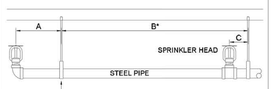
Permit: 2018-1447213 -CT
RSN: 1282092
1 of 14

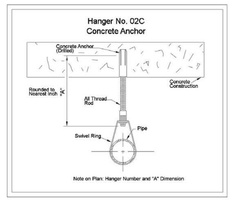
City of Aurora Building Division
Counter Permit intake by: WHP
Date: Apr 27, 2018
RSN: 1282092
Permit: 2018-1447213 -CT
2015 INTERNATIONAL CODES & 2014 NEC Scope of permit to be field verified.

STEEL PIPE HANGER LOCATION DETAIL

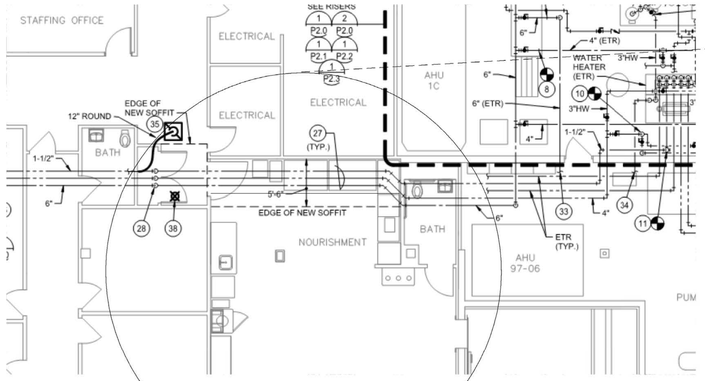
PIPE SIZE	A	B*	C
1"	3'-0" MAX.	12'-0" MAX.	3" MIN.
1½"	4'-0" MAX.	12'-0" MAX.	3" MIN.
1½"-8"	5'-0" MAX.	15'-0" MAX.	3" MIN.

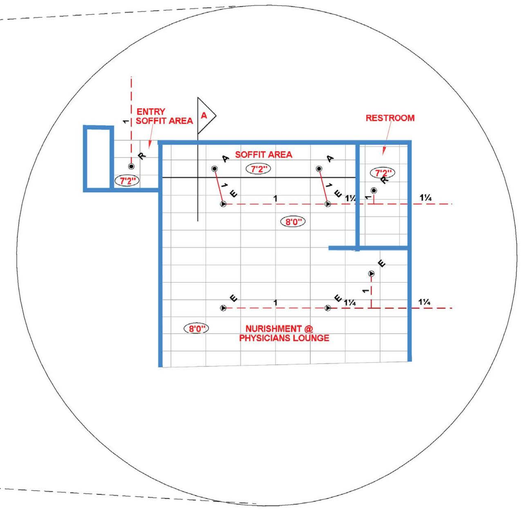


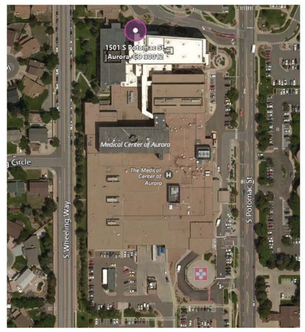
* MAXIMUM HANGER SPACING FOR THREADED LIGHTWALL STEEL PIPE IS 12'-0" FOR ALL PIPE SIZES



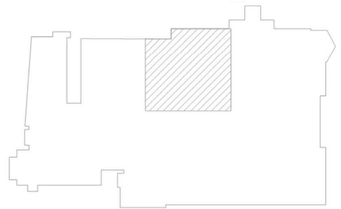
SCOPE OF WORK: RELOCATE SPRINKLERS TO 7'2" CEILNG IN RESTROOM & ENTRY
ADD SPRINKLERS IN LOWER SOFFIT (4'0" WIDE 10" DEEP)





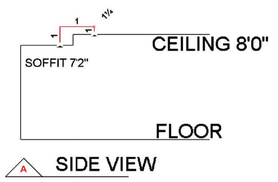


SITE MAP



KEY PLAN AT SITE

1. MODIFY THE EXISTING SYSTEM IN AREA OF WORK TO COMPLY WITH NFPA 13, 2016 FOR NEW WALL & CEILING CONFIGURATION
2. ALL NEW PIPE SHOWN AS SOLID PIPES TO BE 1" STEEL PIPE, EXISTING PIPES ARE DASHED PIPES
3. SYSTEM MODIFICATIONS TO BE DESIGNED, INSTALLED AND TESTED PER NFPA 13 2016
4. EXISTING SYSTEM DESIGNED FOR LIGHT HAZARD OCCUPANCY EXCEPT STORAGE AND MECHANICAL ROOMS
5. NO MORE THAN TWO SPRINKLERS TO BE PIPED FROM ANY 1" OUTLET, IF OUTLET IS NOT USED IT WILL BE PLUGGED.
8. ALL DROPS AND ARM-OVERS TO BE FIELD FABRICATED, SPRINKLER HEADS INSTALLED CENTER OR QUARTER POINTS OF TILES
9. OWNER TO PROVIDE ADEQUATE HEAT TO ALL PLACES WHERE WET SPRINKLER PIPE IS INSTALLED.
10. ALL PAINTING AND WIRING OF DEVICES (IF REQUIRED) TO BE DONE BY OTHERS PER CONTRACT
11. UPON COMPLETION OF THE PROJECT IT IS THE OWNER'S RESPONSIBILITY TO INSPECT, TEST AND MAINTAIN THE SPRINKLER SYSTEM PER NFPA 25



Thomas M. Coakley, CET
Western States Fire Protection Co.
NICET Level III
Registration #107852
Sprinkler System Layout
Signature

SPRINKLER LEGEND

BY	SYMBOL	DESCRIPTION	SIN	ORIF	TEMP	COLOR	COUNT
	●	RELIABLE G5-56 CONCEALER HEADS	RA3415	1/2"	155°	CHROME	2
	◐	CENTRAL SEMI-RECESSED CHROME SSP - EXISTING	EXISTS	1/2"	155°	CHROME	2

REVISIONS

NO.	DATE	DESCRIPTION
1	04/24/18	
2		
3		
4		
5		
6		

DRAWN BY: JOSEPH HAGAN
DATE: 4-23-2018
1/8" = 1'-0"

THE MEDICAL CENTER OF AURORA
PHYSICIAN LOUNGE
1501 S. POTOMAC STREET
AURORA, CO 80014

CONTRACT NUMBER
BG51797

NORTH

FP 1.0

Western States Fire Protection Co.
7026 South Tucson Way
Centennial, Colorado 80112
Tel.: 303-792-0022 Fax: 303-792-9049
Colorado State Registration Number 032

Bulletin 034 Rev. B

Model G5-56, Model G5-42, Model G5-28 Quick Response Concealed Automatic Sprinkler

UL Quick Response FM Standard Response Concealed Sprinkler With a ¾" (19mm) Adjustment

Features

1. Cover plate attachment (Plain or Perforated) with ¾" (19mm) assembly adjustment.
2. Smooth aesthetic ceiling profile.
3. Factory installed protective cap.
4. Available in Chrome and White as Standard Finishes. Special Application Finishes are also available.
5. Ordinary and Intermediate temperature rating.

