



**ASSOCIATED FIRE PROTECTION**

Post Office Box 28022 – Raleigh, NC 27611

O: 919-553-4021 | F: 919-553-2169 | [www.afp-nc.com](http://www.afp-nc.com)

## Product Data & Hydraulic Calculations

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### Cape Fear MOB - Shell

**Date:**

**October 18, 2023**

**Project Location:**

**215 Brightwater Drive  
Lillington, NC**



# Cape Fear MOB - Shell

EDW-1551

## Product Data Submittal

Section 1	Sprinklers
Section 2	Pipe and Fittings
Section 3	Valves
Section 4	Electrical Components
Section 5	Pipe Hangers
Section 6	Hydraulic Calculations

# Section 1 - Sprinklers

# Victaulic® FireLock™ Series FL-QR/SW

## Standard Coverage, Quick Response

### Horizontal Sidewall and Recessed Horizontal Sidewall Sprinklers K2.8 (4.0), K4.2 (6.1), K5.6 (8.1), K8.0 (11.5)



## 1.0 PRODUCT DESCRIPTION

QUICK RESPONSE HORIZONTAL SIDEWALL				
SIN	V2826	V4226	V2710	V3410
ORIENTATION	Horizontal Sidewall	Horizontal Sidewall	Horizontal Sidewall	Horizontal Sidewall
K-FACTOR <sup>1</sup>	2.8 Imp./4.0 S.I.	4.2 Imp./6.1 S.I.	5.6 Imp./8.1 S.I.	8.0 Imp./11.5 S.I.
CONNECTION	½" NPT/15mm BSPT	½" NPT/15mm BSPT	½" NPT/15mm BSPT/IGS	¾" NPT/ 20mm BSPT/IGS
MAX. WORKING PRESSURE	175 psi/1200 kPa	175 psi/1200 kPa	175 psi/1200 kPa	175 psi/1200 kPa
GLOBE RE-DESIGNATION	GL2826	GL4226		
GLOBE EQUIVALENT			GL5626	GL8127

QUICK RESPONSE RECESSED HORIZONTAL SIDEWALL				
SIN	V2826	V4226	V2710	V3410
ORIENTATION	Horizontal Sidewall	Horizontal Sidewall	Horizontal Sidewall	Horizontal Sidewall
K-FACTOR <sup>1</sup>	2.8 Imp./4.0 S.I.	4.2 Imp./6.1 S.I.	5.6 Imp./8.1 S.I.	8.0 Imp./11.5 S.I.
CONNECTION	½" NPT/15mm BSPT	½" NPT/15mm BSPT	½" NPT/15mm BSPT	¾" NPT/ 20mm BSPT
MAX. WORKING PRESSURE	175 psi/1200 kPa	175 psi/1200 kPa	175 psi/1200 kPa	175 psi/1200 kPa
ESCUTCHEON	Recessed	Recessed	Recessed	Recessed
GLOBE RE-DESIGNATION	GL2826	GL4226		
GLOBE EQUIVALENT			GL5626	GL8127

AVAILABLE GUARDS				
SPRINKLER	V28	V42	V27	V34
Horizontal Sidewall			■	

AVAILABLE WRENCHES							
Sprinkler	V56-2 Recessed	V56 Open End	V27-2 Recessed	V27 Open End	V34-2 Recessed	V34 Open End	¾ Hex-Bit
V2826 and V4226	■	■					
V2710			■	■			■
V3410					■	■	■

**Factory Hydrostatic Test:** 100% @ 500 psi/3447 kPa/34 bar

**Min. Operating Pressure:** UL/FM: 7psi/48 kPa/.5 bar

**Temperature Rating:** See tables in section 2.

<sup>1</sup> For K-Factor when pressure is measured in bar, multiply S.I. units by 10.0.

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

## 2.0 CERTIFICATION/LISTINGS



HORIZONTAL SIDEWALL APPROVALS/LISTINGS				
SIN	V2826	V4226	V2710	V3410
Nominal K Factor Imperial	2.8	4.2	5.6	8
Nominal K Factor S.I. <sup>2</sup>	4.0	6.1	8.1	11.5
Orientation	Horizontal Sidewall	Horizontal Sidewall	Horizontal Sidewall	Horizontal Sidewall
Escutcheon	Flush   Extended	Flush   Extended	Flush   Extended	Flush   Extended
Approved Temperature Ratings F°/C°				
cULus 4" – 12" Deflector Distance	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C 286°F/141°C	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C 286°F/141°C	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C 286°F/141°C	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C 286°F/141°C
FM	-	-	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C 286°F/141°C	-
LPCB	-	-	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C 286°F/141°C	-
CE	-	-	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C 286°F/141°C	-

RECESSED HORIZONTAL SIDEWALL APPROVALS/LISTINGS				
SIN	V2826	V4226	V2710	V3410
Nominal K Factor Imperial	2.8	4.2	5.6	8
Nominal K Factor S.I. <sup>2</sup>	4.0	6.1	8.1	11.5
Orientation	Horizontal Sidewall	Horizontal Sidewall	Horizontal Sidewall	Horizontal Sidewall
Escutcheon	RECESSED	RECESSED	RECESSED	RECESSED
Approved Temperature Ratings F°/C°				
cULus 4" – 12" Deflector Distance ½" and ¾" Adjustment Escutcheon "	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C 286°F/141°C	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C 286°F/141°C	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C
FM ½" Adjustment Escutcheon Only	-	-	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C	-

<sup>2</sup> For K-Factor when pressure is measured in Bar, multiply S.I. units by 10.

### NOTES

- Listings and approval as of printing.
- Where cULus Listed, Polyester and VC-250 Coatings Listed as Corrosion Resistant
- Where FM Approved, VC-250 Coating Approved as Corrosion Resistant
- New York City Acceptance - All UL Listed and/or FM Approved sprinklers acceptable to NYC per section 28-113 of the Administrative Code and the OTCR Rule

### 3.0 SPECIFICATIONS – MATERIAL

**Deflector:** Bronze

**Bulb Nominal Diameter:** 3.0mm

**Load Screw:** Bronze

**Pip Cap:** Bronze

**Spring Seal:** PTFE coated Beryllium nickel alloy

**Frame:** Brass

**Lodgement Spring:** Stainless steel

**Installation Wrench:** Ductile iron

**Sprinkler Frame Finishes:**

- Plain brass
- Chrome plated
- White polyester painted<sup>3, 4</sup>
- Flat black polyester painted<sup>3, 4</sup>
- Custom polyester painted<sup>3, 4</sup>
- VC-250<sup>5</sup>

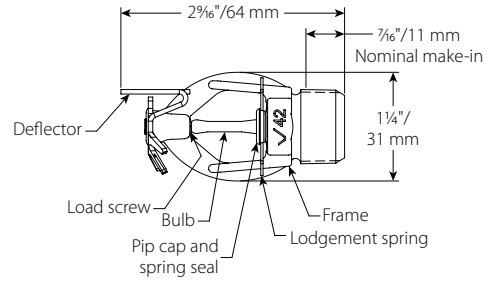
<sup>3</sup> Not available on the Intermediate Level Style Pendant.

<sup>4</sup> UL Listed for corrosion resistance.

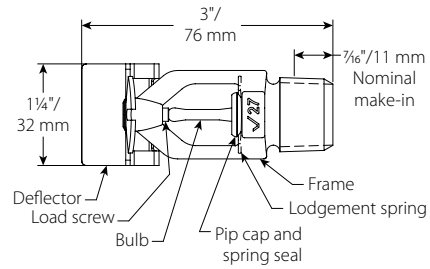
<sup>5</sup> UL Listed and FM Approved for corrosion resistance.

**NOTE**

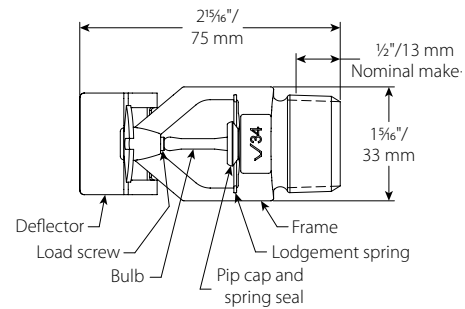
- For cabinets and other accessories refer to separate sheet.



**V2826, V4226**

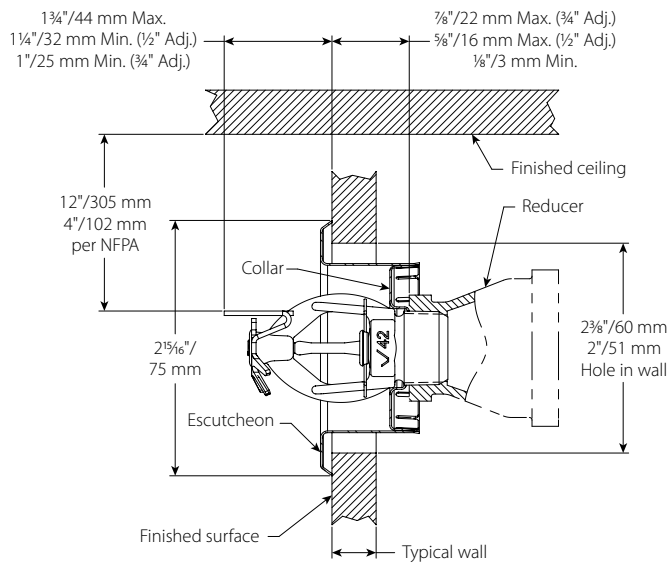


**V2710**



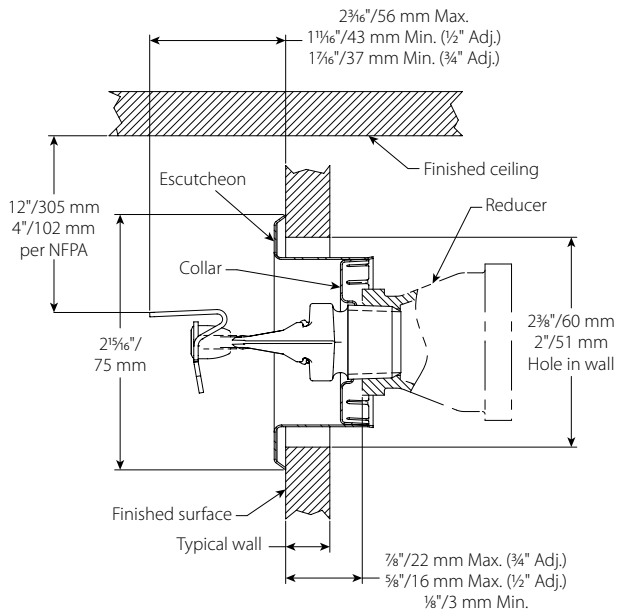
**V3410**

### 4.0 DIMENSIONS

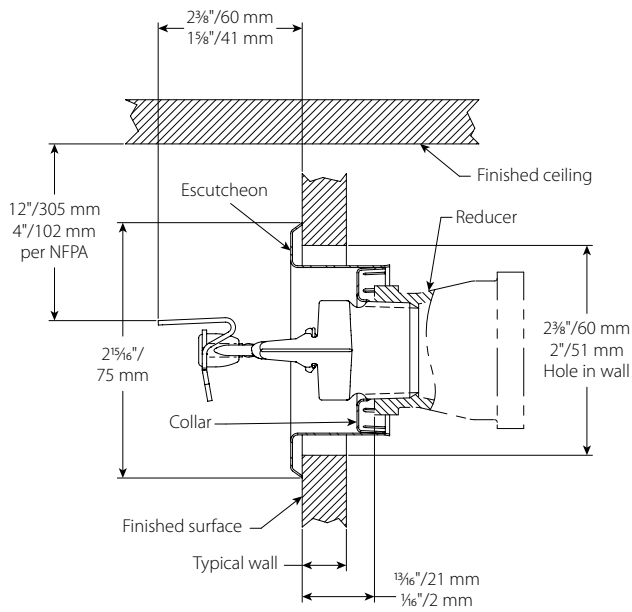


**V2826, V4226**

4.0 DIMENSIONS (CONTINUED)



V2710









V3410

## 5.0 PERFORMANCE

Sprinkler is to be installed and designed as per NFPA, FM Datasheets, or any local standards.

## 6.0 NOTIFICATIONS

 <b>WARNING</b>	
    	<ul style="list-style-type: none"><li>• Read and understand all instructions before attempting to install any Victaulic products.</li><li>• Always verify that the piping system has been completely depressurized and drained immediately prior to installation, removal, adjustment, or maintenance of any Victaulic products.</li><li>• Wear safety glasses, hardhat, and foot protection.</li></ul> <p>Failure to follow these instructions could result in death or serious personal injury and property damage.</p>
<ul style="list-style-type: none"><li>• 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 13, 13D, 13R, etc.) standards, or equivalent 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.</li><li>• The installer shall understand the use of this product and why it was specified for the particular application.</li><li>• The installer shall understand common industry safety standards and potential consequences of improper product installation.</li><li>• 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.</li><li>• The material specifier shall evaluate the 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.</li></ul> <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>	

## 7.0 REFERENCE MATERIALS

**Ratings:** All glass bulbs are rated for temperatures from -67°F/-55°C.

[1-40: Victaulic FireLock™ Automatic Sprinklers Installation and Maintenance Instructions](#)

[1-V9: Style V9 Victaulic FireLock™ IGS™ Installation-Ready™ Sprinkler Coupling Installation Instructions](#)

### User Responsibility for Product Selection and Suitability

Each user bears final responsibility for making a determination as to the suitability of Victaulic products for a particular end-use application, in accordance with industry standards and project specifications, as well as Victaulic performance, maintenance, safety, and warning 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, installation guide, or this disclaimer.

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### Note

This product shall be manufactured by Victaulic or to Victaulic specifications. All products to be installed in accordance with current Victaulic installation/assembly instructions. Victaulic reserves the right to change product specifications, designs and standard equipment without notice and without incurring obligations.

### Installation

Reference should always be made to the Victaulic installation handbook or installation instructions of 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 [www.victaulic.com](http://www.victaulic.com).

### Warranty

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

### Trademarks

*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.



# Victaulic® FireLock™ Series FL-QR

## Standard Coverage, Quick Response

### Upright, Pendent and Recessed Pendent Sprinklers

#### K2.8 (4.0), K4.2 (6.1), K5.6 (8.1), K8.0 (11.5)



41.01



## 1.0 PRODUCT DESCRIPTION

QUICK RESPONSE UPRIGHT SPRINKLERS				
SIN	V2815	V4215	V2704	V3402
ORIENTATION	UPRIGHT	UPRIGHT	UPRIGHT	UPRIGHT
K-FACTOR <sup>1</sup>	2.8 Imp./4.0 S.I.	4.2 Imp./6.1 S.I.	5.6 Imp./8.1 S.I.	8.0 Imp./11.5 S.I.
CONNECTION	½" NPT/15mm BSPT	½" NPT/15mm BSPT	½" NPT/15mm BSPT/IGS	¾" NPT/20mm BSPT/IGS
MAX. WORKING PRESSURE	175 psi/1200 kPa	175 psi/1200 kPa	175 psi/1200 kPa cULus 250 psi/1725 kPa	175 psi/1200 kPa
GLOBE RE-DESIGNATION	GL2815	GL4215	-	-
GLOBE EQUIVALENT	-	-	GL5615	GL8118

QUICK RESPONSE PENDENT SPRINKLERS				
SIN	V2801	V4201	V2708	V3406
ORIENTATION	PENDENT	PENDENT	PENDENT	PENDENT
K-FACTOR <sup>1</sup>	2.8 Imp./4.0 S.I.	4.2 Imp./6.1 S.I.	5.6 Imp./8.1 S.I.	8.0 Imp./11.5 S.I.
CONNECTION	½" NPT/15mm BSPT	½" NPT/15mm BSPT	½" NPT/15mm BSPT/IGS	¾" NPT/20mm BSPT/IGS
MAX. WORKING PRESSURE	175 psi/1200 kPa	175 psi/1200 kPa	175 psi/1200 kPa cULus 250 psi/1725 kPa	175 psi/1200 kPa
GLOBE RE-DESIGNATION	GL2801	GL4201	-	-
GLOBE EQUIVALENT	-	-	GL5601	GL8101

QUICK RESPONSE RECESSED PENDENT SPRINKLERS				
SIN	V2801	V4201	V2708	V3406
ORIENTATION	PENDENT	PENDENT	PENDENT	PENDENT
K-FACTOR <sup>1</sup>	2.8 Imp./4.0 S.I.	4.2 Imp./6.1 S.I.	5.6 Imp./8.1 S.I.	8.0 Imp./11.5 S.I.
CONNECTION	½" NPT/15mm BSPT	½" NPT/15mm BSPT	½" NPT/15mm BSPT/IGS	¾" NPT/20mm BSPT/IGS
MAX. WORKING PRESSURE	175 psi/1200 kPa	175 psi/1200 kPa	175 psi/1200 kPa cULus 250 psi/1725 kPa	175 psi/1200 kPa
ESCUTCHEON	Recessed	Recessed	Recessed	Recessed
GLOBE RE-DESIGNATION	GL2801	GL4201	-	-
GLOBE EQUIVALENT	-	-	GL5601	GL8101

AVAILABLE GUARDS/SHIELDS				
SPRINKLER	V28	V42	V27	V34
Upright			■	■
Pendent			■	■

AVAILABLE WRENCHES							
SPRINKLER	V56-2 Recessed	V56 Open End	V27-2 Recessed	V27 Open End	V34-2 Recessed	V34 Open End	⅜ Hex-Bit
V2815 and V4215		■					
V2707 and V2704				■			■
V3402						■	■
V2801, and V4201	■	■					
V2706 and V2708			■	■			■
V3406					■	■	■

**Factory Hydrostatic Test:** 100% @ 500 psi/3447 kPa/34 bar

**Min. Operating Pressure:** UL/FM: 7 psi/48 kPa/.5 bar  
VdS: 5 psi/35 kPa/.35 bar (Upright only)

**Temperature Rating:** See tables in section 2.0

<sup>1</sup> For K-Factor when pressure is measured in bar, multiply S.I. units by 10.0.

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



## 2.0 CERTIFICATION/LISTINGS

UPRIGHT APPROVALS/LISTINGS				
SIN	V2815	V4215	V2704	V3402
Nominal K Factor Imperial	2.8	4.2	5.6	8.0
Nominal K Factor S.I. <sup>2</sup>	4.0	6.1	8.1	11.5
Orientation	UPRIGHT	UPRIGHT	UPRIGHT	UPRIGHT
Approved Temperature Ratings F°/C°				
cULus	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C 286°F/141°C	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C 286°F/141°C	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C 286°F/141°C	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C 286°F/141°C
FM	-	-	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C 286°F/141°C	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C 286°F/141°C
LPCB	-	-	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C 286°F/141°C	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C 286°F/141°C
CE	-	-	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C 286°F/141°C	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C 286°F/141°C
VdS	-	-	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C 286°F/141°C	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C 286°F/141°C
CCC K-ZSTZ	-	-	155°F/68°C 175°F/79°C 286°F/141°C	155°F/68°C 175°F/79°C 286°F/141°C

<sup>2</sup> For K-Factor when pressure is measured in Bar, multiply S.I. units by 10.

PENDENT APPROVALS/LISTINGS				
SIN	V2801	V4201	V2708	V3406
Nominal K Factor Imperial	2.8	4.2	5.6	8.0
Nominal K Factor S.I. <sup>2</sup>	4.0	6.1	8.1	11.5
Orientation	PENDENT	PENDENT	PENDENT	PENDENT
Escutcheon	Flush/Extended	Flush/Extended	Flush/Extended	Flush/Extended
Approved Temperature Ratings F°/C°				
cULus	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C 286°F/141°C	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C 286°F/141°C	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C 286°F/141°C	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C 286°F/141°C
FM	-	-	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C 286°F/141°C	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C 286°F/141°C
CCC K-ZSTX	-	-	155°F/68°C 200°F/93°C 286°F/141°C	155°F/68°C 200°F/93°C 286°F/141°C

<sup>2</sup> For K-Factor when pressure is measured in Bar, multiply S.I. units by 10.

**NOTES**

- Listings and approval as of printing.
- Where cULus Listed, Polyester and VC-250 Coatings Listed as Corrosion Resistant (V3402 with VC-250 Only)
- Where FM Approved, VC-250 Coating Approved as Corrosion Resistant
- New York City Acceptance - All UL Listed and/or FM Approved sprinklers acceptable to NYC per section 28-113 of the Administrative Code and the OTCR Rule.

**2.0 CERTIFICATION/LISTINGS (CONTINUED)**

RECESSED PENDENT APPROVALS/LISTINGS				
SIN	V2801	V4201	V2708	V3406
Nominal K Factor Imperial	2.8	4.2	5.6	8.0
Nominal K Factor S.I. <sup>2</sup>	4.0	6.1	8.1	11.5
Orientation	PENDENT	PENDENT	PENDENT	PENDENT
Escutcheon	Recessed	Recessed	Recessed	Recessed
Approved Temperature Ratings F°/C°				
cULus	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C 286°F/141°C	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C 286°F/141°C	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C 286°F/141°C
FM WITH ½" ADJUSTMENT ESCUTCHEON ONLY	-	-	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C
CCC K-ZSTX	-	-	155°F/68°C 200°F/93°C 286°F/141°C	155°F/68°C 286°F/141°C

<sup>2</sup> For K-Factor when pressure is measured in Bar, multiply S.I. units by 10.

**NOTES**

- Listings and approval as of printing.
- Where cULus Listed, Polyester and VC-250 Coatings Listed as Corrosion Resistant (V3402 with VC-250 Only)
- Where FM Approved, VC-250 Coating Approved as Corrosion Resistant
- New York City Acceptance - All UL Listed and/or FM Approved sprinklers acceptable to NYC per section 28-113 of the Administrative Code and the OTCR Rule.

### 3.0 SPECIFICATIONS – MATERIAL

**Deflector:** Bronze

**Bulb Nominal Diameter:** 3.0mm

**Load Screw:** Bronze

**Pip Cap:** Bronze

**Spring Seal:** PTFE coated Beryllium nickel alloy

**Frame:** Brass

**Lodgement Spring:** Stainless steel

**Installation Wrench:** Ductile iron

**Sprinkler Frame Finishes:**

- Plain brass
- Chrome plated
- White polyester painted<sup>3, 4</sup>
- Flat black polyester painted<sup>3, 4</sup>
- Custom polyester painted<sup>3, 4</sup>
- VC-250<sup>5</sup>

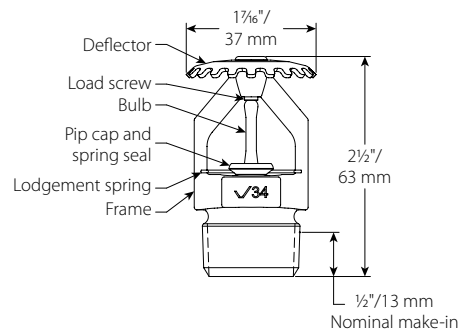
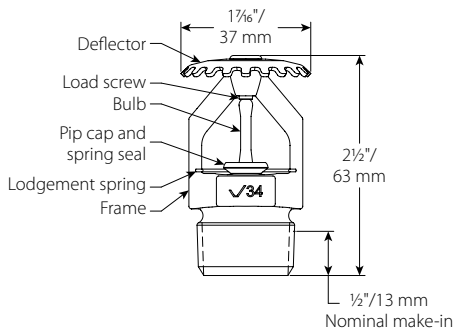
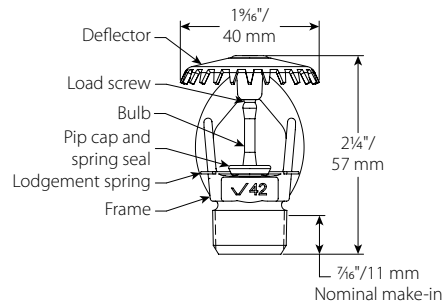
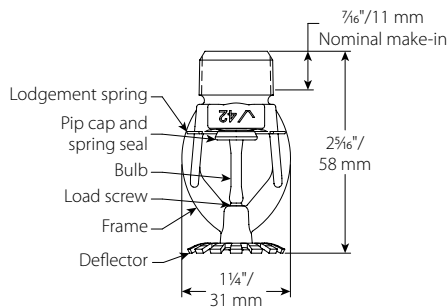
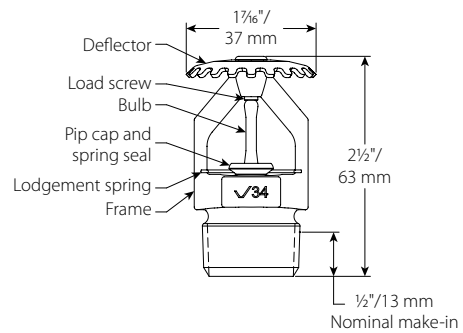
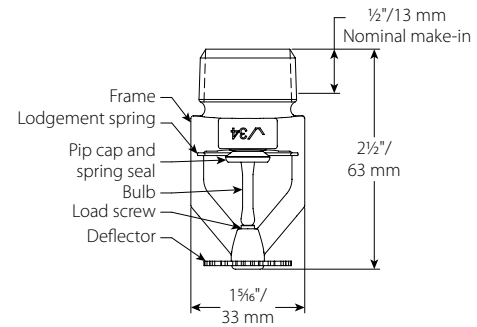
<sup>3</sup> Not available on the Intermediate Level Style Pendant.

<sup>4</sup> UL Listed for corrosion resistance.

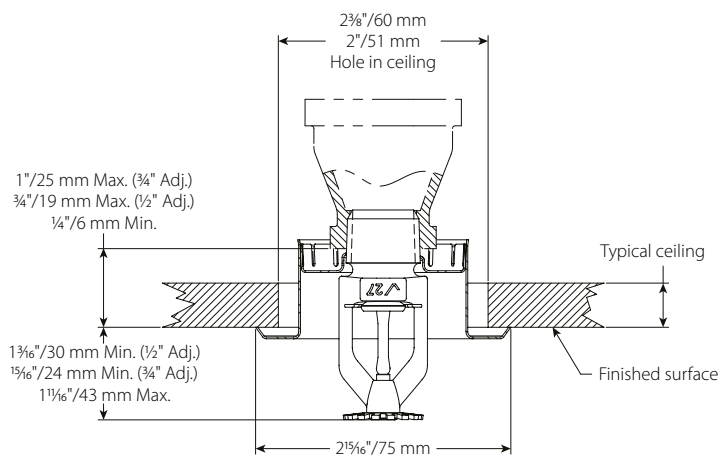
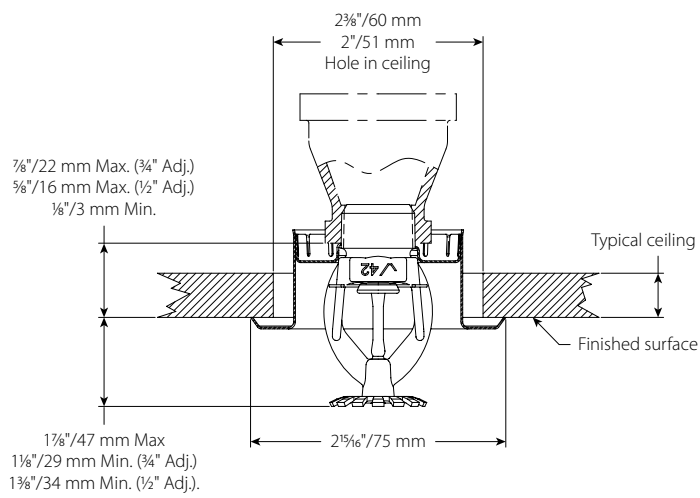
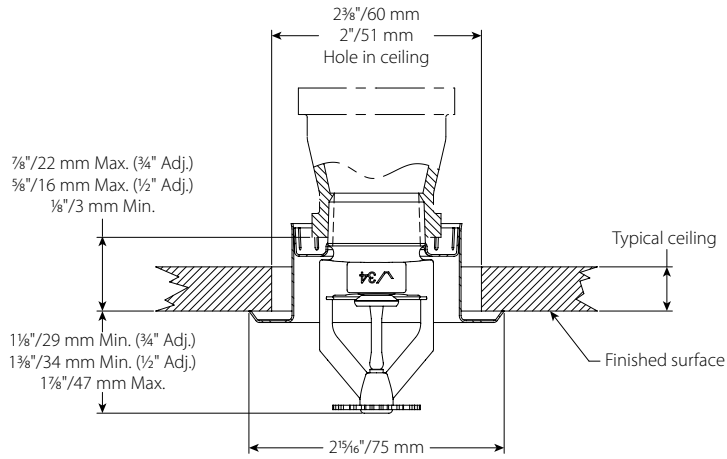
<sup>5</sup> UL Listed and FM Approved for corrosion resistance.

**NOTE**

- For cabinets and other accessories refer to separate sheet.




## 4.0 DIMENSIONS



## 5.0 PERFORMANCE

Sprinkler is to be installed and designed as per NFPA, FM Datasheets, or any local standards.

## 6.0 NOTIFICATIONS

<b>⚠ WARNING</b>	
	<ul style="list-style-type: none"> <li>• Read and understand all instructions before attempting to install any Victaulic products.</li> <li>• Always verify that the piping system has been completely depressurized and drained immediately prior to installation, removal, adjustment, or maintenance of any Victaulic products.</li> <li>• Wear safety glasses, hardhat, and foot protection.</li> </ul> <p>Failure to follow these instructions could result in death or serious personal injury and property damage.</p>
<ul style="list-style-type: none"> <li>• 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 13, 13D, 13R, etc.) standards, or equivalent 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.</li> <li>• The installer shall understand the use of this product and why it was specified for the particular application.</li> <li>• The installer shall understand common industry safety standards and potential consequences of improper product installation.</li> <li>• 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.</li> <li>• The material specifier shall evaluate the 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.</li> </ul> <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>	

## 7.0 REFERENCE MATERIALS

Ratings: All glass bulbs are rated for temperatures from -67°F/-55°C to those shown in the table below.

[I-40: Victaulic FireLock™ Automatic Sprinklers Installation and Maintenance Instructions](#)

[I-V9: Style V9 Victaulic FireLock™ IGS™ Installation-Ready™ Sprinkler Coupling Installation Instructions](#)

### User Responsibility for Product Selection and Suitability

Each user bears final responsibility for making a determination as to the suitability of Victaulic products for a particular end-use application, in accordance with industry standards and project specifications, as well as Victaulic performance, maintenance, safety, and warning 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, installation guide, or this disclaimer.

### Intellectual Property Rights

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### Note

This product shall be manufactured by Victaulic or to Victaulic specifications. All products to be installed in accordance with current Victaulic installation/assembly instructions. Victaulic reserves the right to change product specifications, designs and standard equipment without notice and without incurring obligations.

### Installation

Reference should always be made to the Victaulic installation handbook or installation instructions of 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 [www.victaulic.com](http://www.victaulic.com).

### Warranty

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

### Trademarks

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# Victaulic® FireLock Model FL-QR/C

## Standard Coverage, Quick Response

### Concealed Pendent Sprinklers, K5.6 (8.1)



## 1.0 PRODUCT DESCRIPTION

QUICK RESPONSE CONCEALED PENDENT SPRINKLERS			
SIN	V5606	V3802	V3808
ORIENTATION	Concealed Pendent	Concealed Pendent	Concealed Pendent
K-FACTOR <sup>1</sup>	5.6 Imp./8.1 S.I.	5.6 Imp./8.1 S.I.	5.6 Imp./8.1 S.I.
CONNECTION	½" NPT/15mm BSPT	½" NPT/15mm BSPT	½" NPT/15mm BSPT
MAX. WORKING PRESSURE	175 psi (1200 kPa)	175 psi (1200 kPa)	300psi (2068 kPa)
ESCUTCHEON	Concealed	Concealed	Concealed
GLOBE RE-DESIGNATED	GL5606		
GLOBE EQUIVALENT		GL5604	GL5605

AVAILABLE WRENCHES			
SPRINKLER	1" ADJ Concealed	V38 Concealed	V38 Concealed
PENDENT	■	■	■

CLEAN ROOM GASKET			
SPRINKLER	1" ADJ Concealed	V38 Concealed	V38 Concealed
PENDENT		■	■

**Factory Hydrostatic Test:** 100% @ 500 psi/3447 kPa/34 bar

**Min. Operating Pressure:** UL/FM: 7psi/48 kPa/5 bar

**Temperature Rating:** See tables in section 2.0

<sup>1</sup> For K-Factor when pressure is measured in bar, multiply S.I. units by 10.0.

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

## 2.0 CERTIFICATION/LISTINGS



APPROVALS/LISTINGS					
SIN	V5606	Cover Plate	V3802	V3808	Cover Plate
Nominal K Factor Imperial	5.6	-	5.6	5.6	-
Nominal K Factor S.I. <sup>2</sup>	8.1	-	8.1	8.1	-
Orientation	Pendent	-	Pendent	Pendent	-
Escutcheon	Concealed	-	Concealed	Concealed	-
APPROVED TEMPERATURE RATINGS F°/C°					
cULus	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C	135°F/57°C 135°F/57°C   155°F/68°C 155°F/68°C 155°F/68°C	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C	135°F/57°C 135°F/57°C 165°F/74°C 165°F/74°C
FM Standard Response Only	-	-	155°F/68°C 175°F/79°C 200°F/93°C	-	135°F/57°C 135°F/57°C   165°F/74°C 165°F/74°C
LPCB	-	-	155°F/68°C 175°F/79°C 200°F/93°C	-	138°F/59°C 165°F/74°C 165°F/74°C
CE	-	-	155°F/68°C 175°F/79°C 200°F/93°C	-	138°F/59°C 165°F/74°C 165°F/74°C
CCC K ZSTDY	-	-	155°F/68°C 200°F/93°C	-	135°F/57°C 135°F/57°C   165°F/74°C

APPROVALS/LISTINGS WITH CLEAN ROOM GASKET			
SIN	V3802 <sup>3</sup>	V3808 <sup>3</sup>	Cover Plate
Nominal K Factor Imperial	5.6	5.6	-
Nominal K Factor S.I. <sup>2</sup>	8.1	8.1	-
Orientation	Pendent	Pendent	-
Escutcheon	Concealed	Concealed	-
APPROVED TEMPERATURE RATINGS F°/C°			
cULus	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C	135°F/57°C 155°F/68°C 175°F/79°C 200°F/93°C	135°F/57°C 135°F/57°C 165°F/74°C 165°F/74°C

<sup>2</sup> For K-Factor when pressure is measured in Bar, multiply S.I. units by 10.

<sup>3</sup> Recognized as standard response when clean room gasket is installed.

**NOTES**

- Listings and approval as of printing.
- New York City Acceptance - All UL Listed and/or FM Approved sprinklers acceptable to NYC per section 28-113 of the Administrative Code and the OTCR Rule.



### 3.0 SPECIFICATIONS – MATERIAL

**Deflector:** Bronze

**Bulb Nominal Diamter:** 3.0 mm

**Load Screw:** Brass

**Pip Cap:** Brass

**Spring Seal:** PTFE coated Beryllium nickel alloy

**Frame:** Brass

**Concealed Cup:** Steel

**Cover Plate:** Steel

**Lodgement Spring:** Stainless Steel

**Pin:** Stainless Steel

**Installation Wrench:** Ductile Iron

**Sealing Gasket:** White nitrile (CLEAN ROOM USE ONLY)

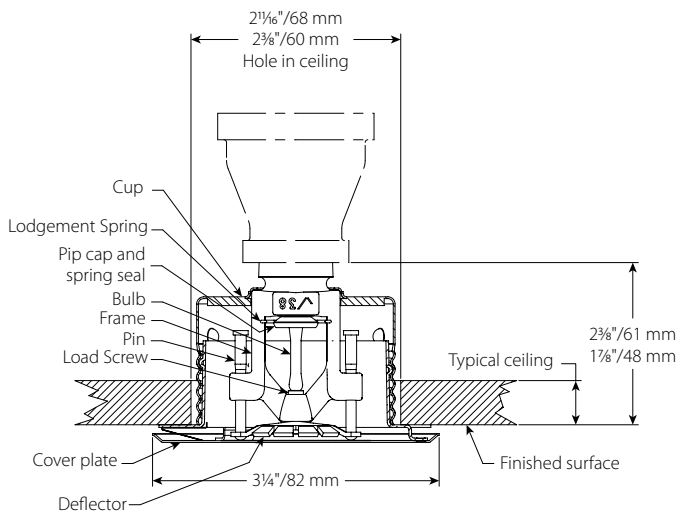
**Cover Plate Finishes:**

- Chrome plated
- White painted
- Flat black painted
- Custom painted

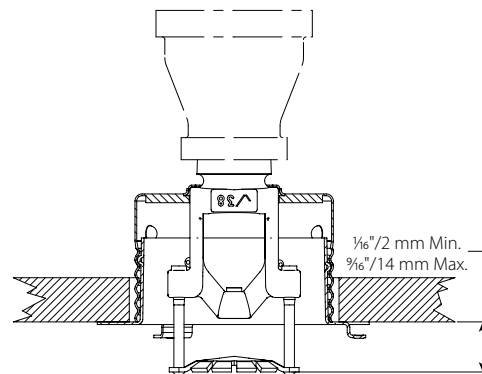
**NOTE**

- For cabinets and other accessories refer to separate sheet.

### 4.0 DIMENSIONS

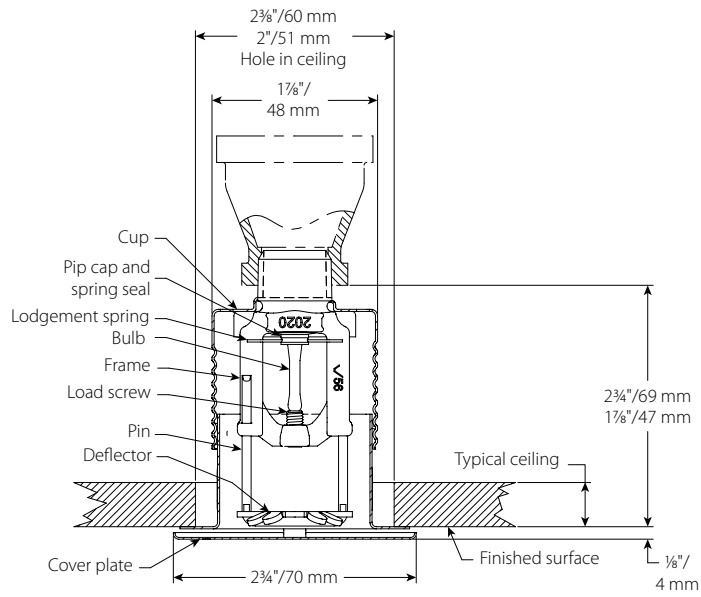


V3802, V3808

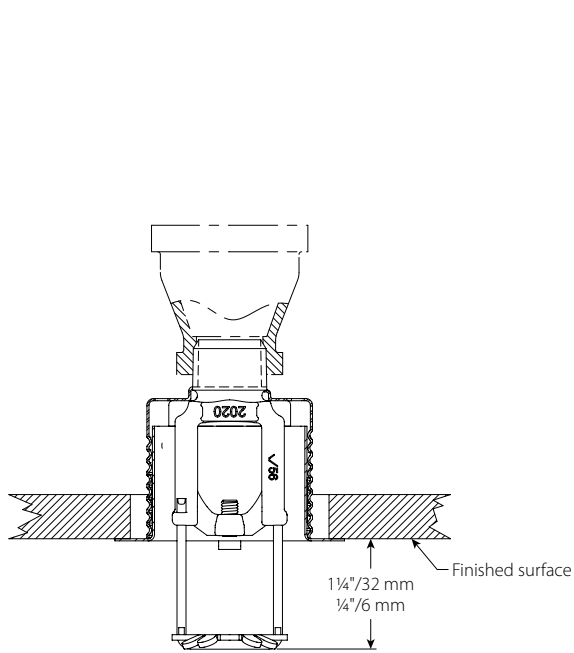


V3802, V3808

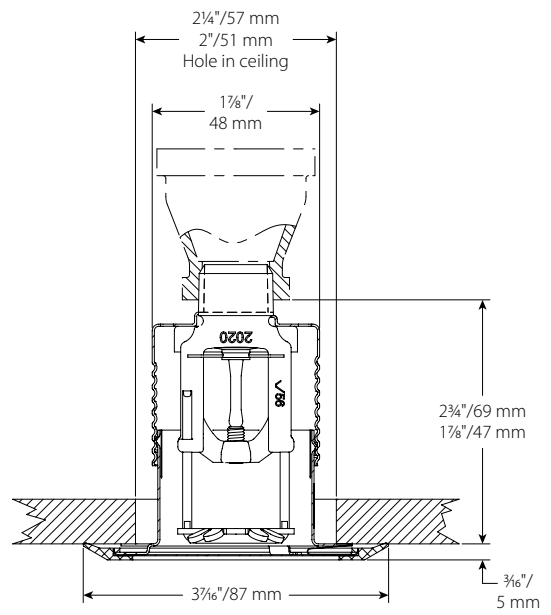
4.0 DIMENSIONS (CONTINUED)



V5606

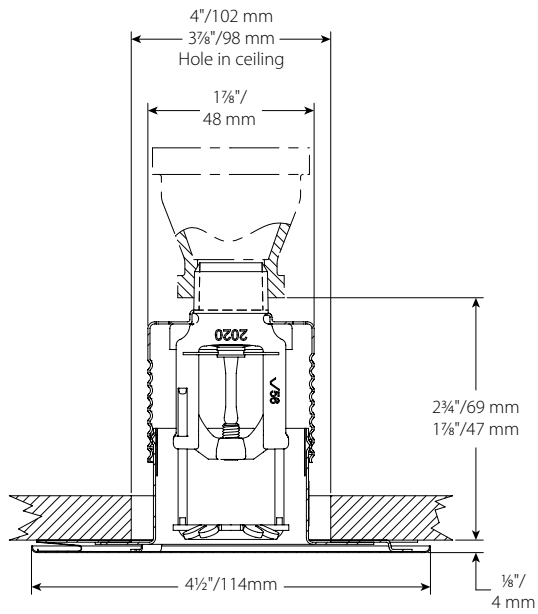


Activated Position  
V5606

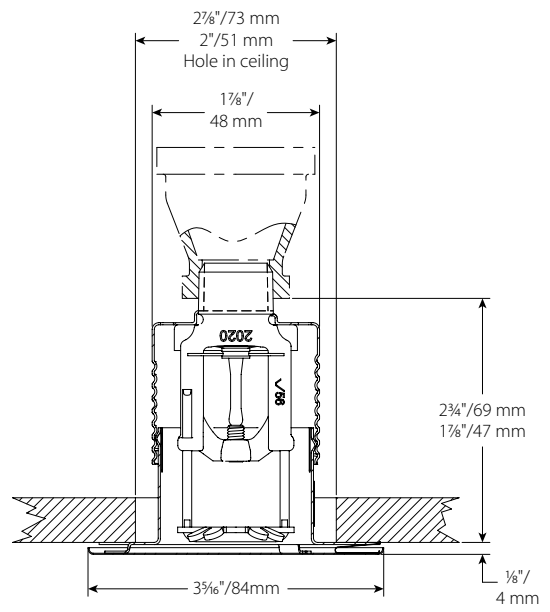


Clean Room Coverplate  
V5606

### 4.0 DIMENSIONS (CONTINUED)



**Seismic Coverplate  
V5606**









**Large Coverplate  
V5606**

## 5.0 PERFORMANCE

Sprinkler is to be installed and designed as per NFPA, FM Datasheets, or any local standards.

## 6.0 NOTIFICATIONS

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## 7.0 REFERENCE MATERIALS

**Ratings:** All glass bulbs are rated for temperatures from -67°F/-55°C.

[1-40: Victaulic FireLock™ Automatic Sprinklers Installation and Maintenance Instructions](#)

[1-V9: Style V9 Victaulic FireLock™ IGS™ Installation-Ready™ Sprinkler Coupling Installation Instructions](#)

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### Intellectual Property Rights

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### Trademarks

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# Victaulic® VicFlex™ Sprinkler Fittings

## Series AH1 and AH1-CC Braided Flexible Hose



Series AH1



Series AH1-CC

### 1.0 PRODUCT DESCRIPTION

#### Available Sizes by Component

**Series AH1 0.8"/DN20 ID Braided Hose:** 31, 36, 48, 60, 72"/790, 914, 1220, 1525, 1830 mm. Note: length includes adapter nipple and 5.75"/140 mm straight reducer.

**Series AH1-CC 0.8"/DN20 ID Braided Hose:** 31, 36, 48, 60, 72"/790, 914, 1219, 1525, 1830 mm. Note: length includes captured coupling and 5.75"/140 mm straight reducer.

#### Connections

- **From Branchline**
  - ¾"/20mm BSPT female thread (VdS only)
  - 1"/25mm NPT or BSPT female Thread
  - 1"/25mm Grooved IGS (refer to [Publication 10.54](#) for additional IGS connections)
    - No. 116 CPVC Adapter (1"/25mm Female CPVC Socket x 1"/25mm Grooved IGS)
    - No. 142 Welded Outlet
    - Style 922 Outlet-T
    - Style 920N Mechanical-T Outlet
    - No. 65 Grooved End of Run Fitting
- **Hose Inlet**
  - 1"/25mm Grooved IGS
  - 1"/25mm NPT or BSPT male thread
  - ¾"/20mm BSPT male thread (VdS only)

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

## 1.0 PRODUCT DESCRIPTION (CONTINUED)

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### • **Sprinkler Reducer**

- Sprinkler Connection: ½" and ¾"/15 mm and 20 mm NPT or BSPT
- Straight Lengths: 5.75, 9, 13"/140, 230, 330 mm
- 90° Elbows
  - Standard Short
  - Low Profile Short
  - Standard Long
  - Low Profile Long

(Short elbows typically used with concealed sprinklers. Long elbows typically used with recessed pendent sprinklers)

### **Brackets**

- Style AB2 for suspended and hard-lid ceilings, allows for vertical sprinkler adjustment, and installation before most ceiling tiles 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, allows for vertical sprinkler adjustment
- Style AB7 for suspended and hard-lid ceilings
- Style AB7 Adjustable 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 installations (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"/100mm
- 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 Approval)
- 175 psi/1206 kPa (cULus Listed)
- 1600 kPa/232 psi (VdS/LPCB Approved)
- 1.4 MPa (CCC Approval)
- 175 psi/1206 kPa (No. 116 CPVC Adapter)

### **Minimum Bend Radius**

- 7"/178 mm (FM/CCC Approval)
- 3"/76.2 mm (cULus Listed)
- 3"/76.2 mm (VdS/LPCB Approved)

## 1.0 PRODUCT DESCRIPTION (CONTINUED)

### Maximum Allowable Sprinkler K-Factors

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

## 2.0 CERTIFICATION/LISTINGS



## 3.0 SPECIFICATIONS – MATERIAL

### Series AH1

- 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 (½ or ¾"):** Carbon Steel, Zinc-Plated
- Low Profile Elbows:** Ductile Iron, Zinc-Plated

**Brackets:** Carbon Steel, Zinc-Plated

### Series AH1-CC

- Flexible Hose:** 300-series Stainless Steel
- Collar/Weld Fitting:** 300-series Stainless Steel
- Gasket Seal:** Victaulic EPDM
- Isolation Ring:** Nylon
- Coupling Retainer Ring:** Polyethelene
- Nut:** Carbon Steel, Zinc-Plated
- Reducer (½"/15 mm or ¾"/20 mm):** Carbon Steel, Zinc-Plated
- Low Profile Elbows:** Ductile Iron, 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.

