (Type 10) *WW-H-171-E (Type 10)* and MSS-SP-69 (Type 10).
UL Listed and FM Approved (Sizes 3/4" - 8").
Features:

- Threads are countersunk so that they cannot become burred or damaged.
- Knurled swivel nut provides vertical adjustment after piping is in place.
- Captured swivel nut in the 1/2" through 3" sizes.

Ordering: Specify size, figure number and name.

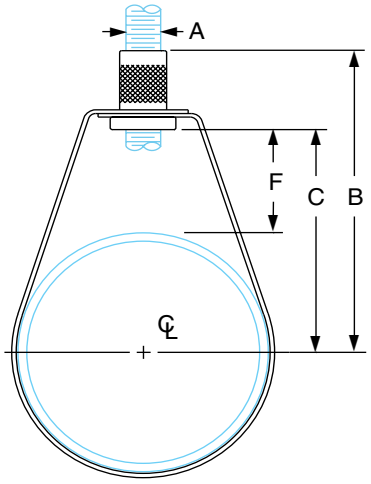


Fig. 69: Loads (lbs) • Weight (lbs) • Dimensions (in)

Pipe Size	Max Load	Weight	Rod Size A	B	C	F
1/2	300	0.10	3/8	2 7/8	2	1 9/16
3/4		0.10		2 3/4	1 7/8	1 15/16
1		0.10		2 9/16	1 11/16	1
1 1/4		0.10		2 5/8	1 3/4	7/8
1 1/2		0.10		2 3/4	1 7/8	
2		0.11		3 1/4	2 3/8	1 1/8
2 1/2	525	0.20		4	2 3/4	1 5/16
3		0.20		3 13/16	2 15/16	1 3/16
4	650	0.30		4 11/16	3 13/16	1 9/16
5	1,000	0.54	1/2	5 5/16	4 3/8	
6		0.65		6 11/16	5 9/16	2 1/4
8		1.00		8	7	2 11/16

Fig. 67 — Pipe or Conduit Hanger

Size Range: ½" through 6"

Material: Carbon steel

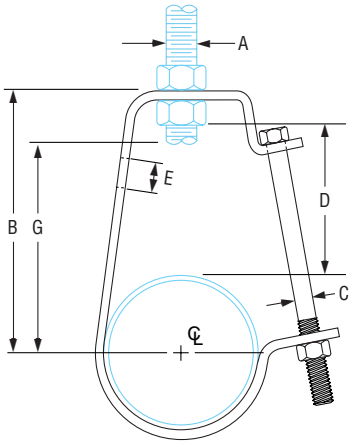
Finish: Galvanized

Service: Can be suspended by hanger rod or attached to wall. "T" slot in hanger permits side bolt to be installed after installation and setting of pipe.

Approvals: Complies with Federal Specification A-A-1192A (Type 5) and MSS-SP-69 (Type 5).

Components: Strap and bolt with nut – assembled.

Ordering: Specify pipe size, figure number and name.



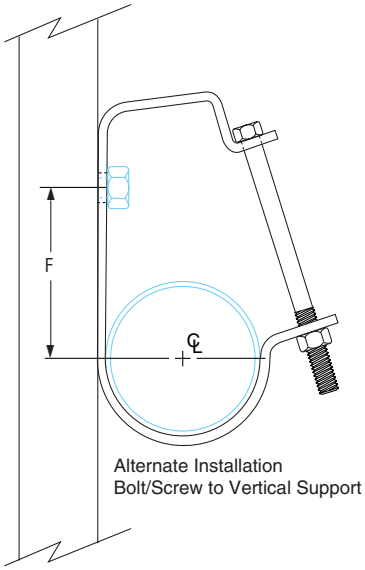


Fig. 67: Loads (lbs) • Weight (lbs) • Dimensions (in)

Pipe Size	Load Rating	Weight	Rod Size A	B	C	D	E	F	G
1/2	400	0.21	3/8	2 5/8	1/4	1 3/4	7/16	1 1/2	1 15/16
3/4		0.22		2 7/8		1 7/8		1 11/16	2 1/8
1		0.25		2 15/16		1 15/16		1 13/16	2 5/16
1 1/4		0.27		3 1/4		2		2 1/16	2 5/8
1 1/2		0.29		3 9/16		2 3/16		2 7/16	2 7/8
2		0.31		3 11/16		2 1/8		2 9/16	3 1/16
2 1/2	500	0.71	1/2	4 7/16	3/8	2 7/16	9/16	3 3/16	3 5/8
3		0.78		4 13/16		2 9/16		3 1/2	4 1/16
4	550	1.39	5/8	6 1/8		3 3/16		4 5/8	5 3/16
5		1.66		6 3/4		3 1/4		5 1/16	5 3/4
6	600	2.26	3/4	7 3/4		3 9/16		5 13/16	6 5/8

Fig. 65 — Light Duty Adjustable Clevis

Size Range: 3/8" through 4"
Material: Carbon steel
Finish: Plain, Galvanized or Epoxy coated
Service: Recommended for suspension of **stationary** pipe or conduit.
Maximum Temperature: Plain 650° F, Galvanized and Epoxy 450° F
Approvals: Complies with Federal Specification WW-H-171-E (Type 12). UL Listed (Sizes 2 1/2" through 4" galvanized only).
Installation: Hanger load nut above the clevis must be tightened securely to assure proper hanger performance.
Adjustment: Vertical adjustment is provided, varying with the size of clevis. Tighten upper nut after adjustment.
Features: An economical attachment for light duty service.
Ordering: Specify pipe size, figure number, name and finish.

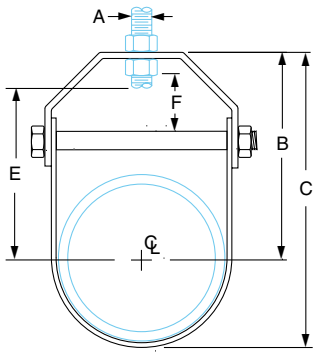


Fig. 65: Loads (lbs) • Weight (lbs) • Dimensions (in)

Pipe Size	Max Load	Weight	Rod Size A	B	C	Rod Take Out E	Adjustment F
3/8	150	0.09	3/8	1 1/2	1 27/32	1 1/16	5/16
1/2		0.10		1 11/16	2 3/32	1 1/4	7/16
3/4	250	0.17		1 7/8	2 13/32	1 7/16	1/2
1		0.18		2 5/32	2 13/16	1 11/16	5/8
1 1/4		0.21		2 17/32	3 3/8	2 1/16	13/16
1 1/2		0.24		2 13/16	3 13/16	2 3/8	15/16
2		0.26		3 11/32	4 17/32	2 7/8	1 3/16
2 1/2	350	0.50	1/2	3 27/32	5 9/32	3 1/4	1 5/16
3		0.59		4 15/32	6 7/32	3 7/8	1 5/8
3 1/2		0.62		4 31/32	6 31/32	4 3/8	1 7/8
4	400	0.77		5 17/32	7 25/32	4 15/16	2 1/8

Fig. 260 Adjustable Clevis Hanger

Size Range: ½" through 30"

Material: Carbon steel

Finish: Plain or Galvanized, also available plastic or epoxy coated

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

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

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

Installation: Hanger load nut *above* clevis must be tightened securely to assure proper hanger performance. When an oversized clevis is used, a pipe spacer should be placed over the clevis bolt as a spacer to assure that the lower U-strap will not move in on the bolt. For ductile iron pipe sizes, see Figure 590.

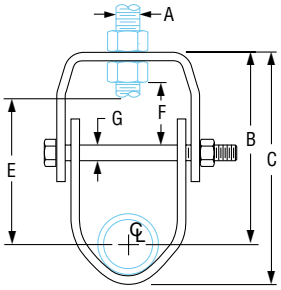
Adjustment: Vertical adjustment without removing pipe may be made from ⅜" through 5⅛", varying with the size of clevis. Tighten upper nut after adjustment.

Features:

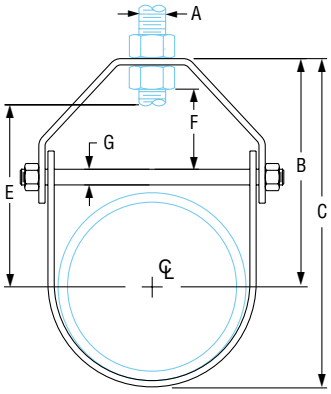
- Design has yoke on outside of lower U-strap so yoke cannot slide toward center of bolt, thus bending of bolt is minimized.
- Sizes 5" and up have rod and two nuts instead of bolt and nut; thread length on clevis rod is such that the thread locks the nuts in place, and threads are not in shear plane.

Ordering: Specify pipe size, figure number, name and finish.

Note: Punched forming holes may be present on certain sizes of this clevis hanger. These holes are solely for the purpose of manufacturing, and do not effect the structural integrity or load carrying capacities of these hangers.



½" through ¾" Pipe



1" through 30" Pipe

Fig. 260: Loads (lbs) • Weights (lbs) • Dimensions (in)

Pipe Size	Max Load	Span Ft.	Weight	Rod Size A	B	C	RodTake Out E	Adjust. F	G
½	610	7*	0.34	⅜	2 3/16	2 11/16	1½	⅝	¼
¾			0.34		2		1 5/16		
1	730		0.35		2 5/16	3	1⅝		
1¼			0.40		2⅜	3¼	1 11/16		
1½		9*	0.45		2 13/16	3 13/16	2⅛	⅞	
2		10*	0.50		3 5/16	4½	2⅝	1⅛	
2½	1,350	11*	0.65	½	4 1/16	5½	3 3/16	1 5/16	⅜
3		12*	0.85		4¾	6½	4 1/16	1⅝	
3½		13*	1.10		5 1/16	7 1/16	4 3/16	1 13/16	
4	1,430	14*	1.51	⅝	5 9/16	7 13/16	4½	1 11/16	⅜
5		16*	1.70		6 9/16	8 15/16	5½	1 15/16	
6	1,940	17*	3.10	¾	6 15/16	10¼	5¾	1 11/16	½
8	2,000	19*	4.75		8⅜	12 11/16	7 3/16	2	
10	3,600	22*	8.60	⅞	9⅞	15¼	8 7/16	2⅛	⅝
12	3,800	23*	11.20		11 9/16	17 15/16	10⅛	2 13/16	
14	4,200	25*	12.50	1	12 9/16	19 9/16	10 11/16	2 11/16	¾
16	4,600	27	19.85		14	22	12	2¾	1
18	4,800	28	22.25		15 15/16	24 15/16	13 15/16	3 13/16	
20	4,800	30	40.33	1¼	17 9/16	27 9/16	15 3/16	3⅞	1¼
24	4,800	32	49.83		19 13/16	31 13/16	17 5/16		
30	6,000	33	70.18		24 3/16	39 3/16	21 9/16	5⅛	

"Span" represents the maximum recommended distance between hangers on a continuous and straight run of horizontal standard weight steel pipe filled with water. In all cases, verify that chosen location of hangers does not subject hangers to a load greater than the maximum recommended load shown above.
*Indicates that span represents the maximum span for water filled pipe as given in Table 1 of page PH-207.

Fig. 300 — Adjustable Clevis for Insulated Lines

Size Range: 3/4" through 12"

Material: Carbon steel

Finish: Plain, Galvanized or Epoxy coated

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

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

Approvals: Complies with Federal Specification A-A-1192A (Type 1) *WW-H-171-E (Type 1)* and MSS-SP-69 (Type 1).

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

Adjustment: Vertical adjustment is provided, varying with the size of the clevis. Tighten upper nut after adjustment.

Features:

- Designed for 2" of insulation on 3/4" through 1 1/2" pipe and 4" of insulation on 2" and larger pipe.
- When properly installed, clevis bolt is outside the insulation.

Ordering: Specify pipe size, figure number, name and finish.

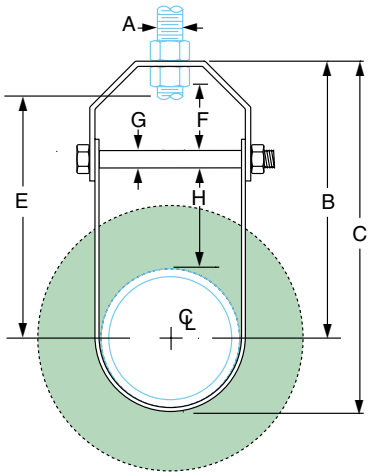


Fig. 300: Loads (lbs) • Weight (lbs) • Dimensions (in)

Pipe Size	Max Load	Weight	Rod Size A	B	C	E	Adjustment F	G	H
3/4	730	0.51	3/8	3 5/8	4 1/4	2 7/8	1/2	1/4	2
1		0.58		4	4 11/16	3 1/4	5/8		
1 1/4		0.64		4 7/16	5 1/4	3 5/8	7/8		
1 1/2		0.72		4 3/4	5 3/4	4 1/16	1 1/16		
2		0.85		7 7/16	8 11/16	6 1/2	1 5/8		4
2 1/2	1,350	1.90	1/2	8 7/16	9 15/16	7 1/2	2	3/8	
3		2.00		8 5/8	10 5/16	7 9/16	1 3/4		
4	1,430	2.50	5/8	9 3/8	11 5/8	8 3/16	1 15/16		
5		3.00		9 7/8	12 5/8	8 3/4	1 3/4	1/2	
6	1,940	3.40	3/4	10 5/8	14	9 3/8	1 7/8		
8	2,000	6.70		12 3/8	16 3/4	11	2	5/8	
10	3,600	11.0	7/8	13 3/4	19 3/16	12 1/4	2 1/8	3/4	
12	3,800	13.8		15 1/8	21 9/16	13 5/8	2 7/16		

Fig. 590 Adjustable Clevis for Ductile or Cast Iron Pipe

Size Range: 4" through 24" ductile or cast iron pipe

Material: Carbon steel

Finish: Plain or Galvanized

Service: Recommended for the suspension of ductile iron or cast iron pipe.

Approvals: Complies with Federal Specification A-A-1192A (Type 1) WW-*H-171-E (Type 1)* and MSS-SP-69 (Type 1).

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

Adjustment: Vertical adjustment without removing pipe may be made from 1 15/16" through 3 3/16", varying with the size of the clevis. Tighten upper nut after adjustment.

Ordering: Specify pipe size, figure number, name and finish.

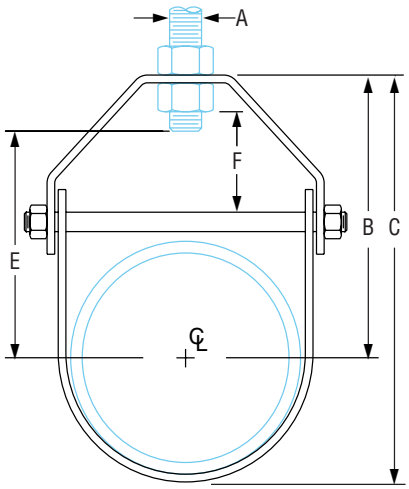


Fig. 590: Loads (lbs) • Weight (lbs) • Dimensions (in)

D.I./C.I. Pipe Size	Max Load	Weight	D.I./C.I. Pipe O.D.	Rod Size A	B	C	E	F
4	1,430	1.64	5	5/8	5 3/4	8 3/16	4 3/4	1 15/16
6	1,940	4.26	7 1/8	3/4	7 1/8	10 9/16	5 15/16	
8	2,000	6.70	9 5/16		8 5/8	13 3/16	7 1/2	2 1/4
10	3,600	9.73	11 1/2	7/8	10 1/8	15 11/16	8 3/4	2 5/16
12	3,800	13.64	13 1/2		12 1/16	18 11/16	10 11/16	2 7/8
14	4,200	16.04	15 3/4	1	13 1/4	20 7/8	11 5/16	2 9/16
16	4,600	24.52	17 7/8		14 1/4	22 15/16	12 9/16	2 7/16
18	4,800	27.45	20		16 7/8	26 5/8	15 3/16	3 13/16
20	4,800	46.24	22 1/8	1 1/4	18 1/4	29 1/16	16 3/8	
24	4,800	57.10	26 3/8		20 5/16	33 1/4	18 3/8	

Fig. 261 — Extension Pipe or Riser Clamp

Size Range: 3/4" through 24"

Material: Carbon steel

Finish: Plain, Galvanized or Epoxy coated

Service: For support of stationary steel pipe risers, cast iron pipe or conduit. This product is not intended for use with hanger rods. For this application refer to Fig. 40 Riser Clamp, page PH-33.

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

Approvals: Complies with Federal Specification A-A-1192A (Type 8) *WW-H-171-E (Type 8)* and MSS-SP-69 (Type 8).
UL, ULC Listed (Sizes 1 1/2" - 8").

Installation: Clamp is fitted and bolted preferably below a coupling or welded lugs on steel pipe. Bolt torques should be per industry standards (see page PH-212). Clamp is designed for standard steel pipe O.D. and this must be considered in sizing the riser for other types of piping.

Ordering: Specify pipe size, figure number, name and finish.

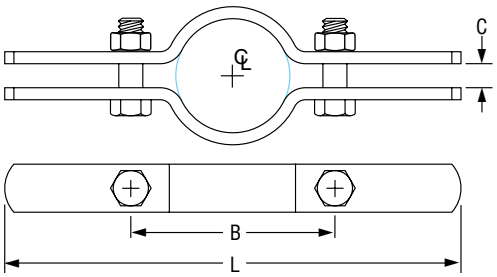


Fig. 261: Loads (lbs) • Weight (lbs) • Dimensions (in)

Pipe Size	Max Load	Weight	L	B	C	Bolt Dia.
3/4	220	1.1	8 7/8	2 7/8	3/8	3/8
1		1.1		3 1/8		
1 1/4	250	1.6	10	3 1/2		
1 1/2		1.6	10 1/4	3 7/8		
2	300	1.7		4 1/4	1/2	7/16
2 1/2	400	1.9	11 1/4	4 3/4		
3	500	1.9	11 3/8	5 1/2		
3 1/2	600	2.3	12 7/8	6 1/2	1/2	1/2
4	750	2.4		7		
5	1,500	3.6	13 3/4	8		
6	1,600	4.0	14 3/4	9		
8	2,500	7.6	18 1/2	12	5/8	5/8
10		11.1	20 1/4	13 3/4		
12	2,700	16.5	22 3/4	15 3/4		
14		17.7	24	17 1/4		
16	2,900	30.4	26	19 3/4	3/4	3/4
18		33.8	28	21 3/4		
20		35.0	30	23 3/4		
24	3,200	82.0	36 3/4	30	1	7/8

Fig. 40 — Riser Clamp – Standard

Size Range: 2" through 24"

Material: Carbon steel (CS), Alloy (A), or Stainless Steel (SS)

Finish: Plain or Galvanized

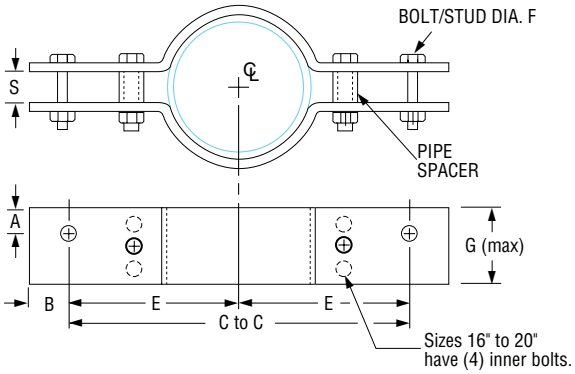
Maximum Temperature: Galvanized 450° F, 650° F (CS), 950° F (A) and 1,000° F (SS)

Service: Riser clamps are used for the support of vertical piping. Load is carried by shear lugs which are welded to the pipe. Shear lugs provided upon request. Local pipe wall stress evaluation available upon request.

Approvals: Complies with Federal Specification A-A-1192A (Type 42) and MSS-SP-69 (Type 42).

Ordering: Specify pipe size, material, figure number, name and finish.

Note: If greater loads are required, refer to Fig. 40-SD special design riser clamp.



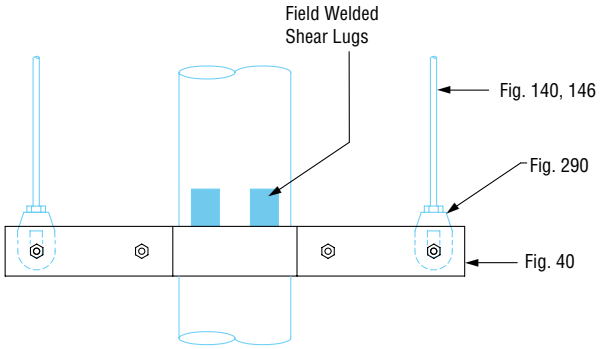


Fig. 40: Loads (lbs) • Weight (lbs) • Dimensions (in)

Pipe Size	Max Load		C-C	E	F	G (max)	S	A	B	Maximum Weight Each		
	Rigid Assembly	Spring Assembly								CS	SS	Alloy
2	900	1,800	18	9	1/2	2 1/2	3/4	7/8	2	18	15	18
2 1/2			20	10						20	20	20
3	1,500	3,000			5/8	3	1			30	25	30
4	2,200	4,400	22	11	3/4	4	1 1/4	1 1/8		40	40	44
5										45	40	45
6	3,000	6,000	24	12	7/8	5	1 1/2	1 1/4		60	60	73
8			27	13 1/2						82	82	82
10	5,500	11,000	30	15	1 1/4	6	2 1/4	1 5/8	3	157	157	157
12	7,800	15,600	32	16	1 1/2	7	2 1/2	1 7/8		216	202	250
14			34	17				1 3/8		228	228	263
16	9,000	18,000	36	18		8		2		314	277	315
18			39	19 1/2		9				338	338	377
20	13,500	27,000	42	21	2	10	3 1/2	2 5/8	4 1/4	525	525	580
24			45	22 1/2		11				621	565	681

Fig. 103 Offset Pipe Clamp

Size Range: ¾" through 8"
Material: Carbon steel
Finish: Plain or Galvanized
Service: For use in supporting piping away from wall or floor.
Maximum Temperature: Plain 650° F, Galvanized 450° F
Ordering: Specify pipe size, figure number, name and finish

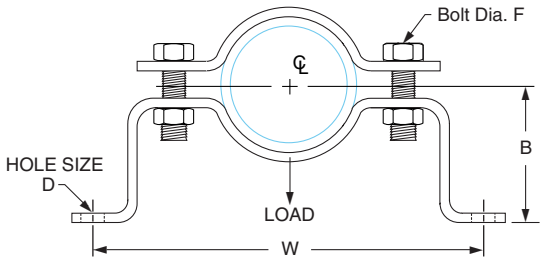


Fig. 103: Loads (lbs) • Weight (lbs) • Dimensions (in)

Pipe Size	Max Load	Weight	W	B	D	Bolt Dia. F
3/4	190	1.50	8 3/4	2 1/2	7/16	3/8
1		1.60	9 1/4	2 5/8		
1 1/4		1.70	9 3/4	2 13/16		
1 1/2		1.80	10	2 15/16		
2	420	2.70	11 1/4	3 3/16	9/16	1/2
2 1/2		2.90	11 3/4	3 7/16		
3		3.20	12 7/8	3 3/4		
4	610	4.60	13 7/8	4 1/4		
5		7.30	15 5/8	4 3/4	11/16	5/8
6	870	7.80	16 3/4	5 5/16		
8		9.00	18 3/4	6 5/16		

Fig. 100 Extended Pipe Clamp

Size Range: 1/2" through 8"
Material: Carbon steel
Finish: Plain or Galvanized
Service: For attachment to structure without use of rods.
Maximum Temperature: Plain 650° F, Galvanized 450° F
Ordering: Specify pipe size, figure number, name and finish.

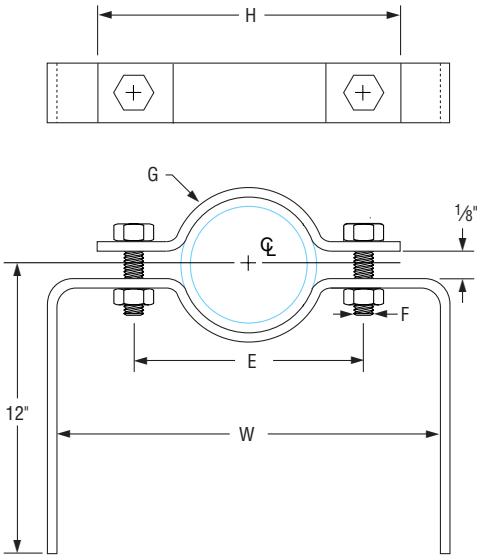


Fig. 100: Weight (lbs) • Dimensions (in)

Pipe Size	W	E	F	G	H	Weight
1/2	5 5/8	2 7/8	3/8	3/16 x 1	4 1/4	1.85
3/4	5 7/8	3 1/8		3/16 x 1 1/4	4 1/2	2.20
1	6 3/8	3 5/8			5	2.25
1 1/4	6 7/8	4 1/8			5 1/2	2.34
1 1/2	7 1/8	4 3/8			5 3/4	2.39
2	8 3/8	5 1/8	1/2	1/4 x 1 1/4	6 7/8	3.25
2 1/2	8 7/8	5 5/8			7 3/8	3.40
3	10	6 3/4			8 1/4	3.58
4	10 5/8	7 3/8		1/4 x 1 1/2	9 1/8	4.74
5	12 3/8	8 5/8	5/8	1/4 x 2	10 7/8	5.09
6	13 1/2	9 3/4			12	8.23
8	15 1/2	11 3/4			14	9.25

Fig. 212 — Medium Pipe Clamp

Size Range: ½" through 30"

Material: Carbon steel

Finish: Plain or Galvanized

Service: Recommended for suspension of cold pipe lines or hot lines where no insulation is required.

Maximum Temperature: Plain 750° F, Galvanized 450° F

Approvals: Complies with Federal Specification A-A-1192A (Type 4) *WW-H-171-E (Type 4)* and MSS-SP-69 (Type 4). UL, ULC Listed and FM Approved (Sizes ¾" - 8").

Installation: Normally used with weldless eye nut Fig. 290, page PH-89 or eye rod.

Features:

- Clamps tightly to pipe.
- Wide range of sizes.
- Equal gap design.

Ordering: Specify pipe size, figure number, name and finish.

Note: The "C" gap dimention should be used at the upper and lower locations to ensure proper installation of the clamp.

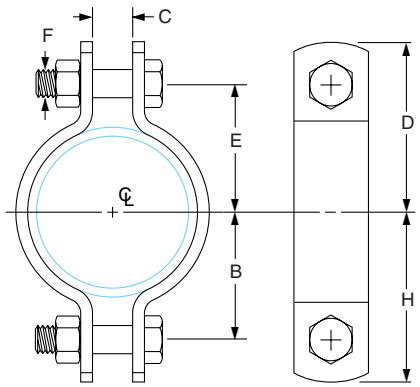


Fig. 212: Loads (lbs) • Weight (lbs) • Dimensions (in)

Pipe Size	Span Ft.	Max Load For Service Temp		Weight	B	C	Rod Take Out E	H	D	F
		650° F	750° F							
½	7*	500	–	0.29	1	½	1 3/16	1 17/32	1 23/32	5/16
¾				0.33	1 1/8		1 1/4	1 21/32	1 25/32	
1				0.35			1 3/8		1 29/32	
1 1/4				0.38	1 7/16		1 5/8	1 31/32	2 5/32	
1 1/2	9*	800		0.43	1 9/16		1 11/16	2 3/32	2 7/32	
2	10*	1,040	930	1.10	2 1/8		2 1/8	2 3/4	2 3/4	½
2 1/2	11*			1.20	2 5/8	5/8	2 5/8	3 1/4	3 1/4	
3	12*			1.40	2 7/8		2 7/8	3 1/2	3 1/2	
3 1/2	13*			1.50	3 3/16		3 3/16	3 13/16	3 13/16	
4	14*			1.80	3 1/2		3 1/2	4 1/4	4 1/4	
5	16*			2.60	4 3/16	¾	4 3/16	4 15/16	4 15/16	5/8
6	17*	1,615	1,440	5.40	4 7/8	1 1/4	4 7/8	5 3/4	5 3/4	¾
8	19*			6.50	6		6	6 7/8	6 7/8	
10	22*	2,490	2,220	13.60	7 7/16	1	7 7/16	8 9/16	8 9/16	7/8
12	23*			15.20	8 7/16		8 7/16	9 9/16	9 9/16	
14	20			20.50	9 1/4	1 1/8	9 1/4	10 5/8	10 5/8	
16	15			22.30	10 1/4		10 1/4	11 5/8	11 5/8	
18	15	3,060	2,730	31.60	11 5/8	1 1/4	11 5/8	13	13	1
20	12			35.80	12 3/4	1 3/8	12 3/4	14 1/8	14 1/8	1 1/8
24	12			53.10	15 1/4	1 5/8	15 1/4	16 7/8	16 7/8	1 1/4
30	9	3,500	3,360	113.90	19	2	19	21 1/8	21 1/8	1 3/4

Clamps may be furnished with square ends.

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

For vapor service, the presence of fittings or insulation, and other weights and types of pipe, spans may either increase or decrease. In all cases, verify that chosen location of hanger does not subject hangers to a load greater than the maximum recommended load shown.

*Indicates that span represents the maximum span for water filled pipe as given in Table 1 of page PH-207.

Fig. 212FP — Earthquake Bracing Clamp

Size Range: 2½" through 12"

Material: Carbon steel

Finish: Plain or Galvanized

Service: For seismic bracing, to be used with Fig. 113 brace fitting. Pipe clamp bolt holes are designed to match holes in brace fitting.

Maximum Temperature: Plain 750° F, Galvanized 450° F

Approvals: Complies with Federal Specification A-A-1192A (Type 4) *WW-H-171-E (Type 4)* and MSS-SP-69 (Type 4).

Installation: Designed for use with Fig. 113 brace fitting, see page PH-62.

Ordering: Specify pipe size, figure number, name and finish.

Note: The "C" gap dimention should be used at the upper and lower locations to ensure proper installation of the clamp.

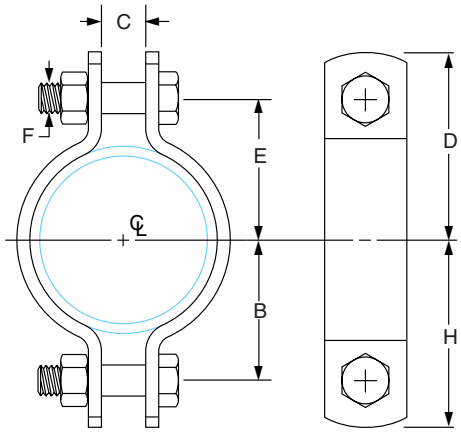


Fig. 212FP: Loads (lbs) • Weight (lbs) • Dimensions (in)

Pipe Size	Max Load For Service Temp		Weight (lbs)	B	C	Rod Take-Out E	H	D	F
	650° F	750° F							
2½	1,040	930	1.20	2⅝	⅝	2⅝	3¼	3¼	½
3			1.40	2⅞		2⅞	3½	3½	
3½			1.50	3 3/16		3 3/16	3 13/16	3 13/16	
4			2.20	3½		3½	4¼	4¼	
5			2.50	4 3/16	¾	4 3/16	4 15/16	4 15/16	
6			5.20	4⅞	⅞	5	5¾	5⅞	
8			6.30	6	1	6⅛	6⅞	7	
10			13.60	7 7/16		7 7/16	8 9/16	8 9/16	
12			15.20	8 7/16		8 7/16	9 9/16	9 9/16	

Fig. 216 Heavy Pipe Clamp

Size Range: 3" through 42"

Material: Carbon steel

Finish: Plain or Galvanized

Service: Recommended for suspension of pipe lines where no insulation is required.

Maximum Temperature: Plain 750° F, Galvanized 450° F

Approvals: Complies with Federal Specification A-A-1192A (Type 4) *WW-H-171-E (Type 4)* and MSS-SP-69 (Type 4).

Installation: Normally used with welded eye rod or with weldless eye nut Fig. 290, see page PH-89.

Features:

- Designed for heavy load up to 750° F

Ordering: Specify pipe size, figure number, name and finish.

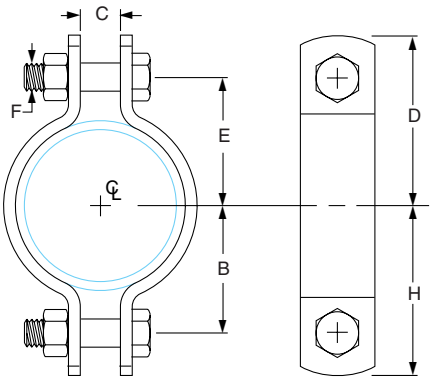


Fig. 216: Loads (lbs) • Weight (lbs) • Dimensions (in)

Pipe Size	Max Load For Service Temp		Weight	B	C	D	Rod Take Out E	F	H
	650° F	750° F							
3	3,370	3,005	3.6	2 15/16	1	4	3 1/8	3/4	3 13/16
4	3,515	3,135	5.5	3 9/16		4 7/8	3 3/4	7/8	4 11/16
5			6.3	4 1/8		5 1/2	4 3/8		5 1/4
6	4,865	4,350	11.7	5	1 1/8	6 5/8	5 1/4	1	6 3/8
8		4,340	13.9	6 1/8		7 5/8	6 1/4		7 1/2
10	6,010	5,360	22.3	7 9/16	1 1/4	9 1/16	7 11/16	1 1/4	8 15/16
12	8,675	7,740	38.1	9	1 5/8	10 7/8	9 1/4	1 1/2	10 5/8
14	9,120	8,135	46.8	9 3/4		11 7/8	10		11 5/8
16			51.4	10 3/4		12 7/8	11		12 5/8
18	13,800	–	130.1	14 1/2	3	17 1/4	14 1/2	2	17 1/4
20	15,300	–	163.6	16		18 3/4	16		18 3/4
24	16,300	–	215.2	18 1/2	3 1/4	21 1/2	18 1/2	2 1/4	21 1/2
28	18,000	–	302.8	20 1/2		23 1/2	20 1/2		23 1/2
30	20,500	–	365.4	22 1/2	3 1/2	26	22 1/2	2 1/2	26
32	23,750	–	431.7	23 1/2		27	23 1/2		27
34	25,000	–	533.8	25		28 1/2	25		28 1/2
36	28,000	–	575.1	26 1/2		30 1/4	26 1/2	2 3/4	30 1/4
42	35,000	–	915.7	30		33 3/4	30		33 3/4

Fig. 295 Double Bolt Pipe Clamp

Size Range: 3/4" through 36"

Material: Carbon steel

Finish: Plain or Galvanized

Service: Recommended for suspension of pipe requiring insulation within the limitation of temperature and loads shown below.

Maximum Temperature: Plain 750° F, Galvanized 450° F

Approvals: Complies with Federal Specification A-A-1192A (Type 3) WW-*H-171-E (Type 3)* and MSS-SP-69 (Type 3).

Installation: Attachment to the clamp may be made with a welded eye rod Fig. 278, page PH-82 or the weldless eye nut Fig. 290, see page PH-89.

Features:

- Accommodates up to 4" thick insulation.

Ordering: Specify pipe size, figure number, name and finish.

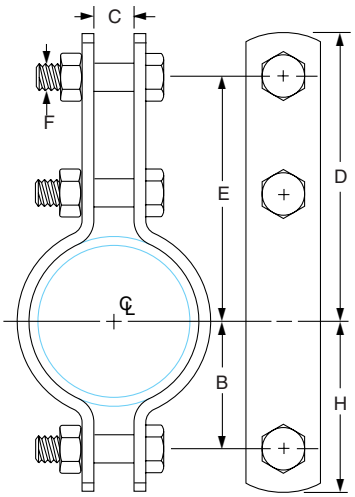


Fig. 295: Loads (lbs) • Weight (lbs) • Dimensions (in)

Pipe Size	Max Span Ft.	Max Load For Service Temp. 650° F	Max Load For Service Temp. 750° F	Weight	B	C	D	Rod Take Out E	F	H
3/4	7*	950	–	0.7	15/16	5/8	2 7/8	2 7/16	3/8	1 3/8
1			–	0.8	1 1/16		3	2 9/16		1 1/2
1 1/4			–	0.8	1 1/4		3 1/8	2 11/16		1 11/16
1 1/2	9*	1,545	1,380	2.3	1 13/16	1 1/16	4 7/8	4 1/8	5/8	2 3/8
2	10*			2.6	2 1/8		5 7/8	5 1/8		2 11/16
2 1/2	11*			1.97	2 5/8	5/8	6 1/8	5 3/8	1/2	3 1/4
3	12*			2.17	2 7/8		6 5/8	6		3 1/2
4	14*	2,500	2,230	6.7	3 1/2		7 1/4	6 1/2		4 1/4
5	16*			7.0	3 15/16	1 1/16	8 1/8	7	3/4	5
6	17*	2,865	2,555	7.31	4 7/8	1 1/4	9 3/8	8 1/2		5 3/4
8	19*			8.33	6		10 3/8	9 1/2		6 7/8
10	22*	3,240	2,890	19.8	6 7/8	1 7/16	12	10 7/16	1	8 1/4
12	23"			22.3	7 7/8		13	11 7/16		9 1/4
14	20	4,300	3,835	37.7	9 1/16	2	14 5/16	12 11/16	1 1/4	10 11/16
16	15			41.4	10 1/16		15 5/16	13 11/16		11 11/16
18				44.9	11 1/16		16 5/16	14 11/16		12 11/16
20	12	5,490	4,900	57.3	12 3/8		17 5/8	15 7/8	1 3/8	14
24	12	4,500	4,015	65.9	14 3/8		19 5/8	17 7/8		16
28	–	6,000	–	112.3	17 1/2	2 1/4	24 1/4	21 3/4	1 1/4	20
30	9	7,500	–	150.0	18 1/2	2 1/2	26 1/8	23 3/8	1 3/8	21 1/4
32	–	8,250	–	193.3	19 5/8		28	25	1 1/2	22 5/8
34	–	9,800	–	248.8	21 1/2	3	31 1/4	27 3/4	1 3/4	25
36	–	10,500	–	257.5	22 1/2		32 1/4	28 3/4		26

Clamps may be furnished with square ends.

"Span" represents the maximum recommended distance between hangers on a continuous and straight run of horizontal standard weight steel pipe filled with water. In all cases, verify that chosen location of hangers does not subject hangers to a load greater than the maximum recommended load shown above. *Indicates that span represents the maximum span for water filled pipe as given in Table 1 of page PH-207.

For vapor service, the presence of fittings or insulation, and other weights and types of pipe, spans may either increase or decrease. In all cases, verify that chosen location of hanger does not subject hangers to a load greater than the maximum recommended load shown.

Fig. 295A — Alloy Double Bolt Pipe Clamp

Size Range: 1½" through 24"

Material: Chrome molybdenum steel (ASTM A-387 Grade 22).

Service: Recommended for suspension of high temperature pipe requiring insulation.

Maximum Temperature: 1,050° F

Approvals: Complies with Federal Specification A-A-1192A (Type 3) *WW-H-171-E (Type 3)* and MSS-SP-69 (Type 3).

Features:

- Pipe size 4" and above accommodates up to 4" thick insulation.

Ordering: Specify pipe size, figure number and name.

Note: Galvanizing is not recommended for alloy products.

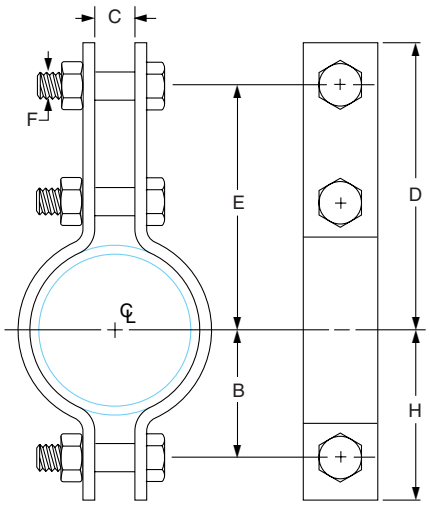


Fig. 295A: Loads (lbs) • Weight (lbs) • Dimensions (in)

Pipe Size	Max Load ■ For Service Temp				Weight	B	C	D	Rod Take Out E	F	H
	650° F	750° F	1,000° F	1,050° F							
1½	1,545	1,410	1,000	745	2.3	1 13/16	1 1/16	4 7/8	4 1/8	5/8	2 3/8
2					2.6	2 1/8		5 7/8	5 1/8		2 11/16
2½					2.7	2 5/16		6 1/8	5 3/8		2 15/16
3					3.0	2 3/4		6 11/16	5 15/16		3 1/2
4	2,500	2,290	1,625	1,200	6.7	3 3/8		7 5/8	6 1/2	3/4	4 1/2
5					7.0	3 15/16		8 1/8	7		5
6	2,865	2,620	1,860	1,380	11.5	4 3/4	1 7/16	9 15/16	8 9/16	7/8	6 1/8
8					13.2	5 3/4		10 15/16	9 9/16		7 1/8
10	3,240	2,970	2,100	1,565	19.8	7 1/16		12	10 5/8	1	8 1/4
12					22.3	8 1/16		12 15/16	11 5/8		9 5/16
14	4,300	3,915	2,795	2,060	37.7	9 1/16	2	14 5/16	12 11/16	1 1/4	10 11/16
16					41.4	10 1/16		15 5/16	13 11/16		11 11/16
18					44.9	11 1/16		16 5/16	14 11/16		12 11/16
20	5,490	4,995	3,550	2,635	57.3	12 3/8		17 1/2	15 7/8	1 3/8	14
24	4,500	4,095	2,910	2,160	65.9	14 3/8		19 1/2	17 7/8		16

■ Based on the allowable stresses shown in the ASME Code for Pressure Piping.

Fig 295H — Heavy Duty Double Bolt Pipe Clamp

Size Range: 6" through 36"

Material: Carbon steel

Finish: Plain or Galvanized

Service: Recommended for suspension of pipe requiring insulation within the limitation of temperature and loads shown below.

Maximum Temperature: Plain 750° F, Galvanized 450° F

Approvals: Complies with Federal Specification A-A-1192A (Type 3) *WW-H-171-E (Type 3)* and MSS-SP-69 (Type 3).

Features:

- Accommodates up to 4" thick insulation.

Ordering: Specify pipe size, figure number, name and finish.

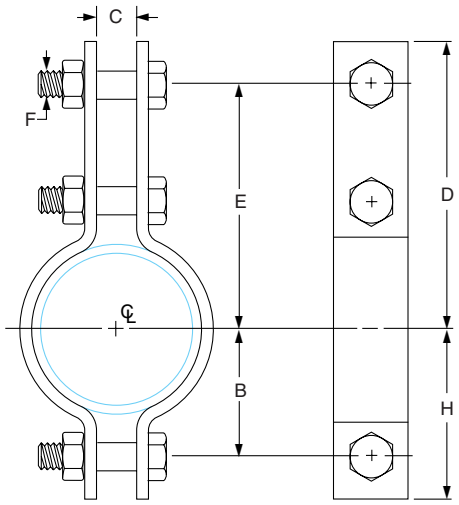


Fig 295H: Loads (lbs) • Weight (lbs) • Dimensions (in)

Pipe Size	Max Load For Service Temp		Weight	B	C	D	Rod Take Out E	F	H
	650° F	750° F							
6	3,500	3,125	12.0	4 3/4	1 3/4	10 13/16	8 15/16	1	6
8	4,800	4,285	18.5	6	2	11 3/8	10 1/8	1 1/8	7 1/4
10	5,500	4,910	30.3	7 1/4	2 1/4	13 1/8	11 3/8	1 1/4	9
12	7,000	6,250	42.0	8 5/8	2 1/2	14 5/16	12 9/16	1 3/8	10 3/8
14	9,500	8,485	60.0	9 5/8		15 1/2	13 1/2	1 1/2	11 5/8
16	10,000	8,930	80.0	10 7/8	3	17 1/8	14 7/8	1 3/4	13 1/8
18	13,800	12,325	115.0	12 1/2	3 1/2	18 1/4	16 1/4	2	14 1/2
20	15,300	13,665	140.0	13 1/2		19 3/4	17 1/4		16
24	16,300	14,555	190.0	15 1/2		22 5/16	19 5/16		18 1/2
28	18,000	–	354.0	18 7/8	4	31 3/4	27 1/4	2 1/4	23 3/8
30	20,500	–	406.0	19 7/8	4 1/4	32 3/4	28 1/4		24 3/8
32	23,750	–	555.0	21 3/4		36	31	2 1/2	26 3/4
34	25,000	–	604.0	23 3/8		37 1/2	32 1/2		28 3/8
36	28,000	–	678.0	24 5/8	4 1/2	40 1/4	34 3/4	2 3/4	30 1/8

Clamps may be furnished with square ends.

Fig. 224 — Alloy Steel Pipe Clamp

Size Range: 4" through 16"

Material: Chrome molybdenum steel except U-bolt which is stainless steel.

Service: Recommended for suspension of high temperature pipe requiring up to 4" of insulation.

Maximum Temperature: 1,050° F

Approvals: Complies with Federal Specification A-A-1192A (Type 2) *WW-H-171-E (Type 2)* and MSS-SP-69 (Type 2).

Installation:

Normally used with welded eye rod Fig. 278, see page PH-82, or weldless eye nut Fig. 290, see page PH-89.

Features:

- Designed for the support of loads at temperatures up to 1,050° F.
- Designed to satisfy most critical engineering specifications.
- Yoke has rugged cross sectional area, eliminating high stress conditions.
- When used on pipe with 4" of insulation the top bolt is outside of the insulation.

Ordering: Specify pipe size, figure number and name.

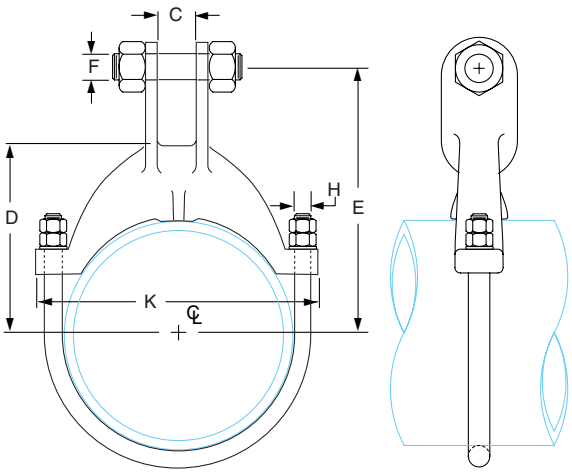


Fig. 224: Loads (lbs) • Weight (lbs) • Dimensions (in)

Pipe Size	Max Load ■				Weight	C	D	Rod Take Out E	F	H	K
	750° F	950° F	1,000° F	1,050° F							
4	3,780	3,300	2,770	1,890	4.0	1 1/16	3 7/8	6 3/4	7/8	1/2	6 1/2
6	6,060	5,290	4,440	3,030	7.5	1 7/16	5 7/16	8 5/16	1	5/8	9 1/8
8					9.0		6 11/16	9 9/16			11 1/8
10	9,060	7,910	6,640	4,420	15.8		8 3/8	10 7/8	1 1/8	3/4	13 5/8
12	12,570	10,980	9,015	6,010	24.3	1 15/16	10 1/8	12 7/8	1 1/2	7/8	16 1/8
14					26.3		11 1/8	13 7/8			17 3/8
16					31.0		12 1/4	15			19 5/8

■ Based on the allowable stresses shown in the ASME Code for Pressure Piping.
Over tightening of nuts may overstress U-bolts reducing the load rating. Installation tag attached to clamp gives proper nut tightening.

Fig. 246 — Heavy Duty Alloy Steel Pipe Clamp

Size Range: 10" through 24"

Material: Chrome molybdenum steel except U-bolt which is stainless steel.

Service: Recommended for suspension of high temperature pipe requiring up to 6" of insulation.

Maximum Temperature: 1,075° F

Approvals: Complies with Federal Specification A-A-1192A (Type 2) *WW-H-171-E (Type 2)* and MSS-SP-69 (Type 2).

Installation: Normally used with welded eye rod Fig. 278, page PH-82 or weldless eye nut Fig. 290, page PH-89.

Features:

- Designed for the support of heavy loads at high temperatures.
- Clamp with filler plate will snugly hold pipe of non-standard size.
- Alloy load distribution strap provided.
- When used on pipe with 6" of covering, the top bolt is outside of the insulation.

Ordering: Specify nominal pipe size and exact O.D. of pipe, figure number, name. Special alloy filler plates will be provided, at an extra charge, when the O.D. of the pipe size is other than standard. Installation instructions are attached to the clamp when the filler plates are required.

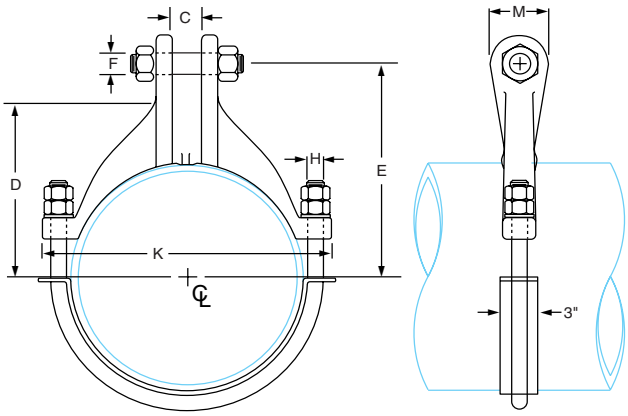


Fig. 246: Loads (lbs) • Weight (lbs) • Dimensions (in)

Pipe Size	Used on O.D. pipe size	Max Load ■				Weight*	C	D	Rod Take Out E	F	H	K	M
		950° F	1,000° F	1,050° F	1,075° F								
10	8 3/4 - 10 13/16	13,500	11,780	7,850	6,120	42.0	2	9 1/8	12	1 1/2	1	15 3/8	3 1/4
12	10 7/8 - 12 13/16	16,500	14,910	9,940	7,750	58.0	2 1/4	10 3/4	13 3/4	1 5/8	1 1/4	17 7/8	4
14	12 7/8 - 14 1/16					63.0		11 1/2	14 1/2			19 1/8	
16	14 1/8 - 16 1/16					69.0		13 1/8	16 3/8			21 1/8	
18	16 1/8 - 18 1/16	19,000	18,410	12,270	9,570	94.0	2 1/2	14 1/2	18 1/4	2		24 1/8	4 1/2
20	18 1/8 - 20 1/16					104.0		15 3/4	19 1/2			26 1/8	
24	20 1/8 - 24 1/16	25,000	22,280	14,850	11,580	167.0	3	18 1/4	22	2 1/4	1 3/8	30 3/4	6

■ Based on the allowable stresses shown in the ASME Code for Pressure Piping.
Over tightening of nuts may overstress U-bolts reducing the load rating. Installation tag attached to clamp gives proper nut tightening.
* This weight does not include filler plates required on non-standard pipe sizes

Fig. 595 — Socket Clamp for Ductile Iron or Cast Iron Pipe
Fig. 594 — Socket Clamp Washer

Size Range: 4" through 24"

Material: Two carbon steel half bands and four bolts and nuts.

Finish: Plain or Galvanized

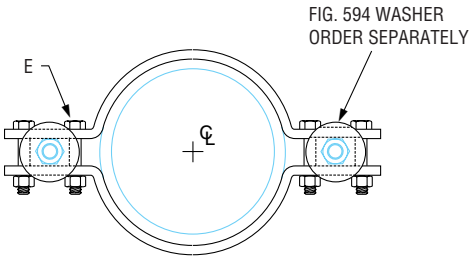
Service: Clamps ductile or cast iron mechanical joint piping or mechanical joint or socket joint fittings together to prevent separation or distortion of pipe line under excessive water pressure.

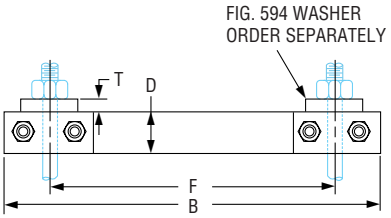
Approvals: Complies with Federal Specification A-A-1192A (Type 8) and MSS-SP-69 (Type 8). Complies with the requirements of the National Fire Protection Association Standard NFPA-24 for Outside Protection.

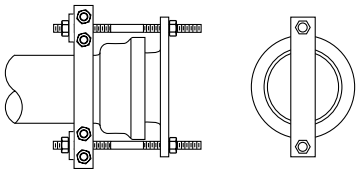
Ordering: Specify pipe size, figure number, name and finish.

Socket clamp washer: Two cast iron washers, Fig. 594, are used with each socket clamp and these must be ordered separately.

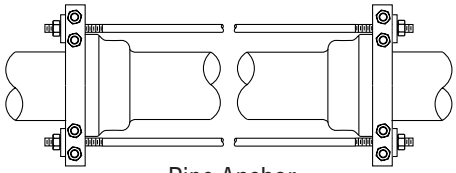
Ordering: Specify washer size, figure number, name and finish.







Plug Strap for
Bell End of Pipe



Pipe Anchor

Fig. 595, Fig. 594: Loads (lbs) • Weight (lbs) • Dimensions (in)

D.I./C.I. Pipe Size	Max Test Pressure (PSI)	Force* On Clamp	Weight		Pipe O.D.	B	D	Bolt Dia. E	F	T	Fig. 594 Washer Rod Dia.
			Fig. 595 Clamp	Fig. 594 Washer							
4	250	4,550	12.8	1.1	5	14 5/8	2	5/8	9 5/8	5/8	3/4
6		9,340	14.6		7 1/8	16 7/8			11 7/8		
8		16,080	23.6		9 5/16	19 1/8	2 1/2		14 1/8		
10		24,180	29.3	1.7	11 1/2	21 3/8		3/4	16 5/8	3/4	1
12		34,230	40.3		13 1/2	25 1/8	3	7/8	19 5/8		
14	120	22,200	53.9	2.7	15 3/4	28 1/4			22 3/8	1 1/8	1 1/4
16	115	27,760	76.5		17 7/8	31 3/8	4	1	25 3/8		
18	100	23,900	94.3	4.3	20	35 1/8		1 1/4	28 1/8		
20	75	27,500	109.8		22 1/8	37 3/4	4 1/2		30 1/2		1 3/8
24	50	26,200	148.6	5.8	26 3/8	44 1/4	5	1 1/2	36	1 1/4	1 1/2

*Refers to Hydrostatic Test

Fig. 600 — Socket Clamp for Ductile Iron or Cast Iron Pipe
Fig. 599 — Socket Clamp Washer

Size Range: 3" through 24" pipe

Material: Two carbon steel halfbands and two bolts and nuts.

Finish: Plain or Galvanized

Service: Clamps joints of socket fittings together to prevent distortion of pipe line under excessive water pressure.

Approvals: Complies with Federal Specification A-A-1192A (Type 8) and MSS-SP-69 (Type 8).

Features: An economical method of anchoring joints of socket fittings when used on other than fire protection work.

Ordering: Specify pipe size, figure number, name and finish.

Socket Clamp Washer

Two cast iron washers, Fig. 599, are used with each socket clamp and these must be ordered separately.

Ordering: Specify washer size, figure number, name and finish.

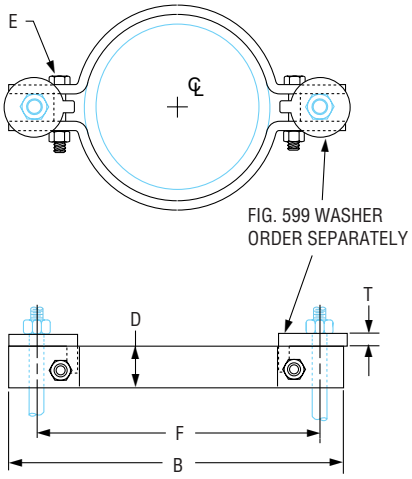


Fig. 600, Fig. 599: Weight (lbs) • Dimensions (in)

D.I./C.I. Pipe Size	Weight		Pipe O.D.	B	D	Bolt Dia. E	F	T	Fig. 599: Washer Rod Dia.
	Fig 600: Clamp	Fig 599: Washer							
3	9.7	1.2	4	11 5/8	2	5/8	9 3/4	5/8	3/4
4	11.0		5	12 1/8					
6	12.7		7 1/16	14 3/8			12		
8	14.5		9 3/16	16 5/8			14 1/4		
10	16.3		11 3/8	18 7/8			16 1/2		
12	18.3		13 1/2	21 1/4			18 7/8		
14	48.7	2.7	15 3/4	25 1/2	3	7/8	22 3/8	1 1/8	1 1/4
16	69.2		17 7/8	28	4	1	24 3/4		
18	82.0	4.5	20	31 1/2		1 1/4	27 5/8		
20	97.5		22 1/8	33 3/4	4 1/2		29 3/4		1 3/8
24	132.0	6.8	26 3/8	39 3/4	5	1 1/2	35 1/4	1 1/4	1 1/2

Fig. 86: C-Clamp With Set Screw and Lock Nut
Fig. 87: C-Clamp With Set Screw and Fig. 89 Retaining Clip
Fig. 88: C-Clamp With Set Screw Only

C-Clamp

Size Range: 3/8" through 3/4"

Material: Malleable iron clamp; hardened steel cup point set screw.

Finish: Plain or Galvanized

Service: Recommended for attachment to "W" and "M" beams where thickness of flange Z (see table page PH-209) does not exceed 0.75". When clamp is used with Fig. 89 retaining clip, flange thickness may not exceed 0.62".

Approvals: Complies with Federal Specification A-A-1192A (Type 23) *WW-H-171-E (Type 23)* and MSS-SP-69 (Type 23). UL, ULC Listed and FM Approved (Sizes 3/8" - 3/4").

Installation: Follow recommended set screw torque values per MSS-SP-69 (See table on page PH-212). The Fig. 88 is only to be used on installations where the clamp cannot become dislodged from the beam.

Features:

- Malleable body assures:
  1) Uniform quality and strength.
  2) Full thread engagement.
- Hardened steel cup point set screw for securing to beam flange.
- Ribbed design of clamp provides added strength.

Ordering: Specify rod size, figure number, name, length of retaining clip, if desired. (Add 2" to flange width of beam to arrive at proper length of retaining clip.) If required length is not standard, order next longer standard.

Fig. 86

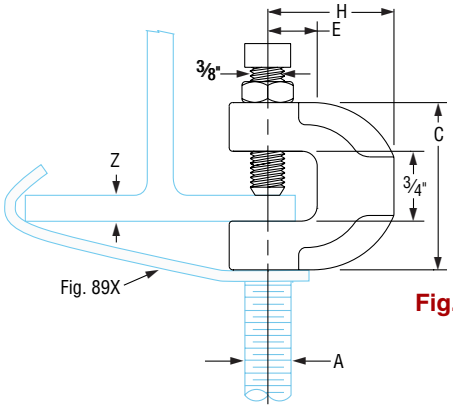


Fig. 86

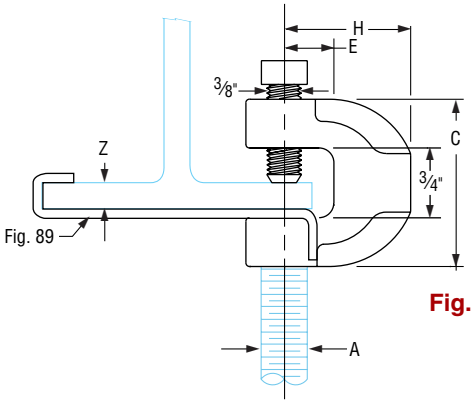


Fig. 87

Fig. 86, Fig. 87 and Fig. 88: Loads (lbs) • Weight (lbs) • Dimensions (in)

Rod Size A	C	E	H	Max Load ■	Weight	
					Fig. 86	Fig. 88
3/8	1 3/4	5/8	1 3/8	400	0.28	0.26
1/2					0.31	0.29
5/8	2	3/4	1 1/2	440	0.42	0.40
3/4				500	0.55	0.53

■ Maximum temperature of 450° F.

Fig. 95 C-Clamp With Locknut

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

Material: Carbon Steel

Finish: Plain or Galvanized

Service: Designed for fastening flange of "W" and "M" beam. Bottom hole tapped to accommodate hanger rod.

Approvals: Complies with Federal Specification A-A-1192A (Type 23) *WW-H-171-E (Type 23)* and MSS-SP-69 (Type 23).
UL Listed (Sizes 3/8").
FM Approved (Sizes 3/8" - 1/2").

Installation: Follow recommended set screw torque values per MSS-SP-69 (See table on page PH-212).

Ordering: Specify rod size, figure number, name and finish.

Note: If a retaining clip is desired, you may specify either Fig. 89X or Fig. 89. For length and other ordering information, refer to Fig. 89X and Fig. 89.

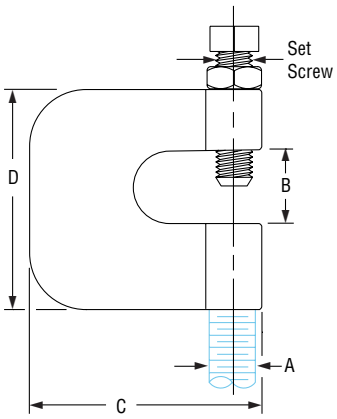


Fig. 95: Load (lbs) • Weight (lbs) • Dimensions (in)							Rod Sized Retaining Clips	
Rod Size A	Set Screw Size	Max Load	B	C	D	Weight	Fig. 89	Fig. 89X
3/8	3/8	230	3/4	2 1/4	2 3/8	0.34	3/8	3/8
1/2	1/2	380				0.40		1/2

Fig. 89 Retaining Clip

Size Range: 3/8" through 1/2"
Material: Carbon steel
Finish: Plain or Galvanized
Service: For use with Figs. 86, 87, 88 & 95 in seismic applications.
How to size: Specify length of retaining strap based on beam size.
Installation: Length of strap should be adequate to allow at least 1" of strap to be bent over the beam side of the flange opposite the side the beam clamp is mounted on.
Ordering: Specify rod size, Figure number, name, length of retaining clip and finish (Add 2" to flange width of beam to arrive at proper length of retaining clip).
If required length is not standard, order next longer standard.

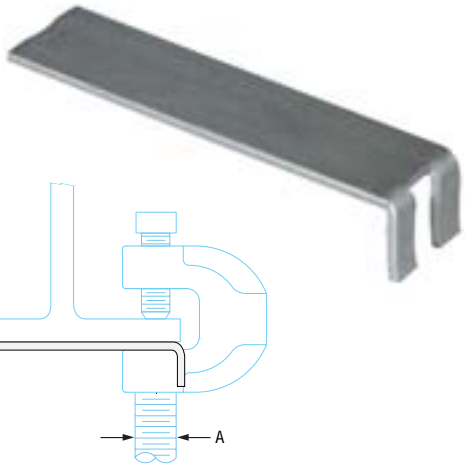
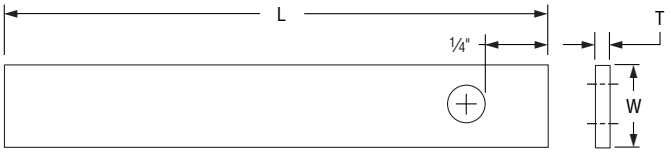


Fig. 89: Retaining Clip: Weight (lbs) • Dimensions (in)

Rod Size A	B	D	Weights				Length L
			4½	8	10	14	
3/8	1	7/16	0.17	0.28	0.35	0.53	4½, 8, 10, 14
1/2	1 1/4	15/32	0.22	0.37	0.46	0.63	
5/8	1 3/8	11/16	0.25	0.43	00.51	0.73	
3/4							

Fig. 89X Retaining Clip

Size Range: 3/8" through 3/4"
Material: Carbon steel
Finish: Plain or Galvanized
Service: For use with Figs. 86, 88, 92, 93, 94 & 95 in seismic applications.
Approvals: Complies with MSS-SP-127.
How to size: Specify length of retaining strap based on beam size.
Installation: Length of strap should be adequate to allow at least 1" of strap to be bent over the beam side of the flange opposite the side the beam clamp is mounted on.
Ordering: Specify rod size, Fig. no., name, length of retaining clip and finish (Add 2" to flange width of beam to arrive at proper length of retaining clip).
If required length is not standard, order next longer standard.



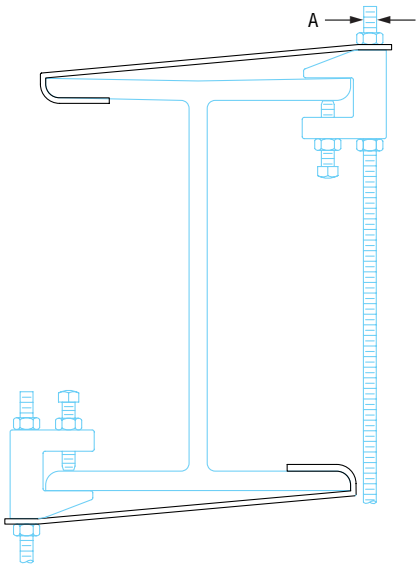


Fig. 89X: Weight (lbs) • Dimensions (in)

Rod Size A	Width W	T	Weight				Length L
			6	8	10	14	
3/8	1	0.058	0.10	0.14	0.17	0.24	6, 8, 10, 14
1/2							
5/8	1 1/4	0.070	0.13	0.17	0.22	0.31	
3/4							

Fig. 92 Universal C-type Clamp (Standard Throat)

Size Range: 3/8 and 1/2"

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

Finish: Plain or Galvanized

Service: Recommended for use under roof installations with bar joist type construction, or for attachment to the top or bottom flange of structural shapes where the vertical hanger rod is required to be offset from the edge of the flange and where the thickness of joist or flange does not exceed 3/4".

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

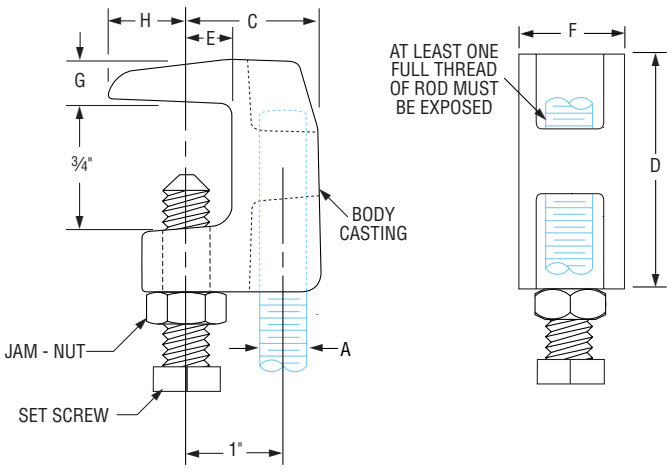
How to size: Size of clamp is determined by size of rod to be used.

Installation: Follow recommended set screw torque values per MSS-SP-69
(See table on page PH-212)

Features:

- They may be attached to horizontal flanges of structural members in either the top beam or bottom beam positions.
- Secured in place by a cup-pointed Set Screw tightened against the flange. A Jam Nut is provided for tightening the Set Screw against the Body Casting.
- Thru tapping of the body casting permits extended adjustment of the threaded rod.
- Can be used with Fig 89X retaining clip for seismic applications.

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



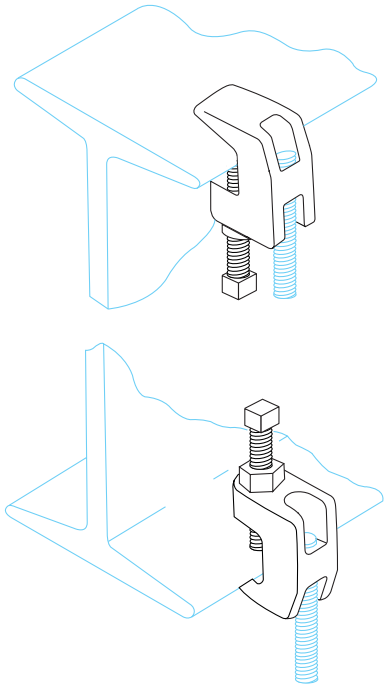


Fig. 92: Load (lbs) • Weight (lbs) • Dimensions (in)

Rod Size A	Set Screw Size	Max Loads ■		Weight	C	D	E	F	G	H
		Top	Bottom							
3/8	3/8	500	250	0.34	1 5/16	1 9/16	9/16	13/16	3/8	1/2
1/2	1/2	950	760	0.63	1 3/8	1 13/16	1/2	1 1/16	7/16	23/32

■ Maximum temperature of 450° F

Fig. 93 Universal C-type Clamp (Wide Throat)

Size Range: 3/8 and 1/2"

Material: Malleable/Ductile iron clamp, hardened steel cup point set screw and locknut.

Finish: Plain and Galvanized

Service: Recommended for use under roof installations with bar joist type constructions, or for attachment to the top or bottom flange of structural shapes where the vertical hanger rod is required to be offset from the edge of the flange and where the thickness of joist or flange does not exceed 1¼".

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

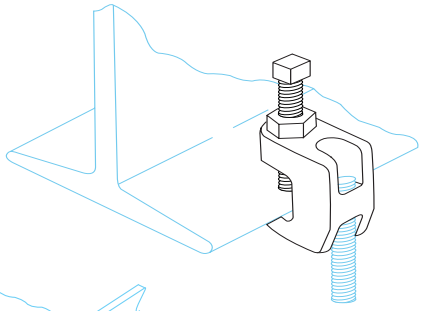
How to size: Size of clamp is determined by size of rod to be used.

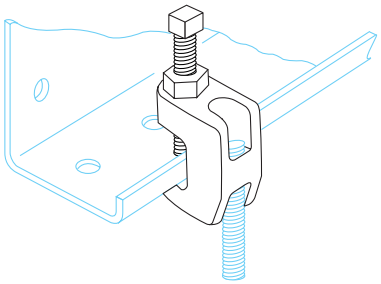
Installation: Follow recommended set screw torque values per MSS-SP-69 (See tables on page PH-212)

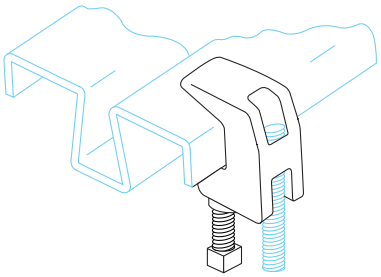
Features:

- They may be attached to horizontal flanges of structural members in either the top beam or bottom beam positions.
- Secured in place by a cup-pointed Set Screw tightened against the flange. A Jam Nut is provided for tightening the Set Screw against the Body Casting.
- Thru tapping of the body casting permits extended adjustment of the threaded rod.
- Wider throat for attaching to flange with up to 1¼" thickness.

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







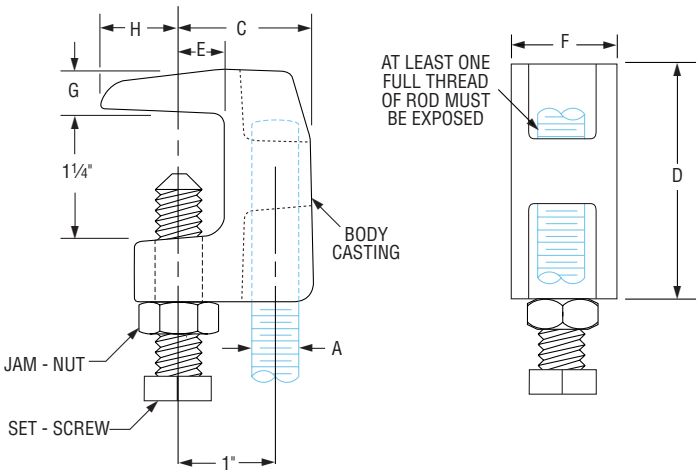


Fig. 93: Load (lbs) • Weight (lbs) • Dimensions (in)

Rod Size A	Set Screw Size	Max Loads ■		Weight	C	D	E	F	G	H
		Top	Bottom							
3/8	3/8	500	250	0.41	1 5/16	2 5/32	9/16	13/16	3/8	5/8
1/2	1/2	950	760	0.75	1 3/8	2 11/32	1/2	1 1/16	7/16	13/16

■ Maximum temperature of 450° F

Fig. 94 — Wide Throat Top Beam C-Clamp

Size Range: 5/8" and 3/4"

Material: Malleable/Ductile iron body, hardened steel cup point set screw and locknut.

Finish: Plain or Galvanized

Service: Recommended for use under roof installations with bar joist type construction, or for attachment to the top flange of structural shapes where the vertical hanger rod is required to be offset from the edge of the flange and where the thickness of joists or flange does not exceed 1 5/16".

Approvals: Complies with Federal Specification A-A-1192A (Type 19) WW-*H-171-E (Type 19)* and MSS-SP-69 (Type 19). UL Listed and FM Approved.

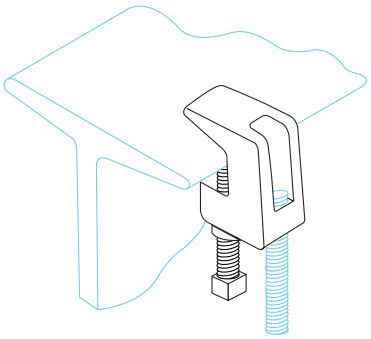
How to size: Size of clamp is determined by size of rod to be used.

Installation: Follow maximum recommended set screw torque values per MSS-SP-69. (See tables on see page PH-212)

Features:

- Provides clamping to bar joists which are directly under roof installations.
- Provides for vertical hanger rod installed offset from the edge of the beam flange.
- Malleable iron body assures full thread engagement of rod.

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



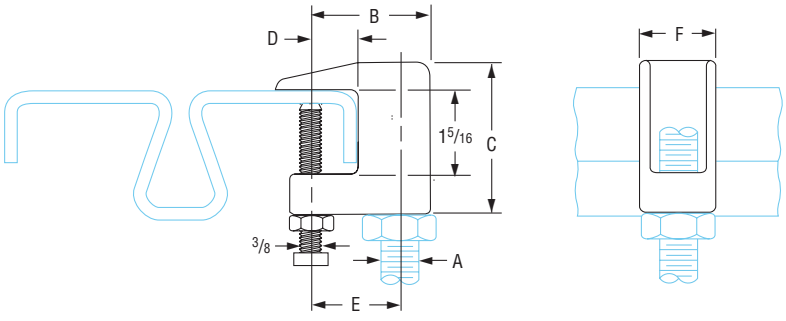


Fig. 94: Load (lbs) • Weight (lbs) • Dimensions (in)

Rod Size A	Max Loads ■	Weight	B	C	D	E	F
5/8	1,200	0.66	1 3/4	2 1/4	3/4	1 1/4	1
3/4	1,600	0.83	1 7/8	2 3/8		1 3/8	1 3/16

■ Maximum temperature of 450° F

Fig. 227 Top Beam Clamp

Material: Carbon steel jaw, hook rod with nut, lock washer and plain washer.

Finish: Plain

Service: Recommended for use on top flange of beam and roof trusses where the flange thickness does not exceed 0.81".

Approvals: Complies with Federal Specification A-A-1192A (Type 25) and MSS-SP-69 (Type 25). UL Listed and FM Approved when used with 3/8" and 1/2" rod sizes.

How to size: Determine hook rod length by adding figure in column headed "x" to flange width (see table on page PH-209 for flange width). "x" is not indicated as a dimension on drawing.

Installation: Slide stamped steel jaw over beam flange and attach hook rod and eye rod, finally tightening hook rod. Hammer jaw firmly against the underside of the beam to complete installation.

Features:

- Two jaw sizes fit beam flanges thickness from 0.25" to 0.81".
- Clamp firmly holds to beam providing safe and extremely economical means of supporting small piping from the top flange of steel beams and roof trusses.

Ordering: Specify jaw size, figure number, name, hook rod length. Standard hook rods are furnished in even inch lengths, either length ordered or next longer length.

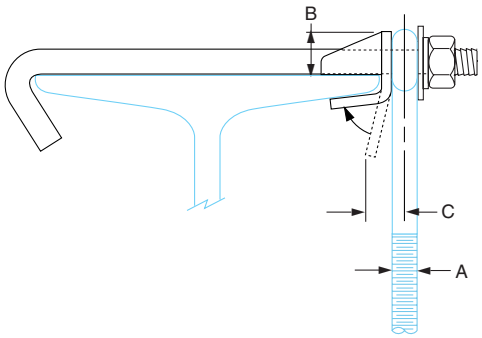


Fig. 227: Loads (lbs) • Weight (lbs) • Dimensions (in)

Jaw Size	Max Load	Weight ▲	Hook Rod Diam	Rod Size A	B	C	X
1	730	0.38	3/8	3/8	3/4	5/16	2 1/8
2	940	0.67	1/2	1/2	1	3/8	2 1/4
				5/8	1 1/8	7/16	2 1/2
				3/4	1 1/4	1/2	2 5/8

▲ Based on 8" hook rod length. Will vary for other hook rod lengths

Fig. 14 — Adjustable Side Beam Clamp

Size Range: 3/8" through 5/8"
Material: Carbon steel
Finish: Plain or Galvanized
Service: Recommended for supporting pipe from the bottom flange of beams.
Approvals: Complies with Federal Specification A-A-1192A (Type 27) *WW-H-171-E (Type 54)* and MSS-SP-69 (Type 27).
Ordering: Specify rod size, figure number, name and finish.

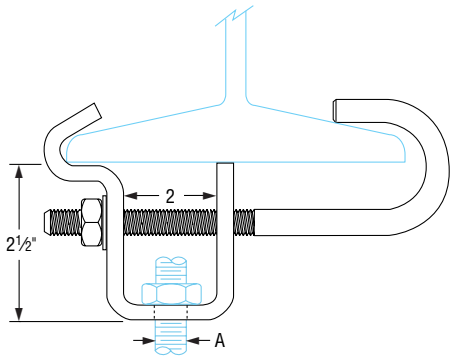


Fig. 14: Load (lbs) • Weight (lbs) • Dimensions (in)

Rod Size A	Max Load	Hole Size A	Adjustment Beam Width		Weight
			Min.	Max.	
3/8	300	7/16	3½	8	1.19
1/2	700	9/16			1.67
5/8	1,000	11/16			2.23

Fig. 217 — Adjustable Side Beam Clamp

Size Range: 3" through 7 5/8"
Material: Carbon steel
Finish: Plain
Service: To be used where it is necessary for the hanger rod to run vertically close to the beams edge, eliminating drilling of holes in structural members.
Components: Top slide, bottom hook, nut and bolt – assembled.
Design: Can be adjusted to fit various beam flange widths and thicknesses
Approvals: Complies with Federal Specification A-A-1192A (Type 25) and MSS-SP-69 (Type 25).
Ordering: Specify size, figure number, type, name.

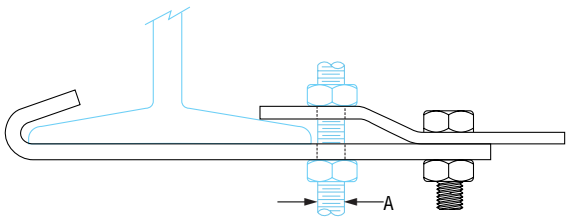


Fig. 217: Load (lbs) • Weight (lbs) • Dimensions (in)

Size	Max Flange Width	Max Flange Thickness	Rod Size A	Max Load	Weight
Fig. 217 - Type 1					
3	3 - 4 1/2	1/2	3/8	300	0.80
4 5/8	4 5/8 - 6	11/16			1.06
6 1/8	6 1/8 - 7 1/2	3/4			1.17
7 5/8	7 5/8 - 9	15/16			1.28
Fig. 217 - Type 2					
3	3 - 4 1/2	1/2	1/2	500	1.57
4 5/8	4 5/8 - 6	11/16			1.84
6 1/8	6 1/8 - 7 1/2	3/4			2.05
7 5/8	7 5/8 - 9	15/16			2.23
Fig. 217 - Type 3					
3	3 - 4 1/2	1/2	5/8	700	3.75
4 5/8	4 5/8 - 6	11/16			4.19
6 1/8	6 1/8 - 7 1/2	3/4			4.53
7 5/8	7 5/8 - 9	15/16			5.11

Fig. 133 Standard Duty Beam Clamp
Fig. 134 Heavy Duty Beam Clamp

Size Range: 4" through 12"

Material: Carbon steel

Finish: Plain or Galvanized

Service: Clamp centers the load on beam to prevent distortion

Approvals: Complies with Federal Specification A-A-1192A (Type 21) *WW-H-171-E (Type 21)* and MSS-SP-69 (Type 21).
Fig. 133 UL Listed and FM Approved when used with 3/8" and 1/2" rod.
Fig. 134 UL Listed and FM Approved when used with 1/2" and 5/8" rod.

Components: Two half-clamps, pipe spacer and bolt with nut assembled.

Ordering: Figure number, width of flange, name and finish.

Note: Spacer is furnished for use with Fig. 290 weldless eye nuts. Spacer may be removed for use with Fig 278 eye rods.

Fig. 133
Standard Duty

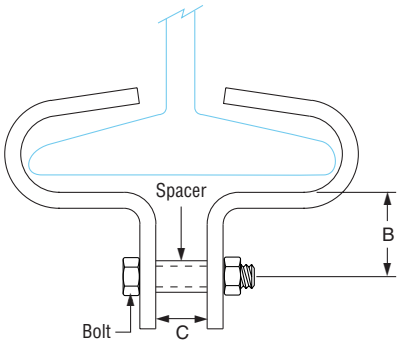


Fig. 134
Heavy Duty

Flange Size			
Flange Width	Max Flange Thickness	Weight (lbs)	
		Fig. 133 Std. Duty	Fig. 134 Heavy Duty
4	1/2	0.91	3.82
5	5/8	1.00	4.35
6	3/4	1.15	4.52
7	7/8	1.29	4.84
8		1.44	5.10
9	1	–	5.83
10		–	6.25
11		–	6.67
12		–	7.09

Fig. 133, 134: Loads (lbs) • Dimensions (in)					
	C	B	Bolt Size	Spacer O.D.	Max Load
Fig. 133	1/2	1 3/8	3/8	11/16	1,000
Fig. 134	3/4	2 1/4	5/8	1 1/16	3,000

Fig. 218 Malleable Beam Clamp Without Extension Piece

Material: Malleable iron jaw, steel tie rod, nuts and washer.

Finish: Plain or Galvanized

Service: Recommended for attachment to structural steel. Use in conjunction with beams where beam widths are from 2⅜" minimum to 7" maximum and flange thickness does not exceed 0.60".

Approvals: Complies with Federal Specification A-A-1192A (Type 30) *WW-H-171-E (Type 30)* and MSS-SP-69 (Type 30).
UL, ULC Listed and FM Approved (Sizes ¾" - 8" pipe size), when used with the Fig. 157 extension piece (Sizes ⅜" - ⅞").

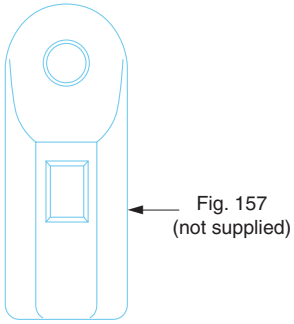
Installation: The malleable beam clamp Fig. 218 may be used with an eye rod, or Fig. 157 extension piece.

Features:

- Functional design insures proper fit for all beam sizes.
- Tie rod locks clamp in place when nuts are tightened.
- Ordering and stocking simplified because of one universal size.
- Design allows hanger rod to swing from vertical providing flexibility at the beam clamp.

Ordering: Specify figure number, name and finish.

Note: When used with Fig. 157 see page PH-86 extension piece, an additional inch or more of vertical adjustment is obtained.



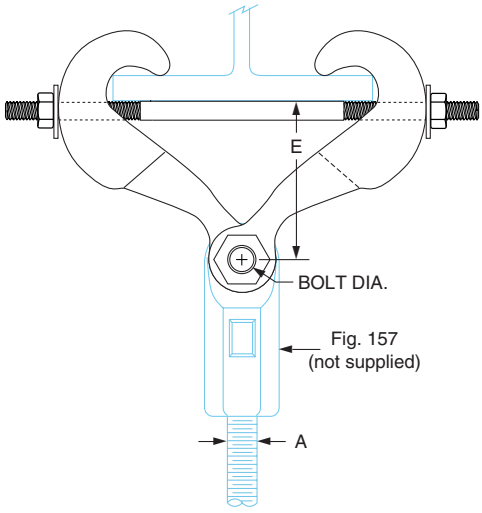


Fig. 218: Loads (lbs) • Weight (lbs) • Dimensions (in)

Max Rod Size A	Max Load ■	Weight	Width of Beam Flange (in)						
			Rod Take Out - E (in)						
			2⅜	3	4	5	6	7	Bolt Diam
⅞	1,365	2.2	3 1/2	3 7/16	3 5/16	2 15/16	2 9/16	1 7/8	7/16

■ Note: see page PH-207 for load capacity of rod

Fig. 228 — Universal Forged Steel (UFS) Beam Clamp With UFS (Upper) Nut Right-Hand Thread

Material: Forged steel

Finish: Plain or Galvanized

Service: For suspension of heavy loads from beams with flange widths to 15" and flange thickness to 1.031.

Approvals: Complies with Federal Specification A-A-1192A (Type 28 without links; Type 29 with links) *WW-H-171-E (Type 30 & 31)* and MSS-SP-69 (Type 28 without links; Type 29 with links).

Installation: Fit jaws over edges of lower beam flange and tighten nuts on tie rod to lock clamp in place.

Features:

- Upper nut is tapped to any specified size up to the maximum rod size.
- Quickly, easily, economically installed.
- Tie rod insures a tight non-slip fit to the beam.
- Clamps are available, tapped to any specified rod size up to the maximum rod size.

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

Note: The application of a load to a structural beam by means of a beam clamp produces a transverse stress, perpendicular to the axis of the beam, in the flange to which the load is applied.

Size per load, beam flange width and rod size

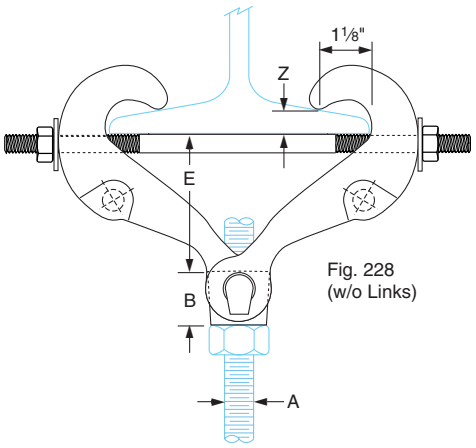


Fig. 228 (w/o Links)

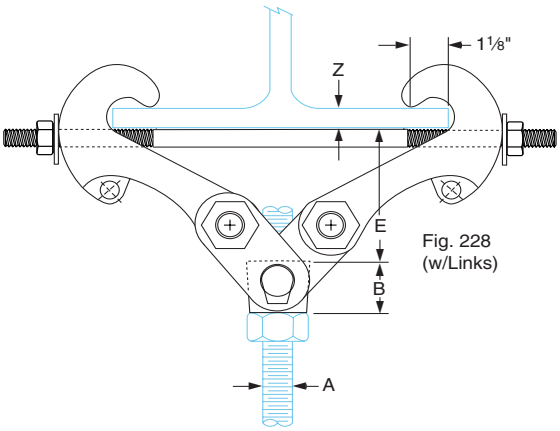


Fig. 228 (w/Links)

Fig. 228: Loads (lbs) • Weight (lbs) • Dimensions (in)

Clamp Size No.	Max Rod Size A	Max Load ■	Weight	Z ✥	B	Jaw and Eye Nut Size ▲
1	⅝	2,160	3.3	0.60	1 1/16	228 – 1
2	⅞	4,480	7.0		1 3/8	228 – 2
3•			10.6			
4	1½	11,500	19.3	1.031	2 3/8	228 – 3
5•			31.0			

▲ For reference only, order by clamp size.
• Furnished with links.
■ Note: Load capacity based on rod sizes shown.
For load capacity of other rod sizes see page PH-207
✥ For actual "Z" dimensions see table on page PH-209

Clamp Size No.	Width of Beam Flange (in)												
	Rod Take Out - E (in)												
	3	4	5	6	7	8	9	10	11	12	13	14	15
1	1 9/16	1½	1 5/16	1⅛	¾	–	–	–	–	–	–	–	–
2	–	1 7/16			11/16	–	–	–	–	–	–	–	–
3•	–	–	–	–	1 15/16	1 13/16	1½	1 5/16	–	–	–	–	–
4	–	2 5/16	2 3/16	2 1/16	1 13/16	1 7/8	1 9/16		–	–	–	–	–
5•	–	–	–	–	–	–	–	3	2 11/16	2 9/16	2 1/4	1 15/16	1 5/8

• Furnished with links.

Fig. 292: Right-Hand Thread
Fig. 292L: Left-Hand Thread

Universal Forged Steel (UFS) Beam Clamp With Weldless Eye Nut

Material: Forged steel

Finish: Plain or Galvanized

Service: For suspension of heavy loads from beams with flange widths to 15" and flange thickness to 1.031.

Approvals: Complies with Federal Specification A-A-1192A (Type 28 without links; Type 29 with links) *WW-H-171-E (Type 28 without links; Type 29 with links)* and MSS-SP-69 (Type 28 without links; Type 29 with links).

Installation: Fit jaws over edges of lower beam flange and tighten nuts on tie rod to lock clamp in place.

Features:

- Weldless eye nut provides for horizontal pipe movement without binding.
- Weldless eye nut is furnished tapped to any specified rod size up to the maximum rod size.
- Tie rod assures a tight non-slip fit to the beam.

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

Note: The application of a load to a structural beam by means of a beam clamp produces a transverse stress, perpendicular to the axis of the beam, in the flange to which the load is applied.

