

Brimstone

Fire Safety Management LLC

3615 132nd St SW SuiteA - Lynwood, WA 98087

FIRE PROTECTION SUBMITTALS

McDonalds Puyallup

731 SHAW RD

PUYALLUP, WA 98372

FIRE SPRINKLER SYSTEM

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Series DS-1 – 5.6 K-factor, Dry-type Sprinklers Pendent, Upright, and Horizontal Sidewall Standard Response, Standard Coverage

General Description

TYCO Series DS-1 5.6K Pendent, Upright, and Horizontal Sidewall, Standard Response (5 mm bulb), Standard Coverage Dry-type Sprinklers are decorative glass bulb automatic sprinklers typically used where:

- pendent sprinklers are required on dry pipe systems that are exposed to freezing temperatures (for example, sprinkler drops from unheated portions of buildings)
- sprinklers and/or a portion of the connecting piping may be exposed to freezing temperatures (for example, sprinkler drops from wet systems into freezers, or horizontal piping extensions through a wall to protect unheated areas of a building such as loading docks, overhangs, and building exteriors)
- sprinklers are used on systems that are seasonably drained to avoid freezing (for example, vacation resort areas)

NOTICE

Series DS-1 Dry-type Sprinklers described herein must be installed and maintained in compliance with this document, as well as with the applicable standards of the NATIONAL FIRE PROTECTION ASSOCIATION (NFPA), in addition to the standards of any other authorities having jurisdiction. Failure to do so may impair the performance of these devices.

The owner is responsible for maintaining their fire protection system and devices in proper operating condition. Contact the installing contractor or product manufacturer with any questions.

Series DS-1 Dry-type Sprinklers must only be installed in fittings that meet the requirements of the Design Criteria section.

Sprinkler Identification Numbers (SINs)

TY3255 – Pendent
TY3155 – Upright
TY3355 – Horizontal Sidewall

Technical Data

Approvals

- UL and C-UL Listed
- FM Approved
- NYC Approved
- under MEA 352-01-E
- LPCB Approved
- Reference No. 094a/11
- CE Certified
- Certificate of Conformity No.2831-CPR-S2015

See Tables A and B for details.

Maximum Working Pressure

175 psi (12,1 bar)

Inlet Thread Connections

1 in. NPT
ISO 7-R 1



Discharge Coefficient

K=5.6 gpm/psi^{1/2} (80,6 lpm/bar^{1/2})

Temperature Ratings

See Tables A and B.

Finishes

Sprinkler: See Table D.
Escutcheon: See Table D.

Physical Characteristics

Inlet	.....	Copper
Plug	.....	Copper
Yoke	.....	Stainless Steel
Casing	.....	Galvanized Carbon Steel
Insert	.....	Bronze
Bulb Seat	.....	Stainless Steel
Bulb (5 mm dia.)	.....	Glass
Compression Screw	.....	Bronze
Deflector	.....	Bronze
Frame	.....	Bronze
Guide Tube	.....	Stainless Steel
Water Tube	.....	Stainless Steel
Spring	.....	Stainless Steel
Sealing Assembly	.....	Beryllium Nickel w/TEFLON
Escutcheon	.....	Carbon Steel or Stainless Steel

IMPORTANT

Refer to Technical Data Sheet TFP2300 for warnings pertaining to regulatory and health information.

Always refer to Technical Data Sheet TFP700 for the "INSTALLER WARNING" that provides cautions with respect to handling and installation of sprinkler systems and components. Improper handling and installation can permanently damage a sprinkler system or its components and cause the sprinkler to fail to operate in a fire situation or cause it to operate prematurely.

SPRINKLER TYPE	ESCUTCHEON TYPE	TEMPERATURE RATING	BULB COLOR CODE	SPRINKLER FINISH						
				NATURAL BRASS	CHROME PLATED	POLYESTER*				
PENDENT (TY3255)	STANDARD	135°F (57°C)	Orange	1, 2, 3, 4, 5		1, 2, 4, 5				
		155°F (68°C)	Red							
		175°F (79°C)	Yellow							
		200°F (93°C)	Green							
		286°F (141°C)	Blue							
		360°F (182°C)	Mauve				1, 2, 3	1, 2		
	RECESSED	135°F (57°C)	Orange	1, 2, 3, 5		1, 2, 5				
		155°F (68°C)	Red							
		175°F (79°C)	Yellow							
		200°F (93°C)	Green							
		286°F (141°C)	Blue				1, 2			
		360°F (182°C)	Mauve				N/A			
	DEEP	135°F (57°C)	Orange	1, 2, 3, 4, 5		1, 2, 4, 5				
		155°F (68°C)	Red							
		175°F (79°C)	Yellow							
		200°F (93°C)	Green							
		286°F (141°C)	Blue							
		360°F (182°C)	Mauve							
		WITHOUT	135°F (57°C)				Orange	1, 2, 3		1, 2
			155°F (68°C)				Red			
			175°F (79°C)				Yellow			
200°F (93°C)			Green							
286°F (141°C)			Blue							
360°F (182°C)			Mauve							
UPRIGHT (TY3155)	WITHOUT	135°F (57°C)	Orange	1, 2, 3, 4, 5		1, 2, 4, 5				
		155°F (68°C)	Red							
		175°F (79°C)	Yellow							
		200°F (93°C)	Green							
		286°F (141°C)	Blue							
		360°F (182°C)	Mauve				1, 2, 3	1, 2		

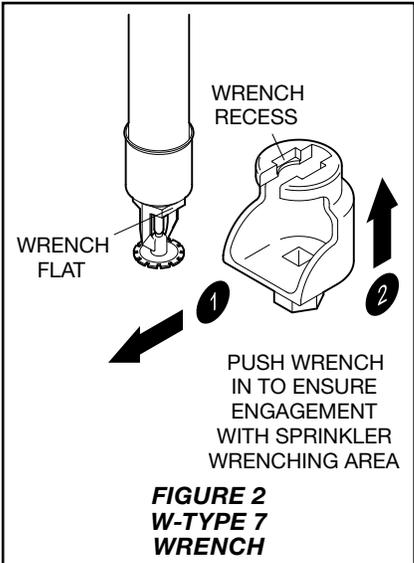
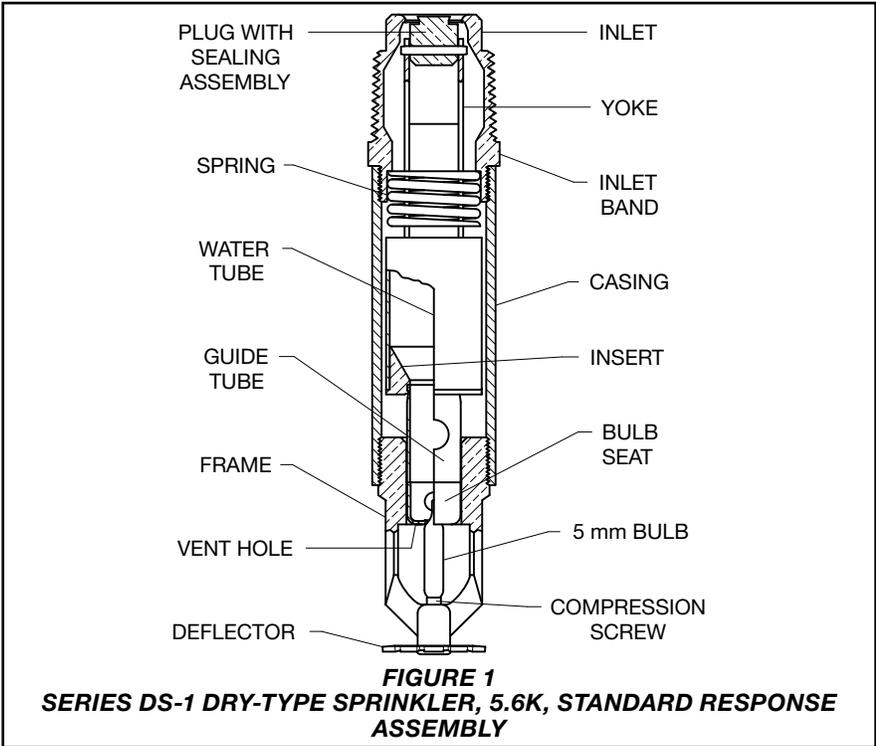
- Notes:**
1. Listed by Underwriters Laboratories, Inc. (UL), maximum order length of 48 in.
 2. Listed by Underwriters Laboratories for use in Canada (C-UL), maximum order length of 48 in.
 3. Approved by FM Global (FM Approvals), maximum order length of 48 in.
 4. Loss Prevention Certification Board (LPCB) and CE conformity apply to these temperature ratings only
 5. Approved by the City of New York under MEA 352-01-E
- * Frame and deflector only
N/A – Not Applicable

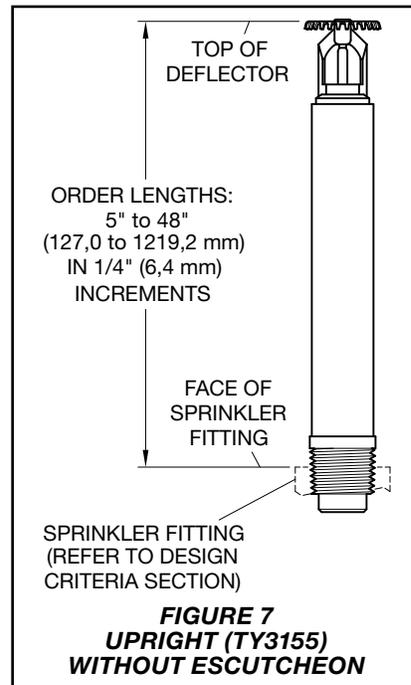
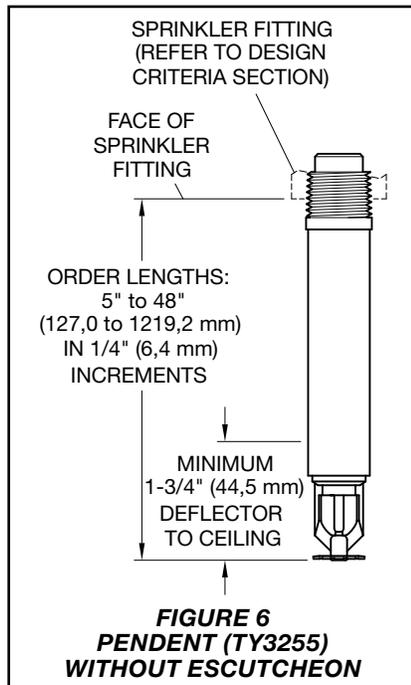
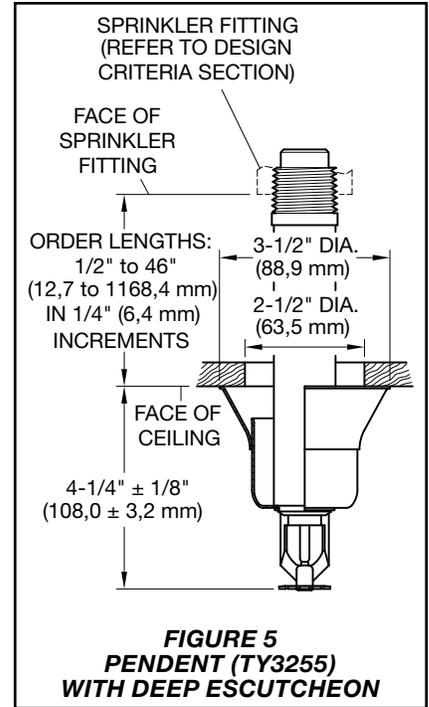
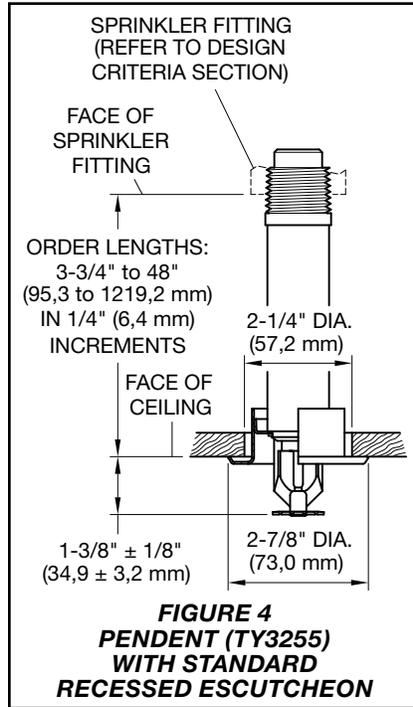
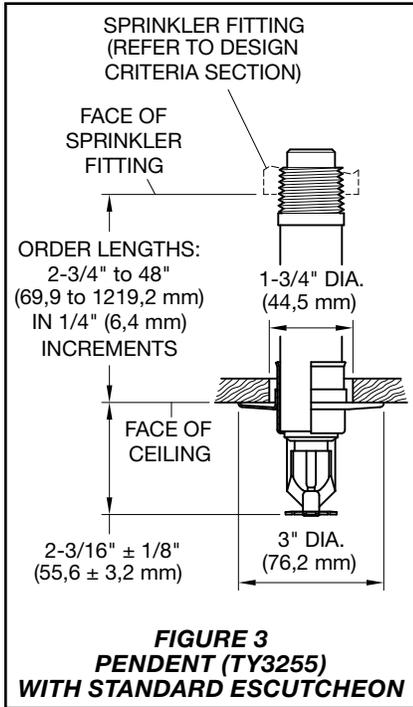
TABLE A
SERIES DS-1 PENDENT & UPRIGHT DRY-TYPE SPRINKLERS, 5.6K, STANDARD RESPONSE
LABORATORY LISTINGS AND APPROVALS

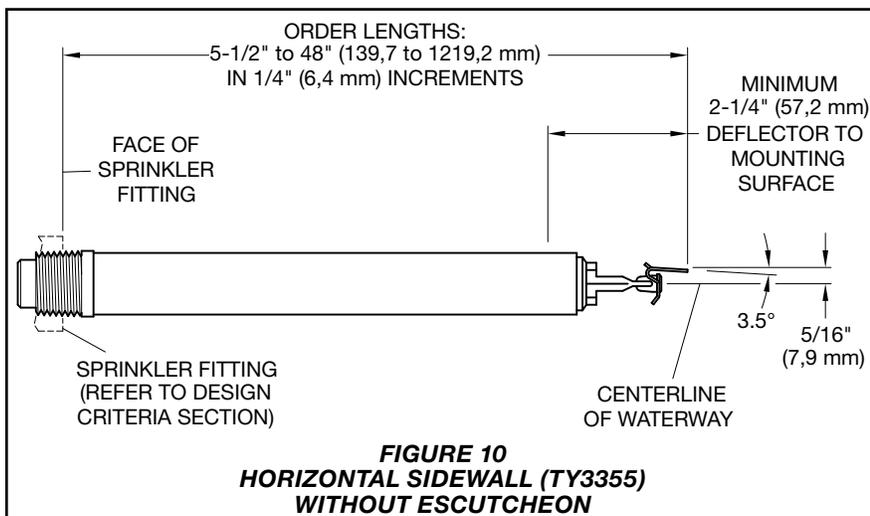
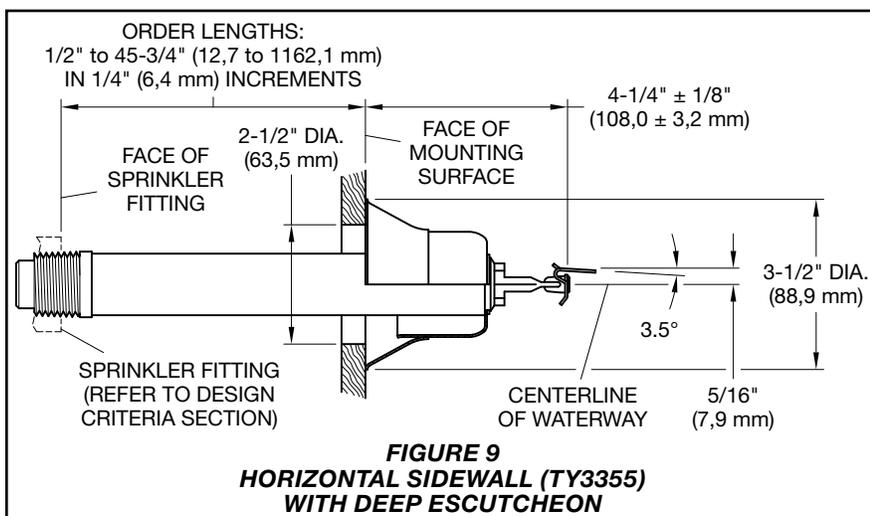
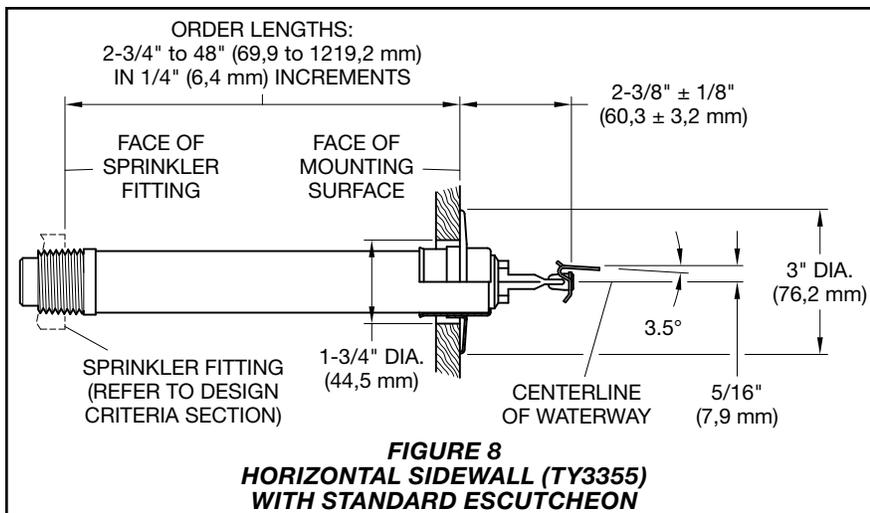
SPRINKLER TYPE	ESCUTCHEON TYPE	TEMPERATURE RATING	BULB COLOR CODE	SPRINKLER FINISH		
				NATURAL BRASS	CHROME PLATED	POLYESTER***
HSW* (TY3355)	STANDARD	135°F (57°C)	Orange	1**, 2**, 3**, 4, 5		1**, 2**, 4, 5
		155°F (68°C)	Red			
		175°F (79°C)	Yellow			
		200°F (93°C)	Green			
		286°F (141°C)	Blue			
		360°F (182°C)	Mauve			
	DEEP	135°F (57°C)	Orange			
		155°F (68°C)	Red			
		175°F (79°C)	Yellow			
		200°F (93°C)	Green			
		286°F (141°C)	Blue			
		360°F (182°C)	Mauve			
	WITHOUT	135°F (57°C)	Orange			
		155°F (68°C)	Red			
		175°F (79°C)	Yellow			
		200°F (93°C)	Green			
		286°F (141°C)	Blue			
		360°F (182°C)	Mauve				1**, 2**, 5	1**, 2**

- Notes:**
- Listed by Underwriters Laboratories, Inc. (UL), maximum order length of 48 in.
 - Listed by Underwriters Laboratories for use in Canada (C-UL), maximum order length of 48 in.
 - Approved by FM Global (FM Approvals), maximum order length of 48 in.
 - Loss Prevention Certification Board (LPCB) and CE conformity apply to these temperature ratings only
 - Approved by the City of New York under MEA 352-01-E
- * Horizontal sidewall with top of deflector-to-ceiling distance of 4 to 12 in. (100 to 300 mm)
 ** Light and ordinary hazard occupancies only
 *** Light hazard occupancies only
 **** Frame and deflector only

TABLE B
SERIES DS-1 HORIZONTAL SIDEWALL (HSW) DRY-TYPE SPRINKLER, 5.6K, STANDARD RESPONSE
LABORATORY LISTINGS AND APPROVALS







Operation

When TYCO Series DS-1 5.6K Pendent, Upright, and Horizontal Sidewall, Standard Response, Standard Coverage Dry-type Sprinklers are in service, water is prevented from entering the assembly by the Plug with Sealing Assembly (see Figure 1) in the Inlet of the sprinkler.

The glass bulb contains a fluid that expands when exposed to heat. When the rated temperature is reached, the fluid expands sufficiently to shatter the glass bulb, and the Bulb Seat is released.

The compressed Spring is then able to expand and push the Water Tube as well as the Guide Tube outward. This action simultaneously pulls inward on the Yoke, withdrawing the Plug with Sealing Assembly from the Inlet, allowing the sprinkler to activate and flow water.

Design Criteria

TYCO Series DS-1 5.6K Pendent, Upright, and Horizontal Sidewall, Standard Response, Standard Coverage Dry-type Sprinklers are intended for use in fire sprinkler systems designed in accordance with the standard installation rules recognized by the applicable listing or approval agency (for example, UL Listing is based on NFPA 13 requirements). For more information on LPCB Approval, contact Johnson Controls at the following office:

Kopersteden 1
7547 TJ Enschede
The Netherlands
Tel: +31-(0)53-428-4444
Fax: +31-(0)53-428-3377

Sprinkler Fittings

Install 1 in. NPT Series DS-1 Dry-type Sprinklers in the 1 in. NPT outlet or run of the following fittings:

- malleable or ductile iron threaded tee fittings that meet the dimensional requirements of ANSI B16.3 (Class 150)
- cast iron threaded tee fittings that meet the dimensional requirements of ANSI B16.4 (Class 125)

Do not install Series DS-1 Dry-type Sprinklers into elbow fittings. The Inlet of the sprinkler can contact the interior of the elbow.

The unused outlet of the threaded tee is plugged as shown in Figure 12.

Ambient Temperature Exposed to Discharge End of Sprinkler	Temperatures for Heated Area ⁽¹⁾		
	40°F (4°C)	50°F (10°C)	60°F (16°C)
	Minimum Exposed Barrel Length ⁽²⁾ , in. (mm)		
40°F (4°C)	0	0	0
30°F (-1°C)	0	0	0
20°F (-7°C)	4 (100)	0	0
10°F (-12°C)	8 (200)	1 (25)	0
0°F (-18°C)	12 (305)	3 (75)	0
-10°F (-23°C)	14 (355)	4 (100)	1 (25)
-20°F (-29°C)	14 (355)	6 (150)	3 (75)
-30°F (-34°C)	16 (405)	8 (200)	4 (100)
-40°F (-40°C)	18 (455)	8 (200)	4 (100)
-50°F (-46°C)	20 (510)	10 (255)	6 (150)
-60°F (-51°C)	20 (510)	10 (255)	6 (150)

Notes:
1. For protected area temperatures that occur between values listed above, use the next cooler temperature.
2. These lengths are inclusive of wind velocities up to 30 mph (18,6 kph).

TABLE C
EXPOSED SPRINKLER BARRELS IN WET PIPE SYSTEMS
MINIMUM RECOMMENDED LENGTHS

You can also install Series DS-1 Dry-type Sprinklers in the 1 in. NPT outlet of a GRINNELL Figure 730 Mechanical Tee and GRINNELL G-FIRE Figure 522; however, the use of the Figure 730 Tee and Figure 522 for this arrangement is limited to wet pipe systems.

The configuration shown in Figure 13 is only applicable for wet pipe systems where the sprinkler fitting and water-filled pipe above the sprinkler fitting are not subject to freezing and where the length of the dry-type sprinkler has the minimum exposure length depicted in Figure 11. See the Exposure Length section.

For wet pipe system installations of 1 in. NPT Series DS-1 Dry-Type Sprinklers connected to CPVC piping, use only the following TYCO CPVC fittings:

- 1 in. x 1 in. NPT Female Adapter (P/N 80145)
- 1 in. x 1 in. x 1 in. NPT Sprinkler Head Adapter Tee (P/N 80249)

For dry pipe system installations, use only the side outlet of maximum 2 1/2 in. reducing tee when locating Series DS-1 Dry-type Sprinklers directly below the branchline; otherwise, use the configuration shown in Figure 12 to assure complete water drainage from above Series DS-1 Dry-type Sprinklers and the branchline. Failure to do so may result in pipe freezing and water damage.

NOTICE

Do not install Series DS-1 Dry-type Sprinklers into any other type fitting. Failure to use the appropriate fitting may result in one of the following:

- *failure of the sprinkler to operate properly due to formation of ice over the Inlet Plug or binding of the Inlet Plug*
- *insufficient engagement of the Inlet pipe-threads with consequent leakage*

Drainage

In accordance with the minimum requirements of the NATIONAL FIRE PROTECTION ASSOCIATION for dry pipe sprinkler systems, branch, cross, and feed-main piping connected to Dry Sprinklers and subject to freezing temperatures must be pitched for proper drainage.

Exposure Length

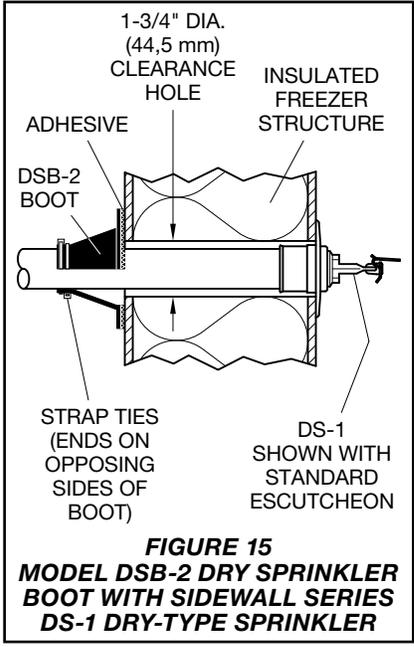
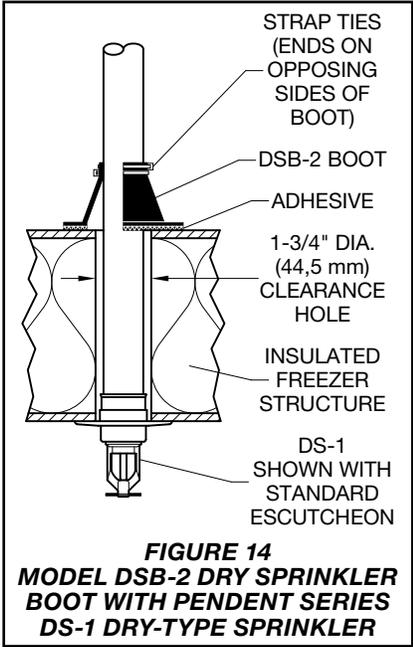
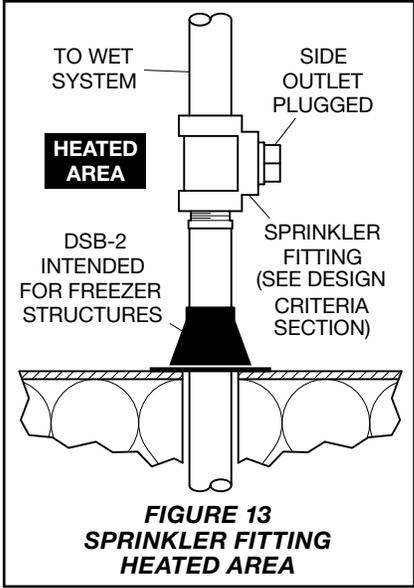
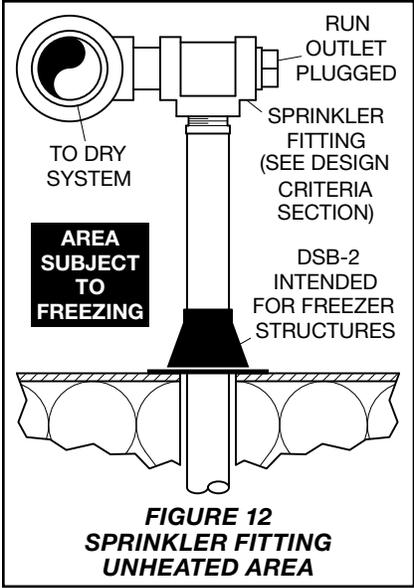
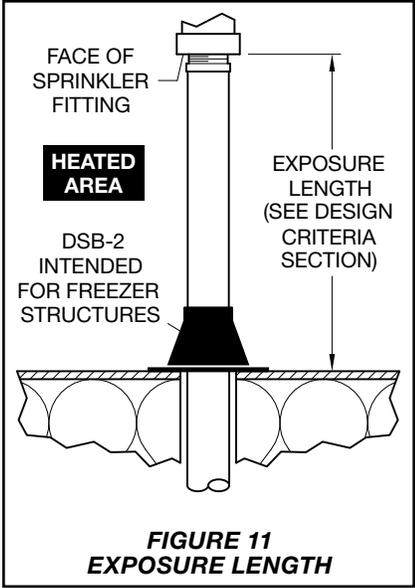
When using Dry Sprinklers in wet pipe sprinkler systems to protect areas subject to freezing temperatures, use Table C to determine a sprinkler's appropriate exposed barrel length to prevent water from freezing in the connecting pipes due to conduction. The exposed barrel length measurement must be taken from the face of the sprinkler fitting to the surface of the structure or insulation that is exposed to the heated area. See Figure 11 for an example.

For protected area temperatures between those given above, the minimum recommended length from the face of the fitting to the outside of the protected area may be determined by interpolating between the indicated values.

Clearance Space

In accordance with NFPA 13, when connecting an area subject to freezing and an area containing a wet pipe sprinkler system, the clearance space around the sprinkler barrel of dry-type sprinklers must be sealed. Due to temperature differences between two areas, the potential for the formation of condensation in the sprinkler and subsequent ice build-up is increased. If this condensation is not controlled, ice build-up can occur that might damage the dry-type sprinkler and/or prevent proper operation in a fire situation.

Use of the Model DSB-2 Dry Sprinkler Boot, described in technical data sheet TFP591 and shown in Figures 14 and 15, can provide the recommended seal.



Installation

TYCO Series DS-1 5.6K Pendent, Upright, and Horizontal Sidewall, Standard Response, Standard Coverage Dry-type Sprinklers must be installed in accordance with this section.

General Instructions

Series DS-1 Dry-type Sprinklers must only be installed in fittings that meet the requirements of the Design Criteria section. See the Design Criteria section for other important requirements regarding piping design and sealing of the clearance space around the Sprinkler Casing.

Do not install any bulb-type sprinkler if the bulb is cracked or there is a loss of liquid from the bulb. With the sprinkler held horizontally, a small air bubble should be present. The diameter of the air bubble is approximately 1/16 in. (1,6 mm) for the 135°F (57°C) rating to 1/8 in. (3,2 mm) for the 360°F (182°C) rating.

Obtain a leak-tight 1 in. NPT sprinkler joint by applying a minimum-to-maximum torque of 20 to 30 lb-ft (26,8 to 40,2 N·m). Higher levels of torque may distort the sprinkler Inlet with consequent leakage or impairment of the sprinkler.

Do not attempt to compensate for insufficient adjustment in an Escutcheon Plate by under or over-tightening the Sprinkler. Re-adjust the position of the sprinkler fitting to suit.

Notes:

- *Install pendent sprinklers only in the pendent position; install upright sprinklers only in the upright position. The deflector of a pendent or upright sprinkler is to be parallel to the ceiling.*
- *Install horizontal sidewall sprinklers in the horizontal position with their centerline of waterway perpendicular to the back wall and parallel to the ceiling. Ensure the word "TOP" on the Deflector faces the ceiling.*

Step 1. With a non-hardening pipe-thread sealant such as TEFLON applied to the inlet threads, hand-tighten the sprinkler into the sprinkler fitting.

Step 2. Wrench-tighten the sprinkler using either:

- a pipe wrench on the Inlet Band or the Casing, see Figure 1
- the W-Type 7 Sprinkler Wrench on the Wrench Flat, see Figure 2

Apply the wrench recess of the W-Type 7 Sprinkler Wrench to the wrench flat.

Note: *If sprinkler removal becomes necessary, remove the sprinkler using the same wrenching method noted above. Sprinkler removal is easier when a non-hardening sealant was used and torque guidelines were followed. After removal, inspect the sprinkler for damage.*

Step 3. After installing the ceiling or wall and applying a ceiling finish, slide on the outer piece of the escutcheon until it comes in contact with the ceiling/wall. Do not lift the ceiling panel out of its normal position.

When using the Deep Escutcheon, hold the outer piece in contact with the mounting surface (ceiling or wall). Then rotate the inner piece approximately 1/4 turn with respect to the outer piece, to hold the Deep Escutcheon firmly together.

Care and Maintenance

TYCO Series DS-1 5.6K Pendent, Upright, and Horizontal Sidewall, Standard Response, Standard Coverage Dry-type Sprinklers must be maintained and serviced in accordance with this section.

Before closing a fire protection system main control valve for maintenance work on the fire protection system that it controls, obtain permission to shut down the affected fire protection systems from the proper authorities and notify all personnel who may be affected by this action.

Absence of the outer piece of an escutcheon, which is used to cover a clearance hole, may delay the time to sprinkler operation in a fire situation.

A Vent Hole is provided in the Bulb Seat (see Figure 1) to indicate if the Dry Sprinkler is remaining dry. Evidence of leakage from the Vent Hole indicates potential leakage past the Inlet seal and the need to remove the sprinkler to determine the cause of leakage; for example, an improper installation or an ice plug. Close the fire protection system control valve and drain the system before removing the sprinkler.

Sprinklers which are found to be leaking or exhibiting visible signs of corrosion must be replaced.

Automatic sprinklers must never be painted, plated, coated, or otherwise altered after leaving the factory. Modified sprinklers must be replaced. Sprinklers that have been exposed to corrosive products of combustion, but

have not operated, should be replaced if they cannot be completely cleaned by wiping the sprinkler with a cloth or by brushing it with a soft bristle brush.

Care must be exercised to avoid damage to the sprinklers before, during, and after installation. Sprinklers damaged by dropping, striking, wrench twist/slippage, or the like, must be replaced. Also, replace any sprinkler that has a cracked bulb or that has lost liquid from its bulb. See the Installation section.

The owner is responsible for the inspection, testing, and maintenance of their fire protection system and devices in compliance with this document, as well as with the applicable standards of the NATIONAL FIRE PROTECTION ASSOCIATION, such as NFPA 25, in addition to the standards of any other authorities having jurisdiction. Contact the installing contractor or product manufacturer with any questions.

Automatic sprinkler systems are recommended to be inspected, tested, and maintained by a qualified Inspection Service in accordance with local requirements and/or national codes.

P/N* 60 - XXX - X - XXX

		SIN
96	Pendent with Standard Escutcheon (1 in. NPT)	TY3255 (Figure 3)
93	Pendent with Deep Escutcheon (1 in. NPT)	TY3255 (Figure 5)
97	Pendent with Recessed Escutcheon (1 in. NPT)	TY3255 (Figure 4)
92	Pendent without Escutcheon (1 in. NPT)	TY3255 (Figure 6)
94	Sidewall with Standard Escutcheon (1 in. NPT)	TY3355 (Figure 8)
53	Sidewall with Deep Escutcheon (1 in. NPT)	TY3355 (Figure 9)
54	Sidewall without Escutcheon (1 in. NPT)	TY3355 (Figure 10)
98	Upright without Escutcheon (1 in. NPT)	TY3155 (Figure 7)

	SPRINKLER FINISH	ESCUTCHEON FINISH ⁽¹⁾
0	CHROME PLATED	SIGNAL WHITE (RAL9003) POLYESTER
1	NATURAL BRASS	SIGNAL WHITE (RAL9003) POLYESTER
2	NATURAL BRASS	BRASS PLATED
4	SIGNAL WHITE (RAL9003) POLYESTER	SIGNAL WHITE (RAL9003) POLYESTER
8	CHROME PLATED	STAINLESS STEEL
9	CHROME PLATED	CHROME PLATED

	TEMPERATURE RATING ⁽²⁾
0	135°F (57°C)
1	155°F (68°C)
2	175°F (79°C)
3	200°F (93°C)
4	286°F (141°C)
5	360°F (182°C)

	ORDER LENGTH ⁽³⁾
055	5.50 in.
082	8.25 in.
180	18.00 in.
187	18.75 in.
372	37.25 in.
480	48.00 in.

Notes:

1. Escutcheon Finish applies to sprinklers provided with escutcheons.
 2. 360°F (182°C) temperature rating applies to non-recessed sprinkler assemblies.
 3. Dry-type Sprinklers are furnished based upon "Order Length" as measured per Figures 3 through 10, as applicable, and for each individual sprinkler where it is to be installed. After the measurement is taken, round it to the nearest 1/4 in. increment.
- * Use Prefix "I" for ISO 7-R 1 Connection (for example, I-60-961-1-180).

TABLE D
SERIES DS-1 DRY-TYPE SPRINKLERS, 5.6K, STANDARD RESPONSE
PART NUMBER SELECTION

Limited Warranty

For warranty terms and conditions, visit www.tyco-fire.com.

Ordering Procedure

Contact your local distributor for availability. When placing an order, indicate the full product name, including description and part number (P/N).

Dry-type Sprinklers

When ordering Series DS-1 5.6K Pendent, Upright, and Horizontal Sidewall, Standard Response, Standard Coverage Dry-type Sprinklers, specify the following information:

- SIN:
TY3255 – Pendent
TY3155 – Upright
TY3355 – Horizontal Sidewall

- Order Length:
Dry-type Sprinklers are furnished based upon Order Length as measured per Figures 3 through 10, as applicable. After the measurement is taken, round it to the nearest 1/4 in. increment.
- Inlet Connections:
1 in. NPT (Standard)
ISO 7-R 1
(For information on ISO Inlet Thread Connections, contact your Johnson Controls Sales Representative.)
- Temperature Rating
- Sprinkler Finish
- Escutcheon Type and Finish, as applicable
- P/N from Table D
Part numbers are for 1 in. NPT standard order sprinklers. Orders for all other sprinkler assemblies must be accompanied by a complete description.

Replacement Escutcheons

Order replacement escutcheons separately.

Note: *Style 10 Recessed Escutcheons are shipped as assemblies comprised of closure ring and mounting plate. The included mounting plate is not used for Dry Type Sprinkler applications, discard accordingly.*

Specify: (specify type), (specify) finish, P/N (specify):

Recessed (Style 10)

Brass Plated	56-701-2-010
Signal White (RAL9003)	56-701-4-010
Chrome Plated	56-701-9-010

Standard (Push-On)

White Color	91-106-0-007
Brass Plated	91-106-2-007
Chrome Plated	91-106-9-007

Deep

Brass Plated	91-107-2-010
White	91-107-4-007
Chrome Plated	91-107-9-007

Sprinkler Wrench

Specify W-Type 7 Sprinkler Wrench, P/N 56-850-4-001

Sprinkler Boot

Specify Model DSB-2 Dry Sprinkler Boot, P/N 63-000-0-002

This part number includes one (1) Boot, two (2) Strap Ties, and 1/3 oz of Adhesive (a sufficient quantity for installing one boot).

Series TY-FRB, 5.6 K-factor Upright, Pendent, and Recessed Pendent Sprinklers Quick Response, Standard Coverage

IMPORTANT

Refer to Technical Data Sheet TFP2300 for warnings pertaining to regulatory and health information.

Always refer to Technical Data Sheet TFP700 for the "INSTALLER WARNING" that provides cautions with respect to handling and installation of sprinkler systems and components. Improper handling and installation can permanently damage a sprinkler system or its components and cause the sprinkler to fail to operate in a fire situation or cause it to operate prematurely.

Scan the QR code or enter the URL in a web browser to access the most up-to-date electronic version of this document. Data rates may apply.



docs.jci.com/tycofire/TFP172

General Description

The TYCO Series TY-FRB, 5.6 K-factor, Upright (TY313) and Pendent (TY323) Sprinklers described in this data sheet are quick response, standard coverage, decorative 3 mm glass bulb-type spray sprinklers designed for use in light or ordinary hazard, commercial occupancies such as banks, hotels, and shopping malls.

The recessed version of the Series TY-FRB Pendent Sprinkler, where applicable, is intended for use in areas

with a finished ceiling. This recessed pendent sprinkler uses one of the following:

- A two-piece Style 15 Recessed Escutcheon with recessed adjustment up to 5/8 in. (15,9 mm) from the flush pendent position.
- A two-piece Style 20 Recessed Escutcheon with recessed adjustment up to 1/2 in. (12,7 mm) from the flush pendent position.

The adjustment provided by the Recessed Escutcheon reduces the accuracy to which the fixed pipe drops to the sprinklers must be cut.

Intermediate level versions of Series TY-FRB Sprinklers are described in Technical Data Sheet TFP357. Sprinkler guards and shields are described in Technical Data Sheet TFP780.

NOTICE

The TYCO Series TY-FRB Sprinklers described herein must be installed and maintained in compliance with this document, as well as with the applicable standards of the National Fire Protection Association, in addition to the standards of any other authorities having jurisdiction. Failure to do so may impair the performance of these devices.

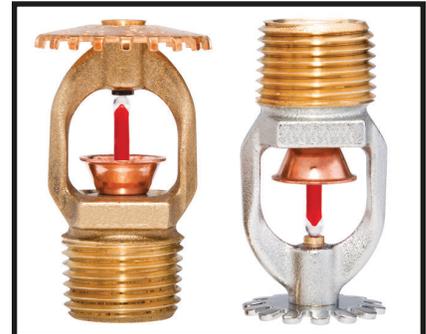
The owner is responsible for maintaining their fire protection system and devices in proper operating condition. Contact the installing contractor or product manufacturer with any questions.

Sprinkler Identification Number (SIN)

TY313 Upright 5.6K, 1/2 in. NPT
TY323 Pendent 5.6K, 1/2 in. NPT

Technical Data

Approvals
See Table A



Maximum Working Pressure
175 psi (12.1 bar)
250 psi (17.2 bar)*

* The maximum working pressure of 250 psi (17.2 bar) only applies to the listing by Underwriters Laboratories, Inc. (UL).

Discharge Coefficient
K=5.6 GPM/psi^{1/2} (80,6 LPM/bar^{1/2})

Temperature Rating
See Table A

Finishes
Sprinkler: See Table B

Recessed Escutcheon: White Coated, Black Coated, Chrome Plated, or Brass Plated

Physical Characteristics

Frame	Bronze
Button	Brass/Copper
Sealing Assembly	Stainless Steel w/TEFLON
Bulb	Glass
Compression Screw	Bronze
Deflector	Bronze

Components:

- 1 - Frame
- 2 - Button
- 3 - Sealing Assembly
- 4 - Bulb
- 5 - Compression Screw
- 6 - Deflector*

* Temperature rating is indicated on Deflector.

** Pipe thread connections per ISO 7-1 can be provided on special request.

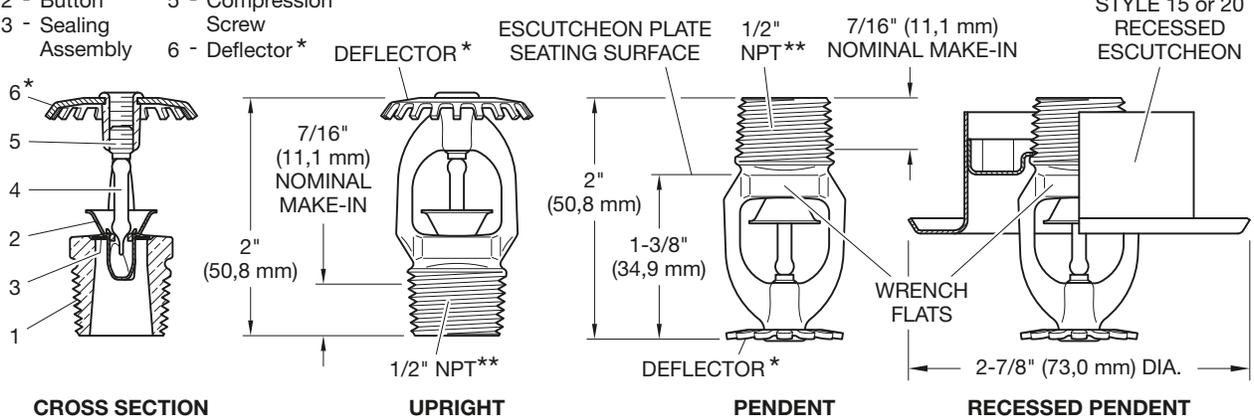


FIGURE 1
SERIES TY-FRB UPRIGHT (TY313) AND PENDENT (TY323) SPRINKLERS
5.6 K-FACTOR, 1/2 INCH NPT, QUICK RESPONSE



FIGURE 2
W-TYPE 6
SPRINKLER WRENCH

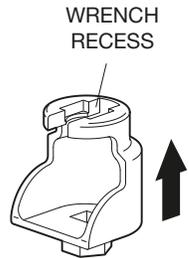


FIGURE 3
W-TYPE 7 RECESSED
SPRINKLER WRENCH

PUSH WRENCH IN TO ENSURE ENGAGEMENT WITH SPRINKLER WRENCHING AREA

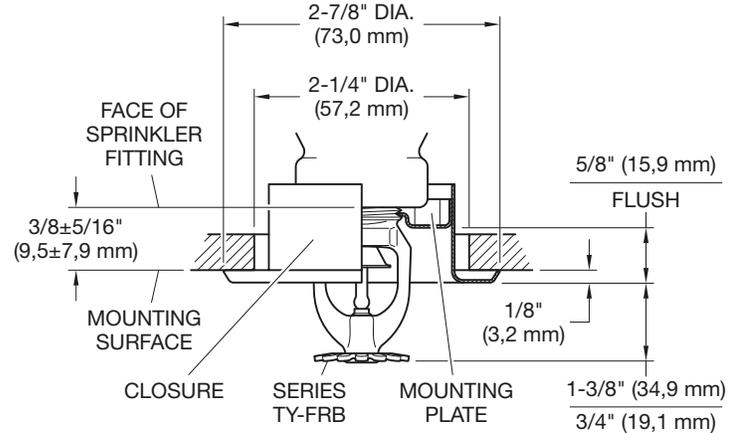


FIGURE 4
SERIES TY-FRB RECESSED PENDENT SPRINKLER ASSEMBLY (TY323)
WITH TWO PIECE 5/8 INCH TOTAL ADJUSTMENT STYLE 15
RECESSED ESCUTCHEON

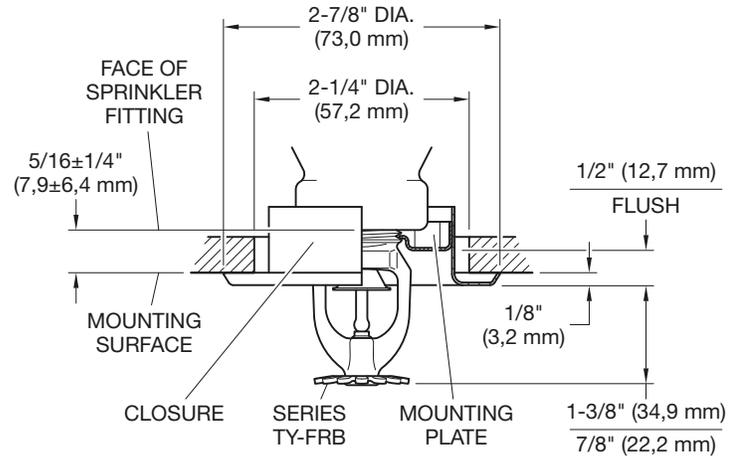


FIGURE 5
SERIES TY-FRB RECESSED PENDENT SPRINKLER ASSEMBLY (TY323)
WITH TWO PIECE 1/2 INCH TOTAL ADJUSTMENT STYLE 20
RECESSED ESCUTCHEON

K-Factor	Type	Temperature	Sprinkler Finish ⁸		
			Bulb Liquid Color	Natural Brass	Chrome Plated	Polyester^{c}
5.6 1/2 in. NPT	UPRIGHT (TY313) and PENDENT (TY323)	135°F (57°C)	Orange		1, 2, 3, 4, 5, 6, 7
		155°F (68°C)	Red		
		175°F (79°C)	Yellow		
		200°F (93°C)	Green		
		286°F (141°C)	Blue		
	RECESSED PENDENT (TY323) Figures 4 ^a and 5 ^b	135°F (57°C)	Orange		1, 2, 3, 4, 7
		155°F (68°C)	Red		
		175°F (79°C)	Yellow		
		200°F (93°C)	Green		

Notes:

1. Listed by Underwriters Laboratories, Inc., (UL) as Quick Response Sprinklers.
2. Listed by Underwriters Laboratories, Inc., for use in Canada (C-UL) as Quick Response Sprinklers.
3. Approved by Factory Mutual Research Corporation (FM) as Quick Response Sprinklers.
4. Approved by the City of New York under MEA 354-01-E.
5. VdS Approved (For details, contact Johnson Controls, Enschede, Netherlands, Tel. 31-53-428-4444/Fax 31-54-428-3377.)
6. Approved by the Loss Prevention Certification Board (LPCB Ref. No. 094a/06) as Quick Response Sprinklers.
7. EAC Approved.
8. Where Polyester Coated Sprinklers are noted to be UL and C-UL Listed, the sprinklers are UL and C-UL Listed as Corrosion-Resistant Sprinklers.
- a. Installed with Style 15 (1/2 in. NPT) 5/8 in. Total Adjustment Recessed Escutcheon, as applicable.
- b. Installed with Style 20 (1/2 in. NPT) 1/2 in. Total Adjustment Recessed Escutcheon, as applicable.
- c. Frame and Deflector only. Listings and approvals apply to color (Special Order).

TABLE A
LABORATORY LISTINGS AND APPROVALS FOR
5.6 K-FACTOR SPRINKLERS

Operation

The glass bulb contains a fluid which expands when exposed to heat. When the rated temperature is reached, the fluid expands sufficiently to shatter the glass bulb, allowing the sprinkler to activate and water to flow.