#### Gasket:<sup>1</sup>

##### 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.

<sup>1</sup> 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 Gasket 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.

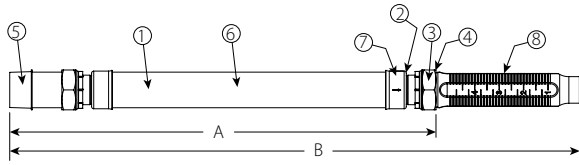
**Linkage:** CrMo Alloy Steel zinc electroplated per ASTM B633 Zn/Fe 5, Type III Finish.

**No. 116 Adapter Fitting:** CPVC and Brass

**Seal:** Victaulic EPDM

## 4.0 DIMENSIONS

### Product Details - Series AH1 Braided Hose

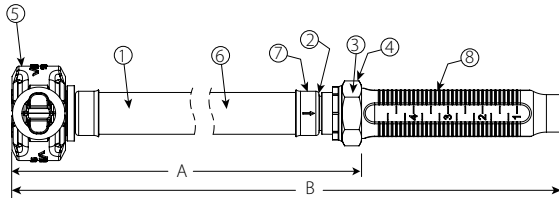


Item	Description
1	Flexible Hose
2	Isolation Ring
3	Gasket
4	Nut
5	Branch Line Nipple
6	Braid
7	Collar/Weld Fitting
8	Reducer

### Hose Length Dimensions

Hose	Dimensions	
	A inches mm	B inches mm
Model		
AH1-31	25.7 653	31.0 788
AH1-36	31.7 806	36.0 915
AH1-48	42.7 1085	48.0 1220
AH1-60	54.7 1390	60.0 1524
AH1-72	66.7 1695	72.0 1829

### Series AH1-CC



Item	Description
1	Flexible Hose
2	Isolation Ring
3	Gasket
4	Nut
5	Style 108 Coupling
6	Braid
7	Collar/Weld Fitting
8	Reducer

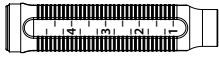
### Hose Length Dimensions

Hose	Dimensions	
	A inches mm	B inches mm
Model		
AH1-CC-31	24.5 623	29.8 757
AH1-CC-36	29.5 750	34.8 884
AH1-CC-48	41.5 1055	46.8 1189
AH1-CC-60	53.5 1359	58.8 1494
AH1-CC-72	65.5 1664	70.8 1799



## 4.1 DIMENSIONS (CONTINUED)

### Standard Reducer



5.75"/140 mm straight reducer

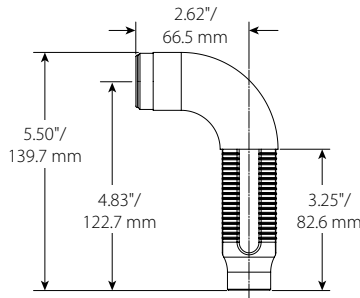
### Optional Reducers



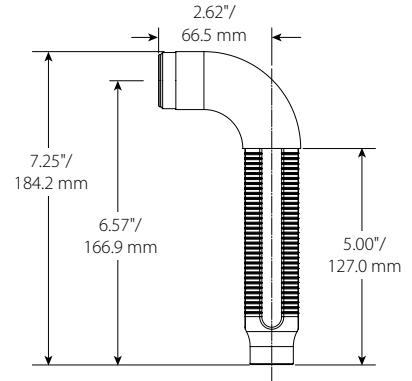
9.0"/229 mm straight reducer



13.0"/330 mm straight reducer



Short 90° elbow reducer

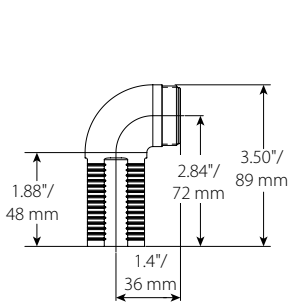


Long 90° elbow reducer

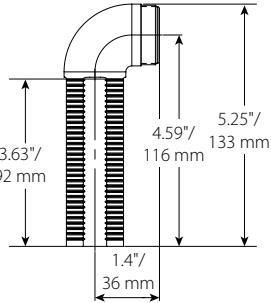
#### NOTES

- The Short 90° elbow reducer is typically used with concealed sprinklers while the longer 90° elbow is typically used in the installation of recessed pendent sprinklers.
- FM/VdS Approved only.

### Low Profile



Short 90° elbow reducer

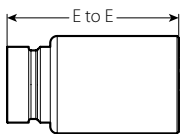


Long 90° elbow reducer

#### NOTE

- Style AB11: When low profiles elbows are 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 Adapters have 2 ft (0.6 m). EQL of 1" Schedule 40 pipe

## 4.2 DIMENSIONS

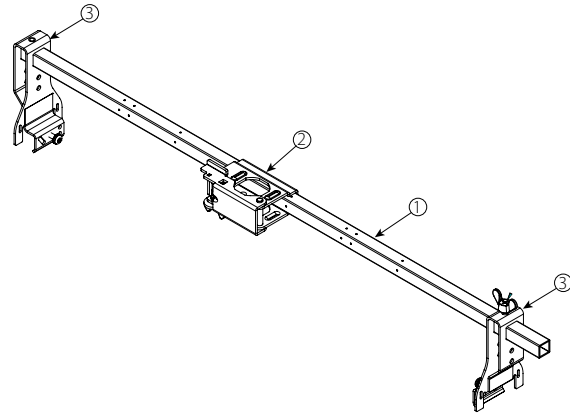
### Style AB2

- Suspended Ceilings
- Hard-Lid Ceilings

Item	Description
1	24"/610 mm or 48"/1220 mm Square Bar
2	Patented Vertically Adjustable Center Bracket
3	End Bracket

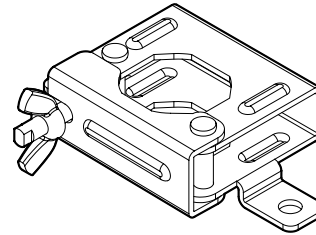
**NOTE**

- Both sizes FM/VdS/LPCB approved, cULus listed



### Style AB3

- Surface Mount Applications
- FM/LPCB Approved



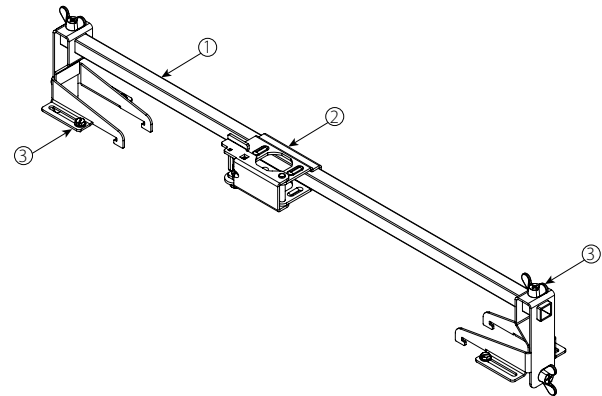
### Style AB4

- Hard-Lid Ceilings with Hat furring channel grid system

Item	Description
1	24"/610 mm or 48"/1220 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



### 4.3 DIMENSIONS

#### VicFlex Brackets

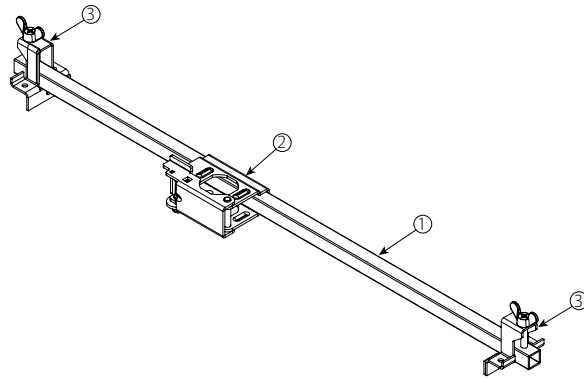
##### Style AB5

- Hard-Lid Ceilings

Item	Description
1	24"/610 mm or 48"/1220 mm Square Bar
2	Patented Vertically Adjustable Center Bracket
3	End Bracket

**NOTE**

- Both sizes FM/VdS/LPCB approved, cULus listed



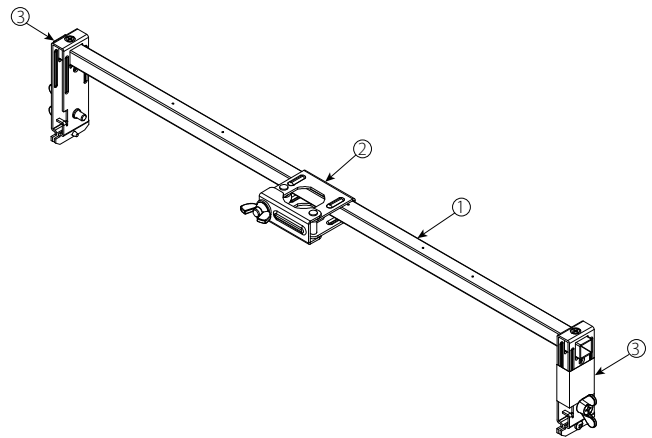
##### Style AB7

- Suspended Ceilings
- Hard-Lid Ceilings

Item	Description
1	24"/610 mm or 48"/1220 mm Square Bar
2	Patented 1-Bee2® Center Bracket
3	End Bracket

**NOTE**

- Both sizes FM/VdS/LPCB approved.



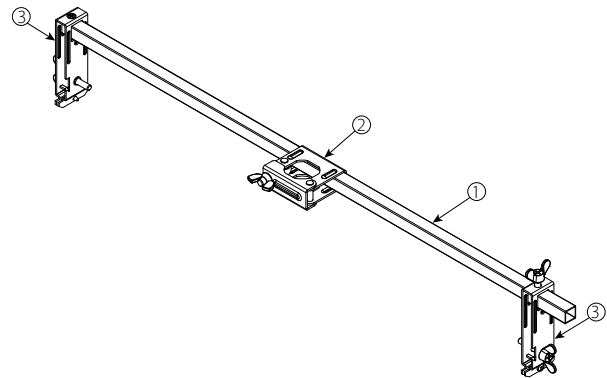
##### Style AB7 Adjustable

- 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.



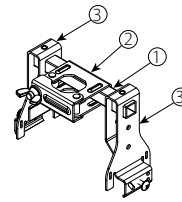
## 4.4 DIMENSIONS

### 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



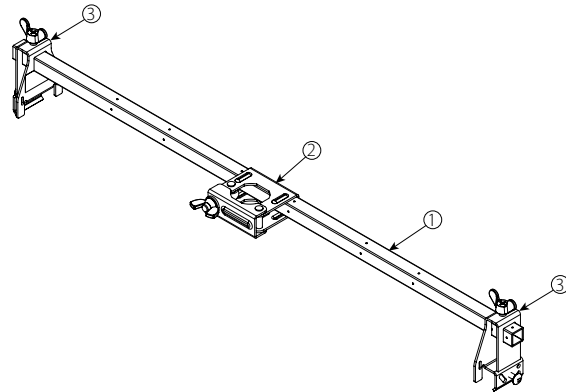
**NOTE**

- 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



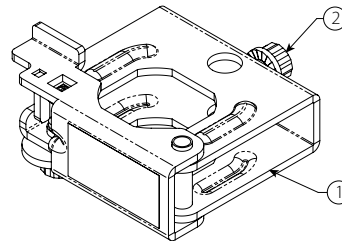
**NOTE**

- FM/VdS 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 Approved.

## 4.5 DIMENSIONS

### VicFlex Brackets

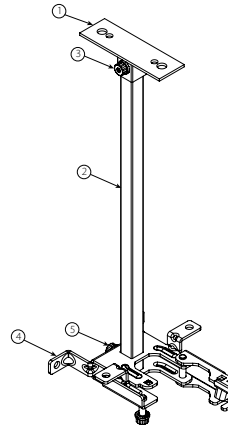
#### Style ABBA

- 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 Approved.



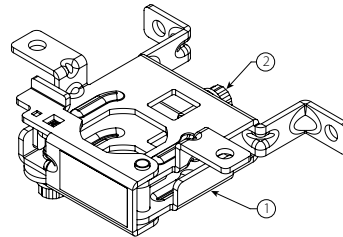
#### Style ABMM

- 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**

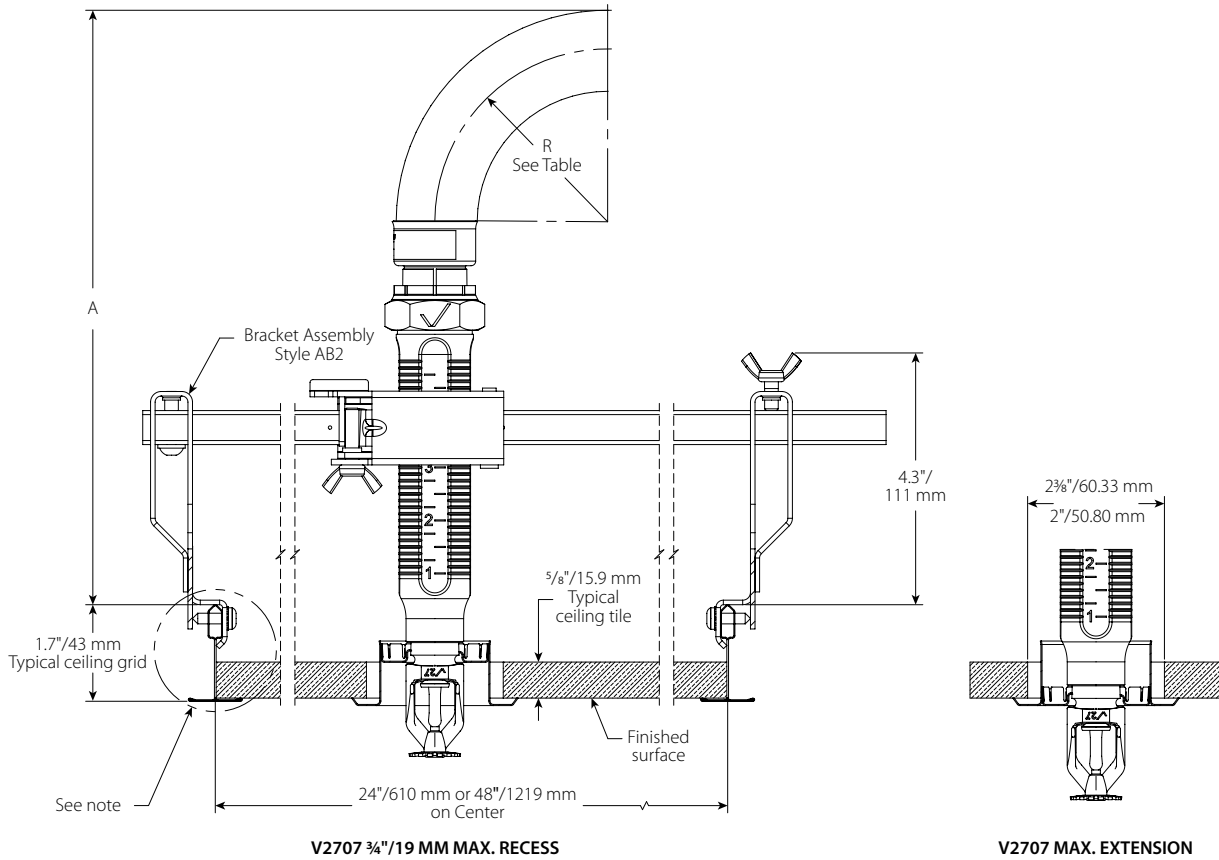
- FM Approved.



## 4.6 DIMENSIONS

### Clearances

Series AH2 Braided Hose and Style AB2 Bracket



V2707 3/4"/19 MM MAX. RECESS

V2707 MAX. EXTENSION

Hose Clearance Chart						
	Straight Reducer				Long Elbow	Short Elbow
	V2707 3/4" Max Recess inches mm	V3802 1/2" Max Recess inches mm	V2707 3/4" Max Recess inches mm	V3802 1/2" Max Recess inches mm	V2707 3/4" Max Recess inches mm	V3802 1/2" Max Recess inches mm
"R" Minimum Bend Radius	3.0 76.2		7.0 177.8		-	
"A" Minimum Required Installation Space	9.6 244	11.1 282	13.6 345	15.1 384	5.8 147	5.8 147

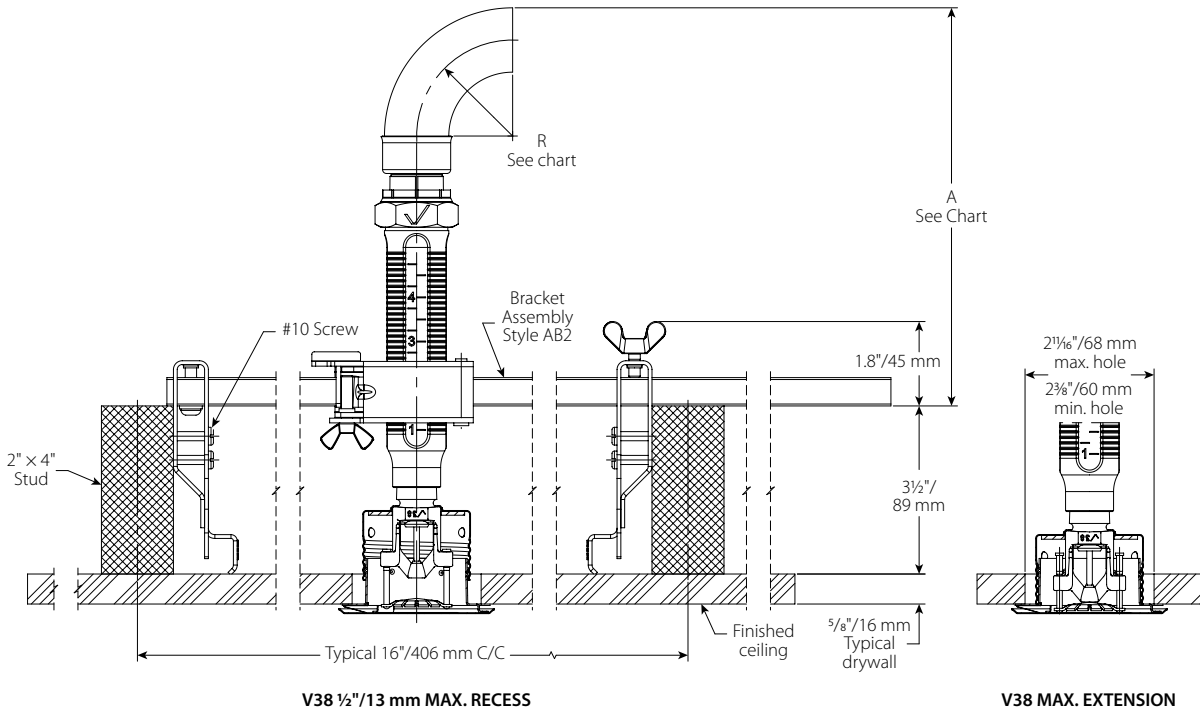
**NOTE**

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

## 4.7 DIMENSIONS

### Clearances

Series AH2 Braided Hose and Style AB2 Bracket



Hose Clearance Chart						
	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
"R" Minimum Bend Radius	3.0 80			7.0 175		
"A" Minimum Required Installation Space	7.2 183	8.6 218	7.1 180	11.2 285	12.6 320	11.1 282

Hose Clearance Chart			
	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" Minimum Bend Radius	-		
"A" Minimum Required Installation Space	3.3 84	3.6 91	3.3 84

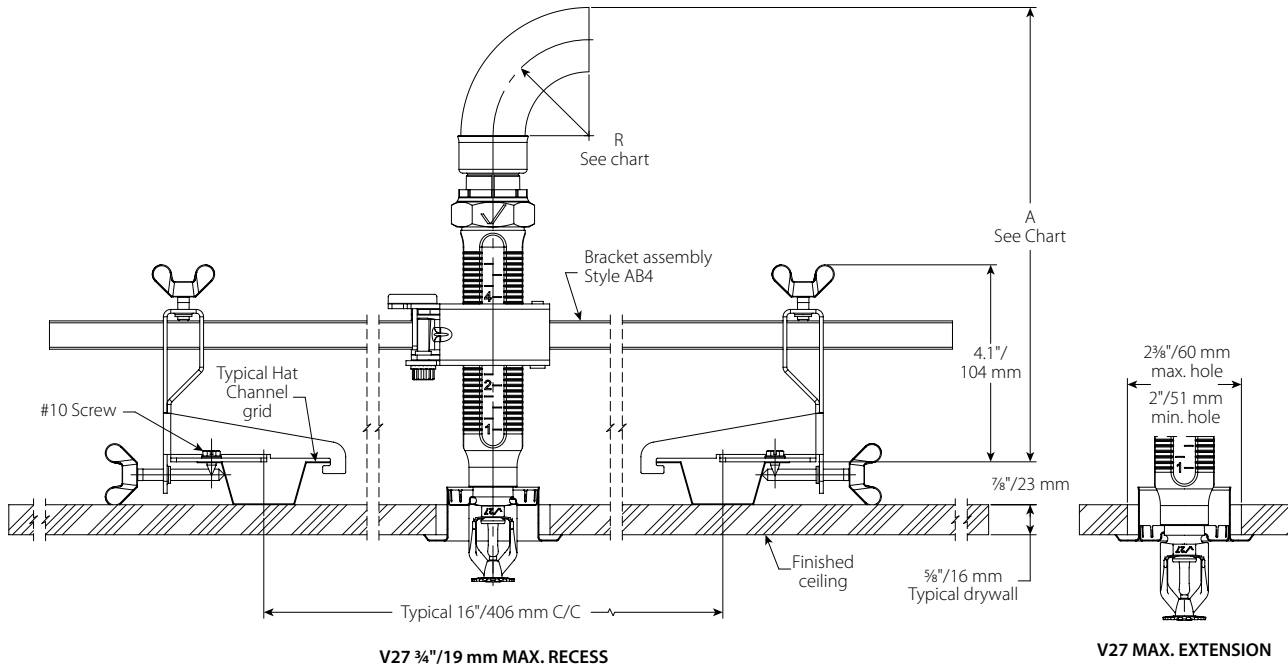
**NOTE**

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

## 4.8 DIMENSIONS

### Clearances

Series AH2 Braided Hose and Style AB4 Bracket



Hose Clearance Chart

					Long Elbow	Short Elbow
	V2707 3/4" Max Recess inches mm	V3802 1/2" Max Recess inches mm	V2707 3/4" Max Recess inches mm	V3802 1/2" Max Recess inches mm	V2707 3/4" Max Recess inches mm	V3802 1/2" Max Recess inches mm
"R" Minimum Bend Radius	3.0 80	3.0 80	7.0 175	7.0 175	-	
"A" Minimum Required Installation Space	9.8 249	11.2 285	13.8 351	15.2 386	8.0 203	5.9 150

**NOTE**

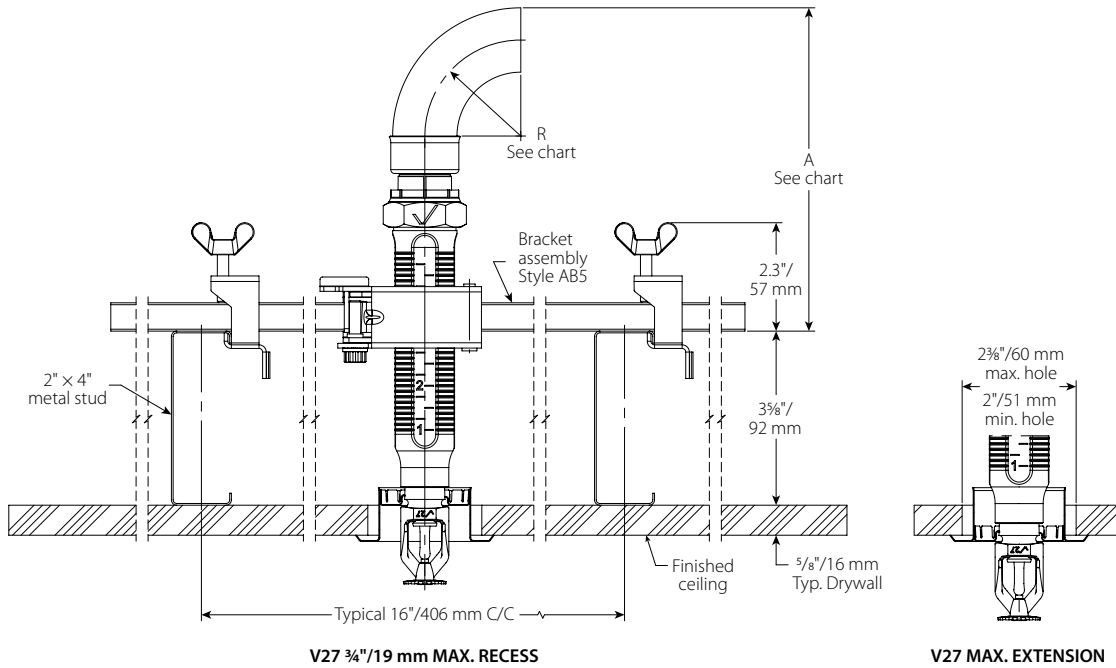
- Variations of ceiling grids, sprinkler heads, brackets, and hoses are permitted but may result in clearance differences from the figures above.



## 4.9 DIMENSIONS

### Clearances

Series AH2 Braided Hose and Style AB5 Bracket



Hose Clearance Chart						
	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" Minimum Bend Radius	3.0 80			7.0 175		
"A" Minimum Required Installation Space	7.0 178	8.7 221	7.1 180	11.0 279	12.7 323	11.1 282

Hose Clearance Chart					
	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" Minimum Bend Radius	-				
"A" Minimum Required Installation Space	3.5 89	4.9 124	3.6 91	2.9 74	3.3 84

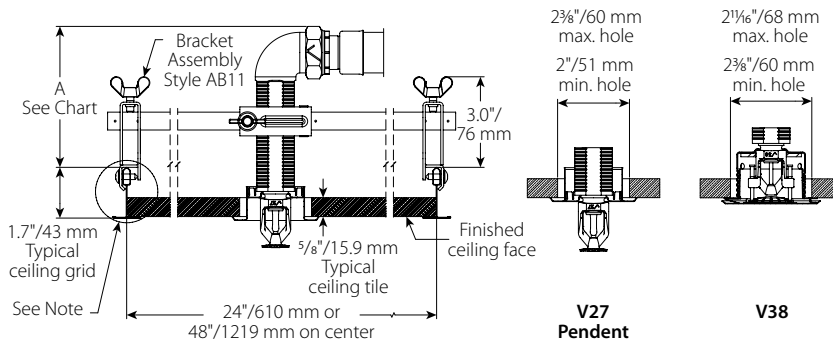
**NOTE**

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

## 4.10 DIMENSIONS

### Clearances

Series AH2 Braided Hose and Style AB11 Bracket (LOW PROFILE SOLUTION)



Hose Clearance Chart		
	Low-Profile Long Elbow	Low-Profile Short Elbow
	<b>V2707</b> 3/4"   20 mm Max Recess"	<b>V3802</b> 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.

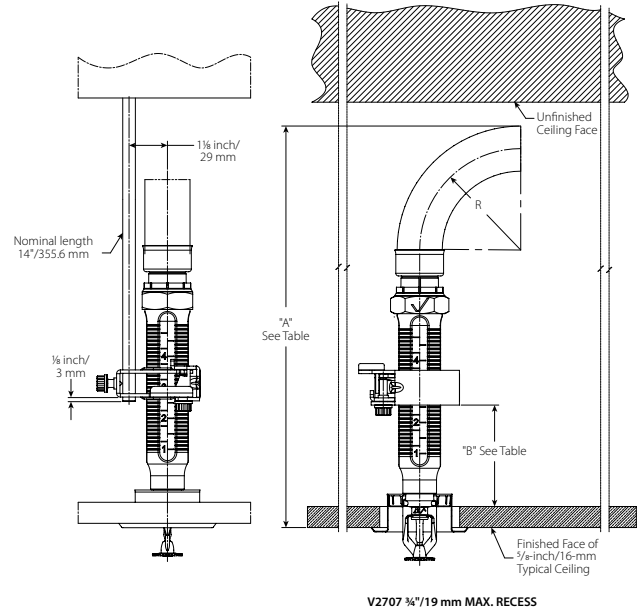
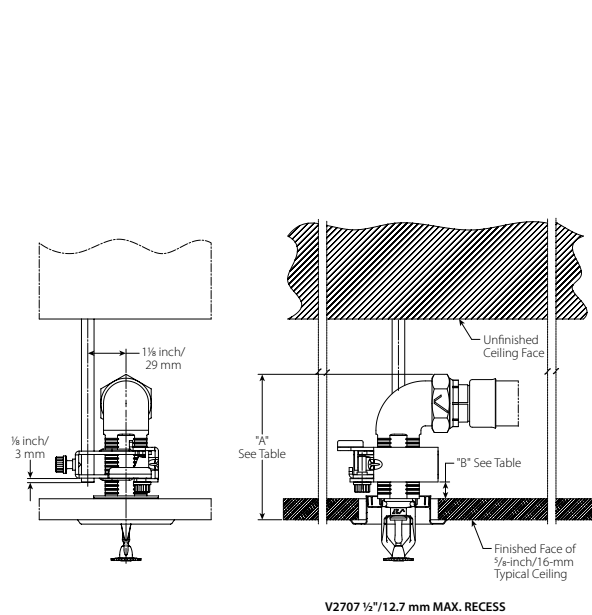
## 4.11 DIMENSIONS

### CLEARANCES ABOVE CEILING

Series AH1 Braided Hose and Style AB12 and ABBA Bracket

Suspended Ceiling Grid with Recessed Sprinkler with Low Profile Short Elbow

Suspended Ceiling Grid with Recessed Sprinkler and Straight 5.75"/140mm Reducer



Dimension		Low Profile Short Elbow		Low Profile Long Elbow		Standard Short Elbow		Standard Long Elbow		Standard Straight Reducer	
		3/4" / 19mm Recessed*	Concealed	3/4" / 19mm Recessed	Concealed	3/4" / 19mm Recessed	Concealed	3/4" / 19mm Recessed	Concealed	3/4" / 19mm Recessed	Concealed
		inches	inches	inches	inches	inches	inches	inches	inches	inches	inches
A	Minimum Required Installation Space	4.0	5.5	5.6	7.2	5.9	7.5	7.7	9.3	15.0	16.6
		101.6	139.7	142.2	182.9	149.9	190.5	195.6	236.2	381.0	421.6
B	Distance from Top of Typical Ceiling Tile to Bottom of Gate	0.5	2.0	1.5	1.5	1.5	1.5	3.0	3.0	3.0	3.0
		12.7	50.8	38.1	38.1	38.1	38.1	76.2	76.2	76.2	76.2

\* Adjustability will be limited

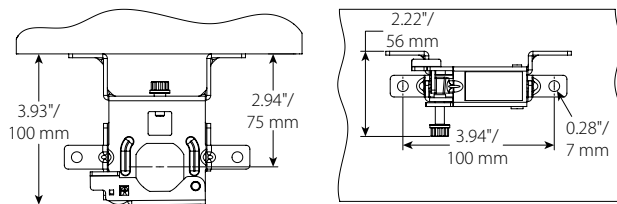
**NOTE**

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

## 4.12 DIMENSIONS

### Style ABMM Bracket

#### Stand-off Dimensions

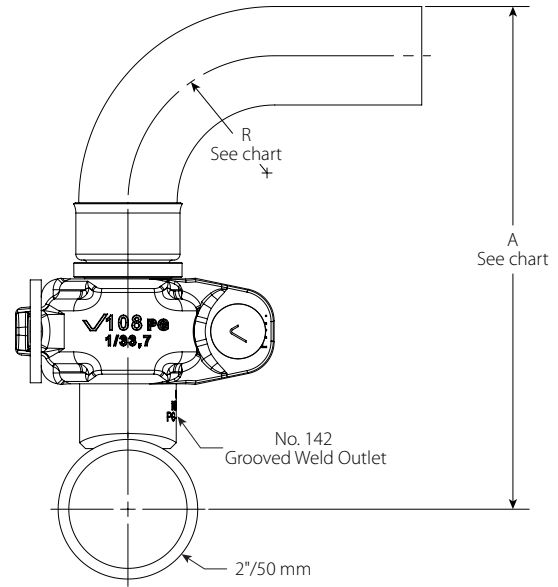
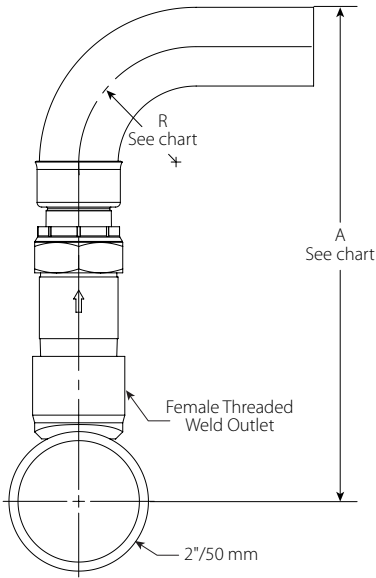


### 4.13 DIMENSIONS

#### BRANCHLINE CLEARANCES

Series AH1 Braided Hose with female threaded outlet

Series AH1-CC Braided Hose with grooved outlet



Hose Clearance Chart						
Dimension		inches mm	inches mm	inches mm	inches mm	inches mm
R	Minimum Bend Radius	3 80	4 100	5 125	6 150	7 175
A	Min.	9.4 239	10.4 264	11.4 290	12.4 315	13.41 341

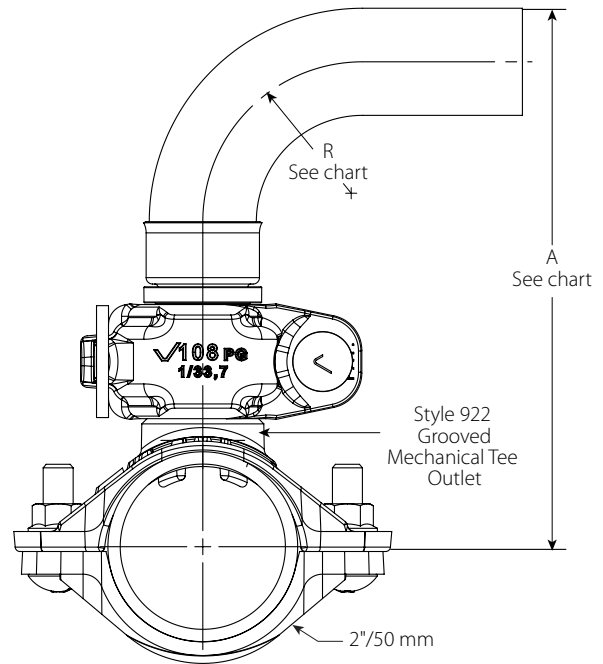
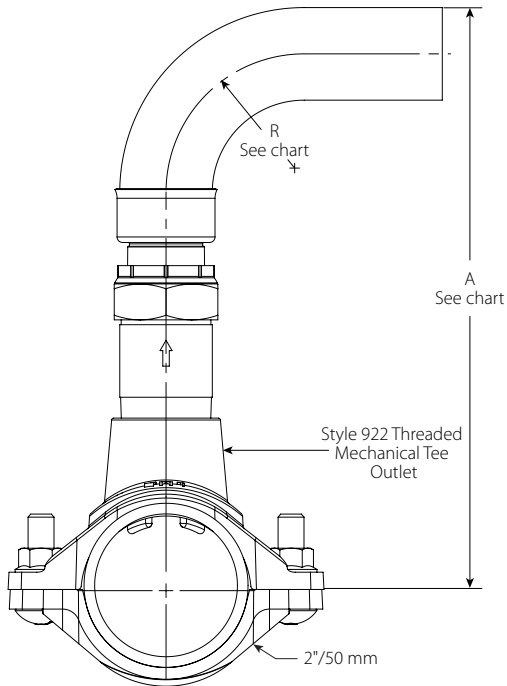
Hose Clearance Chart						
Dimension		inches mm	inches mm	inches mm	inches mm	inches mm
R	Minimum Bend Radius	3 80	4 100	5 125	6 150	7 175
A	Min.	8.1 205	9.1 231	10.1 256	11.1 281	12.1 307

### 4.14 DIMENSIONS

#### BRANCHLINE CLEARANCES

Series AH1 Braided Hose with Style 922 threaded outlet

Series AH1-CC Braided Hose with Style 922 grooved outlet



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

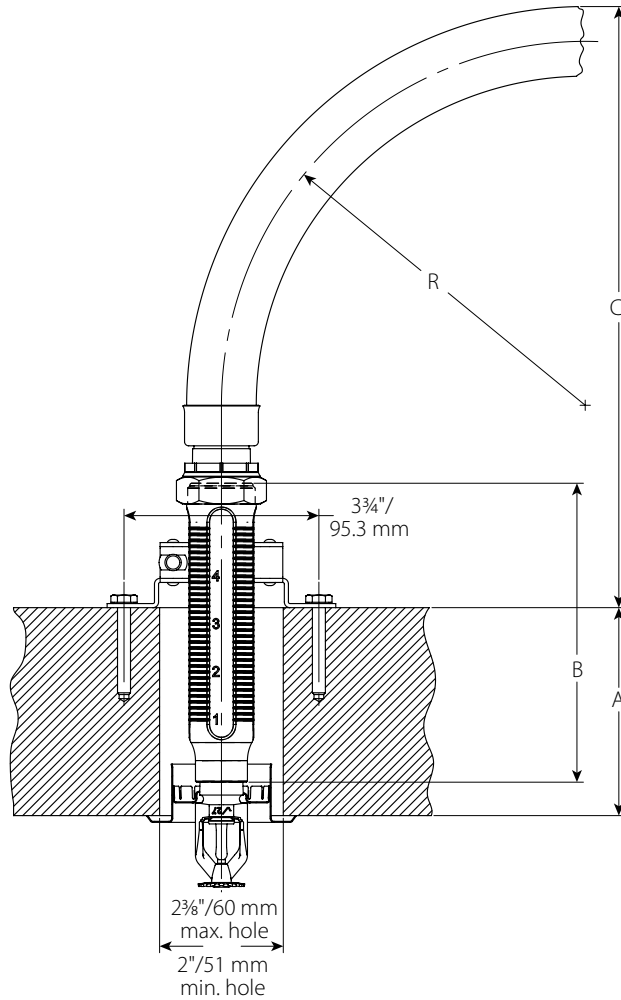
Hose Clearance Chart						
Dimension		inches	inches	inches	inches	inches
		mm	mm	mm	mm	mm
R	Minimum Bend Radius	3	4	5	6	7
		80	100	125	150	175
A	Min.	7.7	8.7	9.7	10.7	11.7
		197	222	247	273	298

### 4.15 DIMENSIONS

#### CLEARANCES ABOVE CEILING

Series AH1 Braided Hose and Style AB3 and ABMM Bracket

Surface Mount Application with Recessed Sprinkler



Hose Clearances																
Wall Thickness "A"	4 100				6 150				8 200				10 250			
Outlet Length "B"	5.75	9	13	9	13	13	13	5.75	9	13	5.75	9	13	5.75	9	13
	146.1	228.6	330.2	228.6	330.2	330.2	330.2	146.1	228.6	330.2	146.1	228.6	330.2	228.6	330.2	330.2
Hose Clearance "C"	9.6	12.8	16.8	10.8	14.8	12.8	10.8	12.6	15.8	19.8	10.6	13.8	17.8	11.8	15.8	13.8
	243	325	427	275	376	325	275	319	402	503	268	351	452	300	402	351
Bend Radius "R"	7 175							8 200								

- 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.

5.0 PERFORMANCE – FRICTION LOSS DATA



Series AH1 and AH1-CC Braided Hose with Straight 5.75" Reducers  
 Style AB2, AB4, AB5 and AB10 Brackets

Length inches mm	Type	Nominal Outlet Size inches DN	Equivalent Length of 1"/33.7mm Sch. 40 pipe feet meters	Max Bends
31 790	Straight	1/2 DN15	41.0 12.5	3
31 790	Straight	3/4 DN20	39.0 11.9	3
36 915	Straight	1/2 DN15	49.0 14.9	4
36 915	Straight	3/4 DN20	48.0 14.6	4
48 1220	Straight	1/2 DN15	62.0 18.9	4
48 1220	Straight	3/4 DN20	59.0 18.0	4
60 1525	Straight	1/2 DN15	72.0 21.9	4
60 1525	Straight	3/4 DN20	73.0 22.3	4
72 1830	Straight	1/2 DN15	87.0 26.5	5
72 1830	Straight	3/4 DN20	90.0 27.4	5

5.0 PERFORMANCE – FRICTION LOSS DATA (CONTINUED)



Series AH1 Braided Hose with 90° Low Profile Elbows  
Style AB11 VicFlex Bracket

Hose		Reducer		UL	
Length inches mm	Type	Nominal Outlet Size inches DN	Equivalent Length of 1"/33.7mm Sch. 40 pipe		Max Bends
			feet	meters	
31 790	LP Elbow	1/2 DN15	37.0 11.3		3
31 790	LP Elbow	3/4 DN20	44.0 13.4		3
36 915	LP Elbow	1/2 DN15	47.0 14.3		4
36 915	LP Elbow	3/4 DN20	53.0 16.2		4
48 1220	LP Elbow	1/2 DN15	58.0 17.7		4
48 1220	LP Elbow	3/4 DN20	68.0 20.7		4
60 1525	LP Elbow	1/2 DN15	70.0 21.3		4
60 1525	LP Elbow	3/4 DN20	77.0 23.5		4
72 1830	LP Elbow	1/2 DN15	83.0 25.3		5
72 1830	LP Elbow	3/4 DN20	99.0 30.2		5



## 5.0 PERFORMANCE – FRICTION LOSS DATA

### Series AH1 Braided Hose Equivalent Length Design Guide

Equivalent length values at various numbers of 90 degree bends at 3"/76.2 mm center line bend radius

Hose		Bends				
Length inches mm	Nominal Outlet Size inches DN	1 Bend feet meters	2 Bends feet meters	3 Bends feet meters	4 Bends feet meters	5 Bends feet meters
31 790	1/2 DN15	28.0 8.5	34.0 10.4	41.0 12.5	–	–
31 790	3/4 DN20	28.0 8.5	33.0 10.1	39.0 11.9	–	–
36 915	1/2 DN15	34.0 10.4	39.0 11.9	44.0 13.4	49.0 14.9	–
36 915	3/4 DN20	33.0 10.1	39.0 11.9	44.0 13.4	48.0 14.6	–
48 1220	1/2 DN15	44.0 13.4	50.0 15.2	56.0 17.1	62.0 18.9	–
48 1220	3/4 DN20	44.0 13.4	50.0 15.2	55.0 16.8	59.0 18.0	–
60 1525	1/2 DN15	55.0 16.8	61.0 18.6	66.0 20.1	72.0 21.9	–
60 1525	3/4 DN20	55.0 16.8	61.0 18.6	67.0 20.4	73.0 22.3	–
72 1830	1/2 DN15	68.0 20.7	72.0 21.9	76.0 23.2	82.0 25.0	87.0 26.5
72 1830	3/4 DN20	67.0 20.4	71.0 21.6	75.0 22.9	83.0 25.3	90.0 27.4

#### NOTES

- Values for use with 5.75" straight reducers.
- The values in this table are provided by the manufacturer for reference only. For friction loss data in accordance with the UL Certification, please refer to page 17 of this publication.

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.

5.0 PERFORMANCE – FRICTION LOSS DATA



Series AH1 and AH1-CC Braided Hose  
 Style AB2, AB3, AB4, AB5, AB7, AB7 Adj., AB8, AB10, 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	Max Bends
31 790	Straight	1/2 DN15	5.6 8.1	35.7 10.9	2
31 790	Elbow	1/2 DN15	5.6 8.1	30.4 9.3	2
36 915	Straight	1/2 DN15	5.6 8.1	42.1 12.8	2
36 915	Elbow	1/2 DN15	5.6 8.1	36.9 11.2	2
48 1220	Straight	1/2 DN15	5.6 8.1	57.5 17.5	3
48 1220	Elbow	1/2 DN15	5.6 8.1	52.2 15.9	3
60 1525	Straight	1/2 DN15	5.6 8.1	72.9 22.2	4
60 1525	Elbow	1/2 DN15	5.6 8.1	68.2 20.8	4
72 1830	Straight	1/2 DN15	5.6 8.1	88.4 26.9	4
72 1830	Elbow	1/2 DN15	5.6 8.1	83.8 25.5	4
31 790	Straight	3/4 DN20	8.0 11.5	32.9 10.0	2
31 790	Elbow	3/4 DN20	8.0 11.5	32.4 9.9	2
36 915	Straight	3/4 DN20	8.0 11.5	39.2 11.9	2
36 915	Elbow	3/4 DN20	8.0 11.5	38.9 11.9	2
48 1220	Straight	3/4 DN20	8.0 11.5	54.4 16.6	3
48 1220	Elbow	3/4 DN20	8.0 11.5	54.5 16.6	3
60 1525	Straight	3/4 DN20	8.0 11.5	69.5 21.2	4
60 1525	Elbow	3/4 DN20	8.0 11.5	70.1 21.4	4
72 1830	Straight	3/4 DN20	8.0 11.5	84.7 25.8	4
72 1830	Elbow	3/4 DN20	8.0 11.5	85.7 26.1	4

FM NOTES

- Series AH1 has 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 and Vds standards 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°.

