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Home2 Suites by Hilton 4-Story Hotel Construction

475 Hospitality Blvd.
Greenwood, SC 29649

John M. Campbell Company
Contractor

XX Reviewed

— Reviewed with corrections as noted on
submittal data and/or attached sheet(s)

Miles Campbell, Project Manager

Date 10/29/2025

AUTOMATIC FIRE SPRINKLER PROTECTION PRODUCT SUBMITTALS

DIVISION 21 FIRE SUPPRESSION SPRINKLER SYSTEMS

GENERAL CONTRACTOR: **John M. Campbell Company**

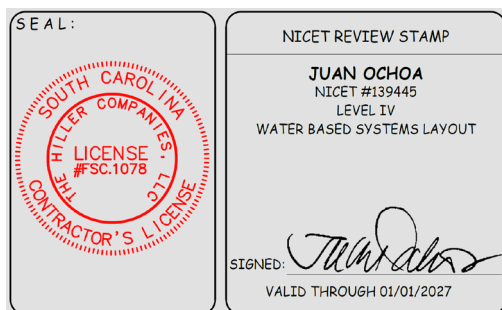


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FIRE PROTECTION SYSTEM

SPRINKLER HEADSTAB #1

Viking FREEDOM Model VK494 155° Fast Response 4.9K Residential Concealed
Pendent w/ White Cover Plate
Viking Concealed Pendent Model VK4621 155°/200° Quick Response 5.6K Concealed
Pendent w/ White Cover Plate
Viking MICORFAST Model VK305 155°/200° Quick Response 5.6K Chrome Horizontal
Sidewall w/ Chrome Semi-Rec Esc
Viking FREEDOM Model VK468 155° Fast Response 4.9K Residential Chrome
Pendent w/ Chrome Semi-Rec Esc
Viking FREEDOM Model VK460 155° Fast Response 5.8K Residential Chrome
Horizontal Sidewall w/ Chrome Semi-Rec Esc
Viking MICROFAST Model VK300 200° Quick Response 5.6K Brass Upright
Viking MICROFAST Model VK302 155°/200° Quick Response 5.6K Chrome
Pendent w/ Chrome Semi-Rec Esc
Victaulic FL-DR/VS1 Model V3518 200° Quick Response 5.6K VC-250 Dry Pendent
w/ VC-250 Concealed Esc
FPPI/ASC Spare Sprinkler Head Storage Cabinet
ARGCO Sprinkler Identification Signs

PIPETAB #2

Bull Moose Tube Sch. 40 – 1" thru 2" / Sch. 10 – 2½" & larger
Wheatland Tube Sch. 40 – 1" thru 2" / Sch. 10 – 2½" & larger
Tyco and Spears CPVC Pipe and Fittings – 1" thru 2" (Above Residential Ceiling Areas)

General Notes:

- 1.) Pipe and fittings exposed to the weather shall be hot-dipped zinc coated (galvanized).
- 2.) Pipe and fittings between backflow preventer test connection and associated control valve shall be hot-dipped zinc coated (galvanized).

GROOVED FITTINGS.....TAB #3

Victaulic Firelock
Victaulic Mechanical-T
Victaulic Flange and Adapters

THREADED FITTINGSTAB #4

Anvil – Cast Iron
Anvil – Malleable Iron
Victaulic Mechanical-T

General Notes:

- 1.) Bushings shall not be used except where allowed by NFPA 13.

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FIRE PROTECTION SYSTEM

PIPE HANGERS & SUPPORTSTAB #5

PHD Electro-Zinc Plated All Thread Rod
PHD Beam Clamps
PHD Hanger Rings
HILTI Anchors
Caddy CPVC Hangers
Sammys Screws

SEISMICTAB #6

Afcon Seismic Braces (Used on CPVC piping)
PHD Manufacturing, Inc. Seismic Braces (Used on Steel Piping)

PIPE SLEEVE SEALSTAB #7

HILTI Firestop Systems

General Notes:

- 1.) Coordinate with the installing contractor as required.
- 2.) Depending upon the actual fire penetration detail/product used, flexible couplings will be required within 1'-0" of wall on both sides of wall if the annular space required by NFPA 13 cannot be provided by the fire penetration detail.

VALVESTAB #8

Victaulic UMC Universal Manifold Check Assembly
Victaulic 717 Grooved Check Valve (Used for FDC)
Victaulic Grooved Butterfly Valve w/ Tamper (Supervised Open & Closed)
FPPI 2½" Rough Brass Grooved Hose Angle Valves w/ Cap & Chain
Guardian Model 6136 3-Way Fire Department Connection (Standpipe Requires 750GPM)
Victaulic 722 Brass Body Ball Valve
Potter PAV Air Vent Assembly

ELECTRICAL / ALARM DEVICESTAB #9

System Sensor Electric Bell (6" @ 120V) Verify Voltage w/ Alarm Contractor
Potter Equipment

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FIRE PROTECTION SYSTEM

FIRE PUMP, JOCKEY PUMP & CONTROL PANELSTAB #10

SyncroFlo SD08LFK – 300 GPM @ 60 PSI FIRE PUMP (208 VOLT)
EATON FD/FT30 Across-The-Line EPCT Fire Pump Controller (208 VOLT)
WEBTROL NV6B7 Jockey Pump (208 VOLT)
EATON XTJP Across-The-Line Jockey Pump Controller (208 VOLT)
CLA-VAL Pump Casing Relief Valve
CLA-VAL TH Series 4" Grooved x (x2) 2-1/2" Hose Valve Test Header

UNDERGROUND (HYDRAULIC REFERENCE ONLY)TAB #11

6" WATTS Series 709DCDA Backflow Device
6" AMES In-Building Stainless Steel Riser
5" Potter Roemer STORZ FDC

SPRINKLER HEADS



TECHNICAL DATA

FREEDOM® RESIDENTIAL CONCEALED PENDENT SPRINKLER VK494 (K4.9)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Visit the Viking website for the latest edition of this technical data page www.vikinggroupinc.com

1. DESCRIPTION

Viking Freedom® Residential Concealed Pendent sprinkler VK494 is a small thermosensitive, glass-bulb residential sprinkler designed for installation on concealed pipe systems where the appearance of a smooth ceiling is desired. The orifice design allows the sprinkler's efficient use of available water supplies for the hydraulically designed fire-protection system. The glass bulb operating element and special deflector characteristics meet the challenges of residential sprinkler standards.

Features:

- K4.9 (70.6 metric)
- Fast response glass bulb operating element.
- Integral threaded adapter cup accepts push-on or thread-on cover plates.
- Low-profile, small diameter, removeable cover plates offer almost flush appearance upon installation and allow ease of maintenance.
- Protective cap prevents damage during installation and ceiling finishing and keeps errant overspray from coating internal parts.
- Various finishes available to meet design requirements.
- Optional Electroless Nickel PTFE (ENT) coating provides corrosion resistance (see Approval Chart).

2. LISTINGS AND APPROVALS



cULusEU Listed: Category VKKW

Refer to the Approval Charts and Design Criteria for C-UL-US-EU Listing requirements that must be followed.

3. TECHNICAL DATA

Specifications:

Minimum Operating Pressure: Refer to the Approval Chart.

Maximum Working Pressure: 175 psi (12 bar). Factory tested hydrostatically to 500 psi (34.5 bar).

Thread size: 1/2" (15 mm) NPT

Nominal K-factor: 4.9 U.S. (70.6 metric*)

Glass-bulb fluid temperature rating: to -65 °F (-55 °C)

* Metric K-factor measurement shown is in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

Material Standards:

Sprinkler Body: Brass UNS-C84400, QM brass, or DZR brass

Deflector: Phosphor bronze UNS-C51000

Deflector Pins: Stainless steel UNS-S30200

Button: Brass UNS-C36000

Pip Cap and Insert Assembly: Copper UNS-C11000 and Stainless Steel UNS-S30400

Compression Screw: 18-8 Stainless Steel

Yoke: Phosphor Bronze UNS-C51000

Belleville Spring Sealing Assembly: Beryllium nickel alloy, coated on both sides with PTFE tape

Cover Adapter: Cold Rolled Steel JIS G3141 and Carbon Steel UNS-G10100 (per JIS G3141)

Shipping Cap: High Density Polyethylene

Vibration damper ring: Buna-N Rubber SAE AS-568-017

Cover Plate Materials:

Cover Plate Assembly: Copper UNS-C11000 and brass UNS-C26800 or stainless steel UNS-S30400

Spring: Beryllium Nickel

Solder: Eutectic

4. INSTALLATION

Refer to appropriate NFPA Installation Standards.

5. OPERATION

During fire conditions, when the temperature around the sprinkler approaches the cover plate's nominal temperature rating, the cover plate detaches and releases the deflector. Continued heating of the exposed sprinkler causes the heat-sensitive liquid in the glass bulb to expand. When the temperature reaches the sprinkler's nominal temperature rating, the glass bulb shatters releasing the yoke, pip cap assembly and sealing spring. Water begins flowing through the sprinkler orifice and strikes the deflector forming a uniform spray pattern over a specific area of coverage, which is determined by the water supply pressure at the sprinkler, in order to extinguish or control the fire.



WARNING: Cancer and Reproductive Harm-
www.P65Warnings.ca.gov



TECHNICAL DATA

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6. INSPECTIONS, TESTS AND MAINTENANCE

Refer to NFPA 25 for Inspection, Testing and Maintenance requirements.

7. AVAILABILITY

Viking Sprinkler Model VK494 is available through a network of domestic and international distributors. See The Viking Corporation web site for the closest distributor or contact The Viking Corporation.

8. GUARANTEE

For details of warranty, refer to Viking's current list price schedule or contact Viking directly.

TABLE 1: SPRINKLER ORDERING INFORMATION

Ordering Instructions:

- (1) Select a sprinkler base part number
- (2) Add the suffix for the desired finish
- (3) Add the suffix for the desired sprinkler temperature rating
- (4) Order a cover plate (Must be ordered separately; refer to Table 2)

Example:

23707AE = 200 °F (93 °C) Temperature rated sprinkler with a standard brass finish.

Sprinkler Base Part Number ¹	Size	1: Finishes		2: Temperature Ratings ⁵			
	NPT Inch	Description	Suffix	Nominal Rating	Bulb Color	Max. Ambient Ceiling Temperature ²	Suffix
23707	1/2	Brass	A	155 °F (68 °C)	Red	100 °F (38 °C)	B
		ENT ^{3,4}	JN	200 °F (93 °C)	Green	150 °F (65 °C)	E

Accessories

Part Number	Description
23143	Installation wrench ⁶
14412	Small concealed cover plate installer tool; requires a piece of 1" PVC pipe or similar to attach (available since 2007).
14867	Large concealed cover plate installer tool; requires a piece of 1" PVC pipe or similar to attach (available since 2007).
01731A	Sprinkler cabinet; holds up to 6 sprinklers (available since 1971).

Footnotes

1. Part number shown is the base part number. For complete part number, refer to the current Viking price list schedule.
2. Based on NFPA 13, NFPA 13R, and NFPA 13D. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.
3. cULusEU listed as corrosion resistant.
4. The corrosion-resistant coatings have passed the standard corrosion test required by the approving agencies indicated in the Approval Charts. These tests cannot and do not represent all possible corrosive environments. Prior to installation, verify through the end-user that the coatings are compatible with or suitable for the proposed environment. For automatic sprinklers, the ENT coating is applied to all exposed exterior surfaces, including the waterway. For ENT-coated sprinklers, the Belleville spring is exposed.
5. The sprinkler temperature rating is stamped on the deflector.
6. The installation wrench is intended to be used for a maximum of 500 sprinkler installations at a maximum torque of 14 ft-lbs (19 Nm).

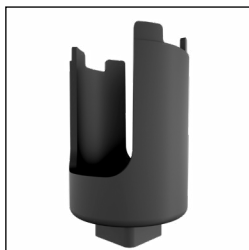


Figure 1: Installation Wrench



TECHNICAL DATA

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TABLE 2: COVER PLATE ORDERING INFORMATION

Instructions:

- (1) Select a cover plate base part number
- (2) Add the suffix for the desired finish
- (3) Add the suffix for the required cover plate nominal rating.

Example:

23190MC/W = 165 °F (74 °C) Temperature rated, 2-3/4" (70 mm) diameter, thread-on style, round cover plate with a painted white finish.

1: Select a Cover Plate Base Part Number ³						2: Select a Finish	
Thread-On Style			Push-On Style				
Base Part Number ¹	Size Inch (mm)	Type	Base Part Number	Size Inch (mm)	Type	Description	Suffix ⁴
23190	2-3/4 (70)	Round	23447	2-3/4 (70)	Round	Polished Chrome	F
23174	3-5/16 (84)	Round	23463	3-5/16 (84)	Round	Brushed Chrome	F-/B
23179	3-5/16 (84)	Square	23482	3-5/16 (84)	Square	Bright Brass	B
23193 ⁵	2-3/4 (70)	Stainless Steel Round	23455 ⁵	2-3/4 (70)	Stainless Steel Round	Antique Brass	B-/A
						Brushed Brass	B-/B
23183 ⁵	3-5/16 (84)	Stainless Steel Round	23473 ⁵	3-5/16 (84)	Stainless Steel Round	Brushed Copper	E-/B
						Painted White	M-/W
						Painted Ivory	M-/I
						Painted Black	M-/B
3: Temperature Rating Matrix ^{1,2}							
Cover Plate Nominal Rating (Required)		Temperature Classification	Sprinkler Nominal Rating		Sprinkler Maximum Ambient Ceiling Temperature ²		Suffix
139 °F (59 °C)		Ordinary	155 °F (68 °C)		100 °F (38 °C)		A
165 °F (74 °C)		Intermediate	200 °F (93 °C)		150 °F (65 °C)		C

Footnotes

1. Part number shown is the base part number. For complete part number, refer to the current Viking price list schedule.
2. The sprinkler temperature rating is stamped on the deflector.
3. Based on NFPA-13, NFPA 13R, and NFPA 13D. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.
4. Where a dash (-) is shown in the Finish suffix designation, insert the desired Temperature Rating suffix. See example above.
5. Stainless steel cover plates can be painted with either the standard or custom paint colors.



TECHNICAL DATA

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Approval Chart Viking VK494, 4.9 K-factor Residential Concealed Pendent Sprinkler

For systems designed to NFPA 13D or NFPA 13R. For systems designed to NFPA 13, refer to the Design Criteria. For Ceiling types refer to current editions of NFPA 13, 13R or 13D

Sprinkler Base Part Number ¹	SIN	Thread Size			Nominal K-factor		Maximum Water	
		NPT	BSPT		U.S.	metric ²	Working Pressure	
23707	VK494	1/2"	15 mm		4.9	70.6	175 psi (12 bar)	
Max. Coverage Area ⁵ W X L Ft. X Ft. (m X m)	Flow GPM (LPM)		Pressure PSI (bar)	Deflector to Ceiling	Installation Type	Listings and Approvals ³		Minimum Spacing Ft. (m)
	155 °F (68 °C), 200 °F (93 °C) Temperature Rated Sprinklers		cULusEU ⁴					
12 X 12 (3.7 X 3.7)	13 (49.2)		7.0 (0.48)	Refer to Figure 5	Concealed with Cover Plate As- sembly. See Footnote 6.	See Footnotes 6 & 7		8 (2.4)
14 X 14 (4.3 X 4.3)	13 (49.2)		7.0 (0.48)					
16 X 16 (4.9 X 4.9)	13 (49.2)		7.0 (0.48)					
18 X 18 (5.5 X 5.5)	17 (64.4)		12.0 (0.83)					
20 X 20 (6.1 X 6.1)	20 (75.7)		16.7 (1.15)					

Footnotes

- Part number shown is the base part number. For complete part number, refer to the current Viking price schedule.
- Metric K-factor measurement shown is when pressure is measured in bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.
- This chart shows the listings and approvals available at the time of printing. Other approvals may be in process. Check with the manufacturer for any additional approvals. Refer also to Design Criteria.
- Listed by Underwriter's Laboratories, Inc. for use in the U.S., Canada, and European Union.
- For areas of coverage smaller than shown, use the "Flow" and "Pressure" for the next larger area listed. Flows and pressures listed are per sprinkler. The distance from sprinklers to walls shall not exceed one-half the sprinkler spacing indicated for the minimum "Flow" and "Pressure" used.
- Accepted Cover Plate Finishes are: Polished chrome, brushed chrome, bright brass, antique brass, brushed brass, brushed copper, painted white, painted ivory, or painted black. Other paint colors are available on request with the same listings as the standard finish colors. Stainless steel cover plates can be painted with either the standard or custom paint colors. Listings and Approvals apply for any paint manufacturer. Contact Viking for additional information. Custom colors are indicated on a label inside the cover assembly. Refer to Figure 2.
- cULusEU Listed as corrosion-resistant - Electroless Nickel PTFE (ENT)

DESIGN CRITERIA

(Also refer to the Approval Chart.)

UL Listing Requirements (C-UL-US-EU):

When using Viking Residential Concealed Pendent Sprinkler VK494 for systems designed to NFPA 13D or NFPA 13R, apply the listed areas of coverage and minimum water supply requirements shown in the Approval Chart.

For systems designed to NFPA 13: The number of design sprinklers is to be the four contiguous most hydraulically demanding sprinklers. The minimum required discharge from each of the four sprinklers is to be the greater of the following:

- The flow rates given in the Approval Chart for NFPA 13D and NFPA 13R applications for each listed area of coverage, **or**
- Calculated based on a minimum discharge of 0.1 gpm/sq. ft. over the "design area" in accordance with sections 9.5.2.1 or 10.2.4.1.2 of the current edition of NFPA 13.
- Minimum distance between residential sprinklers: 8 ft. (2.4 m).

NOTE: Concealed sprinklers must be installed in neutral or negative pressure plenums only.

IMPORTANT: Always refer to Bulletin Form No. F_080415 - Best Practices for Residential Sprinkler Handling and Installation. Also refer to Form No. F_080614 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA and any other similar Authorities Having Jurisdiction, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable. Final approval and acceptance of all residential sprinkler installations must be obtained from the Authorities Having Jurisdiction.



TECHNICAL DATA

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All custom color painted cover plates will have an identifying label affixed to the inside of the cover that indicates the custom color and will have a representative sample (a paint dot) of the paint on the label.

Figure 2: Identification of Custom Paint

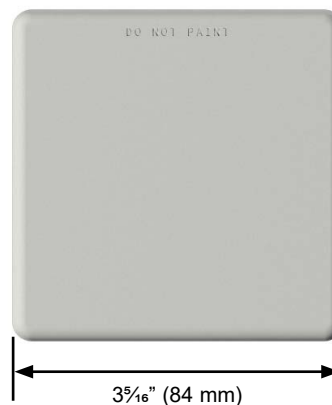
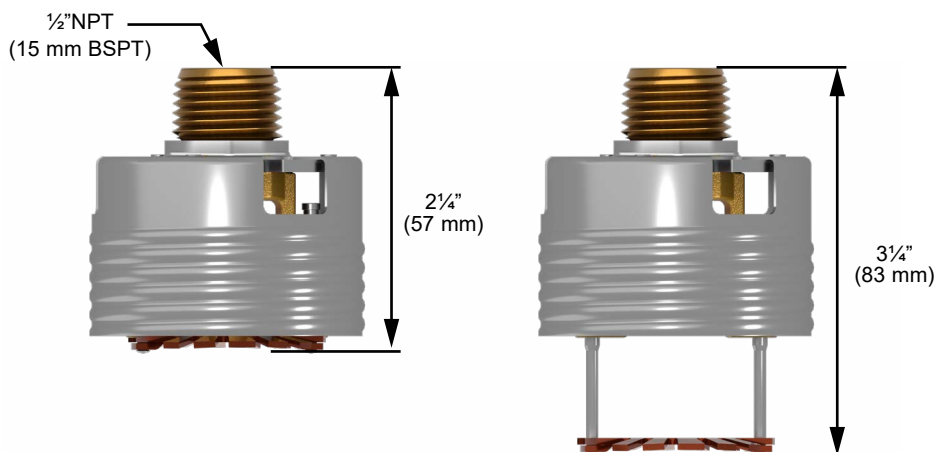


Figure 3: Square Cover Assembly



NOTE: Image is representative only. Actual product may vary.

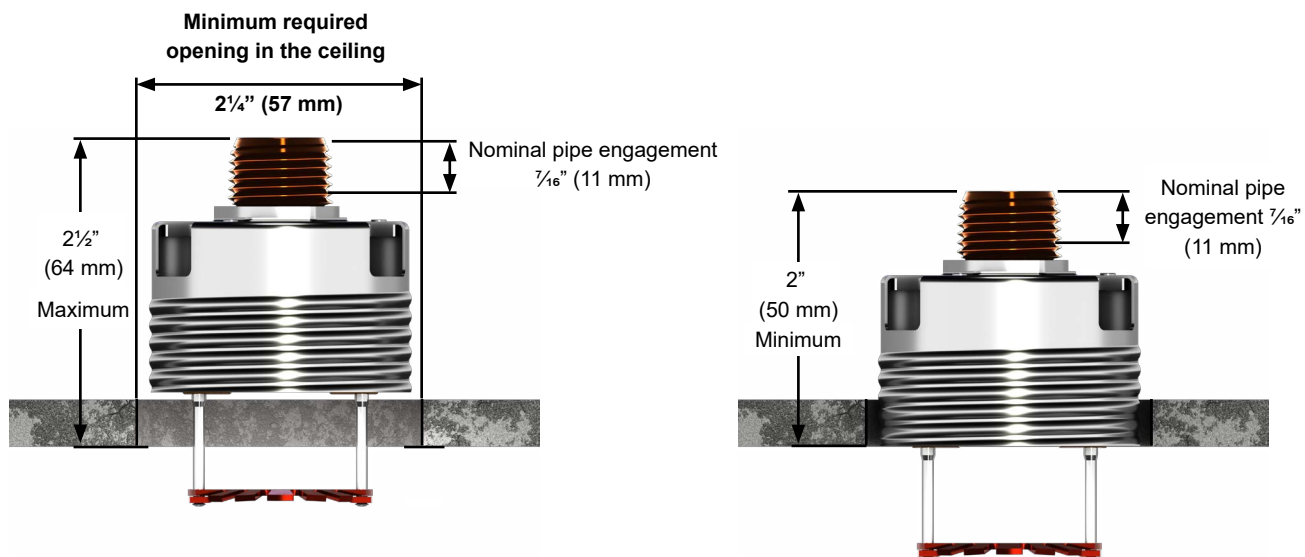
Figure 4: Sprinkler Dimensions



TECHNICAL DATA

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NOTE: Image is representative only. Actual product may vary.

Figure 5: Sprinkler Installation Dimensions



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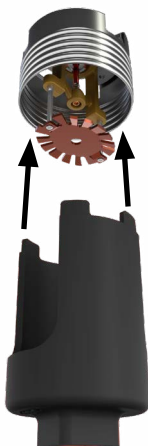


NOTICE: USE ONLY the designated sprinkler wrenches shown in this document. Permanent damage to the sprinkler assembly can occur if the proper wrench is not used. Other sprinkler wrenches available from Viking may fit into the sprinkler adapter cup; however, only the wrenches shown here are designed to properly install this sprinkler.

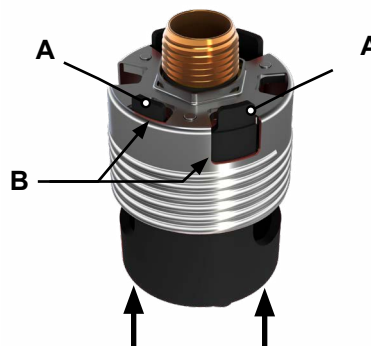
Step 1:
Remove the protective cap.



Step 2:
Insert the wrench into the sprinkler adapter.



Step 3:
Rotate the wrench slightly in either direction until the tines on the wrench (A) line up with the vent openings (B) on the adapter cup and lock into place. NOTE: A leak tight seal must be achieved. Turn the sprinkler clockwise 1 to 1½ turns past finger-tight.



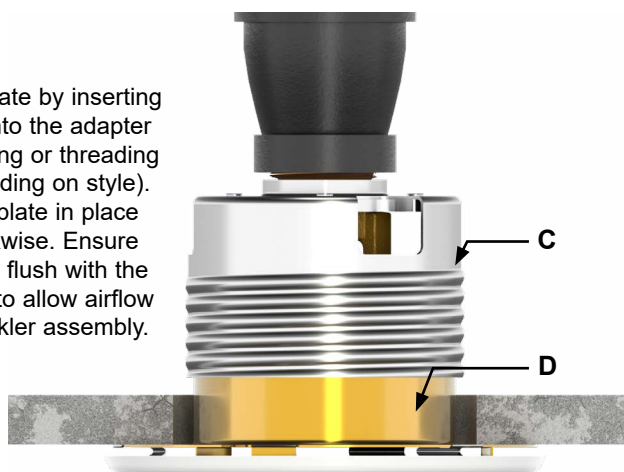
NOTE: Image is representative only. Actual product may vary.

Figure 6: Using the Sprinkler Wrench



Minimum

Install the cover plate by inserting the adapter (D) into the adapter cup (C) and pushing or threading into place (depending on style). Snug the cover plate in place by rotating clockwise. Ensure the cover plate is flush with the ceiling as shown to allow airflow through the sprinkler assembly.



Maximum

NOTE: Image is representative only. Actual product may vary.

Figure 7: Installing the Cover Plate



Viking Residential Sprinkler Installation Guide

October 25, 2018



WARNING: Cancer and Reproductive Harm-
www.P65Warnings.ca.gov

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TECHNICAL DATA

FREEDOM® RESIDENTIAL SPRINKLER INSTALLATION GUIDE

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1. DESCRIPTION

Viking residential automatic sprinklers are equipped with a "fast response" heat-sensitive operating element designed to respond individually and quickly to a specific high temperature. Viking residential sprinklers are designed to combine speed of operation with water distribution characteristics to help in the control of residential fires and to improve life safety by prolonging the time available for occupants to escape or be evacuated.

2. LISTINGS AND APPROVALS

Refer to the Approval Charts on the appropriate sprinkler technical data page(s) and/or approval agency listings.

- A. Viking residential sprinklers are intended for use in the following occupancies: one- and two-family dwellings and mobile homes with the fire protection sprinkler system installed in accordance with NFPA 13D; residential occupancies up to four stories in height with the fire protection system installed in accordance with NFPA 13R; or residential portions of any occupancy with the fire protection system installed in accordance with NFPA 13. Information contained in this guide is based on NFPA 13, "Standard for the Installation of Sprinkler Systems".
- B. The design criteria for residential sprinklers contained in the NFPA installation standards must be followed except as modified by the individual UL 1626 listing information provided in the technical data pages and this Residential Sprinkler Installation Guide. For listed areas of coverage, technical data, and specific design and installation instructions, refer to the appropriate Viking technical data page for the sprinkler model used.
- C. Viking residential sprinklers listed by Underwriters Laboratories, Inc. (UL) have passed fire tests designed to represent fire conditions for the sprinkler's listed area of coverage. The standards for residential sprinkler performance and spray patterns are printed in Underwriters Laboratories Publication UL 1626, "Standard for Residential Sprinklers for Fire Protection Service". All listed Viking residential sprinklers meet or exceed UL 1626 performance requirements and spray pattern criteria for their listed areas of coverage.
- D. NFPA standards allow use of residential sprinklers with rates, design areas, areas of coverage, and minimum design pressures other than those specified in the standards when they have been listed for such specific residential installation conditions.

3. TECHNICAL DATA

Specifications:

Refer to the appropriate sprinkler technical data sheet.

Material Standards:

Refer to the appropriate sprinkler technical data sheet.

Viking Technical Data may be found on
The Viking Corporation's Web site at
<http://www.vikinggroupinc.com>.
The Web site may include a more recent
edition of this Technical Data Page.

4. INSTALLATION

NOTE: Take care not to over-tighten the sprinkler and/or damage its operating parts!

Maximum Torque: 1/2" NPT: 14 ft-lbs. (19.0 N-m) 3/4" NPT: 20 ft-lbs. (27.1 N-m)

A. Care and Handling (also refer to Bulletin - Care and Handling of Sprinklers, Form No. F_091699.)

Sprinklers must be handled with care and protected from mechanical damage during storage, transport, handling, and after installation.

Store sprinklers in a cool, dry place in their original container.

Use care when locating sprinklers near fixtures that can generate heat.

Never install sprinklers that have been dropped, damaged in any way, or exposed to temperatures exceeding the maximum ambient temperature allowed (refer to Table 1.)

Never install any glass-bulb sprinkler if the bulb is cracked or if there is a loss of liquid from the bulb. A small air bubble should be present in the glass bulb. Any sprinkler with a loss of liquid from the glass bulb or damage to the fusible element should be destroyed immediately. (Note: Installing glass bulb sprinklers in direct sunlight (ultraviolet light) may affect the color of the dye used to color code the bulb. This color change does not affect the integrity of the bulb.)

Viking residential sprinklers are intended for use on wet pipe residential systems only. Adequate heat must be provided for wet-pipe systems. DO NOT use Viking residential sprinklers on dry systems unless specifically allowed by recognized installation standards or the Authority Having Jurisdiction.

Residential concealed sprinklers must be installed in neutral or negative pressure plenums only!

Corrosion-resistant sprinklers must be installed when subject to corrosive atmospheres. **NOTE:** Viking residential sprinklers are not intended for use in corrosive environments.



TECHNICAL DATA

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TABLE 1: RESIDENTIAL SPRINKLER TEMPERATURE RATINGS

Sprinkler Temperature Classification	Sprinkler Nominal Temperature Rating ¹	Maximum Ambient Ceiling Temperature ³	Bulb Color
Residential Glass Bulb Style Sprinklers			
Ordinary	155 °F (68 °C)	100 °F (38 °C)	Red
Intermediate	175 °F (79 °C)	150 °F (65 °C)	Yellow
Sprinkler Temperature Classification	Sprinkler Nominal Temperature Rating (Fusing Point) ¹	Maximum Ambient Ceiling Temperature ³	
Residential Fusible Element Style Sprinklers			
Ordinary	165 °F (74 °C)	100 °F (38 °C)	
Sprinkler Temperature Classification	Sprinkler Nominal Temperature Rating (Fusing Point)	Maximum Ambient Ceiling Temperature ³	Temperature Identification Stamp
Residential Flush Style Sprinklers			
Ordinary	165 °F (74 °C)	100 °F (38 °C)	On Cover or Sprinkler Inlet (VK476)
Intermediate	220 °F (104 °C)	150 °F (65 °C)	On Cover
Sprinkler Temperature Classification	Sprinkler Nominal Temperature Rating (Fusing Point)	Maximum Ambient Ceiling Temperature ³	Cover Plate Temperature Rating
Residential Concealed Style Sprinklers			
Ordinary	135 °F (57 °C) ¹ , 140 °F (60 °C) ² , 155 °F (68 °C) ¹ , or 165 °F (74 °C) ¹	100 °F (38 °C)	135 °F (57 °C)
Footnotes			
¹ The sprinkler temperature rating is stamped on the deflector or flow shaper.			
² The temperature rating is stamped on the sprinkler.			
³ Based on NFPA-13. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.			

B. Installation Instructions

Viking sprinklers are manufactured and tested to meet the rigid requirements of approving agencies. They are designed to be installed in accordance with recognized installation standards NFPA 13, NFPA 13R, and NFPA 13D, and any associated TIAs.

Deviation from the standards or any alteration to the sprinklers or cover plate assemblies after they leave the factory including, but not limited to: painting, plating, coating, or modification, may render the sprinklers inoperative and will automatically nullify the approval and any guarantee made by Viking.

The use of residential sprinklers may be limited due to occupancy and hazard. Residential fire protection systems must be designed and installed only by those who are completely familiar with the appropriate standards and codes, and thoroughly experienced in fire protection design, hydraulic calculations, and sprinkler system installation.

Before installation, be sure to have the appropriate sprinkler model and style, with the correct K-Factor, temperature rating, and response characteristics. Viking residential sprinklers must be installed after the piping is in place to prevent mechanical damage. Keep sprinklers with protective caps or bulb shields contained within the caps or shields during installation and testing, and any time the sprinkler is shipped or handled.

1a. For frame-style sprinklers, install escutcheon (if used), which is designed to thread onto the external threads of the sprinkler*.

*Refer to the appropriate sprinkler technical data page to determine approved escutcheons for use with specific sprinkler models.

1b. For flush and concealed style sprinklers: Cut the sprinkler nipple so that the ½" or ¾" (15 mm or 20 mm) NPT** outlet of the reducing coupling is at the desired location and centered in the opening** in the ceiling or wall.

**Size depends on the sprinkler model used. Refer to appropriate sprinkler data page.



TECHNICAL DATA

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DESIGN CRITERIA

For Systems Designed to NFPA 13D or NFPA 13R: Apply the listed areas of coverage and minimum water supply requirements shown in the approval charts on the residential sprinkler data pages. The sprinkler flow rate is the minimum required discharge from each of the total number of design sprinklers as specified in NFPA 13D or NFPA 13R.

For Systems Designed to the latest edition of NFPA 13: The number of design sprinklers is to be the four most hydraulically demanding sprinklers. The minimum required discharge from each of the four sprinklers is to be the greater of the following:

- The flow rates given in the approval charts on the data pages for NFPA 13D and NFPA13R for each area of coverage listed, or
- Calculated based on a minimum discharge of 0.1 gpm/sq. ft. over the “design area” in accordance with sections 8.5.2.1 or 8.6.2.1.2 of NFPA 13. The greatest dimension of the coverage area cannot be any greater than the maximum areas of coverage shown on the data pages.

Flow Rates

All residential sprinklers manufactured on or after July 12, 2002 are listed with a single minimum flow rate. Where rooms have more than one sprinkler, multiple-sprinkler calculations are still required, but the first sprinkler and any additional sprinkler or sprinklers must be calculated flowing at identical minimum flow rates, based on the area of sprinkler coverage, using the minimum flow and pressure listed for the sprinkler model used.

Consult the appropriate standards and the Authorities Having Jurisdiction to determine the number of sprinklers to hydraulically calculate to verify adequate water supply for multiple-sprinkler operation.

Operating Pressure: The minimum operating pressure of any sprinkler shall be the minimum operating pressure specified by the listing, or 7 psi (0.5 bar), whichever is greater. The maximum allowable operating pressure is 175 psi (12 bar).

Areas of Coverage

If the actual area of coverage is less than the listed area of coverage, use the minimum water supply for the next larger area of coverage listed. DO NOT interpolate. Residential sprinkler systems must be hydraulically calculated according to NFPA standards to verify that the water supply is adequate for proper operation of the sprinklers. Hydraulic calculations are required to verify adequate water supply at the hydraulically most remote single sprinkler when it is operating at the minimum gpm and psi listed for single-sprinkler operation for the sprinkler model used.

Viking residential sprinklers may be listed for more than one area of coverage. Suggested practice in selecting area of coverage is to select the one that can be adequately supplied by the available water supply and still allow for the installation of as few sprinklers in a compartment as possible while observing all guidelines pertaining to obstructions and spacing. This maximizes the use of the available water supply, which is often limited on residential fire protection systems. After selecting an appropriate area of coverage, sprinklers must be spaced according to guidelines set forth in the installation standards.

Definition of “COMPARTMENT”: A space completely enclosed by walls and a ceiling. Openings to an adjoining space are allowed, provided the openings have a minimum lintel depth of 8 in. (203.2 mm) from the ceiling.

Spacing Guidelines

For guidelines concerning spacing of Viking residential sprinklers near beams, obstructions, heat sources, and sloped ceilings [slopes more than a 2/12 (9.5°) pitch], refer to the Viking residential sprinkler data pages and installation guide, the appropriate NFPA standard, and the Authority Having Jurisdiction. NOTE: Sloped, beamed, and pitched ceilings could require special design features such as larger flow, or a design for more sprinklers to operate in the compartment, or both.

Distance from Walls: Install not more than one-half the listed sprinkler spacing nor less than 4” (102 mm) from walls, partitions, or obstructions as defined in the standards.

Minimum Sprinkler Spacing: The minimum distance between residential sprinklers to prevent cold soldering (i.e., the spray from one operating sprinkler onto an adjacent sprinkler that could prevent its proper activation) is 8 ft. (2.4 m).

Maximum Sprinkler Spacing: Locate adjacent sprinklers no farther apart than the listed spacing.

Deflector Position: Install frame style residential *pendent* sprinklers with the deflector between 1” and 4” (25.4 mm to 102 mm) below smooth ceilings, unless the sprinkler data page indicates otherwise. Install pendent sprinklers in the pendent position only, with the deflector oriented parallel with the ceiling or roof.

Refer to the individual listings in the residential sprinkler data pages for horizontal sidewall sprinkler deflector or sprinkler centerline distance below the ceiling. Install horizontal sidewall sprinklers in the horizontal position only below smooth ceilings, with the leading edge of the deflector or element assembly oriented parallel with the ceiling.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to the appropriate sprinkler data page. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA and any other similar Authorities Having Jurisdiction, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable. Final approval and acceptance of all residential sprinkler installations must be obtained from the Authorities Having Jurisdiction.



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2. Apply a small amount of pipe-joint compound or tape to the external threads of the sprinkler only, taking care not to allow a build-up of compound in the sprinkler inlet. **NOTE:** Sprinklers with protective caps or bulb shields must be contained within the caps or shields before applying pipe-joint compound or tape. *Exception: For concealed sprinklers (i.e., VK457, VK458, VK468, VK474, and VK4570) the protective cap is removed for installation.*
3. Care must be taken when installing sprinklers on CPVC and copper piping systems. Never install the sprinkler into the reducing fitting before attaching the reducing fitting to the piping. Sprinklers must be installed on CPVC systems after the reducing fitting has been installed and the primer and/or cement manufacturer's recommended curing time has elapsed. When installing sprinklers on copper piping systems, take care to brush the inside of the sprinkler supply piping and reducing fitting to ensure that no flux accumulates in the sprinkler orifice. Excess flux can cause corrosion and may impair the ability of the sprinkler to operate properly.
4. Refer to the appropriate sprinkler technical data page to determine the correct sprinkler wrench for the model of sprinkler used. DO NOT use the sprinkler deflector or fusible element to start or thread the sprinkler into a fitting.
 - a. Install the sprinkler onto the piping using the special sprinkler wrench only, while taking care not to over-tighten or damage the sprinkler operating parts.
 - b. Thread the flush or concealed sprinkler into the 1/2" or 3/4" (15 mm or 20 mm) NPT** outlet of the coupling by turning it clockwise with the special sprinkler wrench. *NOTE: For flush and concealed sprinklers with protective shells, the internal diameter of the special flush and concealed sprinkler installation wrench is designed for use with the sprinkler contained within the shell. Exception: For concealed sprinklers VK457, VK458, VK468, VK474, and VK4570 the protective cap is removed for installation, and then placed back on the sprinkler temporarily.*
5. After installation, the entire sprinkler system must be tested. The test must be conducted to comply with the installation standards.
 - a. Make sure the sprinkler has been properly tightened. If a thread leak occurs, normally the unit must be removed, new pipe-joint compound or tape applied, and then reinstalled. This is due to the fact that when the joint seal leaks, the sealing compound is washed out of the joint.
 - b. **Remove plastic protective sprinkler caps or bulb shields AFTER the wall or ceiling finish work is completed where the sprinkler is installed and there no longer is a potential for mechanical damage to the sprinkler operating elements.** To remove the bulb shields, simply pull the ends of the shields apart where they are snapped together. To remove caps from frame style sprinklers, turn the caps slightly and pull them off the sprinklers. **SPRINKLER CAPS OR BULB SHIELDS MUST BE REMOVED FROM SPRINKLERS BEFORE PLACING THE SYSTEM IN SERVICE!** Retain a protective cap or shield in the spare sprinkler cabinet.
6. For residential flush sprinklers, the ceiling ring can now be installed onto the sprinkler body. Align the ceiling ring with the sprinkler body and thread on or push it on until the flange touches the ceiling. Note the maximum vertical adjustment is 1/2" (12,7 mm) for sprinkler VK420 and 5/8" for VK476. DO NOT MODIFY THE UNIT. If necessary, re-cut the sprinkler drop nipples as required.
7. For residential concealed sprinklers, the cover plate assembly can now be attached.
 - a. Remove the cover plate assembly from the protective box, taking care not to damage the assembly.
 - b. From below the ceiling, gently place the base of the cover plate assembly over the sprinkler protruding through the opening in the ceiling or wall.
 - c. Carefully push the cover plate assembly onto the sprinkler, using even pressure with the palm of the hand, until the unfinished brass flange of the cover plate base touches the ceiling or wall.
 - d. The maximum adjustment available for residential concealed sprinklers is 1/2" (12.7 mm) [1/4" (6.4 mm) for sprinkler VK480]. DO NOT MODIFY THE UNIT. If necessary, re-cut the sprinkler nipples.

NOTE: If it is necessary to remove the entire sprinkler unit, the system must be taken out of service. See Maintenance instructions below and follow all warnings and instructions.

5. OPERATION

During fire conditions, the operating element fuses or shatters (depending on the type of sprinkler), releasing the pip cap and sealing assembly. Water flowing through the sprinkler orifice strikes the sprinkler deflector or flow shaper, forming a uniform, high-wall wetting spray pattern to extinguish or control the fire.



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6. INSPECTIONS, TESTS AND MAINTENANCE

Refer to NFPA 25 for Inspection, Testing and Maintenance requirements. **NOTICE:** The owner is responsible for having the fire-protection system and devices inspected, tested, and maintained in proper operating condition in accordance with this guide, and applicable NFPA standards. In addition, the Authority Having Jurisdiction may have additional maintenance, testing, and inspection requirements that must be followed.

- A. Sprinklers must be inspected on a regular basis for signs of corrosion, mechanical damage, obstructions, paint, etc. Frequency of the inspections may vary due to corrosive atmospheres, water supplies, and activity around the device.
- B. Sprinklers or cover plate assemblies that have been field painted, caulked, or mechanically damaged must be replaced immediately. Sprinklers showing signs of corrosion shall be tested and/or replaced immediately as required. Installation standards require sprinklers to be tested and, if necessary, replaced immediately after a specified term of service. Refer to NFPA 25 and the Authorities Having Jurisdiction for the specified period of time after which testing and/or replacement of residential sprinklers is required. Never attempt to repair or reassemble a sprinkler. Sprinklers and cover assemblies that have operated cannot be reassembled or re-used, but must be replaced. When replacement is necessary, use only new sprinklers and cover assemblies with identical performance characteristics.
- C. The sprinkler discharge pattern is critical for proper fire protection. Nothing should be hung from, attached to, or otherwise obstruct the discharge pattern of the sprinkler. All obstructions must be immediately removed or, if necessary, additional sprinklers installed.
- D. When replacing existing sprinklers, the system must be removed from service. Refer to the appropriate system description and/or valve instructions. Prior to removing the system from service, notify all Authorities Having Jurisdiction. Consideration should be given to employment of a fire patrol in the effected area.
 1. Remove the system from service, drain all water, and relieve all pressure on the piping.
 - 2a. For frame-style sprinklers, use the special sprinkler wrench and remove the old sprinkler by turning it counterclockwise to unthread it from the piping.
 - 2b. *For residential flush pendent and concealed style sprinklers: Remove the ceiling ring or cover plate assembly before unthreading the sprinkler body from the piping. To remove a ceiling ring, grasp it from below the ceiling and gently turn it counterclockwise. Cover plates can be removed either by gently unthreading them or pulling them off the sprinkler body (depends on the sprinkler model used). After the ceiling ring or cover plate assembly has been removed from the sprinkler, use the sprinkler wrench to unthread the sprinkler from the piping. NOTE: For flush and concealed sprinklers with protective shells, the internal diameter of the special flush and concealed sprinkler installation wrench is designed for use with the sprinkler contained within the shell. Place a plastic protective shell (from the spare sprinkler cabinet) over the sprinkler to be removed and then fit the sprinkler wrench over the shell. Exception: Concealed sprinklers VK457, VK458, VK468, VK474, and VK4570 are removed without the plastic cap.*
 3. Follow instructions in section 4B. Installation Instructions to install the new unit. Be sure the replacement sprinkler is the correct model and style, with the appropriate K-Factor, temperature rating, and response characteristics. A fully stocked sprinkler cabinet should be provided for this purpose. *(For flush or concealed style sprinklers, stock of spare ceiling rings or cover plates should also be available in the spare sprinkler cabinet.)*
 4. Place the system back in service and secure all valves. Check for and repair all leaks.
- E. Sprinkler systems that have been subjected to a fire must be returned to service as soon as possible. The entire system must be inspected for damage, and repaired or replaced as necessary. Sprinklers that have been exposed to corrosive products of combustion or high ambient temperatures, but have not operated, should be replaced. Refer to the Authority Having Jurisdiction for minimum replacement requirements.

7. AVAILABILITY

Viking Residential Sprinklers are available through a network of domestic and international distributors. See The Viking Corporation web site for the closest distributor or contact The Viking Corporation.

8. GUARANTEE

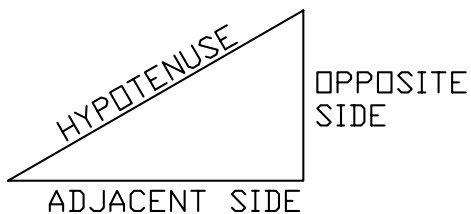
For details of warranty, refer to Viking's current list price schedule or contact Viking directly.



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TANGENT =
 OPPOSITE SIDE (RISE)
 ADJACENT SIDE (RUN)

$$\frac{\text{RISE}}{\text{RUN}} = \text{TANGENT}$$

$$\text{ANGLE} = \tan^{-1} \left(\frac{\text{RISE}}{\text{RUN}} \right)$$

$$\text{SLOPE DISTANCE} = \sqrt{(\text{RISE})^2 + (\text{RUN})^2}$$

RISE	RUN	TANGENT	ANGLE	SLOPE DISTANCE
2	12	.1666	9.45°	12.1
3	12	.2500	14°	12.3
4	12	.3333	18.4°	12.6
5	12	.4166	22.6°	13
6	12	.5000	26.5°	13.4
7	12	.5833	30.2°	13.8
8	12	.6666	33.6°	14.4
9	12	.7500	36.8°	15
10	12	.8333	39.8°	15.6
11	12	.9166	42.5°	16.2
12	12	1	45°	16.97

Table 2
 Rise Over Run Conversion to Degrees of Slope



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SPACING OF RESIDENTIAL SPRINKLERS LISTED FOR USE BELOW SLOPED CEILINGS UP TO AN 8/12 (33.7°) PITCH (Refer to the appropriate residential sprinkler technical data page for listings.)

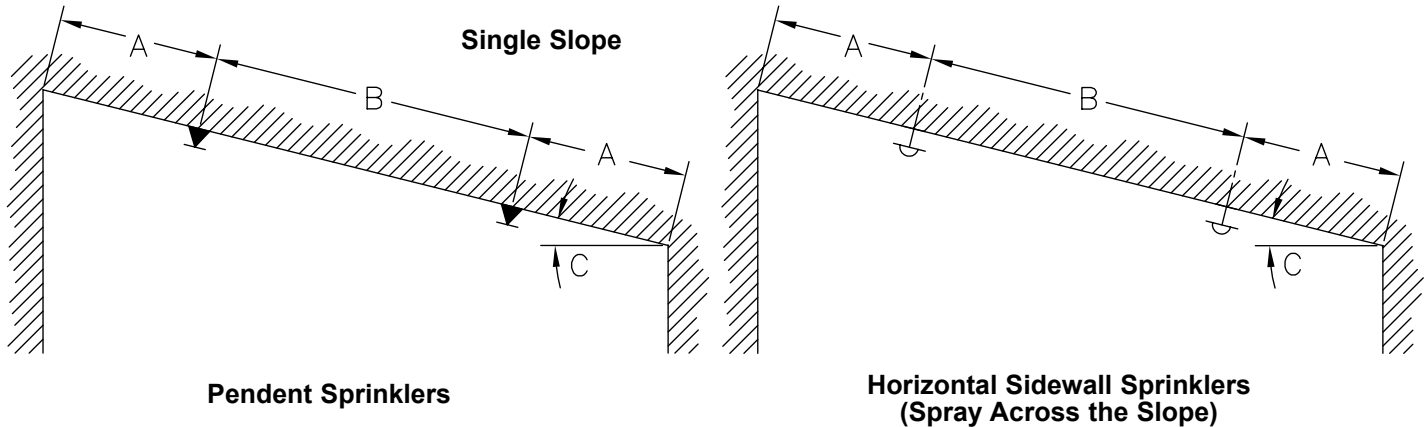


Figure 1

- (A) One-half listed spacing of sprinkler maximum, 0'-4" (0-102 mm) minimum.
- (B) Listed spacing of sprinkler, maximum, 8'-0" (2.4 m) minimum.
- (C) Where angle "C" is greater than an 8/12 (33.7°) pitch, see Figure 2 below.

SPACING OF RESIDENTIAL SPRINKLERS BELOW SLOPED CEILINGS WITH GREATER THAN 8/12 (33.7°) PITCH (NOTE: Refer to NFPA 13D or NFPA 13R, and the Authority Having Jurisdiction.)

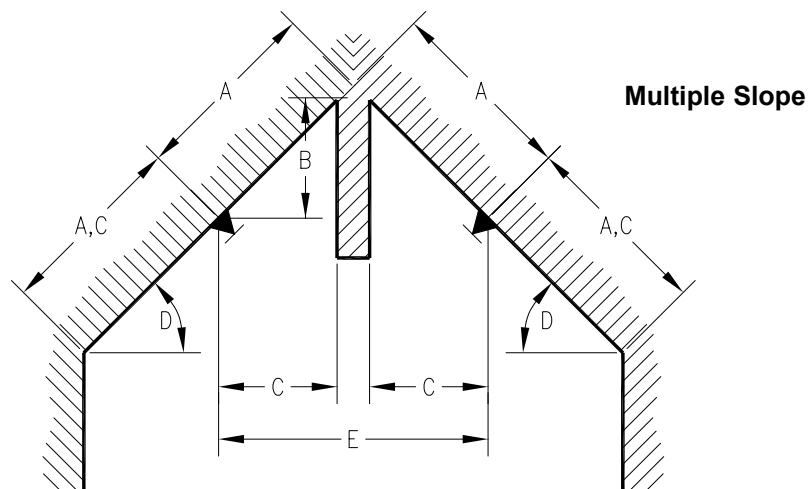


Figure 2

- (A) One-half listed spacing of sprinkler, maximum.
- (B) 3'-0" (.91 m) maximum.
- (C) 0'-4" (0-102 mm) minimum.
- (D) Slopes greater than an 8/12 (33.7°) pitch.
- (E) For distance less than 8'-0" (2.4 m), baffle required.



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SPACING OF RESIDENTIAL SPRINKLERS LISTED FOR USE BELOW SLOPED CEILINGS UP TO AN 8/12 (33.7°) PITCH (Refer to the appropriate residential sprinkler technical data page for listings.)

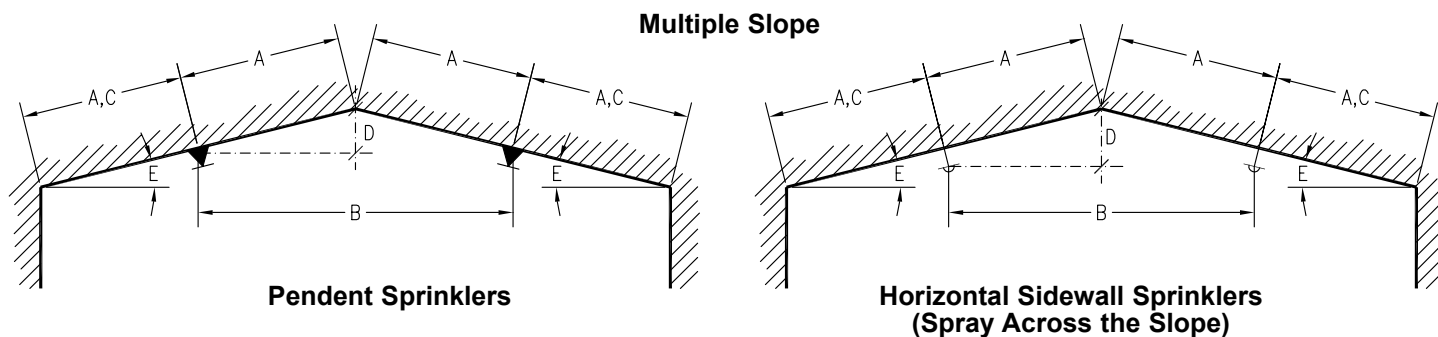


Figure 3

- (A) One-half listed spacing of sprinkler, maximum.
- (B) 8'-0" (2.4 m) minimum.
- (C) 0'-4" (0-102 mm) minimum.
- (D) 3'-0" (.91 m) maximum.
- (E) Acceptable for slopes of 0/12 to 8/12 (0° to 33.7°) pitch.

SPACING OF RESIDENTIAL PENDENT SPRINKLERS AT PEAK OF SLOPED CEILINGS WITH PITCH LESS THAN 8/12 (33.7°) (Refer to the appropriate residential sprinkler technical data page for listings.)

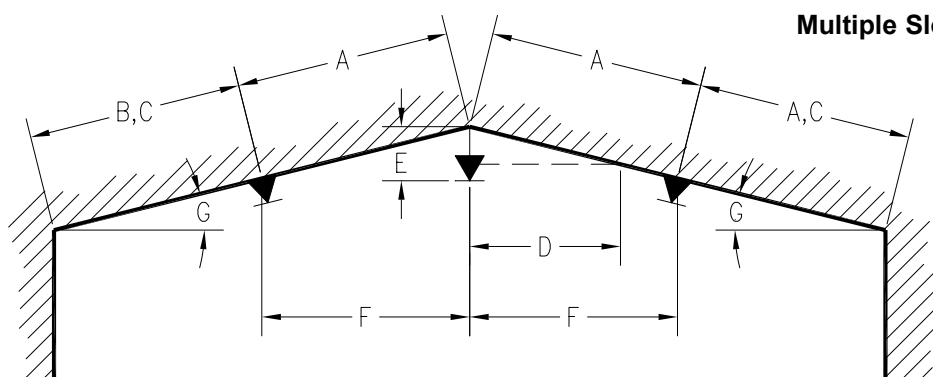


Figure 4

- (A) Listed spacing of sprinkler, maximum.
- (B) One-half listed spacing of sprinkler, maximum.
- (C) 0'-4" minimum.
- (D) Refer to page 10 for minimum distance between sprinkler and intersecting sloped ceiling.
- (E) Refer to the appropriate residential sprinkler technical data page for deflector distance below ceiling.
- (F) 8'-0" minimum.
- (G) Reference: 4/12 (18.0°) pitch maximum for 12' (3.7 m) spacing.
2.5/12 (12.0°) pitch maximum for 14' (4.3 m) spacing.
2/12 (10.0°) pitch maximum for 16' (4.9 m) spacing.
2/12 (10.0°) pitch maximum for 18' (5.5 m) spacing.
1.9/12 (9.0°) pitch maximum for 20' (6.1 m) spacing.
Angles based on sprinklers installed 0'-4" (0-102 mm) from peak.

NOTE: Whenever possible, utilize design as shown in Figure 3 above.



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SPACING OF RESIDENTIAL SPRINKLERS BELOW SLOPED CEILINGS WITH GREATER THAN 8/12 (33.7°) PITCH WITH NO BAFFLE AND A MAXIMUM OF 2 SPRINKLERS IN THE ROOM (NOTE: Refer to NFPA 13D or NFPA 13R, and the Authority Having Jurisdiction.)

Multiple Slope

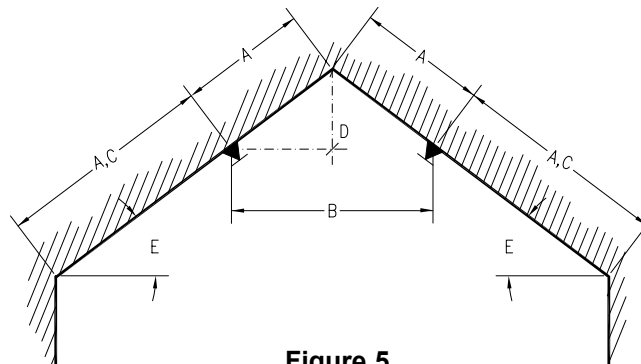


Figure 5

- (A) One-half listed spacing of sprinkler, maximum.
- (B) 8'-0" (2.4 m) minimum.
- (C) 0'-4" (0-102 mm) minimum.
- (D) 3'-0" (.91 m) maximum.
- (E) Acceptable for slopes greater than an 8/12 (33.7°) pitch.
- (F) When this design is used, refer to the appendices of NFPA 13D or NFPA 13R, and the Authority Having Jurisdiction regarding the number of design sprinklers to hydraulically calculate.

SPACING OF RESIDENTIAL SPRINKLERS BELOW CEILINGS WITH SLOPES EXCEEDING 8/12 (33.7°) PITCH WITH NO BAFFLE AND A MAXIMUM OF 3 SPRINKLERS IN THE ROOM (NOTE: Refer to NFPA 13D or NFPA 13R, and the Authority Having Jurisdiction.)

Multiple Slope

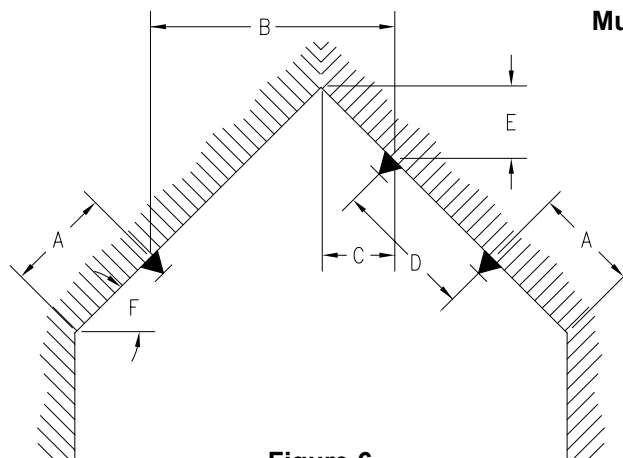


Figure 6

- (A) 0'-4" (0-102 mm) minimum, to one-half listed spacing, maximum.
- (B) One-half listed spacing, maximum, 8'-0" (2.4 m) minimum.
- (C) 0'-4" (0-102 mm) minimum.
- (D) Listed spacing maximum, 8'-0" (2.4 m) minimum.
- (E) 3'-0" (.91 m) maximum.
- (F) Slopes greater than 8/12 up to a 21/12 (33.7° up to 60°) pitch.

NOTES: In addition to the above limits, rooms requiring this type of installation must be hydraulically calculated to supply a minimum of three operating sprinklers. Layout similar for horizontal sidewall sprinklers with throw across slope. Refer to the appropriate residential sprinkler technical data sheets.



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SPACING OF RESIDENTIAL SPRINKLERS BELOW CEILINGS WITH SLOPES EXCEEDING 8/12 (33.7°) PITCH WITH NO BAFFLE AND A MAXIMUM OF 2 SPRINKLERS IN THE ROOM (NOTE: Refer to NFPA 13D or NFPA 13R, and the Authority Having Jurisdiction.)

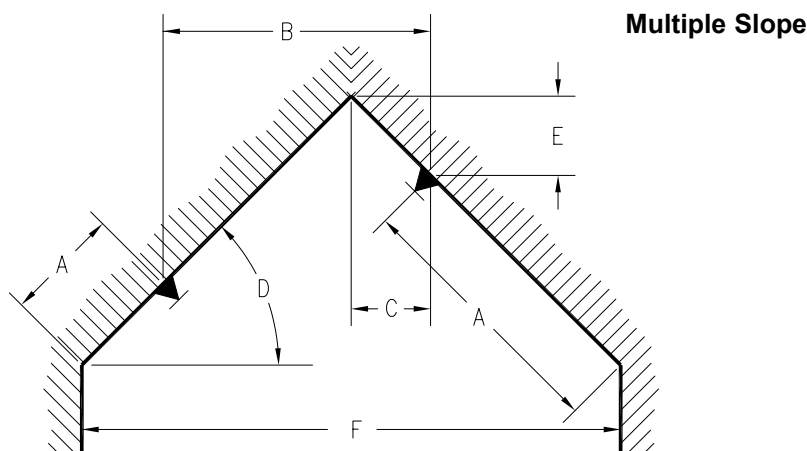


Figure 7

- (A) 0'-4" (0-102 mm) minimum, to one-half listed spacing, maximum.
- (B) One-half listed spacing, maximum, 8'-0" (2.4 m) minimum.
- (C) 0'-4" (0-102 mm) minimum.
- (D) Slopes greater than 8/12 pitch up to a 21/12 (33.7° up to a 60°) pitch.
- (E) 3'-0" (.91 m) maximum.
- (F) When dimension "F" exceeds 16' (4.9 m), utilize design configuration shown in Figure 6.

NOTES: Layout similar for horizontal sidewall sprinklers with throw across slope. Refer to the appropriate residential sprinkler technical data sheets.

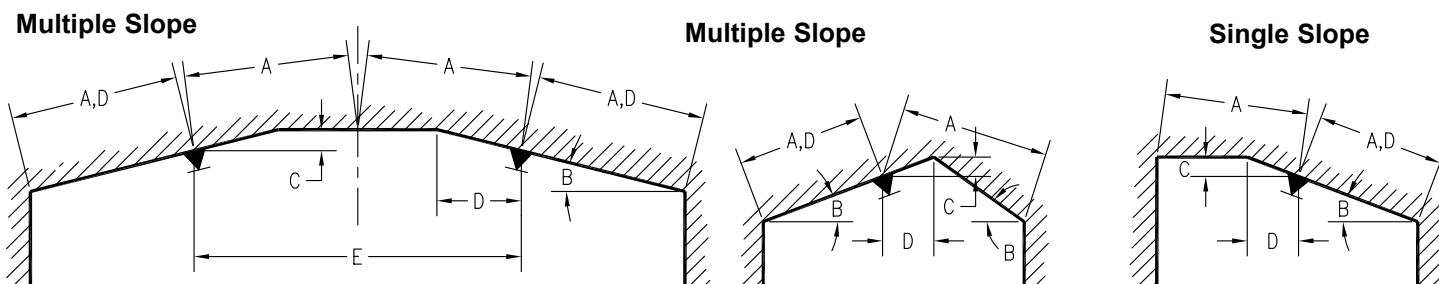


Figure 8

- (A) One-half listed spacing, maximum.
- (B) Refer to the appropriate residential sprinkler technical data pages for listings of sprinklers for use below slopes up to and including a 8/12 (33.7°) pitch.
- (C) 3'-0" (.91 m) maximum.
- (D) 0'-4" (0-102 mm) minimum.
- (E) 8'-0" (2.4 m) minimum without baffle.

NOTES: Layout similar for horizontal sidewall sprinklers with throw across slope. Refer to the appropriate residential sprinkler technical data sheets.

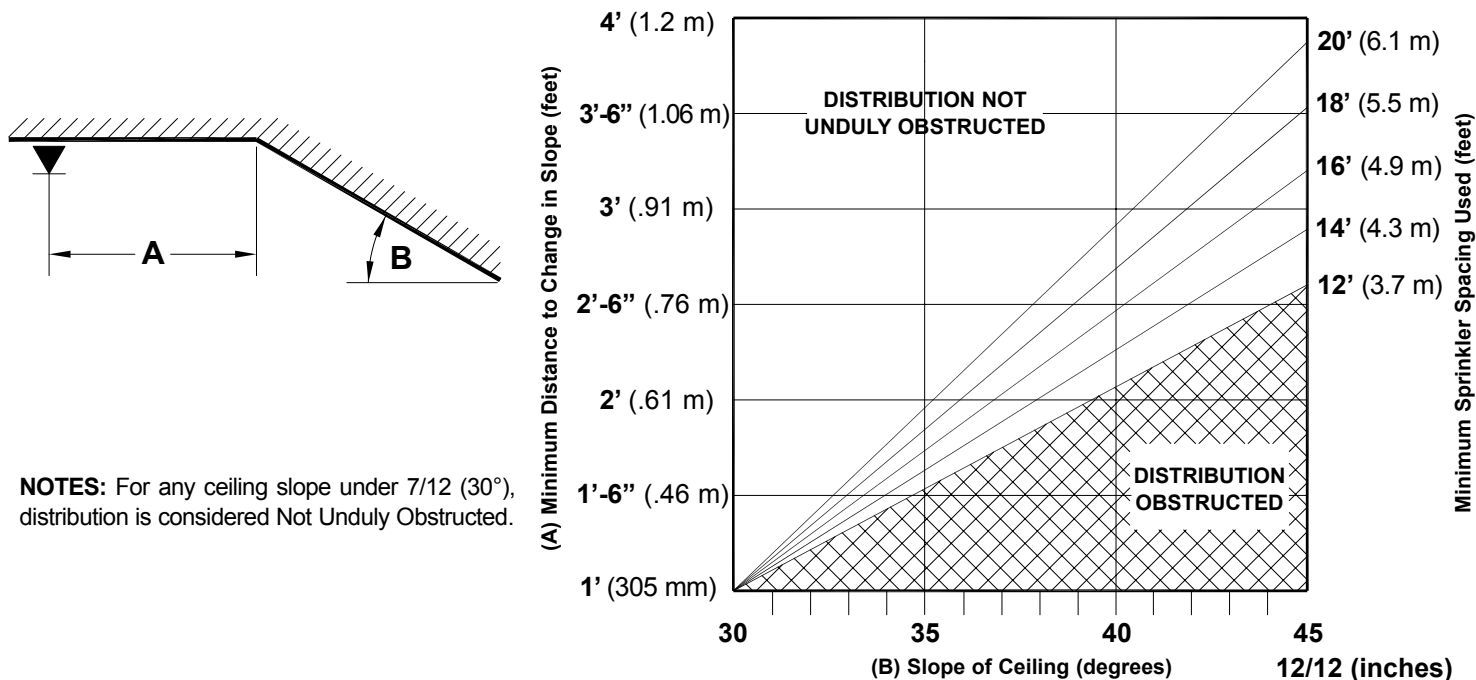


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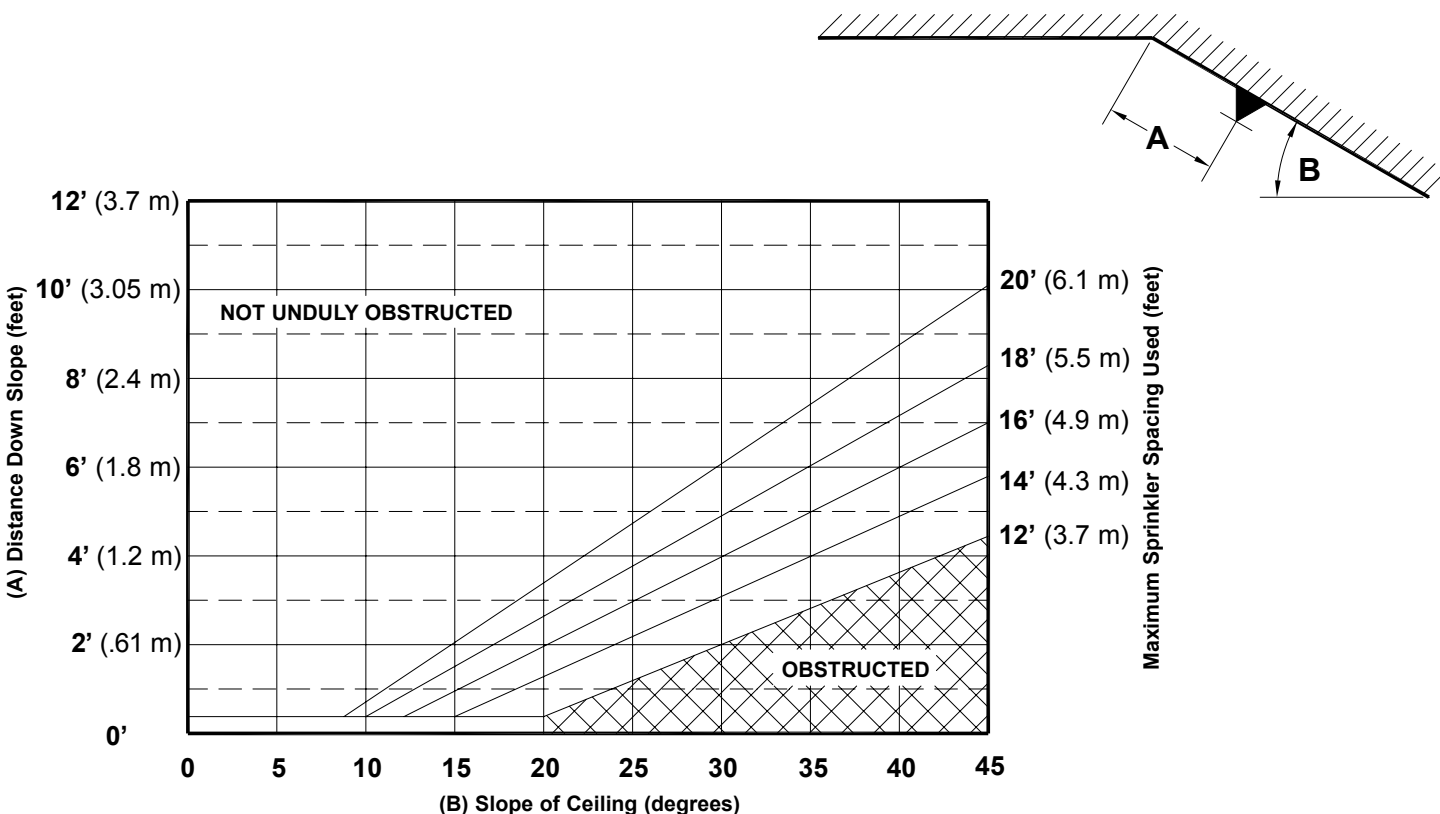
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MINIMUM DISTANCE BETWEEN SPRINKLER AND INTERSECTING SLOPED CEILINGS



MAXIMUM DISTANCE DOWN SLOPE TO AVOID OBSTRUCTION TO SPRINKLER DISCHARGE





TECHNICAL DATA

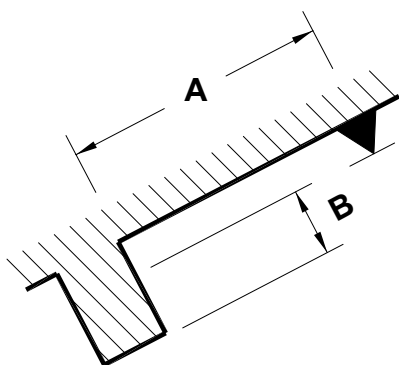
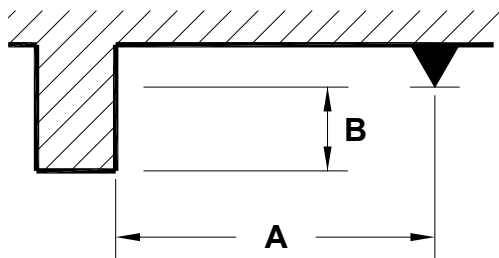
FREEDOM® RESIDENTIAL SPRINKLER INSTALLATION GUIDE

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

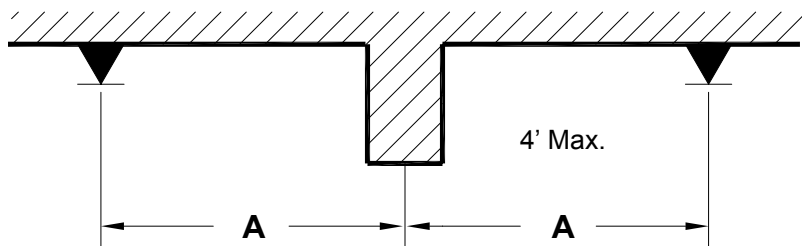
AVOIDING OBSTRUCTIONS TO SPRINKLER DISCHARGE

(Obstruction rules for residential sprinklers are found in section 8.10 of the 2010 edition of NFPA 13.)

Positioning Residential Pendent Sprinklers - Obstructions at the Ceiling

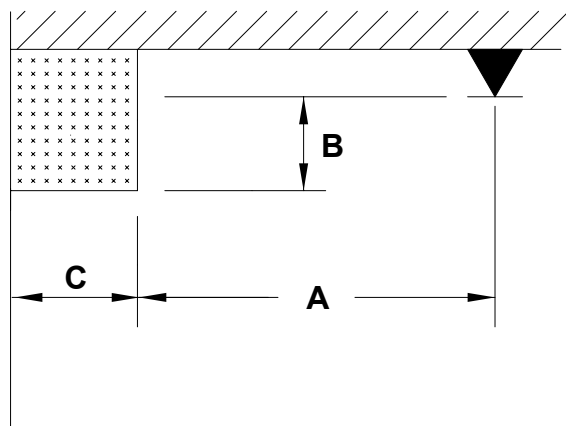


Distance from Sprinkler to Side of Ceiling Obstruction (Dimension A)	Maximum Distance from Deflector to Bottom of Ceiling Obstruction (Dimension B)	
	Inches	mm
Less than 1 ft. 6 in. (Less than 457 mm)	0	0
1 ft. 6 in. to less than 3 ft. (457 mm to less than .94 m)	1	25.4
3 ft. to less than 4 ft. (.91 m to less than 1.2 m)	3	76
4 ft. to less than 4 ft. 6 in. (1.2 m to less than 1.37 m)	5	127
4 ft. 6 in. to less than 6 ft. (1.37 m to less than 1.8 m)	7	178
6 ft. to less than 6 ft. 6 in. (1.8 m to less than 2 m)	9	229
6 ft. 6 in. to less than 7 ft. (2 m to less than 2.1 m)	11	279
7 ft. or greater (2.1 m or greater)	14	356



Residential pendent sprinklers may be located on opposite sides of continuous obstructions up to 4 ft. (1.2 m) wide at the ceiling, as long as the distance from the centerline of the obstruction to the sprinklers (A) does not exceed one-half the maximum spacing allowed between sprinklers.

Positioning Residential Pendent Sprinklers - Obstructions Along Walls



- (A) Distance from centerline of sprinkler to side of obstruction.
(B) Distance from deflector to bottom of obstruction.
(C) Width of the obstruction.

Obstructions up to 30 in. (.8 m) wide (C) located against the wall are permitted to be protected when (A) is greater than or equal to (C) minus 8 in. (.2 m) plus (B).

$$C \leq 30 \text{ in.} \quad \text{for metric } C \leq .8 \text{ m}$$

$$A \geq (C - 8 \text{ in.}) + B \quad A \geq (C - .2 \text{ m}) + B$$



TECHNICAL DATA

FREEDOM® RESIDENTIAL SPRINKLER INSTALLATION GUIDE

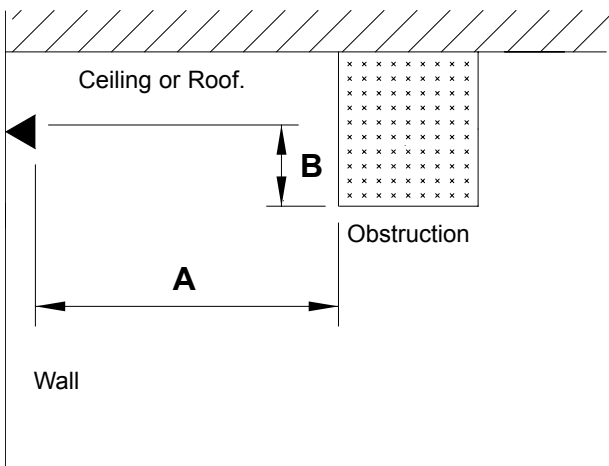
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AVOIDING OBSTRUCTIONS TO SPRINKLER DISCHARGE

(Obstruction rules for residential sprinklers are found in section 8.10 of the 2010 edition of NFPA 13.)

