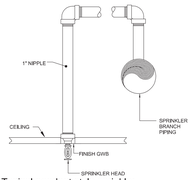
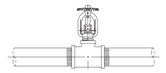


Typical Concealed style sprinkler



Typical pendent style sprinkler



Typical upright style sprinkler

Codes and Regulations

Building Profile

City/ County: Aurora / Arapahoe County
Fire District: City of Aurora Fire Rescue
Construction Classification: II-B
Building Height / Levels: Uknown / 4 Stories
Automatic Sprinklers Throughout

Use and Occupancy

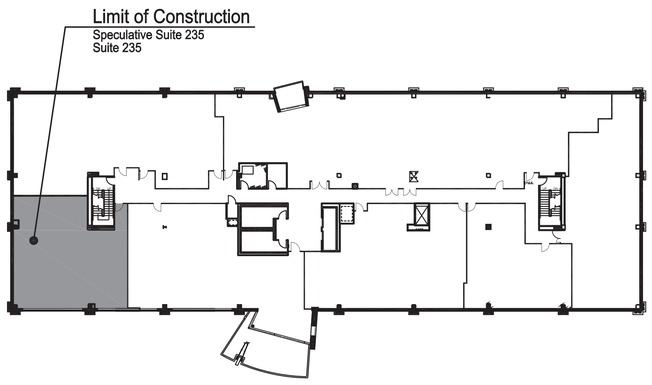
Occupant Name: Speculative Suite 235
Occupant Use: General Business Office
Occupancy Classification: Business Group B

Tenant Area

Total
(approx.) Useable SF: 1,955

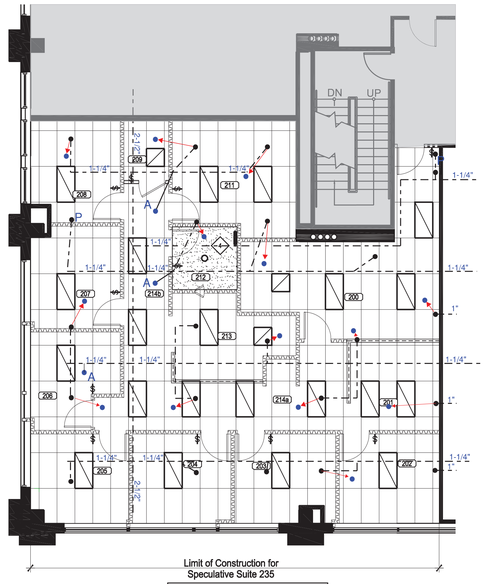
City of AURORA
Applicable Codes

2015 IBC (International Building Code) with Amendments
2015 IEBC (International Existing Building Code)
2015 IPC (International Plumbing Code)
2015 IMC (International Mechanical Code)
2015 IFC (International Fire Code)
2015 IECC (International Energy Conservation Code)
2020 NEC (National Electric Code)
2009 ICC/ANSI A117.1 Accessibility Standard



1 *Proximity Plan*
Level Two — Not to Scale





1 *Reflected Ceiling Plan*
Suite 235 — Scale: 1/8" = 1'-0"





RSN: *1566583*
Permit #: *2021-2027207-CT*

City of Aurora Building Division
Counter Permit intake by: MLA
Date: *Aug 10, 2021*
RSN: *1566583*
Permit: *2021-2027207-CT*
2015 INTERNATIONAL CODES & 2020 NEC Scope of permit to be field verified

COA Adopted Codes for this project:
ICC-2015 - NEC-2020
NFPA 13-2013 - NFPA 72-2013
COA Amendments 22 & 66

Provide a full size set of legible approved construction documents
PRINTED IN COLOR
for review by the Field Inspector.

The hydraulic design area is not being affected by the system modifications.

Scope of Work
1. Add and relocate sprinklers for new ceilings and walls in light hazard tenant space.
2. Fire sprinkler system modifications, hangers, and supports shall be installed per NFPA 13 2013 design requirements and local AHJ.
3. General contractor to coordinate with alarm contractor for system shut down to perform sprinkler modifications.
4. It is the responsibility of the owner to protect the system from freezing and maintain a minimum 40 degree temperature throughout tenant space.
5. Installer shall be responsible to confirm if sprinklers shall be installed centered in the ceiling tile TYPICAL.
6. Relocation of existing lines and mains, paint, patch, wiring, demolition work, sprinklers centered in tiles, custom sprinklers, alarm modifications, and backflow devices are excluded from scope of work.
7. Armovers 1" NPT unless specified

	SYM	CNT	POSITION	FINISH	TEMP	K	NPT	Response	MFG.	MODEL#
Add	A	3	Pendant	White	155	5.6	1/2"	Quick	Reliable	F1FR
Relocate		14	Pendant	White	155	5.6	1/2"	Quick	Reliable	F1FR
Plug	P	2								

REVISIONS

DATE	DESCRIPTION	BY

Speculative Suite 235
1444 South Potomac Street
Aurora CO 80112

All Pro Fire Protection, LLC.
PO Box 352
Centennial, CO 80122
303 656 6137
State Contractor #: 21-S-04230

Job Name:
COMM-CON #:

Model F1FR Series Quick Response Glass Bulb Sprinklers

Model F1FR56 Sprinkler Types
Standard Spray Upright
Standard Spray Pendent
Conventional Upright/Pendent
Vertical Sidewall
Horizontal Sidewall

Model F1FR56 Recessed Sprinkler Types
Standard Spray Pendent
Horizontal Sidewall

Model F1FR56 Concealed Sprinkler Types
Standard Spray Pendent

Model F1FR42, F1FRXLH & F1FR28 Sprinkler Types
Standard Spray Upright
Standard Spray Pendent

Model F1FR40 Sprinkler Types
Standard Spray Pendent

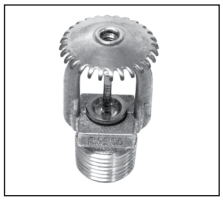
Model F1FR42, F1FR40, F1FRXLH & F1FR28 Recessed Sprinkler Types
Standard Spray Pendent

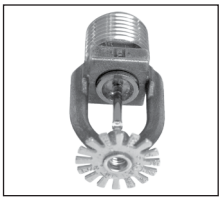
Model F1FR56LL & F1FR42LL Low Lead Sprinkler Types
Standard Spray Pendent with less than 0.25% Lead Content

Listing & Approvals
The following organizations provide Listings or Approvals for various Model F1FR series sprinklers. See the Design and Installation table in this Bulletin for information on specific listings and approvals applicable to each sprinkler.

1. Underwriters Laboratories Inc. and Certified for Canada (cULus) in accordance with ANSI/UL199.
2. FM Approvals (FM)
3. Loss Prevention Certification Board (LPCB)
4. VdS Schadenverhütung GmbH (VdS)
5. Underwriters Laboratories Inc. and Underwriters Laboratories of Canada Certified for Health Effects to NSF/ANSI Standard 61 Annex G (ULH)
6. EC Certificate: 0786-CPD-40239 (RA1414), 0786-CPD-40251 (RA1425), 0786-CPD-40252 (RA1475) (EC)
7. WaterMark certified. Certificate Number 23347. (WM)

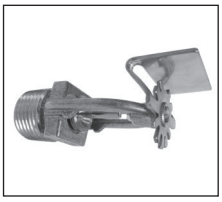
UL Listing Category
Sprinklers, Automatic & Open (VNIV)
Quick Response Sprinkler


Upright

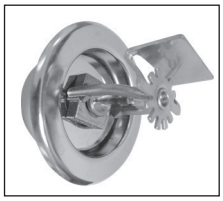

Pendent


Conventional

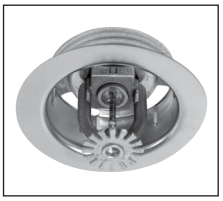

Vertical Sidewall

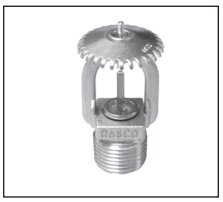

Horizontal Sidewall


Recessed Pendent/F1/F2


Recessed Horizontal Sidewall


Concealed Pendent


Recessed Pendent/FP


XLH Upright


XLH Pendent


XLH Recessed Pendent F1/F2


XLH Recessed Pendent FP

Product Description
Reliable Model F1FR series sprinklers are quick-response automatic sprinklers with a glass bulb thermal element. Model F1FR series sprinklers are Standard Spray sprinklers, with the exception of the Model F1FR56 Conventional sprinkler which is an Old-style/Conventional sprinkler.

The Model F1FR Series automatic sprinklers utilize a 3.0 mm frangible glass bulb. These sprinklers have demonstrated response times in laboratory tests which are five to ten times faster than standard response sprinklers. This quick response enables the Model F1FR Series sprinklers to apply water to a fire faster than standard-response sprinklers of the same temperature rating.

The glass bulb consists of an accurately controlled amount of special fluid hermetically sealed inside a precisely manufactured glass capsule. This glass bulb is specially constructed to provide fast thermal response.

RSN: 1566583
Permit # 2021-2021207 CT
Sheet 3 of 30

At normal temperatures, the glass bulb contains the fluid in both the liquid and vapor phases. The vapor phase can be seen as a small bubble. As heat is applied, the liquid expands, forcing the bubble smaller and smaller as the liquid pressure increases. Continued heating forces the liquid to push out against the bulb, causing the glass to shatter, opening the waterway and allowing the deflector to distribute the discharging water.

Model F1FR Series sprinklers provide a wide range of options where quick-response, glass bulb sprinklers are used:

- Pendent, recessed pendent, upright, horizontal sidewall, and vertical sidewall deflectors
- K-factors of 2.8 (40 metric), 4.0 (57 metric), 4.2 (60 metric), and 5.6 (80 metric)
- Flush, recessed, and concealed installations

See the Design and Installation Information table in this Bulletin for information on the approvals and availability of specific Model F1FR series sprinkler configurations.

Model F1FR Recessed Pendent and Recessed Horizontal Sidewall sprinklers are required to be used with Reliable Model F1, F2, or FP recessed escutcheons. See the Recessed Escutcheon Data table in this Bulletin for listing and approval information with each specific Model F1FR series sprinkler. Model F1 and F2 recessed escutcheons, shown in Fig. 1 and 3, are a friction fit assembly allowing for 3/4-inch (19mm) and 1/2-inch (12.7mm) of adjustment, respectively. Model FP recessed escutcheons, shown in Fig. 2, provide a 1/2-inch (12.7mm) threaded adjustment.

Model F1FR56 Concealed Pendent and Model F1FR56LL Concealed Pendent sprinklers are required to be used with Model CCP cover plates. A standard profile Model CCP cover plate is available that provides up to 1/2-inch (12.7mm) of cover plate adjustment. In addition, a low profile Model CCP cover plate is also available that provides up to 5/16-inch (8.0mm) of cover plate adjustment. See the Design and Installation Information and Listed and Approved Temperature Ratings tables in this Bulletin for further information on approved cover plate options.

Application

Model F1FR Series sprinklers are intended for use in accordance with NFPA 13, FM Property Loss Prevention Data Sheets, and the requirements of the Authority Having Jurisdiction. Care must be exercised that the k-factor, temperature rating, deflector style, and sprinkler type are in accordance with the requirements of the applicable design and installation standards. In addition, Model F1FR Series sprinklers must be used in accordance with their listings and approvals, as well as the information provided in this Bulletin.

Installation

Glass bulb sprinklers have orange bulb protectors or protective caps to minimize bulb damage during shipping, handling and installation. Reliable sprinkler installation wrenches are designed to install sprinklers with bulb protectors in place. Remove the bulb protector at the time when the sprinkler system is placed in service for fire protection. Removal of the bulb protector before this time may leave the bulb vulnerable to damage. Remove bulb protectors by undoing the clasp by hand. Do not use tools to remove bulb protectors.

Model F1FR Series sprinklers must be installed with the Reliable sprinkler installation wrench identified in the Design and Installation Information table in this Bulletin. Any other wrench may damage the sprinkler. A leak tight sprinkler joint can be obtained with a torque of 8 to 18 lb-ft (11 to 24 N-m). Do not tighten sprinklers over the maximum recommended installation torque. Exceeding the maximum recommended installation torque may cause leakage or impairment of the sprinkler.

Recessed Sprinklers

Model F1FR Series Recessed sprinklers are to be installed as shown in Fig. 1, Fig. 2, or Fig. 3, as applicable to the specific model being installed. The Recessed Escutcheon Data table in the Bulletin identifies the only recessed escutcheons that are permitted to be used with each Model F1FR Series Recessed sprinkler. The use of any other recessed escutcheon will void all approvals and negate all warranties.

Concealed Sprinklers

Model F1FR Series Concealed Pendent sprinklers are to be installed as shown in Fig. 4 or Fig. 5, as applicable to the selected cover plate. Model F1FR56 Concealed Pendent and Model F1FR56LL Concealed Pendent sprinklers have a factory-installed Model CCP cup. A protective cap is installed at the factory that should remain on the sprinkler until the sprinkler is installed and should then be reinstalled on the sprinkler until the cover plate is installed. The concealed sprinkler assemblies are completed by the installation of a Model CCP push-on/thread-off cover plate assembly. The cover plate and sprinkler cup assemblies are joined using a cover plate skirt with flexible tabs for threaded engagement. A choice of two Model CCP cover plate assemblies provides either 1/2-inch (13mm) or 5/8-inch (8mm) of cover adjustment. Do not install Model F1FR Series Concealed Pendent sprinklers in ceilings which have positive pressure in the space above.