Design Criteria

The TYCO Series TY-FRB, 5.6 K-factor, Upright (TY313) and Pendent (TY323) Sprinklers are intended for fire protection systems designed in accordance with the standard installation rules recognized by the applicable Listing or Approval agency (such as, UL Listing is based on the requirements of NFPA 13, and FM Approval is based on the requirements of FM's Loss Prevention Data Sheets). Only the Style 15 or Style 20 Recessed Escutcheon is to be used for recessed pendent installations.

Installation

The TYCO Series TY-FRB, 5.6 K-factor, Upright (TY313) and Pendent (TY323) Sprinklers must be installed in accordance with this section.

General Instructions

Do not install any bulb-type sprinkler if the bulb is cracked or there is a loss of liquid from the bulb. With the sprinkler held horizontally, a small air bubble should be present. The diameter of the air bubble is approximately 1/16 in. (1,6 mm) for the 135°F (57°C) and 3/32 in. (2,4 mm) for the 286°F (141°C) temperature ratings.

A leak-tight 1/2 in. NPT sprinkler joint should be obtained by applying a minimum to maximum torque of 7 to 14 lb-ft (9,5 to 19,0 N·m). Higher levels of torque can distort the sprinkler Inlet with consequent leakage or impairment of the sprinkler.

Do not attempt to compensate for insufficient adjustment in the Escutcheon Plate by under- or over-tightening the sprinkler. Re-adjust the position of the sprinkler fitting to suit.

Upright and Pendent Sprinklers

The Series TY-FRB Upright and Pendent Sprinklers must be installed in accordance with the following instructions.

Step 1. Install Pendent sprinklers in the pendent position. Install upright sprinklers in the upright position.

Step 2. With pipe-thread sealant applied to the pipe threads, hand-tighten the sprinkler into the sprinkler fitting.

Step 3. Tighten the sprinkler into the sprinkler fitting using only the W-Type 6 Sprinkler Wrench as shown in Figure 2. Apply the W-Type 6 Sprinkler Wrench to the wrench flats as shown in Figure 1. Torque sprinklers 7 to 14 lb-ft (9,5 to 19,0 N·m).

Recessed Pendent Sprinklers

The Series TY-FRB Recessed Pendent Sprinklers must be installed in accordance with the following instructions.

Step A. After installing the Style 15 or Style 20 Mounting Plate over the sprinkler threads, and with pipe-thread sealant applied to the pipe threads, hand-tighten the sprinkler into the sprinkler fitting.

Step B. Tighten the sprinkler into the sprinkler fitting using only the W-Type 7 Recessed Sprinkler Wrench as shown in Figure 3. Apply the W-Type 7 Recessed Sprinkler Wrench to the sprinkler wrench flats as shown in Figure 1. Torque sprinklers 7 to 14 lb-ft (9,5 to 19,0 N·m).

Step C. After ceiling installation and finishing, slide on the Style 15 or Style 20 Closure over the Series TY-FRB Sprinkler and push the Closure over the Mounting Plate until its flange comes in contact with the ceiling.

P/N^a 77 - XXX - X - XXX

		SIN			SPRINKLER FINISH			TEMPERATURE RATINGS	
370	5.6K UPRIGHT (1/2 in.NPT)	TY313	1	NATURAL BRASS		135	135°F (57°C)		
371	5.6K PENDENT (1/2 in.NPT)	TY323	3	PURE WHITE (RAL9010) ^a POLYESTER		155	155°F (68°C)		
			4	SIGNAL WHITE (RAL9003) POLYESTER		175	175°F (79°C)		
			5	JET BLACK (RAL9005) POLYESTER		200	200°F (93°C)		
			9	CHROME PLATED		286	286°F (141°C)		

Notes:
a. Use suffix "I" for ISO 7-1 connection; for example, 77-370-4-175-I

Notes:
a. Eastern Hemisphere sales only

TABLE B
SERIES TY-FRB UPRIGHT AND PENDENT SPRINKLERS
PART NUMBER SELECTION

Care and Maintenance

The TYCO Series TY-FRB, 5.6 K-factor, Upright (TY313) and Pendent (TY323) Sprinklers must be maintained and serviced in accordance with this section.

Before closing a fire protection system main control valve for maintenance work on the fire protection system that it controls, obtain permission to shut down the affected fire protection systems from the proper authorities and notify all personnel who may be affected by this action.

Absence of the outer piece of an escutcheon, which is used to cover a clearance hole, can delay sprinkler operation in a fire situation.

The owner must assure that the sprinklers are not used for hanging any objects and that the sprinklers are only cleaned by means of gently dusting with a feather duster; otherwise, non-operation in the event of a fire or inadvertent operation may result.

Sprinklers which are found to be leaking or exhibiting visible signs of corrosion must be replaced.

Automatic sprinklers must never be painted, plated, coated, or otherwise altered after leaving the factory. Modified sprinklers must be replaced. Sprinklers that have been exposed to corrosive products of combustion, but have not operated, should be replaced if they cannot be completely cleaned by wiping the sprinkler with a cloth or by brushing it with a soft bristle brush.

Care must be exercised to avoid damage to the sprinklers before, during, and after installation. Sprinklers damaged by dropping, striking, wrench twist/slippage, or the like, must be replaced. Also, replace any sprinkler that has a cracked bulb or that has lost liquid from its bulb. (Ref. Installation Section.)

The owner is responsible for the inspection, testing, and maintenance of their fire protection system and devices in compliance with this document, as well as with the applicable standards of the National Fire Protection Association such as NFPA 25, in addition to the standards of any other authorities having jurisdiction. Contact the installing contractor or product manufacturer with any questions.

Automatic sprinkler systems are recommended to be inspected, tested, and maintained by a qualified Inspection Service in accordance with local requirements and/or national codes.

Limited Warranty

For warranty terms and conditions, visit www.tyco-fire.com.

Ordering Procedure

Contact your local distributor for availability. When placing an order, indicate the full product name and Part Number (P/N).

Sprinkler Assemblies with NPT Thread Connections

Specify: Series TY-FRB Upright or Pendent (specify) Sprinkler, SIN (specify), K=5.6, Quick Response, (specify) temperature rating, (specify) finish, P/N (specify, refer to Table A).

Recessed Escutcheon

Specify: Style 15 Recessed Escutcheon with (specify*) finish, P/N (specify*)

Specify: Style 20 Recessed Escutcheon with (specify*) finish, P/N (specify*)

* Refer to Technical Data Sheet TFP770

Sprinkler Wrench

Specify: W-Type 6 Sprinkler Wrench, P/N 56-000-6-387

Specify: W-Type 7 Sprinkler Wrench, P/N 56-850-4-001



Worldwide
Contacts | www.tyco-fire.com

TFP172 Change History Appendix

ISSUE DATE	NOTES
09-22	Page 1, updated QR code and URL; Page 3, Table A, added EAC Approved; Page 4, changed corporate address and telephone number to 1467 Elmwood Avenue, Cranston, RI 02910 | Telephone +1-401-781-8220, formerly 1400 Pennbrook Parkway, Lansdale, PA 19446 | Telephone +1-215-362-0700.
11-21	Added QR code and URL to allow convenient access to electronic version from printed document.
08-18	Updated Tyco® branding and document format; Added Johnson Controls copyright; Added disclaimer stating specifications and information subject to change without notice; Added reference to Regulatory and Health Warning Technical Data Sheet TFP2300.
02-18	Changed Recessed Pendent (TY313) to Recessed Pendent (TY323) in Type column of Table A.
07-17	Added Table A to organize Laboratory Listings and Approvals; Changed existing Part Number Selection table designation to Table B; Added Jet Black (RAL9005) Polyester sprinkler finish option.
02-14	Added note to indicate sprinklers with Polyester Finish are UL and C-UL Listed as Corrosion Resistant Sprinklers; Added LPCB Approval.
01-13	Changed note in Ordering Procedure Part Number Selection table to indicate special order ISO thread sprinklers may be ordered by adding an I suffix code to Part Numbers, formerly described as prefix.
12-12 Rev A	Added C-UL Listings and reference to Intermediate Level sprinkler data sheets.
12-12	New Technical Data Sheet TFP172 describes Series TY-FRB Quick Response 5.6 K-factor (K80) Standard Coverage TY313 Upright and TY323 Pendent and Recessed Pendent Sprinklers

Fire Sprinkler Pipe

Schedule 10 and Schedule 40

Submittal Data Sheet



FM Approved and Fully Listed Sprinkler Pipe

Wheatland's Schedule 10 and Schedule 40 steel fire sprinkler pipe is FM Approved and UL, C-UL and FM Listed.

Approvals and Specifications

Both products meet or exceed the following standards:

- ASTM A135, Type E, Grade A (Schedule 10)
- ASTM A795, Type E, Grade A (Schedule 40)
- NFPA 13

Manufacturing Protocols

Schedule 10 and Schedule 40 are subjected to the toughest possible testing protocols to ensure the highest quality and long-lasting performance.

Finishes and Coatings

All Wheatland black steel fire sprinkler pipe up to 6" receives a proprietary mill coating to ensure a clean, corrosion-resistant surface that outperforms and outlasts standard lacquer coatings. This coating allows the pipe to be easily painted, without special preparation. Schedule 10 and Schedule 40 can be ordered in black, or with hot-dip galvanizing, to meet FM/UL requirements for dry systems that meet the zinc coating specifications of ASTM A795 or A53. All Wheatland galvanized material is also UL Listed.

Product Marking

Each length of Wheatland fire sprinkler pipe is continuously stenciled to show the manufacturer, type of pipe, grade, size and length. Barcoding is acceptable as a supplementary identification method.

SCHEDULE 10 SPECIFICATIONS

NPS	NOM OD		NOM ID		NOMINAL WALL		NOMINAL WEIGHT		UL CRR*	PIECES Lift
	in.	mm	in.	mm	in.	mm	lbs./ft.	kg/m		
1¼	1.660	42.2	1.442	36.6	.109	2.77	1.81	2.69	7.3	61
1½	1.900	48.3	1.682	42.7	.109	2.77	2.09	3.11	5.8	61
2	2.375	60.3	2.157	54.8	.109	2.77	2.64	3.93	4.7	37
2½	2.875	73.0	2.635	66.9	.120	3.05	3.53	5.26	3.5	30
3	3.500	88.9	3.260	82.8	.120	3.05	4.34	6.46	2.6	19
4	4.500	114.3	4.260	108.2	.120	3.05	5.62	8.37	1.6	19
5	5.563	141.3	5.295	134.5	.134	3.40	7.78	11.58	1.5	13
6	6.625	168.3	6.357	161.5	.134	3.40	9.30	13.85	1.0	10
8	8.625	219.1	8.249	209.5	.188	4.78	16.96	25.26	2.1	7

* Calculated using Standard UL CRR formula, UL Fire Protection Directory, Category VIZY.

* The CRR is a ratio value used to measure the ability of a pipe to withstand corrosion. Threaded Schedule 40 steel pipe is used as the benchmark (value of 1.0).

SCHEDULE 40 SPECIFICATIONS

NPS	NOM OD		NOM ID		NOMINAL WALL		NOMINAL WEIGHT		UL CRR*	PIECES Lift
	in.	mm	in.	mm	in.	mm	lbs./ft.	kg/m		
1	1.315	33.4	1.049	26.6	.133	3.38	1.68	2.50	1.00	70
1¼	1.660	42.2	1.380	35.1	.140	3.56	2.27	3.39	1.00	51
1½	1.900	48.3	1.610	40.9	.145	3.68	2.72	4.05	1.00	44
2	2.375	60.3	2.067	52.5	.154	3.91	3.66	5.45	1.00	30

* Calculated using Standard UL CRR formula, UL Fire Protection Directory, Category VIZY.

* The CRR is a ratio value used to measure the ability of a pipe to withstand corrosion. Threaded Schedule 40 steel pipe is used as the benchmark (value of 1.0).



SUBMITTAL INFORMATION

PROJECT:

CONTRACTOR:

DATE:

ENGINEER:

SPECIFICATION REFERENCE:

SYSTEM TYPE:

LOCATIONS:

COMMENTS:

BLACK

HOT-DIP GALVANIZED

G-FIRE Grooved Fittings Ductile Iron and Fabricated Steel Ductile

General Description

GRINNELL G-FIRE Grooved Fittings provide an economical and efficient method of changing direction, adding an outlet, reducing, or capping piping systems. The G-FIRE grooved fittings are available in ductile iron or fabricated steel as indicated.

Note: Figure 510S and 519S fittings are special short radius fittings with smaller center to end dimensions than standard grooved fittings. Depending on the size and coupling used, there may be interferences at the bolt pads that require repositioning of the coupling orientation. The use of flange adapters is not recommended with Figures 510S and 519S fittings. Contact Johnson Controls for details.

NOTICE

Never remove any piping component nor correct or modify any piping deficiencies without first de-pressurizing and draining the system. Failure to do so may result in serious personal injury, property damage, and/or impaired device performance.

It is the designer's responsibility to select products suitable for the intended service and to ensure that pressure ratings and performance data are not exceeded. Material and gasket selection should be verified to be compatible for the specific application. Always read and understand the installation instructions.

The GRINNELL G-FIRE Grooved Fittings described herein must be installed and maintained in compliance with this document, as well as with the applicable standards of the approval agency, in addition to the standards of any other authorities having jurisdiction. Failure to do so may result in serious personal injury or impair the performance of these devices.

IMPORTANT

Refer to Technical Data Sheet TFP2300 for warnings pertaining to regulatory and health information.

Internal fitting coatings serving as protection during storage and transport can become separated after installation and during system operation, potentially causing blockage of strainers or other filtering equipment. If strainers are installed in the piping system the manufacturer recommends they feature a minimum 5/32 in. (4 mm) mesh size and, to prevent blockages, that they are regularly serviced at intervals to be determined by the system designer.

The owner is responsible for maintaining their system and devices in proper operating condition. Contact the installing contractor or product manufacturer with any questions

Technical Data

Approvals

UL and ULC Listed
FM Approved

VdS Approved
LPCB Certified

Note: LPCB Certification applies to Figures 211, 212, 221, 250, 260, 501, 510, 511, 512, 519, 550, 510S, and 519S.

Material

Cast: Ductile iron conforming to ASTM A536, Grade 65-45-12

Fabricated Steel: Carbon Steel conforming to ASTM A53, ASTM A135, and ASTM A795

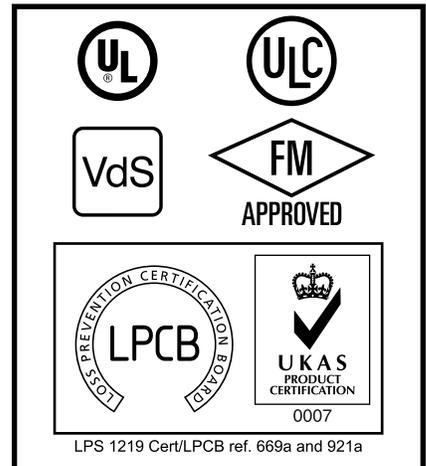
Protective Coatings

- Non-lead orange paint (USA)
- RAL red or non-lead paint (EMEA and APAC)
- Hot dipped galvanized conforming to ASTM A153

Care and Maintenance

The following inspection procedure must be performed as indicated, in addition to any specific requirements of the NFPA. Any impairments must be immediately corrected.

Before closing a fire protection system main control valve for maintenance work on the fire protection system

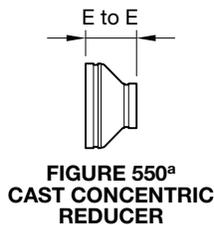
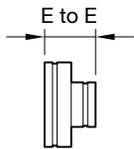
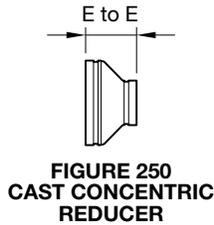


that it controls, obtain permission to shut down the affected fire protection system from the proper authorities and notify all personnel who may be affected by this decision.

The owner is responsible for the inspection, testing, and maintenance of their fire protection system and devices in compliance with this document, as well as with the applicable standards of the NATIONAL FIRE PROTECTION ASSOCIATION, for example, NFPA 25, in addition to the standards of any authority having jurisdiction. Contact the installing contractor or product manufacturer with any questions.

Automatic sprinkler systems are recommended to be inspected, tested, and maintained by a qualified Inspection Service in accordance with local requirements and/or national codes.

After placing a fire protection system in service, notify the proper authorities and advise those responsible for monitoring proprietary and/or central station alarms.

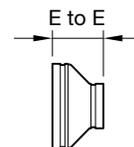


Nominal Pipe Size		Figure 250 Cast		Figure 350 Fabricated		Figure 550 ^(a) Cast	
ANSI Inches (DN)	O.D. Inches (mm)	Nominal E to E Inches (mm)	Approx. Weight Lbs. (kg)	Nominal E to E Inches (mm)	Approx. Weight Lbs. (kg)	Nominal E to E Inches (mm)	Approx. Weight Lbs. (kg)
1-1/4 x 1 (32 x 25)	1.66 x 1.31 (42,4 x 33,4)	2.50 (63,5)	0.7 (0,3)	—	—	2.50 (63,5)	0.7 (0,3)
1-1/2 x 1 (40 x 25)	1.90 x 1.31 (48,3 x 33,4)	—	—	2.50 (63,5)	0.7 (0,3)	—	—
1-1/2 x 1-1/4 (40 x 32)	1.90 x 1.66 (48,3 x 42,4)	2.50 (63,5)	0.8 (0,3)	—	—	2.50 (63,5)	0.8 (0,3)
2 x 1 (50 x 25)	2.37 x 1.31 (60,3 x 33,4)	—	—	2.50 (63,5)	0.9 (0,4)	—	—
2 x 1-1/4 (50 x 32)	2.37 x 1.66 (60,3 x 42,4)	—	—	—	—	2.50 (63,5)	0.9 (0,4)
2 x 1-1/2 (50 x 40)	2.37 x 1.90 (60,3 x 48,3)	—	—	—	—	2.50 (63,5)	1.0 (0,5)
2-1/2 x 1 (65 x 25)	2.87 x 1.31 (73,0 x 33,4)	—	—	2.50 (63,5)	1.2 (0,5)	—	—
2-1/2 x 1-1/4 (65 x 32)	2.87 x 1.66 (73,0 x 42,4)	2.50 (63,5)	1.4 (0,6)	—	—	2.50 (63,5)	1.4 (0,6)
2-1/2 x 1-1/2 (65 x 40)	2.87 x 1.90 (73,0 x 48,3)	2.50 (63,5)	1.4 (0,6)	—	—	2.50 (63,5)	1.4 (0,6)
2-1/2 x 2 (65 x 50)	2.87 x 2.37 (73,0 x 60,3)	2.50 (63,5)	1.3 (0,6)	—	—	2.50 (63,5)	1.3 (0,6)
76,1mm x 1-1/4 (65 x 32)	3.00 x 1.66 (76,1 x 42,4)	2.50 (63,5)	1.4 (0,6)	—	—	2.50 (63,5)	1.4 (0,6)
76,1mm x 1-1/2 (65 x 40)	3.00 x 1.90 (76,1 x 48,3)	2.50 (63,5)	1.4 (0,6)	—	—	2.50 (63,5)	1.4 (0,6)
76,1mm x 2 (65 x 50)	3.00 x 2.37 (76,1 x 60,3)	2.50 (63,5)	1.5 (0,7)	—	—	2.50 (63,5)	1.5 (0,7)
3 x 1 (80 x 25)	3.50 x 1.31 (88,9 x 33,4)	—	—	2.50 (63,5)	1.3 (0,6)	—	—
3 x 1-1/4 (80 x 32)	3.50 x 1.66 (88,9 x 42,4)	—	—	2.50 (63,5)	1.3 (0,6)	—	—
3 x 1-1/2 (80 x 40)	3.50 x 1.90 (88,9 x 48,3)	2.50 (63,5)	1.8 (0,8)	—	—	2.50 (63,5)	1.8 (0,8)
3 x 2 (80 x 50)	3.50 x 2.37 (88,9 x 60,3)	2.50 (63,5)	1.7 (0,8)	—	—	2.50 (63,5)	1.7 (0,8)
3 x 2-1/2 (80 x 65)	3.50 x 2.87 (88,9 x 70,3)	2.50 (63,5)	1.7 (0,8)	—	—	2.50 (63,5)	1.7 (0,8)
3 x 76,1mm (80 x 65)	3.50 x 3.00 (88,9 x 76,1)	2.50 (63,5)	2.0 (0,9)	—	—	2.50 (63,5)	2.0 (0,9)
4 x 1 (100 x 25)	4.50 x 1.31 (114,3 x 33,4)	—	—	3.00 (76,2)	2.9 (1,1)	—	—
4 x 1-1/4 (100 x 32)	4.50 x 1.66 (114,3 x 42,4)	—	—	3.00 (76,2)	2.2 (1,0)	—	—
4 x 1-1/2 (100 x 40)	4.50 x 1.90 (114,3 x 48,3)	—	—	3.00 (76,2)	2.3 (1,0)	—	—
4 x 2 (100 x 50)	4.50 x 2.37 (114,3 x 60,3)	3.00 (76,2)	2.4 (1,1)	—	—	3.00 (76,2)	2.4 (1,1)
4 x 2-1/2 (100 x 65)	4.50 x 2.87 (114,3 x 73,0)	3.00 (76,2)	2.7 (1,2)	—	—	3.00 (76,2)	2.7 (1,2)

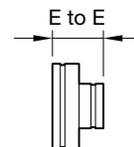
NOTES
 a. Figure 550 is available for the Americas market only.

FIGURE 1 (1 OF 3)
FIGURES 250, 350, AND 550 CONCENTRIC REDUCERS
NOMINAL DIMENSIONS

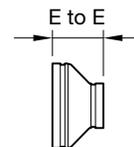
Nominal Pipe Size		Figure 250 Cast		Figure 350 Fabricated		Figure 550 ^(a) Cast	
ANSI Inches (DN)	O.D. Inches (mm)	Nominal E to E Inches (mm)	Approx. Weight Lbs. (kg)	Nominal E to E Inches (mm)	Approx. Weight Lbs. (kg)	Nominal E to E Inches (mm)	Approx. Weight Lbs. (kg)
4 x 76,1mm (100 x 65)	4.50 x 3.00 (114,3 x 76,1)	3.00 (76,2)	3.2 (1,5)	—	—	3.00 (76,2)	3.2 (1,5)
4 x 3 (100 x 80)	4.50 x 3.50 (114,3 x 88,9)	3.00 (76,2)	2.8 (1,3)	—	—	3.00 (76,2)	2.8 (1,3)
139,7mm x 3 (125 x 80)	5.50 x 3.50 (139,7 x 88,9)	3.50 (88,9)	4.2 (1,9)	—	—	3.50 (88,9)	4.2 (1,9)
139,7mm x 4 (125 x 100)	5.50 x 4.50 (139,7 x 114,3)	3.50 (88,9)	4.4 (2,0)	—	—	3.50 (88,9)	4.4 (2,0)
5 x 2 (125 x 50)	5.56 x 2.37 (141,3 x 60,3)	—	—	3.50 (88,9)	4.6 (2,1)	—	—
5 x 2-1/2 (125 x 65)	5.56 x 2.87 (141,3 x 73,0)	—	—	3.50 (88,9)	4.5 (2,0)	—	—
5 x 3 (125 x 80)	5.56 x 3.50 (141,3 x 88,9)	3.50 (88,9)	4.2 (1,9)	—	—	3.50 (88,9)	4.2 (1,9)
5 x 4 (125 x 100)	5.56 x 4.50 (141,3 x 114,3)	3.50 (88,9)	4.4 (2,0)	—	—	3.50 (88,9)	4.4 (2,0)
165,1mm x 3 (150 x 80)	6.50 x 3.50 (165,1 x 88,9)	4.00 (101,6)	5.5 (2,5)	—	—	4.00 (101,6)	5.5 (2,5)
165,1mm x 4 (150 x 100)	6.50 x 4.50 (165,1 x 114,3)	4.00 (101,6)	6.0 (2,7)	—	—	4.00 (101,6)	6.0 (2,7)
165,1mm x 139,7mm (150 x 125)	6.50 x 5.50 (165,1 x 139,7)	4.00 (101,6)	5.6 (2,5)	—	—	4.00 (101,6)	5.6 (2,5)
6 x 1 (150 x 25)	6.63 x 1.31 (168,3 x 33,7)	4.00 (101,6)	4.7 (2,1)	—	—	4.00 (101,6)	4.7 (2,1)
6 x 1-1/2 (150 x 40)	6.63 x 1.90 (168,3 x 48,3)	4.00 (101,6)	5.0 (2,3)	—	—	4.00 (101,6)	5.0 (2,3)
6 x 2 (150 x 50)	6.63 x 2.37 (168,3 x 60,3)	4.00 (101,6)	5.3 (2,4)	—	—	4.00 (101,6)	5.3 (2,4)
6 x 2-1/2 (150 x 65)	6.63 x 2.87 (168,3 x 73,0)	4.00 (101,6)	5.7 (2,6)	—	—	4.00 (101,6)	5.7 (2,6)
6 x 76,1mm (150 x 65)	6.63 x 3.00 (168,3 x 76,1)	4.00 (101,6)	6.1 (2,7)	—	—	4.00 (101,6)	6.1 (2,7)
6 x 3 (150 x 80)	6.63 x 3.50 (168,3 x 88,9)	4.00 (101,6)	5.8 (2,6)	—	—	4.00 (101,6)	5.8 (2,6)
6 x 108,0mm (150 x 100)	6.63 x 4.25 (168,3 x 108,0)	—	—	4.00 (101,6)	6.0 (2,7)	—	—
6 x 4 (150 x 100)	6.63 x 4.50 (168,3 x 114,3)	4.00 (101,6)	6.0 (2,7)	—	—	4.00 (101,6)	6.0 (2,7)
6 x 139,7mm (150 x 100)	6.63 x 5.50 (168,3 x 139,7)	4.00 (101,6)	6.3 (2,3)	—	—	4.00 (101,6)	6.3 (2,3)
6 x 5 (150 x 125)	6.63 x 5.56 (168,3 x 141,3)	4.00 (101,6)	6.2 (2,8)	—	—	4.00 (101,6)	6.2 (2,8)
216,3mm x 2-1/2 (200 x 65)	8.52 x 2.87 (216,3 x 73,0)	—	—	5.00 (127,0)	12.1 (5,5)	—	—
8 x 3 (200 x 80)	8.63 x 3.50 (219,1 x 88,9)	5.00 (127,0)	11.5 (5,2)	—	—	5.00 (127,0)	11.5 (5,2)
8 x 4 (200 x 100)	8.63 x 4.50 (219,1 x 114,3)	5.00 (127,0)	10.7 (4,9)	—	—	5.00 (127,0)	10.7 (4,9)



**FIGURE 250
CAST CONCENTRIC
REDUCER**



**FIGURE 350
FABRICATED CONCENTRIC
REDUCER**

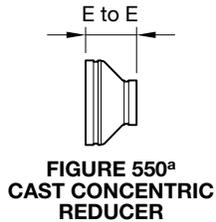
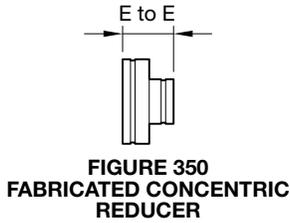
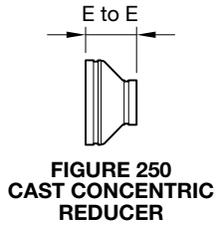


**FIGURE 550^a
CAST CONCENTRIC
REDUCER**

NOTES

a. Figure 550 is available for the Americas market only.

**FIGURE 1 (2 OF 3)
FIGURES 250, 350, AND 550 CONCENTRIC REDUCERS
NOMINAL DIMENSIONS**



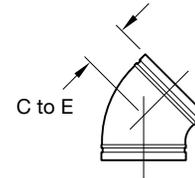
Nominal Pipe Size		Figure 250 Cast		Figure 350 Fabricated		Figure 550 ^(a) Cast	
ANSI Inches (DN)	O.D. Inches (mm)	Nominal E to E Inches (mm)	Approx. Weight Lbs. (kg)	Nominal E to E Inches (mm)	Approx. Weight Lbs. (kg)	Nominal E to E Inches (mm)	Approx. Weight Lbs. (kg)
8 x 139,7mm (200 x 125)	8.63 x 5.50 (219,1 x 139,7)	5.00 (127,0)	10.0 (4,5)	—	—	5.00 (127,0)	10.0 (4,5)
8 x 5 (200 x 125)	8.63 x 5.56 (219,1 x 141,3)	5.00 (127,0)	10.8 (4,9)	—	—	5.00 (127,0)	10.8 (4,9)
8 x 165,1mm (200 x 150)	8.63 x 6.50 (219,1 x 165,1)	5.00 (127,0)	11.0 (5,0)	—	—	5.00 (127,0)	11.0 (5,0)
8 x 6 (200 x 150)	8.63 x 6.63 (219,1 x 168,3)	5.00 (127,0)	11.3 (5,1)	—	—	5.00 (127,0)	11.3 (5,1)
10 x 4 (250 x 100)	10.75 x 4.50 (273,0 x 114,3)	—	—	6.00 (152,4)	20.5 (9,3)	—	—
10 x 5 (250 x 125)	10.75 x 5.56 (273,0 x 141,3)	—	—	6.00 (152,4)	20.1 (9,1)	—	—
10 x 165,1mm (250 x 150)	10.75 x 6.50 (273,0 x 165,1)	6.00 (152,4)	17.8 (8,0)	—	—	6.00 (152,4)	17.8 (8,0)
10 x 6 (250 x 150)	10.75 x 6.63 (273,0 x 168,3)	6.00 (152,4)	16.3 (7,4)	—	—	6.00 (152,4)	16.3 (7,4)
267,4mm x 216,3mm (250 x 200)	10.52 x 8.52 (267,4 x 216,3)	6.00 (152,4)	17.40 (7,89)	—	—	—	—
10 x 8 (250 x 200)	10.75 x 8.63 (273,0 x 219,1)	6.00 (152,4)	18.3 (8,3)	—	—	6.00 (152,4)	18.3 (8,3)
12 x 4 (300 x 100)	12.75 x 4.50 (323,9 x 114,3)	7.00 (177,8)	22.7 (10,3)	—	—	7.00 (177,8)	22.7 (10,3)
12 x 6 (300 x 150)	12.75 x 6.63 (323,9 x 168,3)	7.00 (177,8)	23.6 (10,7)	—	—	7.00 (177,8)	24.2 (11,0)
318,5mm x 216,3mm (300 x 200)	12.54 x 8.52 (318,5 x 216,3)	7.00 (177,8)	23.12 (10,48)	—	—	—	—
12 x 8 (300 x 200)	12.75 x 8.63 (323,9 x 219,1)	7.00 (177,8)	25.2 (11,4)	—	—	7.00 (177,8)	25.8 (11,7)
318,5mm x 267,4mm (300 x 250)	12.54 x 10.52 (318,5 x 267,4)	7.00 (177,8)	25.42 (11,53)	—	—	—	—
12 x 10 (300 x 250)	12.75 x 10.75 (323,9 x 273,0)	7.00 (177,8)	28.2 (12,8)	7.00 (177,8)	28.2 (12,8)	7.00 (177,8)	28.2 (12,8)

NOTES

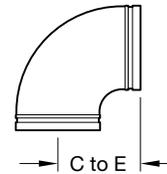
a. Figure 550 is available for the Americas market only.

**FIGURE 1 (3 OF 3)
FIGURES 250, 350, AND 550 CONCENTRIC REDUCERS
NOMINAL DIMENSIONS**

Nominal Pipe Size		Figure 501 Cast 45° Elbow		Figure 510 Cast 90° Elbow	
ANSI Inches (DN)	O.D. Inches (mm)	Nominal C to E Inches (mm)	Approx. Weight Lbs. (kg)	Nominal C to E Inches (mm)	Approx. Weight Lbs. (kg)
1 (25)	1.0 (33,7)	1.7 (43,2)	0.6 (0,3)	2.25 (57,2)	0.8 (0,4)
1-1/4 (32)	1.7 (42,4)	1.8 (44,5)	0.8 (0,4)	2.8 (69,9)	1.1 (0,5)
1-1/2 (40)	1.9 (48,3)	1.8 (44,5)	1.0 (0,5)	2.8 (69,9)	1.4 (0,6)
2 (50)	2.4 (60,3)	2.0 (50,8)	1.3 (0,6)	3.3 (82,6)	2.0 (0,9)
2-1/2 (65)	2.9 (73,0)	2.3 (57,2)	2.1 (1,0)	3.8 (95,3)	2.8 (1,3)
76,1mm (65)	3.0 (76,1)	2.3 (57,2)	2.2 (1,0)	3.8 (95,3)	3.0 (1,3)
3 (80)	3.5 (88,9)	2.5 (63,5)	3.4 (1,5)	4.3 (108,0)	4.1 (1,9)
4 (100)	4.5 (114,3)	3.0 (76,2)	5.5 (2,5)	5.0 (127,0)	7.0 (3,2)
139,7mm (125)	5.5 (139,7)	3.3 (82,6)	7.2 (3,3)	5.5 (139,7)	10.3 (4,7)
165,1mm (150)	6.5 (165,1)	3.5 (88,9)	9.2 (4,2)	6.5 (165,1)	13.9 (6,3)
6 (150)	6.6 (168,3)	3.5 (88,9)	11.2 (5,1)	6.5 (165,1)	15.2 (6,9)
8 (200)	8.6 (219,1)	4.25 (108,0)	20.6 (9,3)	7.8 (196,9)	29.6 (13,4)
267,4mm (250)	10.52 (267,4)	—	—	9.00 (228,6)	45.69 (20,72)
10 (250)	10.750 (273,0)	4.75 (120,7)	30.1 (13,7)	9.00 (228,6)	52.0 (23,6)
318,5mm (300)	12.54 (318,5)	—	—	10.00 (254,0)	61.86 (21,86)
12 (300)	12.750 (323,9)	5.25 (133,4)	48.0 (22,0)	10.00 (254,0)	66.4 (30,1)

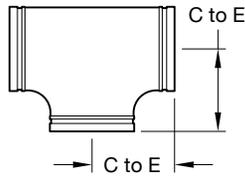


**FIGURE 501
CAST 45° ELBOW**

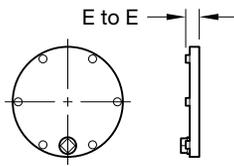


**FIGURE 510
CAST 90° ELBOW**

**FIGURE 2
FIGURES 501 AND 510 ELBOWS
NOMINAL DIMENSIONS**



**FIGURE 519
 CAST TEE**



**FIGURE 260^a
 CAST END CAP**

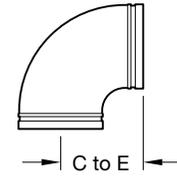
Nominal Pipe Size		Figure 519 Cast Tee		Figure 260 ^(a) Cast End Cap	
ANSI Inches (DN)	O.D. Inches (mm)	Nominal C to E Inches (mm)	Approx. Weight Lbs. (kg)	Nominal E to E Inches (mm)	Approx. Weight Lbs. (kg)
1 (25)	1.3 (33,4)	2.25 (57,2)	1.1 (0,5)	0.8 (21,1)	0.2 (0,1)
1-1/4 (32)	1.7 (42,4)	2.8 (69,9)	1.7 (0,8)	0.8 (21,1)	0.3 (0,1)
1-1/2 (40)	1.9 (48,3)	2.8 (69,9)	2.1 (1,00)	0.8 (21,1)	0.4 (0,2)
2 (50)	2.4 (60,3)	3.3 (82,6)	2.8 (1,3)	0.9 (23,4)	0.7 (0,3)
2-1/2 (65)	2.9 (73,0)	3.8 (95,3)	4.4 (2,0)	0.9 (23,4)	1.0 (0,5)
76,1mm (65)	3.0 (76,1)	3.8 (95,3)	4.5 (2,0)	0.9 (21,8)	1.3 (0,6)
3 (80)	3.5 (88,9)	4.3 (108,0)	6.5 (3,0)	0.9 (23,4)	1.4 (0,6)
4 (100)	4.5 (114,3)	5.0 (127,0)	9.5 (4,3)	1.0 (25,4)	2.6 (1,2)
139,7mm (125)	5.5 (139,7)	5.5 (139,7)	13.9 (6,3)	0.9 (23,4)	4.7 (2,1)
5 (125)	5.6 (141,3)	5.0 (127,0)	14.2 (6,4)	1.0 (25,4)	5.0 (2,3)
165,1mm (150)	6.5 (165,1)	6.5 (165,1)	19.7 (8,9)	0.9 (23,4)	6.4 (2,9)
6 (150)	6.6 (168,3)	6.5 (165,1)	22.4 (10,2)	1.0 (25,4)	6.2 (2,8)
216,3mm (200)	8.52 (216,3)	—	—	1.06 (27,0)	11.02 (4,99)
8 (200)	8.6 (219,1)	7.8 (196,9)	39.8 (18,1)	1.1 (27,0)	7.1 (3,2)
267,4mm (250)	10.52 (267,4)	9.00 (228,6)	62.58 (28,39)	1.02 (25,78)	19.05 (8,64)
10 (250)	10.8 (273,0)	9.00 (228,6)	64.2 (29,1)	1.0 (25,8)	24.5 (11,1)
318,5mm (300)	12.54 (318,5)	10.00 (254,0)	82.79 (37,55)	1.02 (25,8)	28.82 (13,07)
12 (300)	12.8 (323,9)	10.00 (254,0)	110.0 (49,9)	1.02 (25,8)	31.0 (14,1)

NOTES

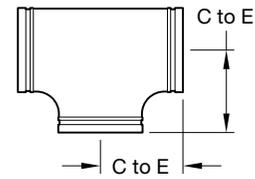
a. Available with tapped plugs. Contact Johnson Controls.

**FIGURE 3
 FIGURES 519 TEE AND FIGURE 260 END CAP
 NOMINAL DIMENSIONS**

Nominal Pipe Size		Figure 510S 90° Elbow		Figure 519S Tee	
ANSI Inches (DN)	O.D. Inches (mm)	Nominal C to E Inches (mm)	Approx. Weight Lbs. (kg)	Nominal C to E Inches (mm)	Approx. Weight Lbs. (kg)
2 (50)	2.4 (60,3)	2.8 (69,9)	1.5 (0,7)	2.8 (69,9)	2.6 (1,2)
2-1/2 (65)	2.9 (73,0)	3.0 (76,2)	2.1 (1,0)	3.0 (76,2)	4.4 (2,0)
76,1mm (65)	3.0 (76,1)	3.0 (76,2)	2.3 (1,0)	3.0 (76,2)	3.1 (1,4)
3 (80)	3.5 (88,9)	3.4 (85,9)	3.0 (1,4)	3.8 (85,9)	6.5 (3,0)
4 (100)	4.5 (114,3)	4.0 (101,6)	5.0 (2,3)	4.0 (101,6)	10.7 (4,9)
139,7mm (125)	5.5 (139,7)	4.9 (124,0)	8.7 (3,9)	4.9 (124,0)	10.9 (5,0)
5 (125)	5.6 (141,3)	4.8 (123,0)	9.4 (4,3)	4.8 (123,0)	11.6 (5,3)
165,1mm (150)	6.5 (165,1)	5.5 (139,7)	11.4 (5,2)	5.5 (139,7)	14.8 (6,7)
6 (150)	6.6 (168,3)	5.5 (139,7)	12.1 (5,5)	5.5 (139,7)	15.0 (6,8)
8 (200)	8.6 (219,1)	6.9 (174,8)	22.2 (10,1)	6.9 (174,8)	39.8 (18,1)

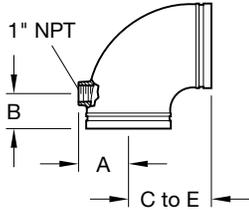


**FIGURE 510S
90° ELBOW
SHORT PATTERN**



**FIGURE 519S
TEE
SHORT PATTERN**

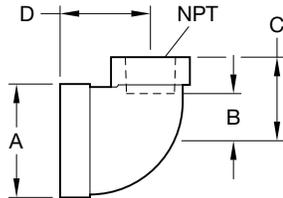
**FIGURE 4
FIGURES 510S ELBOW AND FIGURE 519S TEE
NOMINAL DIMENSIONS**



Nominal Pipe Size		Figure 510DE(a) 90° Drain Elbow			
ANSI Inches (DN)	O.D. Inches (mm)	Nominal C to E Inches (mm)	Nominal A Inches (mm)	Nominal B Inches (mm)	Approx. Weight Lbs. (kg)
2 (50)	2.4 (60,3)	3.8 (95,3)	2.0 (50,8)	2.8 (69,9)	3.1 (1,4)
2-1/2 (65)	2.9 (73,0)	3.8 (95,3)	2.0 (50,8)	2.8 (69,9)	2.2 (1,0)
3 (80)	3.5 (88,9)	4.3 (108,0)	2.3 (59,4)	2.8 (69,9)	6.0 (2,7)
4 (100)	4.5 (114,3)	5.0 (127,0)	2.9 (72,4)	2.8 (69,9)	8.6 (3,9)
6 (150)	6.6 (168,3)	6.5 (165,1)	3.9 (99,6)	2.8 (69,9)	18.0 (8,2)
8 (200)	8.6 (219,1)	7.8 (196,9)	5.00 (125,7)	2.8 (69,9)	31.0 (14,1)

NOTES
a. Figure 510DE not available for the EMEA market.

FIGURE 5
FIGURE 510DE 90° DRAIN ELBOW
NOMINAL DIMENSIONS

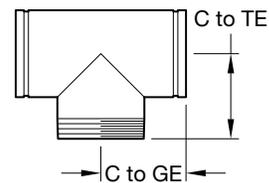


Nominal Pipe Size		Dimensions- Inches (mm)				Approx. Weight Lbs. (kg)
ANSI Inches (DN)	Outlet NPT ⁽¹⁾	A O.D.	B Takeout	C	D	
1-1/2 (40)	1/2	1.9 (48,3)	1.3 (31,8)	1.8 (44,5)	1.9 (48,0)	0.8 (0,4)
	3/4		1.3 (31,8)	1.8 (44,5)	1.9 (48,0)	0.8 (0,4)
	1		1.4 (34,8)	2.0 (50,8)	2.0 (51,3)	0.9 (0,4)
2 (50)	1/2	2.4 (60,3)	1.3 (31,8)	1.8 (44,5)	1.9 (48,0)	0.9 (0,4)
	3/4		1.3 (31,8)	1.8 (44,5)	1.9 (48,0)	0.8 (0,4)
	1		1.4 (34,8)	2.0 (50,8)	2.0 (51,3)	1.1 (0,5)
2-1/2 (65)	1/2	2.9 (73,0)	1.5 (37,3)	2.0 (50,0)	1.9 (48,0)	1.8 (0,8)
	3/4		1.5 (37,3)	2.0 (50,0)	1.9 (48,0)	1.1 (0,5)
	1		1.4 (34,8)	2.0 (50,8)	2.0 (51,3)	1.1 (0,5)

NOTES
a. ISO threaded outlets are available upon request.
b. ADACAP not available for the EMEA market.
c. Rated pressure 300 psi (20,7 bar).

FIGURE 6
ADACAP
NOMINAL DIMENSIONS

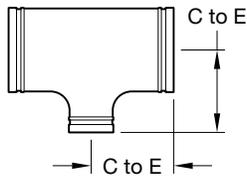
Nominal Pipe Size		Figure 320 Fabricated Thread Tee		
ANSI Inches (DN)	O.D. Inches (mm)	Nominal C to GE Inches (mm)	Nominal C to TE Inches (mm)	Approx. Weight Lbs. (kg)
1 (25)	1.31 (33,4)	2.25 (57,2)	2.25 (57,2)	1.3 (0,6)
1-1/4 (32)	1.66 (42,4)	2.75 (69,9)	2.75 (69,9)	1.5 (0,7)
1-1/2 (40)	1.90 (48,3)	2.75 (69,9)	2.75 (69,9)	1.9 (0,9)
2 (50)	2.37 (60,3)	3.25 (82,6)	4.25 (108,0)	3.2 (1,5)
2-1/2 (65)	2.87 (73,0)	3.75 (95,3)	3.75 (95,3)	4.0 (1,8)
76,1mm (65)	3.00 (76,1)	3.75 (95,3)	3.75 (95,3)	4.5 (2,0)
3 (80)	3.50 (88,9)	4.25 (108,0)	6.00 (152,4)	6.0 (2,7)
4 (100)	4.50 (114,3)	5.00 (127,0)	7.25 (184,2)	11.0 (5,0)
139,7mm (125)	5.50 (139,7)	5.50 (139,7)	5.50 (139,7)	21.0 (9,5)
5 (125)	5.56 (141,3)	5.50 (139,7)	5.50 (139,7)	23.0 (10,5)
165,1mm (150)	6.50 (165,1)	6.50 (165,1)	6.50 (165,1)	25 (11,3)
6 (150)	6.63 (168,3)	6.50 (165,1)	6.50 (165,1)	28.0 (12,7)
8 (200)	8.63 (219,1)	7.75 (196,9)	7.75 (196,9)	38.7 (17,6)
10 (250)	10.75 (273,0)	9.00 (228,6)	9.00 (228,6)	72.1 (32,8)
12 (300)	12.75 (323,9)	10.00 (254,0)	10.00 (254,0)	92.5 (42,0)



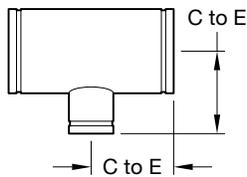
NOTES

a. Figure 320 not available for the EMEA market.