For additional Sprinklers refer to Bulletin 154 for Technical Specification and Approvals

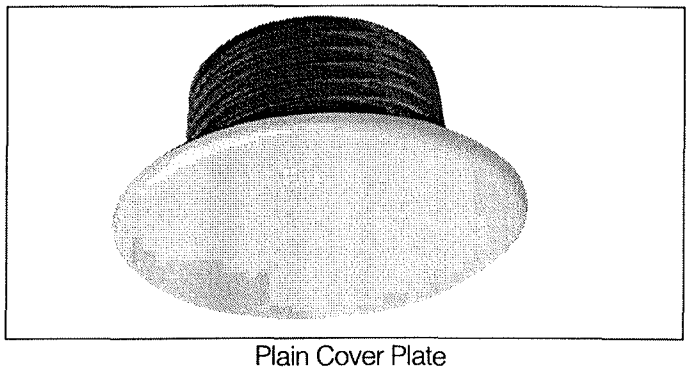
Approvals & Listings

1. Underwriters Laboratories Inc. and cULus - Quick Response
   - G5-56 - Light Hazard and Ordinary Hazard Occupancies
   - G5-42 - Light Hazard Occupancies
   - G5-28 - Light Hazard Occupancies
2. Factory Mutual Research Corp. (FM) - Standard Response (See Page 3)
   - See the most recent FM Global Property Loss Prevention Data Sheets for installation and use guidelines.
3. Loss Prevention Council (LPCB, UK) - Standard Response
   - G5-56 - Light Hazard and Ordinary Hazard Occupancies
4. VdS Schadenverhütung GmbH - Standard Response
5. EC-Certificate of Conformity 0832-CPD-2062

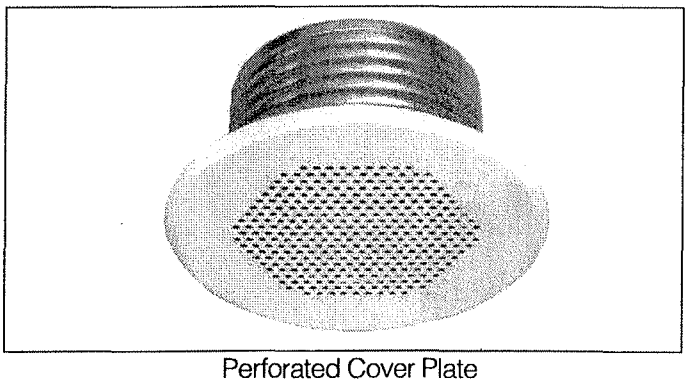
U.S. Patent number 6,554,077.

Application

The Reliable Model G5-56, G5-42 and G5-28 are the most versatile quick response concealed sprinklers available. It provides the best form of fire protection while offering an attractive appearance and ¾" (19mm) of cover adjustment for ease of installation. The small diameter cover plate assembly is easily attached and blends into the ceiling, concealing the most dependable fire protection available, an automatic sprinkler system.



Plain Cover Plate



Perforated Cover Plate

The Model G5-56, G5-42 and G5-28 are designed for use where aesthetic appearance is important. Offices, hospitals, motels and restaurants are but a few of the applications where it can be used.

The Model G5-56, G5-42 and G5-28 are UL Listed Quick Response Concealed sprinklers intended for use in accordance with NFPA 13. FM Approves the G5-56 and the G5-28 sprinkler as a standard response concealed sprinkler intended for use in accordance with FM Loss Prevention Data Sheet 2.0.

Product Description

The Reliable Model G5-56, G5-42 and G5-28 uses a proven quick response fusible element in a standard style sprinkler frame with a drop-down deflector. This assembly is recessed into the ceiling and concealed by a flat cover plate assembly. The threaded engagement provides ¾" (19mm) of cover adjustment. The flat cover plate is attached to the skirt using either 135°F (57°C) or 165°F (74°C) ordinary temperature classification solder.

When the ceiling temperature rises, the solder holding the flat cover plate melts, the flat cover plate released thus exposing the sprinkler inside to the rising ambient temperature.

The subsequent fusing of the element opens the waterway and causes the deflector to distribute the water. Any secure engagement between the cover plate and cup will assure that the drop-down deflector is properly located below the ceiling.

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Installation

Do not install the G5-56, G5-42 and G5-28 in ceilings which have positive pressure in the space above.

- Cut a 2⅝" inch (67mm) diameter hole is cut in the ceiling, the sprinkler is easily installed with the Model FC Wrench. The wrench has a socket drive which is inserted into the body of the sprinkler. When installing a sprinkler the wrench is first positioned into the sprinkler/cup assembly until the wrench socket engages the body of the sprinkler. The sprinkler is then tightened into the pipe fitting. When inserting or removing the wrench from the sprinkler/cup assembly, care should be taken to prevent damage to the sprinkler. DO NOT WRENCH ON ANY OTHER PART OF THE SPRINKLER/CUP ASSEMBLY. Install the cover plate by hand turning the cover in the clockwise direction until it is tight against the ceiling.

A protective cap is provided to protect the drop-down sprinkler deflector from damage which could occur during construction before the cover plate is installed. The cap is factory installed inside the sprinkler cup. Remove cap to install sprinkler, then re-install cap until the cover plate is installed.

Maintenance

The Model G5-56, G5-42 and G5-28 should be inspected quarterly and the sprinkler system maintained in accordance with NFPA 25. Do not clean sprinklers with soap and water, ammonia or any other cleaning fluids. Remove any sprinkler that has been painted (other than factory applied) or damaged in any way. Concealed sprinklers cover plates can not be painted in the field, after installation or have any other coating applied other than the factory finish. A stock of spare sprinklers should be maintained to allow quick replacement of damaged or operated sprinklers. Prior to installation, sprinklers should be maintained in the original cartons and packaging to minimize the potential for damage to sprinklers that would cause improper operation or non-operation.