Model F1FR Series Concealed Pendent sprinklers require a 2-5/8-inch (67mm) diameter hole to be cut in the ceiling. The Model GFR2 wrench is used to engage the sprinkler wrenching surfaces and to install the sprinkler in the fitting. Remove the protective cap to install the sprinkler, then reinstall the protective cap until the cover plate is installed. When inserting or removing the wrench from the sprinkler/cup assembly, care should be taken to prevent damage to the sprinkler. Do not wrench any other part of the sprinkler/cup assembly. Installation is completed by removing the protective cap from the sprinkler and pushing the cover plate onto the cup. Final adjustment is made by hand turning the cover plate until the skirt flange makes full contact with the ceiling. Cover plate removal requires turning the cover plate in the counter clockwise direction. After installation, inspect all sprinklers to ensure that there is a gap between the cover plate and ceiling and that the four cup slots are open and free from any air flow impediment to the space above.

Concealed cover plate/cup assemblies are listed only for use with specific sprinklers. The use of any concealed cover plate/cup assembly other than the Reliable Model CCP with Model F1FR56 Concealed Pendent and Model F1FR56LL Concealed Pendent sprinklers or the use of the Model CCP Concealed cover plate assembly on any sprinkler with which it is not specifically listed my prevent good fire protection and will void all guarantees, warranties, listings and approvals.

Technical Data:

Sensitivity: Quick-response
Thread Size: 1/2-inch NPT standard; ISO 7-R1/2 optional
Maximum Working Pressure: 175 psi (12 bar) - 100% Factory tested hydrostatically to 500 psi (34.5 bar)
SIN RA1425, RA1414 & RA1435 cULus listed for 250 psi (17 bar)

Design and Installation Information											
Model	Nominal K-factor		Nominal Orifice Diameter		Deflector/ Orientation	Nominal Sprinkler Height		Installation Wrench	SIN	Listings and Approvals	Approval Notes
	US	Metric	inches	mm		inches	mm				
F1FR28	2.8	40	3/8	10	Pendent	2.25	57	W2	RA1411	cULus	2
					Recessed Pendent	2.25	57	GFR2	RA1411	cULus	2
					Upright	2.25	57	W2	RA1421	cULus	1,2
F1FR40	4.0	57	3/8	10	Pendent	2.25	57	W2	RA1418	VdS	
					Recessed Pendent	2.25	57	GFR2	RA1418	VdS	
F1FR42	4.2	60	7/16	10	Pendent	2.25	57	W2	RA1413	cULus	2
					Recessed Pendent	2.25	57	GFR2	RA1413	cULus	2
					Upright	2.25	57	W2	RA1423	cULus	1,2
F1FR42LL	4.2	60	7/16	10	Pendent	2.25	57	W2	RA1410	cULus, ULH	
					Recessed Pendent	2.25	57	GFR2	RA1410	cULus, ULH	
F1FRXLH (F1FR42 with Pintle)	4.2	60	7/16	10	Pendent	2.25	57	W2	RA1413	cULus	2
					Recessed Pendent	2.25	57	GFR2	RA1413	cULus	2
					Upright	2.25	57	W2	RA1423	cULus	1,2
F1FR56	5.6	80	1/2	15	Pendent	2.25	57	W2	RA1414	cULus, FM, LPCB, VdS, EC, WM	1,2,3,4
					Recessed Pendent	2.25	57	GFR2	RA1414	cULus, FM, LPCB, VdS, EC, WM	1,2,3,4
					Concealed Pendent	2.25	57	GFR2	RA1414	cULus,VdS,EC, WM	5,6
					Upright	2.25	57	W2	RA1425	cULus, FM, LPCB, VdS, EC, WM	1,2,3,4
					"Conventional (Pendent or Upright)"	2.25	57	W2	RA1475	LPCB, VdS, EC, WM	4
F1FR56LL	5.6	80	1/2	15	Pendent	2.25	57	W2	RA1415	cULus, ULH	1
					Recessed Pendent	2.25	57	GFR2	RA1415	cULus, ULH	
					Concealed Pendent	2.25	57	GFR2	RA1415	cULus, ULH	6
F1FR56	5.6	80	1/2	15	Horizontal Sidewall	2.63	67	W2	RA1435	cULus, FM	1,2,3,7
					Recessed Horizontal Sidewall	2.63	67	GFR2	RA1435	cULus, FM	8
F1FR56	5.6	80	1/2	15	Vertical Sidewall (Pendent or Upright)	2.25	57	W2	RA1485	cULus, FM, LPCB	1,2,3,9

(1) cULus Listed Corrosion Resistant sprinkler when ordered with available Polyester coating.
(2) cULus Listed Corrosion Resistant sprinkler when ordered with available Electroless Nickel PTFE plating.
(3) Available with FM approved Polyester coating in black or white.
(4) Available with LPCB and VdS approved Polyester coating.
(5) VdS and EC approvals of the F1FR56 Concealed Pendent sprinkler are for 155°F (68°C) temperature rated sprinklers only. VdS approved sprinklers must use Norbulb brand glass bulbs with the 1/2-inch (12.7mm) adjustment Model CCP cover plate only.
(6) Model F1FR56 Concealed Pendent and Model F1FR56LL Concealed Pendent sprinklers must be used with Reliable Model CCP cover plates, available as either standard depth with 1/2-inch (12.7mm) of adjustment or low profile with 5/16-inch (8.0 mm) of adjustment.
(7) cULus Listing of the F1FR56 Horizontal Sidewall sprinkler is for Light and Ordinary Hazard occupancies only. Minimum to maximum deflector to ceiling distance shall be 4 inches to 12 inches (102mm to 305mm). FM Approval of the F1FR56 Horizontal Sidewall sprinkler is for Light Hazard occupancies only.
(8) cULus Listing and FM Approval of the F1FR56 Recessed Horizontal Sidewall sprinkler is for Light Hazard occupancies only.
(9) The F1FR56 Vertical Sidewall sprinkler is listed and approved for use only in Light Hazard occupancies. LPCB approval of the F1FR56 Vertical Sidewall sprinkler is for installation in the Pendent position only.

Listed and Approved Temperature Ratings

Model	Deflector/ Orientation	Ordinary Temp. Classification 100°F (38°C) Max. Ambient Temp.		Intermediate Temp. Classification 150°F (65°C) Max. Ambient Temp.		High Temp. Classification 225°F (107°C) Max. Ambient Temp.
		135°F (57°C) Temp. Rating	155°F (68°C) Temp. Rating	175°F (79°C) Temp. Rating	200°F (93°C) Temp. Rating	286°F (141°C) Temp. Rating
		Orange Bulb	Red Bulb	Yellow Bulb	Green Bulb	Blue Bulb
F1FR28	Pendent	cULus				
	Recessed Pendent	cULus				
	Upright	cULus				
F1FR40	Pendent	VdS				
	Recessed Pendent	VdS				
F1FR42	Pendent	cULus				
	Recessed Pendent	cULus				
	Upright	cULus				
F1FR42LL	Pendent				cULus, ULH	
	Recessed Pendent				cULus, ULH	
F1FRXLH	Pendent	cULus				
	Recessed Pendent	cULus				
	Upright	cULus				
F1FR56	Pendent	cULus, FM, LPCB, VdS, EC, WM				
	Recessed Pendent	cULus, FM, LPCB, VdS, EC, WM				
	Concealed Pendent*	cULus, WM	cULus,VdS,EC, WM	cULus, WM		
	Upright	cULus, FM, LPCB, VdS, EC, WM				
	"Conventional (Pendent or Upright)"	LPCB, VdS, EC, WM				
F1FR56LL	Pendent				cULus, ULH	
	Recessed Pendent				cULus, ULH	
	Concealed Pendent*				cULus, ULH	
F1FR56	Horizontal Sidewall	cULus, FM				
	Recessed Horizontal Sidewall	cULus, FM				
F1FR56	Vertical Sidewall (Pendent or Upright)	cULus, FM, LPCB				

* Model F1FR56 Concealed Pendent and F1FR56LL Concealed Pendent sprinklers must be used with Reliable Model CCP cover plates. For Ordinary Temperature Classification sprinklers use a 135°F (57°C) temperature rated cover plate. For Intermediate Temperature Classification sprinklers use a 165°F (74°C) temperature rated cover plate.

Recessed Escutcheon Data

Model	Deflector/ Orientation	Listed and Approved Recessed Escutcheons			SIN
		Model F1 (Fig. 1 & 3) 3/4-inch (19mm) adjustment	Model F2 (Fig. 1 & 3) 1/2-inch (12.7mm) adjustment	Model FP (Fig. 2) 1/2-inch (12.7mm) adjustment	
F1FR28	Recessed Pendent	cULus	cULus	cULus	RA1411
F1FR40	Recessed Pendent	VdS	VdS	VdS	RA1418
F1FR42	Recessed Pendent	cULus	cULus	cULus	RA1413
F1FR42LL	Recessed Pendent	cULus, ULH	cULus, ULH	cULus, ULH	RA1410
F1FR42XLH	Recessed Pendent	cULus	cULus	cULus	RA1413
F1FR56	Recessed Pendent	cULus, LPCB, VdS, EC, WM	cULus, FM, LPCB, VdS, EC, WM	cULus, VdS, EC, WM	RA1414
F1FR56LL	Recessed Pendent	cULus, ULH	cULus, ULH	cULus, ULH	RA1415
F1FR56	Recessed Horizontal Sidewall	cULus	cULus, FM	cULus	RA1435

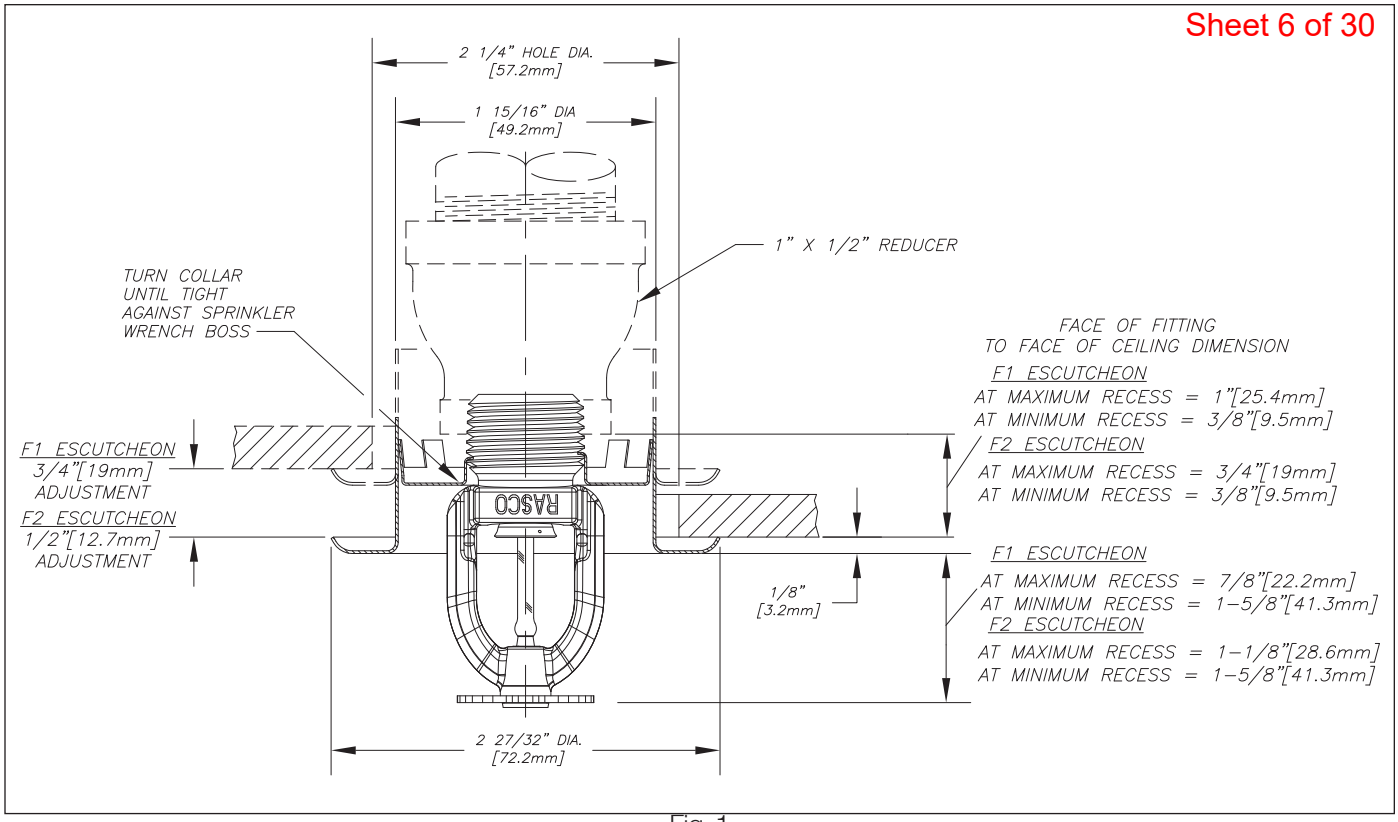


Fig. 1
Model F1FR56, F1FR56LL, F1FR42, F1FR40, F1FR42LL, F1FRXLH & F1FR28
Recessed Pendent sprinkler with Model F1 or F2 escutcheon