5.0 PERFORMANCE – FRICTION LOSS DATA (CONTINUED)



Series AH1 and AH1-CC Braided Hose  
Style AB2, AB3, AB4, AB5, AB7, AB7 Adj., AB8, AB10, 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	Max Bends
31 790	Straight	3/4 DN20	11.2 16.1	32.9 10.0	2
31 790	Elbow	3/4 DN20	11.2 16.1	32.4 9.9	2
36 915	Straight	3/4 DN20	11.2 16.1	39.2 11.9	2
36 915	Elbow	3/4 DN20	11.2 16.1	38.9 11.9	2
48 1220	Straight	3/4 DN20	11.2 16.1	54.4 16.6	3
48 1220	Elbow	3/4 DN20	11.2 16.1	54.5 16.6	3
60 1525	Straight	3/4 DN20	11.2 16.1	69.5 21.2	4
60 1525	Elbow	3/4 DN20	11.2 16.1	70.1 21.4	4
72 1830	Straight	3/4 DN20	11.2 16.1	84.7 25.8	4
72 1830	Elbow	3/4 DN20	11.2 16.1	85.7 26.1	4
31 790	Straight	3/4 DN20	14.0 20.2	32.9 10.0	2
31 790	Elbow	3/4 DN20	14.0 20.2	32.4 9.9	2
36 915	Straight	3/4 DN20	14.0 20.2	39.2 11.9	2
36 915	Elbow	3/4 DN20	14.0 20.2	38.9 11.9	2
48 1220	Straight	3/4 DN20	14.0 20.2	54.4 16.6	3
48 1220	Elbow	3/4 DN20	14.0 20.2	54.5 16.6	3
60 1525	Straight	3/4 DN20	14.0 20.2	69.5 21.2	4
60 1525	Elbow	3/4 DN20	14.0 20.2	70.1 21.4	4
72 1830	Straight	3/4 DN20	14.0 20.2	84.7 25.8	4
72 1830	Elbow	3/4 DN20	14.0 20.2	85.7 26.1	4

FM NOTES

- Series AH1 has 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 and Vds standards 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°.

5.0 PERFORMANCE – FRICTION LOSS DATA



Series AH1 Braided Hose with 90° Low Profile Elbows  
Style AB5, AB11, AB12, ABBA and ABMM VicFlex Bracket

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	Max Bends
31 790	LP Elbow	3/4 DN20	5.6 8.1	31.4 9.6	2
36 915	LP Elbow	3/4 DN20	5.6 8.1	37.7 11.5	2
48 1220	LP Elbow	3/4 DN20	5.6 8.1	52.8 16.1	3
60 1525	LP Elbow	3/4 DN20	5.6 8.1	67.8 20.7	4
72 1830	LP Elbow	3/4 DN20	5.6 8.1	82.9 25.3	4
31 790	LP Elbow	3/4 DN20	8.0 11.5	32.3 9.8	2
36 915	LP Elbow	3/4 DN20	8.0 11.5	38.8 11.8	2
48 1220	LP Elbow	3/4 DN20	8.0 11.5	54.4 16.6	3
60 1525	LP Elbow	3/4 DN20	8.0 11.5	70.1 21.4	4
72 1830	LP Elbow	3/4 DN20	8.0 11.5	85.7 26.1	4
31 790	LP Elbow	3/4 DN20	11.2 16.1	32.3 9.8	2
36 915	LP Elbow	3/4 DN20	11.2 16.1	38.8 11.8	2
48 1220	LP Elbow	3/4 DN20	11.2 16.1	54.4 16.6	3
60 1525	LP Elbow	3/4 DN20	11.2 16.1	70.1 21.4	4
72 1830	LP Elbow	3/4 DN20	11.2 16.1	85.7 26.1	4
31 790	LP Elbow	3/4 DN20	14.0 20.2	32.3 9.8	2
36 915	LP Elbow	3/4 DN20	14.0 20.2	38.8 11.8	2
48 1220	LP Elbow	3/4 DN20	14.0 20.2	54.4 16.6	3
60 1525	LP Elbow	3/4 DN20	14.0 20.2	70.1 21.4	4
72 1830	LP Elbow	3/4 DN20	14.0 20.2	85.7 26.1	4

FM NOTES

- Series AH1 has 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 and Vds standards for safety include, but are not limited to, pressure cycling, corrosion resistance, flow characteristics, vibration resistance, leakage, mechanical and hydrostatic strength.
- Differences in equivalent lengths are due to varying test methods, per FM 1637 and VdS standards. Refer to these standards for additional information regarding friction loss test methods.
- EXAMPLE: A 48-inch hose installed with two 30° bends and two 90° bends at a 7-inch bend radius 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°.

**5.0 PERFORMANCE – FRICTION LOSS DATA**



**Series AH1 and AH1-CC Braided Hose**  
**Style AB2, AB4, AB5, AB7, AB7 Adj., AB8, AB10, AB11 and AB12 Brackets**

Hose	Reducer	VdS	
		Equivalent Length according to EN 10255 DN 20 (26.9 x 2.65mm)	Max Bends
Length mm inches	Nominal Outlet Size DN inches	meters feet	
790 31	DN15 ½	3.2 10.5	3
790 31	DN20 ¾	3.2 10.5	3
915 36	DN15 ½	3.7 12.1	3
915 36	DN20 ¾	3.7 12.1	3
1220 48	DN15 ½	4.9 16.1	3
1220 48	DN20 ¾	4.9 16.1	3
1525 60	DN15 ½	6.1 20.0	4
1525 60	DN20 ¾	6.1 20.0	4
1830 72	DN15 ½	7.3 24.0	4
1830 72	DN20 ¾	7.3 24.0	4

**VDS CEILING MANUFACTURERS LIST**

**AB1, AB2, AB7, AB10, AB11, AB12 AB4**

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

No specific approval

**AB8**

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

5.0 PERFORMANCE – FRICTION LOSS DATA (continued)



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

Series AH1 and AH1-CC Braided Hose  
Style AB2, AB3, AB4, AB5, AB7, AB8 and AB10 Brackets

Hose  Length mm inches	Reducer  Nominal Outlet Size DN inches	LPCB	
		Equivalent Length according to EN 10255 DN 25 (33.7 x 3.25mm) meters feet	Max Bends
790 31	DN15 ½	10.4 34.1	2
790 31	DN20 ¾	11.3 37.1	2
915 36	DN15 ½	13.4 44.0	3
915 36	DN20 ¾	13.9 45.6	3
1220 48	DN15 ½	16.2 53.1	3
1220 48	DN20 ¾	16.5 54.1	3
1525 60	DN15 ½	19.2 63.0	3
1525 60	DN20 ¾	19.7 64.6	3
1830 72	DN15 ½	22.8 74.8	3
1830 72	DN20 ¾	23.5 77.1	3



Series AH1 Flexible Hose Friction Loss Data

Model	Length of Flexible Hose mm inches	Equivalent Length	
		Straight Configuration meters feet	Bend Configuration meters feet
AH1-31	790	4.78	5.80
	31	15.7	19.0
AH1-36	915	5.59	10.15
	36	18.3	33.3
AH1-48	1220	9.75	16.25
	48	32.0	53.3
AH1-60	1525	12.15	22.94
	60	39.9	75.3
AH1-72	1830	14.26	25.98
	72	46.8	85.2

NOTE

- Friction loss data is in accordance with GB5135.16 tested at a flow rate of 114 liters per minute (30 gallons per minute).

## 6.0 NOTIFICATIONS

### WARNING



- 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.

- 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 13, 13D, 13R, etc.) standards, or equivalent 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.

### WARNING

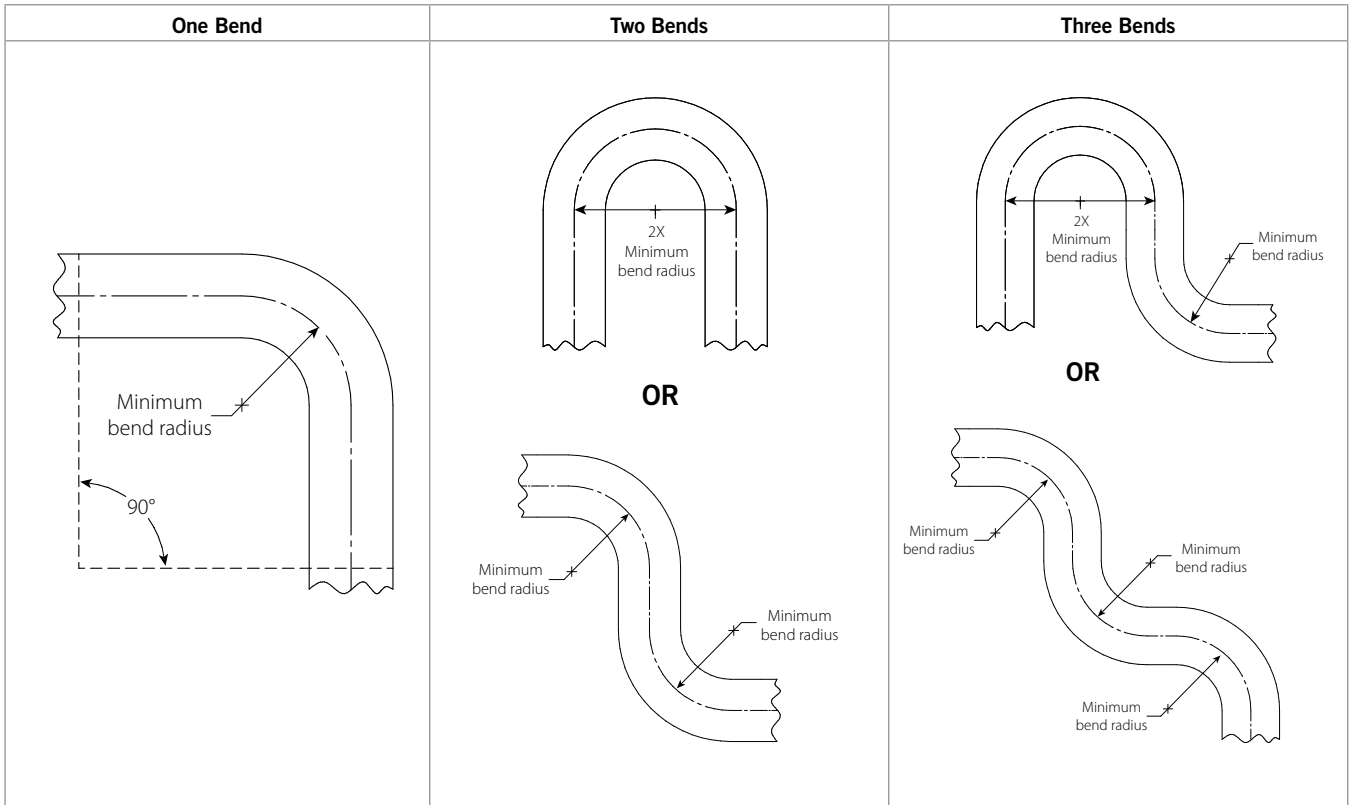
- It is the responsibility of the system designer to verify suitability of 300-series stainless steel flexible hose for use with the intended fluid media within the piping system and external environments.
- The effect of chemical composition, pH level, operating temperature, chloride level, oxygen level, and flow rate on 300-series stainless steel flexible hose must be evaluated by the material specifier 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 micro-biologically influenced corrosion (MIC), including as required by NFPA 13. Failure to identify adverse water quality issues may affect the VicFlex product and void the manufacturer's warranty.

**Failure to follow these instructions could cause product failure, resulting in serious personal injury and/or property damage.**

Victaulic VicFlex Series AH1 and AH1-CC Flexible Sprinkler Fittings may be painted provided the paint is compatible with stainless steel and zinc-plated carbon steel or ductile iron. Care should be taken to ensure the sprinkler and associated escutcheon or coverplate are not painted.

## 7.0 REFERENCE MATERIALS – CHARACTERISTICS

### 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 making a determination as to the suitability of Victaulic products for a particular end-use application, in accordance with industry standards and project specifications, and the applicable building codes and related regulations as well as Victaulic performance, maintenance, safety, and warning 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, installation guide, or this disclaimer.

**Intellectual Property Rights**

No statement contained herein concerning a possible or suggested 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 subsidiaries or affiliates covering such use or design, 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.

**Note**

This product shall be manufactured by Victaulic or to Victaulic specifications. All products to be installed in accordance with current Victaulic installation/assembly instructions. Victaulic reserves the right to change product specifications, designs and standard equipment without notice and without incurring obligations.

**Installation**

Reference should always be made to I-VICFLEX-AB1-AB2-AB10, I-VICFLEX-AB4-AB9, I-VICFLEX-AB7, or I-VICFLEX-AB8 for the product you are installing. Handbooks are included with each shipment of Victaulic products for complete installation and assembly data, and are available in PDF format on our website at [www.victaulic.com](http://www.victaulic.com).

**Warranty**

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

**Trademarks**

*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.



# Section 2 – Pipe & Fittings

## APPROVALS AND SPECIFICATIONS

- ASTM A135, Grade A
- ASTM A795, Type E, Grade A
- Pressure rated to 300 psi
- Underwriters Laboratories—United States of America
- Underwriters Laboratories—Canada
- Factory Mutual
- NFPA-13
- NFPA-13R
- NFPA-14
- CIVIL DEFENSE APPROVAL—United Arab Emirates
- Made in the United States of America
- UL, ULC & FM listed for roll-groove, plain-end and welded joints for wet, dry, preaction and deluge sprinkler systems.
- LEED v4 Certified

## FINISHES AND COATINGS

- Schedule 10 & 40 Sprinkler Pipe receives an OD mill coating of water-based paint which has corrosion protection expected with a painted carbon steel product, i.e. it would be expected to resist corrosion for an extended and indefinite period in a clean and dry environment and, as environmental conditions deteriorate, the corrosion protection would also diminish.
- Schedule 10 & 40 Sprinkler Pipe (black) receives an ID mill coating of Eddy Guard II MIC preventative coating. EG2 has been tested at independent laboratories to resist bacterial growth and maintain minimal bacterial count after multiple flushes (25) of the pipe.
- Schedule 10 & 40 Sprinkler Pipe when Hot Dip Galvanized by ASTM A123 and supplied by Bull Moose Tube is UL listed and FM approved.

## PRODUCT IDENTIFICATION

- Every length of Bull Moose fire sprinkler pipe features large, easy-to-read, continuous stenciling, clearly identifying the manufacturer, type of pipe, size, and length.

Nominal Pipe Size (inches)		1	1-1/4"	1-1/2"	2"	2-1/2"	3"	4"	6"	8"
Schedule 10	O.D. (in)	1.315	1.660	1.900	2.375	2.875	3.500	4.500	6.625	8.625
	I.D. (in)	1.097	1.442	1.682	2.157	2.635	3.260	4.260	6.357	8.249
	Empty Weight (lb/ft)	1.410	1.810	2.090	2.640	3.530	4.340	5.620	9.290	16.940
	Water Filled Weight (lb/ft)	1.800	2.518	3.053	4.223	5.893	7.957	11.796	23.038	40.086
	C.R.R.*	15.27	9.91	7.76	6.27	4.92	3.54	2.50	1.158	1.805
	Pieces per Lift	91	61	61	37	30	19	19	10	7
Schedule 40	O.D. (in)	1.315	1.660	1.900	2.375	2.875	3.500	4.500		
	I.D. (in)	1.049	1.380	1.610	2.067	2.469	3.068	4.026		
	Empty Weight (lb/ft)	1.680	2.270	2.720	3.660	5.800	7.580	10.800		
	Water Filled Weight (lb/ft)	2.055	2.918	3.602	5.114	7.875	10.783	16.316		
	C.R.R.*	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
	Pieces per Lift	70	51	44	30	30	19	19		

\*Calculated using Standard UL CRR formula, UL Fire Protection Directory, Category VIZY \*\*Not Eddy Guard II treated/Not produced by BMT

## SUBMITTAL INFORMATION



Project

Contractor

Engineer

Specification Reference

Date  System Type

Locations

Comments

- Schedule 10 - Black
  Schedule 10 - Hot Dip Galvanized
  Schedule 40 - Black
  Schedule 40 - Hot Dip Galvanized

# FIG. 74FP SlideLOK® Ready for Installation Coupling



The patented SlidelOK coupling is the most rigid ready for installation coupling designed to reduce installation time. The slide action eases assembly and reduces installation time. The patented gasket provides four separate sealing surfaces for added protection.

The SlidelOK coupling is designed to be used with roll, cut or swage grooved steel pipe, Gruvlok® and SPF® grooved-end fittings, and valves.

The SlidelOK coupling allows for a maximum working pressure of 450 psi on roll or cut grooved carbon steel standard wall pipe. The SlidelOK coupling provides a rigid connection allowing pipe hanging practices per ASME B31 Pipe Codes.

\* Patents: 8282136; 8550502; 8615865; 9039046; 9168585; 9194516; 9297482; 9297484; 9500307; 9534715; 9631746; D680629; D680630; D696751



Patented\*



SlideLOK Pressure Responsive Gasket



For Listings/Approval Details and Limitations, visit our website at [www.anvilint.com](http://www.anvilint.com) or contact an Anvil® Sales Representative.

## MATERIAL SPECIFICATIONS

### HOUSING:

Ductile Iron conforming to ASTM A-536, Grade 65-45-12

### BOLTS:

- SAE J429, Grade 5, Zinc Electroplated (standard)
- SAE J429, Grade 5, Thermo-Diffusion Coated (special order)

### HEAVY HEX NUTS:

- ASTM A563, Grade A, Zinc Electroplated, Violet Dyed (standard)
- ASTM A563, Grade A, Thermo-Diffusion Coated (special order)

### HARDWARE KITS:

- 304 Stainless Steel (available in sizes up to 3/4")  
Kit includes: (2) Bolts per ASTM A193, Grade B8 and  
(2) Heavy Hex Nuts per ASTM A194, Grade 8.

### COATINGS:

- Rust inhibiting paint Color: ORANGE (standard)
- Hot Dipped Zinc Galvanized (optional)

### GASKET: Material

Properties as designated in accordance with ASTM D-2000.

### Pre-Lubricated Grade "E" EPDM, Type A Gasket (Violet color code)

-40°F to 150°F (Service Temperature Range)|(-40°C to 66°C)

Recommended for wet and dry (oil free air) pipe fire protection sprinkler systems. For dry pipe systems and freezer applications, Gruvlok Xtreme™ Lubricant is required.

### GASKET TYPE:

SlideLOK (1" - 8")

### LUBRICATION:

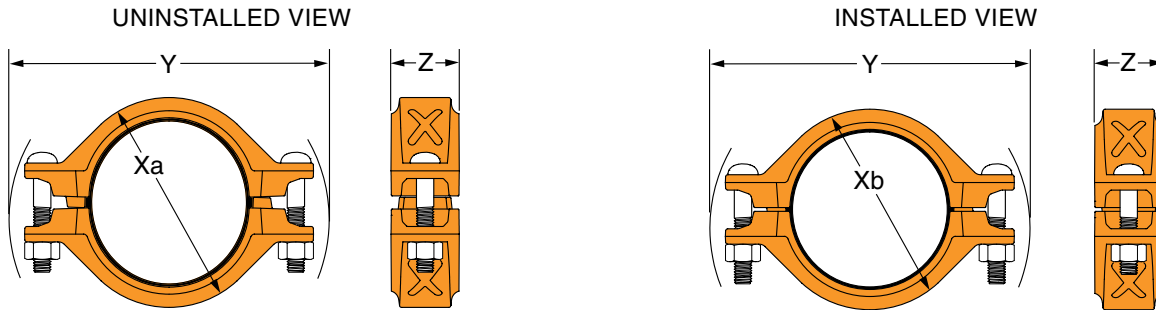
Gruvlok Xtreme™

## PROJECT INFORMATION

## APPROVAL STAMP

Project:	<input type="checkbox"/> Approved
Address:	<input type="checkbox"/> Approved as noted
Contractor:	<input type="checkbox"/> Not approved
Engineer:	Remarks:
Submittal Date:	
Notes 1:	
Notes 2:	

# FIG. 74FP SlideLOK® Ready for Installation Coupling



## 74FP SLIDELOK COUPLING

Figure Number	Nominal Size	Pipe O.D.	Max. Working Pressure▲	Max. End Load	Range of Pipe End Separation	Coupling Dimensions				Coupling Bolts		Approx. Wt. Ea.
						Xa	Xb	Y	Z	Qty.	Size	
	In./DN(mm)	In./mm	PSI/bar	Lbs./kN	In./mm	In./mm	In./mm	In./mm	In./mm		In./mm	Lbs./Kg
74FP	1	1.315	450	611	0-3/16	2 1/16	2 1/2	5	2	2	3/8 x 2 1/4	1.5
	25	33.4	31.0	2.72	0-4.8	68	64	127	51		M10 x 57	0.7
74FP	1 1/4	1.660	450	973	0-3/16	2 29/32	2 1/2	5 17/32	2	2	1/2 x 2 3/4	1.9
	32	42.2	31.0	4.33	0-4.8	74	64	140	51		M12 x 70	0.9
74FP	1 1/2	1.900	450	1,275	0-3/16	3 3/32	2 3/4	5 11/16	2	2	1/2 x 2 3/4	2.1
	40	48.3	31.0	5.67	0-4.8	80	70	144	51		M12 x 70	1.0
74FP	2	2.375	450	1,993	0-3/16	4 13/32	4	6 15/32	2	2	1/2 x 2 3/4	2.5
	50	60.3	31.0	8.87	0-4.8	112	102	164	51		M12 x 70	1.1
74FP	2 1/2	2.875	450	2,921	0-3/16	4 3/16	3 11/16	6 11/16	2	2	1/2 x 2 3/4	2.6
	65	73.0	31.0	12.99	0-4.8	106	94	170	51		M12 x 70	1.2
74FP	3	3.500	450	4,329	0-3/16	4 29/32	4 13/32	7 3/8	2	2	1/2 x 3	3.1
	80	88.9	31.0	19.26	0-4.8	125	112	187	51		M12 x 76	1.4
74FP	4	4.500	400	6,361	0-1/4	5 13/32	5 13/32	8 11/16	2	2	1/2 x 3 1/2	3.1
	100	114.3	27.6	28.30	0-6.3	152	137	221	51		M12 x 89	1.4
74*	5	5.563	300	7,291	0-5/16	7 1/4	6 3/4	10 1/2	2	2	5/8 x 3 1/2	5.5
	125	141.3	20.7	32.43	0-7.9	184	171	267	51		M16 x 89	2.5
74*	6	6.625	300	10,341	0-5/16	8 3/16	7 3/4	11	2	2	5/8 x 3 1/2	6.3
	150	168.3	20.7	46.00	0-7.9	211	197	279	51		M16 x 89	2.9
74*	8	8.625	300	17,527	0-5/16	10 3/4	10 1/8	14	2 1/2	2	3/4 x 4 1/2	14.3
	200	219.1	20.7	77.96	0-7.9	273	273	356	64		M20 x 115	6.5

Range of Pipe End Separation values are for system layout reference only. Actual installation spacing may vary based on pipe condition.

\* When ordering, refer to product as FP74.

▲ - Maximum Working Pressure Rating is for Schedule 40 pipe.

**For use in Dry Pipe Systems:** The SlideLOK pressure responsive gasket is featured with four sealing surfaces to increase protection in low temperature applications. Once the SlideLOK gasket is installed, the performance of the gasket is equivalent to the Gruvlok Flush Gap Gasket. Note: The Flush Gap Gasket is not interchangeable with the SlideLOK gasket.



**For dry pipe systems and freezer applications lubrication of the gasket is required, Gruvlok® Xtreme™ Lubricant is required.**



LISTINGS AND APPROVALS					
Manufacturer	Pipe	Groove	NPS Size Range	Pressure Rating	
				cULus	FM
			<i>In./DN(mm)</i>	<i>PSI/bar</i>	<i>PSI/bar</i>
Schedule 40*		Roll, Cut	1 - 4	450	450
			25 - 100	31.0	31.0
			5 - 6	300	300
			125 - 150	20.7	20.7
			8	400	400
			200	27.6	27.6
Schedule 30*		Roll	8	400	400
			200	27.6	27.6
Schedule 10*		Roll	1 - 4	365	365
			25 - 100	25.2	25.2
			5 - 6	300	300
			125 - 150	20.7	20.7
			8	400	NR
			200	27.6	—
0.188 inch Wall		Roll	8	NR	400
			200	—	27.6
Wheatland Tube	Schedule 10	Swage	1¼ - 4	365	300
			32 - 100	25.2	20.7
	Mega-Flow	Swage	1¼ - 4	NR	300
			32 - 100	—	20.7
		Roll	1¼ - 4, 6	300	300
			32 - 100, 150	20.7	20.7
	Mega-Thread	Roll	1 - 2	300	300
			25 - 50	20.7	20.7
	GL	Roll	1 - 2	300	300
			25 - 50	20.7	20.7
MLT	Roll	1 - 2	300	300	
		25 - 50	20.7	20.7	
WLS	Roll	1 - 2	300	NR	
		25 - 50	20.7	—	
Youngstown	Fire-Flow	Roll	1½ - 4	300	300
			40 - 100	20.7	20.7
	EZ-Thread	Roll	1 - 2	300	300
			25 - 50	20.7	20.7
Bull Moose Tube	Eddy-Flow	Roll	1¼ - 4	300	300
			32 - 100	20.7	20.7
	Eddy-Thread 40	Roll	1 - 2	300	300
			25 - 50	20.7	20.7

For the latest cULus pressure ratings, FM pressure ratings, and pipe approvals, please visit [anvilintl.com](http://anvilintl.com) or contact your local Anvil Representative.

\* Schedule 40/30 pipe to ASTM A795/A53/ASME B36.10 in accordance with NFPA-13.

\* Schedule 10 pipe to ASTM A135/A795/A53 in accordance with NFPA-13.



## ⚠ WARNING



- Read and understand all instructions before use.
- Ensure system is drained and depressurized before installation or service.
- Use appropriate personal protective equipment.

## INSTALLATION INSTRUCTIONS

### READY FOR INSTALLATION - RIGHT OUT OF THE BOX

Do not disassemble the SlideLOK Coupling. The 74FP coupling is ready for installation. The bolt and gasket do not need to be removed.

### 1 Pipe Preparation

Pipe ends are to be cut, rolled or swage grooved according to Anvil specifications. Not for use on "EG" grooved pipe ends. The pipe end must be smooth and free from metal burrs, sharp edges or projections.

### 2 Gasket Preparation

Ensure the gasket is suitable for the intended application by referring to the Anvil gasket compatibility chart.

SlideLOK pre-lubricated gasket does not require lubrication.

**NOTICE:** Gruvlok Xtreme Lubricant must be applied when used in dry pipe systems or freezer applications.

### 3 Assembly

The SlideLOK Fig. 74FP may be installed by one of two methods. The preferred method depends on the type of pipe components being joined and their orientation. Please review both methods before installing.

#### STEP 3 - METHOD #1

Slide the SlideLOK coupling completely over the grooved pipe end. This will allow a clear and un-obstructed view of the pipe for correct alignment.



- A.** Slide the coupling on the pipe past the groove. The bolts and nuts can be hand tightened to position the coupling in place.
- B.** Align the mating pipe end. Align the two adjoining pipes together.

- C.** Slide the coupling back over the grooves so that the coupling keys are located over the respective grooves on both pipe ends.
- D.** Follow the instructions on fastening the coupling as shown in Step 4.

#### STEP 3 - METHOD #2

Slide the SlideLOK coupling half way onto the pipe end or fitting. This will better accommodate fitting, and valve accessories during installation.



- A.** Slide the coupling on the fitting so that the groove and keys are aligned.
- B.** Bring the pipe end or fitting towards the coupling and insert so that the groove and coupling keys are aligned.

- C.** Hand tighten the nuts to correctly position the couplings keys over the respective grooved ends.
- D.** Follow the instructions on fastening the coupling as shown in Step 4.

### 4 Tighten Nuts

Securely tighten nuts alternately and equally, keeping the gaps at the bolt pads evenly spaced.

#### ANSI Specified Bolt Torque

Bolt Size	Wrench Size	Specified Bolt Torque*
In.	In.	Ft.-Lbs
3/8	11/16	40-50
1/2	7/8	80-100
5/8	1 1/16	100-130
3/4	1 1/4	130-180

\* Non-lubricated bolt torque



### 5 Assembly is complete

Visually inspect the pipe joint to assure the coupling keys are fully engaged in the pipe grooves. The bolt pads are to have equal gaps on each side of the coupling.

**NOTICE:** Visually inspect both sides of the coupling to ensure gaps between bolt pads are evenly spaced and are parallel. Any deviations must be corrected before placing coupling into service.

#### Step 5



CORRECT



INCORRECT

**NOTICE:** Uneven tightening may cause the gasket to pinch. Gasket should not be visible between segments after bolts are tightened.



## ⚠ WARNING



- Read and understand all instructions before use.
- Ensure system is drained and depressurized before installation or service.
- Use appropriate personal protective equipment.

## RE-INSTALLATION INSTRUCTIONS

### REINSTALLATION OF THE 74FP SLIDELOK COUPLING

The SlideLOK coupling is designed to be installed in the ready for installation assembly position once. After the initial assemble the following steps are to be taken to re-install the 74FP SlideLOK coupling.

**1 De-Pressurize the System**  
De-pressurize the system before removing the SlideLOK Coupling. Disassemble the couplings by removing the nuts, bolts and gasket from the housing halves. A wrench is required to overcome the epoxy used to secure the nuts on the bolts.

**2 Pipe Preparation**  
Pipe ends are to be cut, rolled or swage grooved according to Anvil specifications. Not for use on "EG" grooved pipe ends. The pipe end must be smooth and free from metal burrs or projections.



**3 Gasket Preparation**  
Ensure the gasket is suitable for the intended application by referring to the Anvil gasket compatibility chart. A light coating of Gruvlok® XTreme™ lubricant must be applied to the gasket prior to installation.



**4 Pipe Alignment and Gasket Installation**  
Slide the gasket onto the pipe then align the two pipe ends together. Pull the gasket into position, centering it between the grooves on each pipe. Gasket should not extend into the groove on either pipe.



**5 Housing Assembly**  
Place each of the housing halves on the pipe making sure the housing key fits into the groove. Be sure that the tongue and recess portions of the housing mate properly. Insert the bolts.



**6 Tighten Nuts**  
Securely tighten nuts alternately and equally, keeping the gaps at the bolt pads evenly spaced.

ANSI Specified Bolt Torque		
Bolt Size	Wrench Size	Specified Bolt Torque*
$\frac{3}{8}$ in.	$1\frac{1}{16}$ in.	40-50 Ft.-Lbs
$\frac{1}{2}$ in.	$\frac{7}{8}$ in.	80-100
$\frac{5}{8}$ in.	$1\frac{1}{16}$ in.	100-130
$\frac{3}{4}$ in.	$1\frac{1}{4}$ in.	130-180

\* Non-lubricated bolt torque

**NOTICE:** Uneven tightening may cause the gasket to pinch. Gasket should not be visible between segments after bolts are tightened.



**7 Assembly is complete**  
Visually inspect the pipe joint to assure the coupling keys are fully engaged in the pipe grooves. The bolt pads are to have equal gaps on each side of the coupling.

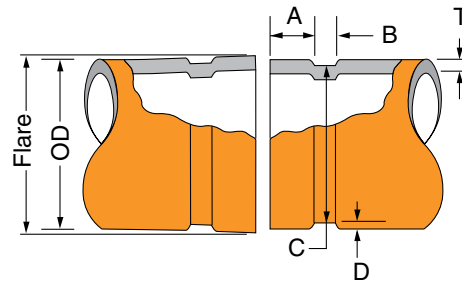
**NOTICE:** Visually inspect both sides of the coupling to ensure gaps between bolt pads are evenly spaced and are parallel. Any deviations must be corrected before placing coupling into service.



CORRECT



INCORRECT



**SWAGE GROOVE SPECIFICATION**

-1- Nominal Pipe Size	-2- O.D.			-3- "A" ±0.030/ ±0.76	-4- "B" ±0.030/ ±0.76	-5-		-6- "D" (Ref. Only)	-7- "T" Min. Allow. Wall Thick	-8- Max. Flare Dia.
	Actual	Tolerance				"C" Actual	"C" Tol.			
	In./DN(mm)	In./mm	+In./mm			-In./mm	In./mm			
1¼ 32	1.660 42.2	+0.016 +0.41	-0.016 -0.41	0.625 15.88	0.281 7.14	1.535 38.99	-0.015 -0.38	0.063 1.60	0.065 1.7	1.770 45.0
1½ 40	1.900 48.3	+0.019 +0.48	-0.019 -0.48	0.625 15.88	0.281 7.14	1.775 45.09	-0.015 -0.38	0.063 1.60	0.065 1.7	2.010 51.1
2 50	2.375 60.3	+0.024 +0.61	-0.024 -0.61	0.625 15.88	0.344 8.74	2.250 57.15	-0.015 -0.38	0.063 1.60	0.065 1.7	2.480 63.0
2½ 65	2.875 73.0	+0.029 +0.74	-0.029 -0.74	0.625 15.88	0.344 8.74	2.720 69.09	-0.018 -0.46	0.078 1.98	0.083 2.1	2.980 75.7
3 80	3.500 88.9	+0.035 +0.89	-0.031 -0.79	0.625 15.88	0.344 8.74	3.344 84.94	-0.018 -0.46	0.078 1.98	0.083 2.1	3.600 91.4
4 100	4.500 114.3	+0.045 +1.14	-0.031 -0.79	0.625 15.88	0.344 8.74	4.334 110.08	-0.020 -0.51	0.083 2.11	0.083 2.1	4.600 116.8

**COLUMN 1** - Nominal IPS Pipe size.

**COLUMN 2** - IPS outside diameter.

**COLUMN 3** - Gasket seat must be free from scores, seams, chips, rust or scale which may interfere with proper sealing of the gasket. Gasket seat width (Dimension A) is to be measured from the pipe end to the vertical flank in the groove wall.

**COLUMN 4** - Groove width (Dimension B) is to be measured between vertical flank of the groove size walls.

**COLUMN 5** - The groove must be of uniform depth around the entire pipe circumference. (See column 6).

**COLUMN 6** - Groove depth: for reference only. Groove must conform to the groove diameter "C" listed in column 5.

**COLUMN 7** - Minimum allowable wall thickness which may be roll grooved.

**COLUMN 8** - Maximum allowable pipe end flare diameter. Measured at the most extreme pipe end diameter of the gasket seat area.

**Out of roundness:** Difference between maximum O.D. and minimum O.D. measured at 90° must not exceed total O.D. tolerance listed (reference column 2).

**For IPS pipe,** the maximum allowable tolerance from square cut ends is 0.03" for 1" thru 3½"; and 0.045" for 4".

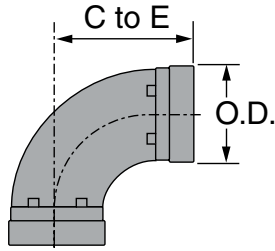
**Weld Seams** must be ground flush with the pipe O.D. and ID prior to roll grooving. Failure to do so may result in damage to the roll grooving machine and unacceptable roll grooves may be produced.

▼ "A" tolerance +0.030" / -0.060" (+0.77 / -1.54 mm)



# FIG. 7050S\*

# Standard 90° Elbow for Fire Protection



## FIGURE 7050S\* STANDARD 90° ELBOW

Nominal Size	O.D.	Max. Rated Pressure	Center to End	Approx. Wt. Ea.
In./DN(mm)	In./mm	PSI/bar	In./mm	Lbs./Kg
1	1.315	300	2¼	0.6
25	33.4	20.7	57	0.3
1¼	1.660	300	2¾	1.0
32	42.2	20.7	70	0.5
1½	1.900	300	2¾	1.2
40	48.3	20.7	70	0.5
2	2.375	300	3¼	1.7
50	60.3	20.7	83	0.8
2½	2.875	300	3¾	2.6
65	73.0	20.7	95	1.2
3 O.D.	2.996	300	4	3.6
76.1	76.1	20.7	102	1.6
3	3.500	300	4¼	4.0
80	88.9	20.7	108	1.8
4	4.500	300	5	7.7
100	114.3	20.7	127	3.5
5½ O.D.	5.500	300	5¼	10.9
139.7	139.7	20.7	133	4.9
5	5.563	300	5½	11.1
125	141.3	20.7	140	5.0
6½ O.D.	6.500	300	6½	17.4
165.1	165.1	20.7	165	7.9
6	6.625	300	6½	16.5
150	168.3	20.7	165	7.5
8	8.625	300	7¾	30.6
200	219.1	20.7	197	13.9
10	10.750	300	9	53.5
250	273.1	20.7	229	24.3
12	12.750	300	10	82
300	323.9	20.7	254	37.2

For additional sizes, see Fig. 7050 in the Gruvlok Catalog or contact an Anvil Representative.

These fittings are designed to provide minimal pressure drop and uniform strength.



- Available galvanized.

\* When ordering, refer to product as FP7050S.

## MATERIAL SPECIFICATIONS

### CAST FITTINGS:

Ductile Iron conforming to ASTM A-536

### COATINGS:

- Rust inhibiting paint Color: ORANGE (standard) or
- Hot Dipped Zinc Galvanized conforming to ASTM A-153 (optional)
- Other available options: Example: RAL3000 or RAL9000 Series

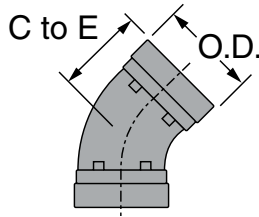
## PROJECT INFORMATION

## APPROVAL STAMP

<b>Project:</b>	<input type="checkbox"/> Approved
<b>Address:</b>	<input type="checkbox"/> Approved as noted
<b>Contractor:</b>	<input type="checkbox"/> Not approved
<b>Engineer:</b>	<b>Remarks:</b>
<b>Submittal Date:</b>	
<b>Notes 1:</b>	
<b>Notes 2:</b>	

# FIG. 7051 \*

## Standard 45° Elbow for Fire Protection



**FIGURE 7051 \*  
STANDARD 45° ELBOW**

Nominal Size	O.D.	Max. Rated Pressure	Center to End	Approx. Wt. Ea.
In./DN(mm)	In./mm	PSI/bar	In./mm	Lbs./Kg
1¼ 32	1.660 42.2	300 20.7	1¾ 44	0.7 0.3
1½ 40	1.900 48.3	300 20.7	1¾ 44	0.9 0.4
2 50	2.375 60.3	300 20.7	2 51	1.5 0.7
2½ 65	2.875 73.0	300 20.7	2¼ 57	1.9 0.9
3 80	3.500 88.9	300 20.7	2½ 64	3.3 1.5
4 100	4.500 114.3	300 20.7	3 76	5.4 2.4
5 125	5.563 141.3	300 20.7	3¼ 83	9.0 4.1
6 150	6.625 168.3	300 20.7	3½ 89	11.2 5.1
8 200	8.625 219.1	300 20.7	4¼ 108	19.8 9.0

Additional sizes available, see Gruvlok Catalog or contact an Anvil Representative.

These fittings are designed to provide minimal pressure drop and uniform strength.



Available as a fabricated fitting.

- Available galvanized.

\* When ordering, refer to product as FP7051.

For Listings/Approval Details and Limitations, visit our website at [www.anvilint.com](http://www.anvilint.com) or contact an Anvil® Sales Representative.

### MATERIAL SPECIFICATIONS

#### CAST FITTINGS:

Ductile Iron conforming to ASTM A-536

#### COATINGS:

- Rust inhibiting paint Color: ORANGE (standard) or
- Hot Dipped Zinc Galvanized conforming to ASTM A-153 (optional)
- Other available options: Example: RAL3000 or RAL9000 Series

### PROJECT INFORMATION

### APPROVAL STAMP

**Project:** Performance Partnership

**Address:** 3523 Jetstream Drive, Wilson, NC

**Contractor:**

**Engineer:**

**Submittal Date:** February 26, 2021

**Notes 1:**

**Notes 2:**

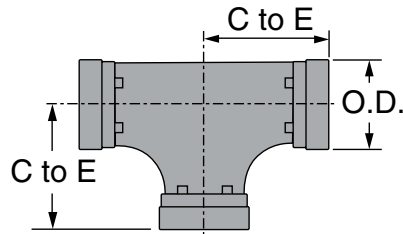
Approved

Approved as noted

Not approved

**Remarks:**

# FIG. 7060S\* Standard Tee for Fire Protection



**FIGURE 7060S\* STANDARD TEE**

Nominal Size	O.D.	Max. Rated Pressure	Center to End	Approx. Wt. Ea.
In./DN(mm)	In./mm	PSI/bar	In./mm	Lbs./Kg
1 25	1.315 33.4	300 20.7	2¼ 57	0.9 0.4
1¼ 32	1.660 42.2	300 20.7	2¾ 70	1.5 0.7
1½ 40	1.900 48.3	300 20.7	2¾ 70	1.8 0.8
2 50	2.375 60.3	300 20.7	3¼ 83	2.4 1.1
2½ 65	2.875 73.0	300 20.7	3¾ 95	4.0 1.8
3 O.D. 76.1	2.996 76.1	300 20.7	4 101	4.6 2.1
3 80	3.500 88.9	300 20.7	4¼ 108	5.8 2.6
4 100	4.500 114.3	300 20.7	5 127	10.3 4.7
5½ O.D. 139.7	5.500 139.7	300 20.7	5½ 140	16.1 7.3
5 125	5.563 141.3	300 20.7	5½ 140	16.2 7.3
6½ O.D. 165.1	6.500 165.1	300 20.7	6½ 165	24.4 11.1
6 150	6.625 168.3	300 20.7	6½ 165	25.7 11.7
8 200	8.625 219.1	300 20.7	7¾ 197	41.1 18.6
10 250	10.750 273.1	300 20.7	9 229	74.5 33.8
12 300	12.750 323.9	300 20.7	10 254	94.7 43.0

Additional sizes available, see Gruvlok Catalog or contact an Anvil Representative.

These fittings are designed to provide minimal pressure drop and uniform strength.



- Available galvanized.

\* When ordering, refer to product as FP7060S.

## MATERIAL SPECIFICATIONS

### CAST FITTINGS:

Ductile Iron conforming to ASTM A-536

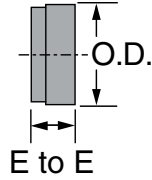
### COATINGS:

- Rust inhibiting paint Color: ORANGE (standard) or
- Hot Dipped Zinc Galvanized conforming to ASTM A-153 (optional)
- Other available options: Example: RAL3000 or RAL9000 Series

## PROJECT INFORMATION

## APPROVAL STAMP

<b>Project:</b>	<input type="checkbox"/> Approved
<b>Address:</b>	<input type="checkbox"/> Approved as noted
<b>Contractor:</b>	<input type="checkbox"/> Not approved
<b>Engineer:</b>	<b>Remarks:</b>
<b>Submittal Date:</b>	
<b>Notes 1:</b>	
<b>Notes 2:</b>	



<b>FIGURE 7074 CAP</b>			
Nominal Size	O.D.	End to End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg
1	1.315	1¼	0.3
25	33.4	32	0.1
1¼	1.660	1¼	0.4
32	42.2	32	0.2
1½	1.900	1¼	0.5
40	48.3	32	0.2
2	2.375	1	0.5
50	60.3	25	0.2
2½	2.875	1	0.7
65	73.0	25	0.3
3 O.D.	2.996	1	0.8
76.1	76.1	25	0.4
3	3.500	1	1.1
80	88.9	25	0.5
4	4.500	1⅝	2.8
100	114.3	29	1.3
5½ O.D.	5.500	1⅞	4.0
139.7	139.7	29	1.8
5	5.563	1⅞	4.0
125	141.3	29	1.8
6½ O.D.	6.500	1⅞	6.0
165.1	165.1	29	2.7
6	6.625	1¾	6.0
150	168.3	33	2.7
8	8.625	1½	12.5
200	219.1	38	5.7
10	10.750	1½	21.9
250	273.1	38	9.9
12	12.750	1½	33.8
300	323.9	38	15.3

Additional sizes available, see Gruvlok Catalog or contact an Anvil Representative.

For Listings/Approval Details and Limitations, visit our website at [www.anvilintl.com](http://www.anvilintl.com) or contact an Anvil® Sales Representative.

- Available galvanized.  
 \* When ordering, refer to product as FP7074.

**MATERIAL SPECIFICATIONS**

**CAST FITTINGS:**  
 Ductile Iron conforming to ASTM A-536

- COATINGS:**
- Rust inhibiting paint Color: ORANGE (standard) or
  - Hot Dipped Zinc Galvanized conforming to ASTM A-153 (optional)
  - Other available options: Example: RAL3000 or RAL9000 Series

<b>PROJECT INFORMATION</b>		<b>APPROVAL STAMP</b>	
<b>Project:</b> Performance Partnership		<input type="checkbox"/> Approved	
<b>Address:</b> 3523 Jetstream Drive, Wilson, NC		<input type="checkbox"/> Approved as noted	
<b>Contractor:</b>		<input type="checkbox"/> Not approved	
<b>Engineer:</b>		<b>Remarks:</b>	
<b>Submittal Date:</b> February 26, 2021			
<b>Notes 1:</b>			
<b>Notes 2:</b>			

# FIG. 7072 Concentric Reducer



## MATERIAL SPECIFICATIONS

### CAST FITTINGS:

Ductile Iron conforming to ASTM A-536

### FABRICATED FITTINGS:

1"–10" Carbon Steel, Schedule 40, conforming to ASTM A-53, Grade B

12" and above Carbon Steel, Standard Wall, conforming to ASTM A-53, Grade B

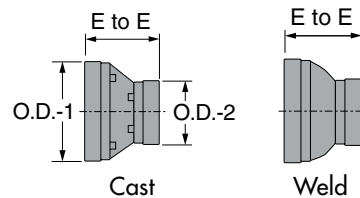
### COATINGS:

- Rust inhibiting paint Color: ORANGE (standard) or
- Hot Dipped Zinc Galvanized conforming to ASTM A-153 (optional)
- Other available options: Example: RAL3000 or RAL9000 Series



Available as a fabricated fitting.