FIGURE 7
FIGURE 320 FABRICATED GROOVE X GROOVE X MALE THREAD TEES (SEGMENT WELDED)
NOMINAL DIMENSIONS



**FIGURE 221
 CAST TEE REDUCING
 GROOVED
 (SEGMENT WELDED)**

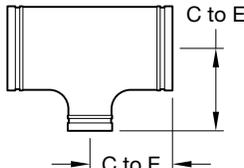


**FIGURE 321
 FABRICATED TEE REDUCING
 GROOVED
 (SEGMENT WELDED)**

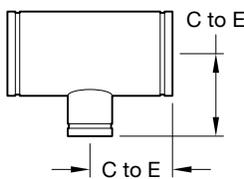
Nominal Pipe Size		Figure 221 Cast Reducing Tee		Figure 321 Fabricated Reducing Tee	
ANSI Inches (DN)	O.D. Inches (mm)	Nominal C to E Inches (mm)	Approx. Weight Lbs. (kg)	Nominal C to E Inches (mm)	Approx. Weight Lbs. (kg)
1-1/4 x 1-1/4 x 1 (32 x 32 x 25)	1.66 x 1.66 x 1.31 (42,4 x 42,4 x 33,4)	—	—	2.75 (69,9)	1.3 (0,6)
1-1/2 x 1-1/2 x 1 (40 x 40 x 25)	1.90 x 1.90 x 1.31 (48,3 x 48,3 x 33,4)	—	—	2.75 (69,9)	1.4 (0,6)
1-1/2 x 1-1/2 x 1-1/4 (40 x 40 x 32)	1.90 x 1.90 x 1.66 (48,3 x 48,3 x 42,4)	—	—	2.75 (69,9)	1.5 (0,7)
2 x 2 x 1 (50 x 50 x 25)	2.37 x 2.37 x 1.32 (60,3 x 60,3 x 33,4)	—	—	3.25 (82,6)	1.6 (0,7)
2 x 2 x 1-1/2 (50 x 50 x 40)	2.37 x 2.37 x 1.90 (60,3 x 60,3 x 48,3)	3.25 (82,6)	2.7 (1,2)	3.25 (82,6)	2.0 (0,9)
2-1/2 x 2-1/2 x 1 (65 x 65 x 25)	2.87 x 2.87 x 1.32 (73,0 x 73,0 x 33,4)	—	—	3.75 (95,3)	2.3 (1,1)
2-1/2 x 2-1/2 x 1-1/4 (65 x 65 x 32)	2.87 x 2.87 x 1.66 (73,0 x 73,0 x 42,4)	—	—	3.75 (95,3)	4.2 (1,9)
2-1/2 x 2-1/2 x 1-1/2 (65 x 65 x 40)	2.87 x 2.87 x 1.90 (73,0 x 73,0 x 48,3)	—	—	3.75 (95,3)	4.2 (1,9)
2-1/2 x 2-1/2 x 2 (65 x 65 x 50)	2.87 x 2.87 x 2.37 (73,0 x 73,0 x 60,3)	3.75 (95,3)	4.2 (1,9)	3.75 (95,3)	4.5 (2,0)
76,1mm x 76,1mm x 1 (65 x 65 x 25)	3.00 x 3.00 x 1.32 (76,1 x 76,1 x 33,4)	—	—	3.75 (95,3)	2.4 (1,1)
76,1mm x 76,1mm x 1-1/4 (65 x 65 x 32)	3.00 x 3.00 x 1.66 (76,1 x 76,1 x 42,4)	—	—	3.75 (95,3)	4.3 (2,0)
76,1mm x 76,1mm x 1-1/2 (65 x 65 x 40)	3.00 x 3.00 x 1.90 (76,1 x 76,1 x 48,3)	3.75 (95,3)	4.5 (2,0)	3.75 (95,3)	4.2 (1,9)
76,1mm x 76,1mm x 2 (65 x 65 x 50)	3.00 x 3.00 x 2.37 (76,1 x 76,1 x 60,3)	3.75 (95,3)	4.3 (2,0)	3.75 (95,3)	4.6 (2,1)
3 x 3 x 1 (80 x 80 x 25)	3.50 x 3.50 x 1.32 (88,9 x 88,9 x 33,4)	4.25 (108,0)	5.6 (2,5)	4.25 (108,0)	6.0 (2,7)
3 x 3 x 1-1/4 (80 x 80 x 32)	3.50 x 3.50 x 1.66 (88,9 x 88,9 x 42,4)	—	—	4.25 (108,0)	6.1 (2,8)
3 x 3 x 1-1/2 (80 x 80 x 40)	3.50 x 3.50 x 1.90 (88,9 x 88,9 x 48,3)	4.25 (108,0)	5.9 (2,7)	4.25 (108,0)	6.2 (2,8)
3 x 3 x 2 (80 x 80 x 50)	3.50 x 3.50 x 2.37 (88,9 x 88,9 x 60,3)	4.25 (108,0)	6.0 (2,7)	4.25 (108,0)	6.4 (2,9)
3 x 3 x 2-1/2 (80 x 80 x 65)	3.50 x 3.50 x 2.87 (88,9 x 88,9 x 73,0)	4.25 (108,0)	6.2 (2,8)	4.25 (108,0)	6.5 (2,9)
3 x 3 x 76,1mm (80 x 80 x 65)	3.50 x 3.50 x 3.00 (88,9 x 88,9 x 76,1)	4.25 (108,0)	6.0 (2,7)	4.25 (108,0)	6.7 (3,0)
4 x 4 x 1 (100 x 100 x 25)	4.50 x 4.50 x 1.32 (114,3 x 114,3 x 33,4)	—	—	5.00 (127,0)	8.0 (3,7)
4 x 4 x 1-1/4 (100 x 100 x 32)	4.50 x 4.50 x 1.66 (114,3 x 114,3 x 42,4)	—	—	5.00 (127,0)	9.8 (4,4)
4 x 4 x 1-1/2 (100 x 100 x 40)	4.50 x 4.50 x 1.90 (114,3 x 114,3 x 48,3)	—	—	5.00 (127,0)	9.9 (4,5)
4 x 4 x 2 (100 x 100 x 50)	4.50 x 4.50 x 2.37 (114,3 x 114,3 x 60,3)	5.00 (127,0)	9.1 (4,1)	5.00 (127,0)	11.0 (5,0)
4 x 4 x 2-1/2 (100 x 100 x 65)	4.50 x 4.50 x 2.88 (114,3 x 114,3 x 73,0)	5.00 (127,0)	9.5 (4,3)	5.00 (127,0)	11.2 (5,1)
4 x 4 x 76,1mm (125 x 125 x 65)	4.50 x 4.50 x 3.00 (114,3 x 114,3 x 76,1)	5.00 (127,0)	9.5 (4,3)	5.00 (127,0)	11.4 (5,2)

**FIGURE 8 (1 OF 3)
 FIGURES 221 AND 321 REDUCING TEES
 NOMINAL DIMENSIONS**

Nominal Pipe Size		Figure 221 Cast Reducing Tee		Figure 321 Fabricated Reducing Tee	
ANSI Inches (DN)	O.D. Inches (mm)	Nominal C to E Inches (mm)	Approx. Weight Lbs. (kg)	Nominal C to E Inches (mm)	Approx. Weight Lbs. (kg)
4 x 4 x 3 (100 x 100 x 80)	4.50 x 4.50 x 3.50 (114,3 x 114,3 x 88,9)	5.00 (127,0)	9.7 (4,4)	5.00 (127,0)	11.6 (5,3)
139,7mm x 139,7mm x 3 (125 x 125 x 80)	5.50 x 5.50 x 3.50 (139,7 x 139,7 x 88,9)	5.50 (139,7)	12.7 (5,8)	5.50 (139,7)	12.2 (5,5)
139,7mm x 139,7mm x 4 (125 x 125 x 100)	5.50 x 5.50 x 4.50 (139,7 x 139,7 x 114,3)	5.50 (139,7)	13.4 (6,1)	5.50 (139,7)	12.5 (5,7)
5 x 5 x 1 (125 x 125 x 25)	5.56 x 5.56 x 1.31 (141,3 x 141,3 x 33,4)	—	—	5.50 (139,7)	13.0 (5,9)
5 x 5 x 1-1/2 (125 x 125 x 40)	5.56 x 5.56 x 1.90 (141,3 x 141,3 x 48,3)	—	—	5.50 (139,7)	13.4 (6,1)
5 x 5 x 2 (125 x 125 x 50)	5.56 x 5.56 x 2.37 (141,3 x 141,3 x 60,3)	—	—	5.50 (139,7)	14.1 (6,4)
5 x 5 x 2-1/2 (125 x 125 x 65)	5.56 x 5.56 x 2.87 (141,3 x 141,3 x 73,0)	5.50 (139,7)	18.0 (8,2)	5.50 (139,7)	14.8 (6,7)
5 x 5 x 76,1mm (125 x 125 x 65)	5.56 x 5.56 x 3.00 (141,3 x 141,3 x 76,1)	—	—	5.50 (139,7)	15.3 (6,9)
5 x 5 x 3 (125 x 125 x 80)	5.56 x 5.56 x 3.50 (141,3 x 141,3 x 88,9)	5.50 (139,7)	14.0 (6,4)	5.50 (139,7)	16.0 (7,3)
5 x 5 x 4 (125 x 125 x 100)	5.56 x 5.56 x 4.50 (141,3 x 141,3 x 114,3)	5.50 (139,7)	13.9 (6,3)	5.50 (139,7)	16.4 (7,4)
165,1mm x 165,1mm x 3 (150 x 150 x 80)	6.50 x 6.50 x 3.50 (165,1 x 165,1 x 88,9)	6.50 (165,1)	18.0 8,2	6.50 (165,1)	22.0 (10,0)
165,1mm x 165,1mm x 4 (150 x 150 x 100)	6.50 x 6.50 x 4.50 (165,1 x 165,1 x 114,3)	6.50 (165,1)	19.5 8,9	6.50 (165,1)	22.6 (10,3)
165,1mm x 165,1mm x 5 (150 x 150 x 125)	6.50 x 6.50 x 5.50 (165,1 x 165,1 x 139,7)	—	—	6.50 (165,1)	23.2 (10,5)
165,1mm x 165,1mm x 139,7mm (150 x 150 x 125)	6.50 x 6.50 x 5.50 (165,1 x 165,1 x 141,3)	—	—	6.50 (165,1)	22.9 (10,4)
6 x 6 x 1 (150 x 150 x 25)	6.63 x 6.63 x 1.31 (168,3 x 168,3 x 33,4)	—	—	6.50 (165,1)	22.8 (10,3)
6 x 6 x 1-1/2 (150 x 150 x 40)	6.63 x 6.63 x 1.90 (168,3 x 168,3 x 48,3)	—	—	6.50 (165,1)	22.9 (10,4)
6 x 6 x 2 (150 x 150 x 50)	6.63 x 6.63 x 2.37 (168,3 x 168,3 x 60,3)	6.50 (165,1)	19.4 (8,8)	6.50 (165,1)	23.0 (10,4)
6 x 6 x 2-1/2 (150 x 150 x 65)	6.63 x 6.63 x 2.87 (168,3 x 168,3 x 73,0)	6.50 (165,1)	21.2 (9,8)	6.50 (165,1)	23.4 (10,6)
6 x 6 x 76,1mm (150 x 150 x 65)	6.63 x 6.63 x 3.00 (168,3 x 168,3 x 76,1)	6.50 (165,1)	21.2 9,8	6.50 (165,1)	23.5 (10,7)
6 x 6 x 3 (150 x 150 x 80)	6.63 x 6.63 x 3.50 (168,3 x 168,3 x 88,9)	6.50 (165,1)	21.0 (9,5)	6.50 (165,1)	23.7 (10,7)
6 x 6 x 4 (150 x 150 x 100)	6.63 x 6.63 x 4.50 (168,3 x 168,3 x 114,3)	6.50 (165,1)	21.8 (9,9)	6.50 (165,1)	23.9 (10,8)
6 x 6 x 139,7mm (150 x 150 x 125)	6.63 x 6.63 x 5.50 (168,3 x 168,3 x 139,7)	6.50 (165,1)	23.0 10,4	6.50 (165,1)	24.0 (10,9)
6 x 6 x 5 (150 x 150 x 125)	6.63 x 6.63 x 5.56 (168,3 x 168,3 x 141,3)	—	—	6.50 (165,1)	27.0 12,2
8 x 8 x 1-1/2 (200 x 200 x 40)	8.63 x 8.63 x 1.90 (219,1 x 219,1 x 48,3)	—	—	7.75 (196,9)	36.0 (16,3)
8 x 8 x 2 (200 x 200 x 50)	8.63 x 8.63 x 2.375 (219,1 x 219,1 x 60,3)	—	—	7.75 (196,9)	36.2 (16,4)



**FIGURE 221
CAST TEE REDUCING
GROOVED
(SEGMENT WELDED)**



**FIGURE 321
FABRICATED TEE REDUCING
GROOVED
(SEGMENT WELDED)**

**FIGURE 8 (2 OF 3)
FIGURES 221 AND 321 REDUCING TEES
NOMINAL DIMENSIONS**

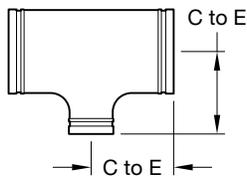


FIGURE 221
CAST TEE REDUCING
GROOVED
(SEGMENT WELDED)

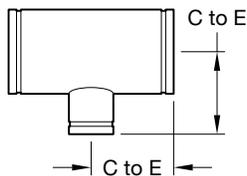
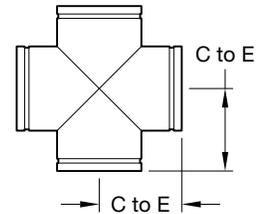


FIGURE 321
FABRICATED TEE REDUCING
GROOVED
(SEGMENT WELDED)

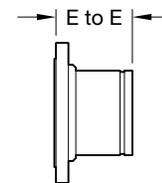
Nominal Pipe Size		Figure 221 Cast Reducing Tee		Figure 321 Fabricated Reducing Tee	
ANSI Inches (DN)	O.D. Inches (mm)	Nominal C to E Inches (mm)	Approx. Weight Lbs. (kg)	Nominal C to E Inches (mm)	Approx. Weight Lbs. (kg)
8 x 8 x 2-1/2 (200 x 200 x 65)	8.63 x 8.63 x 2.88 (219,1 x 219,1 x 73,0)	—	—	7.75 (196,9)	36.4 (16,5)
216mm x 216mm x 165,1mm (200 x 200 x 150)	8.52 x 8.52 x 6.50 (216,3 x 216,3 x 165,1)	—	—	7.75 (196,9)	37.9 (17,2)
8 x 8 x 76,1mm (200 x 200 x 65)	8.63 x 8.63 x 3.00 (216,1 x 219,1 x 76,1)	—	—	7.75 (196,9)	36.4 (16,5)
8 x 8 x 3 (200 x 200 x 80)	8.63 x 8.63 x 3.50 (219,1 x 219,1 x 88,9)	—	—	7.75 (196,9)	36.5 (16,6)
8 x 8 x 4 (200 x 200 x 100)	8.63 x 8.63 x 4.50 (219,1 x 219,1 x 114,1)	7.75 (196,9)	37.2 (16,9)	7.75 (196,9)	36.4 (16,5)
8 x 8 x 139,7mm (200 x 200 x 125)	8.63 x 8.63 x 5.56 (219,1 x 219,1 x 139,7)	7.75 (196,9)	37.7 (17,1)	7.75 (196,9)	36.7 (16,6)
8 x 8 x 5 (200 x 200 x 125)	8.63 x 8.63 x 5.50 (219,1 x 219,1 x 141,3)	—	—	7.75 (196,9)	36.8 (16,7)
8 x 8 x 165,1mm (200 x 200 x 150)	8.63 x 8.63 x 6.50 (219,1 x 219,1 x 165,1)	7.75 (196,9)	37.7 (17,1)	7.75 (196,9)	39.0 (17,7)
10 x 10 x 1-1/2 (250 x 250 x 40)	10.75 x 10.75 x 1.90 (273,0 x 273,0 x 48,3)	—	—	9.00 (228,6)	57.0 (25,8)
10 x 10 x 2 (250 x 250 x 50)	10.75 x 10.75 x 2.37 (273,0 x 273,0 x 60,3)	—	—	9.00 (228,6)	57.1 (25,9)
10 x 10 x 2-1/2 (250 x 250 x 65)	10.75 x 10.75 x 2.87 (273,0 x 273,0 x 73,0)	—	—	9.00 (228,6)	57.3 (26,0)
10 x 10 x 3 (250 x 250 x 80)	10.75 x 10.75 x 3.50 (273,0 x 273,0 x 88,9)	—	—	9.00 (228,6)	57.4 (26,0)
10 x 10 x 4 (250 x 250 x 100)	10.75 x 10.75 x 4.50 (273,0 x 273,0 x 114,3)	—	—	9.00 (228,6)	57.8 (26,2)
10 x 10 x 5 (250 x 250 x 125)	10.75 x 10.75 x 5.56 (273,0 x 273,0 x 141,3)	—	—	9.00 (228,6)	58.0 (26,3)
10 x 10 x 6 (250 x 250 x 150)	10.75 x 10.75 x 6.63 (273,0 x 273,0 x 168,3)	—	—	9.00 (228,6)	62.0 (28,1)
10 x 10 x 8 (250 x 250 x 200)	10.75 x 10.75 x 8.63 (273,0 x 273,0 x 219,1)	—	—	9.00 (228,6)	63.0 (28,6)
12 x 12 x 1 (300 x 300 x 25)	12.75 x 12.75 x 1.31 (323,9 x 323,9 x 33,4)	—	—	10.00 (254,0)	64.0 (29,0)
12 x 12 x 2 (300 x 300 x 50)	12.75 x 12.75 x 2.37 (323,9 x 323,9 x 60,3)	—	—	10.00 (254,0)	69.5 (31,5)
12 x 12 x 2-1/2 (300 x 300 x 65)	12.75 x 12.75 x 2.87 (323,9 x 323,9 x 73,0)	—	—	10.00 (254,0)	75.6 (34,3)
12 x 12 x 3 (300 x 300 x 80)	12.75 x 12.75 x 3.50 (323,9 x 323,9 x 88,9)	—	—	10.00 (254,0)	80.2 (36,4)
12 x 12 x 4 (300 x 300 x 100)	12.75 x 12.75 x 4.50 (323,9 x 323,9 x 114,3)	—	—	10.00 (254,0)	80.5 (36,5)
12 x 12 x 5 (300 x 300 x 125)	12.75 x 12.75 x 5.56 (323,9 x 323,9 x 141,3)	—	—	10.00 (254,0)	80.7 (36,6)
12 x 12 x 6 (300 x 300 x 150)	12.75 x 12.75 x 6.63 (323,9 x 323,9 x 168,3)	—	—	10.00 (254,0)	80.9 (36,7)
12 x 12 x 165,1mm (300 x 300 x 150)	12.75 x 12.75 x 6.50 (323,9 x 323,9 x 165,1)	—	—	10.00 (254,0)	79.9 (36,2)
12 x 12 x 8 (300 x 300 x 200)	12.75 x 12.75 x 8.63 (323,9 x 323,9 x 219,1)	—	—	10.00 (254,0)	76.3 (34,6)
12 x 12 x 10 (300 x 300 x 250)	12.75 x 12.75 x 10.75 (323,9 x 323,9 x 273,0)	—	—	10.00 (254,0)	77.6 (35,2)

FIGURE 8 (3 OF 3)
FIGURES 221 AND 321 REDUCING TEES
NOMINAL DIMENSIONS

Nominal Pipe Size		Figure 327(a)		Figure 341(a)			Figure 342(a)		
ANSI Inches (DN)	O.D. Inches (mm)	Nominal C to E Inches (mm)	Approx. Weight Lbs. (kg)	Nominal E to E Inches (mm)	Mating Flange Bolt Qty.	Approx. Weight Lbs. (kg)	Nominal E to E Inches (mm)	Mating Flange Bolt Qty.	Approx. Weight Lbs. (kg)
1 (25)	1.31 (33,4)	2.25 (57,2)	2.2 (1,0)	3.00 (76,2)	4	2.3 (1,0)	3.00 (76,2)	4	4.0 (1,8)
1-1/4 (32)	1.66 (42,4)	2.75 (69,9)	2.2 (1,0)	4.00 (101,6)	4	2.8 (1,3)	4.00 (101,6)	4	4.6 (2,1)
1-1/2 (40)	1.90 (48,3)	2.75 (69,9)	2.5 (1,1)	4.00 (101,6)	4	3.2 (1,5)	4.00 (101,6)	4	7.1 (3,2)
2 (50)	2.37 (60,3)	3.25 (82,6) ^b	3.7 (1,7) ^b	4.00 (101,6)	4	5.2 (2,4)	4.00 (101,6)	8	8.2 (3,7)
2-1/2 (65)	2.87 (73,0)	3.75 (95,3) ^b	5.8 (2,6) ^b	4.00 (101,6)	4	8.0 (3,6)	4.00 (101,6)	8	11.9 (5,4)
76,1mm (65)	3.00 (76,1)	3.75 (95,3)	6.0 (2,7)	4.00 (101,6)	4	8.8 (4,0)	4.00 (101,6)	8	12.5 (5,7)
3 (80)	3.50 (88,9)	4.25 (108,0)	8.6 (3,9)	4.00 (101,6)	4	10.2 (4,6)	4.00 (101,6)	8	15.5 (7,0)
4 (100)	4.50 (114,3)	5.00 (127,0) ^b	20.7 (9,4) ^b	6.00 (152,4)	8	17.2 (7,8)	6.00 (152,4)	8	28.0 (12,7)
139,7mm (125)	5.50 (139,7)	5.50 (139,7)	18.3 (8,3)	6.00 (152,4)	8	18.5 (8,4)	6.00 (152,4)	8	32.5 (14,7)
5 (125)	5.56 (141,3)	5.50 (139,7)	18.5 (8,4)	6.00 (152,4)	8	21.4 (9,7)	6.00 (152,4)	8	37.0 (16,8)
165,1mm (150)	6.50 (165,1)	6.50 (165,1)	26.2 (11,9)	6.00 (152,4)	8	22.0 (10,0)	6.00 (152,4)	12	42.5 (19,3)
6 (150)	6.63 (168,3)	6.50 (165,1)	27.3 (12,4)	6.00 (152,4)	8	26.0 (11,8)	6.00 (152,4)	12	48.0 (21,8)
216,3mm (200)	8.52 (216,3)	7.75 (196,9)	44.0 (20,0)	6.00 (152,4)	8	34.5 (15,6)	6.00 (152,4)	12	72.5 (32,9)
8 (200)	8.63 (219,1)	7.75 (196,9)	48.0 (21,7)	6.00 (152,4)	8	38.4 (17,4)	6.00 (152,4)	12	79.0 (35,8)
10 (250)	10.75 (273,0)	9.00 (228,6)	75.0 (34,0)	8.00 (203,2)	12	65.0 (29,5)	8.00 (203,2)	16	122.0 (55,3)
12 (300)	12.75 (323,9)	10.00 (254,0)	95.8 (43,4)	8.00 (203,2)	12	91.0 (41,3)	8.00 (203,2)	16	183.0 (83,0)



**FIGURE 327^a
FABRICATED CROSS
GROOVED
(SEGMENT WELDED)**



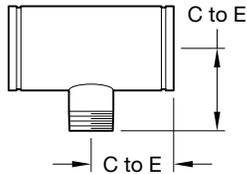
**FIGURE 341^a
FABRICATED
FLANGE ADAPTER
ANSI CLASS 150 LBS.
GROOVED**

**FIGURE 342^a
FABRICATED
FLANGE ADAPTER
ANSI CLASS 300 LBS.
GROOVED**

NOTES

- a. Figure 327, Figure 341, and Figure 342 are not available for the EMEA market.
- b. Figure 227

**FIGURE 9
FIGURE 327 CROSS AND FIGURE 341 AND FIGURE 342 FLANGE ADAPTERS
NOMINAL DIMENSIONS**

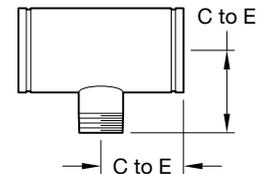


Nominal Pipe Size		Nominal C to E Inches (mm)	Approx. Weight Lbs. (kg)
ANSI Inches (DN)	O.D. Inches (mm)		
2 x 2 x 3/4 (50 x 50 x 20)	2.37 x 2.37 x 1.05 (60,3 x 60,3 x 26,7)	3.25 (82,6)	2.0 (0,9)
2 x 2 x 1 (50 x 50 x 25)	2.37 x 2.37 x 1.31 (60,3 x 60,3 x 33,4)	3.25 (82,6)	2.2 (1,0)
2 x 2 x 1-1/4 (50 x 50 x 32)	2.37 x 2.37 x 1.66 (60,3 x 60,3 x 42,4)	3.25 (82,6)	2.3 (1,0)
2 x 2 x 1-1/2 (50 x 50 x 40)	2.37 x 2.37 x 1.90 (60,3 x 60,3 x 48,3)	3.25 (82,6)	1.4 (1,1)
2-1/2 x 2-1/2 x 1 (65 x 65 x 25)	2.875 x 2.875 x 1.315 (73,0 x 73,0 x 33,4)	3.75 (95,3)	3.6 (1,6)
2-1/2 x 2-1/2 x 1-1/4 (65 x 65 x 32)	2.875 x 2.875 x 1.660 (73,0 x 73,0 x 42,4)	3.75 (95,3)	3.8 (1,7)
2-1/2 x 2-1/2 x 1-1/2 (65 x 65 x 40)	2.875 x 2.875 x 1.900 (73,0 x 73,0 x 48,3)	3.75 (95,3)	4.0 (1,8)
2-1/2 x 2-1/2 x 2 (65 x 65 x 50)	2.875 x 2.875 x 2.375 (73,0 x 73,0 x 60,3)	3.75 (95,3)	4.2 (1,9)
76,1mm x 76,1mm x 1 (65 x 65 x 25)	3.00 x 3.00 x 1.31 (76,1 x 76,1 x 33,4)	3.75 (95,3)	3.8 (1,7)
76,1mm x 76,1mm x 1-1/4 (65 x 65 x 32)	3.00 x 3.00 x 1.66 (76,1 x 76,1 x 42,4)	3.75 (95,3)	4.0 (1,8)
76,1mm x 76,1mm x 1-1/2 (65 x 65 x 40)	3.00 x 3.00 x 1.90 (76,1 x 76,1 x 48,3)	3.75 (95,3)	4.2 (1,9)
3 x 3 x 3/4 (80 x 80 x 20)	3.50 x 3.50 x 1.05 (88,9 x 88,9 x 26,7)	4.25 (108,0)	5.2 (2,4)
3 x 3 x 1 (80 x 80 x 25)	3.50 x 3.50 x 1.31 (88,9 x 88,9 x 33,4)	4.25 (108,0)	5.7 (2,6)
3 x 3 x 1-1/2 (80 x 80 x 40)	3.50 x 3.50 x 1.90 (88,9 x 88,9 x 48,3)	4.25 (108,0)	5.8 (2,6)
3 x 3 x 2 (80 x 80 x 50)	3.50 x 3.50 x 2.37 (88,9 x 88,9 x 60,3)	4.25 (108,0)	5.9 (2,7)
3 x 3 x 2-1/2 (80 x 80 x 65)	3.50 x 3.50 x 2.87 (88,9 x 88,9 x 73,0)	4.25 (108,0)	6.3 (2,9)
3 x 3 x 76,1mm (80 x 80 x 65)	3.50 x 3.50 x 3.00 (88,9 x 88,9 x 76,1)	4.25 (108,0)	6.5 (2,9)
4 x 4 x 3/4 (100 x 100 x 20)	4.50 x 4.50 x 1.05 (114,3 x 114,3 x 26,7)	5.00 (127,0)	6.4 (2,9)
4 x 4 x 1 (100 x 100 x 25)	4.50 x 4.50 x 1.31 (114,3 x 114,3 x 33,4)	5.00 (127,0)	6.9 (3,1)
4 x 4 x 1-1/4 (100 x 100 x 32)	4.50 x 4.50 x 1.66 (114,3 x 114,3 x 42,4)	5.00 (127,0)	7.6 (3,4)
4 x 4 x 1-1/2 (100 x 100 x 40)	4.50 x 4.50 x 1.90 (114,3 x 114,3 x 48,3)	5.00 (127,0)	8.3 (3,8)
4 x 4 x 2 (100 x 100 x 50)	4.50 x 4.50 x 2.37 (114,3 x 114,3 x 60,3)	5.00 (127,0)	9.6 (4,4)
4 x 4 x 2-1/2 (100 x 100 x 65)	4.500 x 4.500 x 2.875 (114,3 x 114,3 x 73,0)	5.00 (127,0)	10.0 (4,5)
4 x 4 x 76,1mm (100 x 100 x 65)	4.500 x 4.500 x 3.00 (114,3 x 114,3 x 76,1)	5.00 (127,0)	10.5 (4,8)

NOTES
a. Figure 323 not available for the EMEA market.

FIGURE 10 (1 OF 3)
FIGURE 323 FABRICATED GROOVE X GROOVE X MALE THREAD REDUCING TEES (SEGMENT WELDED)
NOMINAL DIMENSIONS

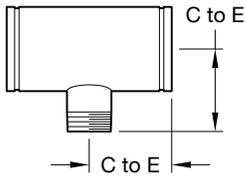
Nominal Pipe Size		Nominal C to E Inches (mm)	Approx. Weight Lbs. (kg)
ANSI Inches (DN)	O.D. Inches (mm)		
4 x 4 x 3 (100 x 100 x 80)	4.50 x 4.50 x 3.50 (114,3 x 114,3 x 88,9)	5.00 (127,0)	10.3 (4,7)
5 x 5 x 2 (125 x 125 x 50)	5.56 x 5.56 x 2.37 (141,3 x 141,3 x 60,3)	5.50 (139,7)	14.0 (6,4)
5 x 5 x 2-1/2 (125 x 125 x 65)	5.56 x 5.56 x 2.87 (141,3 x 141,3 x 73,0)	5.50 (139,7)	14.3 (6,5)
5 x 5 x 76,1mm (125 x 125 x 65)	5.56 x 5.56 x 3.00 (141,3 x 141,3 x 76,1)	5.50 (139,7)	14.5 (6,6)
5 x 5 x 3 (125 x 125 x 80)	5.56 x 5.56 x 3.50 (141,3 x 141,3 x 88,9)	5.50 (139,7)	14.6 (6,6)
5 x 5 x 4 (125 x 125 x 100)	5.56 x 5.56 x 4.50 (141,3 x 141,3 x 114,3)	5.50 (139,7)	15.1 (6,8)
165,1mm x 165,1mm x 2 (150 x 150 x 50)	6.50 x 6.50 x 2.37 (165,1 x 165,1 x 60,3)	6.50 (165,1)	9.5 (4,3)
165,1mm x 165,1mm x 2-1/2 (150 x 150 x 65)	6.50 x 6.50 x 2.875 (165,1 x 165,1 x 73,0)	6.50 (165,1)	9.7 (4,4)
165,1mm x 165,1mm x 76,1mm (150 x 150 x 65)	6.50 x 6.50 x 3.00 (165,1 x 165,1 x 76,1)	6.50 (165,1)	9.7 (4,4)
165,1mm x 165,1mm x 3 (150 x 150 x 80)	6.50 x 6.50 x 3.50 (165,1 x 165,1 x 88,9)	6.50 (165,1)	9.8 (4,4)
165,1mm x 165,1mm x 4 (150 x 150 x 100)	6.50 x 6.50 x 4.50 (165,1 x 165,1 x 114,3)	6.50 (165,1)	10.0 (4,5)
165,1mm x 165,1mm x 5 (150 x 150 x 125)	6.50 x 6.50 x 5.563 (165,1 x 165,1 x 141,3)	6.50 (165,1)	10.2 (4,6)
6 x 6 x 1-1/2 (150 x 150 x 40)	6.625 x 6.625 x 1.90 (168,3 x 168,3 x 48,3)	6.50 (165,1)	19.0 (8,6)
6 x 6 x 2 (150 x 150 x 50)	6.625 x 6.625 x 2.375 (168,3 x 168,3 x 60,3)	6.50 (165,1)	21.3 (9,7)
6 x 6 x 2-1/2 (150 x 150 x 65)	6.625 x 6.625 x 2.875 (168,3 x 168,3 x 73,0)	6.50 (165,1)	21.7 (9,8)
6 x 6 x 76,1mm (150 x 150 x 65)	6.625 x 6.625 x 3.00 (168,3 x 168,3 x 76,1)	6.50 (165,1)	14.5 (6,6)
6 x 6 x 3 (150 x 150 x 80)	6.625 x 6.625 x 3.500 (168,3 x 168,3 x 88,9)	6.50 (165,1)	22.0 (10,0)
6 x 6 x 4 (150 x 150 x 100)	6.625 x 6.625 x 4.500 (168,3 x 168,3 x 114,3)	6.50 (165,1)	22.5 (10,2)
6 x 6 x 5 (150 x 150 x 125)	6.625 x 6.625 x 5.563 (168,3 x 168,3 x 141,3)	6.50 (165,1)	23.1 10,5
8 x 8 x 2 (200 x 200 x 50)	8.63 x 8.63 x 2.37 (219,1 x 219,1 x 60,3)	7.75 (196,9)	32.7 (14,8)
8 x 8 x 3 (200 x 200 x 80)	8.63 x 8.63 x 3.50 (219,1 x 219,1 x 88,9)	7.75 (196,9)	33.5 (15,2)
8 x 8 x 4 (200 x 200 x 100)	8.63 x 8.63 x 4.50 (219,1 x 219,1 x 114,1)	7.75 (196,9)	34.5 (15,6)
8 x 8 x 5 (200 x 200 x 125)	8.63 x 8.63 x 5.56 (219,1 x 219,1 x 141,3)	7.75 (196,9)	34.7 (15,7)



NOTES

a. Figure 323 not available for the EMEA market.

FIGURE 10 (2 OF 3)
FIGURE 323 FABRICATED GROOVE X GROOVE X MALE THREAD REDUCING TEES (SEGMENT WELDED)
NOMINAL DIMENSIONS

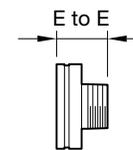


Nominal Pipe Size		Nominal C to E Inches (mm)	Approx. Weight Lbs. (kg)
ANSI Inches (DN)	O.D. Inches (mm)		
8 x 8 x 165,1mm (200 x 200 x 150)	8.63 x 8.63 x 6.50 (219,1 x 219,1 x 165,1)	7.75 (196,9)	35.0 (15,9)
8 x 8 x 6 (200 x 200 x 150)	8.63 x 8.63 x 6.63 (219,1 x 219,1 x 168,3)	7.75 (196,9)	35.6 (16,1)
10 x 10 x 2 (250 x 250 x 50)	10.75 x 10.75 x 2.37 (273,0 x 273,0 x 60,3)	9.00 (228,6)	52.2 (23,7)
10 x 10 x 3 (250 x 250 x 80)	10.75 x 10.75 x 3.50 (273,0 x 273,0 x 88,9)	9.00 (228,6)	53.0 (24,0)
10 x 10 x 4 (250 x 250 x 100)	10.75 x 10.75 x 4.50 (273,0 x 273,0 x 114,3)	9.00 (228,6)	53.6 (24,3)
10 x 10 x 5 (250 x 250 x 125)	10.75 x 10.75 x 5.56 (273,0 x 273,0 x 141,3)	9.00 (228,6)	54.2 (24,6)
10 x 10 x 165,1mm (250 x 250 x 150)	10.75 x 10.75 x 6.50 (273,0 x 273,0 x 165,1)	9.00 (228,6)	55.5 (25,2)
10 x 10 x 6 (250 x 250 x 150)	10.75 x 10.75 x 6.63 (273,0 x 273,0 x 168,3)	9.00 (228,6)	54.9 (24,9)
10 x 10 x 8 (250 x 250 x 200)	10.75 x 10.75 x 8.63 (273,0 x 273,0 x 219,1)	9.00 (228,6)	55.3 (25,1)
12 x 12 x 3 (300 x 300 x 80)	12.75 x 12.75 x 3.50 (323,9 x 323,9 x 88,9)	10.00 (254,0)	74.6 (33,8)
12 x 12 x 4 (300 x 300 x 100)	12.75 x 12.75 x 4.50 (323,9 x 323,9 x 141,3)	10.00 (254,0)	75.1 (34,1)
12 x 12 x 5 (300 x 300 x 125)	12.75 x 12.75 x 5.563 (323,9 x 323,9 x 114,3)	10.00 (254,0)	75.6 (34,3)
12 x 12 x 165,1mm (300 x 300 x 150)	12.75 x 12.75 x 6.50 (323,9 x 323,9 x 165,1)	10.00 (254,0)	76.2 (34,6)
12 x 12 x 6 (300 x 300 x 150)	12.75 x 12.75 x 6.625 (323,9 x 323,9 x 168,3)	10.00 (254,0)	76.2 (34,6)
12 x 12 x 8 (300 x 300 x 200)	12.750 x 12.750 x 8.625 (323,9 x 323,9 x 219,1)	10.00 (254,0)	76.3 (34,6)
12 x 12 x 10 (300 x 300 x 250)	12.750 x 12.750 x 10.750 (323,9 x 323,9 x 273,0)	10.00 (254,0)	77.6 (35,2)

NOTES
a. Figure 323 not available for the EMEA market.

FIGURE 10 (3 OF 3)
FIGURE 323 FABRICATED GROOVE X GROOVE X MALE THREAD REDUCING TEES (SEGMENT WELDED)
NOMINAL DIMENSIONS

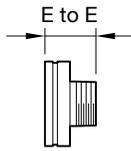
Nominal Pipe Size		E to E Inches (mm)	Approx. Weight Lbs. (kg)
ANSI Inches (DN)	Pipe O.D. Inches (mm)		
1-1/2 x 1 (40 x 25)	1.90 x 1.31 (48,3 x 33,7)	2.50 (63,5)	0.6 (0,3)
2 x 3/4 (50 x 20)	2.37 x 1.05 (60,3 x 26,7)	2.50 (63,5)	1.0 (0,5)
2 x 1 (50 x 25)	2.37 x 1.31 (60,3 x 33,4)	2.50 (63,5)	0.8 (0,4)
2 x 1-1/4 (50 x 32)	2.37 x 1.66 (60,3 x 42,4)	2.50 (63,5)	0.8 (0,4)
2 x 1-1/2 (50 x 40)	2.37 x 1.90 (60,3 x 48,3)	2.50 (63,5)	0.8 (0,4)
2-1/2 x 1 (65 x 25)	2.87 x 1.31 (73,0 x 33,4)	2.50 (63,5)	0.9 (0,4)
2-1/2 x 1-1/4 (65 x 32)	2.87 x 1.66 (73,0 x 42,4)	2.50 (63,5)	1.0 (0,5)
2-1/2 x 1-1/2 (65 x 40)	2.87 x 1.90 (73,0 x 48,3)	2.50 (63,5)	1.3 (0,6)
2-1/2 x 2 (65 x 50)	2.87 x 2.37 (73,0 x 60,3)	2.50 (63,5)	1.2 (0,5)
76,1mm x 1-1/4 (65 x 32)	3.00 x 1.66 (76,1 x 42,4)	2.50 (63,5)	1.0 (0,5)
76,1mm x 1-1/2 (65 x 40)	3.00 x 1.90 (76,1 x 48,3)	2.50 (63,5)	1.1 (0,5)
76,1mm x 2 (65 x 50)	3.00 x 2.37 (76,1 x 60,3)	2.50 (63,5)	1.2 (0,5)
3 x 3/4 (80 x 20)	3.50 x 1.05 (88,9 x 26,7)	2.50 (63,5)	1.1 (0,5)
3 x 1 (80 x 25)	3.50 x 1.31 (88,9 x 33,4)	2.50 (63,5)	1.3 (0,6)
3 x 1-1/4 (80 x 32)	3.50 x 1.66 (88,9 x 42,4)	2.5 (63,5)	1.3 (0,6)
3 x 1-1/2 (80 x 40)	3.50 x 1.90 (88,9 x 48,3)	2.50 (63,5)	1.3 (0,6)
3 x 2 (80 x 50)	3.50 x 2.37 (88,9 x 60,3)	2.50 (63,5)	1.3 (0,6)
3 x 2-1/2 (80 x 65)	3.50 x 2.87 (88,9 x 73,0)	2.50 (63,5)	1.5 (0,7)
3 x 76,1mm (80 x 65)	3.50 x 3.00 (88,9 x 76,1)	2.50 (63,5)	1.5 (0,7)
4 x 1 (100 x 25)	4.50 x 1.31 (114,3 x 33,4)	3.00 (76,2)	1.8 (0,8)
4 x 1-1/4 (100 x 32)	4.50 x 1.66 (114,3 x 42,4)	3.00 (76,2)	2.0 (0,9)
4 x 1-1/2 (100 x 40)	4.50 x 1.90 (114,3 x 48,3)	3.00 (76,2)	2.3 (1,0)
4 x 2 (100 x 50)	4.50 x 2.37 (114,3 x 60,3)	3.00 (76,2)	2.3 (1,0)
4 x 2-1/2 (100 x 65)	4.50 x 2.87 (114,3 x 73,0)	3.00 (76,2)	2.3 (1,0)



NOTES

a. Figure 372 not available for the EMEA market.

FIGURE 11 (1 OF 2)
FIGURE 372 FABRICATED CONCENTRIC REDUCER GROOVE X MALE THREAD (MPT)
NOMINAL DIMENSIONS

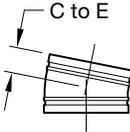


Nominal Pipe Size		E to E Inches (mm)	Approx. Weight Lbs. (kg)
ANSI Inches (DN)	Pipe O.D. Inches (mm)		
4 x 3 (100 x 80)	4.50 x 3.50 (114,3 x 88,9)	3.00 (76,2)	2.6 (1,2)
5 x 4 (125 x 100)	5.56 x 4.50 (141,3 x 114,3)	3.50 (88,9)	4.5 (2,0)
165,1mm x 1 (150 x 25)	6.50 x 1.31 (165,1 x 33,4)	4.00 (101,6)	1.2 (0,5)
165,1mm x 2 (150 x 50)	6.50 x 2.37 (165,1 x 60,3)	4.00 (101,6)	5.5 (2,5)
165,1mm x 76,1mm (150 x 65)	6.50 x 3.00 (165,1 x 76,1)	4.00 (101,6)	5.7 (2,6)
165,1mm x 3 (150 x 50)	6.50 x 3.50 (165,1 x 88,9)	4.00 (101,6)	5.8 (2,6)
165,1mm x 4 (150 x 50)	6.50 x 4.50 (165,1 x 114,3)	4.00 (101,6)	5.8 (2,6)
165,1mm x 5 (150 x 50)	6.50 x 5.563 (165,1 x 141,3)	4.00 (101,6)	5.8 (2,6)
6 x 1 (150 x 25)	6.63 x 1.31 (168,3 x 33,4)	4.00 (101,6)	5.2 (2,4)
6 x 2 (150 x 50)	6.63 x 2.37 (168,3 x 60,3)	4.00 (101,6)	5.4 (2,4)
6 x 2-1/2 (150 x 65)	6.63 x 2.87 (168,3 x 73,0)	4.00 (101,6)	5.6 (2,5)
6 x 76,1mm (150 x 65)	6.63 x 3.00 (168,3 x 76,1)	4.00 (101,6)	5.8 (2,6)
6 x 3 (150 x 80)	6.63 x 3.50 (168,3 x 88,9)	4.00 (101,6)	6.0 (2,7)
6 x 4 (150 x 100)	6.63 x 4.50 (168,3 x 114,3)	4.00 (101,6)	6.2 (2,8)
6 x 5 (150 x 125)	6.63 x 5.56 (168,3 x 141,3)	4.00 (101,6)	6.7 (3,0)

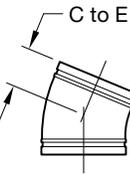
NOTES
a. Figure 372 not available for the EMEA market.

FIGURE 11 (2 OF 2)
FIGURE 372 FABRICATED CONCENTRIC REDUCER GROOVE X MALE THREAD (MPT)
NOMINAL DIMENSIONS

Nominal Pipe Size		Figures 211, 311, & 511		Figures 212, 312, & 512	
ANSI Inches (DN)	O.D. Inches (mm)	Nominal C to E Inches (mm)	Approx. Weight Lbs. (kg)	Nominal C to E Inches (mm)	Approx. Weight Lbs. (kg)
1-1/4 (32)	1.660 (42,4)	1.38 (35,1)	0.4 (0,2)	1.75 (44,5)	0.4 (0,2)
1-1/2 (40)	1.900 (48,3)	1.38 (35,1)	0.5 (0,2)	1.75 (44,5)	0.5 (0,2)
2 (50)	2.375 (60,3)	1.38 (35,1)	0.6 (0,3)	1.88 (47,8)	0.6 (0,3)
2-1/2 ^a (65) ^b	2.875 (73,0)	1.50 (38,1)	1.1 (0,5)	2.00 (50,8)	0.7 (0,3)
76,1mm (65)	3.000 (76,1)	1.50 (38,1)	1.1 (0,5)	2.00 (50,8)	1.2 (0,5)
3 (80)	3.500 (88,9)	1.50 (38,1)	1.2 (0,5)	2.25 (57,2)	1.4 (0,6)
4 (100)	4.500 (114,3)	1.75 (44,5)	2.2 (1,0)	2.63 (66,8)	2.4 (1,1)
139,7mm (125)	5.500 (139,7)	2.00 (50,8)	2.3 (1,0)	2.88 (73,2)	2.5 (1,1)
5 (125)	5.563 (141,3)	2.00 (50,8)	3.3 (1,5)	2.88 (73,2)	4.1 (1,9)
165,1mm (150)	6.500 (165,1)	2.00 (50,8)	3.5 (1,6)	3.13 (79,5)	4.3 (2,0)
6 (150)	6.625 (168,3)	2.00 (50,8)	4.6 (2,1)	3.13 (79,5)	5.6 (2,5)
8 (200)	8.625 (219,1)	2.00 (50,8)	8.7 (3,9)	3.88 (98,6)	11.1 (5,0)
10 (250)	10.750 (273,0)	2.13 (54,1)	9.1 (4,1)	4.38 (111,3)	14.0 (6,4)
12 (300)	12.750 (323,9)	2.25 (57,2)	16.7 (7,6)	4.88 (124,0)	22.0 (10,0)



**FIGURES 211, 311, & 511
FABRICATED 11¼° ELBOW
(SEGMENT WELDED)**

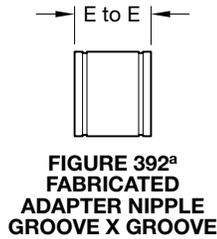
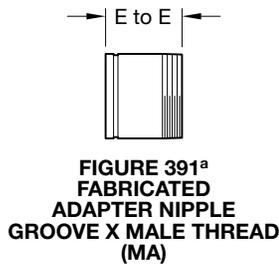


**FIGURES 212, 312, & 512
FABRICATED 22½° ELBOW
(SEGMENT WELDED)**

NOTES

- a. Nominal Pipe Size 2-1/2 in. no longer Figure 311.
- b. Nominal Pipe Size 2-1/2 in. no longer Figure 312.

**FIGURE 12
FIGURES 211, 311, AND 511 FABRICATED ELBOWS AND FIGURES 212, 312, AND 512 FABRICATED ELBOWS
NOMINAL DIMENSIONS**



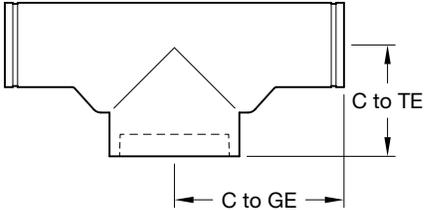
Nominal Pipe Size		Figures 391, 392 & 393 ^a	
ANSI Inches (DN)	O.D. Inches (mm)	Nominal E to E Inches (mm)	Approx. Weight Lbs. (kg)
1-1/4 (32)	1.660 (42,4)	4.00 (101,6)	0.8 (0,4)
1-1/2 (40)	1.900 (48,3)	4.00 (101,6)	0.9 (0,4)
2 ^b (50)	2.375 (60,3)	4.00 (101,6)	1.2 (0,5)
2-1/2 ^b (65)	2.875 (73,0)	4.00 (101,6)	1.9 (0,9)
76,1mm (65)	3.000 (76,1)	4.00 (101,6)	1.9 (0,9)
3 (80)	3.500 (88,9)	4.00 (101,6)	2.5 (1,1)
4 (100)	4.500 (114,3)	6.00 (154,4)	5.5 (2,5)
139,7mm (125)	5.500 (139,7)	6.00 (154,4)	5.6 (2,5)
5 (125)	5.563 (141,3)	6.00 (154,4)	7.4 (3,4)
165,1mm (150)	6.500 (165,1)	6.00 (154,4)	7.6 (3,4)
6 (150)	6.625 (168,3)	6.00 (154,4)	9.5 (4,3)
8 (200)	8.625 (219,1)	6.00 (154,4)	14.2 (6,4)
10 (250)	10.750 (273,0)	8.00 (203,2)	27.0 (12,2)
12 (300)	12.750 (323,9)	8.00 (203,2)	33.0 (15,0)

NOTES

- a. Figure 391, Figure 392, and Figure 393 are not available for the EMEA market.
- b. Figure 391 2 in. x 4 in. (DN50 x DN100) and 2-1/2 in. x 4 in. (DN65 x DN100) are cast.

FIGURE 13
FIGURES 391, 392, AND 393 FABRICATED ADAPTER NIPPLES
NOMINAL DIMENSIONS

ANSI Inches (DN)	O.D. Inches (mm)	Nominal C to GE Inches (mm)	Nominal C to TE Inches (mm)	Approx. Weight Lbs. (kg)
5 x 5 x 8 (125 X 125 X 200)	5.563 x 5.563 x 8.625 (141,3 x 141,3 x 219,1)	13.313 (388,14)	9.313 (236,55)	27.8 (12,6)
6 x 6 x 8 (150 X 150 X 200)	6.625 x 6.625 x 8.625 (168,3 x 168,3 x 219,1)	13.313 (388,14)	8.750 (222,25)	36.7 (16,4)

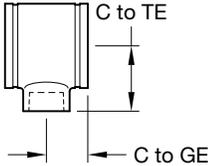


NOTES

a. Figure 507/50L not available for the EMEA market.

FIGURE 14
FIGURE 507/50L FABRICATED BULLHEAD TEE
NOMINAL DIMENSIONS

ANSI Inches (DN)	O.D. Inches (mm)	Nominal C to GE Inches (mm)	Nominal C to TE Inches (mm)	Approx. Weight Lbs. (kg)
4 x 4 x 2-1/2 (100 X 100 X 65)	5.563 x 5.563 x 8.625 (141,3 x 141,3 x 219,1)	13.313 (388,14)	9.313 (236,55)	8.7 (3,9)
6 x 6 x 2-1/2 (150 X 50 X 65)	6.625 x 6.625 x 8.625 (168,3 x 168,3 x 219,1)	13.313 (388,14)	8.750 (222,25)	13.7 (6,2)



NOTES

a. Figure 328 not available for the EMEA and APAC market.

FIGURE 15
FIGURE 328 FABRICATED STANDPIPE TEE
NOMINAL DIMENSIONS

Friction Resistance					
Nominal Pipe Size		Elbows 90° Feet (m)	Elbows 45° Feet (m)	Tee⁽¹⁾ Branch Feet (m)	Tee Run Feet (m)
ANSI Inches (DN)	O.D. Inches (mm)				
1 (25)	1.31 (33,4)	1.3 (0,4)	0.8 (0,3)	3.7 (1,1)	1.3 (0,6)
1-1/4 (32)	1.7 (42,4)	1.9 (0,6)	1.0 (0,3)	4.8 (1,5)	1.9 (0,6)
1-1/2 (40)	1.9 (48,3)	2.3 (0,7)	1.2 (0,4)	5.8 (1,8)	2.3 (0,7)
2 (50)	2.4 (60,3)	3.2 (1,0)	1.6 (0,5)	8.0 (2,5)	3.2 (1,0)
2-1/2 (65)	2.9 (73,0)	3.9 (1,2)	2.0 (0,6)	9.8 (3,0)	3.9 (1,2)
– (65)	3.0 (76,1)	4.1 (1,2)	2.1 (0,6)	10.3 (3,1)	4.1 (1,2)
3 (80)	3.5 (88,9)	4.9 (1,5)	2.4 (0,7)	12.2 (3,7)	4.9 (1,5)
4 (100)	4.5 (114,3)	6.5 (2,0)	3.3 (1,0)	16.3 (5,0)	6.5 (2,0)
– (125)	5.5 (139,7)	8.0 (2,4)	4.1 (1,3)	20.0 (6,1)	8.0 (2,4)
5 (125)	5.6 (141,3)	8.2 (2,5)	4.1 (1,3)	20.5 (6,3)	8.2 (2,5)
– (150)	6.5 (165,1)	9.5 (2,9)	4.8 (1,4)	23.8 (7,2)	9.5 (2,9)
6 (150)	6.6 (168,3)	9.9 (3,0)	5.0 (1,5)	24.8 (7,6)	9.9 (3,0)
8 (200)	8.6 (219,1)	13.1 (4,0)	6.6 (2,0)	32.8 (10,0)	13.1 (4,0)
10 (250)	10.8 (273,0)	16.5 (5,0)	8.3 (2,5)	41.3 (12,6)	16.5 (5,0)
12 (300)	12.8 (323,9)	19.9 (6,1)	9.9 (3,0)	49.7 (15,1)	19.9 (6,1)

NOTES

a. For the reducing tee branches, use the value that is corresponding to the branch size.

Example:

For 8 in. x 8 in. x 2 in. tee, the branch value of 2 in. is 8.0 feet.

For sizes not listed interpolate from the values shown.