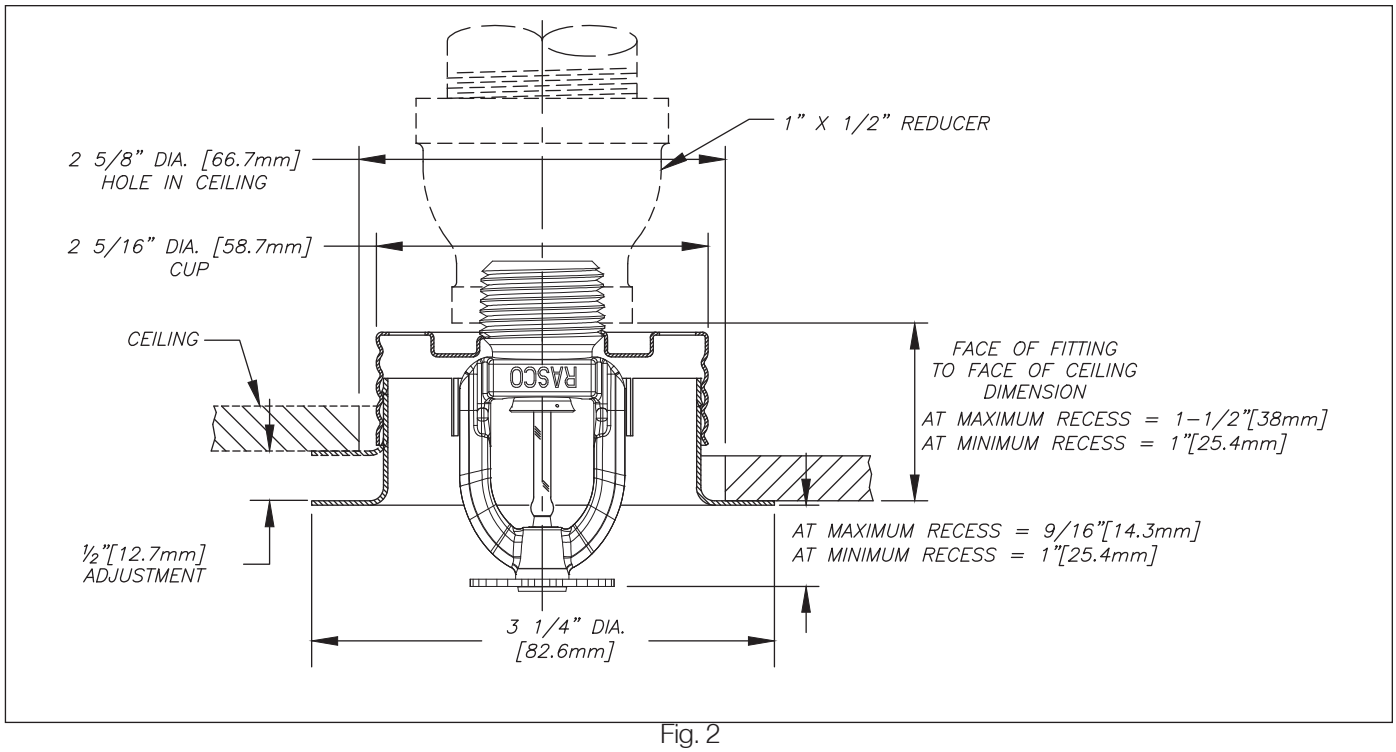


Fig. 2
Model F1FR56, F1FR56LL, F1FR42, F1FR40, F1FR42LL, F1FRXLH & F1FR28
Recessed Pendent sprinkler with Model FP escutcheon

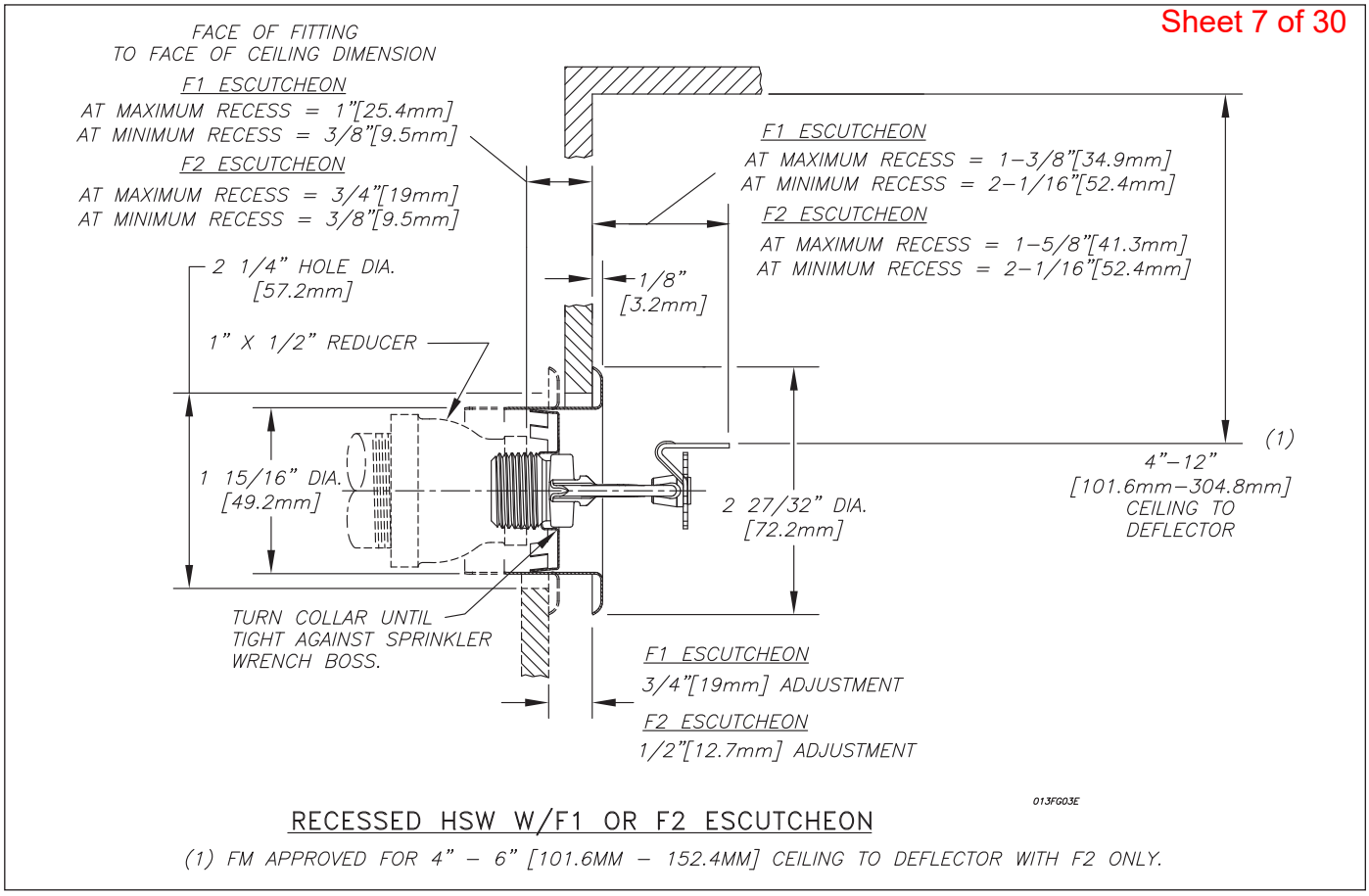


Fig. 3
Model F1FR56 Recessed Horizontal Sidewall sprinkler with Model F1 or F2 escutcheon

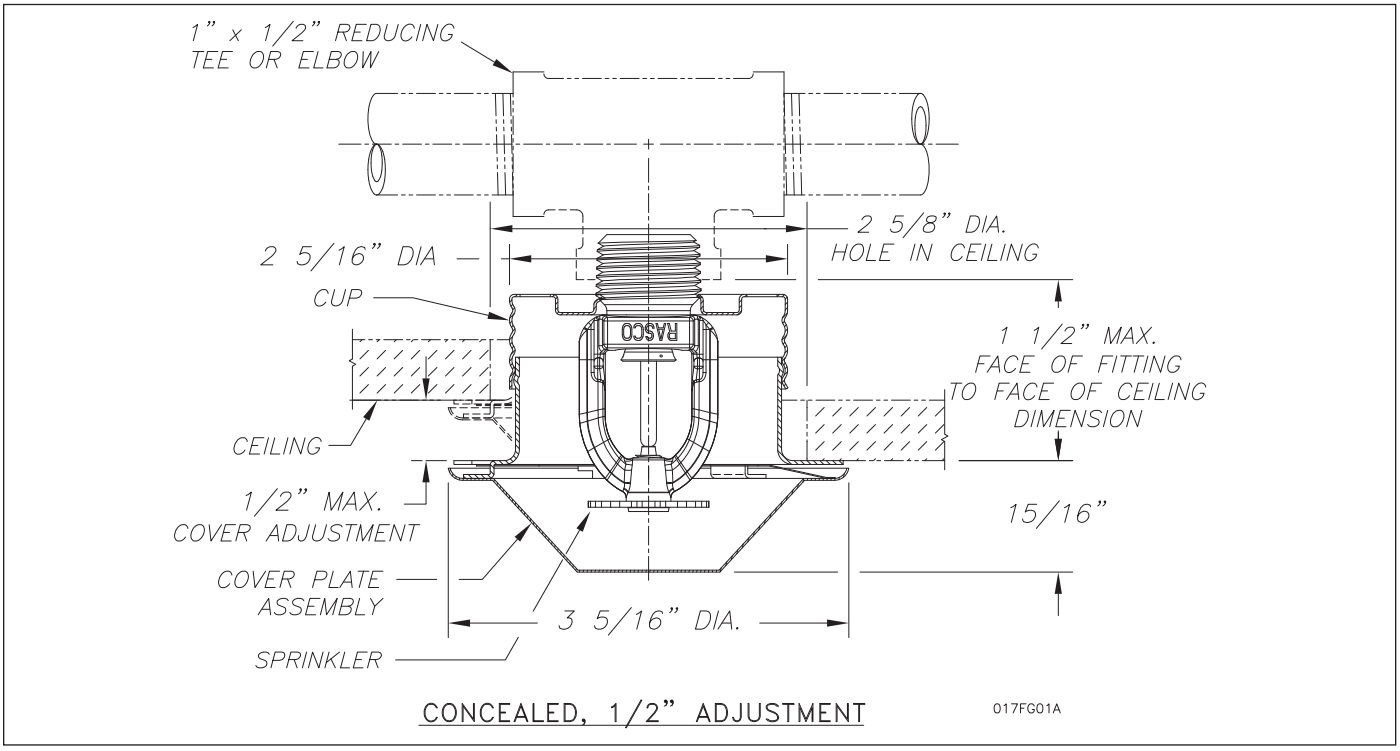


Fig. 4
Model F1FR56/F1FR56LL Concealed Pendent sprinkler with standard depth
1/2-inch (12.7mm) adjustment - Model CCP cover plate

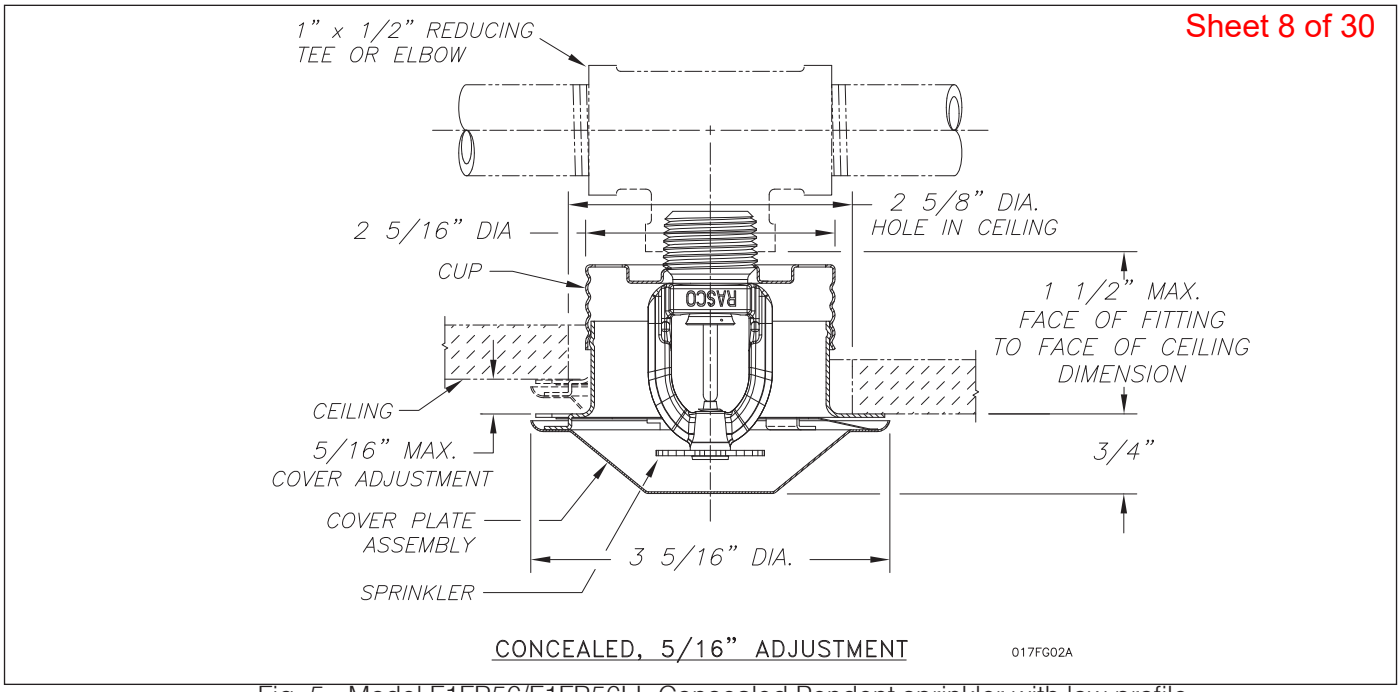


Fig. 5 - Model F1FR56/F1FR56LL Concealed Pendent sprinkler with low profile 5/16-inch (8.0mm) adjustment - Model CCP cover plate

Maintenance

The Model F1FR Series sprinklers should be inspected 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 dust by using a soft brush or gentle vacuuming. Replace any sprinkler which has been painted (other than factory applied) or damaged in any way. A stock of spare sprinklers should be maintained to allow quick replacement of damaged or operated sprinklers.