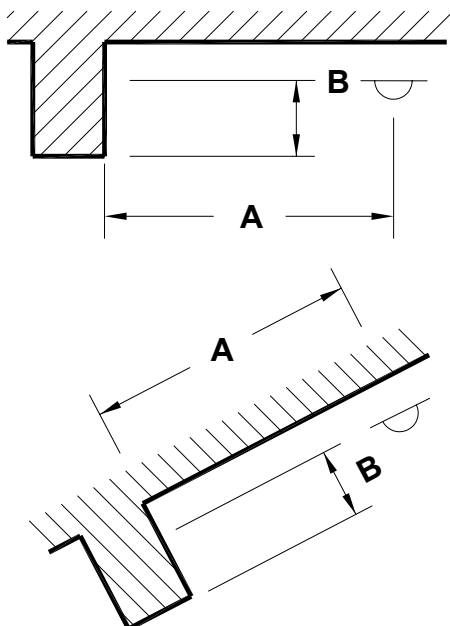
Positioning Residential Horizontal Sidewall Sprinklers - Obstructions at the Ceiling



- (A) Distance from sprinkler to side of obstruction.
(B) Distance from deflector to bottom of obstruction.

Distance from Sprinkler to Side of Ceiling Obstruction (Dimension A)	Maximum Distance from Deflector to Bottom of Ceiling Obstruction (Dimension B)	
	Inches	mm
Less than 8 ft. (Less than 2.4 m)	No Obstructions Allowed	
8 ft. to less than 10 ft. (2.4 m to less than 3.05 m)	1	25.4
10 ft. to less than 11 ft. (3.05 m to less than 3.35 m)	2	50.8
11 ft. to less than 12 ft. (3.35 m to less than 3.7 m)	3	76
12 ft. to less than 13 ft. (3.7 m to less than 4 m)	4	102
13 ft. to less than 14 ft. (4 m to less than 4.3 m)	6	152
14 ft. to less than 15 ft. (4.3 m to less than 4.6 m)	7	178
15 ft. to less than 16 ft. (4.6 m to less than 4.9 m)	9	229
16 ft. to less than 17 ft. (4.9 m to less than 5.2 m)	11	279
17 ft. or greater (5.2 m or greater)	14	356

Positioning Residential Horizontal Sidewall Sprinklers - Obstructions Along Walls



Distance from Sprinkler to Side of Obstruction Along Wall (Dimension A)	Maximum Distance from Deflector to Bottom of Obstruction (Dimension B)	
	Inches	mm
Less than 1 ft. 6 in. (Less than 457 mm)	0	0
1 ft. 6 in. to less than 3 ft. (457 mm to less than .94 m)	1	25.4
3 ft. to less than 4 ft. (.91 m to less than 1.2 m)	3	76
4 ft. to less than 4 ft. 6 in. (1.2 m to less than 1.37 m)	5	127
4 ft. 6 in. to less than 6 ft. (1.37 m to less than 1.8 m)	7	178
6 ft. to less than 6 ft. 6 in. (1.8 m to less than 2 m)	9	229
6 ft. 6 in. to less than 7 ft. (2 m to less than 2.1 m)	11	279
7 ft. or greater (2.1 m or greater)	14	356

- (A) Distance from sprinkler to side of obstruction.
(B) Distance from deflector to bottom of obstruction.



TECHNICAL DATA

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LOCATING RESIDENTIAL SPRINKLERS NEAR HEAT SOURCES

Ordinary temperature rated residential sprinklers (135 °F to 170 °F rated) are only to be installed where the maximum ambient ceiling temperature will not exceed 100 °F. Where the maximum ambient ceiling temperature will be from 101 °F to 150 °F, use intermediate temperature rated residential sprinklers (175 °F to 225 °F rated).

Residential sprinklers must be positioned a sufficient distance away from heat sources that include fireplaces, stoves, kitchen ranges, wall ovens, hot water pipes, water heaters, furnaces and associated flues and ducts, and light fixtures. The following minimum distances must be maintained for both ordinary and intermediate temperature rated residential sprinklers as indicated.

Heat Source	Minimum Distance from Edge of Source to Ordinary Temperature Rated Sprinkler		Minimum Distance from Edge of Source to Intermediate Temperature Rated Sprinkler	
	Inches	metric	Inches	metric
Side of open or recessed fireplace	36	.91 m	12	305 mm
Front of recessed fire place	60	1.5 m	36	.91 m
Coal- or wood-burning stove	42	1.1 m	12	305 mm
Kitchen range	18	457 mm	9	229 mm
Wall oven	18	457 mm	9	229 mm
Hot air flues	18	457 mm	9	229 mm
Uninsulated heat ducts	18	457 mm	9	229 mm
Uninsulated hot water pipes	12	305 mm	6	152 mm
Side of ceiling- or wall-mounted hot air diffusers	24	.61 m	12	305 mm
Front of wall-mounted hot air diffusers	36	.91 m	18	457 mm
Hot water heater or furnace	6	152 mm	3	76 mm
Light fixture less than 250W	6	152 mm	3	76 mm
Light fixture 250W to 499W	12	305 mm	6	152 mm
Where residential sprinklers will be exposed to the rays of the sun passing through glass or plastic skylights, use intermediate temperature rated sprinklers.				
When locating residential sprinklers in an unventilated concealed compartment, under an unventilated attic or uninsulated roof, where the maximum ambient temperature does not exceed 150 °F, use intermediate temperature rated sprinklers.				



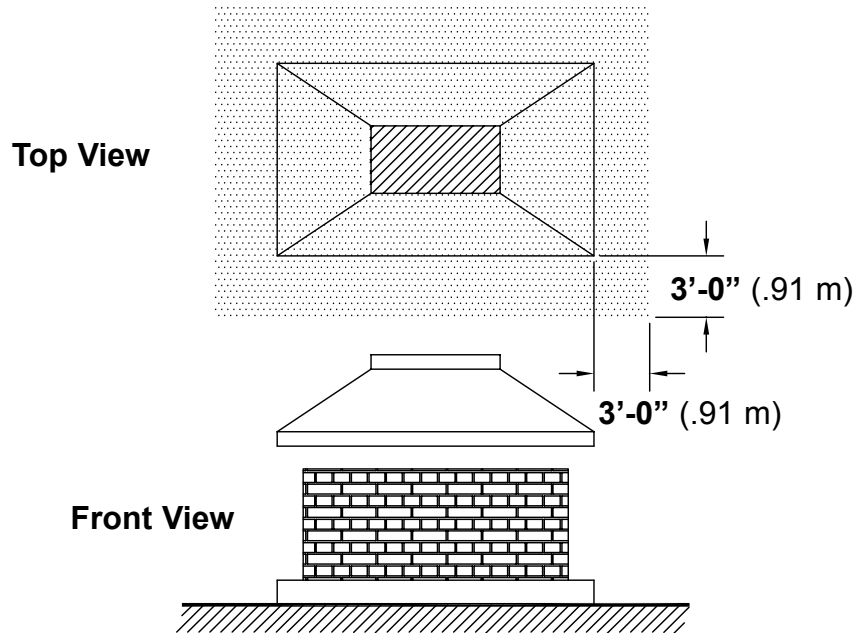
TECHNICAL DATA

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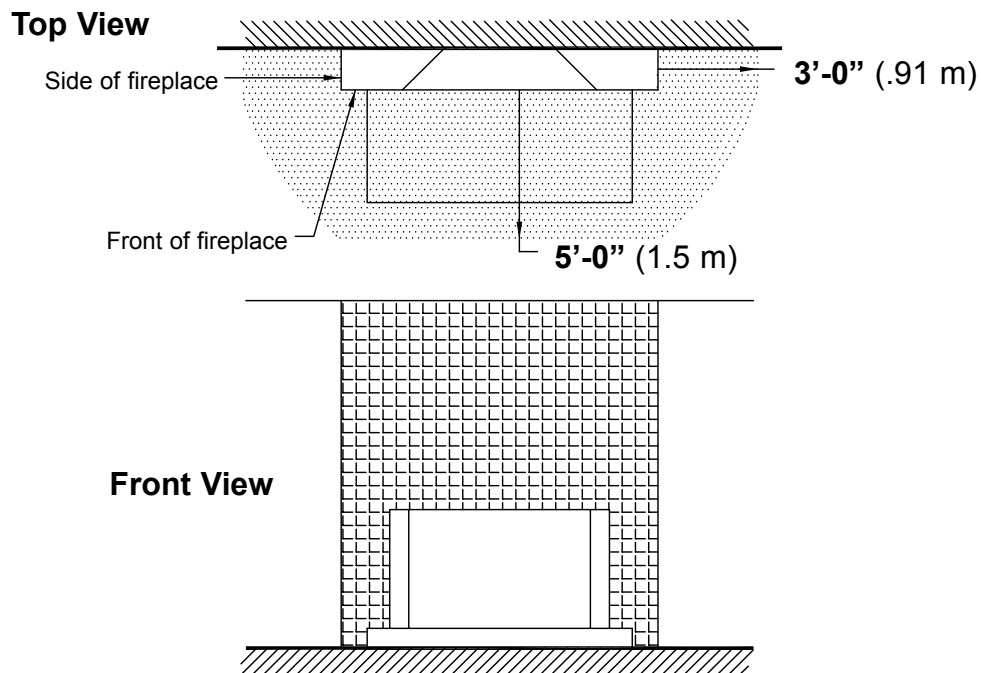
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NOTE: The dimensions shown are intended to apply to residential sprinklers installed in ceilings above fireplaces used to burn products that cause elevated temperatures at or near the ceiling in areas surrounding the fireplace. The recommendations should not be construed to apply to decorative non-opening fireplaces such as gas fire units that will not cause elevated temperatures at the ceiling.



Sprinklers near an open hearth fireplace must be located outside of the shaded area or be intermediate degree rated.



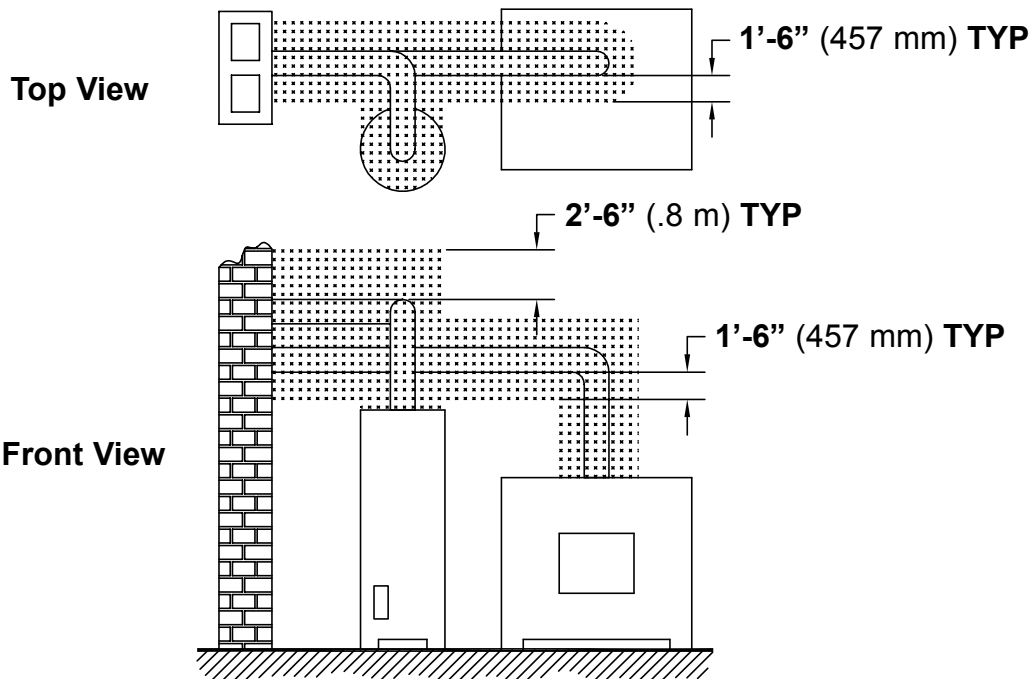
Sprinklers near a recessed hearth fireplace must be located outside of the shaded area [at least 3'-0" (.91 m)] from the side of a recessed fireplace and at least 5'-0" (1.5 m) from the front) or be intermediate degree rated.



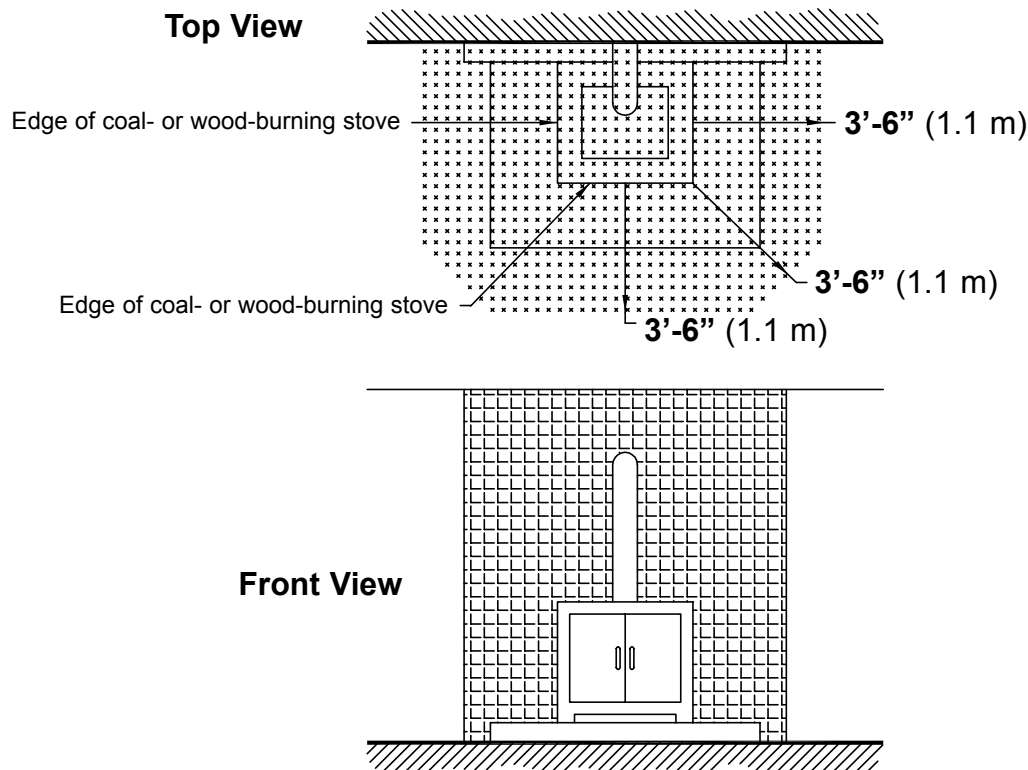
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Sprinklers near a furnace or water heater must be located outside of the shaded area or be intermediate degree rated.



Sprinklers near a coal- or wood-burning stove must be located outside of shaded area or be intermediate degree rated.

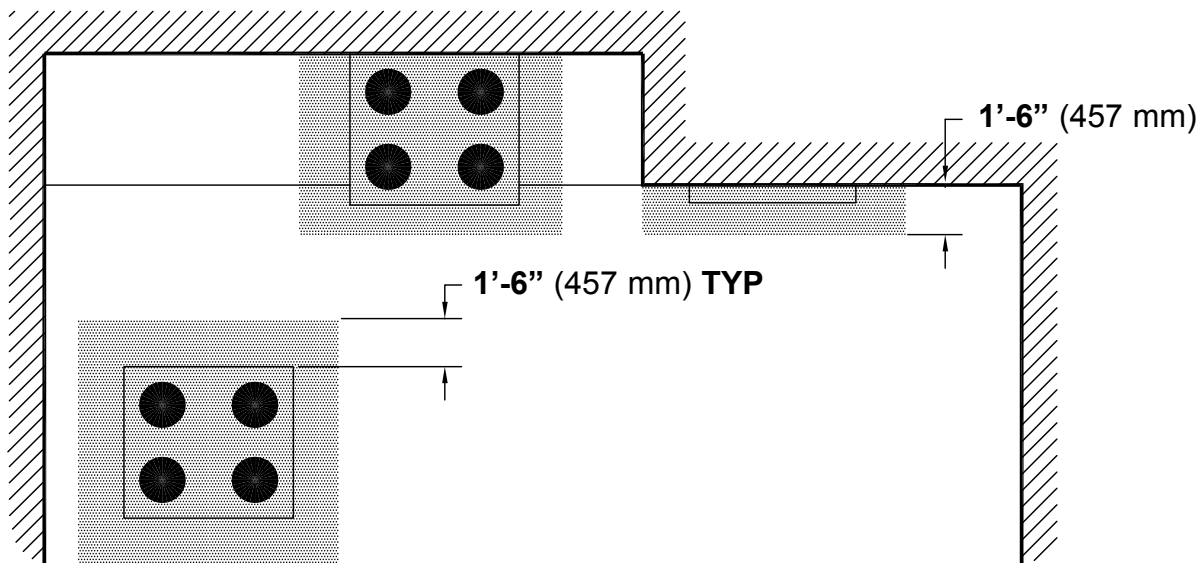


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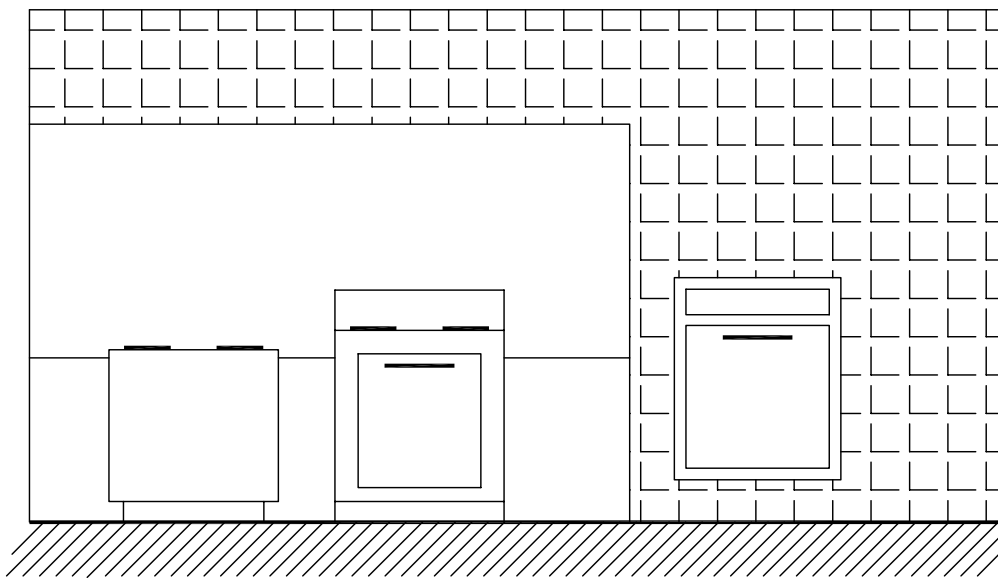
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Top View



Front View



Sprinklers near a range or wall oven must be located outside of shaded areas or be intermediate degree rated.



BULLETIN

CARE AND HANDLING
OF SPRINKLERS

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

SPRINKLERS ARE FRAGILE - HANDLE WITH CARE!

General Handling and Storage:

- Store sprinklers in a cool, dry place.
- Protect sprinklers during storage, transport, handling, and after installation.
- Use the original shipping containers. DO NOT place sprinklers loose in boxes, bins, or buckets.
- Keep sprinklers separated at all times. DO NOT allow metal parts to contact sprinkler operating elements.

For Pre-Assembled Drops:

- Protect sprinklers during handling and after installation.
- For recessed assemblies, use the protective sprinkler cap (Viking Part Number 10364).

Sprinklers with Protective Shields or Caps:

- DO NOT remove shields or caps until after sprinkler installation and there no longer is potential for mechanical damage to the sprinkler operating elements.
- **Sprinkler shields or caps MUST be removed BEFORE placing the system in service!**
- Remove the sprinkler shield by carefully pulling it apart where it is snapped together.
- Remove the cap by turning it slightly and pulling it off the sprinkler.

Sprinkler Installation:

- DO NOT use the sprinkler deflector or operating element to start or thread the sprinkler into a fitting.
- **Use only the designated sprinkler head wrench!** Refer to the current sprinkler technical data page to determine the correct wrench for the model of sprinkler used.
- DO NOT install sprinklers onto piping at the floor level.
- Install sprinklers after the piping is in place to prevent mechanical damage.
- DO NOT allow impacts such as hammer blows directly to sprinklers or to fittings, pipe, or couplings in close proximity to sprinklers. Sprinklers can be damaged from direct or indirect impacts.
- DO NOT attempt to remove drywall, paint, etc., from sprinklers.
- **Take care not to over-tighten the sprinkler and/or damage its operating parts!**

Maximum Torque:

1/2" NPT: 14 ft-lbs. (19.0 N-m)

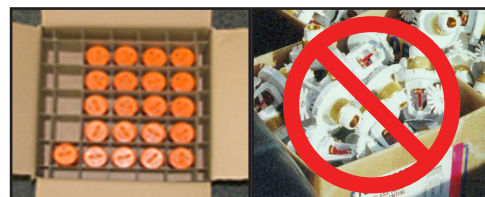
3/4" NPT: 20 ft-lbs. (27.1 N-m)

1" NPT: 30 ft-lbs. (40.7 N-m)



CORRECT
(Original container used)

INCORRECT
(Placed loose in box)



CORRECT
(Protected with caps)

INCORRECT
(Protective caps not used)



CORRECT
(Piping is in place at the ceiling)

INCORRECT
(Sprinkler at floor level)



CORRECT
(Special installation wrenches)

INCORRECT
(Designated wrench not used)



WARNING: Cancer and Reproductive Harm-
www.P65Warnings.ca.gov

! WARNING

Any sprinkler with a loss of liquid from the glass bulb or damage to the fusible element should be destroyed. Never install sprinklers that have been dropped, damaged, or exposed to temperatures exceeding the maximum ambient temperature allowed. Sprinklers that have been painted in the field must be replaced per NFPA 13. Protect sprinklers from paint and paint overspray in accordance with the installation standards. Do not clean sprinklers with soap and water, ammonia, or any other cleaning fluid. Do not use adhesives or solvents on sprinklers or their operating elements.

Refer to the appropriate technical data page and NFPA standards for complete care, handling, installation, and maintenance instructions. For additional product and system information Viking data pages and installation instructions are available on the Viking Web site at www.vikinggroupinc.com.



BULLETIN

CARE AND HANDLING
OF SPRINKLERS

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PROTECTIVE SPRINKLER SHIELDS AND CAPS

General Handling and Storage:

Many Viking sprinklers are available with a plastic protective cap or shield temporarily covering the operating elements. The snap-on shields and caps are factory installed and are intended to help protect the operating elements from mechanical damage during shipping, storage, and installation. NOTE: It is still necessary to follow the care and handling instructions on the appropriate sprinkler technical data sheets* when installing sprinklers with bulb shields or caps.

WHEN TO REMOVE THE SHIELDS AND CAPS:

NOTE: SHIELDS AND CAPS MUST BE REMOVED FROM SPRINKLERS BEFORE PLACING THE SYSTEM IN SERVICE!

Remove the shield or cap from the sprinkler only after checking all of the following:

- The sprinkler has been installed*.
- The wall or ceiling finish work is completed where the sprinkler is installed and there no longer is a potential for mechanical damage to the sprinkler operating elements.

SHIELDS AND CAPS MUST BE REMOVED FROM SPRINKLERS BEFORE PLACING THE SYSTEM IN SERVICE!

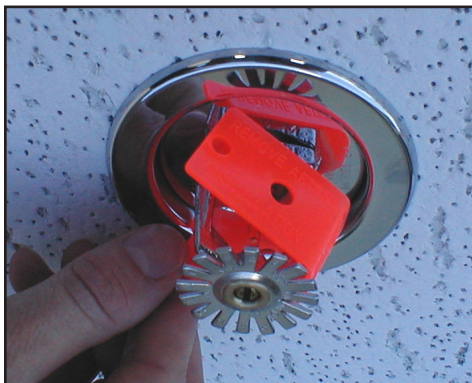


Figure 1: Sprinkler shield being removed from a pendent sprinkler.



Figure 2: Sprinkler cap being removed from a pendent sprinkler.



Figure 3: Sprinkler cap being removed from an upright sprinkler.

HOW TO REMOVE SHIELDS AND CAPS:

No tools are necessary to remove the shields or caps from sprinklers. DO NOT use any sharp objects to remove them! **Take care not to cause mechanical damage to sprinklers when removing the shields or caps.** When removing caps from fusible element sprinklers, use care to prevent dislodging ejector springs or damaging fusible elements. NOTE: Squeezing the sprinkler cap excessively could damage sprinkler fusible elements.

- To remove the shield, simply pull the ends of the shield apart where it is snapped together. Refer to Figure 1.
- To remove the cap, turn it slightly and pull it off the sprinkler. Refer to Figures 2 and 3.

NOTICE

Refer to the current sprinkler technical data page to determine the correct sprinkler wrench for the model of sprinkler used.



Never install sprinklers that have been dropped, damaged, or exposed to temperatures in excess of the maximum ambient temperature allowed.

* Refer to the appropriate current technical data pages for complete care, handling, and installation instructions. Data pages are included with each shipment from Viking or Viking distributors. They can also be found on the Web site at www.vikinggroupinc.com.



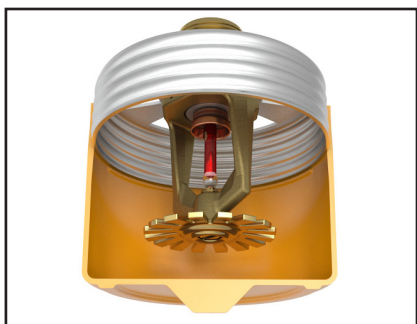
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CONCEALED COVER ASSEMBLIES ARE FRAGILE!
TO ASSURE SATISFACTORY PERFORMANCE OF THE PRODUCT, HANDLE WITH CARE.



Concealed Sprinkler and Adapter
 Assembly with Protective Cap



Concealed Sprinkler and Adapter
 Assembly (Protective Cap Removed)



Cover Plate Assembly
 (Pendent Cover 12381 shown)

GENERAL HANDLING AND STORAGE INSTRUCTIONS:

- Do not store in temperatures exceeding 100 °F (38 °C). Avoid direct sunlight and confined areas subject to heat.
- Protect sprinklers and cover assemblies during storage, transport, handling, and after installation.
 - Use original shipping containers.
 - Do not place sprinklers or cover assemblies loose in boxes, bins, or buckets.
- Keep the sprinkler bodies covered with the protective sprinkler cap any time the sprinklers are shipped or handled, during testing of the system, and while ceiling finish work is being completed.
- Use only the designated Viking recessed sprinkler wrench (refer to the appropriate sprinkler data page) to install these sprinklers. **NOTE:** The protective cap is temporarily removed during installation and then placed back on the sprinkler for protection until finish work is completed.
- Do not over-tighten the sprinklers into fittings during installation.
- Do not use the sprinkler deflector to start or thread the sprinklers into fittings during installation.
- Do not attempt to remove drywall, paint, etc., from the sprinklers.
- Remove the plastic protective cap from the sprinkler before attaching the cover plate assembly. **PROTECTIVE CAPS MUST BE REMOVED FROM SPRINKLERS BEFORE PLACING THE SYSTEM IN SERVICE!**

Refer to the appropriate current technical data pages for complete care, handling, and installation instructions. Data pages are included with each shipment from Viking or Viking distributors. They can also be found on the Web site at www.vikinggroupinc.com.



BULLETIN

CARE AND HANDLING
OF SPRINKLERS

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USE THE FOLLOWING PRECAUTIONS WHEN HANDLING WAX-COATED SPRINKLERS

Many of Viking's sprinklers are available with factory-applied wax coating for corrosion resistance. These sprinklers **MUST** receive appropriate care and handling to avoid damaging the wax coating and to assure satisfactory performance of the product.

General Handling and Storage of Wax-Coated Sprinklers:

- Store the sprinklers in a cool, dry place (in temperatures below the maximum ambient temperature allowed for the sprinkler temperature rating. Refer to Table 1 below.)
- Store containers of wax-coated sprinklers separate from other sprinklers.
- Protect the sprinklers during storage, transport, handling, and after installation.
- Use original shipping containers.
- Do not place sprinklers in loose boxes, bins, or buckets.

Installation of Wax-Coated Sprinklers:

Use only the special sprinkler head wrench designed for installing wax-coated Viking sprinklers (any other wrench may damage the unit).

- Take care not to crack the wax coating on the units.
- For touching up the wax coating after installation, wax is available from Viking in bar form. Refer to Table 1 below. The coating **MUST** be repaired after sprinkler installation to protect the corrosion-resistant properties of the sprinkler.
- Use care when locating sprinklers near fixtures that can generate heat. Do not install sprinklers where they would be exposed to temperatures exceeding the maximum recommended ambient temperature for the temperature rating used.
- Inspect the coated sprinklers frequently soon after installation to verify the integrity of the corrosion resistant coating. Thereafter, inspect representative samples of the coated sprinklers in accordance with NFPA 25. Close up visual inspections are necessary to determine whether the sprinklers are being affected by corrosive conditions.

TABLE 1

Sprinkler Temperature Rating (Fusing Point)	Wax Part Number	Wax Melting Point	Maximum Ambient Ceiling Temperature ¹	Wax Color
155 °F (68 °C) / 165 °F (74 °C)	02568A	148 °F (64 °C)	100 °F (38 °C)	Light Brown
175 °F (79 °C)	04146A	161 °F (71 °C)	150 °F (65 °C)	Brown
200 °F (93 °C)	04146A	161 °F (71 °C)	150 °F (65 °C)	Brown
220 °F (104 °C)	02569A	170 °F (76 °C)	150 °F (65 °C)	Dark Brown
286 °F (141 °C)	02569A	170 °F (76 °C)	150 °F (65 °C)	Dark Brown

¹ Based on NFPA-13. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.



WARNING Never install sprinklers that have been dropped, damaged, or exposed to temperatures in excess of the maximum ambient temperature allowed.

Refer to the appropriate current technical data pages for complete care, handling, and installation instructions. Data pages are included with each shipment from Viking or Viking distributors. They can also be found on the Web site at www.vikinggroupinc.com.



TECHNICAL DATA

SPRINKLER OVERVIEW

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1. DESCRIPTION

Viking fire sprinklers consist of a threaded frame with a specific waterway or orifice size and a deflector for distributing water in a specified pattern. A closed or sealed sprinkler refers to a complete assembly, including the thermosensitive operating element. An open sprinkler does not use an operating element and is open at all times. The distribution of water is intended to extinguish a fire or to control its spread.

Viking sprinklers are available in several models and styles. Refer to specific sprinkler technical data pages for available styles, finishes, temperature ratings, thread sizes, and nominal K-Factors for the particular model selected.

2. LISTINGS AND APPROVALS

Refer to the Approval Charts on the appropriate sprinkler technical data page(s) and/or approval agency listings.



WARNING: Cancer and Reproductive Harm-
www.P65Warnings.ca.gov

3. TECHNICAL DATA

Pressure Ratings:

Maximum allowable water working pressure is 175 psig (12 Bar) unless rated and specified for high water working pressure [250 psig (17.2 bar)].

Sprinkler Identification:

Viking sprinklers are identified and marked with the word "Viking", the sprinkler identification number (SIN) consisting of "VK" plus a three digit number*, the model letter, and the year of manufacture.

Available Finishes:

Viking sprinklers are available in several decorative finishes. Some models are available with corrosion-resistant coatings or are fabricated from non-corrosive material. Refer to the sprinkler technical data page for additional information.

Available Temperature Ratings:

Viking sprinklers are available in several temperature ratings that relate to a specific temperature classification. Applicable installation rules mandate the use and limitations of each temperature classification. In selecting the appropriate temperature classification, the maximum expected ceiling temperature must be known. When there is doubt as to the maximum temperature at the sprinkler location, a maximum-reading thermometer should be used to determine the temperature under conditions that would show the highest readings to be expected. In addition, recognized installation rules may require a higher temperature classification, depending upon sprinkler location, occupancy classification, commodity classification, storage height, and other hazards. In all cases, the maximum expected ceiling temperature dictates the lowest allowable temperature classification. Sprinklers located immediately adjacent to a heat source may require a higher temperature rating.

K-Factors:

Viking sprinklers are available in several orifice sizes with related K-Factors. The orifice is a tapered waterway and, therefore, the K-Factor given is nominal. Nominal U.S. K-Factors are provided in accordance with the 1999 edition of NFPA 13, Section 3-2.3. Refer to the specific data page for appropriate K-Factor information.

Available Styles:

Viking sprinklers are available for installation in several positions as indicated by a stamping on the deflector. The deflector style dictates the appropriate installation position of the sprinkler; it breaks the solid stream of water issuing from the sprinkler orifice to form a specific spray pattern. The following list indicates the various styles and identification of Viking sprinklers.

UPRIGHT SPRINKLER: A sprinkler intended to be installed with the deflector above the frame so water flows upward through the orifice, striking the deflector and forming an umbrella-shaped spray pattern downward. Marked "SSU" (Standard Sprinkler Upright) or "UPRIGHT" on the deflector.

PENDENT SPRINKLER: A sprinkler intended to be oriented with the deflector below the frame so water flows downward through the orifice, striking the deflector and forming an umbrella-shaped spray pattern downward. Marked "SSP" (Standard Sprinkler Pendent) or "PENDENT" on the deflector.

CONVENTIONAL SPRINKLER: An "old style" sprinkler intended to be installed with the deflector in either the upright or pendent position. The deflector provides a spherical type pattern with 40 to 60 percent of the water initially directed downward and a proportion directed upward. Must be installed in accordance with installation rules for conventional or old style sprinklers. DO NOT USE AS A REPLACEMENT FOR STANDARD SPRAY SPRINKLERS. Marked "C U/P" (Conventional Upright/Pendent) on the deflector.

Viking Technical Data may be found on
The Viking Corporation's Web site at
<http://www.vikinggroupinc.com>.
The Web site may include a more recent
edition of this Technical Data Page.



TECHNICAL DATA

SPRINKLER OVERVIEW

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Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

VERTICAL SIDEWALL (VSW) SPRINKLER: A sprinkler intended for installation near the wall and ceiling. The deflector provides a water spray pattern outward in a quarter-spherical pattern and can be installed in the upright or pendent position with the flow arrow in the direction of discharge. Marked "SIDEWALL" on the deflector with an arrow and the word "FLOW". (Note: Some vertical sidewall sprinklers can only be installed in the upright or pendent position—in this case, the sprinkler will also be marked "UPRIGHT" or "PENDENT".)

HORIZONTAL SIDEWALL (HSW) SPRINKLER: A sprinkler intended for installation near the wall and ceiling. The special deflector provides a water spray pattern outward in a quarter-spherical pattern. Most of the water is directed away from the nearby wall with a small portion directed at the wall behind the sprinkler. The top of the deflector is oriented parallel with the ceiling or roof. The flow arrows point in the direction of discharge. Marked "SIDEWALL" and "TOP" with an arrow and the word "FLOW".

EXTENDED COVERAGE (EC) SPRINKLER: A spray sprinkler designed to discharge water over an area having the maximum dimensions indicated in the individual listings. Maximum area of coverage, minimum flow rate, orifice size, and nominal K-Factor are specified in the individual listings. EC sprinklers are intended for Light-Hazard occupancies with smooth, flat, horizontal ceilings unless otherwise specified. In addition to the above markings, the sprinkler is marked "EC".

QUICK RESPONSE (QR) SPRINKLER: A spray sprinkler with a fast-actuating operating element. The use of quick response sprinklers may be limited due to occupancy and hazard. Refer to the Authority Having Jurisdiction (AHJ) prior to installing.

QUICK RESPONSE EXTENDED COVERAGE (QREC) SPRINKLER: A spray sprinkler designed to discharge water over an area having the maximum dimensions indicated in the individual listing. This is a sprinkler with an operating element that meets the criteria for quick response. QREC sprinklers are only intended for Light Hazard occupancies. The sprinkler is marked "QREC".

FLUSH SPRINKLER: A decorative spray sprinkler intended for installation with a concealed piping system. The unit is mounted flush with the ceiling or wall, with the fusible link exposed. Upon actuation, the deflector extends beyond the ceiling or wall to distribute water discharge. The sprinkler is marked "SSP", "PEND", or "SIDEWALL" and "TOP".

CONCEALED SPRINKLER: A decorative spray sprinkler intended for installation with a concealed piping system. The sprinkler is hidden from view by a cover plate installed flush with the ceiling or wall. During fire conditions, the cover plate detaches, and upon sprinkler actuation, the deflector extends beyond the ceiling or wall to distribute water discharge. The sprinkler is marked "SSP", "PEND", or "SIDEWALL" and "TOP".

RECESSED SPRINKLER: A spray sprinkler assembly intended for installation with a concealed piping system. The assembly consists of a sprinkler installed in a decorative adjustable recessed escutcheon that minimizes the protrusion of the sprinkler beyond the ceiling or wall without adversely affecting the sprinkler distribution or sensitivity. Refer to the appropriate technical data page for allowable sprinkler models, temperature ratings, and occupancy classifications. DO NOT RECESS ANY SPRINKLER NOT LISTED FOR USE WITH THE ESCUTCHEON.

CORROSION-RESISTANT SPRINKLER: A special service sprinkler with non-corrosive protective coatings, or that is fabricated from non-corrosive material, for use in atmospheres that would normally corrode sprinklers.

DRY SPRINKLER: A special-service sprinkler intended for installation on dry pipe systems or wet pipe systems where the sprinkler is subject to freezing temperatures. The unit consists of a sprinkler permanently secured to an extension nipple with a sealed inlet end to prevent water from entering the nipple until the sprinkler operates. The unit MUST be installed in a tee fitting. Dry upright sprinklers are marked with the "B" dimension [distance from the face of the fitting (tee) to the top of the deflector]. Dry pendent and sidewall sprinklers are marked with the "A" dimension [the distance from the face of fitting (tee) to the finished surface of the ceiling or wall].

LARGE DROP SPRINKLER: A type of special application sprinkler used to provide fire control of specific high-challenge fire hazards. Large drop sprinklers are designed to produce an umbrella-shaped spray pattern downward with a higher percentage of "large" water droplets than standard spray sprinklers. The sprinkler has an extra-large orifice with a nominal K-Factor of 11.2. Marked "HIGH CHALLENGE" and "UPRIGHT".

EARLY SUPPRESSION FAST-RESPONSE (ESFR) SPRINKLER: A sprinkler intended to provide fire suppression of specific high-challenge fire hazards through the use of a fast response fusible link, 14.0, 16.8, or 25.2 nominal K-Factor, and special deflector. ESFR sprinklers are designed to produce high-momentum water droplets in a hemispherical pattern below the deflector. This permits penetration of the fire plume and direct wetting of the burning fuel surface while cooling the atmosphere early in the development of a high-challenge fire. Marked "ESFR" and "UPRIGHT" or "PEND".

INTERMEDIATE LEVEL/RACK STORAGE SPRINKLER: A standard spray sprinkler assembly designed to protect its operating element from the spray of sprinklers installed at higher elevations. The assembly consists of a standard or large orifice upright or pendent sprinkler with an integral upright or pendent water shield and guard assembly. Use only those sprinklers that have been tested and listed for use with the assembly. Refer to the technical data page for allowable sprinkler models.

RESIDENTIAL SPRINKLER: A sprinkler intended for use in the following occupancies: one- and two-family dwellings with the fire protection sprinkler system installed in accordance with NFPA 13D; residential occupancies up to four stories in height with the fire protection system installed in accordance with NFPA 13R; and where allowed by the Authority Having Jurisdiction in residential portions of any occupancy with the fire protection system installed in accordance with NFPA 13.



TECHNICAL DATA

SPRINKLER OVERVIEW

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Residential sprinklers have a unique distribution pattern and utilize a “fast response” heat sensitive operating element. They enhance survivability in the room of fire origin and are designed to provide a life safety environment for a minimum of ten minutes. For this reason, residential sprinklers must not be used to replace standard sprinklers unless tested for and approved by the Authority Having Jurisdiction. In addition to standard markings, the unit is identified as “RESIDENTIAL SPRINKLER” or “RES”.

4. INSTALLATION

Refer to appropriate NFPA Installation Standards.

5. OPERATION

Refer to the appropriate sprinkler technical data page(s).

6. INSPECTIONS, TESTS AND MAINTENANCE

Refer to NFPA 25 for Inspection, Testing and Maintenance requirements.

7. AVAILABILITY

Viking sprinklers are available through a network of domestic and international distributors. See The Viking Corporation web site for the closest distributor or contact The Viking Corporation.

8. GUARANTEE

For details of warranty, refer to Viking's current list price schedule or contact Viking directly.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers and the appropriate sprinkler general care, installation, and maintenance guide. Vikings sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, FM Global, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable. The sprinkler technical data page may contain installation requirements specific for the sprinkler model selected. The use of certain types of sprinklers may be limited due to occupancy and hazard. Refer to the Authority Having Jurisdiction prior to installation.



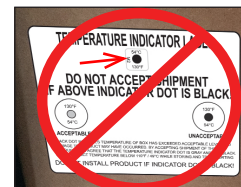
BULLETIN

BEST PRACTICES FOR RESIDENTIAL SPRINKLER HANDLING & INSTALLATION

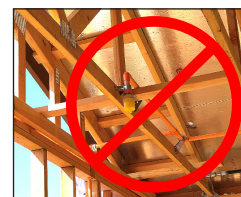
The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
 Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com
 Visit the Viking website for the latest edition of this technical data page.

SPRINKLERS ARE FRAGILE - HANDLE WITH CARE!

- Always keep sprinklers in a cool dry place.
- Protect sprinklers during storage, transport and handling as well as before, during and after installation. Refer to Viking's Care and Handling of Sprinklers Bulletin [Form No. F_091699²](#).
- Proper transit, storage and installation of sprinklers in a high-heat environment is a must. Care should be taken to prevent sprinklers from being exposed to ambient heat conditions in excess of those referenced in installation standards.
- Do not stage or store sprinklers on the job site in advance in a non-conditioned space prior to installation.
- Keep sprinklers in the original packaging and check temperature indicators on box label prior to installation. If the indicator has turned black, DO NOT install any product contained in the box. Refer to Viking product return policies.
- Temperatures exceeding the maximum ambient temperature of the sprinkler temperature-rating during storage, transport, handling and installation must be avoided.
- Per NFPA standards 13, 13R, and 13D, sprinklers installed where maximum ambient temperatures are at or over 101 °F (38 °C) through 150 °F (66 °C) shall be intermediate temperature-rated sprinklers. Additionally, if sprinklers are installed in an unventilated concealed space under an uninsulated roof or in an unventilated attic, they shall be of intermediate temperature classification.
- Sprinklers installed where ambient temperatures are at or below 100 °F (38 °C) may be either ordinary or intermediate temperature-rated sprinklers. Refer to NFPA standards 13R 6.2.3.1 and 13D 7.5.6.1.
- Rough-in of sprinkler piping during hot weather conditions should not include the installation of sprinklers unless reasonable ambient temperatures can be maintained. Ambient temperatures that are considered when choosing the temperature rating for a sprinkler should take into account the range of ambient temperatures that are expected from installation through establishment and maintenance of temperature in a conditioned space. Appropriate insulation may be considered. **Example:** An ordinary temperature sprinkler should not be exposed to maximum ambient temperature higher than 100 °F (38 °C) or more. Refer to NFPA 13, Table 6.2.5.1, NFPA 13R, 6.2.3.1 and NFPA 13D, 7.5.6.1.
- CPVC fire sprinkler products exposed to high ambient temperatures (e.g. installed in unventilated, concealed spaces such as attics) should be insulated to maintain a cooler environment. Refer to Viking Plastics Installation and Design Manual, [Form No. F_080712²](#), for care and handling procedures.
- Protect all sprinklers and connecting CPVC piping in attic spaces and unvented concealed spaces from excessive heat exposure above 100 °F (38 °C). To separate excessive attic heat, properly tent and fully insulate all pipe in unconditioned spaces.
- Pressure relief valves should be installed on wet sprinkler systems where there is a risk of over-pressurization of a checked water supply, due to thermal expansion. Refer to NFPA 13, 7.1.2.1 and NFPA 13D, A.5.2.2.2.
- Fire sprinkler systems should be installed per current referenced editions of building codes and installation standards adopted in the jurisdiction where work is being performed.



INCORRECT
(Heat exposure)



INCORRECT
(Unconditioned at rough-in)



INCORRECT
(Exposed piping)



INCORRECT
(No pressure relief valve)



WARNING: Cancer and Reproductive Harm-
www.P65Warnings.ca.gov

¹Hot weather condition is defined as temperatures that can reach the maximum ambient temperature-rating of the sprinkler.

²Clicking on blue hyperlink will open referenced document.

⚠ WARNING

Any sprinkler with a loss of liquid from the glass bulb or damage to the fusible element should be destroyed. Never install sprinklers that have been dropped, damaged, or exposed to temperatures exceeding the maximum ambient temperature allowed. Sprinklers that have been painted in the field must be replaced per NFPA 13. Protect sprinklers from paint and paint overspray in accordance with the installation standards. Do not clean sprinklers with soap and water, ammonia, or any other cleaning fluid. Do not use adhesives or solvents on sprinklers or their operating elements.

Refer to the appropriate technical data page and NFPA standards for complete care, handling, installation, and maintenance instructions. For additional product and system information Viking data pages and installation instructions are available on the Viking Web site at www.vikinggroupinc.com.

**BULLETIN****REGULATORY AND HEALTH
WARNINGS**

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Visit the Viking website for the latest edition of this technical data page www.vikinggroupinc.com

1. DESCRIPTION

Regulatory and Health Warnings applying to materials used in the manufacture and construction of fire protection products are provided herein as they relate to legally mandated jurisdictional regions.

⚠ WARNING**STATE OF CALIFORNIA, USA**

Installing or servicing fire protection products such as sprinklers, valves, piping etc. can expose you to chemicals including, but not limited to, lead, nickel, butadiene, titanium dioxide, chromium, carbon black, and acrylonitrile which are known to the State of California to cause cancer or birth defects or other reproductive harm.

For more information, go to www.P65Warnings.ca.gov

2. WARRANTY TERMS AND CONDITIONS

For details of warranty, refer to Viking's current list price schedule at www.vikinggroupinc.com or contact Viking directly.



TECHNICAL DATA

STANDARD AND QUICK RESPONSE CONCEALED PENDENT SPRINKLER VK4621 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Visit the Viking website for the latest edition of this technical data page www.vikinggroupinc.com

1. DESCRIPTION

Viking Standard and Quick Response Concealed Pendent Sprinkler VK4621 is a small thermosensitive, glass-bulb sprinkler designed for installation on concealed pipe systems where the appearance of a smooth ceiling is desired. The low-profile cover assemblies provide up to 1/2" (13 mm) of vertical adjustment.

Features:

- K5.6 (80.6 metric).
- Quick response glass bulb operating element.
- Integral threaded adapter cup accepts push-on or thread-on cover plates.
- Low-profile, small diameter, removeable cover plates offer almost flush appearance upon installation and allow ease of maintenance.
- Protective cap prevents damage during installation and finishing and keeps errant overspray from coating internal parts.
- Various finishes available to meet design requirements.
- Optional Electroless Nickel PTFE (ENT) coating provides corrosion resistance (see Approval Chart).

2. LISTINGS AND APPROVALS



cULus Listed: Category VNIV



FM Approved: Class 2015

Also approved for use in FM Approved vacuum dry sprinkler systems with a maximum supervisory vacuum pressure of -3 psi (-207mbar)



VdS Approved: Standard EN 12259-1:199 + A3:2006; Certificate Number G 422002



LPCB Approved: Standard EN 12259-1:199 + A3:2006; Certificate Number 096e



CE: Standard EN 12259-1:1999 + A3:2006, Sprinkler, DOP_VK4621, 2831, 2023



MED Approved: Standard EN 12259-1:1999 + A3:2006, DOC_MED_VK4621, 2831.



UKCA Approved: Standard EN 12259-1:1999 + A3:2006, DOC_UKCA_VK4621, 0832, 2023.

China Approval: Approved according to China GB standard.



WARNING: Cancer and Reproductive Harm-
www.P65Warnings.ca.gov

Refer to the Approval Charts and Design Criteria on for cULus Listing requirements that must be followed.

3. TECHNICAL DATA

Specifications:

Minimum Operating Pressure: 7 psi (0.5 bar)

Maximum Working Pressure: FM - 175 psi (12 bar). UL - 250 psi (17.2 bar)

Factory tested hydrostatically to 500 psi (34.5 bar).

Thread size: 1/2" NPT or 15 mm BSPT

Nominal K-Factor: 5.6 U.S. (80.6 metric*)

Glass-bulb fluid temperature rated to -65 °F (-55 °C)

* Metric K-factor measurement shown is in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.



TECHNICAL DATA

STANDARD AND QUICK RESPONSE CONCEALED PENDENT SPRINKLER VK4621 (K5.6)

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Material Standards:

Sprinkler body: QM Brass or DZR Brass

Deflector: Phosphor Bronze UNS-C51000

Deflector pins: Stainless steel UNS-S43000

Pip cap: Copper UNS-C11000

Pip cap insert: stainless steel UNS-S30400

Pip cap T-hinge ring: Stainless steel UNS-S31600

Compression screw: UNS-C36000

Belleville spring sealing assembly: Nickel alloy, coated on both sides with PTFE tape

Cover adapter: Cold rolled steel JIS G3141 and carbon steel UNS-G10100 (per JIS G3141)

Shipping cap: High density polyethylene

Cover Plate Materials:

Cover plate assembly: Copper UNS-C11000 and brass UNS-C26800 or stainless steel UNS-S30400

Spring: Beryllium nickel

Solder: Eutectic

Ordering Information: Refer to Tables 1 and 2.

4. INSTALLATION

Refer to appropriate NFPA Installation Standards and installation instructions in this document.

5. OPERATION

During fire conditions, when the temperature around the sprinkler approaches its operating temperature, the cover plate detaches, releasing the deflector. Continued heating of the exposed sprinkler causes the heat-sensitive liquid in the glass bulb to expand, causing the glass to shatter, releasing the pip cap and sealing spring assembly. Water flowing through the sprinkler orifice strikes the deflector, forming a uniform spray pattern over a specific area of coverage determined by the water supply pressure at the sprinkler to extinguish or control the fire.

6. INSPECTIONS, TESTS AND MAINTENANCE

Refer to NFPA 25 for Inspection, Testing and Maintenance requirements.

7. AVAILABILITY

Viking Sprinklers are available through a network of domestic and international distributors. See The Viking Corporation web site for the closest distributor contact The Viking Corporation.

8. GUARANTEE

For details of warranty, refer to Viking's current list price schedule or contact Viking directly.



TECHNICAL DATA

STANDARD AND QUICK RESPONSE CONCEALED PENDENT SPRINKLER VK4621 (K5.6)

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Ordering Instructions - Sprinkler Base

1. Choose a sprinkler base part number with the required thread size and listing or approval (refer to the approval chart).
2. Add the suffix for the desired finish.
3. Add the suffix for the desired temperature rating.
4. Order a cover plate (refer to Ordering Instructions - Cover Plate).

EXAMPLE: **24682AB** = VK4621 with brass finish and 155 °F (68 °C) nominal temperature rating. This sprinkler is to be installed into an area with a maximum ambient temperature of 100 °F (38 °C).

1. Sprinkler Base Part Numbers	
Part Number	Thread Size
24682	½" NPT
22962	15 mm BSPT
26548 ⁷	15 mm BSPT

2. Available Finishes	
Description	Suffix
Brass	A
ENT ^{2,3,5}	JN

3. Temperature Ratings				
Sprinkler Temperature Classification	Temperature Rating	Bulb Color	Maximum Ambient Ceiling Temperature ¹	Suffix
Ordinary	155 °F (68 °C)	Red	100 °F (38 °C)	B
Intermediate	175 °F (79 °C)	Yellow	150 °F (66 °C)	D
Intermediate	200 °F (93 °C)	Green	150 °F (66 °C)	E

Accessories

Part Number	Description
23143	Installation wrench ^{4,6}
14412	Concealed cover plate installer tool, for use with push-on cover plates only (available since 2007)
14867	Large concealed cover plate installer tool, for use with push-on cover plates only (available since 2007)
01731A	Sprinkler cabinet; holds up to 6 sprinklers (available since 1971)

FOOTNOTES

1. Based on NFPA 13, NFPA 13R, and NFPA 13D. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.
2. UL Listed as corrosion resistant.
3. The corrosion-resistant coatings have passed the standard corrosion test required by the approving agencies indicated in the Approval Chart. These tests cannot and do not represent all possible corrosive environments. Prior to installation, verify through the end-user that the coatings are compatible with or suitable for the proposed environment. For automatic sprinklers, the ENT coating is applied to all exposed exterior surfaces, including the waterway.
4. Requires a 1/2" ratchet which is not available from Viking.
5. FM Approved as a decorative finish.
6. The installation wrench is intended to be used for a maximum of 500 sprinkler installations at a maximum torque of 14 ft-lbs (19 Nm).
7. See Approval Chart for approval information.



TECHNICAL DATA

STANDARD AND QUICK RESPONSE CONCEALED PENDENT SPRINKLER VK4621 (K5.6)

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Ordering Instructions - Cover Plate

1. Choose a cover plate base part number with the desired shape and style (refer to the approval chart).
2. Add the suffix for the desired finish.
3. Add the suffix for the required temperature rating.

Example:

23190MC/W = Thread-On style, 165 °F (74 °C) Temperature Rated, 2 3/4" (70 mm) diameter Round Cover Plate with a Painted White finish.

1. Cover Plate Base Part Numbers ^{3, 6}			
Style	Base Part Number ⁵	Size Inches (mm)	Shape (type)
Thread-On Style	23190	2 3/4 (70) diameter	Round
	23174	3 5/16 (84) diameter	Round
	23179	3 5/16 (84)	Square
	23174-/CR	3 5/16 (84) diameter	Round (clean room)
	▼ Stainless Steel material ⁴		
	23193	2 3/4 (70) diameter	Round
	23183	3 5/16 (84) diameter	Round
	23183-/CR	3 5/16 (84) diameter	Round (clean room)
Push-On Style	23447	2 3/4 (70) diameter	Round
	23463	3 5/16 (84) diameter	Round
	23482	3 5/16 (84)	Square
	23463-/CR	3 5/16 (84) diameter	Round (clean room)
	▼ Stainless Steel material ⁴		
	23455	2 3/4 (70) diameter	Round
	23473	3 5/16 (84) diameter	Round
	23473-/CR	3 5/16 (84) diameter	Round (clean room)

2. Available Finishes ⁵	
Description	Suffix
Polished Chrome	F
Brushed Chrome	F_/B
Bright Brass	B
Antique Brass	B_/A
Brushed Brass	B_/A
Brushed Copper	B_/A
Painted White	M_/W
Painted Ivory	M_/I
Painted Black	M_/B

3. Temperature Rating Matrix

IMPORTANT: The required cover plate temperature rating is determined by the sprinkler's temperature rating.

Sprinkler Temperature Classification ¹	Required Cover Plate Temperature Rating	Corresponding Sprinkler Nominal Temperature Rating	Maximum Ambient Ceiling Temperature ²	Suffix
Ordinary	139 °F (59 °C)	155 °F (68 °C)	100 °F (38 °C)	A
Intermediate	165 °F (74 °C)	200 °F (93 °C)	150 °F (66 °C)	C

FOOTNOTES

1. The sprinkler temperature rating is stamped on the deflector.
2. Based on NFPA-13. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.
3. Part number shown is the base part number. For complete part number, refer to current Viking price list schedule.
4. Stainless steel cover plates can be painted with either the standard or custom paint colors.
5. Where a dash (-) is shown in the Finish suffix designation, insert the desired Temperature Rating suffix. See example above.
6. For use with gasketed cover plates has been evaluated as part of the UL Listing.



TECHNICAL DATA

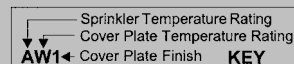
STANDARD AND QUICK RESPONSE CONCEALED PENDENT SPRINKLER VK4621 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
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Approval Chart

Concealed Pendent Sprinkler VK4621

1/2" NPT or 15 mm BSPT, Nominal K-factor 5.6 U.S. (80.6 metric²)



Listings and Approvals³ (Refer also to Design Criteria)

Sprinkler Base Part No. ¹	cULus ^{4,9}	China Approval	FM	VdS	LPCB	CE	MED	UKCA
	Maximum Water Working Pressure 250 psi (17.2 bar)		Maximum Water Working Pressure 175 psi (12 bar)					

Standard Response Applications

24682A	--	--	AV1, BX1, AS2, BT2, BW1, CX1, CT2, CX1	AV1, CX1	AV1, CX1	AV1, CX1	AV1, CX1	AV1, CX1
24682JN ^{7,8}	--	--	AV1, BX1, AS2, BT2, BW1, CX1, CT2, CX1	--	--	--	--	--
22962A	--	--	AV1, BX1, AS2, BT2, BW1, CX1, CT2, CX1	AV1, CX1	AV1, CX1	AV1, CX1	AV1, CX1	AV1, CX1
22962JN ^{7,8}	--	--	AV1, BX1, AS2, BT2, BW1, CX1, CT2, CX1	--	--	--	--	--

Quick Response Applications

24682A	AV1, BX1, AS2, BT2, CX1, CT2	--	--	--	--	--	--	--
24682JN ^{7,8}	AV1, BX1, AS2, BT2, CX1, CT2	--	--	--	--	--	--	--
22962A	AV1, BX1, AS2, BT2, CX1, CT2	--	--	--	--	--	--	--
22962JN ^{7,8}	AV1, BX1, AS2, BT2, CX1, CT2	--	--	--	--	--	--	--
26548	AV1, BX1, AS2, BT2, CX1, CT2	AV1, CX1, AS2, CT2	--	--	--	--	--	--

Approved Sprinkler Temperature Rating Key

A = 155 °F (68 °C)
 B = 175 °F (79 °C)
 C = 200 °F (93 °C)

Approved Cover Plate Assembly Finishes Key⁵

S = 139 °F (59 °C) Stainless steel covers (23193, 23455, 23183, and 23473)
 T = 165 °F (74 °C) Stainless steel covers (23193, 23455, 23183, and 23473)
 V = 139 °F (59 °C) covers (23190, 23447, 23174, 23463, 23179, and 23482)
 W = 165 °F (59 °C) square covers (23179 and 23482)
 X = 165 °F (74 °C) covers (23190, 23447, 23174, and 23463)

Approved Cover Plate Finishes Key

1 = Polished chrome,
 brushed chrome, bright
 brass, antique brass,
 brushed brass, brushed
 copper, painted⁶ white,
 painted⁶ ivory, or paint-
 ed⁶ black
 2 = Stainless steel (painted
 or not painted)

Footnotes

- Part number shown is the base part number. For complete part number, refer to current Viking price list schedule.
- Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.
- This chart shows the listings and approvals available at the time of printing. Other approvals may be in process. Check with the manufacturer for any additional approvals.
- Listed by Underwriter's Laboratories for use in the U.S. and Canada.
- The 139 °F (59 °C) covers have an orange label. The 165 °F (74 °C) covers have a white label.
- Other paint colors are available on request with the same listings as the standard paint colors. Listings and approvals apply for any paint manufacturer. Contact Viking for additional information.
- cULus Listed as corrosion-resistant.
- FM Approved as a decorative finish.
- Refer to the Cleanroom Sprinkler Cover Assembly technical data sheet for Viking's UL Listed cover plates with built-in gaskets.

NOTE: Custom colors are indicated on a label inside the cover assembly. Refer to Figure 2.



TECHNICAL DATA

STANDARD AND QUICK RESPONSE CONCEALED PENDENT SPRINKLER VK4621 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
 Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com
 Visit the Viking website for the latest edition of this technical data page www.vikinggroupinc.com

DESIGN CRITERIA - UL

(Also refer to Approval Chart)

cULus Listing Requirements:

Concealed Pendent Sprinkler VK4621 is cULus Listed as quick response for installation in accordance with the latest edition of NFPA 13 for standard coverage pendent spray sprinklers as indicated below.

- For hazard occupancies up to and including Ordinary Hazard, Group II.
- Protection areas and maximum spacing shall be in accordance with the tables provided in NFPA 13. Maximum spacing allowed is 15 ft. (4.6 m).
- Minimum spacing allowed is 6 ft. (1.8 m) unless baffles are installed in accordance with NFPA 13.
- Minimum distance from walls is 4 in. (102 mm).
- Maximum distance from walls shall be no more than one-half of the allowable distance between sprinklers. The distance shall be measured perpendicular to the wall.
- The sprinkler obstruction rules contained in NFPA 13 for standard coverage pendent spray sprinklers must be followed.

NOTE: Concealed sprinklers must be installed in neutral or negative pressure plenums only.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to Form No. F_080614 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.

DESIGN CRITERIA - FM

(Also refer to Approval Chart)

FM Approval Requirements:

Viking Concealed Pendent Sprinkler VK4621 is FM Approved as a standard response **Non-Storage** concealed pendent sprinkler as indicated in the FM Approval Guide. For specific application and installation requirements, reference the latest applicable FM Loss Prevention Data Sheets (including Data Sheet 2-0). FM Global Loss Prevention Data Sheets contain guidelines relating to, but not limited to: minimum water supply requirements, hydraulic design, ceiling slope and obstructions, minimum and maximum allowable spacing, and deflector distance below the ceiling.

NOTE: The FM installation guidelines may differ from cULus and/or NFPA criteria.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to Form No. F_080614 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.



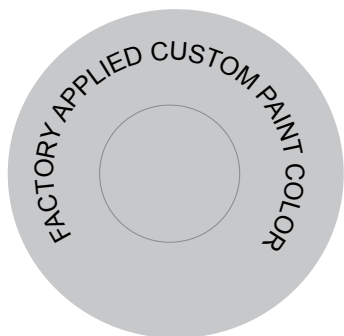
TECHNICAL DATA

STANDARD AND QUICK RESPONSE CONCEALED PENDENT SPRINKLER VK4621 (K5.6)

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Figure 1: Installation Wrench



All custom color painted cover plates will have an identifying label affixed to the inside of the cover that indicates the custom color and will have a representative sample (a paint dot) of the paint on the label.

Figure 2: Identification of Custom Paint



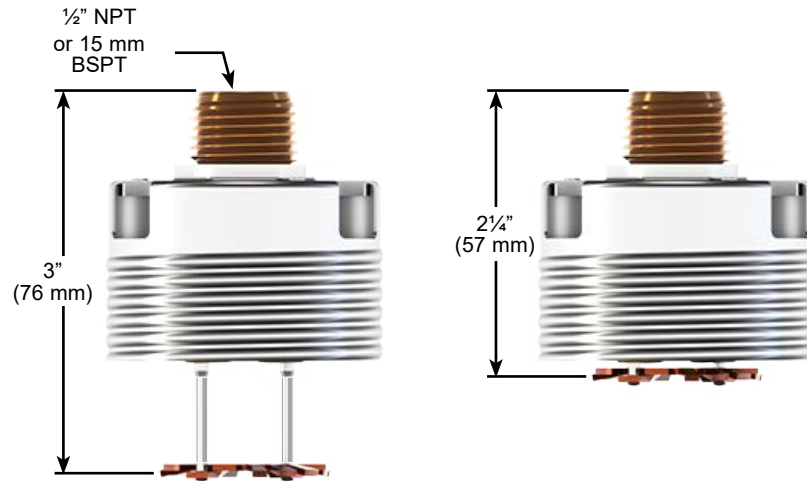
Figure 3: Square Cover Assembly



TECHNICAL DATA

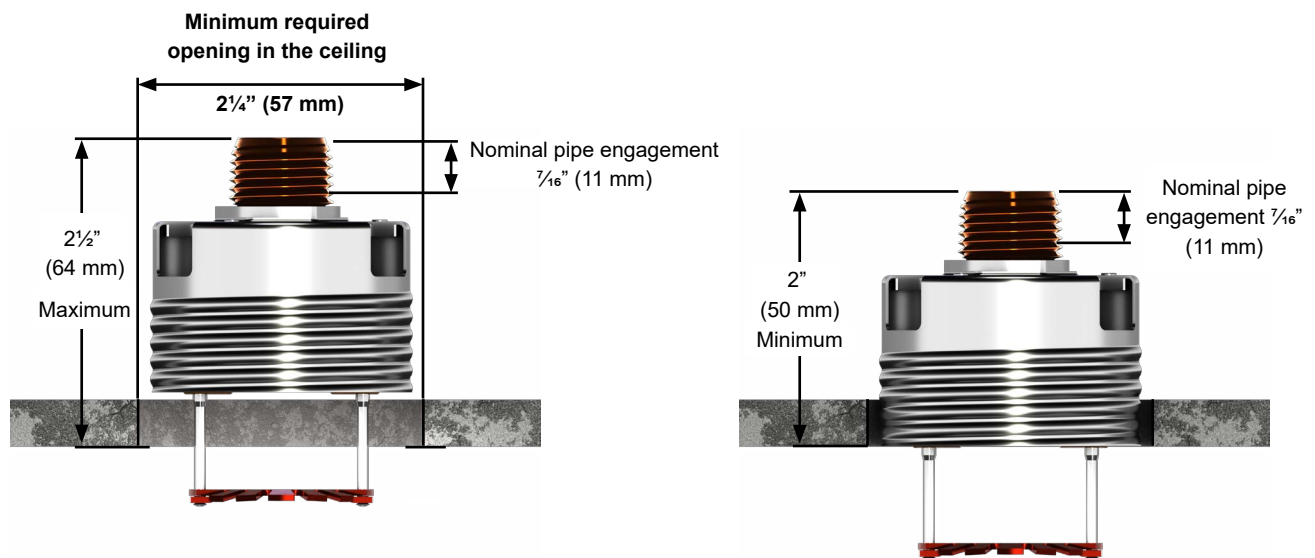
STANDARD AND QUICK RESPONSE CONCEALED PENDENT SPRINKLER VK4621 (K5.6)

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NOTE: Image is representative only. Actual product may vary.

Figure 4: Sprinkler Dimensions



NOTE: Image is representative only. Actual product may vary.

Figure 5: Sprinkler Installation Dimensions



TECHNICAL DATA

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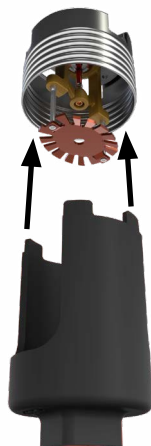


NOTICE: USE ONLY the designated sprinkler wrenches shown in this document. Permanent damage to the sprinkler assembly can occur if the proper wrench is not used. Other sprinkler wrenches available from Viking may fit into the sprinkler adapter cup; however, only the wrenches shown here are designed to properly install this sprinkler.

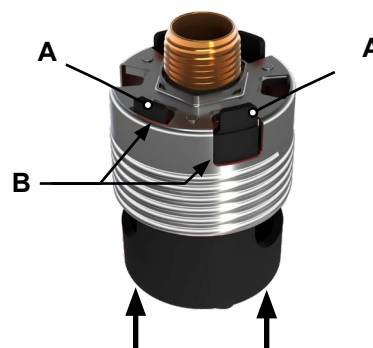
Step 1:
Remove the protective cap.



Step 2:
Insert the wrench into the sprinkler adapter.



Step 3:
Rotate the wrench slightly in either direction until the tines on the wrench (A) line up with the vent openings (B) on the adapter cup and lock into place. NOTE: A leak tight seal must be achieved. Turn the sprinkler clockwise 1 to 1-½ turns past finger-tight.



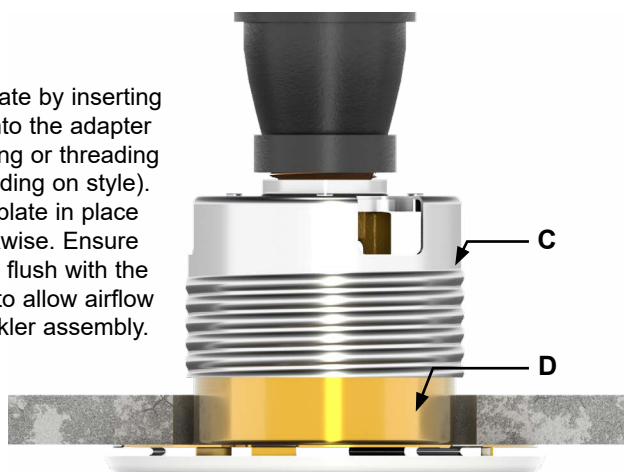
NOTE: Image is representative only. Actual product may vary.

Figure 6: Using the Sprinkler Wrench



Minimum

Install the cover plate by inserting the adapter (D) into the adapter cup (C) and pushing or threading into place (depending on style). Snug the cover plate in place by rotating clockwise. Ensure the cover plate is flush with the ceiling as shown to allow airflow through the sprinkler assembly.



Maximum

NOTE: Image is representative only. Actual product may vary.

Figure 7: Installing the Cover Plate



BULLETIN

CARE AND HANDLING
OF SPRINKLERS

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
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SPRINKLERS ARE FRAGILE - HANDLE WITH CARE!**General Handling and Storage:**

- Store sprinklers in a cool, dry place.
- Protect sprinklers during storage, transport, handling, and after installation.
- Use the original shipping containers. DO NOT place sprinklers loose in boxes, bins, or buckets.
- Keep sprinklers separated at all times. DO NOT allow metal parts to contact sprinkler operating elements.

For Pre-Assembled Drops:

- Protect sprinklers during handling and after installation.
- For recessed assemblies, use the protective sprinkler cap (Viking Part Number 10364).

Sprinklers with Protective Shields or Caps:

- DO NOT remove shields or caps until after sprinkler installation and there no longer is potential for mechanical damage to the sprinkler operating elements.
- **Sprinkler shields or caps MUST be removed BEFORE placing the system in service!**
- Remove the sprinkler shield by carefully pulling it apart where it is snapped together.
- Remove the cap by turning it slightly and pulling it off the sprinkler.

Sprinkler Installation:

- DO NOT use the sprinkler deflector or operating element to start or thread the sprinkler into a fitting.
- **Use only the designated sprinkler head wrench!** Refer to the current sprinkler technical data page to determine the correct wrench for the model of sprinkler used.
- DO NOT install sprinklers onto piping at the floor level.
- Install sprinklers after the piping is in place to prevent mechanical damage.
- DO NOT allow impacts such as hammer blows directly to sprinklers or to fittings, pipe, or couplings in close proximity to sprinklers. Sprinklers can be damaged from direct or indirect impacts.
- DO NOT attempt to remove drywall, paint, etc., from sprinklers.
- **Take care not to over-tighten the sprinkler and/or damage its operating parts!**

Maximum Torque:

1/2" NPT: 14 ft-lbs. (19.0 N-m)

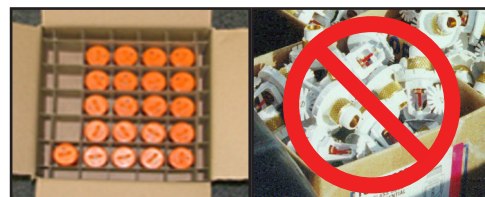
3/4" NPT: 20 ft-lbs. (27.1 N-m)

1" NPT: 30 ft-lbs. (40.7 N-m)



CORRECT
(Original container used)

INCORRECT
(Placed loose in box)



CORRECT
(Protected with caps)

INCORRECT
(Protective caps not used)



CORRECT
(Piping is in place at the ceiling)

INCORRECT
(Sprinkler at floor level)



CORRECT
(Special installation wrenches)

INCORRECT
(Designated wrench not used)



WARNING: Cancer and Reproductive Harm-
www.P65Warnings.ca.gov

! WARNING

Any sprinkler with a loss of liquid from the glass bulb or damage to the fusible element should be destroyed. Never install sprinklers that have been dropped, damaged, or exposed to temperatures exceeding the maximum ambient temperature allowed. Sprinklers that have been painted in the field must be replaced per NFPA 13. Protect sprinklers from paint and paint overspray in accordance with the installation standards. Do not clean sprinklers with soap and water, ammonia, or any other cleaning fluid. Do not use adhesives or solvents on sprinklers or their operating elements.

Refer to the appropriate technical data page and NFPA standards for complete care, handling, installation, and maintenance instructions. For additional product and system information Viking data pages and installation instructions are available on the Viking Web site at www.vikinggroupinc.com.



BULLETIN

CARE AND HANDLING
OF SPRINKLERS

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PROTECTIVE SPRINKLER SHIELDS AND CAPS

General Handling and Storage:

Many Viking sprinklers are available with a plastic protective cap or shield temporarily covering the operating elements. The snap-on shields and caps are factory installed and are intended to help protect the operating elements from mechanical damage during shipping, storage, and installation. NOTE: It is still necessary to follow the care and handling instructions on the appropriate sprinkler technical data sheets* when installing sprinklers with bulb shields or caps.

WHEN TO REMOVE THE SHIELDS AND CAPS:

NOTE: SHIELDS AND CAPS MUST BE REMOVED FROM SPRINKLERS BEFORE PLACING THE SYSTEM IN SERVICE!

Remove the shield or cap from the sprinkler only after checking all of the following:

- The sprinkler has been installed*.
- The wall or ceiling finish work is completed where the sprinkler is installed and there no longer is a potential for mechanical damage to the sprinkler operating elements.

SHIELDS AND CAPS MUST BE REMOVED FROM SPRINKLERS BEFORE PLACING THE SYSTEM IN SERVICE!

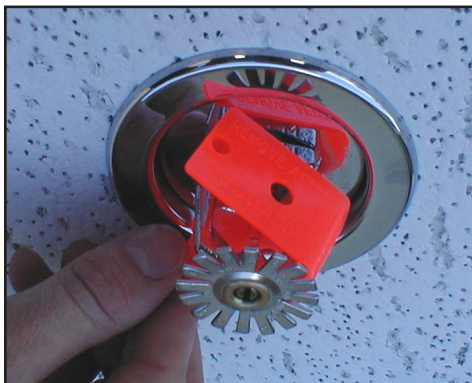


Figure 1: Sprinkler shield being removed from a pendent sprinkler.



Figure 2: Sprinkler cap being removed from a pendent sprinkler.



Figure 3: Sprinkler cap being removed from an upright sprinkler.

HOW TO REMOVE SHIELDS AND CAPS:

No tools are necessary to remove the shields or caps from sprinklers. DO NOT use any sharp objects to remove them! **Take care not to cause mechanical damage to sprinklers when removing the shields or caps.** When removing caps from fusible element sprinklers, use care to prevent dislodging ejector springs or damaging fusible elements. NOTE: Squeezing the sprinkler cap excessively could damage sprinkler fusible elements.

- To remove the shield, simply pull the ends of the shield apart where it is snapped together. Refer to Figure 1.
- To remove the cap, turn it slightly and pull it off the sprinkler. Refer to Figures 2 and 3.

NOTICE

Refer to the current sprinkler technical data page to determine the correct sprinkler wrench for the model of sprinkler used.



WARNING Never install sprinklers that have been dropped, damaged, or exposed to temperatures in excess of the maximum ambient temperature allowed.

* Refer to the appropriate current technical data pages for complete care, handling, and installation instructions. Data pages are included with each shipment from Viking or Viking distributors. They can also be found on the Web site at www.vikinggroupinc.com.



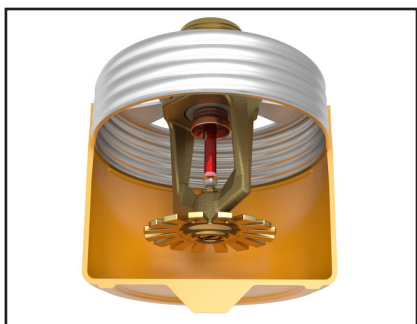
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CONCEALED COVER ASSEMBLIES ARE FRAGILE!
TO ASSURE SATISFACTORY PERFORMANCE OF THE PRODUCT, HANDLE WITH CARE.