TABLE A
FRICITION RESISTANCE FOR
FIGURES 501, 510, 510DE AND 519
(EXPRESSED AS EQUIVALENT STRAIGHT PIPE)

Friction Resistance					
Nominal Pipe Size		Elbows 90° Feet (m)	Elbows 45° Feet (m)	Tee* Branch Feet (m)	Tee Run Feet (m)
ANSI Inches (DN)	O.D. Inches (mm)				
2 (50)	2.4 (60,3)	3.5 (1,1)	1.6 (0,5)	8.0 (2,4)	3.2 (1,0)
2-1/2 (65)	2.9 (73,0)	4.3 (1,3)	2.0 (0,6)	9.8 (3,0)	3.9 (1,2)
– (65)	3.0 (76,1)	4.3 (1,3)	2.1 (0,6)	10.3 (3,1)	4.1 (1,2)
3 (80)	3.5 (88,9)	5.0 (1,5)	2.4 (0,7)	12.2 (3,7)	4.9 (1,5)
4 (100)	4.5 (114,3)	6.7 (2,0)	3.3 (1,0)	16.3 (5,0)	6.5 (2,0)
– (125)	5.5 (139,7)	8.3 (2,5)	4.1 (1,2)	20.0 (6,1)	8.0 (2,4)
5 (125)	5.6 (141,3)	8.5 (2,5)	4.3 (1,3)	21.5 (6,5)	8.6 (2,6)
– (150)	6.5 (165,1)	9.6 (2,9)	4.8 (1,5)	23.8 (7,3)	9.5 (2,9)
6 (150)	6.6 (168,3)	10.0 (3,0)	5.0 (1,5)	24.8 (7,6)	9.9 (3,0)
8 (200)	8.6 (219,1)	13.1 (4,0)	6.6 (2,0)	32.8 (10,0)	13.0 (4,0)

TABLE B
FRICITION RESISTANCE FOR FIGURES 510S AND 519S
(EXPRESSED AS EQUIVALENT LENGTH OF STRAIGHT SCHEDULE 40 STEEL PIPE)

Nominal Pipe Size		Figure 501 Cast 45° Elbow psi bar				Figure 510 Cast 90° Elbow psi bar				Figure 519 Cast Tee psi bar			
Ansi Inches (DN)	O.D. Inches mm	UL	FM	VdS	LPCB	UL	FM	VdS	LPCB	UL	FM	VdS	LPCB
1 (25)	1.31 (33,4)	—	—	—	—	—	—	—	—	—	—	—	—
1-1/4 (32)	1.66 (42,4)	—	—	—	—	365 (25,2)	365 (25,2)	232 (16,0)	290 (20,0)	—	365 (25,2)	232 (16,0)	290 (20,0)
1-1/2 (40)	1.90 (48,3)	—	—	—	—	365 (25,2)	365 (25,2)	232 (16,0)	290 (20,0)	—	365 (25,2)	232 (16,0)	290 (20,0)
2 (50)	2.37 (60,3)	365 (25,2)	365 (25,2)	232 (16,0)	290 (20,0)	365 (25,2)	365 (25,2)	232 (16,0)	290 (20,0)	365 (25,2)	365 (25,2)	232 (16,0)	290 (20,0)
2-1/2 (65)	2.87 (73,0)	365 (25,2)	365 (25,2)	—	—	365 (25,2)	365 (25,2)	—	—	365 (25,2)	365 (25,2)	—	—
76,1mm (65)	3.00 (76,1)	365 (25,2)	365 (25,2)	232 (16,0)	290 (20,0)	365 (25,2)	365 (25,2)	232 (16,0)	290 (20,0)	365 (25,2)	365 (25,2)	232 (16,0)	290 (20,0)
3 (80)	3.50 (88,9)	365 (25,2)	365 (25,2)	232 (16,0)	290 (20,0)	365 (25,2)	365 (25,2)	232 (16,0)	290 (20,0)	365 (25,2)	365 (25,2)	232 (16,0)	290 (20,0)
4 (100)	4.50 (114,3)	365 (25,2)	365 (25,2)	232 (16,0)	290 (20,0)	365 (25,2)	365 (25,2)	232 (16,0)	290 (20,0)	365 (25,2)	365 (25,2)	232 (16,0)	290 (20,0)
139,7mm (125)	5.50 (139,7)	365 (25,2)	365 (25,2)	232 (16,0)	—	365 (25,2)	365 (25,2)	232 (16,0)	—	365 (25,2)	365 (25,2)	232 (16,0)	—
5 (125)	5.56 (141,3)	—	365 (25,2)	—	—	—	365 (25,2)	—	—	—	365 (25,2)	—	—
165,1mm (150)	6.50 (165,1)	365 (25,2)	365 (25,2)	—	290 (20,0)	365 (25,2)	365 (25,2)	—	290 (20,0)	365 (25,2)	365 (25,2)	—	290 (20,0)
6 (150)	6.63 (168,3)	365 (25,2)	365 (25,2)	232 (16,0)	290 (20,0)	365 (25,2)	365 (25,2)	232 (16,0)	290 (20,0)	365 (25,2)	365 (25,2)	232 (16,0)	290 (20,0)
8 (200)	8.63 (219,1)	365 (25,2)	365 (25,2)	232 (16,0)	290 (20,0)	365 (25,2)	365 (25,2)	232 (16,0)	290 (20,0)	365 (25,2)	365 (25,2)	232 (16,0)	290 (20,0)
10 (250) ^a	10.75 (273,0)	450 (31,0)	—	232 (16,0)	290 (20,0)	450 (31,0)	—	232 (16,0)	290 (20,0)	450 (31,0)	—	232 (16,0)	290 (20,0)
12 (300) ^a	12.75 (323,9)	450 (31,0)	—	232 (16,0)	290 (20,0)	450 (31,0)	—	232 (16,0)	290 (20,0)	450 (31,0)	—	232 (16,0)	290 (20,0)

NOTES
a. Marked as Grinnell.

TABLE C
FIGURE 501 AND FIGURE 510 CAST ELBOWS, AND 519 CAST TEE
LISTED/APPROVED PRESSURE RATING

Nominal Pipe Size		Figure 260 Cast End Cap psi bar				Figure 510S Cast 90° Elbow psi bar				Figure 519S Cast Tee psi bar			
Ansi Inches (DN)	O.D. Inches (mm)	UL	FM	VdS	LPCB	UL	FM	VdS	LPCB	UL	FM	VdS	LPCB
1 (25)	1.31 (33,4)	500 (34,5)	—	—	—	—	—	—	—	—	—	—	—
1-1/4 (32)	1.66 (42,4)	500 (34,5)	500 (34,5)	—	—	—	—	—	—	—	—	—	—
1-1/2 (40)	1.90 (48,3)	500 (34,5)	500 (34,5)	—	—	—	—	—	—	—	—	—	—
2 (50)	2.37 (60,3)	500 (34,5)	500 (34,5)	—	—	365 (25,2)	365 (25,2)	232 (16,0)	290 (20,0)	365 (25,2)	365 (25,2)	232 (16,0)	290 (20,0)
2-1/2 (65)	2.87 (73,0)	500 (34,5)	500 (34,5)	—	—	365 (25,2)	365 (25,2)	—	—	365 (25,2)	365 (25,2)	—	—
76,1mm (65)	3.00 (76,1)	500 (34,5)	500 (34,5)	—	—	365 (25,2)	365 (25,2)	232 (16,0)	290 (20,0)	365 (25,2)	365 (25,2)	—	290 (20,0)
3 (80)	3.50 (88,9)	500 (34,5)	500 (34,5)	—	—	365 (25,2)	365 (25,2)	232 (16,0)	290 (20,0)	365 (25,2)	365 (25,2)	232 (16,0)	290 (20,0)
4 (100)	4.50 (114,3)	500 (34,5)	500 (34,5)	—	—	365 (25,2)	365 (25,2)	232 (16,0)	290 (20,0)	365 (25,2)	365 (25,2)	232 (16,0)	290 (20,0)
139,7mm (125)	5.50 (139,7)	500 (34,5)	500 (34,5)	—	—	365 (25,2)	365 (25,2)	232 (16,0)	—	365 (25,2)	365 (25,2)	232 (16,0)	—
5 (125)	5.56 (141,3)	500 (34,5)	500 (34,5)	—	—	—	365 (25,2)	—	—	—	365 (25,2)	—	—
165,1mm (150)	6.50 (165,1)	500 (34,5)	500 (34,5)	—	—	365 (25,2)	365 (25,2)	—	—	365 (25,2)	365 (25,2)	—	—
6 (150)	6.63 (168,3)	500 (34,5)	500 (34,5)	—	—	365 (25,2)	365 (25,2)	232 (16,0)	290 (20,0)	365 (25,2)	365 (25,2)	232 (16,0)	290 (20,0)
8 (200)	8.63 (219,1)	500 (34,5)	500 (34,5)	—	—	365 (25,2)	365 (25,2)	232 (16,0)	290 (20,0)	365 (25,2)	365 (25,2)	232 (16,0)	290 (20,0)
10 (250)	10.75 (273,0)	500 (34,5)	500 (34,5)	—	—	—	—	—	—	—	—	—	—
12 (300)	12.75 (323,9)	500 (34,5)	500 (34,5)	—	—	—	—	—	—	—	—	—	—

TABLE D
FIGURE 260 CAST END CAP, FIGURE 510S CAST ELBOW, AND FIGURE 519S CAST TEE
LISTED/APPROVED PRESSURE RATING

Nominal Pipe Size	ADACAP psi bar			
	UL	FM	VdS	LPCB
1-1/2 x 1/2 (40)	300 (20,7)	300 (20,7)	—	—
1-1/2 x 3/4 (40)	300 (20,7)	300 (20,7)	—	—
1-1/2 x 1 (40)	300 (20,7)	300 (20,7)	—	—
2 x 1/2 (50)	300 (20,7)	300 (20,7)	—	—
2 x 3/4 (50)	300 (20,7)	300 (20,7)	—	—
2 x 1 (50)	300 (20,7)	300 (20,7)	—	—
2-1/2 x 1/2 (65)	300 (20,7)	300 (20,7)	—	—
2-1/2 x 3/4 (65)	300 (20,7)	300 (20,7)	—	—
2-1/2 x 1 (65)	300 (20,7)	300 (20,7)	—	—

TABLE E
ADACAP
LISTED/APPROVED PRESSURE RATING

Limited Warranty

For warranty terms and conditions, visit www.tyco-fire.com.

Ordering Procedure

GRINNELL Products are available globally through a network of distribution centers. For the nearest distributor, visit www.grinnell.com. When placing an order, indicate the full product name.

Please specify the quantity, figure number, wall thickness, and size.

Victaulic® VicFlex™ Sprinkler Fittings

Series AH2 and AH2-CC Braided Flexible Hoses



Series AH2



Series AH2-CC

1.0 PRODUCT DESCRIPTION

Available Sizes by Component

- **Series AH2 1"/DN25 Nominal ID Braided Hose:** 31"/790 mm, 36"/915 mm, 48"/1220 mm, 60"/1525 mm, 72"/1830 mm Note: length includes adapter nipple and 5.75"/146 mm straight reducer.
- **Series AH2-CC 1"/DN25 Nominal ID Braided Hose:** 31"/790 mm, 36"/915 mm, 48"/1220 mm, 60"/1525 mm, 72"/1830 mm Note: length includes captured coupling and 5.75"/146 mm straight reducer.

Connections

- **From Branchline**
 - ¾"/20 mm BSPT Female Thread (VdS only)
 - 1"/25 mm NPT or BSPT Female Thread
 - 1"/25 mm Grooved IGS (refer to [Publication 10.54](#) for additional IGS connections)
 - No. 116 CPVC Adapter (1"/25 mm Female CPVC Socket x 1"/25 mm Grooved IGS)
 - No. 142 Welded Outlet
 - Style 922 Outlet-T
 - Style 920N Mechanical-T Outlet
 - No. 65 Grooved End of Run Fitting
 - 1 ¼"/32 mm BSPT Female Thread (LPCB only)
- **Hose Inlet**
 - ¾"/20 mm BSPT Male Thread (VdS only)
 - 1"/25 mm Grooved IGS
 - 1"/25 mm NPT or BSPT Male Thread
 - 1 ¼"/32 mm BSPT Male Thread (LPCB only)
- **Sprinkler Reducer**
 - Sprinkler Connection: ½"/15 mm, ¾"/20 mm NPT or BSPT Female Thread
 - Straight Lengths: 5.75"/146 mm, 9"/230 mm, 13"/330 mm
 - 90° Elbows: Short elbows typically used with concealed sprinklers; Long elbows typically used with recessed pendent sprinklers.
 - Standard Short
 - Low-Profile Short
 - Standard Long
 - Low-Profile Long

ALWAYS REFER TO ANY NOTIFICATIONS AT THE END OF THIS DOCUMENT REGARDING PRODUCT INSTALLATION, MAINTENANCE OR SUPPORT.

1.0 PRODUCT DESCRIPTION (CONTINUED)

Brackets

- Style AB2 for suspended and hard-lid ceilings and sidewalls: allows for vertical sprinkler adjustment and installation before most ceiling tiles are in place
- Style AB3 for surface mount applications: wood, metal and block walls, or ceilings.
- Style AB4 for hard-lid ceilings with hat furring channel grid systems: allows for vertical sprinkler adjustment
- Style AB5 for hard-lid ceilings and sidewalls: allows for vertical sprinkler adjustment
- Style AB7 / Adjustable AB7 for suspended and hard-lid ceilings
- Style AB10 for Armstrong® TechZone™ ceilings
- Style AB11 for lay-in panel suspended t-grid ceilings or drywall suspended t-grid ceilings: allows for low-profile installation (use only with 90° low-profile elbows)
- Style AB12 for suspended and hard-lid ceilings: allows for vertical sprinkler adjustment, and allows for low-profile installation down to 4"/100 mm.
- Style ABBA bracket for suspended, exposed, and hard-lid ceilings
- Style ABMM bracket for surface mount and stand off-mount applications: wood, metal and block walls, or ceilings and hard-lid ceilings
- Strut channel and pipe clamp, not supplied by Victaulic

Maximum Working Temperature

- 225°F/107°C
- 150°F/65°C (No. 116 CPVC Adapter)

Maximum Working Pressure

- 200 psi/1375 kPa (FM)
- 175 psi/1206 kPa (cULus)
- 232 psi/1600 kPa (VdS/LPCB)
- 203 psi/1.4 MPa (CCC)
- 175 psi/1206 kPa (No. 116 CPVC Adapter)

Minimum Bend Radius

- 7"/178 mm (FM/CCC)
- 2"/51 mm (cULus)
- 3"/76.2 mm (VdS/LPCB)

Maximum Allowable Sprinkler K-Factors

- FM (½"/15 mm reducer) K5.6/8,1 (S.I.), (¾"/20 mm reducer) K14.0/20,2 (S.I.)
- cULus (½"/15 mm reducer) K8.0/11,5 (S.I.), (¾"/20 mm reducer) K14.0/20,2 (S.I.)
- VdS/LPCB (½"/15 mm reducer) K5.6/8,1 (S.I.), (¾"/20 mm reducer) K8.0/11,5 (S.I.)

2.0 CERTIFICATIONS/LISTINGS



NOTE

- The VicFlex™ Series AH2 Hose has been tested and evaluated by Spears® for acceptable use with Spears® CPVC Products and is therefore covered under the Spears® FlameGuard® Installer Protection Plan.

3.0 SPECIFICATIONS – MATERIAL

Series AH2:

- Flexible Hose:** 300-series Stainless Steel
- Collar/Weld Fitting:** 300-series Stainless Steel
- Gasket Seal:** Victaulic EPDM
- Isolation Ring:** Nylon
- Nut and Nipple:** Carbon Steel, Zinc-Plated
- Reducer:** Carbon Steel, Zinc-Plated
- Low-Profile Elbows:** Ductile Iron, Zinc-Plated or Carbon Steel, Zinc-Plated
- Brackets:** Carbon Steel, Zinc-Plated

Series AH2-CC:

- Flexible Hose:** 300-series Stainless Steel
- Collar/Weld Fitting:** 300-series Stainless Steel
- Gasket Seal:** Victaulic EPDM
- Isolation Ring:** Nylon
- Coupling Retainer Ring:** Polyethylene
- Nut:** Carbon Steel, Zinc-Plated
- Reducer:** Carbon Steel, Zinc-Plated
- Low-Profile Elbows:** Ductile Iron, Zinc-Plated or Carbon Steel, Zinc-Plated
- Housing:** Ductile Iron conforming to ASTM A 536, Grade 65-45-12. Ductile Iron conforming to ASTM A 395, Grade 65-45-15, is available upon special request.

Coupling Housing Coating:

- Orange Enamel (North America, Asia Pacific)
- Red Enamel (Europe)
- Hot Dipped Galvanized

Gasket¹:

Grade "E" EPDM (Type A)

FireLock EZ™ products have been Listed by Underwriters Laboratories Inc., Underwriters Laboratories of Canada Limited, and Approved by Factory Mutual Research for wet and dry (oil free air) sprinkler services within the rated working pressure.

¹ Services listed are General Service Guidelines only. It should be noted that there are services for which these gaskets are not compatible. Reference should always be made to the latest [Victaulic Seal Selection Guide](#) for specific gasket service guidelines and for a listing of services which are not compatible.

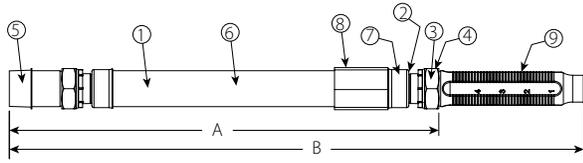
Bolts/Nut: Zinc electroplated carbon steel, trackhead meeting the physical and chemical requirements of ASTM A 449 and physical requirements of ASTM A 183.

Linkage: CrMo Alloy Steel zinc electroplated per ASTM B633 Zn/Fe 5, Type III Finish

No. 116 Adapter Fitting: CPVC and Brass
Seal: Victaulic EPDM

4.0 DIMENSIONS

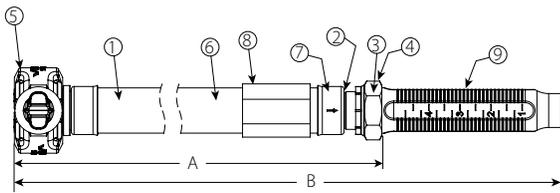
Product Details - Series AH2 Braided Hose



Item	Description
1	Flexible Hose
2	Isolation Ring
3	Gasket
4	Nut
5	Adapter Nipple
6	Braid
7	Collar/Weld Fitting
8	Sleeve
9	Reducer

Hose	Dimensions	
	A	B
Series	inches	inches
	mm	mm
AH2-31	25.6 650	31.0 790
AH2-36	31.6 803	36.0 915
AH2-48	42.6 1082	48.0 1220
AH2-60	54.6 1387	60.0 1525
AH2-72	66.6 1692	72.0 1830

Series AH2-CC Braided Hose

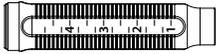


Item	Description
1	Flexible Hose
2	Isolation Ring
3	Gasket
4	Nut
5	Captured Coupling
6	Braid
7	Collar/Weld Fitting
8	Sleeve
9	Reducer

Hose	Dimensions	
	A	B
Series	inches	inches
	mm	mm
AH2-CC-31	24.5 622	29.8 760
AH2-CC-36	29.5 749	34.8 885
AH2-CC-48	41.5 1054	46.8 1190
AH2-CC-60	53.5 1359	58.8 1495
AH2-CC-72	65.5 1664	70.8 1800

4.1 DIMENSIONS

Standard Reducer

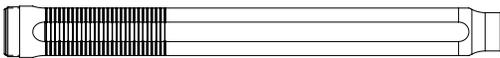


5.75"/146mm straight reducer

Optional Reducers

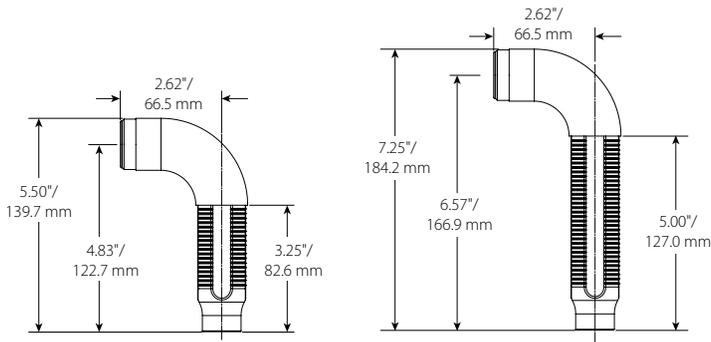


9.0"/230mm straight reducer



13.0"/330mm straight reducer

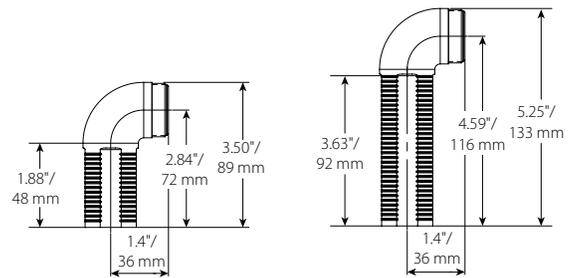
Standard Elbow Reducers



Short 90° Elbow Reducer

Long 90° Elbow Reducer

Low-Profile Elbow Reducers



Short 90° Low-Profile Elbow Reducer

Long 90° Low-Profile Elbow Reducer

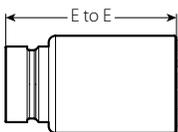
NOTES

- The Short 90° Elbow Reducer is typically used with concealed sprinklers while the Long 90° Elbow Reducer is typically used in the installation of recessed pendent sprinklers.
- FM/VdS/LPCB Approved only

NOTE

- Style AB11: When Low-Profile Elbows are used with the Style AB11 bracket, the Low-Profile Short Elbow is typically used with concealed sprinklers while the Low-Profile Long Elbow is typically used in the installation of recessed pendent sprinklers.

No. 116 CPVC Adapter



NOTES

- E to E is 3.0"/76.0 mm
- The No. 116 CPVC Adapter has 2 ft. (0.6 m) EQL of 1" Schedule 40 pipe.

4.2 DIMENSIONS

VicFlex™ Brackets

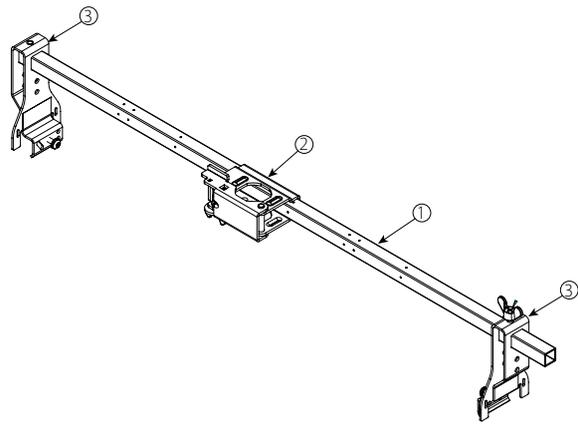
Style AB2

- Suspended Ceilings
- Hard-Lid Ceilings

Item	Description
1	24"/610 mm or 48"/1219 mm Square Bar
2	Patented Vertically Adjustable Center Bracket
3	End Bracket

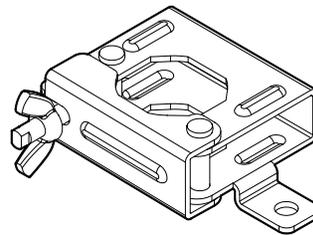
NOTE

- Both sizes FM/VdS/LPCB Approved, cULus Listed



Style AB3

- Surface Mount Applications
- FM/LPCB Approved



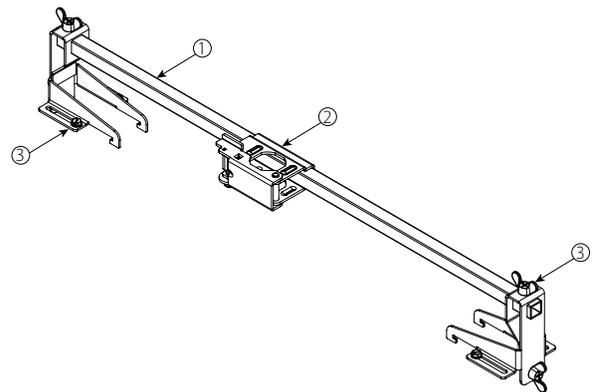
Style AB4

- Hard-Lid Ceilings with Hat Furring Channel Grid System

Item	Description
1	24"/610 mm or 48"/1219 mm Square Bar
2	Patented Vertically Adjustable Center Bracket
3	End Bracket for Hat Furring Channel

NOTE

- Both sizes FM/VdS/LPCB Approved, cULus Listed



4.2 DIMENSIONS (CONTINUED)

VicFlex™ Brackets

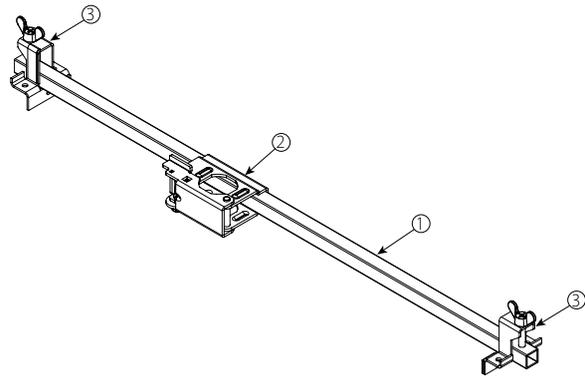
Style AB5

- Hard-Lid Ceilings

Item	Description
1	24"/610 mm or 48"/1219 mm Square Bar
2	Patented Vertically Adjustable Center Bracket
3	End Bracket

NOTE

- Both sizes FM/VdS/LPCB Approved, cULus Listed



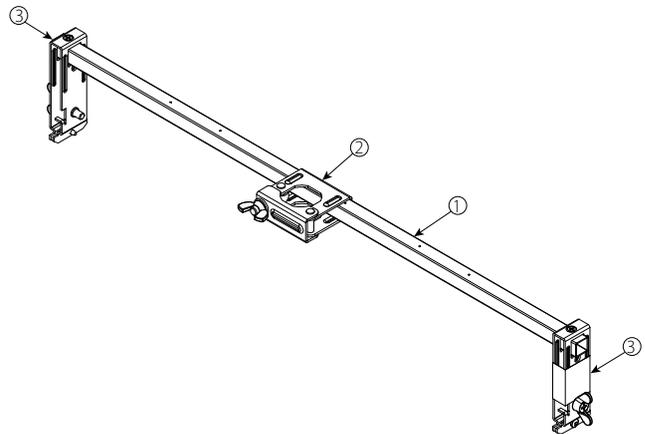
Style AB7

- Suspended Ceilings
- Hard-Lid Ceilings

Item	Description
1	24"/610 mm or 48"/1219 mm Square Bar
2	Patented 1-Bee2® Center Bracket
3	End Bracket

NOTE

- Both sizes FM/VdS/LPCB Approved



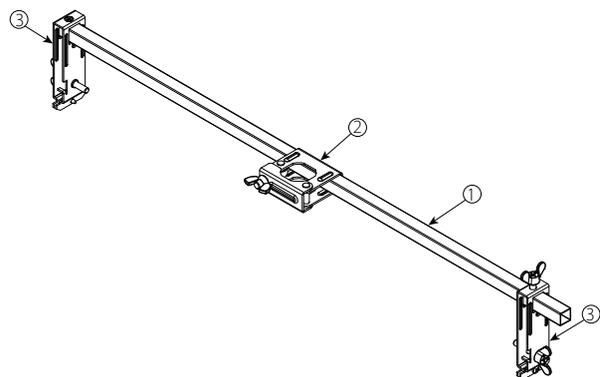
Style AB7 Adjustable

- Suspended Ceilings
- Hard-Lid Ceilings

Item	Description
1	700 mm or 1400 mm Square Bar
2	Patented 1-Bee2® Center Bracket
3	End Bracket (adjustable)

NOTE

- Both sizes FM/VdS/LPCB Approved



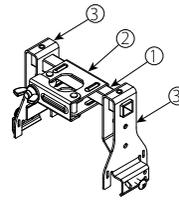
4.2 DIMENSIONS (CONTINUED)

VicFlex™ Brackets

Style AB10

- Suspended Ceilings
- Armstrong® TechZone™

Item	Description
1	6"/152 mm Square Bar
2	Patented 1-Bee2® Center Bracket
3	End Bracket



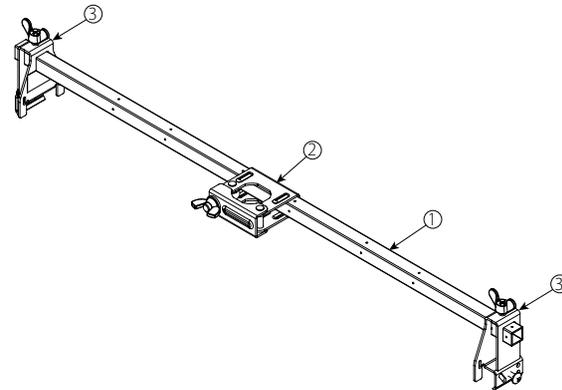
NOTE

- FM/VdS/LPCB Approved, cULus Listed

Style AB11

- Suspended Ceilings
- Hard-Lid Ceilings

Item	Description
1	24"/610 mm or 48"/1219 mm Square Bar
2	Patented 1-Bee2® Center Bracket
3	End Bracket



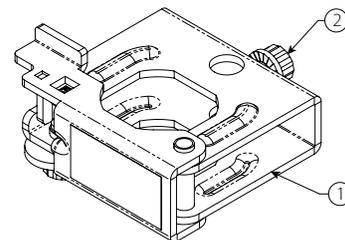
NOTE

- FM/VdS/LPCB Approved, cULus Listed

Style AB12

- Suspended Ceilings
- Hard-Lid Ceilings

Item	Description
1	Style AB12 Bracket Body
2	T25 Drive Set Screw



NOTE

- FM/VdS/LPCB Approved

4.2 DIMENSIONS (CONTINUED)

VicFlex™ Brackets

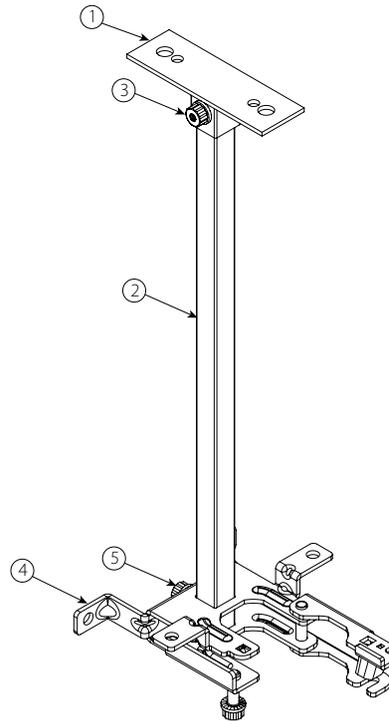
Style ABBA

- Floor-Above Mount
- Cantilever Mount
- Temporary Mount in Exposed Ceilings

Item	Description
1	Style ABBA Mounting Plate
2	Style ABBA Square Bar
3	Cap Screw, Serated Flange, M6 x 1 x 20, T25 Torx Drive Recessed
4	Style ABMM Bracket Body
5	Cap Screw, Serated Flange, M6 x 1 x 15.24, T25 Torx Drive Recessed

NOTE

- FM/LPCB Approved



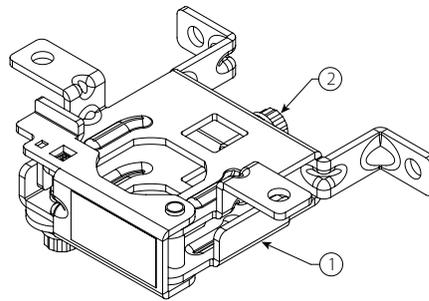
Style ABMM

- Surface Mount
- Stand-off Mount

Item	Description
1	Style ABMM Bracket Body
2	Cap Screw, Serated Flange, M6 x 1 x 15.24, T25 Torx Drive Recessed

NOTE

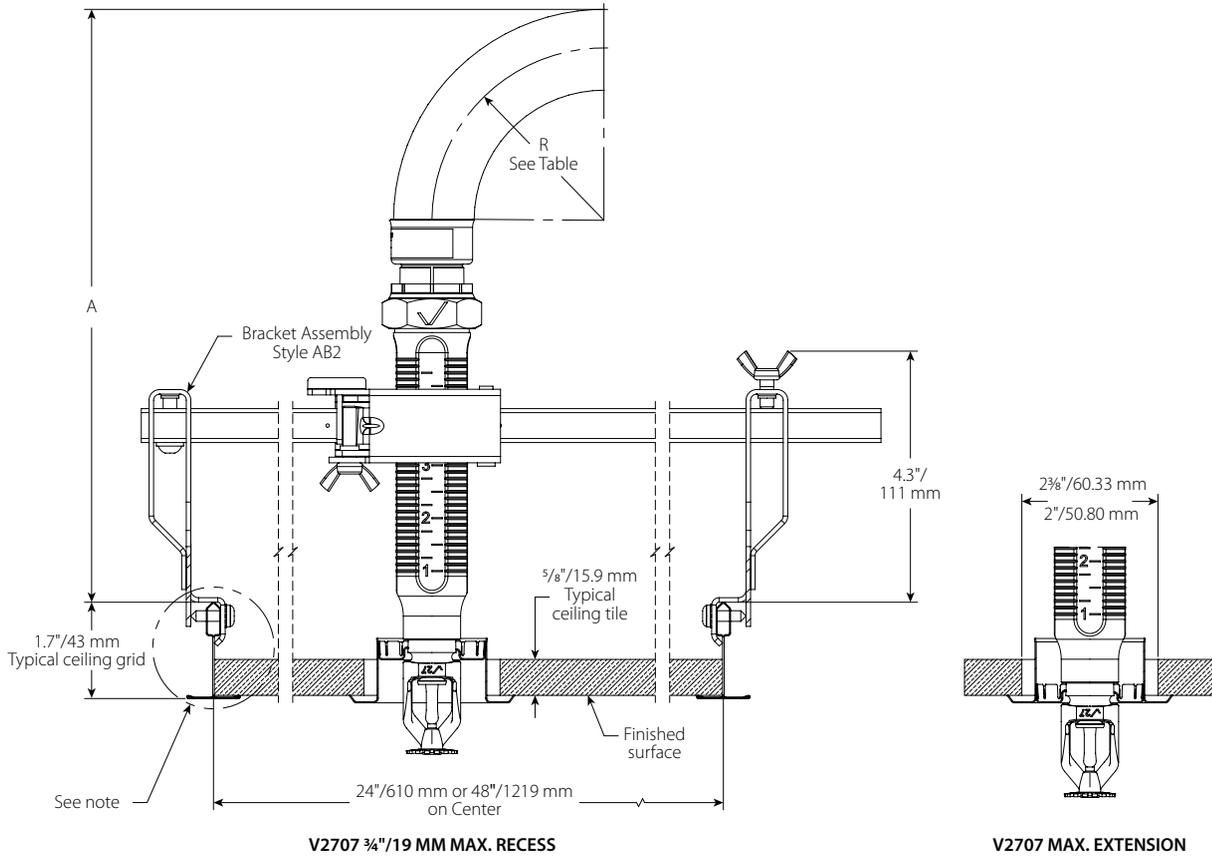
- FM/LPCB Approved



4.3 DIMENSIONS

Clearances

Series AH2 Braided Hose and Style AB2 Bracket with Suspended T-grid Ceilings



Dimension		Hose Clearance							
		Straight Reducer						Long Elbow	Short Elbow
		V2707 3/4" Max Recess inches mm	V3802 1/2" Max Recess inches mm						
R	Bend Radius	2.0 51		3.0 76.2		7.0 178		—	
A	Minimum Required Installation Space	8.6 218	10.1 269	9.6 244	11.1 281	13.6 345	15.1 383	5.8 147	5.8 147

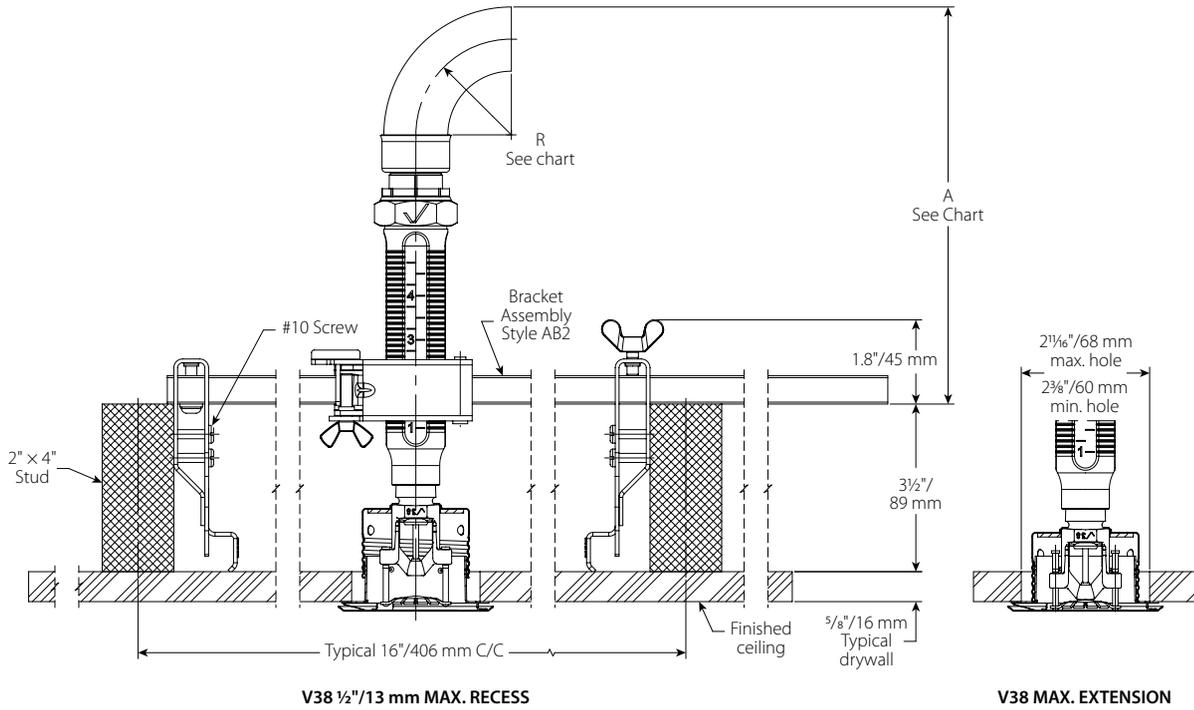
NOTE

- Variations of ceiling grids, sprinkler heads, brackets, and hoses are permitted but may result in clearance differences from the figures above.

4.4 DIMENSIONS

Clearances

Series AH2 Braided Hose and Style AB2 Bracket with Wood/Metal Joist Ceilings



Dimension		Hose Clearance								
		Straight Reducer								
		V2707 ¾" / 20 mm Max Recess inches mm	V3802 ½" / 13 mm Max Recess inches mm	V2709 ¾" / 20 mm Sidewall inches mm	V2707 ¾" / 20 mm Max Recess inches mm	V3802 ½" / 13 mm Max Recess inches mm	V2709 ¾" / 20 mm Sidewall inches mm	V2707 ¾" / 20 mm Max Recess inches mm	V3802 ½" / 13 mm Max Recess inches mm	V2709 ¾" / 20 mm Sidewall inches mm
R	Bend Radius	2.0 50			3.0 80			7.0 175		
A	Minimum Required Installation Space	6.2 158	7.6 193	6.1 155	7.2 183	8.6 218	7.1 180	11.2 285	12.6 320	11.1 282

Dimension		Hose Clearance		
		Long Elbow		Short Elbow
		V2707 ¾" / 20 mm Max Recess inches mm	V2709 ¾" / 20 mm Sidewall inches mm	V3802 ½" / 13 mm Max Recess inches mm
R	Bend Radius	—		—
A	Minimum Required Installation Space	3.3 84	3.6 91	3.3 84

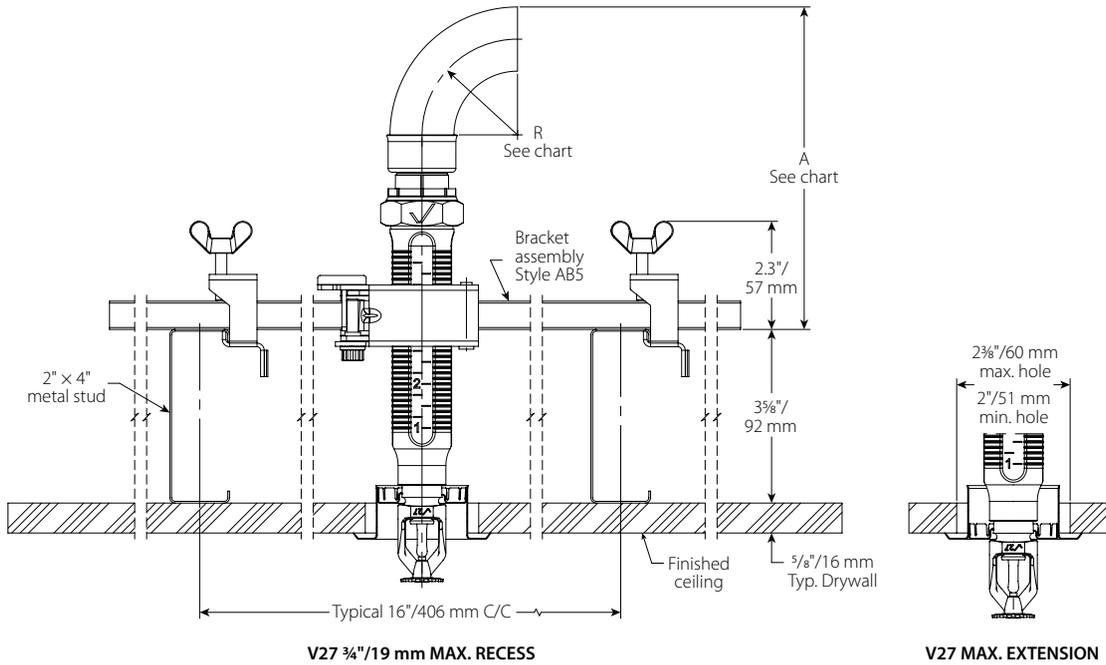
NOTE

- Variations of ceiling grids, sprinkler heads, brackets, and hoses are permitted but may result in clearance differences from the figures above.

4.6 DIMENSIONS

Clearances

Series AH2 Braided Hose and Style AB5 Bracket with Metal Joist Ceiling



Dimension		Hose Clearance								
		Straight Reducer								
		V2707 3/4" / 20 mm Max Recess inches mm	V3802 1/2" / 13 mm Max Recess inches mm	V2709 3/4" / 20 mm Sidewall inches mm	V2707 3/4" / 20 mm Max Recess inches mm	V3802 1/2" / 13 mm Max Recess inches mm	V2709 3/4" / 20 mm Sidewall inches mm	V2707 3/4" / 20 mm Max Recess inches mm	V3802 1/2" / 13 mm Max Recess inches mm	V2709 3/4" / 20 mm Sidewall inches mm
R	Bend Radius	2.0 50			3.0 80			7.0 175		
A	Minimum Required Installation Space	6.0 158	7.7 196	6.1 155	7.0 178	8.7 221	7.1 180	11.0 279	12.7 323	11.1 282

Dimension		Hose Clearance				
		Long Elbow			Low-Profile Long Elbow	Short Elbow
		V2707 3/4" / 20 mm Max Recess inches mm	V3802 1/2" / 13 mm Max Recess inches mm	V2709 3/4" / 20 mm Sidewall inches mm	V3802 1/2" / 13 mm Max Recess inches mm	V3802 1/2" / 13 mm Max Recess inches mm
R	Bend Radius	—			—	—
A	Minimum Required Installation Space	3.5 89	4.9 124	3.6 91	2.9 74	3.3 84

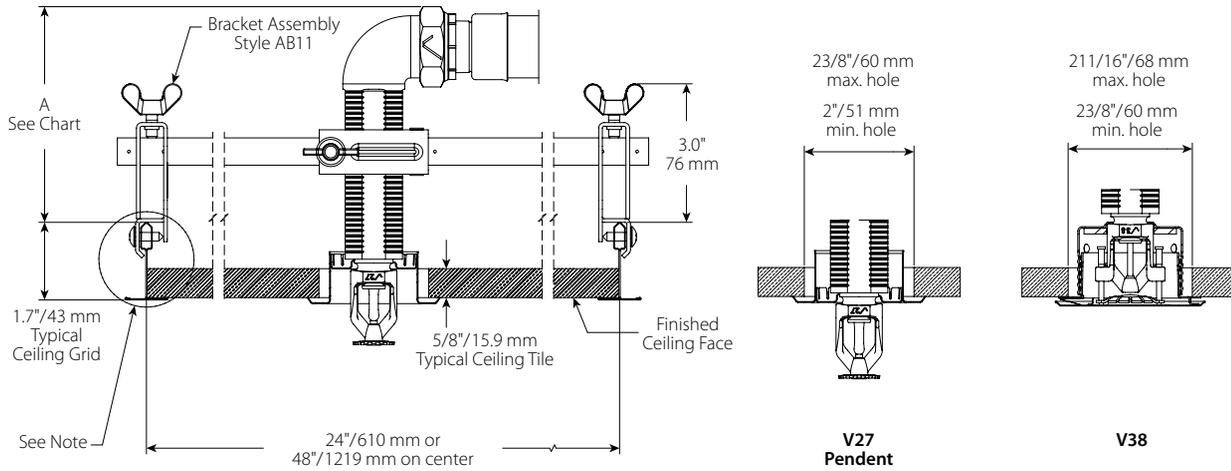
NOTE

- Variations of ceiling grids, sprinkler heads, brackets, and hoses are permitted but may result in clearance differences from the figures above.

4.7 DIMENSIONS

Clearances

Series AH2 Braided Hose and Style AB11 Bracket (LOW-PROFILE SOLUTION) with Suspended T-Grid Ceilings



		Hose Clearance	
		Low-Profile Long Elbow	Low-Profile Short Elbow
Dimension		V2707 3/4" / 20 mm Max Recess"	V3802 1/2" / 13 mm Max Recess
		inches mm	inches mm
A	Minimum Required Installation Space	4.0 102	3.9 99

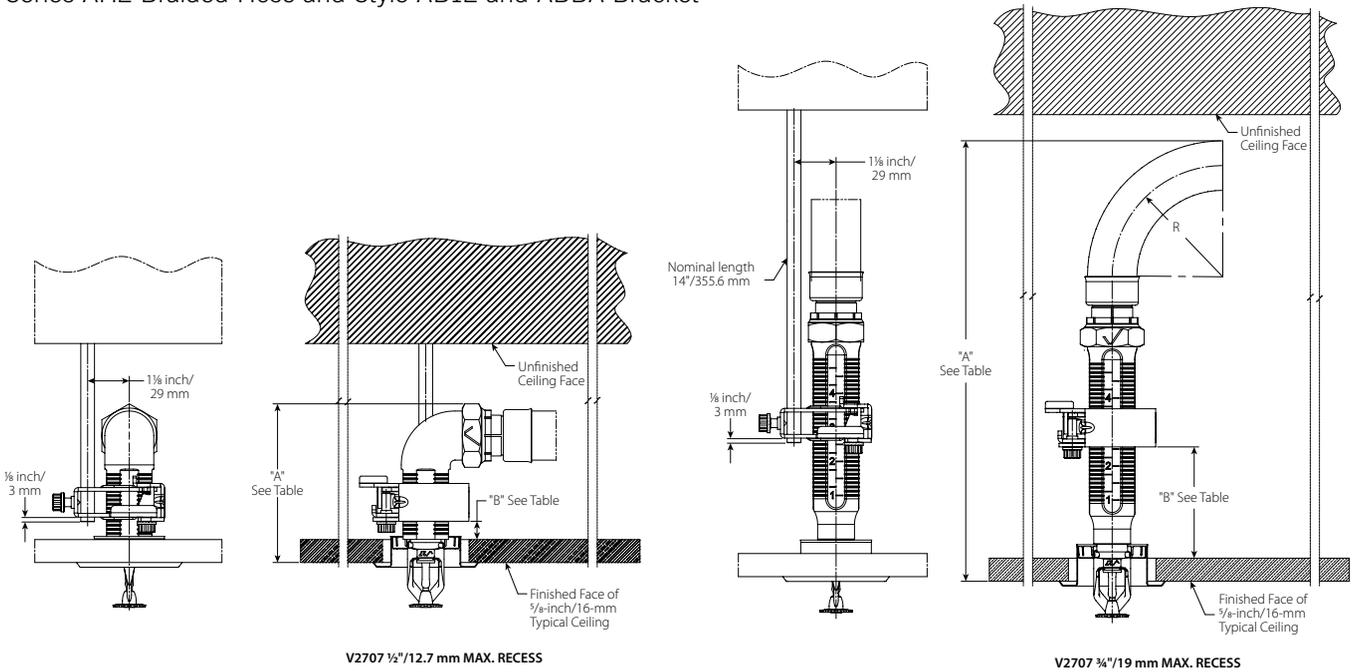
NOTE

- Variations of ceiling grids, sprinkler heads, brackets, and hoses are permitted but may result in clearance differences from the figures above.