Ordering Information

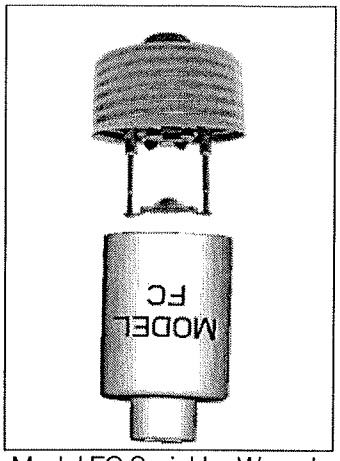
1. Sprinkler Model
2. Nominal Orifice
3. Flat Cover Plate Plain or Perforated
4. Flat Cover Plate Assembly Finish
5. Inlet Type

Cover Plate Finishes[1]

Standard Finishes
Chrome
White Paint
Special Application Finishes[2]
Bright Brass
Finished Bronze
Black Plating
Black Paint
Off White
Satin Chrome

[1] Other finishes and colors are available on special order. Consult factory for details. Coverplate custom paint is semi-gloss, unless specified otherwise.

[2] For the perforated style coverplate, consult factory for availability on these and other custom finishes.



Model FC Sprinkler Wrench

UL Listing Category

Sprinklers, Automatic and Open
Quick Response Sprinkler

UL Guide Number

VNIV

Maximum Working Pressure

175 psi (12 bar)
100% Factory tested Hydrostatically to 500 psi (34.5 bar)

Temperature Rating

Classification	Sprinkler	Cover Plate	Max. Ambient Temp.
Ordinary	165°F/74°C	135°F/57°C	100°F/38°C
Intermediate	212°F/100°C	165°F/74°C	150°F/66°C

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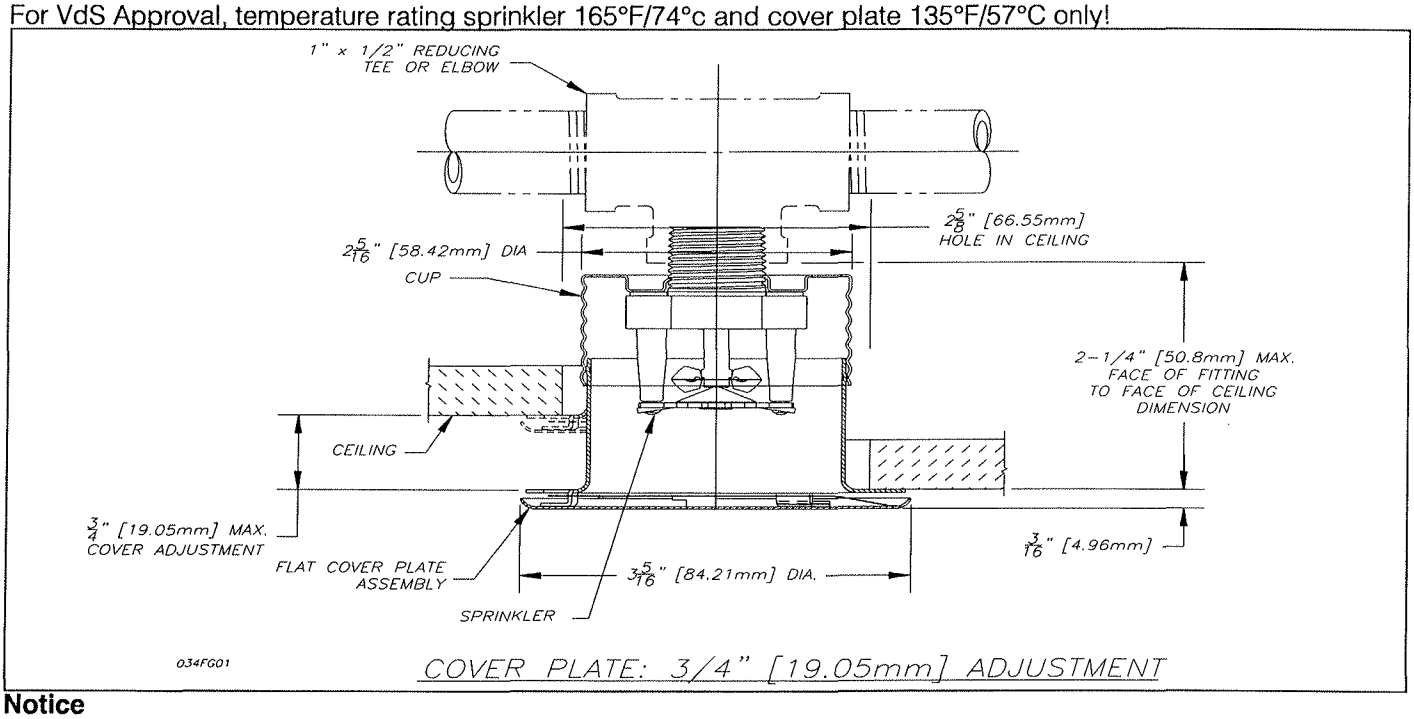
RSN: 1282092