– Available galvanized.



For Listings/Approval Details and Limitations, visit our website at [www.anviltl.com](http://www.anviltl.com) or contact an Anvil® Sales Representative.

### FIGURE 7072 CONCENTRIC REDUCER (GROOVE BY GROOVE)

Nominal Size	O.D.-1	O.D.-2	End to End	Approx. Wt. Ea.	Nominal Size	O.D.-1	O.D.-2	End to End	Approx. Wt. Ea.	Nominal Size	O.D.-1	O.D.-2	End to End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	In./mm	Lbs./Kg	In./DN(mm)	In./mm	In./mm	In./mm	Lbs./Kg	In./DN(mm)	In./mm	In./mm	In./mm	Lbs./Kg
1¼ x 1 32 x 25	1.660 42.2	1.315 33.4	2½ 64	0.6 0.3	4 x 1 100 x 25	4.500 114.3	1.315 33.4	3 76	2.2 1.0	6 x 4 150 x 100	6.625 168.3	4.500 114.3	4 102	5.6 2.5
1½ x 1 40 x 25	1.900 48.3	1.315 33.4	2½ 64	0.6 0.3	4 x 1¼ 100 x 32	4.500 114.3	1.660 42.2	3 76	2.2 1.0	6 x 5 150 x 125	6.625 168.3	5.563 141.3	4 102	6.0 2.7
1½ x 1¼ 40 x 32	1.900 48.3	1.660 42.2	2½ 64	0.6 0.3	4 x 1½ 100 x 40	4.500 114.3	1.900 48.3	3 76	2.3 1.0	8 x 3 200 x 80	8.625 219.1	3.500 88.9	5 127	12.0 5.5
2 x 1 50 x 25	2.375 60.3	1.315 33.4	2½ 64	0.8 0.4	4 x 2 100 x 50	4.500 114.3	2.375 60.3	3 76	2.4 1.1	8 x 4 200 x 100	8.625 219.1	4.500 114.3	5 127	9.0 4.1
2 x 1¼ 50 x 32	2.375 60.3	1.660 42.2	2½ 64	1.3 0.6	4 x 2½ 100 x 65	4.500 114.3	2.875 73.0	3 76	2.6 1.2	8 x 5 200 x 125	8.625 219.1	5.563 141.3	5 127	11.5 5.2
2 x 1½ 50 x 40	2.375 60.3	1.900 48.3	2½ 64	1.3 0.6	4 x 3 100 x 80	4.500 114.3	3.500 88.9	3 76	3.2 1.5	8 x 6 200 x 150	8.625 219.1	6.625 168.3	5 127	15.5 7.0
2½ x 1 65 x 25	2.875 73.0	1.315 33.4	2½ 64	1.0 0.5	4 x 3½ 100 x 90	4.500 114.3	4.000 101.6	3 76	3.6 1.6	10 x 4 250 x 100	10.750 273.1	4.500 114.3	6 152	20.0 9.1
2½ x 1¼ 65 x 32	2.875 73.0	1.660 42.2	2½ 64	1.0 0.5	5 x 2 125 x 50	5.563 141.3	2.375 60.3	3½ 89	4.6 2.1	10 x 5 250 x 125	10.750 273.1	5.563 141.3	6 152	20.0 9.1
2½ x 1½ 65 x 40	2.875 73.0	1.900 48.3	2½ 64	1.3 0.6	5 x 2½ 125 x 65	5.563 141.3	2.875 73.0	3½ 89	4.5 2.0	10 x 6 250 x 150	10.750 273.1	6.625 168.3	6 152	20.0 9.1
2½ x 2 65 x 50	2.875 73.0	2.375 60.3	2½ 64	1.6 0.7	5 x 3 125 x 80	5.563 141.3	3.500 88.9	3½ 89	4.4 2.0	10 x 8 250 x 200	10.750 273.1	8.625 219.1	6 152	23.9 10.8
3 x 1 80 x 25	3.500 88.9	1.315 33.4	2½ 64	1.2 0.5	5 x 4 125 x 100	5.563 141.3	4.500 114.3	3½ 89	4.5 2.0	12 x 4 300 x 100	12.750 323.9	4.500 114.3	7 178	25.0 11.3
3 x 1¼ 80 x 32	3.500 88.9	1.660 42.2	2½ 64	1.3 0.6	6 x 1 150 x 25	6.625 168.3	1.315 33.4	4 102	6.8 3.1	12 x 6 300 x 150	12.750 323.9	6.625 168.3	7 178	29.0 13.2
3 x 1½ 80 x 40	3.500 88.9	1.900 48.3	2½ 64	1.3 0.6	6 x 1½ 150 x 40	6.625 168.3	1.900 48.3	4 102	6.9 3.1	12 x 8 300 x 200	12.750 323.9	8.625 219.1	7 178	29.0 13.2
3 x 2 80 x 50	3.500 88.9	2.375 60.3	2½ 64	1.4 0.6	6 x 2 150 x 50	6.625 168.3	2.375 60.3	4 102	6.0 2.7	12 x 10 300 x 250	12.750 323.9	10.750 273.1	7 178	32.4 14.7
3 x 2½ 80 x 65	3.500 88.9	2.875 73.0	2½ 64	1.6 0.7	6 x 2½ 150 x 65	6.625 168.3	2.875 73.0	4 102	6.0 2.7					
3½ x 3 90 x 80	4.000 101.6	3.500 88.9	3 76	1.8 0.8	6 x 3 150 x 80	6.625 168.3	3.500 88.9	4 102	5.4 2.4					

Additional sizes available, see Gruvlok Catalog or contact an Anvil Representative.

■ – Cast fittings, all others are fabricated steel.

### PROJECT INFORMATION

### APPROVAL STAMP

<b>Project:</b>	<input type="checkbox"/> Approved
<b>Address:</b>	<input type="checkbox"/> Approved as noted
<b>Contractor:</b>	<input type="checkbox"/> Not approved
<b>Engineer:</b>	<b>Remarks:</b>
<b>Submittal Date:</b>	
<b>Notes 1:</b>	
<b>Notes 2:</b>	

# FIG. 7045 Clamp-T®, FPT Branch



For Listings/Approval Details and Limitations, visit our website at [www.anvilintl.com](http://www.anvilintl.com) or contact an Anvil® Sales Representative.

- Available galvanized.



The Gruvlok® Clamp-T provides a quick and easy outlet at any location along the pipe. A hole drilled or cut in the pipe to receive the locating collar of the Clamp-T is all that is required. The full, smooth outlet area provides for optimum flow characteristics.

The Clamp-T housing is specially engineered to conform to the pipe O.D. and the Clamp-T gasket providing a leak tight reliable seal in both positive pressure and vacuum conditions. Working pressure ratings shown are for reference only and are based on Schedule 40 pipe. For the latest UL/ULC listed, LPCB, VdS and FM Approved pressure ratings versus pipe schedule, see [www.anvilintl.com](http://www.anvilintl.com) or contact your local Anvil Representative.

The Gruvlok Clamp-T provides for a branch or cross connection in light wall or standard wall steel pipe.

The Fig. 7045 Clamp-T female pipe thread branch is available with NPT or ISO 7/1 connection and the Fig. 7046 Clamp-T has grooved-end branch connection.

Clamp-T cross connections are available in various sizes allowing greater versatility in piping design.

**NOTE:** Variable End Configurations are Possible — 2" x 1/2" through 8" x 4" Thd x Thd and Gr. x Thd. Sizes

## MATERIAL SPECIFICATIONS

### HOUSING:

Ductile Iron conforming to ASTM A-536, Grade 65-45-12

### ANSI BOLTS & HEAVY HEX NUTS:

Heat treated, oval neck track head bolts conforming to ASTM A-183 Grade 2 with a minimum tensile strength of 110,000 psi and heavy hex nuts of carbon steel conforming to ASTM A-563 Grade A or Grade B, or J995 Grade 2. Bolts and nuts are provided zinc electroplated as standard.

### METRIC BOLTS & HEAVY HEX NUTS:

Heat treated, zinc electroplated oval-neck track head bolts made of carbon steel with mechanical properties per ISO 898-1 Class 8.8. Hex nuts and bolts are zinc electroplated followed by a yellow chromate dip.

### U-BOLT:

Cold drawn steel and zinc plated.

### COATINGS:

- Rust inhibiting paint Color: ORANGE (standard)
  - Hot Dipped Zinc Galvanized (optional)
  - Other available options: Example: RAL3000 or RAL9000 Series
- For other coating requirements contact an Anvil Representative.

### LUBRICATION:

- Standard Gruvlok
- Gruvlok Xtreme™ required for dry pipe systems and freezer applications.

### GASKETS: Materials

Properties as designated in accordance with ASTM D-2000.

- Grade "E" EPDM** (Green color code)  
-40°F to 230°F (Service Temperature Range)(-40°C to 110°C)  
Recommended for water service, diluted acids, alkalies solutions, oil-free air and many chemical services.  
NOT FOR USE IN PETROLEUM APPLICATIONS.
- Grade "EP" EPDM** (Green and Red color code)  
-40°F to 250°F (Service Temperature Range)(-40°C to 121°C)  
Recommended for water service, diluted acids, alkalies solutions, oil-free air and many other chemical services.  
NOT FOR USE IN PETROLEUM APPLICATIONS.

## CLAMP-T FLOW DATA (FRICTIONAL RESISTANCE)

Branch Size <i>In./DN(mm)</i>	Fig. 7045 Threaded Branch	
	C.V. Value	Equiv. Pipe Length <i>Ft./m</i>
1/2 15	22 -	1.0 0.3
3/4 20	25 -	2.0 0.6
1 25	44 -	2.0 0.6
1 1/4 32	76 -	2.5 0.8
1 1/2 40	89 -	4.0 1.2

Branch Size <i>In./DN(mm)</i>	Fig. 7045 Threaded Branch	
	C.V. Value	Equiv. Pipe Length <i>Ft./m</i>
2 50	164 -	3.5 1.1
2 1/2 65	152 -	12.5 3.8
3 80	318 -	8.5 2.6
4 100	536 -	8.0 2.4

## PROJECT INFORMATION

## APPROVAL STAMP

<b>Project:</b>	<input type="checkbox"/> Approved
<b>Address:</b>	<input type="checkbox"/> Approved as noted
<b>Contractor:</b>	<input type="checkbox"/> Not approved
<b>Engineer:</b>	<b>Remarks:</b>
<b>Submittal Date:</b>	
<b>Notes 1:</b>	
<b>Notes 2:</b>	

# FIG. 7045 Clamp-T®, FPT Branch

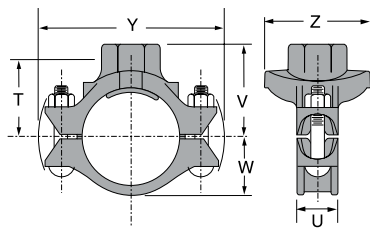


Fig. 7045

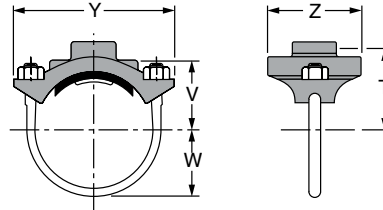


Fig. 7045 (U-Bolt)

**WARNING**  
 For dry pipe systems and freezer applications lubrication of the gasket is required, Gruvlok® Xtreme™ Lubricant is required.

## FIGURE 7045 FPT BRANCH (TABLE CONTINUES TO NEXT PAGE)

Nominal Size	O.D.	Hole Dimensions		Max. Working Pressure▲	Clamp-T Dimensions						Bolt Size	Specified Torque §		Approx. Wt. Ea.
		Min. Diameter	Max. Diameter		T	U	V Threaded	W	Y	Z		Min.	Max.	
In./DN(mm)	In./mm	In./mm	In./mm	PSI/bar	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	Ft.-Lbs./N-m	Lbs./Kg	
2 x 1/2 50 x 15	2.375 x 0.840 60.3 x 21.3	1 1/2 38	1 3/8 41	500 34.5	2 3/16 56	3/16 14	2 5/8 67	1/2 12	5 1/2 140	3 76	1/2 U-Bolt -	30 40	40 2.3 1.0	
2 x 3/4 50 x 20	2.375 x 1.050 60.3 x 26.7	1 1/2 38	1 3/8 41	500 34.5	2 1/16 52	3/16 14	2 5/8 67	1 1/2 38	5 1/2 140	3 76	1/2 U-Bolt -	30 40	40 2.3 1.0	
2 x 1 50 x 25	2.375 x 1.315 60.3 x 33.7	1 1/2 38	1 3/8 41	500 34.5	1 15/16 51	3/16 14	2 5/8 67	1 1/2 38	5 1/2 140	3 76	1/2 U-Bolt -	30 40	40 2.6 1.2	
2 x 1 1/4 50 x 32	2.375 x 1.660 60.3 x 42.4	2 51	2 1/8 54	500 34.5	2 3/16 55	3/16 14	2 1/2 73	1 1/2 38	5 1/2 140	3 1/2 89	1/2 U-Bolt -	30 40	40 2.7 1.2	
2 x 1 1/2 50 x 40	2.375 x 1.900 60.3 x 48.3	2 51	2 1/8 54	500 34.5	2 3/16 55	3/16 14	2 1/8 73	1 1/2 38	7 178	3 1/2 89	1/2 U-Bolt -	30 40	40 2.5 1.1	
2 1/2 x 1/2 65 x 15	2.875 x 0.840 73.0 x 21.3	1 1/2 38	1 3/8 41	500 34.5	2 1/16 62	3/16 14	2 1/8 73	1 3/4 44	5 1/2 140	3 76	1/2 U-Bolt -	30 40	40 3.0 1.4	
2 1/2 x 3/4 65 x 20	2.875 x 1.050 73.0 x 26.7	1 1/2 38	1 3/8 41	500 34.5	2 3/16 59	3/16 14	2 1/8 73	1 3/4 44	5 1/2 140	3 76	1/2 U-Bolt -	30 40	40 2.9 1.3	
2 1/2 x 1 65 x 25	2.875 x 1.315 73.0 x 33.7	1 1/2 38	1 3/8 41	500 34.5	2 3/16 55	3/16 14	2 1/8 73	1 3/4 44	6 1/8 156	3 76	1/2 U-Bolt -	30 40	40 2.9 1.3	
2 1/2 x 1 1/4 65 x 32	2.875 x 1.660 73.0 x 42.4	2 51	2 1/8 54	500 34.5	2 1/16 62	3/16 14	3 1/8 79	1 3/4 44	6 1/8 156	3 3/8 86	1/2 U-Bolt -	30 40	40 3.4 1.5	
2 1/2 x 1 1/2 65 x 40	2.875 x 1.900 73.0 x 48.3	2 51	2 1/8 54	500 34.5	2 1/16 62	3/16 14	3 1/8 79	1 3/4 44	6 1/8 156	3 3/8 86	1/2 U-Bolt -	30 40	40 3.4 1.5	
3 x 1/2 80 x 15	3.500 x 0.840 88.9 x 21.3	1 1/2 38	1 3/8 41	500 34.5	2 3/16 65	3/16 14	3 76	2 1/8 54	7 178	3 3/4 95	1/2 U-Bolt -	30 40	40 2.8 1.2	
3 x 3/4 80 x 20	3.500 x 1.050 88.9 x 26.7	1 1/2 38	1 3/8 41	500 34.5	2 1/16 62	3/16 14	3 76	2 1/8 54	7 178	3 3/4 95	1/2 U-Bolt -	30 40	40 2.7 1.2	
3 x 1 80 x 25	3.500 x 1.315 88.9 x 33.7	1 1/2 38	1 3/8 41	500 34.5	2 5/16 59	3/16 14	3 76	2 1/8 54	7 178	3 3/4 95	1/2 U-Bolt -	30 40	40 2.7 1.2	
3 x 1 1/4 80 x 32	3.500 x 1.660 88.9 x 42.4	2 51	2 1/8 54	500 34.5	2 11/16 68	1 1/2 38	3 3/8 86	2 1/8 54	6 1/8 175	3 3/4 95	1/2 x 2 3/4 -	80 100	100 3.4 1.5	
3 x 1 1/2 80 x 40	3.500 x 1.900 88.9 x 48.3	2 51	2 1/8 54	500 34.5	2 11/16 68	1 1/2 38	3 3/8 86	2 1/8 54	6 1/8 175	3 3/4 95	1/2 x 2 3/4 -	80 100	100 4.4 2.0	
3 x 2 80 x 50	3.500 x 2.375 88.9 x 60.3	2 1/2 64	2 5/8 67	500 34.5	2 11/16 68	1 1/2 38	3 3/8 86	2 1/8 54	6 1/8 175	4 1/8 105	1/2 x 2 3/4 -	80 100	100 4.6 2.1	
4 x 1/2 100 x 15	4.500 x 0.840 114.3 x 21.3	1 1/2 38	1 3/8 41	500 34.5	3 1/16 76	3/16 14	3 1/2 89	2 5/8 67	7 3/4 197	3 3/4 95	1/2 U-Bolt -	30 40	40 2.9 1.3	
4 x 3/4 100 x 20	4.500 x 1.050 114.3 x 26.7	1 1/2 38	1 3/8 41	500 34.5	3 1/16 78	3/16 14	3 1/2 89	2 5/8 67	7 3/4 197	3 3/4 95	1/2 U-Bolt -	30 40	40 2.8 1.3	
4 x 1 100 x 25	4.500 x 1.315 114.3 x 33.7	1 1/2 38	1 3/8 41	500 34.5	2 13/16 73	3/16 14	3 1/2 89	2 5/8 67	7 3/4 197	3 3/4 95	1/2 U-Bolt -	30 40	40 2.7 1.2	
4 x 1 1/4 100 x 32	4.500 x 1.660 114.3 x 42.4	2 51	2 1/8 54	500 34.5	3 3/16 81	1 7/8 48	3 7/8 98	2 5/8 67	7 1/2 191	3 3/4 95	1/2 x 2 3/4 -	80 100	100 4.5 2.0	
4 x 1 1/2 100 x 40	4.500 x 1.900 114.3 x 48.3	2 51	2 1/8 54	500 34.5	3 3/16 81	1 7/8 48	3 7/8 98	2 5/8 67	7 1/2 191	3 3/4 95	1/2 x 2 3/4 -	80 100	100 4.6 2.1	

**NOTE:** 2 1/2", 5" and 6" Nominal size run pipe may be used on 3" O.D., 5 1/2" O.D. and 6 1/2" O.D. pipe.

▲ – Working Pressure Ratings are for reference only and based on Sch. 40 pipe. For the latest UL/UIC, FM, VdS and LPCB pressure ratings versus pipe schedule, please visit [anvilint.com](http://anvilint.com) or contact your local Anvil Representative.

Not for use in copper systems.

§ – For additional Bolt Torque information, see Technical Data Section. (Additional larger sizes on next page)

# FIG. 7045 Clamp-T®, FPT Branch

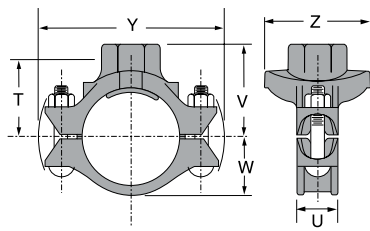


Fig. 7045

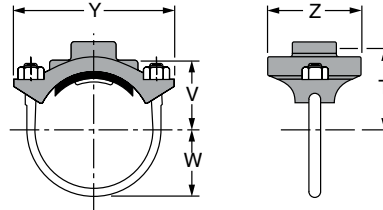


Fig. 7045 (U-Bolt)

**WARNING**  
 For dry pipe systems and freezer applications lubrication of the gasket is required, Gruklok® Xtreme™ Lubricant is required.

## FIGURE 7045 FPT BRANCH (CONTINUED FROM PREVIOUS PAGE)

Nominal Size	O.D.	Hole Dimensions		Max. Working Pressure▲	Clamp-T Dimensions						Bolt Size	Specified Torque §		Approx. Wt. Ea.
		Min. Diameter	Max. Diameter		T	U	V Threaded	W	Y	Z		Min.	Max.	
In./DN(mm)	In./mm	In./mm	In./mm	PSI/bar	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	Ft.-Lbs./N-m	Lbs./Kg	
4 x 2 100 x 50	4.500 x 2.375 114.3 x 60.3	2½ 64	2⅝ 67	500 34.5	3⅝ 84	1⅞ 48	4 102	2⅝ 67	7½ 191	4⅞ 105	½ x 2¾ -	80	100	7.7 3.5
4 x 2½ 100 x 65	4.500 x 2.875 114.3 x 73.0	2¾ 70	2⅞ 73	500 34.5	3⅞ 78	1⅞ 48	4 102	2⅝ 67	7½ 191	4⅞ 111	½ x 2¾ -	80	100	5.2 2.4
4 x 3 O.D. 100 x 80	4.500 x 2.996 114.3 x 76.1	2¾ 70	2⅞ 73	500 34.5	3 76	1⅞ 48	4 102	2⅝ 67	7½ 191	4⅞ 111	½ x 2¾ -	80	100	5.2 2.4
4 x 3 100 x 80	4.500 x 3.500 114.3 x 88.9	3½ 89	3⅞ 92	500 34.5	3¼ 83	1⅞ 48	4¼ 108	2⅝ 67	7½ 191	5¼ 133	½ x 3½ -	80	100	6.5 2.9
5 x 1¼ 125 x 32	5.563 x 1.660 141.3 x 42.4	2 51	2⅞ 54	500 34.5	3⅞ 94	1⅞ 48	4⅞ 111	3¼ 83	9⅞ 232	3¼ 95	⅝ x 3¼ -	100	130	5.4 2.4
5 x 1½ 125 x 40	5.563 x 1.900 141.3 x 48.3	2 51	2⅞ 54	500 34.5	3⅞ 94	1⅞ 48	4⅞ 111	3¼ 83	9⅞ 232	3¼ 95	⅝ x 3¼ -	100	130	5.5 2.5
5 x 2 125 x 50	5.563 x 2.375 141.3 x 60.3	2½ 64	2⅞ 67	500 34.5	3⅞ 97	1⅞ 48	4½ 114	3¼ 83	9⅞ 232	4⅞ 105	⅝ x 3¼ -	100	130	5.7 2.6
5 x 2½ 125 x 65	5.563 x 2.875 141.3 x 73.0	2¾ 70	2⅞ 73	500 34.5	3⅞ 97	1⅞ 48	4¾ 121	3¼ 83	9⅞ 232	4⅞ 111	⅝ x 3¼ -	100	130	7.0 3.2
5 x 3 O.D. 125 x 80	5.563 x 2.996 141.3 x 76.1	2¾ 70	2⅞ 73	500 34.5	3¾ 95	1⅞ 48	4¾ 121	3¼ 83	9⅞ 232	4⅞ 111	⅝ x 3¼ -	130	180	7.0 3.2
5 x 3 125 x 80	5.563 x 3.500 141.3 x 88.9	3½ 89	3⅞ 92	500 34.5	4 102	1⅞ 48	5 127	3¼ 83	9⅞ 232	5¼ 133	⅝ x 3¼ -	100	130	8.7 3.9
6 x 1¼ 150 x 32	6.625 x 1.660 168.3 x 42.4	2 51	2⅞ 54	500 34.5	4⅞ 106	2 51	4⅞ 124	3⅞ 98	10⅞ 257	3¾ 95	⅝ x 4¼ -	100	130	7.8 3.5
6 x 1½ 150 x 40	6.625 x 1.900 168.3 x 48.3	2 51	2⅞ 54	500 34.5	4⅞ 106	2 51	4⅞ 124	3⅞ 98	10⅞ 257	3¾ 95	⅝ x 4¼ -	100	130	7.8 3.5
6 x 2 150 x 50	6.625 x 2.375 168.3 x 60.3	2½ 64	2⅞ 67	500 34.5	4⅞ 106	2 51	4⅞ 124	3⅞ 98	10⅞ 257	4⅞ 105	⅝ x 4¼ -	100	130	7.8 3.5
6 x 2½ 150 x 65	6.625 x 2.875 168.3 x 73.0	2¾ 70	2⅞ 73	500 34.5	4⅞ 106	2 51	5⅞ 130	3⅞ 98	10⅞ 257	4⅞ 111	⅝ x 4¼ -	100	130	8.4 3.8
6 x 3 O.D. 150 x 80	6.625 x 2.996 168.3 x 76.1	2¾ 70	2⅞ 73	500 34.5	4⅞ 105	2 51	5⅞ 130	3⅞ 98	10⅞ 257	4⅞ 111	⅝ x 4¼ -	100	130	8.4 3.8
6 x 3 150 x 80	6.625 x 3.500 168.3 x 88.9	3½ 89	3⅞ 92	500 34.5	4⅞ 111	2 51	5⅞ 137	3⅞ 98	10⅞ 257	5¼ 133	⅝ x 4¼ -	100	130	9.6 4.4
6 x 4 150 x 100	6.625 x 4.500 168.3 x 114.3	4½ 114	4⅞ 117	500 34.5	4⅞ 111	2 51	5½ 140	3⅞ 98	10⅞ 257	6½ 165	⅝ x 4¼ -	100	130	10.5 4.8
8 x 2 200 x 50	8.625 x 2.750 219.1 x 70.0	2½ 64	2⅞ 67	500 34.5	5⅞ 132	2¼ 57	5⅞ 149	5 127	12¾ 324	4⅞ 105	¾ x 4¼ -	130	180	11.3 5.1
8 x 2½ 200 x 65	8.625 x 2.875 219.1 x 73.0	2¾ 70	2⅞ 73	500 34.5	5⅞ 134	2¼ 57	6¼ 159	5 127	12¾ 324	4⅞ 111	¾ x 4½ -	130	180	11.1 5.0
8 x 3 O.D. 200 x 80	8.625 x 2.996 219.1 x 76.1	2¾ 70	2⅞ 73	500 34.5	5¼ 133	2¼ 57	6¼ 159	5 127	12¾ 324	4⅞ 111	¾ x 4½ -	130	180	11.1 5.0
8 x 3 200 x 80	8.625 x 3.500 219.1 x 88.9	3½ 89	3⅞ 92	500 34.5	5⅞ 137	2¼ 57	6⅞ 162	5 127	12¾ 324	5¼ 133	¾ x 4½ -	130	180	13.0 5.9
8 x 4 200 x 100	8.625 x 4.500 219.1 x 114.3	4½ 114	4⅞ 117	500 34.5	5⅞ 137	2¼ 57	6½ 165	5 127	12¾ 324	6½ 165	¾ x 4½ -	130	180	16.2 7.3

NOTE: 2½", 5" and 6" Nominal size run pipe may be used on 3" O.D., 5½" O.D. and 6½" O.D. pipe.

§ - For additional Bolt Torque information, see Technical Data Section.

▲ - Working Pressure Ratings are for reference only and based on Sch. 40 pipe. For the latest UL/ULC, FM, VdS and LPCB pressure ratings versus pipe schedule, please visit [anvilintl.com](http://anvilintl.com) or contact your local Anvil Representative.

Not for use in copper systems.



# FIG. 7046 Clamp-T®, Grooved Branch



The Gruvlok® Clamp-T provides a quick and easy outlet at any location along the pipe. A hole drilled or cut in the pipe to receive the locating collar of the Clamp-T is all that is required. The full, smooth outlet area provides for optimum flow characteristics.

The Clamp-T housing is specially engineered to conform to the pipe O.D. and the Clamp-T gasket providing a leak tight reliable seal in both positive pressure and vacuum conditions. The maximum working pressure for all sizes is 500 PSI (34.5 bar) when assembled on standard wall steel pipe. For the latest UL/ULC listed, LPCB, VdS and FM Approved pressure ratings versus pipe schedule, see [www.anvilintl.com](http://www.anvilintl.com) or contact your local Anvil Representative.

The Gruvlok Clamp-T provides for a branch or cross connection in light wall or standard wall steel pipe.

Clamp-T cross connections are available in most sizes allowing greater versatility in piping design.

## CLAMP-T FLOW DATA (FRICTIONAL RESISTANCE)

Branch Size	Fig. 7046 Grooved Branch	
	C.V. Value	Equiv. Pipe Length
In./DN(mm)		Ft./m
1 1/4 32	5.4 -	5.0 1.5
1 1/2 40	95 -	3.5 1.1
2 50	148 -	4.5 1.4
2 1/2 65	205 -	7.0 2.1
3 80	294 -	9.5 2.9
4 100	571 -	7.0 2.1



- Available galvanized.

## MATERIAL SPECIFICATIONS

### HOUSING:

Ductile Iron conforming to ASTM A-536, Grade 65-45-12

### ANSI BOLTS & HEAVY HEX NUTS:

Heat treated, oval neck track head bolts conforming to ASTM A-183 Grade 2 with a minimum tensile strength of 110,000 psi and heavy hex nuts of carbon steel conforming to ASTM A-563 Grade A or Grade B, or J995 Grade 2. Bolts and nuts are provided zinc electroplated as standard.

### METRIC BOLTS & HEAVY HEX NUTS:

Heat treated, zinc electroplated oval-neck track head bolts made of carbon steel with mechanical properties per ISO 898-1 Class 8.8. Hex nuts and bolts are zinc electroplated followed by a yellow chromate dip.

### U-BOLT:

Cold drawn steel and zinc plated.

### COATINGS:

- Rust inhibiting paint Color: ORANGE (standard)
  - Hot Dipped Zinc Galvanized (optional)
  - Other available options: Example: RAL3000 or RAL9000 Series
- For other coating requirements contact an Anvil Representative.

### LUBRICATION:

- Standard Gruvlok
- Gruvlok Xtreme™ required for dry pipe systems and freezer applications.

### GASKETS: Materials

Properties as designated in accordance with ASTM D-2000.

- Grade "E" EPDM (Green color code)
  - 40°F to 230°F (Service Temperature Range)[-40°C to 110°C]
  - Recommended for water service, diluted acids, alkalis solutions, oil-free air and many chemical services.
  - NOT FOR USE IN PETROLEUM APPLICATIONS.
- Grade "EP" EPDM (Green and Red color code)
  - 40°F to 250°F (Service Temperature Range)[-40°C to 121°C]
  - Recommended for water service, diluted acids, alkalis solutions, oil-free air and many other chemical services.
  - NOT FOR USE IN PETROLEUM APPLICATIONS.

## PROJECT INFORMATION

## APPROVAL STAMP

Project:	<input type="checkbox"/> Approved
Address:	<input type="checkbox"/> Approved as noted
Contractor:	<input type="checkbox"/> Not approved
Engineer:	Remarks:
Submittal Date:	
Notes 1:	
Notes 2:	

# FIG. 7046 Clamp-T®, Grooved Branch

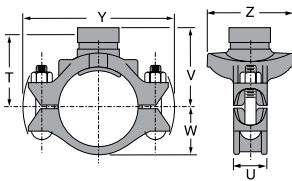


Fig. 7046

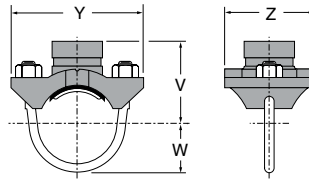


Fig. 7046 (U-Bolt)



For dry pipe systems and freezer applications lubrication of the gasket is required, Gruvlok® Xtreme™ Lubricant is required.

## FIGURE 7046-GR BRANCH

Nominal Size	O.D.	Hole Dimensions		Max. Working Pressure▲	Clamp-T Dimensions					Bolt* Size	Specified Torque §		Approx. Wt. Ea.
		Min. Diameter	Max. Diameter		U	V Grooved	W	Y	Z		Min.	Max.	
In./DN(mm)	In./mm	In./mm	In./mm	PSI/bar	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	Ft.-Lbs./N-m	Lbs./Kg	
2½ x 1¼	2.875 x 1.660	2	2⅛	500	⅞	3⅞	1¾	6⅞	3½	½ U-Bolt	30	40	3.4
65 x 32	73.0 x 42.4	51	54	34.5	14	79	44	156	89	-	-	-	1.5
2½ x 1½	2.875 x 1.900	2	2⅛	500	⅞	3⅞	1¾	6⅞	3½	½ U-Bolt	30	40	3.4
65 x 40	73.0 x 48.3	51	54	34.5	14	79	44	156	89	-	-	-	1.5
3 x 1¼	3.500 x 1.660	2	2⅛	500	1½	3½	2⅞	6⅞	3¾	½ x 2¾	80	100	3.4
80 x 32	88.9 x 42.4	51	54	34.5	38	89	54	175	95	-	-	-	1.5
3 x 1½	3.500 x 1.900	2	2⅛	500	1½	3½	2⅞	6⅞	3¾	½ x 2¾	80	100	4.4
80 x 40	88.9 x 48.3	51	54	34.5	38	89	54	175	95	-	-	-	2.0
3 x 2	3.500 x 2.375	2½	2⅝	500	1½	3½	2⅞	6⅞	4⅞	½ x 2¾	80	100	4.6
80 x 50	88.9 x 60.3	64	67	34.5	38	89	54	175	105	-	-	-	2.1
4 x 1¼	4.500 x 1.660	2	2⅛	500	1⅞	4	2⅞	7½	3¾	½ x 2¾	80	100	4.2
100 x 32	114.3 x 42.4	51	54	34.5	48	102	67	191	95	-	-	-	1.9
4 x 1½	4.500 x 1.900	2	2⅛	500	1⅞	4	2⅞	7½	3¾	½ x 2¾	80	100	4.3
100 x 40	114.3 x 48.3	51	54	34.5	48	102	67	191	95	-	-	-	2.0
4 x 2	4.500 x 2.375	2½	2⅝	500	1⅞	4	2⅞	7½	4⅞	½ x 2¾	80	100	4.6
100 x 50	114.3 x 60.3	64	67	34.5	48	102	67	191	105	-	-	-	2.1
4 x 2½	4.500 x 2.875	2¾	2⅞	500	1⅞	4	2⅞	7½	4⅞	½ x 2¾	80	100	5.0
100 x 65	114.3 x 73.0	70	73	34.5	48	102	67	191	111	-	-	-	2.3
4 x 3 O.D.	4.500 x 2.996	2¾	2⅞	500	1⅞	4	2⅞	7½	4⅞	½ x 2¾	80	100	5.0
100 x 80	114.3 x 76.1	70	73	34.5	48	102	67	191	111	-	-	-	2.3
4 x 3	4.500 x 3.500	3½	3⅝	500	1⅞	4	2⅞	7½	5¼	½ x 3½	80	100	5.6
100 x 80	114.3 x 88.9	89	92	34.5	48	102	67	191	133	-	-	-	2.5
5 x 1¼	5.563 x 1.660	2	2⅛	500	1⅞	4¼	3¼	9⅞	3¾	½ x 2¾	80	100	5.6
125 x 32	141.3 x 42.4	51	54	34.5	48	108	83	232	95	-	-	-	2.5
5 x 1½	5.563 x 1.900	2	2⅛	500	1⅞	4¼	3¼	9⅞	3¾	⅝ x 3¼	100	130	5.6
125 x 40	141.3 x 48.3	51	54	34.5	48	108	83	232	95	-	-	-	2.5
5 x 2	5.563 x 2.375	2½	2⅝	500	1⅞	4¼	3¼	9⅞	4⅞	⅝ x 3¼	100	130	5.5
125 x 50	141.3 x 60.3	64	67	34.5	48	108	83	232	105	-	-	-	2.5
5 x 2½	5.563 x 2.875	2¾	2⅞	500	1⅞	4¼	3¼	9⅞	4⅞	⅝ x 3¼	100	130	5.8
125 x 65	141.3 x 73.0	70	73	34.5	48	108	83	232	111	-	-	-	2.6
5 x 3	5.563 x 3.500	3½	3⅝	500	1⅞	4⅞	3¼	9⅞	5¼	⅝ x 3¼	100	130	7.1
125 x 80	141.3 x 88.9	89	92	34.5	48	117	83	232	133	-	-	-	3.2
6 x 1½	6.625 x 1.900	2	2⅛	500	2	5	3⅞	10⅞	3¾	⅝ x 4¼	100	130	7.2
150 x 40	168.3 x 48.3	51	54	34.5	51	127	98	257	95	*	-	-	3.3
6 x 2	6.625 x 2.375	2½	2⅝	500	2	5	3⅞	10⅞	4⅞	⅝ x 4¼	100	130	7.8
150 x 50	168.3 x 60.3	64	67	34.5	51	127	98	257	105	*	-	-	3.5
6 x 2½	6.625 x 2.875	2¾	2⅞	500	2	5⅞	3⅞	10⅞	4⅞	⅝ x 4¼	100	130	7.6
150 x 65	168.3 x 73.0	70	73	34.5	51	130	98	257	111	*	-	-	3.4
6 x 3 O.D.	6.625 x 2.996	2¾	2⅞	500	2	5⅞	3⅞	10⅞	4⅞	⅝ x 4¼	100	130	7.6
150 x 80	168.3 x 76.1	70	73	34.5	51	130	98	257	111	*	-	-	3.4
6 x 3	6.625 x 3.500	3½	3⅝	500	2	5⅞	3⅞	10⅞	5¼	⅝ x 4¼	100	130	8.0
150 x 80	168.3 x 88.9	89	92	34.5	51	130	98	257	133	*	-	-	3.6
6 x 4	6.625 x 4.500	4½	4⅝	500	2	5¼	3⅞	10⅞	6½	⅝ x 4¼	100	130	10.4
150 x 100	168.3 x 114.3	114	117	34.5	51	133	98	257	165	*	-	-	4.7
8 x 2	8.625 x 2.375	2½	2⅝	500	2¼	6⅞	5	12¾	4¼	¾ x 4½	130	180	10.4
200 x 50	219.1 x 60.3	64	67	34.5	57	156	127	324	108	-	-	-	4.7
8 x 2½	8.625 x 2.875	2¾	2⅞	500	2¼	6⅞	5	12¾	4⅞	¾ x 4½	130	180	10.6
200 x 65	219.1 x 73.0	70	73	34.5	57	156	127	324	111	M20 x 110	175	245	4.8
8 x 3	8.625 x 3.500	3½	3⅝	500	2¼	6⅞	5	12¾	5¼	¾ x 4½	130	180	11.5
200 x 80	219.1 x 88.9	89	92	34.5	57	156	127	324	133	M20 x 110	175	245	5.2
8 x 4	8.625 x 4.500	4½	4⅝	500	2¼	6¼	5	12¾	6½	¾ x 4½	130	180	16.2
200 x 100	219.1 x 114.3	114	117	34.5	57	159	127	324	165	M20 x 110	175	245	7.3

**NOTE:** 2½", 5" and 6" Nominal size run pipe may be used on 3" O.D., 5½" O.D. and 6½" O.D. pipe.  
 \* All bolts and nuts are of track head design and are zinc plated conforming to ASTM B-633.  
 ▲ - Working Pressure Ratings are for reference only and based on Sch. 40 pipe. For the latest UL/UIC, FM, VdS and LPCB pressure ratings versus pipe schedule, please visit [anvilintl.com](http://anvilintl.com) or contact your local Anvil Representative.

Not for use in copper systems.  
 § - For additional Bolt Torque information, see Technical Data Section.  
 • Can not be used in cross configuration.



The Gruvlok® Fig. 7012 Flange allows direct connection of Class 125 or Class 150 flanged components to a grooved piping system. The two interlocking halves of the 2" thru 12" sizes of the Gruvlok Flange are hinged for ease of handling, and are drawn together by a latch bolt which eases assembly on the pipe. Precision machined bolt holes, key and mating surfaces assure concentricity and flatness to provide exact fit-up with flanged, lug, and wafer styles of pipe system equipment. A specially designed gasket provides a leak-tight seal on both the pipe and the mating flange face.



Working pressure ratings shown are for reference only and are based on Schedule 40 pipe. For the latest UL/ULC listed, LPCB, VdS and FM Approved pressure ratings versus pipe schedule, see [www.anvilintl.com](http://www.anvilintl.com) or contact your local Anvil Representative.



The Gruvlok Fig. 7012 Flange requires the use of a steel adapter insert when used against rubber faced surfaces, wafer/lug design valves and serrated or irregular sealing surfaces. In copper systems a phenolic adapter insert is required, in place of the steel adapter insert. (See Installation and Assembly Instructions Section or contact your Anvil Rep. for details.)

– Available galvanized.  
\* When ordering, refer to product as FP7012.

**MATERIAL SPECIFICATIONS**

**HOUSING:**

Ductile Iron conforming to ASTM A-536, Grade 65-45-12

**LATCH BOLT/NUT (2"-12"):**

Heat treated, zinc electroplated, carbon steel oval neck track bolts conforming to ASTM A-183 and zinc electroplated heavy hex nuts of carbon steel conforming to ASTM A-563 Grade A or Grade B, or J995 Grade 2.

**METRIC BOLTS & HEAVY HEX NUTS:**

Heat treated, zinc electroplated oval-neck track head bolts made of carbon steel with mechanical properties per ISO 898-1 Class 8.8. Hex nuts and bolts are zinc electroplated followed by a yellow chromate dip.

**COATINGS:**

- Rust inhibiting paint Color: ORANGE (standard)
  - Hot Dipped Zinc Galvanized (optional)
  - Other available options: Example: RAL3000 or RAL9000 Series
- For other coating requirements contact an Anvil Representative.

**LUBRICATION:**

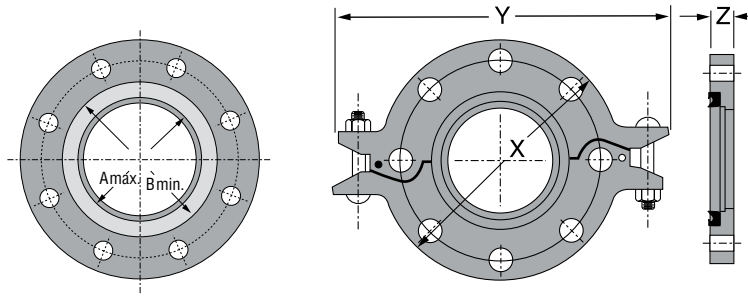
- Standard Gruvlok
- Gruvlok Xtreme™ required for dry pipe systems and freezer applications.

**GASKETS: Materials**

Properties as designated in accordance with ASTM D-2000.

- Grade "E" EPDM (Green color code)  
-40°F to 230°F (Service Temperature Range)[-40°C to 110°C]  
Recommended for water service, diluted acids, alkalies solutions, oil-free air and many chemical services.  
NOT FOR USE IN PETROLEUM APPLICATIONS.

PROJECT INFORMATION		APPROVAL STAMP
Project:		<input type="checkbox"/> Approved
Address:		<input type="checkbox"/> Approved as noted
Contractor:		<input type="checkbox"/> Not approved
Engineer:		Remarks:
Submittal Date:		
Notes 1:		
Notes 2:		



### FIGURE 7012 FLANGE: ANSI CLASS 125 & 150

Nominal Size	Pipe O.D.	Max. Working Pressure ▲	Max. End Load ▲	Latch Bolt			Dimensions			Sealing Surface		Mating Flange Bolts				Approx. Wt. Ea.
				Latch Bolt Size*	Specified Torque §		X	Y	Z	A Max.	B Min.	Mating Flange Bolts		Specified Torque §		
					Min.	Max.						Qty.	Size (ANSI)	Min.	Max.	
2	2.375	300	1,329	3/8 x 2 3/4	30	45	6 1/4	8 3/8	3/4	2 3/8	3 1/16	4	5/8 x 2 3/4	110	140	4.2
50	60.3	20.7	5.91	M10 x 70	40	60	159	213	19	60	87	4	M16 x 70	149	190	1.9
2 1/2	2.875	300	1,948	3/8 x 2 3/4	30	45	7	9 1/2	3/4	2 3/8	4	4	5/8 x 2 3/4	110	140	4.6
65	73.0	20.7	8.66	M10 x 70	40	60	178	241	19	73	102	-	M16 x 70	149	190	2.1
3 O.D.	2.996	300	2,115	-	30	45	7 1/4	9 3/4	3/4	3	4 1/8	-	-	110	140	4.8
76.1	76.1	20.7	9.41	M10 x 70	40	60	184	248	19	76	105	4	M16 x 70	149	190	2.2
3	3.500	300	2,886	3/8 x 2 3/4	30	45	7 7/8	10 1/2	3/4	3 1/2	4 1/16	4	5/8 x 2 3/4	110	140	6.0
88.9	88.9	20.7	12.84	M10 x 70	40	60	200	267	19	89	116	8	M16 x 70	149	190	2.7
4	4.500	300	4,771	3/8 x 2 3/4	30	45	9	11 1/2	3/4	4 1/2	5 1/16	8	5/8 x 2 3/4	110	140	6.3
100	114.3	20.7	21.22	M10 x 70	40	60	229	292	19	114	141	8	M16 x 70	149	190	2.9
5 1/2 O.D.	5.500	300	7,127	-	30	45	9 7/8	12 7/8	7/8	5 1/16	6 3/4	-	-	220	250	15.6
139.7	139.7	20.7	31.70	M10 x 70	40	60	251	327	22	141	171	8	M16 x 75	298	339	7.1
5	5.563	300	7,292	3/8 x 2 3/4	30	45	10	12 1/2	7/8	5 1/16	6 3/4	8	3/4 x 2 7/8	220	250	8.8
125	141.3	20.7	32.44	M10 x 70	40	60	254	318	22	141	171	-	-	298	339	4.0
6 1/2 O.D.	6.500	300	9,955	-	30	45	11 1/4	14	7/8	6 3/8	7 13/16	-	-	220	250	9.7
165.1	165.1	20.7	44.28	M10 x 70	40	60	286	356	22	168	198	8	M20 x 80	298	339	4.4
6	6.625	300	10,341	3/8 x 2 3/4	30	45	11	14	7/8	6 3/8	7 13/16	8	3/4 x 3 1/8	220	250	9.6
150	168.3	20.7	46.00	M10 x 70	40	60	279	356	22	168	198	8	M20 x 80	298	339	4.4
8	8.625	300	17,528	3/8 x 2 3/4	30	45	13 1/2	16 1/2	1	8 3/8	10	8	3/4 x 3 1/4	220	250	15.6
200	219.1	20.7	77.97	M10 x 70	40	60	343	419	25	219	254	8 (12)	M20 x 80	298	339	7.1
10	10.750	300	27,229	3/8 x 2 3/4	30	45	16	19	1	10 3/4	12 1/8	12	7/8 x 3 1/2	320	400	18.2
250	273.1	20.7	121.12	M10 x 70	40	60	406	483	25	273	308	12	M20 x 90	439	542	8.3
12	12.750	300	38,303	3/8 x 2 3/4	30	45	19	21 3/4	1 1/4	12 3/4	14 1/8	12	7/8 x 3 3/4	320	400	29.9
300	323.9	20.7	170.38	M10 x 70	40	60	483	552	32	324	359	12	-	439	542	13.6

+ PN 16 uses M24 x 90 (PN) Dimensions for bolt circle PN 10 & 16 Flange.