Finishes [1]

Standard Finishes		
Sprinkler	**Escutcheon**	**Cover plate[1]**
Bronze	Brass	Chrome
Chrome Plated	Chrome Plated	White
Polyester Coated [4][5][6]	White Painted	
Special Application Finishes		
Sprinkler	**Escutcheon**	**Cover plate[1]**
Electroless Nickel PTFE[7]	Electroless Nickel PTFE	Bright Brass
Bright Brass[3]	Bright Brass	Black Plating
Black Plated	Black Plated	Black Paint
Black Paint[2][6]	Black Paint	Off White
Off White[2][6]	Off White	Satin Chrome
Chrome Dull	Chrome Dull	

[1] Other finishes and colors are available on special order. Consult the factory for details. Custom color painted sprinklers may not retain their UL Corrosion resistance listing. Coverplate custom paint is semi-gloss, unless specified otherwise.

[2] cULus Listed only.

[3] 200°F (93°C) maximum.

[4] cULus listed "corrosion resistance" applies to SIN Numbers RA1435 (HSW), RA1485(VSW), RA1425 (Upright), RA1414 (Pendent) and RA1415 (Pendent) in standard black or white. Corrosion resistance in other polyester colors is available upon request.

[5] FM Approvals finish as "Polyester coated" applies to SIN Number RA1414, RA1435 and RA1425 in standard black or white.

[6] LPCB and VdS Approved finish applies only to RA1425, RA1414, RA1418 (VdS) and RA1475.

[7] cULus listed Corrosion Resistant

Material Data	
Frame:	DZR Brass, QM Brass, or Low Lead Brass
Deflector:	CDA Alloy 220, 260, or 510
Load Screw\Pintle:	CDA Alloy 360 or 544
Cup:	CDA Alloy 651 or 693
Washer:	Nickel Alloy 440 or 360, coated with PTFE Adhesive Tape
Bulb:	Glass

Ordering Information

Specify:

1. Sprinkler Model: [F1FR28][F1FR40][F1FR42] [F1FR42LL][F1FRXLH][F1FR56][F1FR56LL]
2. Sprinkler Deflector/Orientation: [Pendent][Recessed Pendent][Upright][Conventional][Horizontal Sidewall] [Recessed Horizontal Sidewall][Vertical Sidewall]
3. Sprinkler threads: [1/2-inch NPT][ISO 7-R1/2]
4. Sprinkler Temperature Rating: [135°F (57°C)][155°F (68°C)][175°F (79°C)][200°F (93°C)][286°F (141°C)]
5. Sprinkler Finish
6. Escutcheon Model: [F1][F2][FP]
7. Escutcheon Finish (where applicable)
8. Cover plate Model: [standard profile CCP 1/2-inch (12.7mm) adjustment][low profile CCP 5/16-inch (8.0mm) adjustment]
9. Cover plate Temperature Rating: [135°F (57°C) for use with Ordinary Temperature sprinklers][165°F (74°C) for use with Intermediate Temperature sprinklers]
10. Cover plate Finish

Note: When Model F1FR Series Recessed sprinklers are ordered, the sprinklers and escutcheons are packaged separately.

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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 100 years.

Manufactured by

Reliable®

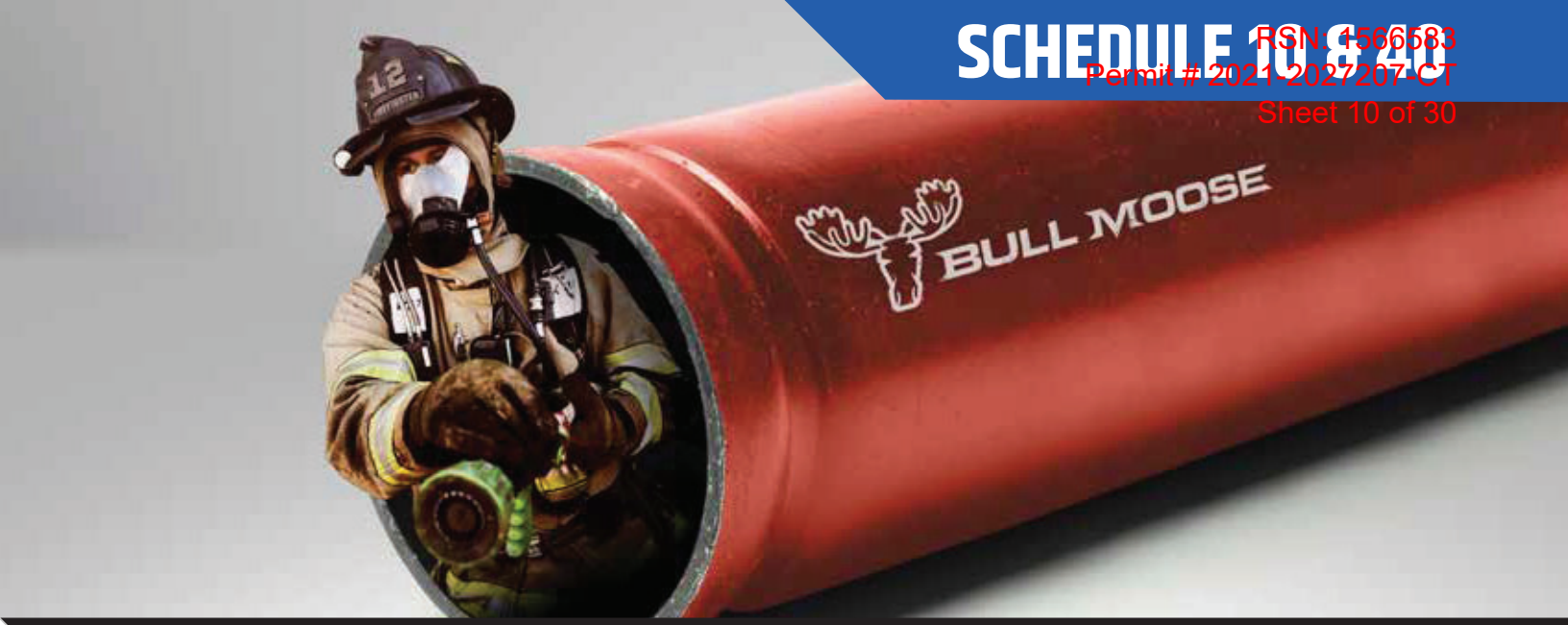
Reliable Automatic Sprinkler Co., Inc.
(800) 431-1588 Sales Offices
(800) 848-6051 Sales Fax
(914) 829-2042 Corporate Offices
www.reliablesprinkler.com Internet Address

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Revision lines indicate updated or new data.

EG. Printed in U.S.A. 10/20 P/N 9999970300

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Always ready to protect your most valuable assets.

As the leading supplier of steel sprinkler pipe, we understand that there are no second chances in fire suppression. You need products of enduring quality and exceptional strength–plus reliable service. You need Bull Moose.

Bull Moose Fire Sprinkler Pipe Product Information

	Nominal Pipe Size (Inches)	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"	4"	6"	8"
SCHEDULE 10	O.D. (in)	1.315	1.660	1.900	2.375	2.875	3.500	4.500	6.625	8.625
	I.D. (in)	1.097	1.442	1.682	2.157	2.635	3.260	4.260	6.357	8.249
	Empty Weight (lb/ft)	1.410	1.810	2.090	2.640	3.530	4.340	5.620	9.290	16.940
	Water Filled Weight (lb/ft)	1.820	2.518	3.053	4.223	5.893	7.957	11.796	23.038	40.086
	C.R.R.	15.27	9.91	7.76	6.27	4.92	3.54	2.50	1.158	1.805
	Pieces per Lift	91	61	61	37	30	19	19	10	7
	Lift Weight (lbs) 21' lengths	2,695	2,319	2,677	2,051	2,224	1,732	2,242	1,951	2,490
	Lift Weight (lbs) 24' lengths	3,079	2,650	3,060	2,344	2,542	1,979	2,563	2,230	2,848
	Lift Weight (lbs) 25' lengths	3,208	2,760	3,187	2,442	2,648	2,062	2,670		

	NPS (In.)	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"	4"
SCHEDULE 40		1.315	1.660	1.900	2.375	2.875	3.500	4.500
		1.049	1.380	1.610	2.067	2.469	3.068	4.026
		1.680	2.270	2.720	3.660	5.800	7.580	10.800
		2.055	2.918	3.602	5.114	7.875	10.783	16.316
		1.00	1.00	1.00	1.00	1.00	1.00	1.00
		70	51	44	30	30	19	19
		2,470	2,431	2,513	2,306	3,654	3,024	4,309
		2,822	2,778	2,872	2,635	4,176	3,456	4,925
		2,940	2,894	2,992	2,745	4,350	3,601	5,130

SCHEDULE 10 & 40 ADVANTAGES:

- UL listed (US & Canada) and FM approved
- ASTM A135 and A795 Type E, Grade A Certified
- Complies with NFPA-13, 13R and 14
- Industry-leading hydraulic characteristics
- CRR of 1.0 and greater
- All pipe NDT weld tested

OTHER BENEFITS/SERVICES:

- We have the most stocking locations in the industry, for best delivery and availability
- Plain end or roll groove
- Eddy Guard II™ bacterial-resistant internal coating
- Custom length options
- Hot dipped galvanization
- Reddi-Pipe® red or black pipe eliminates field painting
- Compatible for use in wet, dry, preaction and deluge sprinkler systems
- The only maker with EPDs (to help earn LEED points).

Exclusive maker of Reddi-Pipe®
RED OR BLACK PAINTED PIPE.

CERTIFIED ENVIRONMENTAL PRODUCT DECLARATION UL.COM/EPD
cULus LISTED
FM APPROVED
NFPA
AFSA American Fire Sprinkler Association
NFSA The Voice of the Fire Sprinkler Industry

BULL MOOSE TUBE
800.325.4467
sales@BullMooseIndustries.com
BullMooseTube.com

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Rod couplers

Material Specifications

Material	ASTM A563, Grade A carbon steel;
Finish	Zinc electroplated to ASTM B 633-98, SC 1, Type I
Thread	Class 2A fit; Class 2B thread



Ordering Information

Description	Length	Width across flats	Qty	Item No.	MSS-SP-58[1] Allowable Tensile Load at 650°F	AISC[2] Allowable Load (lb)
1/4" Rod Coupler	7/8"	3/8"	100	411746	300	780
3/8" Rod Coupler	1-1/8"	1/2"	50	411747	730	1750
1/2" Rod Coupler	1-1/4"	5/8"	50	411748	1350	3110
5/8" Rod Coupler	2-1/8"	13/16"	50	411749	2160	4860
3/4" Rod Coupler	2-1/4"	1"	25	411750	3230	6700

1 Per MSS-SP-58-2002, the ultimate tensile loads are based on a tensile stress of 50,000 psi multiplied by the threaded rod root area based on coarse thread UNC.
2 AISC Allowable Tensile load = 0.33 x Fu x Anom
AISC Allowable Shear load = 0.17 x Fu x Anom

3.2.11.1 Product description
3.2.11.2 Material specifications
3.2.11.3 Technical data
3.2.11.4 Installation instructions
3.2.11.5 Ordering information

3.2.11 STUD FASTENERS FOR ATTACHMENT TO CONCRETE

3.2.11.1 PRODUCT DESCRIPTION

The Hilti threaded stud program is for use with Hilti powder-actuated tools to provide a faster and more reliable solution for making attachments to concrete base materials. Threaded studs are available in standard carbon steel. The X-W6 and W10 threaded studs have varying shank lengths to provide more reliable fastenings to standard and high strength concrete. Thread diameters of 1/4" have thread lengths ranging from 1/2" through 1-1/2". The 3/8" thread diameter has a single thread length of 1-3/16".