Technical Data

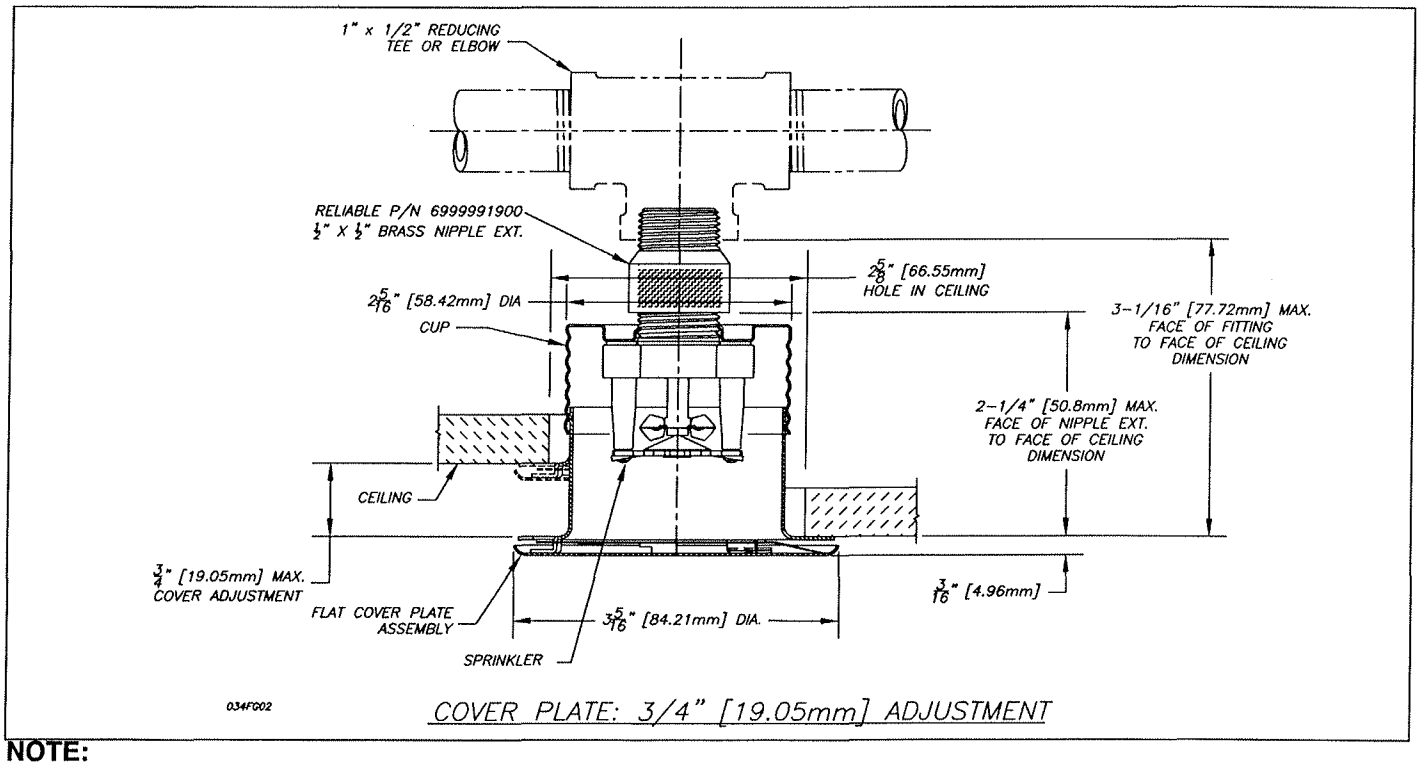
Sprinkler Model	Sprinkler Inlet	Total Adjustment	Nominal Orifice	Nominal K Factor		Thread	Approvals	Sprinkler Identification (SIN)
				US	Metric			
G5-56	Non Adjustable	¾" (19mm)	½" (15mm)	5.6	80	½" NPT (R½)	1,2,3,4,5	RA3415
G5-42	Non Adjustable	¾" (19mm)	7/16" (10mm)	4.2	60	½" NPT (R½)	1	RA3413
G5-28	Non Adjustable	¾" (19mm)	⅜" (10mm)	2.8	40	½" NPT (R½)	1,2	RA3411

For VdS Approval, temperature rating sprinkler 165°F/74°c and cover plate 135°F/57°C only!



Notice

FOR USE AS A REPLACEMENT OF MODEL G4A SPRINKLERS



NOTE:

1. Testing has shown that use of a "nipple extension" will not affect the listing of the sprinkler.
2. For RETROFIT installations, per **NFPA 13 (2010) section 8.15.19.4,** "which allows the use of nipples as the same pipe thread size as the existing outlet when revamping existing systems".
3. Do not exceed 8-18 ft-lbs of torque during installation.

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Reliable...For Complete Protection

Reliable offers a wide selection of sprinkler components. Following are some of the many precision-made Reliable products that guard life and property from fire around the clock.

- Automatic sprinklers
- Flush automatic sprinklers
- Recessed automatic sprinklers
- Concealed automatic sprinklers
- Adjustable automatic sprinklers
- Dry automatic sprinklers
- Intermediate level sprinklers
- Open sprinklers
- Spray nozzles
- Alarm valves
- Retarding chambers
- Dry pipe valves
- Accelerators for dry pipe valves
- Mechanical sprinkler alarms
- Electrical sprinkler alarm switches
- Water flow detectors
- Deluge valves
- Detector check valves
- Check valves
- Electrical system
- Sprinkler emergency cabinets
- Sprinkler wrenches
- Sprinkler escutcheons and guards
- Inspectors test connections
- Sight drains
- Ball drips and drum drips
- Control valve seals
- Air maintenance devices
- Air compressors
- Pressure gauges
- Identification signs
- Fire department connection

The equipment presented in this bulletin is to be installed in accordance with the latest published Standards of the National Fire Protection Association, Factory Mutual Research Corporation, or other similar organizations and also with the provisions of governmental codes or ordinances whenever applicable.

Products manufactured and distributed by Reliable have been protecting life and property for over 90 years, and are installed and serviced by the most highly qualified and reputable sprinkler contractors located throughout the United States, Canada and foreign countries.

Manufactured by
Reliable®

The Reliable Automatic Sprinkler Co., Inc.
(800) 431-1588 Sales Offices
(800) 848-6051 Sales Fax
(914) 829-2042 Corporate Offices
www.reliablesprinkler.com Internet Address

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Revision lines indicate updated or new data.

EG. Printed in U.S.A. 11/12 P/N 9999970421

Schedule 40 - Hydraulic Tables

FM Approved and UL Listed Sprinkler Pipe

Schedule 40 Pipe

NOMINAL PIPE SIZE (in)	O.D. (in)	I.D. (in)	WEIGHT (lbs/ft)	BUNDLE SIZE
1	1.315	1.049	1.68	70
1 1/4	1.660	1.380	2.27	51
1 1/2	1.900	1.610	2.72	44
2	2.375	2.067	3.66	30
2 1/2	2.875	2.468	5.80	30
3	3.500	3.068	7.58	19
4	4.500	4.026	10.80	19

Any questions or comments should be addressed to Bull Moose Tube Technical Support Department at 888-227-5430, or via e-mail at techsupport@bullmoosetube.com. Please request our cutsheet for more information on Schedule 40.

Friction loss calculations are based on the Hazen-Williams formula

$P = (4.52 \times Q^{1.85}) / (C^{1.85} \times d^{4.87})$, Where

P is the frictional resistance in pounds pressure per square inch per foot of pipe,
Q is the gallons per minute flowing,
d is the inside diameter of pipe in inches, and
C is the friction loss coefficient. C=100 (for dry systems), C= 120 (for wet systems).
I.D.'s used for the calculations are given in parenthesis.

BULL MOOSE TUBE COMPANY
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e-mail: sales@bullmoosetube.com

For additional information, contact your salesperson today at (800) 325-4467 or (636) 537-2600 in the USA, or from Canada call (800) 882-4666

c UL us LISTED
FM APPROVED

All information contained herein is accurate as known at the time of publication. Bull Moose Tube reserves the right to change product specifications without notice and without incurring obligation.