Fig. 292, Fig. 292L: Loads (lbs) • Weight (lbs) • Dimensions (in)

Clamp Size No.	Max Rod Size A	Max Load ■	Weight	Z Max ✣	B	Jaw and Eye Nut Size ▲
1	3/4	3,230	3.9	0.60	1 1/4	292 – 1 / 1
2	1	5,900	9.2		1 11/16	292 – 2 / 2
3 •			13.0			
4			21.7	1.031	1 1/2	292 – 3 / 2
5 •			33.9			
6	1 1/2	11,500	23.9		2 1/8	292 – 3 / 3
7 •			35.8			
8	2		36.8		4 9/16	292 – 3 / 4

▲ For reference only, order by clamp size.
• Furnished with links.
■ Note: Load capacity based on rod sizes shown. For load capacity of other rod sizes see page PH-207
✣ For actual "Z" dimentions see table on page PH-209

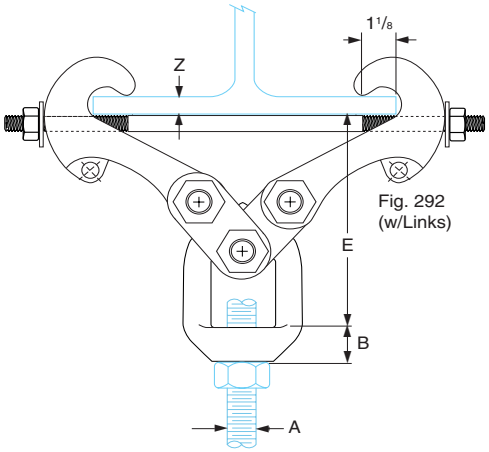


Fig. 292 (w/Links)

Clamp Size No.	Width of Beam Flange (in) / Rod Take Out - E (in)												
	3	4	5	6	7	8	9	10	11	12	13	14	15
1	4 1/2	4 5/16	4 1/16	3 5/8	2 7/8	–	–	–	–	–	–	–	–
2	–	4 3/4	4 7/16	4 1/16	3 3/8	–	–	–	–	–	–	–	–
3 •	–	–	–	–	5 15/16	6	5 5/16	5	–	–	–	–	–
4	–	6 13/16	6 5/8	6 3/8	5 7/8	5 7/8	5 3/8	4 13/16	–	–	–	–	–
5 •	–	–	–	–	–	–	–	–	8 1/8	7 3/4	7 1/8	6 5/8	6 1/16
6	–	7 3/16	7	6 3/4	6 1/4	6 5/16	5 13/16	5 3/16	–	–	–	–	–
7 •	–	–	–	–	–	–	–	–	8 1/2	8 1/8	7 1/2	7	6 7/16
8	–	8 5/8	8 7/16	8 3/16	7 3/4	7 3/4	7 1/4	6 5/8	–	–	–	–	–

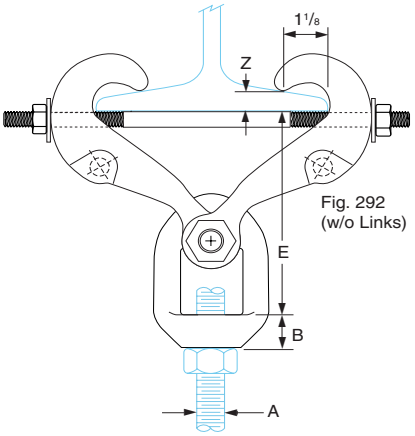


Fig. 292 (w/o Links)

Fig. 55 (Short)
Fig. 55L (Long)

Structural Welding Lug

Size Range: Fig. 55: 1/2" through 3 3/4"
Fig. 55L 1/2" through 2"

Material: Carbon steel

Finish: Plain or Galvanized

Service: For attachment to structural steel in conjunction with the Fig. 299 clevis and with type C variable spring hanger or Type C Constant Support.

Maximum Temperature: Plain 750° F, Galvanized 450° F

Approvals: Complies with Federal Specification A-A-1192A (Type 57) *WW-H-171-E (Type 57)* and MSS-SP-69 (Type 57).

Ordering: Specify rod size, figure number, name, finish and whether short or long lug is required.

Order Separately: Fig. 291 pin with cotters or bolt and nut

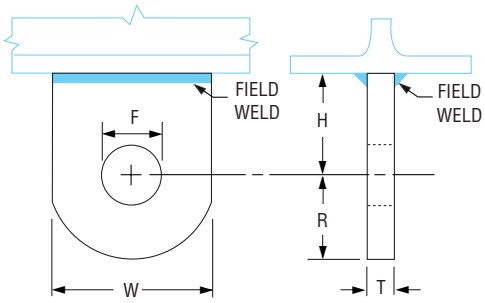


Fig. 55, Fig. 55L: Load (lbs) • Weight (lbs) • Dimensions (in)

Fig. 55, Fig. 55L								Fig. 55 (Short)		Fig. 55L (Long)	
Rod Size A*	Pin or Bolt Dia.	F	R	T	W	Max Load 650° F	Max Load 750° F	Rod Take Out - H	Weight	Rod Take Out - H	Weight
1/2	5/8	11/16	1 1/4	1/4	2 1/2	1,350	1,057	1 1/2	0.48	3	0.75
5/8	3/4	13/16				2,160	1,692		0.41		0.68
3/4	7/8	15/16		3/8		3,230	2,530		0.60		1.0
7/8	1	1 1/8				4,480	3,508	2	0.71		0.98
1	1 1/8	1 1/4	1 1/2	1/2	3	5,900	4,620		1.2		1.6
1 1/4	1 3/8	1 1/2	2	5/8	4	9,500	7,440	3	3.0	4	3.7
1 1/2	1 5/8	1 3/4	2 1/2	3/4	5	13,800	10,807		4.8	4 1/2	6.4
1 3/4	1 7/8	2				18,600	14,566		4.7		6.3
2	2 1/4	2 3/8	3		6	24,600	19,265	4	7.2		8.8
2 1/4	2 1/2	2 5/8				32,300	25,295	4 1/2	7.6	–	–
2 1/2	2 3/4	2 7/8	4	1	8	39,800	31,169		15.5	–	–
2 3/4	3	3 1/8				49,400	38,687		15.1	–	–
3	3 1/4	3 3/8				60,100	47,066	5	16.0	–	–
3 1/4	3 1/2	3 5/8	4 1/2		9	71,900	56,307		18.9	–	–
3 1/2	3 3/4	3 7/8		1 1/2		84,700	66,331	6	31.3	–	–
3 3/4	4	4 1/8		1 3/4		98,500	77,139		35.9	–	–

* Note: Rod size "A" is the assembly rod diameter. Dimension not shown on drawing

Fig. 54 — Two Hole Welding Beam Lug

Size Range: 1/2" through 2 1/4"
Material: Carbon steel
Finish: Plain or Galvanized
Service: For single rod suspension of Fig. 81-H, type B and C constant supports.
Ordering: Specify rod size, figure number, name, finish and "H" dimension.

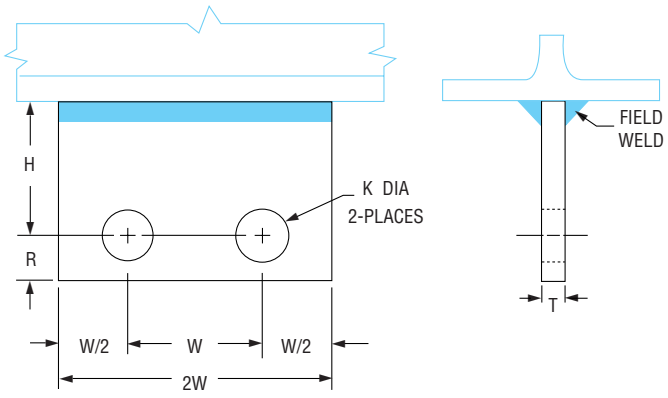


Fig. 54: Load (lbs) • Weight (lbs) • Dimensions (in)

Rod Size A *	Max Load	Weight "H" Dimension ▲				Rod Take Out - "H" Dimension Constant Support Frame Sizes					Pin or Bolt	K Hole	R	T	W	2W	W/2
		1½	2	3	4	1-9	10-18	19-34	35-49	50-63							
1/2	1,350	1.4	1.7	2.2	–	1½	1½	2	3	–	5/8	11/16	1¼	3/8	2½	5	1¼
5/8	2,160	1.4	1.6	2.2	–					–	3/4	13/16					
3/4	3,230	1.3	1.6	2.1	2.6	–				4	7/8	15/16					
1	5,900	–	2.6	3.5	4.3	–	–				1⅛	1¼	1½	½	3	6	1½
1¼	9,500	–	5.0	6.5	7.9	–	–				1⅜	1½	2	5/8	4	8	2
1½	13,800	–	–	10.7	12.8	–	–	–			1⅝	1¾	2½	¾	5	10	2½
1¾	18,600	–	–	10.4	12.5	–	–	–			1⅞	2					
2	24,600	–	–	–	16.0	–	–	–	–		2¼	2⅜	3		6	12	3
2¼	32,300	–	–	–	15.6	–	–	–	–		2½	2⅝					

Select "H" dimension applicable to constant support frame size.
▲ Weight varies with "H" dimension.
* Note: Rod size "A" is the assembly rod diameter. Dimension not shown on drawing

Fig: 66 — Welded Beam Attachment

Size Range: 3/8" through 3½"

Material: Carbon steel

Finish: Plain or Galvanized

Service: Recommended for attachment to bottom of beams, especially where loads are considerable and rod sizes are large.

Maximum Temperature: Plain 750° F, Galvanized 450° F

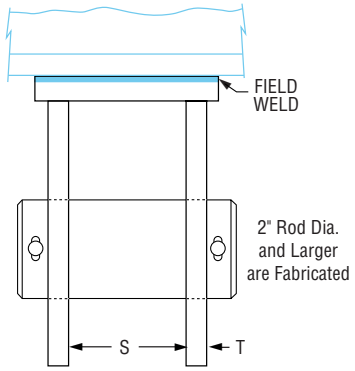
Approvals: Complies with Federal Specification A-A-1192A (Type 22) *WW-H-171-E (Type 22)* and MSS-SP-69 (Type 22).

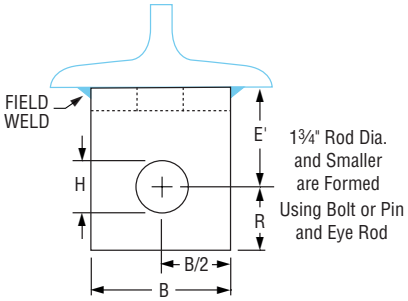
Installation: If flexibility at the beam is desired, use with bolt and eye rod Fig. 278, page PH-82, or with weldless eye nut Fig. 290, page PH-89. If vertical adjustment is desired, use with threaded rod and nut and weld the attachment in an inverted position to the beam.

Features:

- Will accommodate very heavy loads and rod sizes through 3½".
- Can be installed so as to provide for either flexibility or for vertical adjustment.
- Versatility affords economical stocking and erection.
- Beam size need not be considered.

Ordering: Specify rod size, figure number, name and finish. Specify "with bolt and nut" if required for 1" rod size and smaller. Specify "with pin and cotter pins" if required for 1¼" rod size and larger.





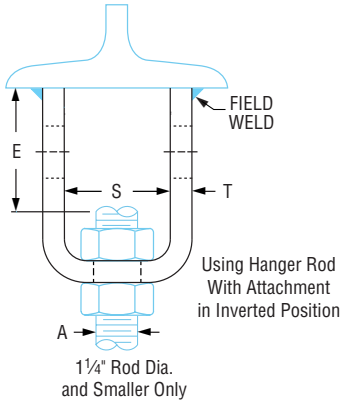
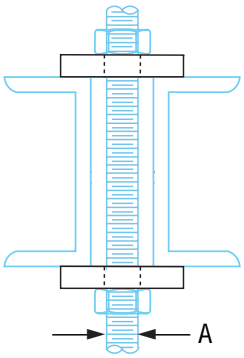


Fig: 66: Load (lbs) • Weight (lbs) • Dimensions (in)

Rod Size A	Pin or Bolt Size	Max Load		Weight		Rod Take Out		B	H	R	S	T
		650° F	750° F	Without Bolt and Nut	With Bolt and Nut	E	E'					
3/8	1/2 x 2 1/2	730	572	0.96	1.2	1 7/8	2	2	9/16	7/8	1 1/4	1/4
1/2	5/8 x 2 1/2	1,350	1,057		1.3	1 3/4			11/16			
5/8	3/4 x 2 3/4	2,160	1,692		1.6				13/16			
3/4	7/8 x 4	3,230	2,530	1.9	2.8			2 1/2	15/16	1 1/8	1 7/8	3/8
7/8	1 x 4	4,480	3,508	2.5	3.9	2 5/8	3		1 1/8	1 1/4	2	
1	1 1/8 x 5	5,900	4,620	4.3	6.3	2 3/4		3	1 1/4	1 1/2	2 1/2	1/2
1 1/4	1 3/8 x 5 3/8	9,500	7,440	8.1	10.2	2 7/8		4	1 1/2	2		5/8
1 1/2	1 5/8 x 6	13,800	10,807	15.6	19.0	–	4	5	1 3/4	2 1/2	3	3/4
1 3/4	1 7/8 x 6 7/8	18,600	14,566	18.7	24.2	–	5		2	2 3/4	3 3/4	
2	2 1/4 x 6 7/8	24,600	19,265	22.8	30.6	–		6	2 3/8	3 1/4	3 1/2	1/2
2 1/4	2 1/2 x 7 3/8	32,300	25,295	26.4	36.8	–	6		2 5/8	3 1/2		5/8
2 1/2	2 3/4 x 7 5/8	39,800	31,169	26.7	39.7	–			2 7/8	3 3/4	3 3/4	
2 3/4	3 x 7	49,400	38,687	26.8	40.8	–	5 3/4		3 1/8	4		
3	3 1/4 x 7	60,100	47,066	32.6	46.7	–	6 1/4	7	3 3/8			
3 1/4	3 1/2 x 7 3/4	71,900	56,307	45.1	62.1	–	7		3 5/8	4 1/2	4 1/4	3/4
3 1/2	3 3/4 x 7 3/4	84,700	66,331	53.4	72.4	–	7 1/2	8	3 7/8			

Fig. 60 — Steel Washer Plate

Size Range: 3/8" to 3 3/4"
Material: Carbon steel
Finish: Plain or Galvanized
Service: A heavy duty washer plate used on top of channels or angles for supporting pipe with rods or U-bolts.
Maximum Temperature: Plain 750° F, Galvanized 450° F
Ordering: Specify rod size, figure number, name and finish.



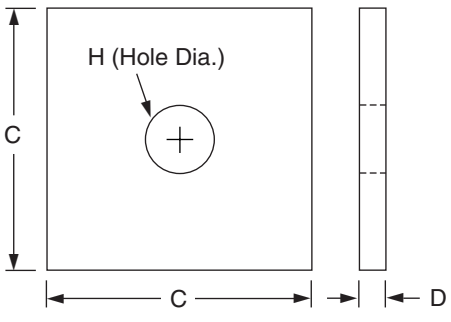


Fig. 60: Weight (lbs) • Dimensions (in)

Rod Size A	Weight	Max Load 650° F	Max Load 750° F	C x C x D Size of Stock	Hole Dia. H
3/8	0.6	730	572	3 x 3 x 1/4	1/2
1/2	0.6	1,350	1,057		5/8
5/8	0.9	2,160	1,692	3 x 3 x 3/8	3/4
3/4	1.6	3,230	2,530		7/8
7/8	2.2	4,480	3,508	4 x 4 x 1/2	1
1	2.1	5,900	4,620		1 1/4
1 1/4	3.3	9,500	7,440	5 x 5 x 1/2	1 1/2
1 1/2	4.8	13,800	10,807	5 x 5 x 3/4	1 3/4
1 3/4	4.7	18,600	14,566		2
2	4.5	24,600	19,265		2 1/4
2 1/4	6.6	32,300	25,295	6 x 6 x 3/4	2 1/2
2 1/2	6.4	39,800	31,169		2 3/4
2 3/4	6.2	49,400	38,687		3
3	5.9	60,100	47,066		3 1/4
3 1/4	5.6	71,900	56,307		3 1/2
3 1/2	8.1	84,700	66,331	7 x 7 x 3/4	3 3/4
3 3/4	7.8	98,500	77,139		4

Fig. 112 Brace Fitting Complete
Fig. 113 Pipe End Only

Size Range: 1" and 1¼"

Material: Malleable iron bracket and pipe end; hex cap screw and nut.

Finish: Plain

Service: For bracing piping against sway and seismic movement.

Installation: Normally two fittings are used; a Fig. 112 complete attached to one end of an IPS nipple and a Fig. 113 pipe end only attached to the other end. The brace fitting complete connects to the building structure while the pipe end only connects to the pipe attachment. Use with Fig. 212 FP pipe clamp see page PH-37.

Features:

- Two piece pivoted assembly accommodates any angle to structure.
- Sight hole in pipe end provides easy means of verifying proper thread engagement.

Ordering: Specify size, figure number, name.

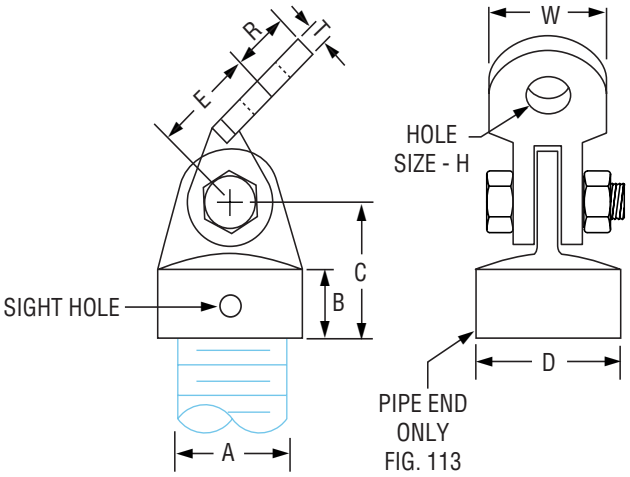


Fig. 112, Fig. 113: Load (lbs) • Weight (lbs) • Dimensions (in)

Pipe Size A	Max Load ■	Weight		B	C	D	E	Hole Dia. H	R	T	W
		Fig. 112	Fig. 113								
1	850	0.95	0.50	1	2 3/16	1 11/16	1 1/2	9/16	3/4	1/4	1 1/2
1 1/4	1,150	1.40	0.80			2 3/16		3/4	7/8	5/16	1 3/4

■ Based on MSS-SP 127 at 450° F and maximum nipple length of 6 feet.

Fig. 202 Iron Side Beam Bracket

Size Range: 3/8" through 5/8"

Material: Malleable iron

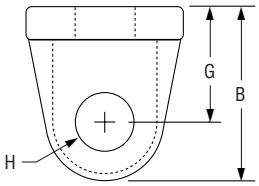
Finish: Plain or Galvanized

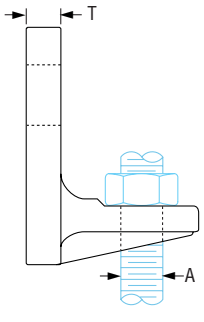
Service: Recommended for attachment to steel or wooden beams, etc.

Approvals: Complies with Federal Specification A-A-1192A (Type 34) *WW-H-171-E (Type 35)* and MSS-SP-69 (Type 34).
UL, ULC Listed and FM Approved.

Features: An economical, practical and adjustable means of securing hangers to beams, etc.

Ordering: Specify rod size, figure number, name and finish.





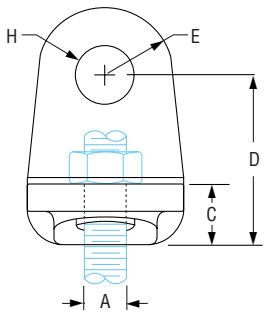


Fig. 202: Load (lbs) • Weight (lbs) • Dimensions (in)

Rod Size A	Max Load ■		Weight	B	C	D	E	Hole Dia. H	G	T
	With Lag Screw	With Bolt to Steel								
3/8	390	730	0.26	1 3/8	5/8	1 7/16	17/32	7/16	7/8	1/4
1/2	640	1,350	0.54	1 13/16	3/4	1 7/8	21/32	9/16	1 3/16	11/32
5/8	760	2,160	0.94	2 3/16	7/8	2 1/8	7/8	3/4	1 7/16	7/16

■ Maximum temperature of 450° F.

Fig. 206 — Steel Side Beam Bracket

Size Range: 3/8" through 5/8"
Material: Carbon steel
Finish: Plain or Galvanized
Maximum recommended Load: 2,000 (lbs) when used with bolts.
Service: Clip can be fastened to side of joist or wall to support hanger rod.
Approvals: Complies with Federal Specification A-A-1192A (Type 34) *WW-H-171-E (Type 35)* and MSS-SP-69 (Type 34). UL Listed and FM Approved.
Ordering: Specify rod size, figure number, name and finish.

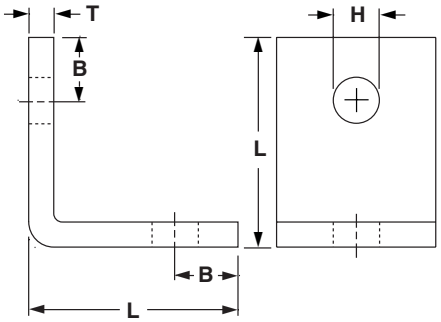


Fig. 206: Load (lbs) • Weight (lbs) • Dimensions (in)

Rod Size A	Max Load		Weight (lbs).	L	B	Hole Size H	T
	With Lag Screw	With Bolt to Steel					
3/8	650	1,150	0.44	2 1/16	5/8	7/16	1/4
1/2			0.43			9/16	
5/8	850	2,000	0.84	2 1/2	3/4	11/16	3/8

Fig. 207 — Threaded Steel Side Beam Bracket

Size Range: 3/8" and 1/2"
Material: Carbon steel
Finish: Plain or Galvanized
Service: Recommended for attachment to steel or wooden beams, etc.
Approvals: Complies with Federal Specification A-A-1192A (Type 34) *WW-H-171-E (Type 35)* and MSS-SP-69 (Type 34). UL Listed (with rod size 3/8" and 1/2"). FM Approved (with rod size 3/8" only)
Features: Threaded mounting bracket provides an economical, practical and adjustable means of securing hangers to beams.
Ordering: Specify rod size, figure number, name and finish.

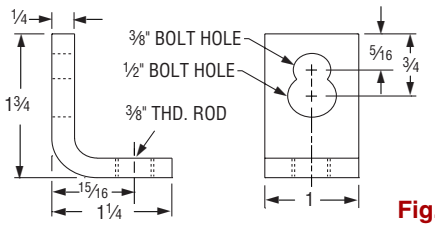


Fig. 207 3/8"

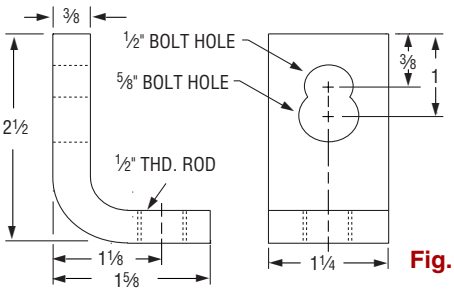


Fig. 207 1/2"

Fig. 207: Load (lbs) • Weight (lbs) • Dimensions (in)

Rod Size A	Bolt Size	Max Load		Weight
		With Lag Screw	With Bolt to Steel	
3/8	3/8	400	620	0.17
	1/2	560		
1/2	1/2	650	1,150	0.42
	5/8	850		

Fig. 194 Light Welded Steel Bracket

Material: Carbon steel

Finish: Plain or Galvanized

Service: Recommended for support from below or above bracket.

Approvals: Complies with Federal Specification A-A-1192A (Type 31) *WW-H-171-E (Type 32)* and MSS-SP-69 (Type 31).
FM Approved when used with rod sizes 3/8" through 7/8"

How to size: Determine bracket size by dimension of standard bracket most suitable to the installation.

Installation: When bolted to a wall, an additional back plate may be required of such thickness and size as to properly distribute the weight over the wall. Size and thickness of the back plate is governed by the load to be carried and the nature and conditions of the wall. Back plates furnished upon request.

Features:

- Bracket may be installed either in position illustrated or reversed.
- Ends of bracket are drilled to accept hanger rods up to 3/4".

Ordering: Specify bracket number, figure number, name and finish.

Order separately: Hanger rods, 2 bolts and plate washers.

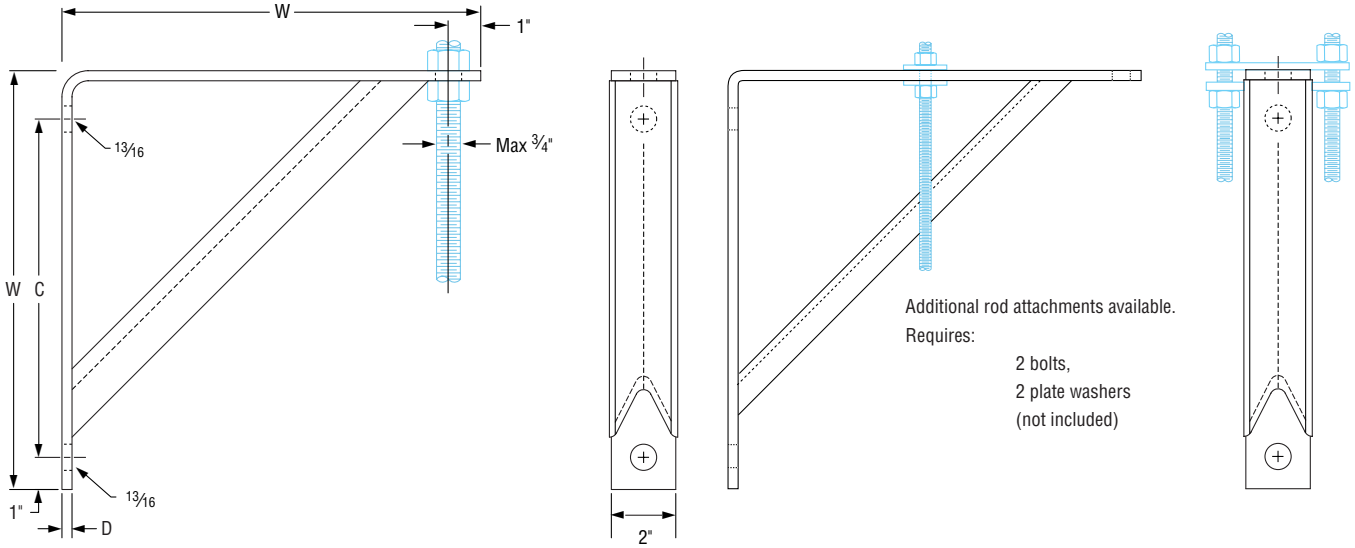


Fig. 194: Load (lbs) • Weight (lbs) • Dimensions (in)

Bracket no.	Max Load	Weight	W	C	D
1	750	3.1	9	6 1/2	5/16
2		7.7	13	10 1/2	
3		12.8	19	16 1/2	3/8

Fig. 195 Medium Welded Steel Bracket

Material: Carbon steel

Finish: Plain or Galvanized

Service: Recommended for the support of loads from below or above bracket.

Approvals: Complies with Federal Specification A-A-1192A (Type 32) *WW-H-171-E (Type 33)* and MSS-SP-69 (Type 32).

How to size: Determine size by dimensions most suitable to the installation (see dimensions of standard brackets below). Special welded steel brackets can be furnished on order.

Installation: When bolted to a wall, an additional back plate may be required of such thickness and size as to properly distribute the weight over the wall. Size and thickness of the back plate is governed by the load to be carried and the nature and conditions of the wall. Back plates furnished upon request.

Features: If supporting pipe by rod, rod can be installed anywhere along the length of the bracket thus providing horizontal adjustment.

Ordering: Specify bracket number, figure number, name and finish. Orders for special brackets are to be accompanied by detailed sketch.

Order Separately: Rod, Fig. 60, bolts, nuts, and back plates for fastening brackets to wall. Specify size and length of rod, bolts size, thickness, and drilling of back plates.

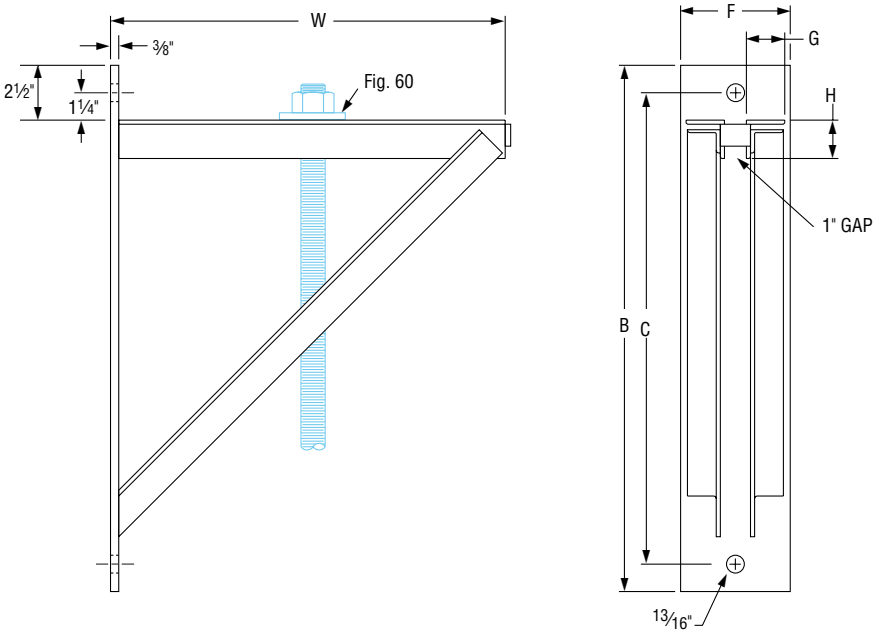


Fig. 195: Load (lbs) • Weight (lbs) • Dimensions (in)

Bracket no.	Max Load	Weight	W	B	C	F	G	H
0	1,500	17.4	12	18	15½	4	1½	1½
1		27.3	18	24	21½	5	1¾	1¾
2		47.7	24	30	27½		2	2

Fig. 199 Heavy Welded Steel Bracket

Material: Carbon steel

Finish: Plain or Galvanized

Service: Recommended for the support of loads from above or below bracket.

Approvals: Complies with Federal Specification A-A-1192A (Type 33) *WW-H-171-E (Type 34)* and MSS-SP-69 (Type 33).

How to size: Determine size by dimensions most suitable to the installation (see dimensions of standard brackets below). Special welded steel brackets can be furnished on order.

Installation: When bolted to a wall, an additional back plate may be required of such thickness and size as to properly distribute the weight over the wall. Size and thickness of the back plate is governed by the load to be carried and the nature and conditions of the wall. Back plates furnished upon request.

Features: If supporting pipe by rod, rod can be installed at any point along the length of the bracket thus providing horizontal adjustment.

Ordering: Specify bracket number, figure number, name. Orders for special brackets are to be accompanied by detailed sketch.

Order Separately: Rod, Fig. 60, bolts, nuts, and back plates for fastening brackets to wall. Specify size and length of rod, bolts size, thickness, and drilling of back plates.

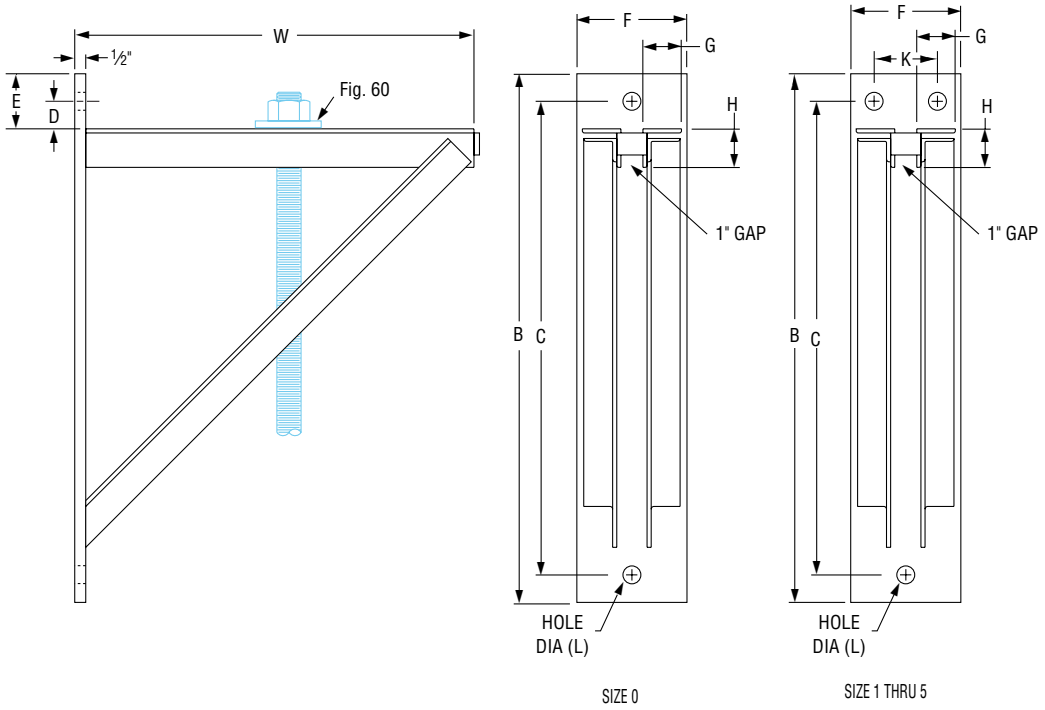


Fig. 199: Load (lbs) • Weight (lbs) • Dimensions (in)

Bracket No.	Max Load	Weight	W	B	C	D	E	F	G	H	K	L
0	3,000	24.3	12	18	15 1/4	1 3/8	2 3/4	4	1 1/4	2	–	13/16
1		51.8	18	24	21 3/8	1 7/16		5	2		2 3/4	15/16
2		65.8	24	30	27 1/2	1 1/2				2 1/2	2 1/2	1 1/16
3		82.1	30	36	33 1/4	1 5/8	3					
4		140.5	36	42	39	1 1/2		6	2 1/2	3 1/2	3 1/2	
5		166.4	42	50	46		3 1/2					

Fig. 127 — Plastic Ceiling Plate

Size Range: 3/8" and 1/2"
Material: Plastic
Service: Recommended for giving a finished appearance where rod enters ceiling.
Installation: Slide plate up rod until flush against ceiling.
Features:

- Highly economical
- Quickly installed
- Held firmly to rod by design and friction

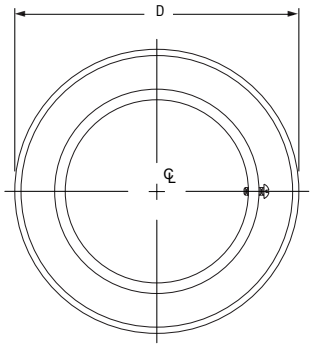
Ordering: Specify rod size, figure number, name. (rod not included)

Fig. 127: Weight (lbs) • Dimensions (in)

Rod Size A	Weight	Outside Dia.	Depth
3/8	0.07	1 13/16	1/2
1/2			

Fig. 395 — Cast Iron Ceiling Plate

Size Range: 1/2" through 8"
Material: Cast iron
Finish: Plain or Galvanized
Service: Gives finished appearance where pipe enters ceiling.
Installation: Sizes 1/2" to 4" furnished with one machine screw; sizes 5" to 8", two machine screws.
Ordering: Specify pipe size, figure number, name and finish.



SIZES ½ THRU 4

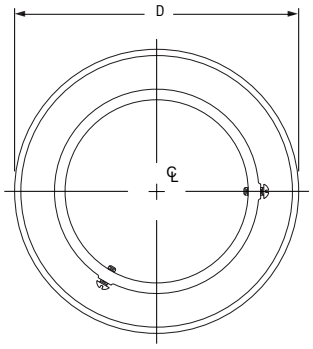


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Fig. 395: Weight (lbs) • Dimensions (in)

Pipe Size	Weight	D - Dia.	L
1/2	0.21	2 7/8	3/4
3/4	0.40	3 3/8	1
1	0.41	3 5/8	
1 1/4	0.51	4	
1 1/2	0.55	4 1/4	
2	0.67	4 3/4	
2 1/2	0.93	5 1/2	
3	1.10	6 1/8	6 1/8
3 1/2	1.20	6 5/8	
4	1.40	7 1/8	
5	2.50	8 11/16	1 1/4
6	3.10	9 3/4	
8	3.30	11 3/4	

Fig. 128 Pipe Threaded, Ceiling Flange

Size Range: 1/4"
Material: Malleable iron
Finish: Plain or Galvanized
Service: Recommended for attachment to wood beams or ceiling.
Ordering: Specify pipe size, figure number, name and finish.

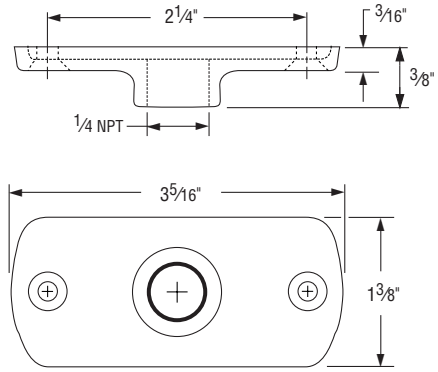


Fig. 128: Load (lbs) • Weight (lbs) • Dimensions (in)					
Pipe Size A	Max Load	Weight	Number of Pieces Per Carton	Screws (not included)	
				Quantity	Size No.
1/4	180	0.20	25	2	12

Fig. 128R Rod Threaded, Ceiling Flange

Size Range: 3/8" and 1/2"
Material: Malleable iron
Finish: Plain or Galvanized
Service: Recommended for attachment to wood beams or ceiling.
Ordering: Specify rod size, figure number, name and finish.

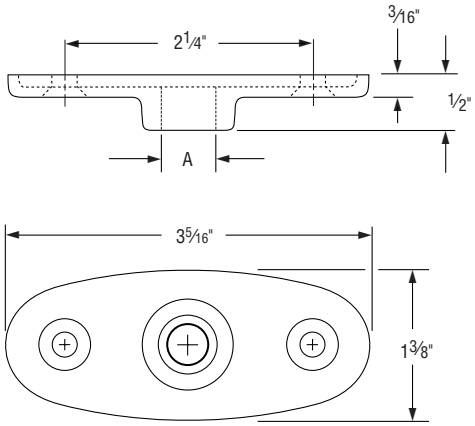


Fig. 128R: Load (lbs) • Weight (lbs) • Dimensions (in)				
Rod Size A	Max Load	Weight	Screws (not included)	
			Quantity	Size no.
3/8	180	0.16	2	12
1/2				

Fig. 153 Pipe Hanger Flange

Size Range: 3/8" through 3/4"

Material: Malleable iron

Finish: Plain

Service: Recommended for suspension of pipe lines or conduit from level ceilings.

Approvals: UL, ULC Listed and FM Approved.

Installation: Flange size 3/8" has two holes, sizes 1/2", 5/8", and 3/4" have three holes.

Features:

- Provides vertical adjustment up to 1".
- Good appearance.

Ordering: specify rod size, figure number and name.

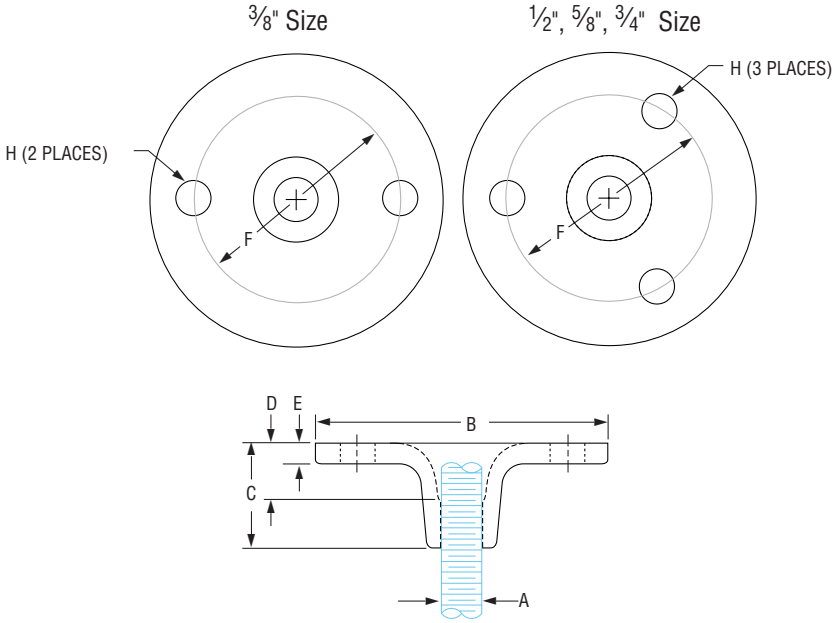


Fig. 153: Load (lbs) • Weight (lbs) • Dimensions (in)

Rod Size A	Max Load	Weight	Size Screw "H" (not included)	B	C	D	E	Screw Circle Dia. – F
3/8	425	0.4	#18 x1 1/2	2 7/8	1 3/8	7/8	3/16	2
1/2	1,050	0.9	3/8 x 2	4	1 1/2	15/16	1/4	2 7/8
5/8	1,220	1.5	1/2 x 2	4 3/4	1 5/8	1	5/16	3 3/8
3/4	1,270	2.2	9/16 x 2	5 1/4	1 7/8	1 1/16	3/8	3 5/8

Fig. 152 Screw Concrete Insert

Size Range: 3/8" through 7/8"

Material: Malleable iron

Finish: Plain

Service: Upper attachment for suspending pipe from a concrete ceiling where no lateral adjustment is required.

Approvals: UL, ULC Listed and FM Approved.

Features:

- Eliminates the necessity of drilling holes in wooden forms.
- Reduced overall height and four slots for nail attachment gives stability to the insert while the concrete is being poured.

Ordering: Specify rod size, figure number and name.

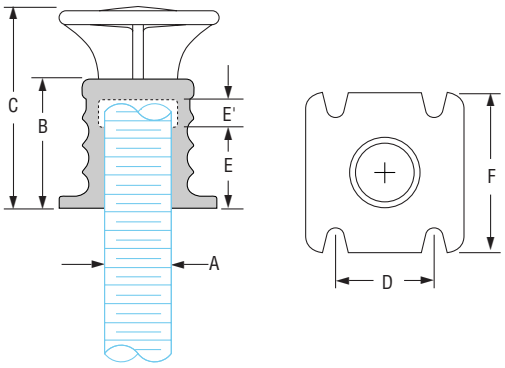


Fig. 152: Load (lbs) • Weight (lbs) • Dimensions (in)

Rod Size A	Max Load ■	Weight	B	C	D	E	E'	F
3/8	730	0.31	1 1/32	2 1/4	1	1/2	3/8	1 5/8
1/2	1,130	0.32						
5/8	1,260	0.37	1 7/32			5/8		
3/4	2,500	0.64	1 5/8	2 1/2	1 1/4	15/16	7/16	2
7/8		0.71				1	3/8	

■ Based on insert only. Rating is subject to the condition that the concrete used is of sufficient strength to hold the insert.

Fig. 282 — Universal Concrete Insert

Size Range: 3/8" through 7/8"

Material: Malleable iron body and nut

Finish: Plain or Galvanized

Service: Upper attachment for suspending pipe, shafting, motors and similar equipment from a concrete ceiling; especially suitable where rod sizes cannot be readily determined in advance.

Approvals: Complies with Federal Specification A-A-1192A (Type 18) *WW-H-171-E (Type 18)* and MSS-SP-69 (Type 18). UL, FM and ULC Approved.

Installation:

1. Nail insert to wooden forms.
2. Where convenient, reinforcing rods may be placed in the opening through the top of the insert, or short lengths of reinforcing rod may be wired to the insert prior to pouring concrete. However, the specified load ratings and approvals are not dependent on the use of any reinforcing rods in contact with the insert.
3. After concrete is poured and wooden forms are removed, place nut in insert and screw rod through nut until rod is firmly against the top of the insert body. The rod should not be forced against the top of the recess thereby placing unnecessary stress at the opening of the insert by the nut.

Features:

- Cast body prevents concrete seepage.
- Opening in top of insert provides for use of reinforcing rods up to 7/8" diameter. Sides of insert are recessed for reinforcing rods up to 1" diameter.
- Low height, broad flat bottom and widely separated nail slots minimize displacement during construction.
- The nut, held in place by V-type teeth on both insert and nut, can be raised and moved from side to side providing for lateral adjustment.
- Rod is locked in place by screwing it firmly against the top of the recess.
- One body size.

Ordering: Specify figure number, name, finish and size of nut.

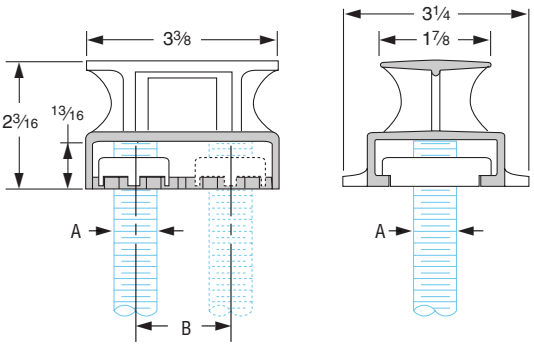


Fig. 282 CB: Load (lbs) • Weight (lbs) • Dimensions (in)

	Rod Size A	Adjustment B	Max Load ■	Weight
Insert Complete With Nut	3/8	1 11/16	730	1.5
	1/2		1,130	
	5/8		1,140	
	3/4		1,140	
	7/8	1 1/8	1,140	
Insert Only	–	–	–	1.3
Nut Only	3/8	–	–	0.2
	1/2	–	–	
	5/8	–	–	
	3/4	–	–	
	7/8	–	–	

■ Based on insert and nut only. Rating is subject to the condition that the concrete used is of sufficient strength to hold the insert.

Fig. 281 — Wedge Type Concrete Insert

Size Range: 1/4" through 7/8"

Material: Carbon steel body; malleable iron nut

Finish: Plain or Galvanized

Service: Upper attachment for suspending pipe or conduit from concrete ceiling.

Approvals: Complies with Federal Specification A-A-1192A (Type 18) *WW-H-171-E (Type 19)* and MSS-SP-69 (Type 18).
UL, ULC Listed and FM Approved (Sizes 3/8" - 3/4").

Installation:

1. Nail insert to wooden forms.
2. Where convenient, reinforcing rods may be placed in the opening through the top of the insert, or short lengths of reinforcing rod may be wired to the insert prior to pouring concrete. However, note that the specified load ratings and approvals are not dependent on the use of any reinforcing rods in contact with the insert.
3. After concrete is poured and forms removed, insert screw driver into slot in knockout plate and snap it out.
4. The nut may be put on the rod before inserting in the insert body. Then, turn rod so that elongated nut lies across the slot; screw rod through nut until rod is firmly against the top of the recess.

Features:

- Nut may be put on hanger rod before insertion, avoiding need of locating nut in insert body prior to inserting rod.
- Insert nut, when located in position, wedges against the sloping sides of insert, providing greater support than if resting on lower edge of the insert body.
- Wedge-shaped body is so held by concrete in compression thus increasing load carrying capacity.
- Easily removed knockout plate.
- Rod can be adjusted along complete length of slot.
- One body for six sizes of rod.

Ordering: Specify figure number, name and size of nut.

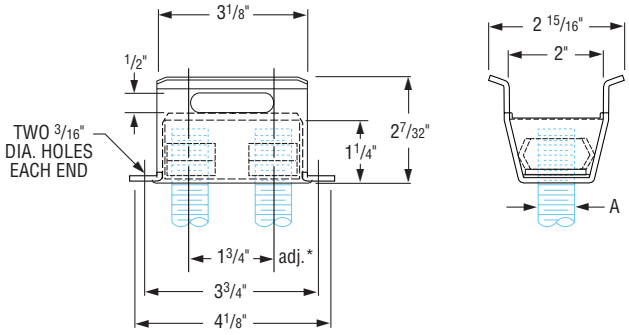
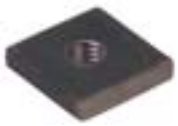


Fig. 281: Load (lbs) • Weight (lbs) • Dimensions (in)

	Rod Size A	Max Load ■	Weight
Insert Complete With Nut	1/4	240	0.82
	3/8	730	
	1/2	1,130	0.86
	5/8	1,200	0.89
	3/4		0.86
	7/8		0.93
Insert Only	–	–	0.69
Nut Only	1/4	–	0.13
	3/8	–	
	1/2	–	0.17
	5/8	–	0.20
	3/4	–	0.17
	7/8	–	0.24

■ Based on insert and nut only. Rating is subject to the condition that the concrete used is of sufficient strength to hold the insert.

Fig. 285 — Light Weight Concrete Insert



Size Range: 1/4" through 5/8"

Material: Carbon steel

Finish: Plain or Galvanized

Service: Upper attachment for suspending pipe or conduit from concrete ceiling.

Approvals: Complies with Federal Specification A-A-1192A (Type 18) *WW-H-171-E (Type 18)* and MSS-SP-69 (Type 19).
UL, ULC Listed and FM Approved (Sizes 3/8" - 5/8").

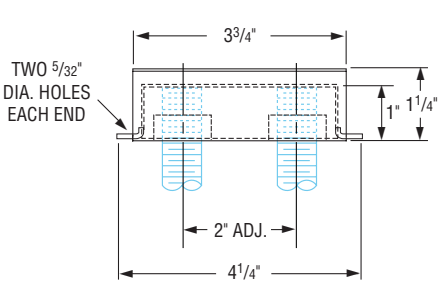
Installation:

1. Nail insert to wooden forms.
2. Reinforcing rods may be located under the arched flanges at the top of the insert. However, note that the specified load ratings and approvals are not dependent on the use of any reinforcing rods in contact with the insert.
3. After concrete is poured and wooden forms are removed, remove knockout by tapping along edge with pointed instrument.
4. Slip nut into insert and screw rod through nut until rod is firmly against the top of the insert body.

Features:

- Suitable for use in concrete 2" thick due to low overall height.
- Highly competitive.
- Provides for 2" of lateral adjustment.
- Knockout prevents seepage of concrete from underneath the insert up into the insert body.
- One body size.
- Removable nut in four sizes.
- Rod can be rigidly locked in position.

Ordering: Specify figure number, name, finish and size of nut.



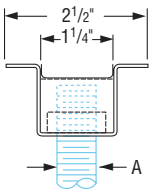


Fig. 285: Load (lbs) • Weight (lbs) • Dimensions (in)

	Rod Size A	Max Load ■	Weight
Insert Complete With Nut	1/4	230	0.46
	3/8	400	0.49
	1/2		0.49
	5/8		0.48
Insert Only	-	–	0.41
Nut Only	1/4	–	0.07
	3/8	–	
	1/2	–	
	5/8	–	

■ Based on insert and nut only. Rating is subject to the condition that the concrete used is of sufficient strength to hold the insert.

Fig. 286 (Formerly Fig. 283) — Iron Cross Design

Size Range: ¾" through 1½"

Material: Stainless steel body, fiberglass bars, polypropylene disc

Service: Upper attachment for suspending pipe or equipment from concrete ceiling.

Approvals: Complies with Federal Specification A-A-1192A (Type 18) *WW-H-171-E (Type 18)* and MSS-SP-69 (Type 18).

Installation:

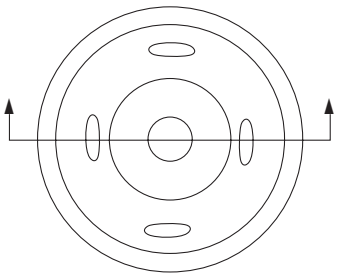
(1) Nail insert to wooden forms.

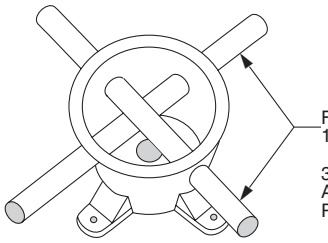
(2) Locate fiberglass bars to rest upon existing reinforcing rods or wire the insert directly into existing reinforced rods to achieve the specified load ratings.

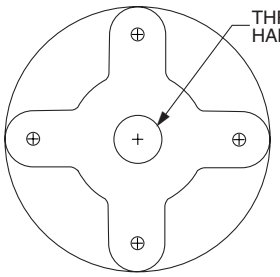
Features:

- Stainless steel body prevents corrosion.
- Cone shaped body.
- Exceptional pullout strength.
- Eliminates uncertainty of tying conventional inserts into bridge deck rebars.

Ordering: Specify figure number, name and rod size.







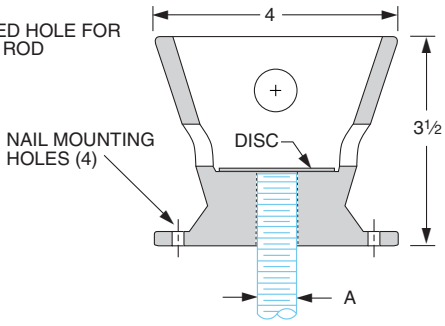


Fig. 286:	
Rod Size A	**Max Load (lbs) ■**
¾	3,230
⅞	4,480
1	5,900
1¼	9,500
1½	13,800

■ Based on the rod diameter only. Rating is subject to the conditions that the concrete used is of sufficient strength to hold the insert.

Fig. 284 — Metal Deck Hanger

Size Range: 3/8" through 3/4"

Material: Carbon steel

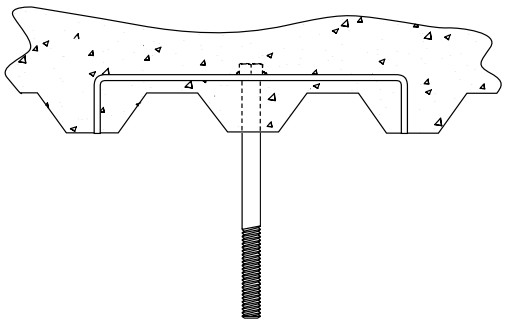
Finish: Plain

Service: Recommended for suspending pipe or conduit in metal concrete deck forms for a variety of rod sizes. May be used with a rod coupling such as the Fig. 135 or 136 to allow for extended rod lengths.

Features:

- L and H can be specified for a custom fit if your particular deck does not accommodate type A, B, or C.
- Standard 6'' long UNC bolt is welded to bracket to ensure assembly remains intact during shipment.

Ordering: Specify Figure 284, design type (A, B, C) and bolt diameter. If your specific deck will not fit one of the design types and/or a different bolt size is required, specify leg height (H), opening (L) and bolt size.



Before pouring concrete, locate the Figure 284 on deck so legs rest in “valleys” of form. Drill hole in deck for bolt.

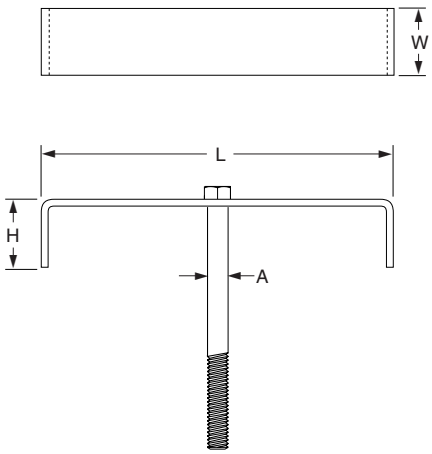


Fig. 284: Load (lbs) • Weight (lbs) • Dimensions (in)

Type	Bolt Size A	Max Load ■	L	H	W	Weight
A	3/8	730	9 5/8	1 3/4	1 1/2	1.33
	1/2	1,350				1.43
	5/8	2,160				1.64
	3/4	3,230				1.92
B	3/8	730	12	3	1 1/2	2.23
	1/2	1,350				2.33
	5/8	2,160				2.54
	3/4	3,230				2.82
C	3/8	730	16	4	1 1/2	3.10
	1/2	1,350				3.20
	5/8	2,160				3.41
	3/4	3,230				3.69

■ Based on the rod diameter only. Rating is subject to the conditions that the concrete used is of sufficient strength to hold the deck hanger.

Fig. 47 — Concrete Single Lug Plate

Size Range: 1/2" through 2"

Material: Carbon steel

Finish: Plain or Galvanized

Service: Structural attachment to concrete ceiling lug is used in conjunction with Fig. 299 (see page PH-87.) forged steel clevis and anchors of sufficient strength to hold the desired load.

Ordering: Specify rod size, figure number, name and finish.

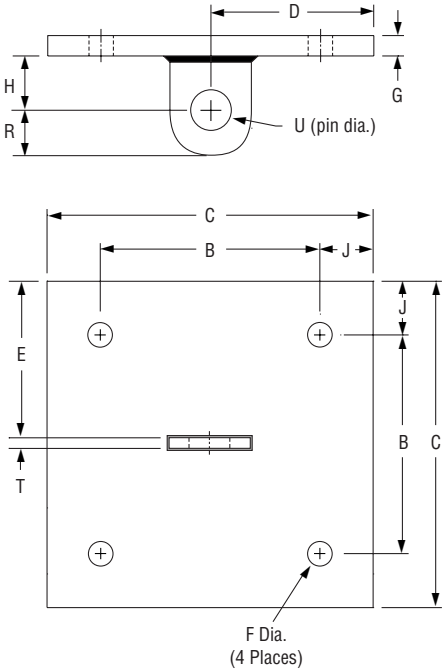


Fig. 47: Load (lbs) • Weight (lbs) • Dimensions (in)

Rod Size A	Max Load ■	Weight	J	B	C	D	E	F	G	H	R	T	U
1/2	1,350	11.1	1	8	10	5	4 7/8	9/16	3/8	1 1/2	1 1/4	1/4	5/8
5/8	2,160	14.6							1/2				3/4
3/4	3,230	14.8					4 13/16	11/16				3/8	7/8
7/8	4,480	22.0							3/4	2			1
1	5,900	31.9	2		12	6	5 3/4	13/16			1 1/2	1/2	1 1/8
1 1/4	9,500	43.8					5 11/16	15/16	1	3	2	5/8	1 3/8
1 1/2	13,800	45.6					5 5/8	1 1/8			2 1/2	3/4	1 5/8
1 3/4	18,600	55.7						1 3/8	1 1/4				1 7/8
2	24,600	58.2								4	3		2 1/4

■ Based on the rod diameter only. Rating is subject to the conditions that the concrete and anchors used are of sufficient strength to hold the load.

Fig. 49 — Concrete Clevis Plate

Size Range: 3/8" through 1 3/4"

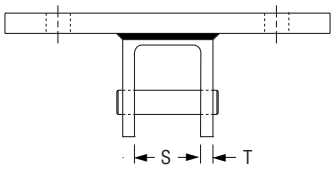
Material: Carbon steel

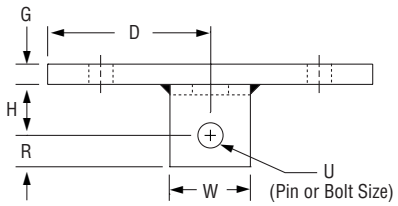
Finish: Plain or Galvanized

Service: Structural attachment to concrete ceiling where flexibility is desired. Concrete clevis plate is normally used in conjunction with Fig. 290, page PH-89, weldless eye nut, or Fig. 278 page PH-82 welded eye rod and anchors of sufficient strength to hold the desired load.

Ordering: Specify rod size, figure number, name and finish.

Note: Sizes 3/8" through 1" are supplied with bolt and nut. Larger sizes are supplied with pin and cotters.





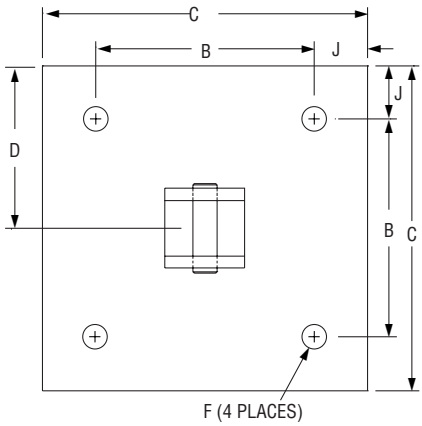


Fig. 49: Load (lbs) • Weight (lbs) • Dimensions (in)

Rod Size A	Max Load ■	Weight	J	B	C	D	F	G	H	R	S	T	U	W
3/8	730	11.8	1	8	10	5	9/16	3/8	2	7/8	1 1/4	1/4	1/2	2
1/2	1,350	11.9											5/8	
5/8	2,160	15.7						1/2					3/4	
3/4	3,230	16.9					11/16			1 1/8	1 7/8	3/8	7/8	2 1/2
7/8	4,480	18.1							3	1 1/4	2		1	
1	5,900	36.9	2		12	6	13/16	3/4	3	1 1/2	2 1/2	1/2	1 1/8	3
1 1/4	9,500	40.9					15/16			2		5/8	1 3/8	4
1 1/2	13,800	59.8					1 1/8	1	4	2 1/2	3	3/4	1 5/8	5
1 3/4	18,600	93.6		10	14	7	1 3/8	1 1/4	5	2 3/4	3 1/2	1/2	1 7/8	

■ Based on the rod diameter only. Rating is subject to the conditions that the concrete and anchors used are of sufficient strength to hold the load.

Fig. 52 Concrete Rod Attachment Plate

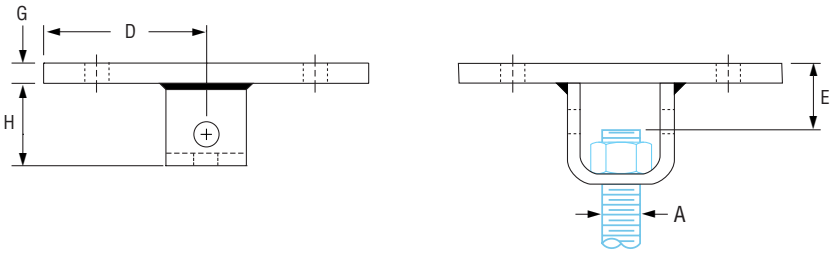
Size Range: 3/8" through 1 1/4"

Material: Carbon steel

Finish: Plain or Galvanized

Service: Structural attachment to concrete ceiling where vertical adjustment is desired. Normally used with threaded rod and nut and anchors of sufficient strength to hold the desired load.

Ordering: Specify rod size, figure number, name and finish.



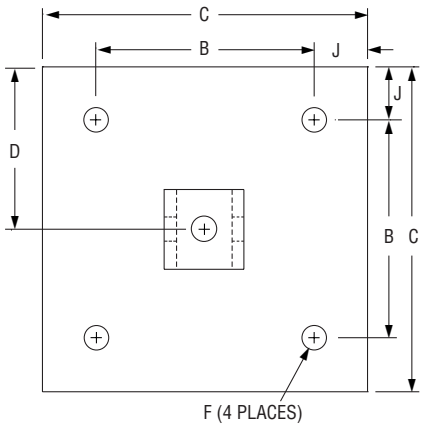


Fig. 52: Load (lbs) • Weight (lbs) • Dimensions (in)

Rod Size A	Max Load ■	Weight	J	B	C	D	E	F	H	G
3/8	730	11.6	1	8	10	5	2 1/4	9/16	2 7/8	3/8
1/2	1,350	11.6					2 1/8			
5/8	2,160	15.1					2 1/4			1/2
3/4	3,230	16.1						11/16	3 1/8	
7/8	4,480	16.7					3 1/8		4 1/4	
1	5,900	34.9	2		12	6	3 1/2	13/16	4 1/2	3/4
1 1/4	9,500	40.9					3 5/8		5	

■ Based on the rod diameter only. Rating is subject to the conditions that the concrete and anchors used are of sufficient strength to hold the load.

Fig. 142 — Coach Screw Rods Machine Threaded on Opposite End

Size Range: 3/8" and 1/2"
Material: Carbon steel
Finish: Plain
Ordering: Specify rod size, figure number, name and rod length.

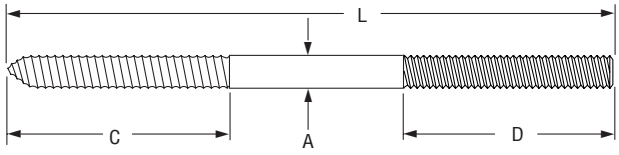


FIg. 142: Standard Thread Lengths(in) • Loads (lbs)

Rod Size A	Standard Length - L	Coach Screw Thread Length – C	Standard Rod Thread Length – D	Max Load
3/8	3 1/2	2	3/4	390
	8		2 1/2	
1/2	3 1/2	2 7/16	3/4	640
	8		2 1/2	

Fig. 146 — Continuous Threaded Rod

Size Range: 1/4" through 1 1/2" Stocked in six, ten, and twelve foot lengths. Other even foot lengths can be furnished to order.
Material: Carbon steel; rod threaded complete length.
Finish: Plain or galvanized.
Maximum Temperature: 650° F.
Ordering: Specify rod diameter and length, figure number, name and finish.

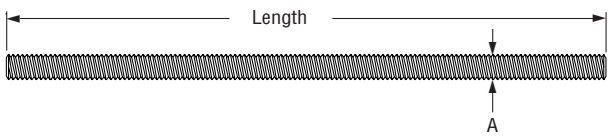


Fig. 146: Loads (lbs) • Weights (lbs) Dimensions (in)

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

Note: Other rod sizes available upon request.
Class 2 fit is available upon request.

Fig. 140: Right-hand Threads
Fig. 253: Right and Left hand Threads

Machine Threaded Rods Threaded Both Ends

Size Range: 3⁄8" through 5"
Material: Carbon steel
Finish: Plain or Galvanized
Ordering: Specify rod size, figure number, name, rod length and finish. Specify thread length if other than standard.

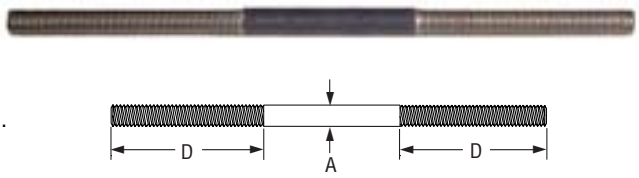


Fig. 140, 253: Loads (lbs) • Dimensions (in)

Rod Size A	Threads per Inch	Max Load 650° F	Max Load 750° F	Standard Rod Thread Length D*
3⁄8	16	730	572	2 1⁄2
1⁄2	13	1,350	1,057	
5⁄8	11	2,160	1,692	
3⁄4	10	3,230	2,530	3
7⁄8	9	4,480	3,508	3 1⁄2
1	8	5,900	4,620	4
1 1⁄4	7	9,500	7,440	5
1 1⁄2	6	13,800	10,807	6
1 3⁄4	5	18,600	14,566	7
2	4 1⁄2	24,600	19,265	8
2 1⁄4	4 1⁄2	32,300	25,295	9
2 1⁄2	4	39,800	31,169	10

Fig. 140, 253: Loads (lbs) • Dimensions (in) (cont.)

Rod Size A	Threads per Inch	Max Load 650° F	Max Load 750° F	Standard Rod Thread Length D*
2 3⁄4	4	49,400	38,687	11
3	4	60,100	47,066	12
3 1⁄4	8 UN	71,900	56,307	13
3 1⁄2	8 UN	84,700	66,331	14
3 3⁄4	8 UN	98,500	77,139	15
4	8 UN	113,400	88,807	
4 1⁄4	8 UN	129,400	101,337	18
4 1⁄2	8 UN	146,600	114,807	
4 3⁄4	8 UN	164,700	128,982	
5	8 UN	184,000	144,096	

*Fig. 140 rod up to 1" rod size and 24" in length may be furnished as Fig 146 rod unless order states that all thread rod is not acceptable.

Fig. 248: Right Hand Threads
Fig. 248L: Left Hand Threads

Eye Rod Not Welded

Size Range: 3⁄8" through 2 1⁄2"
Material: Carbon steel
Finish: Plain or Galvanized.
Maximum Temperature: 650° F
Features: Through 1 1⁄2", inside diameter of eye will accommodate a bolt diameter 1⁄8" larger than rod diameter; 1 3⁄4" and larger, inside diameter of eye will take a bolt diameter 1⁄4" larger than rod diameter.
Ordering: Specify rod diameter, figure number, name, rod length and finish. Specify thread length if other than standard.

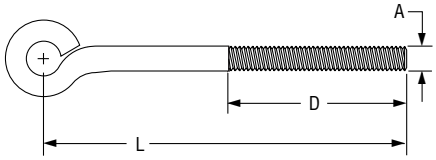


Fig. 248, Fig. 248L: Loads (lbs) • Dimensions (in)

Rod Size A	Standard Rod Thread Length – D	L (min)	Max Load 650° F
3⁄8	2 1⁄2	4 1⁄4	240
1⁄2			
5⁄8		4 1⁄2	705
3⁄4	3	5 1⁄2	1,050
7⁄8	3 1⁄2	6 1⁄2	1,470
1	4	7 1⁄4	1,940
1 1⁄4	5	8 1⁄4	3,120
1 1⁄2	6	10	4,650
1 3⁄4	7	12	6,380
2	8	14	8,280
2 1⁄4	9	15 1⁄2	10,900
2 1⁄2	10	17	13,400

Fig. 278: Right Hand Threads
Fig. 278L: Left Hand Threads

Eye Rod Welded

Size Range: ⅜" through 2½"

Material: Carbon steel

Finish: Plain or Galvanized

Features: Through 1½", inside diameter of eye will accommodate a bolt diameter ⅛" larger than rod diameter; 1¾" and larger, inside diameter of eye will take a bolt diameter ¼" larger than rod diameter.

Maximum Temperature: 750° F

Ordering: Specify rod diameter, figure number, name, rod length and finish. Specify thread length if other than standard.

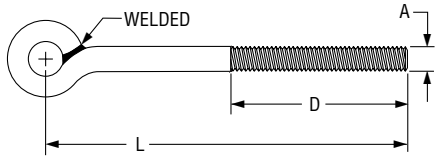


Fig. 278, Fig. 278L: Loads (lbs) • Dimensions (in)

Rod Size A	Standard Rod Thread Length - D	L (min)	Max Load	
			650° F	750° F
⅜	2½	4¼	730	572
½			1,350	1,057
⅝		4½	2,160	1,692
¾	3	5½	3,230	2,530
⅞	3½	6½	4,480	3,508
1	4	7¼	5,900	4,620
1¼	5	8¼	9,500	7,440
1½	6	10	13,800	10,807
1¾	7	12	18,600	14,566
2	8	14	24,600	19,265
2¼	9	15½	32,300	25,295
2½	10	17	39,800	31,169

Fig. 248X: Not Welded
Fig. 278X: Welded

Linked Eye Rods

Size Range: ⅜" through 2½"

Service: The use of linked eye rods in a hanger assembly allows universal movement of the piping without bending and possible fracture of a straight rod.

Finish: Plain or Galvanized

Maximum Temperature: Fig. 248X: 650° F, Fig. 278X: 750° F

Ordering: Specify the size, length of each eye rod, figure number and finish.

Example:

⅞" Fig. 278X linked welded eye rod consisting of:

(L_1) ⅞" Fig. 278 welded eye rod 1 ft. 2½ in. long, center to end.

(L_2) ⅞" Fig. 278 welded eye rod 1 ft. 2½ in. long center to end.

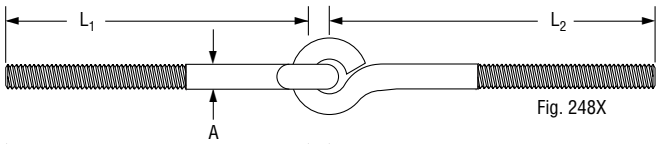


Fig. 248X

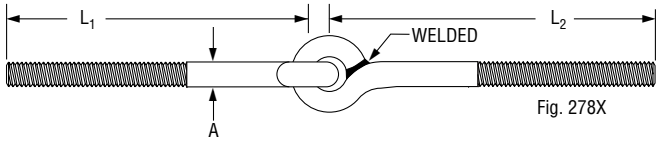


Fig. 278X

Fig. 248X, 278X: Dimensions (in) • Loads (lbs)

Rod Size A	Max Load		
	Fig. 248X 650° F	Fig. 278X	
		650° F	750° F
⅜	240	730	572
½	440	1,350	1,057
⅝	705	2,160	1,692
¾	1,050	3,230	2,530
⅞	1,470	4,480	3,508
1	1,940	5,900	4,620
1¼	3,120	9,500	7,440
1½	4,650	13,800	10,807
1¾	6,380	18,600	14,566
2	8,280	24,600	19,265
2¼	10,900	32,300	25,295
2½	13,400	39,800	31,169

Fig. 148 — Rod with Eye End

Size Range: 2¾" through 5"

Material: Carbon steel

Finish: Plain or Galvanized

Service: A large diameter rod with eye end for load ratings thru 184,000 pounds.

Ordering: Specify rod size, figure number, name, finish and "L" dimension. Indicate if desired thread length is other than standard.

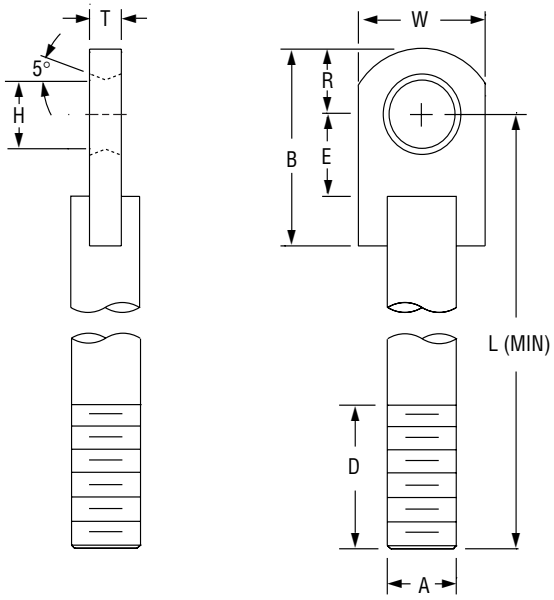


Fig. 148: Loads (lbs) • Weights (lbs) • Dimensions (in)

Rod Size A	Max Load 650° F	Max Load 750° F	Weight* Min Length	Weight/Ft. Additional Length	B	D	E	H	L (Min)	R	T	W
2¾	49,400	38,687	35.9	20	9⅝	12	3¾	3⅛	19	3⅝	1½	6
3	60,100	47,066	42.9	24	11		4	3⅜	20	4		
3¼•	71,900	56,307	54.7	28	12¼			3⅝	21	4¼		7
3½•	84,700	66,331	67.3	33	12½	15	4¾	3⅞	24	4½	2	
3¾•	98,500	77,139	80.0	37	13⅞		5	4⅛	25	4⅞		7½
4•	113,400	88,807	97.0	43	15⅛			4⅜	26	5⅛		8½
4¼•	129,400	101,337	127.0	48	16¼	18	5¼	4⅝	30	5½		9½
4½ •	146,600	114,807	131.0	54	16		5¾	4⅞		5¾	2½	8½
4¾•	164,700	128,982	154.0	60	17			5⅛	31	6		9½
5•	184,000	144,096	175.0	67	17⅞		6¼	5⅜	32	6⅜		10

*Weight calculated with minimum "L" for standard thread
• Furnished with 8 UN series threads

Fig. 135: Straight With Sight-Hole
Fig. 135E: Straight Less Sight-Hole
Fig. 135R: Reducing

Rod Coupling

Size Range: ¼" through 1"
Material: Carbon steel
Finish: Fig. 135:Plain; Fig.135E and Fig.135R Galvanized
Service: For connecting rods to accommodate up to 1" diameter and support up to 5,900 pounds.
Ordering: Specify rod size, figure number and name.

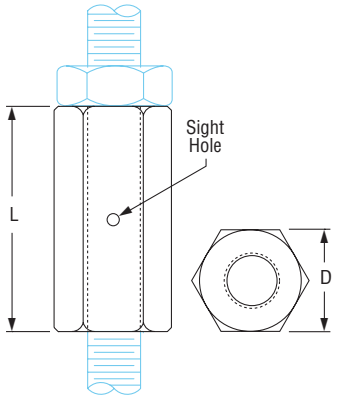


Fig 135, 135E, 135R: Loads (lbs) • Weights (lbs) • Dimensions (in)				
Rod Size A	**Max Load**	**Weight**	**D**	**L**
Fig. 135: Straight With Sight-Hole				
3/8	730	0.09	5/8	1 3/4
1/2	1,350	0.12	3/4	1 1/2
5/8	2,160	0.24	15/16	1 7/8
3/4	3,230	0.42	1 1/8	2 1/4
7/8	4,480	0.66	1 5/16	2 3/8
1	5,900	1.00	1 1/2	3
Fig. 135E: Straight Less Sight-Hole				
1/4	240	0.03	3/8	7/8
3/8	730	0.09	5/8	1 3/4
1/2	1,350	0.14	11/16	
5/8	2,160	0.26	13/16	2 1/4
3/4	3,230	0.34	1	
Fig. 135R: Reducing				
3/8 x 1/4	240	0.13	5/8	1 3/4
1/2 x 3/8	730	0.13	11/16	
5/8 x 1/2	1,350	0.19	13/16	2 1/8
3/4 x 5/8	2,160	0.26	1	2 1/4
7/8 x 3/4	3,230	0.41	1 1/4	2 1/2

Fig. 136: Straight
Fig. 136R: Reducing

Rod Coupling

Size Range: 1/4" through 1"
Material: Malleable iron
Finish: Plain or Galvanized
Service: For connecting rod lengths within limitation.
Approvals: UL, ULC Listed and FM Approved (Sizes 3/8" - 7/8").
Features:

- Available in reducing sizes.
- Provides visual inspection of thread engagement.
- Uniform strength; good appearance.

Ordering: Specify rod tapping size, figure number and name. Furnished with right-hand UNC threads only.

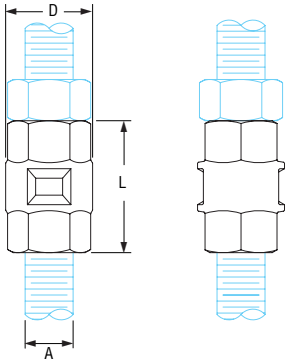


Fig. 136, 136R: Loads (lbs) • Weights (lbs) • Dimensions (in)				
Rod Size A	**Max Load**	**Weight**	**L**	**D**
Straight: Fig. 136				
1/4	230	0.06	1 3/8	5/8
3/8	730	0.10	1 5/8	11/16
1/2	1,350	0.20	2 1/8	15/16
5/8	2,160	0.33	2 1/2	1 1/8
3/4	3,230	0.44	2 5/8	1 1/4
7/8	4,480	0.96	2 3/16	1 5/8
1	5,900	0.94	2 3/4	1 13/16
Reducing: Fig. 136R				
3/8 x 1/4	230	0.10	1 5/8	1 5/8
1/2 x 3/8	730	0.21	2 1/8	2 1/8

Fig. 114 Turnbuckle Adjuster

Size Range: 1/4" through 3/4"
Material: Malleable iron
Finish: Plain
Installation: Normally used with split pipe ring, Fig. 108, see page PH-22
Approvals: Complies with Federal Specification A-A-1192A (Type 15) *WW-H-171-E (Type 15)* and MSS-SP-69 (Type 15).
Maximum Temperature: 450° F
Features:

- An economical and simple means of obtaining vertical adjustment and flexibility at the pipe connection.
- Permits adjustment after pipe is in place.

Ordering: Specify rod size, figure number and name.

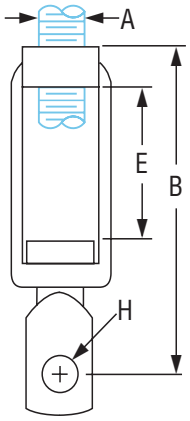


Fig. 114: Loads (lbs) • Weights (lbs) • Dimensions (in)

Rod Size A	Max Load	Weight	B	E	H
1/4	230	0.09	2 1/2	1 1/4	7/32
3/8	730	0.28	3 13/16	1 7/8	13/32
1/2		0.31		1 13/16	
5/8		0.72	4 7/8	2 5/16	1/2
3/4	860	0.70	4 15/16		9/16

Fig. 110R Socket, Rod Threaded

Size Range: 1/4" through 7/8"
Material: Malleable iron
Finish: Plain
Service: For attaching hanger rod to various types of building attachments
Maximum Temperature: 450° F
Approvals: Complies with Federal Specification A-A-1192A (Type 16) *WW-H-171-E (Type 16)* and MSS-SP-69 (Type 16). UL Listed and FM Approved (Sizes 3/8" - 7/8").
Installation: Normally used with the split pipe ring Fig. 108, see page PH-22.
Ordering: Specify rod tapping size, figure number and name.

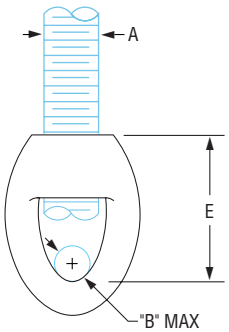


Fig. 110R: Loads (lbs) • Weights (lbs) • Dimensions (in)

Rod Size A	Max Load	Weight	B	E
1/4	650	0.05	1/4	1 1/8
3/8	800	0.07		1 11/32
1/2	1,000	0.13		1 17/32
5/8	1,400	0.19	3/8	1 13/16
3/4	2,200	0.31	1/2	2 5/32
7/8	2,300	0.44		2 11/32

Fig. 157 — Extension piece

Size Range: 3/8" through 7/8"
Material: Malleable iron
Finish: Plain or Galvanized
Maximum Temperature: 450° F
Service: For attaching hanger rod to various types of building attachments.
Approvals: UL Listed and FM Approved.
Installation: May be used to form an integral part of malleable iron beam clamps Fig. 218, see page PH-55.
Ordering: Specify rod size, figure number, name and finish.

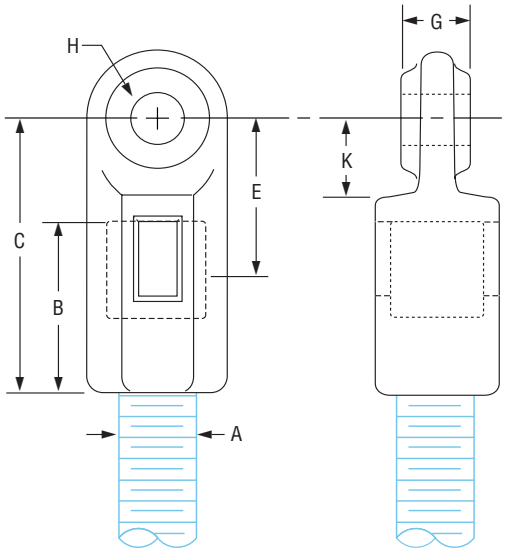


Fig. 157: Loads (lbs) • Weights (lbs) • Dimensions (in)

Rod Size A	Max Load	Weight	B	C	Rod Take-Out – E	G	H	K
3/8	730	0.20	1 1/4	2 1/16	1 1/4	1/2	1/2	9/16
1/2	1,350	0.40	1 3/8	2 5/16	1 3/8	5/8		11/16
5/8	1,550	0.44	1 1/2	2 7/16	1 7/16			3/4
3/4	2,100	0.65	1 3/4	2 7/8	1 11/16			7/8
7/8	2,350	0.78	1 7/8	2	1 3/4	3/4	9/16	

Fig. 299 — Forged Steel Clevis

Size Range: 3/8" through 4"

Material: Forged steel

Finish: Plain or Galvanized

Service: For use on high temperature piping installations.

Approvals: Complies with Federal Specification A-A-1192A (Type 14) *WW-H-171-E (Type 14)* and MSS-SP-69 (Type 14).

Features:

- Available with pin and cotter pins, if required.

Ordering: Specify rod size, figure number, name and finish. If pin and cotter pins are required, specify "with pin". If other than standard combination of clevis number and rod size is required, specify clevis number, special rod tapping size, pin size, grip.

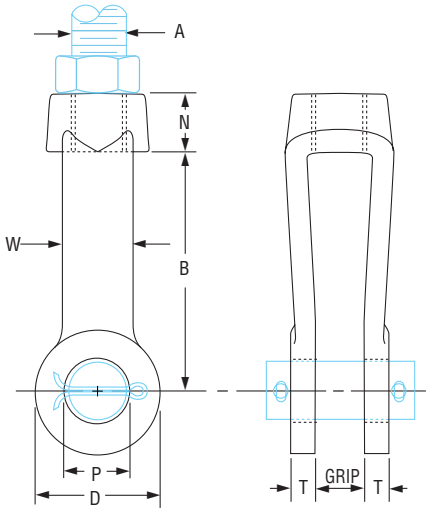


Fig. 299: Loads (lbs) • Weights (lbs) • Dimensions (in)

Rod Size A	Max Load		Weight		Rod Take Out – B	D	N	Pin Dia. P	T	W	Grip	Clevis No.
	650° F	750° F	Without Pin	With Pin								
3/8	730	572	0.9	1.0	3 11/16	1 7/16	5/8	1/2	5/16	1 1/16	1/2	2
1/2	1,350	1,057	0.7	0.9				5/8				
5/8	2,160	1,692	0.7	0.9				3/4			5/8	
3/4	3,230	2,530	2.5	3.0	5	2	7/8	7/8	3/8	1 1/4	3/4	2 1/2
7/8	4,480	3,508	2.5	3.4				1			7/8	
1	5,900	4,620	4.0	5.1		3	1 5/16	1 1/8	1/2	1 1/2	1	3
1 1/4	9,500	7,440	3.8	5.5				1 3/8			1 1/4	
1 1/2	13,800	10,807	6.0	8.5	6	3 1/2	1 5/8	1 5/8		1 3/4	1 1/2	3 1/2
1 3/4	18,600	14,566	8.0	12.9		4	1 3/4	1 7/8		2		4
2	24,600	19,265	16.0	23.3	7	5	2 1/4	2 1/4	5/8	2 1/2	2 1/2	5
2 1/4	32,300	25,295	26.0	35.1	8	6	2 3/4	2 1/2	3/4	3		6
2 1/2	39,800	31,169	25.5	36.0				2 3/4				
2 3/4	49,400	38,687	36.0	50.0	9	7	3	3	7/8	3 1/2		7
3	60,100	47,066	35.0	51.5				3 1/4				
3 1/4 •	71,900	56,307	90.0	116.0	10	8	4	3 1/2	1 1/2	4	4	8
3 1/2 •	84,700	66,331	88.0	118.0				3 3/4				
3 3/4 •	98,500	77,139	86.0	120.0				4				
4 •	113,400	88,807	84.0	122.0				4 1/4				

• Furnished with 8 UN series threads.

Fig. 230 Turnbuckle

Size Range: 3/8" through 2½"

Material: Forged steel

Finish: Plain or Galvanized

Service: Provides adjustment up to 12" for heavy loads.

Approvals: Complies with Federal Specification A-A-1192A (Type 13) *WW-H-171-E (Type 13)* and MSS-SP-69 (Type 13).

Ordering: Specify rod size, figure number, name and finish.

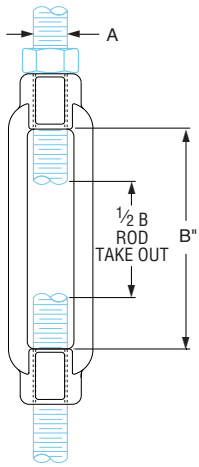


Fig. 230: Loads (lbs) • Weights (lbs) • Dimensions (in)

Rod Size A •	Max Load		Weight	
	650°F	750°F	B= 6" Opening	B=12" Opening
3/8	730	572	0.42	–
1/2	1,350	1,057	0.65	1.20
5/8	2,160	1,692	0.98	1.58
3/4	3,230	2,530	1.50	2.35
7/8	4,480	3,508	1.90	4.05
1	5,900	4,620	2.60	4.02
1 1/4	9,500	7,440	4.50	–
1 1/2	13,800	10,807	6.40	–
1 3/4	18,600	14,566	11.00	–
2	24,600	19,265	14.90	–
2 1/4	32,300	25,295	19.60	–
2 1/2	39,800	31,169	26.90	–

• Tapped right hand and left hand thread
Larger rod sizes or openings available upon request

Fig. 233 Turnbuckle

Size Range: 1¼" through 5"

Material: Carbon steel

Finish: Plain or Galvanized

Services: Provides adjustments up to 24" with loads up thru 184,000 pounds.

Approvals: Complies with Federal Specification A-A-1192A (Type 13) *WW-H-171-E (Type 13)* and MSS-SP-69 (Type 13).

Ordering: Specify rod size, figure number, name, finish and opening dimension.

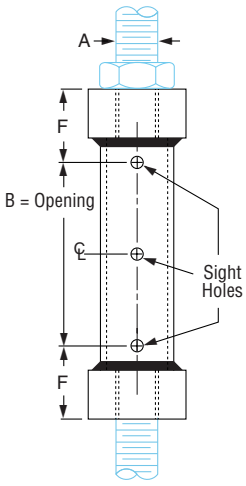


Fig. 233: Loads (lbs) • Weights (lbs) • Dimensions (in)

Rod Size* A	Max Load	Weight/Opening				F
		B= 6"	B=12"	B=18"	B=24"	
1 1/4	9,500	–	9.0	10.8	12.6	2 1/8
1 1/2	13,800	–	12.4	14.9	17.4	2 3/8
1 3/4	18,600	–	11.7	14.2	16.7	
2	24,600	–	20.9	24.7	28.5	3 3/16
2 1/4	32,300	–	29.5	34.6	39.7	3 1/4
2 1/2	39,800	–	28.3	33.4	38.5	
2 3/4	49,400	35.6	41.8	48.1	54.3	3 1/2
3	60,100	41.6	49.1	56.6	64.1	3 13/16
3 1/4•	71,900	39.6	47.0	54.5	62.0	
3 1/2•	84,700	72.5	82.9	93.3	103.7	4 7/16
3 3/4•	98,500	69.6	80.0	90.4	107.30	
4•	113,400	110.7	125.1	139.4	153.6	5
4 1/4•	129,400	107.1	121.5	135.7	150.0	
4 1/2•	146,600	233.5	255.2	276.9	298.6	6 13/16
4 3/4•	164,700	227.6	249.3	271.0	292.7	
5•	184,000	221.4	243.1	264.8	286.5	

•Furnished with 8 UN series threads.
*Tapped right hand and left hand thread.

Fig. 290: Right-Hand Thread
Fig. 290L: Left-Hand Thread

Weldless Eye Nut

Size Range: 3/8" through 2 1/2"

Material: Forged steel

Finish: Plain or Galvanized

Service: For use on high temperature piping installations.

Approvals: Complies with Federal Specification A-A-1192A (Type 17) *WW-H-171-E (Type 17)* and MSS-SP-69 (Type 17).

Features:

- Supports loads equal to the full limitation of the hanger rod.
- Provides flexible connection when used with straight thread rod.

Ordering: Specify rod size, figure number, name and finish. If other than standard combination of eye nut number and rod size, specify eye nut number and special rod tapping size.