Concealed Sprinkler and Adapter
 Assembly with Protective Cap



Concealed Sprinkler and Adapter
 Assembly (Protective Cap Removed)



Cover Plate Assembly
 (Pendent Cover 12381 shown)

GENERAL HANDLING AND STORAGE INSTRUCTIONS:

- Do not store in temperatures exceeding 100 °F (38 °C). Avoid direct sunlight and confined areas subject to heat.
- Protect sprinklers and cover assemblies during storage, transport, handling, and after installation.
 - Use original shipping containers.
 - Do not place sprinklers or cover assemblies loose in boxes, bins, or buckets.
- Keep the sprinkler bodies covered with the protective sprinkler cap any time the sprinklers are shipped or handled, during testing of the system, and while ceiling finish work is being completed.
- Use only the designated Viking recessed sprinkler wrench (refer to the appropriate sprinkler data page) to install these sprinklers. **NOTE:** The protective cap is temporarily removed during installation and then placed back on the sprinkler for protection until finish work is completed.
- Do not over-tighten the sprinklers into fittings during installation.
- Do not use the sprinkler deflector to start or thread the sprinklers into fittings during installation.
- Do not attempt to remove drywall, paint, etc., from the sprinklers.
- Remove the plastic protective cap from the sprinkler before attaching the cover plate assembly. **PROTECTIVE CAPS MUST BE REMOVED FROM SPRINKLERS BEFORE PLACING THE SYSTEM IN SERVICE!**

Refer to the appropriate current technical data pages for complete care, handling, and installation instructions. Data pages are included with each shipment from Viking or Viking distributors. They can also be found on the Web site at www.vikinggroupinc.com.



BULLETIN

CARE AND HANDLING
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USE THE FOLLOWING PRECAUTIONS WHEN HANDLING WAX-COATED SPRINKLERS

Many of Viking's sprinklers are available with factory-applied wax coating for corrosion resistance. These sprinklers **MUST** receive appropriate care and handling to avoid damaging the wax coating and to assure satisfactory performance of the product.

General Handling and Storage of Wax-Coated Sprinklers:

- Store the sprinklers in a cool, dry place (in temperatures below the maximum ambient temperature allowed for the sprinkler temperature rating. Refer to Table 1 below.)
- Store containers of wax-coated sprinklers separate from other sprinklers.
- Protect the sprinklers during storage, transport, handling, and after installation.
- Use original shipping containers.
- Do not place sprinklers in loose boxes, bins, or buckets.

Installation of Wax-Coated Sprinklers:

Use only the special sprinkler head wrench designed for installing wax-coated Viking sprinklers (any other wrench may damage the unit).

- Take care not to crack the wax coating on the units.
- For touching up the wax coating after installation, wax is available from Viking in bar form. Refer to Table 1 below. The coating **MUST** be repaired after sprinkler installation to protect the corrosion-resistant properties of the sprinkler.
- Use care when locating sprinklers near fixtures that can generate heat. Do not install sprinklers where they would be exposed to temperatures exceeding the maximum recommended ambient temperature for the temperature rating used.
- Inspect the coated sprinklers frequently soon after installation to verify the integrity of the corrosion resistant coating. Thereafter, inspect representative samples of the coated sprinklers in accordance with NFPA 25. Close up visual inspections are necessary to determine whether the sprinklers are being affected by corrosive conditions.

TABLE 1

Sprinkler Temperature Rating (Fusing Point)	Wax Part Number	Wax Melting Point	Maximum Ambient Ceiling Temperature ¹	Wax Color
155 °F (68 °C) / 165 °F (74 °C)	02568A	148 °F (64 °C)	100 °F (38 °C)	Light Brown
175 °F (79 °C)	04146A	161 °F (71 °C)	150 °F (65 °C)	Brown
200 °F (93 °C)	04146A	161 °F (71 °C)	150 °F (65 °C)	Brown
220 °F (104 °C)	02569A	170 °F (76 °C)	150 °F (65 °C)	Dark Brown
286 °F (141 °C)	02569A	170 °F (76 °C)	150 °F (65 °C)	Dark Brown

¹ Based on NFPA-13. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.



WARNING Never install sprinklers that have been dropped, damaged, or exposed to temperatures in excess of the maximum ambient temperature allowed.

Refer to the appropriate current technical data pages for complete care, handling, and installation instructions. Data pages are included with each shipment from Viking or Viking distributors. They can also be found on the Web site at www.vikinggroupinc.com.



TECHNICAL DATA

SPRINKLER OVERVIEW

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1. DESCRIPTION

Viking fire sprinklers consist of a threaded frame with a specific waterway or orifice size and a deflector for distributing water in a specified pattern. A closed or sealed sprinkler refers to a complete assembly, including the thermosensitive operating element. An open sprinkler does not use an operating element and is open at all times. The distribution of water is intended to extinguish a fire or to control its spread.

Viking sprinklers are available in several models and styles. Refer to specific sprinkler technical data pages for available styles, finishes, temperature ratings, thread sizes, and nominal K-Factors for the particular model selected.

2. LISTINGS AND APPROVALS

Refer to the Approval Charts on the appropriate sprinkler technical data page(s) and/or approval agency listings.



WARNING: Cancer and Reproductive Harm-
www.P65Warnings.ca.gov

3. TECHNICAL DATA

Pressure Ratings:

Maximum allowable water working pressure is 175 psig (12 Bar) unless rated and specified for high water working pressure [250 psig (17.2 bar)].

Sprinkler Identification:

Viking sprinklers are identified and marked with the word "Viking", the sprinkler identification number (SIN) consisting of "VK" plus a three digit number*, the model letter, and the year of manufacture.

Available Finishes:

Viking sprinklers are available in several decorative finishes. Some models are available with corrosion-resistant coatings or are fabricated from non-corrosive material. Refer to the sprinkler technical data page for additional information.

Available Temperature Ratings:

Viking sprinklers are available in several temperature ratings that relate to a specific temperature classification. Applicable installation rules mandate the use and limitations of each temperature classification. In selecting the appropriate temperature classification, the maximum expected ceiling temperature must be known. When there is doubt as to the maximum temperature at the sprinkler location, a maximum-reading thermometer should be used to determine the temperature under conditions that would show the highest readings to be expected. In addition, recognized installation rules may require a higher temperature classification, depending upon sprinkler location, occupancy classification, commodity classification, storage height, and other hazards. In all cases, the maximum expected ceiling temperature dictates the lowest allowable temperature classification. Sprinklers located immediately adjacent to a heat source may require a higher temperature rating.

K-Factors:

Viking sprinklers are available in several orifice sizes with related K-Factors. The orifice is a tapered waterway and, therefore, the K-Factor given is nominal. Nominal U.S. K-Factors are provided in accordance with the 1999 edition of NFPA 13, Section 3-2.3. Refer to the specific data page for appropriate K-Factor information.

Available Styles:

Viking sprinklers are available for installation in several positions as indicated by a stamping on the deflector. The deflector style dictates the appropriate installation position of the sprinkler; it breaks the solid stream of water issuing from the sprinkler orifice to form a specific spray pattern. The following list indicates the various styles and identification of Viking sprinklers.

UPRIGHT SPRINKLER: A sprinkler intended to be installed with the deflector above the frame so water flows upward through the orifice, striking the deflector and forming an umbrella-shaped spray pattern downward. Marked "SSU" (Standard Sprinkler Upright) or "UPRIGHT" on the deflector.

PENDENT SPRINKLER: A sprinkler intended to be oriented with the deflector below the frame so water flows downward through the orifice, striking the deflector and forming an umbrella-shaped spray pattern downward. Marked "SSP" (Standard Sprinkler Pendent) or "PENDENT" on the deflector.

CONVENTIONAL SPRINKLER: An "old style" sprinkler intended to be installed with the deflector in either the upright or pendent position. The deflector provides a spherical type pattern with 40 to 60 percent of the water initially directed downward and a proportion directed upward. Must be installed in accordance with installation rules for conventional or old style sprinklers. DO NOT USE AS A REPLACEMENT FOR STANDARD SPRAY SPRINKLERS. Marked "C U/P" (Conventional Upright/Pendent) on the deflector.

Viking Technical Data may be found on
The Viking Corporation's Web site at
<http://www.vikinggroupinc.com>.
The Web site may include a more recent
edition of this Technical Data Page.



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VERTICAL SIDEWALL (VSW) SPRINKLER: A sprinkler intended for installation near the wall and ceiling. The deflector provides a water spray pattern outward in a quarter-spherical pattern and can be installed in the upright or pendent position with the flow arrow in the direction of discharge. Marked "SIDEWALL" on the deflector with an arrow and the word "FLOW". (Note: Some vertical sidewall sprinklers can only be installed in the upright or pendent position—in this case, the sprinkler will also be marked "UPRIGHT" or "PENDENT".)

HORIZONTAL SIDEWALL (HSW) SPRINKLER: A sprinkler intended for installation near the wall and ceiling. The special deflector provides a water spray pattern outward in a quarter-spherical pattern. Most of the water is directed away from the nearby wall with a small portion directed at the wall behind the sprinkler. The top of the deflector is oriented parallel with the ceiling or roof. The flow arrows point in the direction of discharge. Marked "SIDEWALL" and "TOP" with an arrow and the word "FLOW".

EXTENDED COVERAGE (EC) SPRINKLER: A spray sprinkler designed to discharge water over an area having the maximum dimensions indicated in the individual listings. Maximum area of coverage, minimum flow rate, orifice size, and nominal K-Factor are specified in the individual listings. EC sprinklers are intended for Light-Hazard occupancies with smooth, flat, horizontal ceilings unless otherwise specified. In addition to the above markings, the sprinkler is marked "EC".

QUICK RESPONSE (QR) SPRINKLER: A spray sprinkler with a fast-actuating operating element. The use of quick response sprinklers may be limited due to occupancy and hazard. Refer to the Authority Having Jurisdiction (AHJ) prior to installing.

QUICK RESPONSE EXTENDED COVERAGE (QREC) SPRINKLER: A spray sprinkler designed to discharge water over an area having the maximum dimensions indicated in the individual listing. This is a sprinkler with an operating element that meets the criteria for quick response. QREC sprinklers are only intended for Light Hazard occupancies. The sprinkler is marked "QREC".

FLUSH SPRINKLER: A decorative spray sprinkler intended for installation with a concealed piping system. The unit is mounted flush with the ceiling or wall, with the fusible link exposed. Upon actuation, the deflector extends beyond the ceiling or wall to distribute water discharge. The sprinkler is marked "SSP", "PEND", or "SIDEWALL" and "TOP".

CONCEALED SPRINKLER: A decorative spray sprinkler intended for installation with a concealed piping system. The sprinkler is hidden from view by a cover plate installed flush with the ceiling or wall. During fire conditions, the cover plate detaches, and upon sprinkler actuation, the deflector extends beyond the ceiling or wall to distribute water discharge. The sprinkler is marked "SSP", "PEND", or "SIDEWALL" and "TOP".

RECESSED SPRINKLER: A spray sprinkler assembly intended for installation with a concealed piping system. The assembly consists of a sprinkler installed in a decorative adjustable recessed escutcheon that minimizes the protrusion of the sprinkler beyond the ceiling or wall without adversely affecting the sprinkler distribution or sensitivity. Refer to the appropriate technical data page for allowable sprinkler models, temperature ratings, and occupancy classifications. DO NOT RECESS ANY SPRINKLER NOT LISTED FOR USE WITH THE ESCUTCHEON.

CORROSION-RESISTANT SPRINKLER: A special service sprinkler with non-corrosive protective coatings, or that is fabricated from non-corrosive material, for use in atmospheres that would normally corrode sprinklers.

DRY SPRINKLER: A special-service sprinkler intended for installation on dry pipe systems or wet pipe systems where the sprinkler is subject to freezing temperatures. The unit consists of a sprinkler permanently secured to an extension nipple with a sealed inlet end to prevent water from entering the nipple until the sprinkler operates. The unit MUST be installed in a tee fitting. Dry upright sprinklers are marked with the "B" dimension [distance from the face of the fitting (tee) to the top of the deflector]. Dry pendent and sidewall sprinklers are marked with the "A" dimension [the distance from the face of fitting (tee) to the finished surface of the ceiling or wall].

LARGE DROP SPRINKLER: A type of special application sprinkler used to provide fire control of specific high-challenge fire hazards. Large drop sprinklers are designed to produce an umbrella-shaped spray pattern downward with a higher percentage of "large" water droplets than standard spray sprinklers. The sprinkler has an extra-large orifice with a nominal K-Factor of 11.2. Marked "HIGH CHALLENGE" and "UPRIGHT".

EARLY SUPPRESSION FAST-RESPONSE (ESFR) SPRINKLER: A sprinkler intended to provide fire suppression of specific high-challenge fire hazards through the use of a fast response fusible link, 14.0, 16.8, or 25.2 nominal K-Factor, and special deflector. ESFR sprinklers are designed to produce high-momentum water droplets in a hemispherical pattern below the deflector. This permits penetration of the fire plume and direct wetting of the burning fuel surface while cooling the atmosphere early in the development of a high-challenge fire. Marked "ESFR" and "UPRIGHT" or "PEND".

INTERMEDIATE LEVEL/RACK STORAGE SPRINKLER: A standard spray sprinkler assembly designed to protect its operating element from the spray of sprinklers installed at higher elevations. The assembly consists of a standard or large orifice upright or pendent sprinkler with an integral upright or pendent water shield and guard assembly. Use only those sprinklers that have been tested and listed for use with the assembly. Refer to the technical data page for allowable sprinkler models.

RESIDENTIAL SPRINKLER: A sprinkler intended for use in the following occupancies: one- and two-family dwellings with the fire protection sprinkler system installed in accordance with NFPA 13D; residential occupancies up to four stories in height with the fire protection system installed in accordance with NFPA 13R; and where allowed by the Authority Having Jurisdiction in residential portions of any occupancy with the fire protection system installed in accordance with NFPA 13.



TECHNICAL DATA

SPRINKLER OVERVIEW

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Residential sprinklers have a unique distribution pattern and utilize a “fast response” heat sensitive operating element. They enhance survivability in the room of fire origin and are designed to provide a life safety environment for a minimum of ten minutes. For this reason, residential sprinklers must not be used to replace standard sprinklers unless tested for and approved by the Authority Having Jurisdiction. In addition to standard markings, the unit is identified as “RESIDENTIAL SPRINKLER” or “RES”.

4. INSTALLATION

Refer to appropriate NFPA Installation Standards.

5. OPERATION

Refer to the appropriate sprinkler technical data page(s).

6. INSPECTIONS, TESTS AND MAINTENANCE

Refer to NFPA 25 for Inspection, Testing and Maintenance requirements.

7. AVAILABILITY

Viking sprinklers are available through a network of domestic and international distributors. See The Viking Corporation web site for the closest distributor or contact The Viking Corporation.

8. GUARANTEE

For details of warranty, refer to Viking's current list price schedule or contact Viking directly.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers and the appropriate sprinkler general care, installation, and maintenance guide. Vikings sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, FM Global, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable. The sprinkler technical data page may contain installation requirements specific for the sprinkler model selected. The use of certain types of sprinklers may be limited due to occupancy and hazard. Refer to the Authority Having Jurisdiction prior to installation.

**BULLETIN****REGULATORY AND HEALTH
WARNINGS**

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Visit the Viking website for the latest edition of this technical data page www.vikinggroupinc.com

1. DESCRIPTION

Regulatory and Health Warnings applying to materials used in the manufacture and construction of fire protection products are provided herein as they relate to legally mandated jurisdictional regions.

⚠ WARNING**STATE OF CALIFORNIA, USA**

Installing or servicing fire protection products such as sprinklers, valves, piping etc. can expose you to chemicals including, but not limited to, lead, nickel, butadiene, titanium dioxide, chromium, carbon black, and acrylonitrile which are known to the State of California to cause cancer or birth defects or other reproductive harm.

For more information, go to www.P65Warnings.ca.gov

2. WARRANTY TERMS AND CONDITIONS

For details of warranty, refer to Viking's current list price schedule at www.vikinggroupinc.com or contact Viking directly.



TECHNICAL DATA

MICROFAST® QUICK RESPONSE HORIZONTAL SIDEWALL SPRINKLER VK305 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
 Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com
 Visit the Viking website for the latest edition of this technical data page: www.vikinggroupinc.com

1. DESCRIPTION

The Viking Microfast® Quick Response Horizontal Sidewall Sprinkler VK305 is a small thermosensitive glass bulb spray sprinkler available with various finishes and temperature ratings to meet design requirements. The special Polyester and Electroless Nickel PTFE (ENT) coatings can be used in decorative applications where colors are desired. In addition, these coatings have been investigated for installation in corrosive atmospheres and are listed/approved as corrosion resistant as indicated in Approval Charts.

2. LISTINGS AND APPROVALS



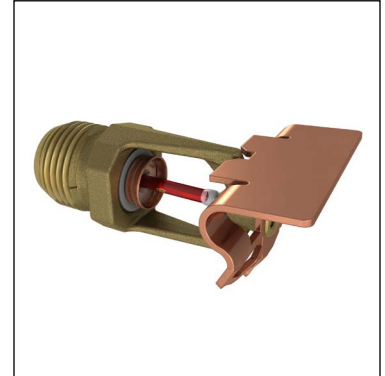
cULus Listed: Category VNIV



FM Approved: Class 2020

China Approval: Approved according to China GB Standard

Refer to Approval Charts and Design Criteria for listing and approval requirements that must be followed.



WARNING: Cancer and Reproductive Harm-
www.P65Warnings.ca.gov

3. TECHNICAL DATA

Specifications:

Minimum Operating Pressure: 7 psi (0.5 bar)
 Rated to 175 psi (12 bar) water working pressure
 Factory tested hydrostatically to 500 psi (34.5 bar)
 Nominal K-Factor: 5.6 U.S. (80.6 metric*)

* Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

Overall Length: 2-3/4" (68 mm)

Material Standards:

Frame Casting: Brass UNS-C84400 or QM Brass
 Deflector: Phosphor Bronze UNS-C51000
 Bulb: Glass, nominal 3 mm diameter
 Belleville Spring Sealing Assembly: Nickel Alloy, coated on both sides with PTFE Tape
 Screw: Brass UNS-C36000
 Pip Cap and Insert Assembly: Copper UNS-C11000 and Stainless Steel UNS-S30400
For Polyester Coated Sprinklers: Belleville Spring-Exposed
For ENT Coated Sprinklers: Belleville Spring - Exposed, Screw and Pip cap - ENT plated.

Ordering Information:

(Also refer to the current Viking price list.)

Order Viking Microfast® Quick Response Horizontal Sidewall Sprinkler VK305 by first adding the appropriate suffix for the sprinkler finish and then the appropriate suffix for the temperature rating to the sprinkler base part number.

Finish Suffix: Brass = A, **Chrome = F**, White Polyester = M-/W, Black Polyester = M-/B, and ENT = JN

Temperature Suffix: 135 °F / 57 °C = A, **155 °F / 68 °C = B**, 175 °F / 79 °C = D, **200 °F / 93 °C = E**, and 286 °F / 141 °C = G

For example, sprinkler 12997 with a Brass finish and a 155 °F / 68 °C temperature rating = Part No. 12997AB

Available Finishes And Temperature Ratings: Refer to Table 1.

Accessories: (Also refer to the Viking website.)

Sprinkler Wrenches:

A. Standard Wrench: Part No. 21475M/B (available since 2017).

B. Wrench for recessed and/or wax coated sprinklers: Part No. 13655W/B** (available since 2006)

**A 1/2" ratchet is required (not available from Viking).



TECHNICAL DATA

MICROFAST® QUICK RESPONSE HORIZONTAL SIDEWALL SPRINKLER VK305 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Visit the Viking website for the latest edition of this technical data page: www.vikinggroupinc.com

Sprinkler Cabinets:

- A. Six-head capacity: Part No. 01724A (available since 1971)
- B. Twelve-head capacity: Part No. 01725A (available since 1971)

4. INSTALLATION

Refer to appropriate NFPA Installation Standards.

5. OPERATION

During fire conditions, the heat-sensitive fusible link disengages, the pip cap and spring are released, and the waterway is opened. Water flowing through the sprinkler orifice strikes the sprinkler deflector, forming a uniform spray pattern to extinguish or control the fire.

6. INSPECTIONS, TESTS AND MAINTENANCE

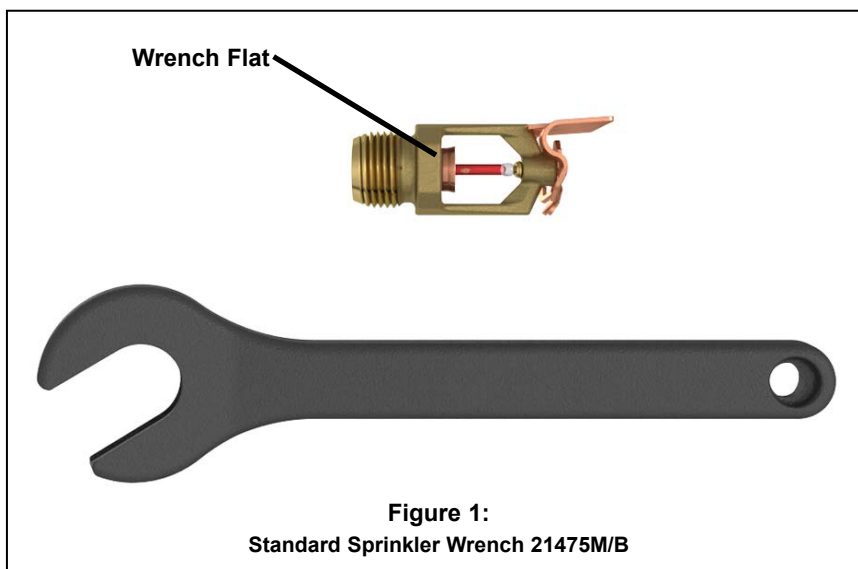
Refer to NFPA 25 for Inspection, Testing and Maintenance requirements.

7. AVAILABILITY

Viking Microfast® Quick Response Horizontal Sidewall Sprinkler VK305 is available through a network of domestic and international distributors. See The Viking Corporation web site for the closest distributor or contact The Viking Corporation.

8. GUARANTEE

For details of warranty, refer to Viking's current list price schedule or contact Viking directly.





TECHNICAL DATA

MICROFAST® QUICK RESPONSE HORIZONTAL SIDEWALL SPRINKLER VK305 (K5.6)

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TABLE 1: AVAILABLE SPRINKLER TEMPERATURE RATINGS AND FINISHES

Sprinkler Temperature Classification	Sprinkler Nominal Temperature Rating ¹	Maximum Ambient Ceiling Temperature ²	Bulb Color
Ordinary	135 °F (57 °C)	100 °F (38 °C)	Orange
Ordinary	155 °F (68 °C)	100 °F (38 °C)	Red
Intermediate	175 °F (79 °C)	150 °F (65 °C)	Yellow
Intermediate	200 °F (93 °C)	150 °F (65 °C)	Green
High	286 °F (141 °C)	225 °F (107 °C)	Blue

Sprinkler Finishes: Brass, Chrome, White Polyester, Black Polyester, and ENT

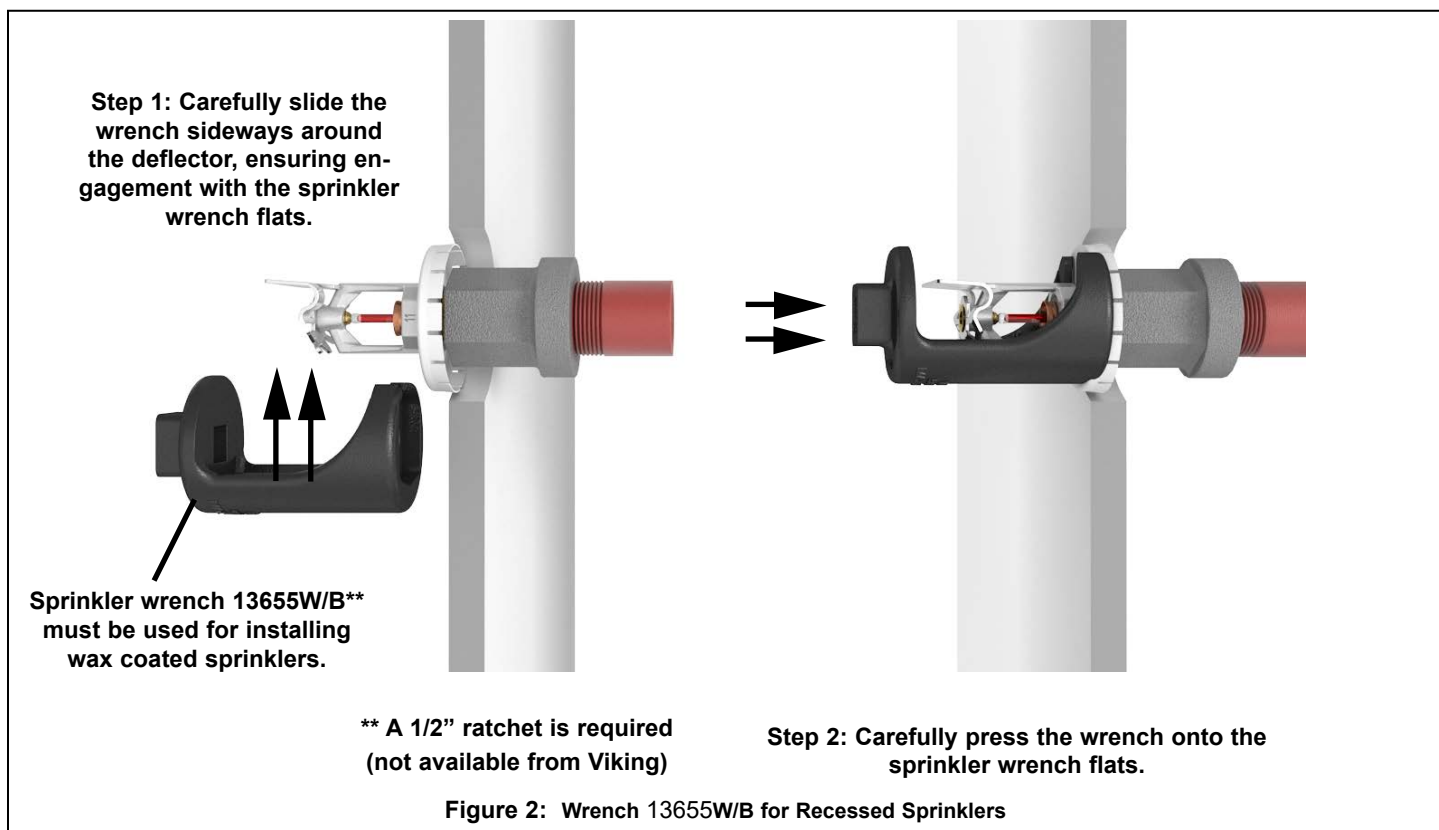
Corrosion-Resistant Coatings³: White Polyester, Black Polyester, and ENT

Footnotes

¹ The sprinkler temperature rating is stamped on the deflector.

² Based on NFPA-13. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.

³ The corrosion-resistant coatings have passed the standard corrosion test required by the approving agencies indicated in the Approval Charts. These tests cannot and do not represent all possible corrosive environments. Prior to installation, verify through the end-user that the coatings are compatible with or suitable for the proposed environment. For automatic sprinklers, the coatings indicated are applied to the exposed exterior surfaces only. For ENT coated sprinklers, the waterway is coated. Note that the spring is exposed on sprinklers with Polyester, and ENT coatings.





TECHNICAL DATA

MICROFAST® QUICK RESPONSE HORIZONTAL SIDEWALL SPRINKLER VK305 (K5.6)

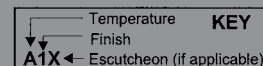
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Approval Chart 1 (UL)

Microfast® Quick Response Horizontal Sidewall Sprinkler VK305
 For Light or Ordinary Hazard Occupancies

Maximum 175 PSI (12 Bar) WWP

Deflector must be located 4" to 12" (102 mm to 305 mm) below the ceiling.



Sprinkler Base Part Number ¹	SIN	Thread Size		Nominal K-Factor		Overall Length		Listings and Approvals ³ (Refer also to UL Design Criteria.)	
		NPT	BSPT	U.S.	metric ²	Inches	mm	cULus ⁴	China Approval
12997	VK305	1/2"	15 mm	5.6	80.6	2-11/16	68	A1W, B1X, C2W, D2Z	--
19782 ⁷	VK305	1/2"	--	5.6	80.6	2-11/16	68	E3	E3

NOTICE - Product Below - Limited Availability (Contact Local Viking Office)

12121	VK305	1/2"	15 mm	5.6	80.6	2-11/16	68	A1W, B1X, C2W, D2Z	--
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Approved Temperature Ratings

A - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C),
 200 °F (93 °C), and 286 °F (141 °C)
 B - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C),
 and 200 °F (93 °C)
 C - 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C),
 and 286 °F (141 °C)
 D - 155 °F (68 °C), 175 °F (79 °C), and 200 °F
 (93 °C)
 E - 155 °F (68 °C)

Approved Finishes

- 1 - Brass, **Chrome**, White Poly-ester^{5,6},
 and Black Polyester^{5,6}
- 2 - ENT⁵
- 3 - Chrome

Approved Escutcheons

W - Installed with standard surface-mounted escutcheons
 X - Installed with standard surface-mounted escutcheons
 or recessed with the Viking Micromatic® Model
 E-1, E-2, or G-1 Recessed Escutcheon
 Z - Installed with standard surface-mounted escutcheons
 or recessed with the Viking Micromatic Model
 E-1

Footnotes

- ¹ Base part number shown. For complete part number, refer to Viking's current price schedule.
² Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.
³ This table shows the listings and approvals available at the time of printing. Other approvals may be in process.
⁴ Listed by Underwriters Laboratories Inc. for use in the U.S. and Canada.
⁵ cULus Listed as corrosion-resistant.
⁶ Other colors are available on request with the same Listings and Approvals as the standard colors.
⁷ Approved according to China GB Standard.

DESIGN CRITERIA - UL

(Also refer to Approval Chart 1.)

cULus Listing Requirements:

Quick Response Horizontal Sprinkler VK305 is cULus Listed as indicated in Approval Chart 1 for installation in accordance with the latest edition of NFPA 13 for sidewall standard spray sprinklers.

- Designed for use in Light and Ordinary Hazard occupancies.
- Locate with the deflector 4" to 12" (102 mm to 305 mm) below the ceiling.
- Protection areas and maximum spacing shall be in accordance with the tables provided in NFPA 13.
- Minimum spacing allowed is 6 ft. (1.8 m).
- Align the top of the deflector parallel with the ceiling.
- Locate no less than 4" (102 mm) from end walls.
- Maximum distance from end walls shall be no more than one-half of the allowable distance between sprinklers. The distance shall be measured perpendicular to the wall.
- The sprinkler installation and obstruction rules contained in NFPA 13 for sidewall standard spray sprinklers must be followed.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to Bulletin Form No. F_080614 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.



TECHNICAL DATA

MICROFAST® QUICK RESPONSE HORIZONTAL SIDEWALL SPRINKLER VK305 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
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 Visit the Viking website for the latest edition of this technical data page: www.vikinggroupinc.com

Approval Chart 1 (FM)

Microfast® Quick Response Sidewall Sprinklers
 Maximum 175 PSI WWP

	Temperature	KEY
↓	Finish	
A1X	Escutcheon (if applicable)	

Sprinkler Base Part Number ¹	SIN	Thread Size		Nominal K-Factor		Overall Length		FM Approvals ^{3,4} (Refer also to Design Criteria below.)	
		NPT	BSPT	U.S.	metric ²	Inches	mm		
12997	VK305	1/2"	15 mm	5.6	80.6	2-11/16	68	A1Y, B1X	
NOTICE - Product Below - Limited Availability (Contact Local Viking Office)									
12121	VK305	1/2"	15 mm	5.6	80.6	2-11/16	68	A1W, B1X, C2W, D2Z	--
Approved Temperature Ratings A - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), and 286 °F (141 °C) B - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), and 200 °F (93 °C)				Approved Finishes 1 - Brass			Approved Escutcheons X - Installed with standard surface-mounted escutcheons or recessed with the Viking Micromatic® Model E-1, E-2, E-3, or G-1 Recessed Escutcheon Y - Installed with standard surface-mounted escutcheons		
Footnotes ¹ Base part number shown. For complete part number, refer to Viking's current price schedule. ² Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0. ³ This table shows the FM Approvals available at the time of printing. Other approvals may be in process. ⁴ Viking vertical sidewall sprinklers may be installed pendent or upright. ⁵ Approved according to China GB Standard.									

DESIGN CRITERIA - FM

(Also refer to Approval Chart 2 above.)

FM Approval Requirements:

Horizontal Sidewall Sprinkler VK305 is FM Approved as a quick response **Non-Storage** sidewall sprinkler as indicated in the FM Approval Guide. For specific application and installation requirements, reference the latest applicable FM Loss Prevention Data Sheets (including Data Sheet 2-0). FM Global Loss Prevention Data Sheets contain guidelines relating to, but not limited to: minimum water supply requirements, hydraulic design, ceiling slope and obstructions, minimum and maximum allowable spacing, and deflector distance below the ceiling.

NOTE: The FM installation guidelines may differ from cULus and/or NFPA criteria.

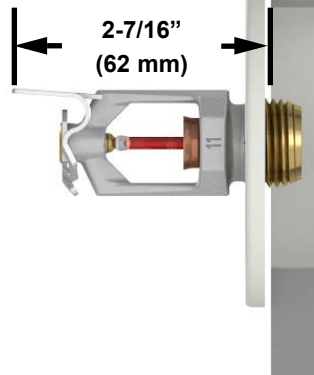
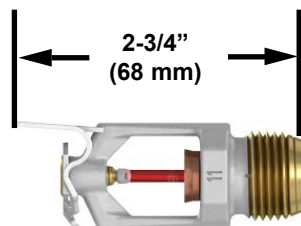
IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to Bulletin Form No. F_080614 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, FM Global, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.



TECHNICAL DATA

MICROFAST® QUICK RESPONSE HORIZONTAL SIDEWALL SPRINKLER VK305 (K5.6)

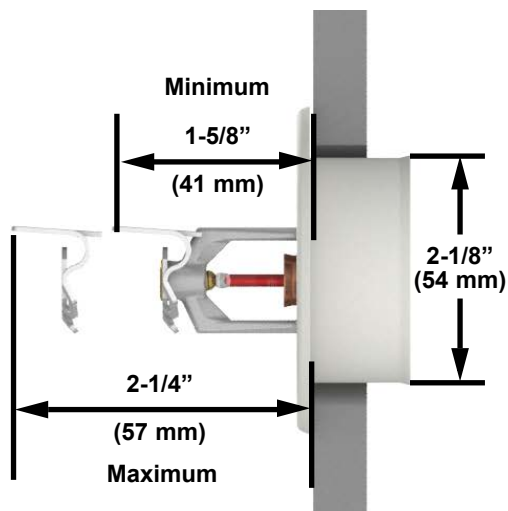
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Wall Opening Size:
 2-5/16" (58.7 mm) minimum
 2-1/2" (63.5 mm) maximum

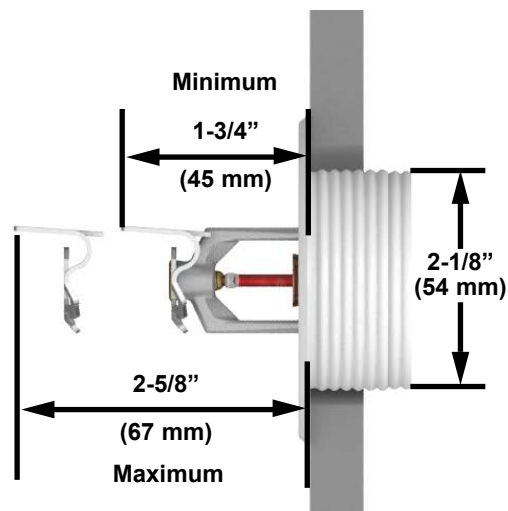
Installed with a Standard
 1/8" Surface-Mounted
 Escutcheon

Figure 3: Sidewall Sprinkler Dimensions with a Standard Escutcheon



Wall Opening Size:
 2-5/16" (58.7 mm) minimum
 2-1/2" (63.5 mm) maximum

Installed with the
 Micromatic Model E-1
 Recessed Escutcheon



Installed with the
 Threaded Model E-2
 Recessed Escutcheon

Figure 4: Sidewall Sprinkler VK305 Dimensions with the Model E-1 and E-2 Recessed Escutcheons



BULLETIN

CARE AND HANDLING
OF SPRINKLERS

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
 Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

SPRINKLERS ARE FRAGILE - HANDLE WITH CARE!**General Handling and Storage:**

- Store sprinklers in a cool, dry place.
- Protect sprinklers during storage, transport, handling, and after installation.
- Use the original shipping containers. DO NOT place sprinklers loose in boxes, bins, or buckets.
- Keep sprinklers separated at all times. DO NOT allow metal parts to contact sprinkler operating elements.

For Pre-Assembled Drops:

- Protect sprinklers during handling and after installation.
- For recessed assemblies, use the protective sprinkler cap (Viking Part Number 10364).

Sprinklers with Protective Shields or Caps:

- DO NOT remove shields or caps until after sprinkler installation and there no longer is potential for mechanical damage to the sprinkler operating elements.
- **Sprinkler shields or caps MUST be removed BEFORE placing the system in service!**
- Remove the sprinkler shield by carefully pulling it apart where it is snapped together.
- Remove the cap by turning it slightly and pulling it off the sprinkler.

Sprinkler Installation:

- DO NOT use the sprinkler deflector or operating element to start or thread the sprinkler into a fitting.
- **Use only the designated sprinkler head wrench!** Refer to the current sprinkler technical data page to determine the correct wrench for the model of sprinkler used.
- DO NOT install sprinklers onto piping at the floor level.
- Install sprinklers after the piping is in place to prevent mechanical damage.
- DO NOT allow impacts such as hammer blows directly to sprinklers or to fittings, pipe, or couplings in close proximity to sprinklers. Sprinklers can be damaged from direct or indirect impacts.
- DO NOT attempt to remove drywall, paint, etc., from sprinklers.
- **Take care not to over-tighten the sprinkler and/or damage its operating parts!**

Maximum Torque:

1/2" NPT: 14 ft-lbs. (19.0 N-m)

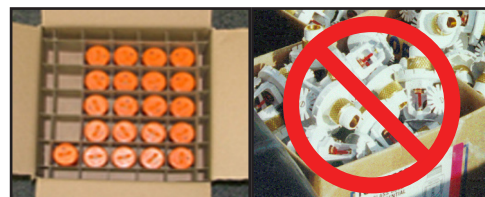
3/4" NPT: 20 ft-lbs. (27.1 N-m)

1" NPT: 30 ft-lbs. (40.7 N-m)



CORRECT
(Original container used)

INCORRECT
(Placed loose in box)



CORRECT
(Protected with caps)

INCORRECT
(Protective caps not used)



CORRECT
(Piping is in place at the ceiling)

INCORRECT
(Sprinkler at floor level)



CORRECT
(Special installation wrenches)

INCORRECT
(Designated wrench not used)



WARNING: Cancer and Reproductive Harm-
www.P65Warnings.ca.gov

! WARNING

Any sprinkler with a loss of liquid from the glass bulb or damage to the fusible element should be destroyed. Never install sprinklers that have been dropped, damaged, or exposed to temperatures exceeding the maximum ambient temperature allowed. Sprinklers that have been painted in the field must be replaced per NFPA 13. Protect sprinklers from paint and paint overspray in accordance with the installation standards. Do not clean sprinklers with soap and water, ammonia, or any other cleaning fluid. Do not use adhesives or solvents on sprinklers or their operating elements.

Refer to the appropriate technical data page and NFPA standards for complete care, handling, installation, and maintenance instructions. For additional product and system information Viking data pages and installation instructions are available on the Viking Web site at www.vikinggroupinc.com.



BULLETIN

CARE AND HANDLING
OF SPRINKLERS

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PROTECTIVE SPRINKLER SHIELDS AND CAPS

General Handling and Storage:

Many Viking sprinklers are available with a plastic protective cap or shield temporarily covering the operating elements. The snap-on shields and caps are factory installed and are intended to help protect the operating elements from mechanical damage during shipping, storage, and installation. NOTE: It is still necessary to follow the care and handling instructions on the appropriate sprinkler technical data sheets* when installing sprinklers with bulb shields or caps.

WHEN TO REMOVE THE SHIELDS AND CAPS:

NOTE: SHIELDS AND CAPS MUST BE REMOVED FROM SPRINKLERS BEFORE PLACING THE SYSTEM IN SERVICE!

Remove the shield or cap from the sprinkler only after checking all of the following:

- The sprinkler has been installed*.
- The wall or ceiling finish work is completed where the sprinkler is installed and there no longer is a potential for mechanical damage to the sprinkler operating elements.

SHIELDS AND CAPS MUST BE REMOVED FROM SPRINKLERS BEFORE PLACING THE SYSTEM IN SERVICE!

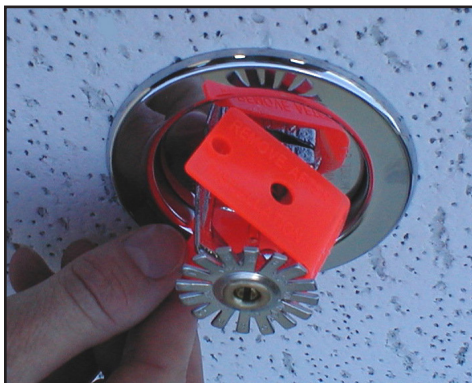


Figure 1: Sprinkler shield being removed from a pendent sprinkler.



Figure 2: Sprinkler cap being removed from a pendent sprinkler.



Figure 3: Sprinkler cap being removed from an upright sprinkler.

HOW TO REMOVE SHIELDS AND CAPS:

No tools are necessary to remove the shields or caps from sprinklers. DO NOT use any sharp objects to remove them! **Take care not to cause mechanical damage to sprinklers when removing the shields or caps.** When removing caps from fusible element sprinklers, use care to prevent dislodging ejector springs or damaging fusible elements. NOTE: Squeezing the sprinkler cap excessively could damage sprinkler fusible elements.

- To remove the shield, simply pull the ends of the shield apart where it is snapped together. Refer to Figure 1.
- To remove the cap, turn it slightly and pull it off the sprinkler. Refer to Figures 2 and 3.

NOTICE

Refer to the current sprinkler technical data page to determine the correct sprinkler wrench for the model of sprinkler used.



Never install sprinklers that have been dropped, damaged, or exposed to temperatures in excess of the maximum ambient temperature allowed.

* Refer to the appropriate current technical data pages for complete care, handling, and installation instructions. Data pages are included with each shipment from Viking or Viking distributors. They can also be found on the Web site at www.vikinggroupinc.com.



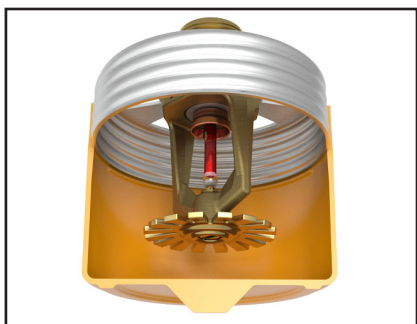
BULLETIN

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CONCEALED COVER ASSEMBLIES ARE FRAGILE!
TO ASSURE SATISFACTORY PERFORMANCE OF THE PRODUCT, HANDLE WITH CARE.



Concealed Sprinkler and Adapter
 Assembly with Protective Cap



Concealed Sprinkler and Adapter
 Assembly (Protective Cap Removed)

Cover Plate Assembly
 (Pendent Cover 12381 shown)



GENERAL HANDLING AND STORAGE INSTRUCTIONS:

- Do not store in temperatures exceeding 100 °F (38 °C). Avoid direct sunlight and confined areas subject to heat.
- Protect sprinklers and cover assemblies during storage, transport, handling, and after installation.
 - Use original shipping containers.
 - Do not place sprinklers or cover assemblies loose in boxes, bins, or buckets.
- Keep the sprinkler bodies covered with the protective sprinkler cap any time the sprinklers are shipped or handled, during testing of the system, and while ceiling finish work is being completed.
- Use only the designated Viking recessed sprinkler wrench (refer to the appropriate sprinkler data page) to install these sprinklers. **NOTE:** The protective cap is temporarily removed during installation and then placed back on the sprinkler for protection until finish work is completed.
- Do not over-tighten the sprinklers into fittings during installation.
- Do not use the sprinkler deflector to start or thread the sprinklers into fittings during installation.
- Do not attempt to remove drywall, paint, etc., from the sprinklers.
- Remove the plastic protective cap from the sprinkler before attaching the cover plate assembly. **PROTECTIVE CAPS MUST BE REMOVED FROM SPRINKLERS BEFORE PLACING THE SYSTEM IN SERVICE!**

Refer to the appropriate current technical data pages for complete care, handling, and installation instructions. Data pages are included with each shipment from Viking or Viking distributors. They can also be found on the Web site at www.vikinggroupinc.com.



BULLETIN

CARE AND HANDLING
OF SPRINKLERS

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

USE THE FOLLOWING PRECAUTIONS WHEN HANDLING WAX-COATED SPRINKLERS

Many of Viking's sprinklers are available with factory-applied wax coating for corrosion resistance. These sprinklers **MUST** receive appropriate care and handling to avoid damaging the wax coating and to assure satisfactory performance of the product.

General Handling and Storage of Wax-Coated Sprinklers:

- Store the sprinklers in a cool, dry place (in temperatures below the maximum ambient temperature allowed for the sprinkler temperature rating. Refer to Table 1 below.)
- Store containers of wax-coated sprinklers separate from other sprinklers.
- Protect the sprinklers during storage, transport, handling, and after installation.
- Use original shipping containers.
- Do not place sprinklers in loose boxes, bins, or buckets.

Installation of Wax-Coated Sprinklers:

Use only the special sprinkler head wrench designed for installing wax-coated Viking sprinklers (any other wrench may damage the unit).

- Take care not to crack the wax coating on the units.
- For touching up the wax coating after installation, wax is available from Viking in bar form. Refer to Table 1 below. The coating **MUST** be repaired after sprinkler installation to protect the corrosion-resistant properties of the sprinkler.
- Use care when locating sprinklers near fixtures that can generate heat. Do not install sprinklers where they would be exposed to temperatures exceeding the maximum recommended ambient temperature for the temperature rating used.
- Inspect the coated sprinklers frequently soon after installation to verify the integrity of the corrosion resistant coating. Thereafter, inspect representative samples of the coated sprinklers in accordance with NFPA 25. Close up visual inspections are necessary to determine whether the sprinklers are being affected by corrosive conditions.

TABLE 1

Sprinkler Temperature Rating (Fusing Point)	Wax Part Number	Wax Melting Point	Maximum Ambient Ceiling Temperature ¹	Wax Color
155 °F (68 °C) / 165 °F (74 °C)	02568A	148 °F (64 °C)	100 °F (38 °C)	Light Brown
175 °F (79 °C)	04146A	161 °F (71 °C)	150 °F (65 °C)	Brown
200 °F (93 °C)	04146A	161 °F (71 °C)	150 °F (65 °C)	Brown
220 °F (104 °C)	02569A	170 °F (76 °C)	150 °F (65 °C)	Dark Brown
286 °F (141 °C)	02569A	170 °F (76 °C)	150 °F (65 °C)	Dark Brown

¹ Based on NFPA-13. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.



WARNING Never install sprinklers that have been dropped, damaged, or exposed to temperatures in excess of the maximum ambient temperature allowed.

Refer to the appropriate current technical data pages for complete care, handling, and installation instructions. Data pages are included with each shipment from Viking or Viking distributors. They can also be found on the Web site at www.vikinggroupinc.com.

**BULLETIN****REGULATORY AND HEALTH
WARNINGS**

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Visit the Viking website for the latest edition of this technical data page www.vikinggroupinc.com

1. DESCRIPTION

Regulatory and Health Warnings applying to materials used in the manufacture and construction of fire protection products are provided herein as they relate to legally mandated jurisdictional regions.

⚠ WARNING**STATE OF CALIFORNIA, USA**

Installing or servicing fire protection products such as sprinklers, valves, piping etc. can expose you to chemicals including, but not limited to, lead, nickel, butadiene, titanium dioxide, chromium, carbon black, and acrylonitrile which are known to the State of California to cause cancer or birth defects or other reproductive harm.

For more information, go to www.P65Warnings.ca.gov

2. WARRANTY TERMS AND CONDITIONS

For details of warranty, refer to Viking's current list price schedule at www.vikinggroupinc.com or contact Viking directly.



TECHNICAL DATA

FREEDOM® RESIDENTIAL PENDENT SPRINKLER VK468 (K4.9)

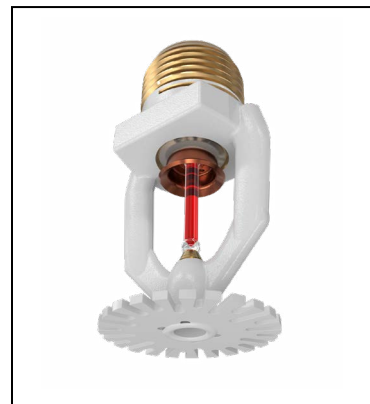
The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

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1. DESCRIPTION

Viking Freedom® Residential Pendent Sprinkler VK468 is a small, thermosensitive, glass-bulb residential sprinkler available in several different finishes and temperature ratings to meet varying design requirements. The Electroless Nickel PTFE (ENT) coating has been investigated for installation in corrosive atmospheres and is C-UL-US-EU Listed as corrosion resistant as indicated in the Approval Chart. The orifice design, with a K-Factor of 4.9 (70.6 metric†), allows efficient use of available water supplies for the hydraulically designed fire-protection system. The glass bulb operating element and special deflector characteristics meet the challenges of residential sprinkler standards.



2. LISTINGS AND APPROVALS



UL Listed (C-UL-US-EU): Category VKKW



VdS Approved

Refer to the Approval Chart and Design Criteria for C-UL-US-EU Listing requirements that must be followed.

3. TECHNICAL DATA

Specifications:

Available since 2006.

Minimum Operating Pressure: Refer to the Approval Chart.

Maximum Working Pressure: 175 psi (12 bar). Factory-tested hydrostatically to 500 psi (34.5 bar).

Thread size: 1/2" (15 mm) NPT

Nominal K-Factor: 4.9 U.S. (70.6 metric†)

†Metric K-factor measurement shown is in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

Glass-bulb fluid temperature rated to -65 °F (-55 °C)

Overall Length: 2-1/4" (58 mm)

Material Standards:

Frame Casting: Brass UNS-C84400, QM Brass, or DZR brass

Deflector: Phosphor Bronze UNS-C51000

Bulb: Glass, nominal 3 mm diameter

Belleville Spring Sealing Assembly: Nickel Alloy, coated on both sides with Polytetrafluoroethylene (PTFE) Tape

Pip Cap and Insert Assembly: Copper UNS-C11000 and Stainless Steel UNS-S30400

Compression Screw: Brass UNS-C36000

For ENT-coated sprinklers: Belleville spring - Exposed, Screw and Pipcap - ENT plated.



WARNING: Cancer and Reproductive Harm-
www.P65Warnings.ca.gov

4. INSTALLATION

Refer to appropriate NFPA Installation Standards.

5. OPERATION

During fire conditions, the heat-sensitive liquid in the glass bulb expands, causing the glass to shatter, releasing the pip cap and sealing spring assembly. Water flowing through the sprinkler orifice strikes the sprinkler deflector, forming a uniform spray pattern to extinguish or control the fire.

6. INSPECTIONS, TESTS AND MAINTENANCE

Refer to NFPA 25 for Inspection, Testing and Maintenance requirements.

7. AVAILABILITY

The Viking Model VK468 Sprinkler is available through a network of domestic and international distributors. See The Viking Corporation web site for the closest distributor or contact The Viking Corporation.

8. GUARANTEE

For details of warranty, refer to Viking's current list price schedule or contact Viking directly.



TECHNICAL DATA

FREEDOM® RESIDENTIAL PENDENT SPRINKLER VK468 (K4.9)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
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 Visit the Viking website for the latest edition of this technical data page www.vikinggroupinc.com

TABLE 1: AVAILABLE SPRINKLER TEMPERATURE RATINGS AND FINISHES

Sprinkler Temperature Classification	Sprinkler Nominal Temperature Rating ¹	Maximum Ambient Ceiling Temperature ²	Bulb Color
Ordinary	155 °F (68 °C)	100 °F (38 °C)	Red
Intermediate	175 °F (79 °C)	150 °F (65 °C)	Yellow

Sprinkler Finishes: Brass, chrome, white polyester³, black polyester³, and ENT^{3,4}

Footnotes

¹ The sprinkler temperature rating is stamped on the deflector.

² Based on NFPA-13. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.

³ Sprinklers with ENT, White Polyester, and Black Polyester finishes are C-UL-US-EU Listed as corrosion resistant.

⁴ The ENT coating has passed the standard corrosion test required by the approving agencies indicated in the Approval Chart. These tests cannot and do not represent all possible corrosive environments. Prior to installation, verify through the end-user that the coatings are compatible with or suitable for the proposed environment. For ENT coated sprinklers, the waterway is coated. Note that the spring is exposed on sprinklers with ENT coating.

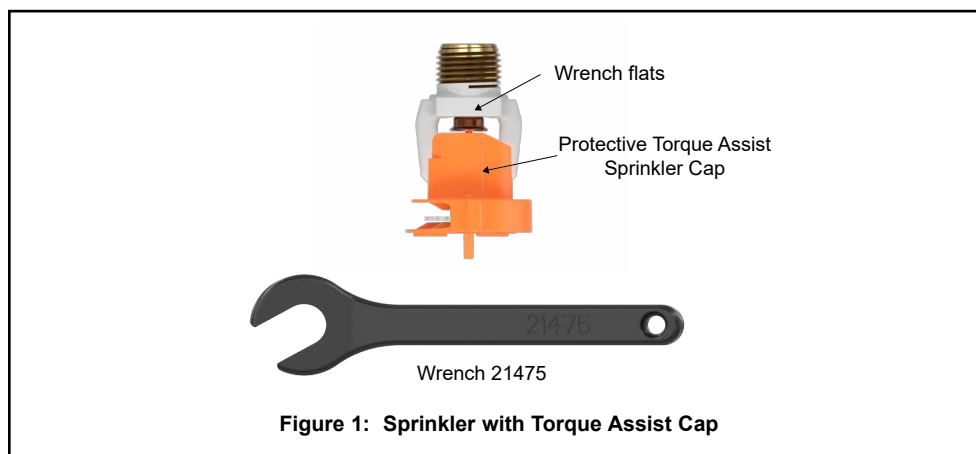


Figure 1: Sprinkler with Torque Assist Cap



TECHNICAL DATA

FREEDOM® RESIDENTIAL PENDENT SPRINKLER VK468 (K4.9)

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Ordering Instructions

1. Choose a sprinkler base part number with the required thread size and listing or approval (refer to the approval chart).
2. Add the suffix for the desired finish.
3. Add the suffix for the desired temperature rating.

EXAMPLE: 13637AB-TQ = VK468 with brass finish and 155 °F (66 °C) nominal temperature rating. This sprinkler is to be installed into an InstaSeal® fitting in an area with a maximum ambient temperature of 100 °F (38 °C).

NOTE: The "TQ" suffix for the part number below indicates a special protective cap (Figure 2-B) intended for use with InstaSeal® fittings. When ordering sprinklers with TQ suffixes in combination with InstaSeal fittings, refer to Form No. F_021323 for installation instructions.

Sprinkler Base Part Number	
Part Number*	Thread Size
13637XX-TQ	1/2" NPT

Temperature Ratings			
Temperature Rating	Bulb Color	Maximum Ambient Ceiling Temperature	Suffix
155 °F (68 °C)	Red	100 °F (38 °C)	B
175 °F (79 °C)	Yellow	150 °F (66 °C)	D

* Where "X" is shown in the base part number, enter the desired suffix for temperature rating (EXAMPLE: 13637AE-TQ)

Accessories
Standard Wrench: Part no. 21475M/B
Recessed wrench: Part no. 13577W/B (requires a 1/2" wrench not available from Viking)
Protective sprinkler cap/escutcheon installation tool: Part no. 15915 (Allows use from the floor by attaching a 1" diameter CPVC tubing to the tool. Ideal for sprinkler cabinets. Refer to bulletin F_051808.
Sprinkler Cabinet: Part no. 01724A (up to 6 sprinklers) or 01725A (up to 12 sprinklers)



TECHNICAL DATA

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Approval Chart

Viking VK468, 4.9 K-Factor Residential Pendent Sprinkler

For systems designed to NFPA 13D or NFPA 13R. For systems designed to NFPA 13, refer to the design criteria. For Ceiling types refer to current editions of NFPA 13, 13R or 13D

Sprinkler Base Part Number ¹	SIN	NPT Thread Size		Nominal K-Factor		Maximum Water Working Pressure	Overall Length		
		Inches	mm	U.S.	metric ²		Inches	mm	
13637XX-TQ	VK468	1/2	15	4.9	70.6	175 psi (12 bar)	2-1/4	58	
Max. Coverage Area ⁴ Ft.X Ft. (m X m)	Ordinary Temp Rating (155 °F/68 °C)		Intermediate Temp Rating (175 °F/79 °C)		Deflector to Ceiling	Installation Type	Listings and Approvals ³		Minimum Spacing Ft. (m)
	Flow ⁴ GPM (L/min)	Pressure ⁴ PSI (bar)	Flow ⁴ GPM (L/min)	Pressure ⁴ PSI (bar)			C-UL-US-EU ⁵	VdS	
12 X 12 (3.7 X 3.7)	13 (49.2)	7.0 (0.48)	13 (49.2)	7.0 (0.48)	1-1/8 to 2 inch	Standard surface-mounted escutcheons, or recessed with the Micromatic® Model E-1, E-2, or E-3 recessed escutcheon	See footnotes 6 and 7.	See footnotes 6 and 7.	8 (2.4)
14 X 14 (4.3 X 4.3)	13 (49.2)	7.0 (0.48)	13 (49.2)	7.0 (0.48)					
16 X 16 (4.9 X 4.9)	13 (49.2)	7.0 (0.48)	13 (49.2)	7.0 (0.48)					
18 X 18 (5.5 X 5.5)	17 (64.4)	12.0 (0.83)	17 (64.4)	12.0 (0.83)					
20 X 20 (6.1 X 6.1)	20 (75.7)	16.7 (1.15)	20 (75.7)	16.7 (1.15)					

Footnotes

¹ Part number shown is the base part number. For complete part number, refer to Viking's current price schedule.

² Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

³ This chart shows the listings and approvals available at the time of printing. Other approvals may be in process. Check with the manufacturer for any additional approvals. Refer also to Design Criteria.

⁴ For areas of coverage smaller than shown, use the "Flow" and "Pressure" for the next larger area listed. Flows and pressures listed are per sprinkler. The distance from sprinklers to walls shall not exceed one-half the sprinkler spacing indicated for the minimum "Flow" and "Pressure" used.

⁵ Listed by Underwriter's Laboratories, Inc. for use in the U.S., Canada, and European Union.

⁶ Approved Finishes are: brass, chrome, white polyester, and black polyester. Other paint colors are available on request with the same C-UL-US-EU listings as the standard finish colors.

⁷ Approved finish is Electroless Nickel PTFE (ENT). Sprinklers with ENT, white polyester, and black polyester finishes are C-UL-US-EU Listed as corrosion-resistant. ENT is available with standard surface-mounted escutcheons or the Micromatic Model E-1 recessed escutcheon.



TECHNICAL DATA

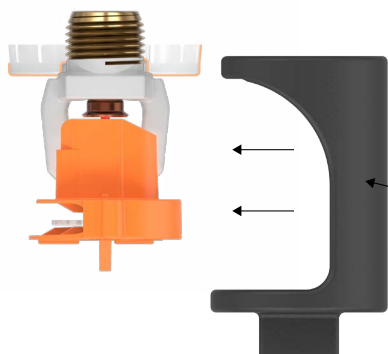
FREEDOM® RESIDENTIAL PENDENT SPRINKLER VK468 (K4.9)

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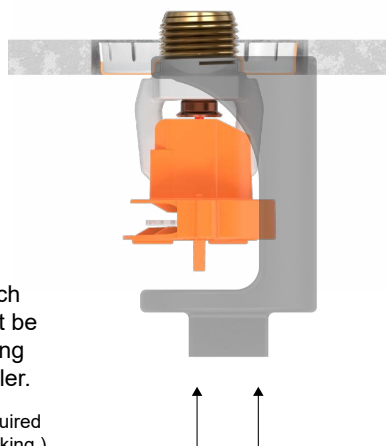
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Step 1:
Carefully slide the wrench sideways
around the deflector and protective clip.
(Note the clip orientation in the wrench.)



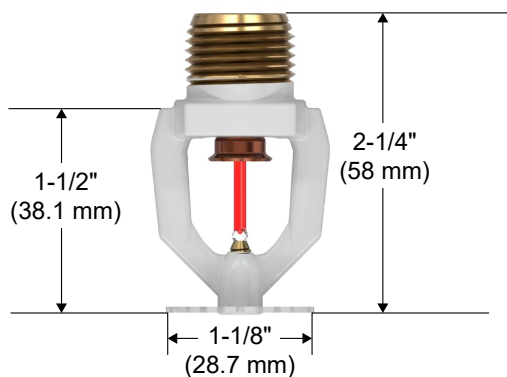
Step 2:
Carefully press the wrench upward
and turn slightly to ensure engage-
ment with the sprinkler wrench flats.



Sprinkler wrench
13577W/B* must be
used for installing
recessed sprinkler.

*A 1/2" ratchet is required
(not available from Viking.)

Figure 2: Wrench 13577W/B for Recessed Sprinkler



Installed with a standard 1/8"
(3.1 mm) surface-mounted escutcheon

Figure 3: Sprinkler VK468 Dimensions with a Standard Escutcheon



TECHNICAL DATA

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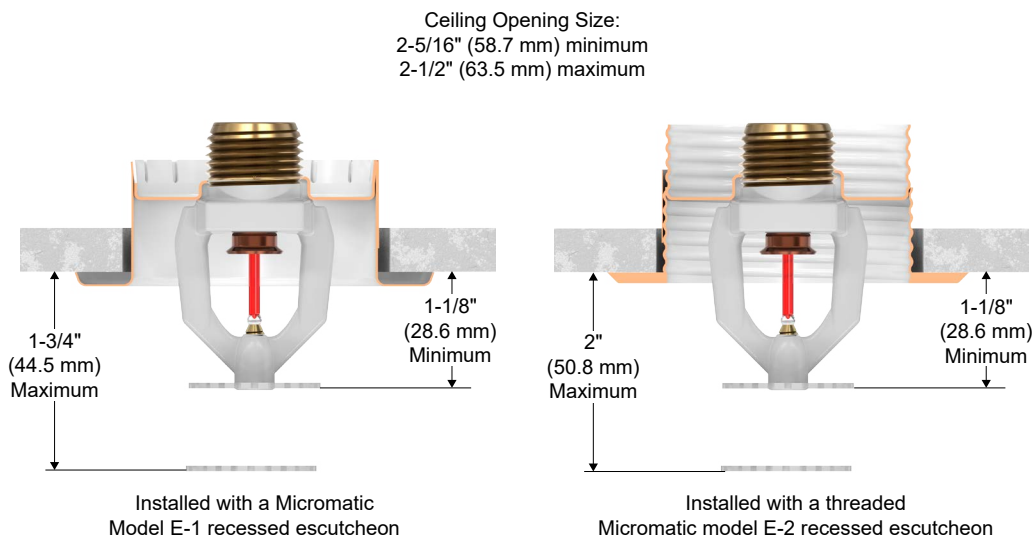


Figure 4: Sprinkler VK468 Dimensions with the Model E-1 and E-2 Recessed Escutcheons

DESIGN CRITERIA

(Also refer to the Approval Chart.)

UL Listing Requirements (C-UL-US-EU):

When using Viking Residential Pendent Sprinkler VK468 for systems designed to NFPA 13D or NFPA 13R, apply the listed areas of coverage and minimum water supply requirements shown in the Approval Chart.

For systems designed to NFPA 13: The number of design sprinklers is to be the four contiguous most hydraulically demanding sprinklers. The minimum required discharge from each of the four sprinklers is to be the greater of the following:

- The flow rates given in the Approval Chart for NFPA 13D and NFPA13R applications for each listed area of coverage, **or**
- Calculated based on a minimum discharge of 0.1 gpm/sq. ft. over the "design area" in accordance with the applicable NFPA 13 edition.
- Minimum distance between residential sprinklers: 8 ft. (2.4 m).
- Venting is not required.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to Form No. F_080614, F_080415 and F_080190 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, VdS, and any other similar Authorities Having Jurisdiction, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable. Final approval and acceptance of all residential sprinkler installations must be obtained from the Authorities Having Jurisdiction.



Viking Residential Sprinkler Installation Guide

October 25, 2018



WARNING: Cancer and Reproductive Harm-
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www.vikinggroupinc.com



TECHNICAL DATA

FREEDOM® RESIDENTIAL SPRINKLER INSTALLATION GUIDE

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

1. DESCRIPTION

Viking residential automatic sprinklers are equipped with a "fast response" heat-sensitive operating element designed to respond individually and quickly to a specific high temperature. Viking residential sprinklers are designed to combine speed of operation with water distribution characteristics to help in the control of residential fires and to improve life safety by prolonging the time available for occupants to escape or be evacuated.

2. LISTINGS AND APPROVALS

Refer to the Approval Charts on the appropriate sprinkler technical data page(s) and/or approval agency listings.

- A. Viking residential sprinklers are intended for use in the following occupancies: one- and two-family dwellings and mobile homes with the fire protection sprinkler system installed in accordance with NFPA 13D; residential occupancies up to four stories in height with the fire protection system installed in accordance with NFPA 13R; or residential portions of any occupancy with the fire protection system installed in accordance with NFPA 13. Information contained in this guide is based on NFPA 13, "Standard for the Installation of Sprinkler Systems".
- B. The design criteria for residential sprinklers contained in the NFPA installation standards must be followed except as modified by the individual UL 1626 listing information provided in the technical data pages and this Residential Sprinkler Installation Guide. For listed areas of coverage, technical data, and specific design and installation instructions, refer to the appropriate Viking technical data page for the sprinkler model used.
- C. Viking residential sprinklers listed by Underwriters Laboratories, Inc. (UL) have passed fire tests designed to represent fire conditions for the sprinkler's listed area of coverage. The standards for residential sprinkler performance and spray patterns are printed in Underwriters Laboratories Publication UL 1626, "Standard for Residential Sprinklers for Fire Protection Service". All listed Viking residential sprinklers meet or exceed UL 1626 performance requirements and spray pattern criteria for their listed areas of coverage.
- D. NFPA standards allow use of residential sprinklers with rates, design areas, areas of coverage, and minimum design pressures other than those specified in the standards when they have been listed for such specific residential installation conditions.

3. TECHNICAL DATA

Specifications:

Refer to the appropriate sprinkler technical data sheet.

Material Standards:

Refer to the appropriate sprinkler technical data sheet.

Viking Technical Data may be found on
The Viking Corporation's Web site at
<http://www.vikinggroupinc.com>.
The Web site may include a more recent
edition of this Technical Data Page.

4. INSTALLATION

NOTE: Take care not to over-tighten the sprinkler and/or damage its operating parts!

Maximum Torque: 1/2" NPT: 14 ft-lbs. (19.0 N-m) 3/4" NPT: 20 ft-lbs. (27.1 N-m)

A. Care and Handling (also refer to Bulletin - Care and Handling of Sprinklers, Form No. F_091699.)

Sprinklers must be handled with care and protected from mechanical damage during storage, transport, handling, and after installation.

Store sprinklers in a cool, dry place in their original container.

Use care when locating sprinklers near fixtures that can generate heat.

Never install sprinklers that have been dropped, damaged in any way, or exposed to temperatures exceeding the maximum ambient temperature allowed (refer to Table 1.)

Never install any glass-bulb sprinkler if the bulb is cracked or if there is a loss of liquid from the bulb. A small air bubble should be present in the glass bulb. Any sprinkler with a loss of liquid from the glass bulb or damage to the fusible element should be destroyed immediately. (Note: Installing glass bulb sprinklers in direct sunlight (ultraviolet light) may affect the color of the dye used to color code the bulb. This color change does not affect the integrity of the bulb.)

Viking residential sprinklers are intended for use on wet pipe residential systems only. Adequate heat must be provided for wet-pipe systems. DO NOT use Viking residential sprinklers on dry systems unless specifically allowed by recognized installation standards or the Authority Having Jurisdiction.

Residential concealed sprinklers must be installed in neutral or negative pressure plenums only!

Corrosion-resistant sprinklers must be installed when subject to corrosive atmospheres. **NOTE:** Viking residential sprinklers are not intended for use in corrosive environments.



TECHNICAL DATA

FREEDOM® RESIDENTIAL SPRINKLER INSTALLATION GUIDE

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TABLE 1: RESIDENTIAL SPRINKLER TEMPERATURE RATINGS

Sprinkler Temperature Classification	Sprinkler Nominal Temperature Rating ¹	Maximum Ambient Ceiling Temperature ³	Bulb Color
Residential Glass Bulb Style Sprinklers			
Ordinary	155 °F (68 °C)	100 °F (38 °C)	Red
Intermediate	175 °F (79 °C)	150 °F (65 °C)	Yellow
Sprinkler Temperature Classification	Sprinkler Nominal Temperature Rating (Fusing Point) ¹	Maximum Ambient Ceiling Temperature ³	
Residential Fusible Element Style Sprinklers			
Ordinary	165 °F (74 °C)	100 °F (38 °C)	
Sprinkler Temperature Classification	Sprinkler Nominal Temperature Rating (Fusing Point)	Maximum Ambient Ceiling Temperature ³	Temperature Identification Stamp
Residential Flush Style Sprinklers			
Ordinary	165 °F (74 °C)	100 °F (38 °C)	On Cover or Sprinkler Inlet (VK476)
Intermediate	220 °F (104 °C)	150 °F (65 °C)	On Cover
Sprinkler Temperature Classification	Sprinkler Nominal Temperature Rating (Fusing Point)	Maximum Ambient Ceiling Temperature ³	Cover Plate Temperature Rating
Residential Concealed Style Sprinklers			
Ordinary	135 °F (57 °C) ¹ , 140 °F (60 °C) ² , 155 °F (68 °C) ¹ , or 165 °F (74 °C) ¹	100 °F (38 °C)	135 °F (57 °C)

Footnotes

¹ The sprinkler temperature rating is stamped on the deflector or flow shaper.

² The temperature rating is stamped on the sprinkler.

³ Based on NFPA-13. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.

B. Installation Instructions

Viking sprinklers are manufactured and tested to meet the rigid requirements of approving agencies. They are designed to be installed in accordance with recognized installation standards NFPA 13, NFPA 13R, and NFPA 13D, and any associated TIAs.

Deviation from the standards or any alteration to the sprinklers or cover plate assemblies after they leave the factory including, but not limited to: painting, plating, coating, or modification, may render the sprinklers inoperative and will automatically nullify the approval and any guarantee made by Viking.

The use of residential sprinklers may be limited due to occupancy and hazard. Residential fire protection systems must be designed and installed only by those who are completely familiar with the appropriate standards and codes, and thoroughly experienced in fire protection design, hydraulic calculations, and sprinkler system installation.

Before installation, be sure to have the appropriate sprinkler model and style, with the correct K-Factor, temperature rating, and response characteristics. Viking residential sprinklers must be installed after the piping is in place to prevent mechanical damage. Keep sprinklers with protective caps or bulb shields contained within the caps or shields during installation and testing, and any time the sprinkler is shipped or handled.

1a. For frame-style sprinklers, install escutcheon (if used), which is designed to thread onto the external threads of the sprinkler*.

*Refer to the appropriate sprinkler technical data page to determine approved escutcheons for use with specific sprinkler models.

1b. For flush and concealed style sprinklers: Cut the sprinkler nipple so that the ½" or ¾" (15 mm or 20 mm) NPT** outlet of the reducing coupling is at the desired location and centered in the opening** in the ceiling or wall.

**Size depends on the sprinkler model used. Refer to appropriate sprinkler data page.



TECHNICAL DATA

FREEDOM® RESIDENTIAL SPRINKLER INSTALLATION GUIDE

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DESIGN CRITERIA

For Systems Designed to NFPA 13D or NFPA 13R: Apply the listed areas of coverage and minimum water supply requirements shown in the approval charts on the residential sprinkler data pages. The sprinkler flow rate is the minimum required discharge from each of the total number of design sprinklers as specified in NFPA 13D or NFPA 13R.

For Systems Designed to the latest edition of NFPA 13: The number of design sprinklers is to be the four most hydraulically demanding sprinklers. The minimum required discharge from each of the four sprinklers is to be the greater of the following:

- The flow rates given in the approval charts on the data pages for NFPA 13D and NFPA13R for each area of coverage listed, or
- Calculated based on a minimum discharge of 0.1 gpm/sq. ft. over the “design area” in accordance with sections 8.5.2.1 or 8.6.2.1.2 of NFPA 13. The greatest dimension of the coverage area cannot be any greater than the maximum areas of coverage shown on the data pages.

Flow Rates

All residential sprinklers manufactured on or after July 12, 2002 are listed with a single minimum flow rate. Where rooms have more than one sprinkler, multiple-sprinkler calculations are still required, but the first sprinkler and any additional sprinkler or sprinklers must be calculated flowing at identical minimum flow rates, based on the area of sprinkler coverage, using the minimum flow and pressure listed for the sprinkler model used.

Consult the appropriate standards and the Authorities Having Jurisdiction to determine the number of sprinklers to hydraulically calculate to verify adequate water supply for multiple-sprinkler operation.

Operating Pressure: The minimum operating pressure of any sprinkler shall be the minimum operating pressure specified by the listing, or 7 psi (0.5 bar), whichever is greater. The maximum allowable operating pressure is 175 psi (12 bar).

Areas of Coverage

If the actual area of coverage is less than the listed area of coverage, use the minimum water supply for the next larger area of coverage listed. DO NOT interpolate. Residential sprinkler systems must be hydraulically calculated according to NFPA standards to verify that the water supply is adequate for proper operation of the sprinklers. Hydraulic calculations are required to verify adequate water supply at the hydraulically most remote single sprinkler when it is operating at the minimum gpm and psi listed for single-sprinkler operation for the sprinkler model used.

Viking residential sprinklers may be listed for more than one area of coverage. Suggested practice in selecting area of coverage is to select the one that can be adequately supplied by the available water supply and still allow for the installation of as few sprinklers in a compartment as possible while observing all guidelines pertaining to obstructions and spacing. This maximizes the use of the available water supply, which is often limited on residential fire protection systems. After selecting an appropriate area of coverage, sprinklers must be spaced according to guidelines set forth in the installation standards.

Definition of “COMPARTMENT”: A space completely enclosed by walls and a ceiling. Openings to an adjoining space are allowed, provided the openings have a minimum lintel depth of 8 in. (203.2 mm) from the ceiling.

Spacing Guidelines

For guidelines concerning spacing of Viking residential sprinklers near beams, obstructions, heat sources, and sloped ceilings [slopes more than a 2/12 (9.5°) pitch], refer to the Viking residential sprinkler data pages and installation guide, the appropriate NFPA standard, and the Authority Having Jurisdiction. NOTE: Sloped, beamed, and pitched ceilings could require special design features such as larger flow, or a design for more sprinklers to operate in the compartment, or both.

Distance from Walls: Install not more than one-half the listed sprinkler spacing nor less than 4” (102 mm) from walls, partitions, or obstructions as defined in the standards.

Minimum Sprinkler Spacing: The minimum distance between residential sprinklers to prevent cold soldering (i.e., the spray from one operating sprinkler onto an adjacent sprinkler that could prevent its proper activation) is 8 ft. (2.4 m).

Maximum Sprinkler Spacing: Locate adjacent sprinklers no farther apart than the listed spacing.

Deflector Position: Install frame style residential *pendent* sprinklers with the deflector between 1” and 4” (25.4 mm to 102 mm) below smooth ceilings, unless the sprinkler data page indicates otherwise. Install pendent sprinklers in the pendent position only, with the deflector oriented parallel with the ceiling or roof.

Refer to the individual listings in the residential sprinkler data pages for horizontal sidewall sprinkler deflector or sprinkler centerline distance below the ceiling. Install horizontal sidewall sprinklers in the horizontal position only below smooth ceilings, with the leading edge of the deflector or element assembly oriented parallel with the ceiling.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to the appropriate sprinkler data page. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA and any other similar Authorities Having Jurisdiction, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable. Final approval and acceptance of all residential sprinkler installations must be obtained from the Authorities Having Jurisdiction.