X-W6 W10

Listings/Approvals

ICC-ES (International Code Council)
ESR-1663 with LABC/LARC Supplement

FM (Factory Mutual)
W10-30-27P10, W10-30-32P10 and W10-30-42P10 Fasteners for Sprinkler Pipe Hangers

UL (Underwriters Laboratories)
W10-30-32P10 and W10-30-42P10, Fasteners for Sprinkler Pipe Hangers - Up to 2-1/2" diameter pipe

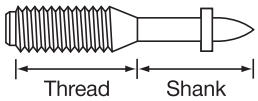
3.2.11.2 Material specifications

Fastener designation	Fastener material	Fastener plating
X-W6	Carbon Steel	5 µm Zinc[1]
W10	Carbon Steel	5 µm Zinc[1]

1 ASTM B633, SC1, Type III. Refer to Section 2.3.3.1 for more information.

3.2.11.3 Technical data

Fastener designation	Thread designation	Thread length in. (mm)	Shank length in. (mm)
X-W6-20-22	UNC 1/4-inch	**3/4** (20)	**7/8** (22)
X-W6-20-27	UNC 1/4-inch	**3/4** (20)	**1** (27)
X-W6-38-27	UNC 1/4-inch	**1-1/2** (38)	**1** (27)
W10-30-27	UNC 3/8-inch	**1-3/16** (30)	**1** (27)
W10-30-32	UNC 3/8-inch	**1-3/16** (30)	**1-1/4** (32)
W10-30-42	UNC 3/8-inch	**1-3/16** (30)	**1-5/8** (42)



Allowable loads in normal weight concrete[1,2]

Description	Fastener	Shank diameter in. (mm)	Minimum embedment in. (mm)	Concrete compressive strength			
				2000 psi		4000 psi	
				Tension lb (kN)	Shear lb (kN)	Tension lb (kN)	Shear lb (kN)
1/4–20 Threaded stud	X-W6	**0.145** (3.7)	**3/4** (19)	**40** (0.18)	**55** (0.24)	**40** (0.18)	**55** (0.24)
			1 (25)	**85** (0.38)	**195** (0.87)	**110** (0.49)	**225** (1.00)
3/8–16 Threaded stud	W10	**0.205** (5.2)	**1** (25)	**85** (0.38)	**95** (0.42)	**100** (0.44)	**105** (0.47)
			1-1/4 (32)	**175** (0.78)	**345** (1.53)	**200** (0.89)	**380** (1.69)
			1-5/8 (41)	**285** (1.27)	**380** (1.69)	**385** (1.71)	**395** (1.76)

1 The tabulated allowable load values are for the low-velocity fasteners only, using a safety factor that is greater than or equal to 5.0, calculated in accordance with ICC-ES AC70. Wood or steel members connected to the substrate must be investigated in accordance with accepted design criteria.

2 Multiple fasteners are recommended for any attachment.

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Allowable Loads in Minimum f'_c = 3000 psi Structural Lightweight Concrete[1,4]

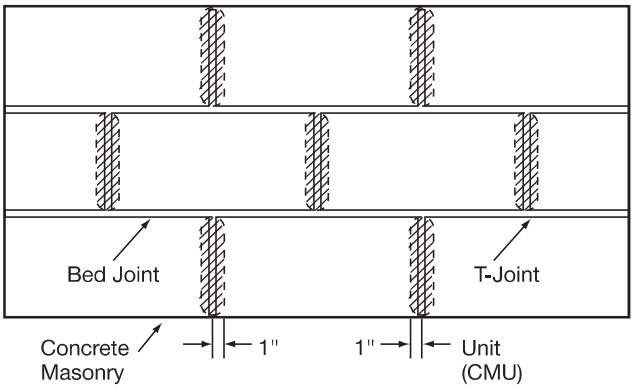
Fastener description	Fastener	Shank dia. in. (mm)	Min. embed. in. (mm)	Fastener location				
				Installed into concrete		Installed through 3" deep metal deck into concrete[2,3]		
				Tension lb (kN)	Shear lb (kN)	Tension lb (kN)		Shear lb (kN)
						Upper flute	Lower flute	
1/4–20 Threaded Stud	X-W6	0.145 (3.7)	3/4 (20)	125 (0.56)	185 (0.82)	125 (0.56)	115 (0.54)	185 (0.82)
			1 (25)	175 (0.78)	185 (0.82)	160 (0.71)	180 (0.80)	185 (0.82)
3/8–16 Threaded Stud	W10	0.205 (5.2)	1 (25)	265 (1.18)	190 (0.85)	160 (0.71)	–	185 (0.82)
			1-1/4 (32)	280 (1.25)	380 (1.69)	160 (0.71)	210 (0.93)	470 (2.09)
			1-5/8 (41)	445 (1.98)	540 (2.40)	435 (1.93)	325 (1.45)	675 (3.00)

1 The tabulated allowable load values are for the low-velocity fasteners only, using a safety factor that is greater than or equal to 5.0, calculated in accordance with ICC-ES AC70. Wood or steel members connected to the substrate must be investigated in accordance with accepted design criteria.
2 The steel deck profile is 3" deep composite floor deck with a thickness of 20 gauge (0.0358"). Figure 1 (Section 3.2.1.6) shows the nominal flute dimensions, fastener locations and load orientations for the deck profile.
3 Structural lightweight concrete fill above top of metal deck shall be a minimum of 3-1/4" deep.
4 Multiple fasteners are recommended for any attachment.

Allowable Loads in Concrete Masonry Units[1,2,3,4,5,8]

Fastener description	Fastener	Shank diameter in. (mm)	Minimum embedment in. (mm)	Hollow CMU				Grout filled CMU			
				Face shell[6]		Mortar joint[6]		Face shell[6]		Mortar joint[6]	
				Tension lb (kN)	Shear lb (kN)	Tension lb (kN)	Shear[7] lb (kN)	Tension lb (kN)	Shear lb (kN)	Tension lb (kN)	Shear[7] lb (kN)
1/4-20 Threaded Stud	X-W6	0.145 (3.7)	1 (25)	105 (0.47)	175 (0.78)	80 (0.36)	110 (0.49)	125 (0.56)	175 (0.78)	135 (0.60)	150 (0.67)

1 The tabulated allowable load values are for the low-velocity fastener only, using a safety factor of 5.0 or higher. Wood or steel members connected to the substrate must be investigated in accordance with accepted design criteria.
2 The tabulated allowable load values are for low-velocity fasteners installed in normal weight or lightweight concrete masonry units conforming to ASTM C90.
3 The tabulated allowable load values are for low-velocity fasteners installed in concrete masonry units with mortar conforming to ASTM C270, Type N.
4 The tabulated allowable load values are for low-velocity fasteners installed in concrete masonry units with grout conforming to ASTM C476, as coarse grout.
5 The tabulated allowable load values are for one low-velocity fastener installed in an individual masonry unit cell and at least 4" from the edge of the wall.
6 Fastener can be located anywhere on the face shell or mortar joint as shown in the figure to the right.
7 Shear direction can be horizontal or vertical (Bed Joint or T-Joint) along the CMU wall plane.
8 Multiple fasteners are recommended for any attachment.



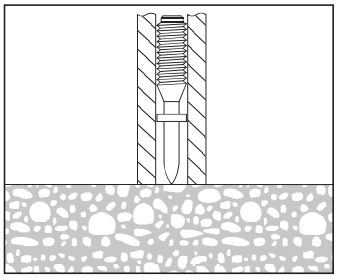
Acceptable locations (NON-SHADED AREAS) for threaded studs in CMU walls

Allowable bending moments for threaded stud fasteners installed in minimum 2,000 psi concrete[1,2]

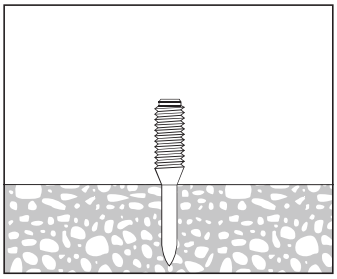
Fastener designation	M_{rec} ft-lb (Nm)
X-W6	3.6 (4.9)
W10	10.0 (13.6)

1 Based on a safety factor greater than or equal to 2.0.
2 For more information on bending moments, reference Section 3.2.2.7.

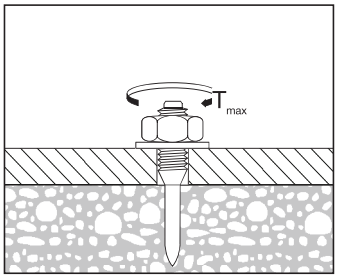
3.2.11.4 INSTALLATION INSTRUCTIONS*



1. Press tip of fastener to concrete base material. Drive fastener with Hilti powder-actuated tool.



2. Ensure proper threaded stud embedment.



3. Make attachment. Do not exceed Maximum Tightening Torque, T_{max}.

* These are abbreviated instructions which may vary by application. **ALWAYS** review/follow the instructions accompanying the product.

Maximum tightening torque, T_{max}, for threaded studs driven into concrete, ft-lb (Nm)

Stud type	
X-W6	W10
3.0 (4.0)	**4.5** (6.0)

3.2.11.5 ORDERING INFORMATION

Fastener description	Shank length in. (mm)	Shank Ø in. (mm)	Thread length in. (mm)	Thread Ø	Guidance washer Ø	Packaging quantity
X-W6-20-22 FP8	**7/8** (22)	**0.145** (3.7)	**3/4** (20)	UNC 1/4-inch	8 mm plastic	100 pcs
X-W6-20-27 FP8	**1** (27)	**0.145** (3.7)	**3/4** (20)	UNC 1/4-inch	8 mm plastic	100 pcs
X-W6-38-27 FP8	**1** (27)	**0.145** (3.7)	**1-1/2** (38)	UNC 1/4-inch	8 mm plastic	100 pcs
W10-30-27 P10	**1** (27)	**0.205** (5.2)	**1-3/16** (30)	UNC 3/8-inch	10 mm plastic	100 pcs
W10-30-32 P10	**1-1/4** (32)	**0.205** (5.2)	**1-3/16** (30)	UNC 3/8-inch	10 mm plastic	100 pcs
W10-30-42 P10	**1-5/8** (42)	**0.205** (5.2)	**1-3/16** (30)	UNC 3/8-inch	10 mm plastic	100 pcs





X-W6



W10*

* W10 threaded stud installation requires a 10mm fastener base plate.

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Fasteners

Anchors, expansion shields, concrete inserts, explosive-driven fasteners and threaded head screws provide anchorage to building structural members for supporting pipe hangers. See PIPE HANGER listing for other components and minimum rod sizes. Unless specifically noted in the listing, the following fasteners are FM Approved for vertical installation only.

Explosive-Driven Fasteners

Explosive-driven fasteners provide anchorage to concrete or steel building members for supporting pipe hangers. The powder-actuated tool used for driving these fasteners may represent an ignition source; therefore, it should not be used in classified hazardous locations or near easily ignited materials. Fasteners should not be used for support of pipe hangers to structural members in Earthquake Zones 500 or less as defined by FM Global Property Loss Prevention Data Sheet 1-2.

A coupling and locknut are provided with each fastener for attaching a pipe hanger to the fastener.

Explosive-Driven Fasteners

Fastener, Cat. No.	*Coupling, Cat. No.*	*For Use In*	*Max Pipe Size, in. (mm)*
W10-30-27P10	D1025	Concrete	2 (51)
W10-30-27P10	ACI-F	"	3 1⁄2 (89)
W10-30-27P10	ACI-H	"	5 (127)
W10-30-32P10	D1025	"	2 (51)
W10-30-32P10	ACI-F	"	3 1⁄2 (89)
W10-30-32P10	ACI-H	"	5 (127)
W10-30-42P10	D1025	"	2 (51)
W10-30-42P10	ACI-F	"	3 1⁄2 (89)
W10-30-42P10	ACI-H	"	5 (127)
W10-30-47P10	D1025	"	2 (51)
W10-30-47P10	ACI-F	"	3 1⁄2 (89)
W10-30-47P10	ACI-H	"	5 (127)
EW10-30-15P10	D1025	Steel	2 (51)
EW10-30-15P10	ACI-F	"	3 1⁄2 (89)
EW10-30-15P10	ACI-H	"	5 (127)

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Fastener, Cat. No.	*Rod Size, in.*	*For Use In*	*Max Pipe Size, in. (mm)*
X-EW6H-11-9 FP8	1⁄4	Steel	3 1⁄2 (89)
X-EW6H-11-9 P12	1⁄4	Steel	3 1⁄2 (89)
X-EW6H-20-9 FP8	1⁄4	Steel	3 1⁄2 (89)
X-EW6H-20-9 P12	1⁄4	Steel	3 1⁄2 (89)
X-EW6H-28-9 FP8	1⁄4	Steel	3 1⁄2 (89)
X-EW6H-28-9 P12	1⁄4	Steel	3 1⁄2 (89)
X-EW6H-38-9 FP8	1⁄4	Steel	3 1⁄2 (89)
X-EW6H-38-9 P12	1⁄4	Steel	3 1⁄2 (89)
X-HS W6 U19 P8 S15	1⁄4	Steel	3 1⁄2 (89)
X-HS W10 U19 P8 S15	3⁄8	Steel	5 (127)
X-EW10H-30-14 P10	3⁄8	Steel	5 (127)

These fasteners are also FM Approved for horizontal installation. Max pipe size 3 1⁄2 in. (89 mm).