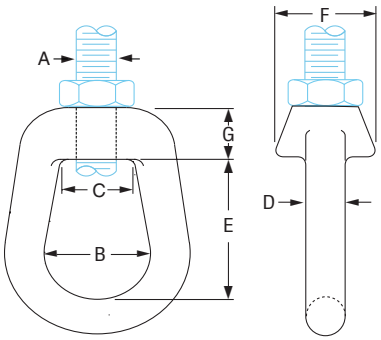


Fig. 290, 290L: Loads (lbs) • Weights (lbs) • Dimensions (in)

Rod Size A	Max Load		Weight	B	C	D	Rod Take Out – E	F	G	Eye Nut Number
	650° F	750° F								
3/8	730	572	0.63	1 1/2	1 3/16	1/2	2	1 3/8	11/16	1
1/2	1,350	1,057	0.63							
5/8	2,160	1,692	0.62							
3/4	3,230	2,530	0.60							
7/8	4,480	3,508	1.70	2	1 11/16	3/4	2 5/8	1 15/16	1	2
1	5,900	4,620	1.70							
1 1/4	9,500	7,440	3.60	2 1/2	1 13/16	1	3 3/8	2 3/8	1 1/4	3
1 1/2	13,800	10,807	3.50							
1 3/4	18,600	14,566	16.40	4	4	1 1/2	6 1/4	4	2 1/4	4
2	24,600	19,265	15.90							
2 1/4	32,300	25,295	15.40							
2 1/2	39,800	31,169	14.90							

Fig. 291 — Clevis Pin With Cotters

Size Range: ½" through 4"
Material: Carbon steel
Finish: Plain or Galvanized
Maximum Temperature: 650° F
Service: For use with type C variable spring hanger, type C constant support (Fig. 81-H only) and Fig. 66 welded beam attachment.
Ordering: Specify pin diameter, figure number, name, finish and if cotter pins are required.

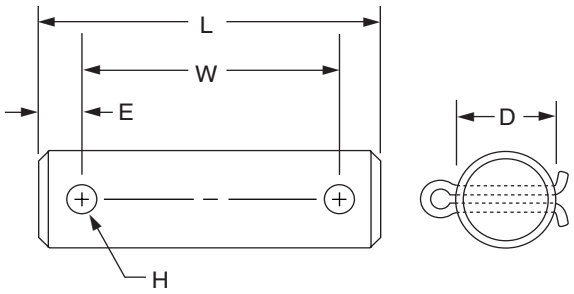


Fig. 291: Loads (lbs) • Weights (lbs) • Dimensions (in)

Pin Dia. – D	Max Load		Weight	L	W	E	H	Cotter Pin Size
	650° F	750° F						
1/2	730	572	0.12	2 7/8	2 1/8	3/8	5/32	1/8 x 1 1/4
5/8	1,350	1,057	0.18	3 1/8	2 3/8			
3/4	2,160	1,691	0.29	3 5/8	2 7/8		7/32	3/16 x 1 1/2
7/8	3,230	2,529	0.47	4	3 1/4			
1	4,480	3,508	0.67					3/16 x 2
1 1/8	5,900	4,620	1.00	4 3/4	4			
1 3/8	9,500	7,439	2.10	5 3/8	4 3/8	1/2	9/32	1/4 x 2
1 5/8	13,800	10,805	3.30	6	5			
1 7/8	18,600	14,564	4.80	7 1/8	5 7/8	5/8	3/8	3/8 x 3
2 1/4	24,600	19,262	7.20					3/8 x 4
2 1/2	32,300	25,291	9.30	7 5/8	6 3/8			
2 3/4	39,800	31,163	12.50	7 7/8	6 5/8			
3	49,400	38,680	16.60	8 1/4	6 3/4	3/4	1/2	1/2 x 5
3 1/4	60,100	47,058	20.00	8 1/2	7			
3 1/2	71,900	56,298	23.90	8 3/4	7 1/4			
3 3/4	84,700	66,320	25.10	9 1/2	8			1/2 x 6
4	98,500	77,125	34.80	9 3/4	8 1/4			

Machine Bolts

Size Range: American Standard hexagon head bolts with American Standard hexagon nuts are stocked in sizes 3/8" through 1 1/8" UNC thread series. Other sizes are available upon request. Lengths of bolts are measured from under head to extreme point.

Ordering: Specify bolt size, name and length.

Hexagon Nuts

Size Range:

- American Standard hexagon nuts - sizes 1/4 thru 1 1/2".
- American Standard heavy hexagon flat nuts - sizes 1 3/4" thru 3 3/4".

Ordering: Specify bolt or rod size and name.

Hex Nuts: Dimensions (in)

Bolt /Rod Size	Width	Thickness
1/4	7/16	15/64
3/8	9/16	11/32
1/2	3/4	29/64
5/8	15/16	9/16
3/4	1 1/8	43/64
7/8	1 5/16	25/32
1	1 1/2	57/64
1 1/4	1 7/8	1 3/32
1 3/8	2 1/16	1 13/64
1 1/2	2 1/4	1 5/16

Heavy Hex Nuts: Dimensions (in)

Bolt /Rod Size	Width	Thickness
1 3/4	2 3/4	1 25/32
2	3 1/8	2 1/32
2 1/4	3 1/2	2 19/64
2 1/2	3 7/8	2 35/64
2 3/4	4 1/4	2 13/16
3	4 5/8	3 1/16
3 1/4 ■	5	3 5/16
3 1/2 ■	5 3/8	3 9/16
3 3/4 ■	5 3/4	3 13/16

■ Furnished with 8 UN Threads

Fig. 137: Standard U-bolt

Fig. 137S*: Special U-bolt (non-standard)

Size Range: ½" through 36"

Material: Carbon steel U-bolt and four finished hex nuts

Finish: Plain or Galvanized

Service: Recommended for support, or guide of heavy loads; often employed in power, process plant and marine service.

Approvals: Complies with Federal Specification A-A-1192A (Type 24) *WW-H-171-E (Type 24)* and MSS-SP-69 (Type 24).

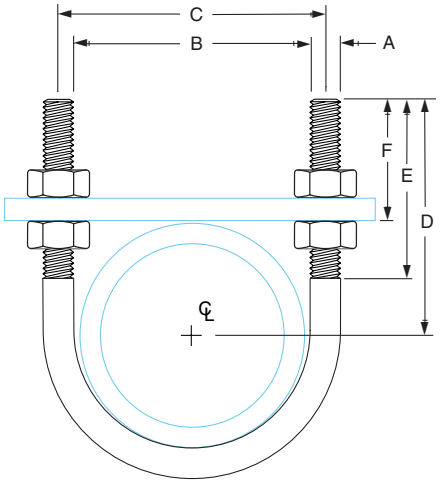
Ordering Fig. 137: Specify pipe size x rod size (e.g., 6 x 5/8), figure number, name. U-bolt will be furnished with longer tangents D or with longer threads E if so required and ordered. If hex nuts are not required, specify "without hex nuts".

Ordering Fig. 137S: Specify figure number, name, material specification, dimensions A, B, C, D, and E, and "with hex nuts" or "without hex nuts".

Fig. 137: Loads (lbs) • Weights (lbs) • Dimensions (in) ■

Pipe Size	Rod Size A	Max Normal Load 650° F	Max Normal Load 750° F	650° F Max Side Load	Wt.	B	C	D	E	F
1/2	1/4	580	454	145	0.11	15/16	1 3/16	2 3/4	2 1/8	2 5/16
3/4					0.12	1 1/8	1 3/8			2 7/32
1					0.12	1 3/8	1 5/8			2 3/32
1 1/4	3/8	1,460	1,144	365	0.28	1 11/16	2 1/16	2 7/8		2 1/32
1 1/2					0.30	2	2 3/8	3	2 1/2	2 1/16
2					0.33	2 7/16	2 13/16	3 1/4		
2 1/2	1/2	2,700	2,114	675	0.73	2 15/16	3 7/16	3 3/4	3	2 5/16
3					0.78	3 9/16	4 1/16	4		2 1/4
3 1/2					0.84	4 1/16	4 9/16	4 1/4		
4					0.90	4 9/16	5 1/16	4 1/2		
5					1.0	5 5/8	6 1/8	5		2 7/32
6	5/8	4,320	3,382	1,080	2.0	6 3/4	7 3/8	6 1/8	3 3/4	2 13/16
8					2.3	8 3/4	9 3/8	7 1/8		
10	3/4	6,460	5,060	1,615	4.9	10 7/8	11 5/8	8 3/8	4	3
12	7/8	9,960	7,016	2,490	7.7	12 7/8	13 3/4	9 5/8	4 1/4	3 1/4
14					8.3	14 1/8	15	10 1/4		
16					9.2	16 1/8	17	11 1/4		
18	1	11,800	9,240	–	13.5	18 1/8	19 1/8	12 5/8	4 3/4	3 5/8
20					14.6	20 1/8	21 1/8	13 5/8		
24					16.9	24 1/8	25 1/8	15 5/8		
30					19.1	30 1/8	31 1/8	18 5/8		
36					23.2	36 1/8	37 1/8	21 5/8		

■ loads, weights and dimensions shown do not apply for Fig. 137S
Max load rating for carbon steel is 2 x max load rating for rod size "A"
Max load rating for stainless steel is .85 x 2 x max load rating for rod size "A"



*When the combination of a normal load and a side load occurs, a straight line interaction formula may be used to determine if the Fig. 137 is still within the allowable stress range:

$Pn/Pna + Ps/Psa \leq 1$

Where: Pn = actual applied normal load; Pna = allowable normal load for the Fig. 137;
Ps = actual applied side load; Psa = allowable side load for the Fig. 137

Nuts must be snug tight in installation to achieve side loads shown.

Fig. 137C: Plastic Coated — U-Bolts

Size Range: 1/2" through 8"
Material: Carbon steel U-bolt and four finished hex nuts. Formed portion of the U-bolt is plastic coated.
Maximum Temperature: 225° F
Service: Recommended for support or guide for glass, copper, brass and aluminum pipe.
Approvals: Complies with Federal Specification A-A-1192A (Type 24) *WW-H-171-E (Type 24)* and MSS-SP-69 (Type 24).
Ordering: Specify pipe size x rod size (e.g., 2 x 3/8), figure number and name. If hex nuts are not required, specify "without hex nuts".

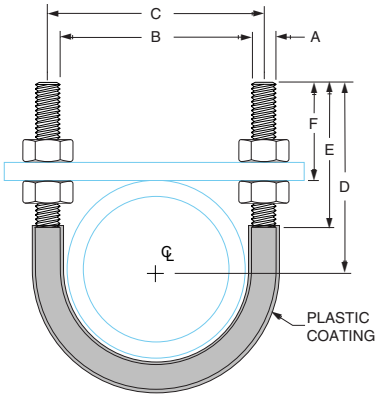


Fig. 137C: Loads (lbs) • Weights (lbs) • Dimensions (in)

Pipe Size	Rod Size A	Max Load	Weight	B	C	D	E	F
1/2	1/4	580	0.11	15/16	1 3/16	2 3/4	2 1/8	2 5/16
3/4			0.12	1 1/8	1 3/8			2 7/32
1			0.12	1 3/8	1 5/8			2 3/32
1 1/4	3/8	1,460	0.28	1 11/16	2 1/16	2 7/8		2 1/32
1 1/2			0.30	2	2 3/8	3	2 1/2	2 1/16
2			0.33	2 7/16	2 13/16	3 1/4		
2 1/2	1/2	2,700	0.73	2 15/16	3 7/16	3 3/4	3	2 5/16
3			0.78	3 9/16	4 1/16	4		2 1/4
3 1/2			0.84	4 1/16	4 9/16	4 1/4		
4			0.90	4 9/16	5 1/16	4 1/2		
5			1.00	5 5/8	6 1/8	5		2 7/32
6	5/8	4,320	2.00	6 3/4	7 3/8	6 1/8	3 3/4	2 13/16
8			2.30	8 3/4	9 3/8	7 1/8		

Fig. 120 — Light Weight U-Bolt

Size Range: 1/2" through 10"
Material: Carbon steel
Finish: Plain or Galvanized
Service: Recommended for support, or guide of relatively light loads. Normally used with two hex nuts.
Maximum Temperature: 650° F.
Ordering: Specify pipe size x rod size, figure number and name. Hex nuts must be ordered separately.

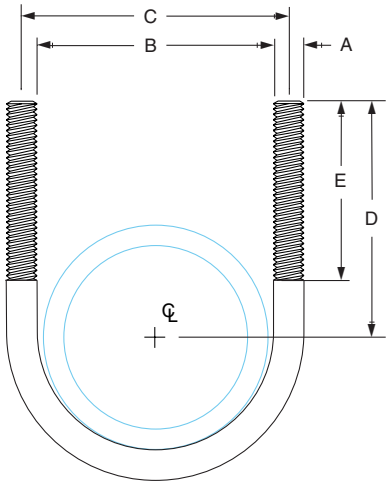


Fig. 120: Loads (lbs) • Weights (lbs) • Dimensions (in)

Pipe Size	Max Load	Weight	Rod Size A	B	C	D	E
1/2	580	0.06	1/4	15/16	1 3/16	1 15/16	1 3/4
3/4		0.07		1 1/8	1 3/8	2 1/16	
1		0.07		1 3/8	1 5/8	2 3/16	
1 1/4		0.08		1 11/16	1 15/16	2 3/8	
1 1/2		0.09		2	2 1/4	2 7/16	
2		0.10		2 7/16	2 11/16	2 11/16	
2 1/2	1,460	0.28	3/8	2 15/16	3 5/16	3 1/16	2
3		0.31		3 9/16	3 15/16	3 3/8	
3 1/2		0.35		4 1/16	4 7/16	3 5/8	
4		0.38		4 9/16	4 15/16	3 7/8	
5		0.45		5 5/8	6	4 9/16	2 1/4
6	2,700	0.95	1/2	6 3/4	7 1/4	5 1/16	
8		1.20		8 3/4	9 1/4	6 1/16	
10	4,320	2.30	5/8	10 7/8	11 1/2	7 1/4	2 1/2

Fig. 262 — Strap Short

Size Range: 1/2" through 4"
Material: Carbon steel
Finish: Plain or Galvanized
Maximum Temperature: 650° F
Approvals: Complies with Federal Specification A-A-1192A (Type 26) *WW-H-171-E (Type 26)* and MSS-SP-69 (Type 26).
Ordering: Specify pipe size, figure number, name and finish.

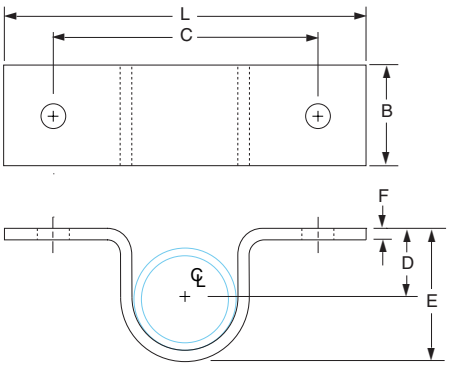


Fig. 262: Loads (lbs) • Weights (lbs) • Dimensions (in)

Pipe Size	Max Load W/ Lag Screws	Max Load W/ Bolts to Steel	Weight	Screw or Bolt Size ■	L	B	C	D	E	F
1/2	300	410	0.20	Two #18 x 2 steel wood screws or two 3/8" bolts to steel	4	1 1/4	2 3/4	1/2	1 1/8	1/8
3/4			0.23		4 3/8		3 1/8	11/16	1 7/16	
1			0.26		4 3/4		3 1/2	11/16	1 5/8	
1 1/4			0.36		5		3 3/4	1 1/16	2 1/8	
1 1/2			0.54		5 3/8		4 1/8	1 3/8	2 1/2	
2			0.60		6 3/8		5 1/8	1 1/4	2 3/4	
2 1/2	450	610	1.40	Two #18 x 3 steel wood screws or two 3/8" bolts to steel	6 13/16	1 1/2	5 9/16	1 3/4	3 5/8	1/4
3			1.60		7 5/16		6 1/16	1 7/8	4	
3 1/2			1.80		7 13/16		6 9/16	2 3/16	4 5/8	
4			1.90		8 3/8		7 1/8	2 3/8	5	

■ Screws or bolts not included

Fig. 126 — One-Hole Clamp

Size Range: 3/8" through 4"
Material: Malleable iron
Finish: Plain or Galvanized
Service: For support of standard conduit, cable and steel pipe on walls or sides of beams. Not recommended for use horizontally on ceilings, bottoms of beams and similar installations since the factor of safety is greatly reduced when so used.
Maximum Temperature: 450° F
Ordering: Specify pipe size, figure number, name and finish. Specify nominal size of conduit or pipe or outside diameter of lead cable with which the clamp is to be used.

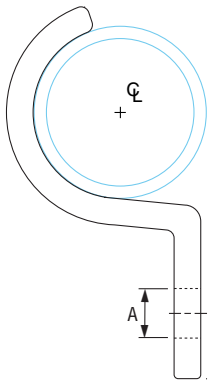


Fig. 126: Weights (lbs) • Dimensions (in)

Pipe Size	Cable Size or Outside Dia. of Conduit ■	Weight	Dia. of Hole - A	Size Screw/Bolt
3/8	0.67	0.03	1/4	No. 10
1/2	0.84	0.03	5/16	1/4
3/4	1.05	0.05		
1	1.31	0.09		
1 1/4	1.66	0.12	3/8	
1 1/2	1.90	0.16	7/16	3/8
2	2.37	0.25		
2 1/2	2.87	0.49	11/16	5/8
3	3.50	0.82		
4	4.50	1.30	3/4	

■ Screws or bolts not included

Fig. 243 Pipe Strap

Size Range: ½" through 6" pipe
Material: Carbon steel
Finish: Plain
Service: Restraint of pipe in specified direction while permitting movement in non-restrained direction.
Maximum Temperature: 650° F
Ordering: Specify Fig. number, name, and pipe size. Larger sizes available upon request.

Fig. 243: Loads (lbs) • Weight (lbs) • Dimensions (in)

Pipe Size	L	T	W	Rated Load P_n	Weight
½	3	¼	2	600	0.71
¾	3½				0.84
1	4				0.98
1¼	4½	⅜	3	1,500	2.64
1½	5				2.94
2	5½				3.39
2½	6	½		2,500	5.20
3	6½		4	2,800	7.93
4	7½				9.63
6	9¾		6	3,000	19.97

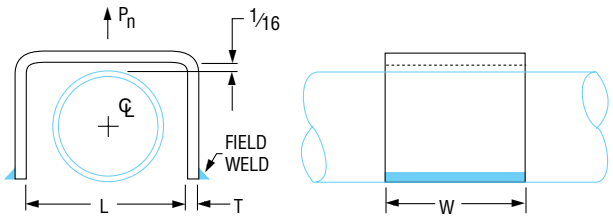


Fig. 244 Pipe Strap

Size Range: ½" through 6" pipe
Material: Carbon steel
Finish: Plain
Service: Restraint of pipe in specified direction while permitting movement in non-restrained direction.
Maximum Temperature: 650° F
Ordering: Specify Fig. number, name, and pipe size. Larger sizes available upon request.

Fig. 244: Loads (lbs) • Weight (lbs) • Dimensions (in)

Pipe Size	Rated Load		L	T	W	Weight
	Ps	Pn				
½	250	1,500	1	¼	2	0.39
¾			1 3/16			0.47
1			1 7/16			0.56
1¼	500	2,000	1¾	⅜	3	1.62
1½			2			1.81
2			2½			2.20
2½	650	2,300	3	½		3.56
3			3 9/16		4	5.74
4			4 9/16			7.16
6	700		6¾		6	15.32

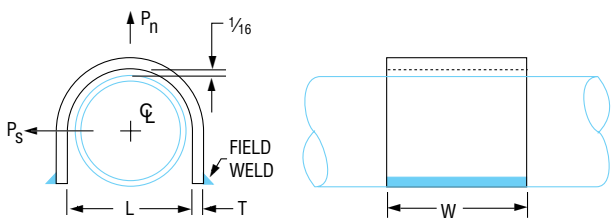


Fig. 62, Type A, B and C — Pipe Stanchion

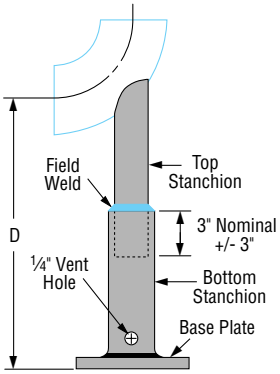


Fig. 62, Type A
(L. R. Elbow) with adjustable base

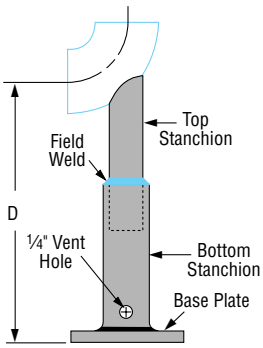


Fig. 62, Type B
(S. R. Elbow) with adjustable base

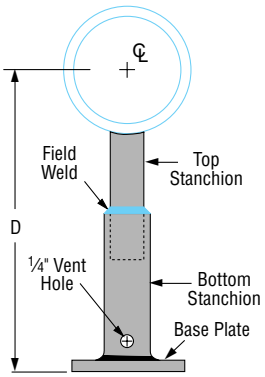


Fig. 62, Type C
(Horizontal Pipe) with adjustable base

Pipe or Elbow Size (in)	Top Stanchion Size (Standard Weight Pipe)			
	1½	2½	4	5
2	•			
2½	•			
3	•	•		
4	•	•		
5	•	•	•	
6		•	•	•
8			•	•
10			•	•
12				•
14				•
16				•
18				•
Weight (Lbs)	12	28	55	75

• Indicates available stanchion size for pipe or elbow size.

Dimensions (in)		
Top Stanchion	Bottom Stanchion	Base Plate
1½	2 Std.	⅜ x 6 x 6
2½	3 Std.	⅜ x 10 x 10
4	5 Sch. 80	⅜ x 10 x 10
5	6 Sch. 80	⅜ x 10 x 10

Fig 62, Stanchion With Adjustable Base

To Order Specify:

Figure Number, Type, Pipe Size, Top Stanchion Size, Material Specification and "D" Dimension.
For base plates that require holes, also specify hole size, and the center line to center line of the holes.

Fig. 63, Type A, B and C — Pipe Stanchion

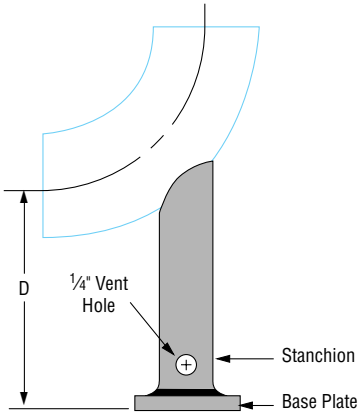


Fig. 63, Type A
(L. R. Elbow)

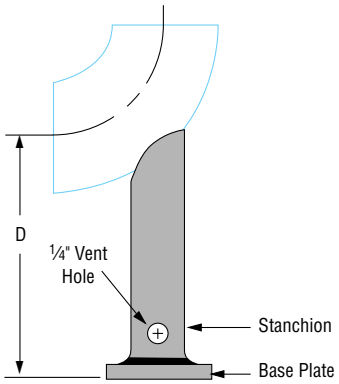


Fig. 63, Type B
(S. R. Elbow)

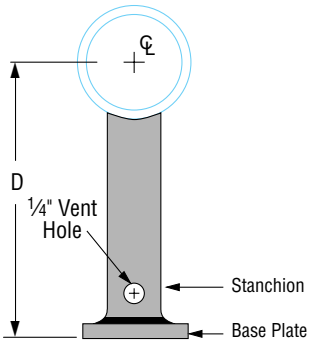


Fig. 63, Type C
(Horizontal Pipe)

Pipe or Elbow Size (in)	Stanchion Size (Standard Weight Pipe)													
	1½	2	2½	3	4	5	6	8	10	12	14	16	20	24
2½	•	•												
3	•	•	•											
4	•	•	•	•										
5	•	•	•	•	•									
6			•	•	•	•								
8				•	•	•	•							
10					•	•	•	•						
12						•	•	•	•					
14						•	•	•	•	•				
16						•	•	•	•	•	•			
18							•	•	•	•	•	•		
20								•	•	•	•	•		
22								•	•	•	•	•	•	
24								•	•	•	•	•	•	
26										•	•	•	•	
28										•	•	•	•	•
30										•	•	•	•	•
32										•	•	•	•	•
34										•	•	•	•	•
36										•	•	•	•	•
42											•	•	•	•
42											•	•	•	•
Weight (Lbs)	9.5	11.6	16.4	23.7	31.8	47.0	59.0	100.0	164.0	201.0	230.0	282.0	374.0	515.0

• Indicates available stanchion size for pipe or elbow size.

Dimensions (in)	
Stanchion Size	**Base Plate**
1½	⅜ x 6 x 6
2	
2½	⅜ x 8 x 8
3	
4	
5	⅜ x 10 x 10
6	
8	⅜ x 14 x 14
10	½ x 18 x 18
12	
14	½ x 20 x 20
16	½ x 22 x 22
20	½ x 24 x 24
24	½ x 30 x 30

To Order Specify:

Figure Number, Type, Pipe Size, Top Stanchion Size, Material Specification and "D" Dimension.
For base plates that require holes, also specify hole size, and the center line to center line of the holes.

Fig 63, Stanchion

Fig. 192 Adjustable Pipe Saddle Support

Size Range: 2" through 12"
Material: Carbon steel
Finish: Plain or Galvanized
Service: Stanchion type support for **stationary** pipe where vertical adjustment is required.
Approvals: Complies with Federal Specification A-A-1192A (Type 38) and MSS-SP-69 (Type 38).
Ordering: Specify pipe size to be supported, figure number, name and finish.

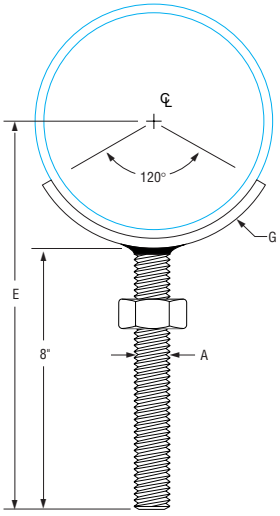


Fig. 192: Weights (lbs) • Dimensions (in)

Pipe Size	Rod Size A	E	G	Weight
2	5/8	9 7/16	1/4 x 1	1.0
2 1/2		9 11/16		1.4
3		10		1.6
3 1/2		10 1/4		2.6
4	7/8	10 1/2	1/4 x 1 1/4	3.0
5		11		3.2
6	1	11 11/16	3/8 x 1 1/2	4.9
8		12 11/16		6.2
10	1 1/4	13 7/8	1/2 x 2	10.5
12		14 7/8		11.8

Fig. 191 Adjustable Pipe Stanchion Saddle With U-Bolt

Size Range: 2" through 12"
Material: Carbon steel
Finish: Plain or Galvanized
Service: Stanchion type support where vertical adjustment is required, plus the additional stability provided by U-bolt attachment to **stationary** pipe.
Approvals: Complies with Federal Specification A-A-1192A (Type 37) and MSS-SP-69 (Type 37).
Ordering: Specify pipe size, figure number, name and finish.

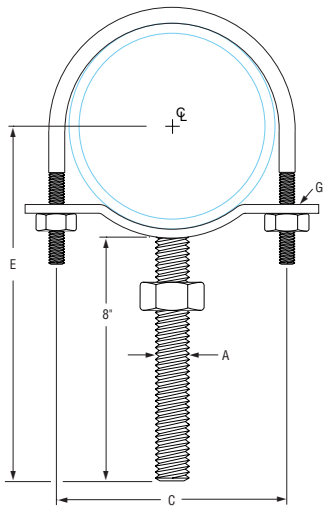


Fig. 191: Weights (lbs) • Dimensions (in)

Pipe Size	Rod Size A	C	E	G	Weight
2	5/8	2 11/16	9 7/16	1/4 x 1	1.2
2 1/2		3 5/16	9 11/16		1.4
3		3 15/16	10		1.6
3 1/2		4 7/16	10 1/4		2.6
4	7/8	5 1/4	10 1/2	1/4 x 1 1/4	3.0
5		6 1/8	11		3.2
6	1	7 1/4	11 11/16	3/8 x 1 1/2	4.9
8		9 3/8	12 11/16		6.2
10	1 1/4	11 1/2	13 7/8	1/2 x 2	10.5
12		13 1/2	14 7/8		11.8

Fig. 258 — Pipe Saddle Support

Size Range: 4" through 36"

Material: Cast iron saddle through 12", 14" through 36" carbon steel saddle. 4" through 12" steel saddle available on special request.

Finish: Plain or Galvanized

Service: Stanchion type support for **stationary** pipe.

Approvals: Complies with Federal Specification A-A-1192A (Type 36) *WW-H-171-E (Type 36 & 37)* and MSS-SP-69 (Type 36).

Installation: Slip saddle base into riser pipe.

Ordering: Specify size to be supported, figure number, name, finish and material.

Fig. 258 Cast

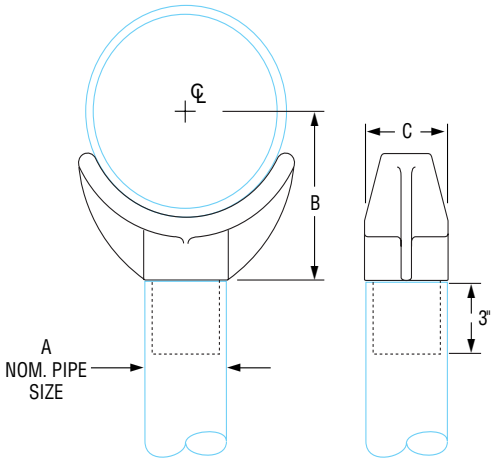


Fig. 258 Fabricated Steel

Fig. 258: Weights (lbs) • Dimensions (in)

Pipe Size	Weight	A	B	Width C	Max Load
4	9.1	3	4 3/16	3 5/8	3,800
5	10.8		4 13/16		
6	11.8		5 7/16		
8	14.3		6 15/16		
10	19.3		8 7/16		
12	23.1		9 15/16		
14	15.0		10 1/2	4	5,300
16	16.0		11 1/2		
18	23.0	4	13 1/2	5	6,700
20	24.0		14 1/2		
22	26.0		15 1/2		7,300
24	30.0		17 1/2		
26	32.0		18 1/2		
30	41.0		20 5/8		
32	42.0		21 5/8		
36	46.0		23 5/8	8 3/4	

* Standard Wall Pipe

The above load ratings are applicable to the saddle only and are not applicable to the stanchion or other means used to support the saddle.

Fig. 264 — Adjustable Pipe Saddle Support

Size Range: 2½" through 36"

Material: Cast iron saddle, locknut nipple and special cast iron reducer, assembled.

Finish: Plain or Galvanized

Service: Stanchion type support where vertical adjustment of **stationary** pipe is required.

Approvals: Complies with Federal Specification A-A-1192A (Type 38) *WW-H-171-E (Type 39)* and MSS-SP-69 (Type 38).

Installation: Adjustment is obtained by turning the locknut nipple. The lower end of the nipple is staked, upsetting the threads to prevent separation of nipple and coupling during adjustment.

Features:

- Vertical adjustment of approximately 4½"
- Saddle supports a broad range of pipe sizes

Ordering: Specify pipe size to be supported, figure number, name and finish.

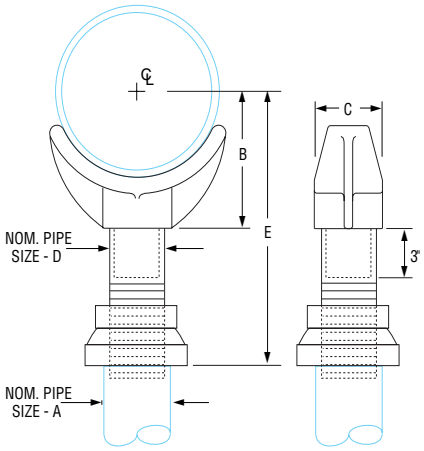


Fig. 264: Loads (lbs) • Weight (lbs) • Dimensions (in)

Pipe Size	Weight		A	B	D	E		Width C	Max Load
	Complete	Saddle Only				Min	Max		
2½	9.0	4.8	2½	3½	1½	8	13	3	1,800
3	9.2	5.0		3¾		8¼	13¼		
3½	9.4	5.2		4		8½	13½		
4	15.0	7.6	3	4¼	2½	9¼	14	3⅝	3,800
5	16.7	8.3		4⅞		10	14¾		
6	17.7	10.3		5½		10½	15¼		
8	20.2	12.8		6⅞		11¾	16½		
10	25.2	17.8		8½		13½	18¼		
12	29.0	21.6		9 15/16		15	19¾		
14	40.2	38.0	4	10 15/16	3	16¼	20¾	4⅝	5,300
16	53.2	42.0		12⅜		17¾	22¼		
18	70.8	51.0	6	13⅞	3½	19½	24		6,700
20	104.8	85.0		15⅜		21	25½	6¾	
22	121.0	98.0		15½	4	21 5/16	25 13/16		7,300
24	137.0	110.0		17 15/16		23¾	28¼		
26	154.0	130.0		18½		24 5/16	28 13/16		
30	170.0	150.0		21 5/16		27	31½		
32	181.0	161.1		22½		28¼	32¾	8¾	
36	249.0	229.0		24½		30¼	34¾		

*The special cast iron reducer may be furnished with a hexed shaped smaller end.

* Standard Wall Pipe

The above load ratings are applicable to the saddle only and are not applicable to the stanchion or other means used to support the saddle.

Fig. 265 Adjustable Pipe Saddle Support

Size Range: 4" through 36"

Material: Cast iron saddle, steel yoke and nuts, steel locknut nipple and special cast iron reducer. (14" through 36" carbon steel saddle with steel yoke. 4" through 12" Steel saddle available upon special request)

Finish: Plain or Galvanized

Service: Stanchion type support where vertical adjustment of **stationary** pipe is required.

Approvals: Complies with Federal Specification A-A-1192A (Type 38) *WW-H-171-E (Type 39)* and MSS-SP-69 (Type 38).

Installation: Adjustment is obtained by turning the locknut nipple. The lower end of the nipple is staked, upsetting the threads to prevent separation of nipple and coupling during adjustment.

Features:

- Vertical adjustment of approximately 4½"
- Saddle supports a broad range of pipe sizes

Ordering: Specify pipe size to be supported, figure number, name and finish.

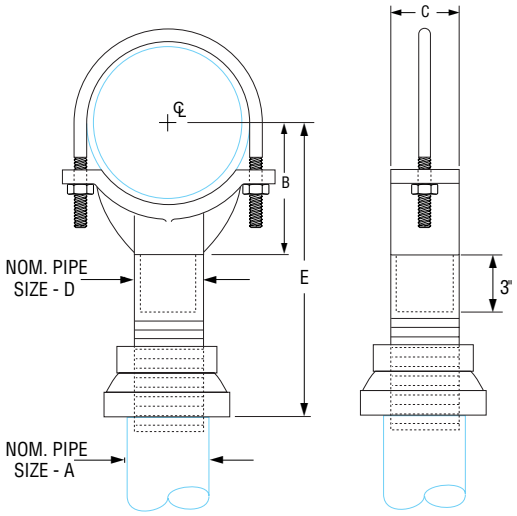


Fig. 265: Loads (lbs) • Weight (lbs) • Dimensions (in)

Pipe Size	Weight		A	B	D	E		Width C	Max Load
	Complete	Saddle Only				Min	Max		
4	22.0	10.8	4	4 3/16	3	9 1/2	14	3 5/8	3,800
5	23.1	12.1		4 13/16		10 1/8	14 5/8		
6	23.9	12.7		5 7/16		10 3/4	15 1/4		
8	32.5	21.3		6 15/16		12 1/4	16 3/4		
10	36.9	25.7		8 7/16		13 3/4	18 1/4		
12	42.4	31.2		9 15/16		14 5/8	19 1/8		
14	39.2	28.0		10 1/2		15 13/16	20 5/16	6	5,300
16	42.2	31.0		11 1/2		16 13/16	21 5/16		
18	60.0	40.0	6	13 1/2	3 1/2	19 1/8	23 5/8		6,700
20	63.0	43.0		14 1/2		20 1/8	24 5/8		
22	66.0	46.0		15 1/2	4	21 5/16	25 13/16		7,300
24	72.0	52.0		17 1/2		23 5/16	27 13/16		
26	75.0	57.0		18 1/2		24 5/16	28 13/16		
30	89.0	69.0		20 5/8		26 7/16	30 15/16		
32	93.0	73.0		21 5/8		27 7/16	31 15/16		
36	101.0	81.0		23 5/8		29 7/16	33 15/16		

*The special cast iron reducer may be furnished with a hexed shaped smaller end.

* Standard Wall Pipe

The above load ratings are applicable to the saddle only and are not applicable to the stanchion or other means used to support the saddle.

Fig. 259 — Pipe Stanchion Saddle

Size Range: 4" through 36" pipe

Material: Cast iron stanchion saddle with steel yoke and nuts. 14" through 36" carbon steel saddle with steel yoke. 4" through 12" steel saddle available on special request.

Finish: Plain or Galvanized

Service: Stanchion type support where vertical adjustment is required, plus the additional stability provided by U-bolt attachment to pipe.

Approvals: Complies with Federal Specification A-A-1192A (Type 37) and MSS-SP-69 (Type 37).

Installation: Same as pipe saddle support Fig. 258, except that yoke is attached to saddle after pipe is in place.

Features: U-bolt yoke provides stability.

Ordering: Specify pipe size to be supported, figure number, name, material and finish.

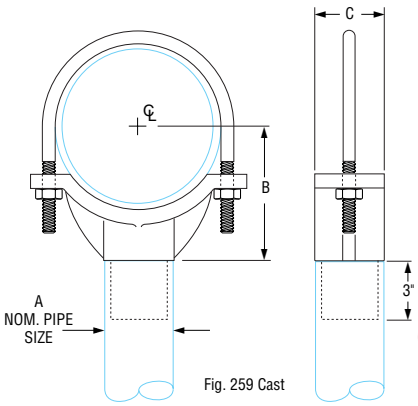


Fig. 259 Cast

Fig. 259
Cast Iron

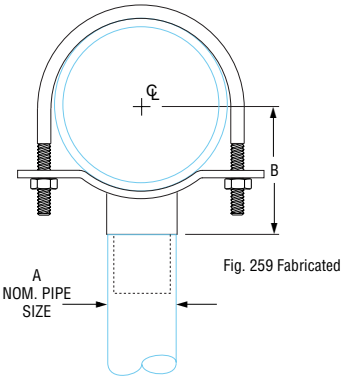


Fig. 259 Fabricated

Fig. 259
Fabricated Steel

Fig. 259: Weights (lbs) • Dimensions (in)

Pipe Size	Weight	A	B	Width C	Max Load
4	10.8	3	4 3/16	3 5/8	3,800
5	12.1		4 13/16		
6	12.7		5 7/16		
8	21.3		6 15/16		
10	25.7		8 7/16		
12	31.2		9 15/16		
14	28.0		10 1/2	6	5,300
16	31.0		11 1/2		
18	40.0	4	13 1/2		6,700
20	43.0		14 1/2		
22	46.0		15 1/2		7,300
24	52.0		17 1/2		
26	55.0		18 1/2		
30	69.0		20 5/8		
32	73.0		21 5/8		
36	81.0		23 5/8		

* Standard Wall Pipe

The above load ratings are applicable to the saddle only and are not applicable to the stanchion or other means used to support the saddle.

Fig. 46 Universal Trapeze Assembly

Material: Carbon steel

Finish: Plain or Galvanized

Service: Trapeze assembly is to be suspended by two rods with Fig. 60 washer plates and is designed for top loading exclusively.

Ordering: Specify size number, figure number, name, finish, C to C dimension and hole size "H". If holes "J" or hole "D" are required, also specify hole size and dimensions "K" and "M" or "B".

Note: Larger C to C dimensions are available upon request.

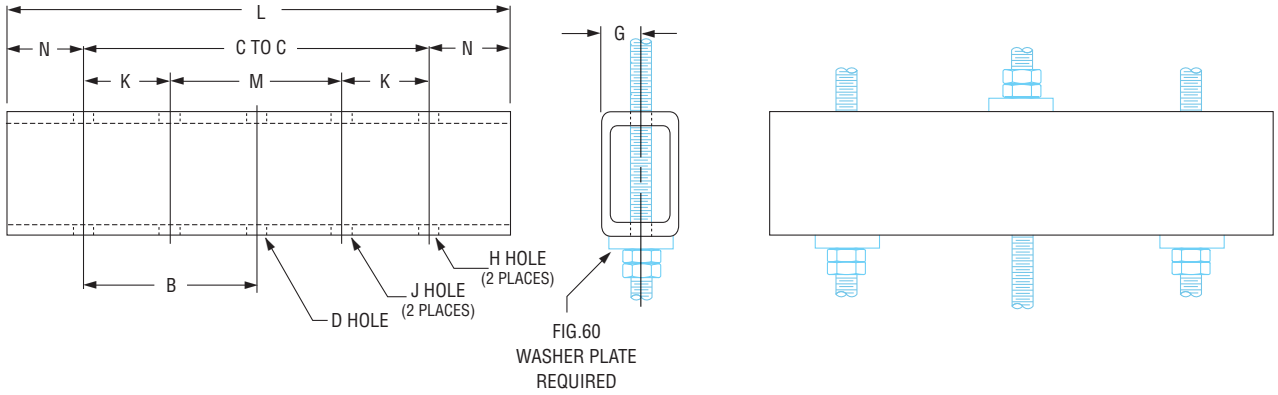


Fig. 46: Weight (lbs) • Dimensions (in)

Size	Size Tubing	Weight	Max Hole Dia. H, J, D	G	N	C to C = Span (in)														
						12	14	16	18	20	22	24	26	28	30	36	42	48	54	60
						L (in)														
1	¼x2x2	5.40	1⅛	1	1½	15	17	19	21	23	25	27	29	31	33	39	–	–	–	–
2	¼x3x2	7.10																		
3	3/16x4x3	8.14	1⅝	1½	2½	–	–	–	23	25	27	29	31	33	35	41	47	53	59	65
4	¼x4x4	12.00	1⅞	2	2⅝	–	–	–	23¼	25¼	27¼	29¼	31¼	33¼	35¼	41¼	47¼	53¼	59¼	65¼
5	¼x6x4	15.42	2⅜		3⅜	–	–	–	–	–	–	30¾	32¾	34¾	36¾	42¾	48¾	54¾	60¾	66¾
6	¼x8x4	18.80	2⅞		4	–	–	–	–	–	–	32	34	36	38	44	50	56	62	68

Fig. 46: Maximum Load (lbs); Based on C to C Dimensions at Max Temperature of 250° F

Size	12	14	16	18	20	22	24	26	28	30	36	42	48	54	60
1	2,600	2,300	1,900	1,700	1,500	1,400	1,300	1,200	1,100	1,000	8,80	–	–	–	–
2	6,700	5,700	5,000	4,500	4,000	3,600	3,300	3,100	2,800	2,700	2,200	–	–	–	–
3	–	–	–	5,800	5,200	4,800	4,400	3,900	3,600	3,500	2,900	2,500	2,200	1,900	1,700
4	–	–	–	10,200	9,100	8,300	7,500	7,000	6,500	6,100	5,100	4,300	3,800	3,300	3,000
5	–	–	–	–	–	–	12,000	11,100	10,300	9,600	8,000	6,800	6,000	5,300	4,800
6	–	–	–	–	–	–	20,000	18,400	17,100	16,000	13,300	11,400	10,000	8,800	8,000

Fig. 45 — Channel Assembly

Material: Carbon steel

Finish: Plain or Galvanized

Ordering: Fig. 45 channel assembly; channel size, rod size, name, finish and C to C. Note: that L = (C to C) + 2M + W

Note: Can also be used with a U-bolt Fig. 137 & Fig. 60 washer plates to secure pipe to the center of channel assembly

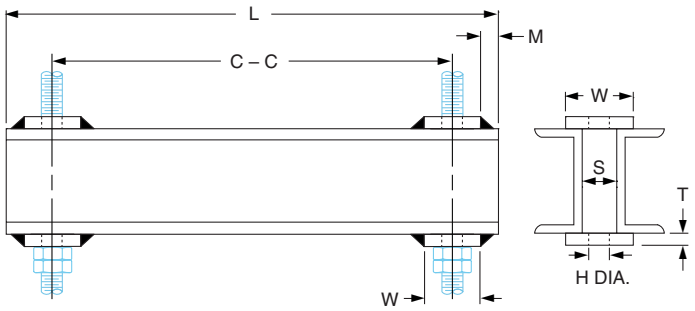


Fig. 45: Dimensions (in)

Rod Dia.	3/8	1/2	5/8	3/4	7/8	1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3	3 1/4	3 1/2
H Hole	1/2	5/8	3/4	7/8	1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3	3 1/4	3 1/2	3 3/4
S	9/16	11/16	13/16	15/16	1 1/16	1 3/8	1 5/8	1 7/8	2 1/4	2 1/2	2 3/4	3	3 1/4	3 1/2	3 3/4	4
W	3	3	3	4	4	4	5	5	5	5	6	6	6	6	6	7
T	1/4	1/4	3/8	3/8	1/2	1/2	1/2	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4
M	3/8	3/8			3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	1/2	1/2	1/2

Size	Wt./Ft. 2C's	Fig. 45: Weights (lbs) • Loads (lbs) • C to C = Span (in)														
		12	14	16	18	20	22	24	26	28	30	36	42	48	54	60
		Maximum Load (lbs); Based on C to C Dimensions at Max Temperature of 250° F														
3	8.2	8,800	7,500	6,600	5,800	5,200	4,800	4,400	3,900	3,600	3,500	2,900	2,500	2,200	1,900	1,700
4	10.8	15,200	13,100	11,400	10,200	9,100	8,300	7,500	7,000	6,500	6,100	5,100	4,300	3,800	3,300	3,000
5	13.4	–	–	–	16,000	14,400	13,100	12,000	11,100	10,300	9,600	8,000	6,800	6,000	5,300	4,800
6	21.0	–	–	–	26,600	24,000	21,800	20,000	18,400	17,100	16,000	13,300	11,400	10,000	8,800	8,000
8	23.0	–	–	–	–	–	–	32,300	29,800	27,700	25,800	21,500	18,500	16,100	14,300	12,900
10	30.6	–	–	–	–	–	–	53,500	49,400	45,800	42,800	35,700	30,600	26,700	23,800	21,400
12	41.4	–	–	–	–	–	–	–	–	–	–	57,000	48,900	42,800	38,000	34,200
15	67.8	–	–	–	–	–	–	–	–	–	–	111,000	95,300	83,400	74,100	66,700

Fig. 50 Equal Leg Angle for Trapeze Assembly

Material: Carbon steel

Finish: Plain or Galvanized

Ordering:

If two holes "H" are required:
Specify Fig. 50 angle
(nominal size, C to C, H, total weight and load)

If two holes "H" and hole "D" are required:
Specify Fig. 50 angle
(nominal size, B, C to C, D, E, H, total weight and load)

If two holes "H" and two holes "J" are required:
Specify Fig. 50 angle
(nominal size, C to C, H, J, K, M, total weight and load)

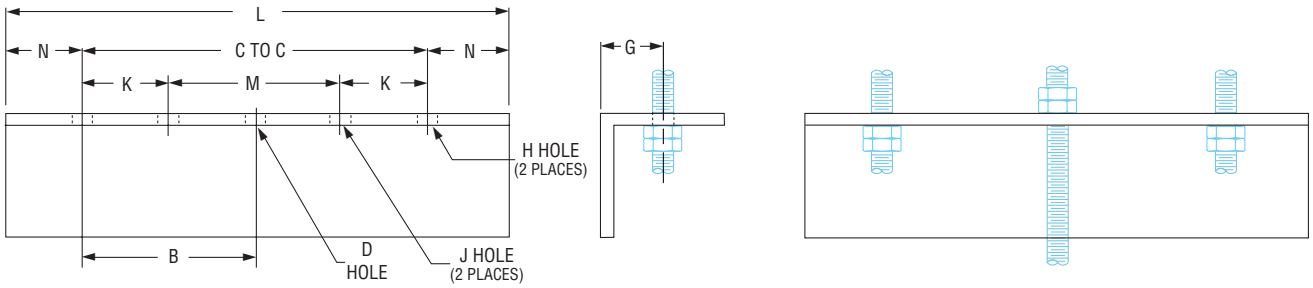


Fig. 50: Load (lbs) • Weight (lbs) • Dimensions (in)

Size	Weight Per/Ft	G	N	Max Rod Size H	C to C = Span in Inches										
					8	10	12	14	16	18	20	22	24	28	30
					Maximum Load; Based on C to C Dimensions at Max Temperature of 250°F										
1½ x ¼	2.34	⅞	1¼	½	780	624	520	446	390	346	312	284	260	223	208
2 x ¼	3.19	1⅛	1½	⅝	1,500	1,200	1,000	856	750	667	600	545	500	428	400
2 x ⅜	4.70			¾	2,100	1,680	1,400	1,200	1,050	933	840	763	700	600	560
2½ x ⅜	5.90	1⅜		1	3,420	2,736	2,280	1,954	1,710	1,520	1,368	1,244	1,140	977	912
3 x ⅜	7.20	1¾	1¾	1¼	4,980	3,984	3,320	2,846	2,490	2,130	1,992	1,810	1,660	1,423	1,328
3 x ½	9.40				6,600	5,280	4,400	3,772	3,300	2,933	2,640	2,400	2,200	1,886	1,760
4 x ½	12.80	2½	2	2	12,000	9,600	8,000	6,858	6,000	5,333	4,800	4,364	4,000	3,429	3,200

Fig. 167 — Insulation Protection Shield

Size Range: ½" through 24" pipe with up to 2" thick insulation

Material: Carbon steel

Finish: Galvanized

Service: Recommended for outside of foam or fiber glass insulation for distribution of loads to preclude crushing of insulation without breaking the vapor barrier.

Approvals: Complies with Federal Specification A-A-1192A (Type 40) *WW-H-171-E (Type 41)* and MSS-SP-69 (Type 40).

How to size: Refer to "shield size selection table" below.

Ordering: Specify size, figure number and name. Data applicable to shields for thicker insulation or larger pipe sizes is available upon request.

Pipe Size	Shield Size Selection for Nominal Pipe Size — Insulation Thickness (in)					Size of Fig. 65 or Fig. 260 Clevis Use With Shield Outside Insulation — Insulation Thickness (in)				
	½	¾	1	1½	2	½	¾	1	1½	2
½	1A	1A	–	–	–	2	2	–	–	–
¾		2A	3A	4A	6A		2½	3	3½	5
1				5A	7A				4	
1¼	2A	3A	4A	6A	7A	2½	3	3½	5	
1½					8A					6
2	3A	4A	5A	7A	8A	3	3½	4		
2½	4A	5A	6A	8A	9A	3½	4	5	6	8
3	5A	6A	7A			4	5			
3½	–	–	8A	9A	10A	–	–	6	8	
4	–	–				–	–			
5	–	–	9B	10B	11B	–	–	8		10
6	–	–	10B	11B	12B	–	–		10	
8	–	–	12B	13C	14C	–	–	10	12	12
10	–	–	14C	15C	16C	–	–	12	14	16
12	–	–	16C	17C	18C	–	–	16	16	18
14	–	–	17C	18C	19C	–	–		18	
16	–	–	19C	20C	21C	–	–	18	20	20
18	–	–	21C	22C	23C	–	–	20	-	-
20	–	–	23C	24C	25C	–	–	-	24	24
24	–	–	26C	27C	28C	–	–	-	-	-

Shield Size Selection for Copper Tubing					
Tube Size	Insulation Thickness (in)				
	½	¾	1	1½	2
⅜	X1A	1A	2A	3A	5A
½, ⅝, ¾				4A	6A
1, 1¼	1A	2A	3A	5A	7A
1½	2A	3A	4A	6A	8A
2	3A	4A	5A	7A	
2½	4A	5A	6A	8A	9A
3	5A	6A	7A		
3½	6A	7A	8A		
4	7A	8A		9A	10A
5	8A		9A	10A	11B
6	9A	9A	10A	11B	12B
8	11B	11B	12B	13C	14C

Note: As actual foam or fiber glass insulation thicknesses vary, verify that the radius of the selected shield is suitable for the required application. Shields are designed for a maximum span of ten feet on four P.S.I. compressive strength insulation. For compressive strengths greater than four P.S.I., spans may be increased proportionately up to maximum allowable for steel pipe. Refer to MSS-SP-69 for specific guidelines on compressive strength and maximum span.

Fig. 167: Weight (lbs) • Dimensions (in)				
Shield Size	Weight	Stock Size	L	Insulation OD
X1A	0.5	18 Ga.	12	1.90
1A	0.7			2.38
2A	0.8			2.88
3A	1.0			3.50
4A	1.1			4.00
5A	1.3			4.50
6A	1.4			5.00
7A	1.6			5.56
8A	1.9	16 Ga.		6.64
9A	2.7			7.64
10A	3.1			8.64
9B	4.0	16 Ga.	18	7.64
10B	4.6			8.64
11B	5.1			9.64
12B	5.6			10.76
13C	10.2	14 Ga.	24	11.76
14C	11.1			12.76
15C	12.3			14.00
16C	12.7			15.00
17C	13.6			16.00
18C	14.5			17.00
19C	21.2	12 Ga.		18.00
20C	22.4			19.00
21C	23.6			20.00
22C	24.8			21.00
23C	25.9			22.00
24C	27.1			23.00
25C	28.3			24.00
26C	31.0			26.00
27C	31.8			27.00
28C	33.0			28.00

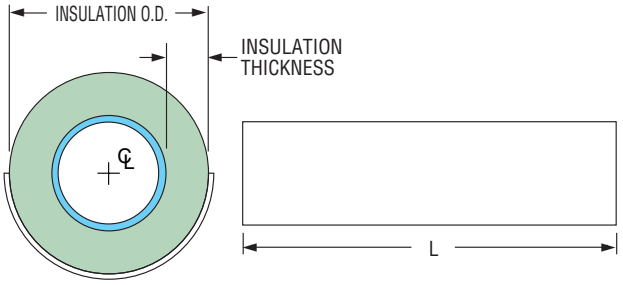


Fig. 168 — Rib-Lok Shield

Size Range: ½" through 8" pipe or copper tube with up to 2" insulation

Material: Carbon steel

Finish: Galvanized

Approvals: Complies with Federal Specification A-A-1192A (Type 40) *WW-H-171-E (Type 41)* and MSS-SP-69 (Type 40).

Service: To be used with Fig. 65 or Fig. 260 clevis. Designed to prevent damage to insulation by hanger. Ribs keep shield centered in hanger.

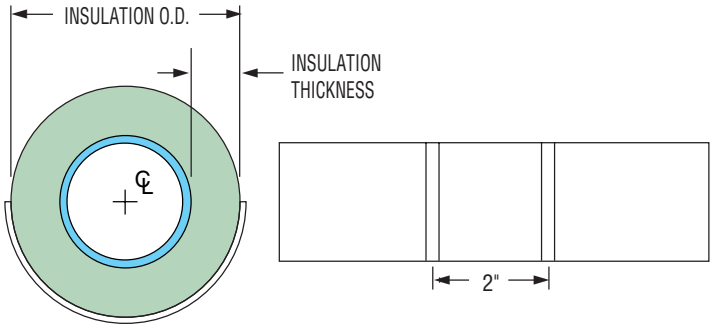
How to size: Refer to shield size selection table below.

Ordering: Specify size, figure number and name.

Note: Data applicable to shields for thicker insulation or larger pipe size is available upon request.

Pipe Size	Shield Size Selection for Nominal Pipe Size					Sizes of Fig. 65 or Fig. 260 Clevis for Use With Shields Outside of Insulation				
	Insulation Thickness (in)					Insulation Thickness (in)				
	½	¾	1	1½	2	½	¾	1	1½	2
½	1	1	–	–	–	2	2	–	–	–
¾			2	4	6		2½	3	3½	5
1		2	3	5	7				4	
1¼	2	3	3	6		2½	3	3½	5	
1½			4							6
2	3	4	5	7	8	3	3½	4		
2½	4	5	6			3½	4	5	6	8
3	5	6	7	8	9	4	5			
3½	–	–	8	9	10	–	–	6	8	
4										
5			9	10	11			8		10
6			10	11	12				10	
8			12	13	14			10	12	12

Fig. 168: Weight (lbs) • Dimensions (in)			
Shield Size	Max O.D. of Insulation	Stock Sizes	Weight
1	2⅜	18 ga.x 8	0.41
2	2⅞		0.50
3	3½		0.61
4	4		0.69
5	4½		0.78
6	5		0.99
7	5⅝		1.09
8	6⅝		1.28
9	7⅝	18 ga.x 12	1.51
10	8⅝		2.24
11	9⅝		2.48
12	10¾		2.76
13	11¾		3.03
14	12¾		3.28



Shield Size Selection for Copper Tubing					
Tube Size	Insulation Thickness (in)				
	½	¾	1	1½	2
⅜	–	1	2	3	5
½, ⅝		1	2	4	6
1	1	2	3	5	7
1¼					
1½	2	3	4	6	
2	3	4	5	7	8
2½	4	5	6		
3	5	6	7	8	9
3½	6	7			
4	7		8	9	10
5	8	8	9	10	11
6	9	9	10	11	12
8	11	11	12	13	14

Fig. 160: 1" **Fig. 161: 1½"** **Fig. 162: 2"** **Pipe Covering Protection Saddle**
Fig. 163: 2½" **Fig. 164: 3"** **Fig. 165: 4"** **For Nominal Thickness of Covering Shown**
Fig. 165A: 4" (Alloy) **Fig. 166A: 5½" (Alloy)**

Size Range: ¾" through 36"

Material:

- Figs. 160, 161, 162, 163, 164, and 165 are curved carbon steel plate.
- Figs. 165A and 166A are alloy steel manufactured from ASTM A-387 Grade 22 Chrome Molybdenum steel plate.
- Figs. 165A and 166A have a welded-in center plate in all sizes.
- All other saddles have a welded-in center plate for pipe sizes 12" and larger.
- All saddles are 12" long with side edges turned up.

Finish: Plain

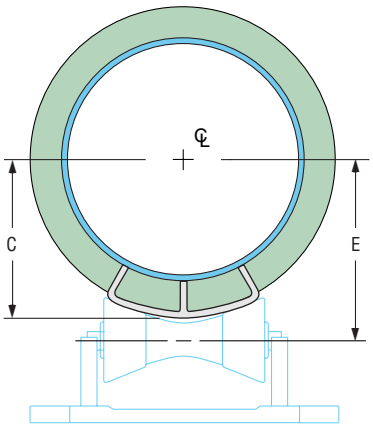
Service: Designed for use on insulated high temperature systems where heat losses are to be kept to a minimum and to protect insulation against damage.

Maximum Temperature: 650° F carbon steel, 950° F alloy steel.

Approvals: Complies with Federal Specification A-A-1192A (Type 39A & 39B) *WW-H-171-E (Type 40A & 40B)* and MSS-SP-69 (Type 39A & 39B).

Features: Permits finished, weather tight covering at all points of pipe support.

Ordering: Specify pipe size, figure number and name. Data for 42" size available on request.



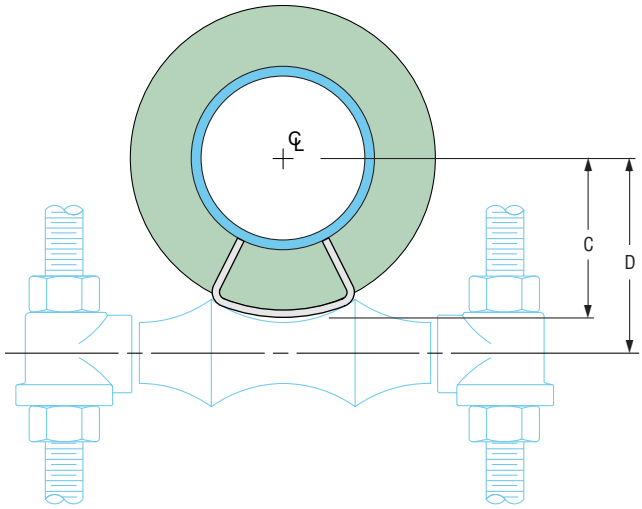


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Fig. 160 to Fig 166A — Pipe Covering Protection Saddle (cont.)

Fig. 160, 161, 162, 163, 164, 165, 165A, 166A: Loads (lbs) • Weight (lbs) • Dimensions (in)

Pipe Size	Fig. No.	Max Load ■	Weight	Size of Pipe Roll			Center Line of Pipe to Outside of Saddle C	Center Line of Pipe to Center Line of Roll		
								D		E
				Figs. 171, 175, 177	Figs. 174,181	Figs. 271, 274, 277		Figs. 171, 175, 177	Figs. 174,181	Figs. 271, 274, 277
3/4	160•	1,200	1.4	2	2 1/2	2-3 1/2	1 5/8	2 1/16	2 1/8	2 1/4
	161•		2.1	3	3 1/2		2 3/16	2 3/4	2 3/4	2 7/8
	162•		2.8	4	5		2 11/16	3 5/16	3 5/16	3 3/8
1	160•	1,200	1.4	2 1/2	3	2-3 1/2	1 13/16	2 5/16	2 1/4	2 7/16
	161•		2.1	3	4		2 5/16	2 7/8	2 7/8	3
	162•		2.8	4	5		2 7/8	3 1/2	3 1/2	3 1/2
1 1/4	160	1,200	1.4	2 1/2	3	2-3 1/2	1 15/16	2 1/2	2 7/16	2 9/16
	161•		2.1	3 1/2	5		2 9/16	3 1/16	3 1/16	3 3/16
	162•		2.8	4			3	3 5/8	3 5/8	3 11/16
	163•		3.6	5	6	4-6	3 3/4	4 3/8	4 3/8	4 3/8
1 1/2	160	1,200	1.5	3	3 1/2	2-3 1/2	2 1/8	2 5/8	2 5/8	2 11/16
	161•		2.1	3 1/2	5		2 5/8	3 1/4	3 1/4	3 5/16
	162•		3.2	5	6	4-6	3 5/16	4	4	3 7/8
	163•		3.6	6	8		3 7/8	4 1/2	4 5/8	4 1/2
2	160	1,200	1.7	3 1/2	4	2-3 1/2	2 3/8	3	2 15/16	3 1/16
	161•		2.3	4	5		2 7/8	3 1/2	3 1/2	3 9/16
	162•		3.2	5	6	4-6	3 9/16	4 1/4	4 1/4	4 3/16
	163•		3.6	6	8		4 1/16	4 3/4	4 13/16	4 3/4
	164•		4.5	8			4 9/16	5 3/8	5 3/8	5 1/4
2 1/2	160	1,200	1.7	3 1/2	5	2-3 1/2	2 11/16	3 1/4	3 1/4	3 5/16
	161		2.8	5	6	4-6	3 5/16	4	4	3 15/16
	162		3.2	6	8		3 7/8	4 1/2	4 5/8	4 1/2
	163		4.1	8			4 1/4	5 1/8	5 1/8	5
	164		4.5		10		4 7/8	5 5/8	5 3/4	5 1/2
3	160	1,200	1.9	4	5	2-3 1/2	2 15/16	3 1/2	3 1/2	3 9/16
	161		2.8	5	6	4-6	3 5/8	4 5/16	4 5/16	4 1/4
	162		3.6	6	8		4 1/8	4 13/16	4 13/16	4 11/16
	163		4.1	8			4 11/16	5 7/16	5 7/16	5 5/16
	164		4.9		10	8-10	5 1/16	6	6	6 1/16
3 1/2	160	1,200	2.3	5	6	4-6	3 5/16	4	4	3 15/16
	161		3.2	6	8		3 11/16	4 9/16	4 9/16	4 1/2
	162		3.6	8			4 5/16	5 1/8	5 1/8	5
	163		4.5		10	8-10	4 11/16	5 5/8	5 5/8	5 11/16
	164		4.9	10			5 3/8	6 5/16	6 5/16	6 3/8
4	160	1,200	2.3	5	6	4-6	3 9/16	4 1/4	4 1/4	4 3/16
	161		3.2	6	8		4 1/16	4 7/8	4 7/8	4 3/4
	162		3.6	8			4 9/16	5 3/8	5 3/8	5 1/4
	163		4.5		10	8-10	5	5 15/16	5 15/16	6
	164		4.9	10			5 5/8	6 9/16	6 9/16	6 5/8
	165		6.1		12	12-14	6 1/2	7 5/8	7 5/8	7 9/16
	165A	7,200	11.6							
	166A		15.7	14	16		8 1/8	9 5/8	9 1/2	9 5/16

■ Maximum recommended loads are applicable only when saddle is used on a flat bearing surface and tack welded to pipe. When saddle is used with a pipe roll, the maximum load for the assembly is the smaller of the two loads.
• Saddles may require notching when used with a U-bolt.

Continued on Following Page

Fig. 160 to Fig 166A — Pipe Covering Protection Saddle (cont.)

Fig. 160, 161, 162, 163, 164, 165, 165A, 166A: Loads (lbs) • Weight (lbs) • Dimensions (in)

Pipe Size	Fig. No.	Max Load ■	Weight	Size of Pipe Roll			Center Line of Pipe to Outside of Saddle C	Center Line of Pipe to Center Line of Roll		
								D		E
				Figs. 171, 175, 177	Figs. 174,181	Figs. 271, 274, 277		Figs. 171, 175, 177	Figs. 174,181	Figs. 271, 274, 277
5	160	1,200	2.3	6	8	4-6	4 1/8	4 13/16	4 13/16	4 3/4
	161		3.2	8			4 11/16	5 1/2	5 1/2	5 3/8
	162		3.6		10	8-10	5 3/16	6	6 1/16	6 1/8
	163		4.5	10			5 5/8	6 9/16	6 9/16	6 5/8
	164		4.9		12		6 3/16	7 1/8	7 1/4	7 1/4
	165		6.1	12	14	12-14	7 1/8	8 3/16	8 3/8	8 3/16
	165A	7,200	11.6					8 1/8		
	166A		15.7	16	16		8 11/16	10 1/16	10 1/16	9 7/8
6	160	1,800	3.8	8	8	4-6	4 1/2	5 3/8	5 3/8	5 1/4
	161		4.4		10	8-10	5 1/16	5 7/8	5 11/16	6
	162		5.7	10		8-10	5 1/2	6 7/16	6 7/16	6 1/2
	163		6.5		12		6 3/16	7 1/8	7 3/16	7 1/4
	164		7.7	12			6 9/16	7 5/8	7 5/8	7 5/8
	165		10.2	14	16	12-14	7 9/16	9	9	8 3/4
	165A	7,200	12.9				7 5/8	9 1/8		8 13/16
	166A		16.3	16	18	16-20	9 1/8	10 5/8	10 9/16	10 7/16
8	161	1,800	5.8	10	12	8-10	6	7 1/16	7 1/16	7 1/16
	162		6.3				6 1/2	7 9/16	7 9/16	7 9/16
	163		7.2	12	14		7 1/4	8 5/16	8 1/2	8 5/16
	164		7.7	14	16	12-14	7 11/16	9	9	8 3/4
	165		10.2	16	18	16-20	8 11/16	10 1/8	10 1/8	9 7/8
	165A	7,200	16.9					10 1/16		
	166A		22.6	18	20		10 1/4	11 7/8	11 13/16	11 5/8
10	161	1,800	5.8	12	14	8–10	7 1/4	8 5/16	8 1/2	8 5/16
	162		7.7	14	16	12-14	7 5/8	9 1/16	9	8 13/16
	163		8.2				8 1/8	9 9/16	9 9/16	9 5/16
	164		8.8	16	18	16-20	8 11/16	10 1/8	10 1/16	10
	165		10.8	18	20		9 3/4	11 1/4	11 1/4	11 1/8
	165A	7,200	18.9				9 11/16	11 5/16		
	166A		24.3	20	–	22-24	11 1/8	12 15/16	–	12 1/2
12	161	5,000	7.8	14	16	12-14	8 1/16	9 1/2	9 1/2	9 1/4
	162		9.9	16	18	16-20	8 5/8	10 3/16	10 1/16	10
	163		10.5				9 1/8	10 11/16	10 9/16	10 1/2
	164		11.4	18	20		9 5/8	11 1/8	11 1/8	11
	165		14.0	20	–		10 13/16	12 3/8	–	12 3/16
	165A	11,140	28.0		–		11	12 1/2	–	12 3/8
	166A		35.5	24	–	22-24	12 5/16	14 1/4	–	13 11/16
14	161	5,000	7.8	16	18	12-14	8 3/4	10 3/16	10 1/8	10 1/16
	162		9.9			16-20	9 5/16	10 7/8	10 13/16	10 11/16
	163		10.5	18	20		9 7/8	11 5/16	11 3/8	11 3/16
	164		11.4				10 5/16	11 3/4	11 3/4	11 5/8
	165		14.0	20	–	22-24	11 5/16	12 7/8	–	12 5/8
	165A	11,140	27.6		–		11 9/16	13 1/16	–	12 7/8
	166A		35.5	24	–		12 7/8	14 3/4	–	14 1/4

■ Maximum recommended loads are applicable only when saddle is used on a flat bearing surface and tack welded to pipe.
When saddle is used with a pipe roll, the maximum load for the assembly is the smaller of the two loads.

Continued on Following Page

Fig. 160 to Fig 166A — Pipe Covering Protection Saddle (cont.)

Fig. 160, 161, 162, 163, 164, 165, 165A, 166A: Loads (lbs) • Weight (lbs) • Dimensions (in)

Pipe Size	Fig. No.	Max Load ■	Weight	Size of Pipe Roll			Center Line of Pipe to Outside of Saddle C	Center Line of Pipe to Center Line of Roll		
								D		E
				Figs. 171, 175, 177	Figs. 174,181	Figs. 271, 274, 277		Figs. 171, 175, 177	Figs. 174,181	Figs. 271, 274, 277
16	161	5,000	8.4	18	20	16-20	9 13/16	11 1/4	11 1/4	11 1/8
	162		10.4				10 3/16	11 3/16	11 3/4	11 9/16
	163	7,200	11.1	20	–		10 13/16	12 5/16	–	12 3/16
	164		13.3	24	–	22-24	11 1/16	12 7/8	–	12 7/16
	165		15.3		–		12 3/16	14 1/8	–	13 5/8
	165A	11,140	30.1		–		12 7/16	14 5/16	–	13 7/8
	166A		40.0	30	–	26-30	13 13/16	16 5/8	–	15 5/8
18	161	5,000	9.1	20	–	16-20	10 13/16	12 5/16	–	12 3/16
	162	7,200	10.4		–	22-24	11 5/16	12 7/8	–	12 11/16
	163		12.4	24	–		11 5/8	13 9/16	–	13 1/16
	164		13.3		–		12 1/4	14 3/16	–	13 5/8
	165		15.3		–		13 5/16	15 1/4	–	14 3/4
	165A	13,370	40.3		–		13 3/4	15 11/16	–	15 1/8
	166A		52.1	30	–	26-30	14 7/8	17 5/8	–	16 5/8
20	161	7,200	10.4	24	–	22-24	11 5/8	13 9/16	–	13 1/16
	162		11.6		–		12 1/4	14 1/8	–	13 5/8
	163		12.4		–		12 3/4	14 11/16	–	14 3/16
	164		13.4		–		13 5/16	15 1/4	–	14 3/4
	165		22.8	30	–	26-30	14 1/8	17	–	15 7/8
	165A	13,370	44.8		–		14 3/8	17 3/16	–	16 1/8
	166A		52.1		–		16 1/8	18 15/16	–	17 7/8
24	161	7,200	12.3	30	–	26-30	13 1/2	16 5/16	–	15 1/4
	162		13.4		–		14	16 7/8	–	15 3/4
	163		14.3		–		14 5/8	17 1/2	–	16 7/16
	164		20.3		–		15 1/4	18 1/16	–	17
	165		23.1		–		16 7/16	19 1/4	–	18 3/16
	165A	13,370	45.4		–		16 11/16	19 1/2	–	18 7/16
	166A		52.1	–	–		18	–	–	19 3/4
30	161	7,200	13.3	–	–	36-42	16 15/16	–	–	18 7/8
	162		14.0	–	–		17 1/2	–	–	19 3/8
	163		20.0	–	–		18 1/16	–	–	19 15/16
	164		21.4	–	–		18 5/8	–	–	20 1/2
	165		24.0	–	–		19 11/16	–	–	21 1/2
	165A	13,370	47.9	–	–		19 15/16	–	–	21 3/4
	166A		55.6	–	–		21 1/2	–	–	23 3/8
36	161	7,200	18.0	–	–	36-42	20 1/4	–	–	22 1/8
	162		18.9	–	–		20 15/16	–	–	22 5/8
	163		20.2	–	–		21 5/16	–	–	23 3/16
	164		21.6	–	–		21 7/8	–	–	23 11/16
	165		24.1	–	–		22 7/8	–	–	24 11/16
	165A	13,370	48.3	–	–		23 1/8	–	–	25
	166A		55.8	–	–		24 5/8	–	–	26 1/2

■ Maximum recommended loads are applicable only when saddle is used on a flat bearing surface and tack welded to pipe. When saddle is used with a pipe roll, the maximum load for the assembly is the smaller of the two loads.

Fig. 177 — Adjustable Pipe Roll Support

Size Range: 1" through 30"

Material: Cast iron roll and sockets; steel roll rod, continuous thread rods and hex nuts

Finish: Plain

Service: For support of pipe where horizontal movement due to expansion and contraction will occur and where vertical adjustment up to 6" may be necessary.

Maximum Temperature: 450° F at roller.

Approvals: Complies with Federal Specification A-A-1192A (Type 41) *WW-H-171-E (Type 42)* and MSS-SP-69 (Type 41).

Installation: Normally used directly above steel beams, brackets, angles, etc.

How to size:

(1) If roll is to support bare pipe, select the size directly from nominal pipe size (see below).

(2) If used with pipe covering protection saddle, see page PH-108 for size of pipe roll.

(3) If roll is to support covered pipe, the O.D. of the covering should not be greater than the O.D. of the pipe for which the roll was designed.

Ordering: Specify size of roll, figure number and name. Be certain to order oversized rolls when insulation and protection saddles makes this necessary.

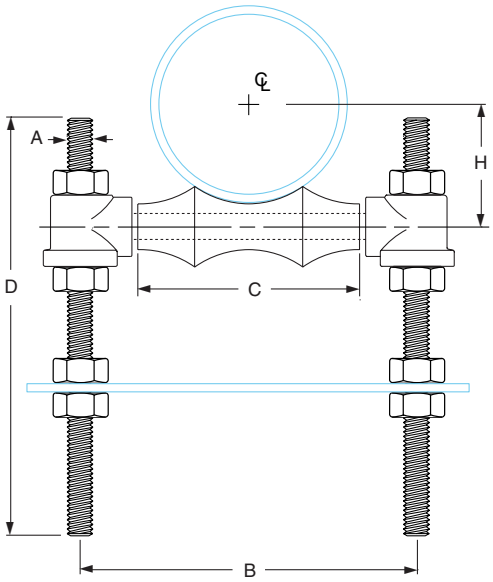


Fig. 177: Weight (lbs) • Dimensions (in)

Pipe Size	Weight	A	B	C	D	H
1	1.1	3/8	3	1 1/2	12	1 1/16
1 1/4	1.2		3 3/8	1 7/8		1 1/4
1 1/2	1.2		3 5/8	2 1/8		1 3/8
2	1.3		4 1/8	2 5/8		1 5/8
2 1/2	2.3	1/2	4 7/8	3 1/8		1 15/16
3	2.4		5 1/2	3 3/4		2 1/4
3 1/2	2.7		6 1/8	4 1/4		2 9/16
4	3.8	5/8	6 3/4	4 3/4		2 13/16
5	4.7		8 1/16	5 13/16		3 7/16
6	7.6	3/4	9 9/16	6 7/8		4
8	11.0		11 15/16	8 7/8		5 1/8
10	13.7	7/8	14 1/16	11		6 3/8
12	19.4		15 13/16	12 1/2		7 7/16
14	31.2	1	17 3/4	14 1/4		8 3/8
16	42.5		19 3/4	16 1/4	18	9 7/16
18	46.6		21 7/8	18 1/4		10 1/2
20	66.2	1 1/4	24 1/4	20 1/4		11 5/8
24	102.5	1 1/2	28 5/8	24 1/4	24	14
30	186.8		35 1/2	30 1/4		17 7/16

Fig. 171: Pipe Roll — Single Pipe Roll

Size Range: 1" through 30"

Material: Cast iron roll and sockets, steel roll rod

Finish: Plain or Galvanized

Service: For suspension of pipe from two rods where longitudinal expansion and contraction may occur.

Approvals: Complies with Federal Specification A-A-1192A (Type 41) *WW-H-171-E (Type 42)* and MSS-SP-69 (Type 41).

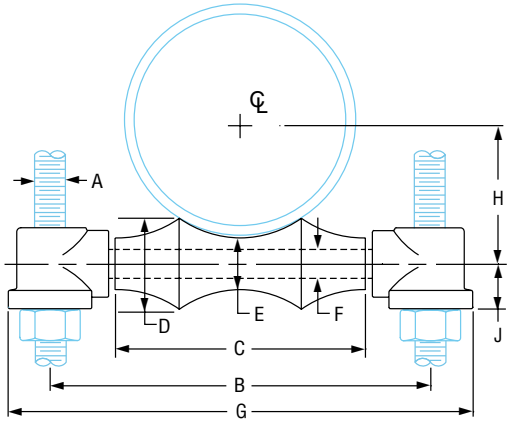
Adjustment: Adjustable socket permits vertical adjustment at the roll.

Maximum Temperature: 450° F at roller

How to size:

(1) If the roll is to support non-insulated pipe, select the size directly from nominal pipe size (column 1) in table below.

(2) If used with pipe covering protection saddle, see page PH-108 for size of pipe roll.



Features:

- Provides for vertical adjustment; nut at bottom of hanger rod fits into the socket preventing loosening or turning due to vibration.
- Pipe roll is designed for two point surface contact with pipe or saddle.

Ordering:

- Specify pipe roll size.
- Order should include figure number, name and finish in all cases. Hanger rods and nuts to be ordered separately.
- Be certain to order oversized rolls when insulation and protection saddles makes this necessary.

Fig. 171: Loads (lbs) • Weight (lbs) • Dimensions (in)

Pipe Size	Max O.D. Covering	Rod Size A	Max Load	Weight	G	B	C	D	E	F	H	J
1	2	3/8	600	0.45	4 1/8	3	1 1/2	1	3/4	3/8	1 1/16	9/16
1 1/4	2 1/2			0.48	4 1/2	3 3/8	1 7/8	1 1/16			1 1/4	
1 1/2	2 3/4			0.51	4 3/4	3 5/8	2 1/8	1 1/8			1 3/8	
2	3 1/4			0.57	5 1/4	4 1/8	2 5/8	1 3/16			1 5/8	
2 1/2	3 3/4	1/2	660	1.00	6 1/4	4 7/8	3 1/8	1 3/8	7/8	1/2	1 15/16	11/16
3	4 1/2		700	1.10	6 7/8	5 1/2	3 3/4	1 7/16			2 1/4	
3 1/2	5		750	1.40	7 1/2	6 1/8	4 1/4	1 5/8	1		2 9/16	3/4
4	5 1/2	5/8		1.70	8 1/4	6 3/4	4 3/4	1 3/4			2 13/16	
5	7			2.60	9 11/16	8 1/16	5 13/16	2	1 1/8	5/8	3 7/16	7/8
6	8 1/4	3/4	1,070	4.50	11 7/16	9 9/16	6 7/8	2 5/16	1 1/4	3/4	4	1
8	10 1/2		1,350	7.20	14 1/16	11 15/16	8 7/8	2 13/16	1 1/2	7/8	5 1/8	1 1/8
10	12 3/4	7/8	1,730	9.50	16 3/16	14 1/16	11	3 3/8	1 3/4		6 3/8	
12	14 3/4		2,400	15.90	17 15/16	15 13/16	12 1/2	3 7/8	2	1	7 7/16	1 1/4
14	16 1/4	1	3,130	24.30	20 1/8	17 3/4	14 1/4	4 5/8	2 1/2	1 1/8	8 3/8	1 3/8
16	18		3,970	31.90	22 1/8	19 3/4	16 1/4	5	2 5/8	1 1/4	9 7/16	1 1/2
18	20 1/4		4,200	35.50	24 1/2	21 7/8	18 1/4	5 7/16	2 3/4		10 1/2	
20	22 1/2	1 1/4	4,550	47.00	27 1/4	24 1/4	20 1/4	6	3		11 5/8	1 5/8
24	26 1/2	1 1/2	6,160	76.30	32 1/8	28 5/8	24 1/4	7 3/16	3 5/8	1 1/2	14	1 3/4
30	32 1/2		7,290	129.90	39	35 1/2	30 1/4	8 15/16	4 1/2	1 3/4	17 7/16	2 7/16

DI/CI Roll Sizing

DI/CI Pipe Size	Fig. 171 Roller Size
3	4
4	5
6	6
8	8
10	10
12	14
14	16
16	18
18	20
20	24
24	30
30	No Recom.

Fig. 178 Spring Cushion Hanger

Material: Spring cushion hanger Fig. 178 consists of a set of two springs and four cast iron retainers only.

Finish: Plain (retainers), Painted (springs)

Service: Generally used with Fig. 171 single pipe roll as shown in above photo. Recommended for installations where formal load and movement calculations are not required, or calculated movement does not exceed ¼"

Maximum Temperature: 450° F at roller

Approvals: Complies with Federal Specification A-A-1192A (Type 49) *WW-H-171-E (Type 50)* and MSS-SP-69 (Type 49).

Ordering: Specify figure number, name and rod size. If used with Fig. 171 single pipe roll, pipe roll must be ordered separately.

The retainers are cased to the dimensions as shown, but center hole can be drilled or reamed larger to satisfy the hanger rod required.

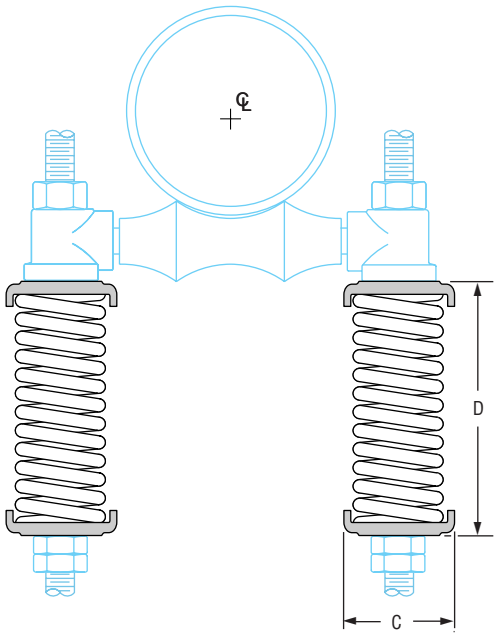


Fig. 178: Loads (lbs) • Weight (lbs) • Dimensions (in)

Spring No.	Max Spring Deflection *	Load at Max Deflection ■	Deflection Rate of Hanger (lbs / inch)	Weight	C	D	Core Hole Dia.	For Rod Size	Max Rod Size ** A
1	1 1/4	535	428	4.5	2 21/32	6 7/16	7/16	3/8	3/4
2		1,500	1,200	14.0	4 1/8	6 1/16	9/16	1/2	
3		3,000	2,400	22.0	4 1/8	9 1/16	15/16	7/8	1 1/2

* At maximum recommended deflection, spring can be compressed an additional ¼" before becoming solid.
■ Maximum capacity of double spring hanger.
** Can be drilled to max. rod size.

Fig. 181 Adjustable Steel Yoke Pipe Roll

Size Range: 2½" through 24"

Material: Cast iron roll; carbon steel yoke, roll rod and hex nuts

Finish: Plain or Galvanized

Service: For suspension of pipe from a single rod where horizontal movement may occur because of expansion or contraction.

Maximum Temperature: 450° F at roller

Approvals: Complies with Federal Specification A-A-1192A (Type 43) *WW-H-171-E (Type 44)* and MSS-SP-69 (Type 43).

How to size: If the roll is to support bare pipe, select the size directly from nominal pipe size (see below). If used with pipe covering protection saddle, see page PH-108 for size of pipe roll to be used.

Ordering: Specify pipe roll size, figure number, name and finish. Be certain to order oversized rolls when insulation and protection saddles are required.

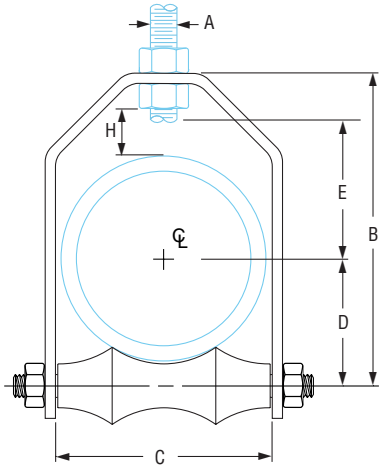


Fig. 181: Loads (lbs) • Weight (lbs) • Dimensions (in)

Pipe Size	Max O.D. of Covering	Max Load	Weight	Rod Size A	B	C	D	Rod Take Out - E	H
2½	3	225	1.7	½	5¾	3¼	1 15/16	2⅞	1 11/16
3	3⅝	310	2.2		6⅜	3⅞	2¼	3⅛	1⅝
3½	4⅛	390	2.5		7	4⅜	2 9/16	3½	1 11/16
4	4 11/16	475	3.2	⅝	7 9/16	4 15/16	2 13/16	3⅝	1⅝
5	5¾	685	6.3		9⅛	6	3 7/16	4½	1 15/16
6	6⅞	780	9.3	¾	10 5/16	7⅛	4	5	1⅞
8	9		14.5		12 11/16	9¼	5⅛	6⅛	2
10	11	965	18.8	⅞	15 1/16	11¼	6⅜	7¼	2 1/16
12	13	1,200	27.7		17 7/16	13¼	7 7/16	8⅜	2¼
14	14¼		39.1	1	18⅞	14½	8⅜	8¾	2
16	16¼		49.1		20 13/16	16½	9⅜	9 11/16	1 15/16
18	18¼	1,400	57.8		23¾	18½	10 7/16	11 7/16	2 13/16
20	20¼	1,600	75.9	1¼	26	20½	11⅝	12¼	2½
24	24¼	1,800	119.3	1½	32 5/16	24⅝	13 15/16	15¾	4⅜

DI/CI Roll Sizing

DI/CI Pipe Size	Fig. 181 Roller Size
3	4
4	5
6	6
8	8
10	10
12	14
14	16
16	18
18	20
20	24

Fig. 175 — Roller Chair

Size Range: 2" through 30" pipe

Material: Cast iron roll, steel chair, roll rod, bolts and hex nuts

Finish: Plain or Galvanized

Maximum Temperature: 450° F at roller

Service: For support of pipe where longitudinal movement due to expansion and contraction may occur, but where no vertical adjustment is required.

Approvals: Complies with Federal Specification A-A-1192A (Type 44) *WW-H-171-E (Type 45)* and MSS-SP-69 (Type 44).

Installation: Two bolts and nuts provide anchorage to floor or top of steel beam or bracket or chair may be welded to supporting steel.

How to size:

(1) If roll is to support bare pipe, select the size directly from nominal pipe size (see below).

(2) If used with pipe covering protection saddle, see page PH-108 for size of pipe roll.

(3) If roll is to support covered pipe, the O.D. of the covering should not be greater than the O.D. of the pipe for which the roll was designed.

Ordering: Specify size of roll, figure number, name and finish. Be certain to order oversized rolls when insulation and protection saddles are required.

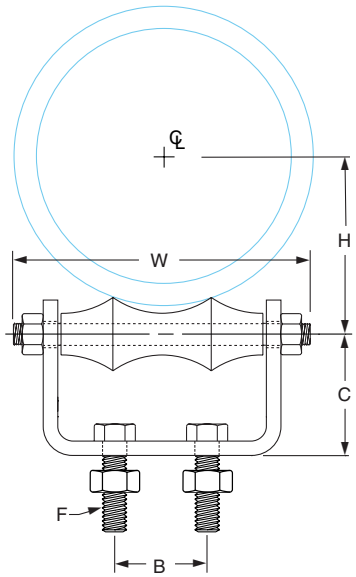


Fig. 175: Loads (lbs) • Weight (lbs) • Dimensions (in)

Pipe Size	Max Load	Weight	W	B	C	F	H
2	600	1.1	4	1 1/4	1 1/2	3/8 x 1 1/2	1 5/8
2 1/2	660	1.4	4 7/8		1 5/8		1 15/16
3	700	1.6	5 3/8	2	1 3/4		2 1/4
3 1/2	750	2.6	6 1/8		2 1/16		2 9/16
4		2.9	6 5/8		2 5/16	1/2 x 1 1/2	2 13/16
5		3.7	7 7/8	3	2 1/2		3 7/16
6	1,070	5.9	9 1/4	3 1/8	2 3/4		4
8	1,350	9.0	11 5/8	3 3/8	3	5/8 x 1 1/2	5 1/8
10	1,730	13.8	14 1/8	5 1/4	3 5/8	5/8 x 2	6 3/8
12	2,400	18.9	16 1/8	5 1/2	4 1/8		7 7/16
14	3,130	28.07	18 3/4	6 1/2	4 11/16	3/4 x 2	8 3/8
16	3,970	34.93	21	8 1/4	5 3/8	3/4 x 2 1/2	9 3/8
18	4,200	44.35	23 1/8	9 1/4	6		10 7/16
20	4,550	56.34	24 5/8	10 1/4	6 1/2		11 5/8
24	6,160	87.52	29 3/8	12 1/4	7 7/8	7/8 x 3 1/2	14
30	7,290	151.25	34 13/16	15 3/8	8 3/4		17 7/16

Fig. 277: With Cast Iron Base Plate
Fig. 277S: With Steel Base Plate

Pipe Roll and Base Plate

Size Range: 2" through 24"

Material: Cast iron roll and plate

Finish: Plain or Galvanized

Service: For support of pipe where small longitudinal movement due to expansion and contraction may occur and where no vertical adjustment is required.

Maximum Temperature: 450° F at roller

Approvals: Complies with Federal Specification A-A-1192A (Type 45) *WW-H-171-E (Type 46)* and MSS-SP-69 (Type 45).

Installation: Consist of sitting the unit in place. Weight of pipe and material hold unit in place.

How to size:

(1) If roll is to support bare pipe, select the size directly from nominal pipe size (see below).

(2) If used with pipe covering protection saddle, see page PH-108 for size of pipe roll.

Features: An economical, practical means of supporting pipe with limited horizontal movement due to expansion and contraction.