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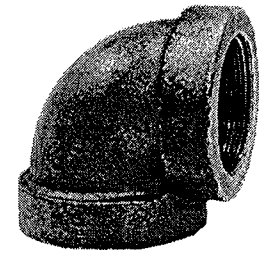
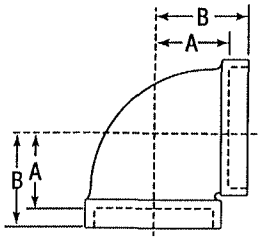
Cast Iron Threaded Fittings

Class 125 (Standard)

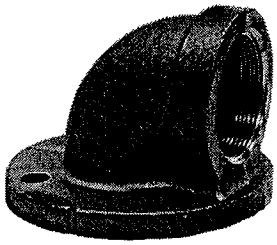
FIGURE 351
90° Elbow

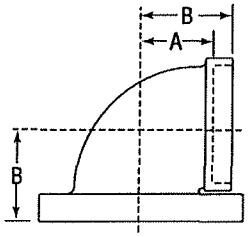




Size		A		B		Unit Weight Black	
NPS	DN	in	mm	in	mm	lbs	kg
1/4	8	1/2	13	13/16	22	0.16	0.07
3/8	10	9/16	14	15/16	24	0.25	0.11
1/2	15	11/16	17	1 1/8	29	0.40	0.18
3/4	20	13/16	22	1 15/16	33	0.60	0.27
1	25	15/16	24	1 1/2	38	0.92	0.42
1 1/4	32	1 1/8	29	1 3/4	44	1.44	0.65
1 1/2	40	1 5/16	33	1 15/16	49	1.95	0.88
2	50	1 9/16	40	2 1/4	57	3.13	1.42
2 1/2	65	1 13/16	47	2 11/16	68	4.94	2.24
3	80	2 3/16	56	3 1/8	79	7.21	3.27
3 1/2	90	2 7/16	62	3 7/16	87	9.67	4.39
4	100	2 11/16	68	3 13/16	98	12.17	5.52
5	125	3 5/16	84	4 1/2	114	21.46	9.73
6	150	3 7/8	98	5 1/8	130	31.33	14.21
8	200	5 3/16	132	6 9/16	167	64.56	29.28

FIGURE 371
90° Elbow,
Flange & Screw





Size		A		B		Unit Weight Black	
NPS	DN	in	mm	in	mm	lbs	kg
2 1/2	65	1 13/16	47	2 11/16	68	10.22	4.63
3	80	2 3/16	56	3 1/8	79	13.25	6.01
4	100	2 11/16	68	3 13/16	98	21.56	9.78
6	150	3 7/8	98	5 1/8	130	40.50	18.37

†Nominal Pipe Sizes of 4" *(100 DN)* and larger have two holes tapped for stud or tap bolts.

Note: See page 36 for pressure-temperature ratings.

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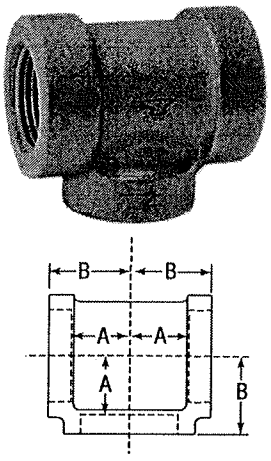
Bolt-14

Cast Iron Threaded Fittings

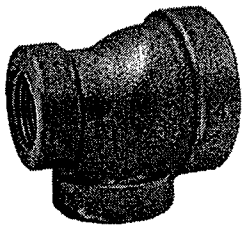
Class 125 (Standard)

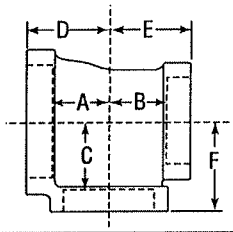
FIGURE 358
Tee



Size		A		B		Unit Weight Black	
NPS	DN	in	mm	in	mm	lbs	kg
1/4	8	1/2	13	13/16	22	0.22	0.10
3/8	10	5/8	16	1	25	0.35	0.16
1/2	15	11/16	17	1 1/8	29	0.56	0.25
3/4	20	13/16	22	1 5/16	33	0.84	0.38
1	25	15/16	24	1 1/2	38	1.25	0.57
1 1/4	32	1 1/8	29	1 3/4	44	2.03	0.92
1 1/2	40	1 5/16	33	1 15/16	49	2.70	1.22
2	50	1 9/16	40	2 1/4	57	4.23	1.92
2 1/2	65	1 13/16	47	2 11/16	68	6.67	3.02
3	80	2 3/16	56	3 1/8	79	10.00	4.54
3 1/2	90	2 7/16	62	3 7/16	87	13.29	6.03
4	100	2 11/16	68	3 3/4	95	16.33	7.41
5	125	3 5/16	84	4 1/2	114	27.33	12.39
6	150	3 7/8	98	5 1/8	130	40.85	18.53
8	200	5 3/16	132	6 9/16	167	79.00	35.83