4.8 DIMENSIONS

Clearances

Series AH2 Braided Hose and Style AB12 and ABBA Bracket



Dimension		Hose Clearance									
		Low-Profile Short Elbow		Low-Profile Long Elbow		Standard Short Elbow		Standard Long Elbow		Standard Straight Reducer	
		3/4" / 19 mm Recessed*	Concealed	3/4" / 19 mm Recessed	Concealed	3/4" / 19 mm Recessed	Concealed	3/4" / 19 mm Recessed	Concealed	3/4" / 19 mm Recessed	Concealed
	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
R	Bend Radius	—	—	—	—	—	—	—	—	7	175.0
A	Minimum Required Installation Space	4.0 101.6	5.5 139.7	5.6 142.2	7.2 182.9	5.9 149.9	7.5 190.5	7.7 195.6	9.3 236.2	15.0 381.0	16.6 421.6
B	Distance from Top of Typical Ceiling Tile to Bottom of Gate	101.6 12.7	139.7 50.8	142.2 38.1	182.9 38.1	149.9 38.1	190.5 38.1	195.6 76.2	236.2 76.2	381.0 76.2	421.6 76.2

* Adjustability will be limited

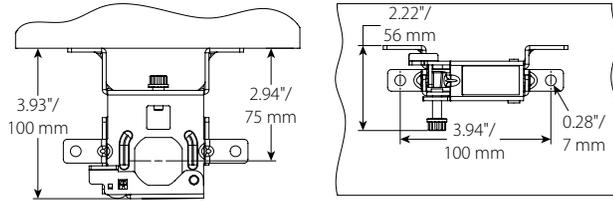
NOTE

- For Style AB12 Bracket Sprinkler location relative to 3/8" threaded rod is 1 1/8"/29 mm center-to-center.
- Variations of ceiling grids, sprinkler heads, brackets, and hoses are permitted but may result in clearance differences from the figures above.

4.9 DIMENSIONS

Stand-off Dimensions

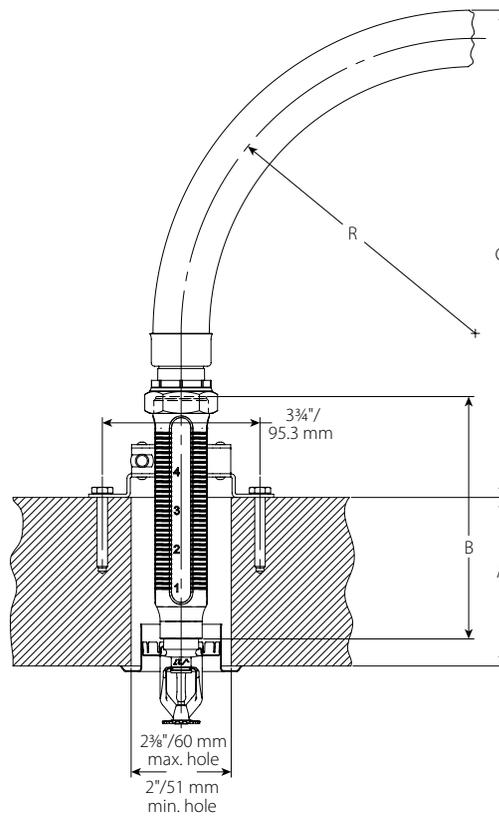
Style ABMM Bracket



4.10 DIMENSIONS

Clearances

Series AH2 Braided Hose and Style AB3 and ABMM Bracket for Surface Mount Application



Dimension	Hose Clearance																			
	inches mm										inches mm									
R	Bend Radius																			
	7 175										8 200									
A	Wall Thickness																			
	2 50		4 100		6 150		8 200		10 250		2 50		4 100		6 150		8 200		10 250	
B	Outlet Length																			
	5.75 146.1	9 228.6	13 330.2	5.75 146.1	9 228.6	13 330.2	9 228.6	13 330.2	13 330.2	13 330.2	5.75 146.1	9 228.6	13 330.2	5.75 146.1	9 228.6	13 330.2	9 228.6	13 330.2	13 330.2	13 330.2
C	Distance from Top of Ceiling to Top of Hose																			
	11.6 294	14.8 376	18.8 478	9.6 243	12.8 325	16.8 427	10.8 275	14.8 376	12.8 325	10.8 275	12.6 319	15.8 402	19.8 503	10.6 268	13.8 351	17.8 452	11.8 300	15.8 402	13.8 351	11.8 300

NOTE

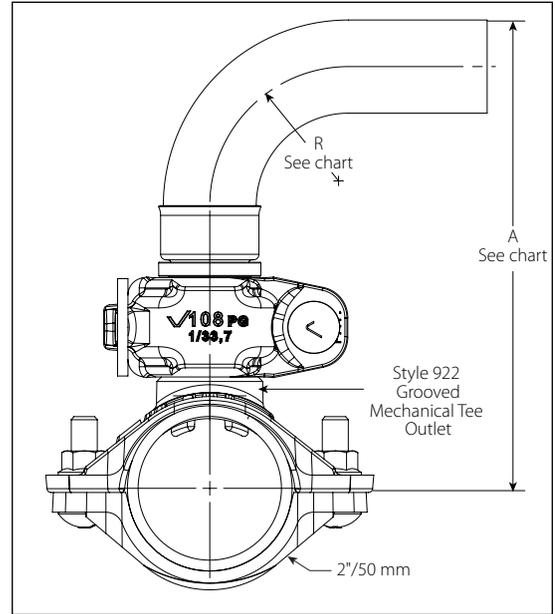
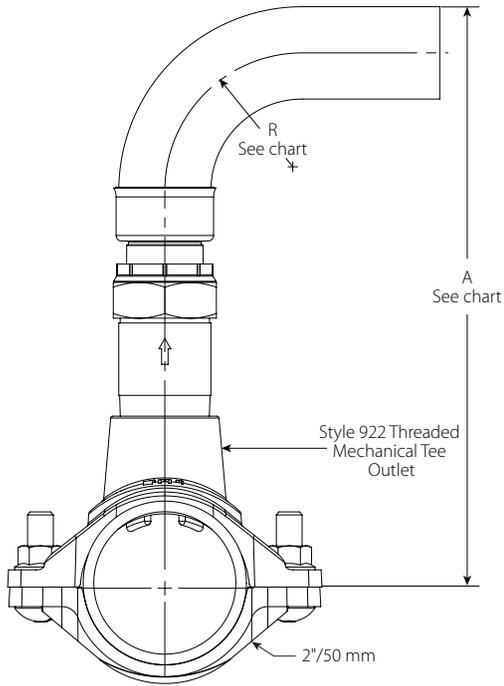
- Variations of ceiling grids, sprinkler heads, brackets, and hoses are permitted but may result in clearance differences from the figures above.
- See installation instructions for mounting screw type and size.

4.11 DIMENSIONS

Branchline Clearances

Series AH2 Braided Hose with Style 922 Threaded Outlet

Series AH2-CC Braided Hose with Style 922 Grooved Outlet



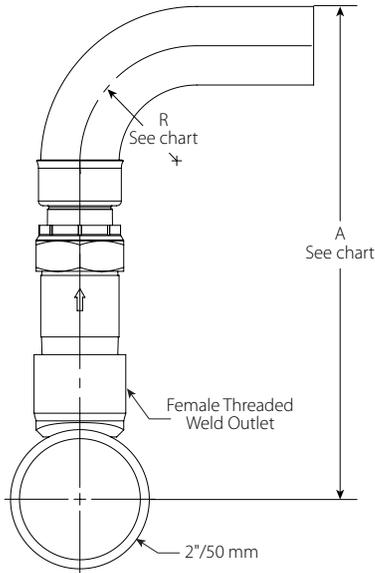
Dimension		Hose Clearance					
		inches mm					
R	Bend Radius	2 51	3 80	4 100	5 125	6 150	7 175
A	Min.	8.4 212	9.4 238	10.4 263	11.4 289	12.4 314	13.4 339

Dimension		Hose Clearance					
		inches mm					
R	Bend Radius	2 51	3 80	4 100	5 125	6 150	7 175
A	Min.	6.7 171	7.7 197	8.7 222	9.7 247	10.7 273	11.7 298

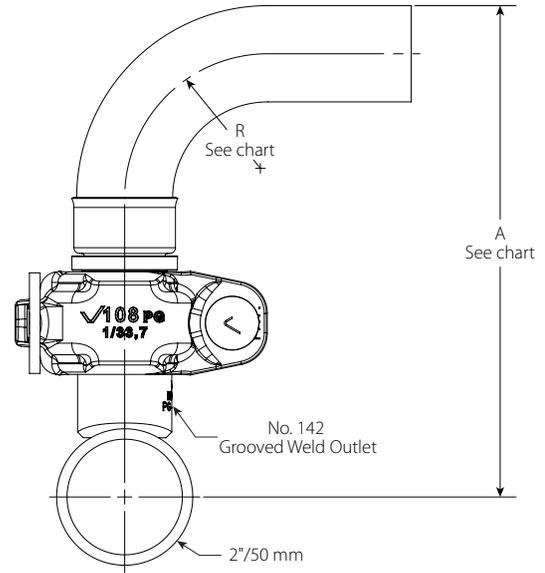
4.12 DIMENSIONS

Branchline Clearances

Series AH2 Braided Hose with Female Threaded Outlet



Series AH2-CC Braided Hose with Grooved Outlet



Dimension		Hose Clearance					
		inches mm					
R	Bend Radius	2	3	4	5	6	7
A	Min.	8.4 214	9.4 239	10.4 264	11.4 290	12.4 315	13.41 341

Dimension		Hose Clearance					
		inches mm					
R	Bend Radius	2	3	4	5	6	7
A	Min.	7.1 180	8.1 205	9.1 231	10.1 256	11.1 281	12.1 307

5.0 PERFORMANCE – FRICTION LOSS DATA



Series AH2 and AH2-CC Braided Hoses with Straight 5.75"/146 mm Reducers
 Style AB2, AB4, AB5 and AB10 VicFlex™ Brackets

Hose Length inches mm	Reducer		UL	
	Type	Nominal Outlet Size inches DN	Equivalent Length of 1"/33.7mm Sch. 40 pipe feet meters	Maximum Bends
31 790	Straight	1/2 DN15	15.0 4.6	3
			16.0 4.9	4
		3/4 DN20	19.0 5.8	3
			20.0 6.1	4
36 915	Straight	1/2 DN15	18.0 5.5	3
			21.0 6.4	5
		3/4 DN20	21.0 6.4	3
			23.0 7.0	5
48 1220	Straight	1/2 DN15	21.0 6.4	3
			32.0 9.8	8
		3/4 DN20	26.0 7.9	3
			37.0 11.3	8
60 1525	Straight	1/2 DN15	27.0 8.2	3
			46.0 14.0	10
		3/4 DN20	27.0 8.2	3
			46.0 14.0	10
72 1830	Straight	1/2 DN15	31.0 9.4	3
			55.0 16.8	12
		3/4 DN20	30.0 9.1	3
			60.0 18.3	12

5.1 PERFORMANCE – FRICTION LOSS DATA



Series AH2 and AH2-CC Braided Hoses with 90° Low-Profile Elbow
Style AB11 VicFlex™ Bracket

Hose Length inches mm	Reducer		UL	
	Type	Nominal Outlet Size inches DN	Equivalent Length of 1"/33.7mm Sch. 40 pipe feet meters	Maximum Bends
31 790	LP Elbow	1/2 DN15	18.0	3
			5.5	
		3/4 DN20	24.0	4
			7.3	
36 915	LP Elbow	1/2 DN15	21.0	3
			6.4	
		3/4 DN20	24.0	4
			7.3	
48 1220	LP Elbow	1/2 DN15	19.0	3
			5.8	
		3/4 DN20	26.0	5
			7.9	
60 1525	LP Elbow	1/2 DN15	23.0	3
			7.0	
		3/4 DN20	28.0	5
			8.5	
72 1830	LP Elbow	1/2 DN15	23.0	3
			7.0	
		3/4 DN20	43.0	8
			13.1	
60 1525	LP Elbow	1/2 DN15	30.0	3
			9.1	
		3/4 DN20	42.0	8
			12.8	
72 1830	LP Elbow	1/2 DN15	28.0	3
			8.5	
		3/4 DN20	49.0	10
			14.9	
72 1830	LP Elbow	1/2 DN15	31.0	3
			9.4	
		3/4 DN20	50.0	10
			15.2	
72 1830	LP Elbow	1/2 DN15	31.0	3
			9.4	
		3/4 DN20	65.0	12
			19.8	
72 1830	LP Elbow	1/2 DN15	36.0	3
			11.0	
		3/4 DN20	63.0	12
			19.2	

5.2 PERFORMANCE – FRICTION LOSS DATA



Series AH2 and AH2-CC Braided Hoses Equivalent Length Design Guide

Hose		Equivalent Length of 1"/33.7 mm Sch. 40 pipe									
Length inches mm	Nominal Outlet Size inches DN	3 Bends feet meters	4 Bends feet meters	5 Bends feet meters	6 Bends feet meters	7 Bends feet meters	8 Bends feet meters	9 Bends feet meters	10 Bends feet meters	11 Bends feet meters	12 Bends feet meters
31 790	1/2 DN15	15.0 4.6	16.0 4.9	-	-	-	-	-	-	-	-
	3/4 DN20	19.0 5.8	20.0 6.1								
36 915	1/2 DN15	18.0 5.5	20.0 6.1	21.0 6.4	-	-	-	-	-	-	-
	3/4 DN20	21.0 6.4	22.0 6.7	23.0 7.0							
48 1220	1/2 DN15	21.0 6.4	24.0 7.3	26.0 7.9	28.0 8.5	30.0 9.1	32.0 9.8	-	-	-	-
	3/4 DN20	26.0 7.9	29.0 8.8	31.0 9.4	33.0 10.1	35.0 10.7	37.0 11.3				
60 1525	1/2 DN15	27.0 8.2	30.0 9.1	33.0 10.1	36.0 11.0	38.0 11.6	41.0 12.5	44.0 13.4	46.0 14.0	-	-
	3/4 DN20	27.0 8.2	30.0 9.1	33.0 10.1	36.0 11.0	38.0 11.6	41.0 12.5	44.0 13.4	46.0 14.0		
72 1830	1/2 DN15	31.0 9.4	34.0 10.4	37.0 11.3	39.0 11.9	42.0 12.8	45.0 13.7	47.0 14.3	50.0 15.2	53.0 16.2	55.0 16.8
	3/4 DN20	30.0 9.1	34.0 10.4	37.0 11.3	40.0 12.2	44.0 13.4	47.0 14.3	50.0 15.2	54.0 16.5	57.0 17.4	60.0 18.3

NOTES

- Values at 2"/51 mm center line bend radius for use with 5.75"/146mm straight reducers

How to use this Design Guide:

- For some systems, it may be advantageous for the designer to calculate the system hydraulics using shorter equivalent lengths associated with fewer than the maximum allowable number of bends. In this case, the designer may select a design number of bends for the job and use the associated equivalent length from the design guide to determine the system hydraulics.
- It is possible that the actual installed condition of some of the flexible drops may have more bends than the designer selected. When this happens, the design guide may be used to find equivalent lengths based on the actual installed number of bends for particular sprinkler installations. The system hydraulics can be recalculated using actual equivalent lengths to verify the performance of the system.

5.3 PERFORMANCE – FRICTION LOSS DATA



Series AH2 and AH2-CC Braided Hoses
 Style AB2, AB3, AB4, AB5, AB7, AB7 Adj., AB8, AB10, AB12, ABBA and ABMM VicFlex™ Brackets

Hose	Sprinkler	Reducer		FM			
		Nominal Outlet Size inches DN	Type	Equivalent Length of 1"/33.7 mm Sch. 40 Pipe feet meters	Maximum Bends		
31 790	5.6 8.1	1/2 DN15	Straight	13.8 4.2	2		
			Elbow	23.5 7.2			
	8.0 11.5	3/4 DN20	Straight	16.8 5.1			
			Elbow	16.8 5.1			
	11.2 16.1	3/4 DN20	Straight	16.5 5.0			
			Elbow	17.8 5.4			
	14.0 20.2	3/4 DN20	Straight	14.9 4.5			
			Elbow	15.5 4.7			
	36 915	5.6 8.1	1/2 DN15	Straight		16.6 5.1	2
				Elbow		25.6 7.8	
		8.0 11.5	3/4 DN20	Straight		20.0 6.1	
				Elbow		19.7 6.0	
11.2 16.1		3/4 DN20	Straight	19.5 5.9			
			Elbow	20.7 6.3			
14.0 20.2		3/4 DN20	Straight	19.4 5.9			
			Elbow	19.6 6.0			
48 1220		5.6 8.1	1/2 DN15	Straight	23.4 7.1	3	
				Elbow	30.7 9.4		
		8.0 11.5	3/4 DN20	Straight	27.8 8.5		
				Elbow	26.6 8.1		
	11.2 16.1	3/4 DN20	Straight	26.7 8.1			
			Elbow	27.9 8.5			
	14.0 20.2	3/4 DN20	Straight	30.3 9.2			
			Elbow	29.5 9.0			

FM NOTES

- The Series AH2 and AH2-CC hoses have been tested and Approved by FM Global for use in wet, dry and preaction systems per NFPA 13, 13R, and 13D and FM data sheets 2-0, 2-5, and 2-8. FM 1637 standard for safety include, but are not limited to, pressure cycling, corrosion resistance, flow characteristics, vibration resistance, leakage, mechanical and hydrostatic strength.
- EXAMPLE: A 48-inch hose installed with two 30° bends and two 90° bends is permitted and considered equivalent to the data in the table shown above. In this example, the total number of degrees is 240°, which is less than the allowable 270°.

5.3 PERFORMANCE – FRICTION LOSS DATA (CONTINUED)



Series AH2 and AH2-CC Braided Hoses
 Style AB2, AB3, AB4, AB5, AB7, AB7 Adj., AB8, AB10, AB12, ABBA and ABMM VicFlex™ Brackets

Hose	Sprinkler	Reducer		FM			
		Nominal Outlet Size inches DN	Type	Equivalent Length of 1"/33.7 mm Sch. 40 Pipe feet meters	Maximum Bends		
60 1525	5.6 8.1	1/2 DN15	Straight	30.2 9.2	4		
			Elbow	35.9 10.9			
	8.0 11.5	3/4 DN20	Straight	35.7 10.9			
			Elbow	33.6 10.2			
	11.2 16.1	3/4 DN20	Straight	33.9 10.3			
			Elbow	35.0 10.7			
	14.0 20.2	3/4 DN20	Straight	33.9 10.3			
			Elbow	34.1 10.4			
	72 1830	5.6 8.1	1/2 DN15	Straight		37.0 11.3	4
				Elbow		41.1 12.5	
		8.0 11.5	3/4 DN20	Straight		43.5 13.3	
				Elbow		40.6 12.4	
11.2 16.1		3/4 DN20	Straight	41.3 12.6			
			Elbow	42.2 12.9			
14.0 20.2		3/4 DN20	Straight	37.5 11.4			
			Elbow	38.6 11.8			

FM NOTES

- The Series AH2 and AH2-CC hoses have been tested and Approved by FM Global for use in wet, dry and preaction systems per NFPA 13, 13R, and 13D and FM data sheets 2-0, 2-5, and 2-8. FM 1637 standard for safety include, but are not limited to, pressure cycling, corrosion resistance, flow characteristics, vibration resistance, leakage, mechanical and hydrostatic strength.
- EXAMPLE: A 48-inch hose installed with two 30° bends and two 90° bends is permitted and considered equivalent to the data in the table shown above. In this example, the total number of degrees is 240°, which is less than the allowable 270°.

5.4 PERFORMANCE – FRICTION LOSS DATA



Series AH2 and AH2-CC Braided Hoses with 90° Low-Profile Elbows
Style AB5, AB11, AB12, ABBA and ABMM VicFlex™ Brackets

Hose Length inches mm	Reducer		Sprinkler K-factor Imperial S.I.	FM	
	Type	Nominal Outlet Size inches DN		Equivalent Length of 1"/33.7mm Sch. 40 pipe feet meters	Maximum Bends
31 790	LP Elbow	1/2 DN15	5.6	13.7	2
			8.1	4.2	
		3/4 DN20	8.0	13.6	
			11.5	4.14	
			11.2	13.7	
			16.1	4.2	
36 915	LP Elbow	1/2 DN15	5.6	17.0	2
			8.1	5.2	
		3/4 DN20	8.0	16.9	
			11.5	5.2	
			11.2	17.0	
			16.1	5.2	
48 1220	LP Elbow	1/2 DN15	5.6	25.0	3
			8.1	7.6	
		3/4 DN20	8.0	27.8	
			11.5	8.5	
			11.2	24.9	
			16.1	7.6	
60 1525	LP Elbow	1/2 DN15	5.6	33.0	4
			8.1	10.1	
		3/4 DN20	8.0	32.6	
			11.5	9.9	
			11.2	32.9	
			16.1	10.0	
72 1830	LP Elbow	1/2 DN15	5.6	41.1	4
			8.1	12.5	
		3/4 DN20	8.0	40.6	
			11.5	12.4	
			11.2	40.9	
			16.1	12.5	
			14.0	40.7	
			20.2	12.4	

FM NOTES

- The Series AH2 and AH2-CC hoses have been tested and Approved by FM Global for use in wet, dry and preaction systems per NFPA 13, 13R, and 13D and FM data sheets 2-0, 2-5, and 2-8. FM 1637 standard for safety include, but are not limited to, pressure cycling, corrosion resistance, flow characteristics, vibration resistance, leakage, mechanical and hydrostatic strength.
- EXAMPLE: A 48-inch hose installed with two 30° bends and two 90° bends is permitted and considered equivalent to the data in the table shown above. In this example, the total number of degrees is 240°, which is less than the allowable 270°.

5.5 PERFORMANCE – FRICTION LOSS DATA



Series AH2 and AH2-CC Braided Hoses
 Style AB2, AB4, AB5, AB7, AB7 Adj., AB8, AB10, AB11 and AB12 VicFlex™ Brackets

Hose Length mm inches	Reducer Nominal Outlet Size DN inches	VdS	
		Equivalent Length according to EN 10255 DN25 (33.7 x 3.25 mm) meters feet	Maximum Bends
790 31	DN15 ½	5.5 18.0	3
	DN20 ¾		
915 36	DN15 ½	6.4 21.0	3
	DN20 ¾		
1220 48	DN15 ½	8.5 27.9	3
	DN20 ¾		
1525 60	DN15 ½	10.7 35.1	4
	DN20 ¾		
1830 72	DN15 ½	12.8 42.0	4
	DN20 ¾		

VDS CEILING MANUFACTURERS LIST

AB2, AB7, AB10, AB11, AB12

1. AMF
2. Armstrong
3. Chicago Metallic
4. Dipling
5. Durlum
6. Geipel
7. Gema-Armstrong
8. Hilti
9. Knauf
10. Lafarge
11. Linder
12. Odenwald
13. Richter
14. Rigips
15. Rockfon Pagos
16. Suckow & Fischer
17. USG Donn

AB4

No specific approval

AB5

1. Hilti
2. Knauf
3. Lafarge
4. Lindner
5. Rigips

5.6 PERFORMANCE – FRICTION LOSS DATA



LPS 1261 Issue 1.2
Cert/LPCB Ref. 104/02
104/03

Series AH2 and AH2-CC Braided Hoses
Style AB2, AB3, AB4, AB5, AB7, AB8 and AB10 VicFlex™ Brackets

Hose	Reducer	LPCB	
		Equivalent Length according to EN 10255 DN25 (33.7 x 3.25 mm)	Maximum Bends
Length mm inches	Nominal Outlet Size DN inches	meters feet	
790 31	DN15 ½	1.8 6.0	2
	DN20 ¾		
915 36	DN15 ½	3.6 11.9	3
	DN20 ¾		
1220 48	DN15 ½	4.3 14.0	3
	DN20 ¾		
1525 60	DN15 ½	4.1 13.6	3
	DN20 ¾		
1830 72	DN15 ½	5.5 18.1	3
	DN20 ¾		

5.7 PERFORMANCE – FRICTION LOSS DATA



Series AH2 Braided Hose

Hose	CCC	
	Equivalent Length of 1"/33.7mm Sch. 40 pipe according to G5135.16 tested at 114 lpm (30 gpm)	
	Straight Configuration	Bend Configuration
Length mm inches	meters feet	meters feet
790 31	0.87 2.9	2.70 8.9
	1.00 3.3	2.80 9.2
1220 48	2.23 7.3	4.66 15.3
	2.90 9.5	6.5 21.3
1830 72	3.31 10.9	7.16 23.5

6.0 NOTIFICATIONS

⚠ WARNING	
	<ul style="list-style-type: none">• Read and understand all instructions before attempting to install any Victaulic products.• Always verify that the piping system has been completely depressurized and drained immediately prior to installation, removal, adjustment, or maintenance of any Victaulic products.• Wear safety glasses, hardhat, and foot protection. <p>Failure to follow these instructions could result in death or serious personal injury and property damage.</p>
<ul style="list-style-type: none">• These products shall be used only in fire protection systems that are designed and installed in accordance with current, applicable National Fire Protection Association (NFPA) standards, or equivalent local and national fire protection standards, and in accordance with applicable building and fire codes. These standards and codes contain important information regarding protection of systems from freezing temperatures, corrosion, mechanical damage, etc.• The installer shall understand the use of this product and why it was specified for the particular application.• The installer shall understand common industry safety standards and potential consequences of improper product installation.• It is the system designer's responsibility to verify suitability of materials for use with the intended fluid media within the piping system and external environment.• The material specifier shall evaluate the internal and external effect of chemical composition, pH level, operating temperature, chloride level, oxygen level, and flow rate on materials to confirm system life will be acceptable for the intended service.• It is the responsibility of the owner of a building or their authorized agent to provide the sprinkler system installer with any knowledge that the water supply might be contaminated with or conducive to the development of microbiologically influenced corrosion (MIC), including as required by NFPA 13. Failure to identify adverse water quality issues may affect the <i>VicFlex</i> product and void the manufacturer's warranty. <p>Failure to follow installation requirements and local and national codes and standards could compromise system integrity or cause system failure, resulting in death or serious personal injury and property damage.</p>	

Victaulic VicFlex™ Braided Hoses may be painted/coated or caulked around, including fire barrier sealant, provided that the substance is compatible with stainless steel and zinc-plated carbon steel or ductile iron. Care shall be taken to ensure that the sprinkler and associated components do not come into contact with paint/coatings and caulking.

Victaulic VicFlex™ Braided Hoses that penetrate through non-fire rated gypsum wall (drywall) will function as designed, provided the components are installed in accordance with the respective installation instructions referenced in this document.

7.0 REFERENCE MATERIALS – CHARACTERISTICS

VicFlex™ Maximum Load Values

Series AH2 Hose with 24" Bracket

Hose Length inches mm	Total Load		Maximum Uniform Load	
	lb	N	lb/linear ft	N/linear m
31 790	5.2	23	2.6	38
36 915	5.5	25	2.8	40
48 1220	6.3	28	3.1	46
60 1525	7.0	31	3.5	51
72 1830	7.7	34	3.9	57

Series AH2 Hose with 48" Bracket

Hose Length inches mm	Total Load		Maximum Uniform Load	
	lb	N	lb/linear ft	N/linear m
31 790	6.1	27	1.5	22
36 915	6.4	29	1.6	23
48 1220	7.2	32	1.8	26
60 1525	7.9	35	2.0	29
72 1830	8.7	39	2.2	32

Total Load is defined as the sum of the weights of the following:

- Water-filled flexible sprinkler hose with threaded end fittings, including a typical fire sprinkler
- Bracket assembly (any applicable Victaulic bracket model of the relevant associated size)

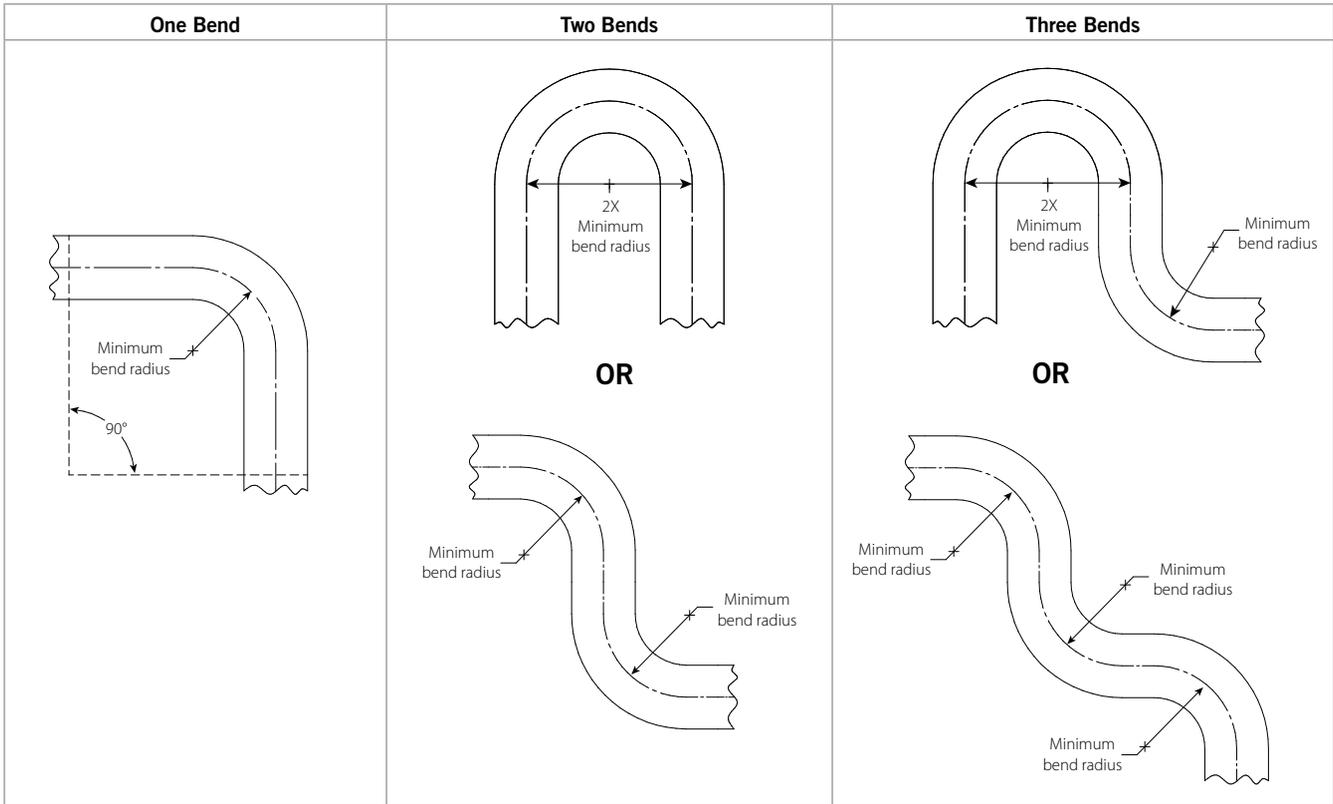
ASTM C 635: Suspension System Load-Carrying Capabilities (excerpted)

Suspension System	Actual Length ft/m	Minimum Allowable Uniform Load	
		lb/linear ft	N/linear m
Direct Hung	Light	5.0	75.7
	Intermediate	12.0	181.0
	Heavy	16.0	241.7

SUMMARY: All direct-hung suspension system duty classifications per ASTM C 635 are able to withstand the maximum water-filled weight of the *VicFlex* sprinkler hose and bracket.

7.0 REFERENCE MATERIALS – CHARACTERISTICS (CONTINUED)

Flexible Hose In-Plane Bend Characteristics



NOTE

- For out-of-plane (three-dimensional) bends, care must be taken to avoid imparting torque on the hose.

[I-VICFLEX: Field Installation Handbook](#)

[I-RES: Field Installation Handbook](#)

User Responsibility for Product Selection and Suitability

Each user bears final responsibility for determining the suitability of Victaulic products for their end-use application, in accordance with industry standards, project specifications, and Victaulic's published performance, maintenance, and safety data, as well as all warnings and installation instructions. Nothing in this or any other document, nor any verbal recommendation, advice, or opinion from any Victaulic employee, shall be deemed to alter, vary, supersede, or waive any provision of Victaulic Company's standard conditions of sale, warranty, installation instructions, or this disclaimer.

Installation

Always refer to and follow the [Victaulic Installation Handbook](#) or installation instructions for the product you are installing. Handbooks are included with each shipment of Victaulic products, providing complete installation and assembly data, and are available in PDF format on our website at victaulic.com.

Warranty

Refer to the Warranty section of the current Price List or contact Victaulic for details.

Intellectual Property Rights

No statement concerning the use of any material, product, service, or design is intended, or should be construed, to grant any license under any patent or other intellectual property right of Victaulic or any of its affiliates, or as a recommendation for the use of such material, product, service, or design in the infringement of any patent or other intellectual property right. The terms "Patented" or "Patent Pending" refer to design or utility patents or patent applications for articles and/or methods of use in the United States and/or other countries. Victaulic and all other Victaulic marks are the trademarks or registered trademarks of Victaulic Company, and/or its affiliated entities, in the U.S. and/or other countries.

Note

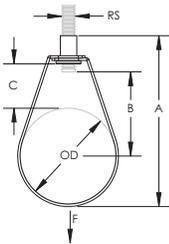
All products bearing a Victaulic trademark are manufactured by Victaulic or to Victaulic specifications. All products are to be installed only in accordance with the applicable Victaulic installation instructions. Victaulic reserves the right to change product specifications, designs and standard equipment without notice and without incurring obligations.

115 Standard Duty Loop Hanger



The 115 Standard Duty Loop Hanger is ideal for suspending stationary, non-insulated pipe lines, including CPVC pipes, in fire sprinkler systems. A knurled insert nut helps simplify vertical adjustments and flared edges on the base (1/2" to 4" sizes) help protect pipes from coming into contact with any sharp edges of the hanger.

- Flared edges help prevent any sharp surfaces from coming into contact with the pipe (1/2" to 4" sizes)
- Retained insert nut helps ensure the loop hanger and insert nut stay together
- Recommended for the suspension of stationary non-insulated pipe lines
- Manufactured to use the minimum rod size permitted by NFPA® for fire sprinkler piping
- Conforms with Federal Specification WW-H-171 (Type 10), Manufacturers Standardization Society (MSS) SP-58 (Type 10)



Material: Steel
Finish: Pregalvanized



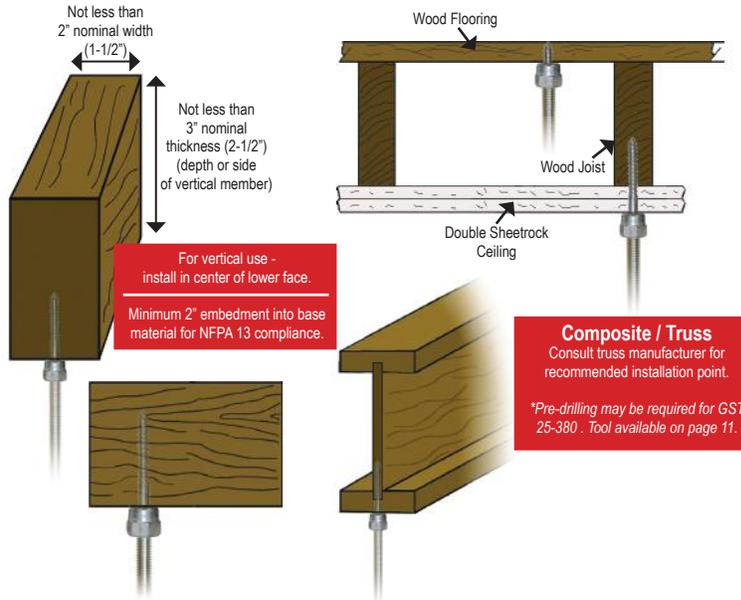
Part Number	Pipe Size	Outer Diameter OD	Rod Size RS	A	B	C	Static Load F	Certifications
1150050EG	1/2"	0.840"	3/8"	2 13/16"	1 1/8"	1"	300 lb	cULus
1150075EG	3/4"	1.050"	3/8"	3"	1 3/16"	15/16"	300 lb	cULus, FM
1150100EG	1"	1.315"	3/8"	3 1/4"	1 3/8"	15/16"	300 lb	cULus, FM
1150125EG	1 1/4"	1.660"	3/8"	3 9/16"	1 1/2"	15/16"	300 lb	cULus, FM
1150150EG	1 1/2"	1.900"	3/8"	3 13/16"	1 5/8"	15/16"	300 lb	cULus, FM
1150200EG	2"	2.375"	3/8"	4 1/4"	1 7/8"	15/16"	300 lb	cULus, FM
1150250EG	2 1/2"	2.875"	3/8"	5 9/16"	2 13/16"	1 9/16"	525 lb	cULus, FM
1150300EG	3"	3.500"	3/8"	6 9/16"	3 1/2"	1 15/16"	525 lb	cULus, FM
1150350EG	3 1/2"	4.000"	3/8"	7 1/16"	3 3/4"	1 15/16"	585 lb	cULus, FM
1150400EG	4"	4.500"	3/8"	7 9/16"	4"	1 15/16"	650 lb	cULus, FM
1150500EG	5"	5.563"	1/2"	9 13/16"	4 3/4"	2 1/4"	1,000 lb	cULus, FM
1150600EG	6"	6.625"	1/2"	11 5/16"	6 5/16"	3 5/16"	1,000 lb	cULus, FM
1150800EG	8"	8.625"	1/2"	12 7/8"	6 7/8"	2 7/8"	1,000 lb	cULus, FM



SAMMYS® FOR WOOD - Vertical Application



Application



Product Features

- No pre-drilling required.
- Quick to install using the Sammy Nut Driver with an 18V cordless drill/driver.
- Saves time from traditional methods.
- Reduces installation costs.
- Made in the U.S.A.



Approvals	Rod Size	Part Number	Model	Screw Descriptions	Ultimate Pullout (lbs)	UL Test Load (lbs)	FM Test Load (lbs)	Box Qty	Case Qty
VERTICAL MOUNT									
	1/4"	8002957	GST 100	1/4 x 1"	210 (7/16" OSB) 670 (3/4" Ply)			25	125
	1/4"	8003957	GST 200	1/4 x 2"	1760 (Fir)			25	125
	1/4"	8004957	GST 300	1/4 x 3"	2060 (Fir)			25	125
	3/8"	8007957	GST 10	1/4 x 1"	210 (7/16" OSB) 670 (3/4" Ply)	300		25	125
	3/8"	8008957	GST 20	1/4 x 2"	1760 (Fir)	850	1475	25	125
	3/8"	8068925	GST 20-SS	1/4 x 2"	1760 (Fir)	850		25	125
	3/8"	8009925	GST 25-380	3/8 x 2-1/2"	2113 (Fir)	1500		25	125
	3/8"	8010957	GST 30	1/4 x 3"	2060 (Fir)	1500	1475	25	125
	3/8"	8069925	GST 30-SS	1/4 x 3"	2060 (Fir)			25	125
	3/8"	8011925	GST 40	1/4 x 4"	2180 (Fir)			25	125
	1/2"	8013925	GST 2	1/4 x 2"	1760 (Fir)			25	125
	1/2"	8014925	GST 2.5-380	3/8 x 2-1/2"	2113 (Fir)			25	125
	1/2"	8015925	GST 3	1/4 x 3"	2275 (Fir)			25	125

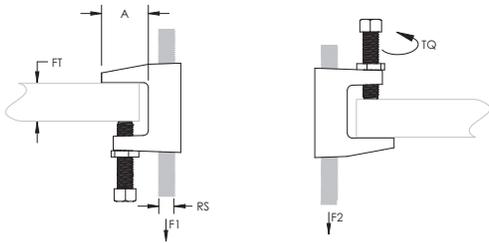


SPECIAL NUT DRIVER SYSTEM: The nut drivers were designed with a unique spin-off feature which provides a fast and safe installation each time. When the face of the driver comes into contact with the material you are installing into, continue drilling until nut driver spins free. Installation is then complete. Warranty requires the use of the appropriate nut driver for installations.

300 Universal Beam Clamp



- Conforms with Federal Specification WW-H-171 (Type 23), Manufacturers Standardization Society ANSI®/MSS-SP-58 (Type 19 and 23)



Material: Cast Iron

Part Number	Rod Size RS	Flange Thickness FT	A	Torque TQ	Static Load 1 F1	Static Load 2 F2	Certifications	Standard Packaging Quantity
Finish: Plain								
3000037PL	3/8"	3/4" Max	1 1/8"	5 ft lb	500 lb	250 lb	cULus, FM	100 pc
3000050PL	1/2"	3/4" Max	1 1/8"	8 ft lb	950 lb	760 lb	cULus, FM	50 pc
3000062PL	5/8"	3/4" Max	1 1/8"	5 ft lb	950 lb	760 lb	cULus	50 pc
3000075PL	3/4"	3/4" Max	1 1/8"	5 ft lb	950 lb	760 lb	cULus	50 pc
3000087PL	7/8"	3/4" Max	1 1/8"	5 ft lb	950 lb	760 lb	cULus	50 pc
Finish: Electrogalvanized								
3000037EG	3/8"	3/4" Max	1 1/8"	5 ft lb	500 lb	250 lb	cULus, FM, VdS G4050085	100 pc
3000050EG	1/2"	3/4" Max	1 1/8"	8 ft lb	950 lb	760 lb	cULus, FM	50 pc
3000062EG	5/8"	3/4" Max	1 1/8"	5 ft lb	950 lb	760 lb	cULus	50 pc
3000075EG	3/4"	3/4" Max	1 1/8"	5 ft lb	950 lb	760 lb	cULus	50 pc
3000087EG	7/8"	3/4" Max	1 1/8"	5 ft lb	950 lb	760 lb	cULus	50 pc

Setscrew must be tightened and torqued onto the sloped side of the I-beam.

Recognizing that torque wrenches are generally not used or available on many job sites, the setscrew should be tightened so it contacts the I-beam and then an additional 1/4 to 1/2 turn added.

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WARNING

nVent products shall be installed and used only as indicated in nVent's product instruction sheets and training materials. Instruction sheets are available at www.erico.com and from your nVent customer service representative. Improper installation, misuse, misapplication or other failure to completely follow nVent's instructions and warnings may cause product malfunction, property damage, serious bodily injury and death and/or void your warranty.

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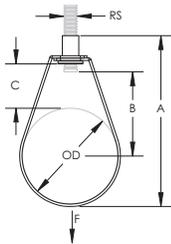


115 Standard Duty Loop Hanger



The 115 Standard Duty Loop Hanger is ideal for suspending stationary, non-insulated pipe lines, including CPVC pipes, in fire sprinkler systems. A knurled insert nut helps simplify vertical adjustments and flared edges on the base (1/2" to 4" sizes) help protect pipes from coming into contact with any sharp edges of the hanger.

- Flared edges help prevent any sharp surfaces from coming into contact with the pipe (1/2" to 4" sizes)
- Retained insert nut helps ensure the loop hanger and insert nut stay together
- Recommended for the suspension of stationary non-insulated pipe lines
- Manufactured to use the minimum rod size permitted by NFPA® for fire sprinkler piping
- Conforms with Federal Specification WW-H-171 (Type 10), Manufacturers Standardization Society (MSS) SP-58 (Type 10)



Material: Steel
Finish: Pregalvanized



Part Number	Pipe Size	Outer Diameter OD	Rod Size RS	A	B	C	Static Load F	Certifications
1150050EG	1/2"	0.840"	3/8"	2 13/16"	1 1/8"	1"	300 lb	cULus
1150075EG	3/4"	1.050"	3/8"	3"	1 3/16"	15/16"	300 lb	cULus, FM
1150100EG	1"	1.315"	3/8"	3 1/4"	1 3/8"	15/16"	300 lb	cULus, FM
1150125EG	1 1/4"	1.660"	3/8"	3 9/16"	1 1/2"	15/16"	300 lb	cULus, FM
1150150EG	1 1/2"	1.900"	3/8"	3 13/16"	1 5/8"	15/16"	300 lb	cULus, FM
1150200EG	2"	2.375"	3/8"	4 1/4"	1 7/8"	15/16"	300 lb	cULus, FM
1150250EG	2 1/2"	2.875"	3/8"	5 9/16"	2 13/16"	1 9/16"	525 lb	cULus, FM
1150300EG	3"	3.500"	3/8"	6 9/16"	3 1/2"	1 15/16"	525 lb	cULus, FM
1150350EG	3 1/2"	4.000"	3/8"	7 1/16"	3 3/4"	1 15/16"	585 lb	cULus, FM
1150400EG	4"	4.500"	3/8"	7 9/16"	4"	1 15/16"	650 lb	cULus, FM
1150500EG	5"	5.563"	1/2"	9 13/16"	4 3/4"	2 1/4"	1,000 lb	cULus, FM
1150600EG	6"	6.625"	1/2"	11 5/16"	6 5/16"	3 5/16"	1,000 lb	cULus, FM
1150800EG	8"	8.625"	1/2"	12 7/8"	6 7/8"	2 7/8"	1,000 lb	cULus, FM





SPRINKLER SYSTEM INSTALLATION GUIDE



For RedBuilt™ Open-Web Trusses and Red-I™ Joists

- Multiple Details for Supporting Sprinkler Pipe
- Options to Add Carrying Capacity
- For Use with RedBuilt™ Products **Only**



INTRODUCTION

Welcome to RedBuilt™

RedBuilt™ offers building solutions for a broad range of commercial applications; pioneering unique manufacturing technologies; and providing world-class service and technical support for architects, specifiers and builders.

RedBuilt™—A family of brand-name building products...a source for innovative ideas and solutions...a supplier that's simpler to do business with.

SPRINKLER SYSTEM INSTALLATION GUIDELINES

General Notes

- The details in this guide are intended for use with RedBuilt™ products only.
- The connections shown in the details will support the sprinkler pipes indicated or the loads shown, provided that the required loads have been included in the original design of the RedBuilt™ open-web truss or Red-I™ joist system.
- The hangers and installation methods shown in this guide are in accordance with the following design specifications:
 - NFPA 13 requires that hangers shall be designed to support 5 times the weight of the water-filled pipe plus 250 lbs at each point of piping support. Standard ferrous hardware referred to in NFPA 13/13R such as U-hooks, eye rods, and steel trapezes, or accepted proprietary hardware are the responsibility of others.
 - NFPA 13 requires that sprinkler piping shall be substantially supported from the building structure, which must support the added load of the water-filled pipe plus a minimum of 250 lbs applied at the point of hanging. Fasteners, such as lag screws and machine bolts, and structural wood hanger blocks are designed to support the weight of the water-filled pipe plus a temporary 250-pound load, using values from the 2005 National Design Specification® For Wood Construction (NDS®).
- Fastener lead hole and size limitations are to be in accordance with the information on page 3 and the applicable requirements of the NFPA 13/13R.
- A table describing the allowable holes in the web of Red-I™ joists is provided on page 7. It assumes that the joists are uniformly loaded. For other load conditions, contact your RedBuilt™ representative.
- Pipe sizes shown on details assume that sprinkler pipes are supported at 15' on-center. Refer to NFPA for actual spacing limitations.

- Loads assumed for water-filled pipes at 15' on-center:

Pipe Diameter	Loads (lbs)
2"	78.0
2½"	118.5
3"	162.0
3½"	202.5
4"	246.0
5"	352.5
6"	475.5

- Earthquake bracing details (EQ1–EQ6 on pages 6, 10, and 11) require that the system designer specify the frequency of the bracing.
- All wood hanger blocks are to be minimum No. 2 grade Douglas fir-larch, southern pine, or equivalent.
- For options beyond the scope of this publication, contact your RedBuilt™ representative.

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ABOUT THIS GUIDE

This guide offers technical information and details for installing sprinkler systems in RedBuilt™ open-web trusses and Red-I™ joists. The information in this guide is intended for use with RedBuilt™ products ONLY.

Cutting or drilling oversized holes in the webs or flanges of RedBuilt™ open-web trusses and Red-I™ joists can weaken the structural integrity of the member to the point where it will need to be repaired or replaced, sometimes at great expense. Proper installation of the allowed fasteners is equally important to the structural integrity of the open-web truss and Red-I™ joist.

- Follow the tables on this page for proper choice and installation of fasteners.
- Follow the tables on page 7 when cutting holes through Red-I™ joist webs.

Self-Tapping Screws

Pre-drilled holes shall be used for screw systems with self-tapping or thread cutting properties.

Drive Screws

Drive screws are not allowed in RedBuilt™ open-web trusses or Red-I™ joists.

Lag Screws

Lag screws shall be installed in prebored lead holes with a wrench. Do not drive lag screws with a hammer.

Lead Hole Size

Fastener Type	Fastener Size	Approximate Lead Hole Size
Nails	0.162" diameter and larger	75% of nail diameter
Wood Screws	Larger than no. 8	70% of root diameter (1/8" for 18 gauge)
Machine Bolts	All	Bolt diameter + 1/32" to 1/16" max.
Lag Screws	1/4" diameter 3/8" diameter 1/2" diameter 5/8" diameter	1/8" ⁽¹⁾ 3/16" ⁽¹⁾ 1/4" ⁽¹⁾ 5/16" ⁽¹⁾

(1) Lead hole size applies to the threaded part of the lag screw. For the unthreaded length of the screw, the lead hole is equal to the shank diameter.

Allowable Holes and Fasteners

The tables below show the largest fastener and lead hole sizes allowed in RedBuilt™ open-web trusses and Red-I™ joists. All holes and attachments made to the underside of a chord or flange shall be centered. See details 1 and 15 on pages 4 and 8, respectively.

Largest Hole and Fastener

RedBuilt™ Product	Hole Size		Fastener Size	
	Side	Top or Bottom	Side	Top or Bottom
Red-L™ Red-LT™ Red-W™	Not allowed	1/4" ⁽¹⁾	16d (3 1/2") common nail	3/8" lag ⁽²⁾
Red-S™	Not allowed	3/16"	16d (3 1/2") common nail	3/8" lag ⁽²⁾
Red-M™ Red-H™	1/4" ⁽¹⁾	1/4" ⁽¹⁾	16d (3 1/2") common nail 1/4" lag ⁽²⁾ 1/4" bolt ⁽²⁾ .294" screw ⁽²⁾	16d (3 1/2") common nail 3/8" lag ⁽²⁾ 7/16" bolt ⁽²⁾⁽³⁾
Red-I™ Joist Flange	Not allowed	3/16"	10d (3") common nail	1/4" lag ⁽²⁾⁽⁴⁾
Red-I™ Joist Web	See web hole chart	—	—	—

(1) May be increased to 1/2" if the location is a minimum of 6" away from a truss pin or any knot larger than 1/4" diameter.