Ordering: Specify pipe roll size, figure number, name and finish. Be certain to order oversized rolls when insulation and protection saddles are required

Note: Fabricated carbon steel base plates for extended travel are available upon request.

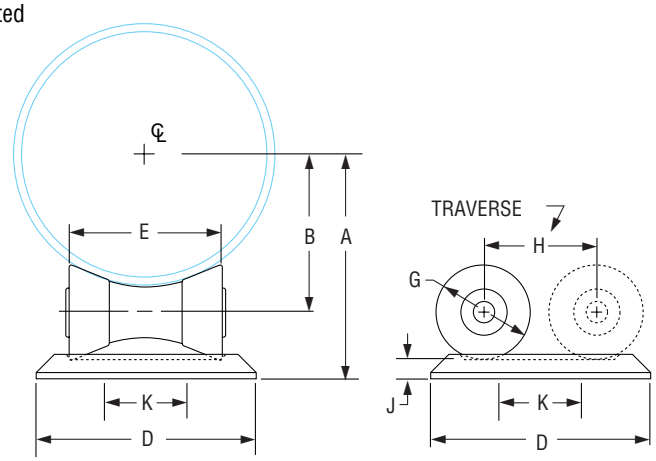


Fig. 277, Fig. 277S: Loads (lbs) • Weight (lbs) • Dimensions (in)

Pipe Size	Max Load	Weight		A	B	D	E	G	H	J	K
		Fig. 277	Fig. 277S								
2	390	4.0	3.3	3 1/4	1 3/4	4 3/4	2 5/8	1 7/8	1 3/4	1/2	
2 1/2				3 1/2	2 1/8						
3				3 13/16	2 3/8						
3 1/2				4 1/16	2 5/8						
4	950	5.6	4.5	4 5/16	2 3/4	5 3/4	3 5/8	2 1/16	2 5/8	1/2	1 1/2
5				4 15/16	3 3/8						
6				5 1/2	4						
8	2,100	15.3	10.9	7 9/16	5 1/4	8 1/4	5 5/8	3 1/4	4	11/16	2 1/2
10				8 11/16	6 3/8						
12	3,075	27.9	19.4	10 1/4	7 1/2	10 3/4	7 5/8	4	5 5/8	3/4	4
14				10 7/8	8 1/8						
16	4,980	43.7	31	12 3/8	9 3/8	12	8 1/2	4 1/2	6 3/8	7/8	5
18				13 1/2	10 3/8						
20				14 1/2	11 3/8						
24	6,100	51.5	37	16 5/8	13 3/8	13 1/4	9 1/2	4 7/16	7 5/8	1	5 3/4

DI/CI Roll Sizing	
DI/CI Pipe Size	Fig. 277 Roller Size
3	4
4	5
6	6
8	8
10	10
12	14
14	16
16	18
18	20
20	24

Fig. 271: Complete — Pipe Roll Stand

Size Range: 2" through 42"

Material: Cast iron roll and stand

Finish: Plain or Galvanized

Service: For support of pipe where longitudinal movement due to expansion and contraction may occur but where no vertical adjustment is required.

Maximum Temperature: 450° F at roller.

Approvals: Complies with Federal Specification A-A-1192A (Type 44) *WW-H-171-E (Type 45)* and MSS-SP-69 (Type 44).

Installation:

(1) Two cored holes for anchorage bolts are provided on all sizes for fastening stands to welded steel brackets, structural supports, piers, floors, etc.

(2) In addition, cored holes "N" at the four corners of the stand are provided for anchorage purposes.

(3) The two cored holes on sizes 2 to 6" are on outside of stand (see dotted lines and dimension J').

(4) On all other sides, the holes are inside of uprights (see dimension J).

How to size:

- If roll is to support bare pipe, select the size directly from nominal pipe size (see below).
- If used with pipe covering protection saddle, see page PH-108 for size of pipe roll.

Ordering: Specify pipe roll size, figure number, name and finish. Be certain to order oversized rolls when insulation and protection saddle are required.

Note: Standard line of carbon steel base plates available.

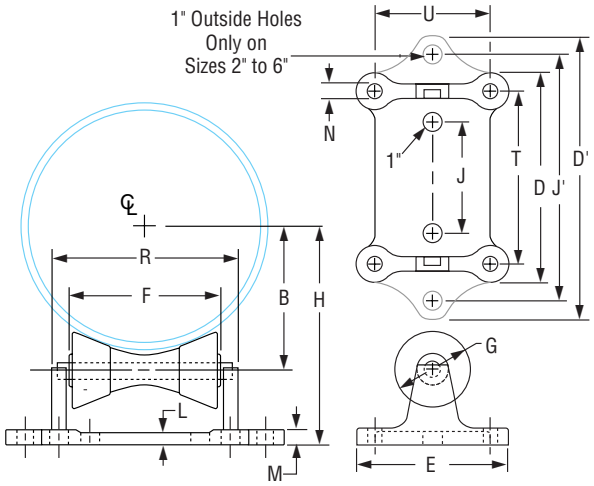


Fig. 271: Weight (lbs) • Loads (lbs) • Dimensions (in)

Pipe Size	Max Load	Weight	H	B	D	D'	E	F	G	J	J'	L	M	N	R	T	U
2	390	6.4	3 1/2	1 3/8	–	8 3/8	5 3/8	2 3/4	1 7/8	–	6 3/8	9/16	11/16	1/2	4	3 7/16	4
2 1/2			3 7/8	2 1/8	–					–							
3			4 1/8	2 3/8	–					–							
3 1/2			4 3/8	2 5/8	–					–							
4	950	8.9	4 13/16	2 3/4	–	9 7/8	5 5/8	3 3/4	2 1/16	–	7 7/8	3/4	7/8		5 3/8	4 11/16	4 1/4
5			5 7/16	3 3/8	–					–							
6			6 1/16	4	–					–							
8	2,100	15.3	8 11/16	5 1/4	8 5/8	–	6 5/8	6	3 1/4	4	–			5/8	7 3/4	7	5
10			9 13/16	6 3/8		–					–						
12	3,075	28.1	11 3/8	7 1/2	10 15/16	–	7 7/8	8	4	5 3/4	–			3/4	9 7/8	9 1/16	6
14			12	8 1/8		–					–						
16	4,980	39.7	13 5/8	9 3/8	12 3/8	–	8 5/8	9	4 1/2	6 3/4	–	7/8	1	13/16	11 1/4	10 1/4	6 1/2
18			14 5/8	10 3/8		–					–						
20			15 5/8	11 3/8		–					–						
24	6,100	49.6	17 3/4	13 3/8	13 1/2	–		10	4 7/16	7 1/2	–	1	1 1/8		12 1/2	11 3/8	
30	7,500	99.3	21 7/8	16 3/4	17	–	10 3/4	12 1/2	5 1/2	10	–	1 1/4	1 1/2	1 1/16	15 3/4	14 1/4	8
36	12,000	152.0	25 3/4	20	20	–	12	15	6 3/8	12	–	1 1/2	1 3/4	1 5/16	18 3/4	17	9
42			28 7/8	20 1/8		–					–						

DI/CI Roll Sizing

DI/CI Pipe Size	Fig. 271 Roller Size
3	4
4	5
6	6
8	8
10	10
12	14
14	16
16	18
18	20
20	24
24	30
30	N/A

Fig. 274: With Base Plate; Fig. 275: W/O Base Plate
Fig. 274P: With Steel Base Plate

Adjustable Pipe Roll Stand

Size Range: 2" through 42"

Material: Cast iron base plate, stand roll; steel adjusting screws

Finish: Plain or Galvanized

Service: For support of pipe lines where longitudinal movement due to expansion and contraction may occur and where vertical and lateral adjustment during installation may be required.

Maximum Temperature: 450° F at roller

Approvals: Complies with Federal Specification A-A-1192A (Type 46) *WW-H-171-E (Type 47)* and MSS-SP-69 (Type 46).

Installation: Base plate is provided with two holes for anchorage to floor, pier, structural support and similar constructions, as well as to welded steel brackets Fig. 195 page PH-66 and Fig. 199, page PH-67. Adjustable pipe roll stand *without base plate*, Fig. 275, can be used for supporting tunnel piping, etc., by resting ends of adjusting screws on structural steel angles, channels, etc.

Adjustment: Vertical adjustment is obtained by use of the four adjusting screws located on corners of stand. Lateral adjustment is secured by stand sliding on each of adjusting screws.

How to size:

(1) If roll is to support bare pipe, select the size directly from nominal pipe size (see below).

(2) If used with pipe covering protection saddle, see page PH-108 for size of pipe roll.

Ordering: Specify pipe roll size, figure number, name and finish. For further dimensions of stand, see Fig. 271, page PH-118. Be certain to order oversized rolls when insulation and protection saddles are required.

Note: Standard line of carbon steel base plates available.

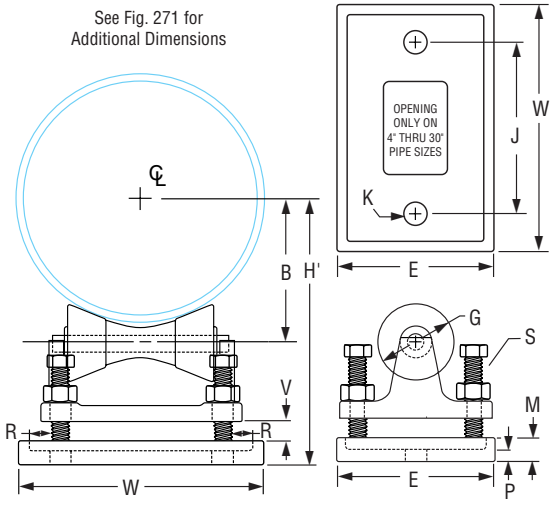


Fig. 274, 275, 274P: Dimensions (in)

Pipe Size	Max Load	Weight Fig. 274	Weight Fig. 275	Weight Fig. 274P	H' Min	H' Max	E	W	K	V Max	M	P	R	S
2	390	15.2	7.8	15.3	5 1/8	5 3/8	5 1/2	6 7/8	1	7/8	1	3/4	1	5/8
2 1/2					5 3/8	5 5/8								
3					5 3/4	6								
3 1/2					6	6 1/4								
4	950	19.3	10.3	19.3	6 1/2	7	5 3/4	8 1/8		1 1/8				
5					7	7 1/2								
6					7 5/8	8 1/8								
8	2,100	32.1	18.1	32.1	10 3/8	11 5/8	6 3/4	10 5/8		1 3/4	1 1/8	13/16		3/4
10					11 1/2	12 3/4								
12	3,075	51.2	32.1	51.2	13	14 1/4	8	13				3/4		7/8
14					13 5/8	14 7/8								
16	4,980	71.3	45.3	71.3	15 1/4	16 5/8	8 5/8	14 5/8		1 7/8	1 1/4	7/8	1 3/16	1
18					16 3/8	17 3/4								
20					17 3/8	18 3/4								
24	6,100	87.0	55.0	87.0	19 5/8	21		15 3/4			1 3/8	1		
30	7,500	166.2	109.2	166.2	24	26 3/4	10 1/2	19 1/4		3 1/4	1 5/8	1 1/4	1 3/8	1 1/4
36	12,000	304.0	176.0	304.0	28 3/8	31 3/4	11	23	1 1/8	4 1/2	2	1 1/2	2 1/4	1 1/2
42					31 1/2	34 7/8								

DI/CI Roll Sizing

DI/CI Pipe Size	Fig. 274 Roller Size
3	4
4	5
6	6
8	8
10	10
12	14
14	16
16	18
18	20
20	24
24	30
30	N/A

Fig. 255 Pipe Alignment Guide

Size Range: 1" through 24" pipe and insulation thickness of 1" through 4"
(Also available in copper tube sizes, see page PH-20)

Material: Carbon steel

Finish: Plain or Galvanized

Service: For maintaining alignment of piping through its axial expansion and contraction cycles. Normally, two or more pipe alignment guides are used on a single piping run to avoid a pivoting effect within the piping system. It is recommended that the first guide be located a maximum of four pipe diameters from an expansion joint. The second guide should be placed a maximum of 18 pipe diameters from an expansion joint. Additional guides should be employed in accordance with the guide spacing data shown on next page. Supports are usually required between the intermediate guides to comply with standard support practice.

Maximum Temperature: 650° F

Installation:

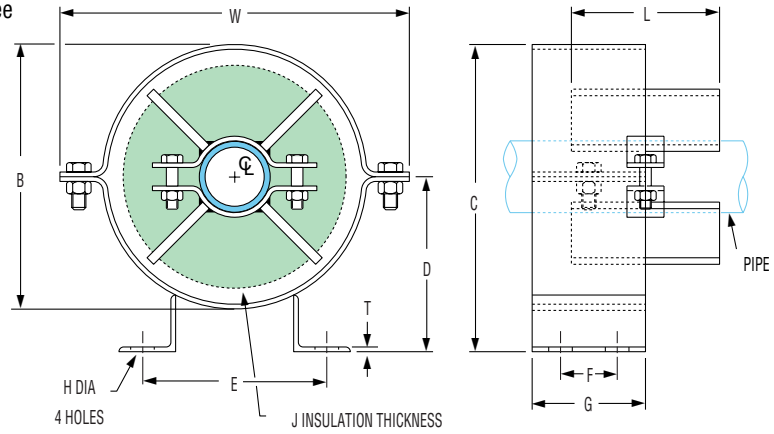
(1) Attach outer housing to structure by bolting or welding.
(2) Remove upper section of housing to open position.
(3) Attach spider clamp to pipe and completely insulate.
(4) Set pipe and spider clamp into outer housing.
(5) Replace upper section of housing to closed position and secure.

Note: Spider attachments to pipe must be properly located during installation to insure that a minimum of one-half the spider width remains within the length of the outer housing for all conditions of operation. See table on opposite page for maximum recommended travels. If larger travels are required, special guides can be furnished to special order.

How to size: Size by nominal pipe size and insulation thickness in accordance with the selection table on the opposite page.

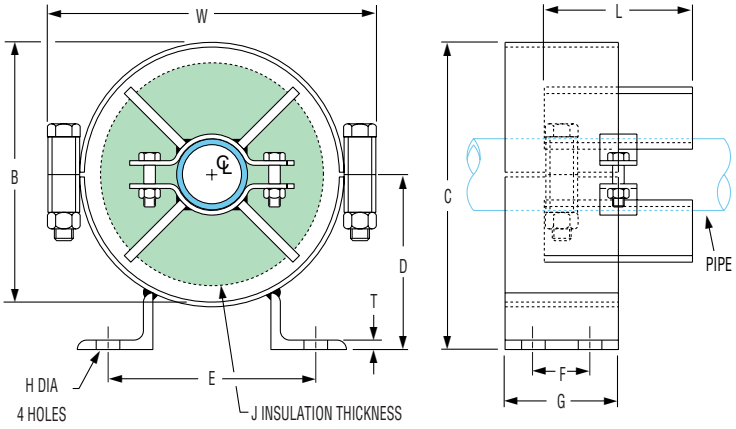
Ordering: Specify size number, pipe size, insulation, thickness, figure number, name and finish.

Caution: Guides are designed to carry 20% of the dead weight load. Dead weight load is defined as maximum span of water filled pipe.



Pipe Alignment Guide
Figure 255, Size A&B

Pipe Size (in)	L (in)	Maximum Movement
1" to 6"	4	4
8" to 16"	6	6
18" to 24"	8	8



Pipe Alignment Guide
Figure 255, Size C Thru J

Dimensional Data on Following Page

Fig. 255 Pipe Alignment Guide (cont.)

Pipe Size	Guide Size Number — Insulation Thickness (in)					
	1	1½	2	2½	3	4
1	A	A	A	B	B	C
1¼						
1½						
2	B	B	B		C	
2½						D
3				C		
3½						
4	C	C	C			
5				D	D	E
6	D	D	D		E	
8	–	E	E	E		F
10	–	F	F	F	F	
12	–					G
14	–	–	G	G	G	
16	–	–				
18	–	–	–	–	H	H
20	–	–	–	–		
24	–	–	–	–	J	J

Guide Size Selection Table

Locate bare nominal pipe size in appropriate insulation thickness column and read guide size from "Guide Size No." column to the left.

Guide Size No.	Dimensions (in)								
	W	B	C	D	E	F	G	H	T
A	8 13/16	6 3/4	8 7/8	4 5/16	6 3/4	2½	4	5/8	1/4
B	10 13/16	8 3/4	9 7/8	5 5/16	7 3/8				
C	13 5/16	11 1/4	12 7/16	6 5/8	7 7/8				
D	15 7/8	13 3/8	14 13/16	7 15/16	9 3/4			3/4	5/16
E	18	15 1/2	17 1/16	9 1/8					
F	22 1/4	19 3/4	21 1/16	11	14 1/8	4	6	1	3/8
G	28	25	26 1/4	13 9/16	15 7/8				
H	32 3/8	29 1/4	30 3/4	15 7/8	16 3/8	5½	8		
J	37 5/8	34 1/2	36 1/8	18 5/8	17 1/8				

Pipe Size* (in)	Maximum Distance (feet) Between Intermediate Guides for Pressure (psig)									
	50	100	150	200	250	300	350	400	500	600
3	38	27	22	20	18	17	15	14	13	12
4	52	37	32	27	25	23	22	19	17	16
6	66	47	40	35	31	28	27	25	23	20
8	85	62	51	45	40	36	35	32	29	27
10	103	75	62	54	50	45	42	40	35	32
12	118	85	70	60	55	50	46	43	40	35
14	120	87	72	62	57	52	48	45	41	37
16	130	95	78	68	61	57	52	49	45	41
18	145	105	87	75	68	62	58	55	50	45
20	155	110	92	90	73	68	62	58	53	49
24	180	128	105	90	83	75	70	65	60	54

* For pipe sizes not shown refer to the Expansion Joint Manufacturers Association Guidelines

Fig. 256 — Pipe Alignment Guide

Size Range: 1" through 24" pipe and insulation thickness of 1" through 4"

Material: Carbon steel

Finish: Plain or Galvanized

Service: For maintaining alignment of piping through its axial expansion and contraction cycles. Normally, two or more pipe alignment guides are used on a single piping run to avoid a pivoting effect within the piping system. It is recommended that the first guide be located a maximum of four pipe diameters from an expansion joint. The second guide should be placed a maximum of 18 pipe diameters from the expansion joint. Additional guides should be employed in accordance with the guide spacing data on next page. Supports are usually required between the intermediate guides to comply with standard support practice.

Maximum Temperature: 750° F

Installation:

(1) Attach outer housing to structure by bolting or welding.
(2) Swing upper section of housing to open positions.
(3) Attach spider clamp to pipe and completely insulate.
(4) Set pipe and spider clamp into outer housing.
(5) Replace upper section of housing to closed position and secure.

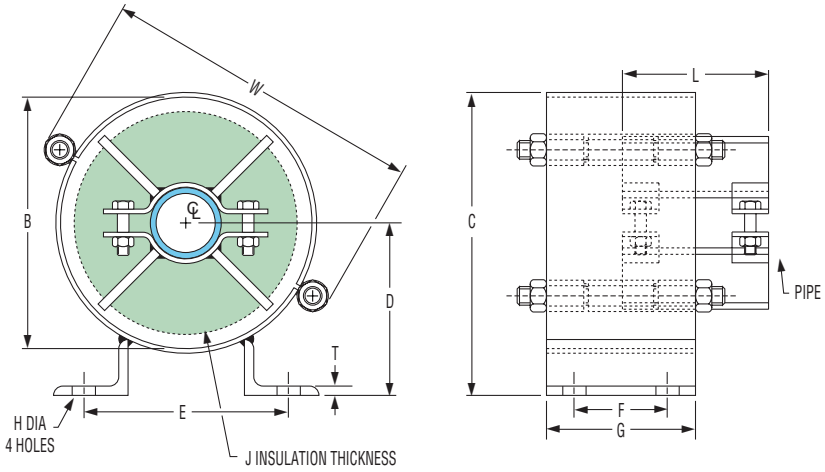
Note: Spider attachments to pipe must be properly located during installation to insure that a minimum of one-half the spider width remains within the length of the outer housing for all conditions of operation. See table on opposite page for maximum recommended travels. If larger travels are required, special guides can be furnished to special order.

How to size: Size by nominal pipe size and insulation thickness in accordance with the selection table on opposite page.

Ordering: Specify size number, pipe size, insulation thickness, figure number, name and finish.

Caution: Guides are designed to carry 20% of the dead weight load.
Dead weight load is defined as maximum span of water filled pipe.

Pipe Size (in)	L (in)	Maximum Movement
1" to 6"	6	6
8" to 16"	8	8
18" to 24"	10	10



Dimensional Data on Following Page

Fig. 256 Pipe Alignment Guide (cont.)

Guide Size Number						
Pipe Size	Insulation Thickness (in)					
	1	1½	2	2½	3	4
1	A	A	A	B	B	C
1¼	A	A	A	B	B	C
1½	A	A	A	B	B	C
2	B	B	B	B	C	C
2½	B	B	B	B	C	D
3	B	B	B	C	C	D
3½	B	B	B	C	C	D
4	C	C	C	C	C	D
5	C	C	C	D	D	E
6	D	D	D	D	E	E
8	–	E	E	E	E	F
10	–	F	F	F	F	F
12	–	F	F	F	F	G
14	–	–	G	G	G	G
16	–	–	G	G	G	G
18	–	–	–	–	H	H
20	–	–	–	–	H	H
24	–	–	–	–	J	J

Guide Size Selection Table

Locate bare nominal pipe size in appropriate insulation thickness column and read guide size from "size no." column to the left.

Guide Size No.	Dimensions (in)								
	W	B	C	D	E	F	G	H	T
A	8 13/16	6 3/4	7 7/8	4 5/16	6 3/4	2½	4	5/8	1/4
B	10 13/16	8 3/4	9 7/8	5 5/16	7 3/8				
C	13 3/4	11 1/4	12 7/16	6 5/8	7 7/8	4	6		
D	15 7/8	13 3/8	14 13/16	7 15/16	9 3/4			3/4	5/16
E	18	15½	17 1/16	9 1/8				1	3/8
F	22 1/4	19 3/4	21 1/16	11	14 1/8	5½	8		
G	28	25	26 1/4	13 9/16	15 7/8				
H	32 3/8	29 1/4	30 3/4	15 7/8	16 3/8				
J	37 5/8	34½	36 1/8	18 5/8	17 1/8				

Recommended Expansion Joint Guide Spacing

Pipe Size* (in)	Maximum Distance (feet) Between Intermediate Guides for Pressure (psig)									
	50	100	150	200	250	300	350	400	500	600
3	38	27	22	20	18	17	15	14	13	12
4	52	37	32	27	25	23	22	19	17	16
6	66	47	40	35	31	28	27	25	23	20
8	85	62	51	45	40	36	35	32	29	27
10	103	75	62	54	50	45	42	40	35	32
12	118	85	70	60	55	50	46	43	40	35
14	120	87	72	62	57	52	48	45	41	37
16	130	95	78	68	61	57	52	49	45	41
18	145	105	87	75	68	62	58	55	50	45
20	155	110	92	90	73	68	62	58	53	49
24	180	128	105	90	83	75	70	65	60	54

* For pipe sizes not shown refer to the Expansion Joint Manufacturers Association Guidelines

PTFE Pipe Slide Assemblies — Overview

Application

Anvil PTFE pipe slide assemblies are designed to support the pipe and provide for lateral and axial movement due to thermal expansion and contraction of the piping system.

Assemblies are fabricated using PTFE slide bearings to provide a low coefficient of friction, minimizing frictional stress on the pipe and support structure.

Features

- Pre-engineered to save calculation and installation time.
- PTFE slide bearing pads are composed of 100% virgin Polytetrafluoroethylene polymer.
- Capable of supporting constant loads up to 2000 PSI at 70° F
- The low 0.2 coefficient of friction for the PTFE slide assemblies permits a smooth, unrestrained movement of the pipe and reduces overturning movements on supporting structures.
- PTFE is chemically inert and resists attack by chemicals, humidity and other elements found in harsh environments provided that the steel supports are suitably protected.
- Self-lubricating, maintenance-free.
- Provides resistance to galvanic corrosion between pipe and support structure.
- Maximum temperature: 400° F at PTFE
- Allows for up to 4" insulation thickness as standard. Greater than 4" insulation available on special request.
  Special designed slides and tees available on request.

Selection

(1) Determine the support location based on allowable span and loading conditions.
(2) Calculate the load for each slide assembly location.
(3) Determine the lateral and axial movement of the pipe and the direction of movement, cold to hot.
(4) Select pipe slide or tee figure number and attachment configuration, welded or bolted.
(5) Select the method of slide plate attachment to support structure, welded or bolted.
(6) Designate whether guided or non-guided slide plate is required.
(7) Maximum recommended loads shown for pipe slides and structural tees are for vertical loading. Transitional loads for pipe structural tees are to be determined by customer.

The maximum load on the pipe slides is based on using a PTFE width of 2" for the slide plate and a 70° F temperature. For a different temperature at the bearing surfaces, multiply the maximum load rating by the following factor

Temperature °F	Factor
70	1.00
100	0.85
200	0.55
300	0.40
400	0.25

Installation

(1) Determine offset of pipe slide-slide plate interface to allow maximum pipe movement in direction of greatest thermal displacement.
(2) Attach PTFE slide to pipe by welding or clamping with standard Fig. 212 pipe clamp or Fig. 432 special pipe clamp.
(3) Attach slide plates to supporting structure by bolting or welding.
(4) Verify setting to insure full bearing between the PTFE slide and slide base surfaces under all pipe movement conditions.

Fig. 257: Structural Tee Slide Assembly
Fig. 257A: Structural Tee
Fig. 436: Fabricated Tee Slide Assembly
Fig. 436A: Fabricated Tee

Pipe Slides Assembly, Complete

Size Range: All sizes within maximum load rating.

Material: Carbon steel tee, PTFE bonded slide plates and carbon steel base.

Finish: Plain, Painted or Galvanized

Service: For the support of piping where horizontal movement resulting from expansion and contraction takes place and where a low coefficient of friction is desired.

Approvals: Complies with Federal Specification A-A-1192A (Type35) and MSS-SP-69 (Type 35).

Maximum Load: As indicated at 70° F see page PH-124 for rating factor at higher temperatures.

Maximum Temperature: 750° F

Temperature Range at PTFE: -20° F to 400° F

Features:

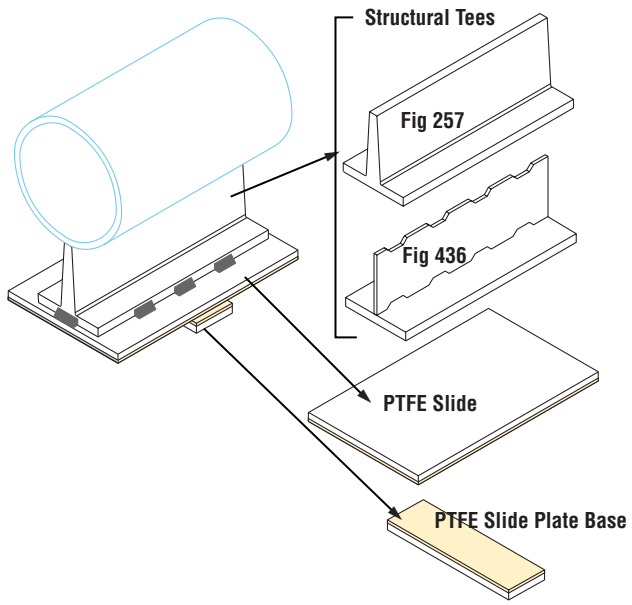
- No lubrication required.
- Designed to minimize heat loss.
- Allows up to 3" of insulation.
- Allows up to 10" travel standard
- Weld in place design.

Available Options:

- Increased travels.
- Increased Tee heights.
- End plates.
- Clamps, Fig. 212 or Fig. 432.
- Base plate with mounting holes

Ordering: Specify figure number, type, name, finish and any other option desired.

PTFE Pipe Slide Assembly – "T" Style (Type 1)



Note: In the PH-92 and PH-92R Catalogs:

The Fig. 257 & 436 (slide "T" section only) formerly referred to as Fig. 280 & 435

The Fig. 257 & 436 (slide base plate) formerly referred to as Fig. 438 (slide base plate)

Fig. 257, 436: Loads (lbs) • Dimensions (in) • Weights (lbs)

Figure Number	Type	Max Load			Welded Slide				Bolted Slide					
		Down	Side *	Up	H**	W	BL	Weight	H**	W	BL	Hole Locations	Bolt Size	Weight
Fig. 257	Tee	8,000	–	–	3 15/16	4	12	7.00	–	–	–	–	½	–
	1				4 3/8	3½	2	11.93	4 3/8	8	4	2½ x 6½		15.25
	2		2,000		5	8	4	16.10	5					16.10
	3			800				16.95						16.95
	4		–	–	4 3/8	5½	2	12.47	4 3/8	11½	5	3 x 9½		18.36
	5		2,000		5	11½	4	18.81	5					19.21
	6			800				19.66						20.06
Fig. 436	Tee	8,000	–	–	4	4	12	7.00	–	–	–	–	½	–
	1				4 11/16		2	15.42	4 11/16	8	4	2½ x 6½		18.74
	2		2,000		4 15/16	8	4	19.59	4 15/16					19.59
	3			800				20.44						20.44
	4		–	–	4 11/16	6	2	15.97	4 11/16	11½	5	3 x 9½		21.85
	5		2,000		4 15/16	11½	4	22.30	4 15/16					22.70
	6			800				23.15						23.55

* Side load is only applicable if appropriate endplates are added to slide or "T" Section
** With the Fig. 432 clamp, add the material thickness. The Tees are now being notched for the material thickness when welding on the Fig. 212 See page PH-129

Fig. 257 and 436 PTFE Pipe Slide Assemblies

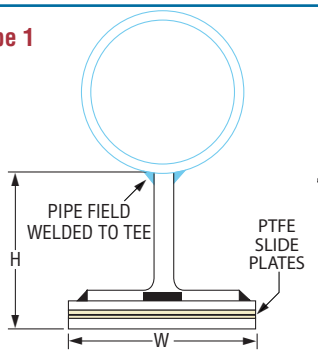
Notes:

- Types 1, 2, and 3 provide for longitudinal movement only.
- Types 4, 5, and 6 provide for both longitudinal and transverse movement of piping.

Structural Tee — Fig 257

Fabricated Tee — Fig 436

Type 1



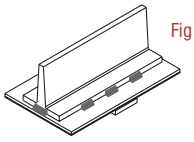


Fig 257, Type 1

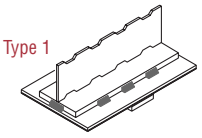
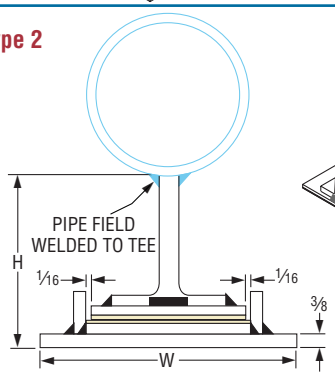


Fig 436, Type 1

Type 2



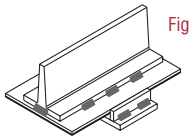


Fig 257, Type 2

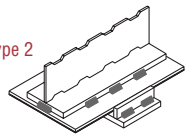
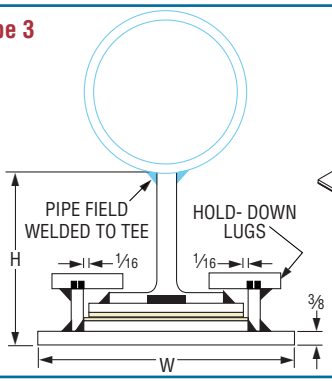


Fig 436, Type 2

Type 3



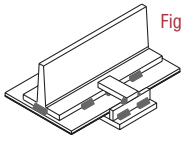


Fig 257, Type 3

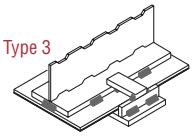
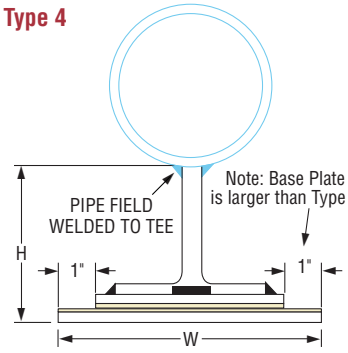


Fig 436, Type 3

Type 4



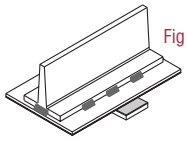


Fig 257, Type 4

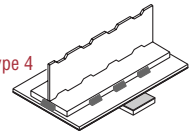
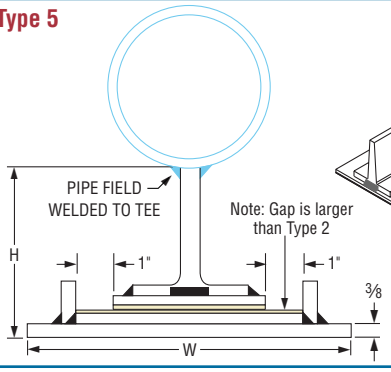


Fig 436, Type 4

Type 5



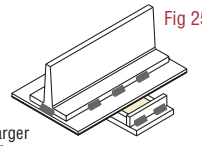


Fig 257, Type 5

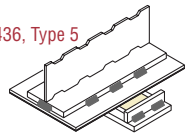
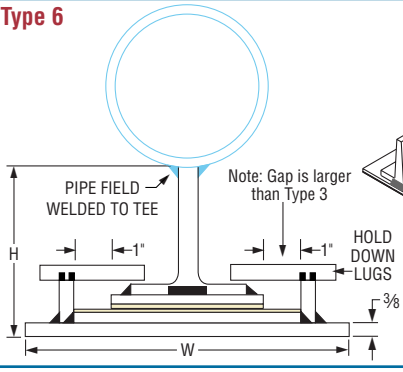


Fig 436, Type 5

Type 6



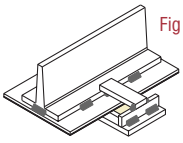


Fig 257, Type 6

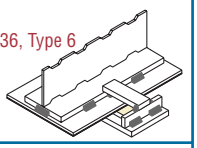
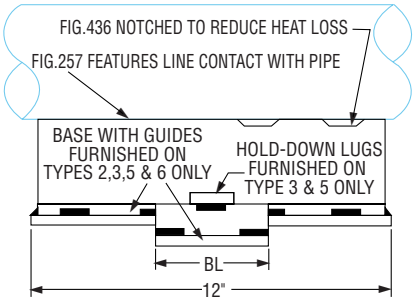


Fig 436, Type 6

Side View, All Types



Options (for all types)

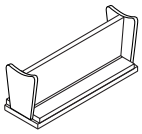


Fig. 257 w/End Plates

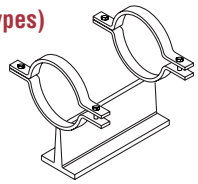


Fig. 257 w/Fig 212 Clamps

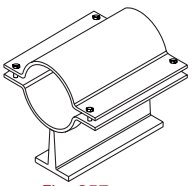


Fig. 257 w/Fig 432 Clamp

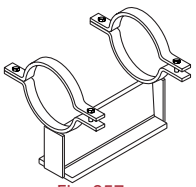


Fig. 257 w/Fig 212 Clamps & End Plates

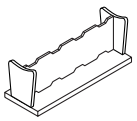


Fig. 436 w/End Plates

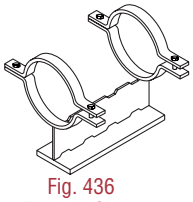


Fig. 436 w/Fig 212 Clamps

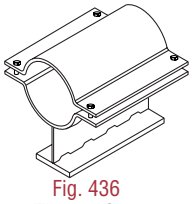


Fig. 436 w/Fig 432 Clamp

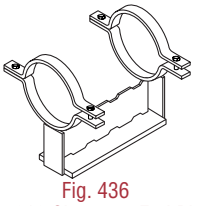


Fig. 436 w/Fig 212 Clamps & End Plates

Fig. 439 — Structural "H" Slide Assembly, Complete

Size Range: 6" through 36"

Material: Carbon steel "H" section, PTFE bonded slide plates and carbon steel base.

Finish: Plain, Painted or Galvanized

Service: A heavy duty slide support where horizontal movement resulting from expansion and contraction takes place and where a low coefficient of friction is desired.

Approvals: Complies with Federal Specification A-A-1192A (Type 35) and MSS-SP-69 (Type 35)

Maximum Load: As indicated at 70° F see page PH-124 for rating factor at higher temperatures.

Maximum Temperature: 750° F

Temperature Range at PTFE: -20° F to 400° F

Features:

- No lubrication required.
- Allows up to 4" of insulation.
- Allows up to 10" travel standard.
- Weld in place design.

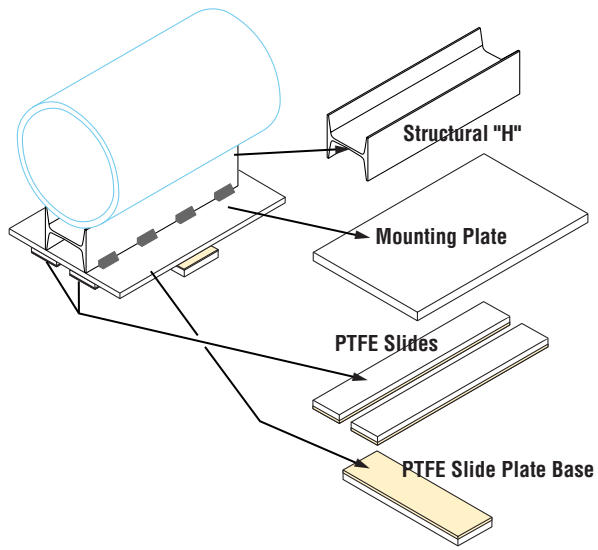
Available Options:

- Increased travels.
- Increased "H" Section heights.
- Clamps, Fig. 212 or Fig. 432.
- Base plate with mounting holes. the bolt spacing for the bolted base plates is equal to the "W" dimention minus 1½" and the "BL" dimention minus 1½"" for all pipe sizes andthe hole diameter is 9/16" for all sizes.

Ordering: Specify figure number, type, name, finish and any other option desired.

Notes: Types 1, 2, and 3 provide for longitudinal movement only. Types 4 and 5 provide for both longitudinal and transverse movement of piping.

PTFE Pipe Slide Assembly – "H" Type



Note: In the PH-92 and PH-92R Catalogs:
The Fig. 439 (slide "H" section only) formerly referred to as Fig. 437.
The Fig. 439 (slide base plate) formerly referred to as Fig. 438 (slide base plate).

Fig. 439: Loads (lbs) • Weight (lbs) • Dimensions (in)

Pipe Size	W Type 1	W Type 2 & 3	W Type 4	W Type 5	B Type 1 & 4	B Type 2 & 5	B Type 3	H* Type 1 & 4	H* Type 2 & 5	H* Type 3	BL Type 1 & 4	BL Type 2, 3, & 5	Max Load Down	Max Load Side Type 2, 3, 5	Max Load Up Type 3	Weight Type 1	Weight Type 2	Weight Type 3	Weight Type 4	Weight Type 5
6	6	10	8	12	5	5 1/4	5 5/16	7 3/4	8	8 1/16	2	6	12,000	3,000	1,200	19.3	27.8	29.8	19.7	29.5
8	8							8 3/4	9	9 1/16										
10	8	12	10	14	5 1/8	5 3/8	5 7/16	9 5/8	9 7/8	9 15/16			16,000	4,000	1,600	24.7	34.5	36.4	25.1	36.1
12								10 3/4	11	11 1/16										
14	10	14	12	16 1/2				10 7/8	11 1/8	11 3/16						28.1	39.1	41.6	28.6	41.0
16								12 1/8	12 3/8	12 7/16										
18	12	16 1/2	14					12 5/8	12 7/8	12 15/16						32.6	45.0	47.5	33.0	46.6
20				18 1/2				13 3/4	14	14 1/16										
24	14	18 1/2	16	21	5 1/4	5 1/2	5 9/16	15 5/8	15 7/8	15 15/16			24,000	6,000	2,400	41.0	54.6	59.2	41.4	68.8
30	16	21	18	23	6 1/4	6 5/8	6 11/16	19 5/8	19 7/8	20 1/16		8				51.4	78.8	84.0	51.8	81.4
36	18	23	20	25	6 7/16	6 13/16	6 3/4	23	23 1/4	23 7/16						55.8	85.4	90.6	56.3	87.7

* With clamps; add material thickness of a Fig. 212.

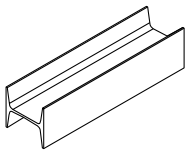
** With the Figure 432 special clamp, add the material thickness of Figure 432. See page PH-129

Fig. 439 PTFE Pipe Slide Assemblies

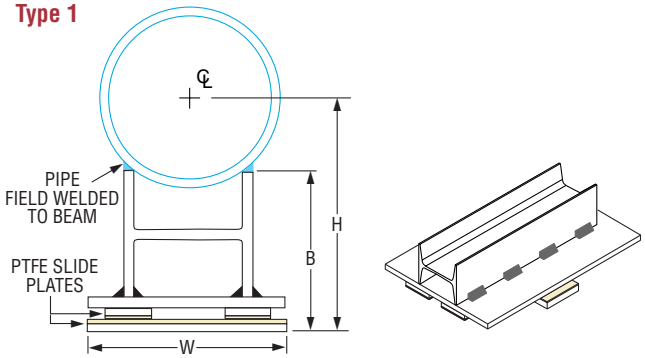
Notes:

- Types 1, 2, and 3 provide for longitudinal movement only.
- Types 4 and 5 provide for both longitudinal and transverse movement of piping.

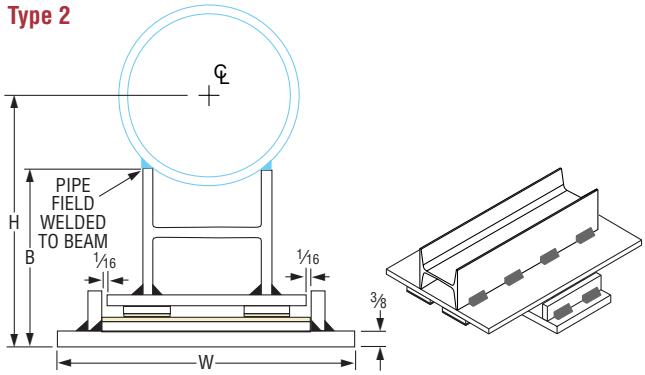
"H" Section Only



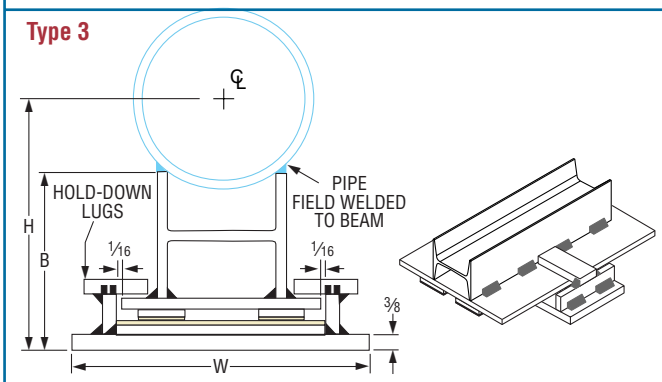
Type 1



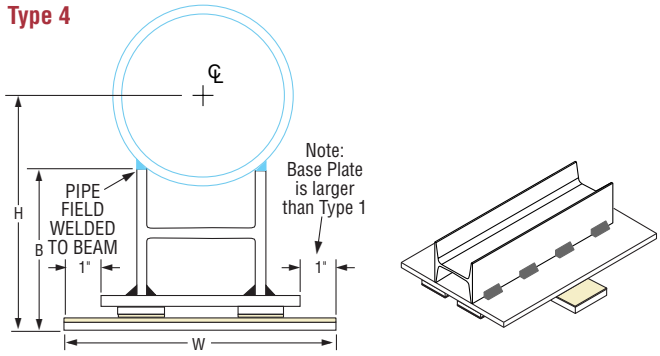
Type 2



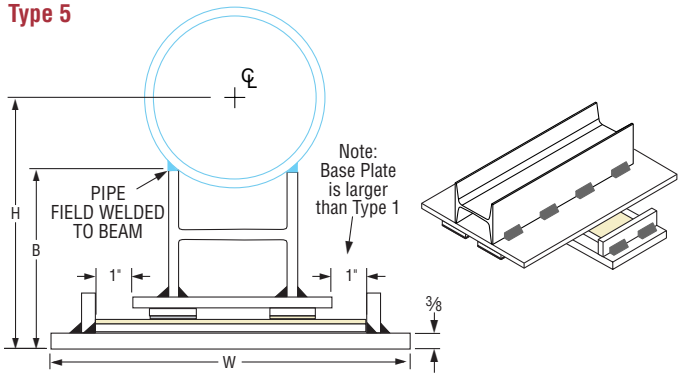
Type 3



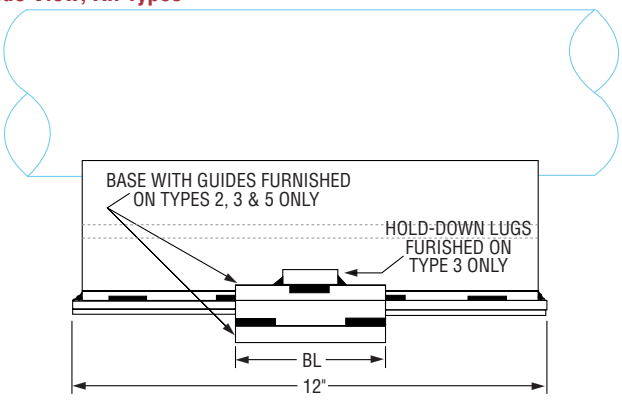
Type 4



Type 5



Side View, All Types



Options (for all types)

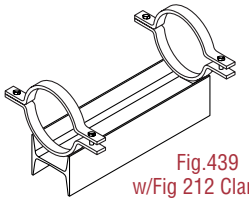


Fig.439
w/Fig 212 Clamps

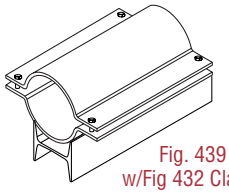


Fig. 439
w/Fig 432 Clamp

Fig. 432 — Special Clamp

Size Range: 2" through 24"

Material: Carbon steel

Finish: Plain or Galvanized

Maximum Temperature: Plain 750° F, Galvanized 450° F for carbon steel pipe only

Service: Used with and where pipe slides cannot be welded directly to pipe or copper tube. When used with fiberglass, plastic, or aluminum pipe, a thin protective liner should be inserted between the pipe and the clamp. Clamp is designed for use with Figure 257 and Figures 436 and 439 slides and tees.

Ordering: Specify figure number, pipe size, name and finish.

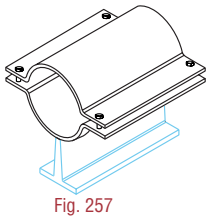


Fig. 257
w/Fig 432 Clamp

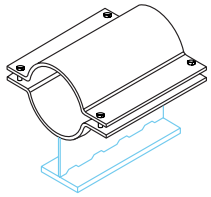


Fig. 436
w/Fig 432 Clamp

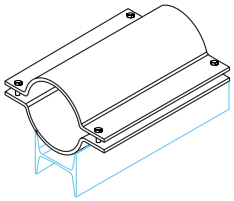


Fig. 439
w/Fig 432 Clamp

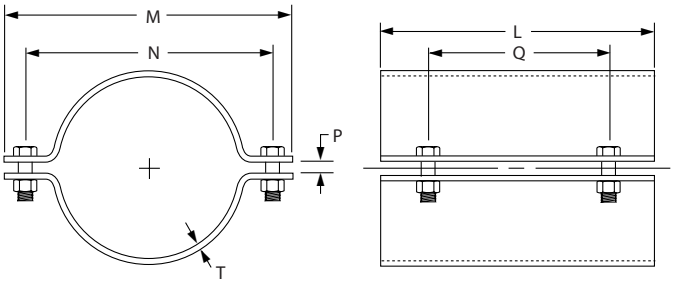
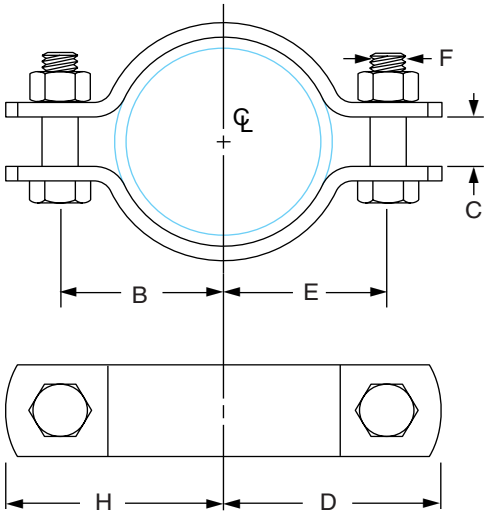


Fig. 432: Weight (lbs) • Dimensions (in)

Pipe Size	L	M	N	P	Q	T	Weight
2	6	5	4	1/4	4 1/2	1/8	2
2 1/2		5 1/2	4 1/2				3
3		6	5				3
3 1/2		6 1/2	5 1/2				4
4		7	6				4
5		8	7				5
6	8	9 5/8	8 1/2	3/8	6	3/16	12
8		11 5/8	10 1/2				15
10		13 3/4	12 5/8	1/2			18
12		15 3/4	14 5/8				21
14	12	17 7/8	16 1/2			1/4	41
16		19 7/8	18 1/2		8		46
18		21 7/8	20 1/2				52
20		23 7/8	22 1/2	5/8			57
24		28 1/8	26 7/8				67

FIG. 212 — Medium Pipe Clamp

Size Range: 2" through 30"
Material: Carbon steel
Finish: Plain or Galvanized
Maximum Temperature: Plain 750° F, Galvanized 450° F
Service: Pipe clamp for figure numbers 257, 436, and 439 slides and tees.
Ordering: Specify pipe size, figure number, name and finish.
Note: Two clamps are required. "T" section 257/436 or "H" section 439 are notched to accommodate clamps and to eliminate the increase in height of the slide assembly.



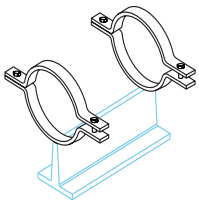


Fig. 257
w/Fig 212 Clamps

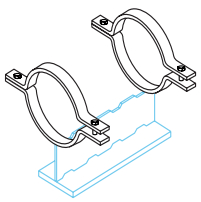


Fig. 436
w/Fig 212 Clamps

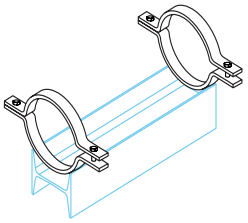


Fig.439
w/Fig 212 Clamps

Fig. 212: Weight (lbs) • Dimensions (in)

Pipe Size	B	C	D	E	H	F	Weight
2	2 1/8	1/2	2 3/4	2 1/8	2 3/4	1/2	2.2
2 1/2	2 5/8	5/8	3 1/8	2 5/8	3 1/4		2.4
3	2 7/8		3 7/16	2 7/8	3 9/16		2.8
3 1/2	3 3/16		3 13/16	3 3/16	3 13/16		3.0
4	3 1/2	3/4	4 3/16	3 1/2	4 3/8	5/8	4.6
5	4 3/16		4 15/16	4 3/16	4 15/16		5.2
6	4 7/8	7/8	5 3/4	4 7/8	5 7/8	3/4	10.8
8	6	1	6 7/8	6	7		13.0
10	7 7/16		8 9/16	7 7/16	8 9/16	7/8	27.2
12	8 7/16		9 9/16	8 7/16	9 9/16		30.4
14	9 1/4	1 1/8	10 5/8	9 1/4	10 5/8		41.0
16	10 1/4		11 5/8	10 1/4	11 5/8		44.6
18	11 5/8	1 1/4	13	11 5/8	13	1	63.2
20	12 3/4	1 3/8	14 1/8	12 3/4	14 1/8	1 1/8	71.6
24	15 1/4	1 5/8	16 7/8	15 1/4	16 7/8	1 1/4	106.2
30	19	2	21 1/8	19	21 1/8	1 3/4	227.8

•Clamps may be furnished with square ends.

Fig. 247 Light-Duty Spring Hanger

Finish: Painted

Service: Recommended for light loads where vertical movement does not exceed 1¼".

Approvals: WW-H-171E (Type 49) and MSS-SP-69 (Type 48).

Installation: Designed for attachment to its supporting member by screwing a rod into the top cap of the hanger the full depth of the cap. Incorporates a convenient load coupling to facilitate proper adjustment during installation.

Ordering: Specify size of hanger, figure number and name.

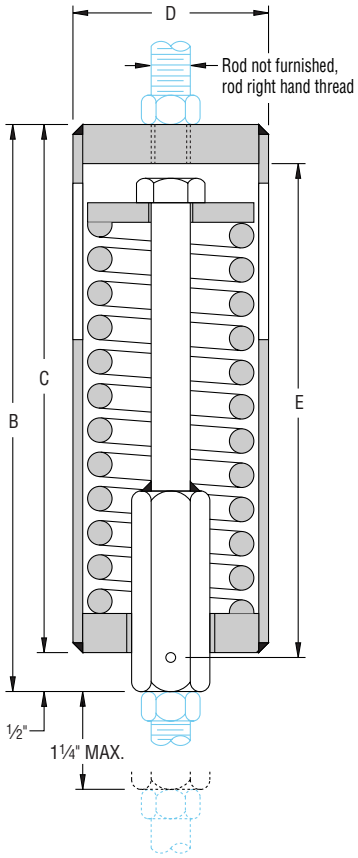


Fig. 247: Loads (lbs) • Weight (lbs) • Dimensions (in)

Size No.	Max Deflection*	Max Load	Spring Rate of Hanger	Weight	Rod Size A	Shipping Length B	Casing Length C	Casing Diam D	Rod Take Out E
1	1¼	47.5	38	1.4	⅜	4⅝	4⅛	1¾	4¼
2		85.0	68	1.6		5 19/32	5 3/32		5¼
3		150.0	120	3.1	½	5 11/16	5 3/16	2½	
4		267.0	214	4.5		7¼	6¾		6 13/16

*At maximum recommended deflection, spring can be compressed an additional ¼" before becoming solid.

Fig. 82, Fig. B-268, Fig. 98, Triple Spring, and Quadruple Spring
Fig. C-82, Fig. C-268, Fig. C-98, Triple-CR, and Quadruple-CR Spring (Corrosion Resistant)

Design features:

- Precompression.
  Precompressing the spring into the hanger casing provides the following advantages:
  (1) Saves up to 50% in headroom by reducing the length of the hanger.
  (2) Reduces the installed height of the overall hanger assembly.
  (3) Prevents the spring supporting force from exceeding the normal safe limits of variations.
  (4) Saves valuable erection time because spring is precompressed close to ½" of the working range.
- Calibration: all Anvil Variable Spring Hangers and supports are calibrated for accurate loading conditions.
- Load indicator is clearly seen in the slot, simplifying reading of the scale plate. Load is read from bottom of indicator.
- Cold set at the factory upon request.
- Spring and casing are fabricated of steel and are rugged and compact.
- Piston cap serves as a centering device or guide maintaining spring alignment.
- Casing protects the spring from damage and weather conditions.

Standard Finish: Painted with semi-gloss primer.

Corrosion Resistant:

Anvil offers corrosion-resistant and weather-resistant Variable Spring Hangers to fill vital needs in the chemical and refinery industries as well as in modern outdoor power plant construction.
For protection against severe weather conditions or moderate corrosive conditions, the parts of the hanger are galvanized per ASTM A-153, except the spring which has a protective coating and the load column for Type F which is electro-galvanized.

Advantages of a Protective Coating:

- Protects from a wide range of corrosives.
- Does not affect the flex life of the spring.
- Recommended for ambient temperatures up to 200° F

Travel stop:

The functional design of the pre-compressed variable spring hanger permits the incorporation of a two-piece travel stop that locks the hanger spring against upward or downward movement for temporary conditions of underload or overload. The complete travel stop, the up travel stop only for cold set purposes or the down travel stop only which may be employed during erection, hydrostatic test (Anvil permits a hydrostatic test load of 2 times the normal operating load for the spring hanger) or chemical cleanout will be furnished only when specified. The travel stop is painted red and is installed at the factory with a caution tag attached calling attention that the device must be removed before the pipe line is put in service. Permanently attached travel stops available upon request.

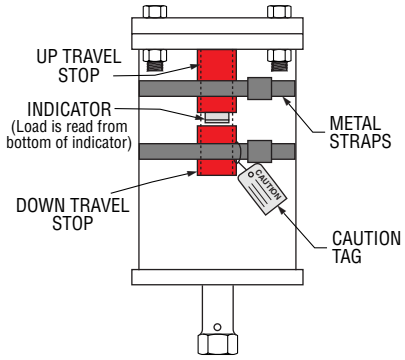


Fig. 98

Fig. B-268

Fig. 82

Approvals: WW-H-171E (Types 51, 56 and 57) and MSS-SP-69 (Types 51, 52 and 53).

Specifications: Anvil Variable Spring Hangers are welded in strict accordance with ASME Section IX.

Size Range: The Anvil Variable Spring Hanger in five series and seven types is offered in twenty-three sizes (Fig. B-268 only is offered in twenty-five sizes). The hanger can be furnished to take loads 10 lbs. to 50,000 lbs.

Ordering:

(1) Size
(2) Type
(3) Figure number
(4) Product name
(5) Desired supporting force in operating position
(6) Calculated amount and direction of pipe movement from installed to operating position.
(7) Customer's identification number (if any)
(8) When ordering Type F spring specify if roller or guided, load column is to be furnished.
(9) When ordering Type G, specify total load and load per spring plus center to center rod dimensions.
(10) If required, specify with travel stop
(11) When ordering corrosion resistant, specify C-268, C-82, C-98, Triple-CR, or Quadruple-CR " completely galvanized except coated spring coil".

Note: To help alleviate the problem of lifting large size spring hangers into position for installation, this product is available with lifting lugs (if required) on sizes weighing one hundred pounds or more.

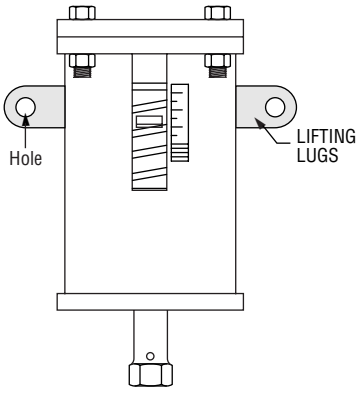
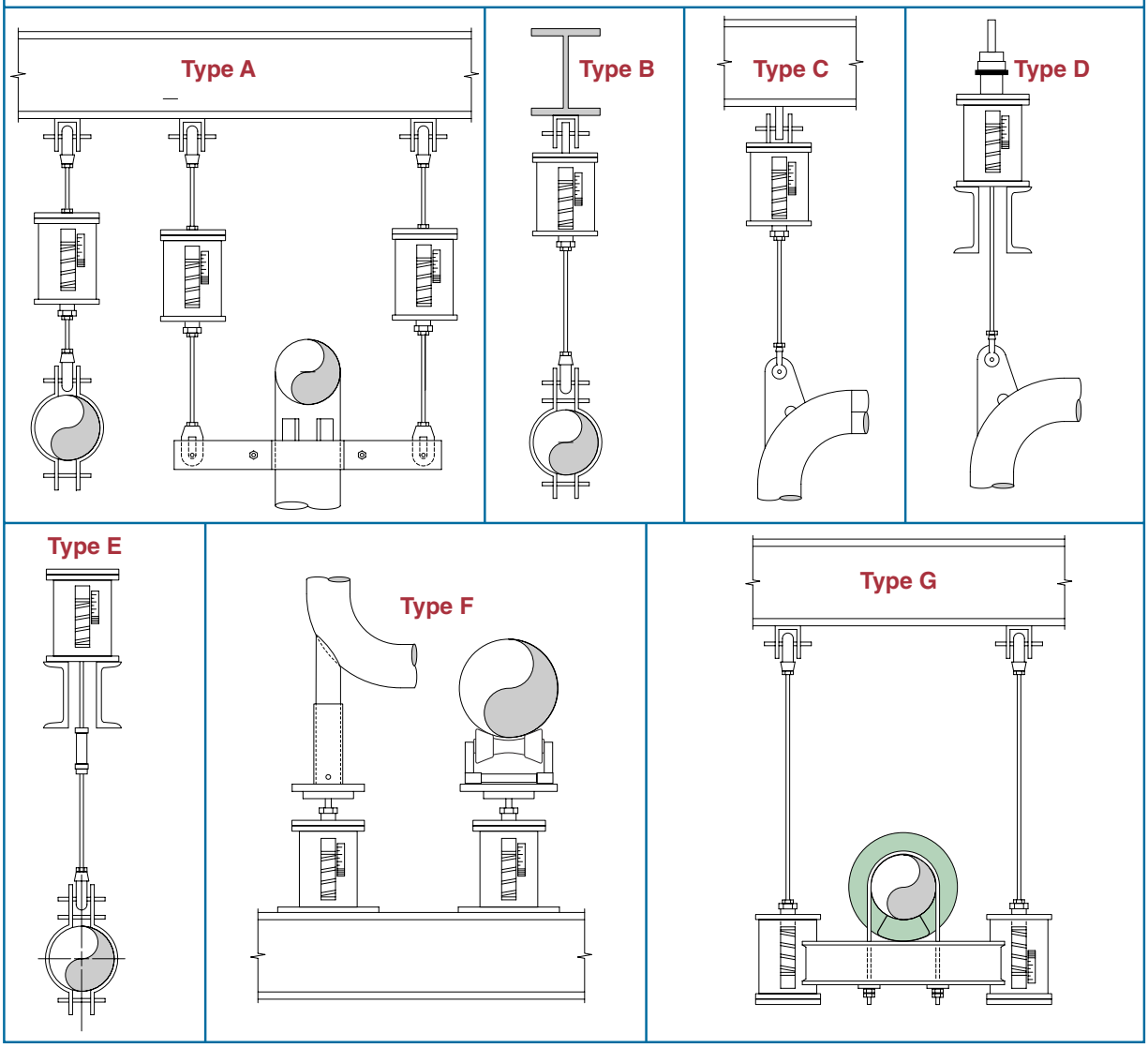


Fig. 82, Fig. B-268, Fig. 98, Triple Spring, and Quadruple Spring (cont.)
Fig. C-82, Fig. C-268, Fig. C-98, Triple-CR, and Quadruple-CR Spring (Corrosion Resistant)

How to Determine Type: The type of variable spring hanger to be used depends upon the physical characteristics required by the suspension problem (e.g., amount of head room, whether pipe is to be supported above or below the spring, etc.). Consideration should be given to the seven standard types offered (see illustration on the below). Special variable spring hangers can be fabricated for unusual conditions.

Spring Hanger Types – Typical Applications



Recommended Service: Pipe hangers located at points that are subject to vertical thermal movement and for which a constant support hanger is not required (see "recommended service" for constant support hanger, page PH-151). Type D & E spring hangers may accommodate less than 4° of rod swing depending on size, figure number, and application.

Installation: Securely attach hanger to the building. Attach lower hanger rod and turn the load coupling until the load indicator is positioned at the desired setting indicated on the load scale plate.

Adjustment of Hanger: Once installed in the line; the hanger should be adjusted until the load indicator moves to the white button marked "C" (cold position). On inspection of the system, after a reasonable period of operation, the load indicator should be at the red button marked "H" (hot position). If it is not, the hanger should be readjusted to the hot position. No other adjustment is necessary.

How to Determine Series: Complete sizing information is given on the hanger selection chart on page PH-134 - PH-135. The sizing information is applicable to hangers of all series. As noted on the hanger selection charts that the total spring deflection in the casing leaves a reserve (overtravel) above and below the recommended working load range.

Spring Hanger Size and Series Selection

How to use hanger selection table:

In order to choose a proper size hanger, it is necessary to know the actual load which the spring is to support and the amount and direction of the pipe line movement from the cold to the hot position.

Find the actual load of the pipe in the load table. As it is desirable to support the actual weight of the pipe when the line is hot, the actual load is the hot load. To determine the cold load, read the spring scale, up or down, for the amount of expected movement.

The chart must be read opposite from the direction of the pipe's movement. The load arrived at is the cold load.

If the cold load falls outside of the working load range of the hanger selected, relocate the actual or hot load in the adjacent column and find the cold load. When the hot and cold loads are both within the working range of a hanger, the size number of that hanger will be found at the top of the column.

Load Table (lbs) for Selection of Hanger Size (sizes 10 through 22 on next page)

Working Range (in) Shaded Rows Show Overtravel					Hanger size											
Figure No.					B-268 Only		Fig. 82, Fig. B-268, Fig. 98, Triple & Quadruple Spring									
Quad.	Triple	98	B-268	82	000	00	0	1	2	3	4	5	6	7	8	9
2	1½	1	½	¼	7	19	43	63	81	105	141	189	252	336	450	600
					7	20	44	66	84	109	147	197	263	350	469	625
					8	22	46	68	88	114	153	206	273	364	488	650
					9	24	48	71	91	118	159	213	284	378	506	675
0	0	0	0	0	10	26	50	74	95	123	165	221	294	392	525	700
					11	28	52	76	98	127	170	228	305	406	544	725
					12	30	54	79	101	131	176	236	315	420	563	750
					12	31	56	81	105	136	182	244	326	434	581	775
2	1½	1	½	¼	14	34	58	84	108	140	188	252	336	448	600	800
					14	35	59	87	111	144	194	260	347	462	619	825
					15	38	61	89	115	149	200	268	357	476	638	850
					16	40	63	92	118	153	206	276	368	490	656	875
4	3	2	1	½	17	41	65	95	122	158	212	284	378	504	675	900
					18	43	67	97	125	162	217	291	389	518	694	925
					19	45	69	100	128	166	223	299	399	532	713	950
					20	47	71	102	132	171	229	307	410	546	731	975
6	4½	3	1½	¾	21	49	73	105	135	175	235	315	420	560	750	1,000
					21	50	74	108	138	179	241	323	431	574	769	1,025
					22	53	76	110	142	184	247	331	441	588	788	1,050
					23	55	78	113	145	188	253	339	452	602	806	1,075
8	6	4	2	1	24	56	80	116	149	193	258	347	462	616	825	1,100
					25	58	82	118	152	197	264	354	473	630	844	1,125
					26	60	84	121	155	201	270	362	483	644	863	1,150
					27	62	86	123	159	206	276	370	494	658	881	1,175
10	7½	5	2½	1¼	28	64	88	126	162	210	282	378	504	672	900	1,200
2	1½	1	½	¼	28	66	89	129	165	214	288	386	515	686	919	1,225
					29	68	91	131	169	219	294	394	525	700	938	1,250
					30	70	93	134	172	223	300	402	536	714	956	1,275
					31	72	95	137	176	228	306	410	546	728	975	1,300
					Spring Rate (lbs/in)											
				82	–	–	30	42	54	70	94	126	168	224	300	400
			B-268		7	15	15	21	27	35	47	63	84	112	150	200
		98			–	–	7	10	13	17	23	31	42	56	75	100
	Triple				–	–	5	7	9	12	16	21	28	37	50	67
Quadruple					–	–	4	5	7	9	12	16	21	28	38	50

Note: General rule for series selection use Fig. 82 for up to ½" of movement up to 1" use Fig. B-268, up to 2" use Fig. 98, up to 3" use a Triple, up to 4" use a Quadruple. Double check to assure desired variability is achieved.

Spring Hanger Size and Series Selection

How to use hanger selection table (cont.):

Should it be impossible to select a hanger in a particular series such that both loads occur within the working range, consideration should be given to a variable spring hanger with a wider working range or a constant support hanger.
The cold load is calculated by adding (for up movement) or subtracting (for down movement) the product of spring rate times movement to or from the hot load.

Cold load = (hot load) ± (movement) x (spring rate)

A key criteria in selecting the size and series of a variable spring is a factor known as variability. This is a measurement of the percentage change in supporting force between the hot and cold positions of a spring and is calculated from the formula:

Variability = (Movement) x (Spring Rate) / (Hot Load)

If an allowable variability is not specified, good practice would be to use 25% as recommended by MSS-SP-58.

Load Table (lbs) for Selection of Hanger Size (Cont. from previous page)

Hanger size — Fig. 82, Fig. B-268, Fig. 98, Triple & Quadruple Spring													Working Range (in) Shaded Rows Show Overtravel — Figure No.				
10	11	12	13	14	15	16	17	18	19	20	21	22	82	B-268	98	Triple	Quad
780	1,020	1,350	1,800	2,400	3,240	4,500	6,000	7,990	10,610	14,100	18,750	25,005					
813	1,063	1,406	1,875	2,500	3,375	4,688	6,250	8,322	11,053	14,588	19,531	26,047	¼	½	1	1½	2
845	1,105	1,463	1,950	2,600	3,510	4,875	6,500	8,655	11,495	15,275	20,313	27,089					
878	1,148	1,519	2,025	2,700	3,645	5,063	6,750	8,987	11,938	15,863	21,094	28,131					
910	1,190	1,575	2,100	2,800	3,780	5,250	7,000	9,320	12,380	16,450	21,875	29,173	0	0	0	0	0
943	1,233	1,631	2,175	2,900	3,915	5,438	7,250	9,652	12,823	17,038	22,656	30,215					
975	1,275	1,688	2,250	3,000	4,050	5,625	7,500	9,985	13,265	17,625	23,438	31,256					
1,008	1,318	1,744	2,325	3,100	4,185	5,813	7,750	10,317	13,708	18,213	24,219	32,298					
1,040	1,360	1,800	2,400	3,200	4,320	6,000	8,000	10,650	14,150	18,800	25,000	33,340	¼	½	1	1½	2
1,073	1,403	1,856	2,475	3,300	4,455	6,188	8,250	10,982	14,592	19,388	25,781	34,382					
1,105	1,445	1,913	2,550	3,400	4,590	6,375	8,500	11,315	15,035	19,975	26,563	35,424					
1,138	1,488	1,969	2,625	3,500	4,725	6,563	8,750	11,647	15,477	20,563	27,344	36,466					
1,170	1,530	2,025	2,700	3,600	4,860	6,750	9,000	11,980	15,920	21,150	28,125	37,508	½	1	2	3	4
1,203	1,573	2,081	2,775	3,700	4,995	6,938	9,250	12,312	16,362	21,738	28,906	38,549					
1,235	1,615	2,138	2,850	3,800	5,130	7,125	9,500	12,645	16,805	22,325	29,688	39,591					
1,268	1,658	2,194	2,925	3,900	5,265	7,313	9,750	12,977	17,247	22,913	30,469	40,633					
1,300	1,700	2,250	3,000	4,000	5,400	7,500	10,000	13,310	17,690	23,500	31,250	41,675	¾	1½	3	4½	6
1,333	1,743	2,306	3,075	4,100	5,535	7,688	10,250	13,642	18,132	24,088	32,031	42,717					
1,365	1,785	2,363	3,150	4,200	5,670	7,875	10,500	13,975	18,575	24,675	32,813	43,759					
1,398	1,828	2,419	3,225	4,300	5,805	8,063	10,750	14,307	19,017	25,263	33,594	44,801					
1,430	1,870	2,475	3,300	4,400	5,940	8,250	11,000	14,640	19,460	25,850	34,375	45,843	1	2	4	6	8
1,463	1,913	2,531	3,375	4,500	6,075	8,438	11,250	14,972	19,902	26,438	35,156	46,885					
1,495	1,955	2,588	3,450	4,600	6,210	8,625	11,500	15,305	20,345	27,025	35,938	47,926					
1,528	1,998	2,644	3,525	4,700	6,345	8,813	11,750	15,637	20,787	27,613	36,719	48,968					
1,560	2,040	2,700	3,600	4,800	6,480	9,000	12,000	15,970	21,230	28,200	37,500	50,010	1¼	2½	5	7½	10
1,593	2,083	2,756	3,675	4,900	6,615	9,188	12,250	16,302	21,672	28,788	38,281	51,052					
1,625	2,125	2,813	3,750	5,000	6,750	9,375	12,500	16,635	22,115	29,375	39,063	52,094	¼	½	1	1½	2
1,658	2,168	2,869	3,825	5,100	6,885	9,563	12,750	16,967	22,557	29,963	39,844	53,136					
1,690	2,210	2,925	3,900	5,200	7,020	9,750	13,000	17,300	23,000	30,550	40,625	54,178					

Spring Rate (lbs/In)													
520	680	900	1,200	1,600	2,160	3,000	4,000	5,320	7,080	9,400	12,500	16,670	82
260	340	450	600	800	1,080	1,500	2,000	2,660	3,540	4,700	6,250	8,335	B-268
130	170	225	300	400	540	750	1,000	1,330	1,770	2,350	3,125	4,167	98
87	113	150	200	267	360	500	667	887	1,180	1,567	2,083	2,778	Triple
65	85	113	150	200	270	375	500	665	885	1,175	1,563	2,084	Quadruple

Note: General rule for series selection use Fig. 82 for up to ½" of movement up to 1" use Fig. B-268, up to 2" use Fig. 98, up to 3" use a Triple-, up to 4" use a Quadruple. Double check to assure desired variability is achieved.

Variable Spring — Check List for Requesting a Quote or Ordering

Anvil International
Precision Park
160 Frenchtown Rd.
North Kingstown, RI 02852

For technical information regarding
Variable Springs Call or Fax:
Fax Number: (401) 886-3056
Phone Number: (401) 886-3025

Finish: Standard Primer: _____ Galvanized: _____ Special Coating: _____

Quantity: _____

Figure No.: Options are: ❑ 82, ❑ B-268, ❑ 98, ❑ Triple, ❑ Quadruple

or: ❑ C-82, ❑ C-268, ❑ C-98, ❑ Triple-CR, ❑ Quadruple-CR

Size: Options are: #0 through #22 *(B-268 / C-268 also available in #00 and #000)*

Type: Options are: A through G*

Hot (Operating or Design) Load (lbs): _____ *(optional)***

Cold/Installed (Factory Set) Load (lbs): _____ *(optional)***

Vertical Movement: _____ + (up) *or* – (down) *(optional)***

Mark Number: _____ *(If Required)*

Travel Stops: Yes: _____ No: _____

If travel stops are ordered and hot & cold loads are not provided, then the spring will be set to mid range load.

Lifting Lugs: Yes: _____ No: _____

Available on sizes weighing 100 lbs or more.

Notes:

* *Type G Springs must also include the C-to-C dimension & the load per spring.*

** *Anvil will determine the appropriate Figure Number and will calculate the Cold Load when only the Hot Load and movement are specified.*

Fig. B-268, C-268 — Spring Hangers (Type A)

Type A is the basic unit of Fig. B-268 Anvil *Variable* Spring Hanger. It is designed for attachment to its supporting member by screwing a rod into a tapped hole in the top cap of the hanger the full depth of the top cap ("G" dimension). The upper jam nut should then be locked, securing the hanger. Adjustment of the hanger load is accomplished by turning the coupling on the lower hanger rod until the hanger picks up the load and the load indicator points to the desired position.

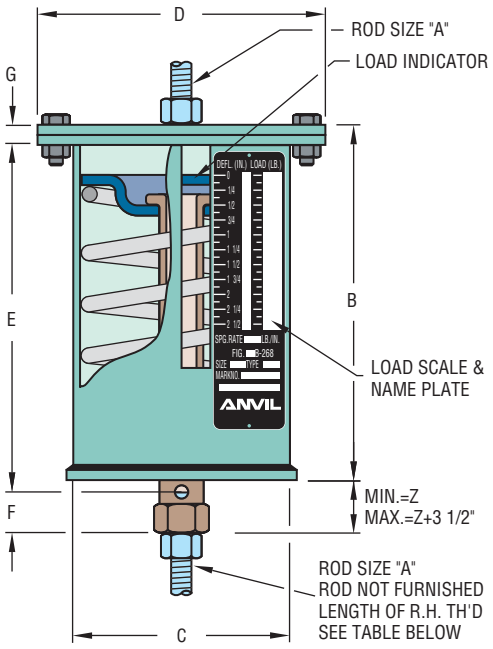


FIG. B-268 TYPE A

Fig. B-268, Fig. C-268 Type A: Weight (lbs) • Dimensions (in)

Hanger Size	Weight	Rod Size A	R.H. Thread Length	Casing Length B	Casing Diam C	Flange Diam D	Rod Take Out E	Min. Thread Engagement F	Thread Depth G	Z
000	5	½	5	5⅝	4	5⅛	5 1/16	15/16	7/16	13/16
00	6			7 9/16			7⅜			1 3/16
0	8	½	5	6 11/16	4	5⅛	6 1/16	15/16	7/16	¾
1	8			7 9/16			6 15/16			
2	9			8 5/16			7 15/16			1
3	14	½	5	7 15/16	5 9/16	6 15/16	7 9/16	15/16	7/16	1
4	15						7 15/16			1⅜
5	16			8⅝						1 1/16
6	26	⅝	5	8 13/16	6⅝	8⅜	7 13/16	15/16	⅝	9/16
7	29			10			9 1/16			⅝
8	31									
9	65	¾	6	10 7/16	8⅝	10¾	8 15/16	1¼	1	¾
10	71			12⅛			11⅜			1½
11	65			10 7/16			9⅞			1 11/16
12	71	1	6	10 7/16	8⅝	10¾	9½	1¼	1	1 1/16
13	89		7	13⅛			11⅜			½
14	93	1¼		13¼			11⅜		1¼	⅜
15	111	1¼	7	13¼	8⅝	10¾	11⅜	1¼	1¼	⅜
16	133	1½	8	16 1/16		11⅜	14 13/16	1 15/16	1⅜	2 1/16
17	162	1¾		18⅛			16¾		1⅜	1 15/16
18	330	2	9	18¼	12¾	15⅞	16	2¾	2¼	2 9/16
19	376	2¼		20½			18⅜			2 11/16
20	480	2½	10	23¾			21⅝			
21	556	2¾	10	27 5/16	12¾	16⅞	23⅞	3⅝	2¾	3 11/16
22	705	3	11	33⅜			29¾		3	3¾

Fig. B-268, C-268 Spring Hangers (Type B & Type C)

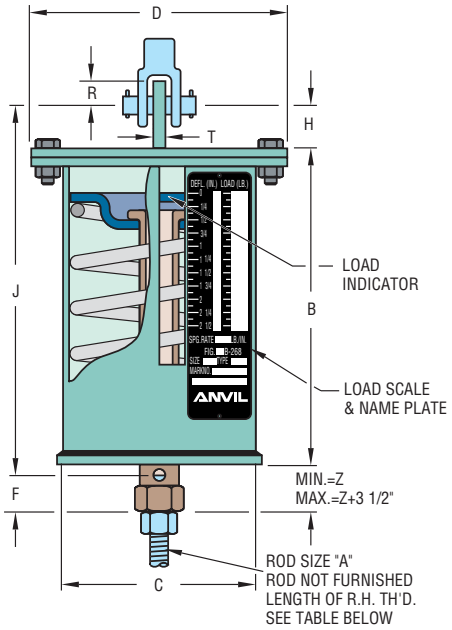


FIG. B-268 TYPE B

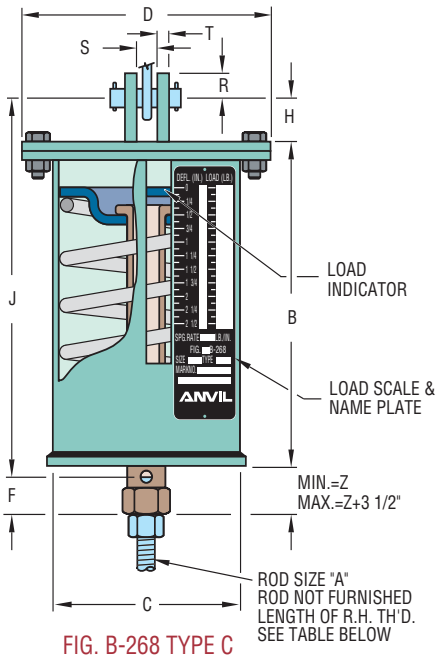


FIG. B-268 TYPE C

Type B is furnished with a single lug for attachment to the building structure. The lug permits use of a clevis or a pair of angles for attachment where headroom is limited.

Type C is furnished with two lugs for attachment to the building structure. These two lugs permit the use of an eye rod or a single plate for attachment where headroom is limited.

Fig. B-268, Fig. C-268 Type B, C: Weight (lbs) • Dimensions (in)

Hanger Size (in)	Weight (lbs)	Rod Size A	R.H. Thread Length	Lug Hole Size	Casing Length B	Casing Diam C	Flange Diam D	Min. Thd Engagement F	Height of Pin H	Rod Take Out J	R	Clevis Opening S	Thickness T	Z
000	5	½	5	11/16	5⅝	4	5⅛	15/16	1½	7	1¼	⅞	¼	13/16
00	6				7⅜16					9½				13/16
0	8	½	5	11/16	6 11/16	4	5⅛	15/16	1½	8	1¼	⅞	¼	¾
1	9				7⅜16					8⅞				
2	10				8⅝16					9⅞				1
3	14	½	5	11/16	7 15/16	5⅜16	6 15/16	15/16	1½	9½	1¼	⅞	¼	1
4	16									9⅞				1⅜
5	17				8⅝									11/16
6	27	⅝	5	13/16	8 13/16	6⅝	8⅜	15/16	1½	9 15/16	1¼	1 1/16	¼	9/16
7	30				10					11 3/16				⅝
8	32													
9	66	¾	6	15/16	10⅞16	8⅝	10¾	1¼	1½	11⅞16	1¼	1¼	⅜	¾
10	72				12⅛					13⅞				1½
11	66				10⅞16					12⅜				1 11/16
12	71	1	6	1¼	10⅞16	8⅝	10¾	1¼	2	12½	1½	1⅝	½	1 1/16
13	89		7		13⅛					14⅜				½
14	94	1¼		1½	13¼				3	15⅜	2	2	⅝	⅜
15	114	1¼	7	1½	13¼	8⅝	10¾	1 15/16	3	15⅜	2	2	⅝	⅜
16	138	1½	8	1¾	16 1/16		11⅜			19 3/16	2½	2⅜	¾	2 1/16
17	168	1¾		2	18⅛					21⅛		2⅝		1 15/16
18	331	2	9	2⅜	18¼	12¾	15⅞	2¾	4	22⅛	3	2⅞	¾	2 9/16
19	378	2¼		2⅝	20½				4½	25		3⅛		2 11/16
20	486	2½	10	2⅞	23¾					28¼	4	3⅜	1	
21	568	2¾	10	3⅛	27 5/16	12¾	16⅞	3⅝	4½	31⅛	4	3⅝	1	3 11/16
22	714	3	11	3⅜	33⅜				5	37¾		3⅞		3¾

Fig. B-268, C-268 — Spring Hangers (Type D & Type E)

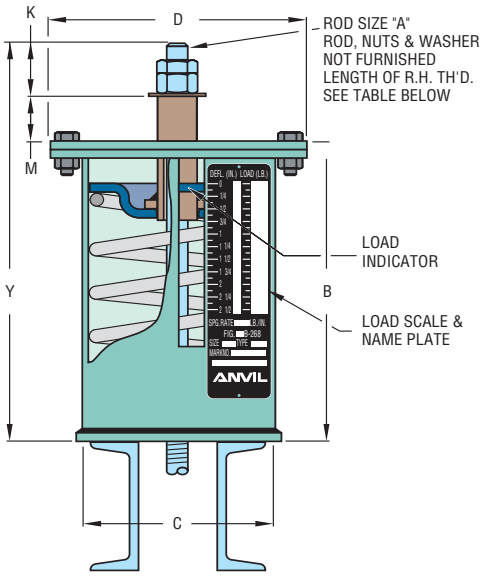


FIG. B-268 TYPE D

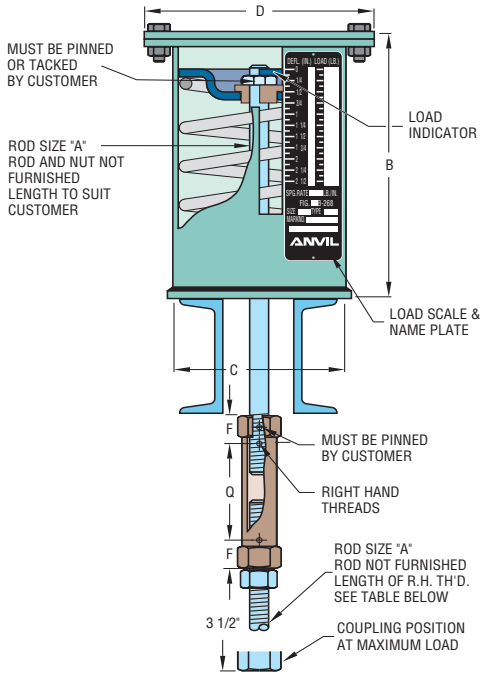


FIG. B-268 TYPE E

Type D permits adjustment of the hanger from the top. This type has a piece of tubing which passes through a hole in the top cap. Type D is especially adapted for use where the hanger is set above the supporting beams and pipe is suspended below.

Type E is designed to permit adjustment from either above or below the hanger, when it is installed upon the supporting member and pipe is suspended below. A coupling tapped right hand both ends is furnished.

Fig. B-268, Fig. C-268 Type D, E: Weight (lbs) • Dimensions (in)

Hanger Size (in)	Weight (lbs)	Rod Size A	R.H. Thd Length	Casing Length B	Casing Diam C	Flange Diam D	Min Thread Engagement F	Allowance for Nuts K	Height of Spacer M	Rod Length Y	Rod Take-out Q
000	5	½	5	5⅝	4	5⅛	13⁄16	1¼	3⅛	10	6
00	6			7⁹⁄16						11¾	
0	6	½	5	6¹¹⁄16	4	5⅛	15⁄16	1¼	3⅛	11¹⁄16	6
1	7			7⁹⁄16						11¹⁵⁄16	
2	8			8⁵⁄16						12¹¹⁄16	
3	11	½	5	7¹⁵⁄16	5⁹⁄16	6¹⁵⁄16	15⁄16	1¼	3⅛	11¹¹⁄16	6
4	12									12⁵⁄16	
5	14			8⅝						13	
6	22	⅝	5	8¹³⁄16	6⅝	8⅜	15⁄16	1½	3	13⁵⁄16	6
7	25			10						14¼	
8	26									14¾	
9	51	¾	6	10⁷⁄16	8⅝	10¾	1¼	1¾	3	15⅝	6
10	58			12⅛						16⅞	
11	51			10⁷⁄16						14¹¹⁄16	
12	56	1	6	10⁷⁄16	8⅝	10¾	1¼	2¼	3	15¹³⁄16	6
13	73		7	13⅛						18⅜	
14	77	1¼						3		19¼	
15	88	1¼	7	13⅛	8⅝	10¾	1¼	3	3	19¾	6
16	107	1½	8	15¹⁵⁄16		11⅜	1 15⁄16	3½		22⁹⁄16	
17	133	1¾		18				4		25⅛	
18	262	2	9	18¼	12¾	15⅞	2¾	4⁹⁄16	3	25¹¹⁄16	6
19	300	2¼		20½				5		28⅜	
20	370	2½	10	23¾				5⁹⁄16		32³⁄16	
21	455	2¾		27⁵⁄16	12¾	16⅞	3⅝	6¼	3	35⁹⁄16	7
22	505	3	11	33⅜				6⅝		42	

Fig. B-268, C-268 — Spring Hangers (Type F)

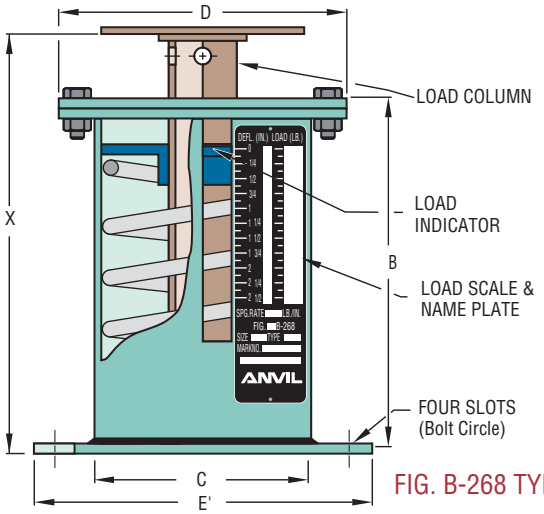
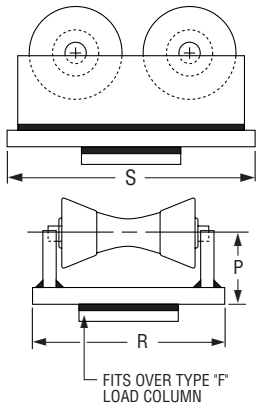


FIG. B-268 TYPE F



Pipe Roll: Dimensions (in), Load (lbs)					
Roll Size	Roll Mat'l	Max Load	P	R	S
2 - 3½	Cast Iron	780	1¾	4½	4½
4 - 6	Cast Iron	1,900	2⅛	5⅞	5½
8 - 10	Cast Iron	4,200	2¾	8¼	6¾
8 - 10	Steel	14,000	2¾	8¼	6¾
12 - 14	Cast Iron	6,150	3½	10⅝	6¾
12 - 14	Steel	26,000	3½	12	6¾
16 - 20	Cast Iron	9,960	3¾	12	6¾
16 - 20	Steel	34,000	3¾	12	6¾
24	Cast Iron	12,200	4	13¼	7
24	Steel	60,000	4	13¼	10
30	Cast Iron	15,000	4½	16½	8¼
30	Steel	60,000	5	16½	10
36	Cast Iron	24,000	4 15/16	19	13
36	Steel	60,000	5	19	12

Type F is for use under a base elbow or piping that must be supported directly from the floor. If more than ¼" of horizontal translation occurs of loads resting on the flat load flange or other flat surface junction between the type F spring hanger and the load, a double roller design pipe roll is recommended. Pipe rolls, as illustrated above, will be furnished on request. For dimension of the pipe roll, refer to Fig. 271, see page PH-118.

Base type variable springs will be furnished with an extended load column on special order. Guided Load Columns and roller are available on request.

Adjustment to the required load rating is made by inserting a bar into holes provided in the load column and turning the column. The 2" increment between minimum and maximum "X" dimensions is the amount of field adjustment available and is in excess of the amount required for load adjustment.