\* Available in ANSI or metric bolt sizes only as indicated.

▲ - Working Pressure Ratings are for reference only and based on Sch. 40 pipe. For the latest UL/ULC, FM, VdS and LPCB pressure ratings versus pipe schedule, please visit [anvilintl.com](http://anvilintl.com) or contact your local Anvil Representative.

§ - For additional Bolt Torque information, see Technical Data Section.

The Gruvlok Flange bolt hole pattern conforms to ANSI Class 150 and Class 125 flanges.

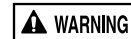
To avoid interference issues, flanges cannot be assembled directly to Series 7700 butterfly valve. Flange can be assembled to one side of series 7500 and 7600 valve only.

Mating flange bolts must be at least Intermediate Strength Bolting per ASME B16.5. Bolts with material properties equal or greater than SAE J429 Grade 5 are acceptable.

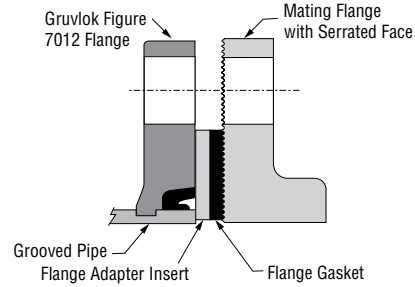
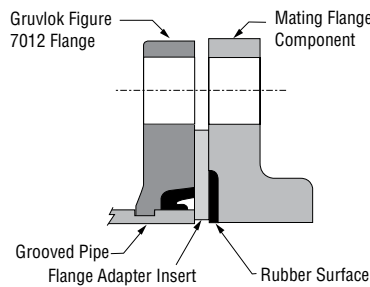
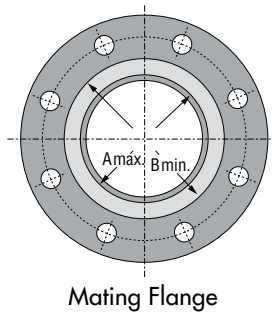
Refer to the Gruvlok Product Catalog or Anvil's web site for more information on installing this flange.

300 Lb Flange is available, Fig. 7013, see Gruvlok Catalog or contact your Anvil Rep. for more information.

Other sizes available, contact an Anvil Representative.



**For dry pipe systems and freezer applications lubrication of the gasket is required, Gruvlok® Xtreme™ Lubricant is required.**



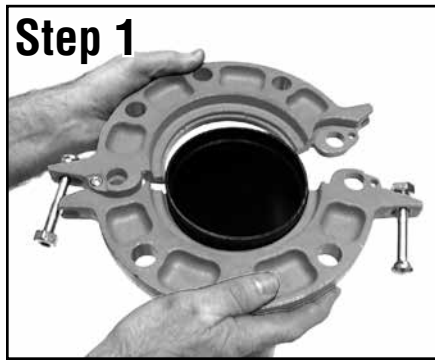
- A. The sealing surfaces A Max. to B Min. of the mating flange must be free from gouges, undulations and deformities of any type to ensure proper sealing of the gasket.
- B. Gruvlok Flanges are to be assembled on butterfly valves so as not to interfere with actuator or handle operation.
- C. Do not use Gruvlok Flanges within 90 degrees of one another on standard fittings because the outside dimensions may cause interference.
- D. Gruvlok Flanges should not be used as anchor points for tie-rods across non-restrained joints.
- E. Fig. 7012 Gruvlok Flange sealing gaskets require a hard flat surface for adequate sealing. The use of a Gruvlok Flange Adapter Insert is required for applications against rubber faced valves or other equipment. The Gruvlok Flange Adapter Insert is installed between the Gruvlok Flange sealing gasket and the mating flange or surface to provide a good sealing surface area.
- F. Gruvlok Flanges are not recommended for use against formed rubber flanges.
- G. An additional bolt is recommended for the hinge side of the 2" - 12" Figure 7012 when connecting to lug valves.
- H. Contact an Anvil Representative for Di-Electric Flange connections.

**Applications which require a Gruvlok Flange Adapter Insert:**

1. When mating to a wafer valve (lug valve), if the valve is rubber faced in the area designated by the sealing surface dimensions (A Max. to B Min.), place the Gruvlok Flange Adapter Insert between the valve and the Gruvlok flange.
2. When mating to a rubber-faced metal flange, the Gruvlok Flange Adapter Insert is placed between the Gruvlok Flange and the rubber-faced flange.
3. When mating to a serrated flange surface, a standard full-faced flange gasket is installed against the serrated flange face and the Gruvlok Flange Adapter Insert is placed between the Gruvlok Flange and the standard Flange gasket.
4. When mating to valves or other component equipment where the flange face has an insert, use procedure described in note 3.



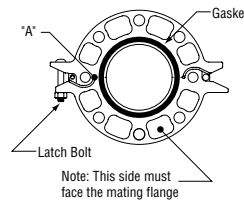
ALWAYS USE A GRUVLOK® SPF/ANVIL™ LUBRICANT FOR PROPER COUPLING ASSEMBLY. Thorough lubrication of the external surface of the gasket is essential to prevent pinching and possible damage to the gasket. For temperatures above 150°F (65°C) and below 32°F (0°C) use Gruvlok® SPF/Anvil™ Xtreme Lubricant™ and lubricate all gasket surfaces, internal and external. See Gruvlok SPF/Anvil Lubricants in the Technical Data section of the Anvil SPF catalog for additional important information. **Check pipe end for proper grooved dimensions and to assure that the pipe end is free of indentations and projections that would prevent proper sealing of the Gruvlok flange gasket.**



**1** On the side without the hinge pin, loosen the latch bolt nut to the end of the bolt thread. (It is not necessary to remove the nut from the latch bolt.) Swing the latch bolt out of the slot. Open the Gruvlok Flange and place around the grooved pipe end with the key section fitting into the groove. The flange gasket cavity must face the pipe end.

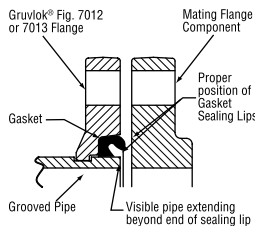


**2** Place the latch bolt back into the slotted hole. Tighten the nut until there is a  $\frac{1}{16}$ " gap between the flange halves at location "A". (See Figure below)



**3** Check the gasket to assure that it is properly suited for the intended service. Lubricate the entire exterior surface of the gasket, including the sealing lips, using the proper Gruvlok lubricant.

**4** Stretch the Gruvlok gasket around the pipe end and then press the gasket into the cavity between the pipe O.D. and the flange. The gasket must be properly positioned as shown in the figure below.



**5** With the gasket in place apply lubricant to the exposed gasket tip, which will seal on the mating flange. **Tighten the nuts on the latch bolts alternately to the specified latch bolt torque. The flange housings must be in firm metal-to-metal contact.**



## ⚠ WARNING

The Gruvlok Flange gasket must be inserted so that the sealing lips face toward the pipe end and the mating flange. The lip of the gasket, sealing on the pipe, should not extend beyond the pipe end. The pipe should extend out beyond the end of the sealing lip by approximately  $\frac{1}{8}$ " on the 2"-6" sizes and  $\frac{3}{16}$ " on the 8"-12" sizes.



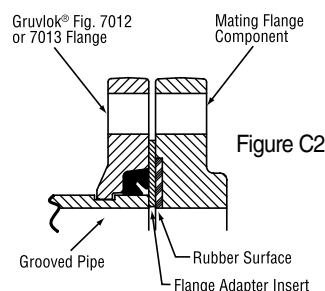
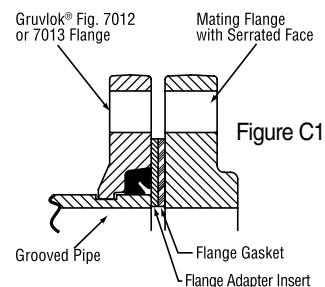
**6** Verify that the mating flange face is hard, flat and smooth, free of indentations, which would prevent proper sealing of the Gruvlok Flange gasket. Assure the gasket is still in the proper position and align Gruvlok Flange bolt holes with the mating flange, pump, tank, etc., bolt holes.



**7** Insert a flange bolt or stud with material properties of SAE J429 Grade 5 or higher through the bolt holes and thread a nut on hand tight. Continue this procedure until all bolt holes have been fitted. Tighten the nuts alternately and evenly so the flange faces remain parallel. All the bolts or studs must be torqued to the mating flange bolts specified torque. The flange faces should have metal-to-metal contact.

### WARNING

It is important to line up the bolt holes before bringing the two flanges together. Sliding the flanges into place will dislodge the gasket and cause leakage to occur. When using a flange insert, it is important that the insert is properly aligned with the gasket prior to tightening the bolts.



**Note:** The Gruvlok Fig. 7012 Flange requires the use of a Flange Adapter Insert when used against rubber surfaces (Figure C1), serrated flange surfaces or mating flanges with inserts (Figure C2). The Flange Adapter Insert will be exposed to the fluids in the system. Ensure that the Insert is compatible with the fluids in the systems and with adjacent piping components.

### WARNING

Do not use a steel Flange Adapter Insert in copper systems or in systems where galvanic corrosion is possible.

## Specified Bolt Torque for Latch and Mating Flange Bolts

Specified bolt torque is for the latch and mating flange bolts used on Gruvlok® flanges. The nuts must be tightened alternately and evenly until fully tightened. **Caution:** Use of an impact wrench is not recommended because the torque output can vary significantly due to many variables including air pressure supply, battery strength and operational variations.

**Caution:** Proper torquing of latch and mating flange bolts is required to obtain specified performance. **Over torquing the bolts may result in damage to the bolt and/or casting which could result in pipe joint separation.** Under torquing the bolts may result in lower pressure retention capabilities, lower bend load capabilities, joint leakage and pipe joint separation. Pipe joint separation may result in significant property damage and serious injury.

Note: For VDS approved applications, please refer to data sheet VDSGruv: "VDS – Roll Grooving Approval Specifications" in the Technical Data/Installation Instruction Section at [www.anvilintl.com](http://www.anvilintl.com).

### ANSI/METRIC SPECIFIED LATCH BOLT TORQUE

Bolt Size	Wrench Size	Specified Bolt Torque *
In./mm	In./mm	Ft.-Lbs/N-M
3/8 M10	11/16 16	30-45 40-60
1/2	3/8	80-100
5/8	1 1/16	100-130
3/4	1 1/4	130-180
7/8	1 7/16	180-220

\* Non-lubricated bolt torques.

### ANSI/METRIC SPECIFIED MATING FLANGE BOLT TORQUE

Bolt Size	Wrench Size	Specified Bolt Torque *
In./mm	In./mm	Ft.-Lbs/N-M
5/8 M16	1 1/16 24	110-140 149-190
3/4 M20	1 1/4 30	220-250 298-339
7/8 M24	1 7/16 36	320-400 434-542
1	1 3/8	360-520
1 1/8	1 13/16	450-725
1 1/4	2	620-1000

\* Non-lubricated bolt torques.

## 90° ELBOW

- Approved By UL, ULC and FM at 300 psi
- Cast Iron ASTM A 126 Class B.
- NPT Thread per ANSI/ASME B1.20.1.
- Dimension per ASME B16.4
- Marked with SPD
- For current listing/approval details contact a Titus representative

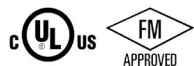


Nominal Size in/mm	Pressure PSI/MPa	Dimension		Unit WT LB/KGS
		A	B	
1	300	1.50	1.50	0.90
25	2065	38.1	38.1	0.41
1-1/4	300	1.75	1.75	1.39
32	2065	44.45	44.45	0.63
1-1/2	300	1.94	1.94	1.83
40	2065	49.27	49.27	0.83
2	300	2.25	2.25	3.10
50	2065	57.15	57.15	1.41
2-1/2	300	2.70	2.70	4.80
65	2065	68.58	68.58	2.18



## 90° REDUCED ELBOW

- Approved By UL, ULC and FM at 300 psi
- Cast Iron ASTM A 126 Class B.
- NPT Thread per ANSI/ASME B1.20.1.
- Dimension per ASME B16.4
- Marked with SPD
- For current listing/approval details contact a Titus representative



Nominal Size in/mm	Pressure PSI/MPa	Dimension		Unit WT LB/KGS
		A	B	
1x1/2	300	1.26	1.36	0.68
25x15	2065	32.0	34.5	0.31
1x3/4	300	1.37	1.45	0.77
25x20	2065	34.80	36.83	0.35
1-1/4x1/2	300	1.34	1.53	0.97
32x15	2065	34.04	38.86	0.44
1-1/4x3/4	300	1.45	1.62	1.08
32x20	2065	36.83	41.15	0.49
1-1/4x1	300	1.58	1.67	1.19
32x25	2065	40.13	42.42	0.54
1-1/2x1/2	300	1.41	1.66	1.17
40x15	2065	35.8	42.2	0.53
1-1/2x3/4	300	1.52	1.75	1.30
40x20	2065	38.61	44.45	0.59
1-1/2x1	300	1.65	1.80	1.43
40x25	2065	41.91	45.72	0.65
1-1/2x1/-1/4	300	1.82	1.88	1.65
40x32	2065	46.23	47.75	0.75
2x1/2	300	1.49	1.88	1.72
50x15	2065	37.85	47.75	0.78
2x3/4	300	1.60	1.97	1.85
50x20	2065	40.6	50.0	0.84
2x1	300	1.73	2.02	2.00
50x25	2065	43.94	51.31	0.91
2x1-1/4	300	1.90	2.10	2.31
50x32	2065	48.26	53.34	1.05
2x1-1/2	300	2.02	2.16	2.53
50x40	2065	51.31	54.86	1.15

## 45° ELBOW

- Approved By UL, ULC and FM at 300 psi
- Cast Iron ASTM A 126 Class B.
- NPT Thread per ANSI/ASME B1.20.1.
- Dimension per ASME B16.4
- Marked with SPD
- For current listing/approval details contact a Titus representative



Nominal Size in/mm	Pressure PSI/MPa	Dimension		Unit WT LB/KGS
		A	B	
1	300	1.120	1.120	0.81
25	2065	28.448	28.448	0.37
1-1/4	300	1.290	1.290	1.23
32	2065	32.766	32.766	0.56
1-1/2	300	1.430	1.430	1.65
40	2065	36.322	36.322	0.75
2	300	1.680	1.680	2.68
50	2065	42.672	42.672	1.22

## REDUCED COUPLING

- Approved By UL, ULC and FM at 300 psi
- Cast Iron ASTM A 126 Class B.
- NPT Thread per ANSI/ASME B1.20.1.
- Dimension per ASME B16.4
- Marked with SPD
- For current listing/approval details contact a Titus representative



Nominal Size in/mm	Pressure PSI/MPa	Dimension	Unit WT LB/KGS
		A	
1×1/2	300	1.70	0.616
25×15	2065	43.18	0.28
1×3/4	300	1.70	0.684
25×20	2065	43.18	0.311

## CROSS

- Approved By UL, ULC and FM at 300 psi
- Cast Iron ASTM A 126 Class B.
- NPT Thread per ANSI/ASME B1.20.1.
- Dimension per ASME B16.4
- Marked with SPD
- For current listing/approval details contact a Titus representative



Nominal Size in/mm	Pressure PSI/MPa	Dimension		Unit WT LB/KGS
		A	B	
1	300	1.50	1.50	1.60
25	2065	38.1	38.1	0.73
1-1/4	300	1.75	1.75	2.64
32	2065	44.45	44.45	1.20
1-1/2	300	1.94	1.94	2.99
40	2065	49.27	49.27	1.36
2	300	2.25	2.25	4.80
50	2065	57.15	57.15	2.18

## REDUCED CROSS

- Approved By UL, ULC and FM at 300 psi
- Cast Iron ASTM A 126 Class B.
- NPT Thread per ANSI/ASME B1.20.1.
- Dimension per ASME B16.4
- Marked with SPD
- For current listing/approval details contact a Titus representative



Nominal Size in/mm	Pressure PSI/MPa	Dimension		Unit WT LB/KGS
		A	B	
1-1/4×1 32×25	300 2065	1.58 40.13	1.67 42.42	1.89 0.86
1-1/2×1 40×25	300 2065	1.65 41.91	1.80 45.72	2.27 1.03
2×1 50×25	300 2065	1.73 43.94	2.02 51.31	2.99 1.36

## TEE

- Approved By UL, ULC and FM at 300 psi
- Cast Iron ASTM A 126 Class B.
- NPT Thread per ANSI/ASME B1.20.1.
- Dimension per ASME B16.4
- Marked with SPD
- For current listing/approval details contact a Titus representative



Nominal Size in/mm	Pressure PSI/MPa	Dimension		Unit WT LB/KGS
		A	B	
1	300	1.50	1.50	1.25
25	2065	38.10	38.10	0.57
1-1/4	300	1.75	1.75	1.91
32	2065	44.45	44.45	0.87
1-1/2	300	1.94	1.94	2.55
40	2065	49.27	49.27	1.16
2	300	2.25	2.25	3.96
50	2065	57.15	57.15	1.80
2-1/2	300	2.70	2.70	6.38
65	2065	68.58	68.58	2.90

## REDUCED TEE

- Approved By UL, ULC and FM at 300 psi
- Cast Iron ASTM A 126 Class B.
- NPT Thread per ANSI/ASME B1.20.1.
- Dimension per ASME B16.4
- Marked with SPD
- For current listing/approval details contact a Titus representative

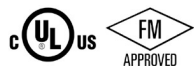


Nominal Size in/mm	Pressure PSI/MPa	Dimension			Unit WT LB/KGS
		A	B	C	
1x1/2x1	300	1.50	1.36	1.50	1.06
25x15x25	2065	38.10	34.54	38.10	0.48
1x3/4x1	300	1.50	1.45	1.50	1.10
25x20x25	2065	38.10	36.83	38.10	0.50
1x1x1/2	300	1.26	1.26	1.36	0.97
25x25x15	2065	32.00	32.00	34.54	0.44
1x1x3/4	300	1.37	1.37	1.45	1.08
25x25x20	2065	34.80	34.80	36.83	0.49
1x1x1-1/4	300	1.67	1.67	1.58	1.45
25x25x32	2065	42.42	42.42	40.13	0.66
1x1x1-1/2	300	1.80	1.80	1.65	1.72
25x25x40	2065	45.72	45.72	41.91	0.78
1-1/4x1x1/2	300	1.34	1.26	1.53	1.19
32x25x15	2065	34.04	32.00	38.86	0.54
1-1/4x1x3/4	300	1.45	1.37	1.62	1.34
32x25x20	2065	36.83	34.80	41.15	0.61
1-1/4x1x1	300	1.58	1.50	1.67	1.45
32x25x25	2065	40.13	38.10	42.42	0.66
1-1/4x1x1-1/4	300	1.75	1.67	1.75	1.78
32x25x32	2065	44.45	42.42	44.45	0.81
1-1/4x1x1-1/2	300	1.88	1.80	1.82	1.94
32x25x40	2065	47.75	45.72	46.23	0.88
1-1/4x1-1/4x1/2	300	1.34	1.34	1.53	1.36
32x32x15	2065	34.04	34.04	38.86	0.62
1-1/4x1-1/4x3/4	300	1.45	1.45	1.62	1.41
32x32x20	2065	36.83	36.83	41.15	0.64
1-1/4x1-1/4x1	300	1.58	1.58	1.67	1.63
32x32x25	2065	40.13	40.13	42.42	0.74
1-1/4x1-1/4x1-1/2	300	1.88	1.88	1.82	1.91
32x32x40	2065	47.75	47.75	46.23	0.87
1-1/4x1-1/4x2	300	2.10	2.10	1.90	2.64
32x32x50	2065	53.34	53.34	48.26	1.20
1-1/2x1x1/2	300	1.41	1.34	1.66	1.43
40x25x15	2065	35.81	34.04	42.16	0.65
1-1/2x1x3/4	300	1.52	1.37	1.75	1.52
40x25x20	2065	38.61	34.80	44.45	0.69
1-1/2x1x1	300	1.65	1.50	1.80	1.78
40x25x25	2065	41.91	38.10	45.72	0.81
1-1/2x1x1-1/4	300	1.82	1.67	1.88	1.98
40x25x32	2065	46.23	42.42	47.75	0.90
1-1/2x1x1-1/2	300	1.94	1.80	1.94	2.20
40x25x40	2065	49.28	45.72	49.28	1.00
1-1/2x1-1/4x1/2	300	1.41	1.34	1.66	1.58
40x32x15	2065	35.81	34.04	42.16	0.72
1-1/2x1-1/4x3/4	300	1.52	1.45	1.75	1.72
40x32x20	2065	38.61	36.83	44.45	0.78
1-1/2x1-1/4x1	300	1.65	1.58	1.80	1.91
40x32x25	2065	41.91	40.13	45.72	0.87
1-1/2x1-1/4x1-1/4	300	1.82	1.75	1.88	2.27
40x32x32	2065	46.23	44.45	47.75	1.03

Nominal Size in/mm	Pressure PSI/MPa	Dimension			Unit WT LB/KGS
		A	B	C	
1-1/2x1-1/4x1-1/2	300	1.94	1.88	1.94	2.42
40x32x40	2065	49.28	47.75	49.28	1.10
1-1/2x1-1/4x2	300	2.16	2.10	2.02	2.95
40x32x50	2065	54.86	53.34	51.31	1.34
1-1/2x1-1/2x1/2	300	1.41	1.41	1.66	1.80
40x40x15	2065	35.81	35.81	42.16	0.82
1-1/2x1-1/2x3/4	300	1.52	1.52	1.75	1.91
40x40x20	2065	38.61	38.61	44.45	0.87
1-1/2x1-1/2x1	300	1.65	1.65	1.80	2.09
40x40x25	2065	41.91	41.91	45.72	0.95
1-1/2x1-1/2x1-1/4	300	1.82	1.82	1.88	2.42
40x40x32	2065	46.23	46.23	47.75	1.10
1-1/2x1-1/2x2	300	2.16	2.16	2.02	2.99
40x40x50	2065	54.86	54.86	51.31	1.36
2x1x2	300	2.25	2.02	2.25	3.21
50x25x50	2065	57.15	51.31	57.15	1.46
2x1-1/4x2	300	2.25	2.10	2.25	3.50
50x32x50	2065	57.15	53.34	57.15	1.59
2x1-1/2x1/2	300	1.49	1.41	1.88	2.27
50x40x15	2065	37.85	35.81	47.75	1.03
2x1-1/2x3/4	300	1.60	1.52	1.97	2.38
50x40x20	2065	40.64	38.61	50.04	1.08
2x1-1/2x1	300	1.73	1.65	2.02	2.53
50x40x25	2065	43.94	41.91	51.31	1.15
2x1-1/2x1-1/4	300	1.90	1.82	2.10	2.86
50x40x32	2065	48.26	46.23	53.34	1.30
2x1-1/2x1-1/2	300	2.02	1.94	2.16	3.08
50x40x40	2065	51.31	49.28	54.86	1.40
2x1-1/2x2	300	2.25	2.16	2.25	3.59
50x40x50	2065	57.15	54.86	57.15	1.63
2x2x1/2	300	1.49	1.49	1.88	2.57
50x50x15	2065	37.85	37.85	47.75	1.17
2x2x3/4	300	1.60	1.60	1.97	2.77
50x50x20	2065	40.64	40.64	50.04	1.26
2x2x1	300	1.73	1.73	2.02	2.93
50x50x25	2065	43.94	43.94	51.31	1.33
2x2x1-1/4	300	1.90	1.90	2.10	3.21
50x50x32	2065	48.26	48.26	53.34	1.46
2x2x1-1/2	300	2.02	2.02	2.16	3.52
50x50x40	2065	51.31	51.31	54.86	1.60
2x2x2-1/2	300	2.60	2.60	2.39	5.06
50x50x65	2065	66.04	66.04	60.71	2.30

## PLUG

- Approved By UL, ULC and FM at 300 psi
- Cast Iron ASTM A 126 Class B.
- NPT Thread per ANSI/ASME B1.20.1.
- Dimension per ASME B16.4
- Marked with SPD
- For current listing/approval details contact a Titus representative



Nominal Size in/mm	Pressure PSI/MPa	Dimension	Unit WT LB/KGS
		A	
1/2	300	0.94	0.10
15	2065	23.88	0.05
3/4	300	1.07	0.18
20	2065	27.18	0.08
1	300	1.25	0.29
25	2065	31.75	0.13
1-1/4	300	1.36	0.46
32	2065	34.54	0.21
1-1/2	300	1.45	0.64
40	2065	36.83	0.29
2	300	1.56	1.08
50	2065	39.62	0.49



## SECTION 10

## TEELOX™ MECHANICAL BRANCH CONNECTOR

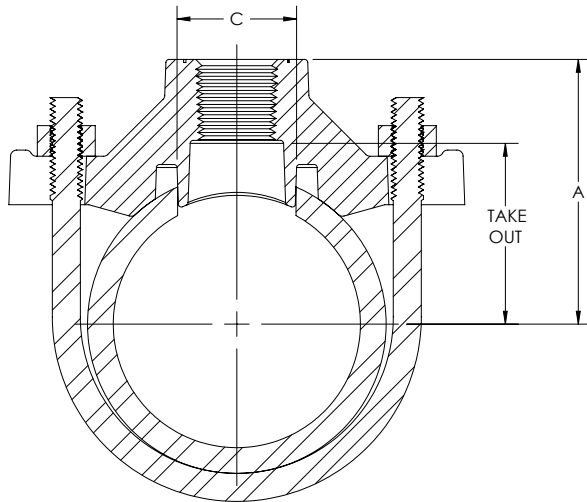


Designed for fast installation of bolted branch outlets, Teelox™ mechanical branch connectors are practical alternatives to existing branch connect systems. Made from high quality cast iron, Teelox™ are known for long-lasting, maintenance-free performance.

Key Features:

- A high grade EPDM rubber gasket surrounds the locating collar for accurate, permanent installation and the best seal in the industry.
- The locating collar is an integral part of the casting.
- A zinc-plated high-tensile steel U-bolt ensures rust-free attachment.
- Teelox™ is approved for conventional and arm-over installations.

NPS	Pipe Center to Outlet A	Hole Dia. B	Take Out
1 1/4 x 1/2	1.98	1.19	1.19
1 1/4 x 3/4	2.05	1.19	1.19
1 1/4 x 1	2.13	1.19	1.19
1 1/2 x 1/2	1.98	1.19	1.19
1 1/2 x 3/4	2.05	1.19	1.19
1 1/2 x 1	2.13	1.19	1.19
2 x 1/2	2.26	1.19	1.47
2 x 3/4	2.33	1.19	1.47
2 x 1	2.41	1.19	1.47
2 1/2 x 1/2	2.57	1.19	1.78
2 1/2 x 3/4	2.64	1.19	1.78
2 1/2 x 1	2.72	1.19	1.78



**Material:** Cast Iron ASTM A126 Class A Minimum

**Gasket:** E.P.D.M. Rubber ASTM D-2000

**U Bolt:** Zinc Plated High-Tensile Steel

**Dimensions:** ANSI/ASME B1.20.1

**Pressure Ratings:** 175 psi

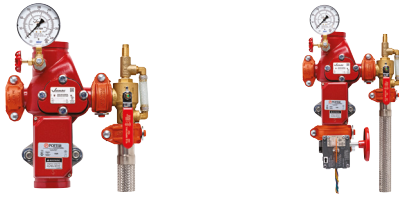
**Coatings:** ASTM B633, ASTM A153

**Additional Specifications:** UL, ULC and FM where applicable

**Torque Requirement:** 20 ft.-lbs. max.

# Section 3 – Valves

# Victaulic® Series UMC (Universal Manifold Check) Assembly



## 1.0 PRODUCT DESCRIPTION

### Available Sizes

- 1 ¼ – 8"/DN32 – DN200

### Maximum Working Pressure

- Up to 300 psi/2068 kPa/20.6 bar

### Application

- Floor control assemblies may be utilized to meet the zone separation requirements of multistory applications exceeding two stories in height or whenever separate control or zoning is specified.
- Shotgun riser assemblies may be utilized in vertical orientations on individual system risers.

### Configurations

- Optional control valve: Series 705 Butterfly Valve or Series 728 Ball Valve
- Factory assembled right-handed/left-handed (field changeable if necessary)

### Included Components

- Integrated Check Valve
- Series UTD (Universal Test Drain) with integrated Series ARV (Adjustable Relief Valve)
- Quick Drain Hose
- Vane Type Flow Switch
- 1 ¼ – 2"/DN32 – DN50 UMC use saddle type 2" VSR flow switch
- 2 ½ – 3"/73mm – DN80 and 8"/DN200 UMC use saddle type VSR flow switch for corresponding valve size
- 4 – 6"/DN100-DN150 UMC use VSR-M flow switch with flange adapter
- 1 ¼ – 8"/DN32 – DN200 System-side pressure gauge 400 psi/2750 kPa/27.5 bar
- 1 ¼ – 3"/DN32-DN80 supply side ½" plugged port located on control valve (if using as a system riser, pressure gauge ordered separately)
- 4 – 8"/DN100 – DN200 Supply-side pressure gauge 400 psi/2750 kPa/27.5 bar

### Available End Connections

- Victaulic Original Groove System (OGS) standard groove

## 2.0 CERTIFICATION/LISTINGS



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

### 3.0 SPECIFICATIONS – MATERIAL

**Body:** Ductile iron conforming to ASTM A536, grade 65-45-12

**Clapper:** Stainless Steel

**Clapper Seal:** EPDM

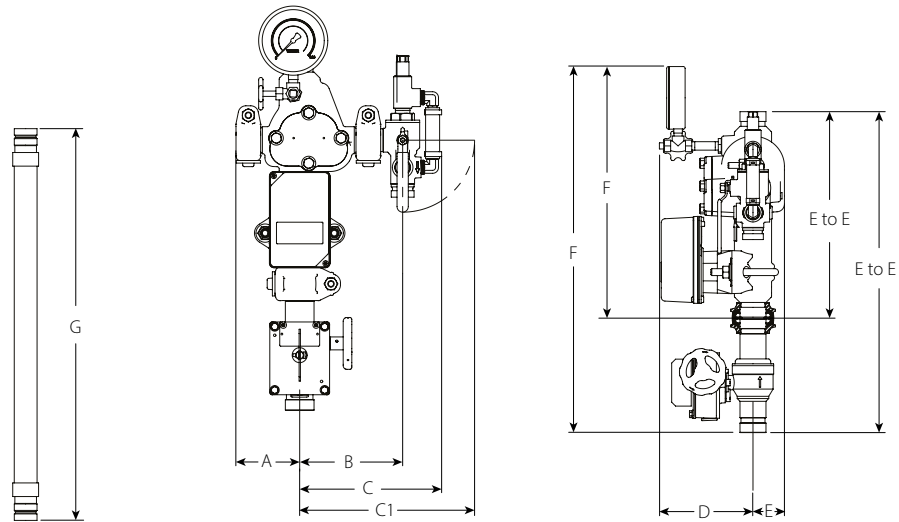
**Shafts:** Stainless Steel

**Seat:** Brass

**Spring:** Stainless Steel

**Hose:** Stainless Steel

### 4.0 DIMENSIONS

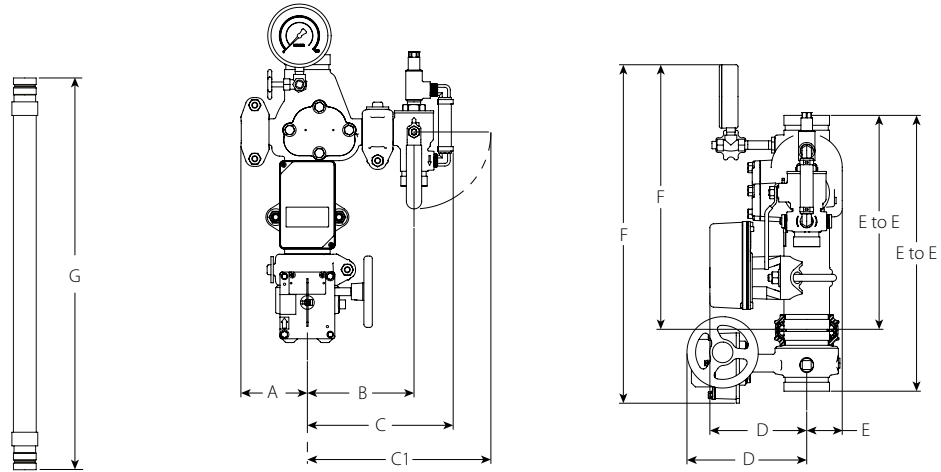


Size		Dimensions											Series UTD Valve Size (Nominal)	Series UTD Test Orifice K-Factor S.I.	G Quick Drain Hose Length	Weight	
Nominal inches DN	Actual Outside Dia. inches mm	E to E with control valve	E to E without control valve	A	B	C	C-1	D with control valve	D without control valve	E	F with control valve	F without control valve				Approx. (Each) with control valve lb kg	Approx. (Each) without control valve lb kg
		inches mm											inches DN		inches mm	lb	kg
1 ¼ DN32	1.660 42.4	20.50 521	13.13 333	3.63 92	5.88 149	8.25 210	10.00 254	6.00 152	6.00 152	2.00 51	23.38 594	16.00 406	1.00 25	2.8 4.0	24.00 610	32.0 14.5	24.0 10.9
1 ½ DN40	1.900 48.3	20.50 521	13.13 333	3.63 92	5.88 149	8.25 210	10.00 254	6.00 152	6.00 152	2.00 51	23.50 597	16.13 410	1.00 25	2.8 4.0	24.00 610	34.0 15.4	25.0 11.3

**NOTES**

- When Series UTD Valve Size (Nominal) is 1"/25 mm, flexible drain hose connection utilizes FireLock IGS™ groove profile
- ½" system supply pressure gauge port located on the control valve for sizes 1 ¼ – 1 ½"/DN32 – DN40

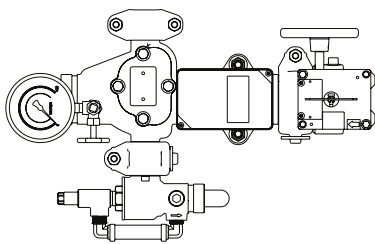
4.0 DIMENSIONS (CONTINUED)



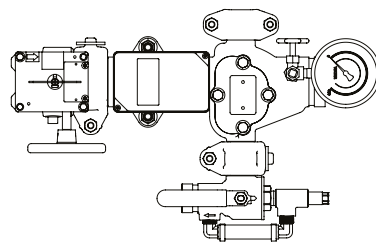
Size		Dimensions											Series UTD Valve Size (Nominal)	Series UTD Test Orifice	G Quick Drain Hose Length	Weight	
Nominal inches DN	Actual Outside Dia. inches mm	E to E with control valve	E to E without control valve	A	B	C	C-1	D with control valve	D without control valve	E	F with control valve	F without control valve				inches DN	K-Factor S.I.
2	2.375	17.50	13.13	3.63	5.88	8.25	10.00	6.38	6.00	2.00	21.13	16.38	1.00	2.8	24.00	36.0	25.0
DN50	60.3	445	333	92	149	210	254	162	152	51	537	416	25	4.0	610	16.3	11.3
2½	2.875	17.38	13.50	4.25	6.75	9.25	11.50	7.50	6.13	2.25	21.25	16.63	1.25	4.2	24.00	39.0	28.0
	73.0	441	343	108	171	235	292	191	156	57	540	422	32	6.1	610	17.7	12.7
DN65	3.000	17.38	13.50	4.25	6.75	9.25	11.50	7.50	6.13	2.25	21.25	16.63	1.25	4.2	24.00	39.0	28.0
	76.1	441	343	108	171	235	292	191	156	57	540	422	32	6.1	610	17.7	12.7
3	3.500	17.63	13.75	4.38	7.13	9.63	11.88	7.75	6.38	2.38	21.13	16.50	1.25	4.2	24.00	44.0	31.0
DN80	88.9	448	349	111	181	244	302	197	162	60	537	419	32	6.1	610	20.0	14.1
4	4.500	19.50	14.63	5.75	8.75	11.63	14.88	8.75	7.00	3.00	22.75	17.63	2.00	5.6	36.00	65.0	52.0
DN100	114.3	495	371	146	222	295	378	222	178	76	578	448	51	8.1	914	29.5	23.6
	6.500	23.50	17.38	6.88	10.00	12.88	16.13	11.38	8.00	3.88	25.88	19.75	2.00	5.6	36.00	100.0	73.0
	165.1	597	441	175	254	327	410	289	203	98	657	502	51	8.1	914	45.4	33.1
6	6.625	23.50	17.38	6.88	10.00	12.88	16.13	11.38	8.00	3.88	25.88	19.75	2.00	5.6	36.00	100.0	73.0
DN150	168.3	597	441	175	254	327	410	289	203	98	657	502	51	8.1	914	45.4	33.1

NOTES

- ½" system supply pressure gauge port located on the control valve for sizes 2 – 3"/DN50 – DN80 (gauge sold separately)
- Included System supply pressure gauge located on the control valve for sizes 4 – 6"/DN100 – DN150
- When Series UTD Valve Size (Nominal) is 1"/25 mm, flexible drain hose connection utilizes FireLock IGS™ groove profile

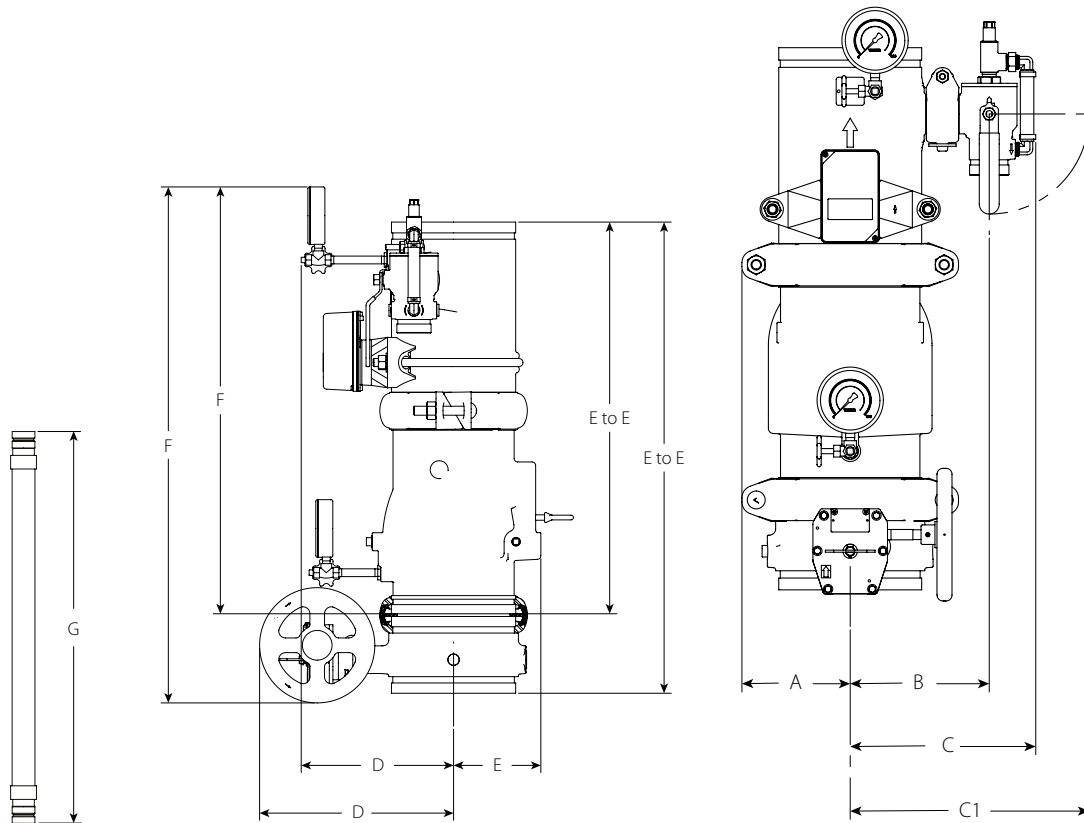


Horizontal Install Left Hand with Control Valve



Horizontal Install Right Hand with Control Valve

4.0 DIMENSIONS (CONTINUED)



Size		Dimensions											Series UTD Valve Size (Nominal)		Series UTD Test Orifice		G Quick Drain Hose Length		Weight	
Nominal	Actual Outside Dia.	E to E with control valve	E to E without control valve	A	B	C	C-1	D with control valve	D without control valve	E	F with control valve	F without control valve	inches	DN	K-Factor	S.I.	inches	mm	Approx. (Each) with control valve	Approx. (Each) without control valve
inches	inches												inches	DN			inches	mm	lb	kg
8	8.625	32.75	27.25	6.50	8.38	11.25	14.38	13.50	10.63	6.00	35.13	29.63	2.00	51	5.6	8.1	36.00	914	178.0	136.0
DN200	219.1	832	692	165	213	286	365	343	270	152	892	752							80.7	61.7

NOTE

- System supply pressure gauge port is on the supply side of check valve

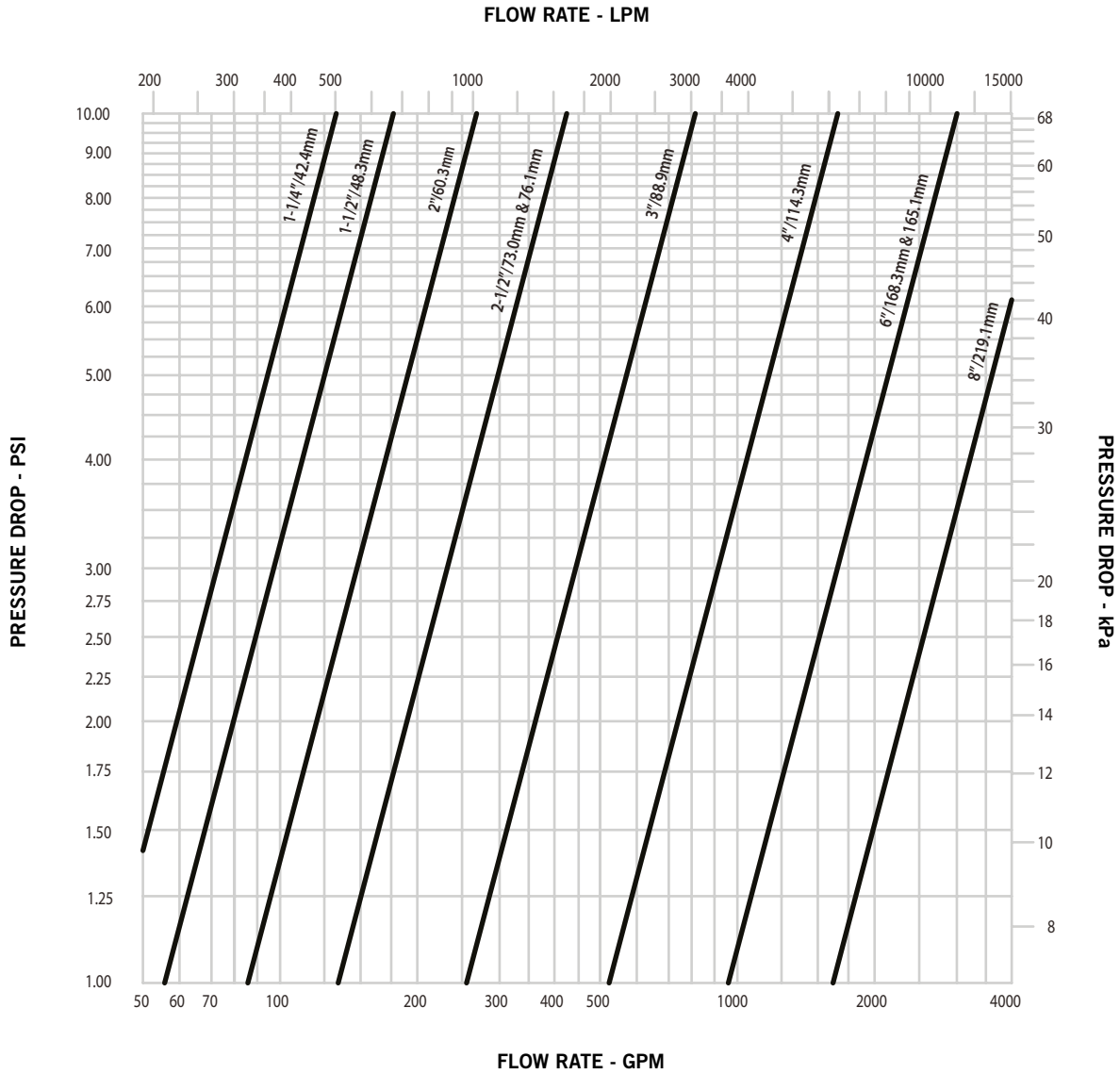
## 5.0 PERFORMANCE

Size		Equivalent Length of Sch. 40 Pipe <sup>1</sup>		Flow Characteristics		Maximum Working Pressure psi kPa
Nominal inches DN	Actual Outside Diameter inches mm	with control valve	without control valve	Cv/Kv Values with control valve	Cv/Kv Values without control valve	
		feet meters	feet meters	Full Open	Full Open	
1 ¼ DN32	1.660 42.4	8.3 2.5	8.0 2.4	38.52 33	35.59 31	300 2068
1 ½ DN40	1.900 48.3	10.1 3.1	10.0 3.0	56.75 49	57.43 50	300 2068
2 DN50	2.375 60.3	21.1 6.4	15.8 4.8	71.43 62	83.14 72	300 2068
2 ½	2.875 73.0	19.6 6.0	15.8 4.8	112.43 97	125.84 109	300 2068
DN65	3.000 76.1	19.6 6.0	15.8 4.8	112.43 97	125.84 109	300 2068
3 DN80	3.500 88.9	20.0 6.1	13.3 4.0	199.32 172	241.43 209	300 2068
4 DN100	4.500 114.3	17.6 5.4	12.9 3.9	425.88 368	499.23 432	300 2068
	6.500 165.1	40.6 12.4	32.0 9.8	834.97 722	932.83 807	300 2068
6 DN150	6.625 168.3	40.6 12.4	32.0 9.8	834.97 722	932.83 807	300 2068
8 DN200	8.625 219.1	60.8 18.5	45.8 13.9	1376.8 1191	1556.57 1346	300 2068