(2) Requires prebored lead hole—see **Lead Hole Size** table.

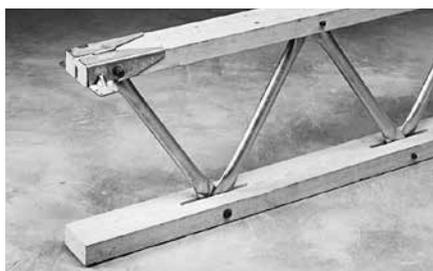
(3) May be limited by applicable hole size.

(4) 3/8" lag allowed when joist flange width is greater than 1 3/4".

- Only one hole may be drilled in any cross section of any chord or flange.

OPEN-WEB TRUSS DESCRIPTIONS

Red-L™, Red-LT™ and Red-W™ Trusses



Red-S™ Truss



Red-M™ and Red-H™ Trusses



Open-Web Truss Chords

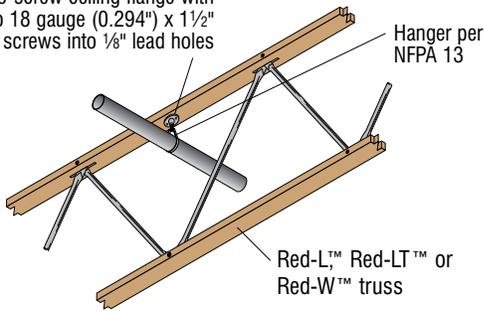
Open-Web Truss	Top Chord		Bottom Chord	
	Size	Material	Size	Material
Red-L™	1 1/2" x 3 1/2"	MSR	1 1/2" x 3 1/2"	MSR
Red-LT™	1 1/2" x 3 1/2"	TimberStrand® LSL	1 1/2" x 3 1/2"	MSR
Red-W™	1 1/2" x 4 3/4"	MSR	1 1/2" x 4 3/4"	MSR
Red-S™	Double 1 1/2" x 2.3" RedLam™ LVL			
Red-M™	Double 1 1/2" x 3 1/2" MSR lumber			
Red-H™	Double 1 1/2" x 5 1/2" MSR lumber			

Preservative-treated open-web trusses are not available

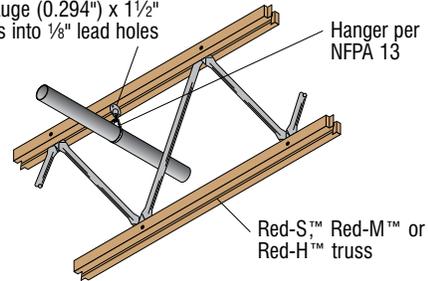
OPEN-WEB TRUSS SPRINKLER DETAILS

1 All RedBuilt™ Open-Web Trusses

Two-screw ceiling flange with two 18 gauge (0.294") x 1½" wood screws into ⅛" lead holes



Two-screw ceiling flange with two 18 gauge (0.294") x 1½" wood screws into ⅛" lead holes

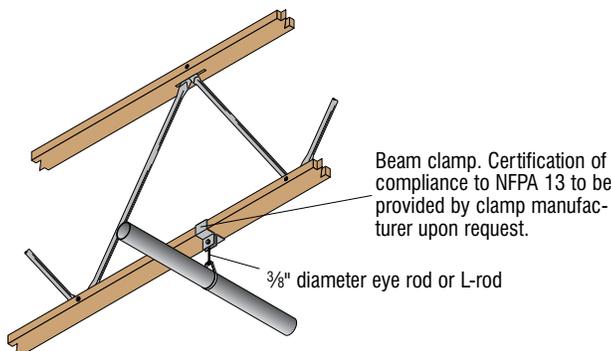


- For Red-L™, Red-LT™ and Red-W™ trusses, screws must line up along the center of the chord $\pm 1/2"$ tolerance.
- For all double chord trusses, one screw must be positioned in the center of each chord $\pm 1/4"$ tolerance.

- This detail may be used on top or bottom chord.
- If installing through a gypsum board ceiling, increase the fastener length by the gypsum board thickness.

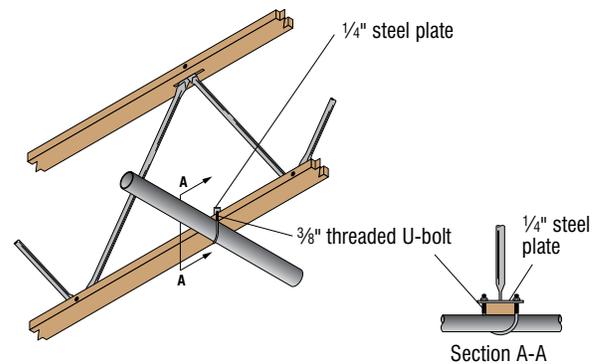
Pipe size at maximum hanger spacing: 2"

2 Red-L™ and Red-LT™ Trusses



Pipe size at maximum hanger spacing: 2" (may be increased to 4" with special truss design)

3 All RedBuilt™ Open-Web Trusses

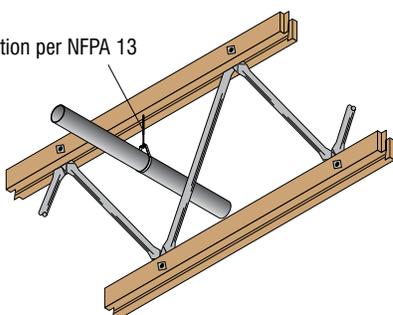


- Pipe may also be placed on top side of bottom chord.

Pipe size at maximum hanger spacing: 2" (may be increased to 4" with special truss design)

4 All RedBuilt™ Open-Web Trusses

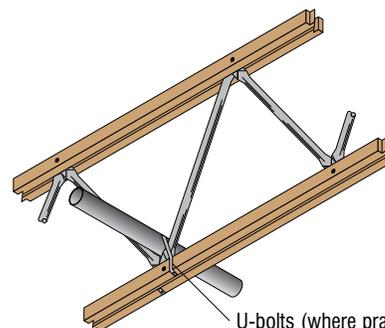
Approved connection per NFPA 13



- May be attached to top or bottom chord.
- Rods shall be centered in the chords, $\pm 1/4"$ tolerance on double chord trusses.
- If installing through a gypsum board ceiling, increase the fastener length by the gypsum board thickness.

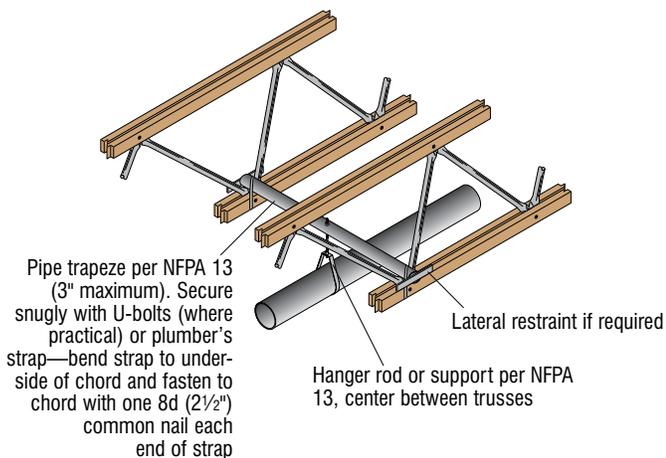
Pipe size at maximum hanger spacing: 2"

5 All RedBuilt™ Open-Web Trusses



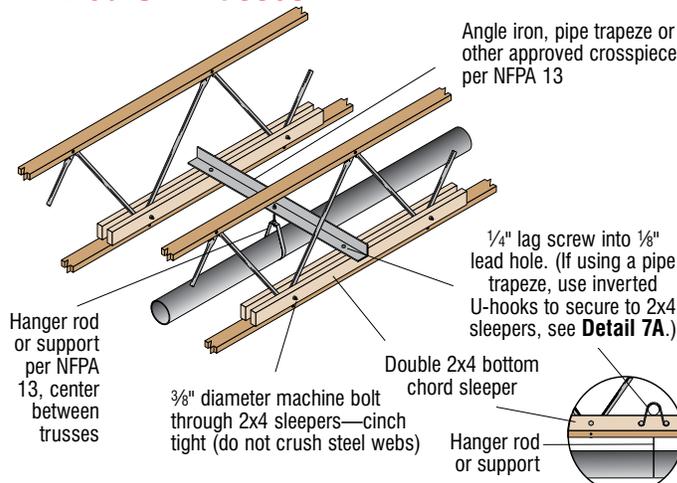
Pipe size at maximum hanger spacing: 3"

6 All RedBuilt™ Open-Web Trusses



Pipe size at maximum hanger spacing: 6"

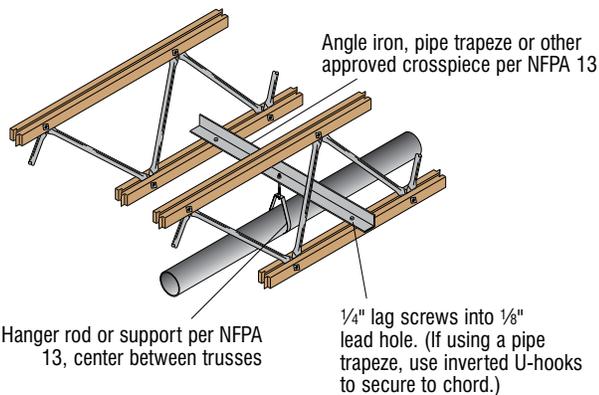
7 Red-L™, Red-LT™, Red-W™ and Red-S™ Trusses



Pipe size at maximum hanger spacing: 6"

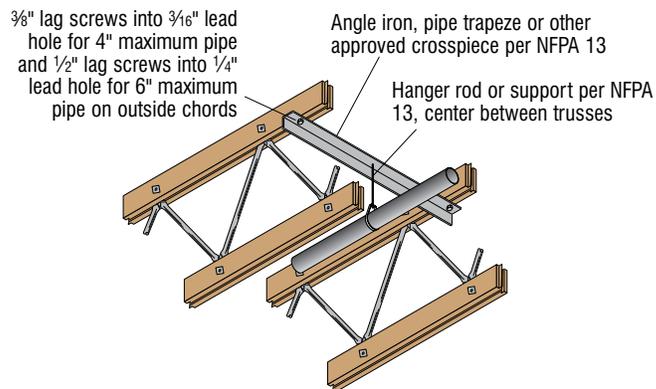
Detail 7A

8 Red-M™ and Red-H™ Trusses



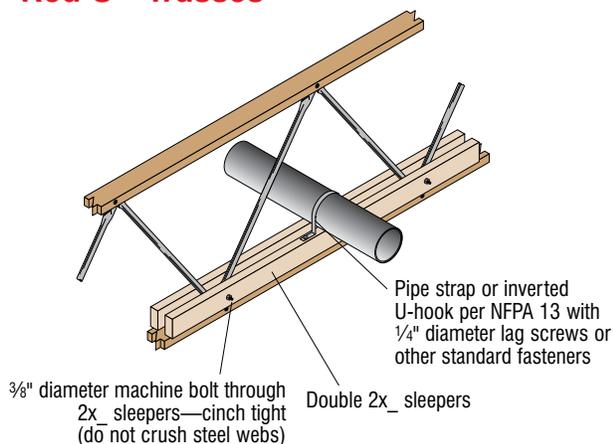
Pipe size at maximum hanger spacing: 4" for Red-M™ trusses, 6" for Red-H™ trusses

9 Red-M™ and Red-H™ Trusses



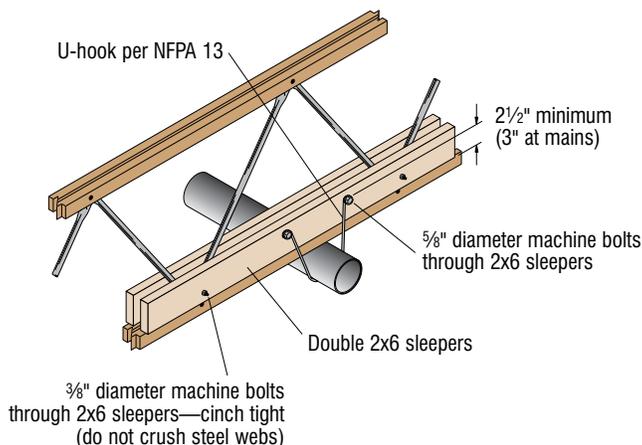
Pipe size at maximum hanger spacing: 4" for Red-M™ trusses, 6" for Red-H™ trusses

10 Red-L™, Red-LT™, Red-W™ and Red-S™ Trusses



Pipe size at maximum hanger spacing: 4" with 2x4 sleeper, 6" with 2x6 sleeper

11 Red-L™, Red-LT™, Red-W™ and Red-S™ Trusses

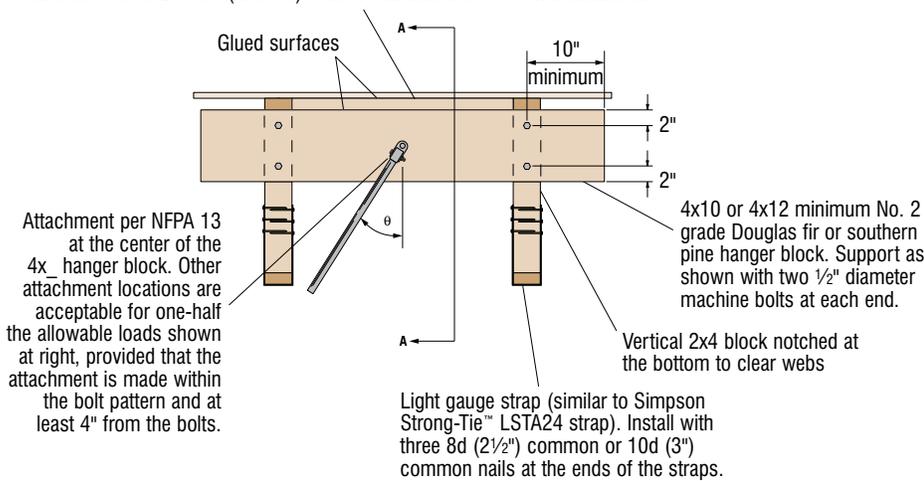


Pipe size at maximum hanger spacing: 6"

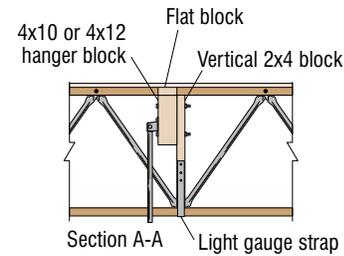
OPEN-WEB TRUSS SEISMIC DETAILS

EQ1 For Loads Perpendicular To Open-Web Trusses

Flat block. Glue top and bottom surfaces with four 1/4" beads of approved elastomeric floor adhesive ASTM D 3498 (AFG-01). Follow manufacturer's recommendations.



- Glued surfaces must be clean and dust free.

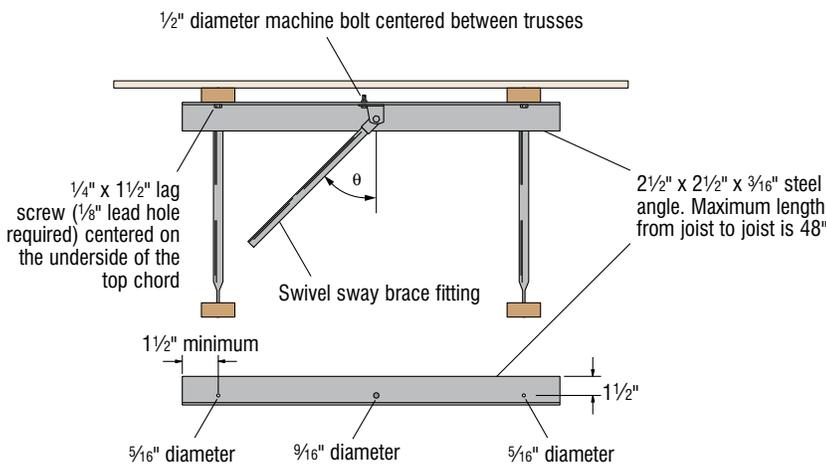


Allowable Horizontal Seismic Loads (lbs)

Angle to Vertical (θ)		
30°	45°	60°
800	1,400	1,400

- Loads are based on the controlling connection to the truss.
- The capacity of the brace fastener to the wood block may limit the capacity of the detail (see NFPA 13).
- Loads include a 1.33 and 1.60 duration factor adjustment.

EQ2 For Loads Parallel or Perpendicular to Open-Web Trusses



Allowable Horizontal Seismic Loads (lbs)

Angle to Vertical (θ)		
30°	45°	60°
190	240	240

- Loads are based on the controlling connection to the truss.
- Loads include a 1.33 and 1.60 duration factor adjustment.

RED-I™ JOIST DESCRIPTIONS

Red-I™ Joist Series

The Red-I™ joist product line is manufactured in lengths up to 80' and in numerous depths. In addition to the standard parallel configuration, some series are available in tapered versions or with built-in camber.

Web Material:

3/8", 7/16", or 1/2" OSB web material

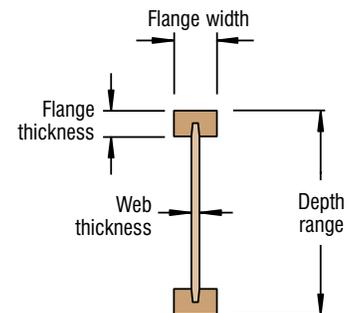
Flange Material:

RedLam™ LVL from 1 1/2" x 1 3/4" to 2 1/2" x 3 1/2"

Depths:

9 1/2" (Red-I45™ only), 11 7/8", and 14" through 32" (in 2" increments)

Red-I™ Joist	Flange Width	Flange Thickness	Web Thickness	Depth Range
I45	1 3/4"	1 1/2"	3/8"	9 1/2", 11 7/8", 14", 16"
I65	2 1/2"	1 1/2"	7/16"	11 7/8", 14"-30"
I90	3 1/2"	1 1/2"	7/16"	11 7/8", 14"-30"
I90H	3 1/2"	1 3/4"	7/16"	11 7/8", 14"-30"
I90HS	3 1/2"	2 1/2"	1/2"	11 7/8", 14"-32"

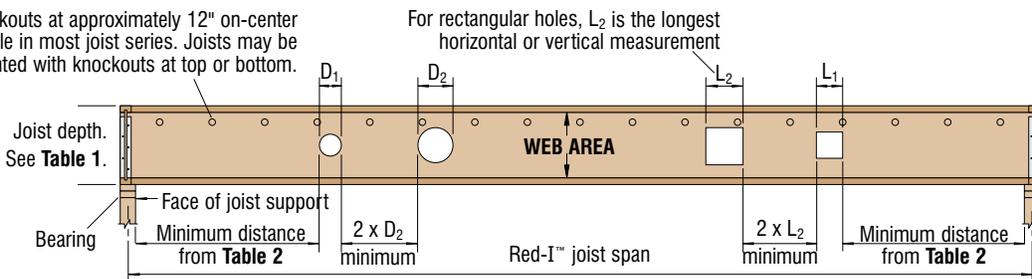


Red-I™ Joist

For load capacities, bearing details, and other information, [contact your RedBuilt™ representative](#)

Red-I65™, Red-I90™, Red-I90H™ and Red-I90HS™

1/2" knockouts at approximately 12" on-center available in most joist series. Joists may be oriented with knockouts at top or bottom.



For concentrated loads or for other conditions or possible exceptions, contact your RedBuilt™ representative

How to Determine Hole Location

1. Determine the joist depth and desired hole size and find hole factor (letter) or hole location (distance) in **Table 1**. If the table reports a hole factor, proceed to step 2.
2. Refer to **Table 2**. The dimension shown where the joist span and hole factor from **Table 1** intersect is the required minimum distance from nearest edge of hole to inside face of support.

General Notes

- Tables are based on:
 - Simple spans.
 - More restrictive of either uniform loads or code-required concentrated loads (2,000 lbs over 2 1/2 feet square) with 25 psf dead and 20 psf partition load.
- The sizes given in the table are hole sizes, not duct sizes. Rectangular hole sizes are based on measurement of the longest side.

- Multiple holes require spacing 2 times the length of the largest hole.
- For joists continuous over a support, add 1" to distance shown in table for each foot of joist span. See **Example** below.
- Holes may be located vertically anywhere in the web. Leave 1/8" of web (minimum) at top and bottom of hole.
- **Do not cut holes in cantilever area without consulting your RedBuilt™ representative.**

Table 1

Round Hole Size	Rectangle Hole Size ⁽²⁾	Hole Size Factors and Locations ⁽¹⁾												
		Joist Depth												
		11 7/8"	14"	16"	18"	20"	22"	24"	26"	28"	30" or 32"			
2"	1 1/4"	A	A	A	4"	4"	4"	4"	4"	4"	4"			
3"	1 3/4"	A	A	A	1'-3"	1'-3"	1'-3"	4"	4"	4"	4"			
4"	2 1/4"	B	B	A	A	A	1'-3"	1'-3"	1'-3"	1'-3"	4"			
5"	3"	C	C	B	A	A	A	A	A	1'-3"	1'-3"			
6"	3 1/2"	E	C	C	B	B	A	A	A	A	1'-3"			
7"	4"		D	C	C	B	B	A	A	A	A			
8"	4 3/4"		E	D	C	C	B	B	B	A	A			
9"	5 1/4"			E	D	C	C	B	B	B	A			
10"	6"				E	E	D	C	C	B	B			
11"	6 1/2"					D	D	C	C	B	B			
12"	7"					E	D	D	C	C	B			
13"	7 3/4"						E	E	D	C	C			
14"	8 1/4"							E	E	D	C			
15"	9"								E	D	C			
16"	9 1/2"									E	D			
17"	10"										E			
18"	10 3/4"											E		
19"	11 1/4"												E	
20"	12"													E

(1) **Bold italic** indicates that for Red-I90HS™ joists, hole factor (letter) values must be increased by one letter and hole locations (distance) must be converted to hole factor A. No holes are allowed with hole factor E for these two joists.

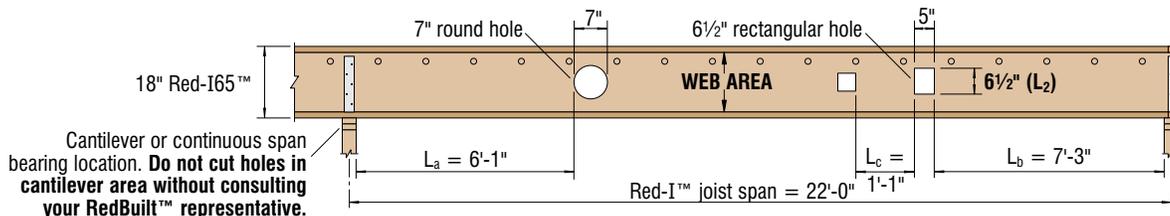
(2) Rectangular holes based on measurement of longest side.

Table 2

Joist Span	Hole Locations ⁽¹⁾				
	Hole Factor				
	A	B	C	D	E
14'	1'-3"	2'-0"	2'-6"	3'-9"	5'-0"
15'	1'-3"	2'-0"	3'-0"	4'-0"	5'-3"
16'	1'-3"	2'-3"	3'-3"	4'-6"	5'-9"
17'	1'-6"	2'-9"	3'-9"	5'-0"	6'-3"
18'	1'-6"	3'-0"	4'-3"	5'-6"	6'-9"
19'	1'-9"	3'-0"	4'-3"	5'-6"	7'-0"
20'	1'-9"	3'-0"	4'-3"	5'-6"	7'-0"
21'	2'-0"	3'-0"	4'-3"	5'-9"	7'-3"
22'	2'-0"	3'-0"	4'-3"	5'-9"	7'-3"
23'	2'-0"	3'-3"	4'-3"	5'-9"	7'-6"
24'	2'-3"	3'-3"	4'-6"	5'-9"	7'-6"
25'	2'-3"	3'-6"	4'-9"	5'-9"	7'-9"
26'	2'-3"	3'-9"	4'-9"	6'-0"	7'-9"
27'	2'-6"	3'-9"	5'-0"	6'-3"	7'-9"
28'	2'-6"	4'-0"	5'-3"	6'-6"	8'-0"
29'	2'-6"	4'-0"	5'-6"	6'-9"	8'-3"
30'	2'-9"	4'-3"	5'-9"	7'-0"	8'-6"
31'	3'-0"	4'-3"	5'-9"	7'-3"	8'-9"
32'	3'-0"	4'-6"	6'-0"	7'-6"	9'-3"
33'	3'-0"	4'-9"	6'-3"	7'-9"	9'-6"
34'	3'-0"	5'-0"	6'-6"	8'-0"	9'-9"
35'	3'-3"	5'-0"	6'-6"	8'-3"	10'-0"
36'	3'-3"	5'-0"	6'-9"	8'-6"	10'-3"

(1) For Red-I90HS™ joists, add 2' to table value.

Example: Find Minimum Distance From Inside Face of Support to Nearest Edge of Hole



DO NOT cut, drill, or notch flanges

Round hole: For a 7" hole, find L_a

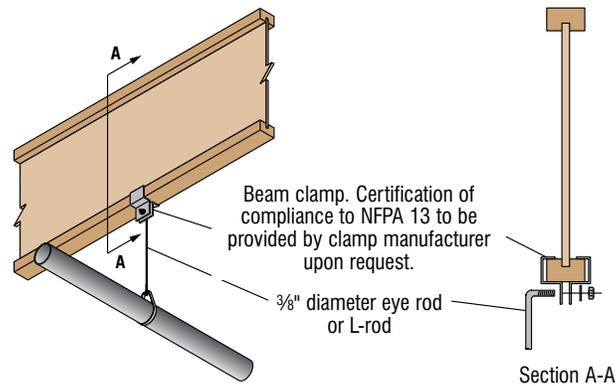
1. From **Table 1**, hole factor is C
2. From **Table 2**, distance is 4'-3"
3. Joist is continuous over the support nearest the hole, so increase L_a by 1" for each foot of span (22"). $L_a = 4'-3" + 22" = 6'-1"$

Rectangular hole: For a 6 1/2" hole, find L_b and L_c

1. From **Table 1**, hole factor is E
2. From **Table 2**, distance L_b is 7'-3". Hole is nearest to an end support, so no distance increase is required.
3. Minimum distance L_c between holes = $2 \times L_2$; $L_c = 2 \times (6 1/2") = 1'-1"$

RED-I™ JOIST SPRINKLER DETAILS

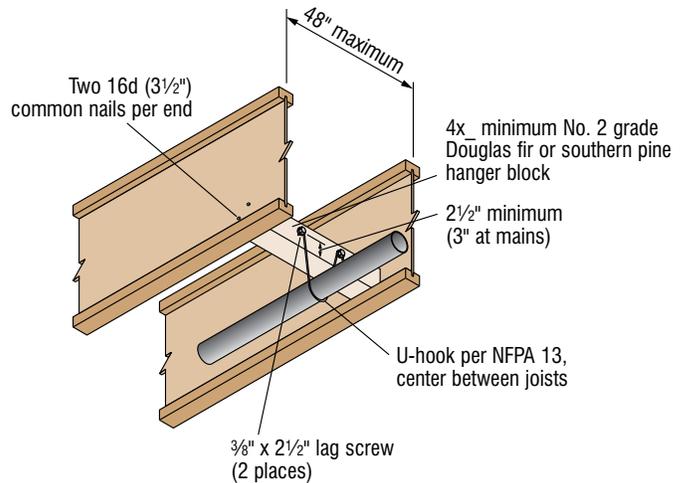
12 All Red-I™ Joists



Check flange and clamp dimensions for compatibility

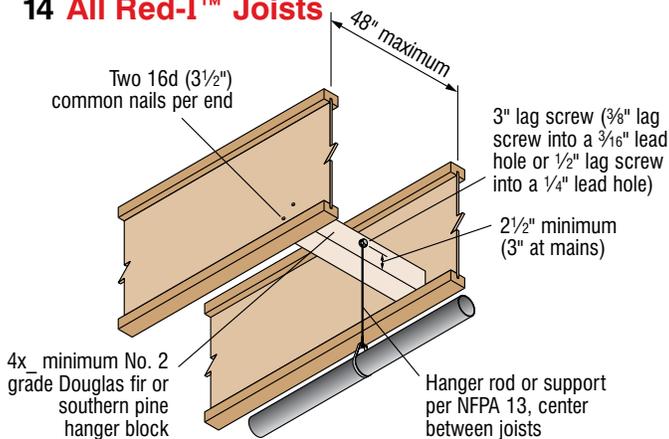
Pipe size at maximum hanger spacing: 4"

13 All Red-I™ Joists



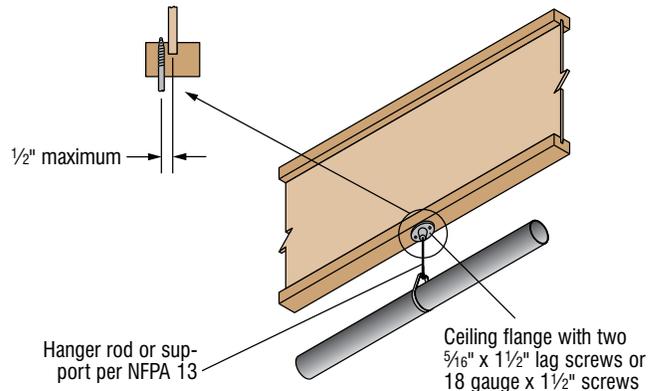
Pipe size at maximum hanger spacing: 3 1/2"

14 All Red-I™ Joists



Pipe size at maximum hanger spacing:
 2" with 3/8" x 3" lag screw
 2 1/2" with 1/2" x 3" lag screw
 3 1/2" with 1/2" x 3" lag screw

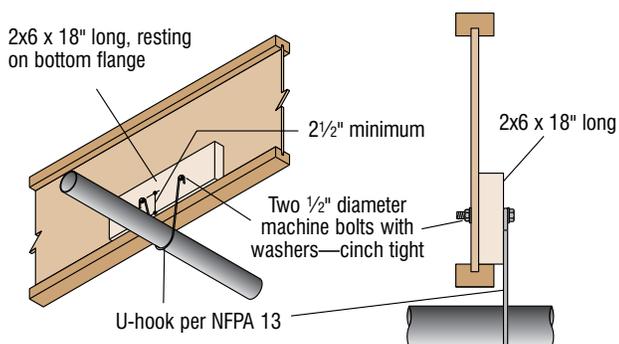
15 Red-I65™, Red-I90™, Red-I90H™ and Red-I90HS™ Joists



■ Penetration of screws into web is allowed.

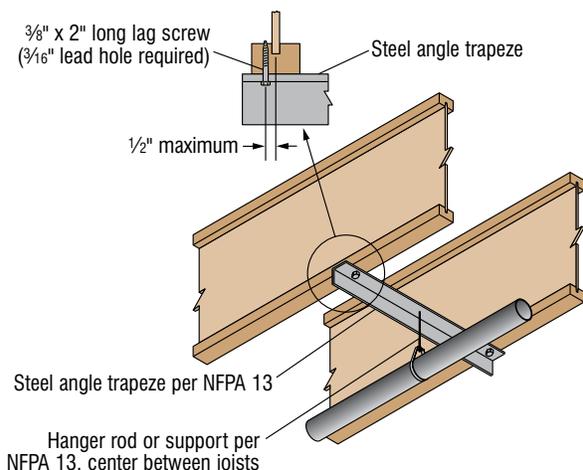
Pipe size at maximum hanger spacing: 2"

16 All Red-I™ Joists



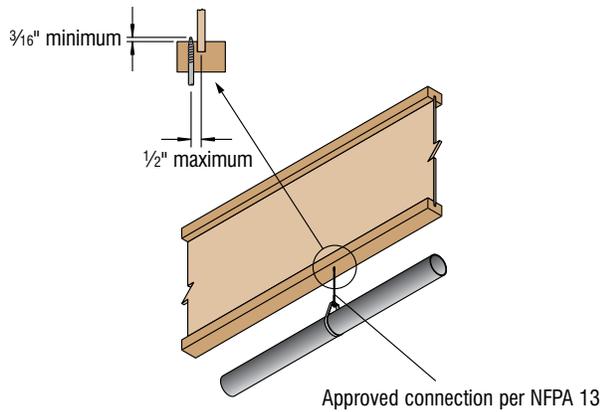
Pipe size at maximum hanger spacing: 4"

17 Red-I65™, Red-I90™, Red-I90H™ and Red-I90HS™ Joists



Pipe size at maximum hanger spacing: 2"

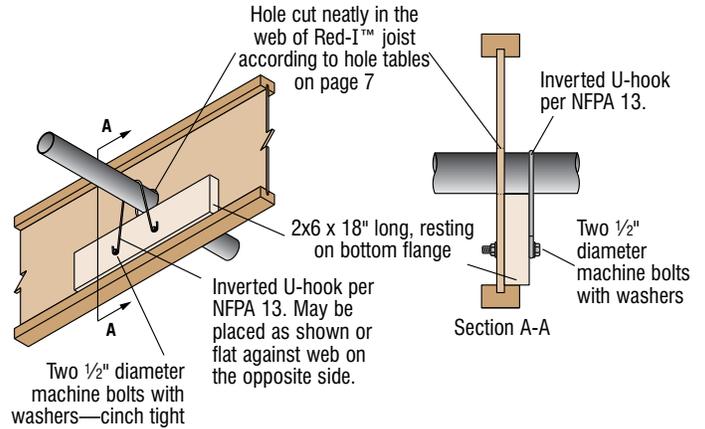
18 Red-I65™, Red-I90™, Red-I90H™ and Red-I90HS™ Joists



- Penetration of screws into web is allowed.

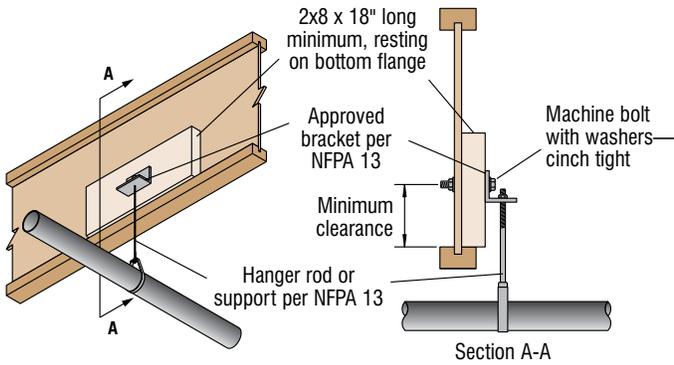
Pipe size at maximum hanger spacing: 2"

19 All Red-I™ Joists



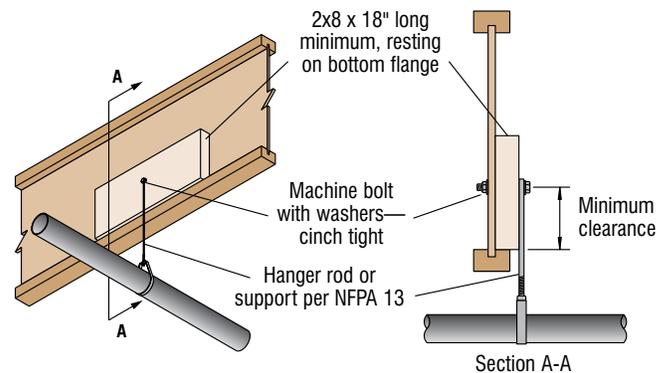
Pipe size at maximum hanger spacing: 4"

20 All Red-I™ Joists



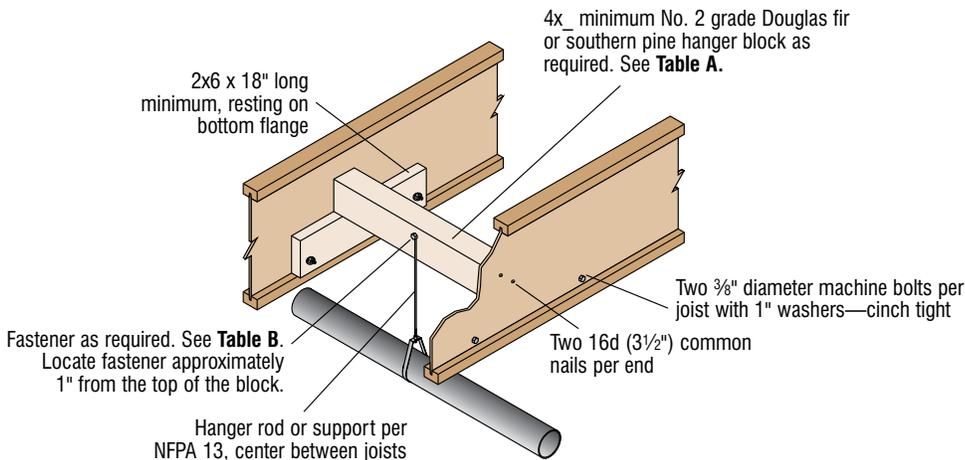
Pipe Size	Machine Bolt Diameter	Min. Clearance
Up to 2"	3/8"	2 1/2"
2 1/2" to 3 1/2"	1/2"	3"

21 All Red-I™ Joists



Pipe Size	Machine Bolt Diameter	Min. Clearance
Up to 2"	3/8"	2 1/2"
2 1/2" to 3 1/2"	1/2"	3"

22 All Red-I™ Joists



Pipe size at maximum hanger spacing: See Table B

Table A

Distance Between Red-I™ Joists	Wood Hanger Block Size
32" or less	4x4 ⁽¹⁾
48"	4x6
96"	4x8

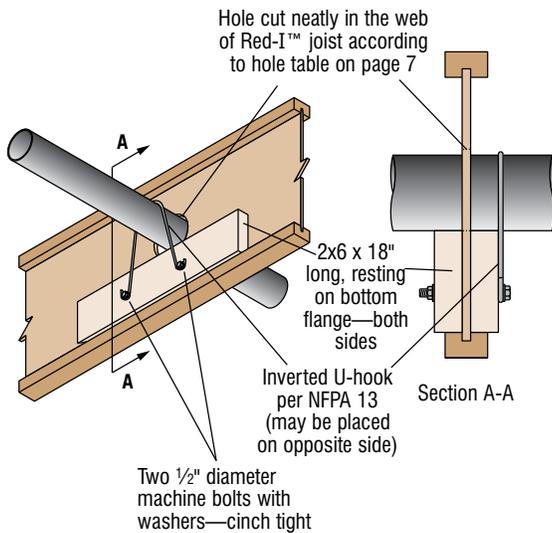
(1) For sprinkler main lines, wood hanger block size is 4x6 for 32" or less spacing.

Table B

Pipe Size	Fastener
2"	3/8" x 3" lag
3"	1/2" x 3" lag
5"	1/2" machine bolt
6"	5/8" machine bolt

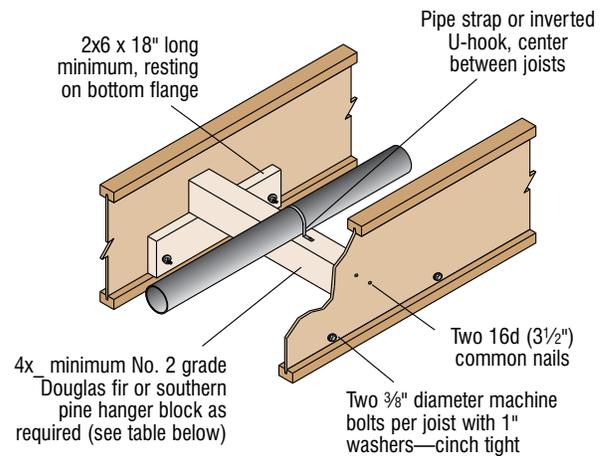
RED-I™ JOIST SPRINKLER DETAILS

23 All Red-I™ Joists



Pipe size at maximum hanger spacing: 6"

24 All Red-I™ Joists

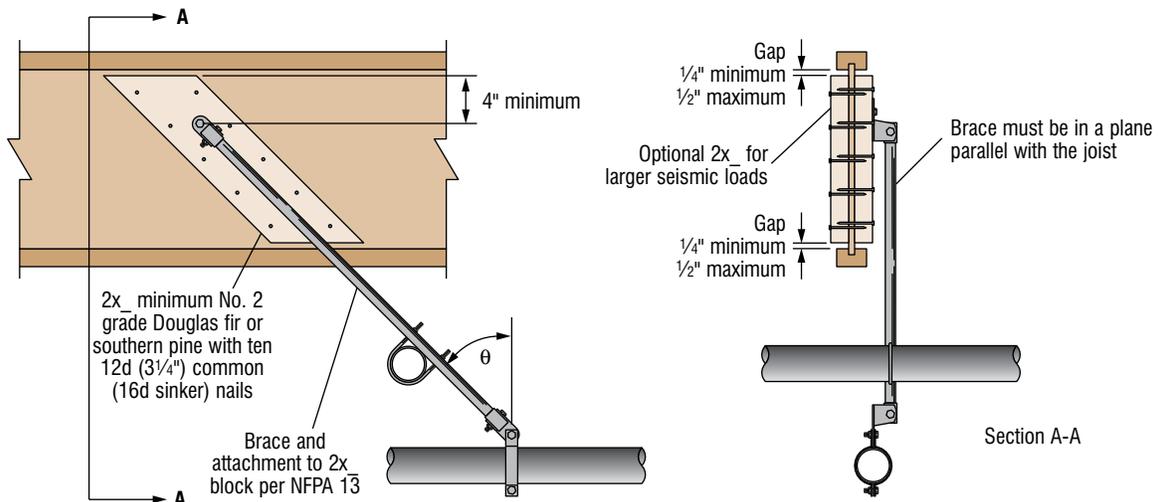


Distance Between Red-I™ Joists	Wood Hanger Block Size
32" or less	4x4
48"	4x6
96"	4x8

Pipe size at maximum hanger spacing: 6"

RED-I™ JOIST SEISMIC DETAILS

EQ3 For Loads Parallel to Red-I™ Joists



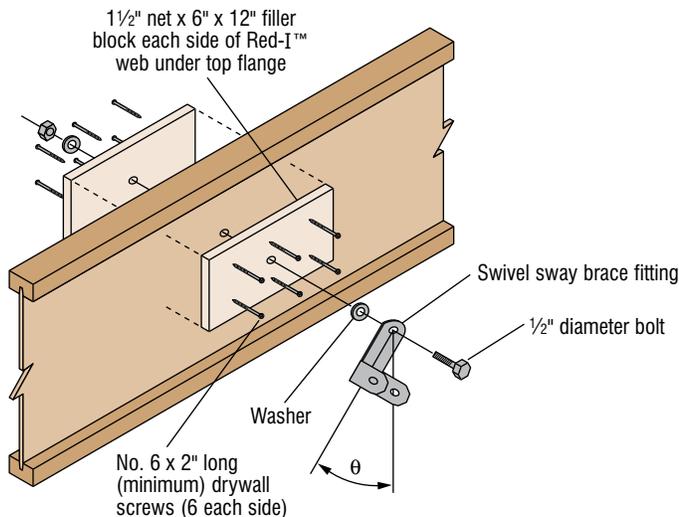
- Do not use this detail for loads perpendicular to the joist.
- Make connection in top half of block, centered at least 4" from the end of the block.
- The direction of the wood grain in the block is approximately parallel with the brace.

Allowable Horizontal Seismic Loads (lbs)

Blocking Condition	Angle to Vertical (θ)		
	30°	45°	60°
2x_ on one side	440	620	760
2x_ on both sides	520	730	900

- Loads are based on the controlling connection to the joist.
- Loads include a 1.33 and 1.60 duration factor adjustment.

EQ4 For Loads Parallel or Perpendicular to Red-I™ Joists

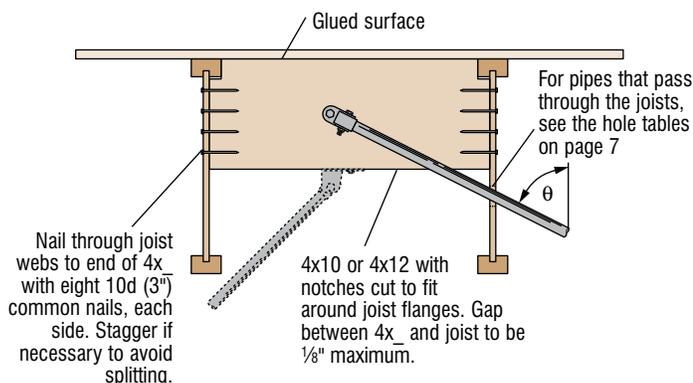


Allowable Horizontal Seismic Loads (lbs)

Angle to Vertical (θ)		
30°	45°	60°
450	620	690

- Loads are based on the controlling connection to the joist.
- Loads include a 1.33 and 1.60 duration factor adjustment.

EQ5 For Loads Parallel or Perpendicular to Red-I™ Joists



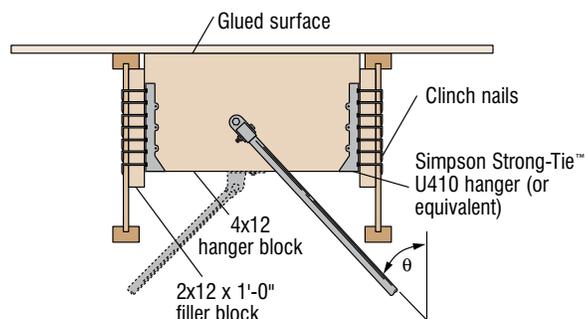
- For loads parallel to the joists, make attachment to the hanger block in the upper half of the block.
- Glue surfaces with approved elastomeric floor adhesive ASTM D 3498 (AFG-01). Follow manufacturer's recommendations. Glued surfaces must be clean and dust free.
- Make attachment per NFPA 13 near the center of the 4x12 block. Fastener must be at least 7 diameters from the end of the block and 4 diameters from all other edges.

Allowable Horizontal Seismic Loads (lbs)

Angle to Vertical (θ)		
30°	45°	60°
390 ⁽¹⁾	600	600

- (1) 600 if connection is centered on the 4x_.
- Loads are based on the controlling connection to the joist.
 - The capacity of the brace fastener to the wood block may limit the capacity of the detail (see NFPA 13).
 - Loads include a 1.33 and 1.60 duration factor adjustment.

EQ6 For Loads Parallel or Perpendicular to Red-I™ Joists



- Before installing in hangers, glue the top face with four 1/4" beads of approved elastomeric floor adhesive ASTM D 3498 (AFG-01). Follow manufacturer's recommendations. Glued surfaces must be clean and dust free.
- Attach hanger and filler block by nailing through the hanger, block and Red-I™ joist web with ten 12d (3 1/4") common (16d sinker) nails and clinch.
- For loads parallel to the joists, make attachment to the hanger block in the upper half of the block.
- Make attachment per NFPA 13 near the center of the 4x12 block. Fastener must be at least 7 diameters from the end of the block and 4 diameters from all other edges.

Allowable Horizontal Seismic Loads (lbs)

Angle to Vertical (θ)		
30°	45°	60°
520	740	810

- Loads are based on the controlling connection to the joist.
- The capacity of the brace fastener to the wood block may limit the capacity of the detail (see NFPA 13).
- Loads include a 1.33 and 1.60 duration factor adjustment.



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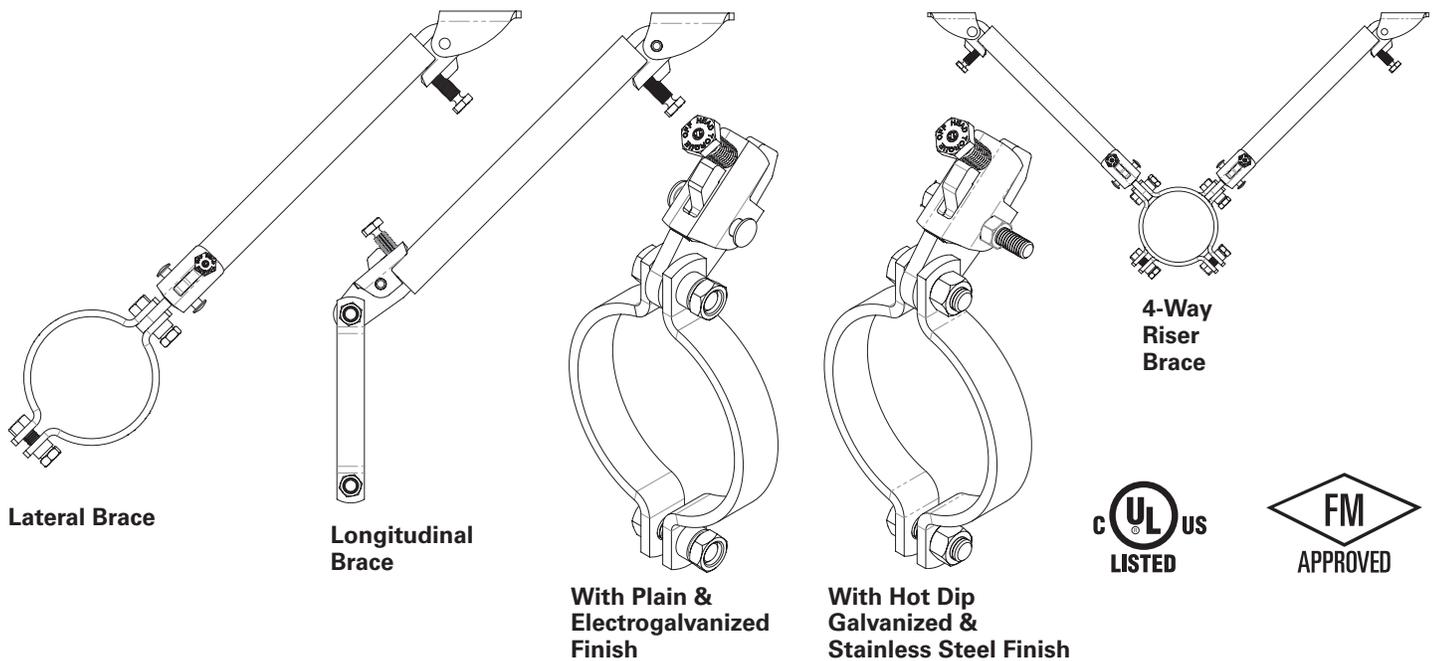
200 E. Mallard Drive, Boise, ID 83706

P.O. Box 60, Boise, ID 83707

REPRESENTATIVE INFORMATION

Fig. 4L TOLCO sway brace attachment

Function: For bracing pipe against sway and seismic disturbances. Fig. 4L is the “braced pipe” attachment component of a longitudinal or lateral sway brace assembly. It is intended to be combined with a 1”-2” NPS “bracing pipe” and a TOLCO structural attachment component to form a complete bracing assembly. Sway brace assemblies are intended to be installed in accordance with NFPA 13 and the manufacturer’s installation instructions.