FIGURE 359
Tee Reducing





Size						A		B		C		D		E		F		Unit Weight Black	
NPS	DN	NPS	DN	NPS	DN	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	lbs	kg
1/2	15	1/2	15	1/4	8	1 1/16	17	11/16	17	13/16	22	1 1/8	29	1 1/8	29	1 1/8	29	0.57	0.26
				3/8	10	1 1/16	17	11/16	17	3/4	19	1 1/8	29	1 1/8	29	1 1/8	29	0.57	0.26
				3/4	20	1 3/16	22	13/16	22	11/16	17	1 1/4	32	1 1/4	32	13/16	22	0.68	0.31
				1	25	1	25	1	25	13/16	22	1 7/16	37	1 7/16	37	1 3/8	35	1.00	0.45
3/4	20	1/4	8	3/4	20	1 3/16	22	15/16	24	13/16	22	15/16	24	1 1/4	32	15/16	24	0.79	0.36
		1/2	15	1/2	15	1 1/16	17	11/16	17	13/16	22	13/16	22	1 1/8	29	1 1/4	32	0.64	0.29
				3/4	20	1 3/16	22	13/16	22	13/16	22	15/16	24	1 1/4	32	15/16	24	0.75	0.34
		3/4	20	1/4	8	9/16	14	9/16	14	7/8	22	11/16	17	11/16	17	13/16	22	0.62	0.28
				3/8	10	1 1/16	17	11/16	17	15/16	24	13/16	22	13/16	22	1 1/4	32	0.75	0.34
				1/2	15	1 1/16	17	11/16	17	13/16	22	13/16	22	13/16	22	1 1/4	32	0.76	0.34
				1	25	1 5/16	24	15/16	24	13/16	22	1 7/16	37	1 7/16	37	1 3/8	35	0.99	0.45
1	25	1/4	8	1	25	1 5/16	24	15/16	24	15/16	24	1 1/2	38	1 1/4	32	1 1/2	38	1.08	0.49
		1/2	15	1/2	15	1 1/16	17	3/4	19	15/16	24	1 1/4	32	13/16	22	1 3/8	35	0.90	0.41
				3/4	20	1 3/16	22	13/16	22	15/16	24	1 3/8	35	1 1/4	32	1 7/16	37	0.91	0.41
				1	25	1 5/16	24	15/16	24	15/16	24	1 1/2	38	1 3/8	35	1 1/2	38	1.08	0.49
		3/4	20	1/2	15	1 1/16	17	11/16	17	15/16	24	1 1/4	32	13/16	22	1 3/8	35	0.89	0.40
				3/4	20	1 3/16	22	13/16	22	15/16	24	1 3/8	35	15/16	24	1 7/16	37	1.00	0.45
				1	25	1 5/16	24	15/16	24	15/16	24	1 1/2	38	1 7/16	37	1 1/2	38	1.13	0.51
		1	25	1/4	8	1 1/16	17	11/16	17	1 1/8	29	1 1/8	29	1 1/4	32	1 3/8	35	1.01	0.46
				1/2	15	1 1/16	17	11/16	17	15/16	24	1 1/4	32	1 1/4	32	1 3/8	35	1.01	0.46
				3/4	20	1 3/16	22	13/16	22	15/16	24	1 3/8	35	1 3/8	35	1 7/16	37	1.11	0.50
				1 1/4	32	1 1/8	29	1 1/8	29	15/16	24	1 11/16	43	1 11/16	43	1 9/16	40	1.49	0.68
				1 1/2	40	1 1/4	32	1 1/4	32	1	25	1 13/16	47	1 13/16	47	1 5/8	41	1.84	0.83
				2	50	1 7/16	37	1 7/16	37	1	25	2	50	2	50	1 3/4	44	2.70	1.22

Note: See page 36 for pressure-temperature ratings.

Continued on next page.

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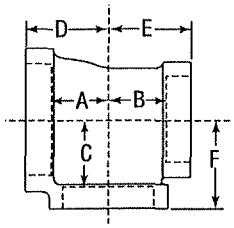
Class 125 (Standard)

FIGURE 359
Tee Reducing



Size						A		B		C		D		E		F		Unit Weight Black	
NPS	DN	NPS	DN	NPS	DN	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	lbs	kg
1¼	32	½	15	½	15	13/16	22	13/16	22	1 1/8	29	1 7/16	37	15/16	24	1 5/8	41	1.00	0.45
				1	25	1 5/16	24	15/16	24	1 1/8	29	1 9/16	40	1 3/8	35	1 11/16	43	1.38	0.63
				1¼	32	1 1/8	29	1 1/8	29	1 1/8	29	1 3/4	44	1 9/16	40	1 3/4	44	1.64	0.74
		¾	20	¾	20	13/16	22	13/16	22	1 1/8	29	1 7/16	37	15/16	24	1 5/8	41	1.27	0.58
				1	25	1 5/16	24	15/16	24	1 1/8	29	1 9/16	40	1 7/16	37	1 11/16	43	1.43	0.65
				1¼	32	1 1/8	29	1 1/8	29	1 1/8	29	1 3/4	44	1 5/8	41	1 3/4	44	1.73	0.78
		1	25	½	15	1 1/16	17	11/16	17	1 1/8	29	15/16	24	1 1/4	32	1 9/16	40	1.27	0.58
				¾	20	1 3/16	22	13/16	22	1 1/8	29	1 7/16	37	1 3/8	35	1 5/8	41	1.36	0.62
				1	25	1 5/16	24	15/16	24	1 1/8	29	1 9/16	40	1 9/16	40	1 11/16	43	1.53	0.69
				1¼	32	1 1/8	29	1 1/8	29	1 1/8	29	1 3/4	44	1 11/16	43	1 3/4	44	1.79	0.81
				1½	40	1 1/4	32	1 1/4	32	13/16	22	1 7/8	48	1 13/16	47	1 13/16	47	2.07	0.94
				2	50	1 7/16	37	1 7/16	37	13/16	22	2 1/16	52	2	50	1 7/8	48	2.66	1.21
		1¼	32	½	15	1 1/16	17	11/16	17	1 1/8	29	15/16	24	15/16	24	1 9/16	40	1.47	0.67
				¾	20	1 3/16	22	13/16	22	1 1/8	29	1 7/16	37	1 7/16	37	1 5/8	41	1.57	0.71
				1	25	1 5/16	24	15/16	24	1 1/8	29	1 9/16	40	1 9/16	40	1 11/16	43	1.73	0.78
				1½	40	1 1/4	32	1 1/4	32	13/16	22	1 7/8	48	1 7/8	48	1 13/16	47	2.29	1.04
				2	50	1 7/16	37	1 7/16	37	13/16	22	2 1/16	52	2 1/16	52	1 7/8	48	2.81	1.27
1½	40	½	15	1¼	32	13/16	22	1 1/8	29	1 1/4	32	1 13/16	47	1 9/16	40	1 7/8	48	1.93	0.88
				1½	40	15/16	24	1 1/4	32	15/16	24	1 15/16	49	1 11/16	43	1 15/16	49	2.14	0.97
		¾	20	1½	40	15/16	24	1 1/4	32	15/16	24	1 15/16	49	1 3/4	44	1 15/16	49	2.18	0.99
		1	25	½	15	13/16	22	3/4	19	1 1/4	32	1 7/16	37	15/16	24	1 11/16	43	1.75	0.79
				¾	20	7/8	22	13/16	22	1 1/4	32	1 1/2	38	1 3/8	35	1 3/4	44	1.70	0.77
				1	25	1	25	15/16	24	1 1/4	32	1 5/8	41	1 1/2	38	1 13/16	47	1.72	0.78
				1¼	32	13/16	22	1 1/8	29	1 1/4	32	1 13/16	47	1 11/16	43	1 7/8	48	2.08	0.94
				1½	40	15/16	24	1 1/4	32	15/16	24	1 15/16	49	1 13/16	47	1 15/16	49	2.29	1.04
				2	50	1 1/2	38	1 7/16	37	15/16	24	2 1/8	54	2	50	2	51	2.91	1.32
		1¼	32	½	15	13/16	22	11/16	17	1 1/4	32	1 7/16	37	15/16	24	1 11/16	43	1.67	0.76
				¾	20	7/8	22	13/16	22	1 1/4	32	1 1/2	38	1 7/16	37	1 3/4	44	1.79	0.81
				1	25	1	25	15/16	24	1 1/4	32	1 5/8	41	1 9/16	40	1 13/16	47	1.97	0.89
				1¼	32	13/16	22	1 1/8	29	1 1/4	32	1 13/16	47	1 3/4	44	17/8	48	2.28	1.03
				1½	40	15/16	24	1 1/4	32	15/16	24	1 15/16	49	1 7/8	48	1 15/16	49	2.50	1.13
				2	50	1 1/2	38	1 7/16	37	15/16	24	2 1/8	54	2 1/16	52	2	51	3.07	1.39
		1½	40	½	15	13/16	22	13/16	22	1 1/4	32	1 7/16	37	1 7/16	37	1 11/16	43	1.84	0.83
				¾	20	7/8	22	7/8	22	1 1/4	32	1 1/2	38	1 1/2	38	1 3/4	44	1.95	0.88
				1	25	1	25	1	25	1 1/4	32	1 5/8	41	1 5/8	41	1 13/16	47	2.13	0.97
				1¼	32	13/16	22	13/16	22	1 1/4	32	1 13/16	47	1 13/16	47	1 7/8	48	2.44	1.11
				2	50	1 1/2	38	1 1/2	38	15/16	24	2 1/8	54	2 1/8	54	2	51	3.23	1.46
				2½	65	1 13/16	47	1 13/16	47	15/16	24	2 7/16	62	2 7/16	62	2 3/16	56	4.15	1.88