Fig. B-268, Fig. C-268 Type F: Weight (lbs) • Dimensions (in)

Hanger Size	Weight	Casing Length B	Casing Diam C	Flange Diam D	Bottom Flange Sq. E'	Bottom Flange Bolt Circle		Bottom Flange Bolts	Thickness Bottom Flange	Lengths - X*		Load Col. Diam	Load Flange Diam	Thickness of Load Flange
						Min	Max			Min	Max			
000	11	5 11/16	4	5⅛	7½	7	8¾	⅝	¼	7 3/16	9 3/16	1.9	3⅞	3/16
00	12	7⅝								9⅛	11⅛			
0	12	6¾	4	5⅛	7½	7	8¾	⅝	¼	8¼	10¼	1.9	3⅞	3/16
1	14	7⅝								9⅛	11⅛			
2	15	8⅜								9⅞	11⅞			
3	23	8	5 9/16	6 15/16	7½	7	8¾	¾	¼	9 9/16	11 9/16	2.875	5⅜	3/16
4	25													
5	26	8 11/16								10¼	12¼			
6	40	8 15/16	6⅝	8⅜	9	8	10⅞	¾	⅜	10½	12½	3.5	6⅜	¼
7	46	10⅛								11 11/16	13 11/16			
8	47													
9	91	10 9/16	8⅝	10¾	13¼	10 9/16	16½	¾	½	12⅛	14⅛	4.5	8⅜	½
10	98	12¼								13 13/16	15 13/16			
11	90	10 9/16								12⅛	14⅛			
12	95	10 9/16	8⅝	10¾	13¼	10 9/16	16½	¾	½	12⅛	14⅛	4.5	8⅜	½
13	115	13¼								14 13/16	16 13/16			
14	119													
15	130	13¼	8⅝	10¾	13¼	10 9/16	16½	¾	½	14 13/16	16 13/16	4.5	8⅜	½
16	150	15 15/16		11⅜						17 15/16	19 15/16	2.0		
17	173	18								20	22			
18	343	18¼	12¾	15⅞	17¼	15¾	22	¾	⅝	20 5/16	22 5/16	2.5	12½	½
19	380	20½								22 9/16	24 9/16			
20	471	23¾								25 13/16	27 13/16			
21	496	27 5/16	12¾	16⅞	17¼	15¾	22	¾	⅝	29 7/16	31 7/16	3.0	12½	½
22	654	33⅜								35½	37½			

*Hanger take-out or installed height. With pipe movement up, cold to hot, installed height should be the mid-point between the minimum and maximum "X" dimension, plus thickness of load flange. With pipe movement down, cold to hot installed height should be mid-point between the minimum and maximum "X" dimension, plus the amount of vertical movement and load flange thickness.
Note: Sizes 16" and larger are furnished with a hexagon nut at the top of a solid load column to facilitate adjustment with a wrench.

Fig. B-268, Fig. C-268 — Spring Hangers (Type G)

Type G is a complete trapeze assembly. The hanger consists of two standard spring units plus a pair of back-to-back channels welded at each end to the hanger casing.
The "P" dimension can be varied with the customer's instructions. In sizing a Type G hanger, it must be remembered that each standard spring unit carries one-half of the total pipe load. Therefore, in using the hanger selection chart, use one-half of the total pipe load as the hot load.
When the pipe line is designed so as not to be centered on the channel, one spring of the trapeze will carry a heavier load, the other a lighter load. Care should be taken in calculating the load of each hanger and in choosing the proper sized spring in such cases. The center-to-center rod dimension must be specified when ordering.

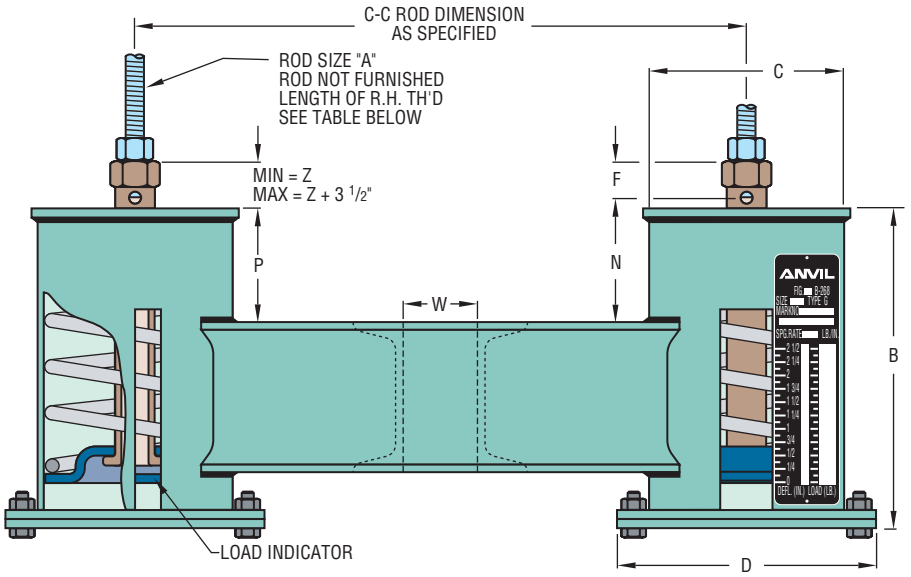


FIG. B-268 TYPE G

Fig. B-268, C-268 Type G: Weight (lbs) • Dimensions (in)

Hanger Size	Weight	Rod Size A	R.H. Thread Length	Casing Length B	Casing Dia. C	Flange Dia. D	Min Thread Engagement F	Rod Take Out N	Channel Size (lb/ft)	Max C-C	Space Between Channels W	P	Z
000	24	½	5	5⅜	4	5⅛	15⁄16	1⅜	C3 x 4.1	24	⅝	1½	13⁄16
00	26			7 9⁄16				1¾					1 3⁄16
0	30	½	5	6 11⁄16	4	5⅛	15⁄16	1 5⁄16	C3 x 4.1	24	⅝	1½	¾
1	31			7 9⁄16									
2	32			8 5⁄16				1 9⁄16					1
3	41	½	5	7 15⁄16	5 9⁄16	6 15⁄16	15⁄16	2 1⁄16	C3 x 4.1	30	¾	2	1
4	42							2 7⁄16					1⅜
5	43			8⅝				1¾					11⁄16
6	63	⅝	5	8 13⁄16	6⅝	8⅜	15⁄16	1⅝	C3 x 4.1	36	1	2	9⁄16
7	69			10				1 11⁄16					⅝
8	73												
9	143	¾	6	10 7⁄16	8⅝	10¾	1¼	2½	C4 x 5.4	36	1¼	3	¾
10	157			12⅛				3¼					1½
11	145			10 7⁄16				3 7⁄16					1 11⁄16
12	157	1	6	10 7⁄16	8⅝	10¾	1¼	3 13⁄16	C5 x 6.7	36	1½	4	1 1⁄16
13	195		7	13⅛				3¼					½
14	203	1¼		13¼				3⅛		33			⅜
15	250	1¼	7	13¼	8⅝	10¾	1 15⁄16	3 15⁄16	C6 x 10.5	36	1½	4	⅜
16	298	1½	8	16 1⁄16		11⅜		4⅛	C8 x 11.5		2⅛		2 1⁄16
17	354	1¾		18⅛				4					1 15⁄16
18	690	2	9	18¼	12¾	15⅞	2¾	4	C12 x 20.7	42	2⅜	4	2 9⁄16
19	783	2¼		20½				4⅛			2⅝		2 11⁄16
20	993	2½	10	23¾						40	2⅞		
21	1,197	2¾	10	27 5⁄16	12¾	16⅞	3⅝	4 5⁄16	C15 x 33.9	48	3⅛	4	3 11⁄16
22	1,496	3	11	33⅜				4⅜			3⅜		3¾

Fig. 82, C-82 — Short Spring Hangers

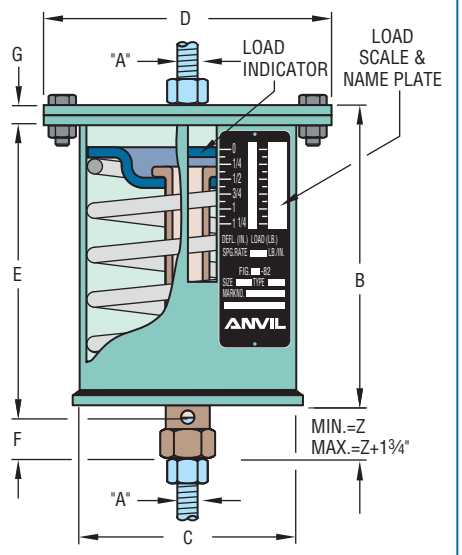


FIG. 82 TYPE A

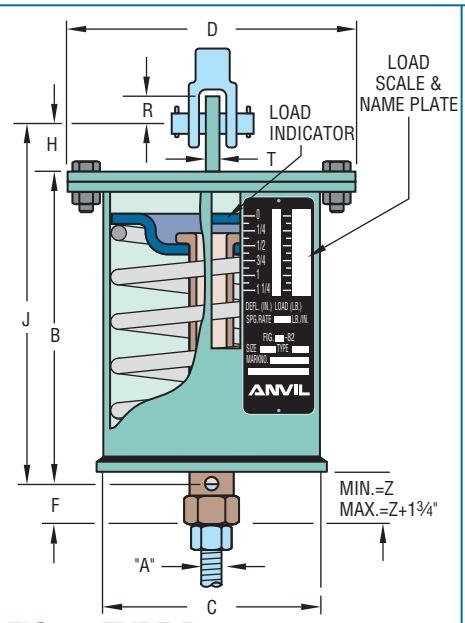


FIG. 82 TYPE B

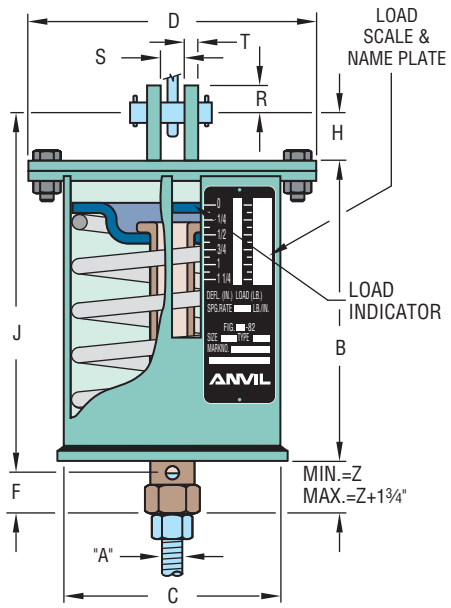


FIG. 82 TYPE C

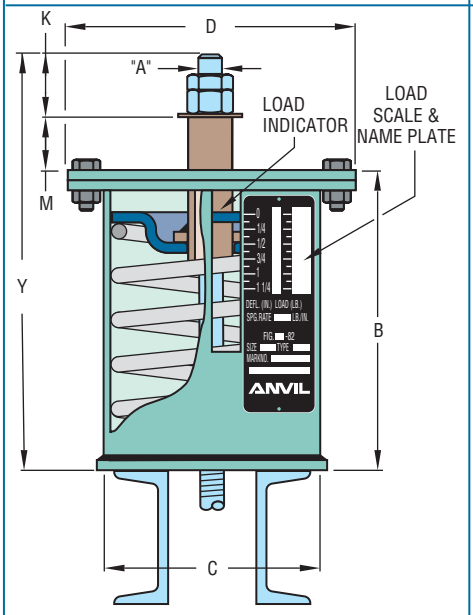


FIG. 82 TYPE D

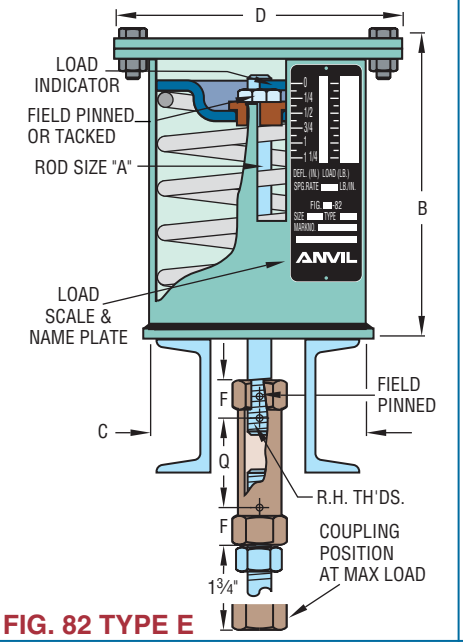


FIG. 82 TYPE E

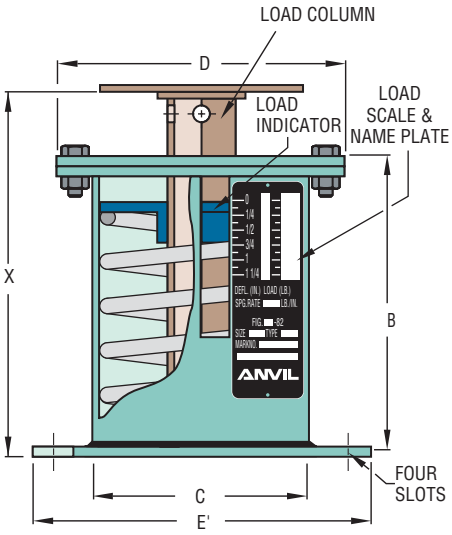


FIG. 82 TYPE F

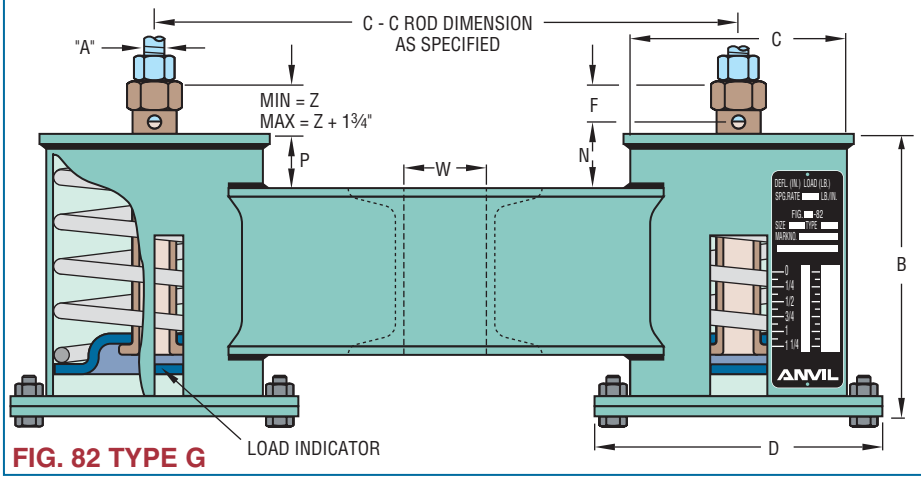


FIG. 82 TYPE G

The Anvil variable short spring hanger, Fig. 82, embodies all of the Fig. B-268 features and is designed to the same exacting specifications. This is useful in confined areas where thermal movement of the piping is relatively small.

The minimum and maximum loads for the individual sizes of the Fig. 82 are exactly the same as those for the Fig. B-268.

This hanger is offered in the seven basic types as shown here.

The load table and instructions for sizing this hanger are found on page PH-133 through PH-135.

Fig. 82, C-82 — Short Spring

Fig. 82, C-82 Weight (lbs) • Dimensions (in)

Hanger Size	Rod Size A	R.H. Thread Length	Casing Length B	Casing Dia. C	Flange Dia. D	Min Thread Engage F	Z	Rod Take Out By Type A	Rod Take Out By Type B,C	Rod Take Out By Type E	Rod Take Out By Type G	Type A Thread Depth G	Types B, C Lug Hole Size	Types B, C Pin Hgh H	Types B, C R	Types B, C Clevis Opening S	Types B, C Thk. T	Type D Rod Length Y	Type D Nut Allow. K	Type D Hgt Spacer M
								E	J	Q	N									
0	½	3	4¾	4	5⅛	15⁄16	15⁄16	4 5⁄16	6¼	2⅛	1	7⁄16	1 1⁄16	1½	1¼	⅞	¼	7½	1¼	1¾
1							1 1⁄16	4 1⁄16	6		¾							7¾		
2			5⅜				1 1⁄16	5 1⁄16	7		1⅛							8⅜		
3	½	3	5¼	5 9⁄16	6 15⁄16	15⁄16	9⁄16	4 7⁄16	6⅜	2⅛	⅝	7⁄16	1 1⁄16	1½	1¼	⅞	¼	7⅞	1¼	1¾
4			5¼				1 3⁄16	5 1⁄16	7		1¼							8¼		
5			5⅜				1 1⁄16				1⅛							8⅝		
6	⅝	3	5 13⁄16	6⅝	8⅜	15⁄16	13⁄16	5 1⁄16	7 3⁄16	2⅛	1⅞	⅝	1 3⁄16	1½	1¼	1 1⁄16	¼	9 1⁄16	1½	1¾
7			6 11⁄16				1 1⁄16	6 3⁄16	8 5⁄16		2⅛							9 11⁄16		
8							13⁄16	5 15⁄16	8 1⁄16		1⅞							9 15⁄16		
9	¾	4	7¼	8⅝	10¾	1¼	1⅛	6⅛	8⅝	2	1⅞	1	1 5⁄16	1½	1¼	1¼	⅜	11¼	1¾	1¾
10			8¼				1⅜	7⅜	9⅞		2⅛							11¾		
11			7¼				1 3⁄16	6 3⁄16	8 11⁄16		1 15⁄16							10 7⁄16		
12	1	4	7¼	8⅝	10¾	1¼	7⁄8	6 3⁄16	8 11⁄16	2	1⅛	1	1¼	2	1½	1⅝	½	11¼	2¼	1¾
13			8¾				1	7⅜	10⅜		2¾							12⅝		
14	1¼		8⅞				¾	7⅜	11⅜		2½		1½	3	2	2	⅝	13⅝	3	
15	1¼	4	8⅞	8⅝	10¾	1¼	¾	7⅜	11⅜	2	2½	1	1½	3	2	2	⅝	14⅛	3	1¾
16	1½	5	10⅝		11⅜	1 15⁄16	2	9⅝	13 11⁄16	6	1 1⁄16	1⅜	1¾		2½	2⅜	¾	15⅞	3½	
17	1¾	6	11⅞					10 9⁄16	14 15⁄16		2 1⁄16		2			2⅝		17⅝	4	
18	2	7	13	12¾	15⅞	2¾	2½	10 11⁄16	16 13⁄16	6	7⁄16	2¼	2⅜	4	3	2⅞	¾	19 3⁄16	4 9⁄16	1¾
19	2¼		14				2 9⁄16	11¾	18⅜		1		2⅝	4½		3⅛		20⅝	5	
20	2½	8	16⅛				2 11⁄16	14	20⅝		1⅛		2⅞		4	3⅜	1	23 5⁄16	5 9⁄16	
21	2¾	9	18	12¾	16⅞	3⅝	2¾	13⅝	20⅞	7	⅜	2¾	3⅛	4½	4	3⅝	1	25	6¼	1¼
22	3	10	22¼					17⅝	25⅜		2⅜	3	3⅜	5		3⅞		29⅝	6⅝	

Hanger Size	Type F E' Bottom Flange Size Sq.	Type F E' Bottom Flange Bolt Circle Min	Type F E' Bottom Flange Bolt Circle Max	Type F Bottom Flange Bolts	Type F Bottom Flange Thick	Type F Load Col. Dia.	Type F Load Flange Dia.	Type F Load Flange Thick.	Type F Length X ■ Min	Type F Length X ■ Max	Type G Channel Size (lbs/ft)	Type G Max C-C	Type G Space Between Channels - W	Type G P	Weight Type A,B,C	Weight Type D,E	Weight Type F	Weight Type G*
0	7½	7	8¾	⅝	¼	1.900	3⅞	3⁄16	6 5⁄16	6 13⁄16	C3 x 4.1	24	⅝	¾	6	5	11	27
1															7	6	11	29
2									6 15⁄16	7 7⁄16					8	7	12	
3	7½	7	8¾	¾	¼	2.875	5¾	3⁄16	6⅞	7⅜	C3 x 4.1	30	¾	¾	11	10	10	33
4															12	11	20	35
5									7	7½					13	12	21	36
6	9	8	10⅞	¾	⅜	3.50	6⅜	¼	7½	8	C3 x 4.1	36	1	¾	20	193	33	51
7									8⅜	8⅞					23	22	35	57
8															24	23	36	59
9	13¼	10 9⁄16	16½	¾	½	4.50	8⅜	½	8 15⁄16	9 15⁄16	C4 x 5.4	36	1¼	1	56	52	78	125
10									9 15⁄16	10 15⁄16					62	58	84	137
11									8 15⁄16	9 15⁄16					55	51	76	121
12	13¼	10 9⁄16	16½	¾	½	4.50	8⅜	½	8 15⁄16	9 15⁄16	C5 x 6.7	36	1½	1	58	53	78	132
13									10 7⁄16	11 7⁄16					69	63	81	154
14									10 9⁄16	11 9⁄16		33			72	55	91	159
15	13¼	10 9⁄16	16½	¾	½	4.50	8⅜	½	10 9⁄16	11 9⁄16	C6 x 10.5	36	1½	1	88	79	100	198
16						2.00			12⅝	13⅝	C8 x 11.5		2⅛		102	91	112	230
17									13⅞	14⅞					120	105	126	266
18	17¼	15¾	22	¾	⅝	2.50	12½	½	15 1⁄16	16 1⁄16	–	–	–	–	259	226	270	–
19									16 1⁄16	17 1⁄16	–	–	–	–	286	246	275	–
20									18 3⁄16	19 3⁄16	–	–	–	–	350	302	344	–
21	17¼	15¾	22	¾	⅝	3.00	12½	½	20⅛	21⅛	–	–	–	–	401	339	348	–
22									24⅜	25⅜	–	–	–	–	490	431	443	–

■ Hanger take-out or installed height. With pipe movement up, cold to hot, installed height should be the mid point between the minimum and maximum "X" dimension, plus thickness of load fl ange. With pipe movement down, cold to hot installed height should be mid-point between the minimum and maximum "X" dimension, plus the amount of vertical movement and load fl ange thickness. (Type F only).

*Weight based on 24" center-to-center dimension. See page PH-140 for Type F roller information.

Fig. 98, C-98 — Double Spring

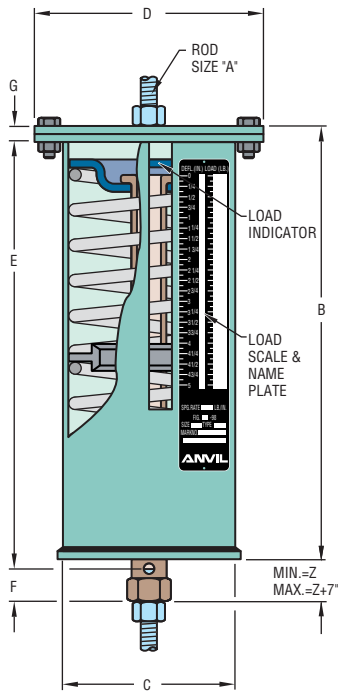


FIG. 98 TYPE A

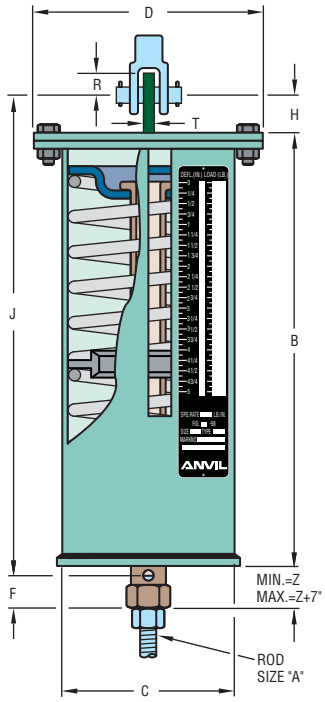


FIG. 98 TYPE B

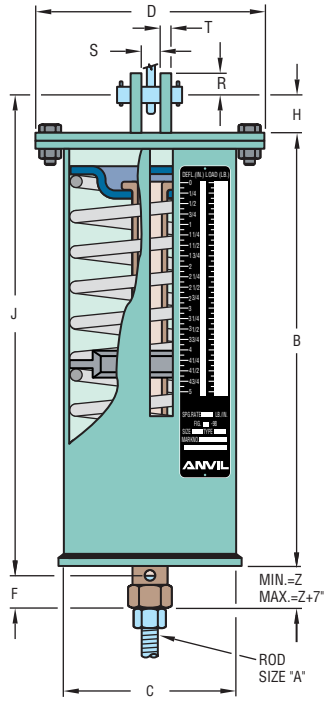


FIG. 98 TYPE C

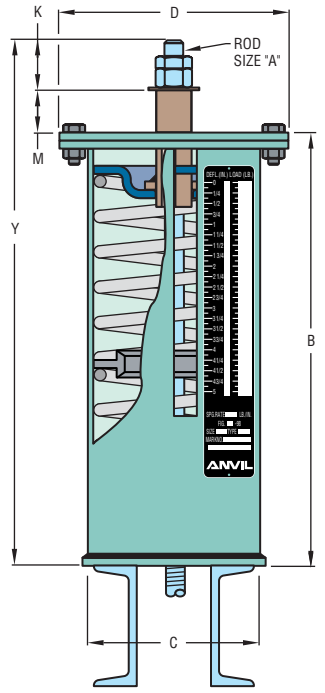


FIG. 98 TYPE D

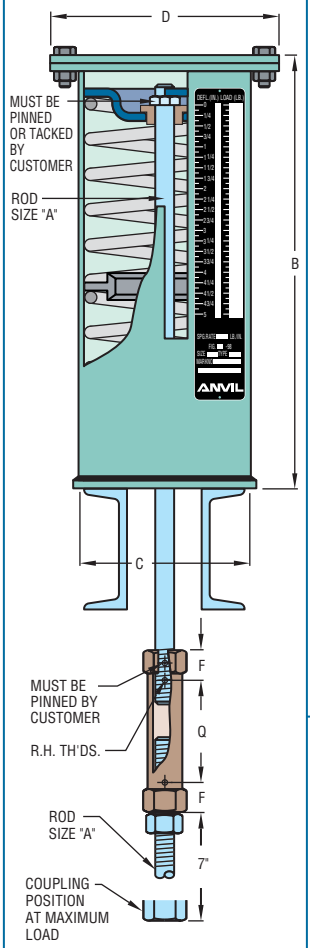


FIG. 98 TYPE E

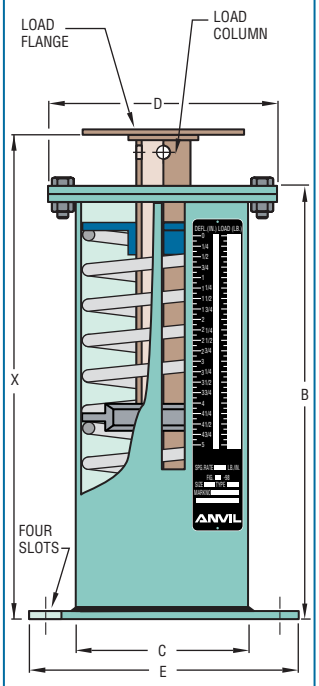


FIG. 98 TYPE F

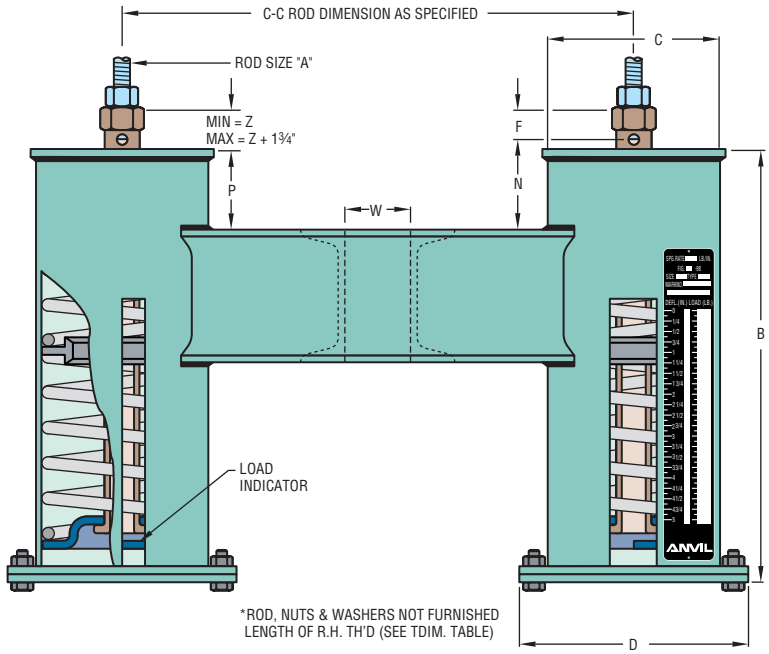


FIG. 98 TYPE G

The Anvil Variable Double Spring Hanger, Fig. 98, embodies all of the Fig. B-268 features and is designed to the same exacting specifications. Each basic unit consists of two springs arranged in series within a single casing. A centering guide is provided to assure the permanent alignment of the spring assembly. This hanger is offered in the seven basic types as shown here.

The load table and instructions for sizing this hanger may be found on page PH-133 through PH-135.

Fig. 98, C-98 — Double Spring

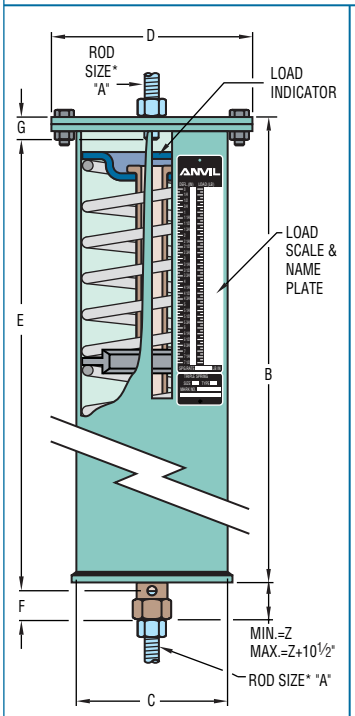
Fig. 98, C-98: Weight (lbs) • Dimensions (in)

Hanger Size	Rod Size A	R.H. Thread Length	Casing Length B	Casing Dia. C	Flange Dia. D	Min Thread Engage F	Z	Rod Take Out By Type A	Rod Take Out By Type B,C	Rod Take Out By Type E	Rod Take Out By Type G	Type A Thread Depth G	Types B, C Lug Hole Size	Types B, C Pin Hgt H	Types B, C R	Types B, C Clevis Opening S	Types B, C Thk. T	Type D Rod Length Y	Type D Nut Allow. K	Type D Hgt Spacer M
								E	J	Q	N									
0	½	9	12⅝	4	5⅛	15/16	15/16	12 3/16	14⅛	9	1½	7/16	11/16	1½	1¼	⅞	¼	19⅜	1¼	5½
1			14⅜				15/16	13 15/16	15⅞		1½							21⅛		
2			15⅞				11/16	15 3/16	17⅛		1¼							22½		
3	½	9	14	5 9/16	6 15/16	15/16	13/16	13 7/16	15⅜	9	1⅞	7/16	11/16	1½	1¼	⅞	¼	20¾	1¼	5½
4			15¼				13/16	15 3/16	17⅛		2⅜							22		
5			16⅝				11/16	15 15/16	17⅞		1¾							23⅜		
6	⅝	9	16 11/16	6⅝	8⅜	15/16	13/16	15 15/16	18 1/16	9	1⅞	⅝	13/16	1½	1¼	1 1/16	¼	23 11/16	1½	5½
7			18⅝				1⅛	18 3/16	20 5/16		2 3/16							25⅝		
8			19 9/16				11/16	18 11/16	20 13/16		1¾							26 9/16		
9	¾	9	20 3/16	8⅝	10¾	1¼	15/16	18⅞	21⅜	9	2 11/16	1	15/16	1½	1¼	1¼	⅜	27 7/16	1¾	5½
10			22⅝				1	21⅜	23⅞		2¾							29⅞		
11		10	18¼				⅞	16⅞	19⅜	12	2⅝							25½		
12	1	10	19½	8⅝	10¾	1¼	⅝	17⅞	20⅞	12	3⅜	1	1¼	2	1½	1⅝	½	27¼	2¼	5½
13			24¾				¾	23¼	26¼		3½							32⅜		
14	1¼		24⅞				½	23⅛	27⅛		3¼		1½	3	2	2	⅝	33⅜	3	
15	1¼	10	24⅞	8⅝	10¾	1 15/16	½	23⅛	27⅛	12	3¼	1	1½	3	2	2	⅝	33¾	3	5½
16	1½	11	29⅞		11⅜		2	28 9/16	32 15/16	7	4 1/16	1⅜	1¾		2½	2⅜		38⅞	3½	
17	1¾	12	34				2⅛	32 13/16	37 3/16		4 3/16		2			2⅝	¾	43½	4	
18	2	12	33¼	12¾	15⅞	2¾	2 11/16	31⅛	37 3/16	7	4⅛	2¼	2⅜	4	3	2⅞	¾	43 3/16	4 9/16	5½
19	2¼	13	37¾				2 9/16	35½	42⅛		4		2⅝	4½		3⅛		48⅛	5	
20	2½	14	44¼				2 11/16	42⅛	48¾		4⅛		2⅞		4	3⅜	1	55 3/16	5 9/16	
21	2¾	14	49⅞	12¾	16⅞	3⅝	2 11/16	45 7/16	52 11/16	7	3 5/16	2¾	3⅛	4½	4	3⅝	1	60⅝	6¼	5½
22	3	15	62				3½	58⅛	66⅛		4⅛	3	3⅜	5		3⅞		73⅛	6⅝	

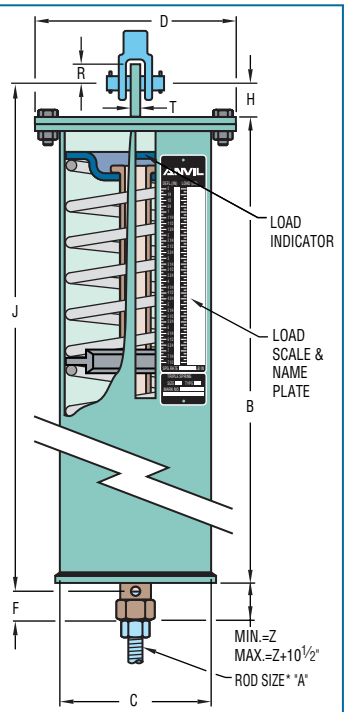
Hanger Size	Type F: E' Bottom Flange Size Sq.	E' Bottom Flange Bolt Circle Min	E' Bottom Flange Bolt Circle Max	Bottom Flange Bolts	Bottom Flange Thick	Load Col. Dia.	Load Flange Dia.	Load Flange Thick.	Length X ■ Min	Length X ■ Max	Type G: Channel Size (lbs/ft)	Type G: Max C-C	Type G: Space Between Channels - W	Type G: P	Weight: Type A,B,C	Weight: Type D,E	Weight: Type F	Weight: Type G*
0	7½	7	8¾	⅝	¼	1.90	3⅞	3/16	14 3/16	16 3/16	C3 x 4.1	24	⅝	1½	12	12	20	37
1									15 15/16	17 15/16					14	14	21	41
2									17 7/16	19 7/16					16	16	23	45
3	7½	7	8¾	¾	¼	2.88	5¾	3/16	15⅝	17⅝	C3 x 4.1	30	¾	2	22	21	35	55
4									16⅞	18⅞					25	24	39	61
5									18¼	20¼					27	26	41	65
6	9	8	10⅞	¾	⅜	3.50	6⅜	¼	18⅜	20⅜	C3 x 4.1	36	1	2	41	40	62	93
7									20 5/16	22 5/16					49	48	72	109
8									21¼	23¼					61	52	75	133
9	13¼	10 9/16	16½	¾	½	4.50	8⅜	½	21⅞	23⅞	C4 x 5.4	36	1¼	3	97	94	136	207
10									24 5/16	26 5/16					114	108	150	241
11									19 15/16	21 15/16					96	95	134	209
12	13¼	10 9/16	16½	¾	½	4.50	8⅜	½	21 3/16	23 3/16	C5 x 6.7	36	1½	4	108	104	144	223
13									26 7/16	28 7/16					144	139	181	305
14									26 9/16	28 9/16		33			153	147	188	323
15	13¼	10 9/16	16½	¾	½	4.50	8⅜	½	26 9/16	28 9/16	C6 x 10.5	36	1½	4	172	163	201	368
16						2.00			31⅞	33⅞	C8 x 11.5		2⅛		218	202	241	462
17									36	38					273	247	287	572
18	17¼	15¾	22	¾	⅝	2.50	12½	½	35 5/16	37 5/16	C12 x 20.7	42	2⅜	4	512	477	550	1,056
19									39 13/16	41 13/16					600	548	624	1,231
20									46 5/16	48 5/16		40			802	723	807	1,633
21	17¼	15¾	22	¾	⅝	3.00	12½	½	51⅞	53⅞	C15 x 33.9	48	3⅛	4	940	845	872	1,965
22									64	66			3⅜		1,240	1,140	1,184	2,566

■ Hanger take-out or installed height. With pipe movement up, cold to hot, installed height should be the mid point between the minimum and maximum "X" dimension, plus thickness of load flange. With pipe movement down, cold to hot installed height should be mid-point between the minimum and maximum "X" dimension, plus the amount of vertical movement and load flange thickness. (Type F only).
*Weight based on 24" center-to-center dimension. See page PH-140 for type F roller information.

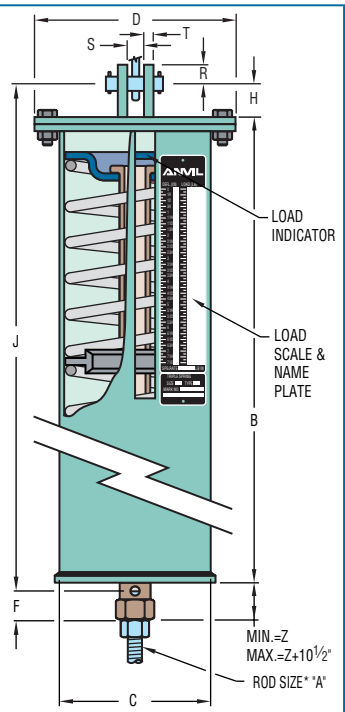
Triple Spring, Triple Spring-CR



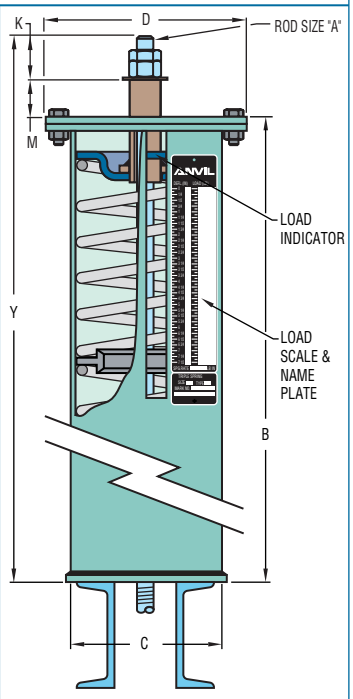
TRIPLE TYPE A



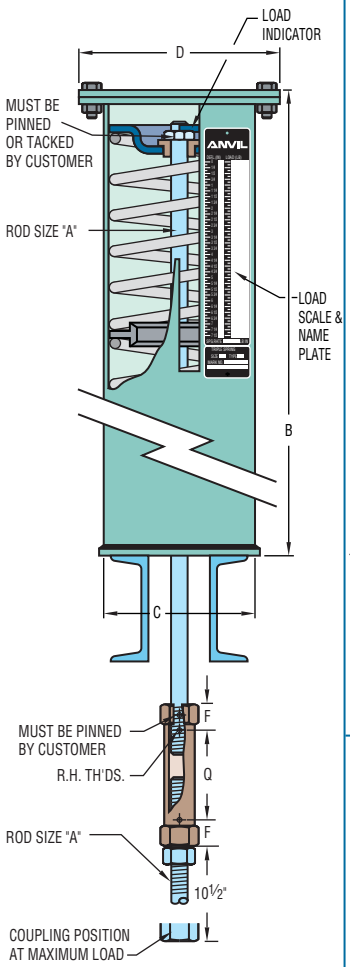
TRIPLE TYPE B



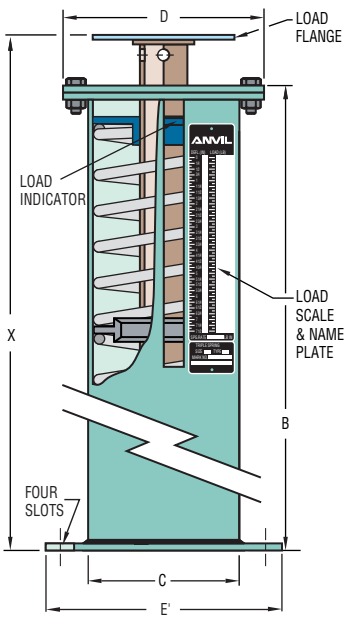
TRIPLE TYPE C



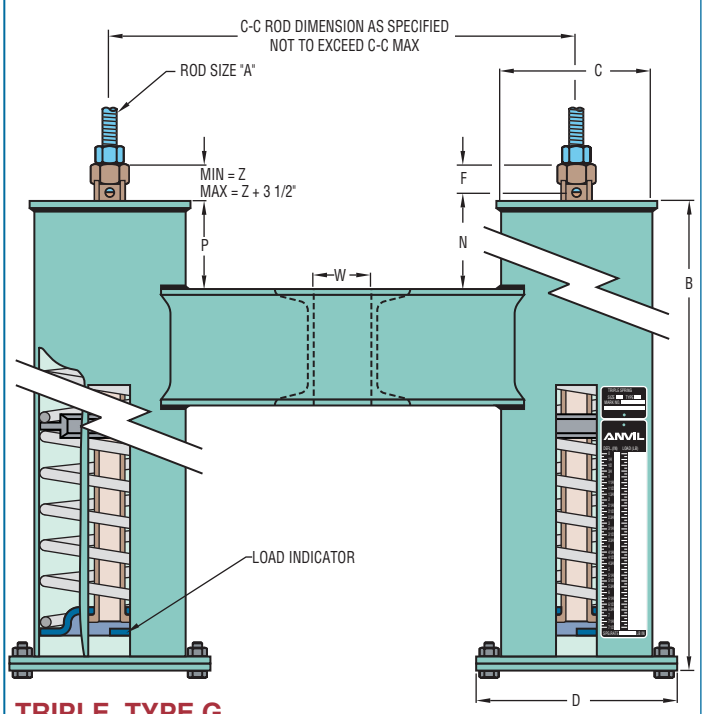
TRIPLE TYPE D



TRIPLE TYPE E



TRIPLE TYPE F



TRIPLE TYPE G

The Anvil Variable Triple Spring Hanger, embodies all of the Fig. B-268 features and is designed to the same exacting specifications. Each basic unit consists of three springs arranged in series within a single casing. A centering guide is provided to assure the permanent alignment of the spring assembly. This hanger is offered in the seven basic types as shown here.

The load table and instructions for sizing this hanger may be found on page PH-133 through PH-135.

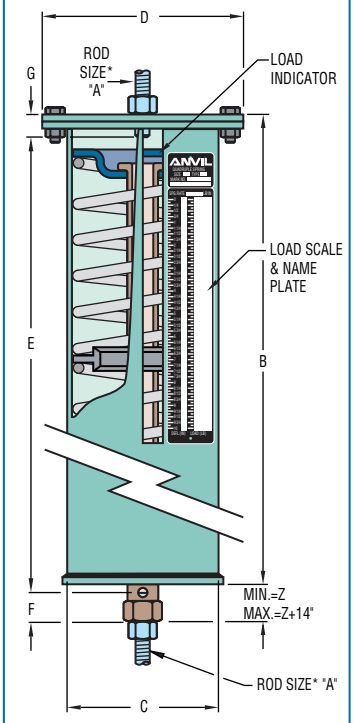
Triple Spring, Triple Spring-CR

Triple Spring: Dimensions (in)

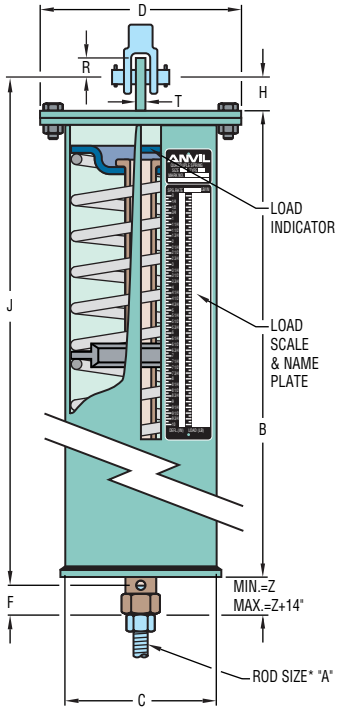
Hanger Size	General Dimensions						Rod Take Out For Types					Type A	Type D		Type F		Type G
	Rod Size A	R.H. Thread Length	Casing Length B	Casing Dia. C	Min Thread F	Z	A / E	B & C / J	D / Y	E / Q	G / N	Depth Thread G	K	M	Loaded Length Dim X Min	Loaded Length Dim X Max	P
0	½	12	19 1/8	4	15/16	15/16	19 1/8	20 5/8	28 1/8	11 1/8	1 1/2	7/16	1 1/4	7 3/4	20 15/16	22 15/16	1 1/2
1			21 3/4				21 3/4	23 1/4	30 3/4						23 9/16	25 9/16	
2			24				24	25 1/2	33						25 13/16	27 9/16	
3	½	12	21 3/16	5 9/16	15/16	15/16	21 3/16	22 11/16	30 3/16	11 1/8	2	7/16	1 1/4	7 3/4	23	25	2
4			23 1/16				23 1/16	24 9/16	32 1/16						24 7/8	26 7/8	
5			25 1/8				25 1/8	26 5/8	34 1/8						26 15/16	28 15/16	
6	5/8	12	25	6 5/8	15/16	15/16	25	26 1/2	34 3/16	11 1/8	2	5/8	1 1/2	7 11/16	26 15/16	28 15/16	2
7		13	27 15/16				27 15/16	29 7/16	37 1/8						29 7/8	31 7/8	
8			29 5/16				29 5/16	30 13/16	38 1/2						31 1/4	33 1/4	
9	¾	13	29 9/16	8 5/8	1 1/4	1 1/4	29 9/16	31 1/16	38 7/8	11 1/2	3	1	1 3/4	7 9/16	31 5/8	33 5/8	3
10			33 1/4				33 1/4	34 3/4	42 9/16						35 5/16	37 5/16	
11			26 11/16				26 11/16	28 3/16	36				2		28 3/4	30 3/4	
12	1	13	28 9/16	8 5/8	1 1/4	1 1/4	28 9/16	30 9/16	38 3/8	11 1/2	3 7/8	1	2 1/4	7 9/16	30 5/8	32 5/8	4
13		14	36 1/4				36 1/4	38 1/4	46 1/16				2 1/2		38 5/16	40 5/16	
14	1 1/4		36 3/4		1 3/8		36 3/4	39 5/8	47 5/16		4				38 13/16	40 13/16	
15	1 1/4	14	36 5/8	8 5/8	1 3/8	1 1/4	36 5/8	39 1/2	47 3/16	10 9/16	4	1 3/8	3	7 9/16	38 11/16	40 11/16	4
16	1 1/2	15	44 1/16		1 15/16	1 15/16	44 1/16	47 1/16	54 5/8	11 1/16			3 1/2	7 1/16	46 1/8	48 1/8	
17	1 3/4		50 1/4				50 1/4	53 1/4	61 5/16	11 9/16			4		52 5/16	54 5/16	
18	2	16	49 1/8	12 3/4	2 3/4	2 3/4	49 1/8	53 1/8	60 11/16	10 7/8	4	2 1/4	4 9/16	7	51 5/16	53 5/16	4
19	2 1/4		55 7/8				55 7/8	60 3/8	67 7/8	11 7/16			5		58 1/16	60 1/16	
20	2 1/2	17	65 5/8				65 5/8	70 1/8	78 3/16	11 15/16			5 9/16		67 13/16	69 13/16	
21	2 3/4	17	73 5/16	12 3/4	3 5/8	3 5/8	73 5/16	76 13/16	87 7/8	11	4	2 3/4	6 1/4	9 5/16	75 7/16	77 7/16	4
22	3	18	91 1/2				91 1/2	95 1/2	106 7/16	11 1/2		3	6 5/8		93 5/8	95 5/8	

See Fig. B-268 for dimensions not listed

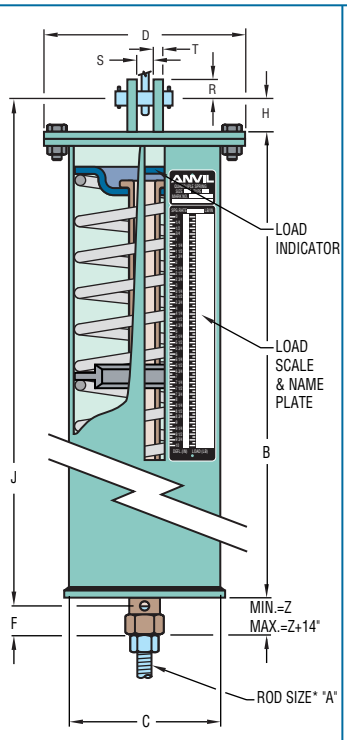
Quadruple Spring, Quadruple Spring-CR



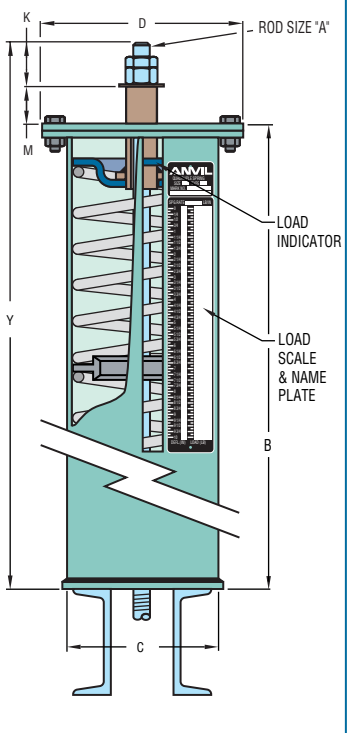
QUADRUPLE TYPE A



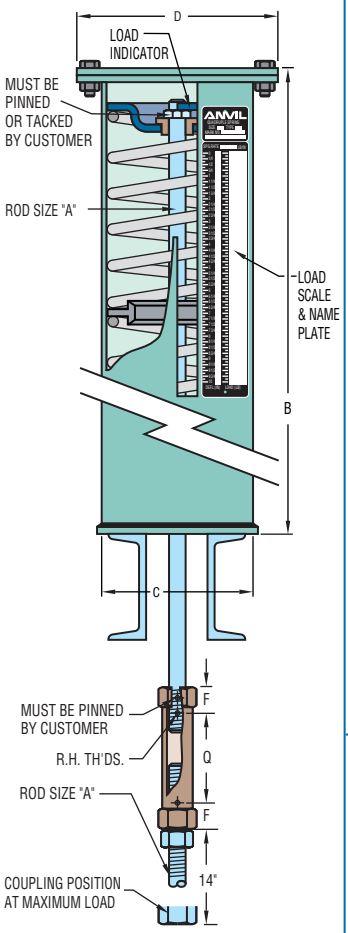
QUADRUPLE TYPE B



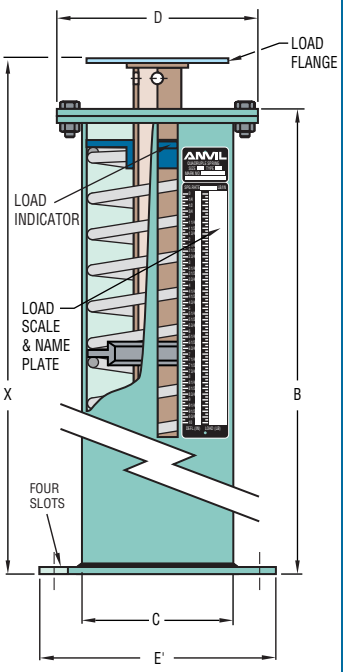
QUADRUPLE TYPE C



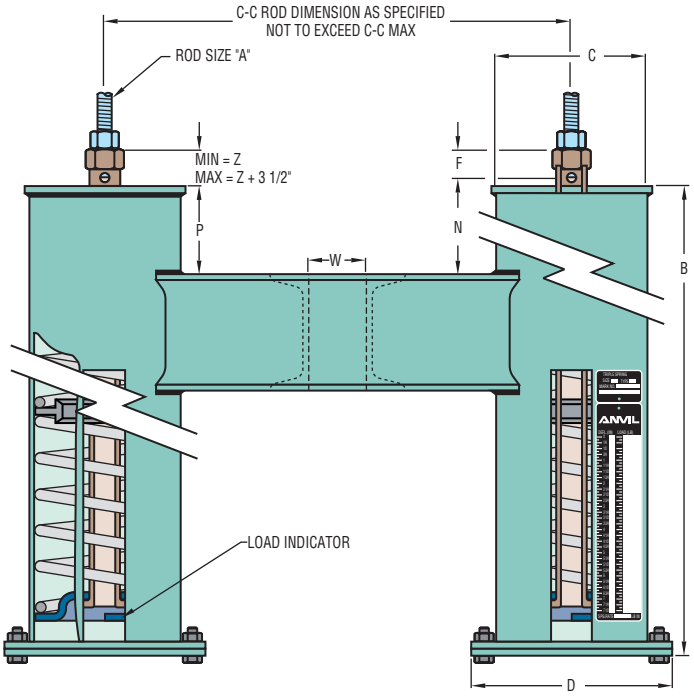
QUADRUPLE TYPE D



QUADRUPLE TYPE E



QUADRUPLE TYPE F



QUADRUPLE TYPE G

The Anvil Variable Quadruple Spring Hanger, embodies all of the Fig. B-268 features and is designed to the same exacting specifications. Each basic unit consists of four springs arranged in series within a single casing. A centering guide is provided to assure the permanent alignment of the spring assembly. This hanger is offered in the seven basic types as shown here.

The load table and instructions for sizing this hanger may be found on page PH-133 through PH-135.

Quadruple Spring, Quadruple Spring-CR

Quadruple Spring: Dimensions (in)

Hanger Size	General Dimensions						Rod Take Out for Types					Type A	Type D		Type F		Type G
	Rod Size A	R.H. Thd Lth	Casing Length B	Casing Dia C	Min Thd F	Z	A / E	B & C / J	D / Y	E / Q	G / N	Depth Thd G	K	M	Loaded Length Dim X Min	Loaded Length Dim X Max	P
0	½	16	25 1/8	4	15/16	15/16	25 1/8	26 5/8	37 1/8	15 1/8	1 1/2	7/16	1 1/4	7 3/4	26 15/16	28 15/16	1 1/2
1			28 5/8				28 5/8	30 1/8	40 5/8						30 7/16	32 7/16	
2			31 5/8				31 5/8	33 1/8	43 5/8						33 7/16	35 7/16	
3	½	16	27 7/8	5 9/16	15/16	15/16	27 7/8	29 3/8	39 7/8	15 1/8	2	7/16	1 1/4	7 3/4	29 11/16	31 11/16	2
4			30 3/8				30 3/8	31 7/8	42 3/8						32 3/16	34 3/16	
5			33 1/8				33 1/8	34 5/8	45 1/8						34 15/16	36 15/16	
6	5/8	16	32 15/16	6 5/8	15/16	15/16	32 15/16	34 7/16	45 1/8	15 1/8	2	5/8	1 1/2	7 9/16	34 7/8	36 7/8	2
7			36 7/8				36 7/8	38 3/8	49 1/16						38 13/16	40 13/16	
8			38 11/16				38 11/16	40 3/16	50 7/8						40 5/8	42 5/8	
9	¾	16	38 13/16	8 5/8	1 1/4	1 1/4	38 13/16	40 5/16	51 1/8	15 1/2	3	1	1 3/4	7 1/16	40 7/8	42 7/8	3
10			43 3/4				43 3/4	45 1/4	56 1/16						45 13/16	47 13/16	
11		17	35				35	36 1/2	47 5/16				2		37 1/16	39 1/16	
12	1	17	37 1/2	8 5/8	1 1/4	1 1/4	37 1/2	39 1/2	50 5/16	15 1/2	3 7/8	1	2 1/4	7 1/16	39 9/16	41 9/16	4
13			47 3/4				47 3/4	49 3/4	60 9/16				2 1/2		49 13/16	51 13/16	
14	1 1/4		48 3/8		1 3/8		48 3/8	51 1/4	61 15/16		4				50 7/16	52 7/16	
15	1 1/4	18	48 1/8	8 5/8	1 3/8	1 1/4	48 1/8	51	61 15/16	15 1/2	4	1 3/8	3	7 1/16	50 3/16	52 3/16	4
16	1 1/2		57 7/8		1 15/16	1 15/16	57 7/8	60 7/8	71 7/16	15 1/16			3 1/2		59 15/16	61 15/16	
17	1 3/4	19	66 1/8				66 1/8	69 1/8	80 3/16	15 9/16			4		68 3/16	70 3/16	
18	2	19	64 1/8	12 3/4	2 3/4	2 3/4	64 1/8	68 1/8	78 11/16	14 7/8	4	2 1/4	4 9/16	7	66 5/16	68 5/16	4
19	2 1/4	20	73 1/8				73 1/8	77 5/8	88 1/8	15 7/16			5		75 5/16	77 5/16	
20	2 1/2		86 1/8				86 1/8	90 5/8	101 11/16	15 15/16			5 9/16		88 5/16	90 5/16	
21	2 3/4	21	95 7/8	12 3/4	3 5/8	3 5/8	95 7/8	99 3/8	113 7/16	15	4	2 3/4	6 1/4	9 5/16	98	100	4
22	3		120 1/8				120 1/8	124 1/8	138 7/16	15 1/2		3	6 5/8		122 1/4	124 1/4	

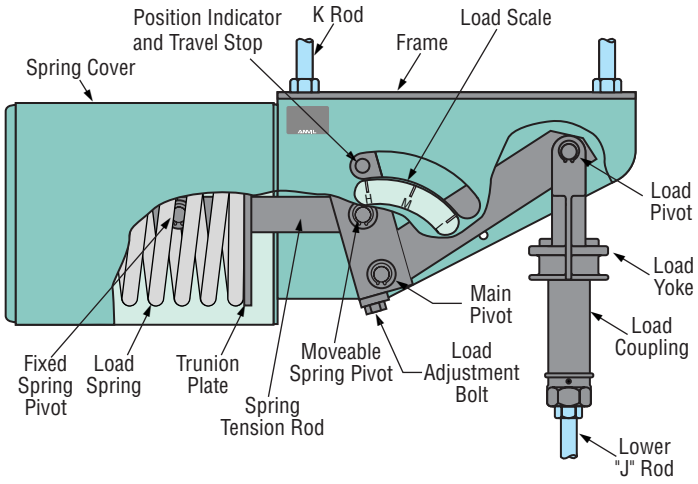
See Fig. B-268 for dimensions not listed

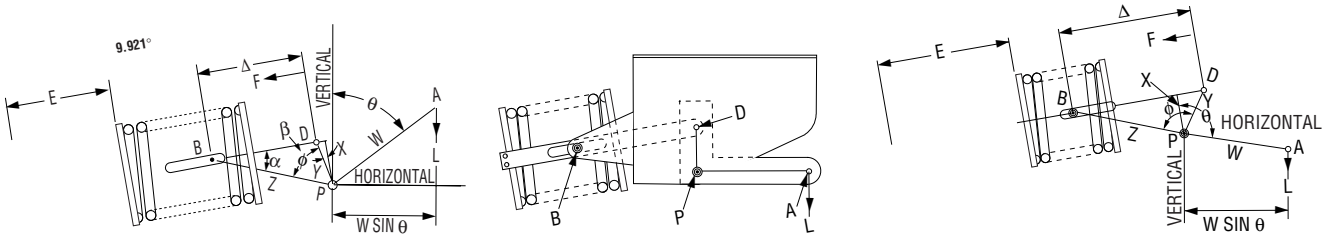
Model R — Mathematically Perfect Pipe Support

The exclusive geometric design of Anvil Model R Constant Support Hanger assures perfectly constant support through the entire deflection of the pipe load. This counter-balancing of the load and spring moments about the main pivot is obtained by the use of carefully designed compression type load springs, lever, and spring tension rods.

As the lever moves from the high to the low position, the load spring is compressed and the resulting increasing force acting on the decreasing spring moment arm creates a turning moment about the main pivot which is exactly equal and opposite to the turning moment of the load and load moment arm.

As the lever moves from the low to the high position, the load spring is increasing in length and the resulting decreasing force acting on the increasing spring moment arm creates a turning moment about the main pivot which is exactly equal and opposite to the turning moment of the load and load moment arm.





(1)

$$\frac{\sin\alpha}{Y} = \frac{\sin\phi}{\Delta} \qquad \sin\beta = X$$

$$\frac{\sin\alpha}{Y} = \frac{\sin\beta}{Z} \qquad \sin\alpha = \frac{X}{Z}$$

$$\sin\alpha = \frac{Y\sin\beta}{Z}$$

Substituting in (1), we have (2) $\frac{X}{YZ} = \frac{\sin\phi}{\Delta}$ and (3) $X = \frac{YZ\sin\phi}{\Delta}$

The load "L" is suspended from the lever at point "A" and at any point within the load travel range the moment of the load about the main lever-pivot "P" is equal to the load times its moment arm, thus:

(4) Load moment = $L\ (W\sin\theta)$, where $(W\sin\theta)$ is the load moment arm

The spring is attached at one of its ends to the fixed pivot "B". The spring's free end is attached by means of a rod to the lever-pivot "D". This spring arrangement provides a spring moment about the main lever-pivot "P" which opposes the load moment and is equal to the spring force "F" times its moment arm; thus:

(5) Spring Moment = $F\left(\frac{YZ\sin\phi}{\Delta}\right)$,

where $\left(\frac{YZ\sin\phi}{\Delta}\right)$ is the spring moment arm

The spring force "F" is equal to the spring constant "K" times the spring deflection "E"; thus:

(6) $F = KE$; Therefore equation (5) may be written as:

(7) Spring Moment = $KE\left(\frac{YZ\sin\phi}{\Delta}\right)$

To obtain perfect constant support the load moment must always equal the spring moment. Therefore:

(8) $LW = \left(\frac{KEYZ\sin\phi}{\Delta}\right)$

By proper design "ϕ" and "θ" are made equal. Therefore, equation (8) may be written as:

(9) $LW = \left(\frac{KEYZ}{\Delta}\right)$

The spring and the rod are so arranged that the spring deflection "E" always equals the distance "Δ" between pivots "B" and "D". Therefore, equation (9) may be written as:

(10) $LW = KYZ$ or, (11) $L = (KYZ)/W$

Since equation (11) holds true for all positions of the load within its travel range and "K", "Y", "Z", and "W" remain constant it is therefore true that perfect constant support is obtained.

Model R Fig. 80-V, C-80-V Vertical
Model R Fig. 81-H, C-81-H Horizontal

Constant Support

Model R
Fig. 80-V,
Vertical

Model R
Fig. 81-H,
Horizontal

Finish: Standard finish; painted with semi gloss primer. Corrosion resistant; galvanized with coated coil or painted with CZ11 and coated coil.

Recommended Service: When piping stress is critical and pipe is subject to vertical movement in excess of ½" due to thermal expansion, and also at locations where it is necessary to avoid any transfer of stress from support or onto critical terminals or connecting equipment.

Approvals: WW-H-171E (Types 52, 58 and 59) and MSS-SP-69 (Types 54, 55 and 56).

Features:

- Because of exclusive geometric design, mathematically perfect constancy of support is maintained throughout the full range of load adjustment.
- Compactness – design provides smaller and more versatile units.
- Increased load and travel capacity.
- Each hanger is individually calibrated before shipment to support the exact load specified.
- All model R constant supports have a wide range of load adjustability. No less than 10% of this adjustability is provided either side of the calibrated load.
- White button marked “C” denotes cold setting of hanger; red button marked “H” denotes hot or operating setting.
- Field load adjustment is made by turning the single load adjustment bolt.
- Covered spring provides protection and good appearance.
- J-rod swings at least 4° from vertical.
- Non-resonant to all vertical vibrations.

Size Range: Anvil Model R constant support hangers are made in two basic designs, 80- V (vertical design) and 81-H (horizontal design). Combined, the 80-V and 81-H constant supports are made in nine different frame sizes and 110 spring sizes to accommodate travels from 1½" to 20" and loads from 27lbs to 87,500 lbs.

Single rod suspension: Available in Types A, B and C, Fig. 80-V (see page PH-158 through PH-160) and Fig. 81-H (see page PH-165 through PH-167).

How to select hanger sizes: Determine the total load to be supported by the hanger as well as the actual travel – that is, the actual vertical movement of the pipe at the point of hanger location. Refer to the Load-Travel table for constant support hangers (see page PH-154 through PH-157) and select a size hanger which will accommodate the known load and actual travel. It must be noted that the travel shown in the table is a total travel – that is, the maximum vertical movement which the hanger will accommodate. The total travel of the hanger should always be greater than the calculated travel of pipe line to allow for some discrepancy between calculated travel and actual travel. **It is suggested that the total travel for constant supports should be equal to “actual travel” plus 1" or 20% whichever is greater.**

How to determine type: After the size of the constant support is determined, consideration of available room for suspending the pipe and hanger will indicate whether a vertical (80-V series, page PH-158 - PH-164) or horizontal (81-H series, page PH-165 - PH-171) hanger is desirable.

How to determine design: After the hanger size and design are determined, the type of constant support to be used depends upon the physical installation required by the suspension problem, i.e., whether the hanger is to be installed above, between or below steel members (see line cuts referring to Types A, B, C, etc.). It will be noted that the Type F is made in horizontal design only and the type G is made in the vertical design only. **Special constant support hangers can be fabricated for unusual conditions.**

J-rod and K-hole diameter: Tapping or drilling for standard rod size will be furnished as shown in the J-rod and K-hole selection charts unless otherwise specified. Upper attachments, turnbuckles and clamps should be tapped to agree with the rod as shown in the selection chart. Standard rod diameters are based on the load to be carried by the upper rod which includes the weight of the hanger assembly as well as the pipe line. Tapped connections for hanger rod sizes 3" and smaller are UNC-Thread Series, Class 2 fit. 3¼" and large rod tappings are 8UN Series Threads.

Model R (Continued)

Ordering: Specify:

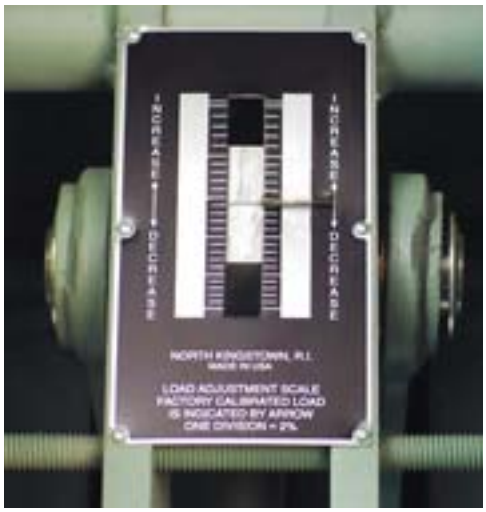
(1) Hanger size number
(2) Figure number
(3) Type
(4) Name of hanger
(5) Loads to be supported (pounds)
(6) Total travel (inches)
(7) Actual travel (inches)
(8) Direction of movement “cold to hot”
(9) Customer’s hanger mark.
(10) When ordering Type G, specify C-C rod dimension as well as load per spring and total load.
(11) For Types A, B, C, Fig. 81-H when required specify “for single rod suspension.”
(12) Constant Support Hangers are also available corrosion-resistant as figures C-80-V and C-81-H.

Installation:

(1) Securely attach the hanger to the building structure at a point where the load coupling is directly over the desired point of attachment to the pipe in the operating position.
(1) Make certain that the moving parts of the hanger will be unobstructed.
(2) Attach the lower J-rod between the pipe attachment and the load coupling. Make certain that the lower J-rod has enough thread engagement before taking up the load. A sight hole is provided for this.
(3) Turn the load coupling, as you would a turnbuckle, until the travel indicator rotates to the desired cold setting (white button) marked “C” indicated on the position scale. If the constant support incorporates a travel stop see below.
(4) After the line is in operation, check hanger for indicated hot setting. If necessary, make adjustment by turning the load coupling to bring the indicator to the hot position (red button) marked “H”. No other adjustment is normally required since the load as calibrated at the factory is equal to the load specified to be supported.

Adjustment: When the hanger is installed, its supporting force should be in balance with the portion of the piping weight assigned to it. Each hanger is individually calibrated before shipment to support the exact load specified. All model “R” Constant Supports have a wide range of load adjustability. Special instructions for field recalibration of individual hangers may be obtained from Anvil representatives. No less than 10% adjustability is provided either side of the calibrated load for plus or minus field load adjustment. The percentage increase or decrease from the factory calibrated load should be carefully calculated. The calibrated load setting of each hanger is indicated by a die-stamp on the load adjustment scale. Load adjustments should be made from this reference point, with each division on the patented scale equal to 2% except sizes 84-110 where each division is valued at 1%. The load adjustment is made by turning the single load adjustment bolt. For example, a calibrated load of 3,000 pounds revised to 2,760 pounds is a decrease of 240 pounds. 240/3,000 = 8%. By turning the load adjusting bolt the arrow moves in the "Decrease" direction four divisions.

Note: Field Recalibration of load does not decrease total travel.



Load adjustment scale shown applies to size 1 through 83 only.
The load adjustment scale for sizes 84 through 110
1 division equals 1%

Travel stop: The functional design of the Constant Support Hanger permits the incorporation of a travel stop that will lock the hanger against upward or downward movement for temporary conditions of underload or overload, such as may exist during erection, hydrostatic test or chemical clean-out. Anvil Constant Supports are designed for hydrostatic test load of at least 2 times the normal operating load for the Constant Support. The travel stop for sizes 19 - 110 consists of two plates, with matched serrations, attached to the hanger frame with two or more cap screws and with a socketed piece which engages the position indicator. It is installed at the factory to hold the hanger in the “cold” position. A series of serrations can be engaged to lock the hanger at any position along the total travel range. The travel stop, which is furnished only when specified, is painted red. The stop must be removed before the piping system is put into operation, but not before the hanger is installed and fully loaded. The travel stop is released by removing the cap screws. A tag marked “Caution” and containing instructions for removal of the travel stop is attached to the hanger.

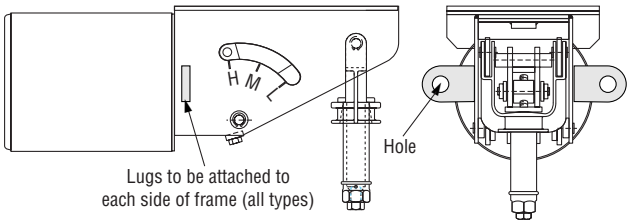
Note: See installation procedures PE-217-80 for a travel stop description on sizes 1-18.

Model R (Continued)

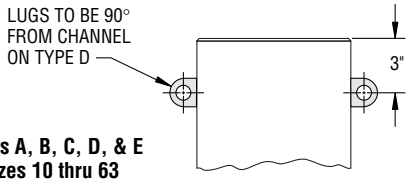
Model R lifting lugs:

To help alleviate the problem of lifting large size Constant Supports into position for installation, this product is available with lifting lugs (if requested) on sizes ten and larger.

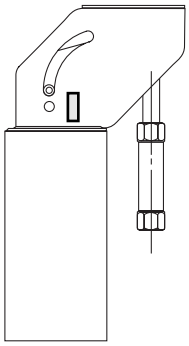
Lifting Lugs (Figure 81-H):



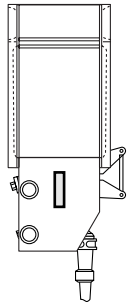
Lifting Lugs (Fig 80-V):



Types A, B, C, D, & E
sizes 10 thru 63

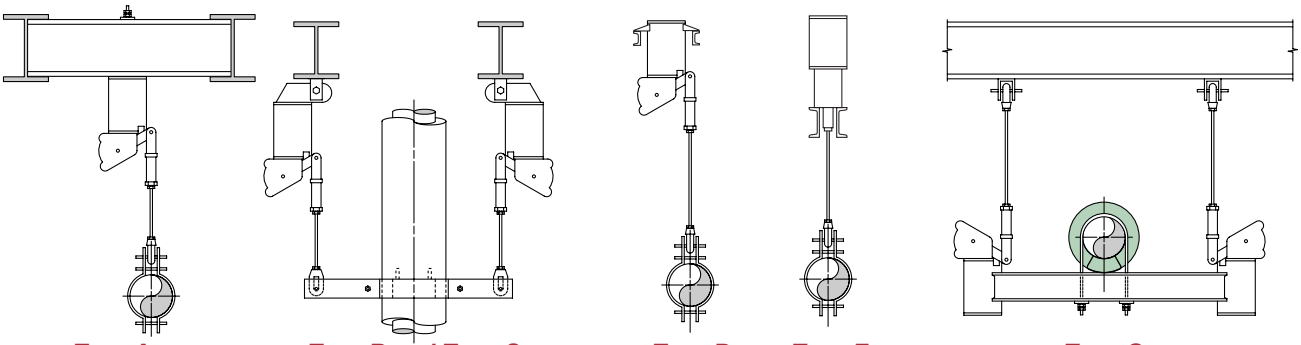


sizes 84 thru 110



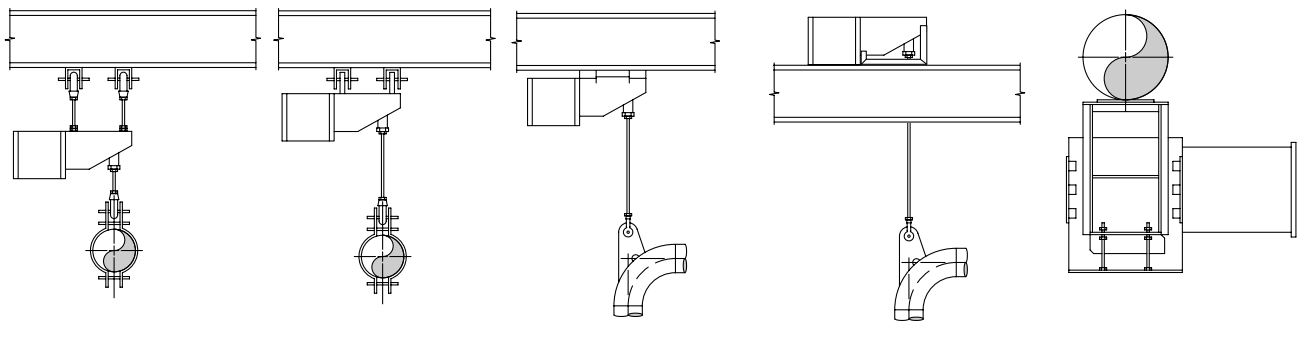
sizes 64 thru 83
Lugs to be attached to each side of frame and will need stabilizing rigging when being lifted

Fig. 80V (Vertical): Typical Applications



Type A | Type B and Type C | Type D | Type E | Type G

Fig. 81-H (Horizontal): Typical Applications



Type A | Type B and Type C | Type D | Type E | Type F

ANVIL® INTERNATIONAL, INC.

Hanger Size No.	Total Travel* (in); Load (lbs) See notes on page PH-157														
	1½	2	2½	3	3½	4	4½	5	5½	6	6½	7	7½	8	8½
1	144	108	86	72	62	54	48	43	39	36	33	31	29	27	
	173	130	104	87	74	65	58	52	47	43	40	37	35	33	
2	204	153	122	102	87	77	68	61	56	51	47	44	41	38	
3	233	175	140	117	100	88	78	70	64	58	54	50	47	44	
4	280	210	168	140	120	105	93	84	76	70	65	60	56	53	
5	327	245	196	163	140	123	109	98	89	82	75	70	65	61	
6	373	280	224	187	160	140	124	112	102	93	86	80	75	70	
7	451	338	270	225	193	169	150	135	123	113	104	97	90	85	
8	527	395	316	263	226	198	176	158	144	132	122	113	105	99	
9	600	450	360	300	257	225	200	180	164	150	138	129	120	113	
10	727	545	436	363	311	273	242	218	198	182	168	156	145	136	
11	851	638	510	425	365	319	284	255	232	213	196	182	170	160	
12	977	733	586	489	419	367	326	293	267	244	226	209	195	183	
13	1,177	883	706	589	505	442	392	353	321	294	272	252	235	221	
14	1,373	1,030	824	687	589	515	458	412	375	343	317	294	275	258	
15	1,573	1,180	944	787	674	590	524	472	429	393	363	337	315	295	
16	1,893	1,420	1,136	947	811	710	631	568	516	473	437	406	379	355	
17	2,217	1,663	1,330	1,109	950	832	739	665	605	554	512	475	443	416	
18	2,540	1,905	1,524	1,270	1,089	953	847	762	693	635	586	544	508	476	
19		2,025	1,620	1,350	1,157	1,013	900	810	736	675	623	579	540	506	448
															476
20		2,145	1,716	1,430	1,226	1,073	953	858	780	715	660	613	572	536	505
21		2,335	1,868	1,557	1,334	1,168	1,038	934	849	778	718	667	623	584	549
22		2,525	2,020	1,683	1,443	1,263	1,122	1,010	918	842	777	721	673	631	594
23		2,710	2,168	1,807	1,549	1,355	1,204	1,080	985	903	834	775	723	678	638
24		2,910	2,328	1,940	1,663	1,455	1,293	1,164	1,058	970	895	831	776	728	685
25		3,110	2,488	2,073	1,777	1,555	1,382	1,244	1,131	1,037	957	889	829	778	732
26		3,310	2,648	2,207	1,891	1,655	1,471	1,324	1,204	1,103	1,018	946	883	828	779
27		3,630	2,904	2,420	2,074	1,815	1,613	1,452	1,320	1,210	1,117	1,037	968	908	854
28		3,950	3,160	2,633	2,257	1,975	1,756	1,580	1,436	1,317	1,215	1,129	1,053	988	929
29		4,270	3,416	2,847	2,440	2,135	1,898	1,708	1,553	1,423	1,314	1,220	1,139	1,068	1,005
30		4,535	3,628	3,023	2,591	2,268	2,016	1,814	1,649	1,512	1,395	1,296	1,209	1,134	1,067
31		4,795	3,836	3,197	2,740	2,398	2,131	1,918	1,744	1,598	1,475	1,370	1,279	1,199	1,128
32		5,060	4,048	3,373	2,891	2,530	2,249	2,024	1,840	1,687	1,557	1,446	1,349	1,265	1,191
33		5,295	4,236	3,530	3,026	2,648	2,353	2,118	1,925	1,765	1,629	1,513	1,412	1,324	1,246
34		5,525	4,420	3,683	3,157	2,763	2,456	2,210	2,009	1,842	1,700	1,579	1,473	1,381	1,300
35			4,696	3,913	3,354	2,935	2,609	2,348	2,135	1,957	1,806	1,677	1,565	1,468	1,381
36			4,968	4,140	3,549	3,105	2,760	2,484	2,258	2,070	1,911	1,774	1,656	1,553	1,461
37			5,240	4,367	3,743	3,275	2,911	2,620	2,382	2,183	2,015	1,871	1,747	1,638	1,541
38			5,616	4,680	4,011	3,510	3,120	2,808	2,553	2,340	2,160	2,006	1,872	1,755	1,652
39			5,988	4,990	4,277	3,743	3,327	2,994	2,722	2,495	2,303	2,139	1,996	1,871	1,761
40			6,360	5,300	4,543	3,975	3,533	3,180	2,891	2,650	2,446	2,271	2,120	1,988	1,871
41			6,976	5,813	4,983	4,360	3,876	3,488	3,171	2,907	2,683	2,491	2,325	2,180	2,052
42			7,588	6,323	5,420	4,743	4,216	3,794	3,449	3,162	2,919	2,710	2,529	2,371	2,232
43			8,200	6,833	5,857	5,125	4,556	4,100	3,727	3,417	3,154	2,929	2,733	2,563	2,412
44			8,724	7,270	6,231	5,453	4,847	4,362	3,965	3,635	3,355	3,116	2,908	2,726	2,566
45			9,284	7,737	6,631	5,803	5,158	4,642	4,220	3,868	3,571	3,316	3,095	2,901	2,731
46			9,760	8,133	6,971	6,100	5,422	4,880	4,436	4,067	3,754	3,486	3,253	3,050	2,871
47			10,376	8,647	7,411	6,485	5,764	5,188	4,716	4,323	3,991	3,706	3,459	3,243	3,052
48			10,988	9,157	7,848	6,868	6,104	5,494	4,995	4,578	4,226	3,924	3,663	3,434	3,232
49			11,600	9,667	8,286	7,250	6,444	5,800	5,273	4,833	4,462	4,143	3,867	3,625	3,412
50				10,367	8,886	7,775	6,911	6,220	5,655	5,183	4,785	4,443	4,147	3,888	3,659
51				11,067	9,486	8,300	7,378	6,640	6,036	5,533	5,108	4,743	4,427	4,150	3,906
52				11,847	10,154	8,885	7,898	7,108	6,462	5,923	5,468	5,077	4,739	4,443	4,181
53				12,623	10,820	9,468	8,415	7,574	6,886	6,311	5,826	5,410	5,049	4,734	4,455
54				13,400	11,486	10,050	8,933	8,040	7,309	6,700	6,185	5,743	5,360	5,025	4,730
55				14,713	12,611	11,035	9,809	8,828	8,026	7,356	6,791	6,306	5,885	5,518	5,193
56				16,023	13,734	12,018	10,682	9,614	8,740	8,011	7,396	6,867	6,409	6,009	5,655
57				17,333	14,857	13,000	11,555	10,400	9,455	8,666	8,000	7,429	6,933	6,500	6,118
58				18,423	15,791	13,818	12,282	11,054	10,049	9,211	8,503	7,896	7,369	6,809	6,503
59				19,510	16,723	14,633	13,007	11,706	10,642	9,755	9,005	8,362	7,804	7,316	6,886
60				20,600	17,657	15,450	13,733	12,360	11,236	10,300	9,508	8,829	8,240	7,725	7,271
61				21,890	18,763	16,418	14,593	13,134	11,940	10,945	10,103	9,382	8,756	8,209	7,726
62				23,176	19,665	17,383	15,451	13,906	12,642	11,588	10,697	9,933	9,270	8,691	8,180
63				24,463	20,968	18,348	16,309	14,678	13,344	12,231	11,291	10,484	9,785	9,174	8,634
"B (avg. in.)	1⅜	1⅞	2¼	2¾	3¼	3⅝	4⅛	4⅝	5⅛	5½	6	6½	6⅞	7⅜	7⅞

Table Continued on Facing Page

Constant Supports

Hanger Size No.	Total Travel* (in); Load (lbs) See notes on page PH-157														
	9	9½	10	10½	11	11½	12	12½	13	13½	14	14½	15	15½	16
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19	423	401	381												
	450	426	405												
20	477	452	429												
21	519	492	467												
22	561	532	505												
23	602	571	542												
24	647	613	582												
25	691	655	622												
26	736	697	662												
27	807	764	726												
28	878	832	790												
29	949	899	854												
30	1,008	955	907												
31	1,066	1,009	959												
32	1,124	1,065	1,012												
33	1,177	1,115	1,059												
34	1,228	1,163	1,105												
35	1,304	1,236	1,174	1,053	1,005	962	922	885	851	819	790				
				1,118	1,067	1,021	978	939	903	870	838				
36	1,380	1,307	1,242	1,183	1,129	1,080	1,035	994	955	920	887				
37	1,456	1,379	1,310	1,248	1,191	1,139	1,092	1,048	1,008	970	936				
38	1,560	1,478	1,404	1,337	1,276	1,221	1,170	1,123	1,080	1,040	1,003				
39	1,663	1,576	1,497	1,426	1,361	1,302	1,247	1,198	1,151	1,109	1,069				
40	1,767	1,674	1,590	1,514	1,445	1,383	1,325	1,272	1,223	1,178	1,136				
41	1,938	1,836	1,744	1,661	1,585	1,516	1,453	1,395	1,341	1,292	1,246				
42	2,108	1,997	1,897	1,807	1,724	1,649	1,581	1,518	1,459	1,405	1,355				
43	2,278	2,158	2,050	1,952	1,863	1,782	1,708	1,640	1,577	1,518	1,464				
44	2,423	2,296	2,181	2,077	1,983	1,896	1,817	1,745	1,678	1,615	1,558				
45	2,579	2,443	2,321	2,210	2,110	2,018	1,934	1,857	1,785	1,719	1,658				
46	2,711	2,568	2,440	2,324	2,218	2,122	2,033	1,952	1,877	1,807	1,743				
47	2,882	2,730	2,594	2,470	2,358	2,255	2,162	2,075	1,995	1,921	1,853				
48	3,052	2,891	2,747	2,616	2,497	2,389	2,289	2,198	2,113	2,035	1,962				
49	3,222	3,053	2,900	2,762	2,636	2,522	2,417	2,320	2,231	2,148	2,071				
50	3,456	3,274	3,110	2,962	2,827	2,704	2,592	2,488	2,392	2,304	2,221	2,001	1,934	1,871	1,813
												2,145	2,073	2,006	1,944
51	3,689	3,495	3,320	3,162	3,018	2,887	2,767	2,656	2,554	2,459	2,371	2,289	2,213	2,142	2,075
52	3,949	3,741	3,554	3,384	3,231	3,090	2,962	2,843	2,734	2,632	2,538	2,451	2,369	2,293	2,221
53	4,208	3,986	3,787	3,606	3,442	3,293	3,156	3,030	2,913	2,805	2,705	2,612	2,524	2,443	2,367
54	4,467	4,231	4,020	3,828	3,654	3,495	3,350	3,216	3,092	2,978	2,871	2,772	2,680	2,593	2,513
55	4,904	4,646	4,414	4,203	4,012	3,838	3,678	3,531	3,395	3,269	3,152	3,044	2,942	2,847	2,759
56	5,341	5,060	4,807	4,518	4,370	4,180	4,006	3,846	3,698	3,561	3,433	3,315	3,204	3,101	3,004
57	5,778	5,474	5,200	4,952	4,727	4,521	4,333	4,160	4,000	3,852	3,714	3,586	3,466	3,355	3,250
58	6,141	6,818	5,527	5,263	5,024	4,806	4,606	4,422	4,251	4,094	3,947	3,811	3,684	3,565	3,454
59	6,503	6,161	5,853	5,574	5,320	5,089	4,877	4,682	4,502	4,335	4,180	4,036	3,902	3,776	3,658
60	6,867	6,505	6,180	5,885	5,618	5,374	5,150	4,944	4,754	4,578	4,414	4,262	4,120	3,987	3,863
61	7,297	6,912	6,567	6,254	5,969	5,710	5,472	5,254	5,051	4,864	4,690	4,529	4,378	4,236	4,104
62	7,725	7,319	6,953	6,621	6,320	6,046	5,794	5,562	5,348	5,150	4,965	4,795	4,635	4,485	4,346
63	8,154	7,725	7,339	6,989	6,671	6,381	6,116	5,871	5,645	5,436	5,242	5,061	4,892	4,734	4,587
"B (avg. in.)	8¼	8¾	9¼	9⅝	10⅛	10⅝	11	11½	12	12⅜	12⅞	13⅜	13⅞	14¼	14¾

Table Continued on Facing Page

Hanger Size No.	Total Travel* (in); Load (lbs) See notes on page PH-157																	
	4	4½	5	5½	6	6½	7	7½	8	8½	9	9½	10	10½	11	11½	12	
64	19,225	17,089	15,380	13,982	12,816	11,831	10,986	10,253	9,613	9,047	8,544	8,094	7,690	7,323	6,990	6,686	6,408	
65	20,100	17,866	16,080	14,618	13,400	12,370	11,486	10,720	10,050	9,459	8,933	8,463	8,040	7,657	7,308	6,991	6,700	
66	22,068	19,615	17,654	16,049	14,711	13,580	12,610	11,769	11,034	10,385	9,808	9,291	8,827	8,406	8,024	7,675	7,356	
67	24,033	21,362	19,226	17,478	16,021	14,790	13,733	12,817	12,016	11,310	10,681	10,119	9,613	9,154	8,738	8,359	8,011	
68	26,000	23,111	20,800	18,909	17,333	16,000	14,857	13,866	13,000	12,236	11,555	10,947	10,400	9,904	9,454	9,043	8,666	
69	27,635	24,564	22,108	20,098	18,423	17,007	15,792	14,738	13,818	13,005	12,282	11,635	11,054	10527	10,048	9,611	9,211	➢
70	29,268	26,015	23,414	21,286	19,511	18,011	16,725	15,609	14,632	13,773	13,008	12,323	11,707	11,149	10,642	10,179	9,755	➢
71	30,900	27,466	24,720	22,473	20,599	19,016	17,657	16,480	15,450	14,542	13,733	13,010	12,360	11,770	11,235	10,747	10,300	
72	32,835	29,186	26,268	23,880	21,889	20,207	18,763	17,512	16,418	15,452	14,593	13,825	13,134	12,508	11,939	11,420	10,945	
73	34,768	30,904	27,814	25,286	23,177	21,396	19,868	18,542	17,384	16,362	15,452	14,639	13,907	13,244	12,641	12,092	11,589	
74	36,700	32,622	29,360	26,691	24,466	22,585	20,972	19,573	18,350	17,271	16,311	15,452	14,680	13,980	13,344	12,764	12,233	
75	38,800	34,489	31,040	28,218	25,866	23,878	22,172	20,693	19,400	18,259	17,244	16,336	15,520	14,780	14,108	13,495	12,933	
76	40,900	36,355	32,720	29,746	27,266	25,170	23,372	21,813	20,450	19,248	18,178	17,221	16,360	15,580	14,871	14,225	13,633	
77	43,000	38,222	34,400	31,273	28,666	26,462	24,572	22,933	21,500	20,236	19,111	18,105	17,200	16,380	15,635	14,955	14,333	➢
78	45,335	40,297	36,268	32,971	30,222	27,899	25,906	24,178	22,668	21,335	20,149	19,088	18,134	17,269	16,484	15,768	15,111	➢
79	47,668	42,371	38,134	34,668	31,779	29,335	27,239	25,422	23,834	22,432	21,185	20,070	19,067	18,158	17,332	16,579	15,889	
80	50,000	44,444	40,000	36,364	33,332	30,770	28,572	26,666	25,000	23,530	22,222	21,052	20,000	19,046	18,180	17,390	16,666	
81	52,500	46,666	42,000	38,182	35,000	32,309	30,000	27,999	26,250	24,707	23,333	22,105	21,000	19,998	19,089	18,260	17,500	
82	55,000	48,888	44,000	40,000	36,665	33,847	31,429	29,333	27,500	25,883	24,444	23,157	22,000	20,951	20,000	19,129	18,333	
83	57,500	51,111	46,000	41,819	38,332	35,386	32,858	30,666	28,750	27,060	25,555	24,210	23,000	21,903	20,907	20,000	19,166	
84			49,200	44,728	40,998	37,847	35,144	32,799	30,750	28,942	27,333	25,894	24,600	23,427	22,361	21,390	20,500	
85			52,400	47,637	43,665	40,309	37,429	34,932	32,750	30,824	29,111	27,578	26,200	24,950	23,816	22,781	21,832	
86			55,400	50,364	46,165	42,616	39,572	36,932	34,625	32,589	30,777	29,157	27,700	26,379	25,179	24,085	23,082	
87			58,400	53,091	48,665	44,924	41,715	38,932	36,500	34,354	32,444	30,736	29,200	27,807	26,543	25,389	24,332	
88			61,400	55,819	51,165	47,232	43,858	40,932	38,375	36,119	34,111	32,315	30,700	29,236	27,906	26,694	25,582	
89			66,000	60,000	54,998	50,771	47,144	43,999	41,250	38,825	36,666	34,736	33,000	31,426	29,997	28,694	27,500	
90					61,331	56,617	52,572	49,065	46,000	43,295	40,888	38,736	36,800	35,045	33,451	31,998	30,665	
91					67,164	62,002	57,573	53,732	50,375	47,413	44,777	42,420	40,300	38,378	36,633	35,041	33,582	
92					73,500	67,848	63,001	58,799	55,125	51,884	49,000	46,420	44100,	41,996	40,087	38,345	36,749	
93					80,830	74,617	69,287	64,665	60,625	57,060	53,888	51,051	48,500	46,187	44,087	42,171	40,415	
94					87,500	81,540	75,716	70,665	66,250	62,355	58,888	55,788	53,000	50,472	48,177	46,084	44,165	
95							78,930	73,665	69,063	65,002	61,388	58,156	55,250	52,615	50,222	48,040	46,040	
96							82,145	76,665	71,875	67,649	63,888	60,525	57,500	54,757	52,268	50,000	47,915	➢
97							85,360	79,665	74,688	70,296	66,388	62,893	59,750	56,900	54,313	51,953	49,790	➢
98							87,500	82,665	77,500	72,943	68,888	65,261	62,000	59,043	56,358	53,909	51,665	
99								85,998	80,625	75,884	71,666	67,893	64,500	61,423	58,631	56,083	53,748	
100								87,500	83,750	78,826	74,444	70,524	67,000	63,804	60,903	58,257	55,831	
101									86,875	81,767	77,221	73,156	69,500	66,185	63,176	60,430	57,914	
102									87,500	84,708	80,000	75,787	72,000	68,566	65,448	62,604	60,000	
103										87,500	83,610	79,210	75,250	71,661	68,402	65,430	62,706	
104											87,221	82,629	78,500	74,756	71,357	68,256	65,414	➢
105											87,500	86,050	81,750	77,851	74,311	71,082	68,122	➢
106												87,500	85,000	80,946	77,265	73,908	70,831	
107													87,500	84,469	80,628	77,125	73,914	
108														87,500	83,992	80,342	77,000	
109															87,446	83,646	80,163	
110															87,500	86,950	83,330	
"B" dim Sizes 64 to 83	3⅝	4⅛	4⅝	5⅛	5½	6	6½	6⅞	7⅜	7⅞	8¼	8¾	9¼	9⅝	10⅛	10⅝	11	
"B" dim Sizes 84 to 110			4 3/16	4 9/16	5	5⅜	5 13/16	6¼	6⅝	7 1/16	7½	7⅞	8 5/16	8¾	9⅛	9 9/16	10	

Table Continued on Facing Page

	Hanger Size No.	Total Travel* (in); Load (lbs)															
		12½	13	13½	14	14½	15	15½	16	16½	17	17½	18	18½	19	19½	20
	64	6,152	5,915	5,696	5,492	5,303	5,126	4,961	4,806								
	65	6,432	6,184	5,955	5,742	5,544	5,359	5,187	5,025								
	66	7,062	6,790	6,538	6,304	6,087	5,884	5,694	5,517								
	67	7,690	7,394	7,120	6,966	6,629	6,408	6,201	6,008								
	68	8,320	8,000	7,703	7,428	7,172	6,933	6,709	6,500								
	69	8,843	8,503	8,188	7,895	7,623	7,369	7,131	6,909								
	70	9,366	9,005	8,671	8,361	8,073	7,804	7,552	7,317								
	71	9,888	9,507	9,155	8,828	8,523	8,239	7,973	7,725								
	72	10,507	10,103	9,728	9,380	9,057	8,755	8,473	8,209								
	73	11,126	10,697	10,301	9,932	9,590	9,270	8,971	8,692								
	74	11,744	11,292	10,873	10,484	10,123	9,786	9,470	9,175								
	75	12,416	11,938	11,496	11,084	10,703	10,346	10,012	9,700								
	76	13,088	12,584	12,118	11,684	11,282	10,906	10,554	10,225								
	77	13,760	13,230	12,740	12,284	11,861	11,466	11,096	10,750								
	78	14,507	13,949	13,432	12,951	12,505	12,088	11,698	11,334								
	79	15,254	14,666	14,123	13,618	13,149	12,710	12,300	11,917								
	80	16,000	15,384	14,814	14,284	13,792	13,332	12,902	12,500								
	81	16,800	16,153	15,555	14,998	14,482	14,000	13,547	13,125								
	82	17,600	16,922	16,295	15,712	15,171	14,665	14,192	13,750								
	83	18,400	17,692	17,036	16,427	18,561	15,332	14,837	14,375								
	84	19,680	18,922	18,221	17,569	16,964	16,398	15,869	15,375								
	85	20,960	20,153	19,406	18,712	18,068	17,465	16,902	16,375								
	86	22,160	21,307	20,517	19,783	19,102	18,465	17,869	17,313								
	87	23,360	22,461	21,628	20,855	20,136	19,465	18,837	18,250								
	88	24,560	23,614	22,739	21,926	21,171	20,465	19,805	19,188								
	89	26,400	25,384	24,443	23,569	22,757	21,998	21,288	20,626								
	90	29,440	28,307	27,258	26,283	25,377	24,531	23,740	23,000								
	91	32,240	31,000	29,850	28,782	27,791	26,864	25,998	25,188								
	92	35,280	33,922	32,665	31,496	30,411	29,397	28,449	27,563								
	93	38,800	37,306	35,924	34,639	33,446	32,330	31,287	30,313								
	94	42,400	40,768	39,257	37,583	36,549	35,330	34,190	33,125								
	95	44,200	42,498	40,924	39,460	38,100	36,830	35,642	34,531	32,119 33,482	31,175 32,498	30,285 31,570	29,442 30,691	28,647 29,863	27,894 29,078	27,179 28,332	26,500 27,625
	96	46,000	44,230	42,590	41,067	39,652	38,330	37,093	35,938	34,845	33,822	32,856	31,941	31,080	30,262	29,486	28,750
	97	47,800	45,960	44,257	42,673	41,204	39,829	39,545	37,344	36,209	35,145	34,141	33,191	32,295	31,446	30,640	29,875
	98	49,600	47,690	45,923	44,280	42,755	41,329	40,000	38,750	37,572	36,468	35,427	34,441	33,511	32,631	31,794	31,000
	99	51,600	49,613	47,775	46,066	44,479	42,996	41,609	40,313	39,087	37,939	36,855	35,830	34,862	33,946	33,076	32,250
	100	53,600	51,536	49,627	47,851	46,203	44,662	43,221	41,875	40,602	39,409	38,284	37,219	36,214	35,262	34,358	33,500
	101	55,600	53,459	51,479	49,637	47,927	46,329	44,834	43,438	42,117	40,880	39,712	38,607	37,565	36,578	35,640	34,750
	102	57,600	56,382	53,330	51,422	49,651	47,995	46,447	45,000	43,632	42,350	41,141	39,996	38,916	37,894	36,922	36,000
	103	60,200	57,882	55,738	53,744	51,892	50,162	48,544	47,031	45,602	44,262	42,998	41,801	40,673	39,604	38,588	37,625
	104	62,800	60,382	58,145	56,065	54,134	52,328	50,640	49,063	47,571	46,174	44,855	43,607	42,429	41,315	40,255	39,250
	105	65,400	62,882	60,552	58,386	56,375	54,495	52,737	51,094	49,541	48,085	46,712	45,412	44,186	43,025	41,921	40,875
	106	68,000	65,382	62,960	60,707	58,616	56,661	54,834	53,125	51,510	50,000	48,569	47,218	45,943	44,736	43,588	42,500
	107	70,960	68,228	65,700	63,350	61,168	59,127	57,220	55,438	53,752	52,173	50,683	49,273	47,942	46,683	45,485	44,350
	108	73,920	71,074	68,441	65,992	63,719	61,594	59,607	57,750	55,994	54,350	52,797	51,328	49,942	48,630	47,383	46,200
	109	76,960	74,000	71,255	68,706	66,340	64,127	62,059	60,125	58,297	56,585	54,969	53,439	52,000	50,630	49,331	48,100
	110	80,000	76,920	74,070	71,420	68,960	66,660	64,510	62,500	60,600	58,820	57,140	55,550	54,050	52,630	51,280	50,000
	"B" dim Sizes 64 to 83	11½	12	12⅜	12⅞	13⅜	13⅞	14¼	14¾	–	–	–	–	–	–	–	–
	"B" dim Sizes 84 to 110	10⅜	10 13/16	11 3/16	11⅝	12 1/16	12½	12⅞	13 5/16	13 11/16	14⅛	14 9/16	14 15/16	15⅜	15¾	16 3/16	16⅝

Table Continued on Facing Page

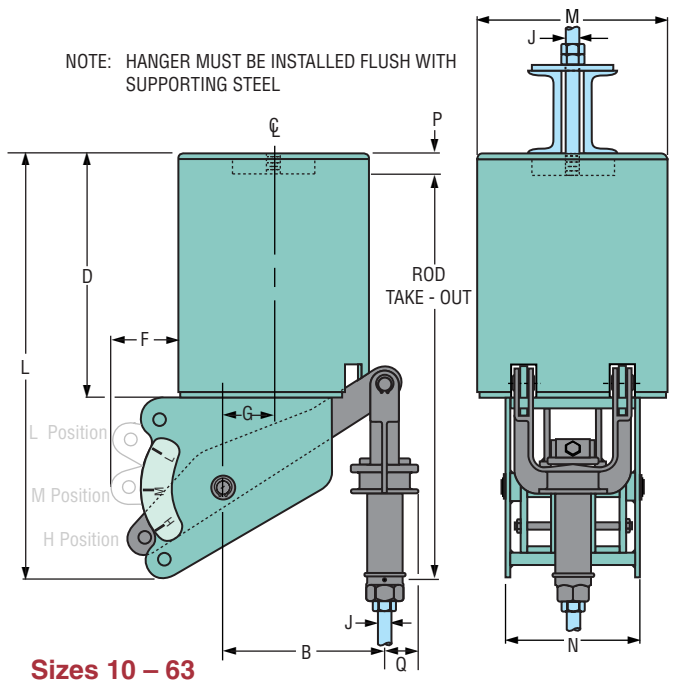
(1) * Note: Total travel equals actual travel plus 1" or 20% (whichever is greater), rounded up to nearest ½" as applicable.