Max UL Rated Load when used as a lateral brace

Pipe size	Rated load	SS Rated load
1" – 4"	1000 lbs.	**1000 lbs.
5"– 6"	*1600 lbs.	**1600 lbs.
8"	*2100 lbs.	—

*Only UL listed for use with a 1" brace pipe
 ** Stainless steel (Fig. 4LS) is only offered for 4" and 6" size pipe 2½" - 8" 2000 lbs.

Max UL Rated Load when used as a longitudinal brace

Pipe size	Rated load	SS Rated load
1" – 1½"	1000 lbs.	—
2"	1600 lbs.	—
2½"– 8"***	2000 lbs.	**2100 lbs.

** Stainless steel (Fig. 4LS) is only offered for 4" and 6" size pipe
 *** Note that the Fig. 4L-4" and 5" are only UL listed for use with 1" thru 1½" brace pipes.

To install: Place the Fig. 4L over the pipe to be braced and tighten down the break-off nuts (note: apply between 50-60 lb. ft. of torque). Tighten the jaw component side nut first until the hex head portion breaks off to verify correct installation torque and then repeat for other side. Next, place the Fig. 4L onto the “bracing pipe” so that there is no more than an 1/8" gap between the end of the bracing pipe and the back of the jaw. Tighten break-off head bolt until the hex head breaks off to verify correct installation torque (note: apply between 36-40 lb. ft. of torque on PLN or EG or 45-50 lb. ft. of torque on HDG or SS Fig. 4L). Pivot jaw for correct angle and attach to structure using TOLCO brand transitional attachment and structural attachment.

Note: Break off nut is only for plain and electrogalvanized finish while standard hex nut is for hot dip galvanized and stainless steel finish. Torque requirements for standard hex nut is a minimum of 50 lbs/ft. and a maximum of 52 lbs/ft.



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Fig. 980 - TOLCO Universal swivel sway brace attachment -³/₈"-16 to ³/₄"-10 rods
Fig. 980H - TOLCO Universal swivel sway brace attachment -⁷/₈"-9 to 1¹/₄"-7

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

Material: Carbon steel

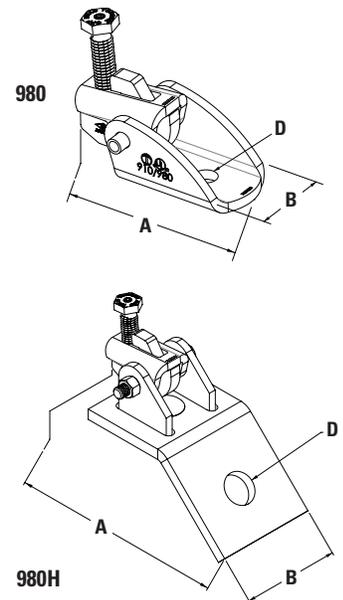
Function: The Fig. 980 is the structural or transitional attachment component of a longitudinal or lateral sway brace assembly. It is intended to be combined with the a 1" through 2" "bracing pipe" and TOLCO "brace pipe" attachment to form a complete bracing assembly. Sway brace assemblies are intended to be installed in accordance with NFPA 13 and the manufacturer's installation instructions.

Features: A concentric attachment opening which is critical to the performance of structural seismic connections. NFPA 13 (2010) 9.3.5.8.4 indicates clearly that fastener table load values are based only on concentric loading. Mounts to any surface angle. Break-off bolt head helps assure verification of proper installation.

To install: Place the Fig. 980 onto the "bracing pipe" so that there is no more than an ¹/₈" gap between the end of the bracing pipe and the back of the jaw. Tighten the set screw until the head breaks off (hint: apply between 36-40 lb. ft. of torque). When using in combination with a Fig. 825A, Fig. 825, Fig. 828, or Fig. 906, refer to those instruction sheets, otherwise select an anchor that is sized appropriately for the intended use and follow anchor manufacturer's instructions regarding structural thickness and embedment requirements. The required type, number and size of fasteners used for the structure attachment fitting shall be in accordance with NFPA 13. Once the anchor is installed per manufacturer's direction, secure the Fig. 980 to the anchor. Attachment can pivot to allow for proper brace angle adjustment.

Finish: Plain, electro-galvanized or stainless steel.

Component of State of California OSHPD Approved Seismic Restraints System

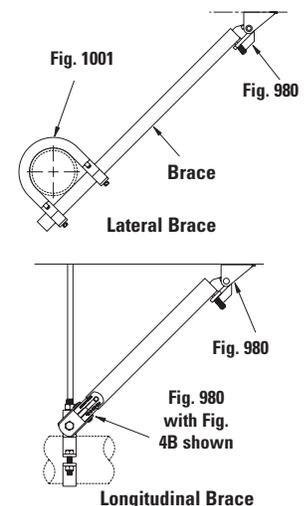


Catalog #	A		B		D**	Max. Design Load (cULus) lbs./kN	Max. Design Load*** (FM)				Approx. Wt./100	
	in.	(mm)	in.	(mm)			30°-44°	45°-59°	60°-74°	75°-90°	lbs.	(kg)
*980- ³ / ₈	4 ⁹ / ₁₆ (114.9)		2 ¹ / ₁₆ (52.4)		⁷ / ₁₆ (11.1)	1600 (7.12)					149	(67.6)
*980- ¹ / ₂					⁹ / ₁₆ (14.3)	2100 (9.34)	2370	2790	3360	3750	148	(67.1)
*980- ⁵ / ₈					¹¹ / ₁₆ (17.5)	2100 (9.34)	(10.54)	(12.41)	(14.94)	(16.68)	147	(66.7)
*980- ³ / ₄					¹³ / ₁₆ (20.6)	2100 (9.34)					146	(66.2)
980H- ⁷ / ₈	6 ³ / ₄ (171.4)	3 ¹ / ₂ (88.9)			¹⁵ / ₁₆ (23.8)						402	(182.3)
980H-1					¹ / ₁₆ (27.0)						400	(181.4)
980H-1 ¹ / ₈					¹³ / ₁₆ (30.2)						397	(180.1)
980H-1 ¹ / ₄					¹⁵ / ₁₆ (33.3)						390	(176.9)

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

** Mounting attachment hole size.

*** Installed with 1" or 1¹/₄" schedule 40 brace pipe.



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Engineering Specification

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Contractor _____

Job Location _____

Approval _____

Engineer _____

Contractor's P.O. No. _____

Approval _____

Representative _____

Series 3000SS

Double Check Detector Assembly

2½" – 12"

Series 3000SS Double Check Detector assembly is designed for use in accordance with water utility non-health hazard containment requirements. It is mandatory to prevent the reverse flow of fire protection system substances, such as glycerin wetting agents, stagnant water, and water of non-potable quality from being pumped or siphoned into the potable water supply. The OS&Y model includes an option for an integrated supervisory switch on each gate valve.

Features

- Cam-Check Assembly valve provides low head loss
- Short lay length is ideally suited for retrofit installations
- Stainless steel body is half the weight of competitive designs reducing installation and shipping cost
- Stainless steel construction provides long term corrosion protection and maximum strength
- Single top access cover with two-bolt grooved style coupling for ease of maintenance
- No special tools required for servicing
- Compact construction allows for smaller vaults and enclosures
- Furnished with 5/8" x 3/4" bronze meter (gpm or cfm)
- Detects underground leaks and unauthorized water use
- May be installed horizontal or vertical "flow up" position (ASSE Only)
- Includes an integrated supervisory switch as an option on each gate valve of the OS&Y model

Standards

ASSE 1048, AWWA C510-92, CSA B64.5, UL 1469



3000SS-OSY FxF with supervisory switches

Approvals

UL Classified (OSY only), FM Approved (sizes 2½" – 10", OSY only)
USC Foundation for Cross-Connection Control and Hydraulic Research



For 12" assembly approvals, consult factory.

NOTICE

The information contained herein is not intended to replace the full product installation and safety information available or the experience of a trained product installer. You are required to thoroughly read all installation instructions and product safety information before beginning the installation of this product.

Inquire with governing authorities for local installation requirements.

WARNING

It is illegal to use this product in any plumbing system providing water for human consumption, such as drinking or dishwashing, in the United States. Before installing standard material product, consult your local water authority, building and plumbing codes.

*The wetted surface of this product contacted by consumable water contains less than 0.25% of lead by weight.

Ames Fire & Waterworks product specifications in U.S. customary units and metric are approximate and are provided for reference only. For precise measurements, please contact Ames Fire & Waterworks Technical Service. Ames Fire & Waterworks reserves the right to change or modify product design, construction, specifications, or materials without prior notice and without incurring any obligation to make such changes and modifications on Ames Fire & Waterworks products previously or subsequently sold.



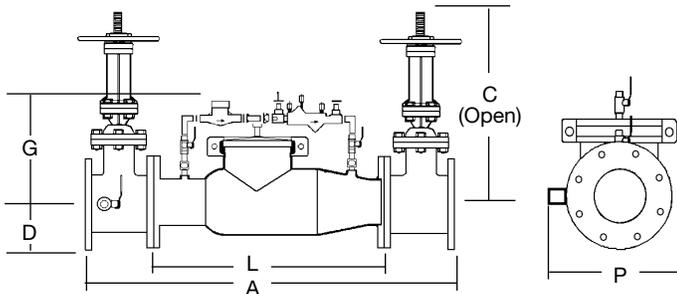
Specification

A Double Check Detector assembly shall be installed on fire protection systems when connected to a drinking water supply. Degree of hazard present is determined by the local authority having jurisdiction. The main valve body shall be manufactured from 300 Series stainless steel to provide corrosion resistance, 100% lead free* through the waterway. The double check detector assembly consists of two independently operating, spring loaded check valves, two UL, FM, OSY resilient seated gate valves, and bypass assembly. The bypass assembly consists of a meter (cubic ft. or gallons), a double check including shutoff valves and required test cocks. Each cam-check shall be internally loaded and provide a positive drip tight closure against reverse flow. Cam-check includes a stainless steel cam arm and spring, rubber faced disc and a replaceable seat. There shall be no brass or bronze parts used within the cam-check valve assembly.

The check valve seats shall be of molded thermoplastic construction. The use of seat screws as a retention method is prohibited. All internal parts shall be accessible through a single cover on the valve assembly. The valve cover shall be held in place through the use of a single grooved style two-bolt coupling. The bypass line shall be hydraulically sized to accurately measure low flow. The bypass line shall consist of a meter, a small diameter double check assembly with test cocks and isolation valves. The bypass line double check valve shall have two independently operating modular poppet check valves, and top mounted test cocks.

The integrated supervisory tamper switch, an option on the OS&Y model, shall have continuity with the valve fully open and activate within two (2) turns from open. The device consists of two SPDT switches and is designed to send a tamper signal when the valve is closed and when the switch is removed from the valve. In the neutral position, the switch indicates the valve is fully open. Closing the valve causes the switch rod to come out of the valve stem groove, activating the switch. Removing the tamper switch also activates the switch. The assembly shall be an Ames Fire & Waterworks 3000SS.

Dimensions – Weights



Materials

Internal metal parts	300 Series stainless steel
Main valve body	300 Series stainless steel
Check assembly	Noryl® Flange dimension in accordance with AWWA Class D

Model/Option

LG	Less shutoff valves
OSY	UL Classified and FM Approved outside stem and yoke resilient seated gate valve
TS-OSY	Integrated supervisory switch (UL Certified, Safety Signaling, Control No. 3L38) on outside stem and yoke resilient seated gate valve
OSY FxG**	Flanged inlet gate connection and grooved outlet gate connection
OSY FxF**	Flanged inlet gate connection and flanged outlet gate connection
OSY GxF**	Grooved inlet gate connection and flanged outlet gate connection
OSY GxG**	Grooved inlet gate connection and grooved outlet gate connection
CFM	Cubic feet per minute
GPM	Gallons per minute meter

Pressure – Temperature

Temperature Range: 33°F – 110°F (0.5°C – 43°C)
 Maximum Working Pressure: 175 psi (12 bar)

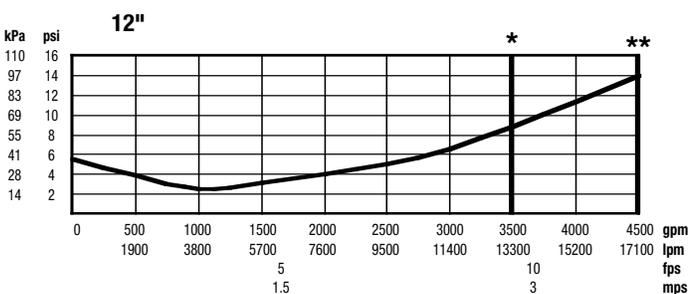
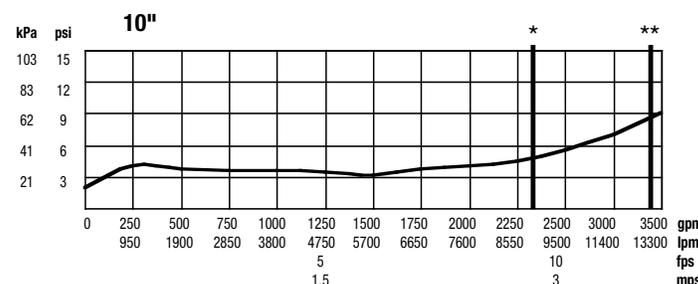
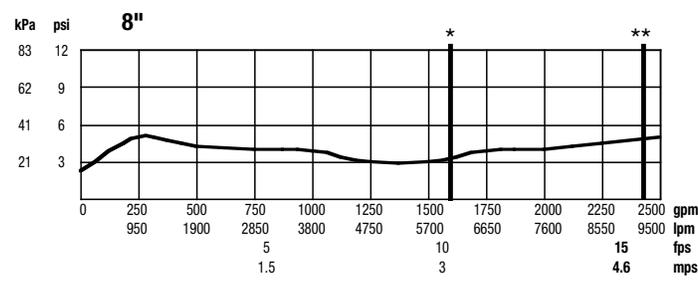
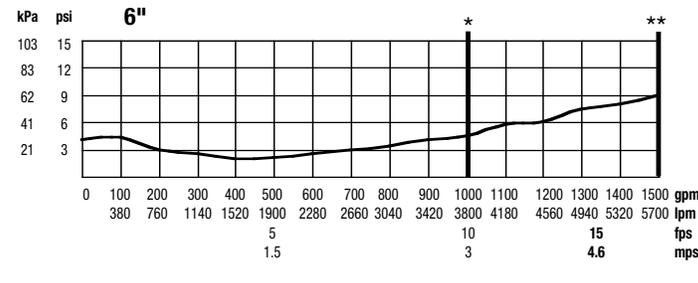
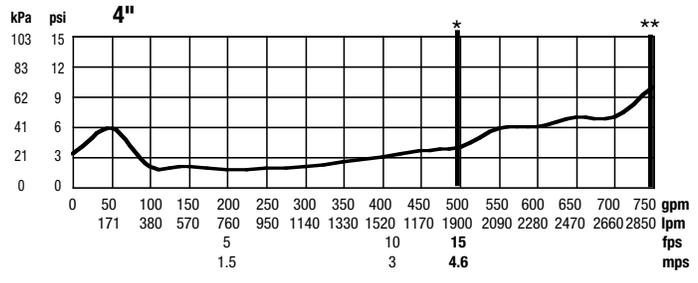
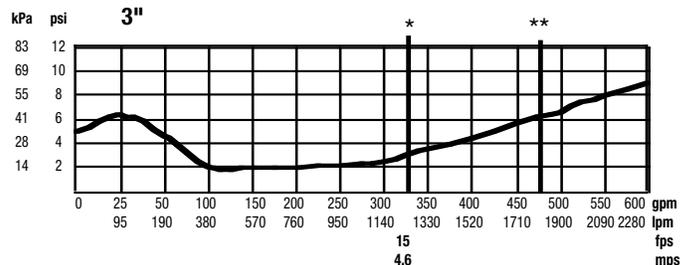
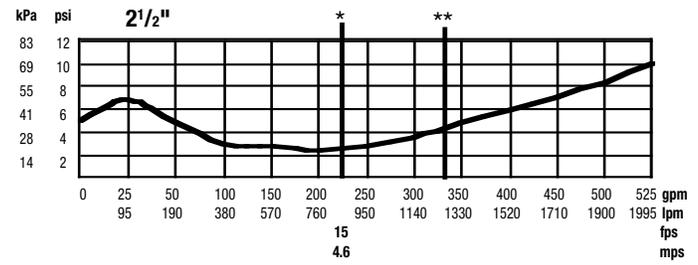
SIZE	DIMENSIONS								NET WEIGHT		NET WEIGHT					
	A		C (OSY)		D		G		L		P		With Gates	Without Gates		
in.	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	lb	kg		
2½	37	965	16¾	416	3½	89	10	250	22	559	12½	318	160	72	68	31
3	38	965	18¾	479	3¾	95	10	250	22	559	13	330	235	106	70	32
4	40	1016	22¾	578	4½	114	10	250	22	559	14½	368	245	111	73	33
6	48½	1232	30¾	765	5½	140	15	381	27½	699	15½	394	395	179	120	54
8	52½	1334	37¾	959	6¾	171	15	381	29½	749	18½	464	577	261	180	82
10	55½	1410	45¾	1162	8	200	15	381	29½	749	19½	495	779	353	190	86
12	57½	1461	53¾	1349	9½	241	15	381	29½	749	21	533	1049	476	220	100

Noryl is a registered trademark of SHPP Global Technologies B.V.

** Consult factory for the following: Grooved NRS gate valves, post indicator plate and operating nut, dimensions

Capacity

Flow curves as tested by Underwriters Laboratory per UL 1469, 1996. * Rated flow **UL Tested



A WATTS Brand

USA: Backflow T: (978) 689-6066 • AmesFireWater.com
 USA: Control Valves T: (713) 943-0688 • AmesFireWater.com
 Canada: T: (888) 208-8927 • AmesFireWater.ca
 Latin America: T: (52) 55-4122-0138 • AmesFireWater.com

Features

- UL Listed for Fire Sprinkler Branch line applications per UL subject 2573—"Automatic Air Release Valves for Fire Protection Service"
- FM Approved for "Automatic Air Release Valve for Sprinkler Systems"



Description

The PAV is an automatic float type air vent used to reduce the amount of air trapped in a pressurized fire sprinkler system. Reducing the amount of air in a fire sprinkler system is essential to help protect the system piping from the effects of corrosion that is often found at the air/water interface in the fire sprinkler system piping.

Removing as much air as possible will also have a positive effect on the performance of vane type waterflow detectors. The operation of vane type waterflow detectors can be delayed or prevented if too much air is trapped in the system piping.

The intent of the product is to vent as much air from the fire sprinkler system as possible. The PAV provides automatic venting of air as the system is being filled. Furthermore, trapped air can also be vented as the air in the system migrates to the vent location over time. The air vent will automatically close when water reaches the vent. The PAV provides a 1/2" NPT-male connection which will allow installers to pipe the outlet to a drain or other suitable location if there are concerns of inadvertent water discharge.

Technical Specifications

Service Pressure	Up to 175 PSIG
Environmental Limitations	40°F to 120°F (4.5°C to 49°C)
Air Vent	1/2" NPT inlet / 1/2" outlet to drain 5/64" Orifice Brass Construction
Optional Accessories	Ball valve supervisory switch model RBVS (Supervisory switch only) Used to monitor the position of the isolation valve. Outdoor vent screen assembly for outdoor installations above 40°F. See Figure 2.

*Specifications subject to change without notice.

Installation

NOTICE

It is strongly recommended to install a ball valve in line with the PAV to assist in servicing the strainer without disabling the sprinkler system.

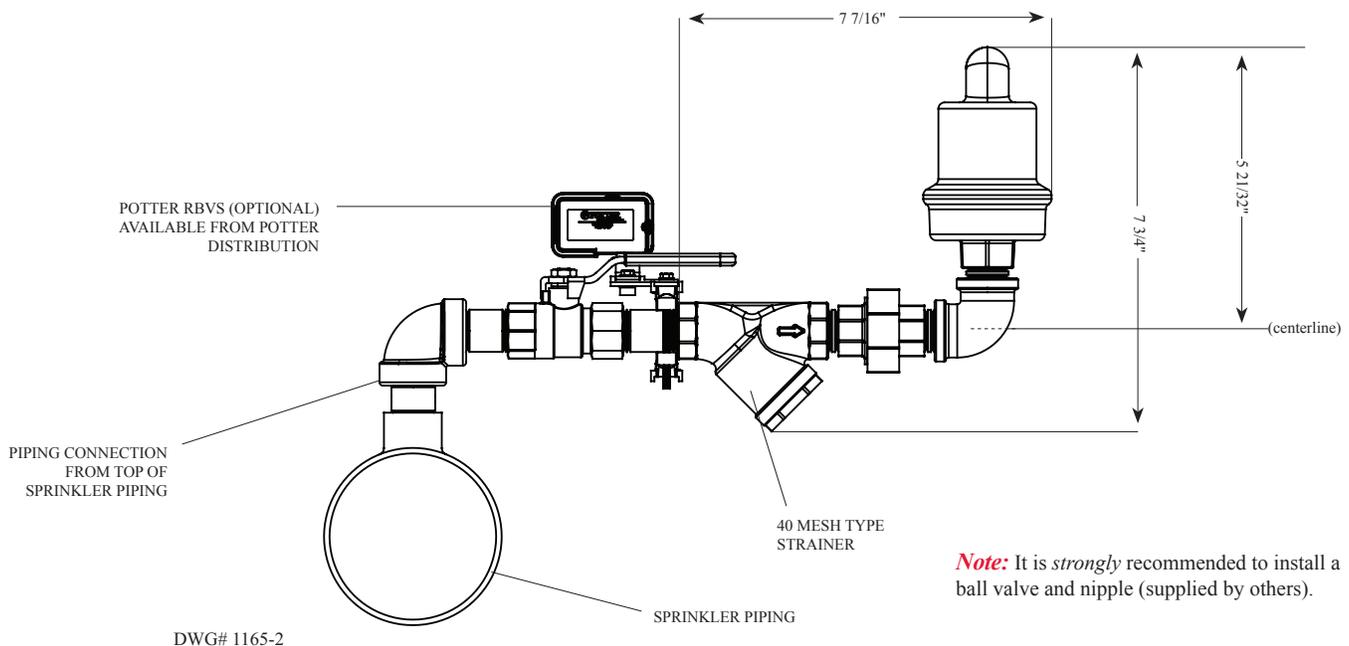
1. Read and understand the instructions provided before you proceed with installation. The PAV shall be installed in accordance with local ordinances and the applicable NFPA13, NFPA13D, or NFPA13R standard.
2. The Engineer of Record should select the Model PAV, Potter Air Vent installation location. Usually at a point in the system that will vent the most air.
3. The location of the PAV must not interfere with the spray pattern of any sprinkler head. The connection point must be off the top of the pipe. (See Fig. 1)
4. The piping must be level or pitch back toward the fire sprinkler system piping and arranged in such a manner that water will not become trapped. The outlet of the PAV contains a 1/2" male NPT threaded connection allowing the device to be piped to a drain or other suitable location if there are concerns about inadvertent water discharge.
5. Immediately after installation and filling of the fire sprinkler system, the PAV should be inspected for leaks and proper operation. The unit should be inspected periodically. Thereafter the manufacturer recommends quarterly or more frequently
6. Inspection should include removal and cleaning of the strainer screen. Remove the screen and flush with clean water. Use a wire brush if necessary to remove any particles trapped in the screen.

PAV and Shutoff Valve Replacement

The vent used in the PAV is not field replaceable. If the vent should fail, the entire unit must be replaced.

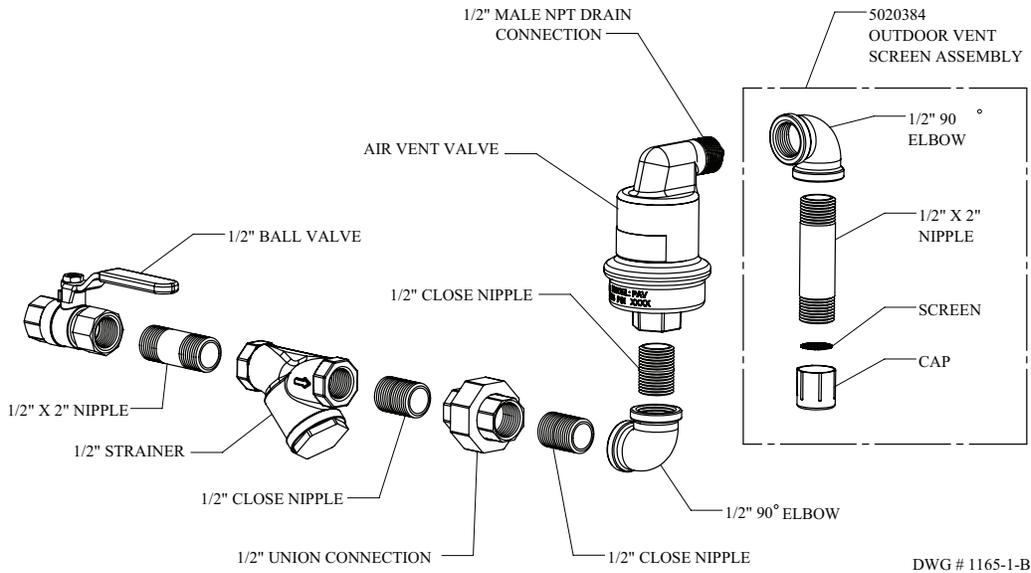
PAV Outline Drawing

Fig 1



PAV Assembly

Fig 2



Note: It is *strongly* recommended to install a ball valve and nipple before the strainer. The ball valve and nipple are supplied by others.

Ordering Information

Model	Description	Part Number
PAV	Potter Air Vent	1119720
	Outdoor Vent Screen Assembly	5020384
RBVS	Retrofit Ball Valve Switch (w/o cover tamper)	1000040
RBVS-T	RBVS-T Retrofit Ball Valve Switch (with cover tamper)	1000035



Model BFV-300/BFV-300C Butterfly Valve Grooved End

General Description

The TYCO Models BFV-300 and BFV-300C Grooved End Butterfly Valves are indicating type valves designed for use in fire protection systems where a visual indication of open or closed valve condition is required. They are used, for example, as system, sectional and pump water control valves. They have grooved inlet and outlet connections that are suitable for use with grooved end pipe couplings listed or approved for fire protection systems.

For applications requiring supervision of the open or closed state of the valve, the Gear Operators for the Model BFV-300/BFV-300C Butterfly Valves feature two sets of factory installed internal switches each having SPDT contacts, see Figure 3. The supervisory switches transfer their electrical contacts when there is movement from the open or closed disc position during the first two revolutions of the handwheel.

Note: If the butterfly valve is required in a foam system, verify the valve is compatible by referring to the foam concentrate manufacturer technical literature for information about foam compatibility, and acceptable system equipment materials of construction.

NOTICE

The Model BFV-300/BFV-300C Grooved End Butterfly Valves described herein must be installed and maintained in compliance with this document, as well as with the applicable standards of the NATIONAL FIRE PROTECTION ASSOCIATION, in addition to the standards of any other authorities having jurisdiction. Failure to do so may impair the performance of these devices.

The owner is responsible for maintaining their fire protection system and devices in proper operating condition. Contact the installing contractor or product manufacturer with any questions.

IMPORTANT

Refer to Technical Data Sheet TFP2300 for warnings pertaining to regulatory and health information.

Technical Data

Approvals

UL and ULC Listed
FM Approved
CE Certified
VdS Approved
Russian Fire Certificate
CNPP R1 Listed-APSA
Listed by California State Fire Marshall

For specific information about approvals, see Tables A, B, and C.

Note: All laboratory listings and approvals are for indoor and outdoor use.

Sizes

2 in. to 12 in. (DN50 to DN300)

UL/ULC/FM Maximum Working Pressure

2 in.-8 in. (DN50-DN200) . . . 300 psi (20,7 bar)
10 in.-12 in. (DN250-DN300) . . 175 psi (12,1 bar)

VdS Maximum Working Pressure

2 in.-8 in. (DN50-DN200) . . . 300 psi (20,7 bar)
10 in. (DN250) 232 psi (16,0 bar)
12 in. (DN300) 175 psi (12,1 bar)

Maximum Working Temperature

212°F (100°C) in accordance with UL 1091

Materials of Construction

Body Ductile Iron
Body Coating RILSAN PA11 Black
Disc Ductile Iron
Disc Seal EPDM Encapsulated
Upper & Lower Stem Stainless Steel
Handwheel Ductile Iron
(BFV-300 red painted; BFV-300C black painted)
Actuator, 2 in.-6 in. (DN50-DN150):

- IP65, bronze traveling nut gearbox, ductile iron housing
- Actuator, 8 in.-12 in. (DN200-DN300):
- IP65, brass segmented gearbox, ductile iron housing

Silicone Free Model Availability

Silicone free models are available. Contact TYCO sales for information.

Tapping Bosses

Two factory-plugged NPT threaded tapping bosses in the valve body are located on the up- and downstream sides of the disc for connection to valve trim. Tapping boss sizes:

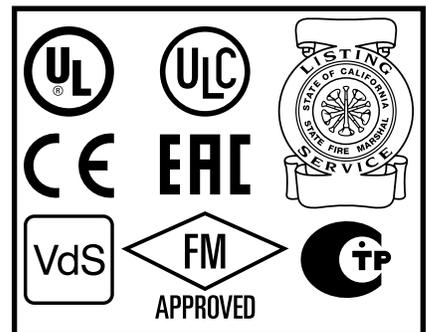
2 in.-3 in. (DN50-DN80) 3/8 NPT
4 in.-12 in. (DN100-DN300) 1/2 NPT



MODEL BFV-300
OPEN SUPERVISORY SWITCHES



MODEL BFV-300C
CLOSED SUPERVISORY SWITCHES



Control Valve Seat Leakage Class IEC 60534-4

CLASS VI (Type C) Control Valve Seat
Leakage according to ANSI/FCI
70-2-2006 (ASME B16.104)

Nominal Valve Size Inches (DN)	Pipe OD Inches (mm)	Nominal Dimensions Inches (mm)									Weight Lbs. (kg)
		A	B	C	D	E	F	G	H	J	
2 (DN50)	2.37 (60,3)	3.8 (96,4)	10.63 (270)	2.85 (72,5)	4.90 (124,5)	4.92 (125)	4.28 (108,6)	1.99 (50,5)	0	0	10.8 (4,9)
2-1/2 (DN65)	2.88 (73,0)	3.8 (96,4)	11.72 (297,8)	3.35 (85)	5.5 (139,8)	4.92 (125)	4.28 (108,6)	1.99 (50,5)	0	0	13.0 (5,9)
— (DN65)	3 (76,1)	3.8 (96,4)	11.72 (297,8)	3.35 (85)	5.5 (139,8)	4.92 (125)	4.28 (108,6)	1.99 (50,5)	0	0	13.0 (5,9)
3 (DN80)	3.5 (88,9)	3.8 (96,4)	12.22 (310,3)	3.58 (91)	5.76 (146,3)	4.92 (125)	4.28 (108,6)	1.99 (50,5)	0	0	13.9 (6,3)
4 (DN100)	4.5 (114,3)	4.54 (115,4)	13.92 (353,5)	4.29 (109)	6.75 (171,5)	4.92 (125)	4.28 (108,6)	1.99 (50,5)	0	0	17.64 (8,0)
— (DN125)	5.5 (139,7)	5.83 (148)	16 (406,6)	5.16 (131)	7.93 (201,5)	5.91 (150)	5.79 (147)	2.32 (58,9)	0	0	26.4 (11,9)
5 (DN125)	5.56 (141,3)	5.83 (148)	16 (406,6)	5.16 (131)	7.93 (201,5)	5.91 (150)	5.79 (147)	2.32 (58,9)	0	0	26.4 (11,9)
— (DN150)	6.5 (165,1)	5.83 (148)	17.07 (433,6)	5.71 (145)	8.44 (214,5)	5.91 (150)	5.79 (147)	2.32 (58,9)	0	0	30.42 (13,8)
6 (DN150)	6.63 (168,3)	5.83 (148)	17.07 (433,6)	5.71 (145)	8.44 (214,5)	5.91 (150)	5.79 (147)	2.32 (58,9)	0	0	30.42 (13,8)
8 (DN200)	8.63 (219,1)	5.24 (133)	19.67 (499,5)	6.69 (170)	9.29 (236)	8.86 (225)	8.19 (208)	2.76 (70)	5.66 (143,7)	1.24 (31,4)	47.18 (21,4)
10 (DN250)	10.75 (273)	6.26 (159)	22.46 (570,5)	7.68 (195)	11.1 (282)	11.14 (283)	8.19 (208)	2.91 (74)	7.21 (183,1)	1.65 (41,8)	73.41 (33,3)
12 (DN300)	12.75 (323,9)	6.5 (165)	25.39 (645)	9.5 (241,5)	12.2 (310)	11.14 (283)	8.19 (208)	2.91 (74)	9.96 (252,9)	2.7 (68,5)	89.29 (40,5)

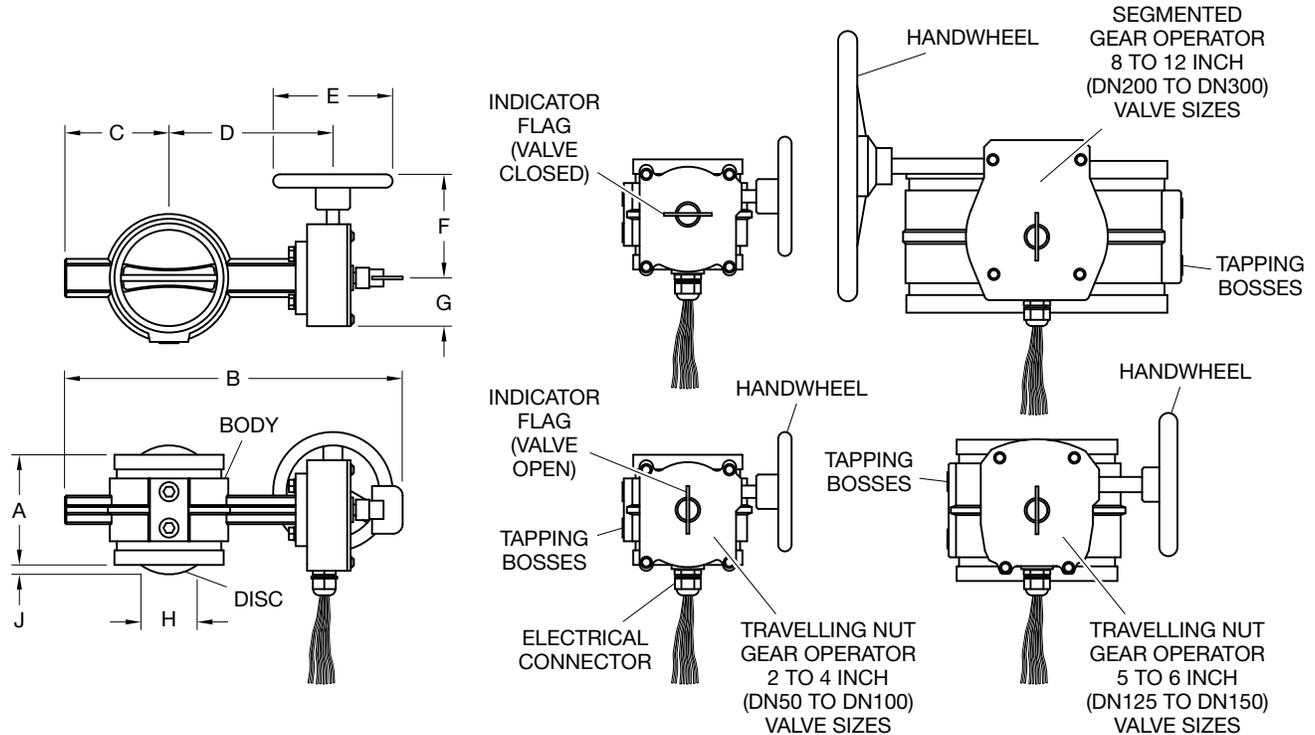
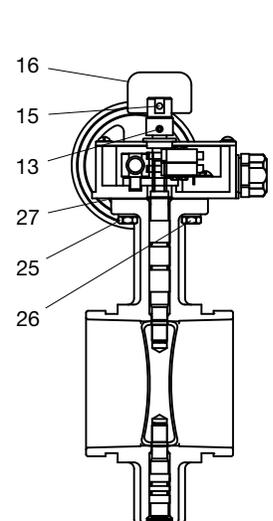
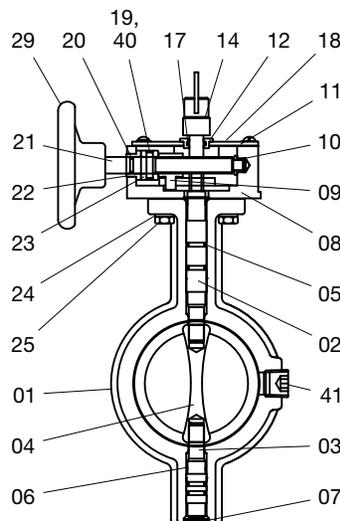
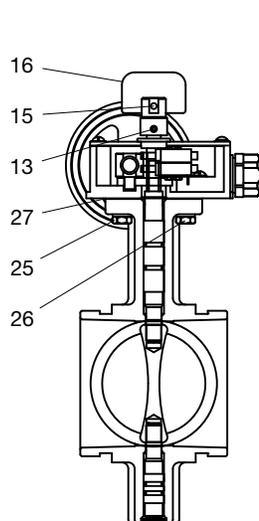
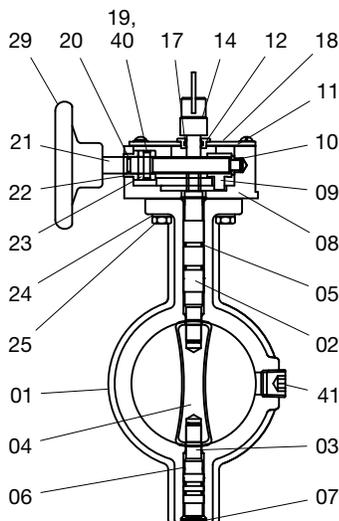
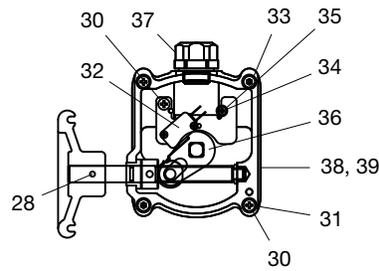
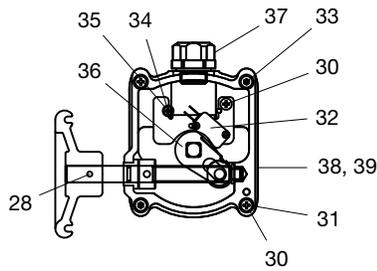


FIGURE 1
MODEL BFV-300/BFV-300C GROOVED END BUTTERFLY VALVE
NOMINAL DIMENSIONS

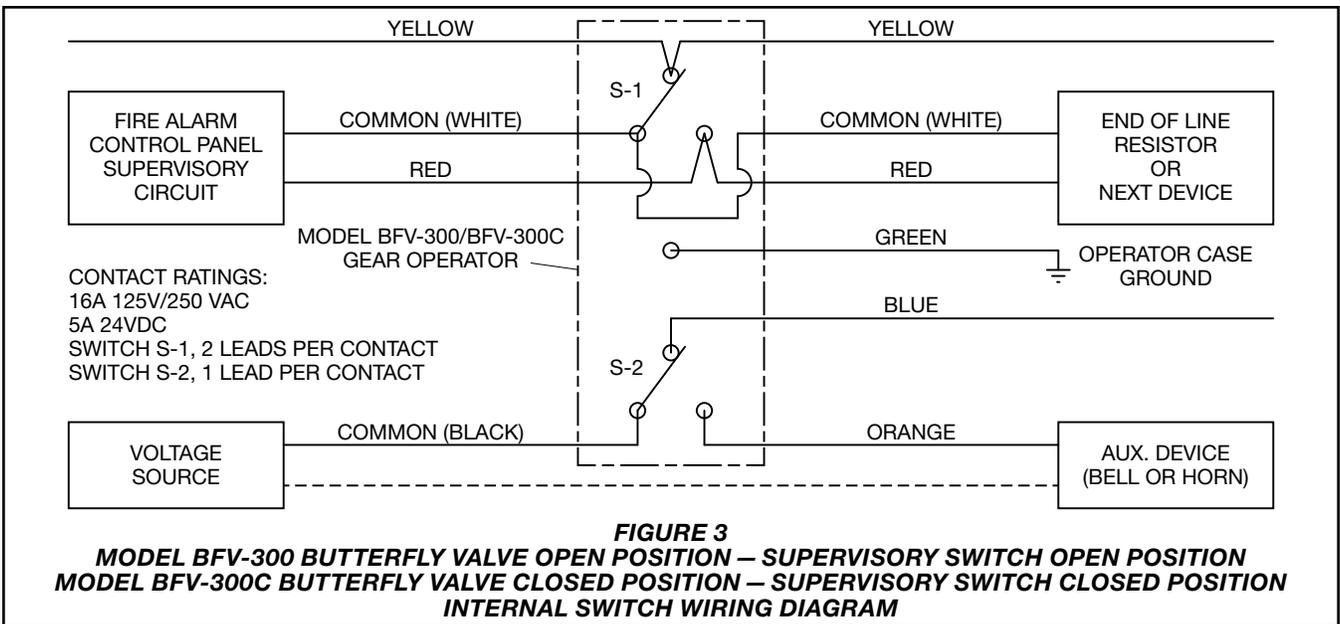
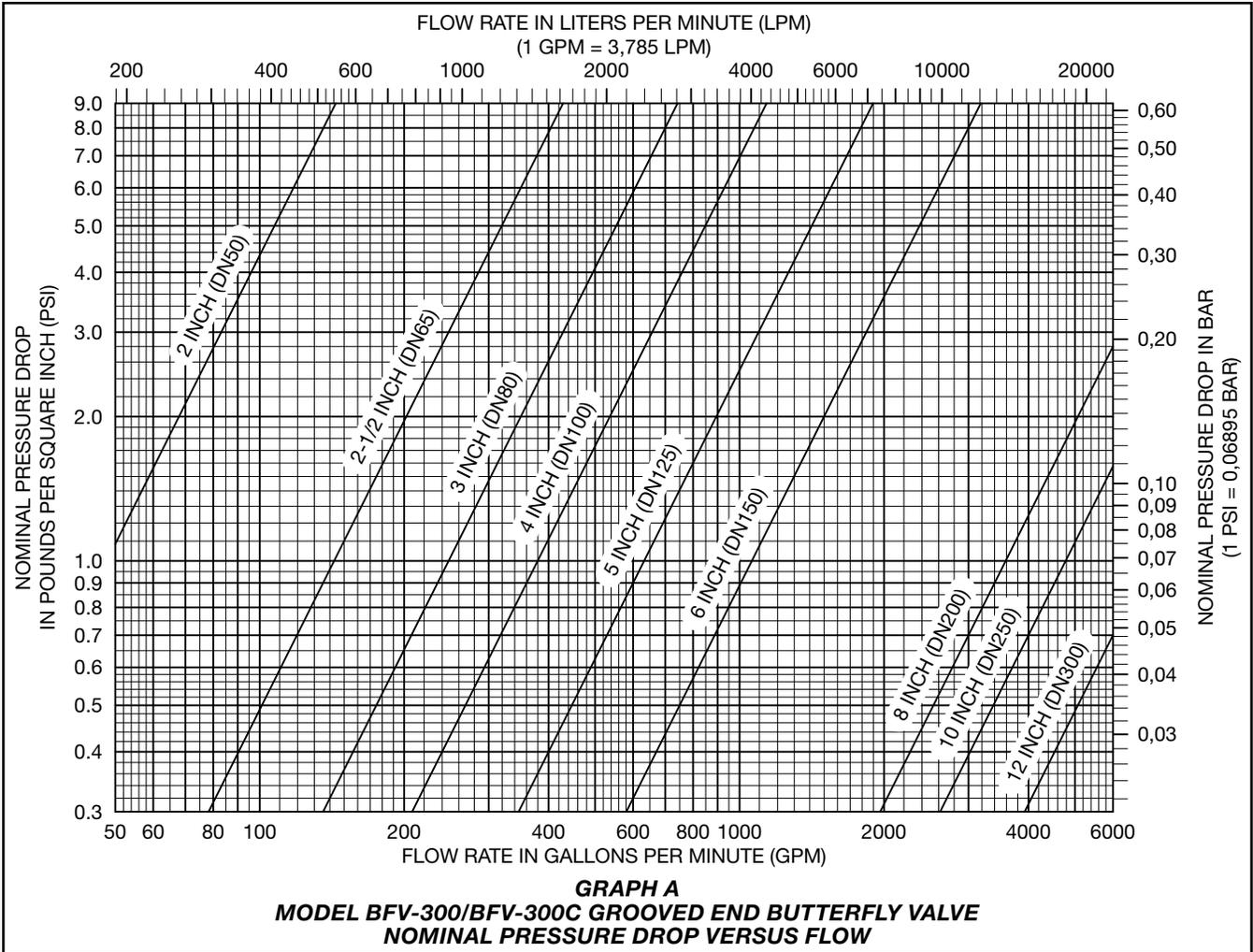
No.	Part	Material	Qty.	No.	Part	Material	Qty.	No.	Part	Material	Qty.
01	Body	ASTM A-536	1	15	Spring Pin	ASTM A-228	1	30	Bolt (Round)	ASTM A-167	3
02	Upper Stem	AISI 410	1	16	Indicator	ASTM A-619	1	31	Plate Washer	ASTM A-167	4
03	Lower Stem	AISI 410	1	17	O-Ring	NBR	1	32	Switch Assembly	—	1
04	Disc	EPDM	1	18	Cover Gasket	Paper	1	33	T/R Bolt	ASTM A-307	2
05	O-Ring (P12)	EPDM	4	19	Spring Pin Ø5x1T x25	ASTM A-228	1	34	Tapping Screw ST3.5 x 7.5	S10C	1
06	Oiless B/R (MB1410)	—	4	20	O-Ring (P10)	EPDM	1	35	Tooth Washer 4#	S10C	1
07	End Cap 2-1/2-4 Inch	EPDM	1	21	Worm Shaft	AISI 410	1	36	Lever	ASTM A-619	1
08	Gear Box	ASTM A-536	1	22	Bushing (1)	FD-0205-45	1	37	Connector	—	1
09	Traveling Nut 2-6 Inch	Bronze	1	23	Collar	FD-0205-45	1	38	Sticker	—	1
	Segment Gear 8-12 Inch	C3604BD	1	24	Spring Washer	ASTM A-167	4	39	Sticker	—	1
10	Bushing (2)	FD-0205-45	1	25	Hex Bolt M8 x 20L	ASTM A-167	2	40	Spring Pin Ø3x0.6T x25	ASTM A-228	1
11	Cover	ASTM A-619	1	26	Hex Bolt M8 x 25L	ASTM A-167	2		41	Headless Plug 3/8 NPT 2-3 Inch	ASTM A-307	2
12	Bushing	Fe	1	27	Gasket	Paper	1	41		Headless Plug 1/2 NPT 4-12 Inch	
13	Headless Wrench Bolt M5 x 7L	ASTM A-307	1	28	Spring Pin Ø4x0.8t x35	ASTM A-228	1				
14	Stem Housing	Fe	1	29	Handwheel	ASTM A-536	1				



**BFV-300 Normally Open Valve
Supervisory Switch Arrangement**

**BFV-300C Normally Closed Valve
Supervisory Switch Arrangement**

**FIGURE 2
MODEL BFV-300/BFV-300C GROOVED END BUTTERFLY VALVE
ASSEMBLY**



Nominal Valve Size Inches (DN)	Pipe O.D. Inches (mm)	Max. PSI (bar)	Part Number		Agency Listing/Approval								
			BFV-300 Supv. Switch OPEN	BFV-300C Supv. Switch CLOSED	CE	UL	ULC	FM	VdS	CA Fire Marshall	CNPP	PAVUS	Russian Fire Cert.
2 (DN50)	2.38 (60,3)	300 (20,7)	59300G020WS	59300G020WSC	✓	✓	✓		✓			✓	✓
2-1/2 (DN65)	2.88 (73,0)	300 (20,7)	59300G025WS	59300G025WSC	✓	✓	✓	✓	✓	✓		✓	✓
— DN65	3 76,1	300 (20,7)	59300G026WS	59300G026WSC	✓	✓	✓	✓	✓			✓	✓
3 (DN80)	3.5 (88,9)	300 (20,7)	59300G030WS	59300G030WSC	✓	✓	✓	✓	✓	✓		✓	✓
4 (DN100)	4.5 (114,3)	300 (20,7)	59300G040WS	59300G040WSC	✓	✓	✓	✓	✓	✓		✓	✓
— DN125	5.5 (139,7)	300 (20,7)	59300G056WS	59300G056WSC	✓	✓	✓	✓	✓			✓	✓
5 (DN125)	5.56 (141,3)	300 (20,7)	59300G050WS	59300G050WSC	✓	✓	✓	✓	✓	✓		✓	✓
— DN150	6.5 (165,1)	300 (20,7)	59300G066WS	59300G066WSC	✓	✓	✓	✓	✓			✓	✓
6 (DN150)	6.63 (168,3)	300 (20,7)	59300G060WS	59300G060WSC	✓	✓	✓	✓	✓	✓		✓	✓
8 (DN200)	8.63 (219,1)	300 (20,7)	59300G080WS	59300G080WSC	✓	✓	✓	✓	✓	✓		✓	✓
10 (DN250)	10.75 (273)	175 (12,1)	59300G100WS	59300G100WSC	✓	✓	✓	✓	✓	✓		✓	✓
12 (DN300)	12.75 (323,9)	175 (12,1)	59300G120WS	59300G120WSC	✓	✓	✓		✓			✓	✓

TABLE A
MODEL BFV-300/BFV-300C GROOVED END BUTTERFLY VALVE
WITH INTERNAL SUPERVISORY SWITCHES
PART NUMBER SELECTION AND AGENCY LISTINGS/APPROVALS

Nominal Valve Size Inches (DN)	Pipe O.D. Inches (mm)	Max. PSI (bar)	Part Number		Agency Listing/Approval		
			BFV-300 Supv. Switch OPEN	BFV-300C Supv. Switch CLOSED	CE	VdS	CNPP
2 (DN50)	2.38 (60,3)	300 (20,7)	59300G020AWS	59300G020AWSC	✓	✓	✓
2-1/2 (DN65)	2.88 (73,0)	300 (20,7)	59300G025AWS	59300G025AWSC	✓	✓	✓
— DN65	3 76,1	300 (20,7)	59300G026AWS	59300G026AWSC	✓	✓	✓
3 (DN80)	3.5 (88,9)	300 (20,7)	59300G030AWS	59300G030AWSC	✓	✓	✓
4 (DN100)	4.5 (114,3)	300 (20,7)	59300G040AWS	59300G040AWSC	✓	✓	✓
— DN125	5.5 (139,7)	300 (20,7)	59300G056AWS	59300G056AWSC	✓	✓	✓
5 (DN125)	5.56 (141,3)	300 (20,7)	59300G050AWS	59300G050AWSC	✓	✓	✓
— DN150	6.5 (165,1)	300 (20,7)	59300G066AWS	59300G066AWSC	✓	✓	✓
6 (DN150)	6.63 (168,3)	300 (20,7)	59300G060AWS	59300G060AWSC	✓	✓	✓
8 (DN200)	8.63 (219,1)	300 (20,7)	59300G080AWS	59300G080AWSC	✓	✓	✓
10 (DN250)	10.75 (273)	175 (12,1)	59300G100AWS	59300G100AWSC	✓	✓	✓
12 (DN300)	12.75 (323,9)	175 (12,1)	59300G120AWS	59300G120AWSC	✓	✓	✓

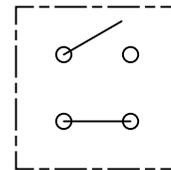
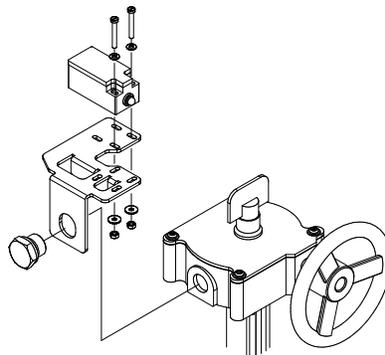
TABLE B
MODEL BFV-300/BFV-300C GROOVED END BUTTERFLY VALVE
WITH CNPP-APSA LARGE 100 X 100 MM FLAG AND INTERNAL SUPERVISORY SWITCHES
PART NUMBER SELECTION AND AGENCY LISTINGS/APPROVALS

Nominal Valve Size Inches (DN)	Pipe O.D. Inches (mm)	Max. PSI (bar)	Part Number	Agency Listing/Approval								
				CE	UL	ULC	FM	VdS	CA Fire Marshall	CNPP	PAVUS	Russian Fire Cert.
2 (DN50)	2.38 (60,3)	300 (20,7)	59300G020NS	✓	✓	✓		✓			✓	✓
2-1/2 (DN65)	2.88 (73,0)	300 (20,7)	59300G025NS	✓	✓	✓	✓	✓	✓		✓	✓
— DN65	3 (76,1)	300 (20,7)	59300G026NS	✓	✓	✓	✓	✓			✓	✓
3 (DN80)	3.5 (88,9)	300 (20,7)	59300G030NS	✓	✓	✓	✓	✓	✓		✓	✓
4 (DN100)	4.5 (114,3)	300 (20,7)	59300G040NS	✓	✓	✓	✓	✓	✓		✓	✓
— DN125	5.5 (139,7)	300 (20,7)	59300G056NS	✓	✓	✓	✓	✓			✓	✓
5 (DN125)	5.56 (141,3)	300 (20,7)	59300G050NS	✓	✓	✓	✓	✓	✓		✓	✓
— DN150	6.5 (165,1)	300 (20,7)	59300G066NS	✓	✓	✓	✓	✓			✓	✓
6 (DN150)	6.63 (168,3)	300 (20,7)	59300G060NS	✓	✓	✓	✓	✓	✓		✓	✓
8 (DN200)	8.63 (219,1)	300 (20,7)	59300G080NS	✓	✓	✓	✓	✓	✓		✓	✓
10 (DN250)	10.75 (273)	175 (12,1)	59300G100NS	✓	✓	✓	✓	✓	✓		✓	✓
12 (DN300)	12.75 (323,9)	175 (12,1)	59300G120NS	✓	✓	✓		✓			✓	✓

TABLE C
MODEL BFV-300 GROOVED END BUTTERFLY VALVE
WITHOUT INTERNAL SUPERVISORY SWITCHES
PART NUMBER SELECTION AND AGENCY LISTINGS/APPROVALS

Nominal Valve Size Inches (DN)	Gear Operator Type	Part Number			
		Mounting Bracket with Mounting Bolts	Bernstein i88-IP65 Regular Switch	Bernstein i88-IP65 LED Switch 24V	Bernstein GC-SU1Z Ex IP-66/67 ATEX (Ex II2G Ex dIIC T6 Gb) Switch
2-4 (DN50-DN100)	Travelling Nut	59300SPBRACKET10	59300SPSW	59300SPSWLED	59300SPSWATEX
5-6 (DN125-DN200)		59300SPBRACKET20			
8 (DN200)	Segmented Gear	59300SPBRACKET25			
10-12 (DN250-DN300)		59300SPBRACKET30			

Notes:
1. Install a single switch in either bracket mounting position to monitor Open or Closed valve condition



Bernstein Switch Wiring Diagram

TABLE D
MODEL BFV-300 GROOVED END BUTTERFLY VALVE WITHOUT INTERNAL SUPERVISORY SWITCHES
ACCESSORY EXTERNAL SUPERVISORY SWITCHES AND MOUNTING BRACKETS
PART NUMBER SELECTION

Installation

The Model BFV-300/BFV-300C Grooved End Butterfly Valves may be installed with flow in either direction and can be positioned either horizontally or vertically.