TECHNICAL DATA

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2. Apply a small amount of pipe-joint compound or tape to the external threads of the sprinkler only, taking care not to allow a build-up of compound in the sprinkler inlet. **NOTE:** Sprinklers with protective caps or bulb shields must be contained within the caps or shields before applying pipe-joint compound or tape. *Exception: For concealed sprinklers (i.e., VK457, VK458, VK468, VK474, and VK4570) the protective cap is removed for installation.*
3. Care must be taken when installing sprinklers on CPVC and copper piping systems. Never install the sprinkler into the reducing fitting before attaching the reducing fitting to the piping. Sprinklers must be installed on CPVC systems after the reducing fitting has been installed and the primer and/or cement manufacturer's recommended curing time has elapsed. When installing sprinklers on copper piping systems, take care to brush the inside of the sprinkler supply piping and reducing fitting to ensure that no flux accumulates in the sprinkler orifice. Excess flux can cause corrosion and may impair the ability of the sprinkler to operate properly.
4. Refer to the appropriate sprinkler technical data page to determine the correct sprinkler wrench for the model of sprinkler used. DO NOT use the sprinkler deflector or fusible element to start or thread the sprinkler into a fitting.
 - a. Install the sprinkler onto the piping using the special sprinkler wrench only, while taking care not to over-tighten or damage the sprinkler operating parts.
 - b. Thread the flush or concealed sprinkler into the ½" or ¾" (15 mm or 20 mm) NPT** outlet of the coupling by turning it clockwise with the special sprinkler wrench. *NOTE: For flush and concealed sprinklers with protective shells, the internal diameter of the special flush and concealed sprinkler installation wrench is designed for use with the sprinkler contained within the shell. Exception: For concealed sprinklers VK457, VK458, VK468, VK474, and VK4570 the protective cap is removed for installation, and then placed back on the sprinkler temporarily.*
5. After installation, the entire sprinkler system must be tested. The test must be conducted to comply with the installation standards.
 - a. Make sure the sprinkler has been properly tightened. If a thread leak occurs, normally the unit must be removed, new pipe-joint compound or tape applied, and then reinstalled. This is due to the fact that when the joint seal leaks, the sealing compound is washed out of the joint.
 - b. **Remove plastic protective sprinkler caps or bulb shields AFTER the wall or ceiling finish work is completed where the sprinkler is installed and there no longer is a potential for mechanical damage to the sprinkler operating elements.** To remove the bulb shields, simply pull the ends of the shields apart where they are snapped together. To remove caps from frame style sprinklers, turn the caps slightly and pull them off the sprinklers. **SPRINKLER CAPS OR BULB SHIELDS MUST BE REMOVED FROM SPRINKLERS BEFORE PLACING THE SYSTEM IN SERVICE!** Retain a protective cap or shield in the spare sprinkler cabinet.
6. For residential flush sprinklers, the ceiling ring can now be installed onto the sprinkler body. Align the ceiling ring with the sprinkler body and thread on or push it on until the flange touches the ceiling. Note the maximum vertical adjustment is ½" (12,7 mm) for sprinkler VK420 and 5/8" for VK476. DO NOT MODIFY THE UNIT. If necessary, re-cut the sprinkler drop nipples as required.
7. For residential concealed sprinklers, the cover plate assembly can now be attached.
 - a. Remove the cover plate assembly from the protective box, taking care not to damage the assembly.
 - b. From below the ceiling, gently place the base of the cover plate assembly over the sprinkler protruding through the opening in the ceiling or wall.
 - c. Carefully push the cover plate assembly onto the sprinkler, using even pressure with the palm of the hand, until the unfinished brass flange of the cover plate base touches the ceiling or wall.
 - d. The maximum adjustment available for residential concealed sprinklers is ½" (12.7 mm) [1/4" (6.4 mm) for sprinkler VK480]. DO NOT MODIFY THE UNIT. If necessary, re-cut the sprinkler nipples.

NOTE: If it is necessary to remove the entire sprinkler unit, the system must be taken out of service. See Maintenance instructions below and follow all warnings and instructions.

5. OPERATION

During fire conditions, the operating element fuses or shatters (depending on the type of sprinkler), releasing the pip cap and sealing assembly. Water flowing through the sprinkler orifice strikes the sprinkler deflector or flow shaper, forming a uniform, high-wall wetting spray pattern to extinguish or control the fire.



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6. INSPECTIONS, TESTS AND MAINTENANCE

Refer to NFPA 25 for Inspection, Testing and Maintenance requirements. **NOTICE:** The owner is responsible for having the fire-protection system and devices inspected, tested, and maintained in proper operating condition in accordance with this guide, and applicable NFPA standards. In addition, the Authority Having Jurisdiction may have additional maintenance, testing, and inspection requirements that must be followed.

- A. Sprinklers must be inspected on a regular basis for signs of corrosion, mechanical damage, obstructions, paint, etc. Frequency of the inspections may vary due to corrosive atmospheres, water supplies, and activity around the device.
- B. Sprinklers or cover plate assemblies that have been field painted, caulked, or mechanically damaged must be replaced immediately. Sprinklers showing signs of corrosion shall be tested and/or replaced immediately as required. Installation standards require sprinklers to be tested and, if necessary, replaced immediately after a specified term of service. Refer to NFPA 25 and the Authorities Having Jurisdiction for the specified period of time after which testing and/or replacement of residential sprinklers is required. Never attempt to repair or reassemble a sprinkler. Sprinklers and cover assemblies that have operated cannot be reassembled or re-used, but must be replaced. When replacement is necessary, use only new sprinklers and cover assemblies with identical performance characteristics.
- C. The sprinkler discharge pattern is critical for proper fire protection. Nothing should be hung from, attached to, or otherwise obstruct the discharge pattern of the sprinkler. All obstructions must be immediately removed or, if necessary, additional sprinklers installed.
- D. When replacing existing sprinklers, the system must be removed from service. Refer to the appropriate system description and/or valve instructions. Prior to removing the system from service, notify all Authorities Having Jurisdiction. Consideration should be given to employment of a fire patrol in the effected area.
 1. Remove the system from service, drain all water, and relieve all pressure on the piping.
 - 2a. For frame-style sprinklers, use the special sprinkler wrench and remove the old sprinkler by turning it counterclockwise to unthread it from the piping.
 - 2b. *For residential flush pendent and concealed style sprinklers: Remove the ceiling ring or cover plate assembly before unthreading the sprinkler body from the piping. To remove a ceiling ring, grasp it from below the ceiling and gently turn it counterclockwise. Cover plates can be removed either by gently unthreading them or pulling them off the sprinkler body (depends on the sprinkler model used). After the ceiling ring or cover plate assembly has been removed from the sprinkler, use the sprinkler wrench to unthread the sprinkler from the piping. NOTE: For flush and concealed sprinklers with protective shells, the internal diameter of the special flush and concealed sprinkler installation wrench is designed for use with the sprinkler contained within the shell. Place a plastic protective shell (from the spare sprinkler cabinet) over the sprinkler to be removed and then fit the sprinkler wrench over the shell. Exception: Concealed sprinklers VK457, VK458, VK468, VK474, and VK4570 are removed without the plastic cap.*
 3. Follow instructions in section 4B. Installation Instructions to install the new unit. Be sure the replacement sprinkler is the correct model and style, with the appropriate K-Factor, temperature rating, and response characteristics. A fully stocked sprinkler cabinet should be provided for this purpose. *(For flush or concealed style sprinklers, stock of spare ceiling rings or cover plates should also be available in the spare sprinkler cabinet.)*
 4. Place the system back in service and secure all valves. Check for and repair all leaks.
- E. Sprinkler systems that have been subjected to a fire must be returned to service as soon as possible. The entire system must be inspected for damage, and repaired or replaced as necessary. Sprinklers that have been exposed to corrosive products of combustion or high ambient temperatures, but have not operated, should be replaced. Refer to the Authority Having Jurisdiction for minimum replacement requirements.

7. AVAILABILITY

Viking Residential Sprinklers are available through a network of domestic and international distributors. See The Viking Corporation web site for the closest distributor or contact The Viking Corporation.

8. GUARANTEE

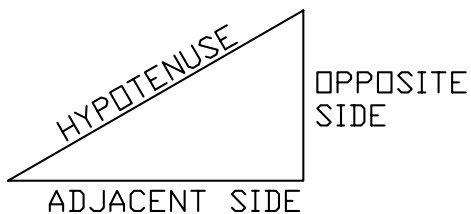
For details of warranty, refer to Viking's current list price schedule or contact Viking directly.



TECHNICAL DATA

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TANGENT =
 OPPOSITE SIDE (RISE)
 ADJACENT SIDE (RUN)

$$\frac{\text{RISE}}{\text{RUN}} = \text{TANGENT}$$

$$\text{ANGLE} = \tan^{-1} \left(\frac{\text{RISE}}{\text{RUN}} \right)$$

$$\text{SLOPE DISTANCE} = \sqrt{(\text{RISE})^2 + (\text{RUN})^2}$$

RISE	RUN	TANGENT	ANGLE	SLOPE DISTANCE
2	12	.1666	9.45°	12.1
3	12	.2500	14°	12.3
4	12	.3333	18.4°	12.6
5	12	.4166	22.6°	13
6	12	.5000	26.5°	13.4
7	12	.5833	30.2°	13.8
8	12	.6666	33.6°	14.4
9	12	.7500	36.8°	15
10	12	.8333	39.8°	15.6
11	12	.9166	42.5°	16.2
12	12	1	45°	16.97

Table 2
 Rise Over Run Conversion to Degrees of Slope



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SPACING OF RESIDENTIAL SPRINKLERS LISTED FOR USE BELOW SLOPED CEILINGS UP TO AN 8/12 (33.7°) PITCH (Refer to the appropriate residential sprinkler technical data page for listings.)

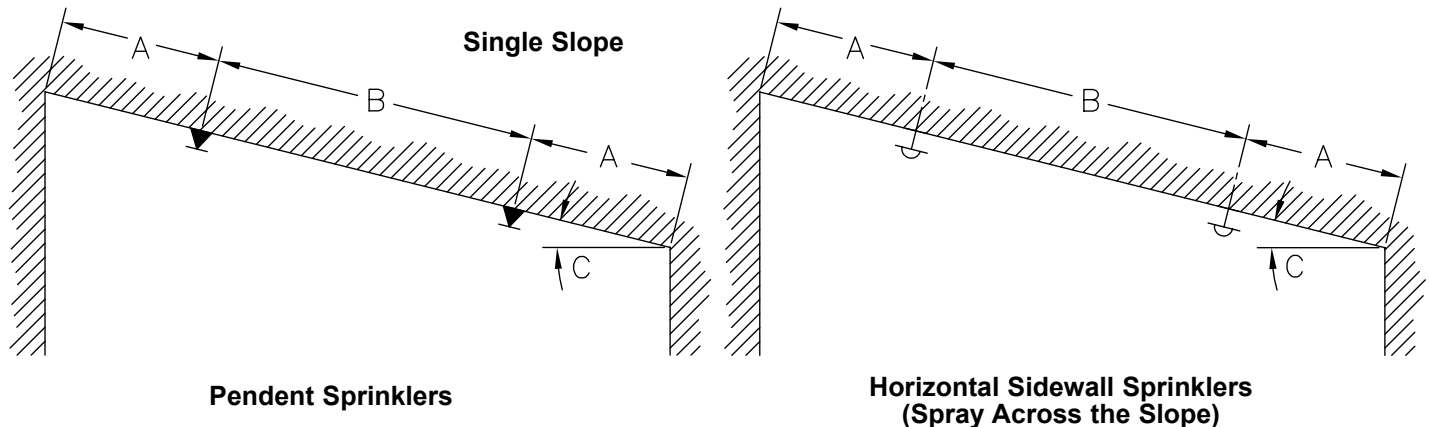


Figure 1

- (A) One-half listed spacing of sprinkler maximum, 0'-4" (0-102 mm) minimum.
- (B) Listed spacing of sprinkler, maximum, 8'-0" (2.4 m) minimum.
- (C) Where angle "C" is greater than an 8/12 (33.7°) pitch, see Figure 2 below.

SPACING OF RESIDENTIAL SPRINKLERS BELOW SLOPED CEILINGS WITH GREATER THAN 8/12 (33.7°) PITCH (NOTE: Refer to NFPA 13D or NFPA 13R, and the Authority Having Jurisdiction.)

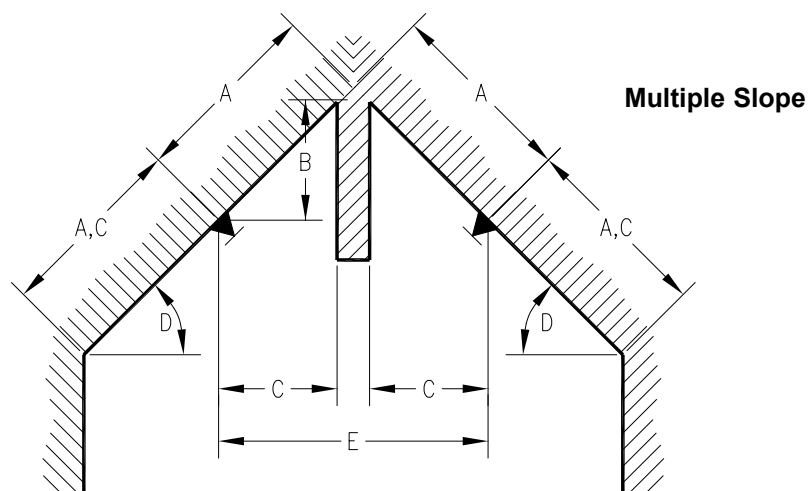


Figure 2

- (A) One-half listed spacing of sprinkler, maximum.
- (B) 3'-0" (.91 m) maximum.
- (C) 0'-4" (0-102 mm) minimum.
- (D) Slopes greater than an 8/12 (33.7°) pitch.
- (E) For distance less than 8'-0" (2.4 m), baffle required.



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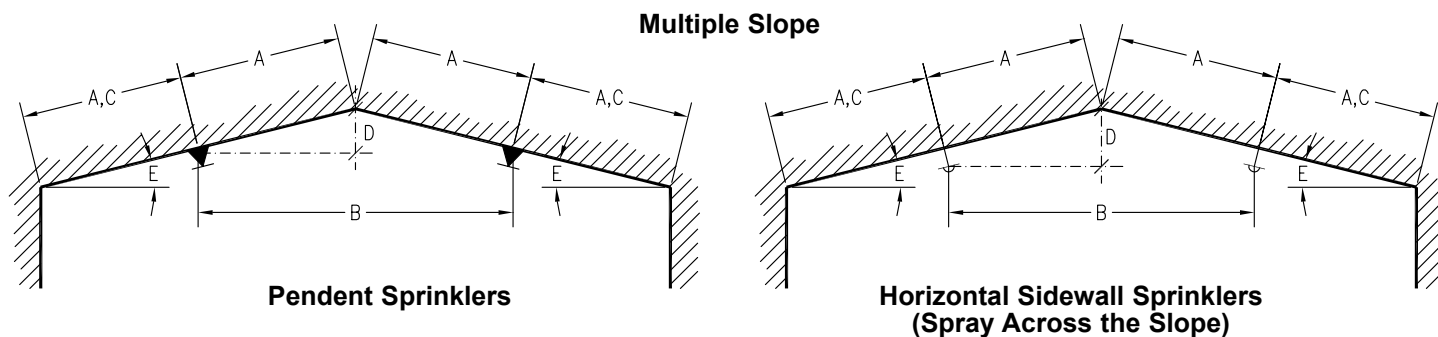


Figure 3

- (A) One-half listed spacing of sprinkler, maximum.
- (B) 8'-0" (2.4 m) minimum.
- (C) 0'-4" (0-102 mm) minimum.
- (D) 3'-0" (.91 m) maximum.
- (E) Acceptable for slopes of 0/12 to 8/12 (0° to 33.7°) pitch.

SPACING OF RESIDENTIAL PENDENT SPRINKLERS AT PEAK OF SLOPED CEILINGS WITH PITCH LESS THAN 8/12 (33.7°) (Refer to the appropriate residential sprinkler technical data page for listings.)

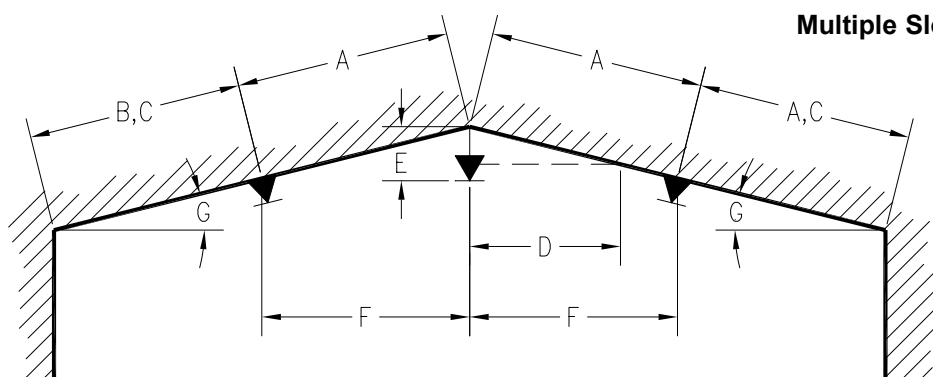


Figure 4

- (A) Listed spacing of sprinkler, maximum.
- (B) One-half listed spacing of sprinkler, maximum.
- (C) 0'-4" minimum.
- (D) Refer to page 10 for minimum distance between sprinkler and intersecting sloped ceiling.
- (E) Refer to the appropriate residential sprinkler technical data page for deflector distance below ceiling.
- (F) 8'-0" minimum.
- (G) Reference: 4/12 (18.0°) pitch maximum for 12' (3.7 m) spacing.
2.5/12 (12.0°) pitch maximum for 14' (4.3 m) spacing.
2/12 (10.0°) pitch maximum for 16' (4.9 m) spacing.
2/12 (10.0°) pitch maximum for 18' (5.5 m) spacing.
1.9/12 (9.0°) pitch maximum for 20' (6.1 m) spacing.
Angles based on sprinklers installed 0'-4" (0-102 mm) from peak.

NOTE: Whenever possible, utilize design as shown in Figure 3 above.



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SPACING OF RESIDENTIAL SPRINKLERS BELOW SLOPED CEILINGS WITH GREATER THAN 8/12 (33.7°) PITCH WITH NO BAFFLE AND A MAXIMUM OF 2 SPRINKLERS IN THE ROOM (NOTE: Refer to NFPA 13D or NFPA 13R, and the Authority Having Jurisdiction.)

Multiple Slope

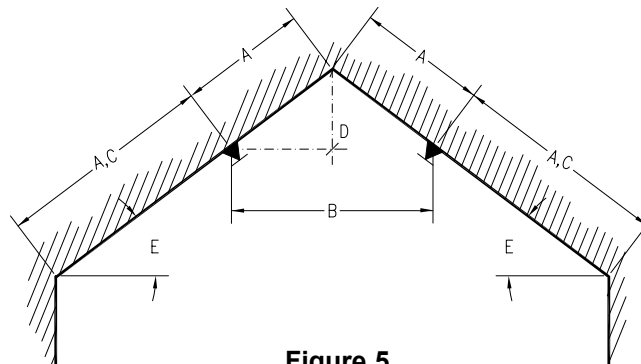


Figure 5

(A) One-half listed spacing of sprinkler, maximum.

(B) 8'-0" (2.4 m) minimum.

(C) 0'-4" (0-102 mm) minimum.

(D) 3'-0" (.91 m) maximum.

(E) Acceptable for slopes greater than an 8/12 (33.7°) pitch.

(F) When this design is used, refer to the appendices of NFPA 13D or NFPA 13R, and the Authority Having Jurisdiction regarding the number of design sprinklers to hydraulically calculate.

SPACING OF RESIDENTIAL SPRINKLERS BELOW CEILINGS WITH SLOPES EXCEEDING 8/12 (33.7°) PITCH WITH NO BAFFLE AND A MAXIMUM OF 3 SPRINKLERS IN THE ROOM (NOTE: Refer to NFPA 13D or NFPA 13R, and the Authority Having Jurisdiction.)

Multiple Slope

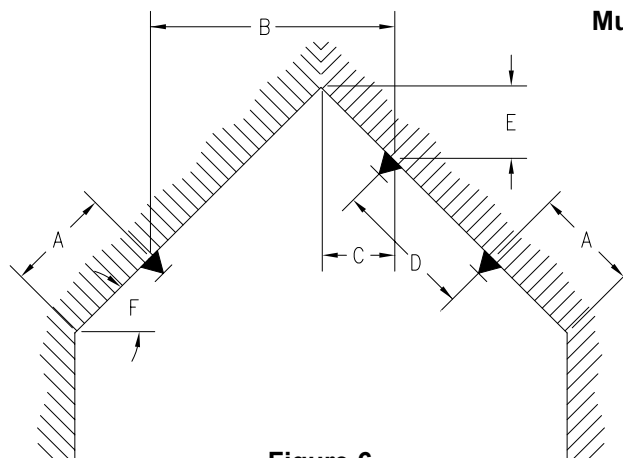


Figure 6

(A) 0'-4" (0-102 mm) minimum, to one-half listed spacing, maximum.

(B) One-half listed spacing, maximum, 8'-0" (2.4 m) minimum.

(C) 0'-4" (0-102 mm) minimum.

(D) Listed spacing maximum, 8'-0" (2.4 m) minimum.

(E) 3'-0" (.91 m) maximum.

(F) Slopes greater than 8/12 up to a 21/12 (33.7° up to 60°) pitch.

NOTES: In addition to the above limits, rooms requiring this type of installation must be hydraulically calculated to supply a minimum of three operating sprinklers. Layout similar for horizontal sidewall sprinklers with throw across slope. Refer to the appropriate residential sprinkler technical data sheets.



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SPACING OF RESIDENTIAL SPRINKLERS BELOW CEILINGS WITH SLOPES EXCEEDING 8/12 (33.7°) PITCH WITH NO BAFFLE AND A MAXIMUM OF 2 SPRINKLERS IN THE ROOM (NOTE: Refer to NFPA 13D or NFPA 13R, and the Authority Having Jurisdiction.)

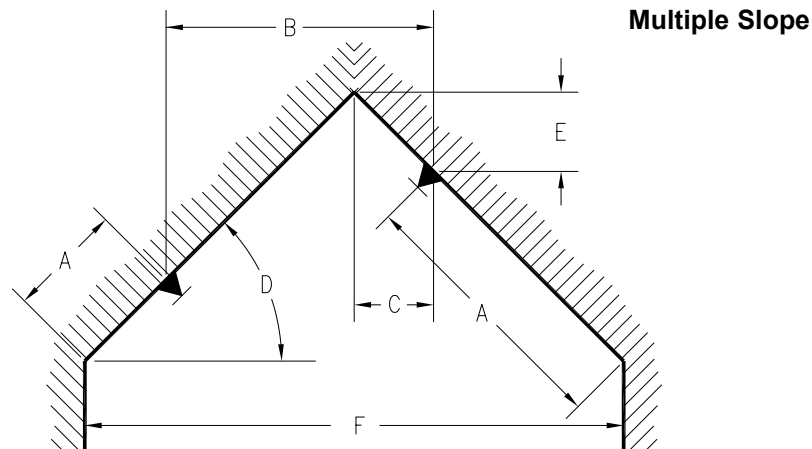


Figure 7

- (A) 0'-4" (0-102 mm) minimum, to one-half listed spacing, maximum.
- (B) One-half listed spacing, maximum, 8'-0" (2.4 m) minimum.
- (C) 0'-4" (0-102 mm) minimum.
- (D) Slopes greater than 8/12 pitch up to a 21/12 (33.7° up to a 60°) pitch.
- (E) 3'-0" (.91 m) maximum.
- (F) When dimension "F" exceeds 16' (4.9 m), utilize design configuration shown in Figure 6.

NOTES: Layout similar for horizontal sidewall sprinklers with throw across slope. Refer to the appropriate residential sprinkler technical data sheets.

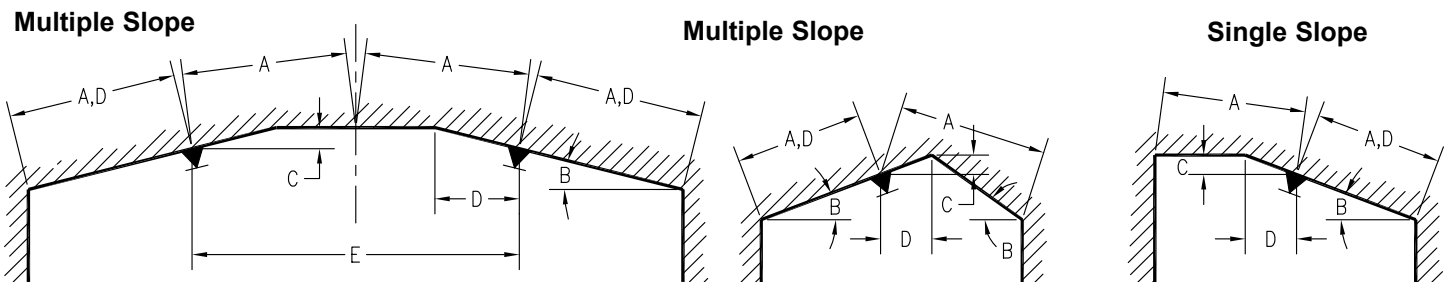


Figure 8

- (A) One-half listed spacing, maximum.
- (B) Refer to the appropriate residential sprinkler technical data pages for listings of sprinklers for use below slopes up to and including a 8/12 (33.7°) pitch.
- (C) 3'-0" (.91 m) maximum.
- (D) 0'-4" (0-102 mm) minimum.
- (E) 8'-0" (2.4 m) minimum without baffle.

NOTES: Layout similar for horizontal sidewall sprinklers with throw across slope. Refer to the appropriate residential sprinkler technical data sheets.

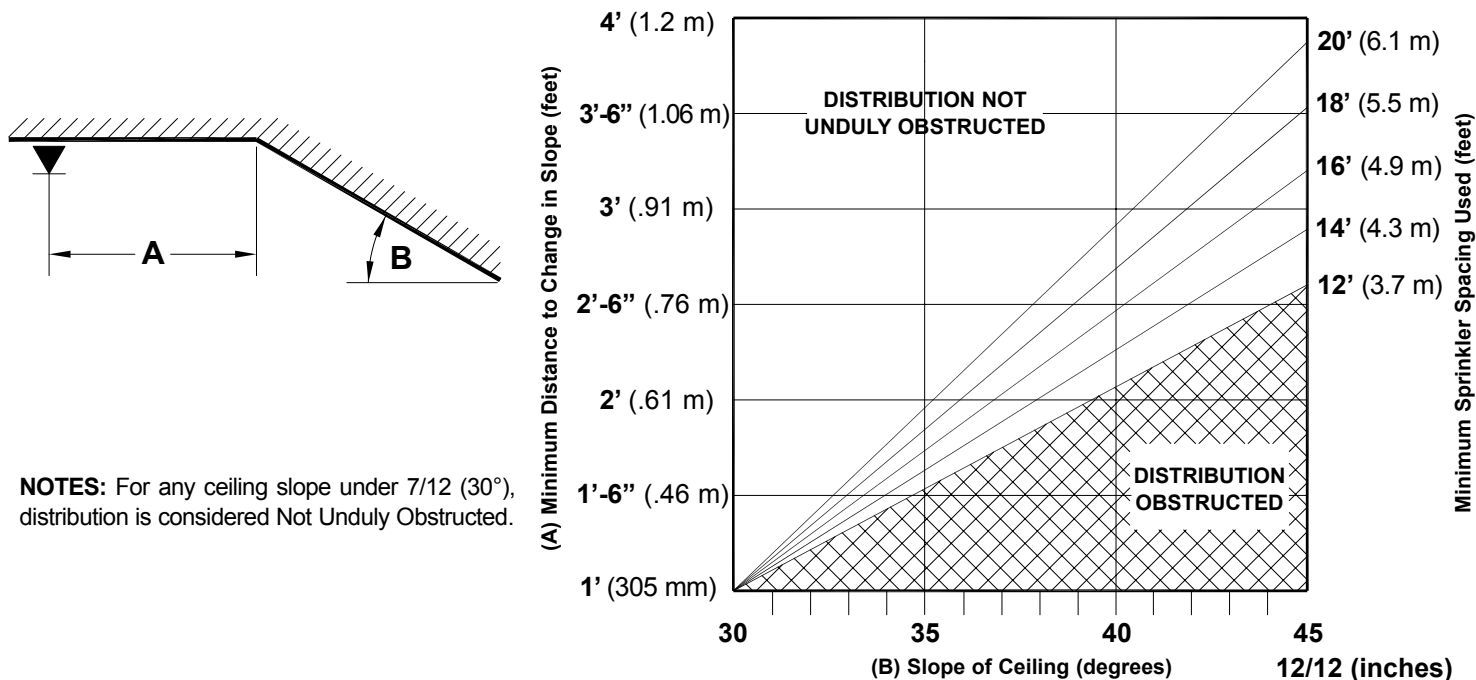


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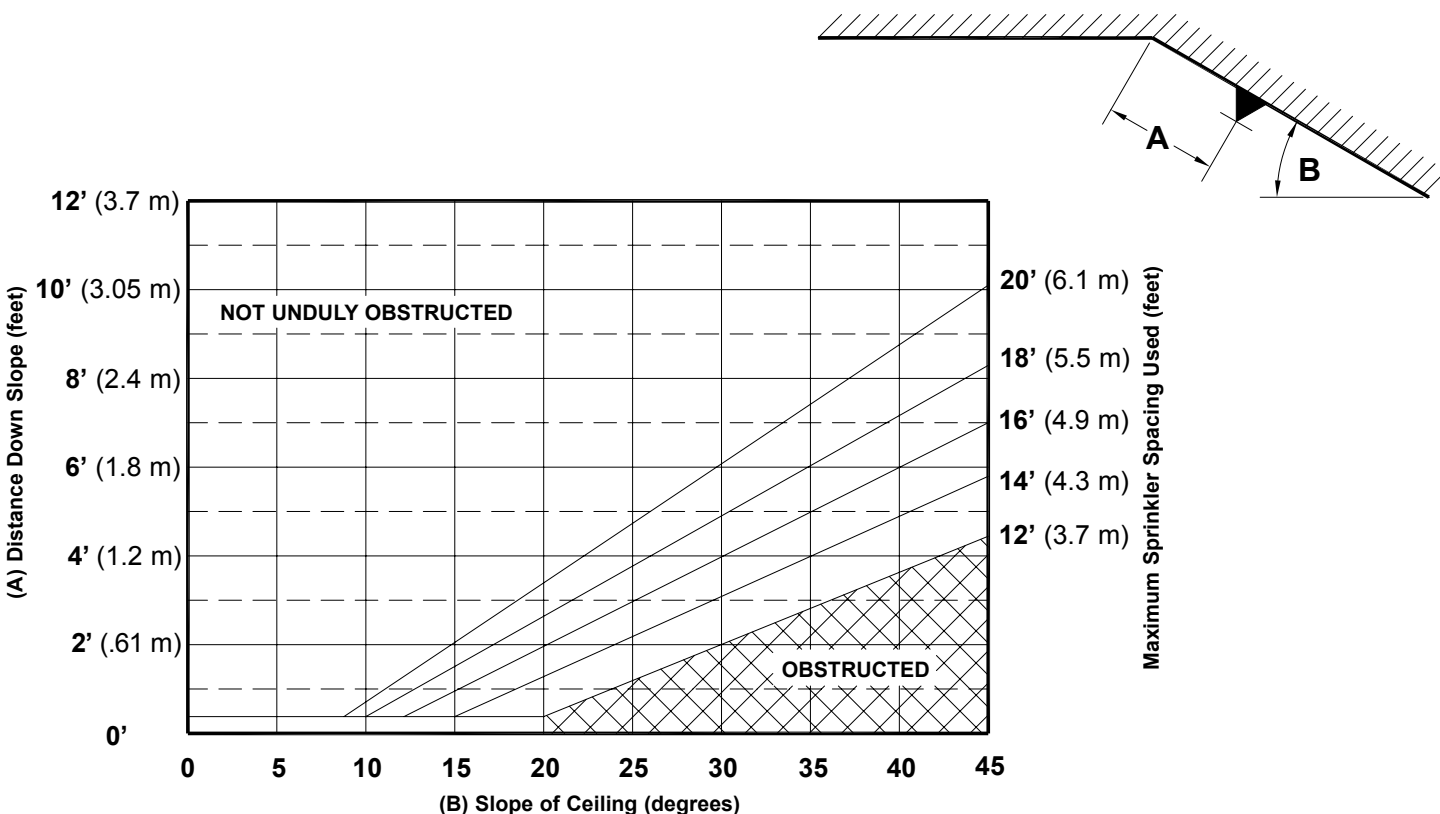
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MINIMUM DISTANCE BETWEEN SPRINKLER AND INTERSECTING SLOPED CEILINGS



MAXIMUM DISTANCE DOWN SLOPE TO AVOID OBSTRUCTION TO SPRINKLER DISCHARGE





TECHNICAL DATA

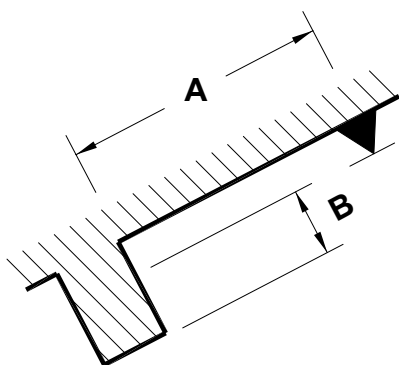
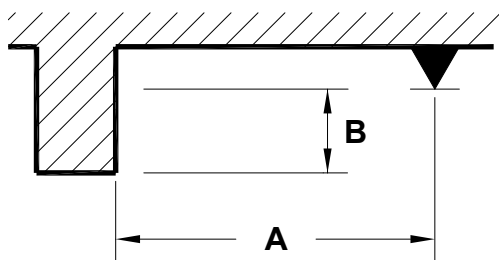
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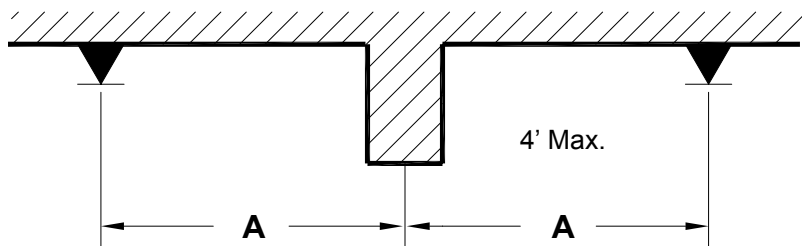
AVOIDING OBSTRUCTIONS TO SPRINKLER DISCHARGE

(Obstruction rules for residential sprinklers are found in section 8.10 of the 2010 edition of NFPA 13.)

Positioning Residential Pendent Sprinklers - Obstructions at the Ceiling

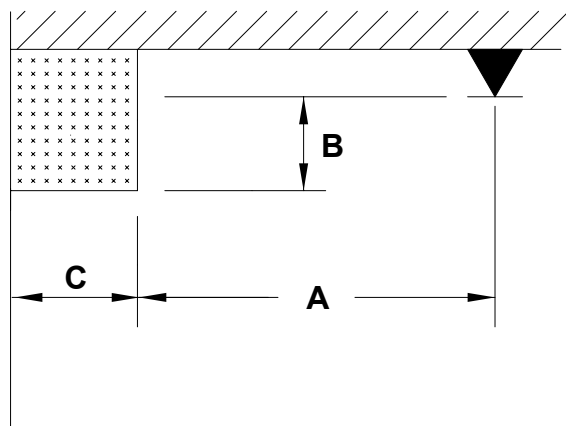


Distance from Sprinkler to Side of Ceiling Obstruction (Dimension A)	Maximum Distance from Deflector to Bottom of Ceiling Obstruction (Dimension B)	
	Inches	mm
Less than 1 ft. 6 in. (Less than 457 mm)	0	0
1 ft. 6 in. to less than 3 ft. (457 mm to less than .94 m)	1	25.4
3 ft. to less than 4 ft. (.91 m to less than 1.2 m)	3	76
4 ft. to less than 4 ft. 6 in. (1.2 m to less than 1.37 m)	5	127
4 ft. 6 in. to less than 6 ft. (1.37 m to less than 1.8 m)	7	178
6 ft. to less than 6 ft. 6 in. (1.8 m to less than 2 m)	9	229
6 ft. 6 in. to less than 7 ft. (2 m to less than 2.1 m)	11	279
7 ft. or greater (2.1 m or greater)	14	356



Residential pendent sprinklers may be located on opposite sides of continuous obstructions up to 4 ft. (1.2 m) wide at the ceiling, as long as the distance from the centerline of the obstruction to the sprinklers (A) does not exceed one-half the maximum spacing allowed between sprinklers.

Positioning Residential Pendent Sprinklers - Obstructions Along Walls



- (A) Distance from centerline of sprinkler to side of obstruction.
(B) Distance from deflector to bottom of obstruction.
(C) Width of the obstruction.

Obstructions up to 30 in. (.8 m) wide (C) located against the wall are permitted to be protected when (A) is greater than or equal to (C) minus 8 in. (.2 m) plus (B).

$$C \leq 30 \text{ in.} \quad \text{for metric } C \leq .8 \text{ m}$$

$$A \geq (C - 8 \text{ in.}) + B \quad A \geq (C - .2 \text{ m}) + B$$



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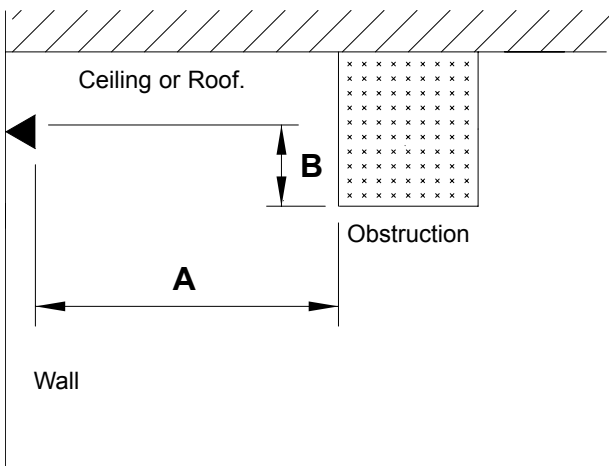
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AVOIDING OBSTRUCTIONS TO SPRINKLER DISCHARGE

(Obstruction rules for residential sprinklers are found in section 8.10 of the 2010 edition of NFPA 13.)

Positioning Residential Horizontal Sidewall Sprinklers - Obstructions at the Ceiling

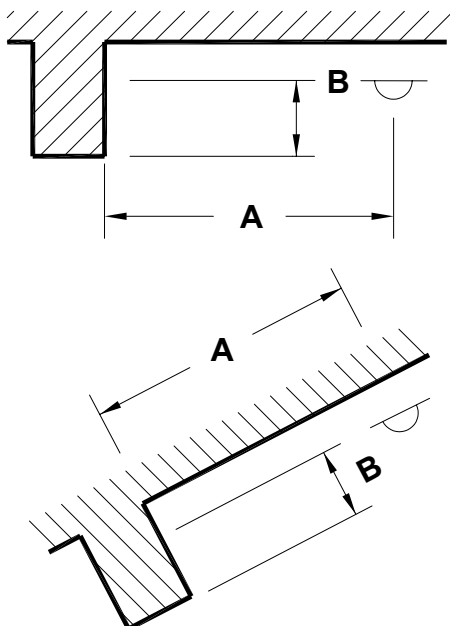


(A) Distance from sprinkler to side of obstruction.

(B) Distance from deflector to bottom of obstruction.

Distance from Sprinkler to Side of Ceiling Obstruction (Dimension A)	Maximum Distance from Deflector to Bottom of Ceiling Obstruction (Dimension B)	
	Inches	mm
Less than 8 ft. (Less than 2.4 m)	No Obstructions Allowed	
8 ft. to less than 10 ft. (2.4 m to less than 3.05 m)	1	25.4
10 ft. to less than 11 ft. (3.05 m to less than 3.35 m)	2	50.8
11 ft. to less than 12 ft. (3.35 m to less than 3.7 m)	3	76
12 ft. to less than 13 ft. (3.7 m to less than 4 m)	4	102
13 ft. to less than 14 ft. (4 m to less than 4.3 m)	6	152
14 ft. to less than 15 ft. (4.3 m to less than 4.6 m)	7	178
15 ft. to less than 16 ft. (4.6 m to less than 4.9 m)	9	229
16 ft. to less than 17 ft. (4.9 m to less than 5.2 m)	11	279
17 ft. or greater (5.2 m or greater)	14	356

Positioning Residential Horizontal Sidewall Sprinklers - Obstructions Along Walls



Distance from Sprinkler to Side of Obstruction Along Wall (Dimension A)	Maximum Distance from Deflector to Bottom of Obstruction (Dimension B)	
	Inches	mm
Less than 1 ft. 6 in. (Less than 457 mm)	0	0
1 ft. 6 in. to less than 3 ft. (457 mm to less than .94 m)	1	25.4
3 ft. to less than 4 ft. (.91 m to less than 1.2 m)	3	76
4 ft. to less than 4 ft. 6 in. (1.2 m to less than 1.37 m)	5	127
4 ft. 6 in. to less than 6 ft. (1.37 m to less than 1.8 m)	7	178
6 ft. to less than 6 ft. 6 in. (1.8 m to less than 2 m)	9	229
6 ft. 6 in. to less than 7 ft. (2 m to less than 2.1 m)	11	279
7 ft. or greater (2.1 m or greater)	14	356

(A) Distance from sprinkler to side of obstruction.

(B) Distance from deflector to bottom of obstruction.



TECHNICAL DATA

FREEDOM® RESIDENTIAL SPRINKLER INSTALLATION GUIDE

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
 Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

LOCATING RESIDENTIAL SPRINKLERS NEAR HEAT SOURCES

Ordinary temperature rated residential sprinklers (135 °F to 170 °F rated) are only to be installed where the maximum ambient ceiling temperature will not exceed 100 °F. Where the maximum ambient ceiling temperature will be from 101 °F to 150 °F, use intermediate temperature rated residential sprinklers (175 °F to 225 °F rated).

Residential sprinklers must be positioned a sufficient distance away from heat sources that include fireplaces, stoves, kitchen ranges, wall ovens, hot water pipes, water heaters, furnaces and associated flues and ducts, and light fixtures. The following minimum distances must be maintained for both ordinary and intermediate temperature rated residential sprinklers as indicated.

Heat Source	Minimum Distance from Edge of Source to Ordinary Temperature Rated Sprinkler		Minimum Distance from Edge of Source to Intermediate Temperature Rated Sprinkler	
	Inches	metric	Inches	metric
Side of open or recessed fireplace	36	.91 m	12	305 mm
Front of recessed fire place	60	1.5 m	36	.91 m
Coal- or wood-burning stove	42	1.1 m	12	305 mm
Kitchen range	18	457 mm	9	229 mm
Wall oven	18	457 mm	9	229 mm
Hot air flues	18	457 mm	9	229 mm
Uninsulated heat ducts	18	457 mm	9	229 mm
Uninsulated hot water pipes	12	305 mm	6	152 mm
Side of ceiling- or wall-mounted hot air diffusers	24	.61 m	12	305 mm
Front of wall-mounted hot air diffusers	36	.91 m	18	457 mm
Hot water heater or furnace	6	152 mm	3	76 mm
Light fixture less than 250W	6	152 mm	3	76 mm
Light fixture 250W to 499W	12	305 mm	6	152 mm
Where residential sprinklers will be exposed to the rays of the sun passing through glass or plastic skylights, use intermediate temperature rated sprinklers.				
When locating residential sprinklers in an unventilated concealed compartment, under an unventilated attic or uninsulated roof, where the maximum ambient temperature does not exceed 150 °F, use intermediate temperature rated sprinklers.				



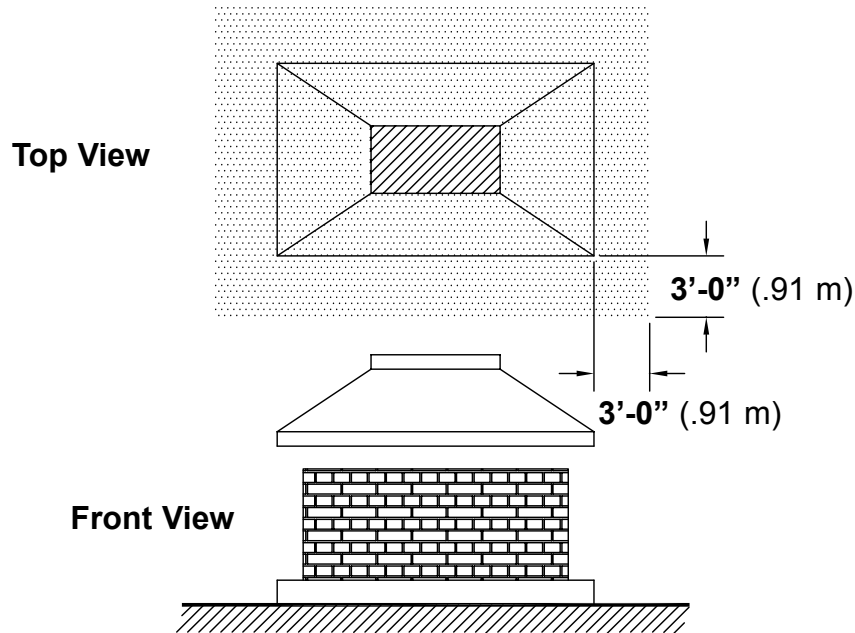
TECHNICAL DATA

FREEDOM® RESIDENTIAL SPRINKLER INSTALLATION GUIDE

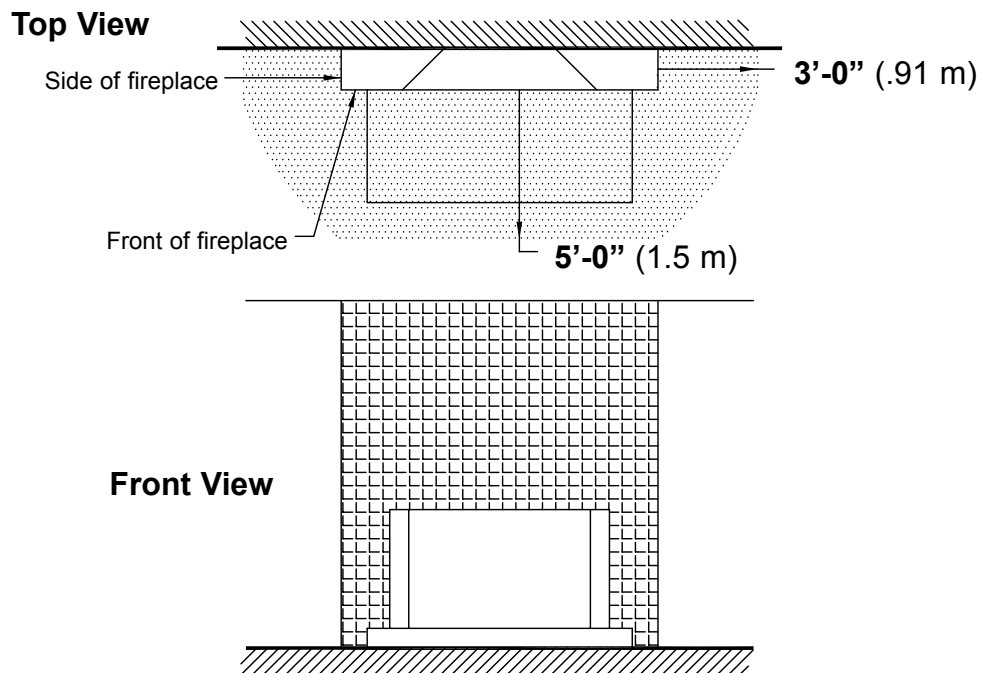
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NOTE: The dimensions shown are intended to apply to residential sprinklers installed in ceilings above fireplaces used to burn products that cause elevated temperatures at or near the ceiling in areas surrounding the fireplace. The recommendations should not be construed to apply to decorative non-opening fireplaces such as gas fire units that will not cause elevated temperatures at the ceiling.



Sprinklers near an open hearth fireplace must be located outside of the shaded area or be intermediate degree rated.



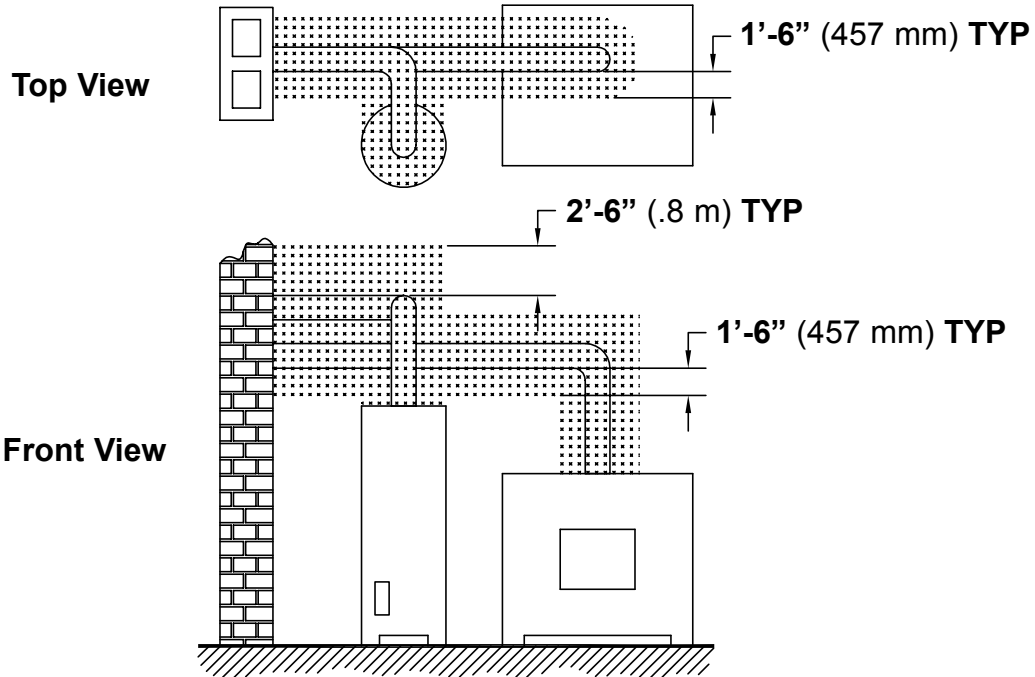
Sprinklers near a recessed hearth fireplace must be located outside of the shaded area [at least 3'-0" (.91 m)] from the side of a recessed fireplace and at least 5'-0" (1.5 m) from the front) or be intermediate degree rated.



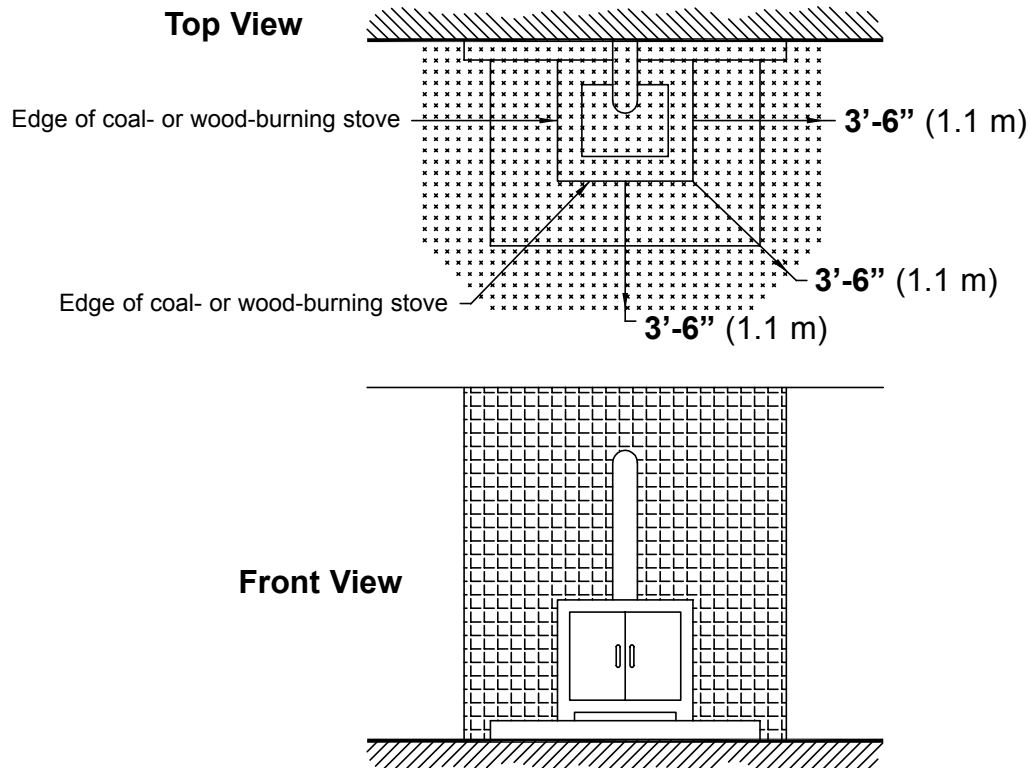
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Sprinklers near a furnace or water heater must be located outside of the shaded area or be intermediate degree rated.



Sprinklers near a coal- or wood-burning stove must be located outside of shaded area or be intermediate degree rated.

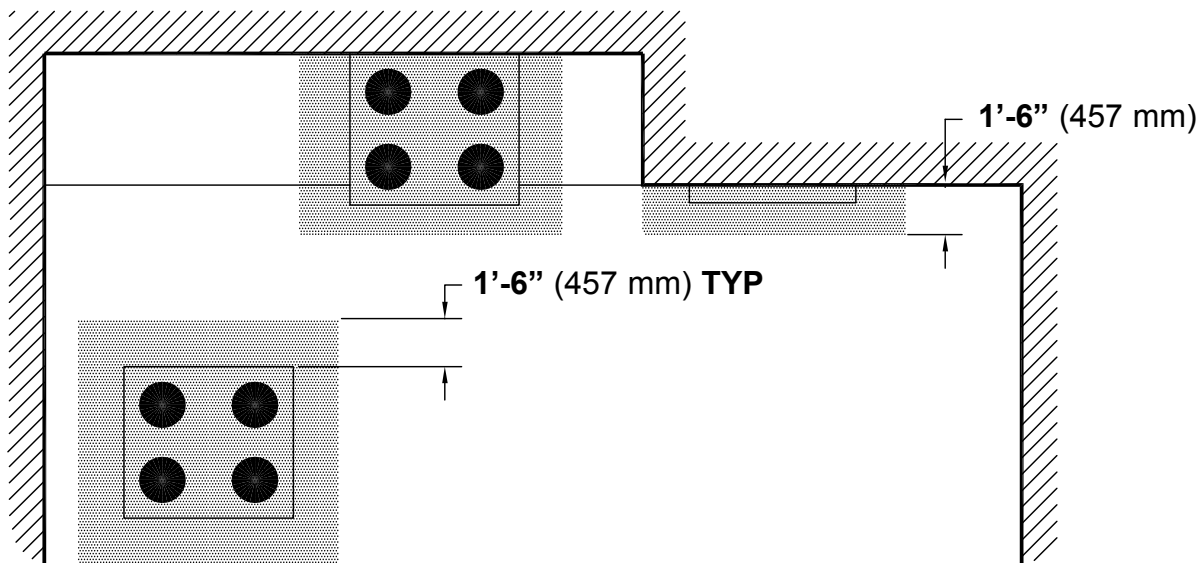


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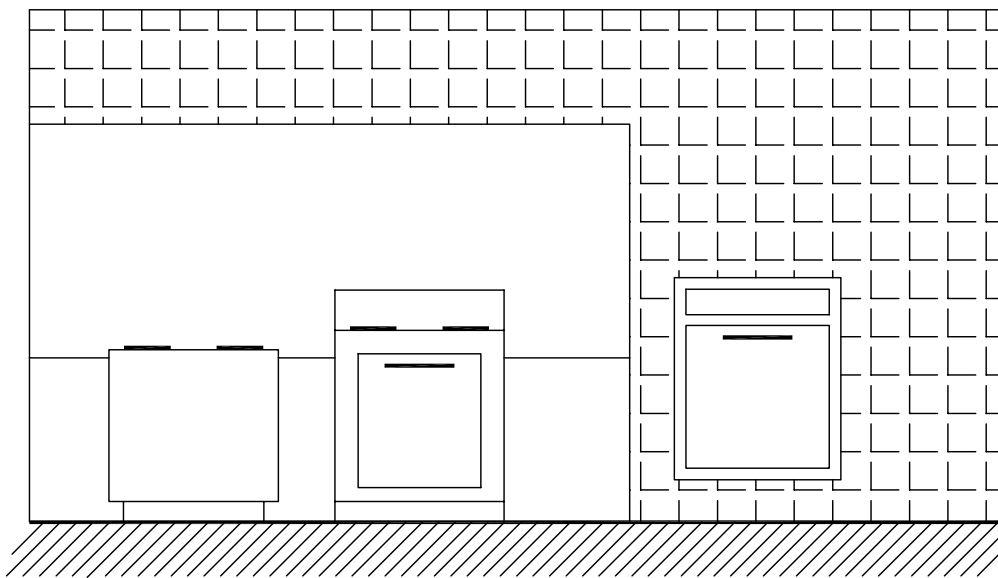
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Top View



Front View



Sprinklers near a range or wall oven must be located outside of shaded areas or be intermediate degree rated.



BULLETIN

CARE AND HANDLING
OF SPRINKLERS

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
 Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

SPRINKLERS ARE FRAGILE - HANDLE WITH CARE!**General Handling and Storage:**

- Store sprinklers in a cool, dry place.
- Protect sprinklers during storage, transport, handling, and after installation.
- Use the original shipping containers. DO NOT place sprinklers loose in boxes, bins, or buckets.
- Keep sprinklers separated at all times. DO NOT allow metal parts to contact sprinkler operating elements.

For Pre-Assembled Drops:

- Protect sprinklers during handling and after installation.
- For recessed assemblies, use the protective sprinkler cap (Viking Part Number 10364).

Sprinklers with Protective Shields or Caps:

- DO NOT remove shields or caps until after sprinkler installation and there no longer is potential for mechanical damage to the sprinkler operating elements.
- **Sprinkler shields or caps MUST be removed BEFORE placing the system in service!**
- Remove the sprinkler shield by carefully pulling it apart where it is snapped together.
- Remove the cap by turning it slightly and pulling it off the sprinkler.

Sprinkler Installation:

- DO NOT use the sprinkler deflector or operating element to start or thread the sprinkler into a fitting.
- **Use only the designated sprinkler head wrench!** Refer to the current sprinkler technical data page to determine the correct wrench for the model of sprinkler used.
- DO NOT install sprinklers onto piping at the floor level.
- Install sprinklers after the piping is in place to prevent mechanical damage.
- DO NOT allow impacts such as hammer blows directly to sprinklers or to fittings, pipe, or couplings in close proximity to sprinklers. Sprinklers can be damaged from direct or indirect impacts.
- DO NOT attempt to remove drywall, paint, etc., from sprinklers.
- **Take care not to over-tighten the sprinkler and/or damage its operating parts!**

Maximum Torque:

1/2" NPT: 14 ft-lbs. (19.0 N-m)

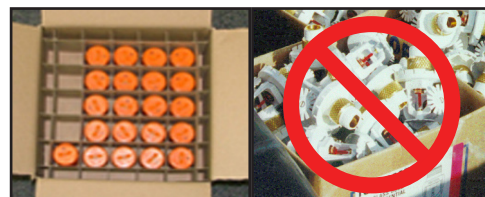
3/4" NPT: 20 ft-lbs. (27.1 N-m)

1" NPT: 30 ft-lbs. (40.7 N-m)



CORRECT
(Original container used)

INCORRECT
(Placed loose in box)



CORRECT
(Protected with caps)

INCORRECT
(Protective caps not used)



CORRECT
(Piping is in place at the ceiling)

INCORRECT
(Sprinkler at floor level)



CORRECT
(Special installation wrenches)

INCORRECT
(Designated wrench not used)



WARNING: Cancer and Reproductive Harm-
www.P65Warnings.ca.gov

! WARNING

Any sprinkler with a loss of liquid from the glass bulb or damage to the fusible element should be destroyed. Never install sprinklers that have been dropped, damaged, or exposed to temperatures exceeding the maximum ambient temperature allowed. Sprinklers that have been painted in the field must be replaced per NFPA 13. Protect sprinklers from paint and paint overspray in accordance with the installation standards. Do not clean sprinklers with soap and water, ammonia, or any other cleaning fluid. Do not use adhesives or solvents on sprinklers or their operating elements.

Refer to the appropriate technical data page and NFPA standards for complete care, handling, installation, and maintenance instructions. For additional product and system information Viking data pages and installation instructions are available on the Viking Web site at www.vikinggroupinc.com.



BULLETIN

CARE AND HANDLING
OF SPRINKLERS

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PROTECTIVE SPRINKLER SHIELDS AND CAPS

General Handling and Storage:

Many Viking sprinklers are available with a plastic protective cap or shield temporarily covering the operating elements. The snap-on shields and caps are factory installed and are intended to help protect the operating elements from mechanical damage during shipping, storage, and installation. NOTE: It is still necessary to follow the care and handling instructions on the appropriate sprinkler technical data sheets* when installing sprinklers with bulb shields or caps.

WHEN TO REMOVE THE SHIELDS AND CAPS:

NOTE: SHIELDS AND CAPS MUST BE REMOVED FROM SPRINKLERS BEFORE PLACING THE SYSTEM IN SERVICE!

Remove the shield or cap from the sprinkler only after checking all of the following:

- The sprinkler has been installed*.
- The wall or ceiling finish work is completed where the sprinkler is installed and there no longer is a potential for mechanical damage to the sprinkler operating elements.

SHIELDS AND CAPS MUST BE REMOVED FROM SPRINKLERS BEFORE PLACING THE SYSTEM IN SERVICE!

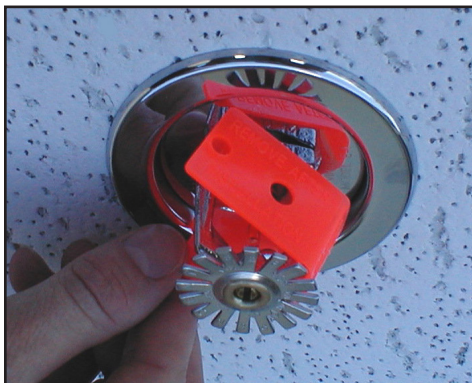


Figure 1: Sprinkler shield being removed from a pendent sprinkler.



Figure 2: Sprinkler cap being removed from a pendent sprinkler.



Figure 3: Sprinkler cap being removed from an upright sprinkler.

HOW TO REMOVE SHIELDS AND CAPS:

No tools are necessary to remove the shields or caps from sprinklers. DO NOT use any sharp objects to remove them! **Take care not to cause mechanical damage to sprinklers when removing the shields or caps.** When removing caps from fusible element sprinklers, use care to prevent dislodging ejector springs or damaging fusible elements. NOTE: Squeezing the sprinkler cap excessively could damage sprinkler fusible elements.

- To remove the shield, simply pull the ends of the shield apart where it is snapped together. Refer to Figure 1.
- To remove the cap, turn it slightly and pull it off the sprinkler. Refer to Figures 2 and 3.

NOTICE

Refer to the current sprinkler technical data page to determine the correct sprinkler wrench for the model of sprinkler used.



Never install sprinklers that have been dropped, damaged, or exposed to temperatures in excess of the maximum ambient temperature allowed.

* Refer to the appropriate current technical data pages for complete care, handling, and installation instructions. Data pages are included with each shipment from Viking or Viking distributors. They can also be found on the Web site at www.vikinggroupinc.com.



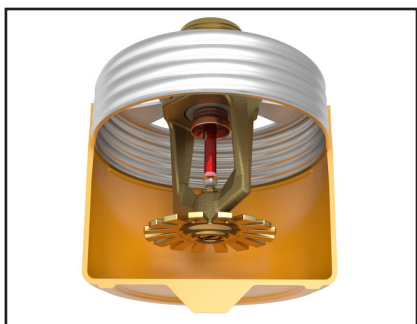
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CONCEALED COVER ASSEMBLIES ARE FRAGILE!
TO ASSURE SATISFACTORY PERFORMANCE OF THE PRODUCT, HANDLE WITH CARE.



Concealed Sprinkler and Adapter
 Assembly with Protective Cap



Concealed Sprinkler and Adapter
 Assembly (Protective Cap Removed)

Cover Plate Assembly
 (Pendent Cover 12381 shown)



GENERAL HANDLING AND STORAGE INSTRUCTIONS:

- Do not store in temperatures exceeding 100 °F (38 °C). Avoid direct sunlight and confined areas subject to heat.
- Protect sprinklers and cover assemblies during storage, transport, handling, and after installation.
 - Use original shipping containers.
 - Do not place sprinklers or cover assemblies loose in boxes, bins, or buckets.
- Keep the sprinkler bodies covered with the protective sprinkler cap any time the sprinklers are shipped or handled, during testing of the system, and while ceiling finish work is being completed.
- Use only the designated Viking recessed sprinkler wrench (refer to the appropriate sprinkler data page) to install these sprinklers. **NOTE:** The protective cap is temporarily removed during installation and then placed back on the sprinkler for protection until finish work is completed.
- Do not over-tighten the sprinklers into fittings during installation.
- Do not use the sprinkler deflector to start or thread the sprinklers into fittings during installation.
- Do not attempt to remove drywall, paint, etc., from the sprinklers.
- Remove the plastic protective cap from the sprinkler before attaching the cover plate assembly. **PROTECTIVE CAPS MUST BE REMOVED FROM SPRINKLERS BEFORE PLACING THE SYSTEM IN SERVICE!**

Refer to the appropriate current technical data pages for complete care, handling, and installation instructions. Data pages are included with each shipment from Viking or Viking distributors. They can also be found on the Web site at www.vikinggroupinc.com.



BULLETIN

CARE AND HANDLING
OF SPRINKLERS

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

USE THE FOLLOWING PRECAUTIONS WHEN HANDLING WAX-COATED SPRINKLERS

Many of Viking's sprinklers are available with factory-applied wax coating for corrosion resistance. These sprinklers **MUST** receive appropriate care and handling to avoid damaging the wax coating and to assure satisfactory performance of the product.

General Handling and Storage of Wax-Coated Sprinklers:

- Store the sprinklers in a cool, dry place (in temperatures below the maximum ambient temperature allowed for the sprinkler temperature rating. Refer to Table 1 below.)
- Store containers of wax-coated sprinklers separate from other sprinklers.
- Protect the sprinklers during storage, transport, handling, and after installation.
- Use original shipping containers.
- Do not place sprinklers in loose boxes, bins, or buckets.

Installation of Wax-Coated Sprinklers:

Use only the special sprinkler head wrench designed for installing wax-coated Viking sprinklers (any other wrench may damage the unit).

- Take care not to crack the wax coating on the units.
- For touching up the wax coating after installation, wax is available from Viking in bar form. Refer to Table 1 below. The coating **MUST** be repaired after sprinkler installation to protect the corrosion-resistant properties of the sprinkler.
- Use care when locating sprinklers near fixtures that can generate heat. Do not install sprinklers where they would be exposed to temperatures exceeding the maximum recommended ambient temperature for the temperature rating used.
- Inspect the coated sprinklers frequently soon after installation to verify the integrity of the corrosion resistant coating. Thereafter, inspect representative samples of the coated sprinklers in accordance with NFPA 25. Close up visual inspections are necessary to determine whether the sprinklers are being affected by corrosive conditions.

TABLE 1

Sprinkler Temperature Rating (Fusing Point)	Wax Part Number	Wax Melting Point	Maximum Ambient Ceiling Temperature ¹	Wax Color
155 °F (68 °C) / 165 °F (74 °C)	02568A	148 °F (64 °C)	100 °F (38 °C)	Light Brown
175 °F (79 °C)	04146A	161 °F (71 °C)	150 °F (65 °C)	Brown
200 °F (93 °C)	04146A	161 °F (71 °C)	150 °F (65 °C)	Brown
220 °F (104 °C)	02569A	170 °F (76 °C)	150 °F (65 °C)	Dark Brown
286 °F (141 °C)	02569A	170 °F (76 °C)	150 °F (65 °C)	Dark Brown

¹ Based on NFPA-13. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.



WARNING Never install sprinklers that have been dropped, damaged, or exposed to temperatures in excess of the maximum ambient temperature allowed.

Refer to the appropriate current technical data pages for complete care, handling, and installation instructions. Data pages are included with each shipment from Viking or Viking distributors. They can also be found on the Web site at www.vikinggroupinc.com.



TECHNICAL DATA

SPRINKLER OVERVIEW

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1. DESCRIPTION

Viking fire sprinklers consist of a threaded frame with a specific waterway or orifice size and a deflector for distributing water in a specified pattern. A closed or sealed sprinkler refers to a complete assembly, including the thermosensitive operating element. An open sprinkler does not use an operating element and is open at all times. The distribution of water is intended to extinguish a fire or to control its spread.

Viking sprinklers are available in several models and styles. Refer to specific sprinkler technical data pages for available styles, finishes, temperature ratings, thread sizes, and nominal K-Factors for the particular model selected.

2. LISTINGS AND APPROVALS

Refer to the Approval Charts on the appropriate sprinkler technical data page(s) and/or approval agency listings.



WARNING: Cancer and Reproductive Harm-
www.P65Warnings.ca.gov

3. TECHNICAL DATA

Pressure Ratings:

Maximum allowable water working pressure is 175 psig (12 Bar) unless rated and specified for high water working pressure [250 psig (17.2 bar)].

Sprinkler Identification:

Viking sprinklers are identified and marked with the word "Viking", the sprinkler identification number (SIN) consisting of "VK" plus a three digit number*, the model letter, and the year of manufacture.

Available Finishes:

Viking sprinklers are available in several decorative finishes. Some models are available with corrosion-resistant coatings or are fabricated from non-corrosive material. Refer to the sprinkler technical data page for additional information.

Available Temperature Ratings:

Viking sprinklers are available in several temperature ratings that relate to a specific temperature classification. Applicable installation rules mandate the use and limitations of each temperature classification. In selecting the appropriate temperature classification, the maximum expected ceiling temperature must be known. When there is doubt as to the maximum temperature at the sprinkler location, a maximum-reading thermometer should be used to determine the temperature under conditions that would show the highest readings to be expected. In addition, recognized installation rules may require a higher temperature classification, depending upon sprinkler location, occupancy classification, commodity classification, storage height, and other hazards. In all cases, the maximum expected ceiling temperature dictates the lowest allowable temperature classification. Sprinklers located immediately adjacent to a heat source may require a higher temperature rating.

K-Factors:

Viking sprinklers are available in several orifice sizes with related K-Factors. The orifice is a tapered waterway and, therefore, the K-Factor given is nominal. Nominal U.S. K-Factors are provided in accordance with the 1999 edition of NFPA 13, Section 3-2.3. Refer to the specific data page for appropriate K-Factor information.

Available Styles:

Viking sprinklers are available for installation in several positions as indicated by a stamping on the deflector. The deflector style dictates the appropriate installation position of the sprinkler; it breaks the solid stream of water issuing from the sprinkler orifice to form a specific spray pattern. The following list indicates the various styles and identification of Viking sprinklers.

UPRIGHT SPRINKLER: A sprinkler intended to be installed with the deflector above the frame so water flows upward through the orifice, striking the deflector and forming an umbrella-shaped spray pattern downward. Marked "SSU" (Standard Sprinkler Upright) or "UPRIGHT" on the deflector.

PENDENT SPRINKLER: A sprinkler intended to be oriented with the deflector below the frame so water flows downward through the orifice, striking the deflector and forming an umbrella-shaped spray pattern downward. Marked "SSP" (Standard Sprinkler Pendent) or "PENDENT" on the deflector.

CONVENTIONAL SPRINKLER: An "old style" sprinkler intended to be installed with the deflector in either the upright or pendent position. The deflector provides a spherical type pattern with 40 to 60 percent of the water initially directed downward and a proportion directed upward. Must be installed in accordance with installation rules for conventional or old style sprinklers. DO NOT USE AS A REPLACEMENT FOR STANDARD SPRAY SPRINKLERS. Marked "C U/P" (Conventional Upright/Pendent) on the deflector.

Viking Technical Data may be found on
The Viking Corporation's Web site at
<http://www.vikinggroupinc.com>.
The Web site may include a more recent
edition of this Technical Data Page.



TECHNICAL DATA

SPRINKLER OVERVIEW

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VERTICAL SIDEWALL (VSW) SPRINKLER: A sprinkler intended for installation near the wall and ceiling. The deflector provides a water spray pattern outward in a quarter-spherical pattern and can be installed in the upright or pendent position with the flow arrow in the direction of discharge. Marked "SIDEWALL" on the deflector with an arrow and the word "FLOW". (Note: Some vertical sidewall sprinklers can only be installed in the upright or pendent position—in this case, the sprinkler will also be marked "UPRIGHT" or "PENDENT".)

HORIZONTAL SIDEWALL (HSW) SPRINKLER: A sprinkler intended for installation near the wall and ceiling. The special deflector provides a water spray pattern outward in a quarter-spherical pattern. Most of the water is directed away from the nearby wall with a small portion directed at the wall behind the sprinkler. The top of the deflector is oriented parallel with the ceiling or roof. The flow arrows point in the direction of discharge. Marked "SIDEWALL" and "TOP" with an arrow and the word "FLOW".

EXTENDED COVERAGE (EC) SPRINKLER: A spray sprinkler designed to discharge water over an area having the maximum dimensions indicated in the individual listings. Maximum area of coverage, minimum flow rate, orifice size, and nominal K-Factor are specified in the individual listings. EC sprinklers are intended for Light-Hazard occupancies with smooth, flat, horizontal ceilings unless otherwise specified. In addition to the above markings, the sprinkler is marked "EC".

QUICK RESPONSE (QR) SPRINKLER: A spray sprinkler with a fast-actuating operating element. The use of quick response sprinklers may be limited due to occupancy and hazard. Refer to the Authority Having Jurisdiction (AHJ) prior to installing.

QUICK RESPONSE EXTENDED COVERAGE (QREC) SPRINKLER: A spray sprinkler designed to discharge water over an area having the maximum dimensions indicated in the individual listing. This is a sprinkler with an operating element that meets the criteria for quick response. QREC sprinklers are only intended for Light Hazard occupancies. The sprinkler is marked "QREC".

FLUSH SPRINKLER: A decorative spray sprinkler intended for installation with a concealed piping system. The unit is mounted flush with the ceiling or wall, with the fusible link exposed. Upon actuation, the deflector extends beyond the ceiling or wall to distribute water discharge. The sprinkler is marked "SSP", "PEND", or "SIDEWALL" and "TOP".

CONCEALED SPRINKLER: A decorative spray sprinkler intended for installation with a concealed piping system. The sprinkler is hidden from view by a cover plate installed flush with the ceiling or wall. During fire conditions, the cover plate detaches, and upon sprinkler actuation, the deflector extends beyond the ceiling or wall to distribute water discharge. The sprinkler is marked "SSP", "PEND", or "SIDEWALL" and "TOP".

RECESSED SPRINKLER: A spray sprinkler assembly intended for installation with a concealed piping system. The assembly consists of a sprinkler installed in a decorative adjustable recessed escutcheon that minimizes the protrusion of the sprinkler beyond the ceiling or wall without adversely affecting the sprinkler distribution or sensitivity. Refer to the appropriate technical data page for allowable sprinkler models, temperature ratings, and occupancy classifications. DO NOT RECESS ANY SPRINKLER NOT LISTED FOR USE WITH THE ESCUTCHEON.

CORROSION-RESISTANT SPRINKLER: A special service sprinkler with non-corrosive protective coatings, or that is fabricated from non-corrosive material, for use in atmospheres that would normally corrode sprinklers.