(2) Constant supports are readily available for travel and load not listed in this table. Dimensions and lug locations may vary from those shown on the following pages.

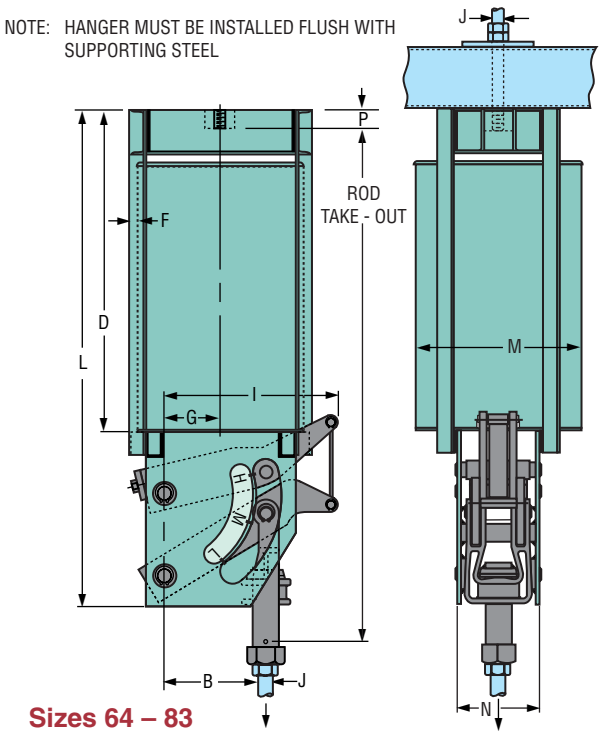
(3) For Type F Upthrust see page PH-170 for standard travel and sizes.

(4) Fig. 80-V are not available for sizes 1 thru 9.

Fig. 80-V Type A — Model R



Sizes 10 – 63



Sizes 64 – 83

Type A of the figure 80-V vertical design model R Constant Support Hanger is designed for attachment to its supporting member by screwing a rod into a tapped hole in the top cap of hanger a distance equal to the "P" dimension plus ⅜". Sight holes are provided near the top of the casing to allow visible inspection for correct thread engagement of upper hanger rod.

Notes: See load travel tables, see page PH-154 through PH-157 for "B" dimension. For weights see page PH-172.

Location of travel indicator and contour of side plate may vary from that shown.

Fig. 80-V, Type A: Dimensions (in)

Hanger Sizes	L	D	F	G	I	Dia. M	N	P	Q	Total Travel TT	Factors	J-rod Min Thd Length	J-rod Rod Dia. Min	J-rod Rod Dia. Max
1 - 9	Available in Fig. 81-H only													
10 - 18	18⅞	8⅞	2	1½	•	8⅝	6 7/16	⅞	1⅜	5 or less	16 15/16	1¾ + TT	½	¾
										5½ or more	19¼			
19 - 34	28½	16	2⅛	2⅝	•	12¾	8 9/16	1⅛	1⅝	5 or less	27 15/16	2⅜ + TT	½	1¼
										5½ or more	30 1/16			
35 - 49	32¾	18¼	4¾	3¾	•	14	9 13/16	1½	2½	6 or less	32⅜	3¼ + TT	½	1¾
										6½ or more	37			
50 - 63	46⅞	28⅛	8 5/16	5⅞	•	18	11¼	2	3	11 or less	46½	4¼ + TT	¾	2¼
										11½ or more	51¾			
64 - 74	67½	44¼	1 3/16	7½	25⅜	22 3/16	11	2½	–	10½ or less	77⅝	5¾ + TT	1¼	2¾
										11 or more	77¾			
75- 83	69½	46¼	1½	7½	25⅜	27 3/16	11	3	–	10½ or less	78 3/16	5¾ + TT	1½	3¼
										11 or more	78 5/16			
84-110	See page PH-164													

Rod take-out = (factor) - (TT / 2), for lever in high position.

• "I" dimension for sizes10 through 63 equals "B" + "Q" Note: See the size selection chart (see page PH-154 through PH-157) for the "B" dimension.

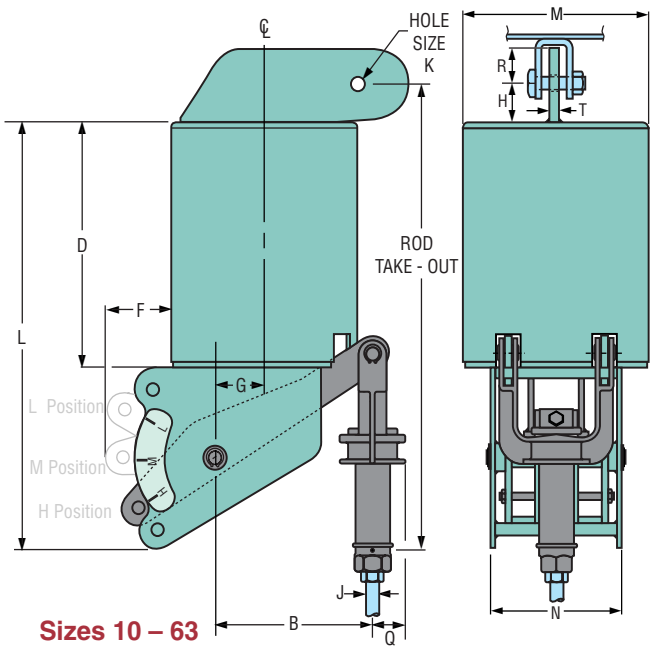
J-Rod Selection Chart

Load (lbs)	0 800	801 1,500	1,501 2,540	2,541 4,000	4,001 6,100	6,101 9,400	9,401 13,400	13,401 18,300	18,301 24,700	24,701 31,000	31,001 39,000	39,001 48,000	48,001 58,000
J Rod Size	½	⅝	¾	1	1¼	1½	1¾	2	2¼	2½	2¾	3	3¼*

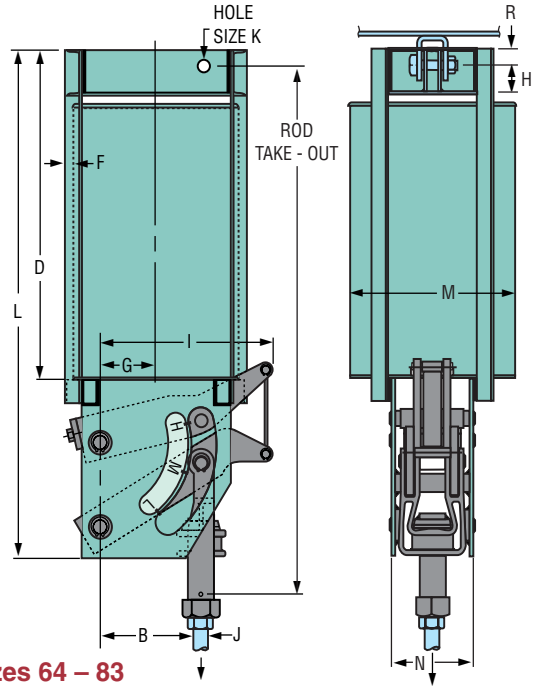
*3¼" is furnished with 8 UN series thread.

Fig. 80-V Type B

Model R



Sizes 10 – 63



Sizes 64 – 83

Type B is furnished with a single lug for attachment to the building structure. The lug permits use of a figure 66* welded beam attachment, a figure 299 clevis or a pair of angles for attachment where headroom is limited.

Notes: See load travel tables, see page PH-154 through PH-157 for "B" dimension. For weights see page PH-172.

Location of travel indicator and contour of side plate may vary from that shown.

Fig. 80-V, Type B: Dimensions (in)

Hanger Size	L	D	F	G	H	I	Dia. M	N	Q	R	T	Total Travel TT	Factors	J-rod Min Thread Length	J-rod Rod Dia. Min	J-rod Rod Dia. Max
1-9	Available in Fig. 81-H only															
10-18	18⅞	8⅞	2	1½	1½	•	8⅝	6⁷⁄₁₆	1⅜	1½	⅜	5 or less	19⁵⁄₁₆	1¾ + TT	½	¾
												5½ or more	21⅝			
19-34	28½	16	2⅛	2⅝	2	•	12¾	8⁹⁄₁₆	1⅝	1½	⅝	5 or less	31¹⁄₁₆	2⅜ + TT	½	1¼
												5½ or more	33³⁄₁₆			
35-49	32¾	18¼	4¾	3¾	3	•	14	9¹³⁄₁₆	2½	1¼ K-hole & smaller, 1½ 1⅜ K-hole and larger, 2	¾	6 or less	36⅞	3¼ + TT	½	1¾
												6½ or more	41½			
50-63	46⅞	28⅛	8⁵⁄₁₆	5⅞	4	•	18	11¼	3	¹⁵⁄₁₆ K-hole, 1½ 1⅛ thru 1⅜ K-hole, 2 1½ K-hole and larger, 3	1	11 or less	52½	4¼ + TT	¾	2¼
												11½ or more	57¾			
64-74	60½	37¼	1³⁄₁₆	7½	4½	25⅜	22³⁄₁₆	11	–	3	2	10½ or less	77¼	5¾ + TT	1¼	2¾
												11 or more	77⅜			
75-83	61¼	38	1½	7½	3⅝	25⅜	27³⁄₁₆	11	–	3¾	2½	10½ or less	77¹⁵⁄₁₆	5¾ + TT	1½	3¼
												11 or more	78¹⁄₁₆			
84-110	See page PH-164															

Rod take-out = (factor) - (TT / 2), for lever in high position. • "I" dimension for sizes10 through 63 equals "B" + "Q"

* For constant support sizes 50-63 and 64-74 where 1¼" rod is required, check the "R" dimensions versus the Fig. 66 welded beam attachment dimensions for compatibility.

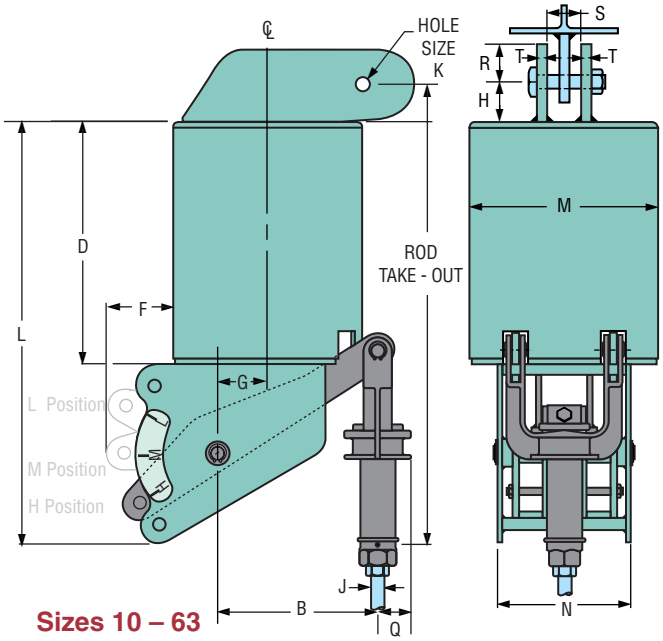
Note: See the size selection chart (see page PH-154 through PH-157) for the "B" dimension.

J - Rod Selection Chart

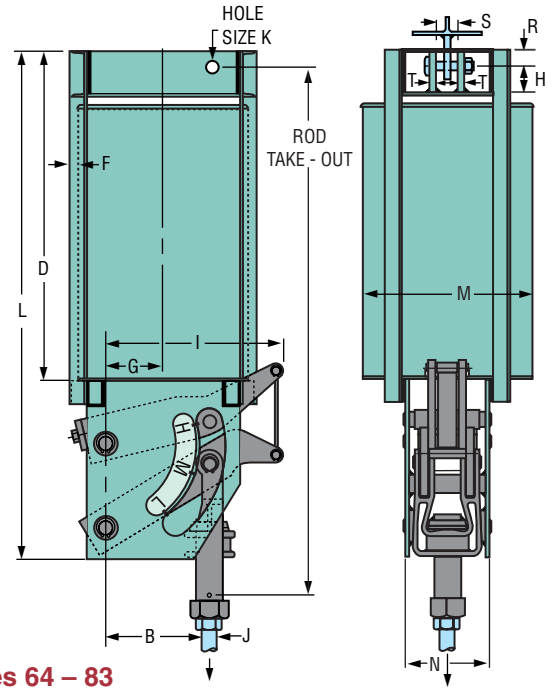
Load (lbs)	0 800	801 1,500	1,501 2,540	2,541 4,000	4,001 6,100	6,101 9,400	9,401 13,400	13,401 18,300	18,301 24,700	24,701 31,000	31,001 39,000	39,001 48,000	48,001 58,000
J-Rod Size	½	⅝	¾	1	1¼	1½	1¾	2	2¼	2½	2¾	3	3¼*
K-Hole	¹¹⁄₁₆	¹³⁄₁₆	¹⁵⁄₁₆	1¼	1½	1¾	2	2⅜	2⅝	2⅞	3⅛	3⅜	3⅝

*3¼" is furnished with 8 UN series thread.

Fig. 80-V Type C — Model R



Sizes 10 – 63



Sizes 64 – 83

Type C is furnished with a pair of lugs for attachment to the building structure. These lugs permit the use of an eye rod or a single plate for attachment where headroom is limited.

Notes: See load travel tables,see page PH-154 through PH-157 for "B" dimension. For weights see page PH-172.

Location of travel indicator and contour of side plate may vary from that shown.

Fig. 80-V, Type C: Dimensions (in)

Hanger Size	L	D	F	G	H	I	Dia. M	N	Q	R	T	Total Travel TT	Factors	J-Rod Min Thd Length	J-Rod Rod Dia.	
1-9	Available in Fig. 81-H only															
10-18	18 7/8	8 7/8	2	1 1/2	1 1/2	•	8 5/8	6 7/16	1 3/8	1 1/2	3/8	5 or less	19 5/16	1 3/4 +TT	1/2	3/4
												5 1/2 or more	21 5/8			
19-34	28 1/2	16	2 1/8	2 5/8	2	•	12 3/4	8 9/16	1 5/8	1 1/2	5/8	5 or less	31 1/16	2 3/8 + TT	1/2	1 1/4
												5 1/2 or more	33 3/16			
35-49	32 3/4	18 1/4	4 3/4	3 3/4	3	•	14	9 13/16	2 1/2	1 1/4 K-hole & smaller, 1 1/2 1 3/8 K-hole and larger, 2	3/4	6 or less	36 7/8	3 1/4 + TT	1/2	1 3/4
												6 1/2 or more	41 1/2			
50-63	46 7/8	28 1/8	8 5/16	5 7/8	4	•	18	11 1/4	3	15/16 K-hole, 1 1/2 1 1/8 thru 1 3/8 K-hole, 2 1 1/2 K-hole and larger, 3	1	11 or less	52 1/2	4 1/4 + TT	3/4	2 1/4
												11 1/2 or more	57 3/4			
64-74	60	36 3/4	1 3/16	7 1/2	5	25 3/8	22 3/16	11	3	3	1/2	10 1/2 or less	77 1/4	5 3/4 + TT	1 1/4	2 3/4
												11 or more	77 3/8			
75-83	60 1/2	37 1/4	1 1/2	7 1/2	4 1/2	25 3/8	27 3/16	11	3	3 3/4	1	10 1/2 or less	77 15/16	5 3/4 + TT	1 1/2	3 1/4*
												11 or more	78 1/16			
84-110	See page PH-164															

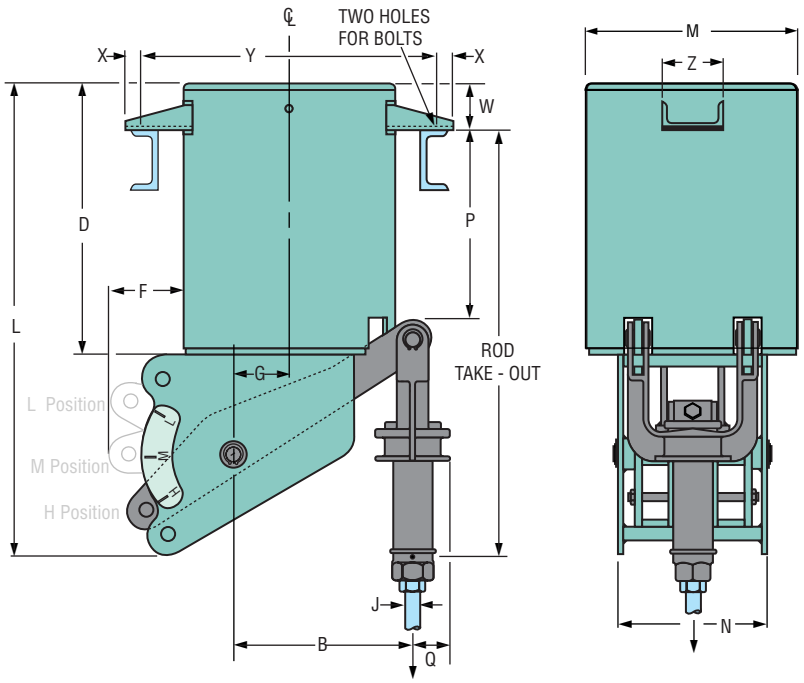
Rod take-out = (factor) - (TT / 2), for lever in high position. • "I" dimension for sizes10 through 63 equals "B" + "Q"
Note: See the size selection chart (see page PH-154 through PH-157) for the "B" dimension.

Load (lbs)	0 800	801 1,500	1,501 2,540	2,541 4,000	4,001 6,100	6,101 9,400	9,401 13,400	13,401 18,300	18,301 24,700	24,701 31,000	31,001 39,000	39,001 48,000	48,001 58,000
J-Rod Size	1/2	5/8	3/4	1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3	3 1/4*
K-Hole Size	11/16	13/16	15/16	1 1/4	1 1/2	1 3/4	2	2 3/8	2 5/8	2 7/8	3 1/8	3 3/8	3 5/8
S	7/8	1 1/16	1 1/4	1 5/8	2	2 3/8	2 5/8	2 7/8	3 1/8	3 3/8	3 5/8	3 7/8	4 1/8

*3 1/4" is furnished with 8 UN series thread.

Fig. 80-V Type D

Model R



Type D rests on top of structural steel while most of the Constant Support itself hangs between or below the supporting beams. The depth of the beam is limited by the "P" dimension. Dimension "P" can be varied on special order, however, "P" dimension shown is maximum for the hanger.

Notes: See load travel tables, see page PH-154 through PH-157 for "B" dimension. For weights see page PH-172.

Location of travel indicator and contour of side plate may vary from that shown.

Fig. 80-V: Dimensions (in)

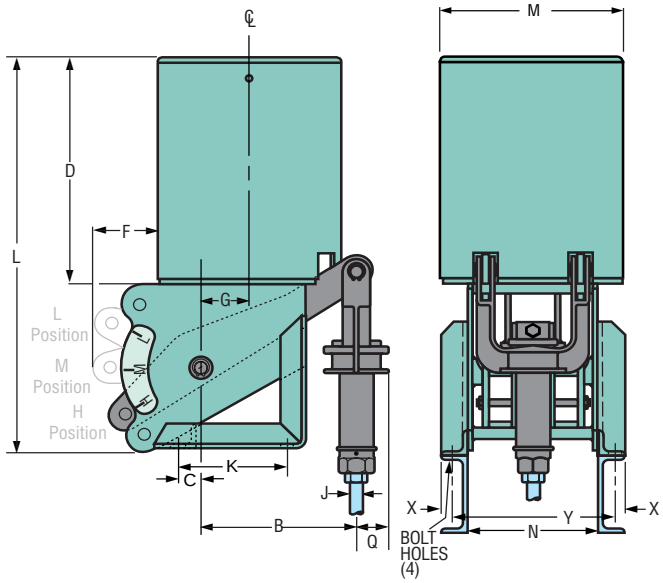
Hanger Sizes	L	D	F	G	Dia. M	N	Q	P	W	X	Y	Z	Bracket Hole Dia.	Total Travel TT	Factors	J-Rod Min Thd Length	J-Rod Min Dia.	J-Rod Max Dia.
1-9	Available in Fig. 81-H only																	
10-18	18 7/8	8 7/8	2	1 1/2	8 5/8	6 7/16	1 3/8	4 15/16	2 3/8	1 1/2	10 3/4	3	3/4	5 or less	15 1/2	1 3/4 + TT	1/2	3/4
														5 1/2 or more	17 3/16			
19-34	28 1/2	16	2 1/8	2 5/8	12 3/4	8 9/16	1 5/8	12 1/2	2 3/8	1 1/2	14 7/8	3	7/8	5 or less	26 11/16	2 3/8 + TT	1/2	1 1/4
														5 1/2 or more	28 13/16			
35-49	32 3/4	18 1/4	4 3/4	3 3/4	14	9 13/16	2 1/2	13 1/4	2 5/8	2	16 3/4	4	1 1/8	6 or less	31 1/4	3 1/4 + TT	1/2	1 3/4
														6 1/2 or more	35 7/8			
50-63	46 7/8	28 1/8	8 5/16	5 7/8	18	11 1/4	3	24 1/2	2 7/8	3	21	6	1 3/8	11 or less	45 9/16	4 1/4 + TT	3/4	2 1/4
														11 1/2 or more	50 7/8			
64-83	Available in Fig. 81-H only.																	
84-110	Not Available																	

*Rod take-out = (factor) - (TT / 2), for lever in high position. • "I" dimension for sizes10 through 63 equals "B" + "Q"

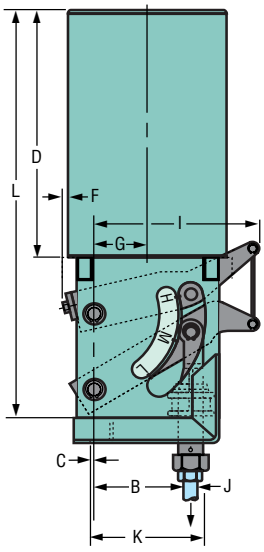
Note: See the size selection chart (see page PH-154 through PH-157) for the "B" dimension.

Load (lbs)	0 800	801 1,500	1,501 2,540	2,541 4,000	4,001 6,100	6,101 9,400	9,401 13,400	13,401 18,300	18,301 24,700
J Rod Size	1/2	5/8	3/4	1	1 1/4	1 1/2	1 3/4	2	2 1/4

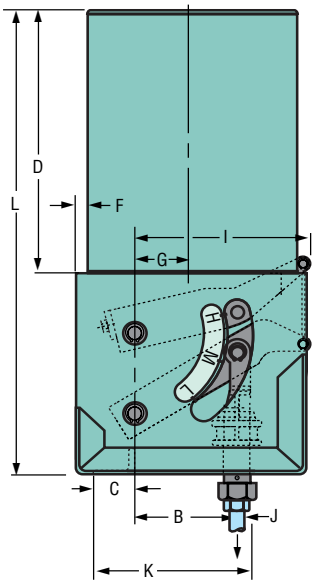
Fig. 80-V Type E — Model R



Sizes 1 to 63



Sizes 64 – 74



Sizes 75 – 83

Type E rests on top flange of structural steel and the constant support itself is entirely above the supporting beams. If the rod take-out does not exceed the depth of the supporting steel and the rod coupling must extend below the steel, specify the depth of the supporting steel. Increase the rod take-out by the depth of the steel

Notes: See load travel tables, see page PH-154 through PH-157 for "B" dimension. For weights see page PH-172.

Location of travel indicator and contour of side plate may vary from that shown.

Fig. 80-V, Type E: Dimensions (in)

Hanger Size	L	C	D	F	G	I	K	Dia. M	X	Y	N	Q	Angle Size	Bracket Hole Dia.	Total Travel TT	Factor	J-Rod Min Thd Length	J-Rod Rod Dia. Min	J-Rod Rod Dia. Max
1-9	Available in Fig. 81-H Only																		
10-18	18 7/8	1 1/2	8 7/8	2	1 1/2	•	4 5/16	8 5/8	5/8	8 15/16	6 7/16	1 3/8	1 1/2 x 2 x 1/4	3/4	5 or less	1 7/16	1 3/4 +TT	1/2	3/4
															5 1/2 or more	3 3/4			
19-34	28 1/2	1 3/16	16	2 1/8	2 5/8	•	6 11/16	12 3/4	5/8	11 3/16	8 9/16	1 5/8	1 1/2 x 2 1/2 x 1/4	3/4	5 or less	2 13/16	2 3/8 + TT	1/2	1 1/4
															5 1/2 or more	4 15/16			
35-49	32 3/4	1 7/8	18 1/4	4 3/4	3 3/4	•	8 5/16	14	1 3/16	13 5/16	9 13/16	2 1/2	2 x 2 x 3/8	7/8	6 or less	2 1/2	3 1/4 + TT	1/2	1 3/4
															6 1/2 or more	7 1/8			
50-63	46 7/8	3 3/4	28 1/8	8 5/16	5 7/8	•	12 13/16	18	1 5/16	14 11/16	11 1/4	3	3 x 3 x 3/8	1 3/8	11 or less	1 5/8	4 1/4 + TT	3/4	2 1/4
															11 1/2 or more	7			
64-74	62	3/8	35 3/4	3/8	7 1/2	25 3/8	15 3/4	22 3/16	1 9/16	14 15/16	11	3	3 1/2 x 3 1/2 x 1/2	1 5/8	10 1/2 or less	9 1/8	5 3/4 + TT	1 1/4	2 3/4
															11 or more	9 1/4			
75-83	62 1/2	5 1/4	35 3/4	1 1/2	7 1/2	25 3/8	25 5/8	27 3/16	1 3/4	15 1/2	11	3	4 x 4 x 3/8	1 5/8	10 1/2 or less	8 3/4	5 3/4 + TT	1 1/2	3 1/4
														1 5/8	11 or more	8 7/8			
84-110	Not Available																		

Rod take-out = (factor) - (TT / 2), for lever in high position. Rod take-out is measured from the bottom of the supporting angles to the center of the load coupling site hole.
• "I" dimension for sizes10 through 63 equals "B" + "Q" Note: See the size selection chart (see page PH-154 through PH-157) for the "B" dimension.

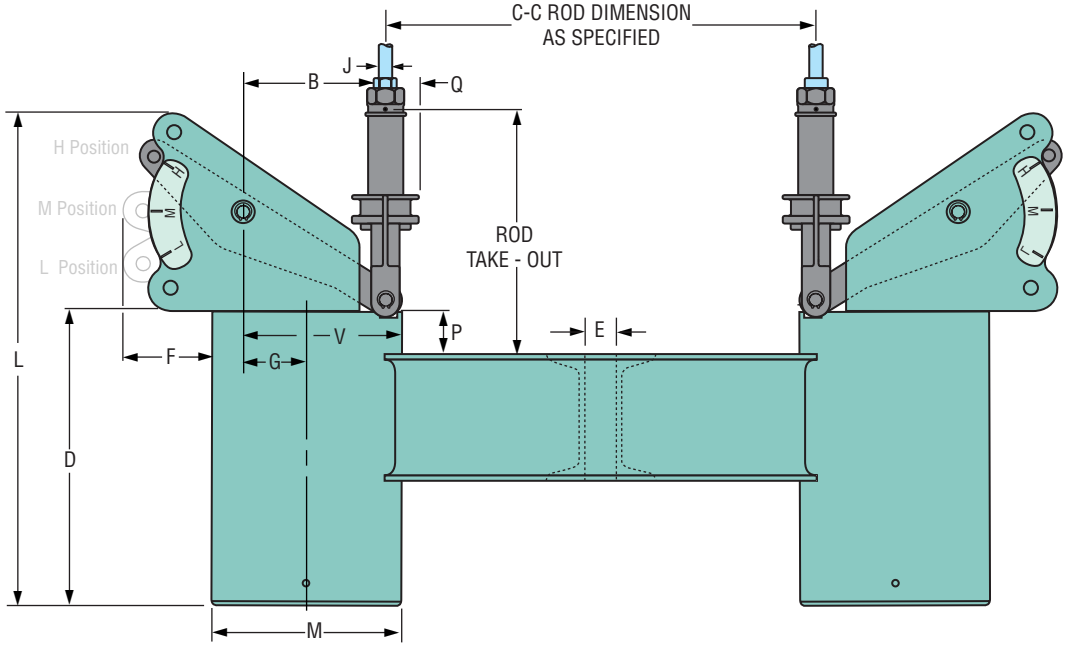
J-Rod Selection Chart

Load (lbs)	0 800	801 1,500	1,501 2,540	2,541 4,000	4,001 6,100	6,101 9,400	9,401 13,400	13,401 18,300	18,301 24,700	24,701 31,000	31,001 39,000	39,001 48,000	48,001 58,000
J Rod Size	1/2	5/8	3/4	1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3	3 1/4*

*3 1/4" is furnished with 8 UN series thread.

Fig. 80-V Type G

Model R



Type G is a complete trapeze assembly. The hanger consists of two vertical type Constant Support units plus a pair of channels, back-to-back, welded at each end to the hanger casing.

In sizing a Type G hanger, it must be remembered that each standard spring unit carries one-half of the total pipe load. Furthermore, the weights of the hanger itself must be considered as part of the overall load. Therefore, using one-half the total pipe load, select the required hanger size from the Load Travel Table and add one-half the weight of the size hanger selected to one-half the total pipe load. If the load now exceeds the maximum load at the required total travel for the hanger size selected, it is necessary to go to the next larger hanger. If the pipe line is designed so as not to be centered on the channel, one spring of the trapeze will carry a heavier load than the other and care must be taken in sizing the individual hanger units. The center-to-center rod dimension must be specified when ordering. The minimum C-C dimension can be determined as follows:

B plus Q > Y: (O.D. of pipe covering) + 2Q.

B plus Q < Y: (O.D. of pipe covering) + 2 (Y - B).

Note: If U-bolt is used to fasten pipe to channels, C-C of U-bolt tangents plus one washer plate width cannot be greater than C-C of the hanger rods minus 2 (V minus B).See load travel tables, see page PH-154 through PH-157 for “B” dimension.
For weights see page PH-172.

Location of travel indicator and contour of side plate may vary from that shown.

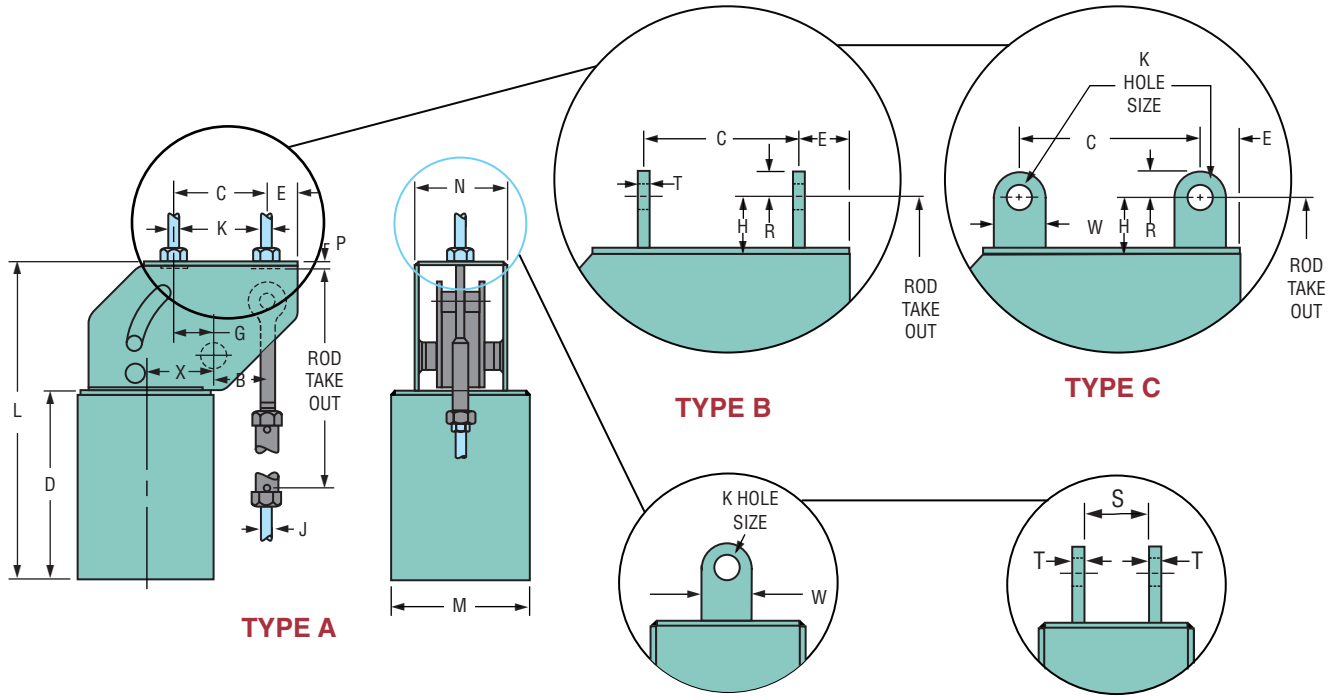
Fig. 80-V, Type G: Dimensions (in)

Hanger Size	L	D	E	F	G	Dia M	N	P	Q	V	Y	Channel Size (lbs/ft)	C - C	Total Travel TT	Factors	J-Rod Min Thread Length	J-Rod Min Rod Dia.	J-Rod Max Rod Dia.
1-9	Not available																	
10-18	18 7/8	8 7/8	1	2	1 1/2	8 5/8	6 7/16	2 9/16	3 1/2	5 13/16	3 15/16	4 @ 5.4	30	5 or less	11 11/16	1 3/4 + TT	1/2	3/4
														5 1/2 or more	14			
19-34	28 1/2	16	1 1/4	2 1/8	2 5/8	12 3/4	8 9/16	3 9/16	4	9	6 1/8	6 @ 10.5	42	5 or less	16 13/16	2 3/8 + TT	1/2	1 1/4
														5 1/2 or more	18 3/4			
35-49	32 3/4	18 1/4	1 1/2	4 3/4	3 3/4	14	9 13/16	3 7/16	5 1/2	10 3/4	8	10 @ 15.3	48	6 or less	19 1/4	3 1/4 + TT	1/2	1 3/4
														6 1/2 or more	23 7/8			
50-63	46 7/8	28 1/8	2 1/8	8 5/16	5 7/8	18	11 1/4	4	6 1/2	14 3/4	10 15/16	12 @ 20.7	48	11 or less	24 5/8	4 1/4 + TT	3/4	2 1/4
														11 1/2 or more	30			
64-110	Not available																	

Rod take-out = (factor) - (TT / 2), for lever in high position.
Note: See the size selection chart (see page PH-154 through PH-157) for the "B" dimension.

Load (lbs)	0 800	801 1,500	1,501 2,540	2,541 4,000	4,001 6,100	6,101 9,400	9,401 13,400	13,401 18,300	18,301 24,700
J Rod Size	1/2	5/8	3/4	1	1 1/4	1 1/2	1 3/4	2	2 1/4

Fig. 80-V Types A, B and C — Model R, Sizes 84 to 110



Note: "B" Dimensions is a function of total travel ("G" + "B" should not be assumed as equal to "C" Dimension)

Types A, B, and C sizes 84 through 110, for large loads and long travels, provide for basically the same methods of upper attachment as sizes 10 to 83 shown Type A on page PH-158, Type B page PH-159 and Type C see page PH-160.

Notes: See load travel tables, see page PH-154 through PH-157 for "B" dimension.

For weights see page PH-172.

Fig. 80-V, Types A,B,C Sizes 84 to 110: Dimensions (in)

Hanger Sizes	L	C		D	E		G		H	M	N	P	X	Total Travel TT	Factor		J - Rod		
		Type A & B	Type C		Type A & B	Type C	Type A & B	Type C							Type A	Type B & C	Min Thread Length	Rod Dia. Min	Rod Dia. Max
84-94	78¾	16	15	49¾	4	4½	1½	1	6	24	10½	3	12	9½ or less	45¾	54¾	10	2	3¾
														10 or more	55½	64½	13		
95-110	100	24	23	64	4	4½	7½	7	6	24	11½	3½	13½	14 or less	51⅛	60⅝	12	2½	3¾
														14½ or more	60⅛	69⅝	15		

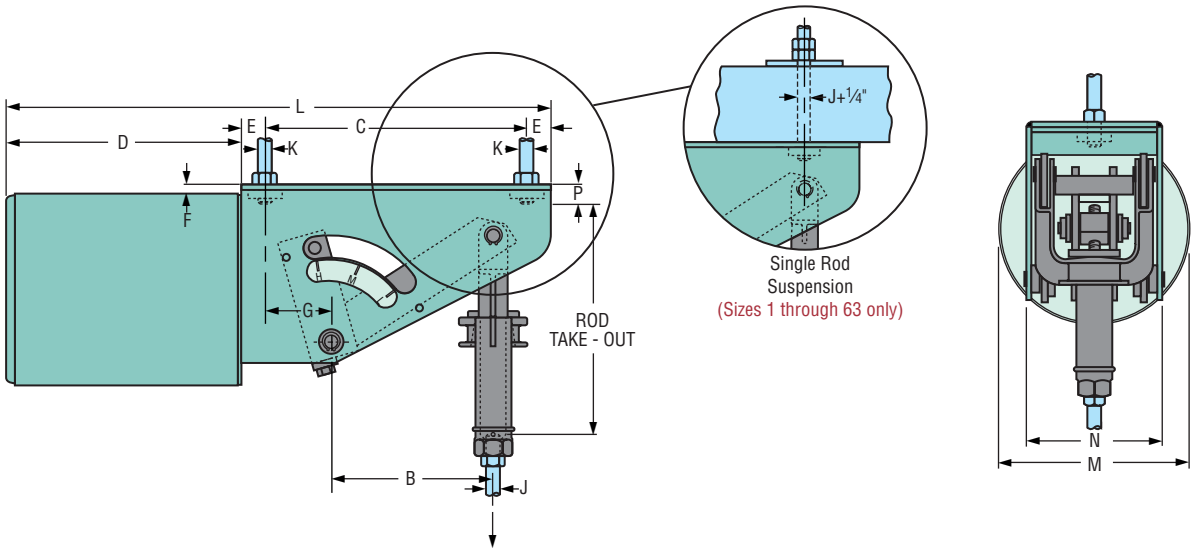
*Rod take-out = (factor) - (.75 x TT), for Lever in high position
Note: See the size selection chart (see page PH-154 through PH-157) for the "B" dimension.

Load (lbs)	14,376 18,300	18,301 24,700	24,701 31,000	31,001 39,000	39,001 48,000	48,001 58,000	58,001 69,000	69,001 87,500
J & K-Rods	2	2¼	2½	2¾	3	3¼*	3½*	3¾*
K-Hole	2⅜	2⅝	2⅞	3⅛	3⅜	3⅝	3⅞	4⅛
R	3	3	4	4	4	4½	4½	4½
S	2⅞	3⅛	3⅜	3⅝	3⅞	4⅛	4⅜	4⅝
T (Type B)	¾	¾	1	1	1	1	1½	1¾
T (Type C)							1¼	1¼
W	6	6	8	8	8	9	9	9

*3¼ and larger are furnished with 8 UN series thread

Fig. 81-H Type A

Model R



Type A of the Figure 81- H Horizontal Design Model R Constant Support Hanger is designed for attaching to its supporting member by screwing two rods into taped holes in the top of the hanger from a distance equal to the "P" dimension plus ⅜". Sizes 1 to 9 are furnished with swivel eye and turnbuckle instead of yoke and coupling.

Notes: Also available for single rod suspension as indicated above. When ordering specify " for single rod suspension". See load travel tables, see page PH-154 through PH-157 for "B" dimension.

For weights see page PH-172.

Location of travel indicator and contour of side plate may vary from that shown.

Fig. 81-H Type A: Dimensions (in)

Hanger Sizes	D	E	F	G	M	N	P	Total Travel TT	L	C	Factors	J-Rod		
												Min Thread Length	Rod Dia. Min	Rod Dia. Max
1- 9	8¼	1	⅞	2	6⅛	4⅛	13/16	4 or less	16¼	6	12¾	1¾ + TT	½	½
								4½ or more	20¼	10	15 5/16			
10 - 18	8 7/16	1	½	2 9/16	8 5/16	6 7/16	11/16	5 or less	18 7/16	8	10⅞	1¾ + TT	½	¾
								5½ or more	21 7/16	11	13¼			
19 - 34	14 7/16	1¼	⅝	3⅞	12 7/16	8 9/16	1⅛	5 or less	26 15/16	10	16¾	2⅜ + TT	½	1¼
								5½ or more	31 1/16	14⅛	18⅞			
35 - 49	17 7/16	1¾	1 1/16	4¾	13¾	9 13/16	1⅜	6 or less	31 9/16	11	21⅛	3¼ + TT	½	1¾
								6½ or more	39 9/16	19	25¾			
50 - 63	26 3/16	1 11/16	15/16	7 11/16	17 11/16	11¼	1¾	8 or less	45 9/16	16	24 15/16	4¼ + TT	¾	2¼
								8½ to 11	53 9/16	24	24 15/16			
								11½ or more	53 9/16	24	30¼			
64 - 74	35¾	3	3¼	5¼	22 3/16	11	3 7/16	10½ or less	57½	15¾	34 7/16	5¾ + TT	1¼	2¾
								11 or more	63	21¼	34 9/16			
75 - 83	35¾	3¼	3⅝	5	27 3/16	11	4¼	10½ or less	57½	15¼	36½	5¾ + TT	1½	3¼
								11 or more	63	20¾	36⅝			
84 - 110	See page PH-171													

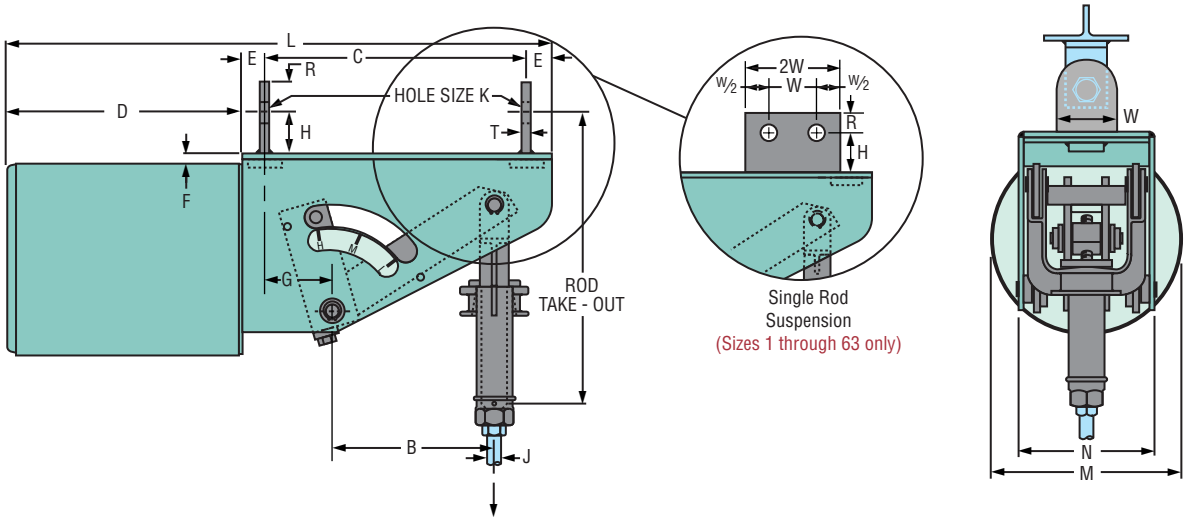
*Rod take-out = (factor) - (TT / 2), for lever in high position.

J-Rod and K-Rod Selection Chart

Load (lbs)	0 800	801 1,500	1,501 2,540	2,541 4,000	4,001 6,100	6,101 9,400	9,401 13,400	13,401 18,300	18,301 24,700	24,701 31,000	31,001 39,000	39,001 48,000	48,001 58,000
J Rod Size	½	⅝	¾	1	1¼	1½	1¾	2	2¼	2½	2¾	3	3¼*

*3¼" is furnished with 8 UN series thread.

Fig. 81-H Type B — Model R



Type B is furnished with two lugs – one at each end of the hanger frame. These lugs permit use of Fig. 66 welded beam attachments, clevises or angle clips for attachment where headroom is limited. Sizes 1 to 9 are furnished with swivel eye and turnbuckle instead of yoke and coupling.

Notes: Also available for single rod suspension as indicated above. When ordering specify "for single rod suspension."

See load travel tables, see page PH-154 through PH-157 for "B" dimension. For weights see page PH-172. Location of travel indicator and contour of side plate may vary form that shown.

Fig. 81-H Type B: Dimensions (in)

Hanger Sizes	D	E	F	G	H	M	N	Total Travel TT	L	C	Factors	J-Rod Min Thd Length	J-Rod Rod Dia. Min	J-Rod Rod Dia. Max
1 - 9	8 1/4	1 1/4	7/8	1 3/4	1 1/2	6 1/8	4 1/8	4 or less	16 1/4	5 1/2	14 5/8	1 3/4 + TT	1/2	1/2
								4 1/2 or more	20 1/4	9 1/2	17 3/16			
10 - 18	8 7/16	1 1/4	1/2	2 5/16	1 1/2	8 5/16	6 7/16	5 or less	18 7/16	7 1/2	13 1/16	1 3/4 + TT	1/2	3/4
								5 1/2 or more	21 7/16	10 1/2	15 7/16			
19 - 34	14 7/16	1 3/8	5/8	3 3/4	2	12 7/16	8 9/16	5 or less	26 15/16	9 3/4	19 7/8	2 3/8 + TT	1/2	1 1/4
								5 1/2 or more	31 1/16	13 7/8	22			
35 - 49	17 7/16	2	11/16	4 1/2	3	13 3/4	9 13/16	6 or less	31 9/16	10 1/2	25 5/8	3 1/4 + TT	1/2	1 3/4
								6 1/2 or more	39 9/16	18 1/2	30 1/8			
50 - 63	26 3/16	3	15/16	6 3/8	4	17 3/8	11 1/4	8 or less	45 9/16	13 3/8	30 11/16	4 1/4 + TT	3/4	2 1/4
								8 1/2 to 11	53 9/16	21 3/8	30 11/16			
								11 1/2 or more	53 9/16	21 3/8	36			
64 - 74	35 3/4	3 1/4	3 1/4	5	4 1/2	22 3/16	11	10 1/2 or less	57 1/2	15 1/4	42 3/8	5 3/4 + TT	1 1/4	2 3/4
								11 or more	63	20 3/4	42 1/2			
75 - 83	35 3/4	3 1/2	3 5/8	4 3/4	5	27 3/16	11	10 1/2 or less	57 1/2	14 3/4	45 3/4	5 3/4 + TT	1 1/2	3 1/4**
								11 or more	63	20 1/4	45 7/8			
84 - 110	See page PH-171													

* Rod take-out = (factor) - (TT / 2), for lever in high position.

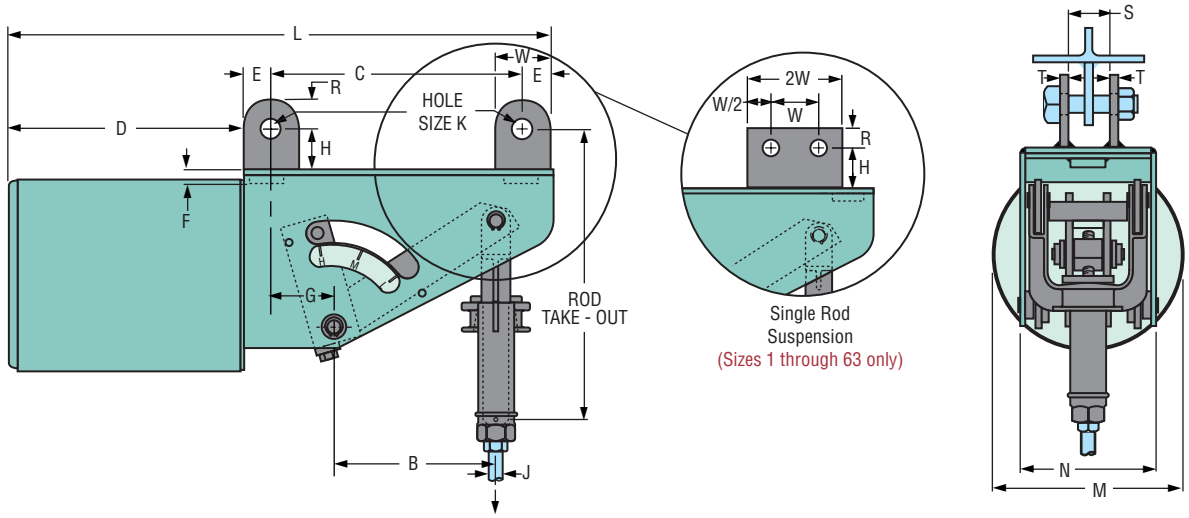
J-Rod and K-Hole Selection Chart

Load (lbs)	0 800	801 1,500	1,501 2,540	2,541 4,000	4,001 6,100	6,101 9,400	9,401 13,400	13,401 18,300	18,301 24,700	24,701 31,000	31,001 39,000	39,001 48,000	48,001 58,000
J-rod	1/2	5/8	3/4	1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3	3 1/4**
K-Hole Size	11/16	13/16	15/16	1 1/4	1 1/2	1 3/4	2	2 3/8	2 5/8	2 7/8	3 1/8	3 3/8	3 5/8
R	1 1/4	1 1/4	1 1/4	1 1/2	2	2 1/2	2 1/2	3	3	4	4	4	4 1/2
T	1/4*	1/4*	3/8	1/2	5/8	3/4	3/4	3/4	3/4	1	1	1	1
W	2 1/2	2 1/2	2 1/2	3	4	5	5	6	6	8	8	8	9

*3/8" for single rod suspension ** 3 1/4" inch is furnished with 8 UN series thread.

Fig. 81-H Type C

Model R



Type C is furnished with two pair of lugs, one pair of lugs at each of the hanger frame. These lugs permit the use of two eye rods or two single plates for attachment where headroom is limited. Sizes 1 to 9 are furnished with swivel eye and turnbuckle instead of yoke and coupling.

Notes: Also available for single rod suspension as indicated above. When ordering specify "for single rod suspension." See load travel tables, see page PH-154 through PH-157 for "B" dimension. For weights see page PH-172.
Location of travel indicator and contour of side plate may vary from that shown.

Fig. 81-H Type C: Dimensions (inches)

Hanger Sizes	D	E	F	G	H	M	N	Total Travel TT	L	C	Factors	J-Rod Min Thread Length	J-Rod Min Rod Dia.	J-Rod Max Rod Dia.
1 - 9	8¼	1¼	⅞	1¾	1½	6⅛	4⅛	4 or less	16¼	5½	14⅝	1¾ + TT	½	½
								4½ or more	20¼	9½	17³⁄₁₆			
10 - 18	8⁷⁄₁₆	1¼	½	2⁵⁄₁₆	1½	8⁵⁄₁₆	6⁷⁄₁₆	5 or less	18⁷⁄₁₆	7½	13¹⁄₁₆	1¾ + TT	½	¾
								5½ or more	21⁷⁄₁₆	10½	15⁷⁄₁₆			
19 - 34	14⁷⁄₁₆	2	⅝	3⅛	2	12⁷⁄₁₆	8⁹⁄₁₆	5 or less	26¹⁵⁄₁₆	8½	19⅞	2⅜ + TT	½	1¼
								5½ or more	31¹⁄₁₆	12⅝	22			
35 - 49	17¹⁄₁₆	2½	¹¹⁄₁₆	4	3	13¾	9¹³⁄₁₆	6 or less	31⁹⁄₁₆	9½	25⅝	3¼ + TT	½	1¾
								6½ or more	39⁹⁄₁₆	17½	30⅛			
50 - 63	26³⁄₁₆	3	¹⁵⁄₁₆	6⅜	4	17¹¹⁄₁₆	11¼	8 or less	45⁹⁄₁₆	13⅜	30¹¹⁄₁₆	4¼ + TT	¾	2¼
								8½ to 11	53⁹⁄₁₆	21⅜	30¹¹⁄₁₆			
								11½ or more	53⁹⁄₁₆	21⅜	36			
64 - 74	35¾	4	3¼	4¼	4½	22³⁄₁₆	11	10½ or less	57½	13¾	42⅜	5¾ + TT	1¼	2¾
								11 or more	63	19¼	42½			
75 - 83	35¾	4½	3⅝	3¾	5	27³⁄₁₆	11	10½ or less	57½	12¾	45¾	5¾ + TT	1½	3¼
								11 or more	63	18¼	45¾			
84 - 110	See page PH-171													

* Rod take-out = (factor) - (TT / 2), for lever in high position.

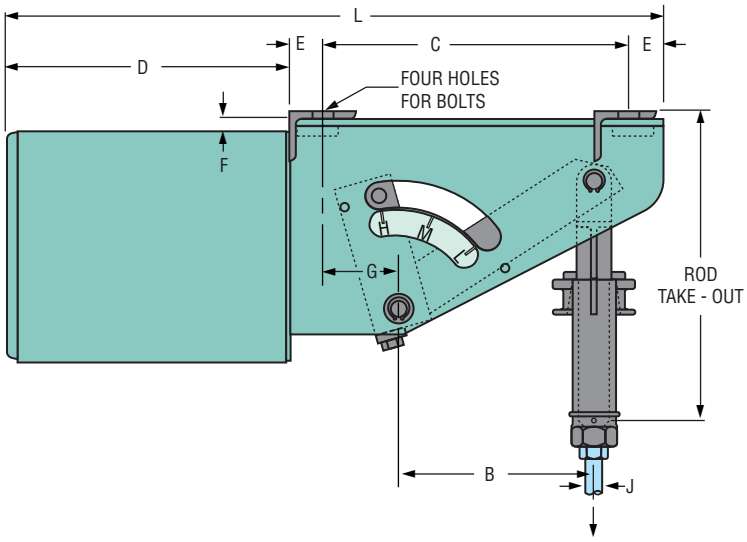
J-Rod and K-Hole Selection Chart

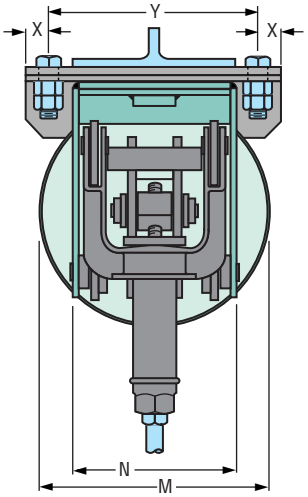
Load (lbs)	0 800	801 1,500	1,501 2,540	2,541 4,000	4,001 6,100	6,101 9,400	9,401 13,400	13,401 18,300	18,301 24,700	24,701 31,000	31,001 39,000	39,001 48,000	48,001 58,000
J-Rod	½	⅝	¾	1	1¼	1½	1¾	2	2¼	2½	2¾	3	3¼**
K-Hole Size	¹¹⁄₁₆	¹³⁄₁₆	¹⁵⁄₁₆	1¼	1½	1¾	2	2⅜	2⅝	2⅞	3⅛	3⅜	3⅝
R	1¼	1¼	1¼	1½	2	2½	2½	3	3	4	4	4	4½
S	⅞	1¹⁄₁₆	1¼	1⅝	2	2⅜	2⅝	2⅞	3⅛	3⅜	3⅝	3⅞	4⅛
T	¼*	¼*	⅜	½	⅝	¾	¾	¾	¾	1	1	1	1
W	2½	2½	2½	3	4	5	5	6	6	8	8	8	9

*⅜" for single rod suspension ** 3¼" inch is furnished with 8 UN series thread.

Fig. 81-H Type D

Model R





Type D may be bolted directly under steel. Sizes 1 to 9 are furnished with swivel eye and turnbuckle instead of yoke and coupling.

NOTES: See load travel tables, see page PH-154 through PH-157 for "B" dimension. For weights see page PH-172.

Location of travel indicator and contour of side plate may vary from that shown.

Fig. 81-H Type D: Dimensions (inches)

Hanger Sizes	D	E	F	G	M	N	X	Y	Angle Size	Bracket Hole Dia.	Total Travel TT	L	C	Factors	J-Rod Min Thread Length	J-Rod Min Rod Dia.	J-Rod Max Rod Dia.
1- 9	8 1/4	1	7/8	2	6 1/8	4 1/8	3/4	5 5/8	2 x 2 x 1/4	9/16	4 or less	16 1/4	6	13 3/8	1 3/4 + TT	1/2	1/2
											4 1/2 or more	20 1/4	10	15 15/16			
10 - 18	8 7/16	3 1/4	1/2	2 9/16	8 5/16	6 7/16	7/8	8 1/16	1 1/2 x 1 1/2 x 1/4	3/4	5 or less	18 7/16	3 1/2	11 13/16	1 3/4 + TT	1/2	3/4
											5 1/2 or more	20 15/16	6	14 3/16			
19 - 34	14 7/16	1 1/2	5/8	3 5/8	12 7/16	8 9/16	1 1/8	11 5/16	3 x 3 1/2 x 1/4	3/4	5 or less	26 15/16	9 1/2	17 3/4	2 3/8 + TT	1/2	1 1/4
											5 1/2 or more	31 1/16	13 5/8	19 7/8			
35 - 49	17 1/16	2	1 1/16	4 1/2	13 3/4	9 13/16	1 3/8	13	3 x 4 x 3/8	7/8	6 or less	31 9/16	10 1/2	20 13/16	3 1/4 + TT	1/2	1 3/4
											6 1/2 or more	39 9/16	18 1/2	25 7/16			
50 - 63	26 3/16	2	1 5/16	7 3/8	17 11/16	11 1/4	1 5/8	14 5/8	4 x 4 x 3/8	1 3/8	8 or less	45 9/16	15 3/8	27 1/16	4 1/4 + TT	3/4	2 1/4
											8 1/2 to 11	53 9/16	23 3/8	27 1/16			
											11 or more	53 9/16	23 3/8	32 3/8			
64 - 74	35 3/4	3	3 1/4	5 1/4	22 3/16	11	2	15	4 x 6 x 1/2	1 5/8	10 1/2 or less	57 1/2	15 3/4	38 3/8	5 3/4 + TT	1 1/4	2 3/4
											11 or more	63	21 1/4	38 1/2			
75 - 83	35 3/4	3	3 5/8	4 3/4	27 3/16	11	2	15	4 x 6 x 1/2	1 5/8	10 1/2 or less	57 1/2	15 3/4	41 1/4	5 3/4 + TT	1 1/2	3 1/4
											11 or more	63	21 1/4	41 3/8			
84 - 110	Not available																

* Rod take-out = factor - (TT / 2), for lever in high position.

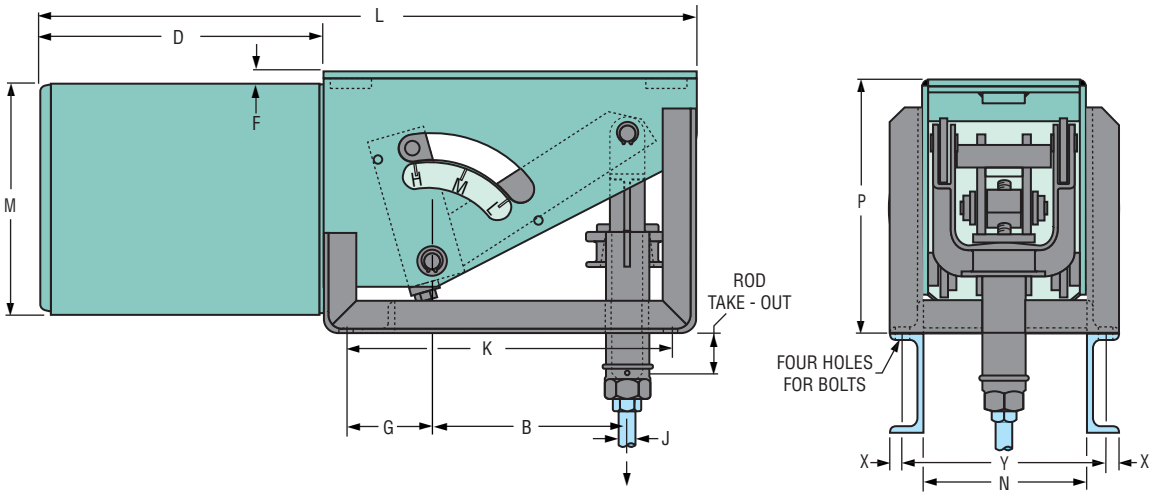
J-Rod Selection Chart

Load (lbs)	0 800	801 1,500	1,501 2,540	2,541 4,000	4,001 6,100	6,101 9,400	9,401 13,400	13,401 18,300	18,301 24,700	24,701 31,000	31,001 39,000	39,001 48,000	48,001 58,000
J Rod Size	1/2	5/8	3/4	1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3	3 1/4*

*3 1/4" is furnished with 8 UN series thread.

Fig. 81-H Type E

Model R



Type E incorporates two brackets as part of its frame, permitting the bolting of the constant support to the top of structural steel. Sizes 1 to 9 are furnished with swivel eye and turnbuckle instead of yoke and coupling.

If rod take-out does not exceed the depth of the supporting steel and rod coupling is required to extend below the steel, specify the depth of the supporting steel. Increase rod take-out by the depth of the steel.

Notes: See load travel tables, see page PH-154 through PH-157 for "B" dimension. For weights see page PH-172.

Location of travel indicator and contour of side plate may vary from that shown.

Fig. 81-H Type E: Dimensions (in)

Hanger Sizes	D	F	G	M	N	P	X	Y	Angle Size	Bkt. Hole Dia.	Total Travel TT	L	K	Factors	J-Rod Min Thread Length	J-Rod Min Rod Dia.	J-Rod Max Rod Dia.
1 - 9	8 1/4	7/8	2	6 1/8	4 1/8	8 1/2	5/8	5 15/16	1 1/2 x 1 1/2 x 1/4	9/16	4 or less	16 1/4	6	5 1/8	1 3/4 + TT	1/2	1/2
											4 1/2 or more	20 1/4	10	7 11/16			
10 - 18	8 7/16	1/2	2 9/16	8 5/16	6 7/16	10 13/16	5/8	8 15/16	1 1/2 x 2 x 1/4	3/4	5 or less	18 7/16	7 1/2	1 3/4	1 3/4 + TT	1/2	3/4
											5 1/2 or more	21 7/16	7 1/2	4 1/16			
19 - 34	14 7/16	5/8	3 5/8	12 7/16	8 9/16	16 1/8	5/8	11 3/16	1 1/2 x 2 1/2 x 1/4	3/4	5 or less	26 15/16	10	3 3/8	2 3/8 + TT	1/2	1 1/4
											5 1/2 or more	31 1/16	10	5 1/2			
35 - 49	17 1/16	1 1/16	4 1/2	13 3/4	9 13/16	19 5/8	1 3/16	13 5/16	2 x 2 x 3/8	7/8	6 or less	31 9/16	11 5/8	4 7/8	3 1/4 + TT	1/2	1 3/4
											6 1/2 or more	39 9/16	11 5/8	9 1/2			
50 - 63	26 3/16	1 5/16	7 3/8	17 11/16	11 1/4	19 3/4	1 5/16	14 11/16	3 x 3 x 3/8	1 3/8	8 or less	45 9/16	15 3/8	6 7/8	4 1/4 + TT	3/4	2 1/4
											8 1/2 to 11	53 9/16	23 3/8	6 7/8			
											11 1/2 or more	53 9/16	23 3/8	12 1/4			
64 - 74	35 3/4	3 1/4	5 1/4	22 3/16	11	26 7/8	1 9/16	14 15/16	3 1/2 x3 1/2 x 3/8	1 5/8	10 1/2 or less	53 1/2	17 1/2	11 1/8	5 3/4 + TT	1 1/4	2 3/4
											11 or more	63	23	11 1/4			
75 - 83	35 3/4	3 5/8	4 3/4	27 3/16	11	31 7/8	1 9/16	14 15/16	3 1/2 x3 1/2 x 3/8	1 5/8	10 1/2 or less	57 1/2	17 1/2	9	5 3/4 + TT	1 1/2	3 1/4
											11 or more	63	23	9 1/8			
84 - 110	Not available																

* Rod take-out = (factor) - (TT / 2), for lever in high position.

J-Rod Selection Chart

Load (lbs)	0 800	801 1,500	1,501 2,540	2,541 4,000	4,001 6,100	6,101 9,400	9,401 13,400	13,401 18,300	18,301 24,700	24,701 31,000	31,001 39,000	39,001 48,000	48,001 58,000
J-Rod Size	1/2	5/8	3/4	1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3	3 1/4

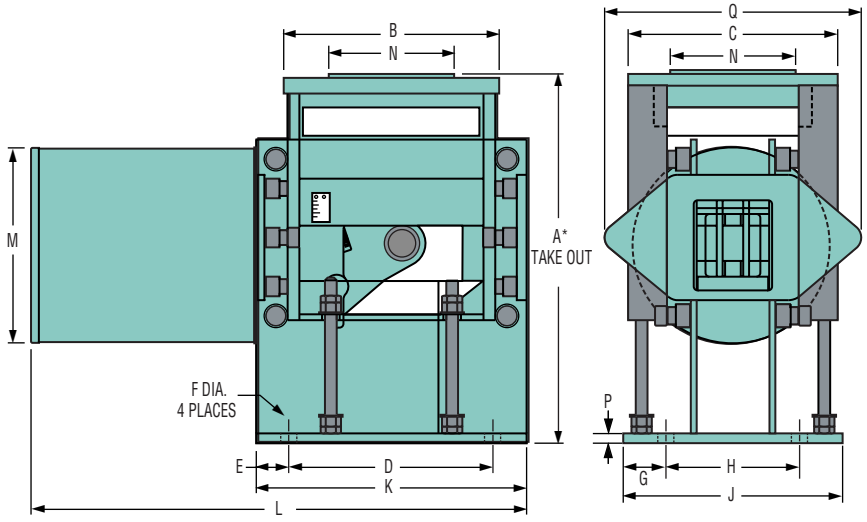
** 3 1/4 in is furnished with 8 UN series thread.

Fig. 81-H Type F Upthrust — Model R

The Upthrust is for support of piping or equipment from below. It has a base flange for fastening to the floor or beams. The load is supported during hydrostatic testing by means of (4) positioning studs. After testing the nuts are moved to either end of the stud to prevent interference during operation.

The Upthrust constant support is available for loads up to 24,463 (lbs).

Corrosion resistant units are available either galvanized or carbon-zinc painted or painted with CZ11.



***** Note: Shorter "A" Dimensions are available upon request.

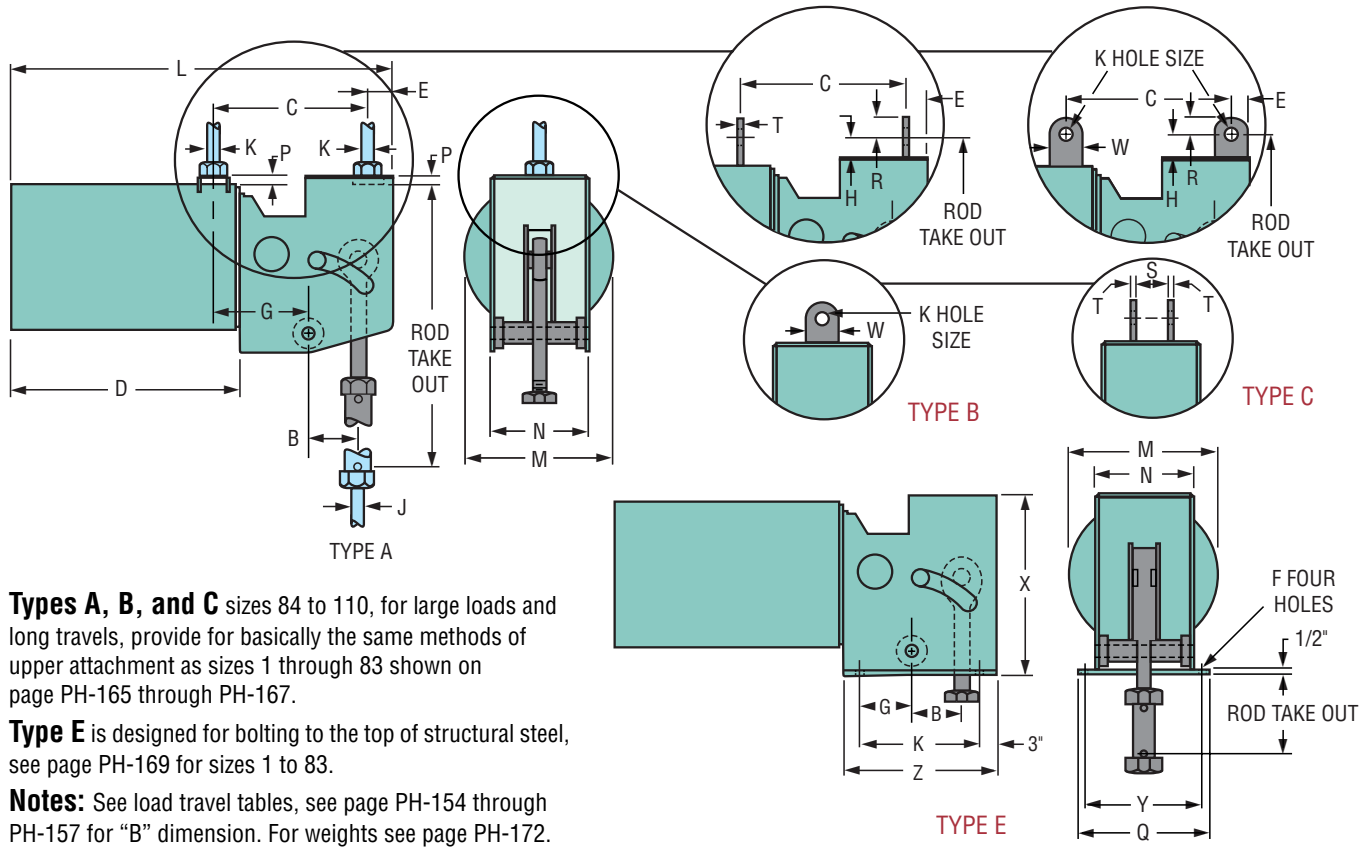
Take-Out Factor* "A"				
T.T.	Sizes			
	10 -18	19 - 34	35 - 49	50 - 63
2.0	16⅛	23⅛	–	–
2.5			25¾	–
3.0				28½
3.5				
4.0	19⅞			
4.5				
5.0				
5.5		27½		
6.0				
6.5	–		31⅝	34
7.0	–			
7.5	–			
8.0	–			
8.5	–	–		
9.0	–	–		
9.5	–	–		
10.0	–	–		

* For down travel:
Take-Out = "A" + (1/2) Actual Travel
For up travel:
Take-Out = "A" - (1/2) Actual Travel

Fig. 81-H Type F: Dimensions (in)

Size	Total Travel TT	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q
10 - 18	2 - 6	See Take Out	10⅞	11⅞	9	2½	¾	2	8	12	14	22 7/16	8¼	5	½	13⅞
19 - 34	2 - 8		13¾	13¾	13	2⅛			10	14	17¼	31⅝	12½	8	⅝	16⅜
35 - 49	2½ - 10		17⅞	16¼	17	2	⅞		13	17	21	38¼	13⅝		¾	19¾
50 - 63	3 - 10		21⅝	19¼	16½	4⅝		3⅝	11¾	19	25¾	52	17⅜	10		23¼

Fig. 81-H, Types A, B C and E — Model R, Sizes 84 to 110



Types A, B, and C sizes 84 to 110, for large loads and long travels, provide for basically the same methods of upper attachment as sizes 1 through 83 shown on page PH-165 through PH-167.

Type E is designed for bolting to the top of structural steel, see page PH-169 for sizes 1 to 83.

Notes: See load travel tables, see page PH-154 through PH-157 for "B" dimension. For weights see page PH-172.

Fig. 81-H, Types A, B C and E: Dimensions (in)

Hanger Size	L	C		D	E		F	G		H	K	M	N	P	Q	X	Y	Z	Total Travel TT	Factors			J-Rod		
		Type A&B	Type C		Type A&B	Type C		Type A & B & C	Type E											Type A	Type B&C	Type E	Min Thd Lgth	Rod Dia. Min	Rod Dia. Max
84- 94	76¾	28	27½	49¾	4	4½	1⅛	14	6	6	21	24	10½	3	16	34	13	27	9½ or less	45¾	54¾	21⅝	10	2	3¾
																			10 or more	55½	64½	31⅜	13		
95- 110	100	49	48½	64	4	4½	1⅜	28¾	8¾	6	30	24	11½	3½	17	37	14½	36	14 or less	56½	66	17⅝	12	2½	3¾
																			14½ or more	65⅜	74⅞	26⅝	15		

* Rod take-out = (factor) - (0.75 x TT), for lever in high position.

Load (lbs)	14,376 18,300	18,301 24,700	24,701 31,000	31,001 39,000	39,001 48,000	48,001 58,000	58,001 69,000	69,001 87,500
J & K-Rods	2	2¼	2½	2¾	3	3¼	3½	3¾
K-Hole	2⅜	2⅝	2⅞	3⅛	3⅜	3⅝	3⅞	4⅛
R	3	3	4	4	4	4½	4½	4½
S	2⅞	3⅛	3⅜	3⅝	3⅞	4⅛	4⅜	4⅝
T (Type B)	¾	¾	1	1	1	1	1½	1¾
T (Type C)							1¼	1¼
W	6	6	8	8	8	9	9	9

Fig. 80-V and 81-H — Weight Chart (approx) lbs, each

Hanger Sizes	Fig 80-V			Fig 81-H			
	Types A, B, C, D & E		Type G ■	Types A, B, C, D & E		Type F	
	Net	Shipping	Net	Net	Shipping	Net	Shipping
1 to 3	–	–	–	18	20	–	–
4 to 6	–	–	–	21	23	–	–
7 to 9	–	–	–	23	25	–	–
10 to 12	62	67	160	52	57	174	179
13 to 15	65	70	166	55	60	177	182
16 to 18	70	75	176	60	65	182	187
19 to 20	163	171	371	150	158	415	423
21 to 23	165	173	375	152	160	417	425
24 to 26	172	180	389	159	167	424	432
27 to 29	180	188	405	167	175	432	440
30 to 32	187	195	419	174	182	439	447
33 to 34	195	203	435	182	190	447	455
35 to 37	300	312	676	280	292	640	652
38 to 40	315	327	706	295	307	655	667
41 to 43	332	344	740	312	324	672	684
44 to 46	343	355	762	323	335	683	695
47 to 49	360	372	796	340	352	700	712
50 to 51	601	661	1,278	511	571	1,181	1,241
52 to 54	626	686	1,328	536	596	1,206	1,266
55 to 57	665	725	1,406	575	635	1,245	1,305
58 to 60	706	766	1,488	616	676	1,286	1,346
61 to 63	745	805	1,566	655	715	1,325	1,385
64 to 65	1,468	1,568	–	1,225	1,325	–	–
66 to 68	1,568	1,668	–	1,325	1,425	–	–
69 to 71	1,653	1,753	–	1,410	1,510	–	–
72 to 74	1,753	1,853	–	1,520	1,620	–	–
75 to 77	2,360	2,460	–	1,970	2,070	–	–
78 to 80	2,430	2,530	–	2,020	2,120	–	–
81 to 83	2,570	2,670	–	2,180	2,280	–	–
84 to 85	2,725	2,845	–	2,310	2,430	–	–
86 to 88	2,870	2,990	–	2,455	2,575	–	–
89 to 90	3,070	3,190	–	2,655	2,775	–	–
91 to 92	3,155	3,275	–	2,740	2,860	–	–
93 to 94	3,255	3,375	–	2,840	2,960	–	–
95 to 98	4,350	4,500	–	3,925	4,075	–	–
99 to 102	4,675	4,825	–	4,250	4,400	–	–
103 to 106	5,300	5,450	–	4,875	5,025	–	–
107 to 110	5,800	5,950	–	5,350	5,500	–	–

■ Based on 3'-0" C - C rod dimension and 8" total travel

Constant Support — Check List for Requesting a Quote or Ordering

Anvil International
Precision Park
160 Frenchtown Rd.
North Kingstown, RI 02852

For technical information regarding
Constant Supports Call or Fax:
Fax Number: (401) 886-3056
Phone Number: (401) 886-3025

Finish: Standard Primer: _____ Galvanized: _____ Special Coating: _____

Quantity: _____

Figure No.: Options are: ❑ 80-V, ❑ 81-H

or: ❑ C-80-V, ❑ C-81-H

Size: Options are: #1 through #110 *(Size #1 through #9 available in 81-H only)*

Type: Options are: A through G* (*Type F Upthrust available in 81-H only, Type G available in 80-V only*)

Actual Travel (AT): _____ (inches)

Total Travel (TT):** _____ (inches)

Direction of Travel: _____ + (up) *or* – (down)

Load: _____ *(lbs)*

"J" Dimension (rod diameter): _____ (inches) (Not required for Type F)

Mark Number: _____ (if required)

Travel Stops: Are always Included

Lifting Lugs: Yes: _____ No: _____

Available on sizes 10 and larger.

Notes:

* *Type G Constants must also include the C-to-C dimension & the load per spring.*

** *Total Travel = Actual travel + 1" or 20% whichever is greater rounded up to the next one half inch increment.*

Fig. 170 Horizontal Traveler

Size Range: Available in four sizes to take loads to 20,700 (lbs). All sizes provide for 12" of horizontal travel.

Approvals: Complies with MSS-SP-69 (Type 58).

Features:

- Highly economical
- Minimum friction
- Virtually dust proof
- Compact – designed for minimum head room
- Versatile

Installation: Shipped ready for installation. Attach to the supporting steel by welding around the frame.

Ordering: Specify size number, figure number, name and "H" dimension, if required. Horizontal travelers will be designed for special loads, travels or dual directional travel upon request.

The Anvil Fig. 170 horizontal traveler facilitates the supporting of piping systems subject to linear horizontal movements where head room is limited. Designed for use with Anvil Variable Spring Hangers or Constant Supports it can also be used in conjunction with a rigid type hanger assembly.