<sup>1</sup> Equivalent length of Sch 40 pipe calculated using the Hazen-Williams formula with a roughness coefficient of C=120

5.0 PERFORMANCE (CONTINUED)

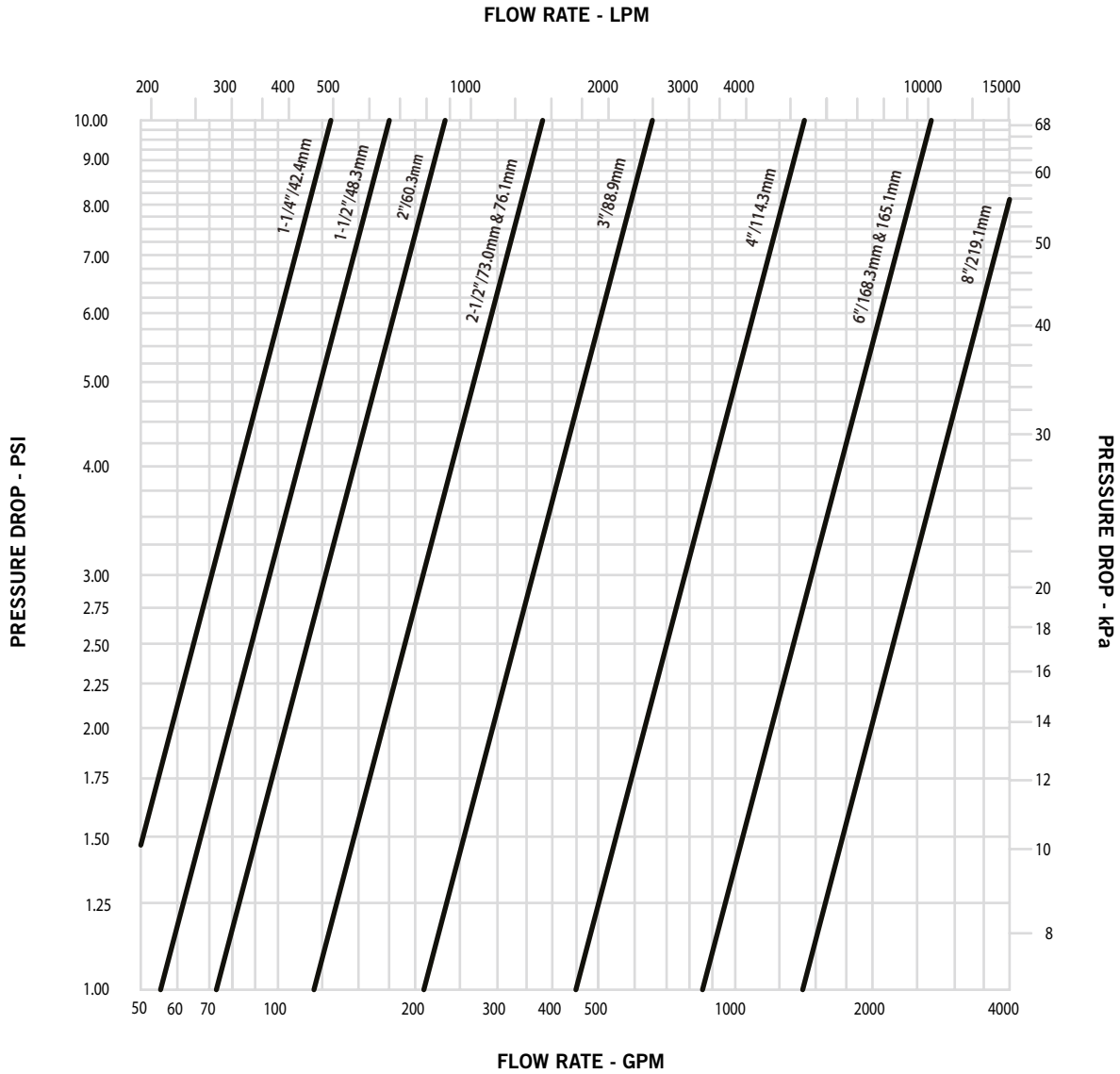
Series UMC without Control Valve





## 5.0 PERFORMANCE (CONTINUED)






### Series UMC with Control Valve



**NOTE**

- Includes friction loss across flow switch

## 6.0 NOTIFICATIONS

<b>⚠ WARNING</b>				
				
<ul style="list-style-type: none"><li>• Read and understand all instructions before attempting to install, remove, adjust, or maintain any Victaulic piping products.</li><li>• Depressurize and drain the piping system before attempting to install, remove, adjust, or maintain any Victaulic piping products.</li><li>• Wear safety glasses, hardhat, and foot protection.</li></ul> <p>Failure to follow these instructions could result in death or serious personal injury and property damage.</p>				

## 7.0 REFERENCE MATERIALS

- [10.17: FireLock® Ball Valve](#)
- [10.54: Victaulic FireLock™ Innovative Groove System I IGS™](#)
- [10.64: Victaulic® FireLock™ Installation-Ready™ Rigid Couplings](#)
- [10.81: FireLock® Butterfly Valve](#)
- [30.71: Series UM Universal Manifold Assembly](#)
- [30.73: Victaulic® Series UTD Universal Test and Drain](#)
- [30.74: Victaulic® Series ARV Adjustable Relief Valve](#)
- [I-100: Field Installation Handbook](#)
- [I-UMC: Series UMC Universal Manifold Check Assembly](#)

### User Responsibility for Product Selection and Suitability

Each user bears final responsibility for making a determination as to the suitability of Victaulic products for a particular end-use application, in accordance with industry standards and project specifications, as well as Victaulic performance, maintenance, safety, and warning 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, installation guide, or this disclaimer.

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### Note

This product shall be manufactured by Victaulic or to Victaulic specifications. All products to be installed in accordance with current Victaulic installation/assembly instructions. Victaulic reserves the right to change product specifications, designs and standard equipment without notice and without incurring obligations.

### Installation

Reference should always be made to the Victaulic installation handbook or installation instructions of 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 [www.victaulic.com](http://www.victaulic.com).

### Warranty

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

### Trademarks

*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.

Designed for years of trouble free reliability, Kennedy UL-FM butterfly valves are constructed of durable ductile iron for a lightweight superior product. We utilize stainless steel upper and lower shafts as well as EPDM encapsulated discs. Our fusion bonded coated bodies offer a superior long-lasting coating. The valves are slow operating with low torque leading to excellent high cycle life. Our butterfly valves are always rated to 300psi and all are fully hydrostatically tested before they leave Elmira, NY.



### GROOVED BUTTERFLY VALVES

- G300 - 2-1/2" - 6"
- 01G - 8"

#### Long Body BFV

- G300E - 2-1/2" - 6"
- 02G - 8"
- Long Body BFV are USC Approved with EPDM Disc

#### Working Pressure

- UL/FM 300 PSI

#### Features

- Outdoor Rated
- NSF Certified (Long Body Only)
- Lightweight
- Standard Grooves



### WAFER BUTTERFLY VALVES

- W300 - 2-1/2" - 6"
- 01W - 8"

#### Working Pressure

- UL/FM 300 PSI

#### Features

- Outdoor Rated
- Integral Gearbox (2-1/2" - 6")
- Lightweight
- Short Lay Length
- Does NOT require washer for installation with grooved flange adapter.

# Section 4 – Electrical Components



Specifications subject to change without notice.

Ordering Information			
Nominal Pipe Size		Model	Part Number
2"	DN50	VSR-2	1144402
2 1/2"	DN65	VSR-2 1/2	1144425
3"	DN80	VSR-3	1144403
3 1/2"	-	VSR-3 1/2	1144435
4"	DN100	VSR-4	1144404
5"	-	VSR-5	1144405
6"	DN150	VSR-6	1144406
8"	DN200	VSR-8	1144408

**Optional:** Cover Tamper Switch Kit, stock no. 0090148

**Replaceable Components:** Retard/Switch Assembly, stock no. 1029030

**UL, CUL and CSFM Listed, FM Approved, LPCB Approved, For CE Marked (EN12259-5) / VdS Approved model use VSR-EU**

**Service Pressure:** 450 PSI (31 BAR) - UL

**Flow Sensitivity Range for Signal:**

4-10 GPM (15-38 LPM) - UL

**Maximum Surge:** 18 FPS (5.5 m/s)

**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

**Conduit Entrances:** Two knockouts provided for 1/2" conduit.

Individual switch compartments suitable for dissimilar voltages.

**Environmental Specifications:**

- NEMA 4/IP54 Rated Enclosure suitable for indoor or outdoor use with factory installed gasket and die-cast housing when used with appropriate conduit fitting.
- Temperature Range: 40°F - 120°F, (4.5°C - 49°C) - UL
- Non-corrosive sleeve factory installed in saddle.

**Service Use:**

Automatic Sprinkler

NFPA-13

One or two family dwelling

NFPA-13D

Residential occupancy up to four stories

NFPA-13R

National Fire Alarm Code

NFPA-72

### WARNING

- Installation must be performed by qualified personnel and in accordance with all national and local codes and ordinances.
- Shock hazard. Disconnect power source before servicing. Serious injury or death could result.
- Risk of explosion. Not for use in hazardous locations. Serious injury or death could result.

### CAUTION

Waterflow switches that are monitoring wet pipe sprinkler systems shall not be used as the sole initiating device to discharge AFFF, deluge, or chemical suppression systems. Waterflow switches used for this application may result in unintended discharges caused by surges, trapped air, or short retard times.

**Important:** This document contains important information on the installation and operation of the VSR waterflow switches. Please read all instructions carefully before beginning installation. A copy of this document is required by NFPA 72 to be maintained on site.

#### General Information

The Model VSR is a vane type waterflow switch for use on wet sprinkler systems. It is UL Listed for use on a steel pipe; schedules 5 through 40, sizes 2" - 6" and is UL Listed and FM Approved for use on steel pipe; schedules 10 through 40, sizes 2" thru 8" (50 mm thru 200 mm). LPC approved sizes are 2" thru 8" (50 mm thru 200 mm). See Ordering Information chart.

The VSR may also be used as a sectional waterflow detector on large systems. The VSR contains two single pole, double throw, snap action switches and an adjustable, instantly recycling pneumatic retard. The switches are actuated when a flow of 10 GPM (38 LPM) or more occurs downstream of the device. The flow condition must exist for a period of time necessary to overcome the selected retard period.

#### Enclosure

The VSR switches and retard device are enclosed in a general purpose, die-cast housing. The cover is held in place with two tamper resistant screws which require a special key for removal. A field installable cover tamper switch is available as an option which may be used to indicate unauthorized removal of the cover. See bulletin number 5401103 for installation instructions of this switch.

Potter Electric Signal Company, LLC • St. Louis, MO • Phone: 866-956-1211/Canada 888-882-1833 • www.pottersignal.com

### Installation (see Fig. 1)

These devices may be mounted on horizontal or vertical pipe. On horizontal pipe they shall be installed on the top side of the pipe where they will be accessible. The device should not be installed within 6" (15 cm) of a fitting which changes the direction of the waterflow or within 24" (60 cm) of a valve or drain.

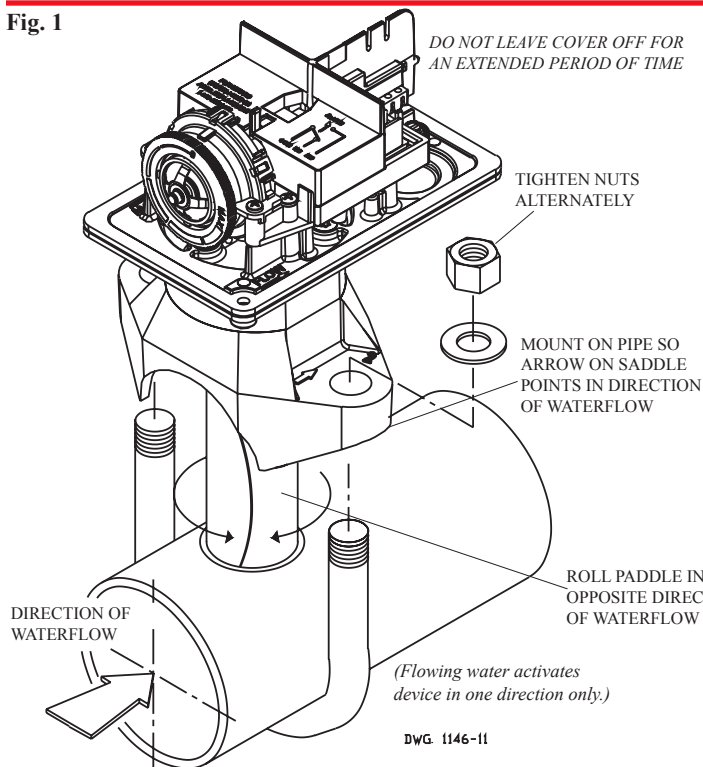
**NOTE:** Do not leave cover off for an extended period of time.

Drain the system and drill a hole in the pipe using a hole saw in a slow speed drill (see Fig. 1). Clean the inside pipe of all growth or other material for a distance equal to the pipe diameter on either side of the hole. Roll the vane so that it may be inserted into the hole; do not bend or crease it. Insert the vane so that the arrow on the saddle points in the direction of the waterflow. Take care not to damage the non-corrosive bushing in the saddle. The bushing should fit inside the hole in the pipe. Install the saddle strap and tighten nuts alternately to required torque (see the chart in Fig. 1). The vane must not rub the inside of the pipe or bind in any way.

### CAUTION

Do not trim the paddle. Failure to follow these instructions may prevent the device from operating and will void the warranty. Do not obstruct or otherwise prevent the trip stem of the flow switch from moving when water flows as this could damage the flow switch and prevent an alarm. If an alarm is not desired, a qualified technician should disable the alarm system.

Fig. 1

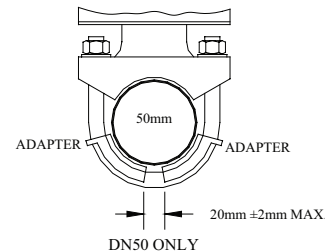
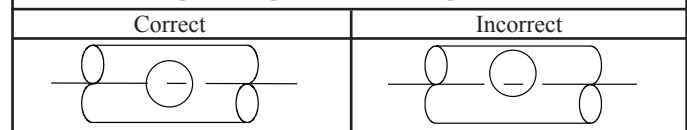


### Retard Adjustment

The delay can be adjusted by rotating the retard adjustment knob from 0 to the max setting (60-90 seconds). The time delay should be set at the minimum required to prevent false alarms

### CAUTION

Hole must be drilled perpendicular to the pipe and vertically centered. Refer to the Compatible Pipe/Installation Requirements chart for size.



USE (2) 5180162 ADAPTERS AS SHOWN ABOVE

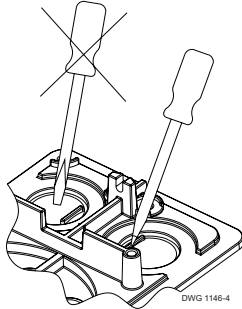
### Compatible Pipe/ Installation Requirements

Model	Nominal Pipe Size		Nominal Pipe O.D.		Pipe Wall Thickness										Hole Size		U-Bolt Nuts Torque	
	inch	mm	inch	mm	Lightwall		Schedule 10 (UL)		Schedule 40 (UL)		BS-1387 (LPC)		DN (VDS)		inch	mm	ft-lb	n-m
VSR-2	2	DN50	2.375	60.3	.065	1.651	0.109	2.77	0.154	3.91	0.142	3.6	0.091	2.3	1.25 ± .125/ .062	33.0 ± 2.0	20	27
VSR-2 1/2	2.5	-	2.875	73.0	.084	2.134	0.120	3.05	0.203	5.16	-	-	-	-				
VSR-2 1/2	-	DN65	3.000	76.1	-	-	-	-	-	-	0.142	3.6	0.102	2.6				
VSR-3	3	DN80	3.500	88.9	.083	2.108	0.120	3.05	0.216	5.49	0.157	4.0	0.114	2.9	2.00 ± .125	50.8 ± 2.0	20	27
VSR-3 1/2	3.5	-	4.000	101.6	-	-	0.120	3.05	0.226	5.74	-	-	-	-				
VSR-4	4	DN100	4.500	114.3	.084	2.134	0.120	3.05	0.237	6.02	0.177	4.5	0.126	3.2				
VSR-5	5	-	5.563	141.3	-	-	0.134	3.40	0.258	6.55	-	-	-	-				
VSR-6	6	DN150	6.625	168.3	.115	2.921	0.134	3.40	0.280	7.11	0.197	5.0	0.157	4.0				
VSR-8	8	DN200	8.625	219.1	-	-	0.148	3.76	0.322	8.18	0.248	6.3	0.177	4.5				

**NOTE:** For copper or plastic pipe use Model VSR-CF.

**Fig. 2**

To remove knockouts: Place screwdriver at inside edge of knockouts, not in the center.



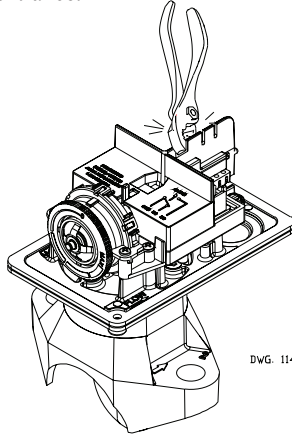
DWG 1146-4

### NOTICE

Do not drill into the base as this creates metal shavings which can create electrical hazards and damage the device. Drilling voids the warranty.

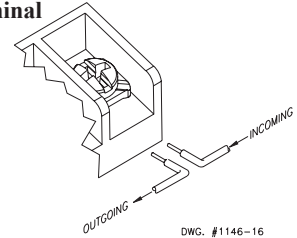
**Fig. 3**

Break out thin section of cover when wiring both switches from one conduit entrance.



DWG 1146-13

**Fig. 4** Switch Terminal Connections Clamping Plate Terminal



DWG. #1146-16

### WARNING

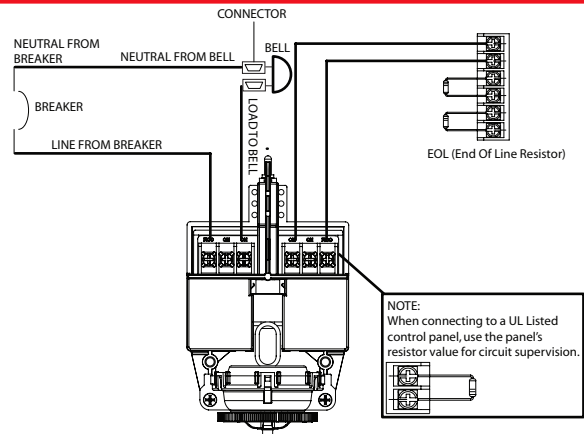
An uninsulated section of a single conductor should not be looped around the terminal and serve as two separate connections. The wire must be severed, thereby providing supervision of the connection in the event that the wire become dislodged from under the terminal. Failure to sever the wire may render the device inoperable risking severe property damage and loss of life.

Do not strip wire beyond 3/8" or length or expose an uninsulated conductor beyond the edge of the terminal block. When using stranded wire, capture all strands under the clamping plate.

**Fig. 5** Typical Electrical Connections

### Notes:

1. The Model VSR 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.
2. For supervised circuits, see "Switch Terminal Connections" drawing and warning note (Fig. 4).



NOTE:  
When connecting to a UL Listed control panel, use the panel's resistor value for circuit supervision.

### Testing

The frequency of inspection and testing for the Model VSR and its associated protective monitoring system shall be in accordance with applicable NFPA Codes and Standards and/or the authority having jurisdiction (manufacturer recommends quarterly or more frequently).

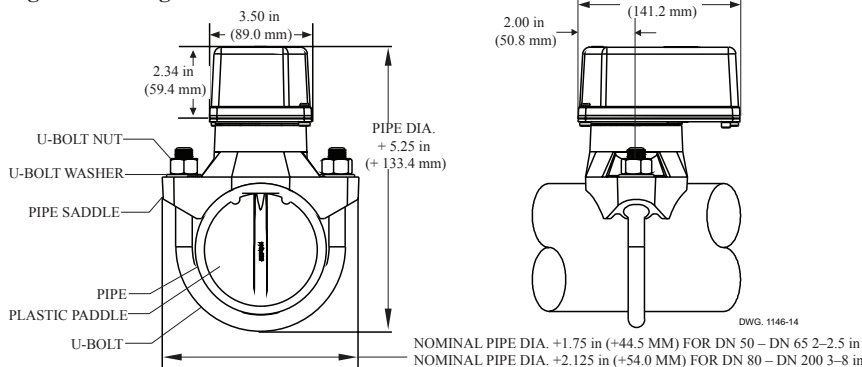
If provided, the inspector's test valve shall always be used for test purposes. If there are no provisions for testing the operation of the flow detection device on the system, application of the VSR is not recommended or advisable.

A minimum flow of 10 GPM (38 LPM) is required to activate this device.

### NOTICE

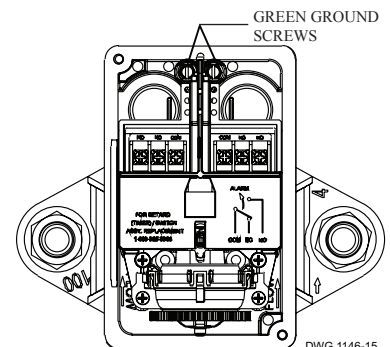
Advise the person responsible for testing of the fire protection system that this system must be tested in accordance with the testing instructions.

**Fig. 6** Mounting Dimensions



DWG. 1146-14

**Fig. 7**



DWG 1146-15

**Maintenance**

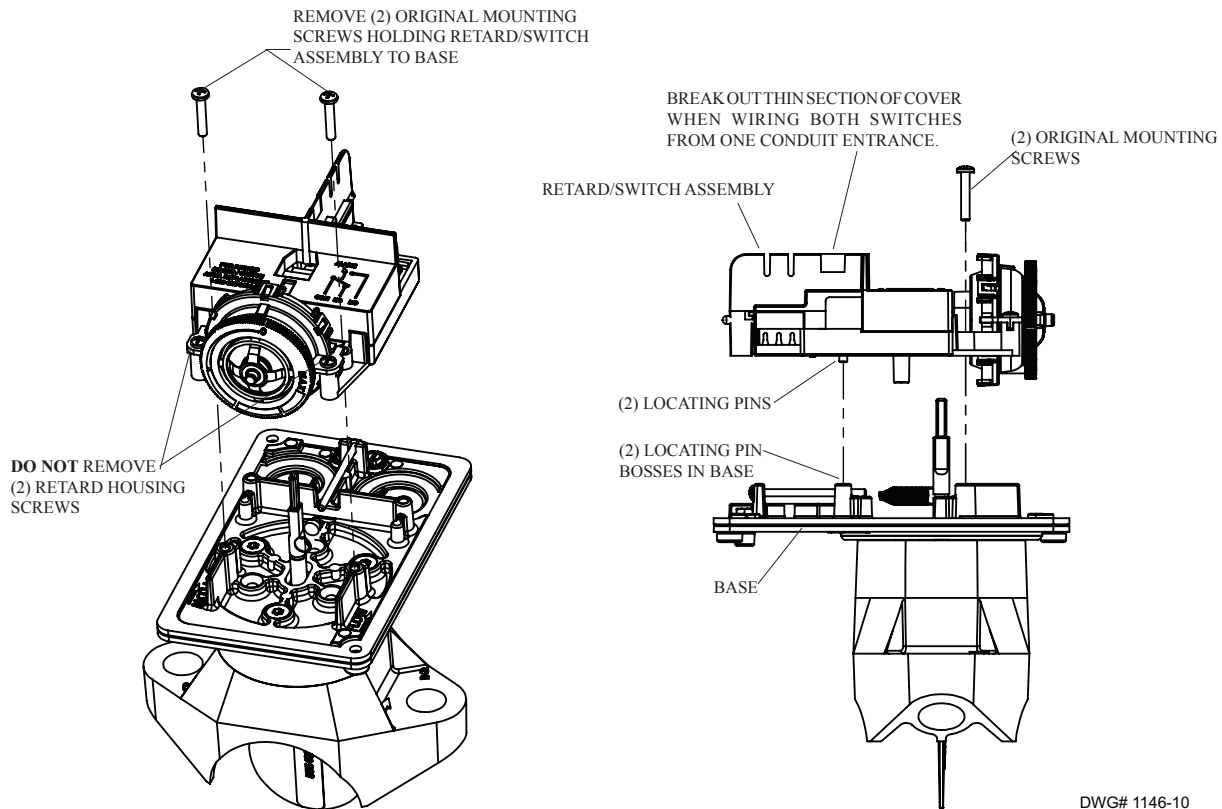
Inspect detectors monthly. If leaks are found, replace the detector. The VSR waterflow switch should provide years of trouble-free service. The retard and switch assembly are easily field replaceable. In the unlikely event that either component does not perform properly, please order replacement retard switch assembly stock #1029030 (see Fig. 8). There is no maintenance required, only periodic testing and inspection.

**Retard/Switch Assembly Replacement (See Fig. 8)**

**NOTICE** The Retard/Switch Assembly is field-replaceable without draining the system or removing the waterflow switch from the pipe

1. Make sure the fire alarm zone or circuit connected to the waterflow switch is bypassed or otherwise taken out of service.
2. Disconnect the power source for local bell (if applicable).
3. Identify and remove all wires from the waterflow switch.
4. Remove the (2) mounting screws holding retard/switch assembly to the base. **Do not** remove the (2) retard housing screws.
5. Remove the retard assembly by lifting it straight up over the tripstem.
6. Install the new retard assembly. Make sure the locating pins on the retard/switch assembly fit into the locating pin bosses on the base.
7. Re-install the (2) original mounting screws.
8. Reconnect all wires. Perform a flow test and place the system back in service.

**Fig. 8**



**Removal of Waterflow Switch**

- To prevent accidental water damage, all control valves should be shut tight and the system completely drained before waterflow detectors are removed or replaced.
- Turn off electrical power to the detector, then disconnect wiring.
- Loosen nuts and remove U-bolts.
- Gently lift the saddle far enough to get your fingers under it. With your fingers, roll the vane so it will fit through the hole while continuing to lift the waterflow detector saddle.
- Lift detector clear of pipe.



### Features

- NEMA 4X\* (IP 65) and 6P (IP 67)  
\*Enclosure is 4X. For additional corrosion protection of mounting hardware, use model OSYSU-2 CRH
- -40° to 140° (-40°C to 60°C) operating temperature range
- Visual switch indicators
- Two conduit entrances
- Adjustable length trip rod
- Accomodates up to 12AWG wire
- Three position switch detects tampering and valve closure
- Knurled mounting bracket prevents slipping
- Fine adjustment feature for fast, easy installation
- RoHS compliant
- One or two SPDT contact models (-1,-2)

### NOTICE

Before any work is done on the fire sprinkler or fire alarm system, the building owner or their authorized representative shall be notified. Before opening any closed valve, ensure that opening the valve will not cause any damage from water flow due to open or missing sprinklers, piping, etc.



**Important:** This document contains important information on the installation and operation of OS&Y valve supervisory switches. Please read all instructions carefully before beginning installation. A copy of this document is required by NFPA 72 to be maintained on site.

### Description

The OSYSU is used to monitor the open position of an OS&Y (outside screw and yoke) type gate valve. This device is available in two models; the OSYSU-1, containing one set of SPDT (Form C) contacts and the OSYSU-2, containing two sets of SPDT (Form C) contacts. These switches mount conveniently to most OS&Y valves ranging in size from 2" to 12" (50mm to 300mm). They will mount on some valves as small as 1/2" (12,5mm).

The cover is held in place by two tamper resistant screws that require a special tool to remove. The tool is furnished with each device.

### Testing

The operation of the OSYSU and its associated protective monitoring system shall be inspected, tested, and maintained in accordance with all applicable local and national codes and standards and/or the Authority Having Jurisdiction (manufacturer recommends quarterly or more frequently). A minimum test shall consist of turning the valve wheel towards the closed position. The OSYSU shall operate within the first two revolutions of the wheel. Fully close the valve and ensure that the OSYSU does not restore. Fully open the valve and ensure that the OSYSU restores to normal only when the valve is fully opened.

### CAUTION

Close the valve fully to determine that the stem threads do not activate the switch. The switch being activated by the stem threads could result in a **false valve open** indication.

### Technical Specifications

Dimensions	See Fig 8
Weight	1.6 lbs (0,73 kg)
Enclosure	Cover: Die Cast Finish: Red Powder Coat Base: Die Cast Finish: Black Powder Coat All parts have corrosion resistant finishes
Cover Tamper	Tamper Resistant Screws Optional Cover Tamper Switch Available
Contact Ratings	OSYSU-1: One Set of SPDT (Form C) OSYSU-2: Two Sets of SPDT (Form C) 10.0 Amps at 125/250 VAC 2.0 Amps at 30VDC Resistive 10 mAmps minimum at 24 VDC
Environmental Limitations	-40° F to 140°F (-40°C to 60°C) NEMA 4X (IP 65) and NEMA 6P (IP 67) Enclosure (Use suitably rated conduit and connector) Indoor or Outdoor Use (See OSYSU-EX Bulletin 5400705 for Hazardous locations)
Conduit Entrances	Two Knockouts for 1/2" conduit provided (See Notice on Page 6 and Fig. 9 on Page 5)
Service Use	NFPA 13, 13D, 13R, 72

Specifications subject to change without notice

## Theory of Operation

The OSYSU is a 3 position switch. The center position is the normal installation position. Normal is when the switch is installed on the OS&Y valve, the valve is fully open and the trip rod of the OSYSU is in the groove of the valve stem. Closing the valve causes the trip rod to ride up out of the groove and activates the switches. Removing the OSYSU from the valve causes the spring to pull the trip rod in the other direction and activates the switches.

## Visual Switch Status Indication

There are 3 visual indicators to determine the status of the switches.

Fig 1; the actuator button of the micro switches are on the raised section of the switch actuator.

Fig 2; the trip rod is perpendicular to the base and lined up with the alignment mark on the mounting bracket.

Fig 3; the white visual indicator is visible through the window on the back of the switch actuator.

A final test is to meter the contacts marked COM and N.O. to ensure they are an open circuit when the valve is open and that they close and have continuity within 2 revolutions of turning the valve handwheel towards the closed position and the contacts remain closed as the valve is completely closed and until the valve is completely opened when the trip rod drops back into the groove in the valve stem.

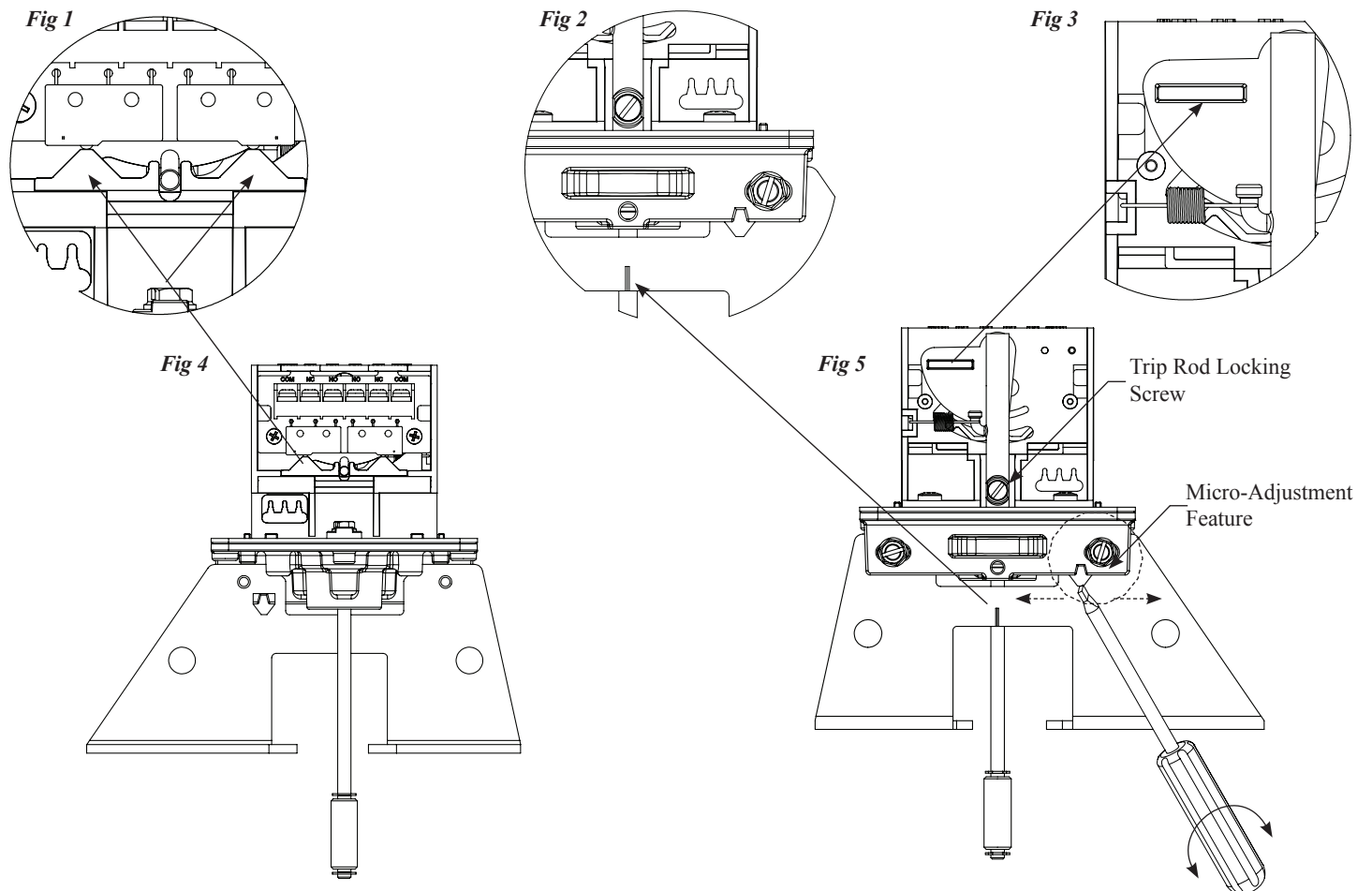
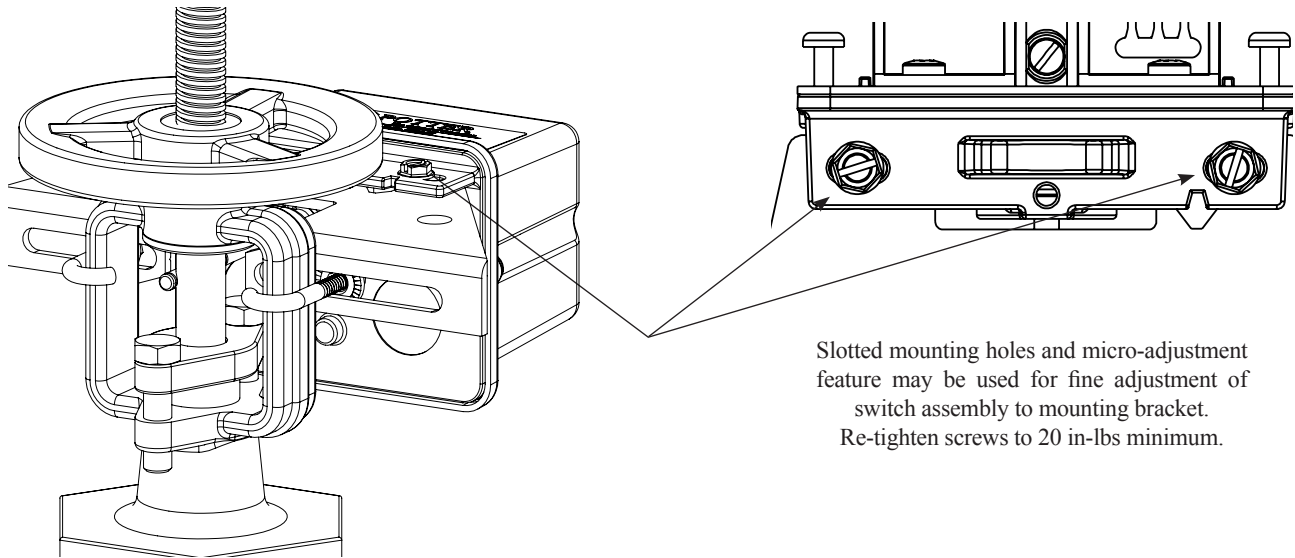


Fig 6

**Small Valve Installation - 1/2" Through 2 1/2" Sizes**



Slotted mounting holes and micro-adjustment feature may be used for fine adjustment of switch assembly to mounting bracket.  
Re-tighten screws to 20 in-lbs minimum.

**Small Valve Installation**

**NOTE:** If the valve stem is pre-grooved at 1/8" minimum depth; proceed to step 7.

1. Remove and discard "E" ring and roller from the trip rod.
  2. With the valve in the FULL OPEN position, locate the OSYSU across the valve yoke as far as possible from the valve gland so that the spring loaded trip rod of the OSYSU is pulled against the non threaded portion of the valve stem. Position the OSYSU with the bracket near the handwheel as shown in Fig. 6 if possible to avoid creating a pinch point between the wheel and the OSYSU.
  3. Loosen the locking screw that holds the trip rod in place and adjust the rod length (see Fig. 5). When adjusted properly, the rod should extend past the valve screw, but not so far that it contacts the clamp bar. Tighten the locking screw to 5 in-lbs minimum to hold the trip rod in place and properly seal the enclosure.
- NOTE:** If trip rod length is excessive, loosen the locking screw and remove the trip rod from the trip lever. Using pliers, break off the one (1) inch long notched section (see Fig. 10). Reinstall trip rod and repeat Step 3 procedure.
4. Mount the OSYSU loosely with the carriage bolts and clamp bar supplied. On valves with limited clearance use J-hooks supplied instead of the carriage bolts and clamp bar to mount the OSYSU.
  5. Mark the valve stem at the center of the trip rod.
  6. Remove the OSYSU. Utilizing a 3/16" or 1/4" diameter straight file, file a 1/8" minimum depth groove centered on the mark on the valve stem. Deburr and smooth the edges of the groove to prevent damage to the valve packing and to allow the trip rod to move easily in and out of the groove as the valve is operated.

**NOTE:** A groove depth of up to approximately 3/16" can

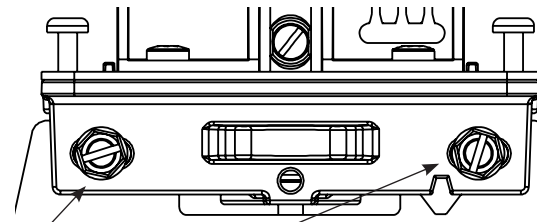
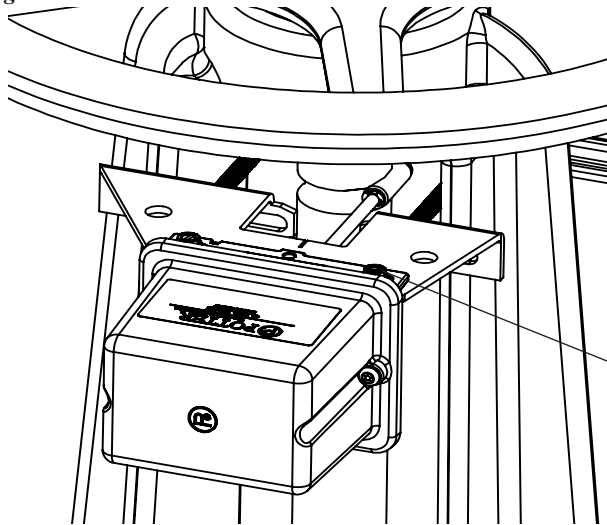
make it easier to install the OSYSU so that it does not restore as it rolls over by the threads of the valve stem.

7. Mount the OSYSU on the valve yoke with the spring loaded trip rod of the OSYSU pulled against the valve stem and centered in the groove of the stem. If possible, position the OSYSU with the flat side of the bracket toward the hand wheel, as shown in Fig. 6, to help avoid creating a pinch point between the wheel and OSYSU. When in this preferred mounting position, it is usually best to use the white indicator visible through the window, as illustrated in Fig. 3, to aid in initially locating the OSYSU in the correct position on the yoke. If the unit must be installed inverted with the white indicator no longer easily visible, use the visual indicators of the actuator buttons on the micro-switches, as illustrated in Fig. 1, or the trip rod alignment mark on the bracket, as illustrated in Fig. 2, to aid in initially locating the OSYSU.
8. Final adjustment can be made by slightly loosening the two screws on the bracket and using the fine adjustment feature (see Fig. 5). The adjustment is correct when the plungers on the switches are depressed by the actuator and there is no continuity between the COM and NO terminals on the switches.
9. Tighten the adjustment screws and all mounting hardware securely (20 in-lbs minimum). Check to insure that the rod moves out of the groove easily and that the switches activate within two turns when the valve is operated from the FULL OPEN towards the CLOSED position.
10. Reinstall the cover and tighten the cover screws to 15 in-lbs minimum to properly seal the enclosure.

**CAUTION**

Close the valve fully to determine that the stem threads do not activate the switch. The switch being activated by the stem threads could result in a *false valve open* indication.

**Fig 7** **Large Valve Installation - 3" Through 12" Sizes**



Slotted mounting holes and micro-adjustment feature may be used for fine adjustment of switch assembly to mounting bracket. Re-tighten screws to 20 in-lbs minimum.

## Large Valve Installation

**NOTE:** If the valve stem is pre-grooved at 1/8" minimum depth; proceed to step 6.

1. With the valve in the FULL OPEN position, locate the OSYSU across the valve yoke as far from the valve gland as possible so that the spring loaded trip rod of the OSYSU is pulled against the non threaded portion of the valve stem. Position the OSYSU with the bracket near the handwheel as shown in Fig. 7 if possible to avoid creating a pinch point between the wheel and the OSYSU.
2. Mount the OSYSU loosely with the carriage bolts and clamp bar supplied.
3. Loosen the locking screw that holds the trip rod in place and adjust the rod length (see Fig. 5). When adjusted properly, the rod should extend past the valve screw, but not so far that it contacts the clamp bar. Tighten the locking screw to 5 in-lbs minimum to hold the trip rod in place and properly seal the enclosure.
4. Mark the valve stem at the center of the trip rod.
5. Remove the OSYSU. Utilizing a 3/8" or 1/2" diameter straight file, file a 1/8" minimum depth groove centered on the mark on the valve stem. Deburr and smooth the edges of the groove to prevent damage to the valve packing and to allow the trip rod to move easily in and out of the groove as the valve is operated.

**NOTE:** A groove depth of up to approximately 3/16" can make it easier to install the OSYSU so that it does not restore

as it rolls over by the threads of the valve stem.