Note: See page 36 for pressure-temperature ratings.

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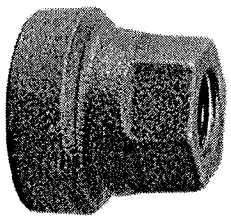
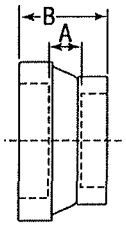
Cast Iron Threaded Fittings

Class 125 (Standard)

FIGURE 367
Concentric Reducer





Size				A		B		Unit Weight Black	
NPS	DN	NPS	DN	in	mm	in	mm	lbs	kg
3/4	20	1/2	15	5/8	16	1 9/16	40	0.40	0.18
1	25	1/2 (Hex)	15	11/16	17	1 11/16	43	0.54	0.24
		3/4 (Hex)	20	7/16	11	1 1/2	38	0.63	0.29
1 1/4	32	1/2	15	9/16	14	1 5/8	41	0.84	0.38
		3/4	20	1	25	2 1/8	54	0.90	0.41
		1	25	15/16	24	2 1/8	54	1.07	0.49
1 1/2	40	1/2	15	1/2	13	1 5/8	41	1.00	0.45
		3/4	20	1/2	13	1 5/8	41	1.20	0.54
		1	25	1/2	13	1 3/4	44	1.50	0.68
		1 1/4	32	1	25	2 1/4	57	1.45	0.66
2	50	1/2	15	5/8	16	2	51	2.00	0.91
		3/4	20	3/4	19	2	51	1.90	0.86
		1	25	3/4	19	2	51	1.83	0.83
		1 1/4	32	13/16	22	2 1/8	54	1.78	0.81
		1 1/2	40	7/8	22	2 3/16	56	1.98	0.90
2 1/2	65	1 1/2	40	3/4	19	2	51	3.10	1.41
		2	50	1	25	2 9/16	65	2.98	1.35
3	80	3/4	20	15/16	24	2 1/2	64	4.31	1.95
		2	50	1 1/16	27	2 3/4	70	3.96	1.80
		2 1/2	65	15/16	24	2 13/16	73	4.40	2.00
4	100	2	50	1 3/16	30	2 15/16	75	6.50	2.95
		2 1/2	65	1 3/16	30	3 1/8	79	7.78	3.53
		3	80	1 1/16	27	3 1/8	79	7.01	3.18
5	125	4	100	1 1/16	27	3 5/16	84	10.48	4.75
6	150	4	100	1 1/8	29	3 7/16	87	13.83	6.27
		5	125	1 1/8	29	3 9/16	90	15.53	7.04
8	200	6	150	1 1/4	32	3 7/8	98	29.10	13.20

Note: See page 36 for pressure-temperature ratings.

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HDI, HDI-L, HDI+ and HDI-L+ Drop-in Anchor 3.3.11

3.3.11.1 Product description

HDI+, HDI-L+ and HDI drop-in anchors are internally threaded, flush mounted expansion anchors for use in concrete.

Product features

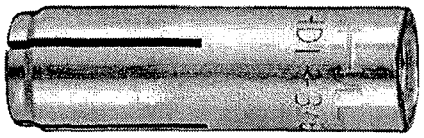
HDI+, HDI-L+ and HDI

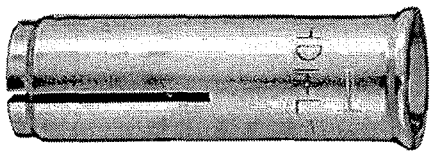
- Anchor, setting tool and Hilti drill bit form a matched tolerance system to provide reliable fastenings
- Allows shallow embedment without sacrificing performance
- Lip allows accurate flush surface setting, independent of hole depth for the HDI-L+
- Ideal for repetitive fastenings with threaded rods of equal length
- HDI+ and HDI-L+ have an innovative stepped plug that reduces number of hammer blows by up to 50%
- HDI+ and HDI-L+ can be installed with the new HDI+ Setting Tool system (stop drill bit and machine setting tool) for improved productivity

Guide specifications

Expansion anchor shall be drop-in, shell or flush type. Carbon steel anchors are zinc plated in accordance with ASTM B633, SC 1, Type III. Stainless steel anchors are manufactured from AISI Type 303 stainless steel. Anchors shall be Hilti HDI+ (HDI-L+) (HDI) anchors as supplied by Hilti.

3.3.11.1 Product description
3.3.11.2 Material specifications
3.3.11.3 Technical data
3.3.11.4 Installation instructions
3.3.11.5 Ordering information





Listings/Approvals

FM (Factory Mutual)
Pipe Hanger Components for Automatic Sprinkler Systems HDI+ 3/8, HDI-L+ 3/8, HDI+1/2, HDI-L+ 1/2, HDI 5/8 and HDI 3/4

UL LLC
UL 203 Pipe Hanger Equipment for Fire Protection Services HDI+ 3/8, HDI-L+ 3/8, HDI+1/2, HDI-L+ 1/2, HDI 5/8 and HDI 3/4

FM APPROVED c UL us LISTED

3.3.