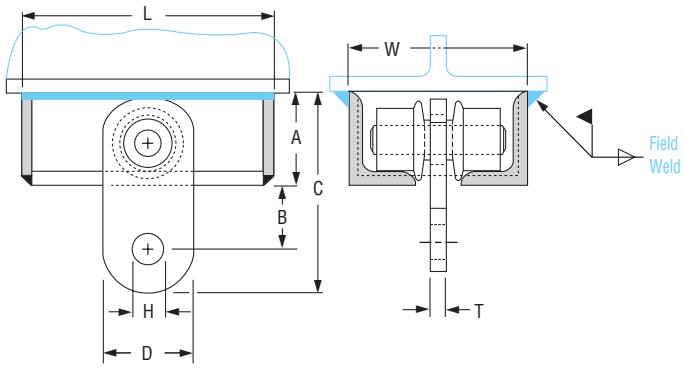


Fig. 170: Loads (lbs) • Weights (lbs) • Dimensions (in)

Size	Maximum Load	Weight	A	B	C	D	H Max	L	T	W
1	3,770	15	2½	1⅝	5⅜	2½	1⅛	15⅛	¾	4⅝
2	6,230	37	3½	2⅝	7⅞	3½	1⅜	16⅜		6⅞
3	11,630	69	5	3	10½	5	1¾	17⅞	1	8 7/16
4	20,700	102	6	3½	12½	6	2⅜	19⅛	1½	9⅞

Fig. 296 — Sway Brace

Fig. 301: With Adjustable Preload

Fig. C-296, Fig. C-301: Corrosion Resistant

Size Range: Preloads from 50 to 1,800 pounds and maximum forces from 200 to 7,200 pounds.

Finish: Standard finish: painted with semi gloss primer. Corrosion resistant: galvanized with coated coil.

Service: Recommended for controlling vibration; absorbing shock loading; guiding or restraining the movement of pipe resulting from thermal expansion; bracing a pipe line against sway.

Approvals: Complies with Federal Specification A-A-1192A (Type 55) *WW-H-171E (Type 55)* and MSS SP-69 (Type 50).

Installation: Shipped ready for installation (see line cuts of Fig. 297, Fig. 298, Fig. 302 and Fig. 303 on page PH-177 for typical installed hanger assemblies).

Adjustment: The sway brace should be in the neutral position when the system is hot and operating, at which time both spring plates should be in contact with the end plates. If they are not, the sway brace should be adjusted to the neutral position by use of the load coupling.

Features:

- Vibration is dampened with an instantaneous opposing force bringing the pipe back to normal position.
- A single pre-loaded spring provides two way movement.
- One spring saves space and simplifies design.
- Spring has 3-inch travel in either direction.
- Accurate neutral adjustment assured.
- A tight fitting connection at rear bracket and clamp.

Additional Features – Fig. 301:

The Fig. 301 sway brace is adjustable from the initial preload to the maximum capacity of the unit selected. It is equipped with a load-deflection scale to facilitate preload adjustment. Preload adjustment reduces spring travel accordingly.

Ordering: Specify figure, name and sway brace size. The Anvil Fig. 296 and Fig. 301 consist of the sway brace only. Available corrosion resistant as Fig. C-296 and Fig. C-301.

Preload adjustment – Fig. 301: Turn the preload adjustment nut until desired preload is indicated. Turn thrust nut until it is in contact with the spring plate. Lock in position. Indicated deflection must be greater than thermal movement.

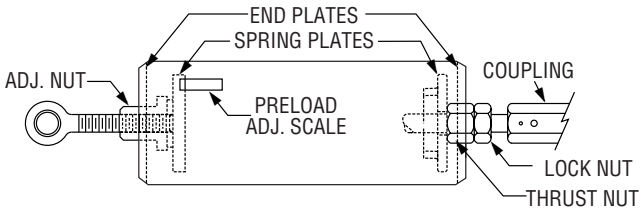


Fig. 296, Fig. 301: With Adjustable Preload
Fig. C-296, Fig. C-301: Corrosion Resistant

Size selection: The Anvil Vibration Control and Sway Brace gives full deflection forces from 200 to 7,200 pounds and has initial precompressed spring forces from 50 to 1,800 pounds to control vibrations and pipe sway.

The amount of force needed to control piping should be in proportion to the mass, amplitude of movement, and nature of disturbing forces acting on the pipe. When it is possible to calculate the exact restraining force required, the size of the Vibration Control and Sway Brace capable of providing this force should be selected.

As a general reference, the following sizes have been historically used for the pipe sizes shown:

- #1 - 3½" and smaller
- #2 - 4" to 8"
- #3 - 10" to 16"
- #4 - 18" to 24"
- #5 and #6 - above 24"

Installation: 1) attach rear bracket to structure and pipe attachment to piping or equipment. 2) connect coupling to pipe attachment and turn coupling so that spring is compressed in direction opposite to and by approximate amount of piping thermal movement.

Important: Final adjustment should be made with the pipe in its hot or operating position. Turn the coupling until both spring plates are in contact with the end plates of the Sway Brace.

When correct tension adjustments are completed, the brace exerts no force on the pipe in its operating position. Under shutdown conditions, the brace allows the pipe to assume its cold position. It exerts a nominal cold strain force equal to the preload force plus the amount of travel from the hot to cold position, times the spring scale of the particular size of the Vibration Control and Sway Brace.

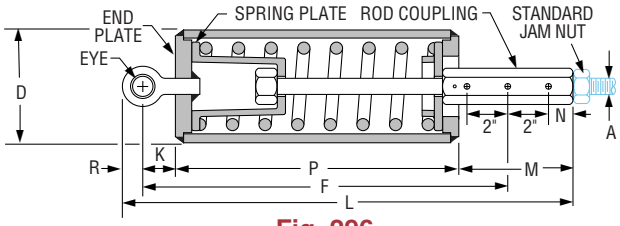


Fig. 296

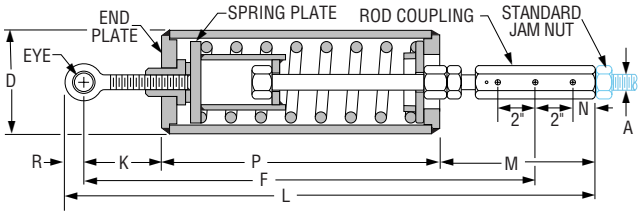


Fig. 301

Fig. 296: Loads • Weights (lbs) • Dimensions (in)

Sway Brace Size	Pipe Size	Preload and Spring Scale (lb/in)	Max Force (lbs)	Weight	Rod Size Fig. 297 A	Eye		D	Length F	K	L	M	N	P	R
						Dia. Hole	Thickness								
1	1½ to 24	50	200	22	¾	1	1	4½	13⅝	1⅝	17⅞	6⅛	1	8⅞	1¼
2		150	600	25	1				14⅜		18⅝			9⅝	
3		450	1,800	36					17¾		22			13	
4		900	3,600	64	1¼	1½	1½	6⅝	17	2¼	22 5/16	6¾	1½	11½	1 13/16
5	6 to 30	1,350	5,400	79	1½				18½		23 13/16			13	
6		1,800	7,200	95					20½		25 13/16			15	

Fig. 301: Loads • Weights (lbs) • Dimensions (in)

Sway Brace Size	Pipe Size	Preload and Spring Scale lb/in	Max Force (lbs)	Weight	Rod Size Fig. 302 A	Eye		D	Length F	K	L	M	N	P	R
						Dia. Hole	Thickness								
1	1½ to 24	50	200	23	¾	1	¾	4½	20	5 15/16	24¼	7⅞	1	9 3/16	1¼
2		150	600	26	1				20¾		25			9 15/16	
3		450	1,800	38					24⅛		28⅜			13 5/16	
4	6 to 30	900	3,600	67	1¼	1½	1½	6⅝	24 5/16	6 9/16	29⅝	9¼	1½	12	1 13/16
5		1,350	5,400	82	1½				25 13/16		31⅛			13½	
6		1,800	7,200	98					27 13/16		33⅛			15½	

Fig. 297 and Fig. 298 — Sway Brace Assembly

Fig. 302 and Fig. 303: With Adjustable Preload

Fig. C-297, Fig. C-298, Fig. C-302 and Fig. C-303: Corrosion Resistant

The Fig. 297 and Fig. 302 consist of a structural attachment, two studs, the Sway Brace, extension piece up to 2' 0" in length as required, and a modified Fig. 295 pipe clamp.

The Fig. 298 and Fig. 303 consist of a structural attachment, two studs, the Sway Brace, adjustable extension piece 2' 1" in length or over as required, an adapter and a toleranced pipe clamp.

Note: In specifying Sway Brace assemblies where the "W" dimension exceeds 2' 0" in length, the Fig. 298 or Fig. 303 assembly is required. Verify that calculated "W" is within the min/max shown in table.

Ordering assemblies: Specify figure number, name, Sway Brace size, pipe size, "W" dimension. Available corrosion resistant as Fig. C-297, C-298, C-302 and C-303.

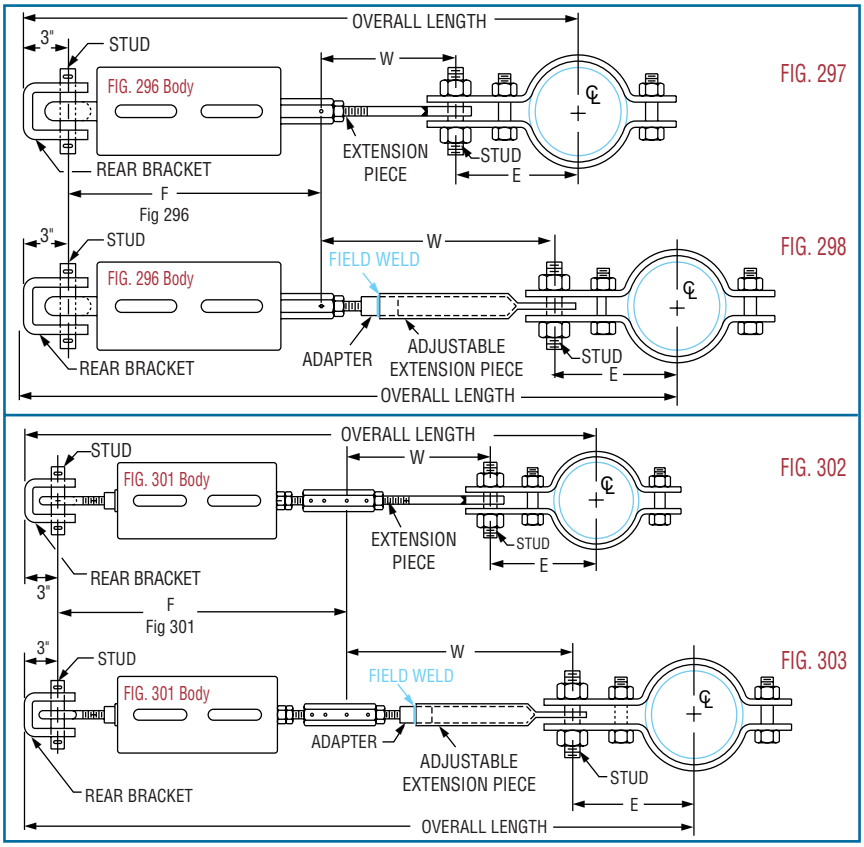


Fig. 297, 298, 302, 303, C-297, C-298, C-302 and C-303: Dimensions (in)

Pipe Size	E		
	Size 1 – 4 Carbon	Size 5 & 6 Carbon	Size 5 & 6 Alloy
1½	4⅛	–	–
2	5⅛	–	–
2½	5⅜	–	–
3	5 15/16	–	–
3½	6 3/16	–	–
4	6½	–	–
5	7	–	–
6	8 9/16	11 7/16	12 1/16
8	9 9/16	12 7/16	13 1/16
10	10⅝	13½	14⅜
12	11⅝	14¾	15⅜
14	12 11/16	15⅜	16
16	13 11/16	16⅜	17
18	14 11/16	17⅜	18
20	15⅞	19	19½
24	17⅞	21⅝	22⅛
30	–	25⅛	25⅛
	–		

Fig. 297, 298, 302, 303, C-297, C-298, C-302 and C-303: Dimensions (in)

Sway Brace Size	W			
	Fig. 297, 302		Fig. 298, 303	
	Min	Max	Min	Max
1	7 15/16	24	24	90 3/16
2	8 9/16	24	24	86 11/16
3	8 9/16	24	24	79 3/16
4	9 11/16	24	24	74 13/16
5	9 13/16	24	24⅛	61 13/16
6				46 13/16

Fig. 211, Fig. C-211 — Sway Strut Assembly

Fig. 640, Fig. C-640: Field Welded Strut

Finish: Painted (Fig. 211 & Fig. 640) or Galvanized (Fig. C-211 & C-640)

Service: Used to restrain movement of piping while allowing for movement in the other two directions.

How to size:

(1) Select size consistent with max. load to be restrained.

(2) C to C is obtained by subtracting E and A from the distance from structural steel to center of pipe. Verify that the calculated C to C is within the min/max limits.

(3) Determine W dimension by: W=(C to C)-2F.

Installation: Shipped assembled. Securely fasten bracket to structure, make necessary adjustment in overall length, and fasten clamp to pipe.

Features:

- Effective under either tensile or compressive force.
- Provides 3½" (Fig. 211) or 2" (Fig. 640) of field adjustment in either direction.
- Self-aligning bushings permits ±5° misalignment or angular motion. Bushings are coated with a dry lubricant.

Ordering: Specify figure number, assembly size, name, option number, normal pipe size or special O.D., and "W" dimension. Alloy pipe clamps are available as a special order. For restraint parallel to the pipe axis using two sway strut assemblies, a riser clamp is available. If a riser clamp is required, consult the nearest Anvil representative for information about this clamp.

Note: The rear bracket assembly can be ordered separately.

E-Take Out: Dimensions (in)

Pipe Size	Size A	Size B & C	Size 1 & 2	Size 3	Size 4	Size 5	Size 6	Size 7	Size 8
¾	2 7/16	–	–	–	–	–	–	–	–
1	2 9/16	–	–	–	–	–	–	–	–
1¼	2 11/16	–	–	–	–	–	–	–	–
1½	4⅛	–	–	–	–	–	–	–	–
2	5⅛	6⅜	6⅜	–	–	–	–	–	–
2½	5⅜	7	7	8⅛	–	–	–	–	–
3	5 15/16				–	–	–	–	–
3½	6 3/16				–	10	–	–	–
4	6½	7¼	7¼	8⅜			–	–	–
5	7¾	7¾	7¾	9⅛	9⅛		–	–	–
6	8⅜	8⅜	8⅜	10	10		11⅞	–	–
8	9⅜	9⅜	9⅜	11¼	11¼	11¼	12⅝	–	–
10	10½	10½	10½	12¾	12¾	12¾	14¼	14¼	16¼
12	–	11⅞	11⅞	13⅞	13⅞	13⅞	15⅜	15⅜	17¼
14	–	12⅝	12⅝	14½	14½	14½	16	16¼	18
16	–	13⅝	13⅝	15¼	15¼	15¼	17⅛	17½	19
18	–	14⅝	14⅝	16⅜	16⅜	16⅜	18¼	18½	20¼
20	–	15¾	15¾	17¾	17¾	17¾	19¼	19¾	21½
24	–	18⅛	18⅛	19⅞	19⅞	19⅞	21¾	21¾	24
30	–	21¼	21¼	23	23	23	25	25	28
36	–	24	24	26½	26½	26½	28⅛	28⅛	31¼

Fig. 211, Fig. C-211
Fig. 640, Fig. C-640: Field Welded Strut

Sway Strut Assembly

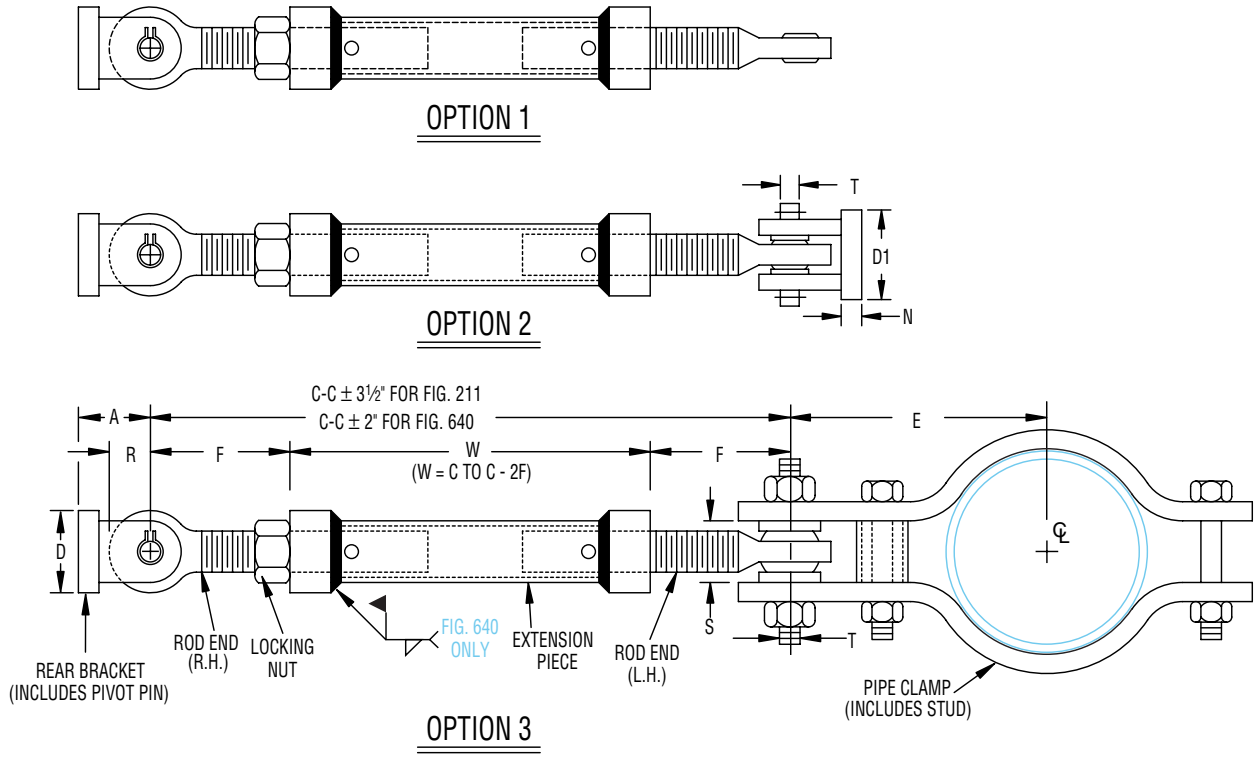


Fig. 211, C-211, Fig. 640 & Fig. C-640: Load (lbs) • Dimensions (in)

Size	Fig. 211 & Fig. 640										Fig. 211					Fig. 640			
	Load ■	Rod End	Ext. Piece	A	D	D1	N	R	S	T	C-C Max	C-C Min	W Max	W Min	F	Weld Z	C-C Max	C-C Min	F
A	650	¾	1	1	2	1¼	¼	⅝	⅝	0.374 0.372	60	16½	53⅛	9⅝	3⁷⁄₁₆	¾₁₆	60	12⅛	2¹¹⁄₁₆
B	1,500	1	1½	2½		2⅜	⅝	1⅜	1⅜	0.749 0.747	108	19	99⅛	10⅛	4⁷⁄₁₆		96	14⁷⁄₁₆	3¹¹⁄₁₆
C	4,500	1	2							0.749 0.747	120		111⅛	10⅛					
1	8,000	1¼				2⅞	¾	1½		0.999 0.997		21	110⅜	11⅜	4¹³⁄₁₆	5⁄₁₆		16½	4⅛
2	11,630	1½	2½							0.999 0.997		21⅜	110		5			16⁷⁄₈	4¼
3	15,700	1¾		3	3	3³⁄₁₆	¾	2	1¹¹⁄₁₆	1.249 1.247		22⅞	108½		5¾			18⅜	5
4	20,700	2	3							1.249 1.247		25	108		6			20½	5¼
5	27,200	2¼		4	6⅛	4¼	1¼	2½	2	1.499 1.497		26½	106½	13	6¾	⅜		22	6
6	33,500	2½	4	5	7⅞	5⅜	1¾	3	2⅜	1.749 1.747		28¼	104¾		7⅝			23¾	6⅞
7	68,200	3		5¾	9⅛	6¼	2	3½	3	1.999 1.997		32½	102½	15	8¾	⅝		28	8
8	120,000	4	6	7¼	14	8¾	2¼	4¾	3⅜	2.499 2.497		39¼	98	17¼	11	¾		34¾	10¼

■ Loads must not be applied outside a 10° included angle cone of action to the pipe clamp axis without special authorization.
Fig. 640 shipped at maximum length C-C, field cut to "W" to suit, unless otherwise specified.

Fig. 222, C-222 — Mini-Sway Strut Assembly

Finish: Painted or Galvanized

Service: Used to restrain movement of piping in one direction while allowing movement in the other two directions.

How to size:

(1) Select size consistent with max. load to be restrained.

(2) C to C is obtained by subtracting E and A from the distance from structural steel to center of pipe. Verify that the calculated C to C in within the min/max limits.

(3) Determine W dimension by: W=(C-C)-2F.

Installation: Shipped assembled. Securely fasten bracket to structure, make necessary adjustment in overall length, and fasten clamp to pipe.

Features:

- Assembly provides a shorter C to C dimension.
- Effective under either tensile or compressive force.
- Self-aligning bushings permit ± 5 misalignment or angular motion. Bushings are coated with a dry lubricant.

Ordering: Specify assembly size, figure number, name, finish, pipe O.D. or option number, if other than standard, and load.

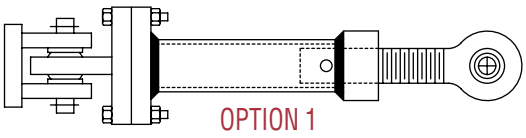
Ex: Size A-1, Fig. 222 mini sway strut 10¾ O.D. pipe, 650#. Alloy pipe clamps are available as a special order. For restraint parallel to the pipe axis using two sway strut assemblies, a riser clamp is available. Contact your Anvil representative for information about this clamp.

Note: The rear bracket assembly can be ordered separately

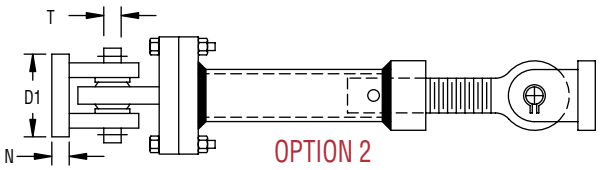
E-Take Out: Dimensions (in)

Pipe Size	Size A	Size B & C	Size 1
¾	2 7/16	–	–
1	2 9/16	–	–
1¼	2 11/16	–	–
1½	4⅛	–	–
2	5⅛	6⅜	6⅜
2½	5⅜	7	7
3	5 15/16		
3½	6 3/16		
4	6½	7¼	7¼
5	7¾	7¾	7¾
6	8⅜	8⅜	8⅜
8	9⅜	9⅜	9⅜
10	10½	10½	10½
12	–	11⅞	11⅞
14	–	12⅝	12⅝
16	–	13⅝	13⅝
18	–	14⅝	14⅝
20	–	15¾	15¾
24	–	18⅛	18⅛
30	–	21¼	21¼
36	–	24	24

Fig. 222, C-222 Mini-Sway Strut Assembly (cont.)



OPTION 1



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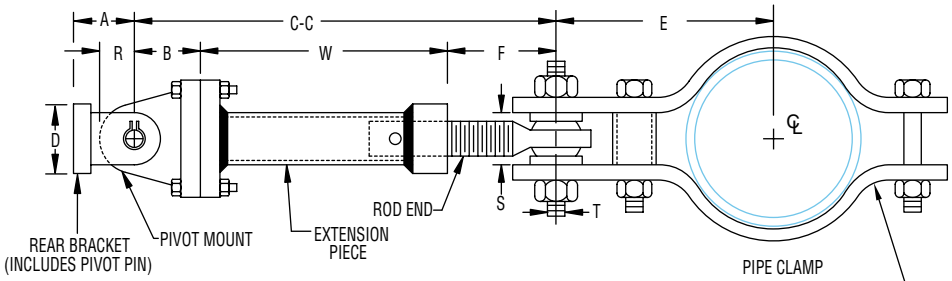

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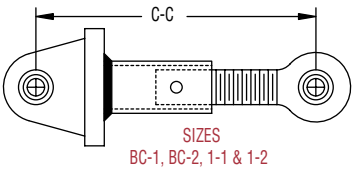


Sway Strut Assembly

Fig. 222, C-222: Loads (lbs) • Dimensions (in)

Assembly Size		Load ■	C-C		F		W	Rod End	A	D	D1	N	R	S	T Nom.	B
			Max	Min	Max	Min										
A	A-1	650	6 5/8	5 3/8	2 13/16	1 9/16	2 5/8	3/4	1	2	1 1/4	1/4	5/8	5/8	3/8	1 3/16
	A-2		8 1/2	6 1/2	4 1/4	2 1/4	3 1/16									
	A-3		13 1/4	8 1/2	6 1/4	1 1/2	5 13/16									
B & C	BC-1	4,500	6 1/2	6	2 7/8	2 3/8	1 1/2	1	2 1/2	2	2 3/8	5/8	1 3/8	1 3/8	3/4	2 1/8
	BC-2		7 3/4	6 5/8	3 1/2	2 3/8	2 1/8									
	BC-3		8 11/16	7 9/16	3 13/16	2 11/16	2 3/4									
	BC-4		10 15/16	8 11/16	4 15/16	2 11/16	3 7/8									
	BC-5		15 7/16	10 15/16	7 3/16	2 11/16	6 1/8									
	BC-6		19 9/16	15 7/16	9 1/4	5 1/8	8 3/16									
1	1–1	8,000	8 7/8	8	3 11/16	2 13/16	2 15/16	1 1/4	2 1/2	2	2 7/8	3/4	1 9/16	1 3/8	1	2 1/4
	1–2		10 5/8	8 7/8	4 9/16	2 13/16	3 13/16									
	1–3		11 7/8	10 1/4	4 13/16	3 3/16	4 13/16									
	1–4		15 1/8	11 7/8	6 7/16	3 3/16	6 7/16									
	1–5		21 5/8	15 1/8	9 11/16	3 3/16	9 11/16									

■ Loads must not be applied outside a 10° included angle cone of action to the pipe clamp axis without special authorization.

Fig. 210 — Replacement Strut

Finish: Painted or Galvanized

Service: Rigid replacement struts provide a viable, low cost solution that complements snubber reduction programs in nuclear and non-nuclear power plants. They are being used to replace both mechanical and hydraulic snubbers on a one-to-one size basis in most installations. Replaced snubbers may then be placed back on the shelf and used for maintenance and repair, reducing or eliminating the stocking of new snubbers.

Ordering: Specify size, figure number, name, finish and "W" dimension.

Note: The Fig. 210 has the same load rating as the snubber it replaces.

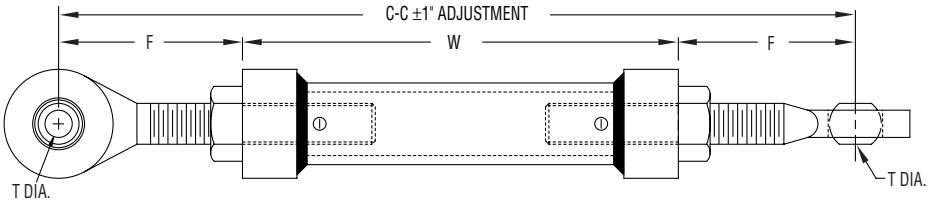


Fig. 210: Loads (lbs) • Dimensions (in)

Size	F	C to C		W		T Nominal	Replaces	
		Min	Max	Min	Max		Fig. 200/201	Fig. 306/307
1	2 3/16	9	66	4 5/8	61 5/8	3/8	–	1/4K & 1/2K
2	3 1/16	12 9/16	77	6 7/16	70 7/8	1/2	–	1K
3	3 3/8	14 13/16	100	8 1/16	93 1/4	3/4	1 1/2	3K
4	4	15 5/8	120	7 5/8	112	1	2 1/2	10K
5	4 3/4	17 7/8	120	8 3/8	110 1/2	1 1/4	3 1/4	–
6	5 3/4	19 7/8	120	8 3/8	108 1/2	1 1/2	4	–
7	6 1/2	22 1/2	120	9 1/2	107	1 3/4	5	–
8	6 3/8	27	130	14 1/4	117 1/4	1 1/2	–	35K
9	7 5/8	25 1/4	120	10	104 3/4	2	6	–

Note: The Fig. 210 has the same load rating as the snubber it replaces

Fig. 1306 — Limit Stop

Fig. 1307: With Extension Piece

Size Range: Rated loads from 650 (lbs) to 670,000 (lbs).

Service: Limit stops are passive restraints with preset gaps. The gaps are sized to permit free thermal movement but prevent excessive pipe stresses by limiting displacements due to seismic or other disturbing events.

How to size: Select size based on expected load. Stroke is determined by the required gap.

Features:

- Totally passive
- Unrestricted thermal movement
- Simple installation
- Simplified inspection – visual
- ISO-9001 qualified
- Pin-to-pin: up to 120"

Materials: Smaller sizes (up to 10,000 lb. Load) are of stainless steel construction and utilize internal body threads for adjusting gaps. For larger sizes, carbon steel is used, and the gaps are adjusted with internal spacer washers. Hard chrome, as well as other platings and coating, are utilized to meet any environment.

Ordering:

Fig. 1306 specify: size, stroke, limit stop, compression setting and tension setting
Fig. 1307 specify: size, stroke, limit stop, W dimension, compression setting and tension setting.

Fig 1306, 1307: Loads (lbs) • Dimensions (in)

Rated Load	Size	Stroke *	Pin Dia	Pin to Pin (Fig. 1306)*	
				Min.	Max.
650	1	4	3/8	10 1/8	14 1/8
1,500	2	4	1/2	12 1/2	16 1/2
3,000	11	5	3/4	14 3/4	19 3/4
6,000	3	5		16 1/2	21 1/2
12,500	12	5	1	15 5/8	20 5/8
15,000	4	6		20 3/16	26 3/16
21,000	13	5	1 1/4	17 7/8	22 7/8
32,000	14	5	1 1/2	19 7/8	24 7/8
50,000	5	6		27	33
50,000	15	5	1 3/4	22 1/2	27 1/2
72,000	16	5	2	25 1/4	30 1/4
120,000	6	6	2 1/2	32 13/16	38 13/16
128,000	18	5		29 1/2	34 1/2
200,000	19	As Required			
268,000	20				
670,000	21				

*Standard - other strokes available

Fig. 3306 Hydraulic Snubber
Fig. 3307: With Extension Piece

Size Range: Six standard sizes with load ratings from 350 to 50,000 pounds.

Finish: Basic unit is corrosion resistant salt bath nitrided. Attachments are painted with semi gloss primer, carbo zinc or other.

Service: For use on piping systems or equipment when unrestrained thermal movement must be allowed, but which must be restrained during impulsive or cyclic disturbance. The unit is not effective against low amplitude, high frequency movement. Use with standard settings to prevent destructive response to earthquakes, flow transients or wind load. Special settings are available to absorb the continuous thrust resulting from safety valve blow-off or pipe rupture.

Fig. 3306

Standard Settings: The standard settings are: Locking (activation) velocity 8 ± 2 in/min. Bleed rate (post activation) at normal rated load 4 ± 1 in/min. (Special settings are available). The valves are calibrated at the factory within the tolerances indicated at room temperature. Locking velocity and bleed rate will vary with temperature. Testing has indicated that there is little effect of these changes on dynamic operation.

Fig. 3307 with Extension Piece

Features:

- Temperature compensating valves minimize the effects of temperature on lockup and bleed
- Pressurized reservoirs
- Continuous operation at 150° F with brief transients to 350° F
- Factory calibrated valves
- Rapid, positive valve closure
- Special design minimizes the “lost motion“which results from the shifting and seating of piston seals
- Unlocked resisting force is less than 17 1/2 pounds for sizes 1/4 and 1/2 and less than 2% of rated load for larger sizes
- Stable non-flammable, long life hydraulic fluid
- Self-aligning bushings permit ± 5° misalignment or angular motion. Bushings are coated with a dry lubricant.
- Choice of coating (paint, primer, carbo zinc, epoxy, plating or other) for attachments.

Applications:

- Direct replacement for Fig. 306/307 Pacific Scientific (PSA) mechanical snubbers: Exact load ratings, exact pin sizes, exact stroke lengths and exact pin-to-pin dimensions. The cross sectional dimensions of the Fig. 3306 are based on those of PSA to facilitate non-interference one-to-one replacement. Pins, clamps, pivot mounts, extension pieces, and rear brackets used with PSA snubbers are compatible with the Fig. 3306 and can be utilized.
- New installations: For new installations, the Fig. 3306 is available with a complete line of pipe clamps and rear brackets.

Loads (lbs)		
Size	**Stroke (in)**	**Max Load ***
1/4	4	350
1/2	2 1/2	650
1	4, 8	1,500
3	5, 10	6,000
10	6, 12	15,000
35	6	50,000

* Loads must not be applied outside a 10° included angle cone of action to the pipe clamp axis without special authorization.

Fig. 3306 Hydraulic Snubber
Fig. 3307: With Extension Piece

How to size:

(1) **Size:** Use table on the previous page to select size large enough to restrain expected load.

(2) **Stroke:** Define expected movement of the pivot joining the snubber with the equipment to be protected (cold to hot plus any abnormal movements). Determine maximum and minimum distances between this curve and the fixed pivot pin of the snubber. The minimum recommended stroke is 20% greater than the difference between these lengths. Make sure that all normal movement of equipment will be accommodated without the snubber entering the last 1/4" (preferably 1/2") of the stroke at either end.
Note: If erected position at the snubber's location on the equipment is outside of the range of normal cold-to-hot movement (e.g cold pull of pipe), the snubber should not be installed until after the equipment is in its cold position. This eliminates the need of providing for the extra travel in the snubber's stroke.

(3) **Piston position:** To aid in measuring the piston position, we have shown a dimension, "Z". This dimension represents the distance between the cylinder head and the end of the rod when the rod is fully retracted. Whenever specifying the position at which the piston rod is to be set, the total dimension from the cylinder head to the end of the rod should be given. Thus, *piston setting=piston position +Z.*

(4) **Assembly length:** Determine the installed "C" dimension by adding the installed piston position (not setting) to C minimum. Lay in takeout dimensions E and/or B, and find required pin-to-pin snubber length. If a pin-to-pin length adjustment is desired, use Fig. 3307. Calculate the required "W" dimension by subtracting (C installed + F) from the required pin-to-pin length. If this is less than W minimum, only a Fig. 3306 can be used, and one of the attachments will have to be moved or shimmed to suit. If a Fig. 3306 is to be used, make sure that the required pin-to-pin length is at least as great as (C installed + B). If neither a Fig. 3306 nor a Fig. 3307 can be accommodated, and the installation cannot be modified, consult your Anvil representative about designing a special or modified unit.

(5) **Installed piston setting:** As indicated previously, the snubber should be installed at its cold piston position if possible. From the installed position, take extension (outward movement) of the piston rod as positive (+) and retraction as negative (-).
Installed piston position =

$$\left(\frac{\text{Stroke} - (\text{Algebraic Sum of Movements})}{2}\right)$$

Ordering: Specify

- Fig. No.
- Size
- Stroke
- Load
- Cold and hot piston settings
- W dimension when specifying Fig. 3307
- Pipe clamp size when specifying option 3
- Attachment surface coating
- Option

Fig. 3306 & 3307 Options	
Option	**Consists of...**
0	Fig 3306: Basic unit (snubber) with pivot mount and one rear bracket.
	Fig. 3307: Basic unit with extension piece and one rear bracket.
1	Option 0 plus cylinder eye.
2	Option 0 plus cylinder eye and additional rear bracket.
3	Option 0 plus cylinder eye and pipe clamp.

Fig. 3306 Hydraulic Shock and Sway Suppressor (cont.)

Fig. 3307: With Extension Piece

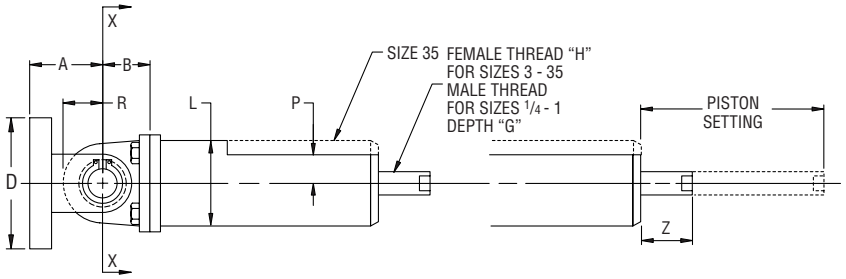


FIG. 3306 (OPTION 0)

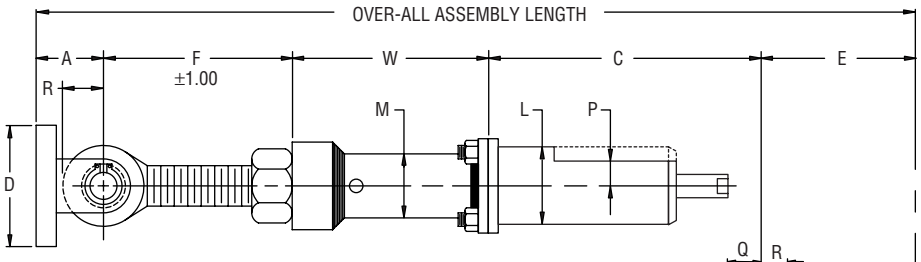
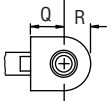
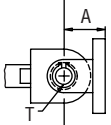


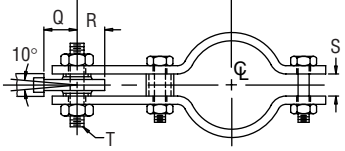
FIG. 3307 (OPTION 0)



OPTION 1



OPTION 2



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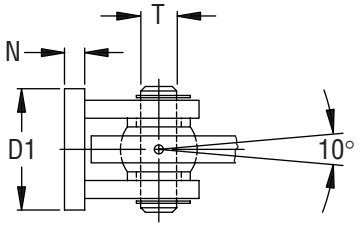
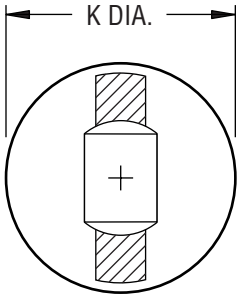




NOTE: CYLINDER EYE MAY BE ROTATED TO ANY POSITION

BOLT PLATE (SIZES 1/4 - 10)
SECTION X–X

Fig. 3306
Fig. 3307: With Extension Piece

Hydraulic Snubber (cont.)

Fig 3306, 3307 Dimensions (in)

Snubber Size	Stroke	A	B	C			D	D1	F	G	H	K Dia	L Dia	M Dia	N	P	Q Ref	R Max	S	T Dia	W		Max Pin to Pin	Z
				Min	Mid	Max															Min	Max		
¼	4.00	1.00	1.19	9.0	11.00	13.0	2.00	1.25	2.94	0.38	⅜-16	2.25	2.25	1.31	0.25	0.62	1.19	0.63	0.63	0.374	8.25	45.56	61.50	0.19
½	2.50			7.5	8.75	10.0														0.372	8.25	48.56		
1	4.00	1.62	1.56	11.0	13.00	15.0	4.00	1.75	3.00	0.38	⅜-16	3.25	2.38	1.31	0.38	0.69	2.00	1.00	1.00	0.499	8.81	43.50	61.50	0.19
	8.00			15.5	19.50	23.5														0.497	N/A	N/A	25.06	0.13
3	5.00	2.12	2.12	14.5	17.00	19.5	5.00	3.62	4.50	0.72	⅝-18	4.62	4.62	2.38	0.50	1.44	2.12	1.38	1.38	0.749	9.31	37.50	61.50	1.25
	10.00			20.5	25.50	30.5														0.747	N/A	N/A	32.62	
10	6.00	3.00	3.06	17.1	20.10	23.1	7.00	4.00	5.12	1.00	1-14	5.75	5.75	2.88	1.00	1.62	2.00	1.62	1.38	0.999	10.18	44.50	72.75	2.10
	12.00			24.1	30.10	36.1														0.997	N/A	N/A	39.16	3.10
35	6.00	4.62	3.00	24.0	27.00	30.0	9.75	6.50	7.75	1.88	1⅞-12	–	6.00	4.50	1.25	–	3.00	2.79	2.00	1.499 1.497	10.00	79.75	117.50	1.48

Fig 3306, 3307 Dimensions (in)

*Pipe Size	E-Take Out					Clamp Stock Size				
	Snubber Size					Snubber Size				
	¼ & ½	1	3	10	35	¼ & ½	1	3	10	35
¾	2 7/16	–	–	–	–	3/16 x 1	–	–	–	–
1	2 9/16	–	–	–	–	3/16 x 1	–	–	–	–
1¼	2 11/16	–	–	–	–	3/16 x 1	–	–	–	–
1½	4⅛	–	–	–	–	¼ x 1¼	–	–	–	–
2	5⅛	–	–	–	–	¼ x 1¼	–	–	–	–
2½	5⅜	7	7	7	–	¼ x 1¼	⅜ x 1¾	½ x 2½	⅝ x 2½	–
3	5 15/16	7	7	8⅛	–	¼ x 1¼	⅜ x 1¾	½ x 2½	⅝ x 2½	–
3½	6 3/16	7	7	8⅛	–	¼ x 1¼	⅜ x 1¾	½ x 2½	⅝ x 2½	–
4	6½	7¼	7¼	8⅜	–	5/16 x 2	½ x 1½	⅝ x 2½	⅝ x 2½	–
5	7¾	7¾	7¾	9⅛	–	5/16 x 2	½ x 1½	⅝ x 2½	¾ x 3	–
6	8⅜	8⅜	8⅜	10	–	5/16 x 2	½ x 2	⅝ x 3	¾ x 4	–
8	9⅜	9⅜	9⅜	11¼	12⅝	5/16 x 2	½ x 2½	¾ x 3	¾ x 5	1 x 7
10	10½	10½	10½	12¾	14¼	5/16 x 2	⅝ x 2½	¾ x 4	¾ x 6	1¼ x 6
12	–	11⅞	11⅞	13⅞	15⅜	–	⅝ x 2½	¾ x 5	1 x 5	1¼ x 6
14	–	12⅝	12⅝	14½	16	–	⅝ x 2½	¾ x 5	1 x 5	1¼ x 7
16	–	13⅝	13⅝	15¼	17⅛	–	⅝ x 3	¾ x 5	1 x 5	1¼ x 8
18	–	14⅝	14⅝	16⅜	18¼	–	¾ x 3	¾ x 5	1 x 6	1¼ x 9
20	–	15¾	15¾	17¾	19¼	–	¾ x 3	¾ x 5	1 x 7	1½ x 8
24	–	18⅛	18⅛	19⅞	21¾	–	¾ x 4	¾ x 5	1 x 7	1½ x 9
30	–	21¼	21¼	23	25	–	¾ x 4	¾ x 6	1 x 7	1½ x 10
36	–	24	24	26½	28⅛	–	¾ x 5	¾ x 7	1 x 7	1½ x 10

* Intermediate sizes between 20 and 36 are available and will have the take out and stock of the next larger size.

Fig. 200, Fig. C-200 — Hydraulic Snubber
Fig. 201, Fig. C-201: With Extension Piece

Size Range: Seven standard sizes with cylinder bores of 1½" to 8" and with normal load ratings from 3,000 pounds to 128,000 pounds. All are available with 5", 10", 15", or 20" strokes except the 1½" size which is offered with 5" and 10" strokes only. Snubbers are available with integral or remote reservoirs.

Finish: Fig. 200/201 painted with semi gloss primer.
Fig. C-200/C-201 corrosion resistant; painted with carbo zinc.

Service: For use on piping systems or equipment when unrestrained thermal movement must be allowed, but which must be restrained during impulsive or cyclic disturbance. The unit is not effective against low amplitude, high frequency movement. Use with standard settings to prevent destructive response to earthquakes, flow transients or wind load. Special settings are available to absorb the continuous thrust resulting from safety valve blow-off or pipe rupture.

Standard settings: The standard settings are: Locking (activation) velocity 8 ± 2 in/min.
Bleed rate (post activation) at normal rated load 4 ± 1 in/min. (Special settings are available).
The valves are calibrated at the factory within the tolerances indicated at room temperature. Locking velocity and bleed rate will vary with temperature. Testing has indicated that there is little effect of these changes on dynamic operation.

Features:

- Choice of valve type
  - ❒ Adjustable – permits field adjustments
  - ❒ Temperature compensating – minimizes the effects of temperature on lockup and bleed
- Choice of reservoir type
  - ❒ Transparent – continuous operation at 200° F with brief transients to 250° F
  - ❒ Metal or pressurized metal – allows brief transients to 340° F
  - ❒ Pressurized – eliminates the concern of reservoir orientation relative to valve and cylinder – minimizes internal contamination
  - ❒ Remote
- Factory calibrated valves
- Rapid, positive valve closure
- Special design minimizes the "lost motion" which results from the shifting and seating of piston seals
- Unlocked resisting force is less than 1% of rated load
- Stable, non-flammable, long life hydraulic fluid made highly visible for ease of inspection
- Self-aligning bushings permit ± 5° misalignment or angular motion. Bushings are coated with a dry lubricant.
- Choice of coating (paint, primer, carbo zinc, epoxy, plating or other)

Loads (lbs)	
Cylinder Size (in)	**Max Load ***
1½ (5" stroke)	3,000
1½ (10" stroke)	1,250
2½ (5", 10", 15" stroke)	12,500
2½ (20" stroke)	10,500
3¼	21,000
4	32,000
5	50,000
6	72,000
8	128,000

* Loads must not be applied outside a 10° included angle cone of action to the pipe clamp axis without special authorization.

Fig. 200, Fig. 201 — Hydraulic Snubber (cont.)

Upgrade Kits: Kits are available to upgrade existing snubbers with temperature compensating valves and/or pressurized reservoir.

How to size:

(1) Cylinder size: Use table on page PH-191 to select cylinder bore size large enough to restrain expected load.

(2) Stroke: Define expected movement of the pivot joining the suppressor with the equipment to be protected (cold to hot plus any abnormal movements). Determine maximum and minimum distances between this curve and the fixed pivot pin of the snubber. The minimum recommended stroke is 20% greater than the difference between these lengths. **Note:** If erected position at the snubber's location on the equipment is outside of the range of normal cold-to-hot movement (e.g. cold pull of pipe), the snubber should not be installed until after the equipment is in its cold position. This eliminates the need of providing for the extra travel in the snubber's stroke. For 2½" through 8" snubbers, standard strokes are 5", 10", 15", and 20". For the 1½" snubber, 5" and 10" are the only standard strokes.

(3) Installed piston setting: As indicated previously, the snubber should be installed at its cold piston position if possible. From the installed position, take extension (outward movement) of the piston rod as positive (+) and retraction as negative (-).

(4) Installed piston position =

$$\left(\frac{\text{Stroke} - (\text{Algebraic Sum of Movements})}{2}\right)$$

To aid in measuring the piston position, we have shown a dimension, "Z". This dimension represents the distance between the cylinder head and the end of the rod when the rod is fully retracted. Whenever specifying the position at which the piston rod is to be set, the total dimension from the cylinder head to the end of the rod should be given. Thus, Piston Setting = Piston Position + Z.

(5) Assembly length: Determine the installed "C" dimension by adding the installed piston position (not setting) to C minimum. Lay in take out dimensions E and/or B, and find required pin-to-pin snubber length. If a pin-to-pin length adjustment is desired, use Fig. 201. Calculate the required "W" dimension by subtracting (C installed + F) from the required pin-to-pin length. If this is less than W minimum, only a Fig. 200 can be used, and one of the attachments will have to be moved or shimmed to suit. If a Fig. 200 is to be used, make sure that the required pin-to-pin length is at least as great as (C installed + B). If neither a Fig. 200 nor a Fig. 201 can be accommodated, and the installation cannot be modified, consult your Anvil representative about designing a special or modified unit.

Ordering:

Ordering: Specify part number as follows:

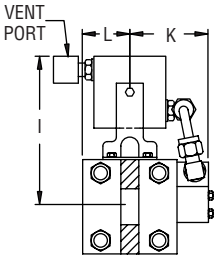
XXX X XX X X X X

- Reservoir Orientation
  - O=Does not apply for pressurized or remote
  - U=Rod up
  - D=Rod down or horizontal
- Reservoir Type
  - L=Transparent (Polycarbonate)
  - M=Metal (limited applications)
  - P=Pressurized
  - R=Remote
- Valve Type
  - A=Adjustable
  - T=Temperature Compensating
- Option (0,1,2, or 3), See Option Table Below
- Stroke (5, 10, 15, 20)
- Cylinder Size:
  - 1 (1½ Cyl.)
  - 2 (2½ Cyl.)
  - 3 (3¼ Cyl.)
  - 4 (4Cyl.)
  - 5 (5Cyl.)
  - 6 (6Cyl.)
  - 8 (8 Cyl.)
- Figure No. (200 or 201), Also Specify:
  - W Dimension when Specifying Fig 201
  - Pipe Clamp Size when Specifying Option 3
  - Surface Coating
  - Cold and Hot Piston Settings.

Fig. 200 & Fig. 201 Options

Option	Consists of...
0	Fig 200: Basic unit (snubber) with pivot mount and one rear bracket.
	Fig. 201: Basic unit with extension piece and one rear bracket.
1	Option 0 plus cylinder eye.
2	Option 0 plus cylinder eye and additional rear bracket.
3	Option 0 plus cylinder eye and pipe clamp.

Fig. 200, Fig. 201 — Hydraulic Snubber (cont.)



SECTION X-X

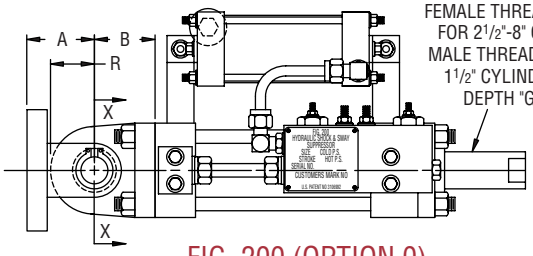
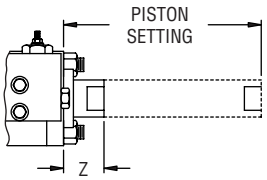


FIG. 200 (OPTION 0)



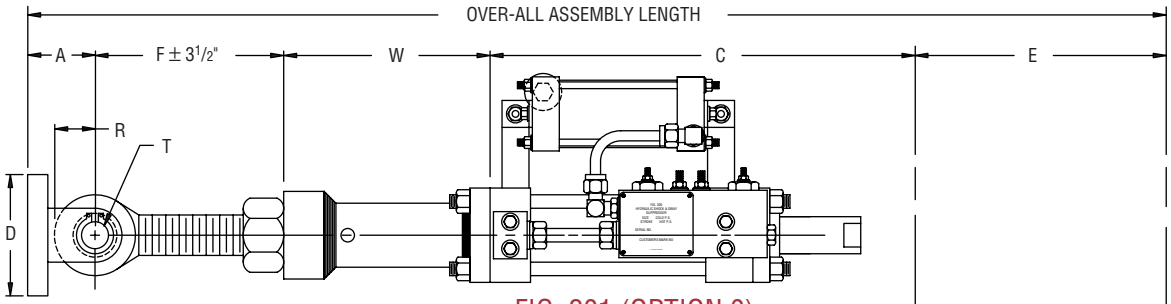
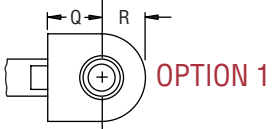
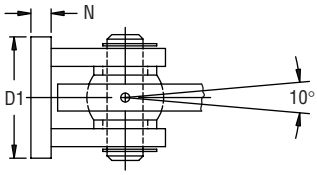


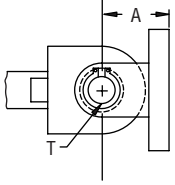
FIG. 201 (OPTION 0)



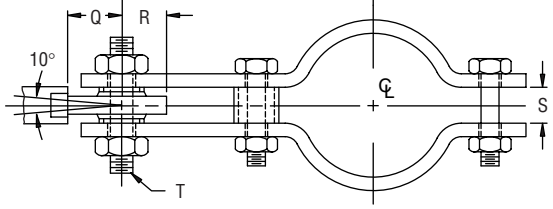
OPTION 1



NOTE:
CYLINDER EYE
MAY BE ROTATED
TO ANY POSITION



OPTION 2



OPTION 3

Fig. 200, Fig. 201 — Hydraulic Snubber (cont.)

Fig 200, 201: Weight (lbs) • Dimensions (in)

Cylinder		Fig. 200 Wgt.	A	B	C			D	D1	F	G	H	I			K	L	N	Q	R	S	T	W		Z
Bore	Stroke				Min	Mid	Max						Metal Res.	Trans. Res.	Press Res.								Min	Max	
1½	5	45	2½	1⅝	13⅛	15⅝	18⅛	2	2⅜	6	¾	⅝–18	5⁹⁄₁₆	4¹³⁄₁₆	4¾	2¾	2¼	⅝	2⅛	1⅛	1	¾	9½	75⅝	⅝
	10	49			18⅛	23⅛	28⅛																	65⅝	
2½	5	75	2½	2¼	13⅜	15⅞	18⅜	2	2⅞	7³⁄₁₆	⅞	⅞–14	6¼	5⅛	5¾	3¼	1¾	¾	2	1⅝	1⅜	1	10⅜	94⁹⁄₁₆	1
	10	81			18⅜	23⅜	28⅜																	84⁹⁄₁₆	
	15	87			23⅜	30⅞	38⅜																	74⁹⁄₁₆	
	20	93			28⅜	38⅜	48⅜								N/A									64⁹⁄₁₆	
3¼	5	121	3	3	14⅞	17⅜	19⅞	3	3³⁄₁₆	7¹⁵⁄₁₆	1⅛	1⅛–12	6⅞	5¾	6¾	3¾	2¼	¾	2½	2¹⁄₁₆	1¹¹⁄₁₆	1¼	10½	92	1⅛
	10	132			19⅞	24⅞	29⅞																	82	
	15	146			24⅞	32⅜	39⅞																	72	
	20	156			29⅞	39⅞	49⅞								N/A									62	
4	5	177	4	3¾	16⅛	18⅝	21⅛	6⅛	4¼	9⁵⁄₁₆	1½	1½–12	7⅛	6	7¹³⁄₁₆	4	2½	1¼	3⅜	2½	2	1½	11½	89⁹⁄₁₆	1⅛
	10	189			21⅛	26⅛	31⅛																	79⁹⁄₁₆	
	15	206			26⅛	33⅝	41⅛																	69⁹⁄₁₆	
	20	223			31⅛	41⅛	51⅛								N/A									59⁹⁄₁₆	
5	5	235	5	4½	18	20½	23	7⅞	5⅜	10³⁄₁₆	1⅞	1⅞–12	8½	7	9⁵⁄₁₆	4¾	3¼	1¾	4	3¹⁄₁₆	2⅜	1¾	12	86¹³⁄₁₆	1⅞
	10	256			23	28	33																	76¹³⁄₁₆	
	15	277			28	35½	43																	66¹³⁄₁₆	
	20	298			33	43	53								N/A									56¹³⁄₁₆	
6	5	292	5¾	5½	19¾	22¼	24¾	9⅛	6¼	11⁵⁄₁₆	2¼	2¼ - 12	9¹⁄₁₆	7⅝	10¹⁵⁄₁₆	5¼	3⅞	2	4⅝	3½	2¾	2	13⅜	83¹⁵⁄₁₆	1¾
	10	320			24¾	29¾	34¾																	73¹⁵⁄₁₆	
	15	348			29¾	37¼	44¾																	63¹⁵⁄₁₆	
	20	375			34¾	44¾	54¾								N/A									53¹⁵⁄₁₆	
8	5	515	7¼	6	23½	26	28½	14	8¾	14½	4	3–12	12½	not available		4⅞	4⅞	2¼	6¾	4¾	–	2½	14½	75½	2¼
	10	575			28½	33½	38½																	65½	
	15	640			33½	41	48½																	55½	
	20	705			38½	48½	58½																	45½	

Fig 200, 201: Dimensions (in)

Pipe Size	E-Take Out						Clamp Stock Size					
	Cylinder Bore						Cylinder Bore					
	1½	2½	3¼	4	5	6	1½	2½	3¼	4	5	6
2	6	6⅜	–	–	–	–	⅜ x 1¾	½ x 2½	–	–	–	–
2½	7	7	–	–	–	–	⅜ x 1¾	½ x 2½	–	–	–	–
3	7	7	–	–	–	–	⅜ x 1¾	½ x 2½	–	–	–	–
3½	7	7	–	–	–	–	⅜ x 1¾	½ x 2½	–	–	–	–
4	7¼	7¼	–	–	–	–	½ x 1½	⅝ x 2½	–	–	–	–
5	7¾	7¾	9⅛	10	–	–	½ x 1½	⅝ x 2½	¾ x 3	¾ x 5	–	–
6	8⅜	8⅜	10	10	11⅞	–	½ x 2	⅝ x 3	¾ x 4	¾ x 5	1 x 5	–
8	9⅜	9⅜	11¼	11¼	12⅝	–	½ x 2½	¾ x 3	¾ x 5	1 x 5	1 x 6	–
10	10½	10½	12¾	12¾	14¼	–	⅝ x 2½	¾ x 4	¾ x 6	1 x 5	1 x 7	–
12	11⅞	11⅞	13⅞	13⅞	15⅜	–	⅝ x 2½	¾ x 5	1 x 5	1 x 6	1 x 7	–
14	12⅝	12⅝	14½	14½	16	–	⅝ x 2½	¾ x 5	1 x 5	1 x 7	1¼ x 6	–
16	13⅝	13⅝	15¼	15¼	17⅛	–	⅝ x 3	¾ x 6	1 x 5	1 x 7	1¼ x 6	–
18	14⅝	14⅝	16⅜	16⅜	18¼	–	¾ x 3	1 x 5	1 x 6	1 x 7	1¼ x 7	–
20	15¾	15¾	17¾	17¾	19¼	19¼	¾ x 3	1 x 5	1 x 7	1¼ x 6	1¼ x 8	1½ x 8
24	18⅛	18⅛	19⅞	19⅞	21¾	21¾	¾ x 4	1 x 5	1 x 7	1¼ x 6	1¼ x 9	1½ x 9
30	21¼	21¼	23	23	25	25	¾ x 4	1 x 6	1¼ x 6	1¼ x 8	1½ x 8	1¾ x 10
36	24	24	26½	26½	28⅛	28⅛	¾ x 5	1 x 7	1¼ x 6	1¼ x 9	1½ x 10	1¾ x 10

TAPERED LOAD PIN

Fig. 312 — Tapered Pin

Size Range: 3/8" through 2 1/2"

Service: Used as a replacement to standard rear bracket load pin to facilitate easy removal at time of rebuild or testing. May be supplied with new orders, when specified.

How to size: Select size consistent with load pin diameter for Fig. 200/201 or Fig. 306/307.

Features:

- Designed to sharply reduce the time necessary to remove a badly corroded conventional pin and may also eliminate damage to the bushing and bracket assembly, particularly if the pin and bracket are corroded.
- Minimizes "free play" between pin to pin.

Ordering: Specify figure number, nominal pin size and name.

Installation: Shipped assembled. Remove cotter pin, slotted hex nut and washer. Loosen sleeve on pin and install sleeve/pin. Re-install washer and slotted hex nut. Tighten hex nut to snug. Install cotter pin.

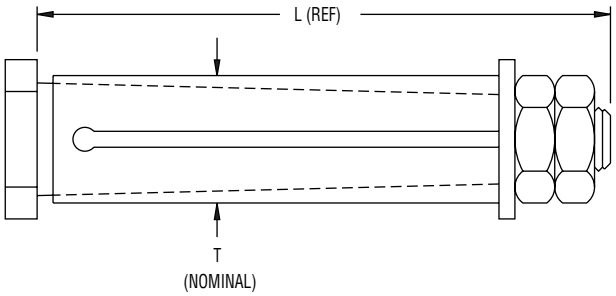


Fig 312: Loads (lbs) • Dimensions (in)

Nominal Dia. T	Max Load	L	Compatible With	
			Fig. 200/201	Fig. 306/307
3/8	650	1 61/64	–	1/4 & 1/2
1/2	1,500	2 3/8	–	1
3/4	6,000	3 7/8	1 1/2	3
1	15,000	4 3/8	2 1/2	10
1 1/4	21,000	4 1/2	3 1/4	–
1 1/2	50,000	7 1/8	4	35
1 3/4	50,000	6 3/4	5	–
2	72,000	7 3/4	6	–
2 1/2	128,000	9 3/8	8	100

The load must be applied by a spherical bearing.

Fig. 38 SD — Half Clamp

This product is a special design per customer requirements.
Contact Anvil Intl. for further information and how to order.

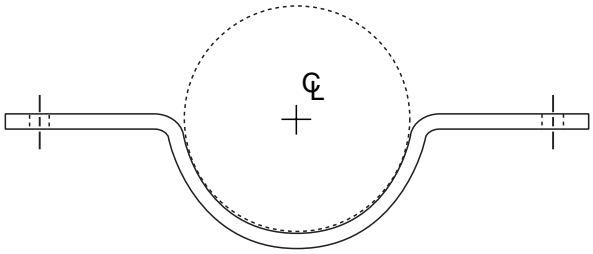


Fig. 53 SD — Welding Lug for L.R. Elbow

This product is a special design per customer requirements. Contact Anvil Intl. for further information and how to order sizes not shown.

Local pipe wall stress should be evaluated.

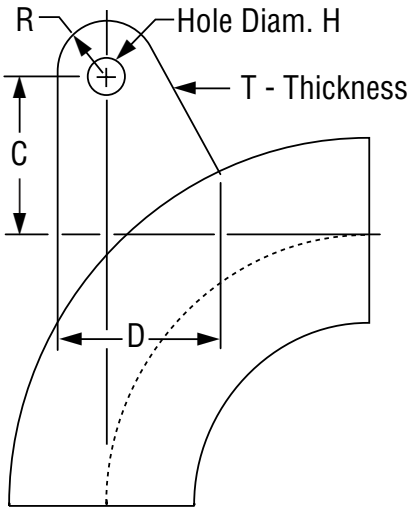


Fig. 53SD: Dimensions (in)

Size	Rod Size A	C Rod Take Out	T	D	R	H Hole Dia.
2½	¾	7 5/16	½	3½	1½	15/16
3		7 7/16				
3½	⅞	7½				1 1/16
4						
6		7 9/16				
8	1	7 7/16		5	2	1⅜
10	1¼	7 5/16	⅝	6	2½	1½
12	1½	7⅛	¾	7	3	1¾

* Based on maximum 4" insulation.

Fig. 71 SD — Double Roll Horizontal Traveler

This product is a special design per customer requirements. Contact Anvil Intl. for further information and how to order.

The Anvil Fig. 71 horizontal traveler facilitates the supporting of piping systems subject to linear horizontal movements were head room is limited. Designed for use with Anvil Variable Spring Hangers or Constant Supports it can also be used in conjunction with a rigid type hanger assembly.

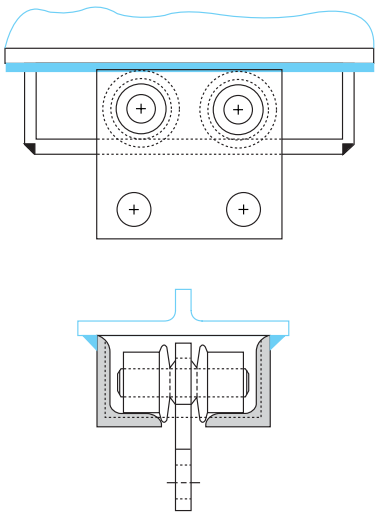


Fig. 72 SD — Dual Direction Horizontal Traveler

This product is a special design per customer requirements. Contact Anvil Intl. for further information and how to order.

The Anvil Fig. 71 Horizontal Traveler facilitates the supporting of piping systems subject to linear horizontal movements where head room is limited. Designed for use with Anvil Variable Spring Hangers or Constant Supports, it can also be used in conjunction with a rigid type hanger assembly.

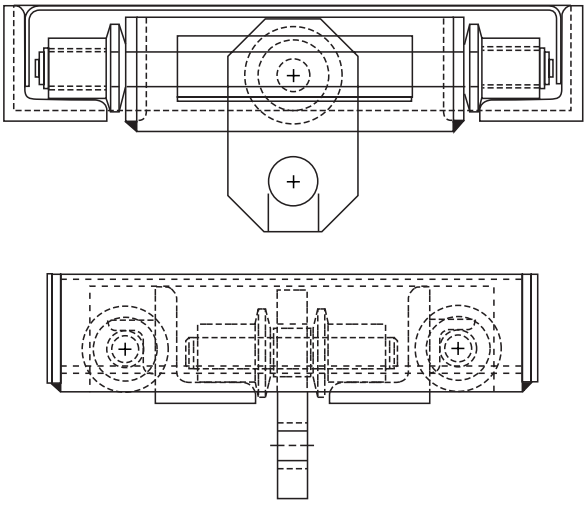
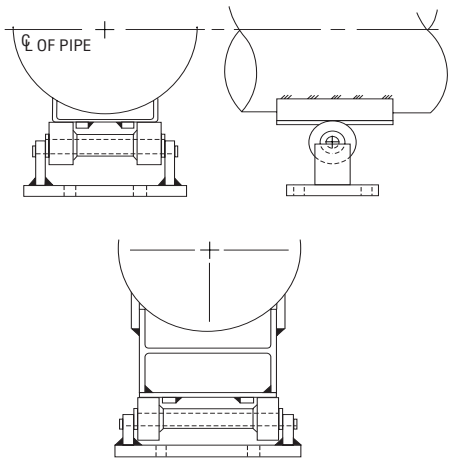


Fig. 75 SD — Flat Roller With Saddle

This product is a special design per customer requirements. Contact Anvil Intl. for further information and how to order.

Pipe sizes 4" through 42"



PIPE SIZES 4" - 42"

Fig. 76 SD — Fabricated Roller for Large Diameter Pipe

This product is a special design per customer requirements. Contact Anvil Intl. for further information and how to order.

Fig. 76SD: Loads (lbs) • Dimensions (in)

Size	Max Load	A	B	C	D	E
30	60,000	23 1/4	13 5/8	8 3/16	8 13/16	0
36		26			9 15/16	1
42		28 15/16			10 15/16	2
46		30 7/8			11 7/16	2 7/16
46	60,000	31 1/8	16 1/4	10 13/16	12 7/8	1 1/4
48		32			13 1/4	1 11/16
54		34 7/8			14 5/16	2 3/4
60		37 3/4			15 7/8	3 15/16
66		40 9/16			16 1/2	5
72		43 3/8			17 5/8	6 1/16

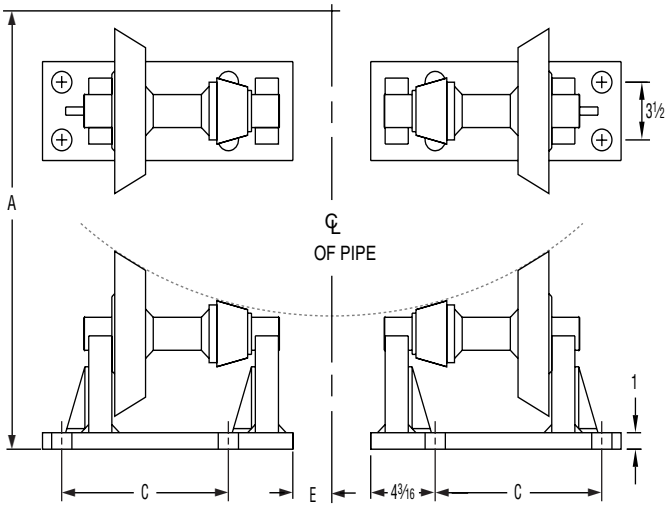


Fig. 77SD — Slide Base for Type "F" Variable Spring Hanger

This product is a special design per customer requirements. Contact Anvil Intl. for further information and how to order.

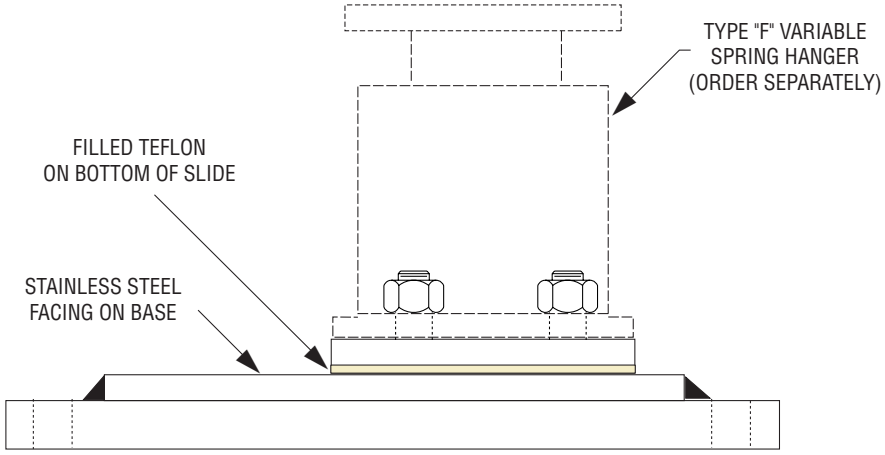


Fig. 40 SD — Riser Clamp

Material: Carbon steel chrome molybdenum or stainless steel.

Finish: Plain or Galvanized

Maximum Temperature: As required.

Ordering: Specify figure number 40SD, riser clamp special design, material, exact pipe size, load, operating temperature, insulation thickness, C-C dimension, rod diameter, finish and if connected to a spring or rigid connection.

Service: Riser clamps are used for the support of vertical piping. Load is carried by shear lugs which are welded to the pipe. Shear lugs not provided.

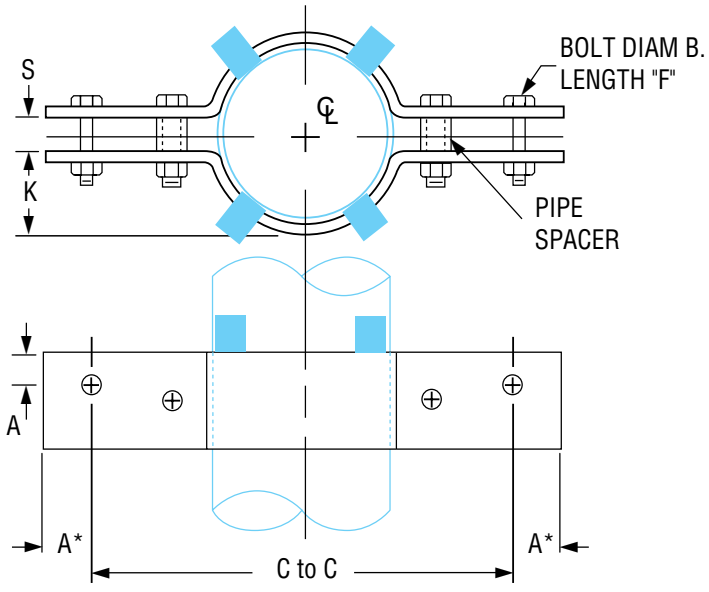


Fig. 41 SD — Non-Standard Three Bolt Pipe Clamp

Ordering: Specify Fig. 41SD double bolt pipe clamp, material specification, pipe size, load, operating temperature, insulation thickness and finish.
Alloy clamps, unless otherwise specified, will be furnished with alloy studs made from ASTM A-193-B7 stud stock and ASTM A-194-Gr. 2H hex nuts.

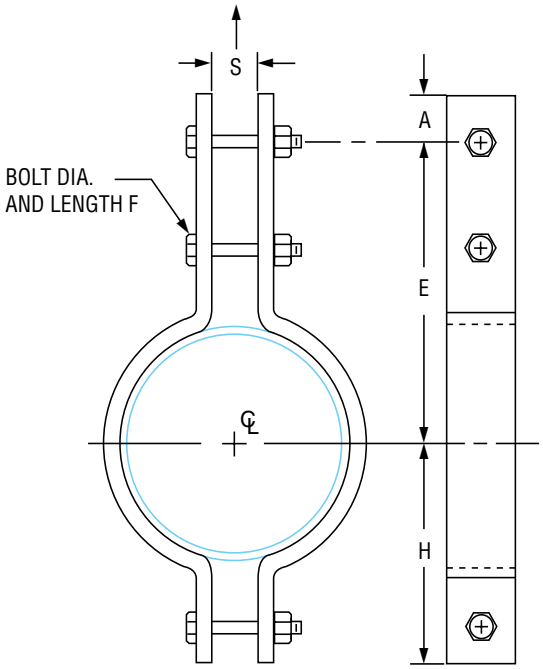
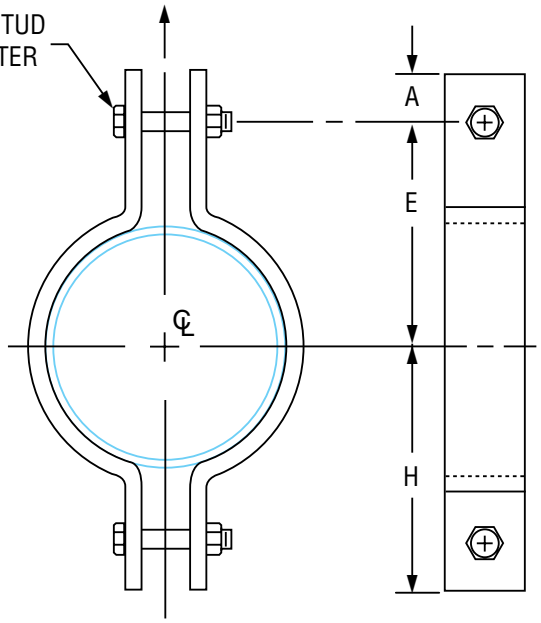


Fig. 42 SD — Non-Standard Two Bolt Pipe Clamp

Ordering: Specify Fig. 42SD pipe clamp, material specification, pipe size, load, temperature and finish.
Alloy clamps, unless otherwise specified, will be furnished with alloy studs made from ASTM. A-193-B7 stud stock and ASTM A-194-Gr. 2H hex nuts.



Constant Hanger Assemblies

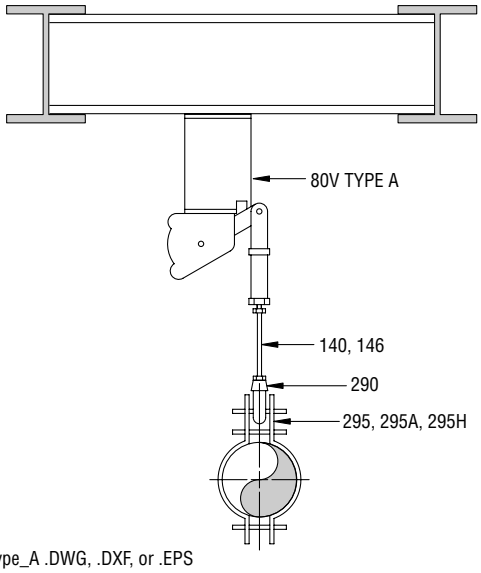


Fig_80V_Type_A .DWG, .DXF, or .EPS

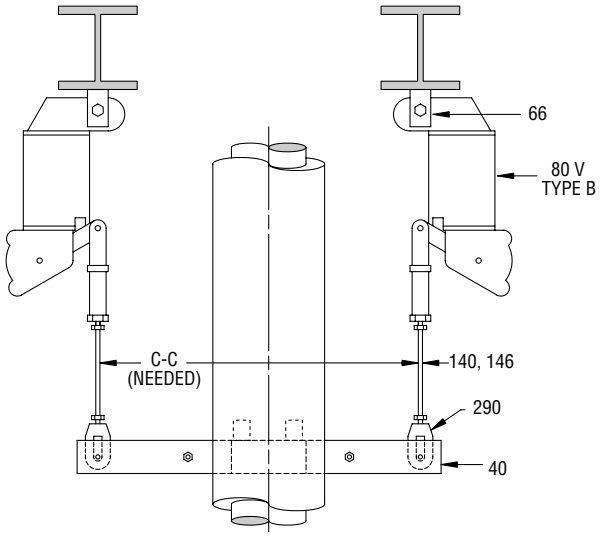


Fig_80V_Type_B .DWG, .DXF, or .EPS

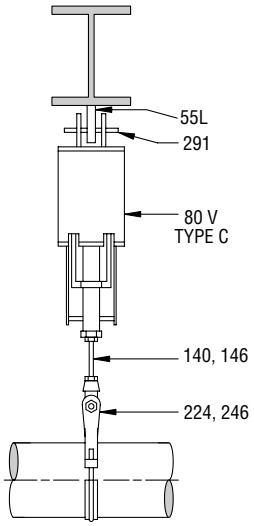


Fig_80V_Type_C .DWG, .DXF, or .EPS

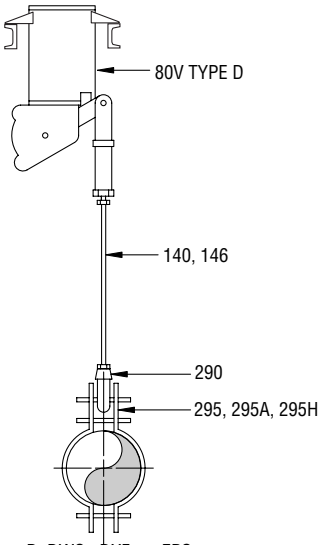


Fig_80V_Type_D .DWG, .DXF, or .EPS

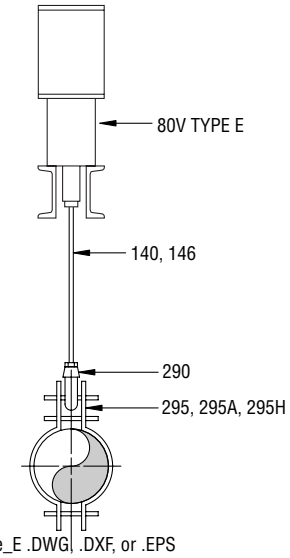


Fig_80V_Type_E .DWG, .DXF, or .EPS

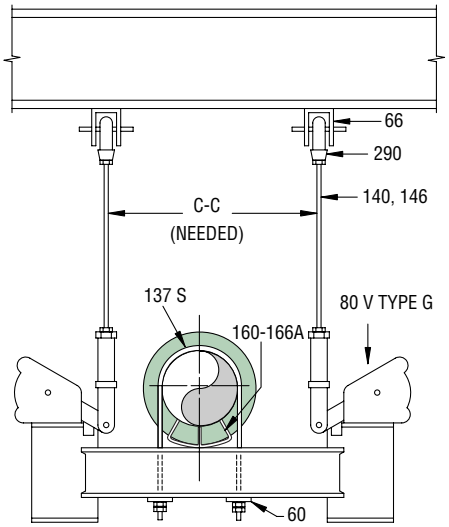


Fig_80V_Type_G .DWG, .DXF, or .EPS

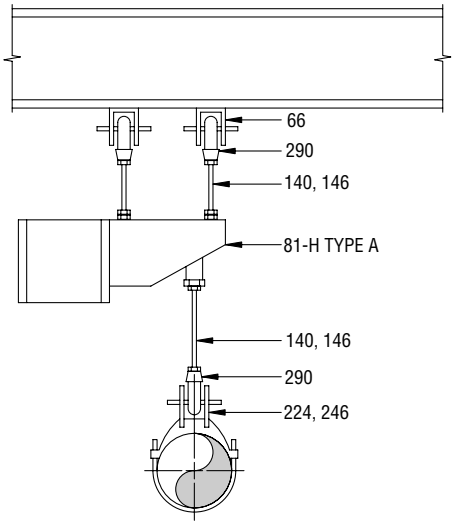


Fig_81H_Type_A_224 .DWG, .DXF, or .EPS

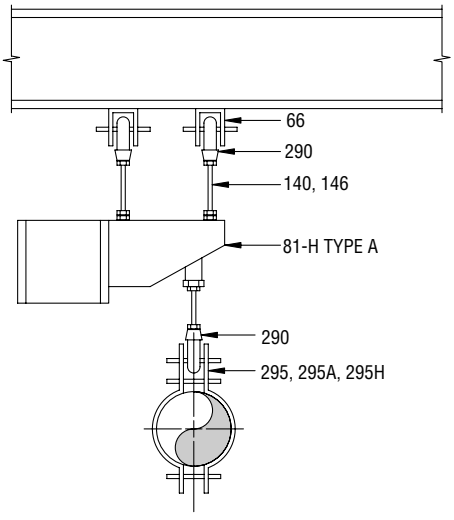


Fig_81H_Type_A_295 .DWG, .DXF, or .EPS

Application Examples

Each of these drawings are available on the Anvil web site in CAD format. The file name at the bottom of each box refers to that CAD file.

Constant Hanger Assemblies (continued)

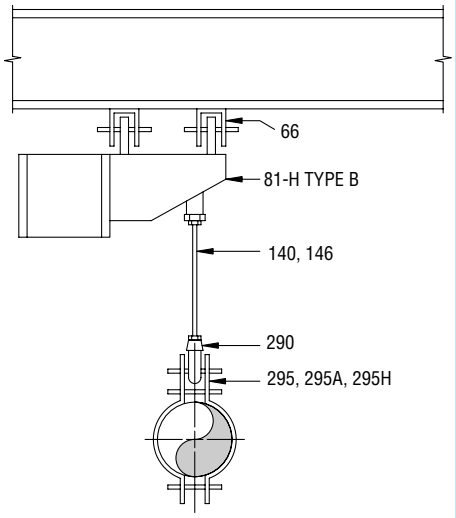


Fig_81H_Type_B_295 .DWG, .DXF, or .EPS

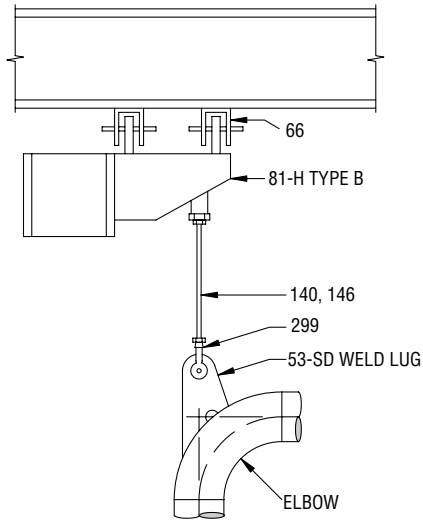


Fig_81H_Type_B_53_SD .DWG, .DXF, or .EPS

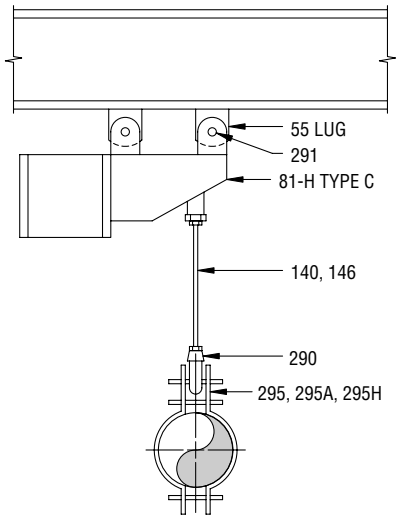


Fig_81H_Type_C .DWG, .DXF, or .EPS

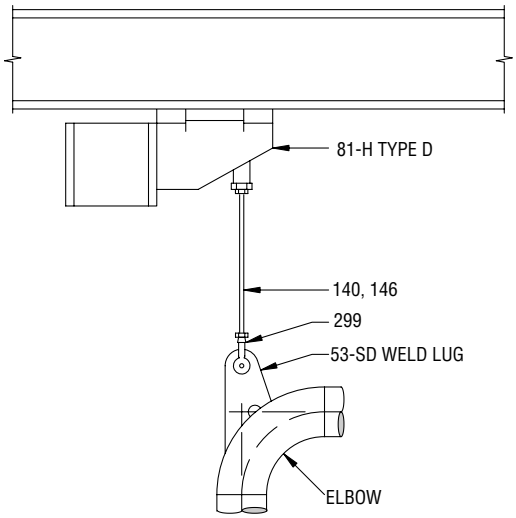


Fig_81H_Type_D .DWG, .DXF, or .EPS

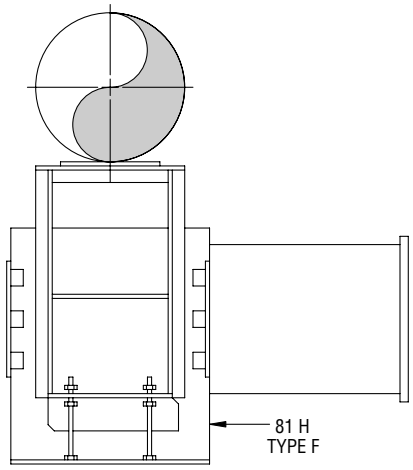
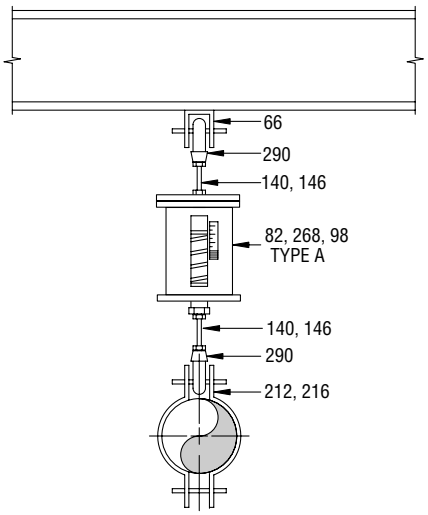


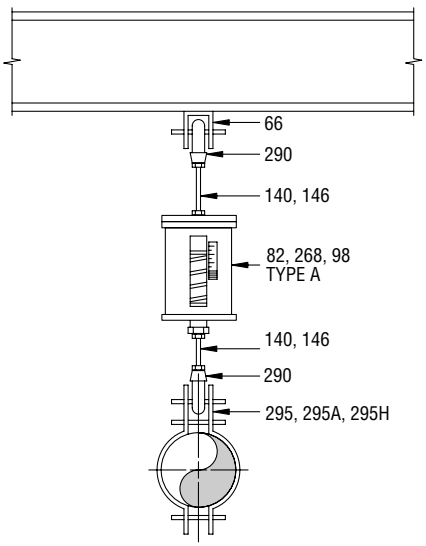
Fig_81H_Type_F .DWG, .DXF, or .EPS

Each of these drawings are available on the Anvil web site in CAD format. The file name at the bottom of each box refers to that CAD file.

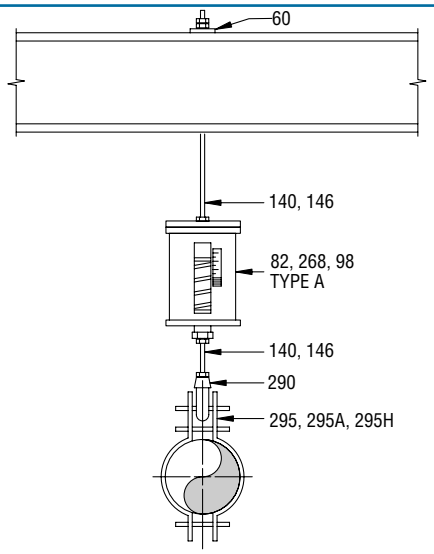
Spring Hanger Assemblies



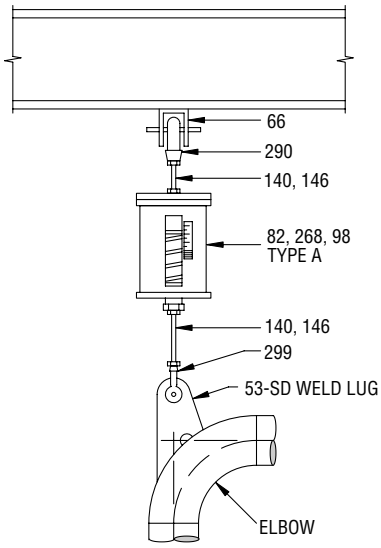
SH_Type_A_212 .DWG, .DXF, or .EPS



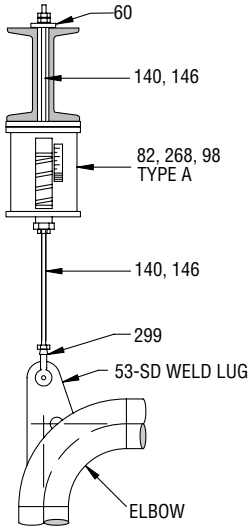
SH_Type_A_295 .DWG, .DXF, or .EPS



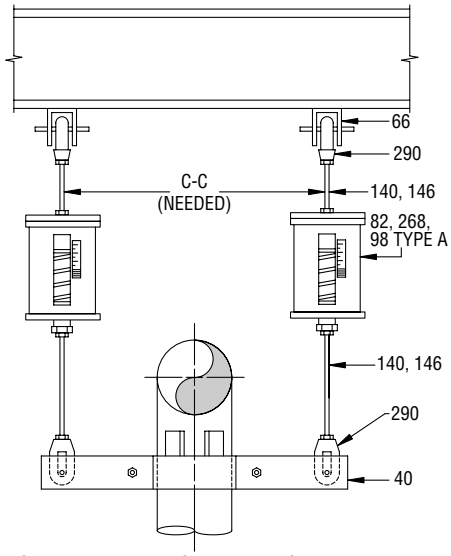
SH_Type_A_60 .DWG, .DXF, or .EPS



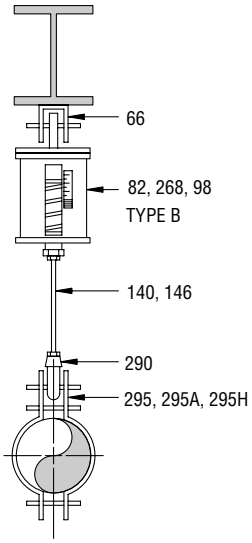
SH_Type_A_53SD .DWG, .DXF, or .EPS



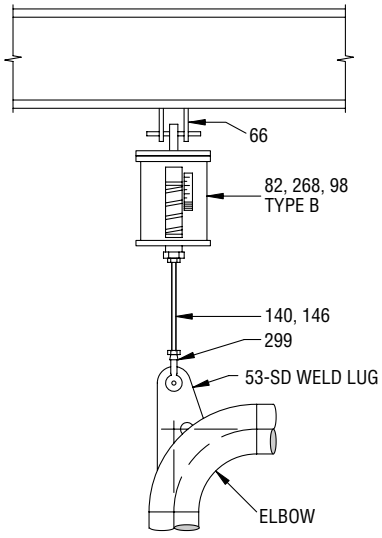
SH_Type_A_53SD_60 .DWG, .DXF, or .EPS



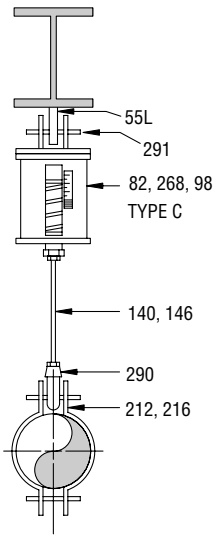
SH_Type_A_Riser.DWG, .DXF, or .EPS



SH_Type_B_295 .DWG, .DXF, or .EPS



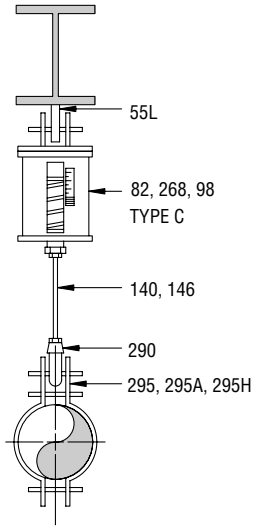
SH_Type_B_53SD .DWG, .DXF, or .EPS



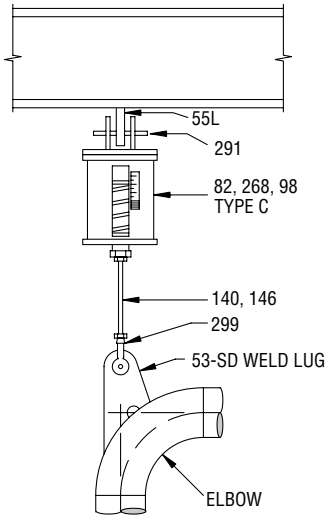
SH_Type_C_212 .DWG, .DXF, or .EPS

Each of these drawings are available on the Anvil web site in CAD format. The file name at the bottom of each box refers to that CAD file.