Company Name:	Hilti Inc
Company Address:	5400 S 122nd East Ave, Tulsa, Oklahoma 74146, USA
Company Website:	http://www.hilti.com
New/Updated Product Listing:	No
Listing Country:	United States of America
Certification Type:	FM Approved

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THREADED IRON

BROWSE TITUS FIRE PROTECTION PRODUCTS

GROOVED COUPLINGS

GROOVED FITTINGS

THREADED IRON

BALL VALVES

FASTENERS



CAST IRON

- Available in sizes from 1" to 2½", Class 125 Standard
- UL / FM Approved at 300 psi
- Air Tested

MALLEABLE IRON

- Available in sizes from 1/8" to 6", Class 150
- UL / FM Approved at 300 psi
- Air Tested

DUCTILE IRON

- Available in sizes from 1/2" to 2", Class 150 Standard DI
- UL / FM Approved at 500 psi

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TITUS

TITUS

MALLEABLE IRON THREADED PRODUCTS TECHNICAL BULLETINS

www.titusindustrial.com

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PLUGS .....

REDUCING TEES 7

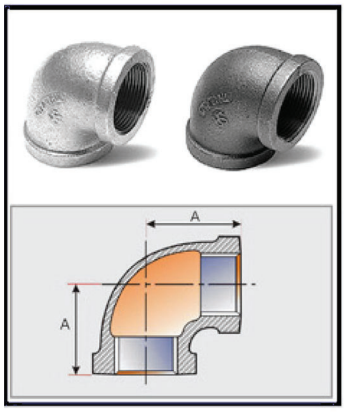
TEES 8
EXTENSION .....
UNIONS .....

BUSHINGS 9

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ELBOWS 90°

AL 90, BL 90

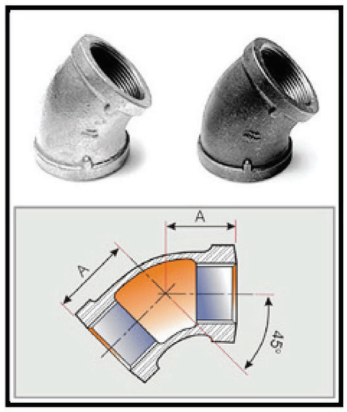


Size (inch)	Dimensions A	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO.of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
1/8	17.5	50	600	12	0.0306	18
1/4	20.6	35	420	12	0.0515	22
3/8	24.1	90	360	4	0.0710	26
1/2	28.4	50	200	4	0.1195	24
3/4	33.3	35	105	3	0.1865	20
1	38.1	20	60	3	0.2838	17
1 1/4	44.5	20	40	2	0.4504	18
1 1/2	49.3	15	30	2	0.5736	17
2	57.2	8	16	2	0.8932	14
2 1/2	68.6	-	12	1	1.4816	18
3	78.2	-	8	1	2.2560	20
3 1/2	86.9	-	4	1	3.1930	13
4	96.3	-	2	1	4.2200	8
5	114.3	-	2	1	6.7980	14
6	132.0	-	1	1	8.8690	9

*** THE ACTUAL WEIGHT CAN VARY BY ± 3%**

ELBOWS 45°

AL 45, BL 45

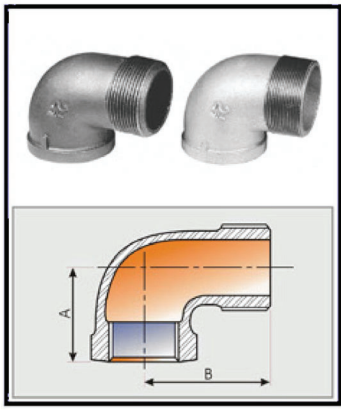


Size (inch)	Dimensions A	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO.of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
1/8	16.0	50	600	12	0.0245	15
1/4	18.5	30	360	12	0.0464	17
3/8	20.3	75	300	4	0.0676	20
1/2	22.3	50	200	4	0.1024	20
3/4	24.9	40	120	3	0.1628	20
1	28.4	20	60	3	0.2503	15
1 1/4	32.8	20	40	2	0.3467	14
1 1/2	36.3	10	30	3	0.5098	15
2	42.7	12	24	2	0.8008	19
2 1/2	49.5	-	12	1	1.2640	15
3	55.1	-	10	1	1.9436	19
4	66.3	-	4	1	3.4280	14
5	77.5	-	2	1	4.8500	10
6	87.9	-	1	1	6.7660	7

*** THE ACTUAL WEIGHT CAN VARY BY ± 3%**

STREET ELBOWS 90°

ASL 90, BSL 90



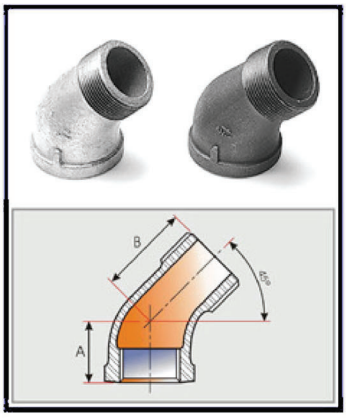
Size (inch)	Dimensions A	B	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO.of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
1/8	17.5	25.4	60	720	12	0.0256	18
1/4	20.6	30.2	35	420	12	0.0440	18
3/8	24.1	36.6	60	240	4	0.0720	17
1/2	28.4	41.4	60	180	3	0.1070	19
3/4	33.3	48.0	35	105	3	0.1740	18
1	38.1	54.3	45	90	2	0.2693	24
1 1/4	44.5	62.2	25	50	2	0.4216	21
1 1/2	49.3	68.3	9	27	3	0.5734	15
2	57.2	82.8	8	16	2	1.0092	16
2 1/2	68.6	98.0	5	10	2	1.6400	16
3	78.2	114.5	-	8	1	2.4160	19
4	96.3	144.5	-	4	1	4.2400	17
5	114.3	174.2	-	1	1	5.5000	6
6	130.3	204.0	-	1	1	12.3666	12

*** THE ACTUAL WEIGHT CAN VARY BY ± 3%**

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STREET ELBOWS 45°

ASL 45, BSL 45

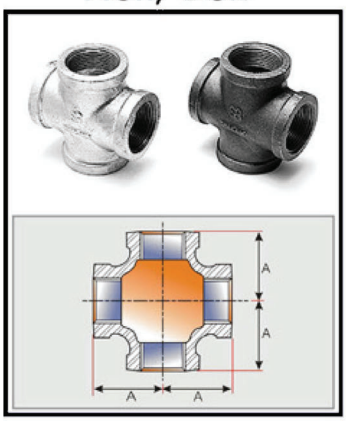


Size (inch)	Dimensions A	Dimensions B	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO.of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
1/8	16.0	21.0	70	840	12	0.0243	20
1/4	18.5	23.9	40	480	12	0.0395	19
3/8	20.3	26.2	100	400	4	0.0582	23
1/2	22.3	33.0	75	225	3	0.0996	22
3/4	24.9	37.5	40	120	3	0.1436	17
1	28.4	43.0	25	75	3	0.2540	19
1 1/4	32.8	47.4	10	40	4	0.3546	14
1 1/2	36.3	51.7	10	30	3	0.5104	15
2	42.7	60.4	12	24	2	0.7944	19
2 1/2	49.5	69.0	6	12	2	1.3512	16
3	55.1	80.2	3	6	2	2.1280	13
4	66.3	99.0	-	4	1	3.3770	14

*** THE ACTUAL WEIGHT CAN VARY BY ± 3%**

CROSSES

ACR, BCR

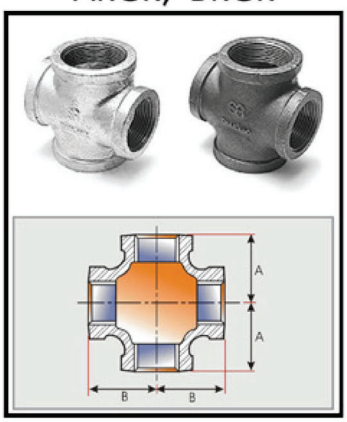


Size (inch)	Dimensions A	Inner Box B	Master Ctn. Pcs./Box	NO.of Pcs./Ctn.	Weight/Pcs. Inner Box	N.W./Ctn. (Kgs.)
1/8	17.5	30	360	12	0.0520	19
1/4	20.6	60	240	4	0.0881	21
3/8	24.1	50	150	3	0.1310	20
1/2	28.4	30	90	3	0.1980	18
3/4	33.3	20	60	3	0.3006	18
1	38.1	15	30	2	0.4642	14
1 1/4	44.5	10	20	2	0.7200	14
1 1/2	49.3	8	16	2	0.9384	15
2	57.2	5	10	2	1.4200	14
2 1/2	68.6	3	6	2	2.4520	15
3	78.2	2	4	2	3.7440	15
4	96.3	1	2	2	6.2900	13

*** THE ACTUAL WEIGHT CAN VARY BY ± 3%**

REDUCING CROSSES

ARCR, BRCR



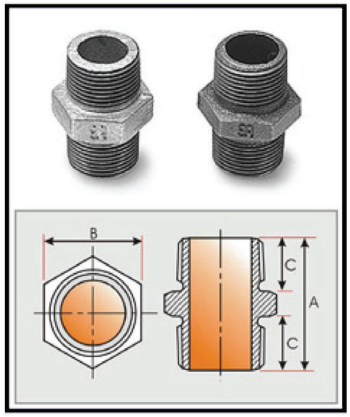
Size (inch)	Dimensions A	Dimensions B	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO.of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
1 1/2 X 1 1/4	46.2	47.8	9	18	2	0.9060	16
2 X 1 1/4	48.3	53.3	5	10	2	1.1380	11
2 1/2 X 1 1/4	52.0	62.0	4	8	2	1.4510	12
2 1/2 X 1 1/2	56.0	63.0	4	8	2	1.5430	12

*** THE ACTUAL WEIGHT CAN VARY BY ± 3%**

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NIPPLES

NI

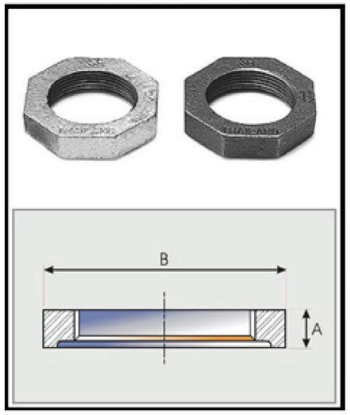


Size (inch)	Dimensions A	B	C	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO.of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
1/8	32	14	11.0	240	960	4	0.0220	21
1/4	34	17	12.0	200	800	4	0.0260	21
3/8	36	21	13.0	150	600	4	0.0410	25
1/2	45	27	18.5	80	320	4	0.0692	22
3/4	48	32	19.5	60	180	3	0.1056	20
1	53	38	21.5	40	120	3	0.1560	19
1 1/4	56	48	23.0	35	70	2	0.2226	19
1 1/2	60	55	24.0	25	50	2	0.3360	17
2	70	70	28.0	18	36	2	0.6112	22
2 1/2	76	85	31.0	10	20	2	0.8636	17
3	84	100	34.0	6	12	2	1.2865	15
4	95	130	38.5	3	6	2	1.8512	11

*** THE ACTUAL WEIGHT CAN VARY BY ± 3%**

LOCKNUTS

ALN, LN

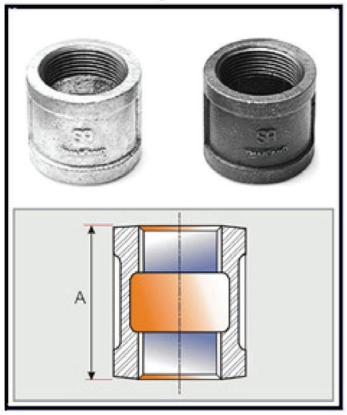


Size (inch)	Dimensions A	B	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO.of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
1/8	5.0	17.5	250	3000	12	0.0080	24
1/4	6.6	21.3	125	1500	12	0.0117	18
3/8	7.3	25.4	125	1500	12	0.0150	23
1/2	8.1	30.0	150	600	4	0.0387	23
3/4	8.8	36.3	90	360	4	0.0526	19
1	9.9	44.5	60	240	4	0.0826	20
1 1/4	10.9	53.3	45	180	4	0.1220	22
1 1/2	12.1	59.7	45	135	3	0.2084	28
2	13.7	73.2	25	75	3	0.2680	19
2 1/2	15.2	98.0	20	40	2	0.5150	21
3	17.2	117.3	20	40	2	0.6090	24
4	20.5	147.1	7	14	2	0.7530	11

*** THE ACTUAL WEIGHT CAN VARY BY ± 3%**

COUPLINGS

AS, BS



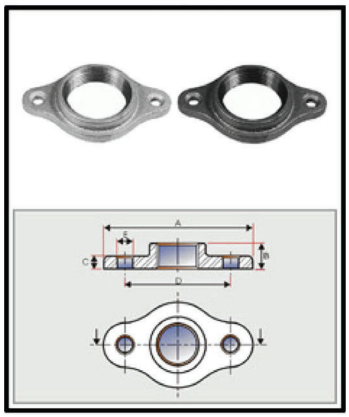
Size (inch)	Dimensions A	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO.of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
1/8	24.4	70	840	12	0.0250	21
1/4	26.9	40	480	12	0.0399	19
3/8	29.5	40	480	12	0.0574	28
1/2	34.0	60	240	4	0.0920	22
3/4	38.6	50	150	3	0.1330	20
1	42.4	25	100	4	0.2077	21
1 1/4	49.0	16	64	4	0.3164	20
1 1/2	54.6	18	36	2	0.4196	15
2	64.3	12	24	2	0.6556	16
2 1/2	73.2	8	16	2	1.0320	17
3	80.8	-	12	1	1.6377	20
4	93.7	3	6	2	2.6060	16