DRY SPRINKLER: A special-service sprinkler intended for installation on dry pipe systems or wet pipe systems where the sprinkler is subject to freezing temperatures. The unit consists of a sprinkler permanently secured to an extension nipple with a sealed inlet end to prevent water from entering the nipple until the sprinkler operates. The unit MUST be installed in a tee fitting. Dry upright sprinklers are marked with the "B" dimension [distance from the face of the fitting (tee) to the top of the deflector]. Dry pendent and sidewall sprinklers are marked with the "A" dimension [the distance from the face of fitting (tee) to the finished surface of the ceiling or wall].

LARGE DROP SPRINKLER: A type of special application sprinkler used to provide fire control of specific high-challenge fire hazards. Large drop sprinklers are designed to produce an umbrella-shaped spray pattern downward with a higher percentage of "large" water droplets than standard spray sprinklers. The sprinkler has an extra-large orifice with a nominal K-Factor of 11.2. Marked "HIGH CHALLENGE" and "UPRIGHT".

EARLY SUPPRESSION FAST-RESPONSE (ESFR) SPRINKLER: A sprinkler intended to provide fire suppression of specific high-challenge fire hazards through the use of a fast response fusible link, 14.0, 16.8, or 25.2 nominal K-Factor, and special deflector. ESFR sprinklers are designed to produce high-momentum water droplets in a hemispherical pattern below the deflector. This permits penetration of the fire plume and direct wetting of the burning fuel surface while cooling the atmosphere early in the development of a high-challenge fire. Marked "ESFR" and "UPRIGHT" or "PEND".

INTERMEDIATE LEVEL/RACK STORAGE SPRINKLER: A standard spray sprinkler assembly designed to protect its operating element from the spray of sprinklers installed at higher elevations. The assembly consists of a standard or large orifice upright or pendent sprinkler with an integral upright or pendent water shield and guard assembly. Use only those sprinklers that have been tested and listed for use with the assembly. Refer to the technical data page for allowable sprinkler models.

RESIDENTIAL SPRINKLER: A sprinkler intended for use in the following occupancies: one- and two-family dwellings with the fire protection sprinkler system installed in accordance with NFPA 13D; residential occupancies up to four stories in height with the fire protection system installed in accordance with NFPA 13R; and where allowed by the Authority Having Jurisdiction in residential portions of any occupancy with the fire protection system installed in accordance with NFPA 13.



TECHNICAL DATA

SPRINKLER OVERVIEW

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Residential sprinklers have a unique distribution pattern and utilize a “fast response” heat sensitive operating element. They enhance survivability in the room of fire origin and are designed to provide a life safety environment for a minimum of ten minutes. For this reason, residential sprinklers must not be used to replace standard sprinklers unless tested for and approved by the Authority Having Jurisdiction. In addition to standard markings, the unit is identified as “RESIDENTIAL SPRINKLER” or “RES”.

4. INSTALLATION

Refer to appropriate NFPA Installation Standards.

5. OPERATION

Refer to the appropriate sprinkler technical data page(s).

6. INSPECTIONS, TESTS AND MAINTENANCE

Refer to NFPA 25 for Inspection, Testing and Maintenance requirements.

7. AVAILABILITY

Viking sprinklers are available through a network of domestic and international distributors. See The Viking Corporation web site for the closest distributor or contact The Viking Corporation.

8. GUARANTEE

For details of warranty, refer to Viking's current list price schedule or contact Viking directly.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers and the appropriate sprinkler general care, installation, and maintenance guide. Vikings sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, FM Global, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable. The sprinkler technical data page may contain installation requirements specific for the sprinkler model selected. The use of certain types of sprinklers may be limited due to occupancy and hazard. Refer to the Authority Having Jurisdiction prior to installation.



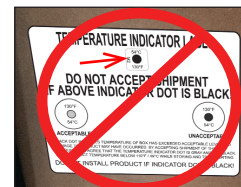
BULLETIN

BEST PRACTICES FOR RESIDENTIAL SPRINKLER HANDLING & INSTALLATION

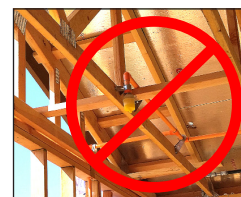
The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
 Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com
 Visit the Viking website for the latest edition of this technical data page.

SPRINKLERS ARE FRAGILE - HANDLE WITH CARE!

- Always keep sprinklers in a cool dry place.
- Protect sprinklers during storage, transport and handling as well as before, during and after installation. Refer to Viking's Care and Handling of Sprinklers Bulletin [Form No. F_091699²](#).
- Proper transit, storage and installation of sprinklers in a high-heat environment is a must. Care should be taken to prevent sprinklers from being exposed to ambient heat conditions in excess of those referenced in installation standards.
- Do not stage or store sprinklers on the job site in advance in a non-conditioned space prior to installation.
- Keep sprinklers in the original packaging and check temperature indicators on box label prior to installation. If the indicator has turned black, DO NOT install any product contained in the box. Refer to Viking product return policies.
- Temperatures exceeding the maximum ambient temperature of the sprinkler temperature-rating during storage, transport, handling and installation must be avoided.
- Per NFPA standards 13, 13R, and 13D, sprinklers installed where maximum ambient temperatures are at or over 101 °F (38 °C) through 150 °F (66 °C) shall be intermediate temperature-rated sprinklers. Additionally, if sprinklers are installed in an unventilated concealed space under an uninsulated roof or in an unventilated attic, they shall be of intermediate temperature classification.
- Sprinklers installed where ambient temperatures are at or below 100 °F (38 °C) may be either ordinary or intermediate temperature-rated sprinklers. Refer to NFPA standards 13R 6.2.3.1 and 13D 7.5.6.1.
- Rough-in of sprinkler piping during hot weather conditions should not include the installation of sprinklers unless reasonable ambient temperatures can be maintained. Ambient temperatures that are considered when choosing the temperature rating for a sprinkler should take into account the range of ambient temperatures that are expected from installation through establishment and maintenance of temperature in a conditioned space. Appropriate insulation may be considered. **Example:** An ordinary temperature sprinkler should not be exposed to maximum ambient temperature higher than 100 °F (38 °C) or more. Refer to NFPA 13, Table 6.2.5.1, NFPA 13R, 6.2.3.1 and NFPA 13D, 7.5.6.1.
- CPVC fire sprinkler products exposed to high ambient temperatures (e.g. installed in unventilated, concealed spaces such as attics) should be insulated to maintain a cooler environment. Refer to Viking Plastics Installation and Design Manual, [Form No. F_080712²](#), for care and handling procedures.
- Protect all sprinklers and connecting CPVC piping in attic spaces and unvented concealed spaces from excessive heat exposure above 100 °F (38 °C). To separate excessive attic heat, properly tent and fully insulate all pipe in unconditioned spaces.
- Pressure relief valves should be installed on wet sprinkler systems where there is a risk of over-pressurization of a checked water supply, due to thermal expansion. Refer to NFPA 13, 7.1.2.1 and NFPA 13D, A.5.2.2.2.
- Fire sprinkler systems should be installed per current referenced editions of building codes and installation standards adopted in the jurisdiction where work is being performed.



INCORRECT
(Heat exposure)



INCORRECT
(Unconditioned at rough-in)



INCORRECT
(Exposed piping)



INCORRECT
(No pressure relief valve)



WARNING: Cancer and Reproductive Harm-
www.P65Warnings.ca.gov

¹Hot weather condition is defined as temperatures that can reach the maximum ambient temperature-rating of the sprinkler.

²Clicking on blue hyperlink will open referenced document.

⚠ WARNING

Any sprinkler with a loss of liquid from the glass bulb or damage to the fusible element should be destroyed. Never install sprinklers that have been dropped, damaged, or exposed to temperatures exceeding the maximum ambient temperature allowed. Sprinklers that have been painted in the field must be replaced per NFPA 13. Protect sprinklers from paint and paint overspray in accordance with the installation standards. Do not clean sprinklers with soap and water, ammonia, or any other cleaning fluid. Do not use adhesives or solvents on sprinklers or their operating elements.

Refer to the appropriate technical data page and NFPA standards for complete care, handling, installation, and maintenance instructions. For additional product and system information Viking data pages and installation instructions are available on the Viking Web site at www.vikinggroupinc.com.

**BULLETIN****REGULATORY AND HEALTH
WARNINGS**

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

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Visit the Viking website for the latest edition of this technical data page www.vikinggroupinc.com

1. DESCRIPTION

Regulatory and Health Warnings applying to materials used in the manufacture and construction of fire protection products are provided herein as they relate to legally mandated jurisdictional regions.

⚠ WARNING**STATE OF CALIFORNIA, USA**

Installing or servicing fire protection products such as sprinklers, valves, piping etc. can expose you to chemicals including, but not limited to, lead, nickel, butadiene, titanium dioxide, chromium, carbon black, and acrylonitrile which are known to the State of California to cause cancer or birth defects or other reproductive harm.

For more information, go to www.P65Warnings.ca.gov

2. WARRANTY TERMS AND CONDITIONS

For details of warranty, refer to Viking's current list price schedule at www.vikinggroupinc.com or contact Viking directly.



TECHNICAL DATA

FREEDOM® RESIDENTIAL HORIZONTAL SIDEWALL SPRINKLER VK460 (K5.8)

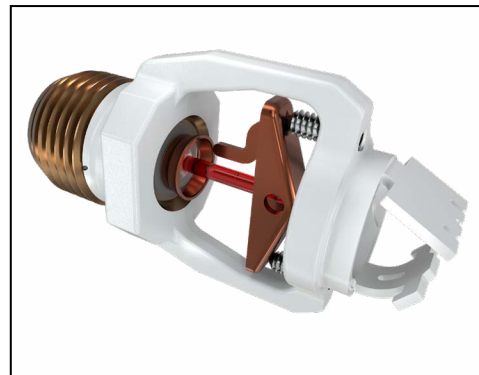
The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

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1. DESCRIPTION

Viking Freedom® Residential Horizontal Sidewall Sprinkler VK460 is a small, thermosensitive, glass-bulb residential sprinkler available in several different finishes and temperature ratings to meet varying design requirements. The Electroless Nickel PTFE (ENT) coating has been investigated for installation in corrosive atmospheres and is C-UL-US-EU Listed as corrosion resistant as indicated in the Approval Chart. The orifice design, with a K-Factor of 5.8 (83.6 metric†), allows efficient use of available water supplies for the hydraulically designed fire-protection system. The glass bulb operating element and special deflector characteristics meet the challenges of residential sprinkler standards.



2. LISTINGS AND APPROVALS

 **UL Listed (C-UL-US-EU):** Category VKKW

 **VdS Approved**



WARNING: Cancer and Reproductive Harm-
www.P65Warnings.ca.gov

Refer to the Approval Chart and Design Criteria for C-UL-US-EU Listing requirements that must be followed.

3. TECHNICAL DATA

Specifications:

Available since 2007.

Minimum Operating Pressure: 7 PSI (0.5 bar).

Maximum Working Pressure: 175 PSI (12 bar). Factory-tested hydrostatically to 500 PSI (34.5 bar).

Thread size: 1/2" (15 mm) NPT

Nominal K-Factor: 5.8 U.S. (83.6 metric†)

† Metric K-factor measurement shown is in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

Glass-bulb fluid temperature rated to -65 °F (-55 °C)

Overall Length: 2-1/2" (63.5 mm)

Covered by the following US Patent Nos.: 7,854,269 and 7,712,218

Material Standards:

Frame Casting: Brass UNS-C84400 or QM brass

Deflector: Brass UNS-C23000 or Phosphor bronze UNS-C51000

Bulb: Glass, nominal 3 mm diameter

Belleville Spring Sealing Assembly: Nickel alloy, coated on both sides with PTFE tape

Pip Cap and Insert Assembly: Copper UNS-C11000 and Stainless steel UNS-S30400

Compression Screws: 18-8 Stainless steel

Yoke: Phosphor bronze UNS-C51000

Ordering Information: See Table 1.

4. INSTALLATION

Refer to appropriate NFPA Installation Standards.

5. OPERATION

During fire conditions, the heat-sensitive liquid in the glass bulb expands, causing the glass to shatter, releasing the yoke, pip cap, and sealing spring assembly. Water flowing through the sprinkler orifice strikes the sprinkler deflector, forming a uniform spray pattern to extinguish or control the fire.

6. INSPECTIONS, TESTS AND MAINTENANCE

Refer to NFPA 25 for Inspection, Testing and Maintenance requirements.

7. AVAILABILITY

The Viking Model VK460 Sprinkler is available through a network of domestic and international distributors. See The Viking Corporation web site for the closest distributor or contact The Viking Corporation.

8. GUARANTEE

For details of warranty, refer to Viking's current list price schedule or contact Viking directly.



TECHNICAL DATA

FREEDOM® RESIDENTIAL HORIZONTAL SIDEWALL SPRINKLER VK460 (K5.8)

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Ordering Instructions

1. Choose a sprinkler base part number with the required thread size and listing or approval (refer to the approval chart).
2. Add the suffix for the desired finish.
3. Add the suffix for the desired temperature rating.

EXAMPLE: 13933AB-TQ = VK460 with brass finish and 155 °F (66 °C) nominal temperature rating. This sprinkler is to be installed into an InstaSeal® fitting in an area with a maximum ambient temperature of 100 °F (38 °C).

NOTE: The "TQ" suffix for the part number below indicates a special protective cap (Figure 2-B) intended for use with InstaSeal® fittings. When ordering sprinklers with TQ suffixes in combination with InstaSeal fittings, refer to Form No. F_021323 for installation instructions.

Sprinkler Base Part Number	
Part Number*	Thread Size
13933XX-TQ	1/2" NPT

Temperature Ratings			
Temperature Rating	Bulb Color	Maximum Ambient Ceiling Temperature	Suffix
155 °F (68 °C)	Red	100 °F (38 °C)	B
175 °F (79 °C)	Yellow	150 °F (66 °C)	D

* Where "X" is shown in the base part number, enter the desired suffix for temperature rating (EXAMPLE: 13933AE-TQ)

Accessories
Standard Wrench: Part no. 21475M/B
Recessed wrench: Part no. 13655W/B (requires a 1/2" wrench not available from Viking)
Protective sprinkler cap/escutcheon installation tool: Part no. 15915
Sprinkler Cabinet: Part no. 01724A (up to 6 sprinklers) or 01725A (up to 12 sprinklers)

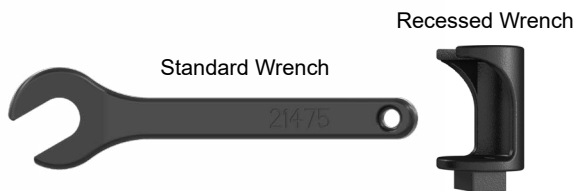


Figure 1: Sprinkler Wrenches



TECHNICAL DATA

FREEDOM® RESIDENTIAL HORIZONTAL SIDEWALL SPRINKLER VK460 (K5.8)

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Approval Chart

Viking VK460, 5.8 K-Factor Residential Horizontal Sidewall Sprinkler

For systems designed to NFPA 13D or NFPA 13R. For systems designed to NFPA 13, refer to the design criteria. For Ceiling types refer to current editions of NFPA 13, 13R or 13D.

Sprinkler Base Part Number ¹	SIN	NPT Thread Size		Nominal K-Factor		Maximum Water Working Pressure	Overall Length			
		Inches	mm	U.S.	metric ²		Inches	mm		
13933XX-TQ	VK460	1/2	15	5.8	83.6	175 PSI (12 bar)	2-1/2	63.5		
Max. Coverage Area ³ Width X Length Ft. X Ft. (m X m)	Max. Spacing Ft. (m)	Ordinary Temp Rating (155 °F/68 °C)		Intermediate Temp Rating (175 °F/79 °C)		Top of Deflector to Ceiling	Installation Type	Listings and Approvals ⁴		Minimum Spacing Ft. (m)
		Flow ³ GPM (L/min)	Pressure ³ PSI (bar)	Flow ³ GPM (L/min)	Pressure ³ PSI (bar)			C-UL-US-EU ⁵	VdS	
12 X 12 (3.7 X 3.7)	12 (3.7)	16 (60.6)	7.6 (0.52)	16 (60.6)	7.6 (0.52)	4 to 6 inches	Standard surface-mounted escutcheons or recessed with the Micromatic® Model E-1, E-2, or E-3 recessed escutcheon, or G-1 adjustable escutcheon	See footnote 6 and 7	See footnote 6	8 (2.4)
14 X 14 (4.3 X 4.3)	14 (4.3)	16 (60.6)	7.6 (0.52)	16 (60.6)	7.6 (0.52)					
16 X 16 (4.9 X 4.9)	16 (4.9)	20 (75.7)	11.9 (0.82)	21 (79.5)	13.1 (0.90)					
16 X 18 (4.9 X 5.5)	16 (4.9)	22 (83.3)	14.4 (0.99)	22 (83.3)	14.4 (0.99)					
16 X 20 (4.9 X 6.1)	16 (4.9)	26 (98.4)	20.1 (1.39)	26 (98.4)	20.1 (1.39)					
16 X 22 (4.9 X 6.7)	16 (4.9)	31 (117.3)	28.6 (1.97)	--	--					
18 X 18 (5.5 X 5.5)	18 (5.5)	23 (87.1)	15.7 (1.1)	23 (87.1)	15.7 (1.1)					
18 X 20 (5.5 X 6.1)	18 (5.5)	29 (109.8)	25.0 (1.7)	29 (109.8)	25.0 (1.7)					
20 X 20 (6.1 X 6.1)	20 (6.1)	30 (113.6)	26.8 (1.8)	30 (113.6)	26.8 (1.8)					
16 X 24 (4.9 X 7.3)	16 (4.9)	38 (143.8)	42.9 (2.96)	--	--					
14 X 26 (4.3 X 7.9)	14 (4.3)	42 (159)	52.4 (3.62)	--	--	6 to 12 inches	Standard surface-mounted escutcheons only	See footnote 6 and 7	See footnote 6	
12 X 12 (3.7 X 3.7)	12 (3.7)	16 (60.6)	7.6 (0.52)	16 (60.6)	7.6 (0.52)					
14 X 14 (4.3 X 4.3)	14 (4.3)	18 (68.1)	9.7 (0.67)	18 (68.1)	9.7 (0.67)					
16 X 16 (4.9 X 4.9)	16 (4.9)	24 (90.8)	17.1 (1.2)	24 (90.8)	17.1 (1.2)					
16 X 18 (4.9 X 5.5)	16 (4.9)	27 (102.2)	21.7 (1.49)	27 (102.2)	21.7 (1.49)					
16 X 20 (4.9 X 6.1)	16 (4.9)	32 (121.1)	30.4 (2.1)	32 (121.1)	30.4 (2.1)					
16 X 22 (4.9 X 6.7)	16 (4.9)	37 (140.1)	40.7 (2.81)	--	--					
18 X 18 (5.5 X 5.5)	18 (5.5)	29 (109.8)	25.0 (1.7)	29 (109.8)	25.0 (1.7)					
18 X 20 (5.5 X 6.1)	18 (5.5)	35 (132.5)	36.4 (2.51)	35 (132.5)	36.4 (2.51)					
20 X 20 (6.1 X 6.1)	20 (6.1)	36 (136.3)	38.5 (2.66)	36 (136.3)	38.5 (2.66)					
16 X 24 (4.9 X 7.3)	16 (4.9)	42 (159)	52.4 (3.62)	--	--					
14 X 26 (4.3 X 7.9)	14 (4.3)	46 (174.1)	62.9 (4.34)	--	--					

Footnotes

- Part number shown is the base part number. For complete part number, refer to Viking's current price schedule.
- Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.
- For areas of coverage smaller than shown, use the "Flow" and "Pressure" for the next larger area listed. Flows and pressures listed are per sprinkler. The distance from sprinklers to walls shall not exceed one-half the sprinkler spacing indicated for the minimum "Flow" and "Pressure" used.
- This chart shows the listings and approvals available at the time of printing. Other approvals may be in process. Check with the manufacturer for any additional approvals. Refer also to Design Criteria.
- Listed by Underwriter's Laboratories, Inc. for use in the U.S., Canada, and European Union.
- Approved Finishes are: Brass, **chrome**, white polyester, and black polyester. Other paint colors are available on request with the same C-UL-US-EU listings as the standard finish colors.
- Approved finish is Electroless Nickel PTFE (ENT). Sprinklers with ENT, White polyester, and black polyester finishes are C-UL-US-EU Listed as corrosion-resistant. ENT is available with standard surface-mounted escutcheons or the Micromatic Model E-1 recessed escutcheon.



TECHNICAL DATA

FREEDOM® RESIDENTIAL HORIZONTAL SIDEWALL SPRINKLER VK460 (K5.8)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Visit the Viking website for the latest edition of this technical data page. www.vikinggroupinc.com

DESIGN CRITERIA

(Also refer to the Approval Chart.)

UL Listing Requirements (C-UL-US-EU):

When using Viking Residential Sprinkler VK460 for systems designed to NFPA 13D or NFPA 13R, apply the listed areas of coverage and minimum water supply requirements shown in the Approval Chart.

For systems designed to NFPA 13: The number of design sprinklers is to be the four contiguous most hydraulically demanding sprinklers. The minimum required discharge from each of the four sprinklers is to be the greater of the following:

- The flow rates given in the Approval Chart for NFPA 13D and NFPA13R applications for each listed area of coverage, **or**
- Calculated based on a minimum discharge of 0.1 gpm/sq. ft. over the "design area" in accordance with sections 8.5.2.1 or 8.6.2.1.2 of NFPA 13.
- Minimum distance between residential sprinklers: 8 ft. (2.4 m).
- The VK460 horizontal sidewall sprinkler deflector shall be located a minimum of 1-3/8" (35 mm) and a maximum of 6" (152 mm) from the wall on which it is installed.

DEFLECTOR POSITION: Install sprinkler VK460 with the leading edge of the deflector oriented parallel to the ceiling and the sprinkler frame arms oriented perpendicular to the ceiling (see Figure 3). **THE TOP SURFACE OF THE DEFLECTOR IS MARKED "TOP"**. The sprinkler must be oriented as shown in Figure 3.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to Forms F_080415, F_080814, and F_080190 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, VdS, and any other similar Authorities Having Jurisdiction, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable. Final approval and acceptance of all residential sprinkler installations must be obtained from the Authorities Having Jurisdiction.

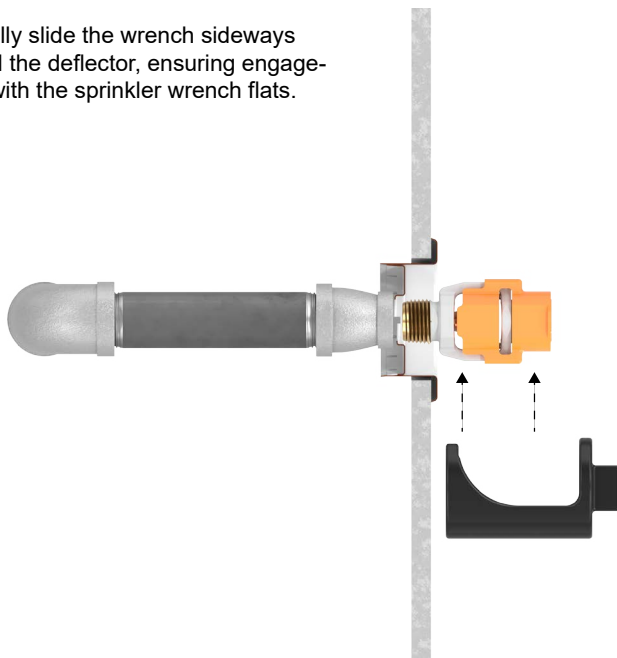
**TECHNICAL DATA****FREEDOM® RESIDENTIAL
HORIZONTAL SIDEWALL
SPRINKLER VK460 (K5.8)**

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

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- ① Carefully slide the wrench sideways around the deflector, ensuring engagement with the sprinkler wrench flats.



- ② Carefully press the wrench onto the sprinkler wrench flats.

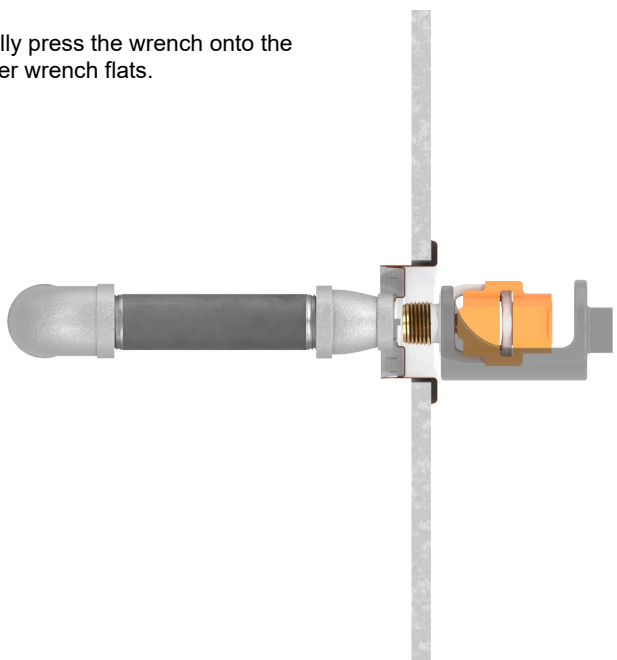


Figure 2: Recessed Sprinkler Installation

**** A 1/2" ratchet is required which is not available from us.**



TECHNICAL DATA

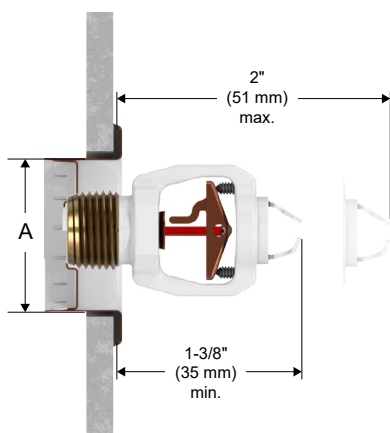
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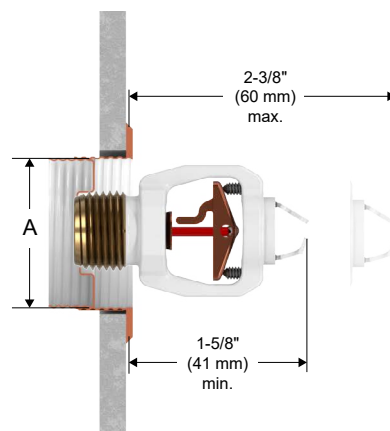
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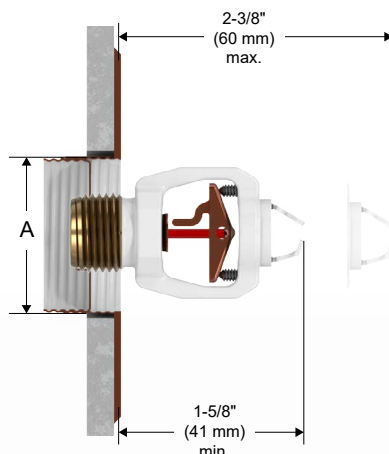
Model E-1 Escutcheon



Model E-2 Escutcheon

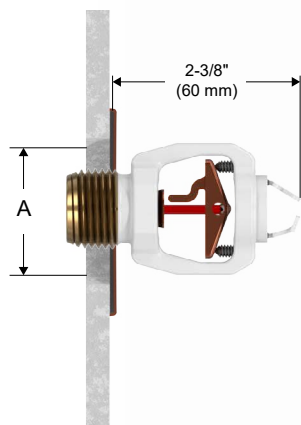


Model E-3 Escutcheon

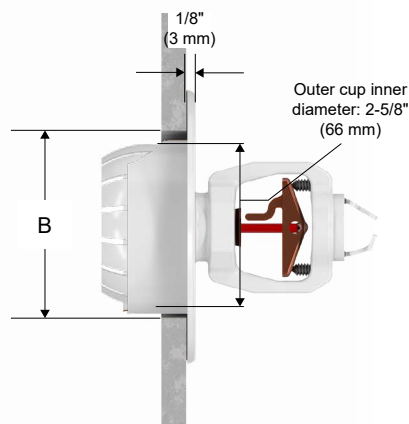


Wall Opening Size (A): Minimum 2-5/16" (59 mm) Maximum 2-1/2" (64 mm)

**Wall Opening Size (B):
Minimum 2-5/8" (66 mm)
Maximum 3-3/4" (95 mm)**



Surface-Mount Escutcheon



Model G-1 Escutcheon

Figure 3: Installation Dimensions with Escutcheons



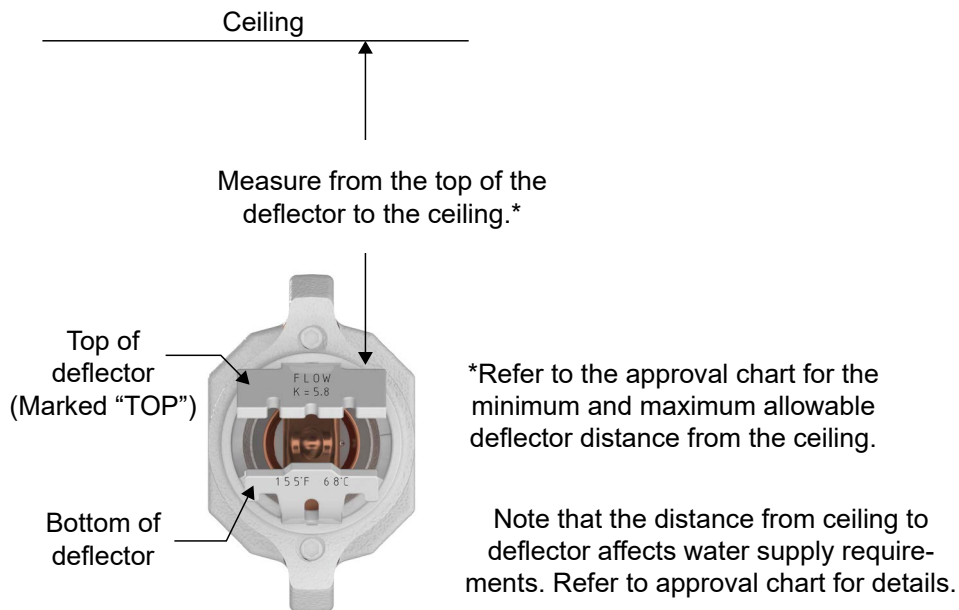
TECHNICAL DATA

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Note that the distance from ceiling to deflector affects water supply requirements. Refer to approval chart for details.

Figure 4: Correct Deflector Orientation



Viking Residential Sprinkler Installation Guide

October 25, 2018



WARNING: Cancer and Reproductive Harm-
www.P65Warnings.ca.gov

Trusted Above All™

www.vikinggroupinc.com



TECHNICAL DATA

FREEDOM® RESIDENTIAL SPRINKLER INSTALLATION GUIDE

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

1. DESCRIPTION

Viking residential automatic sprinklers are equipped with a "fast response" heat-sensitive operating element designed to respond individually and quickly to a specific high temperature. Viking residential sprinklers are designed to combine speed of operation with water distribution characteristics to help in the control of residential fires and to improve life safety by prolonging the time available for occupants to escape or be evacuated.

2. LISTINGS AND APPROVALS

Refer to the Approval Charts on the appropriate sprinkler technical data page(s) and/or approval agency listings.

- A. Viking residential sprinklers are intended for use in the following occupancies: one- and two-family dwellings and mobile homes with the fire protection sprinkler system installed in accordance with NFPA 13D; residential occupancies up to four stories in height with the fire protection system installed in accordance with NFPA 13R; or residential portions of any occupancy with the fire protection system installed in accordance with NFPA 13. Information contained in this guide is based on NFPA 13, "Standard for the Installation of Sprinkler Systems".
- B. The design criteria for residential sprinklers contained in the NFPA installation standards must be followed except as modified by the individual UL 1626 listing information provided in the technical data pages and this Residential Sprinkler Installation Guide. For listed areas of coverage, technical data, and specific design and installation instructions, refer to the appropriate Viking technical data page for the sprinkler model used.
- C. Viking residential sprinklers listed by Underwriters Laboratories, Inc. (UL) have passed fire tests designed to represent fire conditions for the sprinkler's listed area of coverage. The standards for residential sprinkler performance and spray patterns are printed in Underwriters Laboratories Publication UL 1626, "Standard for Residential Sprinklers for Fire Protection Service". All listed Viking residential sprinklers meet or exceed UL 1626 performance requirements and spray pattern criteria for their listed areas of coverage.
- D. NFPA standards allow use of residential sprinklers with rates, design areas, areas of coverage, and minimum design pressures other than those specified in the standards when they have been listed for such specific residential installation conditions.

3. TECHNICAL DATA

Specifications:

Refer to the appropriate sprinkler technical data sheet.

Material Standards:

Refer to the appropriate sprinkler technical data sheet.

Viking Technical Data may be found on
The Viking Corporation's Web site at
<http://www.vikinggroupinc.com>.
The Web site may include a more recent
edition of this Technical Data Page.

4. INSTALLATION

NOTE: Take care not to over-tighten the sprinkler and/or damage its operating parts!

Maximum Torque: 1/2" NPT: 14 ft-lbs. (19.0 N-m) 3/4" NPT: 20 ft-lbs. (27.1 N-m)

A. Care and Handling (also refer to Bulletin - Care and Handling of Sprinklers, Form No. F_091699.)

Sprinklers must be handled with care and protected from mechanical damage during storage, transport, handling, and after installation.

Store sprinklers in a cool, dry place in their original container.

Use care when locating sprinklers near fixtures that can generate heat.

Never install sprinklers that have been dropped, damaged in any way, or exposed to temperatures exceeding the maximum ambient temperature allowed (refer to Table 1.)

Never install any glass-bulb sprinkler if the bulb is cracked or if there is a loss of liquid from the bulb. A small air bubble should be present in the glass bulb. Any sprinkler with a loss of liquid from the glass bulb or damage to the fusible element should be destroyed immediately. (Note: Installing glass bulb sprinklers in direct sunlight (ultraviolet light) may affect the color of the dye used to color code the bulb. This color change does not affect the integrity of the bulb.)

Viking residential sprinklers are intended for use on wet pipe residential systems only. Adequate heat must be provided for wet-pipe systems. DO NOT use Viking residential sprinklers on dry systems unless specifically allowed by recognized installation standards or the Authority Having Jurisdiction.

Residential concealed sprinklers must be installed in neutral or negative pressure plenums only!

Corrosion-resistant sprinklers must be installed when subject to corrosive atmospheres. **NOTE:** Viking residential sprinklers are not intended for use in corrosive environments.



TECHNICAL DATA

FREEDOM® RESIDENTIAL SPRINKLER INSTALLATION GUIDE

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
 Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

TABLE 1: RESIDENTIAL SPRINKLER TEMPERATURE RATINGS

Sprinkler Temperature Classification	Sprinkler Nominal Temperature Rating ¹	Maximum Ambient Ceiling Temperature ³	Bulb Color
Residential Glass Bulb Style Sprinklers			
Ordinary	155 °F (68 °C)	100 °F (38 °C)	Red
Intermediate	175 °F (79 °C)	150 °F (65 °C)	Yellow
Sprinkler Temperature Classification	Sprinkler Nominal Temperature Rating (Fusing Point) ¹	Maximum Ambient Ceiling Temperature ³	
Residential Fusible Element Style Sprinklers			
Ordinary	165 °F (74 °C)	100 °F (38 °C)	
Sprinkler Temperature Classification	Sprinkler Nominal Temperature Rating (Fusing Point)	Maximum Ambient Ceiling Temperature ³	Temperature Identification Stamp
Residential Flush Style Sprinklers			
Ordinary	165 °F (74 °C)	100 °F (38 °C)	On Cover or Sprinkler Inlet (VK476)
Intermediate	220 °F (104 °C)	150 °F (65 °C)	On Cover
Sprinkler Temperature Classification	Sprinkler Nominal Temperature Rating (Fusing Point)	Maximum Ambient Ceiling Temperature ³	Cover Plate Temperature Rating
Residential Concealed Style Sprinklers			
Ordinary	135 °F (57 °C) ¹ , 140 °F (60 °C) ² , 155 °F (68 °C) ¹ , or 165 °F (74 °C) ¹	100 °F (38 °C)	135 °F (57 °C)
Footnotes			
¹ The sprinkler temperature rating is stamped on the deflector or flow shaper.			
² The temperature rating is stamped on the sprinkler.			
³ Based on NFPA-13. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.			

B. Installation Instructions

Viking sprinklers are manufactured and tested to meet the rigid requirements of approving agencies. They are designed to be installed in accordance with recognized installation standards NFPA 13, NFPA 13R, and NFPA 13D, and any associated TIAs.

Deviation from the standards or any alteration to the sprinklers or cover plate assemblies after they leave the factory including, but not limited to: painting, plating, coating, or modification, may render the sprinklers inoperative and will automatically nullify the approval and any guarantee made by Viking.

The use of residential sprinklers may be limited due to occupancy and hazard. Residential fire protection systems must be designed and installed only by those who are completely familiar with the appropriate standards and codes, and thoroughly experienced in fire protection design, hydraulic calculations, and sprinkler system installation.

Before installation, be sure to have the appropriate sprinkler model and style, with the correct K-Factor, temperature rating, and response characteristics. Viking residential sprinklers must be installed after the piping is in place to prevent mechanical damage. Keep sprinklers with protective caps or bulb shields contained within the caps or shields during installation and testing, and any time the sprinkler is shipped or handled.

1a. For frame-style sprinklers, install escutcheon (if used), which is designed to thread onto the external threads of the sprinkler*.

*Refer to the appropriate sprinkler technical data page to determine approved escutcheons for use with specific sprinkler models.

1b. For flush and concealed style sprinklers: Cut the sprinkler nipple so that the ½" or ¾" (15 mm or 20 mm) NPT** outlet of the reducing coupling is at the desired location and centered in the opening** in the ceiling or wall.

**Size depends on the sprinkler model used. Refer to appropriate sprinkler data page.



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DESIGN CRITERIA

For Systems Designed to NFPA 13D or NFPA 13R: Apply the listed areas of coverage and minimum water supply requirements shown in the approval charts on the residential sprinkler data pages. The sprinkler flow rate is the minimum required discharge from each of the total number of design sprinklers as specified in NFPA 13D or NFPA 13R.

For Systems Designed to the latest edition of NFPA 13: The number of design sprinklers is to be the four most hydraulically demanding sprinklers. The minimum required discharge from each of the four sprinklers is to be the greater of the following:

- The flow rates given in the approval charts on the data pages for NFPA 13D and NFPA13R for each area of coverage listed, or
- Calculated based on a minimum discharge of 0.1 gpm/sq. ft. over the “design area” in accordance with sections 8.5.2.1 or 8.6.2.1.2 of NFPA 13. The greatest dimension of the coverage area cannot be any greater than the maximum areas of coverage shown on the data pages.

Flow Rates

All residential sprinklers manufactured on or after July 12, 2002 are listed with a single minimum flow rate. Where rooms have more than one sprinkler, multiple-sprinkler calculations are still required, but the first sprinkler and any additional sprinkler or sprinklers must be calculated flowing at identical minimum flow rates, based on the area of sprinkler coverage, using the minimum flow and pressure listed for the sprinkler model used.

Consult the appropriate standards and the Authorities Having Jurisdiction to determine the number of sprinklers to hydraulically calculate to verify adequate water supply for multiple-sprinkler operation.

Operating Pressure: The minimum operating pressure of any sprinkler shall be the minimum operating pressure specified by the listing, or 7 psi (0.5 bar), whichever is greater. The maximum allowable operating pressure is 175 psi (12 bar).

Areas of Coverage

If the actual area of coverage is less than the listed area of coverage, use the minimum water supply for the next larger area of coverage listed. DO NOT interpolate. Residential sprinkler systems must be hydraulically calculated according to NFPA standards to verify that the water supply is adequate for proper operation of the sprinklers. Hydraulic calculations are required to verify adequate water supply at the hydraulically most remote single sprinkler when it is operating at the minimum gpm and psi listed for single-sprinkler operation for the sprinkler model used.

Viking residential sprinklers may be listed for more than one area of coverage. Suggested practice in selecting area of coverage is to select the one that can be adequately supplied by the available water supply and still allow for the installation of as few sprinklers in a compartment as possible while observing all guidelines pertaining to obstructions and spacing. This maximizes the use of the available water supply, which is often limited on residential fire protection systems. After selecting an appropriate area of coverage, sprinklers must be spaced according to guidelines set forth in the installation standards.

Definition of “COMPARTMENT”: A space completely enclosed by walls and a ceiling. Openings to an adjoining space are allowed, provided the openings have a minimum lintel depth of 8 in. (203.2 mm) from the ceiling.

Spacing Guidelines

For guidelines concerning spacing of Viking residential sprinklers near beams, obstructions, heat sources, and sloped ceilings [slopes more than a 2/12 (9.5°) pitch], refer to the Viking residential sprinkler data pages and installation guide, the appropriate NFPA standard, and the Authority Having Jurisdiction. NOTE: Sloped, beamed, and pitched ceilings could require special design features such as larger flow, or a design for more sprinklers to operate in the compartment, or both.

Distance from Walls: Install not more than one-half the listed sprinkler spacing nor less than 4” (102 mm) from walls, partitions, or obstructions as defined in the standards.

Minimum Sprinkler Spacing: The minimum distance between residential sprinklers to prevent cold soldering (i.e., the spray from one operating sprinkler onto an adjacent sprinkler that could prevent its proper activation) is 8 ft. (2.4 m).

Maximum Sprinkler Spacing: Locate adjacent sprinklers no farther apart than the listed spacing.

Deflector Position: Install frame style residential *pendent* sprinklers with the deflector between 1” and 4” (25.4 mm to 102 mm) below smooth ceilings, unless the sprinkler data page indicates otherwise. Install pendent sprinklers in the pendent position only, with the deflector oriented parallel with the ceiling or roof.

Refer to the individual listings in the residential sprinkler data pages for horizontal sidewall sprinkler deflector or sprinkler centerline distance below the ceiling. Install horizontal sidewall sprinklers in the horizontal position only below smooth ceilings, with the leading edge of the deflector or element assembly oriented parallel with the ceiling.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to the appropriate sprinkler data page. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA and any other similar Authorities Having Jurisdiction, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable. Final approval and acceptance of all residential sprinkler installations must be obtained from the Authorities Having Jurisdiction.



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2. Apply a small amount of pipe-joint compound or tape to the external threads of the sprinkler only, taking care not to allow a build-up of compound in the sprinkler inlet. **NOTE:** Sprinklers with protective caps or bulb shields must be contained within the caps or shields before applying pipe-joint compound or tape. *Exception: For concealed sprinklers (i.e., VK457, VK458, VK468, VK474, and VK4570) the protective cap is removed for installation.*
3. Care must be taken when installing sprinklers on CPVC and copper piping systems. Never install the sprinkler into the reducing fitting before attaching the reducing fitting to the piping. Sprinklers must be installed on CPVC systems after the reducing fitting has been installed and the primer and/or cement manufacturer's recommended curing time has elapsed. When installing sprinklers on copper piping systems, take care to brush the inside of the sprinkler supply piping and reducing fitting to ensure that no flux accumulates in the sprinkler orifice. Excess flux can cause corrosion and may impair the ability of the sprinkler to operate properly.
4. Refer to the appropriate sprinkler technical data page to determine the correct sprinkler wrench for the model of sprinkler used. DO NOT use the sprinkler deflector or fusible element to start or thread the sprinkler into a fitting.
 - a. Install the sprinkler onto the piping using the special sprinkler wrench only, while taking care not to over-tighten or damage the sprinkler operating parts.
 - b. Thread the flush or concealed sprinkler into the 1/2" or 3/4" (15 mm or 20 mm) NPT** outlet of the coupling by turning it clockwise with the special sprinkler wrench. *NOTE: For flush and concealed sprinklers with protective shells, the internal diameter of the special flush and concealed sprinkler installation wrench is designed for use with the sprinkler contained within the shell. Exception: For concealed sprinklers VK457, VK458, VK468, VK474, and VK4570 the protective cap is removed for installation, and then placed back on the sprinkler temporarily.*
5. After installation, the entire sprinkler system must be tested. The test must be conducted to comply with the installation standards.
 - a. Make sure the sprinkler has been properly tightened. If a thread leak occurs, normally the unit must be removed, new pipe-joint compound or tape applied, and then reinstalled. This is due to the fact that when the joint seal leaks, the sealing compound is washed out of the joint.
 - b. **Remove plastic protective sprinkler caps or bulb shields AFTER the wall or ceiling finish work is completed where the sprinkler is installed and there no longer is a potential for mechanical damage to the sprinkler operating elements.** To remove the bulb shields, simply pull the ends of the shields apart where they are snapped together. To remove caps from frame style sprinklers, turn the caps slightly and pull them off the sprinklers. **SPRINKLER CAPS OR BULB SHIELDS MUST BE REMOVED FROM SPRINKLERS BEFORE PLACING THE SYSTEM IN SERVICE!** Retain a protective cap or shield in the spare sprinkler cabinet.
6. For residential flush sprinklers, the ceiling ring can now be installed onto the sprinkler body. Align the ceiling ring with the sprinkler body and thread on or push it on until the flange touches the ceiling. Note the maximum vertical adjustment is 1/2" (12,7 mm) for sprinkler VK420 and 5/8" for VK476. DO NOT MODIFY THE UNIT. If necessary, re-cut the sprinkler drop nipples as required.
7. For residential concealed sprinklers, the cover plate assembly can now be attached.
 - a. Remove the cover plate assembly from the protective box, taking care not to damage the assembly.
 - b. From below the ceiling, gently place the base of the cover plate assembly over the sprinkler protruding through the opening in the ceiling or wall.
 - c. Carefully push the cover plate assembly onto the sprinkler, using even pressure with the palm of the hand, until the unfinished brass flange of the cover plate base touches the ceiling or wall.
 - d. The maximum adjustment available for residential concealed sprinklers is 1/2" (12.7 mm) [1/4" (6.4 mm) for sprinkler VK480]. DO NOT MODIFY THE UNIT. If necessary, re-cut the sprinkler nipples.

NOTE: If it is necessary to remove the entire sprinkler unit, the system must be taken out of service. See Maintenance instructions below and follow all warnings and instructions.

5. OPERATION

During fire conditions, the operating element fuses or shatters (depending on the type of sprinkler), releasing the pip cap and sealing assembly. Water flowing through the sprinkler orifice strikes the sprinkler deflector or flow shaper, forming a uniform, high-wall wetting spray pattern to extinguish or control the fire.



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6. INSPECTIONS, TESTS AND MAINTENANCE

Refer to NFPA 25 for Inspection, Testing and Maintenance requirements. **NOTICE:** The owner is responsible for having the fire-protection system and devices inspected, tested, and maintained in proper operating condition in accordance with this guide, and applicable NFPA standards. In addition, the Authority Having Jurisdiction may have additional maintenance, testing, and inspection requirements that must be followed.

- A. Sprinklers must be inspected on a regular basis for signs of corrosion, mechanical damage, obstructions, paint, etc. Frequency of the inspections may vary due to corrosive atmospheres, water supplies, and activity around the device.
- B. Sprinklers or cover plate assemblies that have been field painted, caulked, or mechanically damaged must be replaced immediately. Sprinklers showing signs of corrosion shall be tested and/or replaced immediately as required. Installation standards require sprinklers to be tested and, if necessary, replaced immediately after a specified term of service. Refer to NFPA 25 and the Authorities Having Jurisdiction for the specified period of time after which testing and/or replacement of residential sprinklers is required. Never attempt to repair or reassemble a sprinkler. Sprinklers and cover assemblies that have operated cannot be reassembled or re-used, but must be replaced. When replacement is necessary, use only new sprinklers and cover assemblies with identical performance characteristics.
- C. The sprinkler discharge pattern is critical for proper fire protection. Nothing should be hung from, attached to, or otherwise obstruct the discharge pattern of the sprinkler. All obstructions must be immediately removed or, if necessary, additional sprinklers installed.
- D. When replacing existing sprinklers, the system must be removed from service. Refer to the appropriate system description and/or valve instructions. Prior to removing the system from service, notify all Authorities Having Jurisdiction. Consideration should be given to employment of a fire patrol in the effected area.
 1. Remove the system from service, drain all water, and relieve all pressure on the piping.
 - 2a. For frame-style sprinklers, use the special sprinkler wrench and remove the old sprinkler by turning it counterclockwise to unthread it from the piping.
 - 2b. *For residential flush pendent and concealed style sprinklers: Remove the ceiling ring or cover plate assembly before unthreading the sprinkler body from the piping. To remove a ceiling ring, grasp it from below the ceiling and gently turn it counterclockwise. Cover plates can be removed either by gently unthreading them or pulling them off the sprinkler body (depends on the sprinkler model used). After the ceiling ring or cover plate assembly has been removed from the sprinkler, use the sprinkler wrench to unthread the sprinkler from the piping. NOTE: For flush and concealed sprinklers with protective shells, the internal diameter of the special flush and concealed sprinkler installation wrench is designed for use with the sprinkler contained within the shell. Place a plastic protective shell (from the spare sprinkler cabinet) over the sprinkler to be removed and then fit the sprinkler wrench over the shell. Exception: Concealed sprinklers VK457, VK458, VK468, VK474, and VK4570 are removed without the plastic cap.*
 3. Follow instructions in section 4B. Installation Instructions to install the new unit. Be sure the replacement sprinkler is the correct model and style, with the appropriate K-Factor, temperature rating, and response characteristics. A fully stocked sprinkler cabinet should be provided for this purpose. *(For flush or concealed style sprinklers, stock of spare ceiling rings or cover plates should also be available in the spare sprinkler cabinet.)*
 4. Place the system back in service and secure all valves. Check for and repair all leaks.
- E. Sprinkler systems that have been subjected to a fire must be returned to service as soon as possible. The entire system must be inspected for damage, and repaired or replaced as necessary. Sprinklers that have been exposed to corrosive products of combustion or high ambient temperatures, but have not operated, should be replaced. Refer to the Authority Having Jurisdiction for minimum replacement requirements.

7. AVAILABILITY

Viking Residential Sprinklers are available through a network of domestic and international distributors. See The Viking Corporation web site for the closest distributor or contact The Viking Corporation.

8. GUARANTEE

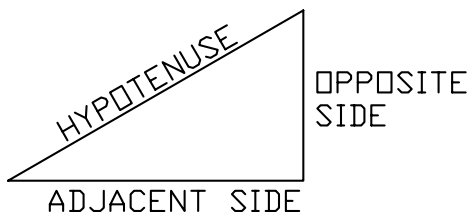
For details of warranty, refer to Viking's current list price schedule or contact Viking directly.



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TANGENT =
 OPPOSITE SIDE (RISE)
 ADJACENT SIDE (RUN)

$$\frac{\text{RISE}}{\text{RUN}} = \text{TANGENT}$$

$$\text{ANGLE} = \tan^{-1} \left(\frac{\text{RISE}}{\text{RUN}} \right)$$

$$\text{SLOPE DISTANCE} = \sqrt{(\text{RISE})^2 + (\text{RUN})^2}$$

RISE	RUN	TANGENT	ANGLE	SLOPE DISTANCE
2	12	.1666	9.45°	12.1
3	12	.2500	14°	12.3
4	12	.3333	18.4°	12.6
5	12	.4166	22.6°	13
6	12	.5000	26.5°	13.4
7	12	.5833	30.2°	13.8
8	12	.6666	33.6°	14.4
9	12	.7500	36.8°	15
10	12	.8333	39.8°	15.6
11	12	.9166	42.5°	16.2
12	12	1	45°	16.97

Table 2
 Rise Over Run Conversion to Degrees of Slope



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SPACING OF RESIDENTIAL SPRINKLERS LISTED FOR USE BELOW SLOPED CEILINGS UP TO AN 8/12 (33.7°) PITCH (Refer to the appropriate residential sprinkler technical data page for listings.)

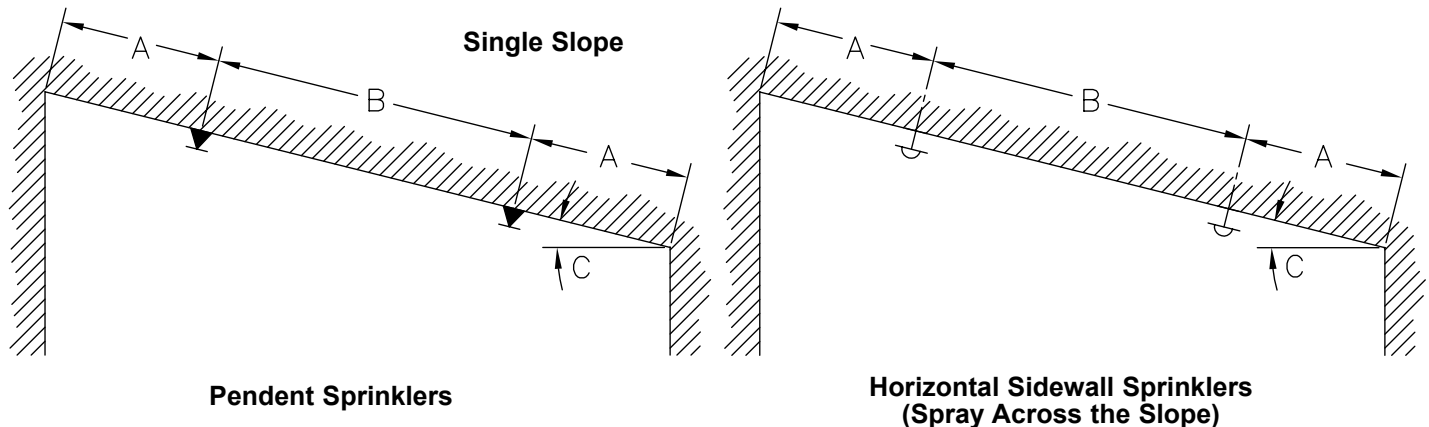


Figure 1

- (A) One-half listed spacing of sprinkler maximum, 0'-4" (0-102 mm) minimum.
- (B) Listed spacing of sprinkler, maximum, 8'-0" (2.4 m) minimum.
- (C) Where angle "C" is greater than an 8/12 (33.7°) pitch, see Figure 2 below.

SPACING OF RESIDENTIAL SPRINKLERS BELOW SLOPED CEILINGS WITH GREATER THAN 8/12 (33.7°) PITCH (NOTE: Refer to NFPA 13D or NFPA 13R, and the Authority Having Jurisdiction.)

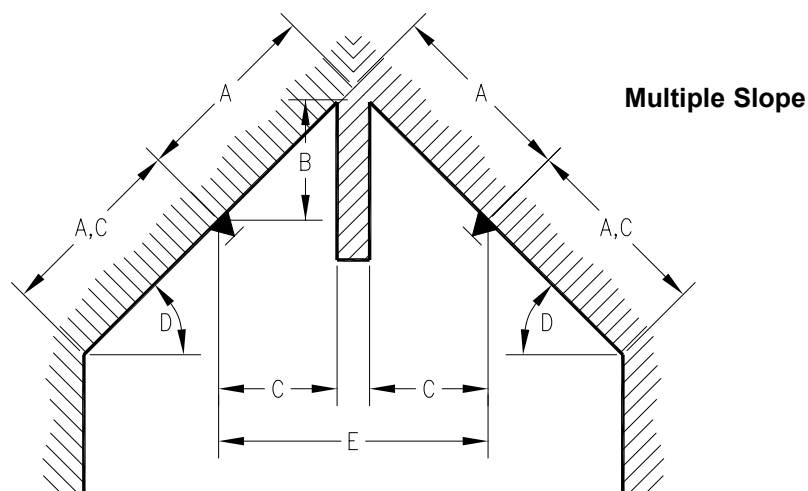


Figure 2

- (A) One-half listed spacing of sprinkler, maximum.
- (B) 3'-0" (.91 m) maximum.
- (C) 0'-4" (0-102 mm) minimum.
- (D) Slopes greater than an 8/12 (33.7°) pitch.
- (E) For distance less than 8'-0" (2.4 m), baffle required.



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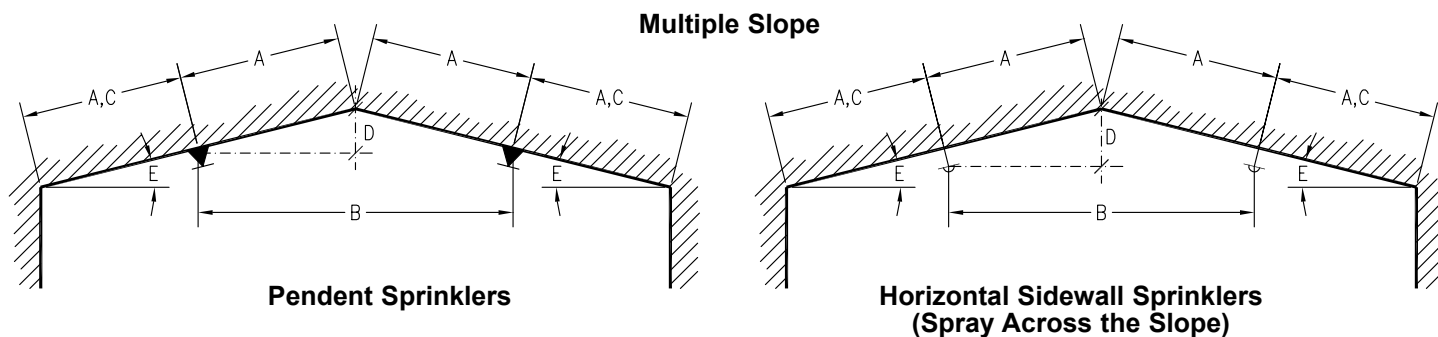


Figure 3

- (A) One-half listed spacing of sprinkler, maximum.
- (B) 8'-0" (2.4 m) minimum.
- (C) 0'-4" (0-102 mm) minimum.
- (D) 3'-0" (.91 m) maximum.
- (E) Acceptable for slopes of 0/12 to 8/12 (0° to 33.7°) pitch.

SPACING OF RESIDENTIAL PENDENT SPRINKLERS AT PEAK OF SLOPED CEILINGS WITH PITCH LESS THAN 8/12 (33.7°) (Refer to the appropriate residential sprinkler technical data page for listings.)

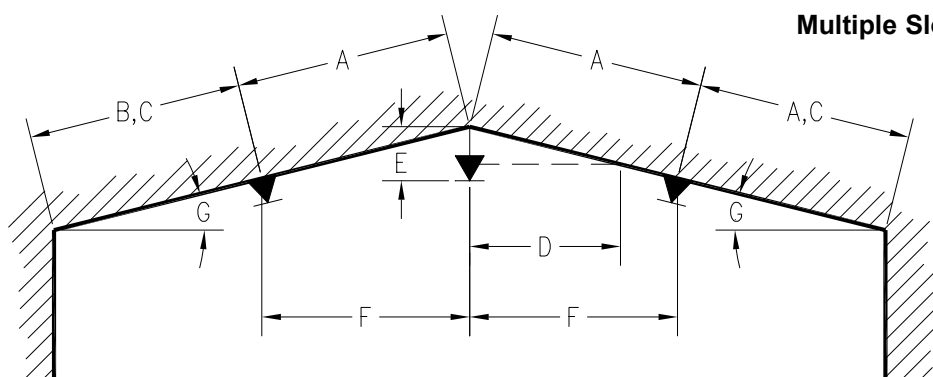


Figure 4

- (A) Listed spacing of sprinkler, maximum.
- (B) One-half listed spacing of sprinkler, maximum.
- (C) 0'-4" minimum.
- (D) Refer to page 10 for minimum distance between sprinkler and intersecting sloped ceiling.
- (E) Refer to the appropriate residential sprinkler technical data page for deflector distance below ceiling.
- (F) 8'-0" minimum.
- (G) Reference: 4/12 (18.0°) pitch maximum for 12' (3.7 m) spacing.
2.5/12 (12.0°) pitch maximum for 14' (4.3 m) spacing.
2/12 (10.0°) pitch maximum for 16' (4.9 m) spacing.
2/12 (10.0°) pitch maximum for 18' (5.5 m) spacing.
1.9/12 (9.0°) pitch maximum for 20' (6.1 m) spacing.
Angles based on sprinklers installed 0'-4" (0-102 mm) from peak.

NOTE: Whenever possible, utilize design as shown in Figure 3 above.



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SPACING OF RESIDENTIAL SPRINKLERS BELOW SLOPED CEILINGS WITH GREATER THAN 8/12 (33.7°) PITCH WITH NO BAFFLE AND A MAXIMUM OF 2 SPRINKLERS IN THE ROOM

(NOTE: Refer to NFPA 13D or NFPA 13R, and the Authority Having Jurisdiction.)

Multiple Slope

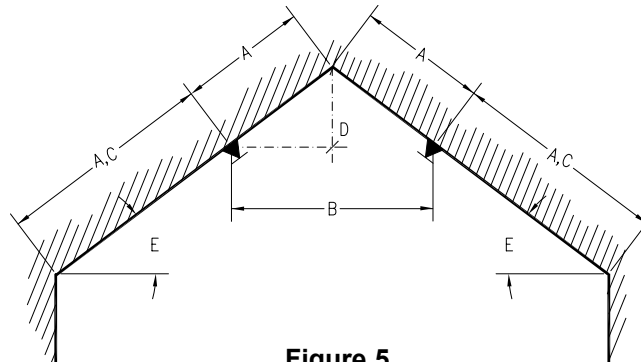


Figure 5

(A) One-half listed spacing of sprinkler, maximum.

(B) 8'-0" (2.4 m) minimum.

(C) 0'-4" (0-102 mm) minimum.

(D) 3'-0" (.91 m) maximum.

(E) Acceptable for slopes greater than an 8/12 (33.7°) pitch.

(F) When this design is used, refer to the appendices of NFPA 13D or NFPA 13R, and the Authority Having Jurisdiction regarding the number of design sprinklers to hydraulically calculate.

SPACING OF RESIDENTIAL SPRINKLERS BELOW CEILINGS WITH SLOPES EXCEEDING 8/12 (33.7°) PITCH WITH NO BAFFLE AND A MAXIMUM OF 3 SPRINKLERS IN THE ROOM

(NOTE: Refer to NFPA 13D or NFPA 13R, and the Authority Having Jurisdiction.)

Multiple Slope

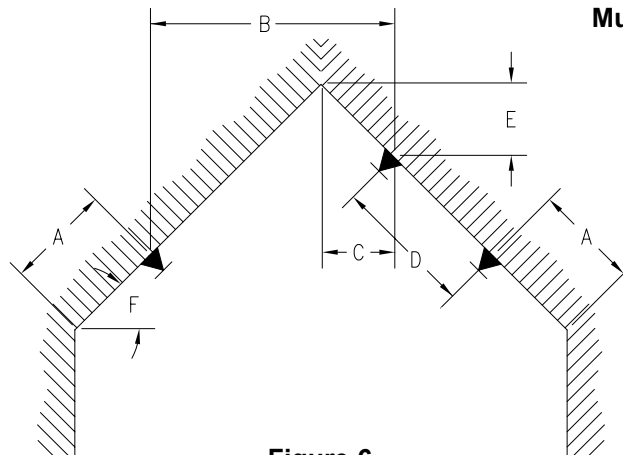


Figure 6

(A) 0'-4" (0-102 mm) minimum, to one-half listed spacing, maximum.

(B) One-half listed spacing, maximum, 8'-0" (2.4 m) minimum.

(C) 0'-4" (0-102 mm) minimum.

(D) Listed spacing maximum, 8'-0" (2.4 m) minimum.

(E) 3'-0" (.91 m) maximum.

(F) Slopes greater than 8/12 up to a 21/12 (33.7° up to 60°) pitch.

NOTES: In addition to the above limits, rooms requiring this type of installation must be hydraulically calculated to supply a minimum of three operating sprinklers. Layout similar for horizontal sidewall sprinklers with throw across slope. Refer to the appropriate residential sprinkler technical data sheets.



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SPACING OF RESIDENTIAL SPRINKLERS BELOW CEILINGS WITH SLOPES EXCEEDING 8/12 (33.7°) PITCH WITH NO BAFFLE AND A MAXIMUM OF 2 SPRINKLERS IN THE ROOM (NOTE: Refer to NFPA 13D or NFPA 13R, and the Authority Having Jurisdiction.)

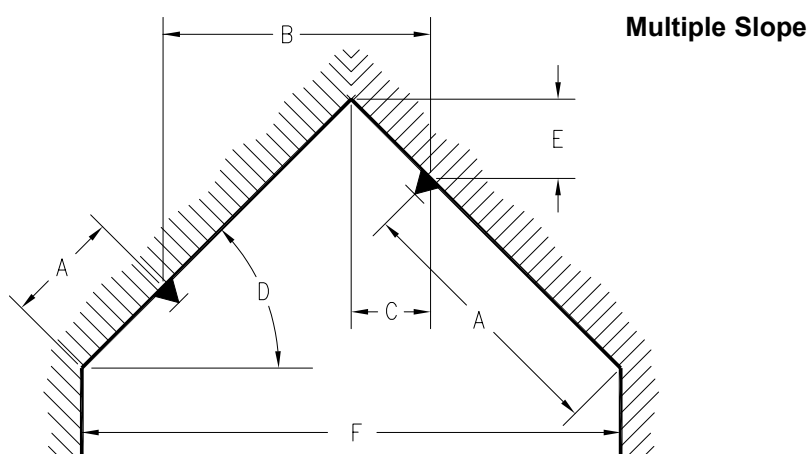


Figure 7

- (A) 0'-4" (0-102 mm) minimum, to one-half listed spacing, maximum.
- (B) One-half listed spacing, maximum, 8'-0" (2.4 m) minimum.
- (C) 0'-4" (0-102 mm) minimum.
- (D) Slopes greater than 8/12 pitch up to a 21/12 (33.7° up to a 60°) pitch.
- (E) 3'-0" (.91 m) maximum.
- (F) When dimension "F" exceeds 16' (4.9 m), utilize design configuration shown in Figure 6.

NOTES: Layout similar for horizontal sidewall sprinklers with throw across slope. Refer to the appropriate residential sprinkler technical data sheets.

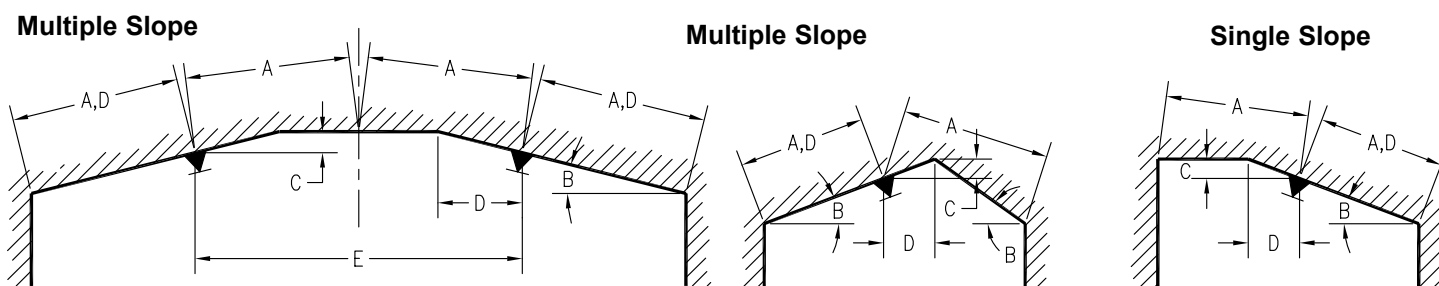


Figure 8

- (A) One-half listed spacing, maximum.
- (B) Refer to the appropriate residential sprinkler technical data pages for listings of sprinklers for use below slopes up to and including a 8/12 (33.7°) pitch.
- (C) 3'-0" (.91 m) maximum.
- (D) 0'-4" (0-102 mm) minimum.
- (E) 8'-0" (2.4 m) minimum without baffle.

NOTES: Layout similar for horizontal sidewall sprinklers with throw across slope. Refer to the appropriate residential sprinkler technical data sheets.

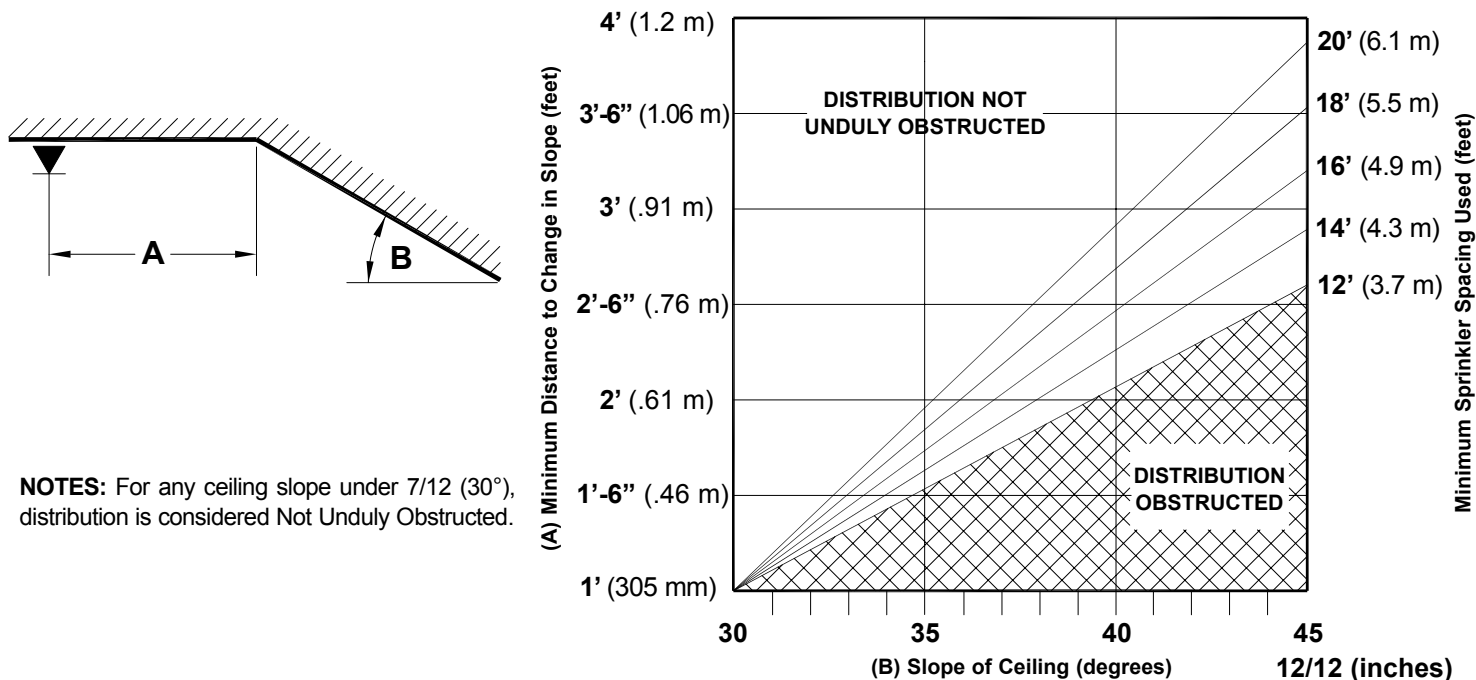


TECHNICAL DATA

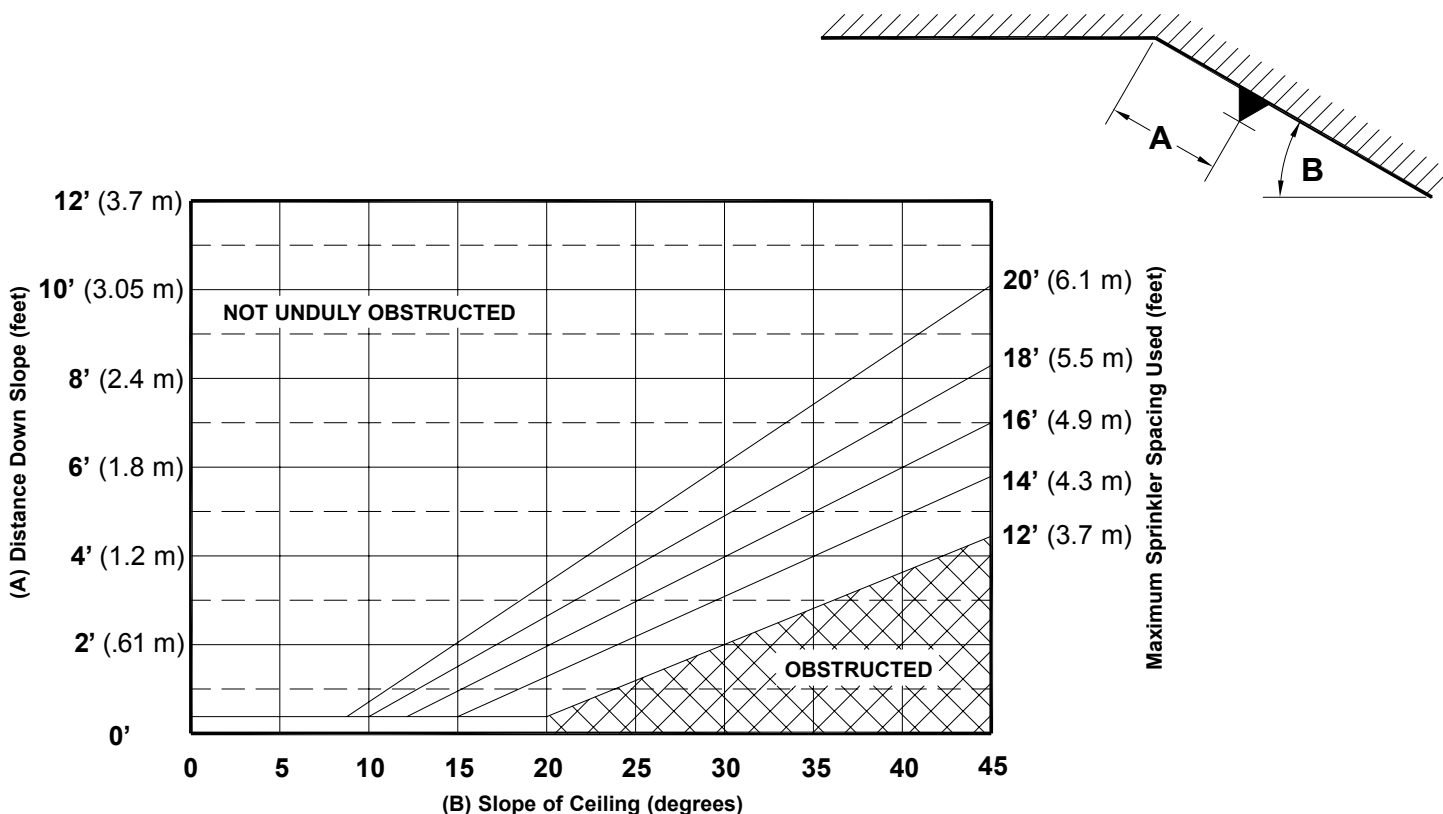
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The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
 Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

MINIMUM DISTANCE BETWEEN SPRINKLER AND INTERSECTING SLOPED CEILINGS



MAXIMUM DISTANCE DOWN SLOPE TO AVOID OBSTRUCTION TO SPRINKLER DISCHARGE





TECHNICAL DATA

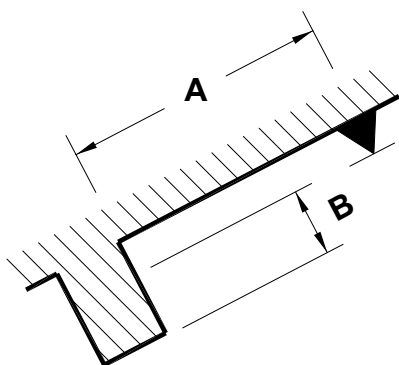
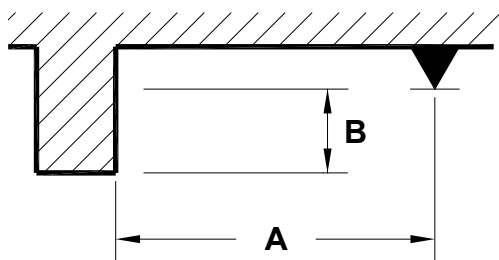
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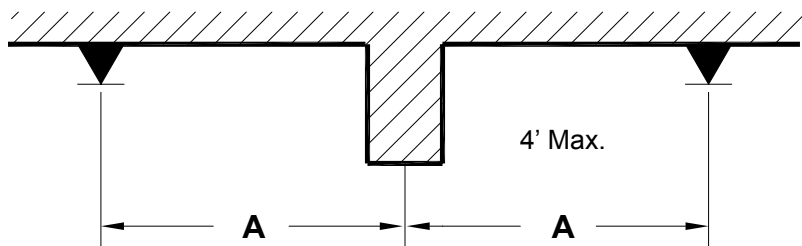
AVOIDING OBSTRUCTIONS TO SPRINKLER DISCHARGE

(Obstruction rules for residential sprinklers are found in section 8.10 of the 2010 edition of NFPA 13.)