Spring Hanger Assemblies (continued)



SH_Type_C_295 .DWG, .DXF, or .EPS



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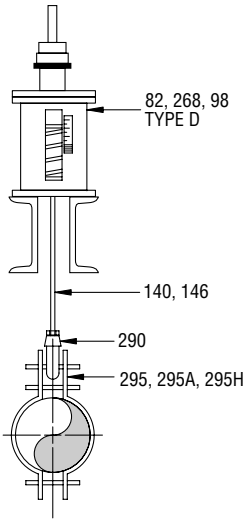
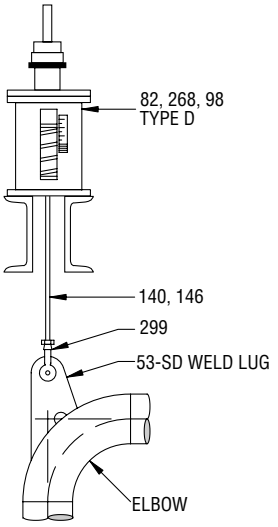
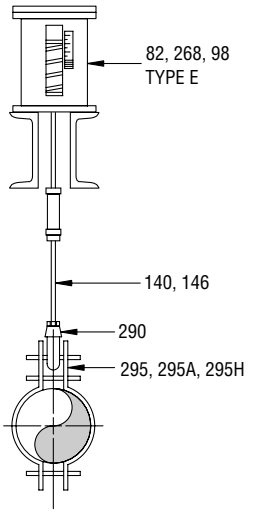


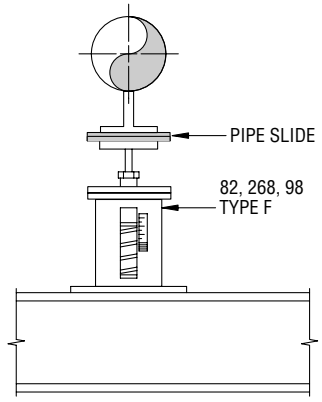
SH_Type_D_295 .DWG, .DXF, or .EPS



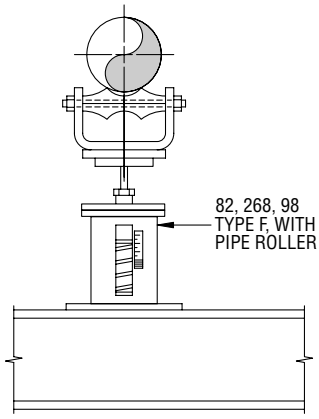
SH_Type_D_53SD .DWG, .DXF, or .EPS



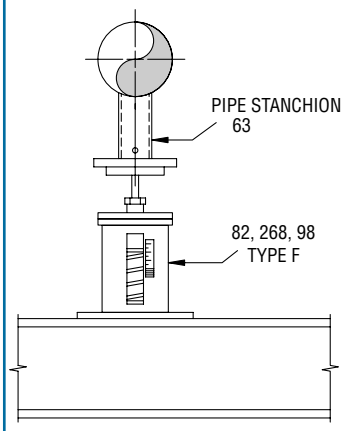
SH_Type_E .DWG, .DXF, or .EPS



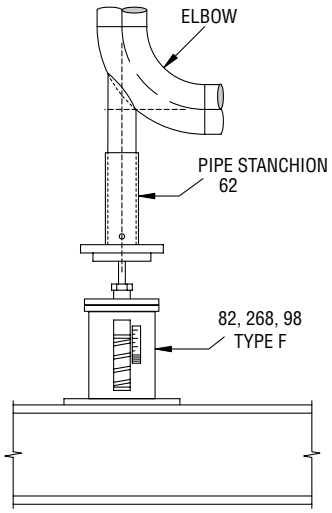
SH_Type_F_PipeSlide .DWG, .DXF, or .EPS



SH_Type_F_PipeRoller .DWG, .DXF, or .EPS



SH_Type_F_63 .DWG, .DXF, or .EPS



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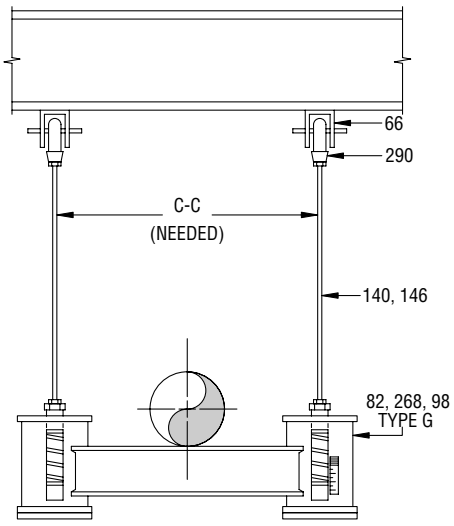
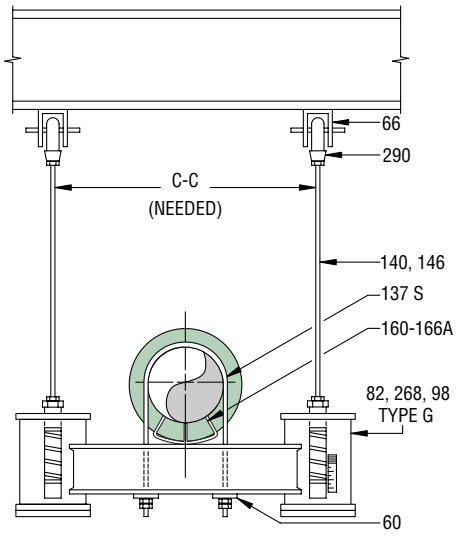


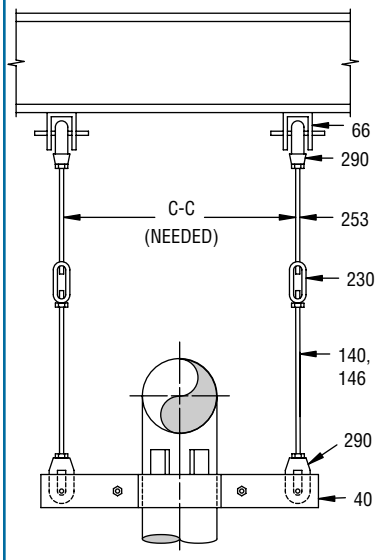
SH_Type_G .DWG, .DXF, or .EPS



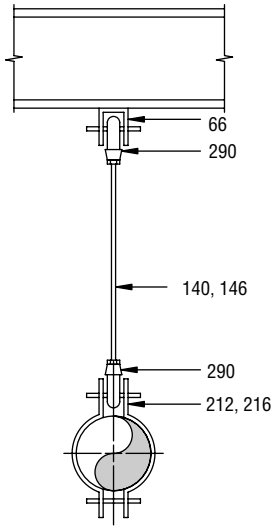
SH_Type_G_160-137S.DWG, .DXF, or .EPS

Each of these drawings are available on the Anvil web site in CAD format. The file name at the bottom of each box refers to that CAD file.

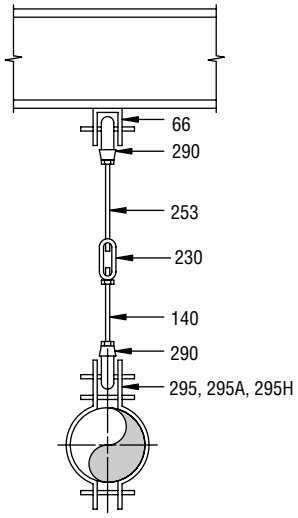
Rigid Hanger Assemblies



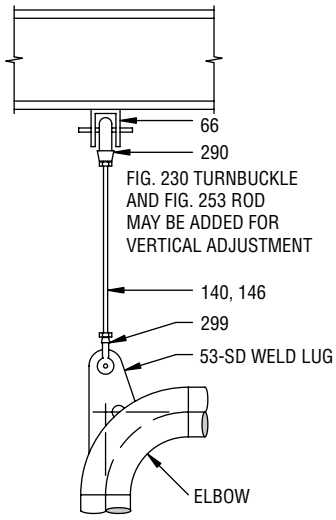
RH_40_290_230_Riser.DWG, .DXF, or .EPS



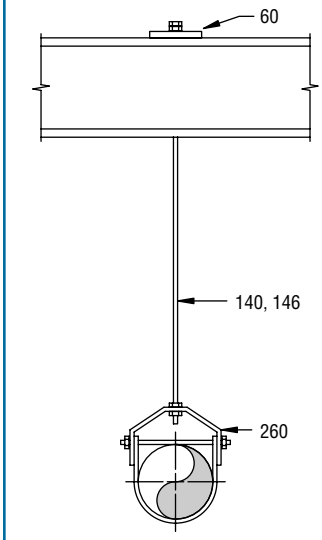
RH_212_290_140_66.DWG, .DXF, or .EPS



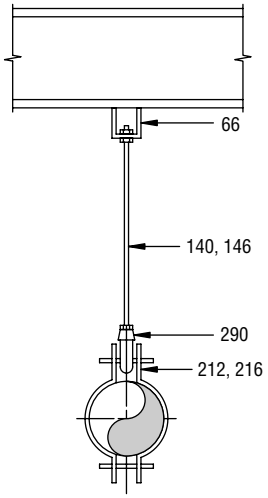
RH_295_290_230.DWG, .DXF, or .EPS



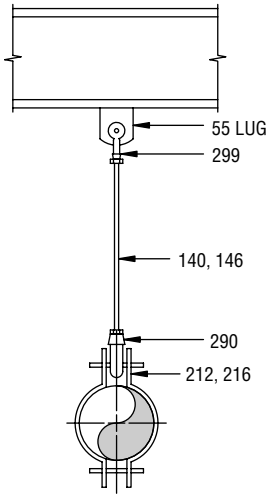
RH_53SD_299_290.DWG, .DXF, or .EPS



RH_260_140_60.DWG, .DXF, or .EPS



RH_212_290.DWG, .DXF, or .EPS



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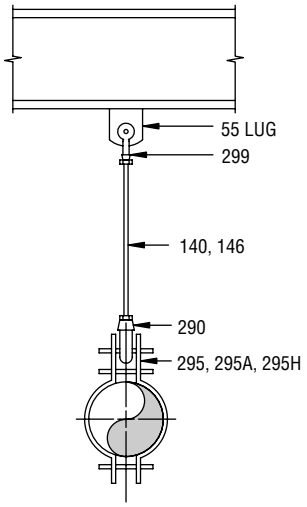

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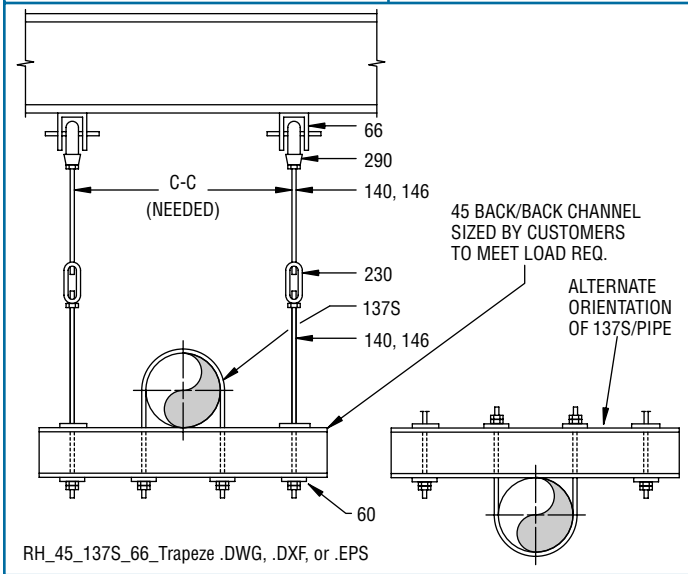

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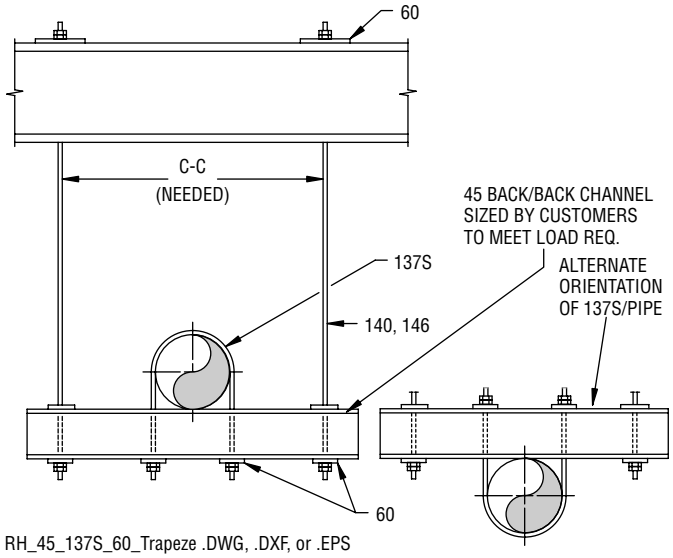

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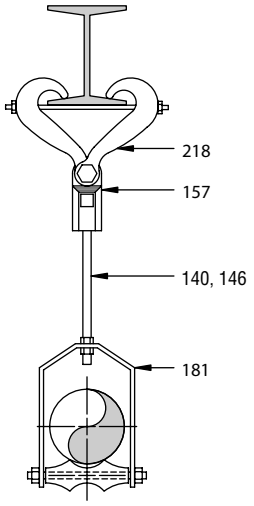
Application Examples

Each of these drawings are available on the Anvil web site in CAD format. The file name at the bottom of each box refers to that CAD file.

Rigid Hanger Assemblies (continued)



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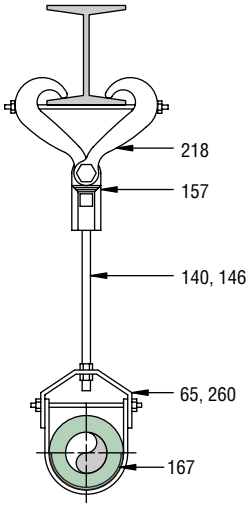

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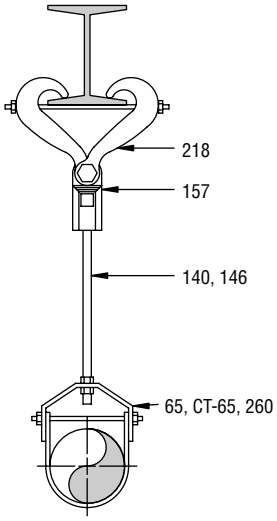

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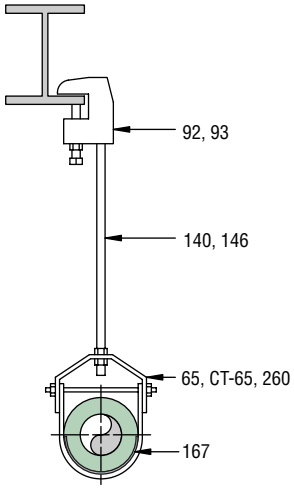

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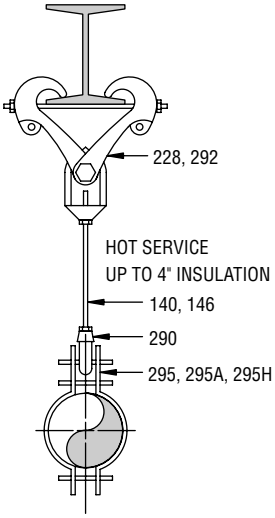

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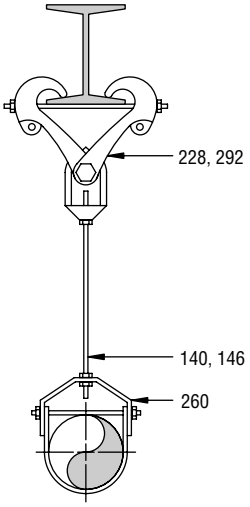

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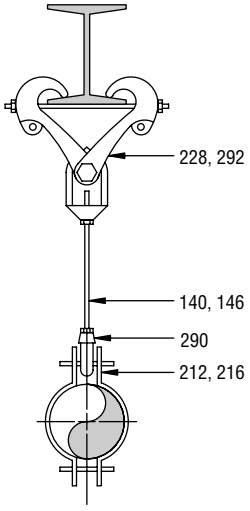

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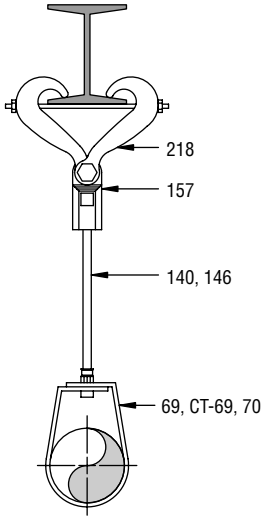

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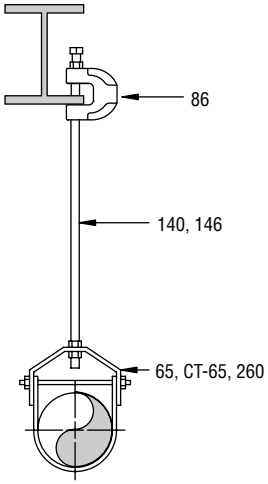

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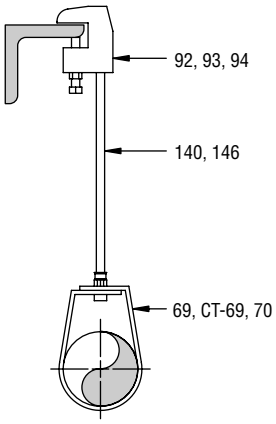

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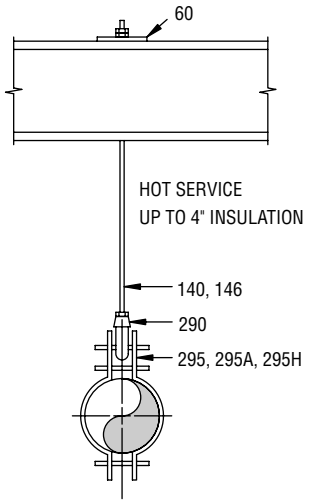

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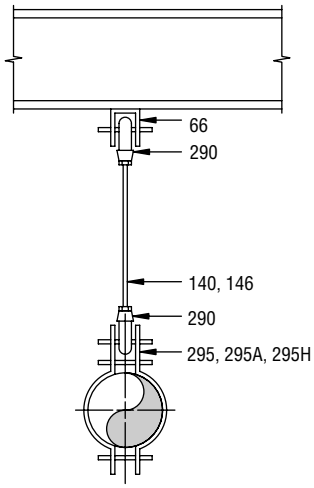
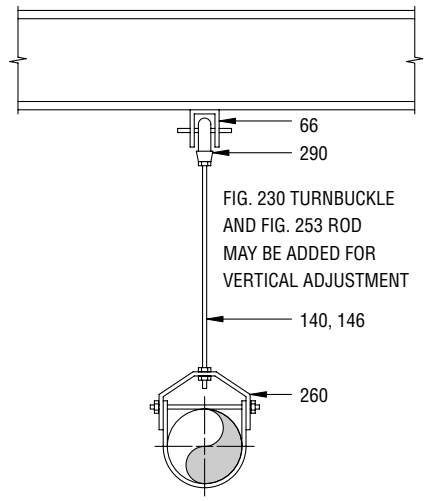


RH_295_290_66.DWG, .DXF, or .EPS

Each of these drawings are available on the Anvil web site in CAD format. The file name at the bottom of each box refers to that CAD file.

Rigid Hanger Assemblies (continued)



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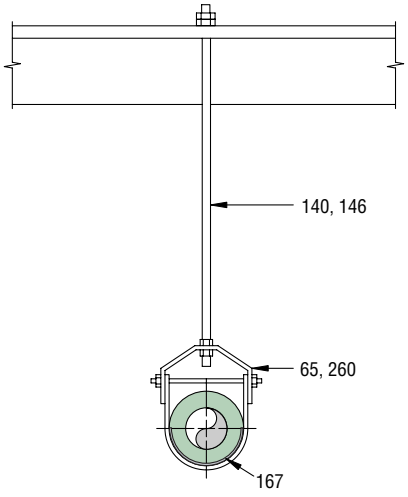

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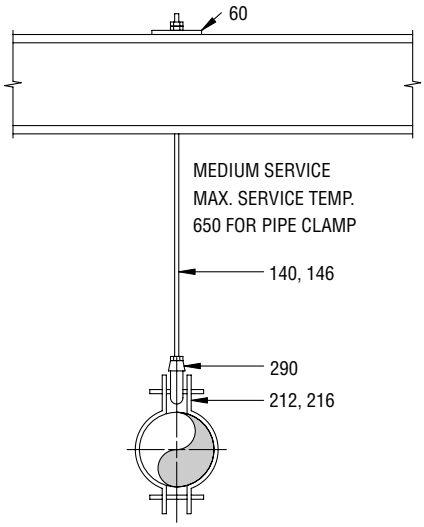

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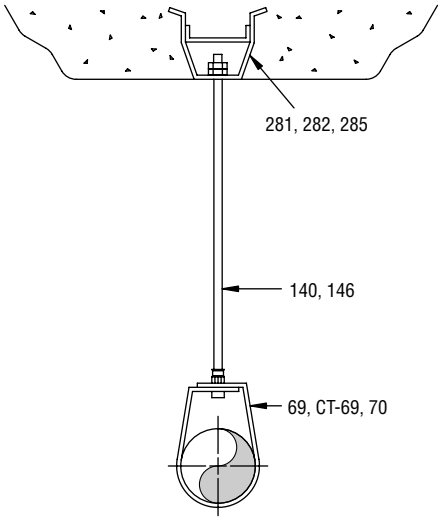

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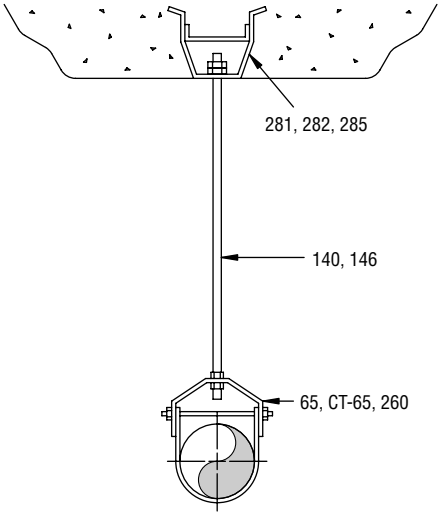

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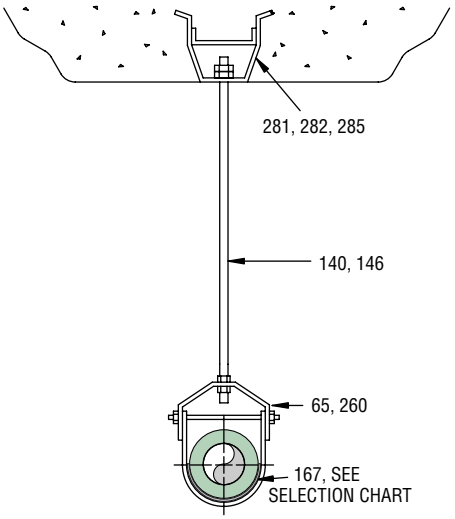

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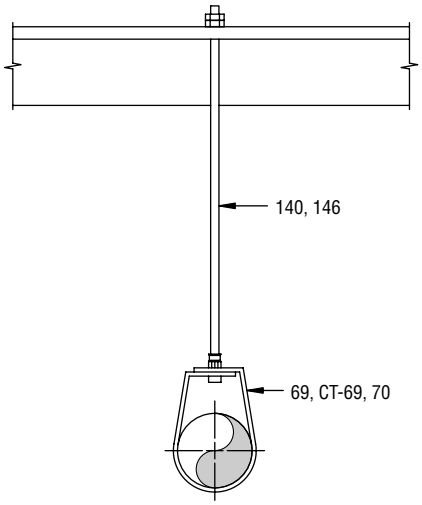

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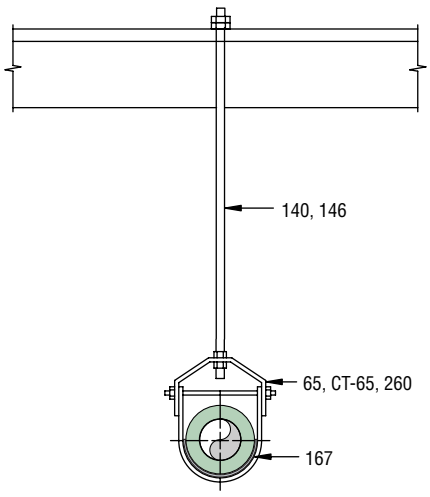
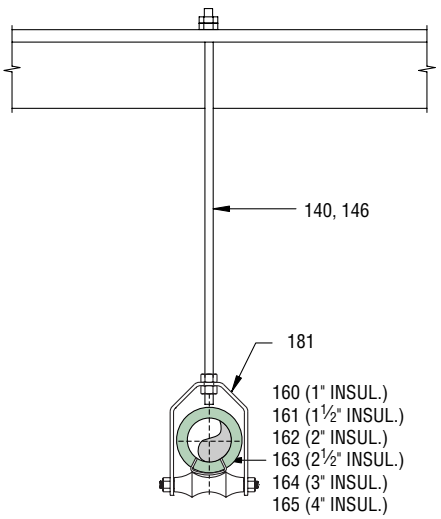


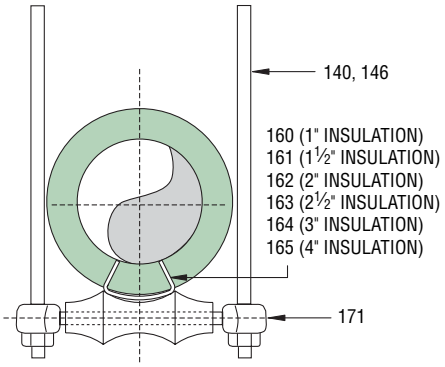
RH_160_181_60.DWG, .DXF, or .EPS



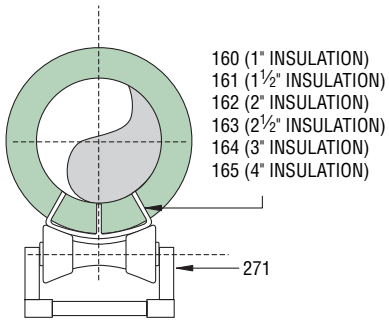
RH_167_260_60.DWG, .DXF, or .EPS

Each of these drawings are available on the Anvil web site in CAD format. The file name at the bottom of each box refers to that CAD file.

Rigid Hanger Assemblies (continued)



RH_171_160_Trapeze .DWG, .DXF, or .EPS



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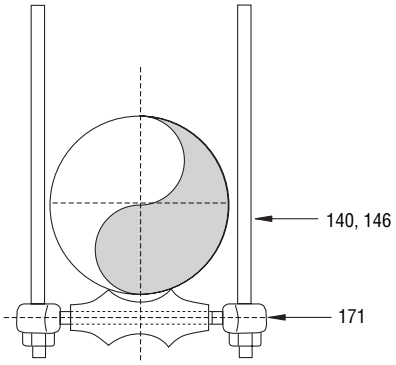

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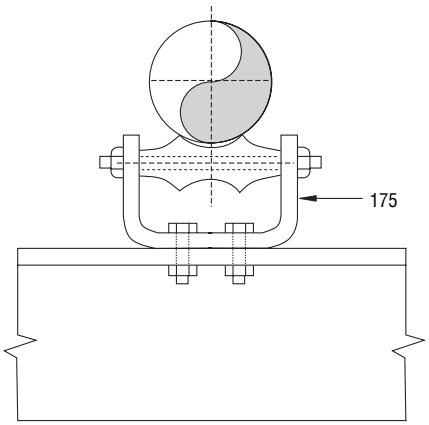
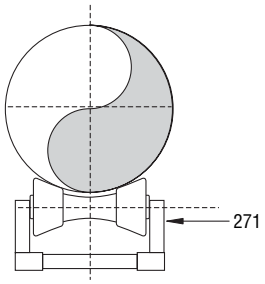


RH_175_Support .DWG, .DXF, or .EPS



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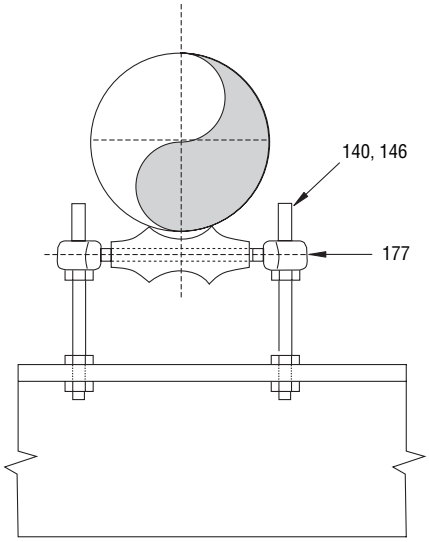


RH_177_Support .DWG, .DXF, or .EPS

Each of these drawings are available on the Anvil web site in CAD format. The file name at the bottom of each box refers to that CAD file.

A Typical Pipe Hanger Specification

1.SCOPE

This specification shall apply for the design and fabrication of all hangers, supports, anchors, and guides. Where piping design is such that exceptions to this specification are necessary, the particular system will be identified, and the exceptions clearly listed through an addendum which will be made a part of the specification.

2.DESIGN

(a) All supports and parts shall conform to the latest requirements of the ASME Code for Pressure Piping B31.1 and MSS Standard Practice SP-58, SP-69, SP-89 and SP-90 except as supplemented or modified by the requirements of this specification.

(b). Designs generally accepted as exemplifying good engineering practice, using stock or production parts, shall be utilized wherever possible.

(c) Accurate weight balance calculations shall be made to determine the required supporting force at each hanger location and the pipe weight load at each equipment connection.

(d) Pipe hangers shall be capable of supporting the pipe in all conditions of operation. They shall allow free expansion and contraction of the piping, and prevent excessive stress resulting from transferred weight being introduced into the pipe or connected equipment.

(e) Wherever possible, pipe attachments for horizontal piping shall be pipe clamps.

(f) For critical high-temperature piping, at hanger locations where the vertical movement of the piping is ½" or more, or where it is necessary to avoid the transfer of load to adjacent hangers or connected equipment, pipe hangers shall be an approved constant support design, as Anvil Fig. 80-V and Fig. 81-H Constant Support Hangers, or equal.

Where transfer of load to adjacent hangers or equipment is not critical, and where the vertical movement of the piping is less than ½", Variable Spring Hangers may be used, provided the variation in supporting effect does not exceed 25% of the calculated piping load through its total vertical travel.

(g) The total travel for Constant Support Hangers will be equal to actual travel plus 20%. In no case will the difference between actual and total travel be less than 1". The Constant Support Hanger will have travel scales on both sides of the support frame to accommodate inspections.

(h) Constant Support Hanger should be individually calibrated before shipment to support the exact load specified. The calibration record of constant support shall be maintained for a period of 20 years to assist the customer in any redesign of the piping system. Witness marks shall be stamped on the Load Adjustment Scale to establish factory calibration reference point.

(i) In addition to the requirements of ASTM-125 all alloy springs shall be shot peened and examined by magnetic particle. The spring rate tolerance shall be ±5%. All three critical parameters (free height, spring rate and loaded height) of spring coils must be tested for. Each spring coiled must be purchased with a C.M.T.R. and be of domestic manufacture.

(j) Constant Supports should have a wide range of load adjustability. No less than 10% of this adjustability should be provided either side of the calibrated load for plus or minus field adjustment. Load adjustment scale shall be provided to aid the field in accurate adjustment of loads. Additionally, the constant support should be designed so that load adjustments can be made with-out use of special tools and not have an impact on the travel capabilities of the supports.

(k) Constant Supports shall be furnished with travel stops which shall prevent upward and downward movement of the hanger. The travel stops will be factory installed so that the hanger level is at the “cold” position. The travel stops will be of such design as to permit future re-engagement, even in the event the lever is at a position other than “cold”, without having to make hanger adjustments.

(l) For non-critical, low temperature systems, where vertical movements up to 2" are anticipated, an approved pre-compressed Variable Spring design similar to Anvil Fig. B-268 may be used. Where movements are of a small magnitude, spring hangers similar to Anvil Fig. 82 may be used.

(m) Each Variable Spring shall be individually calibrated at the factory and furnished with travel stops. Spring coils must be square to within 1° to insure proper alignment. Each spring coil must be purchased with a C.M.T.R. and be of domestic manufacture.

(n) All rigid rod hangers shall provide a means of vertical adjustment after erection.

(o) Where the piping system is subject to shock loads, such as seismic disturbances or thrusts imposed by the actuation of safety valves, hanger design shall include provisions for rigid restraints or shock absorbing devices of approved design, such as Anvil Fig. 200 shock and sway suppressor, or equal.

A Typical Pipe Hanger Specification (cont.)

(p) Selection of vibration control devices shall not be part of the standard hanger contract. If vibration is encountered after the piping system is in operation, appropriate vibration control equipment shall be installed.

(q) Hanger rods shall be subject to tensile loading only (see Table III). At hanger locations where lateral or axial movement is anticipated, suitable linkage shall be provided to permit swing.

(r) Where horizontal piping movements are greater than 1/2" and where the hanger rod angularly from the vertical is less than or equal to 4 degrees from the cold to hot position of the pipe, the hanger pipe and structural attachments shall be offset in such manner that the rod is vertical in the hot position. When the hanger rod angularity is greater than 4 degrees from vertical, then structural attachment will be offset so that at no point with the rod angularity exceed 4 degrees from vertical.

(t) Hangers shall be spaced in accordance with Table 1 and Table 2 on the following page. (see page PH-207)

(u) Where practical, riser piping shall be supported independently of the connected horizontal piping.

Pipe support attachments to the riser piping shall be riser clamp lugs. Welded attachments shall be of material comparable to that of the pipe, and designed in accordance with governing codes.

(v) Supports, guides, and anchors shall be so designed that excessive heat will not be transmitted to the building steel. The temperature of supporting parts shall be based on a temperature gradient of 100F° per inch distance from the outside surface of the pipe.

(w) Hanger components shall not be used for purposes other than for which they were designed. They shall not be used for rigging and erection purposes.

(x) Hydraulic Snubbers - The hydraulic units shall have a temperature stable control valve. The valve shall provide a locking and bleed rate velocity that provides for tamper proof settings. The fluid level indicator for exact reading of reservoir fluid level in any snubber orientation.

The valve device shall offer a minimum amount of resistance to thermal movement. Any shock force shall cause the suppressor valve to close. With the suppressor valve closed the fluid flow shall essentially stop, thereby causing the unit to resist and absorb the disturbing forces. After the disturbing forces subside, the suppressor valve shall open again to allow free thermal movement of the piping. The suppressor shall have a means of regulating the amount of movement under shock conditions up to the design load for faulted conditions without release of fluid. The suppressor design shall include a fluid bleed system to assure continued free thermal movement after the shock force subsides. The suppressor shall have a hard surfaced, corrosion resistant piston rod supported by a rod bushings and shall be designed so that it is capable of exerting the required force in tension and compression, utilizing the distance.

(y) Paint - Variable Spring and Constant Support units will be furnished painted with Stewart Bros. Green Semi-Gloss Primer (#10947). All other material will receive one shop coat of a red chromate primer meeting the requirements of Federal Specification TT-P-636.

For corrosive conditions hangers will be galvanized or painted with carbo-zinc #11.

(z) All threads are UNC unless otherwise specified.

Hanger Design Service

Hanger for piping 2½" and larger, and all spring support for assemblies, shall be completely engineered.

(a) Engineered hanger assemblies shall be detailed on 8½" x 11" sheets.

Each sketch will include a location plan showing the location of the hanger in relation to columns of equipment.

Each sketch will include an exact bill of material for the component parts making up each assembly.

(b) Each engineered hanger assembly will be individually bundled and tagged as far as practical, ready for installation.

Hanger material for piping 2" and smaller shall be shipped as loose material, identified by piping system only. A piping drawing marked with approximate hanger locations and types, and hanger sketches showing typical support arrangements will be furnished.

(c) Hanger inspections shall be performed in accordance with MSS-SP-89 (Section 7.7) and ASME B31.1 (Appendix V).

A Typical Pipe Hanger Specification (cont.)

Table 1: Maximum Horizontal Spacing Between Pipe Supports for Standard Weight Steel Pipe*

	Nominal Pipe Size (in)																			
	½	¾	1	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24	30
Max. Span (Ft) Water Service	7	7	7	9	10	11	12	13	14	16	17	19	22	23	25	27	28	30	32	33
Max. Span (Ft) Vapor Service	8	9	9	12	13	14	15	16	17	19	21	24	26	30	32	35	37	39	42	34
Recommended Hanger Rod Sizes	3/8					1/2			5/8		3/4		7/8		1		1	1¼	1½	1½
																	or trapeze			

The above spacing and capacities are based on pipe filled with water. Additional valves and fittings increase the load and therefore closer hanger spacing is required.
*Many codes and specifications state "pipe hangers must be spaced every 10ft. regardless of size." This local specification must be followed.

Table 2: Maximum Horizontal Spacing Between Copper Tubing Supports

	Nominal Tubing Size (in)									
	½	¾	1	1¼	1½	2	2½	3	3½	4
Max. Span (Ft) Water Service	5	5	6	7	8	8	9	10	11	12
Max. Span (Ft) Vapor Service	6	7	8	9	10	11	13	14	15	16

Note: Spans shown in Tables 1 and 2 do not apply where there are concentrated loads between supports or where temperatures exceed 750°F.

**Table 3: Load Carrying Capacities of Threaded Hanger Rods.
Materials Carbon Steel with Minimum Actual Tensile Strength of 50 Ksi.**

Rod Diameter (in)	Threads per Inch	Root Area of Coarse Thread (in^2)	Maximum Safe Load (lbs) Rod Temperature, 650° F	Maximum Safe Load (lbs) Rod Temperature, 750° F
3/8	16	0.068	730	572
1/2	13	0.126	1,350	1,057
5/8	11	0.202	2,160	1,692
3/4	10	0.302	3,230	2,530
7/8	9	0.419	4,480	3,508
1	8	0.552	5,900	4,620
1¼	7	0.889	9,500	7,440
1½	6	1.293	13,800	10,807
1¾	5	1.744	18,600	14,566
2	4½	2.292	24,600	19,265
2¼	4½	3.021	32,300	25,295
2½	4	3.716	39,800	31,169
2¾	4	4.619	49,400	38,687
3	4	5.621	60,100	47,066
3¼	8 UN	6.720	71,900	56,307
3½	8 UN	7.918	84,700	66,331
3¾	8 UN	9.214	98,500	77,139
4	8 UN	10.608	113,400	88,807
4¼	8 UN	12.100	129,400	101,337
4½	8 UN	13.690	146,600	114,807
4¾	8 UN	15.379	164,700	128,982
5	8 UN	17.165	184,000	144,096

Standard UNC thread thru 3" diameter and 8-UN-2A thread series for 3¼" diameter and larger

Thermal Expansion of Pipe Material

Thermal Expansion of Pipe Material – (in/ft)

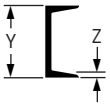
Temp F	Carbon Steel - Low Chrome Steel (thru 3% Cr)									
	0	10	20	30	40	50	60	70	80	90
-200	-0.0180	-0.0187	-0.0192	-0.0198	-0.0203	-0.0209	-0.0215	-0.0220	-0.0225	-0.0230
-100	-0.0121	-0.0127	-0.0133	-0.0140	-0.0146	-0.0152	-0.0158	-0.0163	-0.0169	-0.0174
0	-0.0051	-0.0058	-0.0065	-0.0073	-0.0080	-0.0087	-0.0096	-0.0103	-0.0109	-0.0116
0	-0.0051	-0.0044	-0.0037	-0.0029	-0.0022	-0.0015	-0.0007	0	0.0008	0.0015
100	0.0023	0.0030	0.0038	0.0046	0.0053	0.0061	0.0068	0.0076	0.0084	0.0091
200	0.0099	0.0107	0.0116	0.0124	0.0132	0.0141	0.0149	0.0157	0.0165	0.0174
300	0.0182	0.0191	0.0200	0.0208	0.0217	0.0226	0.0235	0.0244	0.0252	0.0261
400	0.0270	0.0279	0.0288	0.0298	0.0307	0.0316	0.0325	0.0334	0.0344	0.0353
500	0.0362	0.0372	0.0382	0.0391	0.0401	0.0411	0.0421	0.0431	0.0440	0.0450
600	0.0460	0.0470	0.0481	0.0491	0.0501	0.0512	0.0522	0.0532	0.0542	0.0553
700	0.0563	0.0574	0.0584	0.0595	0.0606	0.0617	0.0627	0.0638	0.0649	0.0659
800	0.0670	0.0681	0.0692	0.0703	0.0714	0.0726	0.0737	0.0748	0.0759	0.0770
900	0.0781	0.0792	0.0803	0.0813	0.0824	0.0835	0.0846	0.0857	0.0867	0.0878
1,000	0.0889	0.0901	0.0912	0.0924	0.0935	0.0946	0.0958	0.0970	0.0981	0.0993
1,100	0.1004	0.1015	0.1025	0.1036	0.1046	0.1057	0.1068	0.1078	0.1089	0.1099
1,200	0.1110	0.1121	0.1132	0.1144	0.1155	0.1166	0.1177	0.1188	0.1200	0.1211
1,300	0.1222	0.1233	0.1244	0.1256	0.1267	0.1278	0.1299	0.1320	0.1342	0.1363
1,400	0.1334	–	–	–	–	–	–	–	–	–

Thermal Expansion of Pipe Material – (in/ft)

Temp F	Austenitic Stainless Steels (304, 316, 347)									
	0	10	20	30	40	50	60	70	80	90
-200	-0.0281	-0.0295	-0.0305	-0.0314	-0.0324	-0.0334	-0.0343	-0.0353	-0.0362	-0.0372
-100	-0.0187	-0.0197	-0.0207	-0.0216	-0.0226	-0.0236	-0.0245	-0.0254	-0.0263	-0.0272
0	-0.0078	-0.0089	-0.0100	-0.0112	-0.0123	-0.0134	-0.0145	-0.0155	-0.0166	-0.0176
0	-0.0078	-0.0067	-0.0056	-0.0044	-0.0033	-0.0022	-0.0011	0	0.0012	0.0023
100	0.0034	0.0045	0.0056	0.0068	0.0079	0.0090	0.0101	0.0112	0.0124	0.0135
200	0.0146	0.0158	0.0169	0.0181	0.0192	0.0203	0.0215	0.0227	0.0238	0.0250
300	0.0261	0.0273	0.0285	0.0297	0.0309	0.0321	0.0332	0.0344	0.0356	0.0368
400	0.0380	0.0392	0.0404	0.0416	0.0428	0.0440	0.0453	0.0465	0.0477	0.0489
500	0.0501	0.0513	0.0526	0.0538	0.0550	0.0562	0.0575	0.0587	0.0599	0.0612
600	0.0624	0.0637	0.0649	0.0662	0.0674	0.0687	0.0700	0.0712	0.0725	0.0737
700	0.0750	0.0763	0.0776	0.0789	0.0802	0.0815	0.0828	0.0841	0.0854	0.0867
800	0.0880	0.0893	0.0906	0.0920	0.0933	0.0946	0.0959	0.0972	0.0986	0.0999
900	0.1012	0.1260	0.1039	0.1053	0.1066	0.1080	0.1094	0.1107	0.1121	0.1134
1,000	0.1148	0.1162	0.1175	0.1189	0.1202	0.1216	0.1229	0.1243	0.1257	0.1270
1,100	0.1284	0.1298	0.1311	0.1325	0.1338	0.1352	0.1366	0.1379	0.1393	0.1406
1,200	0.1420	0.1434	0.1447	0.1461	0.1474	0.1488	0.1502	0.1515	0.1529	0.1542
1,300	0.1556	0.1570	0.1583	0.1597	0.1610	0.1624	0.1638	0.1651	0.1665	0.1678
1,400	0.1692	0.1704	0.1717	0.1731	0.1744	0.1757	0.1771	0.1784	0.1796	0.1811

Note: Intersect “10” Degree increments across the top of each table with the “100” degree increments down the left side to determine the coefficient of thermal expansion for the desired temperature.

Beam Dimensions



American Standard Channels

Depth of Section Y	Weight per Ft., lb.	Flange Width	Mean Thick of Flange Z
3	4.1	1⅜	0.250
	5.0	1½	
	6.0	1⅝	
4	5.4	1⅝	0.313
	7.25	1¾	
5	6.7	1¾	0.313
	9.0	1⅞	
6	8.2	1⅞	0.375
	10.5	2	
	13.0	2⅛	
7	9.8	2⅛	0.375
	12.25	2¼	
	14.75	2¼	
8	11.5	2¼	0.375
	13.75	2⅜	
	18.75	2½	
9	13.4	2⅜	0.438
	15.0	2½	
	20.0	2⅝	
10	15.3	2⅝	0.438
	20.0	2¾	
	25.0	2⅞	
	30.0	3	
12	20.7	3	0.500
	25.0	3	
	30.0	3⅛	
15	33.9	3⅜	0.625
	40.0	3½	
	50.0	3¾	
18	42.7	4	0.625
	45.8	4	
	51.9	4⅛	
	58.0	4¼	

S Shapes

Depth of Section Y	Weight per Ft., lb.	Flange Width	Mean Thick of Flange Z
3	5.7	2⅜	0.250
	7.5	2½	
4	7.7	2⅝	0.313
	9.5	2¾	
5	10.0	3	0.313
	14.75	3¼	
6	12.5	3⅜	0.375
	17.25	3⅝	
7	15.3	3⅝	0.375
	20.0	3⅞	
8	18.4	4	0.438
	23.0	4⅛	
10	25.4	4⅝	0.500
	35.0	5	
12	31.8	5	0.563
	35.0	5⅛	
	40.8	5¼	0.688
	50.0	5½	
15	42.9	5½	0.625
	50.0	5⅝	
18	54.7	6	0.688
	70.0	6¼	
20	66.0	6¼	0.813
	75.0	6⅜	
20.3	86.0	7	0.938
	96.0	7¼	
24	80.0	7	0.875
	90.0	7⅛	
	100.0	7¼	

W Shapes

Depth of Section Y	Weight per Ft., lb.	Flange Width	Mean Thick of Flange Z
5	19	5	0.430
6	25	6⅛	0.455
8	18	5¼	0.330
	21	5¼	0.400
	24	6½	0.400
	28	6½	0.465
	31	8	0.435
	35	8	0.495
	40	8⅛	0.560
	48	8⅛	0.685
	58	8¼	0.810
	67	8¼	0.935
10	22	5¾	0.360
	26	5¾	0.440
	30	5¾	0.510
	33	8	0.435
	39	8	0.530
	45	8	0.620
	49	10	0.560
	54	10	0.615
	60	10⅛	0.680
	68	10⅛	0.770
	77	10¼	0.870
	88	10¼	0.990
12	26	6½	0.380
	30	6½	0.440
	35	6½	0.520
	40	8	0.515
	45	8	0.575
	50	8⅛	0.640
	53	10	0.575
	58	10	0.640
	65	12	0.605
	72	12	0.670
	79	12⅛	0.735
	87	12⅛	0.810
	96	12⅛	0.900
	106	12¼	0.990
14	30	6¾	0.385
	34	6¾	0.455
	38	6¾	0.515
	43	8	0.530
	48	8	0.595
	53	8	0.660
	61	10	0.645
	68	10	0.720
	74	10⅛	0.785
	82	10⅛	0.855
	90	14½	0.710

W Shapes

Depth of Section Y	Weight per Ft., lb.	Flange Width	Mean Thick of Flange Z
14	99	14⅝	0.780
	109	14⅝	0.860
	120	14⅝	0.940
	132	14¾	1.030
16	36	7	0.430
	40	7	0.505
	45	7	0.565
	50	7⅛	0.63
	57	7⅛	0.715
	67	10¼	0.665
	77	10¼	0.760
	89	10⅜	0.875
	100	10⅜	0.985
18	50	7½	0.570
	55	7½	0.630
	60	7½	0.695
	65	7⅝	0.750
	71	7⅝	0.810
	76	11	0.680
	86	11⅛	0.770
	97	11⅛	0.870
	106	11¼	0.940
	62	8¼	0.615
	68	8¼	0.685
	73	8¼	0.740
21	83	8⅜	0.835
	93	8⅜	0.930
	101	12¼	0.800
	111	12⅜	0.875
	122	12⅜	0.960
24	76	9	0.680
	84	9	0.770
	94	9⅛	0.875
	104	12¾	0.750
	117	12¾	0.850
	131	12⅞	0.960
27	94	10	0.745
	102	10	0.830
	114	10⅛	0.930
	146	14	0.975
30	108	10½	0.760
	116	10½	0.850
	124	10½	0.930
	132	10½	1.000
33	118	11½	0.740
	130	11½	0.855
	141	11½	0.960
36	135	12	0.790
	150	12	0.940
	160	12	1.020

Steel Pipe Data — Schedule No 40 & 80

Pipe Size	O.D.	Schedule No.	Wall Thick.	Weight. per Foot (lbs)	Weight of Water per Foot (lbs)
3/8	0.675	40	0.091	0.567	0.083
		80	0.126	0.738	0.061
1/2	0.840	40	0.109	0.850	0.132
		80	0.147	1.087	0.101
3/4	1.050	40	0.113	1.130	0.230
		80	0.154	1.473	0.186
1	1.315	40	0.133	1.678	0.374
		80	0.179	2.171	0.311
1 1/4	1.660	40	0.140	2.272	0.647
		80	0.191	2.996	0.555
1 1/2	1.900	40	0.145	2.717	0.882
		80	0.200	3.631	0.765
2	2.375	40	0.154	3.652	1.452
		80	0.218	5.022	1.279
2 1/2	2.875	40	0.203	5.790	2.072
		80	0.276	7.660	1.834
3	3.500	40	0.216	7.570	3.200
		80	0.300	10.250	2.860
3 1/2	4.000	40	0.226	9.110	4.280
		80	0.318	12.510	3.850
4	4.500	40	0.237	10.790	5.510
		80	0.337	14.980	4.980
5	5.563	40	0.258	14.620	8.660
		80	0.375	20.780	7.870
6	6.625	40	0.280	18.970	12.510
		80	0.432	28.570	11.290
8	8.625	40	0.322	28.550	21.600
		80	0.500	43.390	19.800
10	10.750	40	0.365	40.480	34.100
		80	0.593	64.400	31.100
12	12.75	40	0.406	53.600	48.500
		80	0.687	88.600	44.000
14	14.000	40	0.437	63.000	58.500
		80	0.750	107.000	51.200
16	16.000	40	0.500	83.000	76.500
		80	0.843	137.000	69.700
18	18.000	40	0.563	105.000	97.200
		80	0.937	171.000	88.500
20	20.000	40	0.593	123.000	120.400
		80	1.031	209.000	109.400
24	24.000	40	0.687	171.000	174.200
		80	1.218	297.000	158.200
30	30.000	20	0.500	158.000	286.000
36	36.000	API	0.500	190.000	417.000

Copper Tube Data

Type L

Tube Size	O.D. Tubing	O.D.	Wall Thick.	Weight per Foot (lbs)	Weight of Water per Foot (lbs)
1/4	3/8	0.375	0.030	0.126	0.034
3/8	1/2	0.500	0.035	0.198	0.062
1/2	5/8	0.625	0.040	0.285	0.100
5/8	3/4	0.750	0.042	0.362	0.151
3/4	7/8	0.875	0.045	0.455	0.209
1	1 1/8	1.125	0.050	0.655	0.357
1 1/4	1 3/8	1.375	0.055	0.884	0.546
1 1/2	1 5/8	1.625	0.060	1.140	0.767
2	2 1/8	2.125	0.070	1.750	1.341
2 1/2	2 5/8	2.625	0.080	2.480	2.064
3	3 1/8	3.125	0.090	3.330	2.949
3 1/2	3 5/8	3.625	0.100	4.290	3.989
4	4 1/8	4.125	0.110	5.380	5.188
5	5 1/8	5.125	0.125	7.610	8.081
6	6 1/8	6.125	0.140	10.200	11.616
8	8 1/8	8.125	0.200	19.290	20.289
10	10 1/8	10.125	0.250	30.100	31.590
12	12 1/8	12.125	0.280	40.400	45.426

Type K

Tube Size	O.D. Tubing	O.D.	Wall Thick.	Weight per Foot (lbs)	Weight of Water per Foot (lbs)
1/4	3/8	0.375	0.035	0.145	0.032
3/8	1/2	0.500	0.049	0.269	0.055
1/2	5/8	0.625	0.049	0.344	0.094
5/8	3/4	0.750	0.049	0.418	0.144
3/4	7/8	0.875	0.065	0.641	0.188
1	1 1/8	1.125	0.065	0.839	0.337
1 1/4	1 3/8	1.375	0.065	1.040	0.527
1 1/2	1 5/8	1.625	0.072	1.360	0.743
2	2 1/8	2.125	0.083	2.060	1.310
2 1/2	2 5/8	2.625	0.095	2.920	2.000
3	3 1/8	3.125	0.109	4.000	2.960
3 1/2	3 5/8	3.625	0.120	5.120	3.900
4	4 1/8	4.125	0.134	6.510	5.060
5	5 1/8	5.125	0.160	9.670	8.000
6	6 1/8	6.125	0.192	13.870	11.200
8	8 1/8	8.125	0.271	25.900	19.500
10	10 1/8	10.125	0.338	40.300	30.423
12	12 1/8	12.125	0.405	57.800	43.675

Other Pipe Data

Flange Cast Iron Pipe Add Weight of Flanges *					
Pipe Size	Class	O.D. C.I. Pipe	Wall Thick.	Weight per ft. (lbs)	Weight of Water per ft. (lbs).
3	150	3.96	0.32	12.2	3.7
4	150	4.80	0.32	16.4	5.7
6	150	6.90	0.38	25.7	12.8
8	150	9.05	0.41	36.7	23.1
10	150	11.10	0.44	48.7	35.5
12	150	13.20	0.48	62.9	51.0
14	150	15.30	0.51	78.8	69.3
16	150	17.40	0.54	95.0	90.3
18	150	19.50	0.58	114.7	114.0
20	150	21.60	0.62	135.9	141.5
24	150	25.80	0.73	190.4	201.0
30	150	32.00	0.85	277.3	312.0
36	150	38.30	0.94	368.9	449.0
42	150	44.50	1.05	479.1	612.0
48	150	50.80	1.14	595.2	803.0

* Mechanical joint pipe class ISO is approximately the same weight as Bell & Spigot

Glass Pipe - Regular Schedule				
Pipe Size	O.D.	Wall Thick.	Weight/ per ft. (lbs)	Weight of Water per ft. (lbs)
1½	1.84	0.12	0.64	0.89
2	2.34	0.14	0.94	1.45
3	3.41	0.17	1.60	3.19
4	4.53	0.20	2.60	5.79
6	6.66	0.24	4.70	12.78

Glass Pipe - Heavy Schedule				
Pipe Size	O.D.	Wall Thick.	Weight per ft. (lbs)	Weight of Water per ft. (lbs)
1	1.31	0.16	0.6	0.35
1½	1.84	0.17	0.9	0.76
2	2.34	0.17	1.1	1.36
3	3.41	0.20	2.0	3.06
4	4.53	0.26	3.4	5.44
6	6.66	0.33	6.3	12.42

Maximum Recommended Applied Torques

For Fig. 261 Riser Clamp	
Bolt Size	Torque Value (ft.- lbs)
¼	6
⅜	21
½	46
⅝	100
¾	150
⅞	190
1	280
Bolts per ASTM A307 Nuts per ASTM A563	

For Set Screws In MSS Type 19 & 23 C-Clamp	
Thread Size	Torque Value (in.- lbs)
¼	40
⅜	60
½	125
⅝	250
¾	400
⅞	665
Extracted from MSS-SP-69	

PVC Pipe Support Spacing

PIPE SIZE (in.)	SCHEDULE 40 TEMPERATURE (°F)					SCHEDULE 80 TEMPERATURE (°F)					SCHEDULE 120 TEMPERATURE (°F)				
	60	80	100	120	140	60	80	100	120	140	60	80	100	120	140
1/4	4	3 1/2	3 1/2	2	2	4	4	3 1/2	2 1/2	2	–	–	–	–	–
3/8	4	4	3 1/2	2 1/2	2	4 1/2	4 1/2	4	2 1/2	2 1/2	–	–	–	–	–
1/2	4 1/2	4 1/2	4	2 1/2	2 1/2	5	4 1/2	4 1/2	3	2 1/2	5	5	4 1/2	3	2 1/2
3/4	5	4 1/2	4	2 1/2	2 1/2	5 1/2	5	4 1/2	3	2 1/2	5 1/2	5	4 1/2	3	3
1	5 1/2	5	4 1/2	3	2 1/2	6	5 1/2	5	3 1/2	3	6	5 1/2	5	3 1/2	3
1 1/4	5 1/2	5 1/2	5	3	3	6	6	5 1/2	3 1/2	3	6 1/2	6	5 1/2	3 1/2	3 1/2
1 1/2	6	5 1/2	5	3 1/2	3	6 1/2	6	5 1/2	3 1/2	3 1/2	6 1/2	6 1/2	6	4	3 1/2
2	6	5 1/2	5	3 1/2	3	7	6 1/2	6	4	3 1/2	7 1/2	7	6 1/2	4	3 1/2
2 1/2	7	6 1/2	6	4	3 1/2	7 1/2	7 1/2	6 1/2	4 1/2	4	8	7 1/2	7	4 1/2	4
3	7	7	6	4	3 1/2	8	7 1/2	7	4 1/2	4	8 1/2	8	7 1/2	5	4 1/2
3 1/2	7 1/2	7	6 1/2	4	4	8 1/2	8	7 1/2	5	4 1/2	9	8 1/2	7 1/2	5	4 1/2
4	7 1/2	7	6 1/2	4 1/2	4	9	8 1/2	7 1/2	5	4 1/2	9 1/2	9	8 1/2	5 1/2	5
5	8	7 1/2	7	4 1/2	4	9 1/2	9	8	5 1/2	5	10 1/2	10	9	6	5 1/2
6	8 1/2	8	7 1/2	5	4 1/2	10	9 1/2	9	6	5	11 1/2	10 1/2	9 1/2	6 1/2	6
8	9	8 1/2	8	5	4 1/2	11	10 1/2	9 1/2	6 1/2	5 1/2	–	–	–	–	–
10	10	9	8 1/2	5 1/2	5	12	11	10	7	6	–	–	–	–	–
12	11 1/2	10 1/2	9 1/2	6 1/2	5 1/2	13	12	10 1/2	7 1/2	6 1/2	–	–	–	–	–
14	12	11	10	7	6	13 1/2	13	11	8	7	–	–	–	–	–
16	12 1/2	11 1/2	10 1/2	7 1/2	6 1/2	14	13 1/2	11 1/2	8 1/2	7 1/2	–	–	–	–	–
18	13	12	11	8	7	14 1/2	14	12	11	9	–	–	–	–	–
20	14	12 1/2	11 1/2	10	8 1/2	15 1/2	14 1/2	12 1/2	11 1/2	9 1/2	–	–	–	–	–
24	15	13	12 1/2	11	9 1/2	17	15	14	12 1/2	10 1/2	–	–	–	–	–
	SDR 41					SDR 26					–				
18	13	12	11	8	7	14 1/2	14	12	9	8	–	–	–	–	–
20	13 1/2	12 1/2	11 1/2	8 1/2	7 1/2	15	14 1/2	12 1/2	9 1/2	8 1/2	–	–	–	–	–
24	14	13	12	9	8	15 1/2	15	13	10	9	–	–	–	–	–

Note: Although support spacing is shown at 140°F, consideration should be given to the use of CPVC or continuous support above 120°F.

The possibility of temperature overrides beyond regular working temperatures and cost may either make either of the alternatives more desirable. This chart based on continuous spans and for un-insulated line carrying fluids of specific gravity up to 1.00.

The above table is meant as a general guideline, it is recommended that the pipe manufacturer be consulted for specific spacing recommendations relating to their pipe, load conditions, operating temperature and service conditions.

Local codes and specifications may also vary from the above recommended spacing and should be consulted for the applicable spacing requirements prior to installation.

CPVC Pipe Support Spacing

Pipe Size (in.)	SCHEDULE 40 TEMPERATURE (°F)						SCHEDULE 80 TEMPERATURE (°F)					
	73°	100°	120°	140°	160°	180°	73°	100°	120°	140°	160°	180°
½	5	4½	4½	4	2½	2½	5½	5	4½	4½	3	2½
¾	5	5	4½	4	2½	2½	5½	5½	5	4½	3	2½
1	5½	5½	5	4½	3	2½	6	6	5½	5	3½	3
1¼	5½	5½	5½	5	3	3	6½	6	6	5½	3½	3
1½	6	6	5½	5	3½	3	7	6½	6	5½	3½	3½
2	6	6	5½	5	3½	3	7	7	6½	6	4	3½
2½	7	7	6½	6	4	3½	8	7½	7½	6½	4½	4
3	7	7	7	6	4	3½	8	8	7½	7	4½	4
3½	7½	7½	7	6½	4	4	8½	8½	8	7½	5	4½
4	7½	7½	7	6½	4½	4	8½	9	8½	7½	5	4½
6	8½	8	7½	7	5	4½	10	9½	9	8	5½	5
8	9½	9	8½	7½	5½	5	11	10½	10	9	6	5½
10	10½	10	9½	8	6	5½	11½	11	10½	9½	6½	6
12	11½	10½	10	8½	6½	6	12½	12	11½	10½	7½	6½
14	12	11	10	9	8	6	15	13½	12½	11	9½	8
16	13	12	11	9½	8½	7	16	15	13½	12	10	8½

Note: Although support spacing is shown at 140°F, consideration should be given to the use of CPVC or continuous support above 120°F.

The possibility of temperature overrides beyond regular working temperatures and cost may either make either of the alternatives more desirable. This chart based on continuous spans and for un-insulated line carrying fluids of specific gravity up to 1.00.

The above table is meant as a general guideline, it is recommended that the pipe manufacturer be consulted for specific spacing recommendations relating to their pipe, load conditions, operating temperature and service conditions.

Local codes and specifications may also vary from the above recommended spacing and should be consulted for the applicable spacing requirements prior to installation.

Anvil Compliances, Listings and Approvals

Anvil Figure Number	Product Types			Application Sizes					
	MSS-SP-58 & MSS-SP-69	Federal Specifications		FM* Rod Size	FM* Pipe Size	UL■ Rod Size	UL■ Pipe Size	ULC▲ Rod Size	ULC▲ Pipe Size
		WW-H-171-E	A-A-1192A						
14	27	54	27	–	–	–	–	–	–
40	42	–	42	–	–	–	–	–	–
45	–	–	–	–	–	–	–	–	–
46	–	–	–	–	–	–	–	–	–
47	–	–	–	–	–	–	–	–	–
49	–	–	–	–	–	–	–	–	–
50	–	–	–	–	–	–	–	–	–
52	–	–	–	–	–	–	–	–	–
54	–	–	–	–	–	–	–	–	–
55	57	57	57	–	–	–	–	–	–
55L	57	57	57	–	–	–	–	–	–
60	–	–	–	–	–	–	–	–	–
62	–	–	–	–	–	–	–	–	–
63	–	–	–	–	–	–	–	–	–
65	–	12	–	–	–	½	2½ - 4	–	–
66	22	22	22	–	–	–	–	–	–
67	5	–	5	–	–	–	–	–	–
69	10	10	10	⅜	¾ - 4	⅜	¾ - 4	–	–
				½	5 - 8	½	5 - 8	–	–
86	23	23	23	⅜	¾ - 2	⅜	¾ - 2	⅜	¾ - 2
				½	2½ - 3½	½	2½ - 3½	½	2½ - 3½
				⅝	4, 5	⅝	4, 5	⅝	4, 5
				¾	6	¾	6	¾	6
87	23	23	23	⅜	¾ - 2	⅜	¾ - 2	⅜	¾ - 2
				½	2½ - 3½	½	2½ - 3½	½	2½ - 3½
				⅝	4, 5	⅝	4, 5	⅝	4, 5
				¾	6	¾	6	¾	6
88	23	23	23	⅜	¾ - 2	⅜	¾ - 2	⅜	¾ - 2
				½	2½ - 3½	½	2½ - 3½	½	2½ - 3½
				⅝	4, 5	⅝	4, 5	⅝	4, 5
				¾	6	¾	6	¾	6
89	–	–	–	–	–	–	–	–	–
89X	–	–	–	–	–	–	–	–	–
92	19 & 23	23	19 & 23	⅜	¾ - 4	⅜	2½ - 4	⅜	2½ - 4
				½	5 - 8	½	5 - 8	½	5 - 8
93	19 & 23	23	19 & 23	⅜	¾ - 4	⅜	2½ - 4	⅜	2½ - 4
				½	5 - 8	½	5 - 8	½	5 - 8
94	19	19	19	⅝	10	⅝	10	–	–
				¾	12	¾	12	–	–
95	23	23	23	–	–	–	–	–	–
97	9	9	9	⅜	¾ - 2	⅜	¾ - 2	–	–
				½	2½ - 3½	½	2½ - 3½	–	–
				⅝	4	⅝	4	–	–
97C	9	9	9	–	–	–	–	–	–
100	–	–	–	–	–	–	–	–	–
103	–	–	–	–	–	–	–	–	–
104	6	6	6	–	–	–	–	–	–
108	11	11	11	–	–	–	–	–	–
110R	16	16	16	⅜	¾ - 4	⅜	¾ - 4	–	–
				½	5 - 8	½	5 - 8	–	–
				⅝	10	⅝	10	–	–
				¾	12	¾	12	–	–
				⅞	12	⅞	12	–	–

*= FM Approved ■ = UL Listed ▲ = ULC Listed

Anvil Compliances, Listings and Approvals (cont.)

Anvil Figure Number	Product Types			Application Sizes					
	MSS-SP-58 & MSS-SP-69	Federal Specifications		FM* Rod Size	FM* Pipe Size	UL■ Rod Size	UL■ Pipe Size	ULC▲ Rod Size	ULC▲ Pipe Size
		WW-H-171-E	A-A-1192A						
112	–	–	–	–	–	–	–	–	–
113	–	–	–	–	–	–	–	–	–
114	15	15	15	–	–	–	–	–	–
120	–	–	–	–	–	–	–	–	–
126	–	–	–	–	–	–	–	–	–
127	–	–	–	–	–	–	–	–	–
128	–	–	–	–	–	–	–	–	–
128R	–	–	–	–	–	–	–	–	–
133	21	21	21	⅜	¾ - 4	⅜	¾ - 4	–	–
				½	5 - 8	½	5 - 8	–	–
134	21	21	21	½	5 - 8	½	5 - 8	–	–
				⅝	10 - 12	⅝	10 - 12	–	–
135	–	–	–	–	–	–	–	–	–
135E	–	–	–	–	–	–	–	–	–
135R	–	–	–	–	–	–	–	–	–
136	–	–	–	⅜	¾ - 2	⅜	¾ - 2	⅜	¾ - 2
	–	–	–	½	2½ - 3½	½	2½ - 3½	½	2½ - 3½
	–	–	–	⅝	4, 5	⅝	4, 5	⅝	4, 5
	–	–	–	¾	6	¾	6	¾	6
	–	–	–	⅞	8	⅞	8	⅞	8
136R	–	–	–	–	–	–	–	–	–
137	24	24	24	–	–	–	–	–	–
137C	24	24	24	–	–	–	–	–	–
137S	–	–	–	–	–	–	–	–	–
138R	12	25	12	–	–	–	–	–	–
140	–	–	–	–	–	–	–	–	–
142	–	–	–	–	–	–	–	–	–
146	–	–	–	–	–	–	–	–	–
148	–	–	–	–	–	–	–	–	–
152	–	–	–	⅜	¾ - 2	⅜	¾ - 2	⅜	¾ - 2
	–	–	–	½	2½ - 3½	½	2½ - 3½	½	2½ - 3½
	–	–	–	⅝	4, 5	⅝	4, 5	⅝	4, 5
	–	–	–	¾	6	¾	6	¾	6
	–	–	–	⅞	8	⅞	8	⅞	8
153	–	–	–	⅜	¾ - 2	⅜	¾ - 2	⅜	¾ - 2
	–	–	–	½	2½ - 3½	½	2½ - 3½	½	2½ - 3½
	–	–	–	⅝	4, 5	⅝	4, 5	⅝	4, 5
	–	–	–	¾	6	¾	6	¾	6
	–	–	–	⅞	8	⅞	8	⅞	8
157	–	–	–	⅜	¾ - 2	⅜	¾ - 2	–	–
	–	–	–	½	2½ - 3½	½	2½ - 3½	–	–
	–	–	–	⅝	4, 5	⅝	4, 5	–	–
	–	–	–	¾	6	¾	6	–	–
	–	–	–	⅞	8	⅞	8	–	–
160	39A & 39B	40A & 40B	39A & 39B	–	–	–	–	–	–
161	39A & 39B	40A & 40B	39A & 39B	–	–	–	–	–	–
162	39A & 39B	40A & 40B	39A & 39B	–	–	–	–	–	–
163	39A & 39B	40A & 40B	39A & 39B	–	–	–	–	–	–
164	39A & 39B	40A & 40B	39A & 39B	–	–	–	–	–	–
165	39A & 39B	40A & 40B	39A & 39B	–	–	–	–	–	–
165A	39A & 39B	40A & 40B	39A & 39B	–	–	–	–	–	–
166A	39A & 39B	40A & 40B	39A & 39B	–	–	–	–	–	–
167	40	41	40	–	–	–	–	–	–
168	40	41	40	–	–	–	–	–	–
171	41	42	41	–	–	–	–	–	–
175	44	45	44	–	–	–	–	–	–
177	41	42	41	–	–	–	–	–	–
178	49	50	49	–	–	–	–	–	–

*= FM Approved ■ = UL Listed ▲ = ULC Listed

Anvil Compliances, Listings and Approvals (cont.)

Anvil Figure Number	Product Types			Application Sizes					
	MSS-SP-58 & MSS-SP-69	Federal Specifications		FM* Rod Size	FM* Pipe Size	UL■ Rod Size	UL■ Pipe Size	ULC▲ Rod Size	ULC▲ Pipe Size
		WW-H-171-E	A-A-1192A						
181	43	44	43	–	–	–	–	–	–
191	37	38	37	–	–	–	–	–	–
192	38	39	38	–	–	–	–	–	–
194	31	32	31	⅜	¾ - 2	–	–	–	–
				½	2½ - 3½	–	–	–	–
				⅝	4, 5	–	–	–	–
				¾	6	–	–	–	–
				⅞	8	–	–	–	–
195	32	33	32	–	–	–	–	–	–
199	33	34	33	–	–	–	–	–	–
202	34	35	34	⅜	¾ - 2	⅜	¾ - 2	⅜	¾ - 2
				½	2½ - 3½	½	2½ - 3½	½	2½ - 3½
				⅝	4, 5	⅝	4, 5	⅝	4, 5
206	34	35	34	⅜	¾ - 4	⅜	¾ - 4	–	–
				½	5, 6	½	5, 6	–	–
				⅝	8	⅝	8	–	–
207	34	35	34	⅜	¾ - 4	⅜	¾ - 4	–	–
				–	–	½	5 - 8	–	–
212	4	4	4	⅜	¾ - 2	⅜	¾ - 2	⅜	¾ - 2
				½	2½ - 3½	½	2½ - 3½	½	2½ - 3½
				⅝	4, 5	⅝	4, 5	⅝	4, 5
				¾	6	¾	6	¾	6
				⅞	8	⅞	8	⅞	8
212FP	4	4	4	–	–	–	–	–	–
216	4	4	4	–	–	–	–	–	–
217	25	–	25	–	–	–	–	–	–
218	30	30	30	⅜	¾ - 2	⅜	¾ - 2	⅜	¾ - 2
				½	2½ - 3½	½	2½ - 3½	½	2½ - 3½
				⅝	4, 5	⅝	4, 5	⅝	4, 5
				¾	6	¾	6	¾	6
				⅞	8	⅞	8	⅞	8
224	2	2	2	–	–	–	–	–	–
227	25	–	25	⅜	¾ - 2	⅜	¾ - 2	–	–
		–		½	2½ - 8	½	2½ - 8	–	–
228	28 & 29	30 & 31	28 & 29	–	–	–	–	–	–
228L	28 & 29	30 & 31	28 & 29	–	–	–	–	–	–
230	13	13	13	–	–	–	–	–	–
233	13	13	13	–	–	–	–	–	–
243	–	–	–	–	–	–	–	–	–
244	–	–	–	–	–	–	–	–	–
246	2	2	2	–	–	–	–	–	–
248	–	–	–	–	–	–	–	–	–
248L	–	–	–	–	–	–	–	–	–
248X	–	–	–	–	–	–	–	–	–
253	–	–	–	–	–	–	–	–	–
255	–	–	–	–	–	–	–	–	–
256	–	–	–	–	–	–	–	–	–
257	35	–	35	–	–	–	–	–	–
257A	–	–	–	–	–	–	–	–	–
258	36	36 & 37	36	–	–	–	–	–	–

*= FM Approved ■ = UL Listed ▲ = ULC Listed

Anvil Compliances, Listings and Approvals (cont.)

Anvil Figure Number	Product Types			Application Sizes					
	MSS-SP-58 & MSS-SP-69	Federal Specifications		FM Rod Size	FM Pipe Size	UL Rod Size	UL Pipe Size	ULC Rod Size	ULC Pipe Size
		WW-H-171-E	A-A-1192A						
259	37	–	37	–	–	–	–	–	–
260	1	1	1	⅜	¾ - 2	⅜	¾ - 2	⅜	¾ - 2
				½	2½ - 3½	½	2½ - 3½	½	2½ - 3½
				⅝	4, 5	⅝	4, 5	⅝	4, 5
				¾	6	¾	6	¾	6
				⅞	8	⅞	8	⅞	8
261	8	8	8	–	–	N/A	1½ - 8	N/A	1½ - 8
262	26	26	26	–	–	–	–	–	–
264	38	39	38	–	–	–	–	–	–
265	38	39	38	–	–	–	–	–	–
271	44	45	44	–	–	–	–	–	–
274	46	47	46	–	–	–	–	–	–
274P	–	–	–	–	–	–	–	–	–
275	–	–	–	–	–	–	–	–	–
277	45	46	45	–	–	–	–	–	–
277S	–	–	–	–	–	–	–	–	–
278	–	–	–	–	–	–	–	–	–
278L	–	–	–	–	–	–	–	–	–
278X	–	–	–	–	–	–	–	–	–
281	18	19	18	⅜	¾ - 4	⅜	¾ - 4	⅜	¾ - 4
				½	5 - 8	½	5 - 8	½	5 - 8
				⅝	8 MAX.	⅝	8 MAX.	⅝	8 MAX.
				¾	8 MAX.	¾	8 MAX.	¾	8 MAX.
282	18	18	18	⅜	¾ - 4	⅜	¾ - 4	⅜	¾ - 4
				½	5 - 8	½	5 - 8	½	5 - 8
				⅝	8 MAX.	⅝	8 MAX.	⅝	8 MAX.
				¾	8 MAX.	¾	8 MAX.	¾	8 MAX.
				⅞	8 MAX.	⅞	8 MAX.	⅞	8 MAX.
284	–	–	–	–	–	–	–	–	–
285	19	18	18	⅜	¾ - 4	⅜	¾ - 4	⅜	¾ - 4
				½	5 - 8	½	5 - 8	½	5 - 8
				⅝	8 MAX.	⅝	8 MAX.	⅝	8 MAX.
286	18	18	18	–	–	–	–	–	–
290	17	17	17	–	–	–	–	–	–
290L	17	17	17	–	–	–	–	–	–
291	–	–	–	–	–	–	–	–	–
292	28 & 29	28 & 29	28 & 29	–	–	–	–	–	–
292L	28 & 29	28 & 29	28 & 29	–	–	–	–	–	–
295	3	3	3	–	–	–	–	–	–
295A	3	3	3	–	–	–	–	–	–
295H	3	3	3	–	–	–	–	–	–
299	14	14	14	–	–	–	–	–	–
300	1	1	1	–	–	–	–	–	–
395	–	–	–	–	–	–	–	–	–
432	–	–	–	–	–	–	–	–	–
436	35	–	35	–	–	–	–	–	–
436A									
439	35	–	35	–	–	–	–	–	–
590	1	1	1	–	–	–	–	–	–
594	–	–	–	–	–	–	–	–	–
595	8	–	8	–	–	–	–	–	–
599	–	–	–	–	–	–	–	–	–
600	8	–	8	–	–	–	–	–	–

*= FM Approved ■ = UL Listed ▲ = ULC Listed

Anvil Compliances, Listings and Approvals (cont.)

Anvil Figure Number	Product Types			Application Sizes					
	MSS-SP-58 & MSS-SP-69	Federal Specifications		FM Rod Size	FM Pipe Size	UL Rod Size	UL Pipe Size	ULC Rod Size	ULC Pipe Size
		WW-H-171-E	A-A-1192A						
CT-65	–	12	–	–	–	–	–	–	–
CT-69	10	10	10	–	–	–	–	–	–
CT-99	9	9	9	–	–	–	–	–	–
CT-99C	9	9	9	–	–	–	–	–	–
CT-109	11	11	11	–	–	–	–	–	–
CT-121	8	8	8	–	–	–	–	–	–
CT-121C	–	–	–	–	–	–	–	–	–
CT-128C	–	–	–	–	–	–	–	–	–
CT-138R	12	25	12	–	–	–	–	–	–
CT-255	–	–	–	–	–	–	–	–	–

A type is dependent upon its appropriate installation and use.
Note: Figure 218 Must be used with Figure 157.

Engineered Hangers - Compliances, Listings and Approvals

Anvil Figure Number	Product Types		
	MSS-SP-58 & MSS-SP-69	Federal Specifications	
		WW-H-171-E	A-A-1192A
170 - Horizontal Traveler	58	-	-
200, C-200, 201 and C-201 - Hydraulic Snubbers	47	-	-
210 - Replacement Strut	-	-	-
211, C-211, 640, C-640 - Sway Strut Assembly	-	-	-
222 and C-222 - Mini-Sway Strut Assembly	-	-	-
247 - Spring Cushion	48	49	49
296, C-296, 297, C-297, 298, C-298, 301, C-301 & 302 - Swing Sway Brace	50	55	55
312 - Tapered Pin	-	-	-
1306 and 1307 - Limit Stop	-	-	-
3306 & 3307 - Hydraulic Snubbers	47	-	-
Variable Spring Hangers			
82, B-268, 98, Triple, Quadruple Type A-E	51	51	51
C-82, C-268, C-98, Triple-CR, Quadruple-CR Type A-E	51	51	51
82, B-268, 98, Triple, Quadruple Type F	52	56	56
C-82, C-268, C-98, Triple-CR, Quadruple-CR Type F	52	56	56
82, B-268, 98, Triple, Quadruple Type G	53	57	57
C-82, C-268, C-98, Triple-CR, Quadruple-CR Type G	53	57	57
Constant Support Hangers			
80-V and C-80-V Type A-E	55	58	58
80-V and C-80-V Type G	56	59	59
81-H and C-81-H Type A-E	54	52	52

*= FM Approved ■ = UL Listed ▲ = ULC Listed

Anvil Terms of Sale and Conditions

1. CONTROLLING PROVISIONS:

These terms and conditions shall control with respect to any purchase order or sale of Seller's products. No waiver, alteration or modification of these terms and conditions whether on Buyer's purchase order or otherwise shall be valid unless the waiver, alteration or modification is specifically accepted in writing and signed by an authorized representative of Seller.

2. DELIVERY:

Seller will make every effort to complete delivery of products as indicated on Seller's acceptance of an order, but Seller assumes no responsibility or liability, and will accept no back charge, for loss or damage due to delay or inability to deliver caused by acts of God, war, labor difficulties, accident, delays of carriers, by contractors or suppliers, inability to obtain materials, shortages of fuel and energy, or any other causes of any kind whatever beyond the control of Seller. Seller may terminate any contract of sale of its products without liability of any nature, by written notice to Buyer, in the event that the delay in delivery or performance resulting from any of the aforesaid causes shall continue for a period of sixty (60) days. Under no circumstances shall Seller be liable for any special or consequential damages or for loss, damage, or expense (whether or not based on negligence) directly or indirectly arising from delays or failure to give notice of delay.

3. WARRANTY:

Seller warrants for one year from the date of shipment Seller's manufactured products to the extent that Seller will replace those having defects in material or workmanship when used for the purpose and in the manner which Seller recommends. If Seller examination shall disclose to its satisfaction that the products are defective, and an adjustment is required, the amount of such adjustment shall not exceed the net sales price of the defective products and no allowance will be made for labor or expense of repairing or replacing defective products or workmanship of damage resulting from the same. Seller warrants the products which it sells of other manufacturers to the extent of the warranties of their respective makers. Where engineering design or fabrication work is supplied. Buyer's acceptance of Seller's design or of delivery of work shall relieve Seller of all further obligation, other than expressed in Seller's product warranty. THIS IS SELLER'S SOLE WARRANTY. SELLER MAKES NO OTHER WARRANTY OF ANY KIND, EXPRESSED OR IMPLIED AND ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FOR A PARTICULAR PURPOSE WHICH EXCEED SELLER'S AFORESTATED OBLIGATION ARE HEREBY DISCLAIMED BY SELLER AND EXCLUDED FROM THIS WARRANTY. Seller neither assumes, nor authorizes any person to assume for it, any other obligation in connection with the sale of its engineering designs or products. This warranty shall not apply to any products or parts of products which (a) have been repaired or altered outside of Seller's factory, in any manner; (b) have been subjected to misuse, negligence or accidents; (c) have been used in a manner contrary to Seller's instructions or recommendations. Seller shall not be responsible for design errors due to inaccurate or incomplete information supplied by Buyer or its representatives.

4.SELLER'S LIABILITY:

Seller will not be liable for any loss, damage, cost of repairs, incidental or consequential damages of any kind, whether based upon warranty (except for the obligation accepted by Seller under "Warranty" above), contract or negligence, arising in connection with the design, manufacture, sale, use or repair of the products or of the engineering designs supplied to Buyer

5.RETURNS:

Seller cannot accept return of any products unless its written permission has been first obtained, in which case same will be credited subject to the following: (a) all material returned must, on its arrival at Seller's Plant, be found to be in first-class condition; if not, cost of putting in saleable condition will be deducted from credit memoranda; (b) a handling charge deduction of twenty percent (20%) will be made from all credit memoranda issued for material returned; and (c) transportation charges, if not prepaid will be deducted from credit memoranda.

6. SHIPMENTS:

All products sent out will be carefully examined, counted and packed. The cost of any special packing or special handling caused by Buyer's requirements or requests shall be added to the amount of the order. No claim for shortages will be allowed unless make in writing within ten (10) days of receipt of a shipment.

Claims for products damaged or lost in transit should be made on the carrier, as Seller's responsibility ceases, and title passes, on delivery to the carrier.

7. SPECIAL PRODUCTS:

Orders covering special or nonstandard products are not subject to cancellation except on such terms as Seller may specify on application.

8. PRICES AND DESIGNS:

Prices and designs are subject to change without notice. All prices are F.O.B. Point of shipment, unless otherwise stated.

9.TAXES:

The amount of any sales, excise or other taxes, if any, applicable to the products covered by this order, shall be paid by Buyer unless Buyer provides Seller with an exemption certificate acceptable to the taxing authorities.

10. NUCLEAR PLANTS:

Where the products, engineering design or fabrication are utilized in nuclear plant applications, Buyer agrees: (a) to take all necessary steps to add Seller as an insured under the property insurance policies and nuclear liability insurance policies covering the nuclear power plant facility at which the products, engineering design or fabrication are utilized; (b) to obtain a waiver of any claims against Seller by the nuclear power plant owner and a waiver of subrogation against Seller from such owners' property insurer with respect to any loss or damage to property at the nuclear power plant site arising from the products, engineering design or fabrication; (c) to indemnify and hold Seller harmless against all claims, costs, expenses (including attorneys fees), loss, damage, or other liability that Seller would not have incurred but for Buyer's failure to comply with subsections (a) and (b) of this Section 10; and (d) to indemnify and hold Seller harmless with respect to any personal injury (or death), property damage or other loss resulting from a nuclear incident which is caused directly or indirectly by defective design, material or workmanship furnished by Seller.

11. MINIMUM INVOICE:

$100.00 plus transportation.

12. TERMS:

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NOTE: All orders are accepted on the basis of prices in effect at the time of shipment.

NOTICE:

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EXCEPTIONS:

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  - B31.1 Power Piping
  - B31.3 Chemical Plant and Petroleum Refinery Piping
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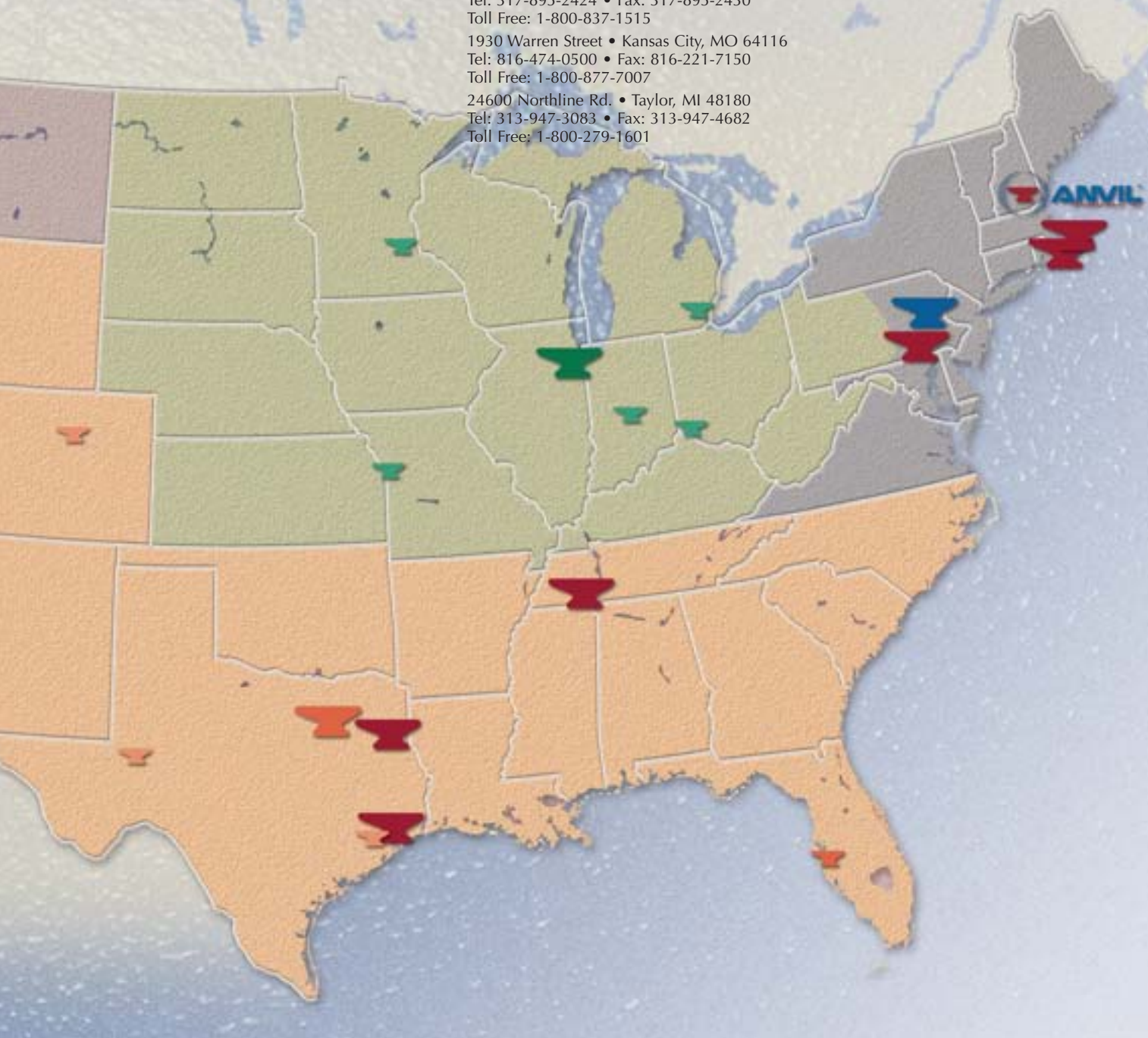

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