*** THE ACTUAL WEIGHT CAN VARY BY ± 3%**

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WASTENUTS

AWN

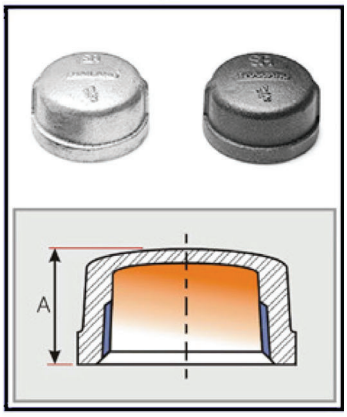


Size (inch)	Dimensions A	B	C	D	E	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO.of Inner Box	Weight. /Pcs	N.W./Ctn. (Kgs.)
1/2	62.0	6.0	4.4	46.0	6.0	90	360	4	0.0540	19
3/4	73.0	10.5	5.0	54.0	7.3	80	240	3	0.0800	19
1	84.1	11.2	4.8	65.1	7.2	50	200	4	0.0960	19
1 1/4	100.0	12.7	5.6	77.8	8.7	30	120	4	0.1450	17
1 1/2	109.5	14.3	6.4	87.3	8.7	50	100	2	0.1890	19
2	130.2	16.0	7.2	104.8	8.7	30	60	2	0.2850	17

*** THE ACTUAL WEIGHT CAN VARY BY ± 3%**

CAPS

ACA, BCA

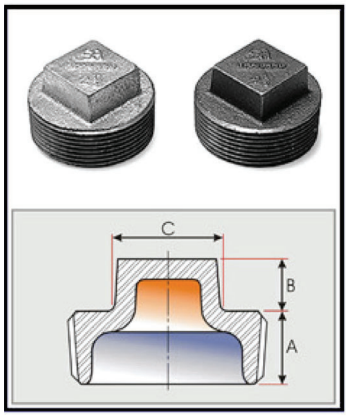


Size (inch)	Dimensions A	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO.of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
1/8	13.5	120	1440	12	0.0161	23
1/4	16.0	80	960	12	0.0245	24
3/8	18.8	60	720	12	0.0347	25
1/2	22.1	75	300	4	0.0575	17
3/4	24.6	40	160	4	0.0966	15
1	29.5	25	100	4	0.1424	14
1 1/4	32.5	20	80	4	0.2008	16
1 1/2	33.8	18	54	3	0.2528	14
2	36.8	12	36	3	0.4220	15
2 1/2	43.2	20	40	2	0.7270	29
3	45.7	-	24	1	1.0684	26
3 1/2	48.3	6	12	2	1.4680	18
4	52.8	6	12	2	1.7672	21

*** THE ACTUAL WEIGHT CAN VARY BY ± 3%**

PLUGS

AP, P



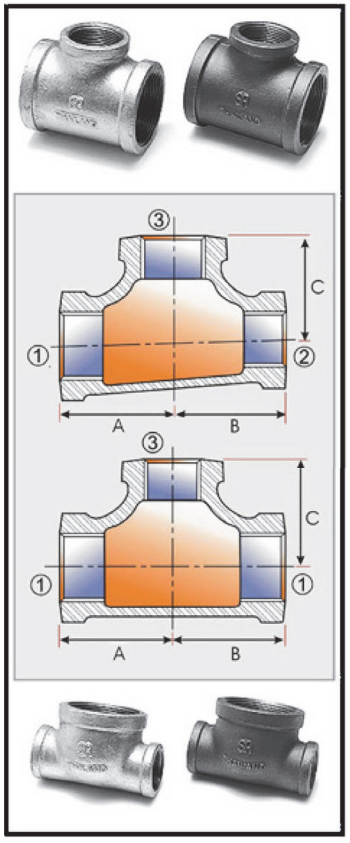
Size (inch)	Dimensions A	B	C	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO.of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
1/8	9.8	6.1	7.1	300	3.600	12	0.0058	21
1/4	11.6	7.1	9.5	150	1.800	12	0.0149	27
3/8	12.6	8.0	11.0	100	1.200	12	0.0220	26
1/2	14.7	9.7	14.3	50	600	12	0.0414	22
3/4	16.5	11.2	15.9	30	360	12	0.0660	21
1	19.1	12.7	20.9	20	240	12	0.1100	22
1 1/4	20.9	14.2	23.8	40	120	3	0.1840	21
1 1/2	21.7	15.8	28.6	30	90	3	0.2500	20
2	23.2	17.3	33.3	20	60	3	0.3840	21
2 1/2	32.0	18.8	38.1	16	32	2	0.5091	16
3	29.4	20.3	42.9	16	32	2	0.7532	24
4	31.0	25.4	58.0	6	12	2	1.4873	18

*** THE ACTUAL WEIGHT CAN VARY BY ± 3%**

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REDUCING TEES

ART, BRT



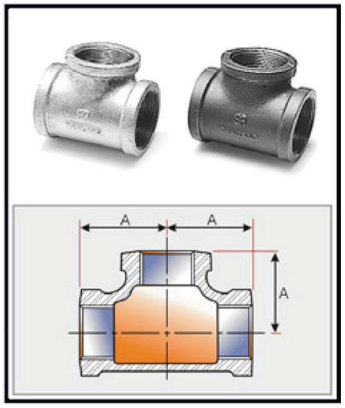
Size 1 x 2 x 3 (inch)	Dimensions A	B	C	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO.of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
1/4 X 1/8	18.8	18.8	19.3	25	300	12	0.0601	18
3/8 X 1/8	22.4	20.6	21.6	90	360	4	0.0730	26
3/8 X 1/4	22.4	22.4	22.9	60	240	4	0.0979	23
1/2 X 1/8	21.9	21.9	23.5	40	160	4	0.1080	17
1/2 X 1/4	24.6	24.6	24.9	40	160	4	0.1248	20
1/2 X 3/8	25.9	25.9	25.7	40	160	4	0.1350	22
3/4 X 1/8	24.0	24.0	25.7	32	128	4	0.1520	19
3/4 X 1/4	26.7	26.7	27.4	25	100	4	0.1746	17
3/4 X 3/8	27.9	27.9	28.1	25	100	4	0.1800	18
3/4 X 1/2	29.9	29.9	30.4	20	80	4	0.2239	18
1 X 1/4	27.6	27.6	30.4	20	80	4	0.2398	19
1 X 3/8	30.0	30.0	32.3	15	60	4	0.2730	16
1 X 1/2	31.4	31.4	34.8	15	60	4	0.3060	18
1 X 3/4	34.8	34.8	36.8	12	48	4	0.3484	17
1 1/4 X 1/4	30.0	30.0	36.6	20	40	2	0.3450	14
1 1/4 X 3/8	32.0	32.0	36.6	20	40	2	0.4009	16
1 1/4 X 1/2	34.0	34.0	38.9	20	40	2	0.4206	17
1 1/4 X 3/4	36.8	36.8	41.2	20	40	2	0.4719	19
1 1/4 X 1	40.1	40.1	42.2	20	40	2	0.5369	21
1 1/2 X 3/8	40.1	40.1	40.2	18	36	2	0.4450	16
1 1/2 X 1/2	35.8	35.8	42.2	18	36	2	0.4840	17
1 1/2 X 3/4	35.8	35.8	44.5	15	30	2	0.5320	16
1 1/2 X 1	41.9	41.9	45.7	10	30	3	0.6168	19
1 1/2 X 11/4	41.9	41.9	47.8	12	24	2	0.6906	17
2 X 3/8	46.2	46.2	-	10	20	2	0.6600	13
2 X 1/2	37.9	37.9	47.8	10	20	2	0.6768	14
2 X 3/4	40.6	40.6	50.0	10	20	2	0.7980	16
2 X 1	43.9	43.9	51.3	10	20	2	0.8096	16
2 X 11/4	47.3	47.3	52.2	8	16	2	0.9056	14
2 X 11/2	50.3	50.3	53.8	8	16	2	1.0662	17
2 1/2 X 1/2	40.2	40.2	55.9	6	12	2	1.2800	3
2 1/2 X 3/4	44.2	44.2	58.9	6	12	2	1.2680	15
2 1/2 X 1	46.5	46.5	59.0	5	10	2	1.3776	14
2 1/2 X 1 1/4	47.5	47.5	62.2	5	10	2	1.4808	15
2 1/2 X 1 1/2	54.9	54.9	63.8	5	10	2	1.5068	15
2 1/2 X2	60.7	60.7	66.0	4	8	2	1.7044	14
3 X 1/2	46.5	46.5	65.0	4	8	2	1.7130	14
3 X 3/4	45.5	45.5	65.3	3	6	2	1.3280	8
3 X 1	50.8	50.8	67.6	3	6	2	1.9765	12
3 X 1 1/4	55.1	55.1	69.6	3	6	2	1.6976	10
3 X 1 1/2	58.2	58.2	71.1	3	6	2	2.1740	13
3 X 2	64.0	64.0	73.4	3	6	2	2.3873	14
3 X 2 1/2	71.9	71.9	76.0	3	6	2	2.7200	16
4 X 1/2	53.5	53.5	79.2	2	4	2	2.5000	10
4 X 3/4	53.5	53.5	79.2	2	4	2	2.7500	11
4 X 1	-	-	-	2	4	2	3.0466	12
4 X 1 1/4	61.0	61.0	86.5	2	4	2	3.1120	12
4 X 1 1/2	62.5	62.5	82.6	2	4	2	3.4200	14
4 X 2	68.2	68.2	84.9	-	3	1	3.6770	11
4 X 2 1/2	77.5	77.5	89.2	-	3	1	4.1900	13
4 X 3	82.1	82.1	89.6	1	2	2	4.1920	8

' THE ACTUAL WEIGHT CAN VARY BY ± 3%

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TEES

AT, BT

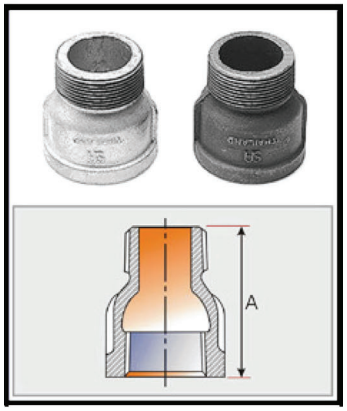


Size (inch)	Dimensions A	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO.of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
1/8	17.5	120	480	4	0.0452	22
1/4	20.6	75	300	4	0.0702	21
3/8	24.1	45	180	4	0.1087	20
1/2	28.4	40	120	3	0.1686	20
3/4	33.3	35	70	2	0.2542	18
1	38.1	20	40	2	0.3998	16
1 1/4	44.5	14	28	2	0.6020	17
1 1/2	49.3	12	24	2	0.7254	17
2	57.2	8	16	2	1.2100	19
2 1/2	68.6	4	8	2	2.2133	18
3	78.2	-	6	1	2.9500	18
4	96.3	1	2	2	5.2920	11
5	114.3	-	1	1	9.1200	9
6	132.0	-	1	1	11.8133	12

*** THE ACTUAL WEIGHT CAN VARY BY ± 3%**

EXTENSION

AX, BX

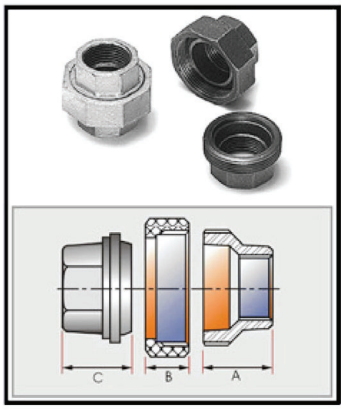


Size (inch)	Dimensions A	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO.of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
3/8	32	40	480	12	0.0480	23
1/2	40	75	300	4	0.0712	5
3/4	48	40	160	4	0.1400	20
1	55	30	90	3	0.1892	17
1 1/4	60	30	60	2	0.2872	17
1 1/2	65	20	40	2	0.3902	16
2	70	15	30	2	0.5990	18

*** THE ACTUAL WEIGHT CAN VARY BY ± 3%**

UNIONS CONICAL IRON TO IRON SEAT

U340



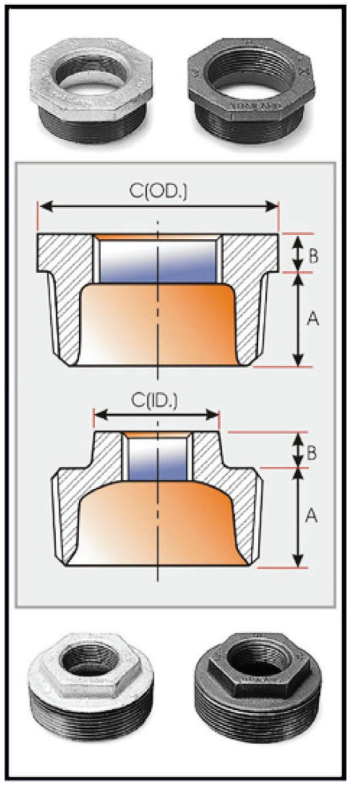
Size (inch)	Dimensions A	B	C	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO.of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
1/2	26.0	19.0	30.0	50	100	2	0.1990	20
3/4	28.0	20.0	30.5	35	70	2	0.2860	20
1	31.0	22.0	34.0	20	40	2	0.3480	14
1 1/4	33.0	24.0	40.0	15	30	2	0.6040	18
1 1/2	36.0	25.0	42.5	10	20	2	0.7180	14
2	42.0	27.0	46.0	6	12	2	1.0740	13
2 1/2	44.0	33.5	51.5	4	8	2	2.0000	16