3.3.11.2 Material specifications

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

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

3.3.11.3 Technical data

Table 1 - HDI+, HDI-L+ and HDI specifications[1]

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

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

Combined shear and tension loading

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

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Fig. 92

Size Range: ⅜ and ½
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 t he 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 ¾.
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 and ULC Listed, and FM Approved.
How to size: Size of clamp is determined by size of rod to be used.
Ordering: Specify rod size, figure number, name of clamp and finish.

Universal C-Type Clamp Standard Throat

SIZE (In.)	PRICE EACH PLAIN	PRICE EACH GALV.	STD. PACK	APRX. WEIGHT EACH (LBS.)	DISCOUNT SCHEDULE
⅜	$5.39	$8.16	50 ✹	0.34	A
½	$9.30	$15.07	20 ■	0.63	A

■ Plain Sold in box only. ✹ Plain and Galvanized sold in box only.

Fig. 93

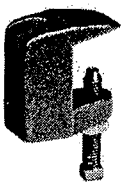
Size Range: ⅜ and ½
Material: Malleable/Ductile iron clamp, hardened steel cup point set screw and locknut.
Finish: Plain and Galvanized
Service: Recommended for use under roof installations with bar joist type constructions, or for attachment to the top or bottom flange of structural shapes where the 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 and ULC Listed, and FM Approved.
How to size: Size of clamp is determined by size of rod to be used.
Ordering: Specify rod size, figure number, name of clamp and finish.

Universal C-Type Clamp Wide Throat

SIZE (In.)	PRICE EACH PLAIN	PRICE EACH GALV.	STD. PACK	APRX. WEIGHT EACH (LBS.)	DISCOUNT SCHEDULE
⅜	$9.79	$13.00	40 ■	0.41	A
½	$13.32	$17.18	20 ■	0.75	A

■ Plain Sold in box only.

Fig. 94



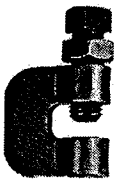
Size Range: ⅝ and ¾
Material: Malleable/Ductile iron body, hardened steel cup point set screw and locknut.
Finish: Plain or Galvanized
Service: Recommended for use under roof installations with bar joist type construction, or for attachment to the top flange of structural shapes where the vertical hanger 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.
Ordering: Specify rod size, figure number, name of clamp and finish.

Wide Throat Top Beam C-Clamp

SIZE (In.)	PRICE EACH PLAIN	PRICE EACH GALV.	STD. PACK	APRX. WEIGHT EACH (LBS.)	DISCOUNT SCHEDULE
⅝	$27.08	$30.80	20 ■	0.66	A
¾	$34.45	$38.90	20	0.83	A

■ Plain Sold in box only.

Fig. 95



Size Range: ⅜ through ½ rod
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 ⅜). FM Approved (Sizes ⅜ - ½).
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.

C-Clamp with Locknut

SIZE (In.)	PRICE EACH PLAIN	PRICE EACH GALV.	STD. PACK	APRX. WEIGHT EACH (LBS.)	DISCOUNT SCHEDULE
⅜	$9.20	$10.40	100 ■	0.34	B
½	$14.40	$17.30	50	0.40	B

■ Plain Sold in box only.

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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 or Stainless Steel Gr 304
Threads: National Coarse (USS), rod threaded complete length.
Finish: ☐ Plain or ☐ Galvanized.
Maximum Temperature: 650° F.
Ordering: Specify rod diameter and length, figure number, name and finish.
Note: The acceptability of galvanized coatings at temperatures above 450°F is at the discretion of the end user.

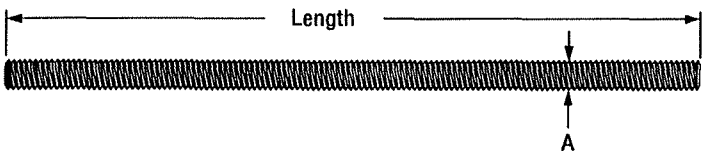

FIG. 146:
LOADS (LBS) • WEIGHTS (LBS) • DIMENSIONS (IN)

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.

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

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Fig. CT-65

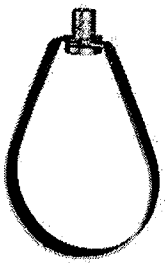
Size Range: ½ through 4
Material: Carbon steel
Finish: Copper plated, also available in yellow dichromate and plastic coated.
Service: Recommended for suspension of non-insulated, stationary copper tube.
Approvals: Complies with Federal Specification WW-H-171-E (Type 12).
Ordering: Specify nominal tube size, figure number, name and finish

Light Weight Adjustable Clevis

SIZE (In.)	PRICE EACH COPPER PLATED	PRICE EACH YELLOW DI	PRICE EACH PLASTIC COATED	STD. PACK	APRX. WEIGHT EACH (LBS.)	DISCOUNT SCHEDULE
½	$6.60	—DISCONTINUED—		100	0.09	AA
¾	$6.83			100 ◆	0.10	AA
1	$6.83			100	0.17	AA
1¼	$7.32			100	0.18	AA
1½	$7.63			100	0.21	AA
2	$8.80			100	0.26	AA
2½	$20.80			50	0.50	AA
3	$18.77			50	0.59	AA
3½	$20.10			10	0.94	AA
4	$20.90			25	0.62	AA

◆Copper Plated sold in box only

Fig. CT-69



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

Adjustable Swivel Ring

SIZE (In.)	PRICE EACH COPPER	PRICE EACH YELLOW DI	STD. PACK	APRX. WEIGHT EACH (LBS.)	DISCOUNT SCHEDULE
½– 1¼	$4.00	–DISCONTINUED–	100 ◆	0.08	A
1½	$4.30		100 ◆	0.10	A
2	$4.30		100 ◆	0.11	A
2½	$11.08		50	0.20	A
3	$12.23		50	0.20	A
3½	$17.99		50	0.35	A
4	$16.57		50	0.30	A

◆Copper Plated sold in box only

Fig. CT-99 & Fig. CT-99C

Size Range: ½ through 4
Material: Carbon steel ring and malleable iron adjusting nut.
Finish: Copper plated; Fig. CT-99C band plastic coated
Service: Fig. CT-99 – Recommended for suspension of non-insulated stationary copper tube.
Approvals: Fig. CT-99 – Complies with Federal Specification A-A-1192A (Type 9), WW-H-171-E (Type 9), and MSS-SP-69 (Type 9).
Ordering: Specify nominal tube size, figure number, name.

—DISCONTINUED—
Adjustable Tubing Ring
Plastic Coated Adjustable Tubing Ring

Fig. CT-109

Size Range: ½ through 3
Material: Malleable iron
Finish: Copper plated
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. 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).
Ordering: Specify nominal tube size, figure number, name.

—DISCONTINUED—
Split Tubing Ring (Ring Only)