Positioning Residential Pendent Sprinklers - Obstructions at the Ceiling

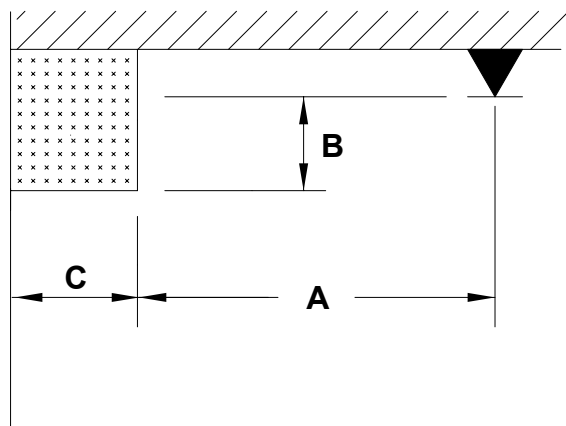


Distance from Sprinkler to Side of Ceiling Obstruction (Dimension A)	Maximum Distance from Deflector to Bottom of Ceiling Obstruction (Dimension B)	
	Inches	mm
Less than 1 ft. 6 in. (Less than 457 mm)	0	0
1 ft. 6 in. to less than 3 ft. (457 mm to less than .94 m)	1	25.4
3 ft. to less than 4 ft. (.91 m to less than 1.2 m)	3	76
4 ft. to less than 4 ft. 6 in. (1.2 m to less than 1.37 m)	5	127
4 ft. 6 in. to less than 6 ft. (1.37 m to less than 1.8 m)	7	178
6 ft. to less than 6 ft. 6 in. (1.8 m to less than 2 m)	9	229
6 ft. 6 in. to less than 7 ft. (2 m to less than 2.1 m)	11	279
7 ft. or greater (2.1 m or greater)	14	356



Residential pendent sprinklers may be located on opposite sides of continuous obstructions up to 4 ft. (1.2 m) wide at the ceiling, as long as the distance from the centerline of the obstruction to the sprinklers (A) does not exceed one-half the maximum spacing allowed between sprinklers.

Positioning Residential Pendent Sprinklers - Obstructions Along Walls



- (A) Distance from centerline of sprinkler to side of obstruction.
(B) Distance from deflector to bottom of obstruction.
(C) Width of the obstruction.

Obstructions up to 30 in. (.8 m) wide (C) located against the wall are permitted to be protected when (A) is greater than or equal to (C) minus 8 in. (.2 m) plus (B).

$$C \leq 30 \text{ in.} \quad \text{for metric } C \leq .8 \text{ m}$$

$$A \geq (C - 8 \text{ in.}) + B \quad A \geq (C - .2 \text{ m}) + B$$



TECHNICAL DATA

FREEDOM® RESIDENTIAL SPRINKLER INSTALLATION GUIDE

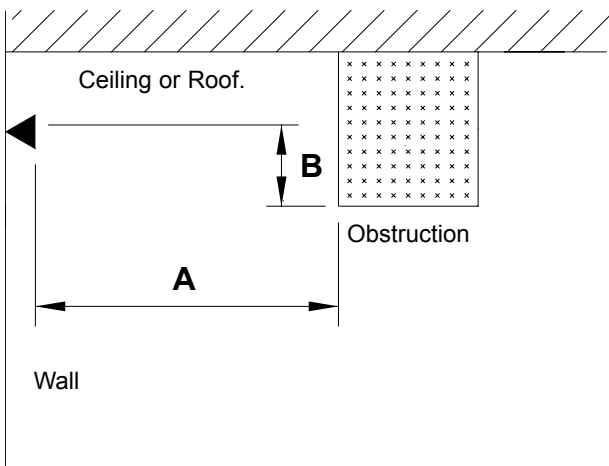
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AVOIDING OBSTRUCTIONS TO SPRINKLER DISCHARGE

(Obstruction rules for residential sprinklers are found in section 8.10 of the 2010 edition of NFPA 13.)

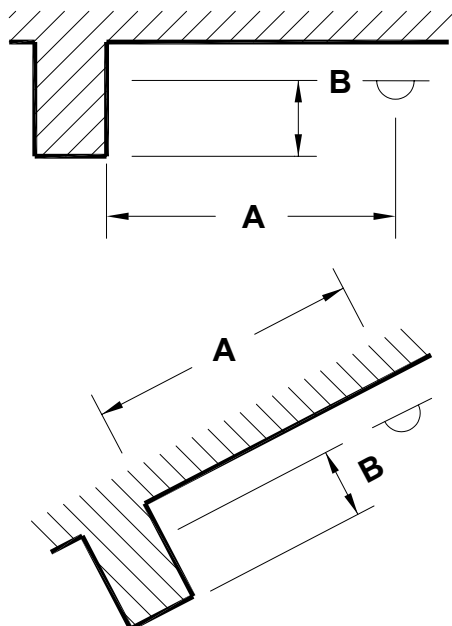
Positioning Residential Horizontal Sidewall Sprinklers - Obstructions at the Ceiling



- (A) Distance from sprinkler to side of obstruction.
(B) Distance from deflector to bottom of obstruction.

Distance from Sprinkler to Side of Ceiling Obstruction (Dimension A)	Maximum Distance from Deflector to Bottom of Ceiling Obstruction (Dimension B)	
	Inches	mm
Less than 8 ft. (Less than 2.4 m)	No Obstructions Allowed	
8 ft. to less than 10 ft. (2.4 m to less than 3.05 m)	1	25.4
10 ft. to less than 11 ft. (3.05 m to less than 3.35 m)	2	50.8
11 ft. to less than 12 ft. (3.35 m to less than 3.7 m)	3	76
12 ft. to less than 13 ft. (3.7 m to less than 4 m)	4	102
13 ft. to less than 14 ft. (4 m to less than 4.3 m)	6	152
14 ft. to less than 15 ft. (4.3 m to less than 4.6 m)	7	178
15 ft. to less than 16 ft. (4.6 m to less than 4.9 m)	9	229
16 ft. to less than 17 ft. (4.9 m to less than 5.2 m)	11	279
17 ft. or greater (5.2 m or greater)	14	356

Positioning Residential Horizontal Sidewall Sprinklers - Obstructions Along Walls



Distance from Sprinkler to Side of Obstruction Along Wall (Dimension A)	Maximum Distance from Deflector to Bottom of Obstruction (Dimension B)	
	Inches	mm
Less than 1 ft. 6 in. (Less than 457 mm)	0	0
1 ft. 6 in. to less than 3 ft. (457 mm to less than .94 m)	1	25.4
3 ft. to less than 4 ft. (.91 m to less than 1.2 m)	3	76
4 ft. to less than 4 ft. 6 in. (1.2 m to less than 1.37 m)	5	127
4 ft. 6 in. to less than 6 ft. (1.37 m to less than 1.8 m)	7	178
6 ft. to less than 6 ft. 6 in. (1.8 m to less than 2 m)	9	229
6 ft. 6 in. to less than 7 ft. (2 m to less than 2.1 m)	11	279
7 ft. or greater (2.1 m or greater)	14	356

- (A) Distance from sprinkler to side of obstruction.
(B) Distance from deflector to bottom of obstruction.



TECHNICAL DATA

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LOCATING RESIDENTIAL SPRINKLERS NEAR HEAT SOURCES

Ordinary temperature rated residential sprinklers (135 °F to 170 °F rated) are only to be installed where the maximum ambient ceiling temperature will not exceed 100 °F. Where the maximum ambient ceiling temperature will be from 101 °F to 150 °F, use intermediate temperature rated residential sprinklers (175 °F to 225 °F rated).

Residential sprinklers must be positioned a sufficient distance away from heat sources that include fireplaces, stoves, kitchen ranges, wall ovens, hot water pipes, water heaters, furnaces and associated flues and ducts, and light fixtures. The following minimum distances must be maintained for both ordinary and intermediate temperature rated residential sprinklers as indicated.

Heat Source	Minimum Distance from Edge of Source to Ordinary Temperature Rated Sprinkler		Minimum Distance from Edge of Source to Intermediate Temperature Rated Sprinkler	
	Inches	metric	Inches	metric
Side of open or recessed fireplace	36	.91 m	12	305 mm
Front of recessed fire place	60	1.5 m	36	.91 m
Coal- or wood-burning stove	42	1.1 m	12	305 mm
Kitchen range	18	457 mm	9	229 mm
Wall oven	18	457 mm	9	229 mm
Hot air flues	18	457 mm	9	229 mm
Uninsulated heat ducts	18	457 mm	9	229 mm
Uninsulated hot water pipes	12	305 mm	6	152 mm
Side of ceiling- or wall-mounted hot air diffusers	24	.61 m	12	305 mm
Front of wall-mounted hot air diffusers	36	.91 m	18	457 mm
Hot water heater or furnace	6	152 mm	3	76 mm
Light fixture less than 250W	6	152 mm	3	76 mm
Light fixture 250W to 499W	12	305 mm	6	152 mm
Where residential sprinklers will be exposed to the rays of the sun passing through glass or plastic skylights, use intermediate temperature rated sprinklers.				
When locating residential sprinklers in an unventilated concealed compartment, under an unventilated attic or uninsulated roof, where the maximum ambient temperature does not exceed 150 °F, use intermediate temperature rated sprinklers.				



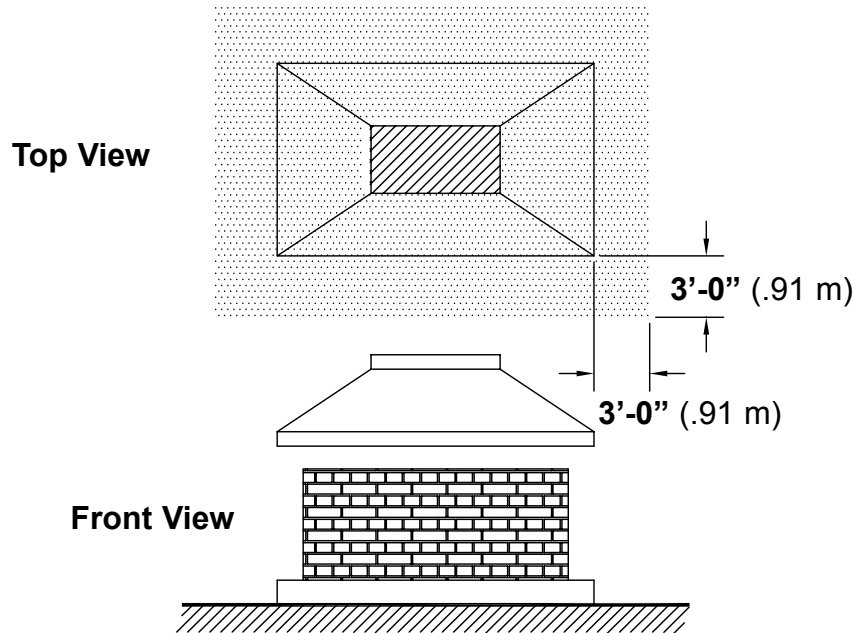
TECHNICAL DATA

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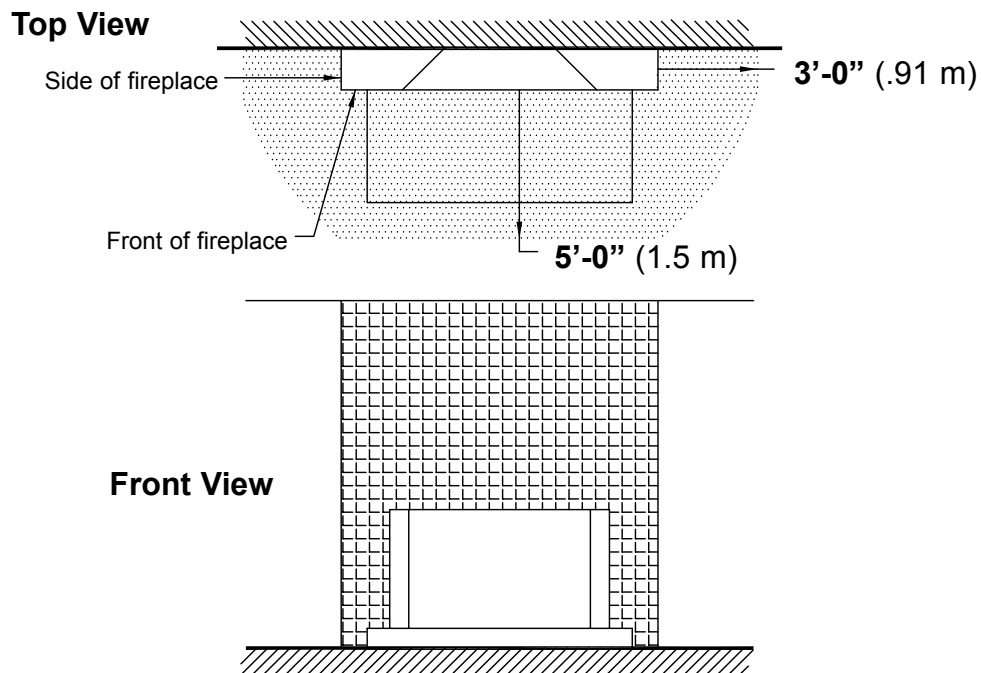
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NOTE: The dimensions shown are intended to apply to residential sprinklers installed in ceilings above fireplaces used to burn products that cause elevated temperatures at or near the ceiling in areas surrounding the fireplace. The recommendations should not be construed to apply to decorative non-opening fireplaces such as gas fire units that will not cause elevated temperatures at the ceiling.



Sprinklers near an open hearth fireplace must be located outside of the shaded area or be intermediate degree rated.



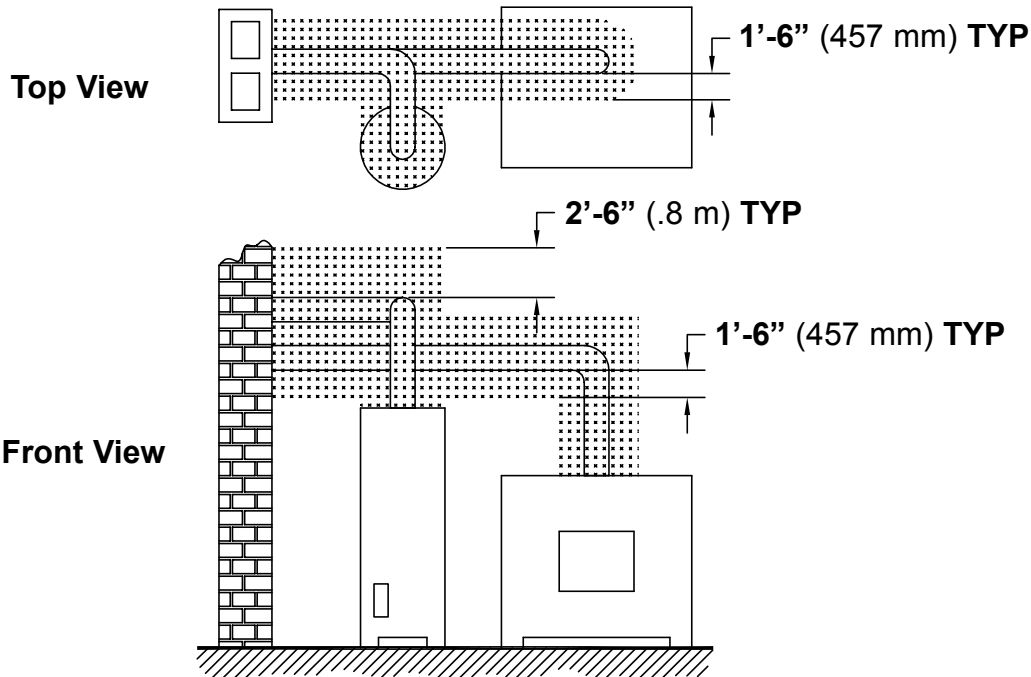
Sprinklers near a recessed hearth fireplace must be located outside of the shaded area [at least 3'-0" (.91 m)] from the side of a recessed fireplace and at least 5'-0" (1.5 m) from the front) or be intermediate degree rated.



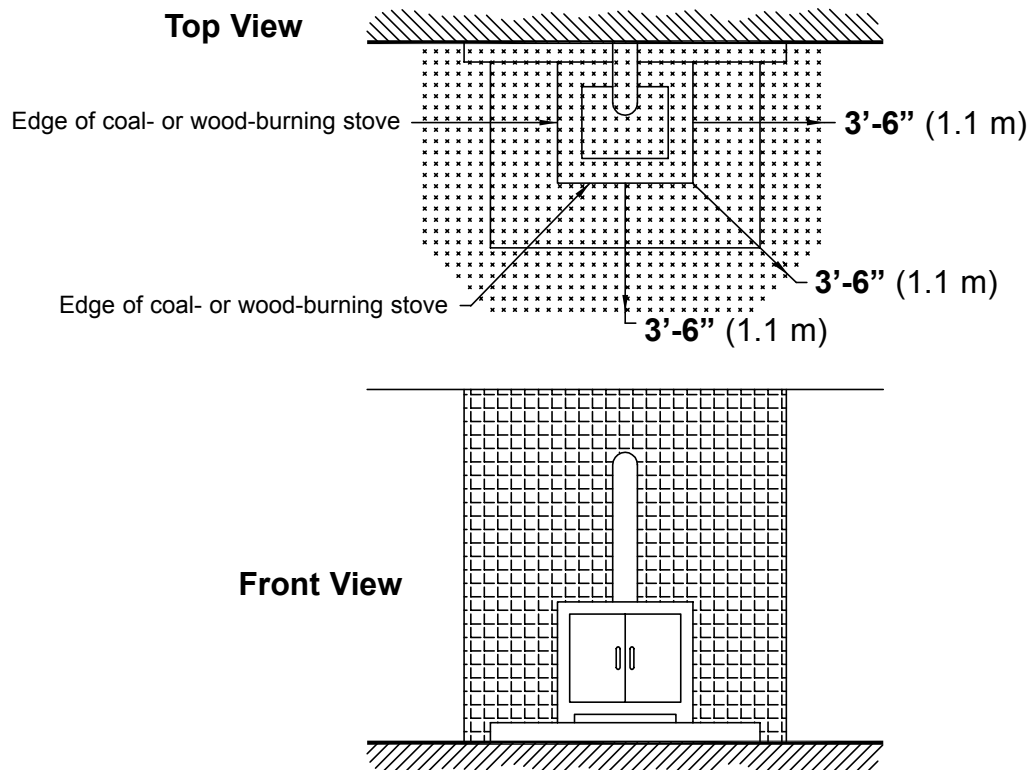
TECHNICAL DATA

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Sprinklers near a furnace or water heater must be located outside of the shaded area or be intermediate degree rated.



Sprinklers near a coal- or wood-burning stove must be located outside of shaded area or be intermediate degree rated.

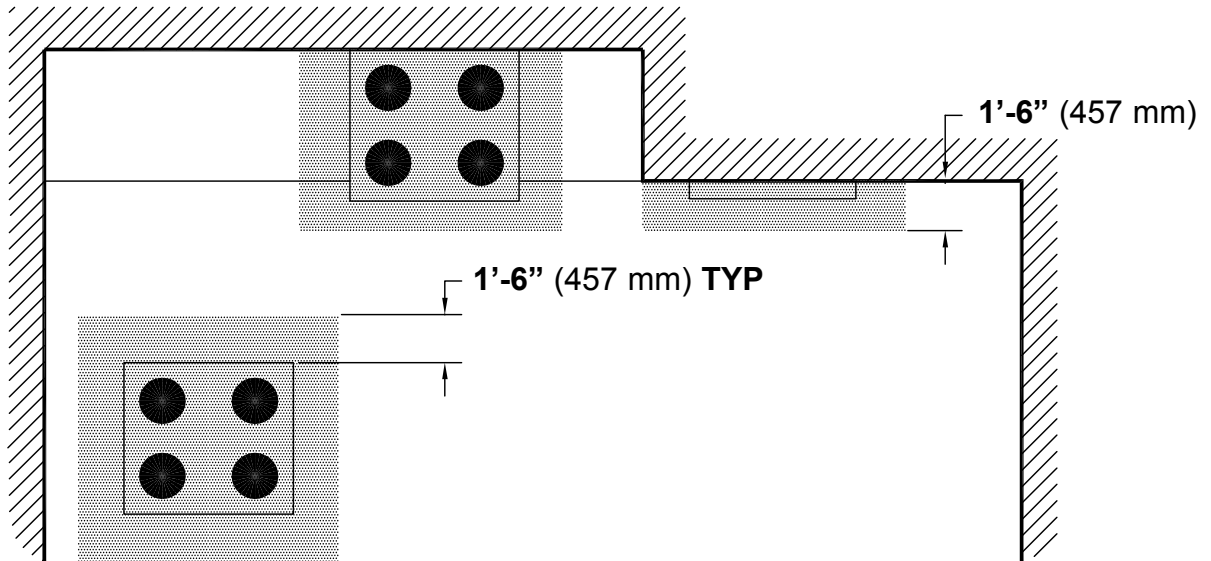


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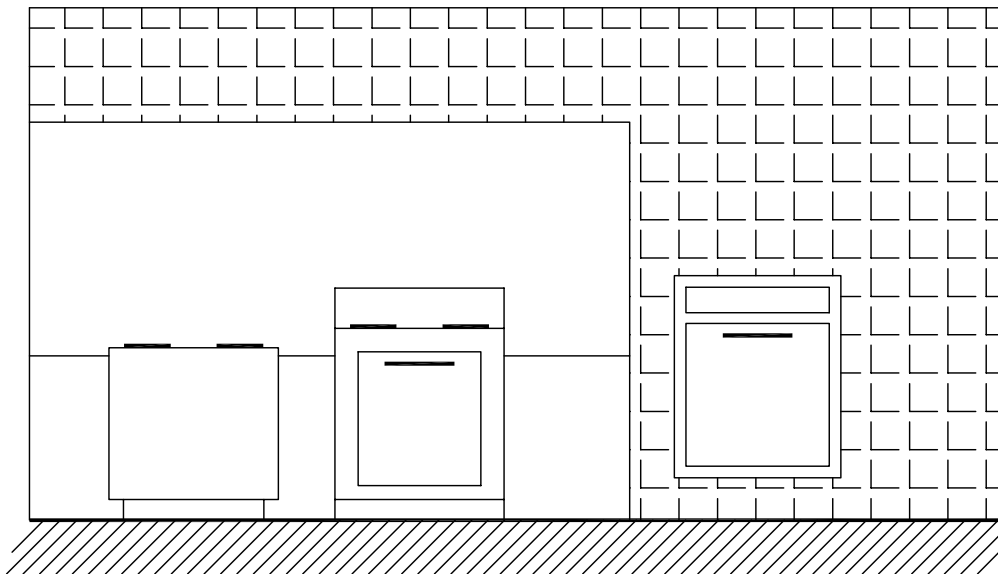
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Top View



Front View



Sprinklers near a range or wall oven must be located outside of shaded areas or be intermediate degree rated.



BULLETIN

CARE AND HANDLING
OF SPRINKLERS

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
 Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

SPRINKLERS ARE FRAGILE - HANDLE WITH CARE!**General Handling and Storage:**

- Store sprinklers in a cool, dry place.
- Protect sprinklers during storage, transport, handling, and after installation.
- Use the original shipping containers. DO NOT place sprinklers loose in boxes, bins, or buckets.
- Keep sprinklers separated at all times. DO NOT allow metal parts to contact sprinkler operating elements.

For Pre-Assembled Drops:

- Protect sprinklers during handling and after installation.
- For recessed assemblies, use the protective sprinkler cap (Viking Part Number 10364).

Sprinklers with Protective Shields or Caps:

- DO NOT remove shields or caps until after sprinkler installation and there no longer is potential for mechanical damage to the sprinkler operating elements.
- **Sprinkler shields or caps MUST be removed BEFORE placing the system in service!**
- Remove the sprinkler shield by carefully pulling it apart where it is snapped together.
- Remove the cap by turning it slightly and pulling it off the sprinkler.

Sprinkler Installation:

- DO NOT use the sprinkler deflector or operating element to start or thread the sprinkler into a fitting.
- **Use only the designated sprinkler head wrench!** Refer to the current sprinkler technical data page to determine the correct wrench for the model of sprinkler used.
- DO NOT install sprinklers onto piping at the floor level.
- Install sprinklers after the piping is in place to prevent mechanical damage.
- DO NOT allow impacts such as hammer blows directly to sprinklers or to fittings, pipe, or couplings in close proximity to sprinklers. Sprinklers can be damaged from direct or indirect impacts.
- DO NOT attempt to remove drywall, paint, etc., from sprinklers.
- **Take care not to over-tighten the sprinkler and/or damage its operating parts!**

Maximum Torque:

1/2" NPT: 14 ft-lbs. (19.0 N-m)

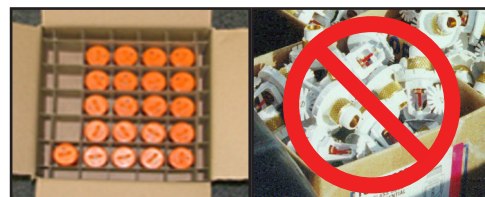
3/4" NPT: 20 ft-lbs. (27.1 N-m)

1" NPT: 30 ft-lbs. (40.7 N-m)



CORRECT
(Original container used)

INCORRECT
(Placed loose in box)



CORRECT
(Protected with caps)

INCORRECT
(Protective caps not used)



CORRECT
(Piping is in place at the ceiling)

INCORRECT
(Sprinkler at floor level)



CORRECT
(Special installation wrenches)

INCORRECT
(Designated wrench not used)



WARNING: Cancer and Reproductive Harm-
www.P65Warnings.ca.gov

! WARNING

Any sprinkler with a loss of liquid from the glass bulb or damage to the fusible element should be destroyed. Never install sprinklers that have been dropped, damaged, or exposed to temperatures exceeding the maximum ambient temperature allowed. Sprinklers that have been painted in the field must be replaced per NFPA 13. Protect sprinklers from paint and paint overspray in accordance with the installation standards. Do not clean sprinklers with soap and water, ammonia, or any other cleaning fluid. Do not use adhesives or solvents on sprinklers or their operating elements.

Refer to the appropriate technical data page and NFPA standards for complete care, handling, installation, and maintenance instructions. For additional product and system information Viking data pages and installation instructions are available on the Viking Web site at www.vikinggroupinc.com.



BULLETIN

CARE AND HANDLING
OF SPRINKLERS

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
 Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

PROTECTIVE SPRINKLER SHIELDS AND CAPS

General Handling and Storage:

Many Viking sprinklers are available with a plastic protective cap or shield temporarily covering the operating elements. The snap-on shields and caps are factory installed and are intended to help protect the operating elements from mechanical damage during shipping, storage, and installation. NOTE: It is still necessary to follow the care and handling instructions on the appropriate sprinkler technical data sheets* when installing sprinklers with bulb shields or caps.

WHEN TO REMOVE THE SHIELDS AND CAPS:

NOTE: SHIELDS AND CAPS MUST BE REMOVED FROM SPRINKLERS BEFORE PLACING THE SYSTEM IN SERVICE!

Remove the shield or cap from the sprinkler only after checking all of the following:

- The sprinkler has been installed*.
- The wall or ceiling finish work is completed where the sprinkler is installed and there no longer is a potential for mechanical damage to the sprinkler operating elements.

SHIELDS AND CAPS MUST BE REMOVED FROM SPRINKLERS BEFORE PLACING THE SYSTEM IN SERVICE!

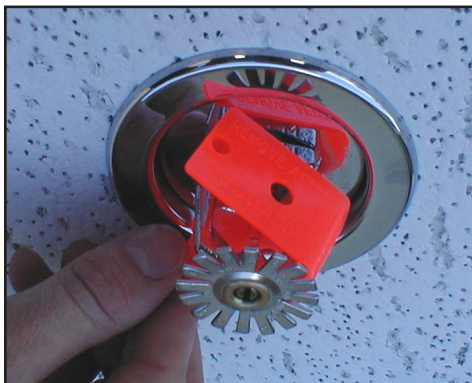


Figure 1: Sprinkler shield being removed from a pendent sprinkler.



Figure 2: Sprinkler cap being removed from a pendent sprinkler.



Figure 3: Sprinkler cap being removed from an upright sprinkler.

HOW TO REMOVE SHIELDS AND CAPS:

No tools are necessary to remove the shields or caps from sprinklers. DO NOT use any sharp objects to remove them! **Take care not to cause mechanical damage to sprinklers when removing the shields or caps.** When removing caps from fusible element sprinklers, use care to prevent dislodging ejector springs or damaging fusible elements. NOTE: Squeezing the sprinkler cap excessively could damage sprinkler fusible elements.

- To remove the shield, simply pull the ends of the shield apart where it is snapped together. Refer to Figure 1.
- To remove the cap, turn it slightly and pull it off the sprinkler. Refer to Figures 2 and 3.

NOTICE

Refer to the current sprinkler technical data page to determine the correct sprinkler wrench for the model of sprinkler used.



Never install sprinklers that have been dropped, damaged, or exposed to temperatures in excess of the maximum ambient temperature allowed.

* Refer to the appropriate current technical data pages for complete care, handling, and installation instructions. Data pages are included with each shipment from Viking or Viking distributors. They can also be found on the Web site at www.vikinggroupinc.com.



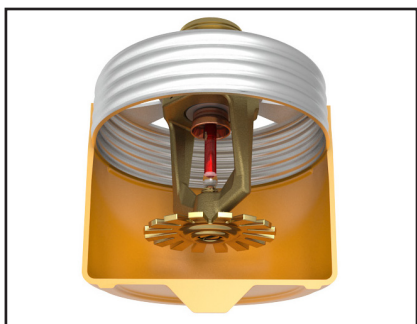
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CARE AND HANDLING
OF SPRINKLERS

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CONCEALED COVER ASSEMBLIES ARE FRAGILE!
TO ASSURE SATISFACTORY PERFORMANCE OF THE PRODUCT, HANDLE WITH CARE.



Concealed Sprinkler and Adapter
 Assembly with Protective Cap



Concealed Sprinkler and Adapter
 Assembly (Protective Cap Removed)



Cover Plate Assembly
 (Pendent Cover 12381 shown)

GENERAL HANDLING AND STORAGE INSTRUCTIONS:

- Do not store in temperatures exceeding 100 °F (38 °C). Avoid direct sunlight and confined areas subject to heat.
- Protect sprinklers and cover assemblies during storage, transport, handling, and after installation.
 - Use original shipping containers.
 - Do not place sprinklers or cover assemblies loose in boxes, bins, or buckets.
- Keep the sprinkler bodies covered with the protective sprinkler cap any time the sprinklers are shipped or handled, during testing of the system, and while ceiling finish work is being completed.
- Use only the designated Viking recessed sprinkler wrench (refer to the appropriate sprinkler data page) to install these sprinklers. **NOTE:** The protective cap is temporarily removed during installation and then placed back on the sprinkler for protection until finish work is completed.
- Do not over-tighten the sprinklers into fittings during installation.
- Do not use the sprinkler deflector to start or thread the sprinklers into fittings during installation.
- Do not attempt to remove drywall, paint, etc., from the sprinklers.
- Remove the plastic protective cap from the sprinkler before attaching the cover plate assembly. **PROTECTIVE CAPS MUST BE REMOVED FROM SPRINKLERS BEFORE PLACING THE SYSTEM IN SERVICE!**

Refer to the appropriate current technical data pages for complete care, handling, and installation instructions. Data pages are included with each shipment from Viking or Viking distributors. They can also be found on the Web site at www.vikinggroupinc.com.



BULLETIN

CARE AND HANDLING
OF SPRINKLERS

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

USE THE FOLLOWING PRECAUTIONS WHEN HANDLING WAX-COATED SPRINKLERS

Many of Viking's sprinklers are available with factory-applied wax coating for corrosion resistance. These sprinklers **MUST** receive appropriate care and handling to avoid damaging the wax coating and to assure satisfactory performance of the product.

General Handling and Storage of Wax-Coated Sprinklers:

- Store the sprinklers in a cool, dry place (in temperatures below the maximum ambient temperature allowed for the sprinkler temperature rating. Refer to Table 1 below.)
- Store containers of wax-coated sprinklers separate from other sprinklers.
- Protect the sprinklers during storage, transport, handling, and after installation.
- Use original shipping containers.
- Do not place sprinklers in loose boxes, bins, or buckets.

Installation of Wax-Coated Sprinklers:

Use only the special sprinkler head wrench designed for installing wax-coated Viking sprinklers (any other wrench may damage the unit).

- Take care not to crack the wax coating on the units.
- For touching up the wax coating after installation, wax is available from Viking in bar form. Refer to Table 1 below. The coating **MUST** be repaired after sprinkler installation to protect the corrosion-resistant properties of the sprinkler.
- Use care when locating sprinklers near fixtures that can generate heat. Do not install sprinklers where they would be exposed to temperatures exceeding the maximum recommended ambient temperature for the temperature rating used.
- Inspect the coated sprinklers frequently soon after installation to verify the integrity of the corrosion resistant coating. Thereafter, inspect representative samples of the coated sprinklers in accordance with NFPA 25. Close up visual inspections are necessary to determine whether the sprinklers are being affected by corrosive conditions.

TABLE 1

Sprinkler Temperature Rating (Fusing Point)	Wax Part Number	Wax Melting Point	Maximum Ambient Ceiling Temperature ¹	Wax Color
155 °F (68 °C) / 165 °F (74 °C)	02568A	148 °F (64 °C)	100 °F (38 °C)	Light Brown
175 °F (79 °C)	04146A	161 °F (71 °C)	150 °F (65 °C)	Brown
200 °F (93 °C)	04146A	161 °F (71 °C)	150 °F (65 °C)	Brown
220 °F (104 °C)	02569A	170 °F (76 °C)	150 °F (65 °C)	Dark Brown
286 °F (141 °C)	02569A	170 °F (76 °C)	150 °F (65 °C)	Dark Brown

¹ Based on NFPA-13. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.



WARNING Never install sprinklers that have been dropped, damaged, or exposed to temperatures in excess of the maximum ambient temperature allowed.

Refer to the appropriate current technical data pages for complete care, handling, and installation instructions. Data pages are included with each shipment from Viking or Viking distributors. They can also be found on the Web site at www.vikinggroupinc.com.



TECHNICAL DATA

SPRINKLER OVERVIEW

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

1. DESCRIPTION

Viking fire sprinklers consist of a threaded frame with a specific waterway or orifice size and a deflector for distributing water in a specified pattern. A closed or sealed sprinkler refers to a complete assembly, including the thermosensitive operating element. An open sprinkler does not use an operating element and is open at all times. The distribution of water is intended to extinguish a fire or to control its spread.

Viking sprinklers are available in several models and styles. Refer to specific sprinkler technical data pages for available styles, finishes, temperature ratings, thread sizes, and nominal K-Factors for the particular model selected.

2. LISTINGS AND APPROVALS

Refer to the Approval Charts on the appropriate sprinkler technical data page(s) and/or approval agency listings.



WARNING: Cancer and Reproductive Harm-
www.P65Warnings.ca.gov

3. TECHNICAL DATA

Pressure Ratings:

Maximum allowable water working pressure is 175 psig (12 Bar) unless rated and specified for high water working pressure [250 psig (17.2 bar)].

Sprinkler Identification:

Viking sprinklers are identified and marked with the word "Viking", the sprinkler identification number (SIN) consisting of "VK" plus a three digit number*, the model letter, and the year of manufacture.

Available Finishes:

Viking sprinklers are available in several decorative finishes. Some models are available with corrosion-resistant coatings or are fabricated from non-corrosive material. Refer to the sprinkler technical data page for additional information.

Available Temperature Ratings:

Viking sprinklers are available in several temperature ratings that relate to a specific temperature classification. Applicable installation rules mandate the use and limitations of each temperature classification. In selecting the appropriate temperature classification, the maximum expected ceiling temperature must be known. When there is doubt as to the maximum temperature at the sprinkler location, a maximum-reading thermometer should be used to determine the temperature under conditions that would show the highest readings to be expected. In addition, recognized installation rules may require a higher temperature classification, depending upon sprinkler location, occupancy classification, commodity classification, storage height, and other hazards. In all cases, the maximum expected ceiling temperature dictates the lowest allowable temperature classification. Sprinklers located immediately adjacent to a heat source may require a higher temperature rating.

K-Factors:

Viking sprinklers are available in several orifice sizes with related K-Factors. The orifice is a tapered waterway and, therefore, the K-Factor given is nominal. Nominal U.S. K-Factors are provided in accordance with the 1999 edition of NFPA 13, Section 3-2.3. Refer to the specific data page for appropriate K-Factor information.

Available Styles:

Viking sprinklers are available for installation in several positions as indicated by a stamping on the deflector. The deflector style dictates the appropriate installation position of the sprinkler; it breaks the solid stream of water issuing from the sprinkler orifice to form a specific spray pattern. The following list indicates the various styles and identification of Viking sprinklers.

UPRIGHT SPRINKLER: A sprinkler intended to be installed with the deflector above the frame so water flows upward through the orifice, striking the deflector and forming an umbrella-shaped spray pattern downward. Marked "SSU" (Standard Sprinkler Upright) or "UPRIGHT" on the deflector.

PENDENT SPRINKLER: A sprinkler intended to be oriented with the deflector below the frame so water flows downward through the orifice, striking the deflector and forming an umbrella-shaped spray pattern downward. Marked "SSP" (Standard Sprinkler Pendent) or "PENDENT" on the deflector.

CONVENTIONAL SPRINKLER: An "old style" sprinkler intended to be installed with the deflector in either the upright or pendent position. The deflector provides a spherical type pattern with 40 to 60 percent of the water initially directed downward and a proportion directed upward. Must be installed in accordance with installation rules for conventional or old style sprinklers. DO NOT USE AS A REPLACEMENT FOR STANDARD SPRAY SPRINKLERS. Marked "C U/P" (Conventional Upright/Pendent) on the deflector.

Viking Technical Data may be found on
The Viking Corporation's Web site at
<http://www.vikinggroupinc.com>.
The Web site may include a more recent
edition of this Technical Data Page.



TECHNICAL DATA

SPRINKLER OVERVIEW

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

VERTICAL SIDEWALL (VSW) SPRINKLER: A sprinkler intended for installation near the wall and ceiling. The deflector provides a water spray pattern outward in a quarter-spherical pattern and can be installed in the upright or pendent position with the flow arrow in the direction of discharge. Marked "SIDEWALL" on the deflector with an arrow and the word "FLOW". (Note: Some vertical sidewall sprinklers can only be installed in the upright or pendent position—in this case, the sprinkler will also be marked "UPRIGHT" or "PENDENT".)

HORIZONTAL SIDEWALL (HSW) SPRINKLER: A sprinkler intended for installation near the wall and ceiling. The special deflector provides a water spray pattern outward in a quarter-spherical pattern. Most of the water is directed away from the nearby wall with a small portion directed at the wall behind the sprinkler. The top of the deflector is oriented parallel with the ceiling or roof. The flow arrows point in the direction of discharge. Marked "SIDEWALL" and "TOP" with an arrow and the word "FLOW".

EXTENDED COVERAGE (EC) SPRINKLER: A spray sprinkler designed to discharge water over an area having the maximum dimensions indicated in the individual listings. Maximum area of coverage, minimum flow rate, orifice size, and nominal K-Factor are specified in the individual listings. EC sprinklers are intended for Light-Hazard occupancies with smooth, flat, horizontal ceilings unless otherwise specified. In addition to the above markings, the sprinkler is marked "EC".

QUICK RESPONSE (QR) SPRINKLER: A spray sprinkler with a fast-actuating operating element. The use of quick response sprinklers may be limited due to occupancy and hazard. Refer to the Authority Having Jurisdiction (AHJ) prior to installing.

QUICK RESPONSE EXTENDED COVERAGE (QREC) SPRINKLER: A spray sprinkler designed to discharge water over an area having the maximum dimensions indicated in the individual listing. This is a sprinkler with an operating element that meets the criteria for quick response. QREC sprinklers are only intended for Light Hazard occupancies. The sprinkler is marked "QREC".

FLUSH SPRINKLER: A decorative spray sprinkler intended for installation with a concealed piping system. The unit is mounted flush with the ceiling or wall, with the fusible link exposed. Upon actuation, the deflector extends beyond the ceiling or wall to distribute water discharge. The sprinkler is marked "SSP", "PEND", or "SIDEWALL" and "TOP".

CONCEALED SPRINKLER: A decorative spray sprinkler intended for installation with a concealed piping system. The sprinkler is hidden from view by a cover plate installed flush with the ceiling or wall. During fire conditions, the cover plate detaches, and upon sprinkler actuation, the deflector extends beyond the ceiling or wall to distribute water discharge. The sprinkler is marked "SSP", "PEND", or "SIDEWALL" and "TOP".

RECESSED SPRINKLER: A spray sprinkler assembly intended for installation with a concealed piping system. The assembly consists of a sprinkler installed in a decorative adjustable recessed escutcheon that minimizes the protrusion of the sprinkler beyond the ceiling or wall without adversely affecting the sprinkler distribution or sensitivity. Refer to the appropriate technical data page for allowable sprinkler models, temperature ratings, and occupancy classifications. DO NOT RECESS ANY SPRINKLER NOT LISTED FOR USE WITH THE ESCUTCHEON.

CORROSION-RESISTANT SPRINKLER: A special service sprinkler with non-corrosive protective coatings, or that is fabricated from non-corrosive material, for use in atmospheres that would normally corrode sprinklers.

DRY SPRINKLER: A special-service sprinkler intended for installation on dry pipe systems or wet pipe systems where the sprinkler is subject to freezing temperatures. The unit consists of a sprinkler permanently secured to an extension nipple with a sealed inlet end to prevent water from entering the nipple until the sprinkler operates. The unit MUST be installed in a tee fitting. Dry upright sprinklers are marked with the "B" dimension [distance from the face of the fitting (tee) to the top of the deflector]. Dry pendent and sidewall sprinklers are marked with the "A" dimension [the distance from the face of fitting (tee) to the finished surface of the ceiling or wall].

LARGE DROP SPRINKLER: A type of special application sprinkler used to provide fire control of specific high-challenge fire hazards. Large drop sprinklers are designed to produce an umbrella-shaped spray pattern downward with a higher percentage of "large" water droplets than standard spray sprinklers. The sprinkler has an extra-large orifice with a nominal K-Factor of 11.2. Marked "HIGH CHALLENGE" and "UPRIGHT".

EARLY SUPPRESSION FAST-RESPONSE (ESFR) SPRINKLER: A sprinkler intended to provide fire suppression of specific high-challenge fire hazards through the use of a fast response fusible link, 14.0, 16.8, or 25.2 nominal K-Factor, and special deflector. ESFR sprinklers are designed to produce high-momentum water droplets in a hemispherical pattern below the deflector. This permits penetration of the fire plume and direct wetting of the burning fuel surface while cooling the atmosphere early in the development of a high-challenge fire. Marked "ESFR" and "UPRIGHT" or "PEND".

INTERMEDIATE LEVEL/RACK STORAGE SPRINKLER: A standard spray sprinkler assembly designed to protect its operating element from the spray of sprinklers installed at higher elevations. The assembly consists of a standard or large orifice upright or pendent sprinkler with an integral upright or pendent water shield and guard assembly. Use only those sprinklers that have been tested and listed for use with the assembly. Refer to the technical data page for allowable sprinkler models.

RESIDENTIAL SPRINKLER: A sprinkler intended for use in the following occupancies: one- and two-family dwellings with the fire protection sprinkler system installed in accordance with NFPA 13D; residential occupancies up to four stories in height with the fire protection system installed in accordance with NFPA 13R; and where allowed by the Authority Having Jurisdiction in residential portions of any occupancy with the fire protection system installed in accordance with NFPA 13.



TECHNICAL DATA

SPRINKLER OVERVIEW

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Residential sprinklers have a unique distribution pattern and utilize a “fast response” heat sensitive operating element. They enhance survivability in the room of fire origin and are designed to provide a life safety environment for a minimum of ten minutes. For this reason, residential sprinklers must not be used to replace standard sprinklers unless tested for and approved by the Authority Having Jurisdiction. In addition to standard markings, the unit is identified as “RESIDENTIAL SPRINKLER” or “RES”.

4. INSTALLATION

Refer to appropriate NFPA Installation Standards.

5. OPERATION

Refer to the appropriate sprinkler technical data page(s).

6. INSPECTIONS, TESTS AND MAINTENANCE

Refer to NFPA 25 for Inspection, Testing and Maintenance requirements.

7. AVAILABILITY

Viking sprinklers are available through a network of domestic and international distributors. See The Viking Corporation web site for the closest distributor or contact The Viking Corporation.

8. GUARANTEE

For details of warranty, refer to Viking's current list price schedule or contact Viking directly.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers and the appropriate sprinkler general care, installation, and maintenance guide. Vikings sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, FM Global, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable. The sprinkler technical data page may contain installation requirements specific for the sprinkler model selected. The use of certain types of sprinklers may be limited due to occupancy and hazard. Refer to the Authority Having Jurisdiction prior to installation.



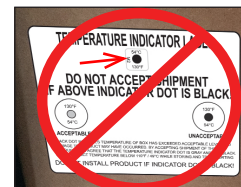
BULLETIN

BEST PRACTICES FOR RESIDENTIAL SPRINKLER HANDLING & INSTALLATION

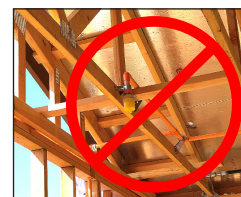
The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
 Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com
 Visit the Viking website for the latest edition of this technical data page.

SPRINKLERS ARE FRAGILE - HANDLE WITH CARE!

- Always keep sprinklers in a cool dry place.
- Protect sprinklers during storage, transport and handling as well as before, during and after installation. Refer to Viking's Care and Handling of Sprinklers Bulletin [Form No. F_091699²](#).
- Proper transit, storage and installation of sprinklers in a high-heat environment is a must. Care should be taken to prevent sprinklers from being exposed to ambient heat conditions in excess of those referenced in installation standards.
- Do not stage or store sprinklers on the job site in advance in a non-conditioned space prior to installation.
- Keep sprinklers in the original packaging and check temperature indicators on box label prior to installation. If the indicator has turned black, DO NOT install any product contained in the box. Refer to Viking product return policies.
- Temperatures exceeding the maximum ambient temperature of the sprinkler temperature-rating during storage, transport, handling and installation must be avoided.
- Per NFPA standards 13, 13R, and 13D, sprinklers installed where maximum ambient temperatures are at or over 101 °F (38 °C) through 150 °F (66 °C) shall be intermediate temperature-rated sprinklers. Additionally, if sprinklers are installed in an unventilated concealed space under an uninsulated roof or in an unventilated attic, they shall be of intermediate temperature classification.
- Sprinklers installed where ambient temperatures are at or below 100 °F (38 °C) may be either ordinary or intermediate temperature-rated sprinklers. Refer to NFPA standards 13R 6.2.3.1 and 13D 7.5.6.1.
- Rough-in of sprinkler piping during hot weather conditions should not include the installation of sprinklers unless reasonable ambient temperatures can be maintained. Ambient temperatures that are considered when choosing the temperature rating for a sprinkler should take into account the range of ambient temperatures that are expected from installation through establishment and maintenance of temperature in a conditioned space. Appropriate insulation may be considered. **Example:** An ordinary temperature sprinkler should not be exposed to maximum ambient temperature higher than 100 °F (38 °C) or more. Refer to NFPA 13, Table 6.2.5.1, NFPA 13R, 6.2.3.1 and NFPA 13D, 7.5.6.1.
- CPVC fire sprinkler products exposed to high ambient temperatures (e.g. installed in unventilated, concealed spaces such as attics) should be insulated to maintain a cooler environment. Refer to Viking Plastics Installation and Design Manual, [Form No. F_080712²](#), for care and handling procedures.
- Protect all sprinklers and connecting CPVC piping in attic spaces and unvented concealed spaces from excessive heat exposure above 100 °F (38 °C). To separate excessive attic heat, properly tent and fully insulate all pipe in unconditioned spaces.
- Pressure relief valves should be installed on wet sprinkler systems where there is a risk of over-pressurization of a checked water supply, due to thermal expansion. Refer to NFPA 13, 7.1.2.1 and NFPA 13D, A.5.2.2.2.
- Fire sprinkler systems should be installed per current referenced editions of building codes and installation standards adopted in the jurisdiction where work is being performed.



INCORRECT
(Heat exposure)



INCORRECT
(Unconditioned at rough-in)



INCORRECT
(Exposed piping)



INCORRECT
(No pressure relief valve)



WARNING: Cancer and Reproductive Harm-
www.P65Warnings.ca.gov

¹Hot weather condition is defined as temperatures that can reach the maximum ambient temperature-rating of the sprinkler.

²Clicking on blue hyperlink will open referenced document.

⚠ WARNING

Any sprinkler with a loss of liquid from the glass bulb or damage to the fusible element should be destroyed. Never install sprinklers that have been dropped, damaged, or exposed to temperatures exceeding the maximum ambient temperature allowed. Sprinklers that have been painted in the field must be replaced per NFPA 13. Protect sprinklers from paint and paint overspray in accordance with the installation standards. Do not clean sprinklers with soap and water, ammonia, or any other cleaning fluid. Do not use adhesives or solvents on sprinklers or their operating elements.

Refer to the appropriate technical data page and NFPA standards for complete care, handling, installation, and maintenance instructions. For additional product and system information Viking data pages and installation instructions are available on the Viking Web site at www.vikinggroupinc.com.

**BULLETIN****REGULATORY AND HEALTH
WARNINGS**

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Visit the Viking website for the latest edition of this technical data page www.vikinggroupinc.com

1. DESCRIPTION

Regulatory and Health Warnings applying to materials used in the manufacture and construction of fire protection products are provided herein as they relate to legally mandated jurisdictional regions.

⚠ WARNING**STATE OF CALIFORNIA, USA**

Installing or servicing fire protection products such as sprinklers, valves, piping etc. can expose you to chemicals including, but not limited to, lead, nickel, butadiene, titanium dioxide, chromium, carbon black, and acrylonitrile which are known to the State of California to cause cancer or birth defects or other reproductive harm.

For more information, go to www.P65Warnings.ca.gov

2. WARRANTY TERMS AND CONDITIONS

For details of warranty, refer to Viking's current list price schedule at www.vikinggroupinc.com or contact Viking directly.



TECHNICAL DATA

MICROFAST® QUICK RESPONSE UPRIGHT SPRINKLER VK300 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Visit the Viking website for the latest edition of this technical data page: www.vikinggroupinc.com

1. DESCRIPTION

The Viking Microfast® Quick Response Upright Sprinkler VK300 is a small, thermosensitive, glass-bulb spray sprinkler available in several different finishes and temperature ratings to meet design requirements. The special Polyester and Electroless Nickel PTFE (ENT) coatings can be used in decorative applications where colors are desired. In addition, these coatings have been investigated for installation in corrosive atmospheres and are listed/approved as corrosion resistant as indicated in the Approval Charts.

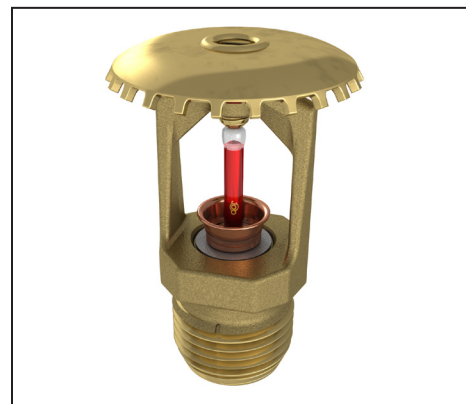
2. LISTINGS AND APPROVALS



cULus Listed: Category VNIV

FM Approved: Classes 2002 and 2020

Refer to Approval Charts and Design Criteria for listing and approval requirements that must be followed.



WARNING: Cancer and Reproductive Harm-
www.P65Warnings.ca.gov

3. TECHNICAL DATA

Specifications:

Minimum Operating Pressure: 7 psi (0.5 bar)*

Maximum Working Pressure: 175 psi (12 bar) wwp.

Factory tested hydrostatically to 500 psi (34.5 bar)

Testing: U.S.A. Patent No. 4,831,870

Thread size: 1/2" NPT, 15 mm BSP

Nominal K-Factor: 5.6 U.S. (80.6 metric**)

Glass-bulb fluid temperature rated to -65 °F (-55 °C)

Overall Length: 2-3/16" (56 mm)

*cULus Listing, FM Approval, and NFPA 13 installs require a minimum of 7 psi (0.5 bar). The minimum operating pressure for LPCB and CE Approvals ONLY is 5 psi (0.35 bar).

Material Standards:

Frame Casting: Brass UNS-C84400 or QM Brass

Deflector: Brass UNS-C23000 or Phosphor Bronze UNS-C51000

Bulb: Glass, nominal 3 mm diameter

Belleville Spring Sealing Assembly: Nickel Alloy, coated on both sides with PTFE Tape

Screw: Brass UNS-C36000

Pip Cap and Insert Assembly: Copper UNS-C11000 and Stainless Steel UNS-S30400

For Polyester Coated Sprinklers: Belleville Spring-Exposed

For ENT Coated Sprinklers: Belleville Spring-Exposed, Screw and Pipcap - ENT plated

Ordering Information: (Also refer to the current Viking price list.)

Order Viking Microfast® Quick Response Upright Sprinkler VK300 by first adding the appropriate suffix for the sprinkler finish and then the appropriate suffix for the temperature rating to the sprinkler base part number.

Finish Suffix: **Brass = A**, Chrome = F, White Polyester = M-/W, Black Polyester = M-/B, and ENT = JN

Temperature Suffix (°F/°C): 135°/57° = A, 155°/68° = B, 175°/79° = D, **200°/93° = E**, and 286°/141° = G

For example, sprinkler VK300 with a 1/2" NPT thread, Brass finish and a 155 °F/68 °C temperature rating = Part No. 12978AB

Available Finishes And Temperature Ratings: Refer to Table 1.

Accessories: (Also refer to the Viking website.)

Sprinkler Wrench: Standard Wrench: Part No. 21475M/B (available since 2017)

Sprinkler Cabinets:

A. Six-head capacity: Part No. 01724A (available since 1971)

B. Twelve-head capacity: Part No. 01725A (available since 1971)

4. INSTALLATION

Refer to appropriate NFPA Installation Standards.



TECHNICAL DATA

MICROFAST® QUICK RESPONSE UPRIGHT SPRINKLER VK300 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

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5. OPERATION

During fire conditions, the heat-sensitive liquid in the glass bulb expands, causing the glass to shatter, releasing the pip cap and sealing spring assembly. Water flowing through the sprinkler orifice strikes the sprinkler deflector, forming a uniform spray pattern to extinguish or control the fire.

6. INSPECTIONS, TESTS AND MAINTENANCE

Refer to NFPA 25 for Inspection, Testing and Maintenance requirements.

7. AVAILABILITY

The Viking Microfast® Quick Response Upright Sprinkler VK300 is available through a network of domestic and international distributors. See The Viking Corporation web site for the closest distributor or contact The Viking Corporation.

8. GUARANTEE

For details of warranty, refer to Viking's current list price schedule or contact Viking directly.

TABLE 1: AVAILABLE SPRINKLER TEMPERATURE RATINGS AND FINISHES

Sprinkler Temperature Classification	Sprinkler Nominal Temperature Rating ¹	Maximum Ambient Ceiling Temperature ²	Bulb Color
Ordinary	135 °F (57 °C)	100 °F (38 °C)	Orange
Ordinary	155 °F (68 °C)	100 °F (38 °C)	Red
Intermediate	175 °F (79 °C)	150 °F (65 °C)	Yellow
Intermediate	200 °F (93 °C)	150 °F (65 °C)	Green
High	286 °F (141 °C)	225 °F (107 °C)	Blue

Sprinkler Finishes: Brass, Chrome, White Polyester, Black Polyester, and ENT

Corrosion-Resistant Coatings³: White Polyester, Black Polyester, and Black PTFE. ENT in all temperature ratings except 135 °F (57 °C)

Footnotes

¹ The sprinkler temperature rating is stamped on the deflector.

² Based on NFPA-13. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.

³ The corrosion-resistant coatings have passed the standard corrosion test required by the approving agencies indicated in the Approval Charts. These tests cannot and do not represent all possible corrosive environments. Prior to installation, verify through the end-user that the coatings are compatible with or suitable for the proposed environment. For automatic sprinklers, the coatings indicated are applied to the exposed exterior surfaces only. Note that the spring is exposed on sprinklers with Polyester, ENT, and PTFE coatings. For ENT coated automatic sprinklers, the waterway is coated.

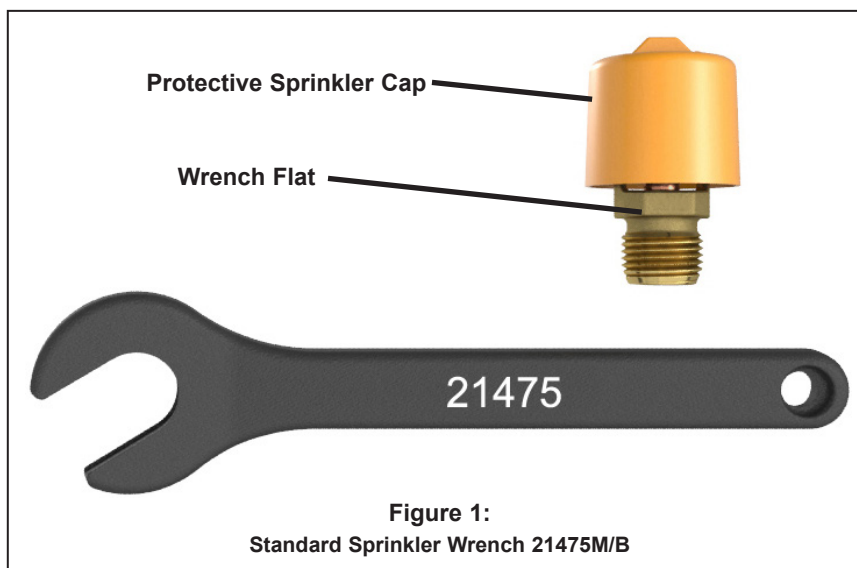


Figure 1:
Standard Sprinkler Wrench 21475M/B



TECHNICAL DATA

MICROFAST® QUICK RESPONSE UPRIGHT SPRINKLER VK300 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Visit the Viking website for the latest edition of this technical data page: www.vikinggroupinc.com

Approval Chart 1 (UL)

Microfast® Quick Response
Upright Sprinkler VK300
Maximum 175 PSI (12 bar) WWP

	Temperature	KEY
↓	Finish	
A1X ←	Escutcheon (if applicable)	

Base Part Number ¹	SIN	Thread Size		Nominal K-Factor		Overall Length		Listings and Approvals ³				
		NPT	BSP	U.S.	metric ²	Inches	mm	cULus	VdS	LPCB	NYC ⁸	CE
12978	VK300	1/2"	15 mm	5.6	80.6	2-3/16	56	A1, B2	--	--	See footnote 7.	--

NOTICE - Product Below - Limited Availability (Contact Local Viking Office)

06661B	VK300	1/2"	15 mm	5.6	80.6	2-3/16	56	A1, B2	--	--	See footnote 7.	--
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Approved Temperature Ratings

A - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), and 286 °F (141 °C)

B - 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), and 286 °F (141 °C)

Approved Finishes

1 - Brass, Chrome, White Polyester^{5,6}, and Black Polyester^{5,6}
2 - ENT⁶

Footnotes

¹ Base part number is shown. For complete part number, refer to Viking's current price schedule.

² Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

³ This table shows the listings and approvals available at the time of printing. Check with the manufacturer for any additional approvals.

⁴ Listed by Underwriters Laboratories Inc. for us in the U.S. and Canada

⁵ Other colors are available on request with the same Listings and Approvals as the standard colors.

⁶ cULus Listed as corrosion resistant.

⁷ Meets New York City requirements, effective July 1, 2008

⁸ Accepted for use, City of New York Board of Standards and Appeals, Calendar Number 219-76-SA and City of New York Department of Buildings, MEA 89-92-E, Vol. 16.

DESIGN CRITERIA - UL

(Also refer to Approval Chart 1 above.)

cULus Listing Requirements:

The Viking Microfast® Quick Response Upright Sprinkler VK300 is cULus Listed as indicated in Approval Chart 1 for installation in accordance with the latest edition of NFPA 13 for standard spray sprinklers.

- Designed for use in Light and Ordinary Hazard occupancies.
- The sprinkler installation rules contained in NFPA 13 for standard spray upright sprinklers must be followed.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to Form No. F_080614 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, FM Global, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.



TECHNICAL DATA

MICROFAST® QUICK RESPONSE UPRIGHT SPRINKLER VK300 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Visit the Viking website for the latest edition of this technical data page: www.vikinggroupinc.com

Approval Chart 2 (FM)

Microfast® Quick Response
Upright Sprinkler VK300
Maximum 175 PSI (12 bar) WWP

	Temperature	KEY
↓	Finish	
A1X	Escutcheon (if applicable)	

Base Part Number ¹	SIN	Thread Size		Nominal K-Factor		Overall Length		FM Approvals ³ (Refer also to Design Criteria below.)
		NPT	BSP	U.S.	metric ²	Inches	mm	
12978	VK300	1/2"	15 mm	5.6	80.6	2-3/16	56	A1, B2
NOTICE - Product Below - Limited Availability (Contact Local Viking Office)								
06661B	VK300	1/2"	15 mm	5.6	80.6	2-3/16	56	A1, B2
Approved Temperature Ratings A - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), and 286 °F (141°C) B - 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), and 286 °F (141°C)							Approved Finishes 1 - Brass, Chrome, White Polyester ⁵ , and Black Polyester ⁵ 2 - ENT ⁶	
Footnotes ¹ Base part number is shown. For complete part number, refer to Viking's current price schedule. ² Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0. ³ This table shows the FM Approvals available at the time of printing. Check with the manufacturer for any additional approvals. ⁵ Other colors are available on request with the same Approvals as the standard colors. ⁶ FM approved as corrosion resistant.								

DESIGN CRITERIA - FM

(Also refer to Approval Chart 2 above.)

FM Approval Requirements:

The Microfast® Quick Response Upright Sprinkler VK300 is FM Approved as a quick response **Non-Storage** upright sprinkler as indicated in the FM Approval Guide. For specific application and installation requirements, reference the latest applicable FM Loss Prevention Data Sheets (including Data Sheet 2-0). FM Global Loss Prevention Data Sheets contain guidelines relating to, but not limited to: minimum water supply requirements, hydraulic design, ceiling slope and obstructions, minimum and maximum allowable spacing, and deflector distance below the ceiling.

NOTE: The FM installation guidelines may differ from cULus and/or NFPA criteria.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to Form No. F_080614 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, FM Global, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.



BULLETIN

CARE AND HANDLING
OF SPRINKLERS

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
 Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

SPRINKLERS ARE FRAGILE - HANDLE WITH CARE!**General Handling and Storage:**

- Store sprinklers in a cool, dry place.
- Protect sprinklers during storage, transport, handling, and after installation.
- Use the original shipping containers. DO NOT place sprinklers loose in boxes, bins, or buckets.
- Keep sprinklers separated at all times. DO NOT allow metal parts to contact sprinkler operating elements.

For Pre-Assembled Drops:

- Protect sprinklers during handling and after installation.
- For recessed assemblies, use the protective sprinkler cap (Viking Part Number 10364).

Sprinklers with Protective Shields or Caps:

- DO NOT remove shields or caps until after sprinkler installation and there no longer is potential for mechanical damage to the sprinkler operating elements.
- **Sprinkler shields or caps MUST be removed BEFORE placing the system in service!**
- Remove the sprinkler shield by carefully pulling it apart where it is snapped together.
- Remove the cap by turning it slightly and pulling it off the sprinkler.

Sprinkler Installation:

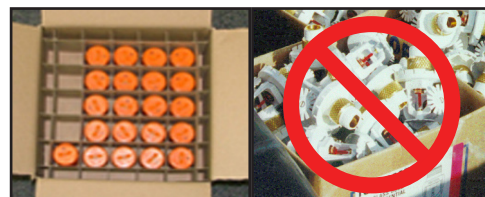
- DO NOT use the sprinkler deflector or operating element to start or thread the sprinkler into a fitting.
- **Use only the designated sprinkler head wrench!** Refer to the current sprinkler technical data page to determine the correct wrench for the model of sprinkler used.
- DO NOT install sprinklers onto piping at the floor level.
- Install sprinklers after the piping is in place to prevent mechanical damage.
- DO NOT allow impacts such as hammer blows directly to sprinklers or to fittings, pipe, or couplings in close proximity to sprinklers. Sprinklers can be damaged from direct or indirect impacts.
- DO NOT attempt to remove drywall, paint, etc., from sprinklers.
- **Take care not to over-tighten the sprinkler and/or damage its operating parts!**

Maximum Torque:

1/2" NPT: 14 ft-lbs. (19.0 N-m)

3/4" NPT: 20 ft-lbs. (27.1 N-m)

1" NPT: 30 ft-lbs. (40.7 N-m)

**CORRECT**
(Original container used)**INCORRECT**
(Placed loose in box)**CORRECT**
(Protected with caps)**INCORRECT**
(Protective caps not used)**CORRECT**
(Piping is in place at the ceiling)**INCORRECT**
(Sprinkler at floor level)**CORRECT**
(Special installation wrenches)**INCORRECT**
(Designated wrench not used)

WARNING: Cancer and Reproductive Harm-
www.P65Warnings.ca.gov

! WARNING

Any sprinkler with a loss of liquid from the glass bulb or damage to the fusible element should be destroyed. Never install sprinklers that have been dropped, damaged, or exposed to temperatures exceeding the maximum ambient temperature allowed. Sprinklers that have been painted in the field must be replaced per NFPA 13. Protect sprinklers from paint and paint overspray in accordance with the installation standards. Do not clean sprinklers with soap and water, ammonia, or any other cleaning fluid. Do not use adhesives or solvents on sprinklers or their operating elements.

Refer to the appropriate technical data page and NFPA standards for complete care, handling, installation, and maintenance instructions. For additional product and system information Viking data pages and installation instructions are available on the Viking Web site at www.vikinggroupinc.com.



BULLETIN

CARE AND HANDLING
OF SPRINKLERS

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
 Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

PROTECTIVE SPRINKLER SHIELDS AND CAPS

General Handling and Storage:

Many Viking sprinklers are available with a plastic protective cap or shield temporarily covering the operating elements. The snap-on shields and caps are factory installed and are intended to help protect the operating elements from mechanical damage during shipping, storage, and installation. NOTE: It is still necessary to follow the care and handling instructions on the appropriate sprinkler technical data sheets* when installing sprinklers with bulb shields or caps.

WHEN TO REMOVE THE SHIELDS AND CAPS:

NOTE: SHIELDS AND CAPS MUST BE REMOVED FROM SPRINKLERS BEFORE PLACING THE SYSTEM IN SERVICE!

Remove the shield or cap from the sprinkler only after checking all of the following:

- The sprinkler has been installed*.
- The wall or ceiling finish work is completed where the sprinkler is installed and there no longer is a potential for mechanical damage to the sprinkler operating elements.

SHIELDS AND CAPS MUST BE REMOVED FROM SPRINKLERS BEFORE PLACING THE SYSTEM IN SERVICE!

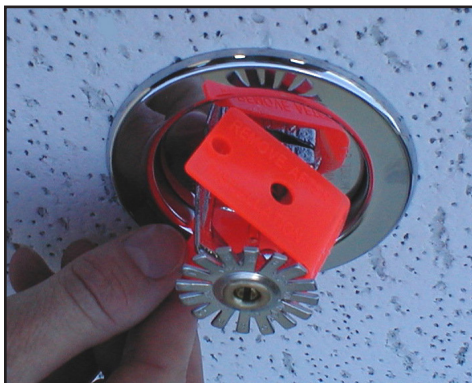


Figure 1: Sprinkler shield being removed from a pendent sprinkler.



Figure 2: Sprinkler cap being removed from a pendent sprinkler.



Figure 3: Sprinkler cap being removed from an upright sprinkler.

HOW TO REMOVE SHIELDS AND CAPS:

No tools are necessary to remove the shields or caps from sprinklers. DO NOT use any sharp objects to remove them! **Take care not to cause mechanical damage to sprinklers when removing the shields or caps.** When removing caps from fusible element sprinklers, use care to prevent dislodging ejector springs or damaging fusible elements. NOTE: Squeezing the sprinkler cap excessively could damage sprinkler fusible elements.

- To remove the shield, simply pull the ends of the shield apart where it is snapped together. Refer to Figure 1.
- To remove the cap, turn it slightly and pull it off the sprinkler. Refer to Figures 2 and 3.

NOTICE

Refer to the current sprinkler technical data page to determine the correct sprinkler wrench for the model of sprinkler used.



WARNING Never install sprinklers that have been dropped, damaged, or exposed to temperatures in excess of the maximum ambient temperature allowed.

* Refer to the appropriate current technical data pages for complete care, handling, and installation instructions. Data pages are included with each shipment from Viking or Viking distributors. They can also be found on the Web site at www.vikinggroupinc.com.



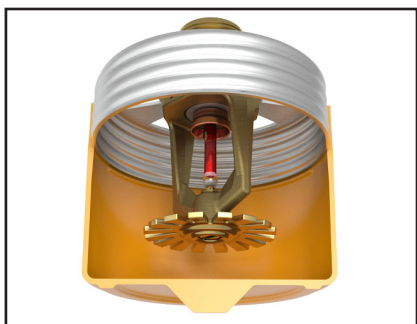
BULLETIN

CARE AND HANDLING
OF SPRINKLERS

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CONCEALED COVER ASSEMBLIES ARE FRAGILE!
TO ASSURE SATISFACTORY PERFORMANCE OF THE PRODUCT, HANDLE WITH CARE.



Concealed Sprinkler and Adapter
 Assembly with Protective Cap



Concealed Sprinkler and Adapter
 Assembly (Protective Cap Removed)



Cover Plate Assembly
 (Pendent Cover 12381 shown)

GENERAL HANDLING AND STORAGE INSTRUCTIONS:

- Do not store in temperatures exceeding 100 °F (38 °C). Avoid direct sunlight and confined areas subject to heat.
- Protect sprinklers and cover assemblies during storage, transport, handling, and after installation.
 - Use original shipping containers.
 - Do not place sprinklers or cover assemblies loose in boxes, bins, or buckets.
- Keep the sprinkler bodies covered with the protective sprinkler cap any time the sprinklers are shipped or handled, during testing of the system, and while ceiling finish work is being completed.
- Use only the designated Viking recessed sprinkler wrench (refer to the appropriate sprinkler data page) to install these sprinklers. **NOTE:** The protective cap is temporarily removed during installation and then placed back on the sprinkler for protection until finish work is completed.
- Do not over-tighten the sprinklers into fittings during installation.
- Do not use the sprinkler deflector to start or thread the sprinklers into fittings during installation.
- Do not attempt to remove drywall, paint, etc., from the sprinklers.
- Remove the plastic protective cap from the sprinkler before attaching the cover plate assembly. **PROTECTIVE CAPS MUST BE REMOVED FROM SPRINKLERS BEFORE PLACING THE SYSTEM IN SERVICE!**

Refer to the appropriate current technical data pages for complete care, handling, and installation instructions. Data pages are included with each shipment from Viking or Viking distributors. They can also be found on the Web site at www.vikinggroupinc.com.



BULLETIN

CARE AND HANDLING
OF SPRINKLERS

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

USE THE FOLLOWING PRECAUTIONS WHEN HANDLING WAX-COATED SPRINKLERS

Many of Viking's sprinklers are available with factory-applied wax coating for corrosion resistance. These sprinklers MUST receive appropriate care and handling to avoid damaging the wax coating and to assure satisfactory performance of the product.

General Handling and Storage of Wax-Coated Sprinklers:

- Store the sprinklers in a cool, dry place (in temperatures below the maximum ambient temperature allowed for the sprinkler temperature rating. Refer to Table 1 below.)
- Store containers of wax-coated sprinklers separate from other sprinklers.
- Protect the sprinklers during storage, transport, handling, and after installation.
- Use original shipping containers.
- Do not place sprinklers in loose boxes, bins, or buckets.

Installation of Wax-Coated Sprinklers:

Use only the special sprinkler head wrench designed for installing wax-coated Viking sprinklers (any other wrench may damage the unit).

- Take care not to crack the wax coating on the units.
- For touching up the wax coating after installation, wax is available from Viking in bar form. Refer to Table 1 below. The coating MUST be repaired after sprinkler installation to protect the corrosion-resistant properties of the sprinkler.
- Use care when locating sprinklers near fixtures that can generate heat. Do not install sprinklers where they would be exposed to temperatures exceeding the maximum recommended ambient temperature for the temperature rating used.
- Inspect the coated sprinklers frequently soon after installation to verify the integrity of the corrosion resistant coating. Thereafter, inspect representative samples of the coated sprinklers in accordance with NFPA 25. Close up visual inspections are necessary to determine whether the sprinklers are being affected by corrosive conditions.

TABLE 1

Sprinkler Temperature Rating (Fusing Point)	Wax Part Number	Wax Melting Point	Maximum Ambient Ceiling Temperature ¹	Wax Color
155 °F (68 °C) / 165 °F (74 °C)	02568A	148 °F (64 °C)	100 °F (38 °C)	Light Brown
175 °F (79 °C)	04146A	161 °F (71 °C)	150 °F (65 °C)	Brown
200 °F (93 °C)	04146A	161 °F (71 °C)	150 °F (65 °C)	Brown
220 °F (104 °C)	02569A	170 °F (76 °C)	150 °F (65 °C)	Dark Brown
286 °F (141 °C)	02569A	170 °F (76 °C)	150 °F (65 °C)	Dark Brown

¹ Based on NFPA-13. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.



WARNING Never install sprinklers that have been dropped, damaged, or exposed to temperatures in excess of the maximum ambient temperature allowed.

Refer to the appropriate current technical data pages for complete care, handling, and installation instructions. Data pages are included with each shipment from Viking or Viking distributors. They can also be found on the Web site at www.vikinggroupinc.com.

**BULLETIN****REGULATORY AND HEALTH
WARNINGS**

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Visit the Viking website for the latest edition of this technical data page www.vikinggroupinc.com

1. DESCRIPTION

Regulatory and Health Warnings applying to materials used in the manufacture and construction of fire protection products are provided herein as they relate to legally mandated jurisdictional regions.

⚠ WARNING**STATE OF CALIFORNIA, USA**

Installing or servicing fire protection products such as sprinklers, valves, piping etc. can expose you to chemicals including, but not limited to, lead, nickel, butadiene, titanium dioxide, chromium, carbon black, and acrylonitrile which are known to the State of California to cause cancer or birth defects or other reproductive harm.

For more information, go to www.P65Warnings.ca.gov

2. WARRANTY TERMS AND CONDITIONS

For details of warranty, refer to Viking's current list price schedule at www.vikinggroupinc.com or contact Viking directly.