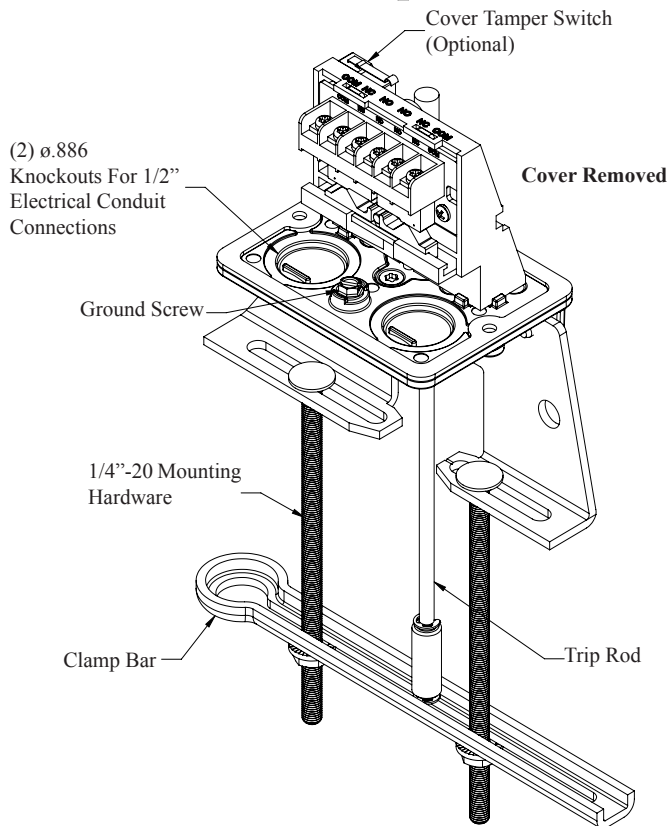
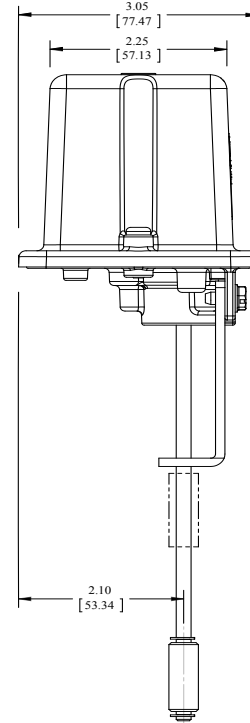
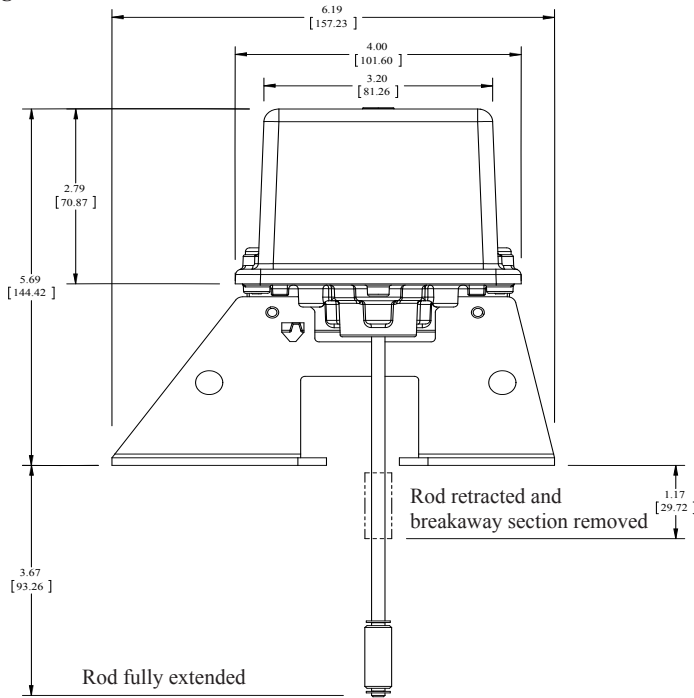
6. Mount the OSYSU on the valve yoke with the spring loaded trip rod of the OSYSU pulled against the valve stem and centered in the groove of the stem. If possible, position the OSYSU with the flat side of the bracket toward the hand wheel, as shown in Fig. 7, to help avoid creating a pinch point between the wheel and OSYSU. When in this preferred mounting position, it is usually best to use the white indicator visible through the window, as illustrated in Fig. 3, to aid in initially locating the OSYSU in the correct position on the yoke. If the unit must be installed inverted with the white indicator no longer easily visible, use the visual indicators of the actuator buttons on the micro-switches, as illustrated in Fig. 1, or the trip rod alignment mark on the bracket, as illustrated in Fig. 2, to aid in initially locating the OSYSU.
7. Final adjustment can be made by slightly loosening the two screws on the bracket and using the fine adjustment feature (see Fig. 5). The adjustment is correct when the plungers on the switches are depressed by the actuator and there is no continuity between the COM and NO terminals on the switches.
8. Tighten the adjustment screws and mounting hardware securely (minimum 20 in-lbs). Check to insure that the rod moves out of the groove easily and that the switches activate within two turns when the valve is operated from the FULL OPEN towards the CLOSED position.
9. Reinstall the cover and tighten the cover screws to 15 in-lbs minimum to properly seal the enclosure.

### **CAUTION**

Close the valve fully to determine that the stem threads do not activate the switch. The switch being activated by the stem threads could result in a **false valve open** indication.

**Dimensions**

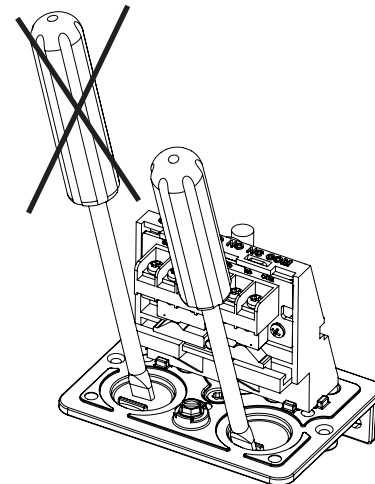
Fig 8



**Knockout Removal**

Fig 9

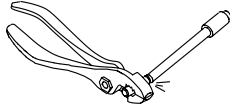
To remove knockouts: Place screwdriver at inside edge of knockouts, not in the center.



**NOTE:** Do not drill into the base as this creates metal shavings which can create electrical hazards and damage the device. Drilling voids the warranty.

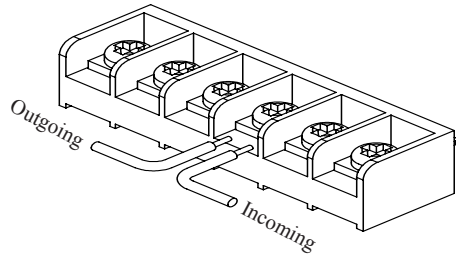
**Breaking Excessive Rod Length**

Fig 10



**Switch Terminal Connections  
Clamping Plate Terminal**

Fig 11



**WARNING**

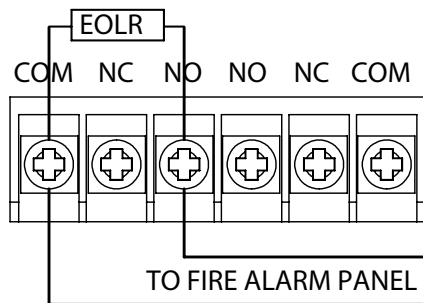
An uninsulated section of a single conductor should not be looped around the terminal and serve as two separate connections. The wire must be severed, thereby providing supervision of the connection in the event that the wire become dislodged from under the terminal. Failure to sever the wire may render the device inoperable risking severe property damage and loss of life. Do not strip wire beyond 3/8" of length or expose an uninsulated conductor beyond the edge of the terminal block. When using stranded wire, capture all strands under the clamping plate.

**NOTICE**

All conduit and connectors selected for the installation of this product shall be suitable for the environment for which it is to be used and shall be installed to the manufacturer's installation instructions. For NEMA 4, 4X, 6, 6P installations, the cover screws are recommended to be tightened to 15 in-lbs minimum and the trip rod locking screw tightened to 5 in-lbs minimum to properly seal the enclosure.

**Typical Electrical Connections**

Fig 12



**Ordering Information**

Model	Description	Stock No.
OSYSU-1	Outside Screw & Yoke Supervisory Switch (Single switch)	1010102
OSYSU-2	Outside Screw & Yoke Supervisory Switch (Double switch)	1010202
OSYSU-2 CRH	Outside Screw & Yoke Supervisory Switch (Double Switch). Corrosion resistant hardware of 316 stainless steel & nickel plated to ASTM B377 Type V Brackets	1010210
	Cover Screw	5490424
	Hex Key for Cover Screws and Installation Adjustments	5250062
	Optional Cover Tamper Switch Kit	0090200

**Engineering Specifications: OS&Y Valves**

UL, CUL Listed / FM Approved and CE Marked valve supervisory switches shall be furnished and installed on all OS&Y type valves that can be used to shut off the flow of water to any portion of the fire sprinkler system, where indicated on the drawings and plans and as required by applicable local and national codes and standards. The supervisory switch shall be NEMA 4X and 6P rated and capable of being mounted in any position indoors or out and be completely submerged without allowing water to enter the enclosure.. The enclosure shall be held captive by tamper resistant screws. The device shall contain two 1/2" conduit entrances and one or two Single Pole Double Throw (SPDT) switches. There shall be a visual indicator to display the status of the switches. To aid in installation, it shall be possible to make fine adjustments to the position of the switch on the valve without loosening the mounting bracket from the valve. The device shall contain an adjustable length trip rod and roller, the trip rod shall be held captive by a set screw accessible upon removal of the cover. The switch contacts shall be rated at 10A, 125/250VAC and 2A, 30VDC. OS&Y Valve supervisory switch shall be model OSYSU-1 for the single switch model and OSYSU-2 for the two switch model manufactured by Potter Electric Signal Company LLC

**NOTICE**

Supervisory switches have a normal service life of 10-15 years. However, the service life may be significantly reduced by local environmental conditions.

# Section 5 – Hanger Materials

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

### 3.3.11.1 Product description

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

#### Product features

##### HDI+, HDI-L+ and HDI

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

- HDI+ and HDI-L+ can be installed with the new HDI+ Setting Tool system (stop drill bit and machine setting tool) for improved productivity

#### Guide specifications

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

3.3.11.1 Product description

3.3.11.2 Material specifications

3.3.11.3 Technical data

3.3.11.4 Installation instructions

3.3.11.5 Ordering information



### 3.3.11.2 Material specifications

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

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

#### Listings/Approvals

##### FM (Factory Mutual)

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

##### UL LLC

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

3.3.11

### 3.3.11.3 Technical data

Table 1 - Hilti HDI+, HDI-L+ and HDI specifications<sup>1</sup>

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

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

#### Combined shear and tension loading

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





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

**Table 2 - Hilti HDI+, HDI-L+ and HDI carbon steel allowable loads in concrete (lb)<sup>1,2</sup>**

Anchor type	Nominal anchor diameter in.	$f'_c = 2,000$		$f'_c = 4,000$		$f'_c = 6,000$	
		Tension	Shear	Tension	Shear	Tension	Shear
HDI+	1/4	500	450	570	625	790	700
	3/8	635	965	920	1,250	1,260	1,500
	1/2	945	1,500	1,605	1,940	1,950	2,500
HDI	5/8	1,875	2,500	2,920	3,250	3,715	3,750
	3/4	2,500	3,875	4,065	5,000	5,565	5,500

**Table 3 - Hilti HDI+, HDI-L+ and HDI carbon steel ultimate loads in concrete (lb)<sup>1</sup>**

Anchor type	Nominal anchor diameter in.	$f'_c = 2,000$		$f'_c = 4,000$		$f'_c = 6,000$	
		Tension	Shear	Tension	Shear	Tension	Shear
HDI+	1/4	1,995	1,800	2,270	2,500	3,150	2,800
	3/8	2,540	3,850	3,685	5,000	5,035	6,000
	1/2	3,780	6,000	6,425	8,500	7,810	10,000
HDI	5/8	7,500	10,000	11,685	13,000	14,865	15,000
	3/4	10,000	15,500	16,260	20,000	22,250	22,000

1 The shear tests were conducted with SAE Grade 5 bolts with minimum yield strength of 85 ksi and minimum tension strength of 120 ksi. Shear testing for the 1/4-in. models were conducted with SAE Grade 8 bolts with minimum yield strength of 120 ksi and minimum tension strength of 150 ksi in 6,000 psi concrete. High-strength bolts were used to force concrete failure modes. When using steel bolts with a lower tensile strength, steel failure must be considered.

2 Allowable loads calculated with a factor of safety of 4.

**Table 4 - Hilti HDI+, HDI-L+ and HDI carbon steel allowable loads in lightweight concrete and lightweight concrete poured over metal deck (lb)<sup>1,2,3,4</sup>**

Anchor type	Nominal anchor diameter in.	Lightweight concrete		Lightweight concrete poured over metal deck			
		Tension	Shear	Upper flute		Lower flute	
				Tension	Shear	Tension	Shear
HDI+	1/4	465	340	530	335	375	250
	3/8	720	940	810	1,010	500	500
	1/2	1,035	1,700	1,035	1,755	625	750
HDI	5/8	1,465	2,835			875	875
	3/4	2,075	3,680			1,250	1,000

1 The shear tests were conducted with SAE Grade 5 bolts with minimum yield strength of 85 ksi and minimum tension strength of 120 ksi. Shear testing for the 1/4-in. models were conducted with SAE Grade 8 bolts with minimum yield strength of 120 ksi and minimum tension strength of 150 ksi in 6,000 psi concrete. High-strength bolts were used to force concrete failure modes. When using steel bolts with a lower tensile strength, steel failure must be considered.

2 Minimum compressive strength of structural lightweight concrete is 3,000 psi.

3 See figure 1 for typical details.

4 Allowable loads calculated with a factor of safety of 4.

**Table 5 - Hilti HDI stainless steel allowable loads in concrete (lb)<sup>1,2,3</sup>**

Nominal anchor diameter in.	$f'_c = 4,000$		$f'_c = 6,000$	
	Tension	Shear	Tension	Shear
1/4	480	600	740	600
3/8	1,040	1,230	1,460	1,230
1/2	1,840	2,760	2,410	2,760
5/8	2,630	4,510	3,770	4,510
3/4	3,830	5,580	5,030	5,580

**Table 6 - Hilti HDI stainless steel ultimate loads in concrete (lb)<sup>1,2</sup>**

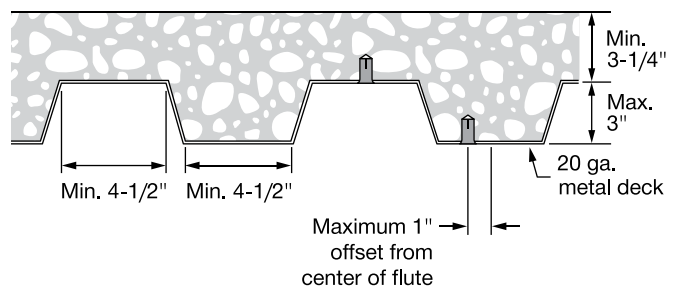
Nominal anchor diameter in.	$f'_c = 4,000$		$f'_c = 6,000$	
	Tension	Shear	Tension	Shear
1/4	1,930	2,400	2,950	2,400
3/8	4,170	4,920	5,850	4,920
1/2	7,350	11,040	9,630	11,040
5/8	10,540	18,040	15,100	18,040
3/4	15,340	22,320	20,130	22,320

1 Stainless steel models available in HDI version only.

2 Shear testing conducted with 18-8 stainless steel bolts.

3 Allowable loads calculated with a factor of safety of 4.

**Figure 1 - Installation of Hilti HDI drop-in anchor in the soffit of concrete over metal deck floor and roof assemblies W – deck**

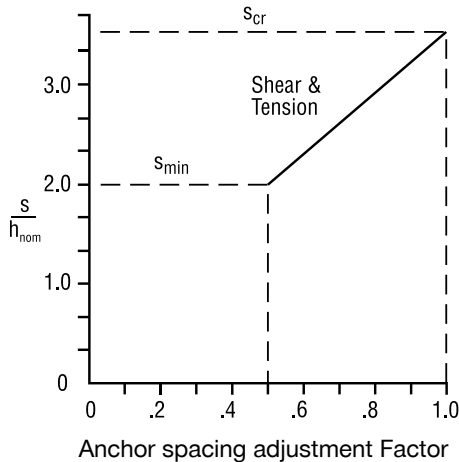


# HDI, HDI-L, HDI+ and HDI-L+ Drop-in Anchor 3.3.11

## Anchor spacing and edge distance guidelines

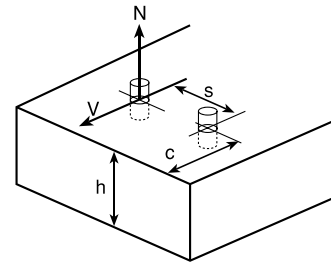
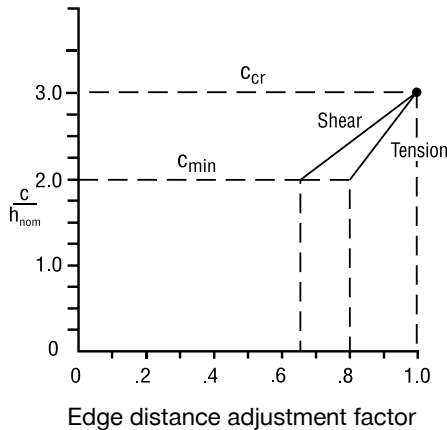
### Anchor spacing adjustment factors

- s = Actual Spacing
- $s_{min} = 2.0 h_{nom}$
- $s_{cr} = 3.5 h_{nom}$



### Edge distance adjustment factors

- c = Actual edge distance
- $c_{min} = 2.0 h_{nom}$
- $c_{cr} = 3.0 h_{nom}$



Influence of anchor spacing and edge distance  $f_A$  and  $f_R$

Anchor Size		$h_{nom}$	
in.	(mm)	in.	(mm)
1/4	(6.4)	1	(25)
3/8	(9.5)	1-9/16	(40)
1/2	(12.7)	2	(51)
5/8	(15.8)	2-9/16	(65)
3/4	(19.1)	3-3/16	(81)

$h_{nom}$  = nominal embedment depth

Table 7 - Load adjustment factors for Hilti HDI drop-in anchors in concrete

Load adjustment factors for anchor spacing $f_A$							Load adjustment factors for edge distance $f_R$											
Tension/shear loads							Tension $f_{RN}$					Shear $f_{RV}$						
Spacing s		Anchor diameter					Edge distance c		Anchor diameter					Anchor diameter				
in.	(mm)	1/4	3/8	1/2	5/8	3/4	in.	(mm)	1/4	3/8	1/2	5/8	3/4	1/4	3/8	1/2	5/8	3/4
2	( 51)	.50					2	( 51)	.80					.65				
2-1/2	( 64)	.67					2-1/2	( 64)	.90					.83				
3	( 76)	.83	.50				3	( 76)	1.0	.80				1.0	.65			
3-1/2	( 89)	1.0	.58				3-1/2	( 89)		.85					.73			
4	(102)		.69	.50			4	(102)		.91	.80				.85	.65		
4-1/2	(114)		.79	.58			4-1/2	(114)		.98	.85				.96	.74		
5	(127)		.90	.67	.50		5	(127)		1.0	.90	.80			1.0	.83	.65	
5-1/2	(140)		1.0	.75	.55		5-1/2	(140)			.95	.83				.91	.70	
6	(152)			.83	.61	.50	6	(152)			1.0	.87				1.0	.77	
7	(178)			1.0	.74	.57	6-1/2	(165)				.91	.80				.84	.65
8	(203)				.87	.67	7	(178)				.95	.84				.91	.72
9	(229)				1.0	.77	8	(203)				1.0	.90				1.0	.83
10	(254)					.88	9	(229)					.96					.94
11	(279)					.98	10	(254)					1.0					1.0
12	(305)					1.0												

$s_{min} = 2.0 h_{nom}$ $s_{cr} = 3.5 h_{nom}$  $f_A = 0.33 \frac{s}{h_{nom}} - 0.17$  for $s_{cr} > s > s_{min}$	$c_{min} = 2.0 h_{nom}$ $c_{cr} = 3.0 h_{nom}$  $f_{RN} = 0.2 \frac{c}{h_{nom}} + 0.4$  for $c_{cr} > c > c_{min}$	$c_{min} = 2.0 h_{nom}$ $c_{cr} = 3.0 h_{nom}$  $f_{RV} = 0.35 \frac{c}{h_{nom}} - 0.05$  for $c_{cr} > c > c_{min}$
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3.3.11

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

#### 3.3.11.4 Installation instructions

Manufacturer's Printed Installation Instructions (MPII) are included with each product package. They can also be viewed or downloaded at [www.hilti.com](http://www.hilti.com). Because of the possibility of changes, always verify that downloaded MPII are current when used. Proper installation is critical to achieve full performance. Training is available on request. Contact Hilti Technical Services for applications and conditions not addressed in the MPII.

#### 3.3.11.5 Ordering information<sup>1</sup>

##### HDI+, HDI-L+ and HDI

###### Carbon steel

Description	Description	Anchor thread size	Qty / box
HDI+ 1/4	HDI-L+ 1/4	1/4	100
HDI+ 3/8	HDI-L+ 3/8	3/8	50
HDI+ 1/2	HDI-L+ 1/2	1/2	50
HDI 5/8	-	5/8	25
HDI 3/4	-	3/4	25

##### HDI-SS anchors

###### Stainless steel

Description	Anchor thread size	Qty / box
HDI 1/4 SS303	1/4	100
HDI 3/8 SS303	3/8	50
HDI 1/2 SS303	1/2	50
HDI 5/8 SS303	5/8	25
HDI 3/4 SS303	3/4	25

##### Setting tools for HDI and HDI-SS anchors

Description	Anchor thread size
HST 5/8 Setting Tool	5/8
HST 3/4 Setting Tool	3/4



##### Setting Tools for HDI+ and HDI-L+

Anchor thread size	Description
1/4	HST 1/4 Setting tool
	HSD-MM 1/4 (TE-C-24D6 1/4 Setting tool)
	HDI+ Setting Tool includes a TE-CX 3/8x1 carbide bit
3/8	HST 3/8 Setting tool
	HSD-MM 3/8 (TE-C-24SD10 3/8 Setting tool)
	HDI+ Setting Tool includes a TE-CX 1/2x1-9/16 carbide bit
1/2	HST 1/2 Setting tool
	HSD-MM 1/2 (TE-C-24SD12 1/2 Setting tool)
	HDI+ Setting Tool includes a TE-CX 5/8x2 carbide bit



<sup>1</sup> All dimensions in inches



The following excerpt are pages from the North American Product Technical Guide, Volume 2: Anchor Fastening, Edition 19.

Please refer to the publication in its entirety for complete details on this product including data development, product specifications, general suitability, installation, corrosion and spacing and edge distance guidelines.

US&CA: <https://submittals.us.hilti.com/PTGVol2/>

To consult directly with a team member regarding our anchor fastening products, contact Hilti's team of technical support specialists between the hours of 7:00am – 6:00pm CST.


US: 877-749-6337 or [HNATechnicalServices@hilti.com](mailto:HNATechnicalServices@hilti.com)

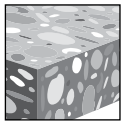
CA: 1-800-363-4458, ext. 6 or [CATechnicalServices@hilti.com](mailto:CATechnicalServices@hilti.com)

### 3.3.14 HDI-P DROP-IN ANCHORS

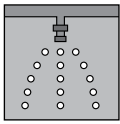
#### PRODUCT DESCRIPTION

##### HDI-P Drop-in Anchors

Anchor System	Features and Benefits
<p>HDI-P Drop-in Anchor</p> 	<ul style="list-style-type: none"> <li>Optimized anchor length to allow reliable fastenings in hollow core panels, precast plank and post tensioned slabs</li> <li>Shallow drilling enables fast installation</li> <li>Lip provides flush installation, consistent anchor depth and easy rod alignment</li> <li>HSD-G 3/8 setting tool with hand guard leaves mark on flange when anchor is set properly to enable inspection and verification of proper expansion</li> </ul>



Uncracked concrete



Fire sprinkler listings

#### MATERIAL SPECIFICATIONS

The HDI-P is manufactured from mild carbon steel, which is zinc plated for corrosion protection in accordance with ASTM B633, SC 1, Type III.

Approvals/Listings	
FM (Factory Mutual)	Pipe hanger components for automatic sprinkler systems for 3/4=8-in. model



#### DESIGN DATA IN CONCRETE USING ALLOWABLE STRESS DESIGN

##### Technical data

Table 1 - Hilti HDI-P loads in normal-weight concrete and hollow core concrete panels

Nominal anchor diameter	Length in. (mm)	Nom. bit dia. in.	Ultimate loads, lb (kN)				Allowable loads, lb (kN) <sup>3</sup>			
			$f'_c = 4,000$ psi concrete		Hollow core <sup>1,2</sup>		$f'_c = 4,000$ psi concrete		Hollow core <sup>1,2</sup>	
			Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear
1/4	5/8 (15.9)	3/8	1,430 (6.4)	1,870 (8.3)	1,550 (6.9)	2,275 (10.1)	285 (1.3)	375 (1.7)	310 (1.4)	455 (2.0)
3/8	3/4 (19.1)	1/2	1,900 (8.5)	3,000 (13.3)	2,100 (9.3)	4,000 (17.8)	380 (1.7)	600 (2.7)	420 (1.9)	800 (3.6)
1/2	1 (25.4)	5/8	3,000 (13.3)	6,075 (27.0)	3,110 (13.8)	5,495 (24.5)	600 (2.7)	1215 (5.4)	620 (2.8)	1,100 (4.9)

- The Admissible Anchor Location must be established to prevent damage to the prestressed cable during the drilling process. Verify the location and height of the cable with the hollow core plank supplier to confirm Admissible Anchor Location.
- Minimum compressive strength of hollow core panels is 7,000 psi at the time of installation. The minimum thickness "t" is 1-3/8 inches.
- Allowable loads calculated with a 5:1 factor-of-safety.

#### INSTALLATION INSTRUCTIONS

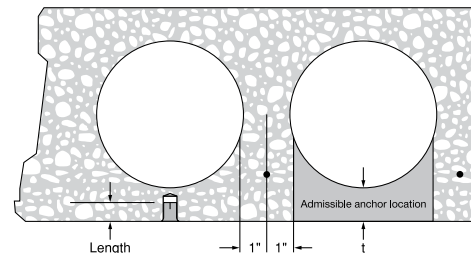
Installation Instructions For Use (IFU) are included with each product package. They can also be viewed or downloaded online at [www.hilti.com](http://www.hilti.com) (Canada). Because of the possibility of changes, always verify that downloaded IFU are current when used. Proper installation is critical to achieve full performance. Training is available on request. Contact Hilti Technical Services for applications and conditions not addressed in the IFU.

#### ORDERING INFORMATION

##### HDI-P anchor

Description	Bit diameter	Qty / box
HDI-P 1/4	3/8	100
HDI-P 3/8	1/2	100
HDI-P 1/2	5/8	50

Figure 1 - Installation of Hilti HDI-P in hollow core concrete



##### Setting tools for HDI-P anchors

Description
HST-P 1/4 Hand Setting Tool
HST-P 3/8 Hand Setting Tool
HSD-G 3/8 Hand Setting Tool with hand guard
HST-P 1/2 Hand Setting Tool

## INSTALLATION INSTRUCTIONS

Manufacturer's Printed Installation Instructions (MPII) are included with each product package. They can also be viewed or downloaded at [www.hilti.com](http://www.hilti.com). Because of the possibility of changes, always verify that downloaded MPII are current when used. Proper installation is critical to achieve full performance. Training is available on request. Contact Hilti Technical Services for applications and conditions not addressed in the MPII.

## ORDERING INFORMATION<sup>1</sup>

### HDI+, HDI-L+ and HDI

#### Carbon steel

Description	Description	Anchor thread size	Qty / box
HDI+ 1/4	HDI-L+ 1/4	1/4	100
HDI+ 3/8	HDI-L+ 3/8	3/8	50
HDI+ 1/2	HDI-L+ 1/2	1/2	50
HDI 5/8	-	5/8	25
HDI 3/4	-	3/4	25

### HDI-SS anchors

#### Stainless steel

Description	Anchor thread size	Qty / box
HDI 1/4 SS303	1/4	100
HDI 3/8 SS303	3/8	50
HDI 1/2 SS303	1/2	50
HDI 5/8 SS303	5/8	25
HDI 3/4 SS303	3/4	25

### Setting tools for HDI and HDI-SS anchors

Description	Anchor thread size
HST 5/8 Setting Tool	5/8
HST 3/4 Setting Tool	3/4



### Setting Tools for HDI+ and HDI-L+

Anchor thread size	Description
1/4	HST 1/4 Setting tool
	HSD-MM 1/4 (TE-C-24D6 1/4 Setting tool)
	HDI+ Setting Tool includes a TE-CX 3/8x1 carbide bit
3/8	HST 3/8 Setting tool
	HSD-MM 3/8 (TE-C-24SD10 3/8 Setting tool)
	HDI+ Setting Tool includes a TE-CX 1/2x1-9/16 carbide bit
1/2	HST 1/2 Setting tool
	HSD-MM 1/2 (TE-C-24SD12 1/2 Setting tool)
	HDI+ Setting Tool includes a TE-CX 5/8x2 carbide bit



3.3.14

<sup>1</sup> All dimensions in inches

# PIPE CLAMPS



## RISER CLAMP

**FIG. 550, 551, & 553**

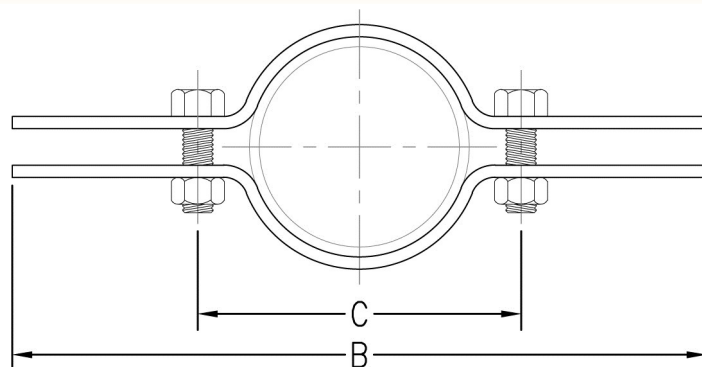
**Function:** Designed for supporting and stabilizing vertical pipe runs. The PVC coating on Fig. 553 protects the pipe from the metal surface of the clamp. This product is not intended for use with hanger rods. Clamp is designed for standard iron pipe O.D. and must be considered when sizing other types of piping.

**Material:** Carbon steel (Type 304 or 316 Stainless Steel upon request)

**Finish:** Plain (**Fig. 550**), electro-galvanized (**Fig. 551**), or plain with PVC coating (**Fig. 553**), or (Hot dipped galvanized with electro-galvanized hardware upon request)

**Approvals:** Underwriters' Laboratories Listed in the U.S. (UL) and Factory Mutual Approved for sizes 3/4" (20mm) to 8" (200mm) only. Complies with Federal Specification A-A-1192A (Type 8) and Manufacturers' Standardization Society ANSI/MSS SP-58 (Type 8) which supersedes ANSI/MSS SP-69.

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



**Installation practice for Model 550 Riser Clamps:**  
When possible the clamp should be placed under a coupling, hub, or welded lugs on steel pipe. Bolt torques should be per industry standards.

Pipe Size		B		C		Bolt Size	Max. Rec. Load		Wt. Each	
							lbs.	kN	lbs.	kg
1/2	(15)	9	(228.60)	2 1/2	(63.50)	3/8 x 1 1/4	220	(0.98)	1.05	(.48)
3/4	(20)	8 7/8	(225.43)	2 3/8	(60.33)	3/8 x 1 1/4	220	(0.98)	1.05	(.48)
1	(25)	8 3/4	(222.25)	2 1/4	(57.15)	3/8 x 1 1/4	220	(0.98)	1.05	(.48)
1 1/4	(32)	9 1/4	(234.95)	2 3/4	(69.85)	3/8 x 1 1/4	250	(1.11)	1.10	(.50)
1 1/2	(40)	10	(254.00)	3 1/2	(88.90)	3/8 x 1 1/4	250	(1.11)	1.17	(.53)
2	(50)	10 1/4	(260.35)	3 3/4	(95.25)	3/8 x 1 1/4	300	(1.33)	1.20	(.54)
2 1/2	(65)	11 1/8	(282.58)	4 5/8	(117.48)	3/8 x 1 1/2	400	(1.78)	1.89	(.86)
3	(80)	11 3/4	(298.45)	5 1/4	(133.35)	3/8 x 1 1/2	500	(2.22)	1.99	(.90)
3 1/2	(90)	12 1/2	(317.50)	6	(152.40)	3/8 x 1 1/2	600	(2.67)	2.17	(.98)
4	(100)	13	(330.20)	6 1/2	(165.10)	1/2 x 1 3/4	750	(3.34)	2.21	(1.00)
5	(125)	14 1/4	(361.95)	7 3/4	(196.85)	1/2 x 1 3/4	1500	(6.67)	3.24	(1.47)
6	(150)	15 3/8	(390.53)	8 7/8	(225.43)	1/2 x 1 3/4	1600	(7.12)	3.89	(1.76)
8	(200)	18 1/2	(469.90)	12	(304.80)	5/8 x 2	2500	(11.12)	7.60	(3.45)
10	(250)	20 1/2	(520.70)	14	(355.60)	5/8 x 2	2500	(11.12)	11.10	(5.03)
12	(300)	22 1/2	(571.50)	16	(406.40)	5/8 x 2 1/2	2700	(12.01)	16.50	(7.48)
14	(350)	25 1/8	(638.18)	18 5/8	(473.08)	5/8 x 3	2700	(12.01)	17.70	(8.03)
16	(400)	26 1/4	(666.75)	20 3/4	(527.05)	3/4 x 3 1/2	2900	(12.90)	30.40	(13.79)
18	(450)	27 7/8	(708.03)	22 3/8	(568.33)	3/4 x 3 1/2	2900	(12.90)	33.30	(15.10)
20	(500)	30	(762.00)	24 1/2	(622.30)	3/4 x 3 1/2	2900	(12.90)	36.30	(16.47)
24	(600)	35	(889.00)	29 1/2	(749.30)	7/8 x 3 1/2	2900	(12.90)	48.68	(22.08)
30	(750)	42 3/8	(1076.33)	35 3/8	(898.52)	7/8 x 3 1/2	2900	(12.90)	60.16	(27.29)

Recommended Torque For Pipe Clamp Hardware						
Bolt Size	1/4"-20	5/16"-18	3/8"-16	1/2"-13	5/8"-11	3/4"-10 & Larger
ft-lbs.	6	11	19	50	65	75
N-m	(8)	(15)	(26)	(68)	(88)	(102)

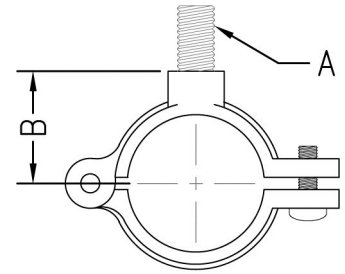
Unless otherwise specified, all dimensions on drawings and in charts are in inches and dimensions shown in parentheses are in millimeters.

THREADED ACCESSORIES  
CPVC STRAPS  
BAND HANGERS  
BEAM CLAMPS  
CLEVIS HANGERS  
PIPE ROLLER SUPPORTS  
SPLIT RING HANGERS  
PIPE CLAMPS  
CENTER LOAD BEAM CLAMPS  
PIPE SHIELDS, INSULATION, & SADDLES  
PIPE GUIDES & SLIDES  
WALL BRACKETS  
PIPE SUPPORTS  
STRUCTURAL ATTACHMENTS  
SEISMIC BRACING

# SPLIT RING HANGERS



**FIG. 508R**



**Function:** Designed for non-insulated stationary pipe lines in either a horizontal or vertical position. The hinged design allows for a quick installation.

**Material:** Malleable iron

**Finish:** Plain or electro-galvanized

**Approvals:** Complies with Federal Specification A-A-1192A (Type 12) and Manufacturers' Standardization Society ANSI/MSS SP-58 (Type 12) which supersedes ANSI/MSS SP-69.

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

Pipe Size		Bolt Thread A	B		Max. Rec. Load		Wt. Each	
					lbs.	kN	lbs.	kg
3/8	(10)	3/8	13/16	(20.64)	180	(0.80)	.13	(.06)
1/2	(15)	3/8	7/8	(22.23)	180	(0.80)	.14	(.06)
3/4	(20)	3/8	1	(25.40)	180	(0.80)	.16	(.07)
1	(25)	3/8	1 1/8	(28.58)	180	(0.80)	.18	(.08)
1 1/4	(32)	3/8	1 5/16	(33.34)	180	(0.80)	.22	(.10)
1 1/2	(40)	3/8	1 7/16	(36.51)	180	(0.80)	.38	(.17)
2	(50)	3/8	1 11/16	(42.86)	180	(0.80)	.44	(.20)
2 1/2	(65)	1/2	2 1/8	(53.98)	300	(1.33)	.45	(.20)
3	(80)	1/2	2 7/16	(61.91)	300	(1.33)	.55	(.25)
4	(100)	1/2	3	(76.20)	300	(1.33)	.95	(.43)

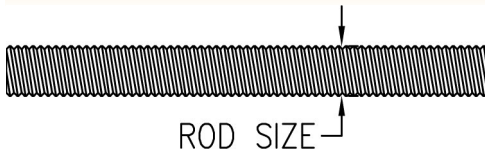
- THREADED ACCESSORIES
- CPVC STRAPS
- BAND HANGERS
- BEAM CLAMPS
- CLEVIS HANGERS
- PIPE ROLLER SUPPORTS
- SPLIT RING HANGERS
- PIPE CLAMPS
- CENTER LOAD BEAM CLAMPS
- PIPE SHIELDS, INSULATION, & SADDLES
- PIPE GUIDES & SLIDES
- WALL BRACKETS
- PIPE SUPPORTS
- STRUCTURAL ATTACHMENTS
- SEISMIC BRACING



# THREADED ACCESSORIES

## FIG. 20 & 21

## CONTINUOUS THREADED ROD



**Function:** Useful in applications where stud lengths cannot be predetermined.

**Material:** Carbon steel (Type 304 or 316 Stainless Steel upon request)

**Finish:** Plain (**Fig. 20**) or electro-galvanized Finish (**Fig. 21**) (Hot dipped galvanized upon request)

**Ordering:** Specify figure number, rod size, length, material, and finish.

Rod Size	Packaging Feet Per Bundle						Max. Rec. Load				Wt. Per Foot			
	6ft.		(1.83)		10ft.		(3.05)		12ft.		(3.66)		lbs.	kg
	lbs.	kN	lbs.	kN	lbs.	kN	lbs.	kN	lbs.	kN				
1/4-20	300	(91.44)	500	(152.4)	600	(182.88)	240	(1.07)	188	(0.84)	.12	(.05)		
3/8-16	150	(45.72)	250	(76.2)	240	(73.15)	730	(3.25)	572	(2.54)	.29	(.13)		
1/2-13	72	(21.95)	120	(36.58)	144	(43.90)	1350	(6.01)	1057	(4.70)	.54	(.25)		
5/8-11	48	(14.63)	80	(24.38)	96	(29.26)	2160	(9.61)	1692	(7.52)	.83	(.38)		
3/4-10	30	(9.14)	50	(15.24)	60	(18.29)	3230	(14.37)	2530	(11.25)	1.25	(.57)		
7/8-9	24	(7.32)	40	(12.19)	48	(14.63)	4480	(19.93)	3508	(15.61)	1.65	(.75)		
1-8	12	(3.66)	20	(6.10)	24	(7.32)	5900	(26.24)	4620	(20.55)	2.25	(1.02)		

# BEAM CLAMPS



## DOMESTIC BEAM CLAMP FIG. 350, 353, 354, 355, 356, & 357

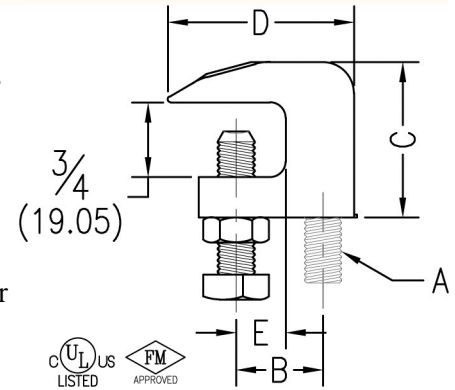
**Function:** Designed for attaching hanger rod to the top flange of a beam or bar joist, where the flange thickness does not exceed  $\frac{3}{4}$ " (19.05mm). The open U design permits rod adjustment. The universal design of the  $\frac{3}{8}$ " Fig. 353 allows it to be used in an inverted position on the bottom flange of a beam as well.

**Material:** Malleable iron with hardened steel cup point set screw and locknut  
**Finish:** Plain or electro-galvanized (Hot dipped galvanized with electro-galvanized hardware upon request)

**Approvals:** Underwriters' Laboratories Listed in the U.S. (UL), Canada (CUL), for sizes  $\frac{3}{8}$ " to  $\frac{7}{8}$ " only. Factory Mutual Approved for rod sizes  $\frac{3}{8}$ " and  $\frac{1}{2}$ " only. Complies with Federal Specifications A-A-1192A (Type 19) and Manufacturers' Standardization Society ANSI/MSS SPSP-58 (Type 19) which supersedes ANSI/MSS SP-69. Fig. 353 sized for  $\frac{3}{8}$ " rod can be used in an inverted position (bottom of beam) and follows the same U.S. (UL), Canada (CUL), and Factory Mutual Approvals. Used in this manner the  $\frac{3}{8}$ " Fig. 353 also complies with Federal Specifications A-A-1192A (Type 23) and Manufacturers' Standardization Society ANSI/MSS SPSP-58 (Type 23) which supersedes ANSI/MSS SP-69. (Approvals are only valid for beam clamps with locknut). Buy American Act compliant.

**Ordering:** Specify figure number, rod size, material, and finish.

*NOTE: When a torque wrench is unavailable, the setscrew should be tightened so it contacts the I-beam and then an additional  $\frac{1}{4}$  to  $\frac{1}{2}$  turn.*



Set Screw Torque			
Nominal Thread Size	$\frac{3}{8}$	$\frac{1}{2}$	Caution should be taken not to over tighten the set screw
Rec. Torque	in-lbs. 60	125	
	N-m (6.8)	(14.1)	

Figure Numbers	Rod Size A	B		C		D		E		Max. Pipe Size		Max. Rec. Load		Wt. Each	
			(mm)		(mm)		(mm)		(mm)	in.	(mm)	lbs.	(kg)	lbs.	(kg)
* 350	$\frac{1}{4}$	$\frac{7}{8}$	(22.23)	$1\frac{1}{2}$	(38.10)	$1\frac{5}{8}$	(41.28)	$\frac{1}{2}$	(12.70)	N/A	N/A	250	(1.11)	.34	(.15)
$\Delta$ 353	$\frac{3}{8}$	$\frac{7}{8}$	(22.23)	$1\frac{1}{2}$	(38.10)	$1\frac{5}{8}$	(41.28)	$\frac{1}{2}$	(12.70)	4	(100)	400	(1.78)	.33	(.15)
354	$\frac{1}{2}$	1	(25.40)	$1\frac{1}{2}$	(38.10)	$1\frac{11}{16}$	(42.86)	$\frac{1}{2}$	(12.70)	8	(200)	500	(2.22)	.34	(.15)
355	$\frac{5}{8}$	$1\frac{1}{16}$	(26.99)	$1\frac{1}{2}$	(38.10)	$1\frac{7}{8}$	(47.63)	$\frac{5}{8}$	(15.88)	8	(200)	600	(2.67)	.39	(.18)
356	$\frac{3}{4}$	$1\frac{5}{16}$	(33.34)	$1\frac{3}{4}$	(44.45)	$2\frac{3}{8}$	(60.33)	$\frac{5}{8}$	(15.88)	8	(200)	800	(3.56)	.63	(.29)
357	$\frac{7}{8}$	$1\frac{5}{16}$	(33.34)	$1\frac{3}{4}$	(44.45)	$2\frac{3}{8}$	(60.33)	$\frac{5}{8}$	(15.88)	8	(200)	1200	(5.34)	.60	(.27)

\*  $\frac{1}{4}$ " Fig. 350 Not UL or FM approved.

$\Delta$   $\frac{3}{8}$ " Fig. 353 Reversible design approved for bottom beam use.

# BAND HANGERS



## NFPA SWIVEL RING HANGER

## FIG. 141 & 141F

**Function:** Designed for the suspension of non-insulated stationary pipe lines. The knurled insert nut that allows a vertical adjustment after installation, is tapped to NFPA reduced rod size standards. Captured knurled insert nut present on pipe sizes 1/2" (15mm) to 2" (50mm). The capture is permanent in the bottom portion of the band, allowing the hanger to be opened during installation if desired, but preventing the knurled insert nut from falling completely out. Fig. 141F has a layer of felt which separates the pipe from the hanger to reduce vibration and sound.

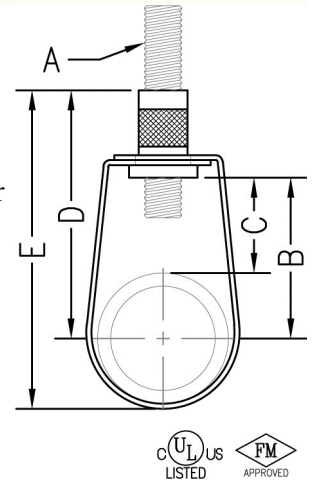
**Material:** Carbon steel

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

**Approvals:** Underwriters' Laboratories Listed in the U.S. (UL), Canada (CUL), for use with standard steel pipe sizes 3/4" (20mm) to 8" (200mm) and CPVC pipe size 3/4" (20mm) to 4" (100mm). Factory Mutual Approved for steel pipe sizes 3/4" (20mm) to 8" (200mm). Complies with Federal Specifications A-A-1192A (Type 10), and Manufacturers' Standardization Society ANSI/MSS SP-58 (Type 10) which supersedes ANSI/MSS SP-69.