*** THE ACTUAL WEIGHT CAN VARY BY ± 3%**

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BUSHINGS

ABU, BU



Size (inch)	Dimensions A	B	C(id)	C(od)	Inner Box Pcs./Box	Master Ctn. Pcs./Ctn.	NO.of Inner Box	Weight/Pcs.	N.W./Ctn. (Kgs.)
1/4 X 1/8	13.2	3.8	-	16.3	120	1440	12	0.0130	19
3/8 X 1/8	12.2	4.1	-	21.6	75	900	12	0.0250	23
3/8 X 1/4	12.2	4.1	-	21.1	75	900	12	0.0201	18
1/2 X 1/8	16.4	4.8	-	26.2	150	600	4	0.0492	30
1/2 X 1/4	14.2	4.8	-	26.2	150	600	4	0.0425	26
1/2 X 3/8	14.2	4.8	-	26.2	150	600	4	0.0352	21
3/4 X 1/8	16.0	5.6	-	29.2	75	300	4	0.0758	23
3/4 X 1/4	16.0	5.6	-	29.2	75	300	4	0.0616	18
3/4 X 3/8	16.0	5.6	-	29.2	75	300	4	0.0524	16
3/4 X 1/2	18.0	5.6	-	29.2	75	300	4	0.0500	15
1 X 1/8	19.1	9.6	28.5	-	50	200	4	0.0938	19
1 X 1/4	19.1	9.6	28.5	-	50	200	4	0.0910	18
1 X 3/8	19.1	9.6	28.5	-	50	200	4	0.0862	17
1 X 1/2	21.6	6.4	-	36.1	50	200	4	0.1044	21
1 X 3/4	21.6	6.4	-	36.1	50	200	4	0.0844	17
1 1/4 X 1/4	22.8	8.6	28.5	-	30	120	4	0.1338	16
1 1/4 X 3/8	22.8	8.6	28.5	-	30	120	4	0.1200	14
1 1/4 X 1/2	22.8	8.6	31.5	-	30	120	4	0.1474	18
1 1/4 X 3/4	20.3	7.1	-	44.7	30	120	4	0.1864	22
1 1/4 X 1	20.3	7.1		44.7	30	120	4	0.1350	16
1 1/2 X 1/8	21.1	9.4	28.4	-	25	75	3	0.2950	22
1 1/2 X 1/4	23.6	9.4	28.5	-	25	75	3	0.1790	13
1 1/2 X 3/8	23.6	9.4	28.5	-	25	75	3	0.1740	13
1 1/2 X 1/2	23.6	9.4	34.0	-	25	75	3	0.1936	15
1 1/2 X 3/4	23.6	9.4	36.5	-	25	75	3	0.1892	14
1 1/2 X 1	23.3	7.9	-	50.8	25	75	3	0.2160	16
1 1/2 X 1 1/4	23.3	7.9	-	50.8	25	75	3	0.1471	11
2 X1/4	21.8	10.6	28.5	-	20	60	3	0.2732	16
2 X 3/8	22.4	10.0	28.5	-	20	60	3	0.2784	26
2 X 1/2	24.9	10.4	34.0	-	20	60	3	0.2832	17
2 X 3/4	24.9	10.4	41.4	-	20	60	3	0.3150	19
2 X 1	24.9	10.4	45.0	-	20	60	3	0.3080	18
2 X 1 1/4	27.0	11.0	-	63.0	20	60	3	0.3840	23
2 X 1 1/2	27.0	11.0	-	63.0	20	60	3	0.3155	19
2 1/2 X 1/2	27.2	11.2	34.0	-	15	30	2	0.7130	21
2 1/2 X 3/4	27.2	11.2	41.4	-	15	30	2	0.4328	13
2 1/2 X 1	27.2	11.2	49.5	-	15	30	2	0.4576	14
2 1/2 X 1 1/4	27.2	11.2	60.7	-	15	30	2	0.4973	15
2 1/2 X 1 1/2	27.2	11.2	-	75.7	15	30	2	0.6208	19
2 1/2 X 2	29.7	9.4	-	75.7	15	30	2	0.4460	13
3 X 1/2	28.7	12.2	34.0	-	12	24	2	1.0100	24
3 X 3/4	28.7	12.2	41.4	-	12	24	2	0.6180	15
3 X 1	28.7	12.2	49.5	-	12	24	2	0.6536	16
3 X 1 1/4	28.7	12.2	60.7	-	12	24	2	0.7950	19
3 X 1 1/2	28.7	12.2	68.1	-	12	24	2	0.7576	18
3 X 2	28.7	12.2	-	98.0	12	24	2	0.9220	22
3 X 2 1/2	28.7	12.2	-	98.0	12	24	2	0.8360	20
3 1/2 X 1 1/2	30.0	13.2	70.0	-	8	16	2	1.0000	16
3 1/2 X 2	33.0	13.2	83.3	-	8	16	2	1.1500	18
3 1/2 X 3	30.0	10.9	-	117.3	8	16	2	0.8488	14
4 X 1/2	39.8	14.2	-	121.0	5	10	2	1.6600	17
4 X 3/4	38.0	13.0	-	121.0	5	10	2	1.4650	15
4 X 1	31.0	15.2	-	-	5	10	2	1.1620	12
4 X 1 1/4	31.0	15.2	60.7	-	5	10	2	1.3712	14
4 X 1 1/2	31.0	15.2	68.1	-	5	10	2	1.0866	11
4 X 2	36.0	15.2	83.3	-	5	10	2	1.3592	14
4 X 2 1/2	31.0	15.2	98.0	-	5	10	2	1.5376	15
4 X 3	37.0	14.0	-	126.0	5	10	2	1.6804	17

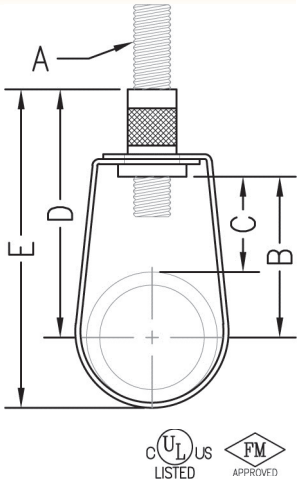
* THE ACTUAL WEIGHT CAN VARY BY ± 3%



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BAND HANGERS

NFPA SWIVEL RING HANGER — FIG. 141 & 141F



Function: Designed for the suspension of non-insulated stationary pipe lines. The knurled insert nut that allows a vertical adjustment after installation, is tapped to NFPA reduced rod size standards. Captured knurled insert nut present on pipe sizes ½" (15mm) to 2" (50mm). The capture is permanent in the bottom portion of the band, allowing the hanger to be opened during installation if desired, but preventing the knurled insert nut from falling completely out. Fig. 141F has a layer of felt which separates the pipe from the hanger to reduce vibration and sound.

Material: Carbon steel

Finish: Pre-galvanized **(Fig. 141)** or pre-galvanized with felt lining **(Fig. 141F)**

Approvals: Underwriters' Laboratories Listed in the U.S. (UL), Canada (CUL), for use with standard steel pipe sizes ¾" (20mm) to 8" (200mm) and CPVC pipe size ¾" (20mm) to 4" (100mm). Factory Mutual Approved for steel pipe sizes ¾" (20mm) to 8" (200mm). Complies with Federal Specifications A-A-1192A (Type 10), and Manufacturers' Standardization Society ANSI/MSS SP-58 (Type 10) which supersedes ANSI/MSS SP-69.

Ordering: Specify figure number and pipe size.

NOTE: If ordering Fig. 141F felt lined hangers for pipe sizes of 3½"(90mm) or under, order the next largest size to allow for the thickness of the felt lining. Metric knurl insert nuts available upon request.

Pipe Size		Rod Size	B		Adj. C		D		E		Max. Rec. Load		Wt. Each	
											lbs.	kN	lbs.	kg
½	(15)	3/8	1 7/8	(47.63)	1 7/16	(36.51)	2 3/4	(69.85)	3 1/16	(77.79)	300	(1.33)	.10	(.05)
¾	(20)	3/8	1 11/16	(42.86)	1 1/8	(28.58)	2 1/2	(63.50)	3 1/16	(77.79)	300	(1.33)	.10	(.05)
1	(25)	3/8	1 5/8	(41.28)	1	(25.40)	2 1/2	(63.50)	3 3/16	(80.96)	300	(1.33)	.10	(.05)
1¼	(32)	3/8	1 15/16	(49.21)	1 1/16	(26.99)	2 13/16	(71.44)	3 9/16	(90.49)	300	(1.33)	.11	(.05)
1½	(40)	3/8	2 1/8	(53.98)	1 1/16	(26.99)	3 1/8	(79.38)	3 7/8	(98.43)	300	(1.33)	.11	(.05)
2	(50)	3/8	2 7/16	(61.91)	1 1/8	(28.58)	3 5/16	(84.14)	4 3/8	(111.13)	300	(1.33)	.14	(.06)
2½	(65)	3/8	3 1/16	(77.79)	1 5/8	(41.28)	3 15/16	(100.01)	5 3/8	(136.53)	525	(2.34)	.19	(.09)
3	(80)	3/8	3 11/16	(93.66)	1 7/8	(47.63)	4 9/16	(115.89)	6 5/16	(160.34)	525	(2.34)	.23	(.10)
3½	(90)	3/8	3 3/4	(95.25)	1 7/8	(47.63)	4 5/8	(117.48)	6 5/8	(168.28)	525	(2.34)	.25	(.11)
4	(100)	3/8	4 3/16	(106.36)	1 7/8	(47.63)	5 1/16	(128.59)	7 5/16	(185.74)	650	(2.89)	.30	(.14)
5	(125)	1/2	4 5/8	(117.48)	1 5/8	(41.28)	5 5/8	(142.88)	8 3/8	(212.73)	1000	(4.45)	.50	(.23)
6	(150)	1/2	5 5/8	(142.88)	2 1/4	(57.15)	6 1/2	(165.10)	9 13/16	(249.24)	1000	(4.45)	.58	(.26)
8	(200)	1/2	6 13/16	(173.04)	2 7/16	(61.91)	7 15/16	(201.61)	12 1/4	(311.15)	1000	(4.45)	.90	(.41)

Unless otherwise specified, all dimensions on drawings and in charts are in inches and dimensions shown in parentheses are in millimeters.

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SURGE RESTRAINT

FIG. 055

Function: Designed to restrict the upward movement of activated fire sprinkler systems. Grips ring hanger, NOT THE NUT, and allows for fine tuning adjustments. Listed for use with PHD Manufacturing, Inc. Figure 141 ring hangers only.

Material: Spring Steel

Finish: Powder Coated

Install: Installs easily before or after pipe installation and without tools. Simply clip Fig. 055 onto Fig. 141 ring hanger and run the hanger rod down to the bottom plate surface to ensure proper restraint.

Approvals: Underwriters Laboratories listed for US and Canada.

Ordering: Specify figure number.

NOTE: For use up to 2" (50) pipe, one size fits all.

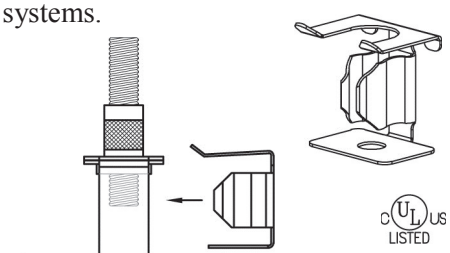


Fig. 055
(Pictured With Fig. 141)

PHD Manufacturing, Inc.
44018 Columbiana-Waterford Road
Columbiana, Ohio 44408-9481
Phone: 800-321-2736 • 330-482-9256
Fax: 330-482-2763
Web: www.phd-mfg.com

FIG. 055 SURGE RESTRAINT

PIPE SIZES: 3/4" through 2"

FUNCTION: Designed to restrict the upward movement of activated fire sprinkler systems. Grips ring hanger, NOT THE NUT, and allows for fine tuning adjustments. Listed for use with PHD Manufacturing, Inc. Figure 141 ring hangers only.

ORIENTATIONS:

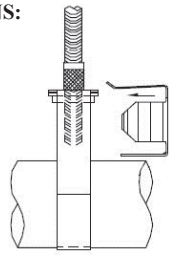


Illustration 1

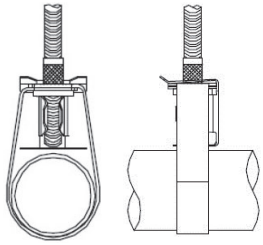


Illustration 1

APPROVALS: Underwriters Laboratories listed for US and Canada

MATERIAL: Spring Steel

FINISH: Black E-Coat

INSTALLATION: Installs easily before or after pipe installation and without tools. Simply clip Fig. 055 onto Fig. 141 ring hanger as shown above in Illustration 1. Run the hanger rod down to the bottom plate surface to ensure proper restraint as seen in Illustration 2.