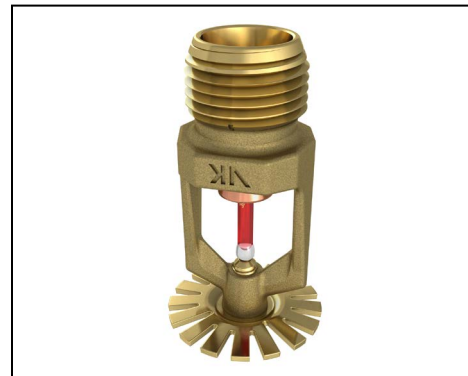
TECHNICAL DATA

MICROFAST® QUICK RESPONSE PENDENT SPRINKLER VK302 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
 Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com
 Visit the Viking website for the latest edition of this technical data page: www.vikinggroupinc.com

1. DESCRIPTION

The Viking Microfast® Quick Response Pendent Sprinkler VK302 is a small thermosensitive glass bulb spray sprinkler that is available with various finishes and temperature ratings to meet design requirements. The special polyester and electroless nickel PTFE (ENT) coatings can be used in decorative applications where colors are desired. In addition, these coatings have been investigated for installation in corrosive environments and are Listed and Approved, as indicated in the Approval Charts.



WARNING: Cancer and Reproductive Harm-
www.P65Warnings.ca.gov

2. LISTINGS AND APPROVALS



cULus Listed: Category VNIV



FM Approved: Class Series 2000



VdS Approved: Certificates G414009, G414010, G4040095, and 4880045



LPCB Approved: Certificate 096e/06



CE: Standard EN 12259-1, Declaration of Performance DOP_Sprinklers_LPCB_5-2-19, DOP_VK302ENT_29-1-20 & DOP_VK302-57C_30-9-20

China Approval: Approved according to China GB standard



MED Certified: Standard EN 12259-1, EC-certificate of conformity 0832-MED-1003



UKCA Approved: Standard EN 12259-1; Certificate Number 0832-UKCA-CPR-S5029; UKCA DOC_S5029; 2021.

Refer to Approval Chart 1 and Design Criteria cULus Listing requirements, and refer to Approval Chart 2 and Design Criteria for FM Approval requirements that must be followed.

3. TECHNICAL DATA

Specifications:

Minimum Operating Pressure: 7 PSI (0.5 bar)
 Rated to 175 PSI (12 bar) water working pressure
 Factory-tested hydrostatically to 500 PSI (34.5 bar)
 Thread size: 1/2" NPT, 15 mm BSP
 Nominal K-Factor: 5.6 U.S. (80.6 metric**)
 Glass-bulb fluid temperature rated to -65 °F (-55 °C)
 Overall Length: 2-1/4" (58 mm)

*cULus Listing, FM Approval, and NFPA 13 installs require a minimum of 7 PSI (0.5 bar). The minimum operating pressure for LPCB and CE Approvals ONLY is 5 PSI (0.35 bar).

Material Standards:

Frame Casting: Brass UNS-C84400 or QM brass
 Deflector: Phosphor bronze UNS-C51000 or copper UNS-C19500
 Bulb: Glass, nominal 3 mm diameter
 Belleville Spring Sealing Assembly: Nickel alloy, coated on both sides with PTFE tape
 Screw: Brass UNS-C36000
 Pip Cap and Insert Assembly: Copper UNS-C11000 and stainless steel UNS-S30400
For Polyester Coated Sprinklers: Belleville spring-exposed
For ENT Coated Sprinklers: Belleville spring-exposed, screw and pipcap - ENT-plated.



TECHNICAL DATA

MICROFAST® QUICK RESPONSE PENDENT SPRINKLER VK302 (K5.6)

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Visit the Viking website for the latest edition of this technical data page: www.vikinggroupinc.com

Ordering Information: (Also refer to the current Viking price list.)

Order quick response pendent sprinklers by first adding the appropriate suffix for the sprinkler finish. Then, add the appropriate temperature rating suffix to the sprinkler base part number.

Finish Suffix: Brass = A, **chrome = F**, white polyester = M-/W, black polyester = M-/B, and ENT = JN

Temperature Suffix: 135 °F (57 °C) = A, 155 °F (68 °C) = B, 175 °F (79 °C) = D, **200 °F (93 °C) = E**, 286 °F (141 °C) = G

For example, sprinkler VK302 with a brass finish and a 155 °F (68 °C) temperature rating = Part No. 12979AB

Available Finishes And Temperature Ratings: Refer to Table 1.

Accessories: (Also refer to the current Viking price list.)

Sprinkler Wrenches:

A. Standard wrench: Part No. 21475M/B.

B. Wrench for recessed pendent sprinklers: Part No. 13655W/B** (available since 2006)

C. Optional protective sprinkler cap remover/escutcheon installer tool*** Part No. 15915 (available since 2010)

**A ½" ratchet is required (not available from Viking).

***Allows use from the floor by attaching a length of 1" diameter CPVC tubing to the tool. Ideal for sprinkler cabinets. Refer to Bulletin F_051808.

Sprinkler Cabinets:

A. Six-head capacity: Part No. 01724A (available since 1971)

B. Twelve-head capacity: Part No. 01725A (available since 1971)

4. INSTALLATION

Refer to appropriate NFPA Installation Standards.

5. OPERATION

During fire conditions, the heat-sensitive liquid in the glass bulb expands, causing the glass to shatter, releasing the pip cap and sealing spring assembly. Water flowing through the sprinkler orifice strikes the sprinkler deflector, forming a uniform spray pattern to extinguish or control the fire.

6. INSPECTIONS, TESTS AND MAINTENANCE

Refer to NFPA 25 for Inspection, Testing and Maintenance requirements.

7. AVAILABILITY

The Viking Microfast® Quick Response Pendent Sprinkler VK302 is available through a network of domestic and international distributors. See The Viking Corporation web site for the closest distributor or contact The Viking Corporation.

8. GUARANTEE

For details of warranty, refer to Viking's current list price schedule or contact Viking directly.

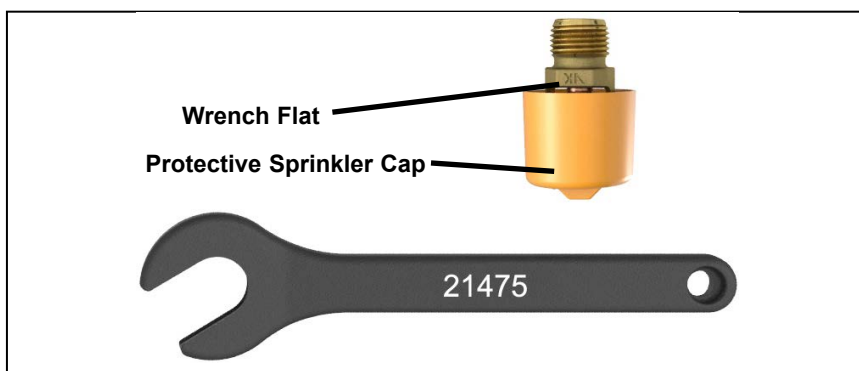


Figure 1:
Standard Sprinkler Wrench 21475M/B



TECHNICAL DATA

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TABLE 1: AVAILABLE SPRINKLER TEMPERATURE RATINGS AND FINISHES

Sprinkler Temperature Classification	Sprinkler Nominal Temperature Rating ¹	Maximum Ambient Ceiling Temperature ²	Bulb Color
Ordinary	135 °F (57 °C)	100 °F (38 °C)	Orange
Ordinary	155 °F (68 °C)	100 °F (38 °C)	Red
Intermediate	175 °F (79 °C)	150 °F (65 °C)	Yellow
Intermediate	200 °F (93 °C)	150 °F (65 °C)	Green
High	286 °F (141 °C)	225 °F (107 °C)	Blue

Sprinkler Finishes: Brass, Chrome, White polyester, black polyester, and ENT

Corrosion-Resistant Coatings³: White polyester, and black polyester. ENT in all temperature ratings except 135 °F (57 °C)

Footnotes

¹ The sprinkler temperature rating is stamped on the deflector.

² Based on NFPA-13. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.

³ The corrosion-resistant coatings have passed the standard corrosion test required by the approving agencies indicated in the Approval Charts. These tests cannot and do not represent all possible corrosive environments. Prior to installation, verify through the end-user that the coatings are compatible with or suitable for the proposed environment. For automatic sprinklers, the coatings indicated are applied to the exposed exterior surfaces only. Note that the spring is exposed on sprinklers with polyester and ENT coatings. For ENT coated automatic sprinklers, the waterway is coated.

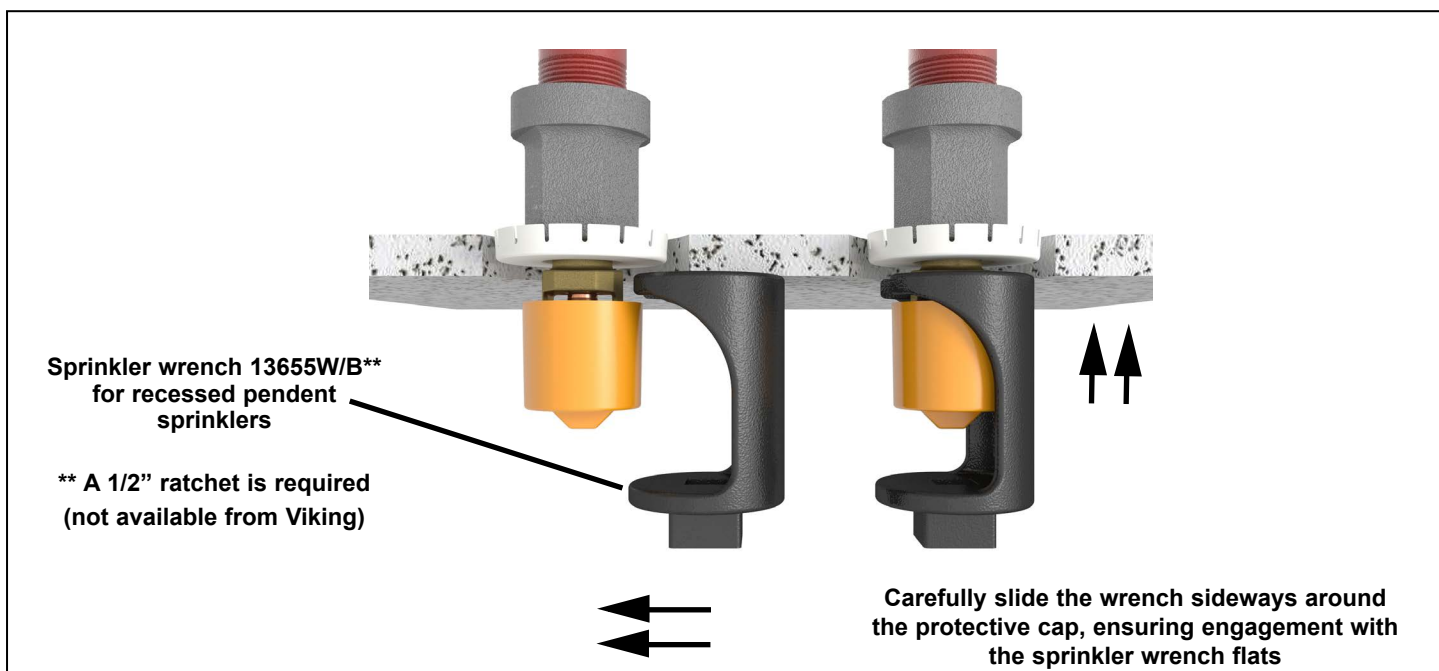


Figure 2: Wrench 13655W/B for Recessed Pendent Sprinklers



TECHNICAL DATA

MICROFAST® QUICK RESPONSE PENDENT SPRINKLER VK302 (K5.6)

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Approval Chart 1 (UL) The Viking Microfast® Quick Response Pendent Sprinkler VK302 Maximum 175 PSI (12 Bar) WWP																Temperature Finish Escutcheon (if applicable) KEY A1X←
Base Part Number¹	SIN	Sprinkler Style	Thread Size		Nominal K-Factor		Overall Length		Listings and Approvals³ (Refer also to Design Criteria.)							
			NPT	BSP	U.S.	met-ric²	Inches	mm	cULus⁴	VdS	LPCB	CE⁷	MED⁸	CCCF	UKCA	
12979	VK302	Pendent	1/2"	15 mm	5.6	80.6	2-1/4	58	A1Z, B1Y, D2, C2X	A1	A1Z, B1Y	D1Z, C1Y, D2, A1Z, B1Y	D1	--	A1Z, B1Y	
21354⁹	VK302	Pendent	--	15 mm	5.6	80.6	2-1/4	58	D3	--	--	--	--	D3	--	
Approved Temperature Ratings A - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), 286 °F (141 °C) B - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), and 200 °F (93 °C) C - 155 °F (68 °C), 175 °F (79 °C), and 200 °F (93 °C) D - 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), 286 °F (141 °C)				Approved Finishes 1 - Brass, chrome, white polyester⁵⁶, black polyester⁵⁶ 2 - ENT⁵ 3 - Chrome				Approved Escutcheons X - Standard surface-mounted escutcheon or the Viking Micromatic® Model E-1 recessed escutcheon Y - Standard surface-mounted escutcheon or recessed with the Viking Micromatic® Model E-1, E-2, or E-3 recessed escutcheon Z - Standard surface-mounted escutcheon								
Footnotes																
¹ Base part number shown. For complete part number, refer to Viking's current price schedule.																
² Metric K-factor measurement shown is when pressure is measured in bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.																
³ This table shows the listings and approvals available at the time of printing. Other approvals may be in process.																
⁴ Listed by Underwriters Laboratories Inc. for use in the U.S. and Canada.																
⁵ cULus Listed as corrosion-resistant.																
⁶ Other colors are available on request with the same Listings and Approvals as the standard colors.																
⁷ CE: Standard EN 12259-1,Declaration of Performance DOP_Sprinklers_LPCB_5-2-19, DOP_VK302ENT_29-1-20 & DOP_VK302-57C_30-9-20.																
⁸ MED Certified, Standard EN 12259-1, EC-0832-MED-1003.																
⁹ Approved according to China GB Standard.																

DESIGN CRITERIA - UL (Also refer to Approval Chart 1 above.)	
cULus Listing Requirements: The Viking Microfast® Quick Response Pendent Sprinkler VK302 is cULus Listed, as indicated in the Approval Chart for installation in accordance with the latest edition of NFPA 13 for standard spray sprinklers. - Designed for use in Light and Ordinary occupancies. - The sprinkler installation rules contained in NFPA 13 for standard spray pendent sprinklers must be followed. - Venting is not required.	
IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to Form No. F_080614 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.	



TECHNICAL DATA

MICROFAST® QUICK RESPONSE PENDENT SPRINKLER VK302 (K5.6)

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Approval Chart 2 (FM) The Viking Microfast® Quick Response Pendent Sprinkler VK302 Maximum 175 PSI (12 Bar) WWP

KEY	
Temperature	→
Finish	→
A1X ← Escutcheon (if applicable)	

Base Part Number ¹	SIN	Sprinkler Style	Thread Size		Nominal K-Factor		Overall Length		FM Approvals ³ (Refer also to Design Criteria.)	
			NPT	BSP	U.S.	metric ²	Inches	mm		
12979	VK302	Pendent	1/2"	15 mm	5.6	80.6	2-1/4	58	A1Z, B1Y, D2X, C2	
21354 ⁶	VK302	Pendent	--	15 mm	5.6	80.6	2-1/4	58	C3	
Approved Temperature Ratings				Approved Finishes 1 - Brass, chrome, white polyester ⁴ , and black polyester ⁴ 2 - ENT ⁵ 3 - Chrome			Approved Escutcheons			
A - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), 286 °F (141 °C)							X - Standard surface-mounted escutcheon or the Viking Micromatic® Model E-1 recessed escutcheon			
B - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), and 200 °F (93 °C)							Y - Standard surface-mounted escutcheon or recessed with the Viking Micromatic® Model E-1 or E-2 recessed escutcheon			
C - 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), 286 °F (141 °C)							Z - Standard surface-mounted escutcheon			
D - 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C)										
Footnotes										
¹ Base part number shown. For complete part number, refer to Viking's current price schedule.										
² Metric K-factor measurement shown is when pressure is measured in bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.										
³ This table shows the FM Approvals available at the time of printing. Other approvals may be in process.										
⁴ Other colors are available on request with the same Approvals as the standard colors.										
⁵ FM approved as corrosion-resistant.										
⁶ Approved according to China GB Standard.										

DESIGN CRITERIA - FM

(Also refer to Approval Chart 2 above.)

FM Approval Requirements:

The Viking Microfast® Quick Response Pendent Sprinkler VK302 is FM Approved as quick response **Non-storage** pendent sprinklers, as indicated in the FM Approval Guide. For specific application and installation requirements, reference the latest applicable FM Loss Prevention Data Sheets (including Data Sheet 2-0). FM Global Loss Prevention Data Sheets contain guidelines relating to, but not limited to: minimum water supply requirements, hydraulic design, ceiling slope and obstructions, minimum and maximum allowable spacing, and deflector distance below the ceiling.

NOTE: The FM installation guidelines may differ from cULus and/or NFPA criteria.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to Form No. F_080614 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, FM Global, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.



TECHNICAL DATA

MICROFAST® QUICK RESPONSE PENDENT SPRINKLER VK302 (K5.6)

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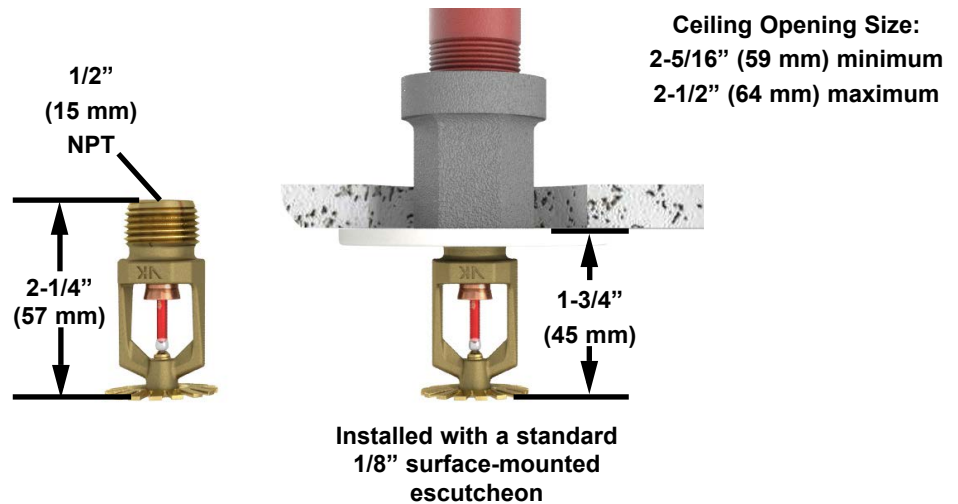


Figure 3: Sprinkler Dimensions with a Standard Escutcheon

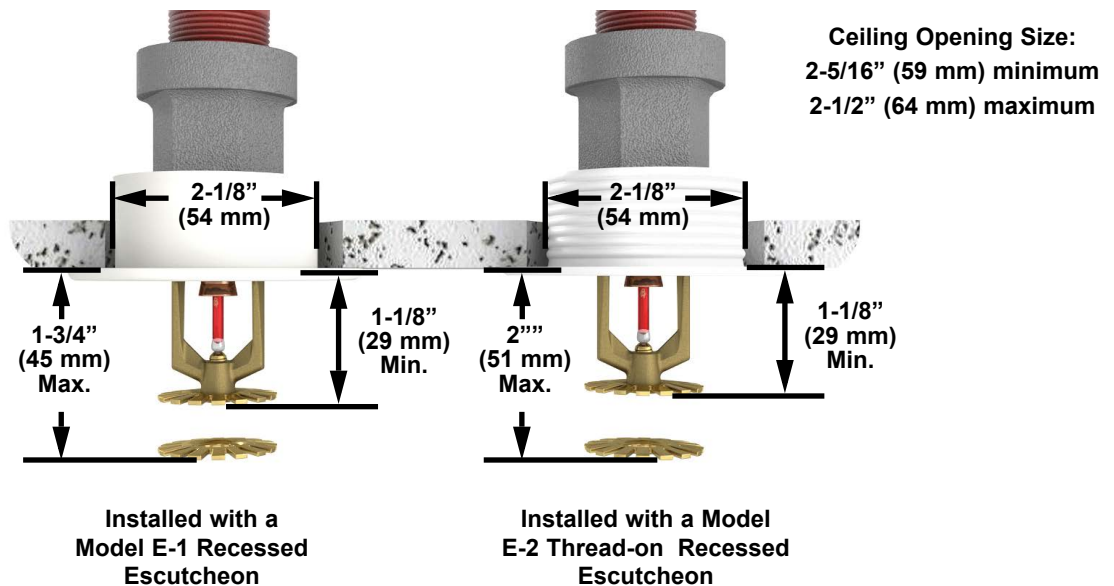


Figure 4: Sprinkler Dimensions with the Model E-1 and E-2 Recessed Escutcheons



BULLETIN

CARE AND HANDLING
OF SPRINKLERS

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SPRINKLERS ARE FRAGILE - HANDLE WITH CARE!**General Handling and Storage:**

- Store sprinklers in a cool, dry place.
- Protect sprinklers during storage, transport, handling, and after installation.
- Use the original shipping containers. DO NOT place sprinklers loose in boxes, bins, or buckets.
- Keep sprinklers separated at all times. DO NOT allow metal parts to contact sprinkler operating elements.

For Pre-Assembled Drops:

- Protect sprinklers during handling and after installation.
- For recessed assemblies, use the protective sprinkler cap (Viking Part Number 10364).

Sprinklers with Protective Shields or Caps:

- DO NOT remove shields or caps until after sprinkler installation and there no longer is potential for mechanical damage to the sprinkler operating elements.
- **Sprinkler shields or caps MUST be removed BEFORE placing the system in service!**
- Remove the sprinkler shield by carefully pulling it apart where it is snapped together.
- Remove the cap by turning it slightly and pulling it off the sprinkler.

Sprinkler Installation:

- DO NOT use the sprinkler deflector or operating element to start or thread the sprinkler into a fitting.
- **Use only the designated sprinkler head wrench!** Refer to the current sprinkler technical data page to determine the correct wrench for the model of sprinkler used.
- DO NOT install sprinklers onto piping at the floor level.
- Install sprinklers after the piping is in place to prevent mechanical damage.
- DO NOT allow impacts such as hammer blows directly to sprinklers or to fittings, pipe, or couplings in close proximity to sprinklers. Sprinklers can be damaged from direct or indirect impacts.
- DO NOT attempt to remove drywall, paint, etc., from sprinklers.
- **Take care not to over-tighten the sprinkler and/or damage its operating parts!**

Maximum Torque:

1/2" NPT: 14 ft-lbs. (19.0 N-m)

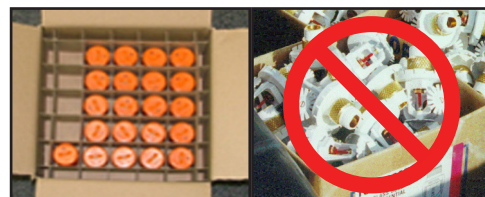
3/4" NPT: 20 ft-lbs. (27.1 N-m)

1" NPT: 30 ft-lbs. (40.7 N-m)



CORRECT
(Original container used)

INCORRECT
(Placed loose in box)



CORRECT
(Protected with caps)

INCORRECT
(Protective caps not used)



CORRECT
(Piping is in place at the ceiling)

INCORRECT
(Sprinkler at floor level)



CORRECT
(Special installation wrenches)

INCORRECT
(Designated wrench not used)



WARNING: Cancer and Reproductive Harm-
www.P65Warnings.ca.gov

! WARNING

Any sprinkler with a loss of liquid from the glass bulb or damage to the fusible element should be destroyed. Never install sprinklers that have been dropped, damaged, or exposed to temperatures exceeding the maximum ambient temperature allowed. Sprinklers that have been painted in the field must be replaced per NFPA 13. Protect sprinklers from paint and paint overspray in accordance with the installation standards. Do not clean sprinklers with soap and water, ammonia, or any other cleaning fluid. Do not use adhesives or solvents on sprinklers or their operating elements.

Refer to the appropriate technical data page and NFPA standards for complete care, handling, installation, and maintenance instructions. For additional product and system information Viking data pages and installation instructions are available on the Viking Web site at www.vikinggroupinc.com.



BULLETIN

CARE AND HANDLING
OF SPRINKLERS

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
 Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

PROTECTIVE SPRINKLER SHIELDS AND CAPS

General Handling and Storage:

Many Viking sprinklers are available with a plastic protective cap or shield temporarily covering the operating elements. The snap-on shields and caps are factory installed and are intended to help protect the operating elements from mechanical damage during shipping, storage, and installation. NOTE: It is still necessary to follow the care and handling instructions on the appropriate sprinkler technical data sheets* when installing sprinklers with bulb shields or caps.

WHEN TO REMOVE THE SHIELDS AND CAPS:

NOTE: SHIELDS AND CAPS MUST BE REMOVED FROM SPRINKLERS BEFORE PLACING THE SYSTEM IN SERVICE!

Remove the shield or cap from the sprinkler only after checking all of the following:

- The sprinkler has been installed*.
- The wall or ceiling finish work is completed where the sprinkler is installed and there no longer is a potential for mechanical damage to the sprinkler operating elements.

SHIELDS AND CAPS MUST BE REMOVED FROM SPRINKLERS BEFORE PLACING THE SYSTEM IN SERVICE!

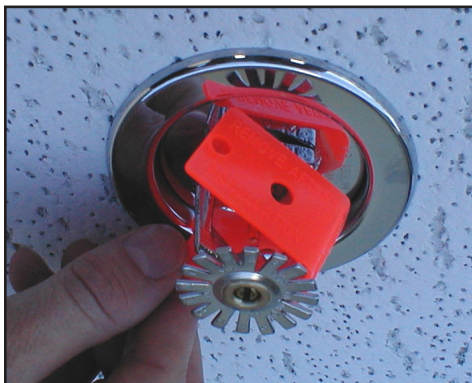


Figure 1: Sprinkler shield being removed from a pendent sprinkler.



Figure 2: Sprinkler cap being removed from a pendent sprinkler.



Figure 3: Sprinkler cap being removed from an upright sprinkler.

HOW TO REMOVE SHIELDS AND CAPS:

No tools are necessary to remove the shields or caps from sprinklers. DO NOT use any sharp objects to remove them! **Take care not to cause mechanical damage to sprinklers when removing the shields or caps.** When removing caps from fusible element sprinklers, use care to prevent dislodging ejector springs or damaging fusible elements. NOTE: Squeezing the sprinkler cap excessively could damage sprinkler fusible elements.

- To remove the shield, simply pull the ends of the shield apart where it is snapped together. Refer to Figure 1.
- To remove the cap, turn it slightly and pull it off the sprinkler. Refer to Figures 2 and 3.

NOTICE

Refer to the current sprinkler technical data page to determine the correct sprinkler wrench for the model of sprinkler used.



Never install sprinklers that have been dropped, damaged, or exposed to temperatures in excess of the maximum ambient temperature allowed.

* Refer to the appropriate current technical data pages for complete care, handling, and installation instructions. Data pages are included with each shipment from Viking or Viking distributors. They can also be found on the Web site at www.vikinggroupinc.com.



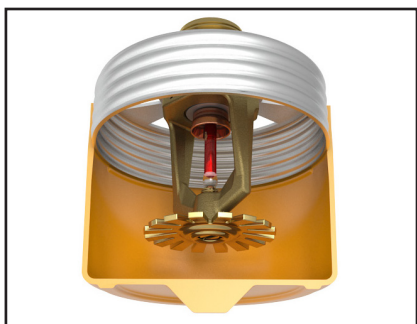
BULLETIN

CARE AND HANDLING
OF SPRINKLERS

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
 Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com



CONCEALED COVER ASSEMBLIES ARE FRAGILE!
TO ASSURE SATISFACTORY PERFORMANCE OF THE PRODUCT, HANDLE WITH CARE.



Concealed Sprinkler and Adapter
 Assembly with Protective Cap



Concealed Sprinkler and Adapter
 Assembly (Protective Cap Removed)



Cover Plate Assembly
 (Pendent Cover 12381 shown)

GENERAL HANDLING AND STORAGE INSTRUCTIONS:

- Do not store in temperatures exceeding 100 °F (38 °C). Avoid direct sunlight and confined areas subject to heat.
- Protect sprinklers and cover assemblies during storage, transport, handling, and after installation.
 - Use original shipping containers.
 - Do not place sprinklers or cover assemblies loose in boxes, bins, or buckets.
- Keep the sprinkler bodies covered with the protective sprinkler cap any time the sprinklers are shipped or handled, during testing of the system, and while ceiling finish work is being completed.
- Use only the designated Viking recessed sprinkler wrench (refer to the appropriate sprinkler data page) to install these sprinklers. **NOTE:** The protective cap is temporarily removed during installation and then placed back on the sprinkler for protection until finish work is completed.
- Do not over-tighten the sprinklers into fittings during installation.
- Do not use the sprinkler deflector to start or thread the sprinklers into fittings during installation.
- Do not attempt to remove drywall, paint, etc., from the sprinklers.
- Remove the plastic protective cap from the sprinkler before attaching the cover plate assembly. **PROTECTIVE CAPS MUST BE REMOVED FROM SPRINKLERS BEFORE PLACING THE SYSTEM IN SERVICE!**

Refer to the appropriate current technical data pages for complete care, handling, and installation instructions. Data pages are included with each shipment from Viking or Viking distributors. They can also be found on the Web site at www.vikinggroupinc.com.



BULLETIN

CARE AND HANDLING
OF SPRINKLERS

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

USE THE FOLLOWING PRECAUTIONS WHEN HANDLING WAX-COATED SPRINKLERS

Many of Viking's sprinklers are available with factory-applied wax coating for corrosion resistance. These sprinklers **MUST** receive appropriate care and handling to avoid damaging the wax coating and to assure satisfactory performance of the product.

General Handling and Storage of Wax-Coated Sprinklers:

- Store the sprinklers in a cool, dry place (in temperatures below the maximum ambient temperature allowed for the sprinkler temperature rating. Refer to Table 1 below.)
- Store containers of wax-coated sprinklers separate from other sprinklers.
- Protect the sprinklers during storage, transport, handling, and after installation.
- Use original shipping containers.
- Do not place sprinklers in loose boxes, bins, or buckets.

Installation of Wax-Coated Sprinklers:

Use only the special sprinkler head wrench designed for installing wax-coated Viking sprinklers (any other wrench may damage the unit).

- Take care not to crack the wax coating on the units.
- For touching up the wax coating after installation, wax is available from Viking in bar form. Refer to Table 1 below. The coating **MUST** be repaired after sprinkler installation to protect the corrosion-resistant properties of the sprinkler.
- Use care when locating sprinklers near fixtures that can generate heat. Do not install sprinklers where they would be exposed to temperatures exceeding the maximum recommended ambient temperature for the temperature rating used.
- Inspect the coated sprinklers frequently soon after installation to verify the integrity of the corrosion resistant coating. Thereafter, inspect representative samples of the coated sprinklers in accordance with NFPA 25. Close up visual inspections are necessary to determine whether the sprinklers are being affected by corrosive conditions.

TABLE 1

Sprinkler Temperature Rating (Fusing Point)	Wax Part Number	Wax Melting Point	Maximum Ambient Ceiling Temperature ¹	Wax Color
155 °F (68 °C) / 165 °F (74 °C)	02568A	148 °F (64 °C)	100 °F (38 °C)	Light Brown
175 °F (79 °C)	04146A	161 °F (71 °C)	150 °F (65 °C)	Brown
200 °F (93 °C)	04146A	161 °F (71 °C)	150 °F (65 °C)	Brown
220 °F (104 °C)	02569A	170 °F (76 °C)	150 °F (65 °C)	Dark Brown
286 °F (141 °C)	02569A	170 °F (76 °C)	150 °F (65 °C)	Dark Brown

¹ Based on NFPA-13. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.



Never install sprinklers that have been dropped, damaged, or exposed to temperatures in excess of the maximum ambient temperature allowed.

Refer to the appropriate current technical data pages for complete care, handling, and installation instructions. Data pages are included with each shipment from Viking or Viking distributors. They can also be found on the Web site at www.vikinggroupinc.com.

**BULLETIN****REGULATORY AND HEALTH
WARNINGS**

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Visit the Viking website for the latest edition of this technical data page www.vikinggroupinc.com

1. DESCRIPTION

Regulatory and Health Warnings applying to materials used in the manufacture and construction of fire protection products are provided herein as they relate to legally mandated jurisdictional regions.

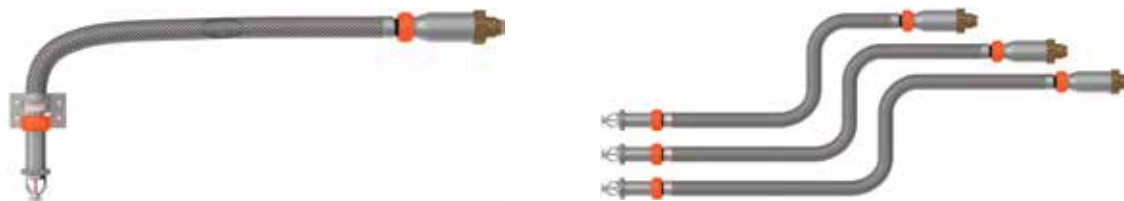
⚠ WARNING**STATE OF CALIFORNIA, USA**

Installing or servicing fire protection products such as sprinklers, valves, piping etc. can expose you to chemicals including, but not limited to, lead, nickel, butadiene, titanium dioxide, chromium, carbon black, and acrylonitrile which are known to the State of California to cause cancer or birth defects or other reproductive harm.

For more information, go to www.P65Warnings.ca.gov

2. WARRANTY TERMS AND CONDITIONS

For details of warranty, refer to Viking's current list price schedule at www.vikinggroupinc.com or contact Viking directly.



1.0 PRODUCT DESCRIPTION

STANDARD RESPONSE SLEEVE AND SKIRT PENDENT SPRINKLER	
SIN	V3505
ORIENTATION	Pendent
NOMINAL K-FACTOR/METRIC K-FACTOR	5.6/80
RESPONSE	Standard
CONNECTION	1" NPT/25 mm BSPT
MAX. WORKING PRESSURE	175 psi (1200 kPa)
ESCUTCHEON	Sleeve and Skirt
LENGTHS	38"/965 mm, 50"/1270 mm and 58"/1473 mm

STANDARD RESPONSE RECESSED PENDENT SPRINKLER	
SIN	V3505
ORIENTATION	Pendent
NOMINAL K-FACTOR/METRIC K-FACTOR	5.6/80
RESPONSE	Standard
CONNECTION	1" NPT/25 mm BSPT
MAX. WORKING PRESSURE	175 psi (1200 kPa)
ESCUTCHEON	Recessed
LENGTHS	38"/965 mm, 50"/1270 mm and 58"/1473 mm

QUICK RESPONSE SLEEVE AND SKIRT PENDENT SPRINKLER	
SIN	V3506
ORIENTATION	Pendent
NOMINAL K-FACTOR/METRIC K-FACTOR	5.6/80
RESPONSE	Quick
CONNECTION	1" NPT/25mm BSPT
MAX. WORKING PRESSURE	175 psi (1200 kPa)
ESCUTCHEON	Sleeve and Skirt
LENGTHS	38"/965 mm, 50"/1270 mm and 58"/1473 mm

QUICK RESPONSE RECESSED PENDENT SPRINKLER	
SIN	V3506
ORIENTATION	Pendent
NOMINAL K-FACTOR/METRIC K-FACTOR	5.6/80
RESPONSE	Quick
CONNECTION	1" NPT/25mm BSPT
MAX. WORKING PRESSURE	175 psi (1200 kPa)
ESCUTCHEON	Recessed
LENGTHS	38"/965 mm, 50"/1270 mm and 58"/1473 mm

STANDARD RESPONSE SLEEVE AND SKIRT HORIZONTAL SIDEWALL SPRINKLER	
SIN	V3509
ORIENTATION	Horizontal Sidewall
NOMINAL K-FACTOR/METRIC K-FACTOR	5.6/80
RESPONSE	Standard
CONNECTION	1" NPT/25mm BSPT
MAX. WORKING PRESSURE	175 psi (1200 kPa)
ESCUTCHEON	Sleeve and Skirt
LENGTHS	38"/965 mm, 50"/1270 mm and 58"/1473 mm

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

1.0 PRODUCT DESCRIPTION (CONTINUED)

STANDARD RESPONSE RECESSED HORIZONTAL SIDEWALL SPRINKLER	
SIN	V3509
ORIENTATION	Horizontal Sidewall
NOMINAL K-FACTOR/METRIC K-FACTOR	5.6/80
RESPONSE	Standard
CONNECTION	1" NPT/25 mm BSPT
MAX. WORKING PRESSURE	175 psi (1200 kPa)
ESCUTCHEON	Recessed
LENGTHS	38"/965 mm, 50"/1270 mm and 58"/1473 mm

QUICK RESPONSE SLEEVE AND SKIRT HORIZONTAL SIDEWALL SPRINKLER	
SIN	V3510
ORIENTATION	Horizontal Sidewall
NOMINAL K-FACTOR/METRIC K-FACTOR	5.6/80
RESPONSE	Quick
CONNECTION	1" NPT/25mm BSPT
MAX. WORKING PRESSURE	175 psi (1200 kPa)
ESCUTCHEON	Sleeve and Skirt
LENGTHS	38"/965 mm, 50"/1270 mm and 58"/1473 mm

QUICK RESPONSE RECESSED HORIZONTAL SIDEWALL SPRINKLER	
SIN	V3510
ORIENTATION	Horizontal Sidewall
NOMINAL K-FACTOR/METRIC K-FACTOR	5.6/80
RESPONSE	Quick
CONNECTION	1" NPT/25mm BSPT
MAX. WORKING PRESSURE	175 psi (1200 kPa)
ESCUTCHEON	Recessed
LENGTHS	38"/965 mm, 50"/1270 mm and 58"/1473 mm

STANDARD RESPONSE CONCEALED PENDENT SPRINKLER	
SIN	V3517
ORIENTATION	Concealed Pendent
NOMINAL K-FACTOR/METRIC K-FACTOR	5.6/80
RESPONSE	Standard
CONNECTION	1" NPT/25mm BSPT
MAX. WORKING PRESSURE	175 psi (1200 kPa)
ESCUTCHEON	Concealed
LENGTHS	38"/965 mm, 50"/1270 mm and 58"/1473 mm

QUICK RESPONSE CONCEALED PENDENT SPRINKLER	
SIN	V3518
ORIENTATION	Concealed Pendent
NOMINAL K-FACTOR/METRIC K-FACTOR	5.6/80
RESPONSE	Quick
CONNECTION	1" NPT/25mm BSPT
MAX. WORKING PRESSURE	175 psi (1200 kPa)
ESCUTCHEON	Concealed
LENGTHS	38"/965 mm, 50"/1270 mm and 58"/1473 mm

AVAILABLE GUARDS	
SPRINKLER	V34
PENDENT	■
SIDEWALL	■

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

Min. Operating Pressure: Pendent: 7 psi/48 kPa/.5 bar

Temperature Rating: See tables in [Section 2.0](#)

2.0 CERTIFICATION/LISTINGS



APPROVALS/LISTINGS					
SIN	V3505	V3505	V3506	V3506	V3509
Nominal K Factor (gpm/(psi) ^{1/2})	5.6	5.6	5.6	5.6	5.6
Metric K-Factor (lpm/(bar) ^{1/2})	80	80	80	80	80
Response	Standard	Standard	Quick	Quick	Standard
Deflector Type	Sleeve and Skirt	Recessed	Sleeve and Skirt	Recessed	Sleeve and Skirt SW
Approved Temperature Ratings F°/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	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 155°F/68°C 175°F/79°C 200°F/93°C 286°F/141°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	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

APPROVALS/LISTINGS					
SIN	V3509	V3510	V3510	V3517 ³	V3518 ³
Nominal K Factor (gpm/(psi) ^{1/2})	5.6	5.6	5.6	5.6	5.6
Metric K-Factor (lpm/(bar) ^{1/2})	80	80	80	80	80
Response	Standard	Quick	Quick	Standard	Quick ¹
Deflector Type	Recessed SW	Sleeve and Skirt SW	Recessed SW	Concealed	Concealed ²
Approved Temperature Ratings F°/C°					
FM	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 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
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	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

¹ Model V3518 is a Standard Response FM sprinkler.

² Model V3518 is listed as a standard response UL sprinkler when installed in a clean room using a gasketed cover plate. Clean room gaskets are optional and ordered separately.

³ These sprinklers are required to be vented. Installations with a pressurized air plenum above the housing is not permitted.

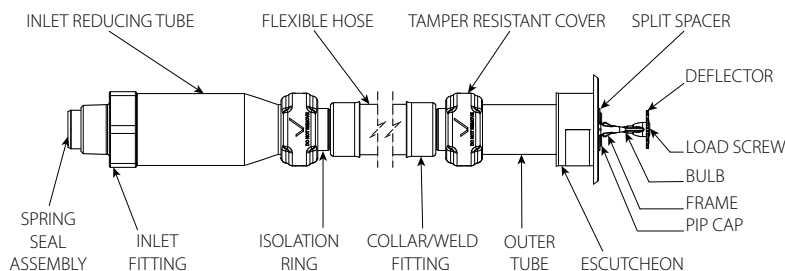
NOTES

- The VicFlex™ Series VS1/Style V35 has been tested and evaluated by Spears® for acceptable use with Spears® CPVC products and therefore is covered under the Spears® FlameGuard® Installer Protection Plan.
- For system design purposes, no equivalent length calculations are required.

MAXIMUM ALLOWABLE NUMBER OF BENDS		
Nominal Sprinkler Length inches mm	Maximum Allowable Number of 90° Bends at 2"/51mm Bend Radius for UL Listing	Maximum Allowable Number of 90° Bends at 7"/178mm Bend Radius for FM Approval
38.0 965	4	2
50.0 1270	4	3
58.0 1473	4	4

Agency	Approved/Listed Bracket Styles	Approved/Listed Guards
UL	VB1, VB2, VB3, VB4	
FM	VB1, VB2, VB3, VB4, VB5, VBBA	V34

3.0 MATERIAL SPECIFICATIONS



Deflector: Brass

Bulb Nominal Diameter:

Quick Response: 3.0 mm

Standard Response: 5.0 mm

Split Spacer: Stainless Steel

Load Screw: Brass

Pip Cap: Stainless Steel

Spring Seal Assembly: PTFE coated Beryllium Nickel Alloy and Stainless Steel

Frame: Brass

Guard (Optional): Carbon Steel, Zinc-Plated

Flexible Hose: Stainless Steel

Collar/Weld Fitting: Stainless Steel

Gasket Seal: Victaulic EPDM

Isolation Ring: Nylon

Hose Fittings: Carbon Steel, Zinc-Plated

Inlet Fitting: Brass

Outer Tube: Stainless Steel

Concealed Cup: Carbon Steel, Zinc-Plated

Concealed Cover Plate Gasket: White Nitrile (Clean room use only)

Brackets: Carbon Steel, Zinc-Plated

Escutcheon: Stainless Steel

Inlet Reducer Fitting: Carbon Steel, Zinc-Plated

Tamper Resistant Cover: Polypropylene

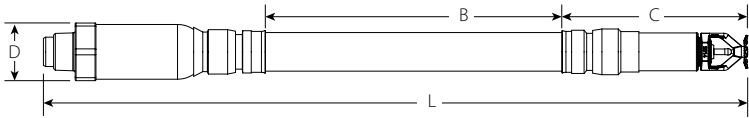
3.1 ACCESSORIES SPECIFICATIONS

Sprinkler Finishes:

- ☐ **Standard:** VC-250
- ☐ White Painted RAL 9010
- ☐ Black

4.0 DIMENSIONS

Product Details and Optional Components
Series VS1 Dry Sprinkler

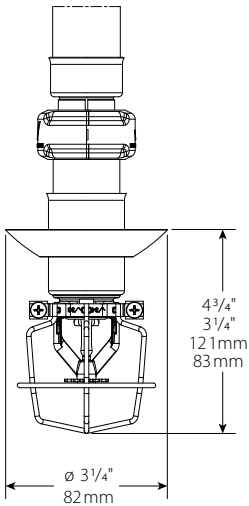


Sprinkler Length	Overall Length (pendent) L	Live Length B	Outlet End Length C	Maximum OD D
inches	inches	inches	inches	inches
mm	mm	mm	mm	mm
38	39.2	25.1	6.5	2.2
965	995	638	165	56
50	51.2	37.1	6.5	2.2
1270	1300	943	165	56
58	59.2	45.1	6.5	2.2
1475	1505	1145	165	56

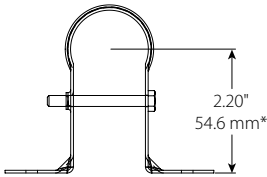
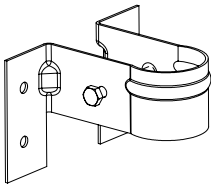
NOTE

- Add ½" to Overall Length and Outlet End Length for increased length of sidewall deflector

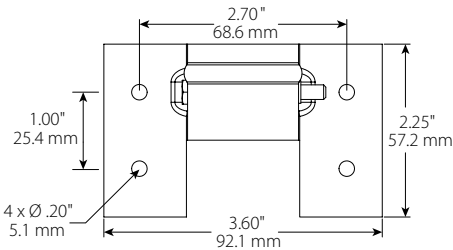
VS1 with Sprinkler Guard



Style VB1 Bracket



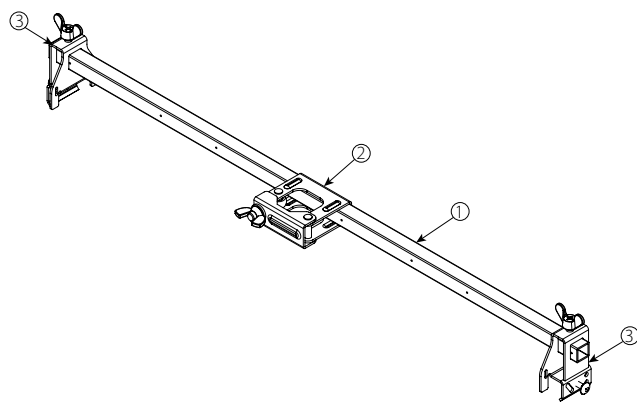
*Note: Theoretical center point of sprinkler in bracket.



4.0 DIMENSIONS (CONTINUED)

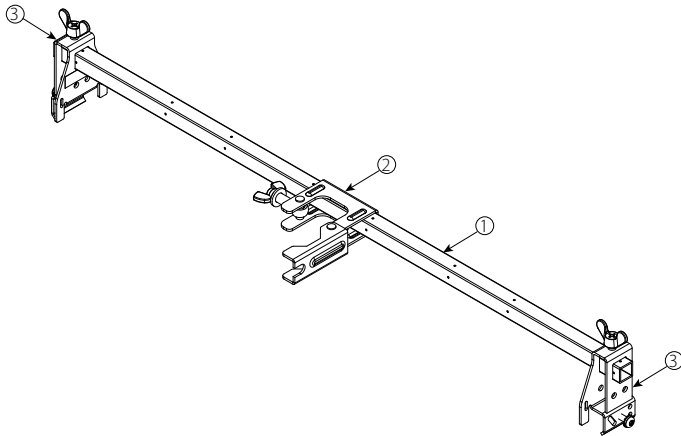
Style VB2 Bracket
Recessed Pendent, Suspended Ceilings

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



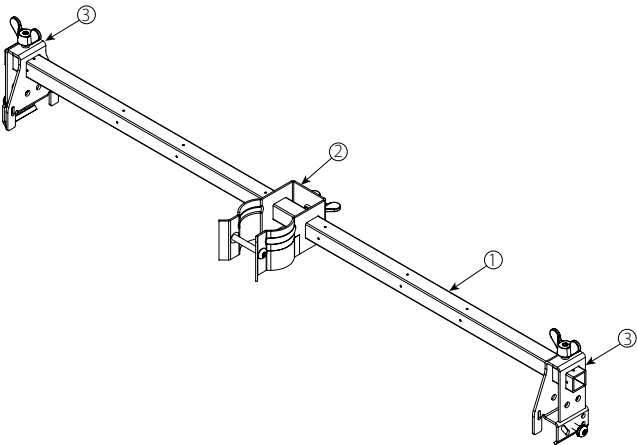
Style VB3 Bracket
Concealed Pendent, Suspended Ceilings

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



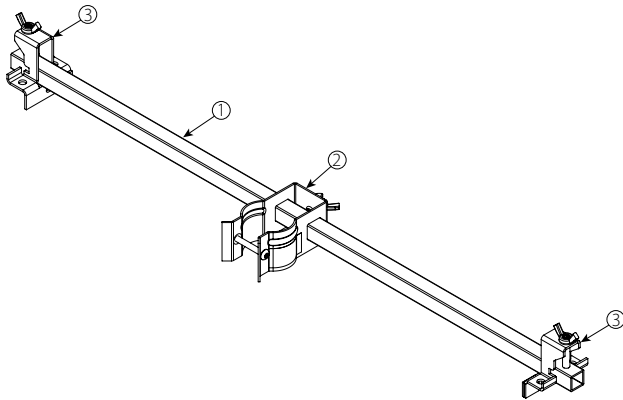
Style VB4 Bracket
Sleeve and Skirt Pendent, Suspended Ceilings

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



Style VB5 Bracket
Data Center Grid, Wood/Metal Joist

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

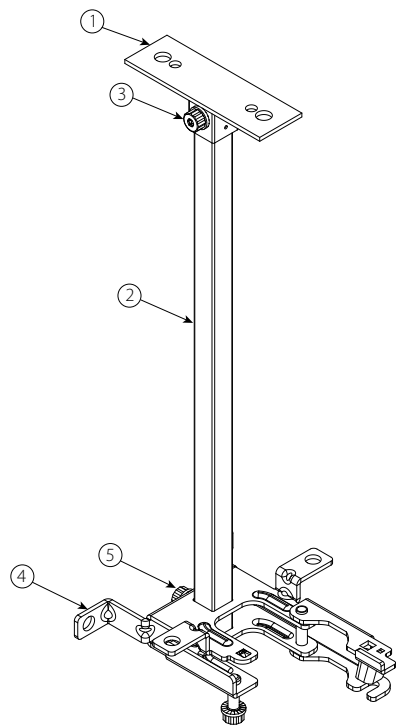


4.0 DIMENSIONS (CONTINUED)

Style VBBA Bracket

Floor Above Mount, Cantilever Mount, Temporary Mount

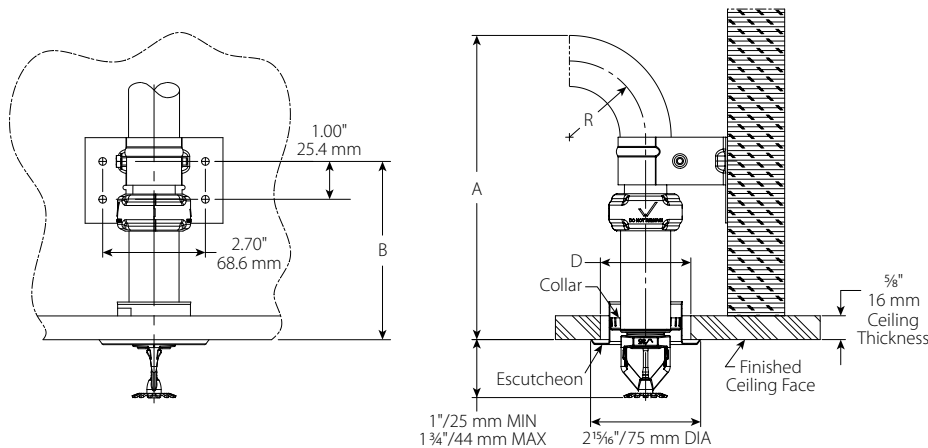
Item	Description
1	Mounting Plate
2	Square Bar
3	Cap Screw
4	Bracket Body
5	Cap Screw



4.1 DIMENSIONS

Sprinkler Finishes: Dimensions and Mounting Conditions

Recessed Pendent:



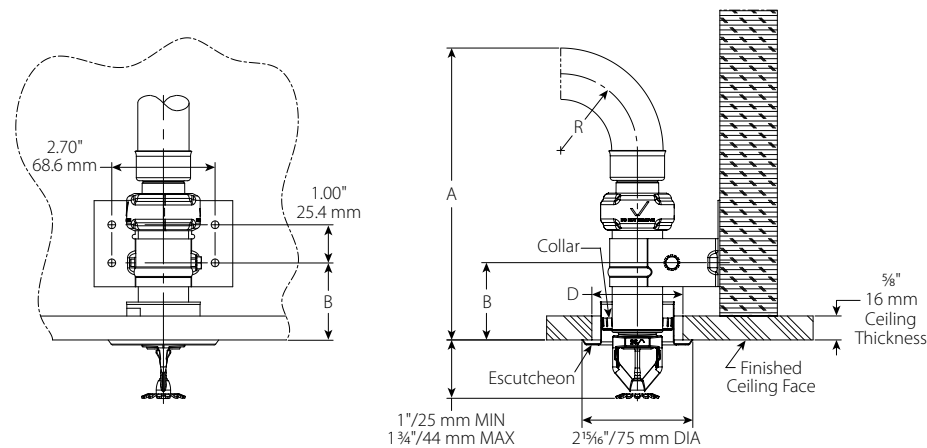
Hose Clearance			
Dimension		inches mm	
R	Bend Radius	2 51	7 178
A	Minimum Required Installation Space	7 5/8 193	12 5/8 320
B	Mounting Screw Hole Location	4 3/4 119	
D	Ceiling Hole Diameter	2 - 2 3/8 51 - 60	

NOTES

- Dimensions are shown with 3/4" escutcheon at middle of height adjustment range.
- Variations of ceiling grids, brackets, and sprinkler assemblies are permitted but may result in clearance differences from the figures above.

4.2 DIMENSIONS

Recessed Pendent Alternative Bracket Location



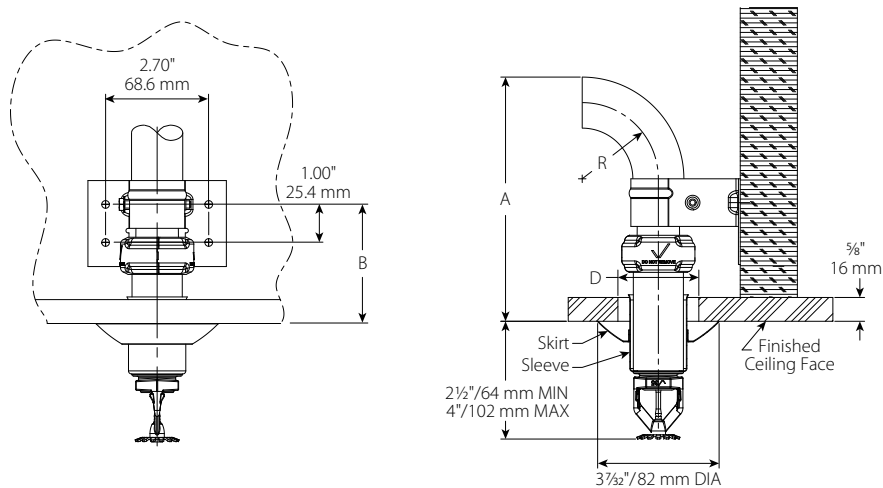
Hose Clearance			
Dimension		inches mm	
R	Bend Radius	2 51	7 178
A	Minimum Required Installation Space	7 5/8 193	12 5/8 320
B	Mounting Screw Hole Location	2 51	
D	Ceiling Hole Diameter	2 – 2 3/8 51 – 60	

NOTES

- Dimensions are shown with 3/4" escutcheon at middle of height adjustment range.
- Variations of ceiling grids, brackets, and sprinkler assemblies are permitted but may result in clearance differences from the figures above.

4.3 DIMENSIONS

Sleeve and Skirt Pendent



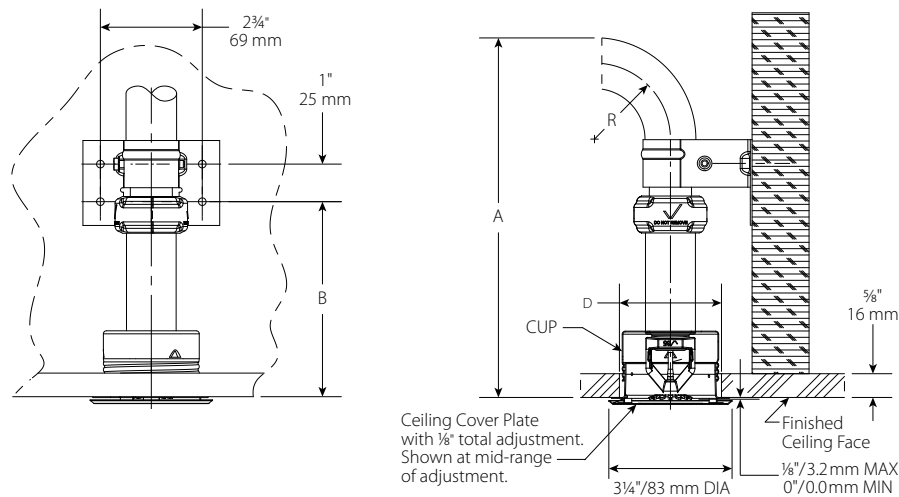
Hose Clearance			
Dimension		inches mm	
R	Bend Radius	2 51	7 178
A	Minimum Required Installation Space	6 1/2 163	11 1/2 290
B	Mounting Screw Hole Location	3 1/8 79	
D	Ceiling Hole Diameter	1 3/4 – 2 1/2 44 – 64	

NOTE

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

4.4 DIMENSIONS

Concealed Pendent



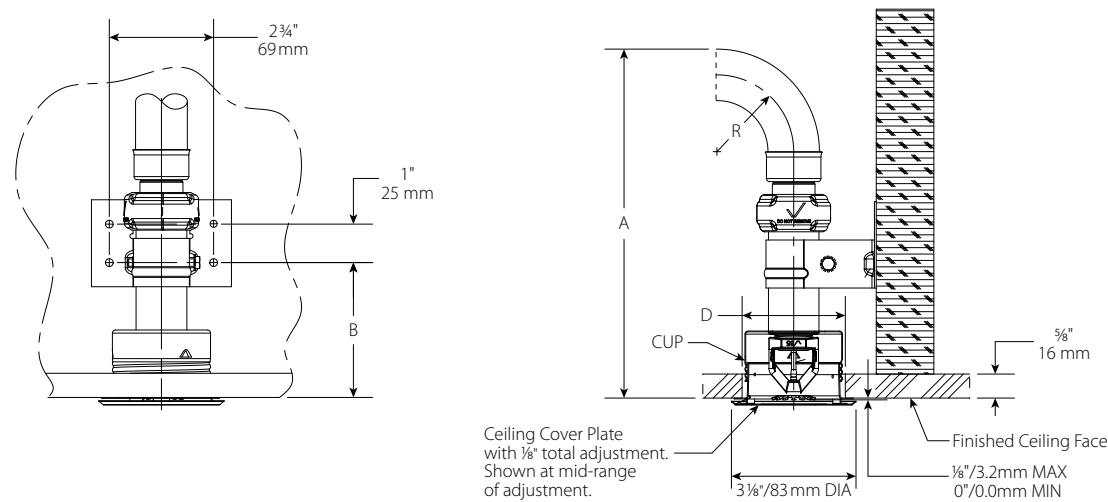
Hose Clearance			
Dimension		inches mm	
R	Bend Radius	2 51	7 178
A	Minimum Required Installation Space	9 1/2 241	14 1/2 369
B	Mounting Screw Hole Location	6 1/4 157	
D	Ceiling Hole Diameter	2 5/8 – 2 3/4 67 – 70	

NOTE

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

4.5 DIMENSIONS

Concealed Pendent Alternative Bracket Location



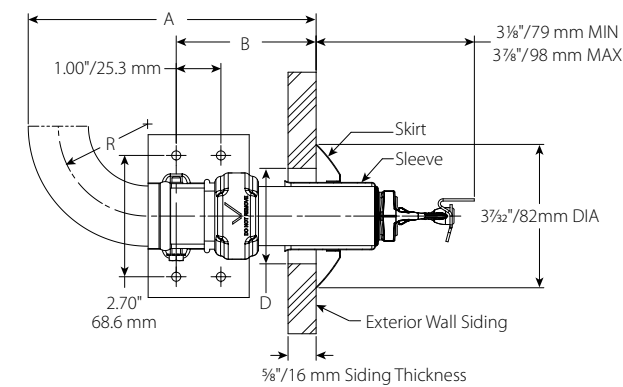
Hose Clearance			
Dimension		inches mm	
R	Bend Radius	2 51	7 178
A	Minimum Required Installation Space	9 1/8 231	14 1/8 358
B	Mounting Screw Hole Location	3 1/2 89	
D	Ceiling Hole Diameter	2 5/8 – 2 3/4 67 – 70	

NOTE

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

4.6 DIMENSIONS

Sleeve and Skirt Sidewall



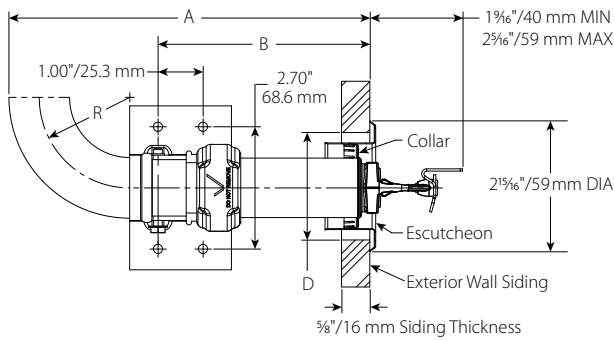
Hose Clearance			
Dimension		inches mm	
R	Bend Radius	2 51	7 178
A	Minimum Required Installation Space	6 1/2 163	11 1/2 290
B	Mounting Screw Hole Location	3 1/8 79	
D	Ceiling Hole Diameter	1 3/4 – 2 1/2 44 – 64	

NOTE

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

4.7 DIMENSIONS

Recessed Sidewall



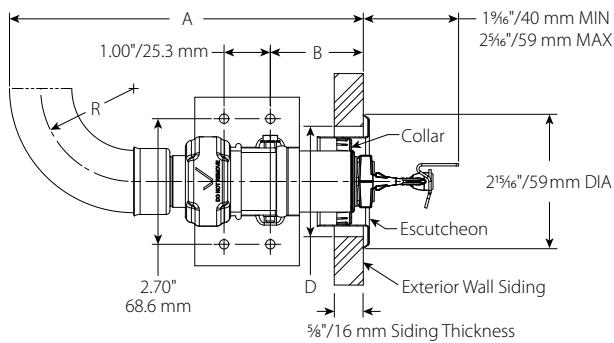
Hose Clearance			
Dimension		inches mm	
R	Bend Radius	2 51	7 178
A	Minimum Required Installation Space	8 203	13 330
B	Mounting Screw Hole Location	4 3/4 119	
D	Ceiling Hole Diameter	2 – 2 3/8 51 – 60	

NOTE

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

4.8 DIMENSIONS

Recessed Sidewall Alternative Bracket Location



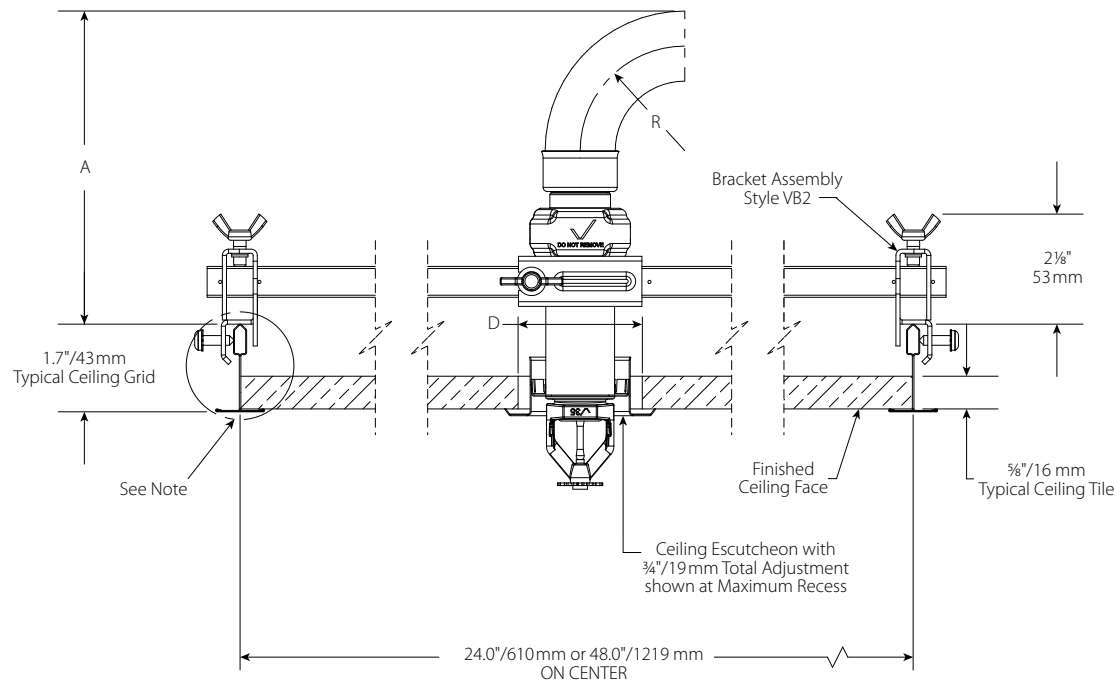
Hose Clearance			
Dimension		inches mm	
R	Bend Radius	2 51	7 178
A	Minimum Required Installation Space	8 203	13 330
B	Mounting Screw Hole Location	2 51	
D	Ceiling Hole Diameter	2 – 2 3/8 51 – 60	

NOTE

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

4.9 DIMENSIONS

VB2 Recessed Pendant



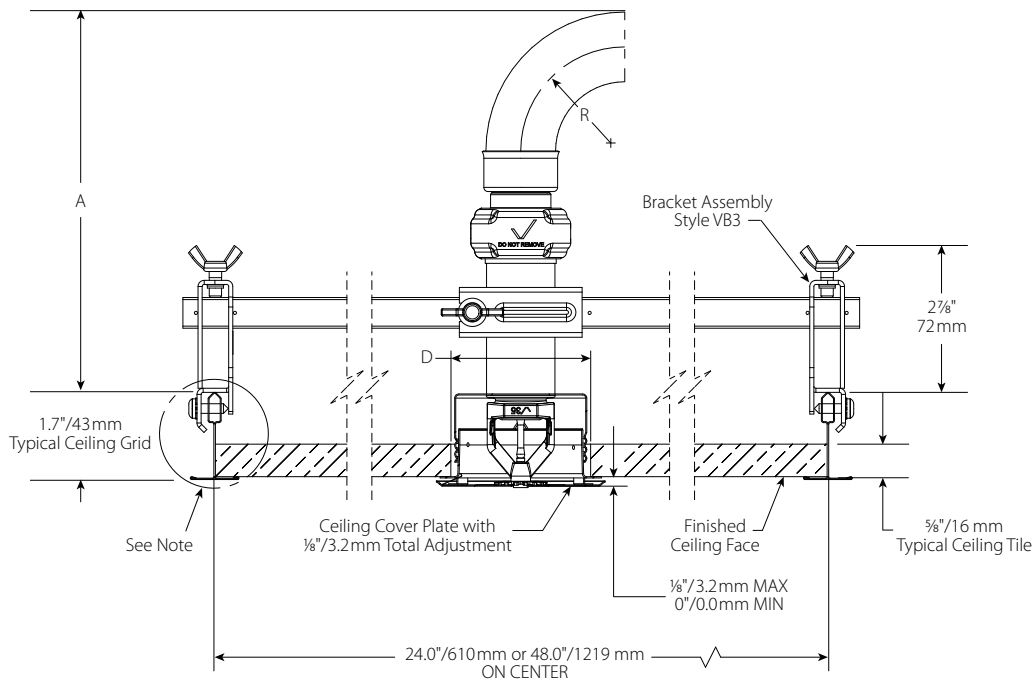
Hose Clearance			
Dimension		inches mm	
R	Bend Radius	2 51	7 178
A	Minimum Required Installation Space	6 1/2 163	11 1/2 290
D	Ceiling Hole Diameter	2 - 2 3/8 51 - 60	

NOTE

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

4.10 DIMENSIONS

VB3 Concealed Pendent



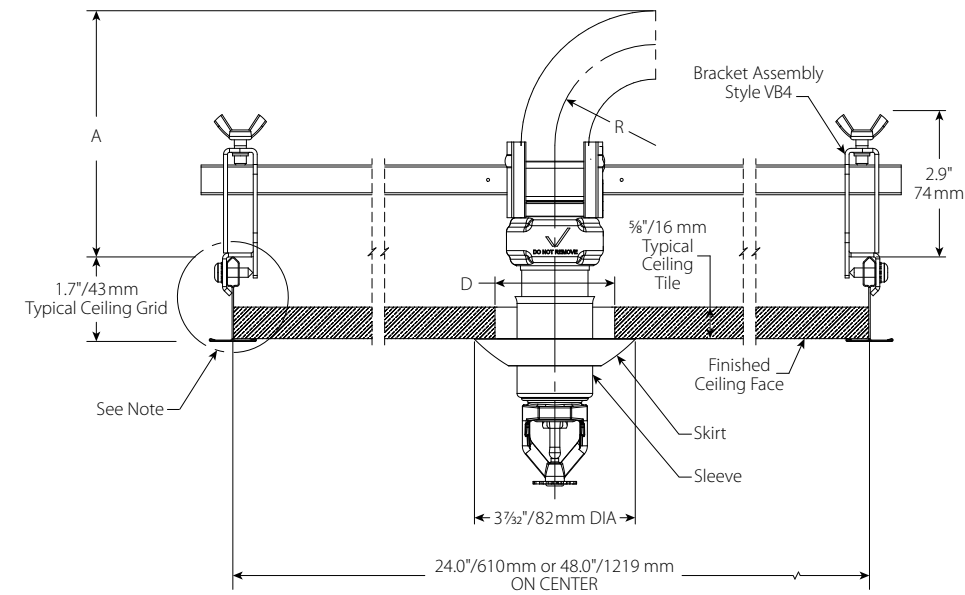
Hose Clearance			
Dimension		inches mm	
R	Bend Radius	2 51	7 178
A	Minimum Required Installation Space	7 5/8 193	12 5/8 320
D	Ceiling Hole Diameter	2 5/8 – 2 3/4 67 – 70	

NOTE

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

4.11 DIMENSIONS

VB4 Sleeve and Skirt Pendent



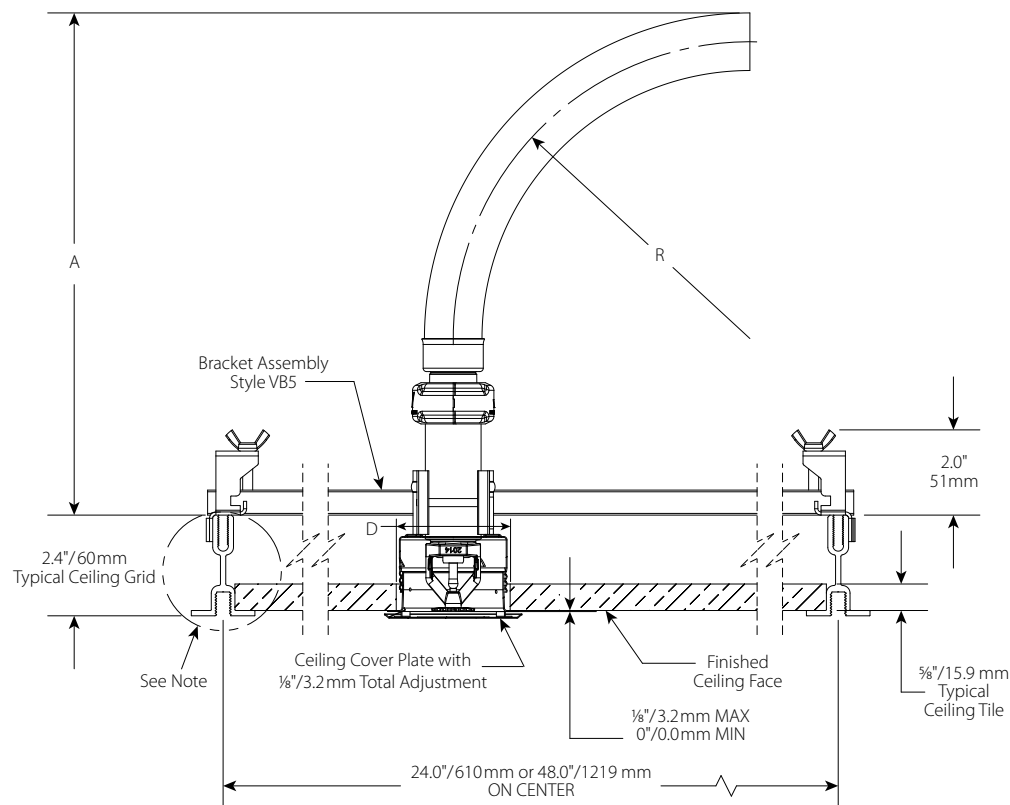
Hose Clearance			
Dimension		inches mm	
R	Bend Radius	2 51	7 178
A	Minimum Required Installation Space	5 127	10 254
D	Ceiling Hole Diameter	1 3/4 – 2 1/2 44 – 64	

NOTE

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

4.12 DIMENSIONS

VB5 Data Center Grid Bracket

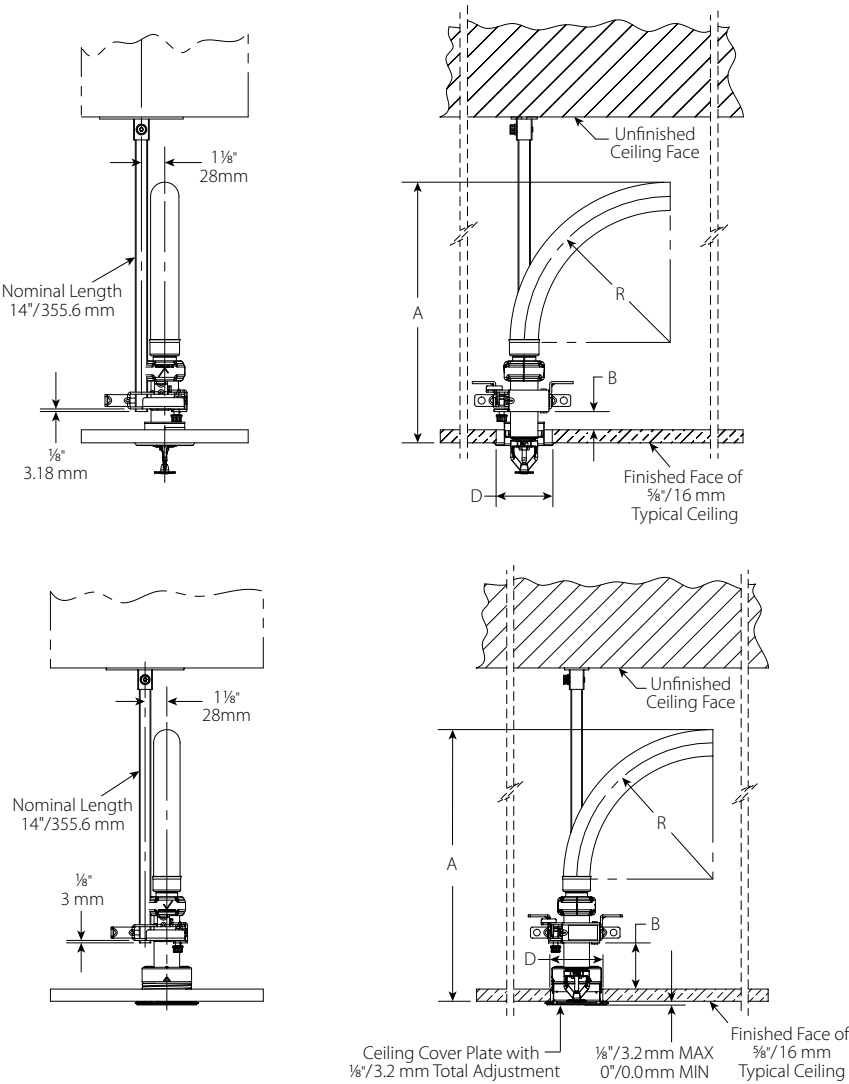


Hose Clearance		
Dimension		inches mm
R	Bend Radius	7 178
A	Minimum Required Installation Space	11.8 300
D	Ceiling Hole Diameter	2 5/8 – 2 3/4 67 – 70

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

4.13 DIMENSIONS

Style VBBA Bracket

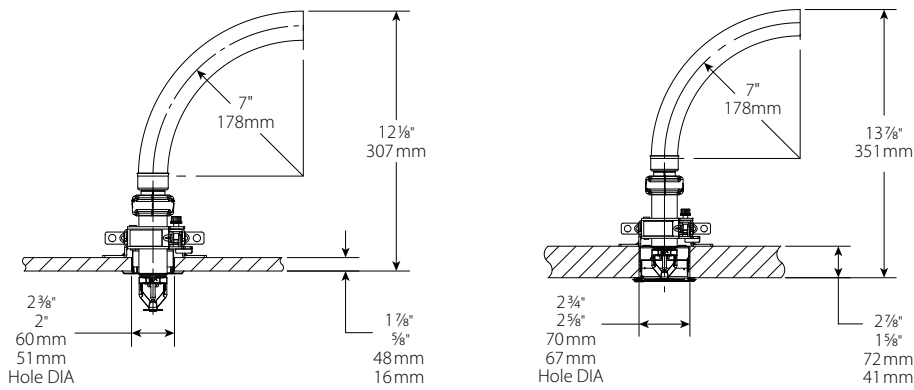


Hose Clearance			
Dimension		Recessed inches mm	Concealed inches mm
R	Bend Radius	7 178	
A	Minimum Required Installation Space	12.5 317	14.0 354
B	Distance from Top of Typical Ceiling Tile to Bottom of Gate	0.9 22.8	2.4 61.0
D	Ceiling Hole Diameter		2 5/8 – 2 3/4 67 – 70

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

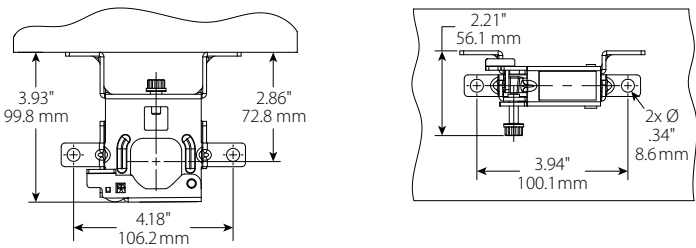
4.14 DIMENSIONS

Style VBBA Bracket



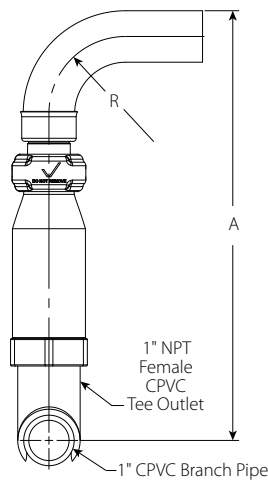
Stand-off Dimensions

Style VBBA Bracket



4.15 DIMENSIONS

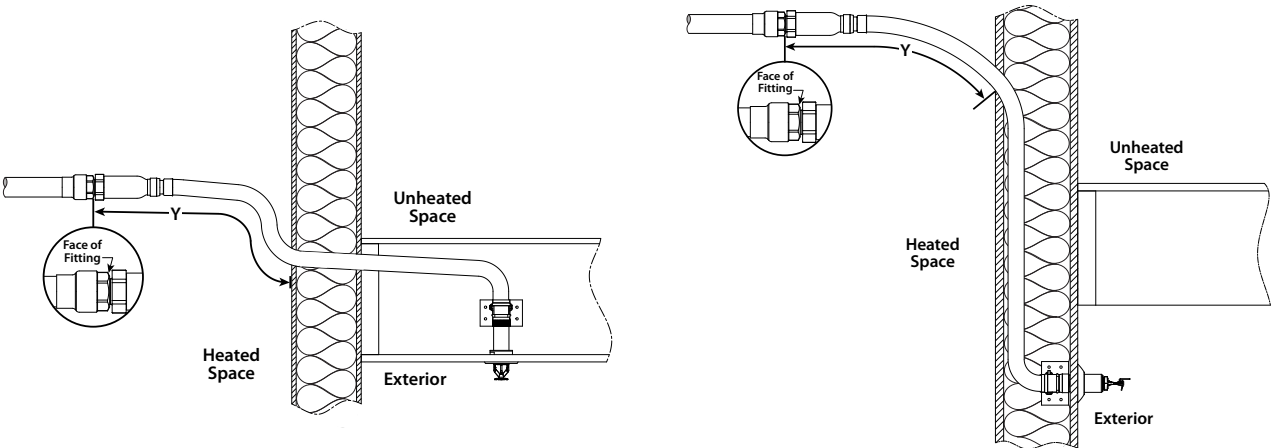
Branchline Clearances



Hose Clearance			
Dimension		inches mm	
R	Bend Radius	2 51	7 178
A	Minimum Required Installation Space	11.2 284	16.2 411

5.0 PERFORMANCE

Freeze Protection



Ambient Temperature Exposed to Discharge End of Sprinkler °F °C	Exposed Minimum Barrel Length "Y"		
	inches mm		
	40°F/4°C	50°F/10°C	60°F/16°C
40 4	0 0	0 0	0 0
30 -1	0 0	0 0	0 0
20 -7	4 100	0 0	0 0
10 -12	8 200	1 25	0 0
0 -18	12 300	3 75	0 0
-10 -23	14 350	4 100	1 25
-20 -29	14 350	6 150	3 75
-30 -34	16 400	8 200	4 100
-40 -40	18 450	8 200	4 100
-50 -46	20 500	10 250	6 150
-60 -51	20 500	10 250	6 150

NOTE

- Exposed minimum barrel lengths are inclusive up to 30-mph/48-kph wind velocities.