The grooved end pipe couplings used with the Model BFV-300/BFV-300C must be listed or approved for fire protection service and installed in accordance with the manufacturers instructions.

The Model BFV-300/BFV-300C Butterfly Valve may be installed with any schedule of pressure class of pipe or tubing that is listed or approved for fire protection.

Conduit and electrical connections are to be made in accordance with the authority having jurisdiction and/or the National Electrical Code. With reference to Figure 3, the supervisory switch is intended for connection to the supervisory circuit of a fire alarm control panel in accordance with NFPA 72. The auxiliary switch is intended for the unsupervised connection to auxiliary equipment in accordance with NFPA 70, National Electric Code.

Note: For outdoor applications with internal supervisory switches, it is recommended that wiring connections be made at a temperature above 15°F (-9°C), in order to insure sufficient flexibility of the wire lead insulation.

Nominal Valve Size Inches (DN)	Part Number	
	BFV-300, Red Painted	BFV-300C, Black Painted
2-4 (DN50-DN100)	59300SPHWHEEL10	59300SPHWHEEL10B
5-6 (DN125-DN150)	59300SPHWHEEL20	59300SPHWHEEL20B
8 (DN200)	59300SPHWHEEL30	59300SPHWHEEL30B
10-12 (DN250-DN300)	59300SPHWHEEL40	59300SPHWHEEL40B

TABLE E
BFV-300/BFV-300C GROOVED END BUTTERFLY VALVE
REPLACEMENT HANDWHEEL
PART NUMBER SELECTION

Nominal Valve Size Inches (DN)	Part Number
2-4 (DN50-DN100)	59300SPFLAG10
5-6 (DN125-DN150)	59300SPFLAG20
8-12 (DN200-DN300)	59300SPFLAG30

TABLE F
BFV-300 WAFER STYLE BUTTERFLY VALVE
INDICATOR FLAG
PART NUMBER SELECTION

Care and Maintenance

Before closing a fire protection system control valve for maintenance or inspection work on either the valve or fire protection system which it controls, permission to shut down the affected fire protection systems must be obtained from the proper authorities and all personnel who may be affected by this decision must be notified.

The owner is responsible for the inspection, testing, and maintenance of their fire protection system and devices in accordance with the applicable standards of the NATIONAL FIRE PROTECTION ASSOCIATION, for example, NFPA 25, in addition to the standards of any authority having jurisdiction. Contact the installing contractor or product manufacturer with any questions. Any impairment must be immediately corrected.

It is recommended that automatic sprinkler systems be inspected, tested, and maintained by a qualified inspection service.

Limited Warranty

For warranty terms and conditions, visit www.tyco-fire.com.

Ordering Procedure

Contact your local distributor for availability. When placing an order, indicate the full product name and Part Number (P/N).

Butterfly Valves

Model BFV-300 with Internal Open Supervisory Switches

Specify: (specify size) Model BFV-300 Grooved End Butterfly Valve, Internal Open Supervisory Switches, P/N (specify per Table A)

Model BFV-300C with Internal Closed Supervisory Switches

Specify: (specify size) Model BFV-300C Grooved End Butterfly Valve, Internal Closed Supervisory Switches, P/N (specify per Table A)

Model BFV-300 with Internal Open Supervisory Switches, APSAD Approved

Specify: (specify size) Model BFV-300 Grooved End Butterfly Valve, Internal Open Supervisory Switches, APSAD Approved, P/N (specify per Table B)

Model BFV-300C with Internal Closed Supervisory Switches, APSAD Approved

Specify: (specify size) Model BFV-300C Grooved End Butterfly Valve, Internal Closed Supervisory Switches, APSAD Approved, P/N (specify per Table B)

Model BFV-300 without Internal Supervisory Switches

Specify: (specify size) Model BFV-300 Grooved End Butterfly Valve, P/N (specify per Table C)

Accessories

External Supervisory Switch and Mounting Bracket

Note: Accessory external supervisory switches and mounting brackets are applicable only to valves without factory-installed internal supervisory switches.

See Table D for switch models and part numbers.

Specify: (specify size) Model BFV-300 Grooved End Butterfly Valve External Switch Mounting Bracket, P/N (specify), with (specify quantity) Bernstein External Switch (specify model), P/N (specify)

Replacement Parts

Note: Only items described in this section are offered as replacement parts.

Handwheel

Replacement handwheel includes pin. See Table E for part numbers.

Model BFV-300, Red Painted

Specify: Handwheel, (specify size) Model BFV-300 Grooved End Butterfly Valve, P/N (specify)

Model BFV-300C, Black Painted

Specify: Handwheel, (specify size) Model BFV-300C Grooved End Butterfly Valve, P/N (specify)

Indicator Flag

Specify: Indicator Flag, (specify size) Model BFV-300, P/N (specify per Table F)

Model RM-1 Riser Manifold Commercial and Residential

General Description

The TYCO commercial and residential Model RM-1 Riser Manifold provide the necessary waterflow alarm, pressure gauge, alarm test orifice, drain, and sight glass equipment in a single assembly for use in NFPA 13 commercial sprinkler systems and in NFPA 13D/13R residential sprinkler systems as follows:

NFPA 13*

- 1-1/2 in. (DN40)
Male Thread x Female Thread
- 2 in.–6 in. (DN50–DN150)
Groove x Groove

NFPA 13D

- 1 in. (DN25)
Female Thread x Female Thread

NFPA 13R

- 1-1/2 in. (DN40)
Male Thread x Female Thread
- 2 in. (DN50)
Groove x Groove

* Although the Riser Manifold described in this technical data sheet is intended for NFPA 13 sprinkler systems, it may be used for NFPA 13D or 13R residential sprinkler systems, where a test orifice of 2.8K or 4.2K is acceptable.

The variety of sizes and grooved end connections allow cost effective and easy transition to check valves, control valves, and system piping. The Model RM-1 Riser Manifolds may be installed either horizontally (flow switch on top) or vertically (flow going up) orientation, for both single sprinkler rises and floor control in high-rises.

Optional Pressure Relief Kits feature a 175 psi pressure relief valve and trim components for convenient integration into commercial and residential riser manifold assemblies.

The pressure relief valve, installed in manifold assemblies above the normally closed test and drain or drain valve, automatically bleeds system pressure exceeding 175 psi through a flexible hose connected to the manifold drain outlet (Ref. Figure 5), reducing system pressure to 175 psi.

NOTICE

The Model RM-1 Riser Manifolds described herein must be installed and maintained in compliance with this document, as well as with the applicable standards of the NATIONAL FIRE PROTECTION ASSOCIATION (NFPA), in addition to the standards of any other authorities having jurisdiction. Failure to do so may impair the performance of these devices.

The owner is responsible for maintaining their fire protection system and devices in proper operating condition. Contact the installing contractor or product manufacturer with any questions.

Technical Data

Approvals

UL and ULC Listed
FM Approved
Listed by California State Fire Marshall

Maximum Working Pressure

300 psi (20,7 bar)

Test Orifice

1 in.–3 in. (DN25–DN80) Manifolds: 2.8K
4 in.–6 in. (DN100–DN150) Manifolds: 4.2K

Finish

Red Painted



IMPORTANT

Refer to Technical Data Sheet TFP2300 for warnings pertaining to regulatory and health information.

Nominal Riser Size Inches (DN)	End Connections		Nominal Dimensions Inches (mm)							Nominal Drain Size Inches (DN)
	Inlet	Outlet	A	B	C	D	E	F	G		H
1-1/2 (40)	Thread MNPT	Thread FNPT	10 (254)	15-1/2 (394)	2-1/4 (57)	5-5/8 (143)	8-3/8 (213)	15 (381)	4-3/8 (111)	1-1/4 (32)
2 (50)	Groove	Groove	13 (330)	18 (457)	2-1/16 (53)	5-5/8 (143)	8-3/8 (213)	15-1/4 (388)	4-3/8 (111)	1-1/4 (32)
2-1/2 (65)	Groove	Groove	13 (330)	18-1/16 (460)	2-1/16 (53)	5-5/8 (143)	8-3/8 (213)	15-1/4 (388)	4-3/8 (111)	1-1/4 (32)
3 (80)	Groove	Groove	13 (330)	18-1/16 (460)	2-1/16 (53)	5-7/8 (150)	8-5/8 (219)	15-3/4 (400)	4-3/8 (111)	1-1/4 (32)
4 (100)	Groove	Groove	13 (330)	20-1/4 (514)	4-1/4 (108)	6-3/4 (172)	10-3/4 (273)	18-3/8 (467)	5-3/16 (132)	2 (50)
6 (150)	Groove	Groove	13 (330)	20-1/4 (514)	4-1/4 (108)	7-3/4 (197)	11-3/4 (300)	21 (533)	6-3/4 (172)	2 (50)

- | | | |
|----|---|----------|
| NO | DESCRIPTION | P/N |
| 1 | 300 psi/2000 kPa Water Pressure Gauge . . . | 90050001 |
| 2 | Test and Drain Valve, Model TD-1: 1-1/2-3 Inch (DN40-DN80) Size Manifolds, 1-1/4", 2.8K Orifice | A61G0420 |
| | 4-6 Inch (DN100-DN150) Size Manifolds, 2", 4.2K Orifice | A61G0601 |
| 3 | Flow Switch, VSR-M: 1-1/2" (DN40) | 91144815 |
| | 2" (DN50) | 91144802 |
| | 2-1/2" (DN65) | 91144825 |
| | 3" (DN80) | 91144803 |
| | 4" (DN100) | 91144804 |
| | 6" (DN150) | 91144806 |
| 4 | Field Replaceable Retard/Switch | 91144800 |

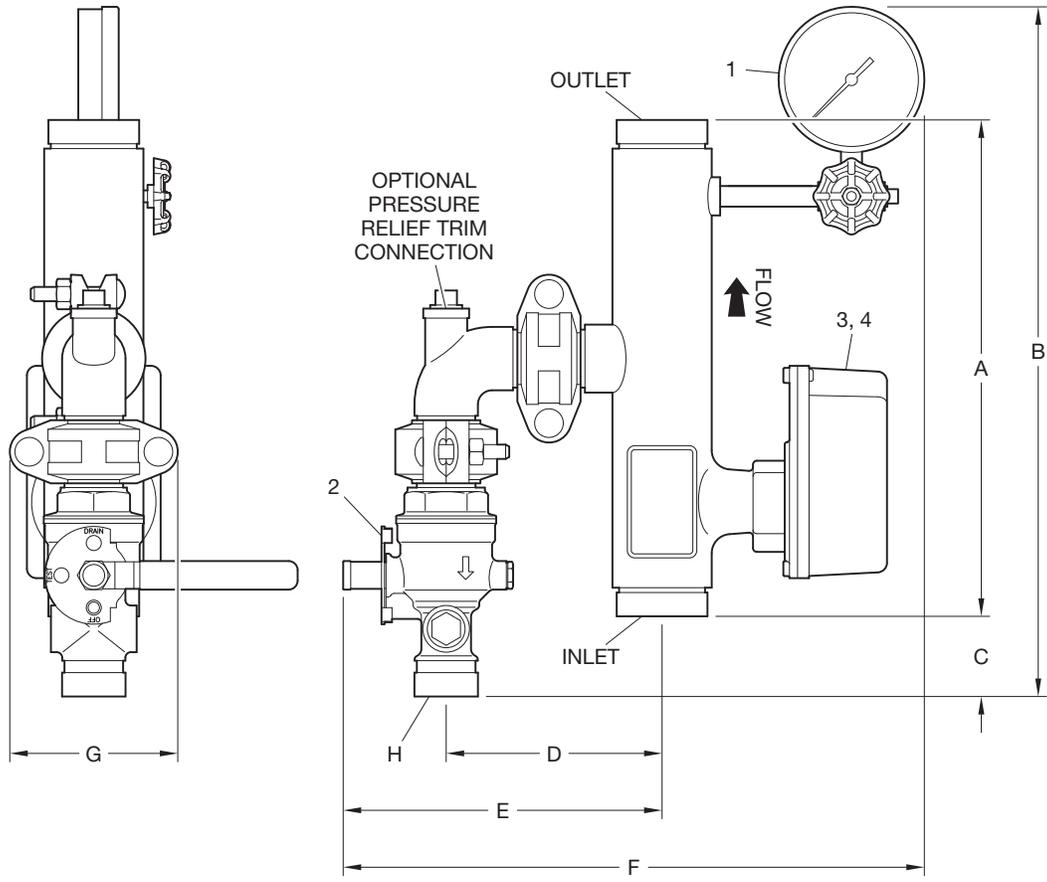
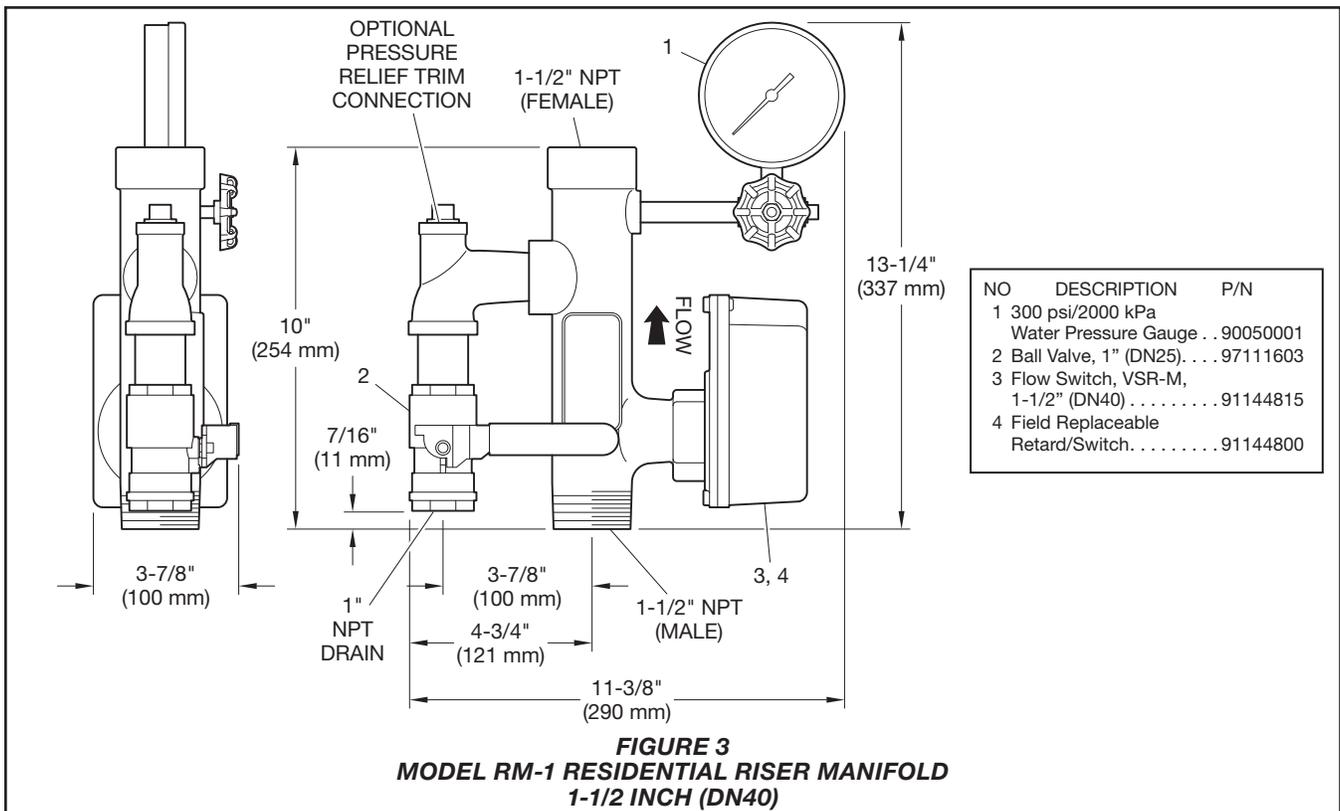
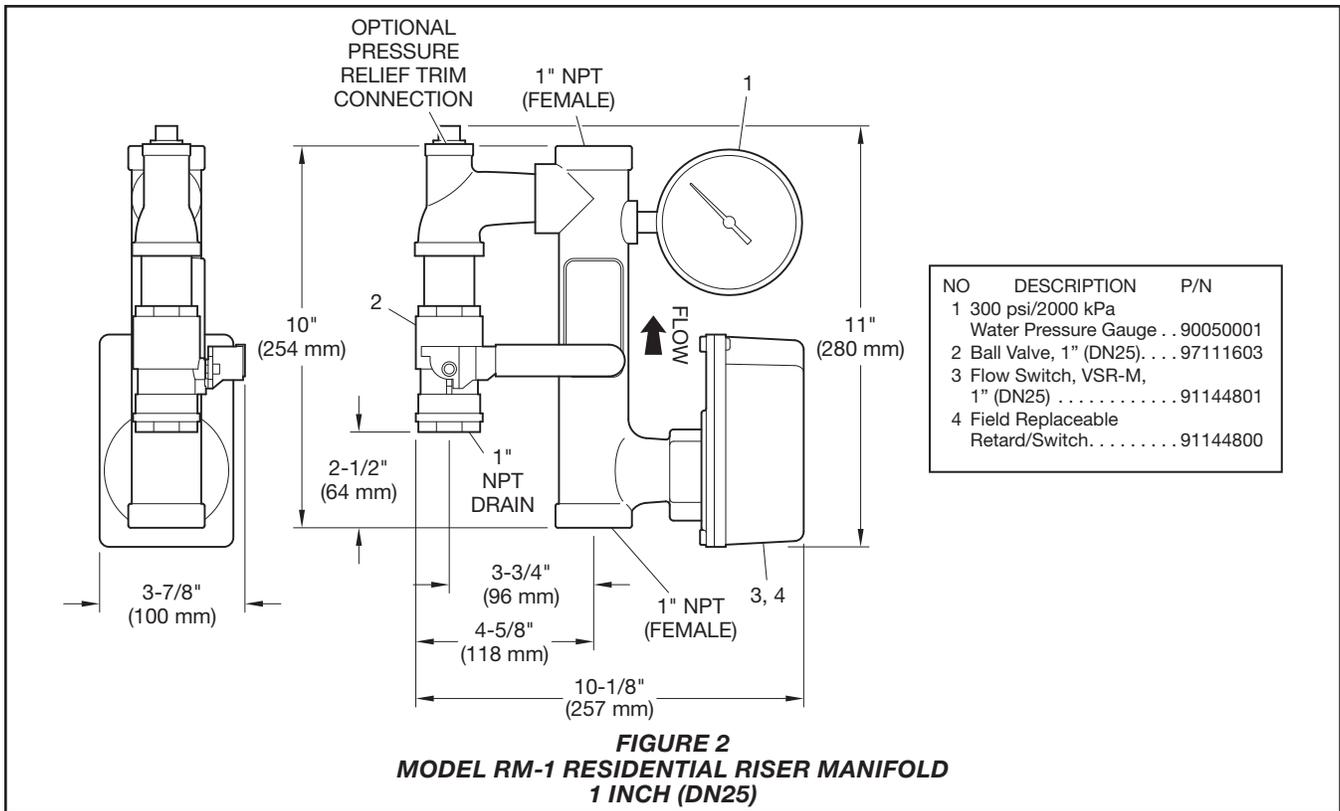
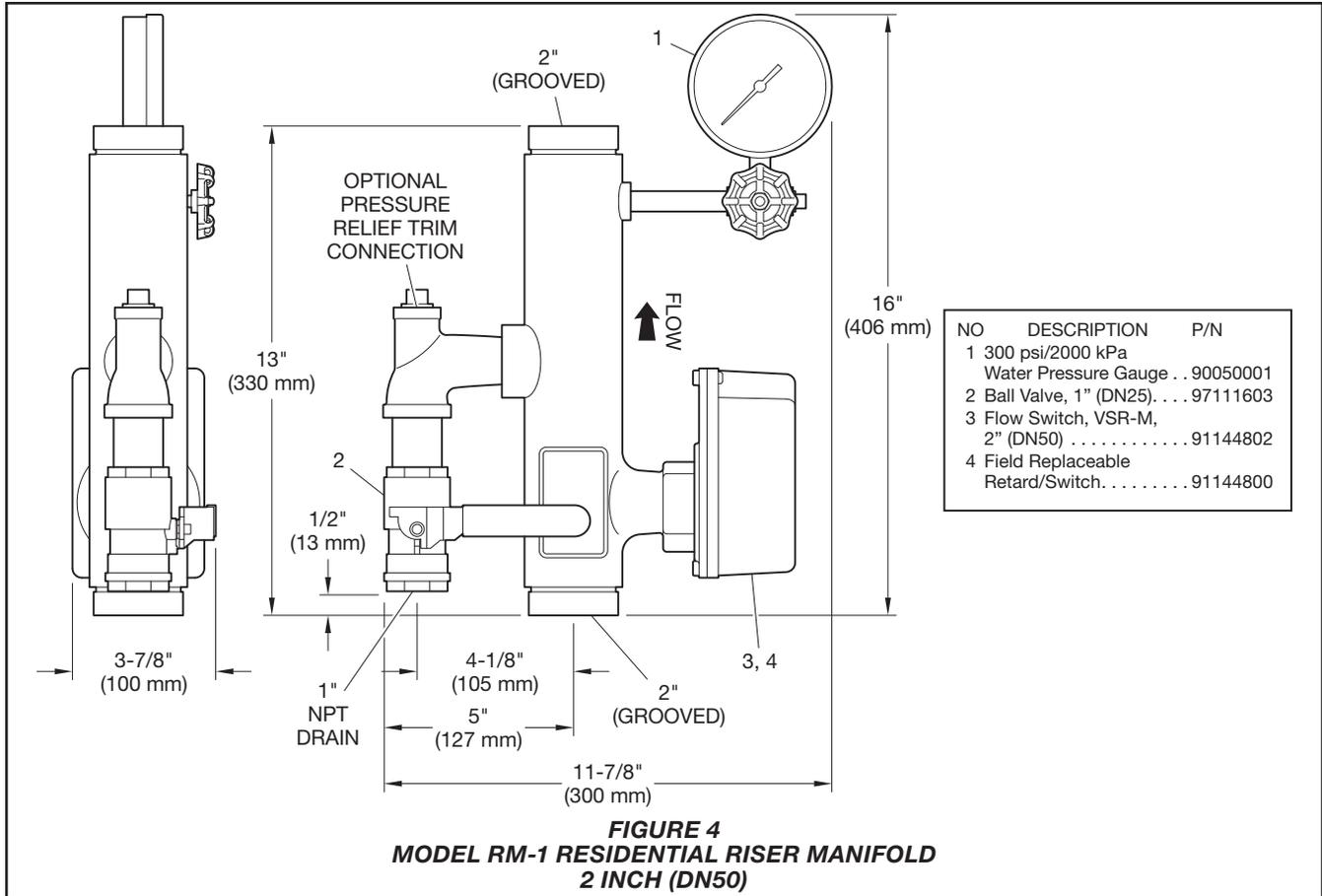


FIGURE 1
MODEL RM-1 COMMERCIAL RISER MANIFOLDS
1-1/2-6 INCH (DN40-DN150)





Manifold Installation

TYCO Model RM-1 Riser Manifold must be installed in accordance with this section.

The Model RM-1 Riser Manifold may be installed either horizontally (flow switch on top) or vertically (flow going up). The inlet of the Riser Manifold may be connected directly to a shut-off control valve.

Notes:

Where applicable pipe thread sealant is to be applied sparingly. Use of a non-hardening pipe thread sealant is recommended.

Never remove any piping component nor correct or modify any piping deficiencies without first depressurizing and draining the system.

Provisions for an alarm test flow on Residential Models must be made. The alarm test flow is to be through an orifice having a flow capacity equal to or smaller than the smallest orifice sprinkler in the system. One of two options can be considered. The first option is to temporarily install a test orifice in the outlet of the drain line prior to performing the alarm test. The second option is to install an Inspector's Test Connection downstream of the Waterflow Alarm Switch.

Step 1. Install the manifold body with the flow arrow pointing in the downstream position using threaded connections and/or listed mechanical grooved connections, as applicable.

Step 2. Connect the drain line and on commercial manifolds set the Model TD-1 Test and Drain Valve to the OFF position or on residential manifolds close the drain valve.

Step 3. Refer to Figure 6 for wiring guidance. All wiring must be performed in accordance with the authority having jurisdiction and/or the National Electrical Code.

Step 4. Refer to Figure 5 for Optional Pressure Relief Trim installation.

Step 5. Place the system in service by filling the system with water. When filling the system, partially open the control valve to slowly fill the system. Filling the system slowly will help avoid damaging the waterflow alarm switch.

After the system is fully pressurized, completely open the control valve.

Step 6. Secure all supply valves open.

Commercial Riser Manifolds		
NO	DESCRIPTION	P/N
1	Pressure Relief Valve, 175 psi, 1/2" NPT	1001184-01
2	1/2" x Close Nipple	1001023-01
3	Flexible Hose: 1-1/2-3 Inch (DN40-DN80) Size Manifolds, 1/2" x 24"	1001266-02
	4-6 Inch (DN100-DN150) Size Manifolds, 1/2" x 30"	1001266-01
4	Figure 323 Reducing Tee, Grooved x NPT Threaded: 1-1/2-3 Inch (DN40-DN80) Size Manifolds, 1-1/4" x 1-1/4" x 1/2"	3231305GS
	4-6 Inch (DN100-DN150) Size Manifolds, 2" x 2" x 1/2"	3232005GS
5	Figure 577 Rigid Grooved Coupling: 1-1/2-3 Inch (DN40-DN80) Size Manifolds, 1-1/4"	57713AGCP
	4-6 Inch (DN100-DN150) Size Manifolds, 2"	57720AGCP

Residential Riser Manifolds		
NO	DESCRIPTION	P/N
1	Pressure Relief Valve, 175 psi, 1/2" NPT	1001184-01
2	1/2" x Close Nipple, Qty 2	1001023-01
3	Flexible Hose, 1/2" x 16"	1001266-03
4	Figure 815 Threaded Reducing Tee, 1" x 1" x 1/2" NPT	1001259-07
5	1" x Close Nipple	1001025-01

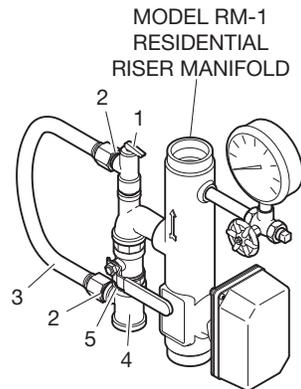
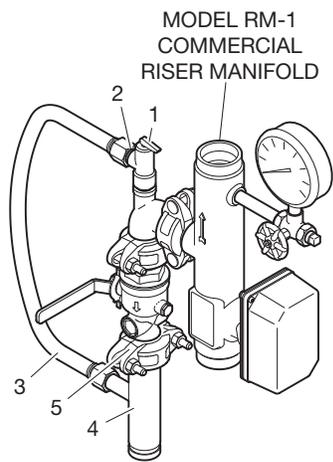


FIGURE 5
MODEL RM-1 COMMERCIAL AND RESIDENTIAL RISER MANIFOLDS
OPTIONAL PRESSURE RELIEF TRIM INSTALLATION

Optional Pressure Relief Trim Installation

Model RM-1 commercial and residential riser manifold assemblies are designed to accommodate an optional pressure relief valve and trim components (Ref. Figure 5).

Optional pressure relief trim must be installed in accordance with the following procedures.

Notes:

For assembly in Riser Manifolds installed and in service, verify the fire protection system is de-pressurized and drained. Close the system supply control valve, set commercial manifold test and drain valve to DRAIN or open residential drain valve to relieve residual pressure and drain system. Make certain that drainage water will not cause any damage or injury.

Refer to Care and Maintenance section for other requirements when closing a fire protection system control valve and placing system in service.

Apply thread sealant or TEFLON tape on all threaded connections, with the exception of internally sealed flexible hose connections.

Commercial Manifolds

Refer to Figure 1 for commercial riser manifold features and Figure 5 for pressure relief trim components described in this procedure.

Step 1. Remove 1/2 in. pipe plug from manifold tee. Inspect exposed female tee threads, remove thread sealant remnants or debris as necessary.

Step 2. Install Pressure Relief Valve (1) in manifold tee, orienting valve outlet port perpendicular to and facing away from manifold body.

Step 3. Install 1/2 in. x Close Nipple (2) in pressure relief valve outlet port.

Step 4. Disconnect drain piping from grooved outlet of manifold TD-1 test and drain valve as applicable and install Figure 323 Grooved Reducing Tee (4) on valve outlet by securing with Figure 577 Grooved Coupling (5), aligning tee threaded branch outlet parallel with pressure relief valve outlet port. Reconnect drain piping to Figure 323 tee drain outlet as necessary.

Note: Refer to Technical Data Sheet G901 for Figure 577 Grooved Coupling installation and assembly instructions.

Step 5. Install Flexible Hose (3) by threading female ends onto 1/2 in. x close nipple installed on relief valve outlet port and onto Figure 323 reducing tee branch outlet.

Note: Assure Flexible Hose is not susceptible to being caught or snagged by other moving equipment.

Residential Manifolds

Refer to Figures 2, 3 or 4 for residential riser manifold features and Figure 5 for pressure relief trim components described in this procedure.

Step 1. Remove 1/2 in. pipe plug from manifold tee. Inspect exposed female tee threads, remove thread sealant remnants or debris as necessary.

Step 2. Install Pressure Relief Valve (1) in manifold tee, orienting valve outlet port perpendicular to and facing away from manifold body.

Step 3. Disconnect drain piping from threaded outlet of manifold drain valve as applicable and install 1 in. x Close Nipple (5) in valve outlet.

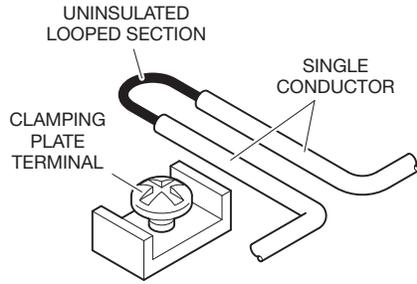
Step 4. Install Figure 815 Reducing Tee (4) onto 1 inch x close nipple, aligning tee branch outlet parallel with pressure relief valve outlet port. Reconnect drain piping to Figure 815 tee drain outlet as necessary.

Step 5. Install 1/2 in. x Close Nipples (2) in pressure relief valve outlet port and in Figure 815 reducing tee branch outlet.

Step 6. Install Flexible Hose (3) by threading female ends onto 1/2 in. x close nipples installed on relief valve outlet port and Figure 815 reducing tee branch outlet.

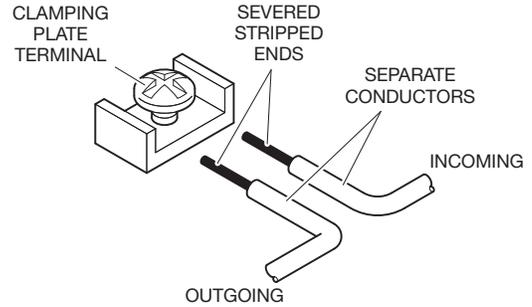
Note: Assure Flexible Hose is not susceptible to being caught or snagged by other moving equipment.

SWITCH TERMINAL CONNECTIONS

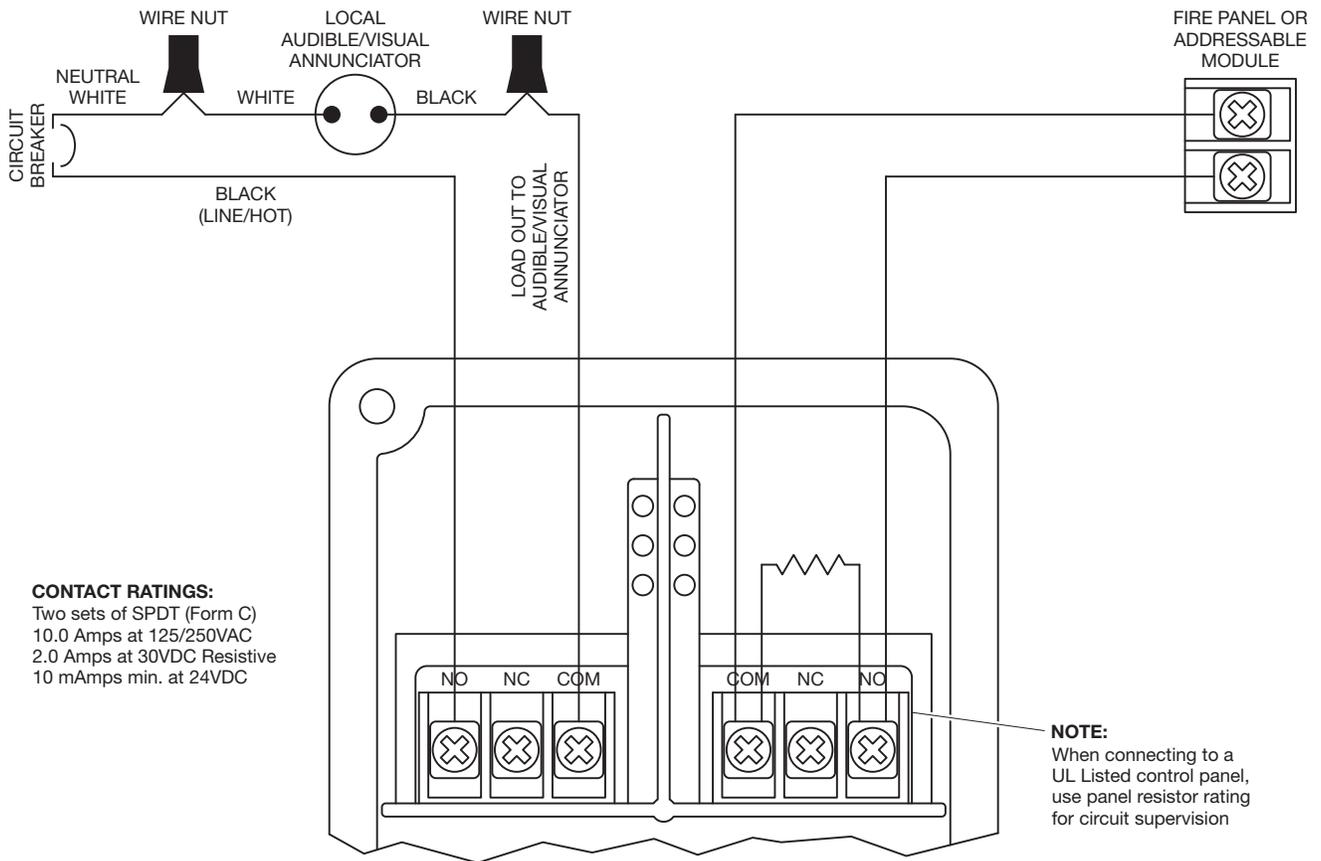


IMPROPER CONNECTION METHOD

CAUTION:
 An uninsulated section of a single conductor is not permitted to be looped around the terminal and serve as two separate connections. The wire must be severed to serve as two separate connections, thereby providing supervision of the connection in the event that the wire becomes dislodged from the terminal.



PROPER CONNECTION METHOD

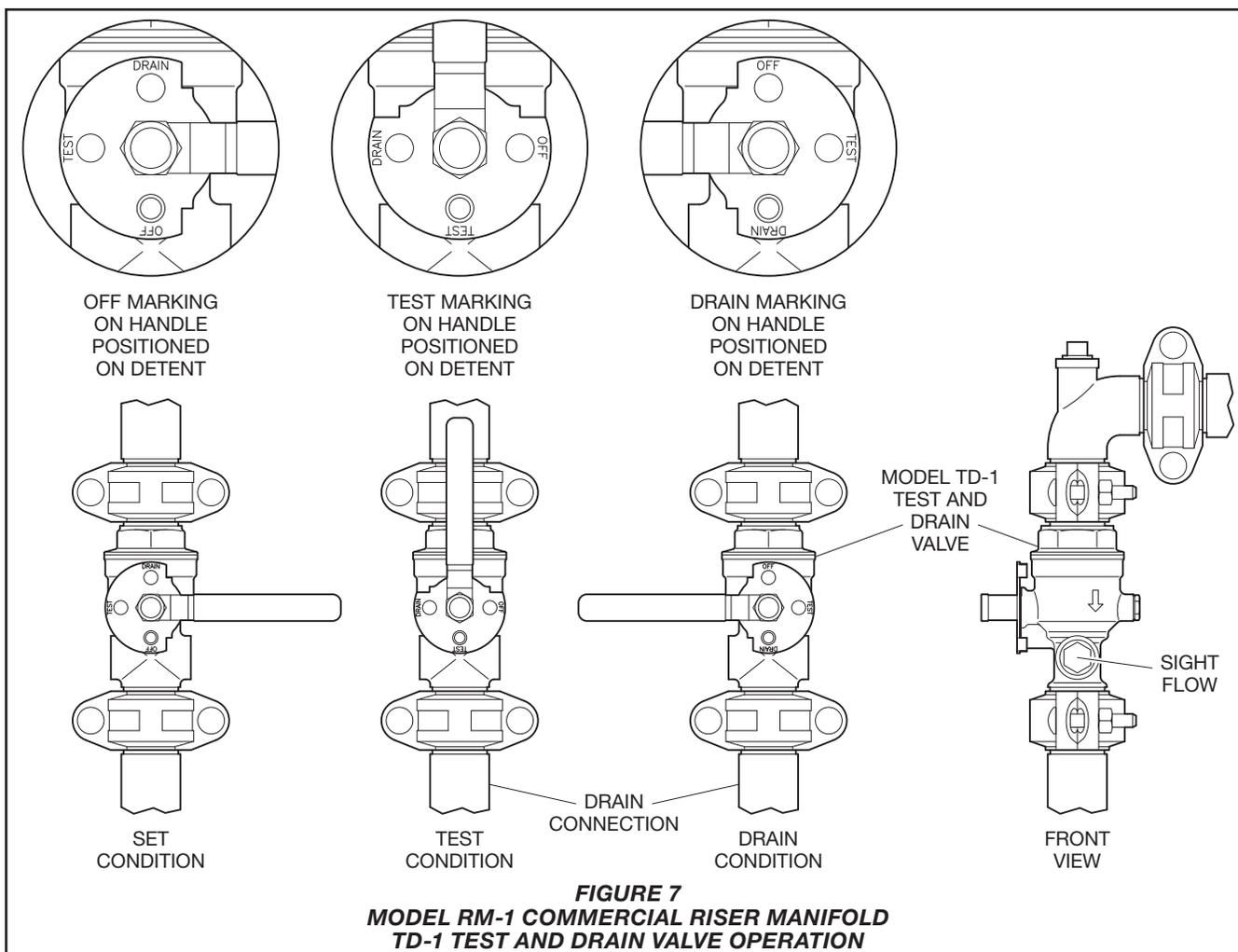


CONTACT RATINGS:
 Two sets of SPDT (Form C)
 10.0 Amps at 125/250VAC
 2.0 Amps at 30VDC Resistive
 10 mAmps min. at 24VDC

NOTE:
 When connecting to a UL Listed control panel, use panel resistor rating for circuit supervision

NOTE:
 For supervised circuits, see "Switch Terminal Connections" above. The Waterflow Alarm Switch has two switches, one can be used to operate a central station, proprietary or remote signaling unit, while the other contact is used to operate a local audible or visual annunciator.

FIGURE 6
MODEL RM-1 COMMERCIAL AND RESIDENTIAL RISER MANIFOLD WIRING GUIDANCE



Care and Maintenance

TYCO Riser Manifolds RM-1 must be serviced and maintained in accordance with this section.

Before closing a fire protection system control valve for inspection or maintenance work on the fire protection system that it controls, permission to shut down the effected fire protection system must first be obtained from the proper authorities and all personnel who may be affected by this action must be notified.

After placing a fire protection system in service, notify the proper authorities and advise those responsible for monitoring proprietary and/or central station alarms.

The owner is responsible for the inspection, testing, and maintenance of their fire protection system and devices in compliance with this document, as well as with the applicable standards of the NATIONAL FIRE PROTECTION ASSOCIATION (e.g., NFPA 25), in addition to the standards of any authority having jurisdiction. Contact the installing contractor or product manufacturer with any questions.

It is recommended that automatic sprinkler systems be inspected, tested, and maintained by a qualified Inspection Service in accordance with local requirements and/or national codes.

Note: No attempt is to be made to repair any Riser Manifold component in the field. Only the pressure gauge, waterflow alarm switch, or relief valve can be replaced. If any other problems are encountered the entire riser manifold must be replaced.

The alarm/flow test procedure will result in operation of the associated alarms. Consequently, notification must be given to the owner and the fire department, central station, or other signal station to which the alarms are connected, and notification must be given to the building occupants.

The following inspection procedure must be performed as indicated, in addition to any specific requirements

of the NFPA, and any impairment must be immediately corrected:

Alarm/Flow Test Procedure

Step 1. Place the Model TD-1 Test and Drain Valve in the TEST position (Ref. Figure 7). On residential assemblies without a test orifice, temporarily install a test orifice in the drain outlet and fully open the Drain Valve. Make certain that drainage water will not cause any damage or injury.

Step 2. Verify operation of associated alarms.

Step 3. Verify that the residual (i.e., flowing) pressure indicated by the pressure gauge is no less than originally recorded for the system when it was first installed.

Step 4. Close the Drain Valve on the Residential models and the Test and Drain valve on commercial models.

Step 5. Verify that the static (i.e., not flowing) pressure indicated by the pressure gauge is no less than originally recorded for the system when it was first installed.

Limited Warranty

For warranty terms and conditions, visit
www.tyco-fire.com.

Ordering Procedure

Contact your local distributor for availability. When placing an order, indicate the full product name, including description and part number (P/N).

Riser Manifolds

Specify: Size (specify) Connection Type (specify inlet x outlet) Model RM-1 Riser Manifold, P/N (specify):

Commercial

1-1/2 in. (DN40) MT x FT	40551
2 in. (DN50) G x G	40601
2-1/2 in. (DN65) G x G	40611
3 in. (DN80) G x G	40621
4 in. (DN100) G x G	40651
6 in. (DN150) G x G	40661

Residential

1 in. (DN25) FT x FT	40671
1-1/2 in. (DN40) MT x FT	40571
2 in. (DN50) G x G	40591

Optional 175 psi Pressure Relief Kit
Specify: Pressure Relief Kit, Model RM-1 Riser Manifold, (specify Commercial or Residential application), (specify size range), P/N (specify):

Commercial

1-1/2 in. - 3 in. (DN40-DN80)	40721
4 in. - 6 in. (DN100-DN150)	40731

Residential

1 in.-2 in. (DN25-DN50)	40711
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Replacement Parts

Specify: Model RM-1 Riser Manifold (specify part description), P/N (specify from Figures 1, 2, 3, 4 or 5)