**Ordering:** Specify figure number and pipe size.

*NOTE: If ordering Fig. 141F felt lined hangers for pipe sizes of 3 1/2" (90mm) or under, order the next largest size to allow for the thickness of the felt lining. Metric knurl insert nuts available upon request.*



Pipe Size		Rod Size	B		Adj. C		D		E		Max. Rec. Load		Wt. Each	
											lbs.	kN	lbs.	kg
1/2	(15)	3/8	17/8	(47.63)	17/16	(36.51)	23/4	(69.85)	31/16	(77.79)	300	(1.33)	.10	(.05)
3/4	(20)	3/8	111/16	(42.86)	11/8	(28.58)	21/2	(63.50)	31/16	(77.79)	300	(1.33)	.10	(.05)
1	(25)	3/8	15/8	(41.28)	1	(25.40)	21/2	(63.50)	33/16	(80.96)	300	(1.33)	.10	(.05)
1 1/4	(32)	3/8	115/16	(49.21)	11/16	(26.99)	213/16	(71.44)	39/16	(90.49)	300	(1.33)	.11	(.05)
1 1/2	(40)	3/8	21/8	(53.98)	11/16	(26.99)	31/8	(79.38)	37/8	(98.43)	300	(1.33)	.11	(.05)
2	(50)	3/8	27/16	(61.91)	11/8	(28.58)	35/16	(84.14)	43/8	(111.13)	300	(1.33)	.14	(.06)
2 1/2	(65)	3/8	31/16	(77.79)	15/8	(41.28)	315/16	(100.01)	53/8	(136.53)	525	(2.34)	.19	(.09)
3	(80)	3/8	311/16	(93.66)	17/8	(47.63)	49/16	(115.89)	65/16	(160.34)	525	(2.34)	.23	(.10)
3 1/2	(90)	3/8	33/4	(95.25)	17/8	(47.63)	45/8	(117.48)	65/8	(168.28)	525	(2.34)	.25	(.11)
4	(100)	3/8	43/16	(106.36)	17/8	(47.63)	51/16	(128.59)	75/16	(185.74)	650	(2.89)	.30	(.14)
5	(125)	1/2	45/8	(117.48)	15/8	(41.28)	55/8	(142.88)	83/8	(212.73)	1000	(4.45)	.50	(.23)
6	(150)	1/2	55/8	(142.88)	21/4	(57.15)	61/2	(165.10)	913/16	(249.24)	1000	(4.45)	.58	(.26)
8	(200)	1/2	613/16	(173.04)	27/16	(61.91)	715/16	(201.61)	121/4	(311.15)	1000	(4.45)	.90	(.41)

# Section 6 – Hydraulic Calculations



Associated Fire Protection  
PO Box 28022  
Raleigh, NC 27611  
919-553-4021

Job Name : CAPE FEAR MOB  
Drawing : FP-4  
Location : 225 BRIGHTWATER DRIVE  
Remote Area : 1  
Contract : EDW-1551  
Data File : RA#1 - 3RD FLOOR SHELL.WXF

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**HYDRAULIC CALCULATIONS**  
**for**

**JOB NAME** CAPE FEAR MOB  
**Location** 225 BRIGHTWATER DRIVE  
**Drawing #** FP-4  
**Contract #** EDW-1551  
**Date** 10.19.23

**DESIGN**

**Remote area #** 1  
**Remote area location** 3RD FLOOR SHELL  
**Occupancy classification** LIGHT HAZARD  
**Density** .10 - Gpm/SqFt  
**Area of application** 1513 - SqFt  
**Coverage/sprinkler** 225 MAX - SqFt  
**Type of sprinkler calculated** SSQRU  
**# Sprinklers calculated** 12  
**In-rack demand** N/A - GPM  
**Hose streams** 100 - GPM  
**Total water required (including hose streams)** 384.02 - GPM @ 104.621 - Psi  
**Type of system** WET  
**Volume of system (dry or pre-action)** N/A - Gal

**WATER SUPPLY INFORMATION**

**Test date** 02.28.23  
**Location** BRIGHTWATER DRIVE  
**Source of info** HYDRANT

**CONTRACTOR INFO** Associated Fire Protection  
**Address** PO Box 28022 / Raleigh, NC 27611  
**Phone #** 919-553-4021  
**Name of designer** WLH  
**Authority having jurisdiction** TOWN OF LILLINGTON  
**NOTES:**

text1(35) - invisible

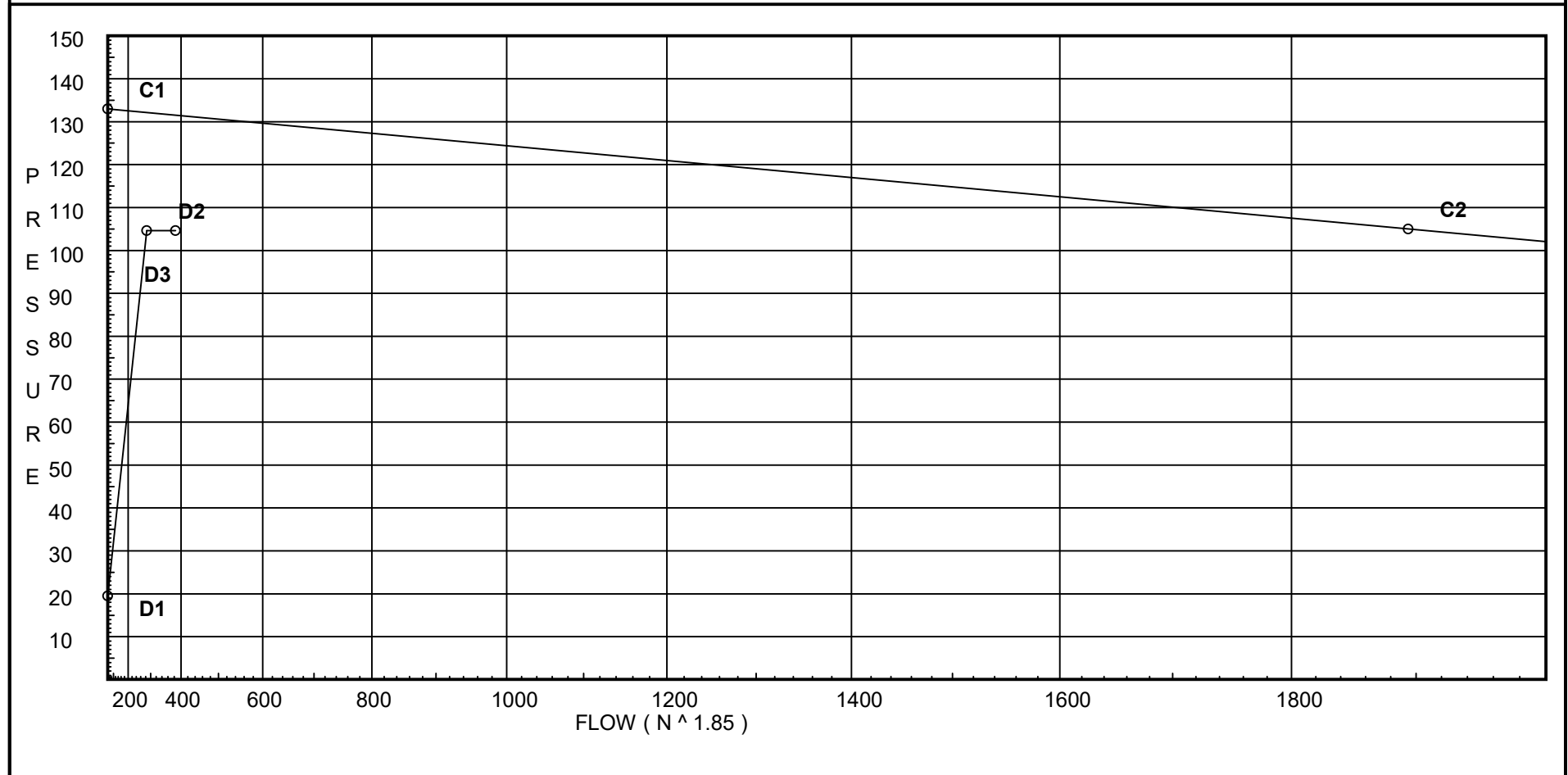
# Water Supply Curve

Associated Fire Protection  
CAPE FEAR MOB

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Date 10.19.23

City Water Supply:  
C1 - Static Pressure : 133  
C2 - Residual Pressure: 105  
C2 - Residual Flow : 1894

Demand:  
D1 - Elevation : 19.490  
D2 - System Flow : 284.02  
D2 - System Pressure : 104.621  
Hose ( Demand ) : 100  
D3 - System Demand : 384.02  
Safety Margin : 26.916



# Fittings Used Summary

Associated Fire Protection  
CAPE FEAR MOB

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## Fitting Legend

Abbrev.	Name	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12	14	16	18	20	24
E	NFPA 13 90' Standard Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
F	NFPA 13 45' Elbow	1	1	1	1	2	2	3	3	3	4	5	7	9	11	13	17	19	21	24	28
G	NFPA 13 Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
S	NFPA 13 Swing Check	0	0	5	7	9	11	14	16	19	22	27	32	45	55	65					
T	NFPA 13 90' Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121

## Units Summary

Diameter Units           Inches  
 Length Units             Feet  
 Flow Units                US Gallons per Minute  
 Pressure Units           Pounds per Square Inch

Note: Fitting Legend provides equivalent pipe lengths for fittings types of various diameters. Equivalent lengths shown are standard for actual diameters of Sched 40 pipe and CFactors of 120 except as noted with \*. The fittings marked with a \* show equivalent lengths values supplied by manufacturers based on specific pipe diameters and CFactors and they require no adjustment. All values for fittings not marked with a \* will be adjusted in the calculation for CFactors of other than 120 and diameters other than Sched 40 per NFPA.



# Flow Summary - NFPA

Associated Fire Protection  
CAPE FEAR MOB

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## SUPPLY ANALYSIS

<i>Node at Source</i>	<i>Static Pressure</i>	<i>Residual Pressure</i>	<i>Flow</i>	<i>Available Pressure</i>	<i>Total Demand</i>	<i>Required Pressure</i>
TEST	133.0	105	1894.0	131.538	384.02	104.621

## NODE ANALYSIS

<i>Node Tag</i>	<i>Elevation</i>	<i>Node Type</i>	<i>Pressure at Node</i>	<i>Discharge at Node</i>	<i>Notes</i>
H1	45.0	5.6	16.84	22.98	0.1 225
H2	45.0	5.6	16.24	22.57	0.1 225
H3	45.0	5.6	16.14	22.5	0.1 225
H4	45.0	5.6	16.22	22.55	0.1 225
H5	45.0	5.6	16.88	23.01	0.1 225
H6	45.0	5.6	16.92	23.03	0.1 225
H7	45.0	5.6	16.31	22.62	0.1 225
H8	45.0	5.6	16.22	22.55	0.1 225
H9	45.0	5.6	16.3	22.61	0.1 225
H10	45.0	5.6	16.96	23.06	0.1 225
H11	45.0	5.6	25.54	28.3	0.1 225
H12	45.0	5.6	25.44	28.24	0.1 225
M1	44.833		36.64		
1	44.833		17.95		
2	44.833		17.31		
3	44.833		17.21		
4	44.833		17.3		
5	44.833		17.99		
M2	44.833		36.78		
6	44.833		18.03		
7	44.833		17.39		
8	44.833		17.29		
9	44.833		17.38		
10	44.833		18.08		
M3	44.833		37.3		
11	44.833		27.13		
12	44.833		27.03		
M4	44.833		38.23		
M5	44.833		39.46		
M6	44.833		46.04		
M7	44.833		47.07		
F1	44.833		27.76		
F2	44.833		27.89		
F3	44.833		28.38		
F4	44.833		29.01		
F5	44.833		29.44		
F6	44.833		29.68		
S1	44.833		56.36		
S2	12.167		71.38		
TOR	12.167		73.72		
BOR	1.0		87.65		
FLG	1.0		87.71		

# Flow Summary - NFPA

Associated Fire Protection  
CAPE FEAR MOB

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## *NODE ANALYSIS (cont.)*

<i>Node Tag</i>	<i>Elevation</i>	<i>Node Type</i>	<i>Pressure at Node</i>	<i>Discharge at Node</i>	<i>Notes</i>
HOSE	-3.0		89.87	100.0	
UG1	0.0		91.06		
BFP	-3.0		105.72		
TEST	0.0		104.62		

# Final Calculations : Hazen-Williams

Associated Fire Protection  
CAPE FEAR MOB

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqiv Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
H1 to 1	45 44.833	5.60	22.98 22.98	1 1.049	T 5.0	1.167 5.000 6.167	120 0.1683	16.840 0.072 1.038		Vel = 8.53	
1			0.0 22.98					17.950		K Factor = 5.42	
H2 to 2	45 44.833	5.60	22.57 22.57	1 1.049	T 5.0	1.167 5.000 6.167	120 0.1626	16.238 0.072 1.003		Vel = 8.38	
2			0.0 22.57					17.313		K Factor = 5.42	
H3 to 3	45 44.833	5.60	22.50 22.5	1 1.049	T 5.0	1.167 5.000 6.167	120 0.1618	16.143 0.072 0.998		Vel = 8.35	
3			0.0 22.50					17.213		K Factor = 5.42	
H4 to 4	45 44.833	5.60	22.55 22.55	1 1.049	T 5.0	1.167 5.000 6.167	120 0.1626	16.221 0.072 1.003		Vel = 8.37	
4			0.0 22.55					17.296		K Factor = 5.42	
H5 to 5	45 44.833	5.60	23.01 23.01	1 1.049	T 5.0	1.167 5.000 6.167	120 0.1688	16.879 0.072 1.041		Vel = 8.54	
5			0.0 23.01					17.992		K Factor = 5.42	
H6 to 6	45 44.833	5.60	23.03 23.03	1 1.049	T 5.0	1.167 5.000 6.167	120 0.1691	16.916 0.072 1.043		Vel = 8.55	
6			0.0 23.03					18.031		K Factor = 5.42	
H7 to 7	45 44.833	5.60	22.62 22.62	1 1.049	T 5.0	1.167 5.000 6.167	120 0.1635	16.312 0.072 1.008		Vel = 8.40	
7			0.0 22.62					17.392		K Factor = 5.42	
H8 to 8	45 44.833	5.60	22.55 22.55	1 1.049	T 5.0	1.167 5.000 6.167	120 0.1625	16.218 0.072 1.002		Vel = 8.37	
8			0.0 22.55					17.292		K Factor = 5.42	
H9 to 9	45 44.833	5.60	22.61 22.61	1 1.049	T 5.0	1.167 5.000 6.167	120 0.1633	16.296 0.072 1.007		Vel = 8.39	
9			0.0 22.61					17.375		K Factor = 5.42	
H10 to 10	45 44.833	5.60	23.06 23.06	1 1.049	T 5.0	1.167 5.000 6.167	120 0.1695	16.958 0.072 1.045		Vel = 8.56	

# Final Calculations : Hazen-Williams

Associated Fire Protection  
CAPE FEAR MOB

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Date 10.19.23

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Equiv Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
			0.0 23.06					18.075		K Factor = 5.42	
H11 to 11	45 44.833	5.60	28.30 28.3	1 1.049	T 5.0	1.167 5.000 6.167	120 0.2474	25.537 0.072 1.526		Vel = 10.51	
			0.0 28.30					27.135		K Factor = 5.43	
H12 to 12	45 44.833	5.60	28.24 28.24	1 1.049	T 5.0	1.167 5.000 6.167	120 0.2465	25.437 0.072 1.520		Vel = 10.48	
			0.0 28.24					27.029		K Factor = 5.43	
M1 to 1	44.833 44.833		-57.65 -57.65	1.25 1.442	T 7.432	88.000 7.432 95.432	120 -0.1959	36.643 0.0 -18.693		Vel = 11.33	
1 to 2	44.833 44.833		22.98 -34.67	1.25 1.442		8.333 8.333	120 -0.0764	17.950 0.0 -0.637		Vel = 6.81	
2 to 3	44.833 44.833		22.57 -12.1	1.25 1.442		9.167 9.167	120 -0.0109	17.313 0.0 -0.100		Vel = 2.38	
3 to 4	44.833 44.833		22.50 10.4	1.25 1.442		10.000 10.000	120 0.0083	17.213 0.0 0.083		Vel = 2.04	
4 to 5	44.833 44.833		22.55 32.95	1.25 1.442		10.000 10.000	120 0.0696	17.296 0.0 0.696		Vel = 6.47	
5 to F1	44.833 44.833		23.01 55.96	1.25 1.442	T 7.432	45.250 7.432 52.682	120 0.1854	17.992 0.0 9.765		Vel = 10.99	
			0.0 55.96					27.757		K Factor = 10.62	
M2 to 6	44.833 44.833		-57.75 -57.75	1.25 1.442	T 7.432	88.000 7.432 95.432	120 -0.1965	36.785 0.0 -18.754		Vel = 11.35	
6 to 7	44.833 44.833		23.03 -34.72	1.25 1.442		8.333 8.333	120 -0.0767	18.031 0.0 -0.639		Vel = 6.82	
7 to 8	44.833 44.833		22.62 -12.1	1.25 1.442		9.167 9.167	120 -0.0109	17.392 0.0 -0.100		Vel = 2.38	
8 to 9	44.833 44.833		22.55 10.45	1.25 1.442		10.000 10.000	120 0.0083	17.292 0.0 0.083		Vel = 2.05	
9 to 10	44.833 44.833		22.61 33.06	1.25 1.442		10.000 10.000	120 0.0700	17.375 0.0 0.700		Vel = 6.49	

# Final Calculations : Hazen-Williams

Associated Fire Protection  
CAPE FEAR MOB

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Date 10.19.23

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
10 to F2	44.833 44.833		23.06 56.12	1.25 1.442	T	7.432	45.250 7.432 52.682	120 0.1863	18.075 0.0 9.817		Vel = 11.02	
F2			0.0 56.12						27.892		K Factor = 10.63	
M3 to 11	44.833 44.833		-41.47 -41.47	1.25 1.442	T	7.432	88.000 7.432 95.432	120 -0.1065	37.298 0.0 -10.163		Vel = 8.15	
11 to 12	44.833 44.833		28.30 -13.17	1.25 1.442			8.333 8.333	120 -0.0127	27.135 0.0 -0.106		Vel = 2.59	
12 to F3	44.833 44.833		28.24 15.07	1.25 1.442	T	7.432	75.000 7.432 82.432	120 0.0164	27.029 0.0 1.349		Vel = 2.96	
F3			0.0 15.07						28.378		K Factor = 2.83	
M4 to F4	44.833 44.833		-23.92 -23.92	1.25 1.442	2T 8E	14.864 29.728	195.000 44.592 239.592	120 -0.0385	38.226 0.0 -9.219		Vel = 4.70	
F4			0.0 -23.92						29.007		K Factor = -4.44	
M5 to F5	44.833 44.833		-28.71 -28.71	1.25 1.442	2T	14.864	170.833 14.864 185.697	120 -0.0539	39.460 0.0 -10.015		Vel = 5.64	
F5			0.0 -28.71						29.445		K Factor = -5.29	
M6 to F6	44.833 44.833		-35.93 -35.93	1.25 1.442	2T 2E	14.864 7.432	178.000 22.296 200.296	120 -0.0817	46.036 0.0 -16.356		Vel = 7.06	
F6			0.0 -35.93						29.680		K Factor = -6.60	
M7 to F7	44.833 0		-38.59 -38.59	1.25 1.442	2T	14.864	171.000 14.864 185.864	120 -0.0932	47.072 19.417 -17.323		Vel = 7.58	
F7			0.0 -38.59						49.166		K Factor = -5.50	
M1 to M2	44.833 44.833		57.65 57.65	2.5 2.635			13.667 13.667	120 0.0104	36.643 0.0 0.142		Vel = 3.39	
M2 to M3	44.833 44.833		57.75 115.4	2.5 2.635			13.667 13.667	120 0.0375	36.785 0.0 0.513		Vel = 6.79	
M3 to M4	44.833 44.833		41.47 156.87	2.5 2.635			14.000 14.000	120 0.0663	37.298 0.0 0.928		Vel = 9.23	
M4 to M5	44.833 44.833		23.92 180.79	2.5 2.635			14.333 14.333	120 0.0861	38.226 0.0 1.234		Vel = 10.64	

# Final Calculations : Hazen-Williams

Associated Fire Protection  
CAPE FEAR MOB

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Date 10.19.23

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqiv Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
M5 to M6	44.833 44.833		28.71 209.5	2.5 2.635	4E 32.948	25.167 32.948 58.115	120 0.1132	39.460 0.0 6.576		Vel = 12.33	
M6 to M7	44.833 44.833		35.93 245.43	2.5 2.635		6.833 6.833	120 0.1516	46.036 0.0 1.036		Vel = 14.44	
M7 to S1	44.833 44.833		38.59 284.02	2.5 2.635	E T Eqi 8.237 16.474 13.557	8.500 38.268 46.768	120 0.1987	47.072 0.0 9.292		Vel = 16.71	
S1			0.0 284.02					56.364		K Factor = 37.83	
F1 to F2	44.833 44.833		55.96 55.96	2.5 2.635		13.667 13.667	120 0.0099	27.757 0.0 0.135		Vel = 3.29	
F2 to F3	44.833 44.833		56.12 112.08	2.5 2.635		13.667 13.667	120 0.0356	27.892 0.0 0.486		Vel = 6.59	
F3 to F4	44.833 44.833		15.07 127.15	2.5 2.635		14.000 14.000	120 0.0449	28.378 0.0 0.629		Vel = 7.48	
F4 to F5	44.833 44.833		-23.92 103.23	2.5 2.635		14.333 14.333	120 0.0306	29.007 0.0 0.438		Vel = 6.07	
F5 to F6	44.833 44.833		-28.71 74.52	2.5 2.635		14.083 14.083	120 0.0167	29.445 0.0 0.235		Vel = 4.38	
F6 to F7	44.833 0		-35.93 38.59	2.5 2.635		13.833 13.833	120 0.0050	29.680 19.417 0.069		Vel = 2.27	
F7			0.0 38.59					49.166		K Factor = 5.50	
S1 to S2	44.833 12.167		284.02 284.02	4 4.26	E	13.167 13.167 45.500	120 0.0191	56.364 14.148 0.871		Vel = 6.39	
S2 to TOR	12.167 12.167		0.0 284.02	4 4.26	3E	39.501 82.667 39.501 122.168	120 0.0191	71.383 0.0 2.339		Vel = 6.39	
TOR			0.0 284.02					73.722		K Factor = 33.08	
TOR to BOR	12.167 1		284.02 284.02	4 4.26	18T	474.015 11.500 463.481 474.981	120 0.0192	73.722 4.836 9.096		Vel = 6.39	
BOR to FLG	1 1		0.0 284.02	6 6.357	E	17.603 3.000 17.603 20.603	120 0.0027	87.654 0.0 0.056		Vel = 2.87	
FLG to HOSE	1 -3		0.0 284.02	6 6.16	E 2F S	20.084 20.084 45.906	140 0.0024	87.710 1.732 0.430		Vel = 3.06	

# Final Calculations : Hazen-Williams

Associated Fire Protection  
CAPE FEAR MOB

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Date 10.19.23

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
HOSE to UG1	-3 0	H100	100.00 384.02	6 6.16	2E F	40.168 10.042	546.000 50.210 596.210	140 0.0042	89.872 -1.299 2.489		Vel = 4.13	
UG1 to BFP	0 -3		0.0 384.02	6 6.16	4E	80.336	5.000 80.336 85.336	140 0.0042	91.062 14.299 0.356		** Fixed Loss = 13 Vel = 4.13	
BFP to TEST	-3 0		0.0 384.02	8 8.27	2G 2F T	12.652 28.468 55.354	108.000 96.474 204.474	140 0.0010	105.717 -1.299 0.203		Vel = 2.29	
TEST			0.0 384.02						104.621		K Factor = 37.54	



**ASSOCIATED FIRE PROTECTION, INC**

Post Office Box 28022 – Raleigh, NC 27611

O: 919-553-4021 | F: 919-553-2169 | [www.afp-nc.com](http://www.afp-nc.com)

## **Fire Flow Test Report**

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# **Cape Fear MOB**

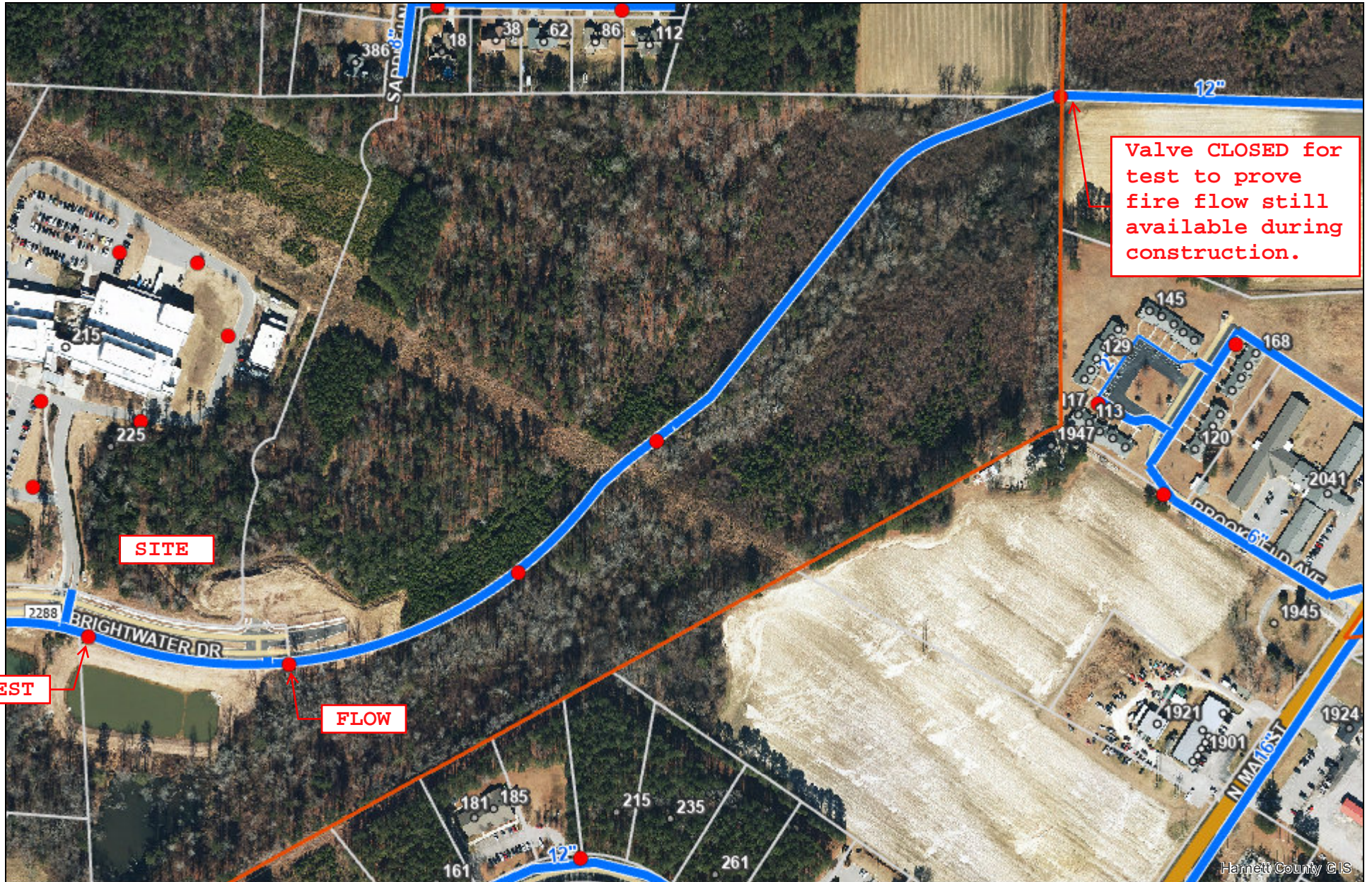
**Test Performed:  
September 6, 2023**

**Test Location:  
215 Brightwater Drive  
Lillington, NC**



# Harnett GIS

NOT FOR LEGAL USE



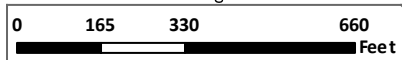
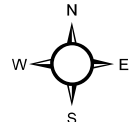
Valve CLOSED for test to prove fire flow still available during construction.

SITE

TEST

FLOW

Harnett County GIS



1 inch = 376 feet

## FIRE HYDRANT FLOW TEST RESULTS

### TEST LOCATION

Address: 215 Brightwater Drive, Lillington (12" Valve CLOSED)

Proposed Tap Location: \_\_\_\_\_

Requested Flow Location: nearest hydrant to the proposed point of connection

### APPLICANT

Name: The Keith Corporation

Address: 4500 Cameron Valley Parkway, Suite 400, Charlotte, NC 28211

Contact Person: Eric Larson Phone: 704.365.6000 Fax: 704.365.0733

### TESTING AGENT

Firm Name: Associated Fire Protection, Inc.

Address: PO Box 28022, Raleigh, North Carolina 27611-28022

Phone: (919) 553-4021 Fax: (919) 553-2169

### SYSTEM ANALYSIS

Main Size: 12" Elevation of Test Location: 172' +/-

Nearest Elevated Tank: MW BPS 1 Time of Test: 9:15 AM

Tank Elevation: N/A Pressure Zone: N/A

Theoretical Pressure: N/A

Calculated by: Drew King Witnessed by: N/A

## RESULTS

Static Pressure: 133 psi 2" Pitotless Nozzle Reading: 18,18 psi

Residual Pressure: 56 psi Volume: 699 + 699 = 1,398 gpm

Disclaimer: These results are an instantaneous snap-shot of the system. It is recommended that the designer allow adequate safety to include low tank level.

Comments: Flowed ( 2 ) 2-1/2" Hose Monster(s) with 2" pitotless nozzle(s). (2" Nozzle C = 1.38)

Completed by: Drew King

Date: 9/6/2023

## **FIRE HYDRANT FLOW TEST RESULTS**

### **TEST LOCATION**

Address: 215 Brightwater Drive, Lillington (12" Valve OPEN)

Proposed Tap Location: \_\_\_\_\_

Requested Flow Location: nearest hydrant to the proposed point of connection

### **APPLICANT**

Name: The Keith Corporation

Address: 4500 Cameron Valley Parkway, Suite 400, Charlotte, NC 28211

Contact Person: Eric Larson Phone: 704.365.6000 Fax: 704.365.0733

### **TESTING AGENT**

Firm Name: Associated Fire Protection, Inc.

Address: PO Box 28022, Raleigh, North Carolina 27611-28022

Phone: (919) 553-4021 Fax: (919) 553-2169

### **SYSTEM ANALYSIS**

Main Size: 12" Elevation of Test Location: 172' +/-

Nearest Elevated Tank: MW BPS 1 Time of Test: 9:20 AM

Tank Elevation: N/A Pressure Zone: N/A

Theoretical Pressure: N/A

Calculated by: Drew King Witnessed by: N/A

## **RESULTS**

Static Pressure: 133 psi 2" Pitotless Nozzle Reading: 33, 33 psi

Residual Pressure: 105 psi Volume: 947 + 947 = 1,894 gpm

Disclaimer: These results are an instantaneous snap-shot of the system. It is recommended that the designer allow adequate safety to include low tank level.

Comments: Flowed ( 2 ) 2-1/2" Hose Monster(s) with 2" pitotless nozzle(s). (2" Nozzle C = 1.38)

Completed by: Drew King

Date: 9/6/2023

# Hydrant Flow Test Report

Test Date 9/6/2023

Test Time 9:15 AM

## Location

Cape Fear MOB  
215 Brightwater Drive  
Lillington, NC

## Tested by

Associated Fire Protection, Inc.  
PO Box 28022  
Raleigh, NC 27611-28022  
DKing@afp-nc.com  
919-906-5236

## Notes

12" Valve CLOSED to prove fire flow still available during construction.

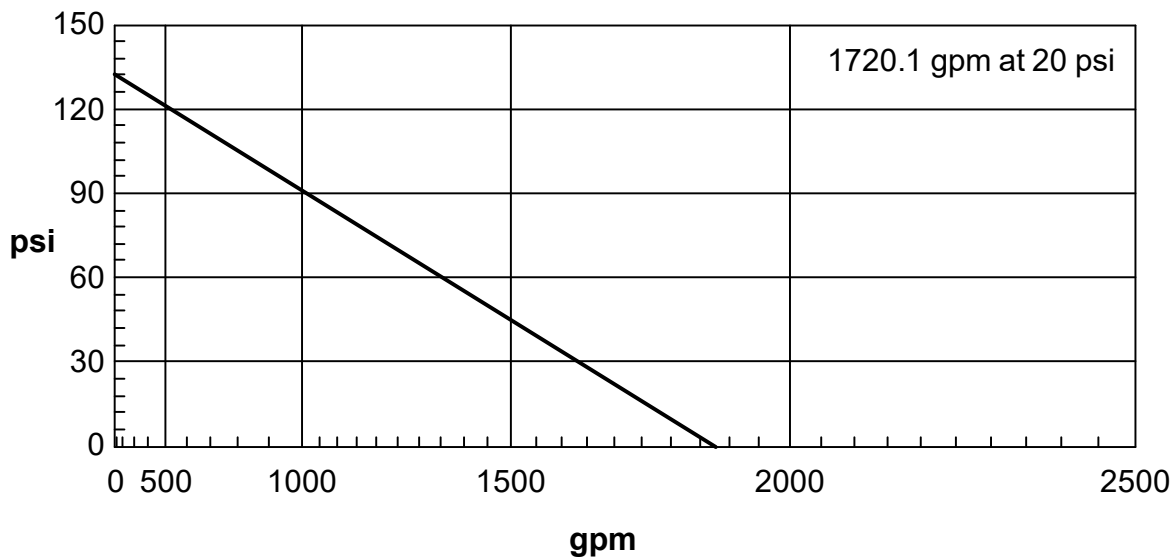
## Read Hydrant

133 psi **static pressure**  
56 psi **residual pressure**  
172 ft **hydrant elevation**

## Flow Hydrant(s)

Outlet	Elev	Size	C	Pitot Pressure	Flow
#1	178	2	1.38	18	699 gpm
#2	178	2	1.38	18	699 gpm
<b>Total</b>					<b>1398 gpm</b>

## Flow Graph



# Hydrant Flow Test Report

Test Date 9/6/2023

Test Time 9:20 AM

## Location

Cape Fear MOB  
215 Brightwater Drive  
Lillington, NC

## Tested by

Associated Fire Protection, Inc.  
PO Box 28022  
Raleigh, NC 27611-28022  
DKing@afp-nc.com  
919-906-5236

## Notes

12" Valve OPEN

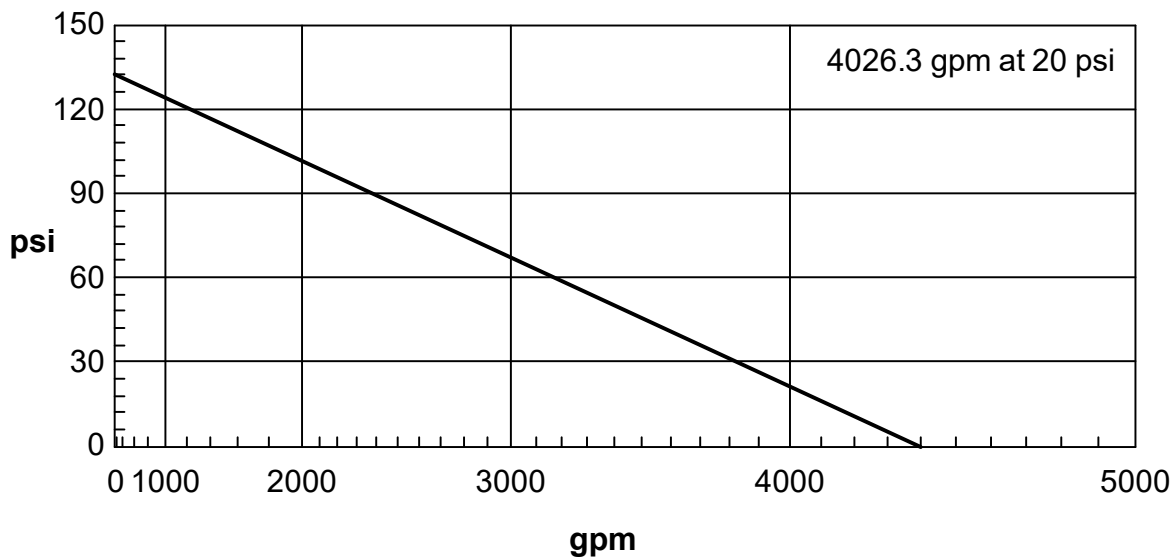
## Read Hydrant

133 psi **static pressure**  
105 psi **residual pressure**  
172 ft **hydrant elevation**

## Flow Hydrant(s)

Outlet	Elev	Size	C	Pitot Pressure	Flow
#1	178	2	1.38	33	947 gpm
#2	178	2	1.38	33	947 gpm
<b>Total</b>					<b>1894 gpm</b>

## Flow Graph




  
**2"**  
**PITOTLESS NOZZLE™**  
 PN2THD  
**FLOW CHART**

10 - 40 PSI			41 - 70 PSI			Key Flow Test Points		
2 1/2" Hose Monster Model II			2 1/2" Hose Monster Model II			2 1/2" Hose Monster Model II		
Open Atmosphere			Open Atmosphere			Open Atmosphere		
PSI	GPM	GPM	PSI	GPM	GPM	GPM	PSI	PSI
10	521	529	41	1055	1071	500	9.5	9.1
11	547	555	42	1068	1084	562.5	11.7	11.3
12	571	579	43	1081	1096	750	20.7	20.1
13	594	603	44	1093	1109	1000	36.8	35.8
14	617	626	45	1106	1122	1125	46.6	45.3
15	638	648	46	1118	1134	1500	82.8	80.5
16	659	669	47	1130	1146			
17	679	689	48	1142	1158			
18	699	709	49	1154	1170			
19	718	729	50	1165	1182			
20	737	748	51	1177	1194			
21	755	766	52	1188	1206			
22	773	784	53	1200	1217			
23	790	802	54	1211	1229			
24	807	819	55	1222	1240			
25	824	836	56	1233	1251			
26	840	853	57	1244	1262			
27	856	869	58	1255	1273			
28	872	885	59	1266	1284			
29	887	900	60	1277	1295			
30	903	916	61	1287	1306			
31	918	931	62	1298	1317			
32	932	946	63	1308	1327			
33	947	960	64	1318	1338			
34	961	975	65	1329	1348			
35	975	989	66	1339	1358			
36	989	1003	67	1349	1369			
37	1002	1017	68	1359	1379			
38	1016	1031	69	1369	1389			
39	1029	1044	70	1379	1399			
40	1042	1057						

The readings on this chart are based on which device the Pitotless Nozzle is connected to. It is the user's responsibility to verify that the correct chart and column is being used.

- **2 1/2" Hose Monster Model II or Flusher with flow splitter (HM2H, HM2HF).** Use this column if the Pitotless Nozzle is connected to the 2 1/2" Hose Monster or Flusher. The built-in pitot or flow splitter must be installed for accuracy. If you do not have the built-in pitot or flow splitter, please contact us.
- **Open Atmosphere.** Use this column when the Pitotless Nozzle is connected directly to a test header or hydrant flowing openly to atmosphere.

This chart is FM Approved for flow rate accuracy. Please call us or instruct the Authority Having Jurisdiction to call us if there are any questions. Additional copies of flow charts are available at: [www.hosemonster.com/literature.html](http://www.hosemonster.com/literature.html)



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[Service@FlowTest.com](mailto:Service@FlowTest.com) EMAIL  
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U. S. Patent # 6,874,375

Updated Jun. 2015

## Calculating Flow-rates

The flow charts we provide with the Pitotless Nozzle™, Hose Monster® and Nozzle Inserts are correct and should be referred to first. Our flow charts are calculated using K-Factors derived from testing performed at FM Approvals. It is common for third-party software to use the pitot formula to compute flow-rate. The 2½" Hose Monster uses a pitot to measure velocity pressure. The Pitotless Nozzle and 4" and 4½" Hose Monsters do not use a pitot, and the pitot formula has to be tricked into calculating correct flow-rates. Entering the coefficients into a program that uses orifice diameter, coefficient and velocity pressure should give relatively accurate flow-rates. Check results against our flow charts.

Here are the equations used for calculating flow-rates and predicting flow-rates. Use the orifice diameter, coefficient or K-factor found on the next page.

### K-factor Formula

Computes a flow-rate in GPM given a psi and a K-factor of the flow device.

$$Q = \sqrt{P} \times K$$

Q = flow-rate in GPM, P = velocity pressure in psi, K = K-factor of flow device

### Pitot Formula

Computes a flow-rate in GPM given a psi and coefficient of the flow device.

$$Q = 29.84 \times \sqrt{P} \times D^2 \times C$$

Q = flow-rate in GPM, P = velocity pressure in psi, D = orifice diameter in inches  
C = coefficient of flow device

### Equation for Determining Rated Capacity

Computes the flow-rate available at a specified residual pressure (a.k.a. Rated Capacity).

The example below enables you to find the predicted flow-rate at 20 psi residual pressure.

$$Q_R = Q_F \times (H_R^{0.54} / H_F^{0.54})$$

Q<sub>R</sub> = Flow-rate predicted at the desired residual pressure in GPM

Q<sub>F</sub> = Total test flow-rate measured during test in GPM  
(GPM measured from Hose Monster or Pitotless Nozzle)

H<sub>R</sub> = Pressure drop from static pressure to desired residual pressure  
(Static – 20 psi [if 20 psi is the desired residual pressure])

H<sub>F</sub> = Actual pressure drop measured during the test (Static – Actual Residual)

(Source: NFPA 291, 2010)

## Conversion Factors

Here are some conversion factors for switching between US and metric units:

#### Flow-rate:

US Gallons per Minute x 3.785 = Liters per Minute  
Liters per Minute x 0.264 = US Gallons per Minute

US Gallons per Minute x 0.1337 = Cubic Feet per Minute  
Cubic Feet per Minute x 7.481 = US Gallons per Minute

#### Volume:

US Gallons x 3.785 = Liters  
Liters x 0.264 = US Gallons

US Gallons x 0.8327 = Imperial Gallons  
Imperial Gallons x 1.201 = US Gallons

Cubic Feet x 7.48051945 = US Gallons  
US Gallons x 0.1337 = Cubic Feet

#### Pressure:

psi x 0.0689 = Bars  
Bars x 14.5038 = psi

psi x 6894.757 = Pascals  
Pascals x 0.000145 = psi

Bars x 100,000 = Pascals  
Pascals x 0.00001 = Bars

#### Weight of Water:

US Gallons of Water x 8.3454 = Pounds  
Cubic Feet of Water x 62.42796 = Pounds

#### Length:

Meters x 3.2808 = Feet  
Feet x 0.3048 = Meters

## Coefficient and K-Factor Table for Various Flow Devices

last update: 2/14/2012

### Pitotless Nozzle™

Device	K-factor	Coefficient	Orifice Diameter	psi Range	Flow Range (GPM)
2" Pitotless Nozzle + Little Hose Monster™	156.0	1.31	2"	10-70	490-1300
<b>2" Pitotless Nozzle + 2½" Hose Monster Steel</b>	<b>164.8</b>	<b>1.38</b>	<b>2"</b>	<b>10-80</b>	<b>520-1380</b>
2" Pitotless Nozzle + Open Atmosphere	167.2	1.40	2"	10-70	530-1400
1¾" Pitotless Nozzle + Little Hose Monster	104.7	1.15	1.75"	10-90	330-1000
1¾" Pitotless Nozzle + 2½" Hose Monster Steel	106.6	1.17	1.75"	10-90	340-1010
1¾" Pitotless Nozzle + Open Atmosphere	109.7	1.20	1.75"	10-90	350-1040
1½" Pitotless Nozzle + Little Hose Monster	37.2	0.98	1.125"	5-90	80-350
1½" Pitotless Nozzle + 2½" Hose Monster Steel	37.4	0.99	1.125"	5-90	80-350
1½" Pitotless Nozzle + Open Atmosphere	37.0	0.98	1.125"	5-90	80-350
1" Pitotless Nozzle + Little Hose Monster	27.2	0.91	1"	3-90	50-260
1" Pitotless Nozzle + 2½" Hose Monster Steel	27.6	0.93	1"	3-90	50-260
1" Pitotless Nozzle + Open Atmosphere	27.7	0.93	1"	3-90	50-260

### In-Line Pitotless Nozzle™

Device	K-factor	Coefficient	Orifice Diameter	psi Range	Flow Range (GPM)
2" In-line Pitotless Nozzle	165.3	1.38	2"	10-75	530-1430
1¾" In-line Pitotless Nozzle	109.9	1.20	1.75"	5-80	250-980
1½" In-line Pitotless Nozzle	38.4	1.02	1.125"	5-70	90-320

### BigBoy Hose Monster™

Device	K-factor	Coefficient	Orifice Diameter	psi Range	Flow Range (GPM)
4 to 10 psi (BigBoy Hose Monster)	382.9	1.38	3.05"	4-10	766-1211
11 to 36 psi (BigBoy Hose Monster)	376.0	1.35	3.05"	11-36	1247-2256
37 to 53 psi (BigBoy Hose Monster)	372.0	1.34	3.05"	37-53	2263-2708

Note: Due to the shape and size of the BigBoy Pitotless Nozzle, the BigBoy Hose Monster uses three different k-factors over its operating range.

### 2½" Hose Monster®

Device	K-factor	Coefficient	Orifice Diameter	psi Range	Flow Range (GPM)
2½" Hose Monster	168.67	0.906	2.5"	10-75	530-1460
1¾" Nozzle Insert	89.04	0.975	1.75"	10-75	280-770
1½" Nozzle Insert	37.36	0.99	1.125"	10-75	120-320

### 4" and 4½" Hose Monster®

Device	K-factor	Coefficient	Orifice Diameter	psi Range	Flow Range (GPM)
4½" Hose Monster	331.07	0.548	4.5"	10-75	1050-2870
4" Hose Monster	339.65	0.712	4"	10-75	1070-2940

### Using Software

Use the table below if you are using software that requires the coefficient input to be less than '1.0'. Notice that the orifice diameter must be changed from its true diameter in order to accommodate the lower coefficient. This is necessary only for the 2" Pitotless Nozzle and the ¾" Pitotless Nozzle.

Device	Coefficient	Orifice Diameter
2" Pitotless Nozzle + Little Hose Monster	0.99	2.30"
2" Pitotless Nozzle + 2½" Hose Monster Steel	0.99	2.36"
2" Pitotless Nozzle + Open Atmosphere	0.99	2.38"
1¾" Pitotless Nozzle + Little Hose Monster	0.99	1.88"
1¾" Pitotless Nozzle + 2½" Hose Monster Steel	0.99	1.90"
1¾" Pitotless Nozzle + Open Atmosphere	0.99	1.93"

Note: If your software uses the Theoretical Discharge Formula, found in NFPA 291, 4.7.3, the coefficient of discharge can be used to produce flow rates that will match our flow charts.

### A hand-held pitot directly at a hydrant outlet

Outlet Type	Coefficient
Outlet smooth and rounded	0.9
Outlet square and sharp	0.8
Outlet square and projecting into barrel	0.7
If a stream straightener is used	0.95

### Classifying and Marking of Hydrants

Rated Capacity at 20 psi	Class	Marking Color of Hydrant Tops and Nozzles
≥1500 GPM	AA	Light Blue
1000-1499 GPM	A	Green
500-999 GPM	B	Orange
≤499 GPM	C	Red

The above are the NFPA hydrant classifications and color markings for various rated capacities. Source: NFPA 291, 5.1, 2010.



# 215 Brightwater Drive, Lillington flow test - Wednesday, September 6, 2023