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.

Failure to follow these instructions could result in death or serious personal injury and property damage.

- These products shall be used only in fire protection systems that are designed and installed in accordance with current, applicable National Fire Protection Association (NFPA) standards, or equivalent local and national fire protection standards, and in accordance with applicable building and fire codes. These standards and codes contain important information regarding protection of systems from freezing temperatures, corrosion, mechanical damage, etc.
- The installer shall understand the use of this product and why it was specified for the particular application.
- The installer shall understand common industry safety standards and potential consequences of improper product installation.
- It is the system designer's responsibility to verify suitability of materials for use with the intended fluid media within the piping system and external environment.
- The material specifier shall evaluate the internal and external effect of chemical composition, pH level, operating temperature, chloride level, oxygen level, and flow rate on materials to confirm system life will be acceptable for the intended service.
- It is the responsibility of the owner of a building or their authorized agent to provide the sprinkler system installer with any knowledge that the water supply might be contaminated with or conducive to the development of microbiologically influenced corrosion (MIC), including as required by NFPA 13. Failure to identify adverse water quality issues may affect the *VicFlex* product and void the manufacturer's warranty.

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.

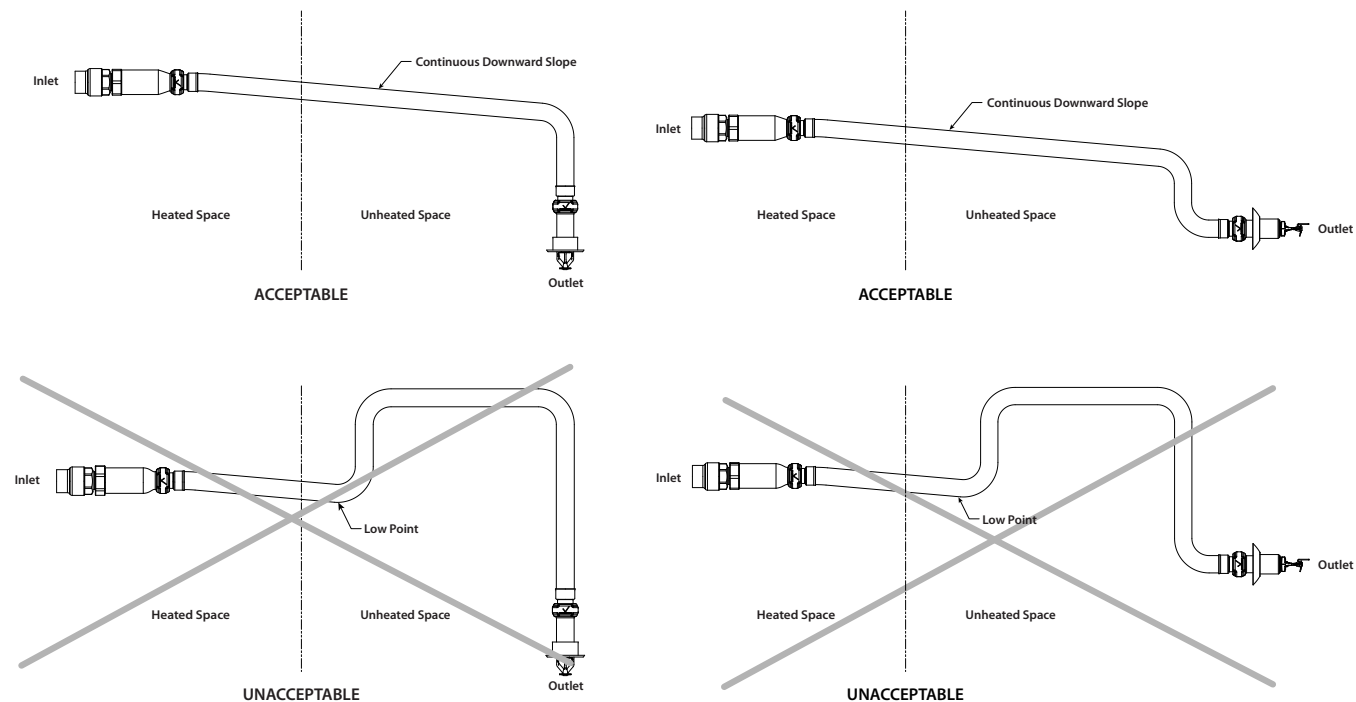
DO NOT paint, coat, or firestop the outlet/inlet portion of the Series FL/VS1 Dry Sprinkler. Braided hose and fitting portions of the Series FL/VS1 Dry Sprinkler may be painted/coated or caulked around, including fire barrier sealant, provided that the substance is compatible with stainless steel and zinc-plated carbon steel or ductile iron. Care shall be taken to ensure that the sprinkler and associated components do not come into contact with paint/coatings and caulking.

Series FL/VS1 Dry Sprinklers that penetrate through non-fire rated gypsum wall (drywall) will function as designed, provided the components are installed in accordance with the respective installation instructions referenced in this document.

6.0 NOTIFICATIONS (CONTINUED)

Important Installation Notes

1. Shall be installed only in accordance with NFPA 13 Standard for the Installation of Sprinkler Systems and applicable FM Data Sheets.
2. Install and tighten swivel hex nut at inlet of sprinkler fitting only.
3. Do not remove deflector or inlet end of sprinkler.



6.0 NOTIFICATIONS (CONTINUED)

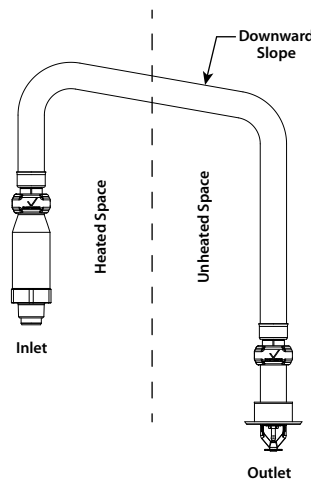
FOR DRY SYSTEMS ONLY:

- The Series FL/VS1 Dry Sprinkler's inlet shall be installed only into the outlet of a fitting (excluding elbows) or welded outlet that meets the dimensional requirements of ANSI B16.3 and ANSI B16.4, Class 125 and Class 150. Use a sample fitting to confirm proper engagement and to verify that there is no interference between the sprinkler and the fitting.

Series FL/VS1 Dry Sprinklers in an unheated space shall be installed with a continuous downward slope along its entire length from the branch line fitting to the sprinkler. No localized low points shall be present along the length of the Series FL/VS1 Dry Sprinkler.

Series FL/VS1 Dry Sprinklers in an unheated space are not permitted to be installed into the top of the branch line piping. Series FL/VS1 Dry Sprinklers shall be installed into the side or from the bottom of the branch line piping.

In a heated space, if a portion of the Series FL/VS1 Dry Sprinkler is installed from the top of a branch line and then extends into an unheated space, it shall be installed with a continuous downward slope along the entire length from the inside wall to the outlet of the sprinkler. No localized low points shall be present along the length of the sprinkler in the unheated space. Refer to the drawing below.



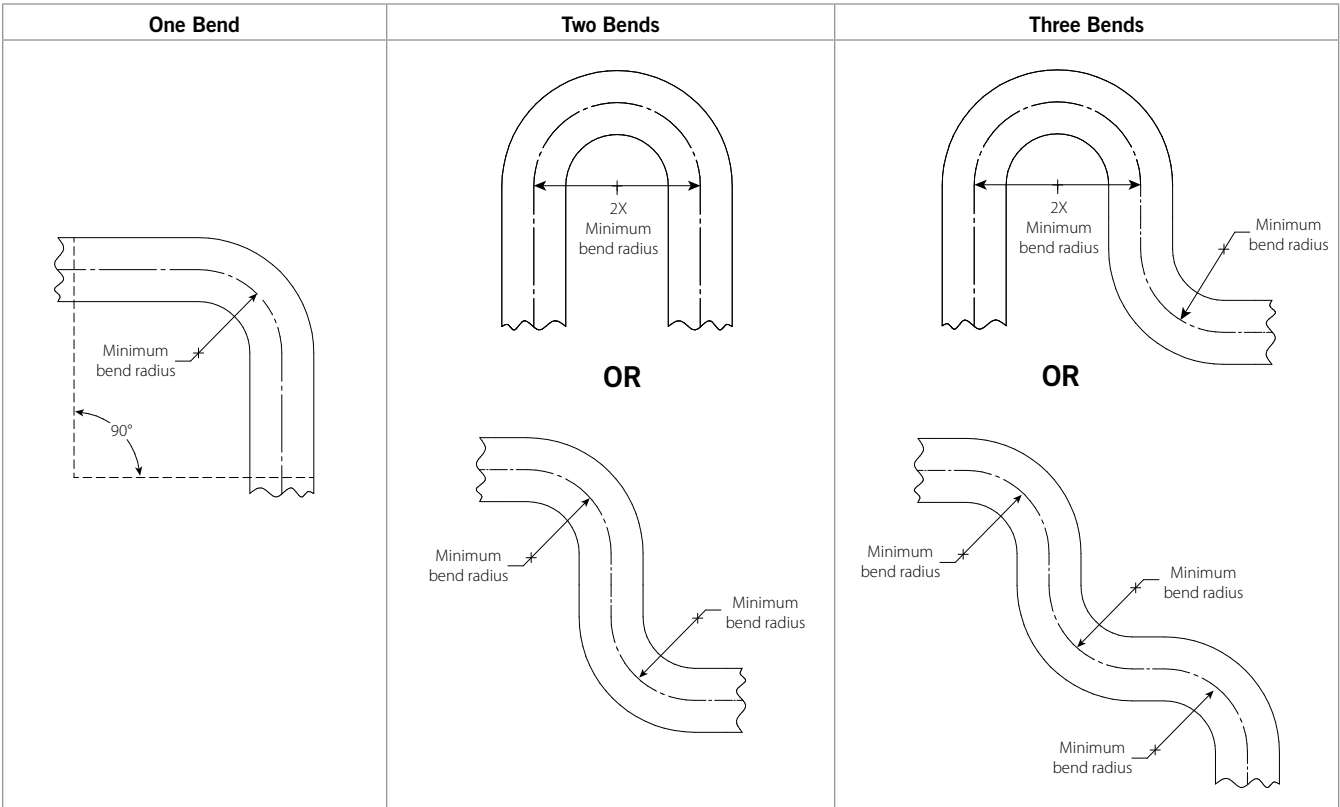
FOR WET SYSTEMS ONLY:

- DO NOT** install Series FL/VS1 Dry Sprinklers into any threaded elbow, threaded-by-thread coupling, or fitting that interferes with thread penetration. The inlet of the Series FL/VS1 Dry Sprinkler **SHALL NOT** bottom out in the fitting. Use a sample fitting to confirm proper engagement.
- To ensure unobstructed flow during operation, the Series FL/VS1 Dry Sprinkler shall be installed into a fitting that will prevent water and debris from accumulating at the dry sprinkler's inlet.

In a heated space, if a portion of the Series FL/VS1 Dry Sprinkler extends into an unheated space, it shall be installed with a continuous downward slope along the entire length from the inside wall to the outlet end of the dry sprinkler. No localized low points shall be present along the length of the sprinkler in the unheated space. Refer to the drawing above.

- Verify that the exposed minimum barrel length in the heated space is measured and maintained in accordance with the [table on page 1](#).

7.0 REFERENCE MATERIALS



NOTE
For out-of-plane (three-dimensional) bends, care must be taken to avoid imparting torsional stress on the sprinkler.

VicFlex™ Maximum Load Values

Series FL-DRY/VS1 with 24" Bracket

Length inches / mm	Total Load		Max. Uniform Load	
	lb	N	lb/linear ft	N/linear m
38 / 965	5.5	24.5	2.8	40.2
50 / 1270	5.9	26.2	3.0	43.0
58 / 1473	6.2	27.6	3.1	45.3

Series FL-DRY/VS1 with 48" Bracket

Length inches / mm	Total Load		Max. Uniform Load	
	lb	N	lb/linear ft	N/linear m
38 / 965	6.8	30.2	1.7	24.8
50 / 1270	7.2	32.0	1.8	26.2
58 / 1473	7.5	33.4	1.9	27.4

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

- Series FL-DRY/VS1 sprinkler
- Bracket assembly (any applicable Victaulic bracket model of the relevant associated size)

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

Suspension System	Actual Length	Min. Allowable Uniform Load	
	ft/m	lb/linear ft	N/linear m
Direct Hung	Light	5	75.7
	Intermediate	12	181
	Heavy	16	241.7

SUMMARY: All direct-hung suspension system duty classifications per ASTM C 635 are able to withstand the maximum water-filled weight of the *VicFlex* Series FL-DRY/VS1 and bracket.

7.0 REFERENCE MATERIALS

VICTAULIC VICFLEX™ STYLE VS1 DRY SPRINKLER ORDER FORM

SHIP TO:

Name:	Date of Order:
Address:	Purchase Order:
City:	Ship Via:
State/Prov.:	Tag:
Zip/Postal Code:	Signature*:

* I agree to purchase the dry sprinklers specified on this form, which are NON-RETURNABLE & NOT CANCELLABLE.

PART CODE CONFIGURATOR: Configure the part code with options from chart below. DO NOT circle pipe order lengths and increments. Input appropriate length and quantity for each in the chart below. Please attach additional forms if extra ordering space is needed. Separate forms must be completed for each configuration ordered.

A	3F					4					
Class	Style	Connection	Deflector	Temperature	Response	K-Factor	Sprinkler Finish	Escutcheon Finish	Flexible Sprinkler Length	Escutcheon Style	
A = VicFlex™	3F = V35	3 = 1" NPT 8 = 25mm BSPT	B = Pendent C = Horizontal Sidewall P = Concealed	A = 135°F/57°C C = 155°F/68°C E = 175°F/79°C F = 200°F/93°C J = 286°F/141°C	Q = Quick S = Standard	4 = 5.6K	4 = White (RAL 9010) ¹ N = VC-250 ^{2,3} B = Black ¹	X = Stainless Steel W = White (RAL 9010) Painted Stainless Steel O = Concealed, No Escutcheon ^{2,4} Y = Black Painted Stainless Steel	380 = 38" 500 = 50" 580 = 58"	12 = Recessed 13 = Sleeve & Skirt 15 = Concealed	

1 Not available with Deflector P = Concealed.
2 Deflector P = Concealed is only available with Sprinkler Finish N = VC-250 Coating and Escutcheon Finish O = Concealed, No Escutcheon.
3 VC-250 coating is only available with stainless steel escutcheons. UL and FM approved corrosion resistant coating, and VdS and LPCB recognized and approved alternate coating. Appears chrome in color.
4 Coverplates sold separately.

Total Sprinklers with specs identical to part code configuration above

Send completed order form to pic@victaulic.com

BRACKET SELECTION: Input quantity for each bracket size.

Style	Size	Victaulic Part No.	Boxes (5 Brackets per Box)
Style VB1: Wood and metal stud or joist	—	A000000SLV	
Style VB2: Recessed pendent, suspended lay-in tile ceilings	24"	A24TBAR000	
	48"	A48TBAR000	
	24"	A240AQVB3	
Style VB3: Concealed pendent, suspended lay-in tile ceilings	48"	A480AQVB3	
	24"	A240VB4VS1	
Style VB4: Sleeve and skirt pendent, suspended lay-in tile ceilings	48"	A480VB4VS1	
	24"	A240VB5001	
Style VB5: Data center ceilings, wood and metal stud or joist	48"	A480VB5001	
Style VBBA: For suspended, exposed and hard-lid ceilings, allows for above mount and cantilever mount	—	A000VBA001	

SF-DRYSPRINKLERS 17227 REV J 01/2025
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7.0 REFERENCE MATERIALS (CONTINUED)

[29.01: Victaulic Terms and Conditions of Sale](#)

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

User Responsibility for Product Selection and Suitability

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

Installation

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

Warranty

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

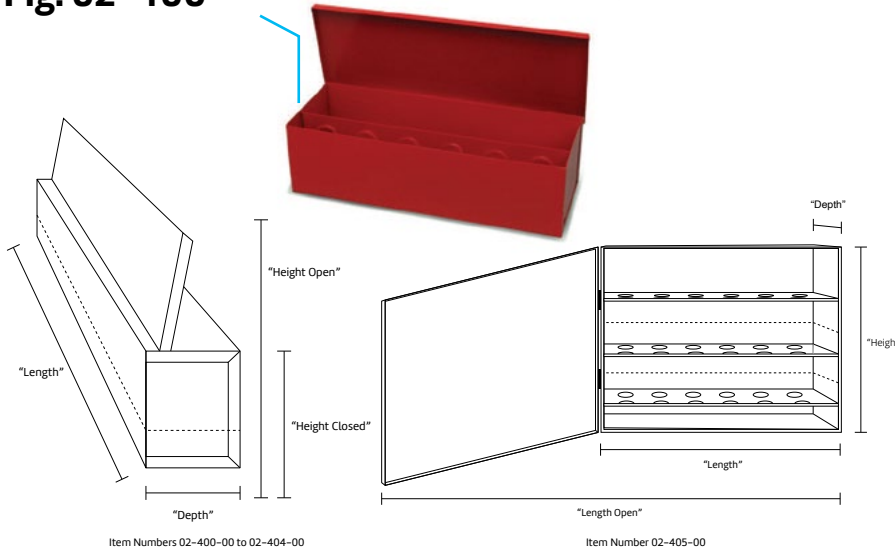
Intellectual Property Rights

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

Note

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

Spare Sprinkler Head Storage Cabinet Fig. 02-400



Specifications

Material:

Steel – 22 Gauge

Finish:

Red enamel

Styles:

3 Spare sprinklers, 1/2" or 3/4"
6 Spare sprinklers, 1/2" or 3/4"
6 Spare, ESFR, 1/2", 3/4" or 1"
12 Spare sprinklers 1/2" or 3/4"
24 Spare sprinklers
36 Spare sprinklers

Cabinet Type	Length	Depth	Height	Height (open)
12 head cabinet (02-400-00)	14 1/4"	4"	5 1/4"	10 7/16"
6 head cabinet (02-401-00)	14 1/4"	2 7/16"	5 1/4"	10 1/4"
3 head cabinet (02-402-00)	7 6/16"	2 1/2"	5 1/4"	10 1/4"
ESFR cabinet 6 head (02-403-00)	14 1/4"	3 3/16"	6 1/2"	12 3/4"
24 head cabinet (02-404-00)	14 1/4"	4"	8 7/16"	17"
36 head cabinet (02-405-00)	12 5/18"	4"	11 3/4"	26 11/16" (Length open)

Description

Fire Protection Products, Inc. Spare Sprinkler Head Cabinets are designed to allow for spare sprinkler head storage as required by NFPA guidelines. The Spare Sprinkler Head Cabinets are available in six configurations. Three head, six head, six head ESFR, twelve head, twenty-four head, and thirty-six head. All six styles are manufactured with "knockouts" to accommodate the most common size sprinklers. The shelf is positioned to allow for the storage of a typical sprinkler head wrench. Each cabinet is finished in red enamel. Each spare head cabinet comes with a hinged door which remains closed to protect the spare sprinklers from the elements and features holes on the back panel to allow for attachment to most surfaces utilizing the appropriate fasteners. Not intended for exposed or harsh environments.

Installation

Select the correct Spare Sprinkler Head Cabinet in accordance with the Automatic Sprinkler Systems Handbook. As per the 1989 Edition the correct number of spare sprinkler is as follows:

0-300 sprinklers, not less than 6; 300-1000, not less than 12; 1000 or more, not less than 24. Stock of spare sprinklers shall include all types and ratings installed.*

Once the correct Spare Sprinkler Head Cabinet has been selected, installation is accomplished by inserting the correct fastener in each of the holes inside the cabinet, securing the cabinet securely to the wall. Insert the correct number and type of sprinklers in accordance with the "handbook".

*Final determination is subject to approval by the AHJ.



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

**The following nameplates shall comply
with Division 21 - Fire Suppression Specs**

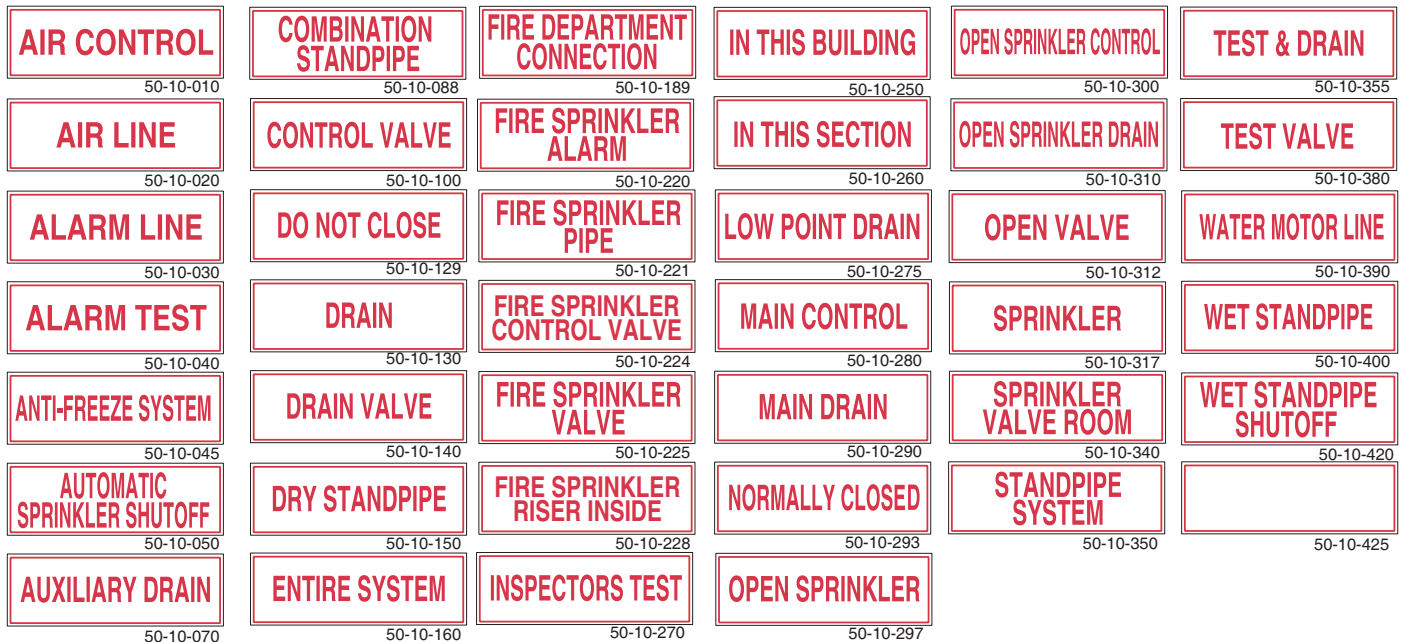
SPRINKLER IDENTIFICATION SIGNS

ALUMINUM



- Designed to mark Fire Sprinkler Components
- .0285" (21 gauge) White Aluminum Printed with Bright Red Fade Resistant Ink
- Holes in each Corner for easy installation
- Designed in accordance to NFPA requirements

6"x 2"



.020 Aluminum • Holes drilled in corners • Zinc Plated Sign Chain Available

6"x 4"



System No.		Location		Spec Section		Paragraph	
Submitted By		Date		Approved		Date	

SPRINKLER IDENTIFICATION SIGNS

ALUMINUM



5" x 7" Hydraulic Calc Signs

Bright Red Background with White Copy and Boxes

Available in Three different styles:

- .020 Aluminum with holes drilled in corners
- Available Personalized

HYDRAULIC-SYSTEM

This building is protected by a Hydraulically Designed Automatic Sprinkler System

Location

No. of Sprinklers

Basis of Design

1. DENSITY GPM/SQ.FT.

2. DESIGNED AREA OF DISCHARGE SQ.FT.

System Demand

1. GPM DISCHARGE GPM

2. RESIDUAL PRESSURE AT THE BASE OF THE RISER PSI

5010240

Hydraulically Calculated System

This system as shown on company print no. dated for at cont. no.

is designed to discharge at a rate of gpm (liters per sq ft (m2) of floor area over a maximum area of sq ft (m2) when supplied with water at the rate of gpm (liters) at psi (bars) at the base of the riser.

Hose stream allowance of gpm (liters) is included in the above.

Occupancy classification

Commodity classification

Maximum storage height

Installed by:

5040240-NFPA

9" x 7" Signs

THIS VALVE CONTROLS SUPPLY TO AUTOMATIC SPRINKLERS

MUST BE OPEN AT ALL TIMES

TO BE HANDLED ONLY BY AUTHORIZED PERSON OR BY EMPLOYEE CARING FOR SPRINKLER SYSTEM

IN CASE OF FIRE DO NOT SHUT VALVE UNTIL FIRE IS ENTIRELY OUT! WHEN VALVE IS SHUT FOR EMERGENCY-REPAIRS-OR FIRE-NOTIFY

REQUEST DIRECTIONS - RESTORE PROTECTION QUICKLY

50-10-120

SPRINKLER FIRE-ALARM

WHEN BELL RINGS CALL FIRE DEPT. OR 911

50-10-171

THIS VALVE CONTROLS STANDPIPE

MUST BE OPEN AT ALL TIMES

TO BE HANDLED ONLY BY AUTHORIZED PERSON OR BY EMPLOYEE CARING FOR SPRINKLER SYSTEM

IN CASE OF FIRE DO NOT SHUT VALVE UNTIL FIRE IS ENTIRELY OUT! WHEN VALVE IS SHUT FOR EMERGENCY-REPAIRS-OR FIRE-NOTIFY

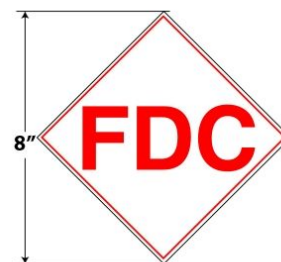
REQUEST DIRECTIONS - RESTORE PROTECTION QUICKLY

50-10-351

SPRINKLER CONTROL VALVE

50-10-322

FDC Signs



See Argco.com for full selection and sizes

System No.		Location		Spec Section		Paragraph	
Submitted By		Date		Approved		Date	

SPRINKLER IDENTIFICATION SIGNS



12" x 10" Signs

AUTOMATIC SPRINKLER IN GARAGE ONLY 50-10-046	AUTOMATIC SPRINKLER IN BASEMENT ONLY 50-10-047	AUTOMATIC SPRINKLER SHUT-OFF VALVE LOCATED ____ FT. OPPOSITE THIS SIGN 50-10-048	AUTOMATIC SPRINKLER SHUT-OFF 50-10-060
SIAMESE CONNECTION FOR FIRE DEPT. 50-10-315	SPRINKLER CONTROL VALVE 50-10-323	SPRINKLER FIRE ALARM 50-10-331	SPRINKLERS THROUGHOUT BUILDING 50-10-333
STANDPIPE 50-10-345	STANDPIPE SHUT-OFF 50-10-360	Zinc-Plated Sign Chain 100 ft. box (50-99-100) 	

Miscellaneous Signs

FIRE HOSE IN OTHER STAIRWAY 8" x 3" 5010214	FIRE STANDPIPE IN OTHER STAIRWELL 8" x 3" 5010227	COLD WEATHER VALVE 8" x 3" 5010081	 FDC Wallplate cast aluminum: 6510330 plastic: 6510340
SPRINKLER DRAIN VALVE 12" x 6" 50-10-329	AUTOMATIC SPRINKLER ALL FLOORS 12" x 6" 5010061	 6" Round Aluminum Bell Sign 5010172	
FIRE DEPARTMENT CONNECTION Cast Aluminum 8" x 4" 50-10-195	FIRE HOSE 12" x 4" 5010217	SPRINKLER VALVE ROOM 24" x 12" 5010342	

System No.		Location		Spec Section		Paragraph	
Submitted By		Date		Approved		Date	

SPRINKLER IDENTIFICATION SIGNS PERSONALIZED ALUMINUM



The best way to advertise on the jobsite

- Designed to mark Fire Sprinkler Components
- .0285" (21 gauge) White Aluminum Printed with Bright Red Fade Resistant Ink
- Available as generic signs or personalized with Company Name & Logo
- Holes in each Corner for easy installation
- Designed in accordance to NFPA requirements
- Made in USA



Personalized Decals, Inspection
Tags and Gauges also available.

Allow 4-6 weeks delivery from artwork
approval date.



System No.		Location		Spec Section		Paragraph	
Submitted By		Date		Approved		Date	

PIPE

Schedule 10 and Schedule 40

FM Approved and UL Listed Sprinkler Pipe

Bull Moose Tube Company is a recognized producer of quality pipe products. Our Schedule 10 and Schedule 40 are FM Approved and UL Listed (for U.S. and Canada), even though these products do not require separate approvals and listings. Bull Moose Tube made the decision to have them approved and listed for your peace of mind. Our Sch. 10 and Sch. 40 have been through the same rigorous testing as our other fine pipe products.

Bull Moose Tube's Sch. 10 and Sch. 40 pipes are made to ASTM A135 and ASTM A795. These products are typically supplied with our protective coating but can be supplied without the coating so they can be hot-dip galvanized to meet FM requirements for use in dry systems in accordance with the zinc coating specifications of ASTM A795 or ASTM A53. All Schedule 10 and Schedule 40 pipe has a pressure rating of 300 PSI.

Schedule 10 Pipe

Nominal Pipe Size (in)	Nominal O.D. (in)	Nominal I.D. (in)	Weight/Ft	Bundle Size
1	1.315	1.097	1.41 lbs/ft	91
1 1/4	1.660	1.442	1.81 lbs/ft	61
1 1/2	1.900	1.682	2.09 lbs/ft	61
2	2.375	2.157	2.64 lbs/ft	37
2 1/2	2.875	2.635	3.53 lbs/ft	30
3	3.500	3.260	4.34 lbs/ft	19
4	4.500	4.260	5.62 lbs/ft	19

Schedule 40 Pipe

Nominal Pipe Size (in)	Nominal O.D. (in)	Nominal I.D. (in)	Weight/Ft	Bundle Size
1	1.315	1.049	1.68 lbs/ft	70
1 1/4	1.660	1.380	2.27 lbs/ft	51
1 1/2	1.900	1.610	2.72 lbs/ft	44
2	2.375	2.067	3.66 lbs/ft	30
2 1/2	2.875	2.468	5.80 lbs/ft	30
3	3.500	3.068	7.58 lbs/ft	19
4	4.500	4.026	10.80 lbs/ft	19

PIPE PREPARATION

For proper operation, all pipe surfaces should be cleaned prior to installation. In order to provide a leak-tight seat for the gasket, pipe surfaces should be free from indentations and projections from the end of the pipe to the groove. All loose paint, scale, dirt, chips, grease, and rust must be removed prior to installation. Failure to take these important steps may result in improper coupling assembly, causing leakage. Also, check the manufacturer's instructions for the specific fitting used.



BULL MOOSE TUBE COMPANY

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today at (800) 325-4467 or
(636) 537-2600 in the USA,
or from Canada
call (800) 882-4666



Fire Sprinkler Pipe

Schedule 10 and Schedule 40

Submittal Data Sheet



FM Approved and Fully Listed Sprinkler Pipe

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

Approvals and Specifications

Both products meet or exceed the following standards:

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

Manufacturing Protocols

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

Finishes and Coatings

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

Product Marking

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

SCHEDULE 10 SPECIFICATIONS

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

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

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

SCHEDULE 40 SPECIFICATIONS

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

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

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



SUBMITTAL INFORMATION

PROJECT:

CONTRACTOR:

DATE:

ENGINEER:

SPECIFICATION REFERENCE:

SYSTEM TYPE:

LOCATIONS:

COMMENTS:

☐ BLACK

☐ HOT-DIP GALVANIZED



CPVC Fire Sprinkler Products



Installation
Instructions &
Technical Handbook

BlazeMaster[®]
FIRE PROTECTION SYSTEMS

BlazeMaster[®]

FIRE PROTECTION SYSTEMS



Installation Instructions & Technical Handbook

MAY 2022

IH-1900

***tyco*[®]**

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4 GENERAL DESCRIPTION

INTRODUCTION

This Installation Handbook refers to TYCO CPVC Pipe and Fittings produced by Johnson Controls. TYCO CPVC Pipe and Fittings are produced using BLAZEMASTER CPVC compound. When reference to NFPA Standards is made in this Installation Handbook, the current edition of the relevant code is used. **This Installation Handbook contains the criteria for installation (including system design, handling, and storage) of BLAZEMASTER CPVC piping systems in accordance with the applicable Listing/Approval agencies.** Additionally, this handbook contains general piping practices and other installation suggestions that may not be required to satisfy the applicable Listing/Approval agencies. To differentiate between a requirement and a suggestion, use the following definitions:

SHALL or MUST – The use of the words “shall” or “must” indicates a mandatory requirement of the Listings/Approvals.

SHOULD or MAY – The use of the words “should” or “may” indicates a recommendation that is strongly advised, but not required to meet the Listings/Approvals.

This handbook is intended as a supplement to basic, fundamental knowledge relating to the installation and/or repair of CPVC fire sprinkler systems. Before commencing installation, a user should understand this Installation Handbook and confirm applicable National Fire Protection Association (NFPA) standards, the National Building Code of Canada (as applicable), and local approval and installation requirements for CPVC fire sprinkler systems.

NOTICE

The TYCO CPVC Pipe and Fittings described herein must be installed and maintained in compliance with this Installation Handbook and with the applicable standards of the National Fire Protection Association, in addition to the standards of any authorities having jurisdiction. Failure to do so may impair the performance of the TYCO CPVC Pipe and Fittings.

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

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

Never remove any piping component or modify any piping deficiencies without first depressurizing and draining the system.

▲WARNING

Never use compressed air or nitrogen in lieu of or to replace the required hydrostatic system acceptance testing. Any pre-testing performed with low pressure air or nitrogen should follow the recommendations on Page 65. System failure when using high-pressure compressed air or nitrogen may result in property damage, serious injury, or death.

ADVANTAGES

TYCO CPVC Pipe and Fittings are designed specifically for fire sprinkler systems and provide the following advantages over traditional sprinkler piping systems:

- Increased hydraulic capabilities (C-Factor =150)
- No pre-cutting and expensive fabrication required
- Pipe, Slip Style Fittings and Rapid Seal Adapter (RSA) threaded sprinkler connection fittings - NSF-pw listed for use in pressure rated potable water piping systems
- Can easily be connected to other sprinkler piping systems
- Flexibility in the piping for greater ease of installation
- Resistant to rust, scale, and foreign contaminant build up
- Inexpensive tools required for installation
- Easily repaired or modified on site
- Easily transported and handled
- Resists sweating and condensation

TRAINING AND DEMONSTRATION

Johnson Controls strongly recommends that installers receive hands on demonstration in the proper procedure(s) for installation of BLAZEMASTER fire sprinkler systems. On-site demonstration in proper pipe preparation, solvent cementing, proper handling of CPVC and installation instruction are available from Johnson Controls at no charge. Upon completion of the TYCO demonstration program, Johnson Controls will issue a completion card to the persons successfully finishing the required subject matter. This card is to be carried when working on TYCO CPVC systems. For information about on-site demonstration, contact your local Johnson Controls Distribution Center or your Johnson Controls sales representative.

TRADEMARKS APPEARING IN THIS MANUAL

TYCOregistered trademark of Johnson Controls
 HEAD SETregistered trademark of Johnson Controls
 LFP Antifreeze. registered trademark of Johnson Controls
 BLAZEMASTERregistered trademark of The Lubrizol Corporation
 CAULK AND WALKregistered trademark of The Lubrizol Corporation
 SOFFI-STEEL..... registered trademark of Grice Engineering
 TEFLON registered trademark of Dupont
 OATEY registered trademark of Oatey
 GREAT WHITE registered trademark of Oatey
 CRISCO registered trademark of J.M. Smucker Co.
 FBC SYSTEM COMPATIBLE PROGRAMregistered trademark of
 The Lubrizol Corporation

IMPORTANT

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

6 GENERAL DESCRIPTION

LISTINGS/APPROVALS (WHERE TO USE)

For verification of Listings and Approvals, consult the current UL Fire Protection Equipment Directory, C-UL Products Certified for Canada Directory, Factory Mutual Research Approval Guide, or LPCB List of Approved Fire Security Products and Services Guide.

Johnson Controls manufactures CPVC pipe and fittings using Lubrizol's BLAZEMASTER compound as a licensee of The Lubrizol Corporation.

**UNDERWRITERS LABORATORIES INC. (UL) AND
UNDERWRITERS LABORATORIES INC. (C-UL) FOR USE IN CANADA**
2

TYCO CPVC Pipe and Fittings are UL and C-UL Listed for use in:

- Light Hazard and residential occupancies as defined in the Standard for Installation of Sprinkler Systems, NFPA 13
- Residential occupancies as defined in the Standard for the Installation of Sprinkler Systems in Low-Rise Residential Occupancies up to Four Stories in Height, NFPA 13R
- Residential occupancies as defined in the Standard for Installation of Sprinkler Systems in One and Two Family Dwellings and Manufactured Homes, NFPA 13D
- Air plenums, as defined by the Installation of Air Conditioning and Ventilating Systems, NFPA 90A
- Underground Water Pressure Service, NFPA 24
- System risers in accordance with NFPA 13, 13R, and 13D
- See UL Fire Protection Equipment Directory, categories VIWT and HFYH.
- See C-UL Products Certified for Canada Directory, categories VIWT7 and HFYH7.

TYCO fire sprinkler systems shall be employed in wet-pipe systems only. (A wet pipe system contains water or water and glycerin (anti-freeze solution) and is connected to a water supply so that the water or water and glycerin (anti-freeze solution) will discharge immediately when a sprinkler is opened.)

National Fire Protection Association Standards 13, 13R, 13D and NFPA 24, in addition to the standards of any other authorities having jurisdiction, must be referenced and followed for design and installation requirements in conjunction with this installation handbook.

Concealed Installations (UL)

- In accordance with the UL Listing, protection shall be provided for TYCO CPVC Pipe and Fittings. The minimum protection shall consist of either one layer of 3/8 in. (9,5 mm) thick gypsum wallboard, 1/2 in. (12,7 mm) plywood soffits, or a suspended membrane ceiling with lay-in panels or tiles having a weight of 0.35 pounds per sq ft (1,7 kg per sq m) when installed with metallic grids. For residential occupancies defined in NFPA 13D and 13R, the minimum protection may consist of one layer of 1/2 in. (12,7 mm) plywood.

Listed Quick Response, standard or extended coverage, 225°F (107°C) maximum temperature rated sprinkler or Listed Residential 225°F

8 LISTINGS & APPROVALS

(107°C) maximum temperature rated sprinkler located in accordance with its Listing may be used.

Solvent cement joints shall be made with TFP-500 or TFP-600 One Step Solvent Cement.

Concealed Installations (C-UL)

- In accordance with the C-UL Listing, protection shall be provided for TYCO CPVC Pipe and Fittings. The minimum protection shall consist of either one layer of 9,5 mm thick gypsum wallboard, one layer of 13 mm plywood, or a suspended membrane ceiling with lay-in panels or tiles classified with respect to surface burning characteristics having a mass of not less than 1,7 kg/m² when installed with metallic grids. The effectiveness of this protection can be impaired if penetrated by large openings such as ventilation grills, exhaust fans connected to metal ducts serving washrooms excepted. Where such penetration is present, individual openings exceeding 0,03 m² but not exceeding 0,71 m² in area must be located such that the distance from the edge of the opening to the nearest sprinkler does not exceed 300 mm.

In these cases any Quick or Standard Response, 107°C maximum temperature rated sprinkler or Listed Residential 107°C maximum temperature rated sprinkler located in accordance with its Listing may be used. TYCO CPVC Pipe and Fittings shall not be used where such openings exceed 0.71 m² in area.

Solvent cement joints shall be made with TFP-500 or TFP-600 One Step Solvent Cement.

Installation in Concrete (UL & C-UL)

TYCO CPVC Pipe and Fittings are acceptable for use embedded in concrete. Direct contact with concrete does not have any adverse chemical effect on BLAZEMASTER materials. The following installation practices shall be followed.

- As the TYCO CPVC pipe is laid out it shall not come into contact with sharp objects or edges, such as rocks, metal, or structural members. Any open pipe ends shall be protected from debris or concrete getting into the system.
- When laying out TYCO CPVC pipe it is best to use straight runs of pipe. However, CPVC pipe is inherently ductile and it is possible for CPVC pipe to be snaked when it is laid out. This can be useful in some installations when some offset from a straight run can be helpful in avoiding various construction obstacles. Straight runs of pipe will minimize any stress that is exerted on the pipe. When the pipe is embedded in concrete there is not opportunity to relieve any stress once the concrete is poured. Therefore, it is important to layout the piping such that the stress is minimized from the time of installation. (Refer to Pipe Deflection section for allowable deflection.)
- Avoid the contact of TYCO CPVC Pipe and Fittings with construction materials that are incompatible with CPVC. Verify the suitability of a product for use with CPVC with the manufacturer of the chemical additive to confirm chemical compatibility.

BLAZEMASTER CPVC pipe and fittings have been successfully installed encased in concrete for many years. Lubrizol is unaware of any problems that have been caused by chemical incompatibility between BLAZEMASTER pipe and fittings and concrete or any chemicals that have been added to concrete. Since new construction materials are regularly introduced to the market, however, you may have questions regarding the compatibility of the products you're using. To help ensure a successful installation, Lubrizol recommends contacting the manufacturer of the chemical to confirm chemical compatibility.

- Steps must be taken to prevent the wire mesh or reinforcing bars from causing any abrasion damage to the TYCO CPVC Pipe and Fittings (see Handling and Storage section). This is mostly of concern prior to pouring the concrete. TYCO CPVC Pipe and Fittings shall not be installed directly within concrete that is to be post tensioned. The post tensioning process can create excessive forces which can damage the TYCO CPVC piping system. TYCO CPVC Pipe and Fittings may be installed within a sleeve or protective enclosure that is installed in concrete that is to be post tensioned provided the following conditions are met:
 - TFP Blazemaster CPVC piping cannot be exposed to any stresses associated with post-tensioning concrete process.
 - TFP Blazemaster CPVC piping cannot be exposed to, or be in direct contact with, any chemically incompatible materials.
 - TFP Blazemaster CPVC piping shall have sufficient clearance to prevent direct contact to the sleeve. The system piping may rest on the bottom of the protective sleeve, provided linear movement of the system piping is not restricted.
 - The material of the sleeve or protective enclosure must be of sufficient strength so it does not compress on the TFP Blazemaster CPVC system piping during the concrete pouring/tensioning process.
- When there are pipe joints that will be covered in concrete, the installation shall be pressure tested prior to pouring the concrete. If there will not be any joints covered by concrete, there is no need to pressure test the system prior to pouring the concrete.
- Prior to the pouring of the concrete, the TYCO CPVC pipe shall be intermittently secured to prevent movement during this process. Nonabrasive, plastic fasteners are good choices for this application. When hangers are used, most metal hangers designed for metal pipe are suitable for TYCO CPVC pipe. Do not use undersized hangers. Hangers with sufficient load bearing surface shall be selected based on pipe size (e.g., 1 1/2 in. hangers for 1 1/2 in. pipe). The hanger shall not apply compressive load or have rough or sharp edges that come into contact with the pipe.
- Care shall be taken so that the TYCO CPVC Pipe and Fittings are not damaged by the tools and equipment used to pour and finish the concrete. All standard methods of pouring concrete onto the ceiling construction with concrete pumps or concrete containers followed by compaction with vibrators can be used in combination with TYCO CPVC sprinkler systems. TYCO CPVC Pipe and Fittings shall not come into contact with equipment such as tampers and agitators.

10 LISTINGS & APPROVALS

- As the concrete is poured, assure that the pipe has not moved from its intended positioning.
- Thermal expansion and contraction is not an issue for TYCO CPVC Pipe and Fittings that are embedded in concrete. Those forces are relieved in a manner that does not affect the pipe or fittings. However, expansion and contraction shall be incorporated in the design of those sections of pipe that are not embedded in concrete. Failure to adequately allow for stress at these points may result in damage to the pipe where it enters and exits the concrete.

NOTE: *It is recommended that when transitioning from embedded to not embedded in concrete that 6 in. of 1 in. compatible foam pipe insulation be installed around the embedded pipe.*

Exposed Installation - General (UL & C-UL)

In accordance with the UL and C-UL Listings, TYCO CPVC Pipe and Fittings may be installed without protection (exposed), subject to the following additional limitations:

Note: *NFPA standards permit the omission of automatic sprinklers in areas such as small closets and bathrooms. Where sprinklers are not required, and when approved by the authority having jurisdiction, it is acceptable to install BLAZEMASTER products exposed in these areas.*

Note: *Where piping is required to be mounted directly to the ceiling/wall, the use of listed hangers for thermoplastic sprinkler piping mounted directly to the ceiling/wall is permitted. The resulting clearance between the pipe and the ceiling/wall as a function of using the listed hanger is acceptable.*

Smooth, Flat, Horizontal, Fixed Ceilings - Exposed Installations (UL & C-UL)

• Standard Coverage Sprinklers

- Pendent Sprinklers shall be Listed, Quick Response, 170°F (77°C) maximum temperature rated, sprinklers having deflectors installed within 8 in. (203,2 mm) of the ceiling. The maximum distance between sprinklers shall not exceed 15 ft (4,6 m). Piping shall be mounted directly to the ceiling.
- Upright Sprinklers shall be Listed, Quick Response, 155°F (68°C) maximum temperature rated, installed within 4 in. (101,6 mm) of the ceiling. The maximum distance between sprinklers shall not exceed 15 ft (4,6 m). The maximum distance from the ceiling to the centerline of the main run of pipe shall not exceed 7 1/2 in. (190,5 mm). The distance from the centerline of the sprinkler to the closest hanger shall be 3 in. (76,2 mm).
- Horizontal Sidewall Sprinklers shall be Listed, Quick Response, 200°F (93°C) maximum temperature rated, having deflectors within 12 in. (305,0 mm) of the ceiling and within 6 in. (152,4 mm) of the side wall. The maximum distance between sprinklers shall not exceed 14 ft (4,3 m). Piping shall be mounted directly to the side wall.
- Solvent cement joints shall be made with TFP-500 or TFP-600 One Step Solvent Cement.

• Extended Coverage Sprinklers

- Pendent Sprinklers shall be Listed, Quick Response, 155°F (68°C) maximum temperature rated, having deflectors installed within 8 in. (203,2 mm) of the ceiling. The maximum distance between sprinklers shall not exceed 20 ft (6,1 m) with an application density of at least 0.1 gpm/sq ft (4,1 mm/min). Piping shall be mounted directly to the ceiling.
- Horizontal Sidewall Sprinklers shall be Listed, Quick Response, 165°F (74°C) maximum temperature rated, having deflectors within 12 in. (305,0 mm) of the ceiling and within 6 in. (152,4 mm) of the side wall. The maximum lateral distance between sprinklers shall not exceed 18 ft (5,5 m) with an application density of at least 0.1 gpm/ft² (4,1 mm/min). Piping shall be mounted directly to the side wall.
- Horizontal Sidewall Sprinklers shall be Listed, Quick Response, 175°F (79°C) maximum temperature rated, having deflectors within 12 in. (305,0 mm) of the ceiling and within 6 in. (152,4 mm) of the side wall. The maximum lateral distance between sprinklers shall not exceed 16 ft (4,9 m) with an application density of at least 0.1 gpm/ft² (4,1 mm/min). Piping shall be mounted directly to the side wall.
- When using fittings 1 1/2 in. (DN40) and larger only Schedule 80 fittings may be used.
- Solvent cement joints shall be made with TFP-500 or TFP-600 One Step Solvent Cement.

• Residential Sprinklers

- Pendent Sprinklers when the maximum lateral distance between sprinklers is 15 ft (4,6 m) or less. Sprinklers shall be Listed 170°F (77°C) maximum temperature rated, having deflectors located in accordance with their Listing and not exceeding 8 in. (203,2 mm) from ceiling. The demand for the sprinklers shall be the minimum flow rates indicated in individual listing. Piping shall be mounted directly to the ceiling.
- Pendent Sprinklers when the maximum lateral distance between sprinklers exceeds 15 ft (4,6 m) but does not exceed 20 ft (6,1 m). Sprinklers shall be Listed 155°F (68°C) maximum temperature rated, having deflectors located in accordance with their Listing and not exceeding 8 in. (203,2 mm) from ceiling. The demand for the sprinklers shall be the greater of either the minimum flow rates indicated in individual listing or calculated based on delivering a minimum of 0.1 gpm/sq ft (4,1 mm/min) over the design area in accordance with the provisions of NFPA 13:(2007) Section 11.3.1.2. Piping shall be mounted directly to the ceiling.
- Horizontal Sidewall Sprinklers when the maximum lateral distance between sprinklers is 14 ft (4,3 m) or less. Sprinklers shall be Listed 200°F (93°C) maximum temperature rated having deflectors located in accordance with their Listing. The demand for the sprinklers shall be the minimum flow rates indicated in individual listing. Piping shall be mounted directly to the side wall.
- Horizontal Sidewall Sprinklers when the maximum lateral distance between sprinklers exceeds 14 ft (4,3 m) but does not exceed 18 ft (5,5 m). Sprinklers shall be Listed 165°F (74°C) maximum temperature rated having deflectors 12 in. (305,0 mm) from ceiling and within 6 in.

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Figure 1 - Unfinished Basement, Solid Wood Joists, Center Wall Riser with Center Room Main

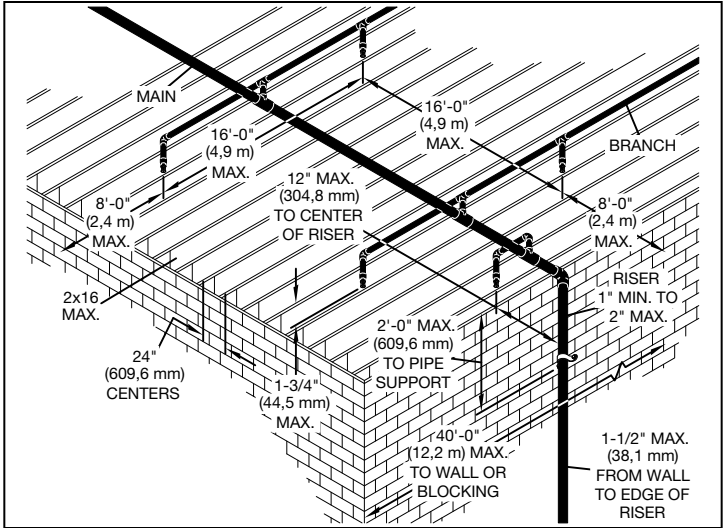


Figure 2 - Unfinished Basement, Solid Wood Joists, Center Wall Riser with Main at Wall

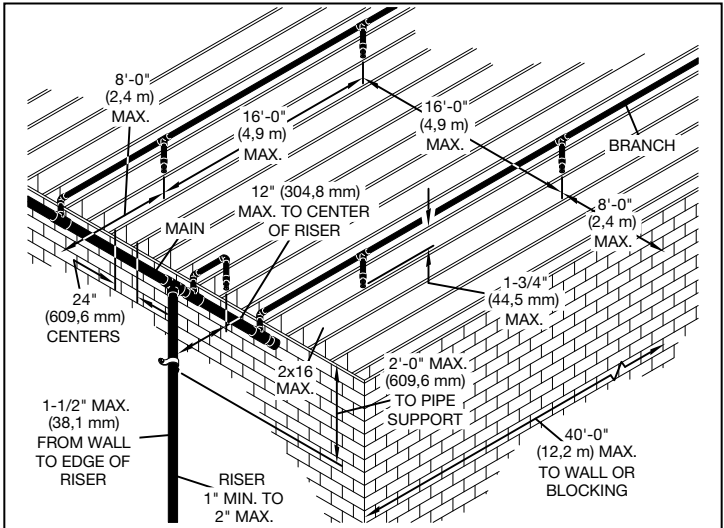
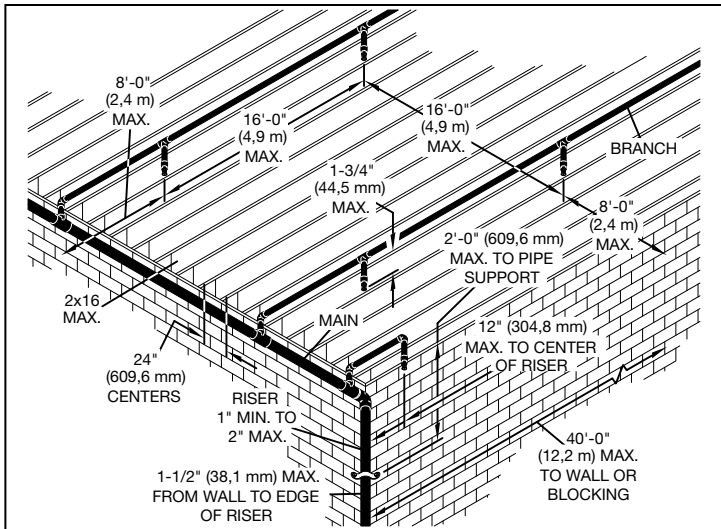
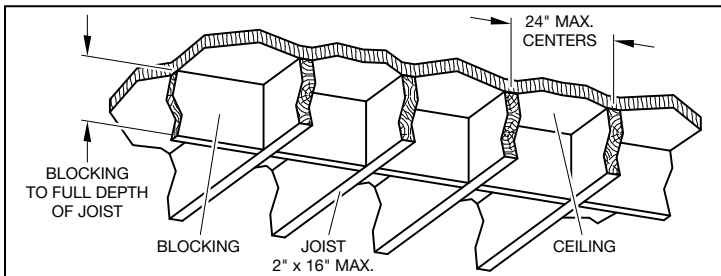
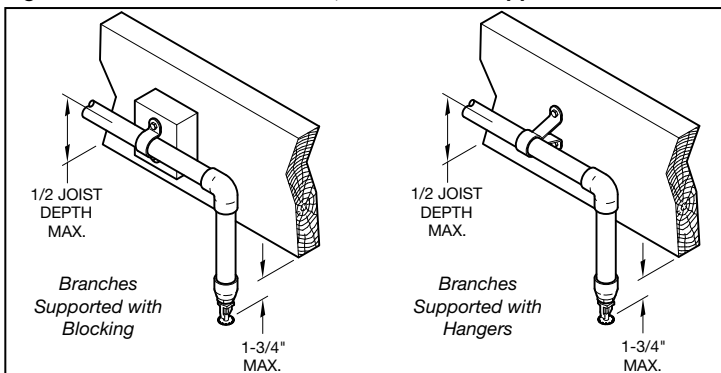


Figure 3 - Unfinished Basement, Solid Wood Joists, Riser in Corner**Figure 4 - Unfinished Basement, Solid Wood Joists, Blocking****Figure 5 - Unfinished Basement, Branch Line Support**

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(152,4 mm) of the wall. The demand for the sprinklers shall be the greater of the minimum flow rates indicated in individual listing or calculated based on delivering a minimum of 0.1 gpm/sq ft (4,1 mm/min) over the design area in accordance with the provisions of NFPA 13:(2007) Section 11.3.1.2. The maximum sprinkler area of coverage shall not exceed 18 ft x 18 ft (5,5 m x 5,5 m). Piping shall be mounted directly to the side wall.

- When applying criteria having a minimum 0.1 gpm/sq ft (4,1 mm/min), Schedule 80 fittings must be used when sizes are 1 1/2 in. (DN40) and larger.
- Solvent cement joints shall be made with TFP-500 or TFP-600 One Step Solvent Cement.

Unfinished Basements - Exposed Installations

Solid and Composite Wood Joists (UL and C-UL)

TYCO CPVC Pipe and Fittings may be installed without protection (exposed) in unfinished basements in accordance with NFPA 13D when subject to the following additional limitations:

- The ceiling shall be horizontal and constructed utilizing solid wood joists or composite wood joists with a nominal depth of 16 in. (406,4 mm) or less on maximum 24 in. (609,6 mm) centers.
- The distance from the floor to the bottom of the joists shall be between 7 ft and 10 ft (2,1 m and 3,0 m).
- Listed residential pendent sprinklers with a maximum temperature rating of 155°F (68°C) and a minimum K-factor of 4.9 are to be used for this type of installation. The maximum sprinkler spacing shall not exceed 16 ft (4,9 m). Lesser areas are also permitted. The system is to be designed based upon the Listed flows for the sprinkler selected except that the flow for a single sprinkler or for multiple sprinklers flowing is to be not less than 13 gpm (49,2 lpm) per sprinkler. The sprinklers are to be installed with their deflectors a maximum of 1 3/4 in. below the bottom of the solid wood or composite wood joists in anticipation of future installation of a finished ceiling. (Refer to NFPA 13D, Section 8.2.4, 2016 Edition.)
- Schedule 80 fittings in the 1 1/2 in. and larger sizes shall be used.
- All solvent cement joints shall be made with One Step Solvent Cement (TFP-500 or TFP-600).
- The maximum length along the joist shall not exceed 40 ft (12,2 m). When the length exceeds 40 ft (12,2 m), blocking shall be utilized. The blocking shall be constructed of minimum 1/2 in. (12,7 mm) plywood, minimum 3/8 in. (9,5 mm) gypsum wallboard or batt insulation with a minimum thickness of 3 1/2 in. (89 mm). These blocking materials shall be the full depth of the joists. When batt insulation is used as blocking, it must be a single piece of insulation. The insulation must be secured in place with metal wire netting which must encase the insulation on both of the exposed sides. The metal wire netting is required to hold the insulation in place and prevent it from being dislodged or repositioned over time. It is acceptable for items such as piping, wires, ducts, etc. to penetrate the blocking. The gap between the item penetrating the blocking and the blocking should be minimized. For installations where the gap exceeds 1/4 in. (6,4 mm), the gap shall be filled with insulation, caulking, or other suitable material.

- When installing TYCO BlazeMaster® CPVC pipe and fittings perpendicular to the joists:
 - System mains installed below the joists shall use listed support devices for thermoplastic sprinkler piping or other listed support devices which mount the piping directly to the bottom of the joists.
 - System mains and branch lines installed through the joists using holes, for support, shall be at or below the center of the depth of the joist. The holes should be oversized to allow for movement and located to not impair the structural integrity of the joists.

CAUTION

When drilling holes in the joists, the structural integrity must be maintained. Consult the Authority Having Jurisdiction (AHJ) or building code for requirements.

- When installing TYCO BlazeMaster® CPVC pipe and fittings parallel to the joists:
 - System mains and branch lines shall be installed in the cavity below the bottom of the ceiling and above the bottom of the joist. The pipe and fittings shall be located at or below the center of the depth of the joist. The pipe shall be installed utilizing listed support devices for thermoplastic sprinkler piping or other listed support devices which mount the piping directly to nominal 2 in. wood blocking or listed support devices for thermoplastic sprinkler piping which offset the pipe a nominal distance of 1 1/2 in. from the joists.

NOTE:

Use of TYCO CPVC Pipe and Fittings is limited to basements where the quantity and combustibility of contents is low and fires with relatively low rates of heat release are expected. For additional information regarding the assembly and installation of TYCO CPVC Pipe and Fittings refer to the manufacturer's installation instructions.

- The instructions shown here for Unfinished Basements with Exposed Solid Wood or Composite Wood Joists require the use of Schedule 80 fittings when sizes are 1 1/2 in. (DN40) and larger.

Use of TYCO CPVC Pipe and Fittings is limited to basements where the quantity and combustibility of contents is low and fires with relatively low rates of heat release are expected.

Combustible Concealed Spaces (UL)

TYCO CPVC Pipe and Fittings are not approved for installation in combustible concealed spaces requiring sprinklers, as referenced in NFPA 13 unless protected by sprinklers specifically Listed for this application. Although NFPA 13R and 13D permit the omission of sprinklers from combustible concealed spaces, TYCO CPVC Pipe and Fittings can be installed in these areas when protecting residential occupancies according to these standards.

For installations where sprinkler pipe runs through an attic space that requires sprinklers per NFPA, CPVC piping shall be protected in order to meet the requirements of its UL and C-UL Listings. Additionally, the authority having jurisdiction shall be consulted prior to any installation of CPVC in attic spaces

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requiring sprinklers. Protection methods and requirements may vary by jurisdiction and are subject to interpretation.

- **Special Use Sprinklers - TYCO Specific Application Attic Sprinklers**
 - **Product Description** - In accordance with the UL Listing, the TYCO Specific Application Sprinklers for Protecting Attics are designed to provide protection of specific light hazard combustible, as well as noncombustible, attic spaces requiring sprinkler protection. The Specific Application Sprinklers for Protecting Attics allow for the use of TYCO CPVC Pipe and Fittings within the attic space and to supply the wet system sprinklers below the ceiling provided the attic space is protected with Specific Application Sprinklers for Protecting Attics.
 - **Installation Requirements** - When using the Specific Application Sprinklers for Protecting Attics, reference Technical Data Sheet TFP610.
- **Special Use Sprinklers - TYCO Specific Application Model CC1, CC2, and CC3 Combustible Concealed Space Sprinklers**
 - **Product Description** - In accordance with the UL Listing, the TYCO Specific Application Model CC1, CC2, and CC3 Combustible Concealed Space Sprinklers are specific application sprinklers designed to provide protection of specific light hazard combustible, as well as noncombustible, concealed spaces requiring sprinkler protection. The Model CC1, CC2, and CC3 Sprinklers in some cases allow for the use of TYCO CPVC Pipe and Fittings within concealed spaces requiring automatic sprinkler protection.
 - **Installation Requirements** - When using the Model CC1, CC2, and CC3 Sprinklers, reference Technical Data Sheet TFP630, TFP632, and TFP633 respectively.

Residential Dry Pipe Systems (UL)

In accordance with the Underwriters Laboratories Inc. (UL) Listing, TYCO CPVC Fire Sprinkler Pipe and Fittings made with BLAZEMASTER compound may be installed in Dry Pipe Systems for Residential Occupancies when subject to the additional limitations listed in this section.

- **Acceptable Residential Occupancies are defined as follows:**
 - Concealed (protected) installations in residential sprinkler systems for one- and two- family dwellings and manufactured homes per NFPA 13D.
 - Residential sprinkler systems for residential occupancies up to and including four stories in height per NFPA 13R.
 - Residential portions of any occupancy per NFPA 13 where calculations for Dry Pipe System water delivery are based on the hazard shown in Table A using a calculation program listed by a nationally recognized laboratory or obtained where the system design specifies that water is delivered to the system test connection in not more than 15 seconds for Residential Occupancies, starting at normal air pressure on the system.
- Residential sprinklers used in conjunction with TYCO CPVC Fire Sprinkler Pipe and Fittings in Dry Pipe Systems shall be specifically listed for such use.
- The TYCO CPVC Sprinkler Head Adapter Tee (P/N 80259) is to be used with

dry-type residential pendent sprinklers in dry pipe system installations.

- Dry Pipe Systems in areas subject to freezing shall be pitched at least 1/4 in. or 1/2 in. per 10 ft (2 mm/m) in accordance with the appropriate NFPA standard being utilized.
- Upon completion of the assembly and cure, the system shall be hydrostatically tested in accordance with the procedures described in the CPVC Installation Handbook (IH-1900).
- TYCO CPVC Fire Sprinkler pipe and fittings used in Dry Pipe Systems may not be used in combination with other thermoplastic piping systems unless specifically listed for use in Dry Pipe Systems. Combining with steel or copper piping systems is permitted, where applicable.
- The pipe and fittings shall be protected (concealed) in accordance with the specifications outlined in the CPVC Installation Handbook (IH-1900).
- Exposed pipe and fittings have not been evaluated.
- Minimum use temperature shall be -20°F (-29°C).
- 3/4 in. to 3 in. pipe and fittings are listed for these applications and are to be assembled with TFP-500 or TFP-600 One Step Solvent Cement.
- In-service system Air Pressure shall be maintained at a maximum of 15 psi (1 bar).
- Pipe friction loss shall be calculated in accordance with the Hazen-Williams formula using a C value of 150.
- Air supply to the TYCO CPVC Pipe and Fittings shall be free of oil and oil vapor. Automatic air compressors shall be of an oil-less type or the air shall be treated to assure oil or oil vapor is not introduced into the piping.

Table A
Residential Dry Pipe System
Water Delivery

Hazard	Residential	Light
Number of Most Remote Sprinklers Initially Open	1	1
Maximum Time of Water Delivery	15 Seconds	60 seconds

Low Pressure Dry Sprinkler Systems (UL)

TYCO BLAZEMASTER pipe is Listed by UL for use in dry pipe sprinkler systems with the following characteristics:

- Pressure does not exceed 15 psi (1,03 bar)
- Ambient temperature is above -20°F (-28,9°C)

The dry system must be installed in Light Hazard and Residential occupancies in accordance with NFPA 13D, NFPA 13R, and/or NFPA 13.

When air is used in dry pipe sprinkler systems that utilize TYCO BLAZEMASTER CPVC pipe and fittings, there must be no residual oil in the compressed air. The types of oil used in this application may be incompatible

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with CPVC. If the oil is not removed from the compressed air, there is the risk that the oil may be incompatible with CPVC. Check the BLAZEMASTER website for chemical compatibility .

The dry pipe sprinkler system must be designed to provide pressure relief when the system pressure exceeds 15 psi (1,03 bar). As an alternative to this requirement, the system may be equipped with an alarm that sounds when the pressure exceeds 15 psi (1,03 bar).

Air Plenums (UL)

TYCO CPVC Pipe and Fittings are UL Listed for use in air plenums. TYCO CPVC Pipe and Fittings comply with UL1887 combustibility requirements for thermoplastic sprinkler pipe as described in the Standard for Installation of Air Conditioning and Ventilating Systems, NFPA 90A, and various model mechanical codes. TYCO CPVC Pipe and Fittings may be installed in the plenum adjacent to, but not over, an opening in the ceiling such as ventilation grills. Return Air Plenum installations may only be made with UL Listed TYCO CPVC Pipe and Fittings and require the use of Schedule 80 fittings when sizes are 1-1/2 in. (DN40) and larger.

Garage Installations (UL)

Garage Installation Specifications shall only apply for the installation of UL Listed TYCO CPVC Pipe and Fittings in garages requiring sprinkler protection per NFPA 13D and NFPA 13R. These Standards are defined in NFPA codes entitled "One and Two Family Dwellings and Mobile Homes" and in "Residential Occupancies up to Four Stories in Height". As referenced in NFPA 13D:(2007) Section 8.6.4, "Sprinklers are not required in garages, open attached porches, carports or similar structures." The installation of TYCO CPVC Pipe and Fittings for use in garages requiring sprinkler protection per NFPA 13R is only applicable to the UL Listing of this product.

Requirements for Pipe, Fittings, Solvent Cement Systems, System Design, Installation, Freeze Protection, and Penetrating Fire Related Walls and Partitions are covered in this Installation Handbook. Read these sections carefully prior to designing or installing TYCO CPVC Pipe and Fittings for garage installations.

• Installation Requirements

- Protection: TYCO CPVC Pipe and Fittings shall be installed concealed behind protection consisting of a minimum of one layer of 3/8 in. (9,5 mm) thick gypsum wallboard or 1/2 in. (13 mm) thick plywood.
- Sprinkler Requirements: UL Listed, pendent or sidewall sprinklers with a 225°F (107°C) maximum temperature rating shall be utilized. All sprinklers shall be installed per the manufacturer's published installation instructions.
- Installation Standard: The Listing for Garage Installations shall pertain to those occupancies defined by NFPA 13R.

System Risers (UL)

In accordance with the UL Listing, TYCO CPVC Pipe and Fittings may be used as system risers in accordance with NFPA 13, 13D, and 13R when subject to the following additional limitations:

1. When installed protected (concealed) in accordance with NFPA 13, 13D, and 13R, the minimum protection shall consist of either one layer of 3/8 in. (9,5 mm) thick gypsum wallboard or 1/2 in. (12,7 mm) thick plywood.
2. When installed without protection (exposed) in accordance with NFPA 13D and 13R, the following limitations shall apply:

- The riser shall be installed below a smooth, flat, horizontal ceiling construction. A Listed residential pendent sprinkler is to be installed with its deflector at the distance from the ceiling specified in the sprinkler Listing.

or

The riser shall be installed below a horizontal unfinished basement ceiling (in accordance with NFPA 13D) constructed utilizing solid wood joists or composite wood joists with a nominal depth of 16 in. (406,4 mm) or less on maximum 24 in. (609,6 mm) centers. A Listed residential pendent sprinkler is to be installed with its deflector a maximum of 1 3/4 in. (44,5 mm) below the bottom of the solid wood or composite wood joist in anticipation of the future installation of a finished ceiling.

- The Listed residential pendent sprinkler is to have 155°F (68°C) maximum temperature rating and a minimum K-factor of 4.9, and is to be installed at a maximum horizontal distance of 12 in. (305,0 mm) from the centerline of the riser. The system is to be designed based upon the Listed flows for the sprinkler selected except that the flow for a single sprinkler or multiple sprinklers shall not be less than 13 gpm (49,2 lpm) per sprinkler.
 - The riser shall be supported vertically within 2 ft (610 mm) of the ceiling or bottom of the joist.
 - The minimum riser diameter shall be 1 in. (DN25) and the maximum riser diameter shall be 2 in. (DN50).
 - The maximum distance between the wall(s) and the outside surface of the riser pipe shall be 1 1/2 in. (38,1 mm).
 - All solvent cement joints shall be made with TFP-500 or TFP-600 One Step Solvent Cement.
 - The instructions shown here for Exposed System Risers require the use of Schedule 80 fittings when riser sizes are 1 1/2 in. (38,1 mm) and larger.
3. The system shall be installed per the requirements of NFPA 13 Section 9.2.5(2016 Edition), Support of Risers.
 4. TYCO CPVC Pipe and Fittings shall be installed per the manufacturer's Installation Instruction and Technical Handbook.
 5. Risers shall be supported by pipe clamps or by hangers located on the horizontal connection closest to the riser. Only Listed hangers and clamps shall be used.
 6. Vertical lines must be supported at intervals, described in Paragraphs 9 and 10 below to avoid placing excessive load on a fitting at the lower end. Do this by using riser clamps or double bolt pipe clamps Listed for this

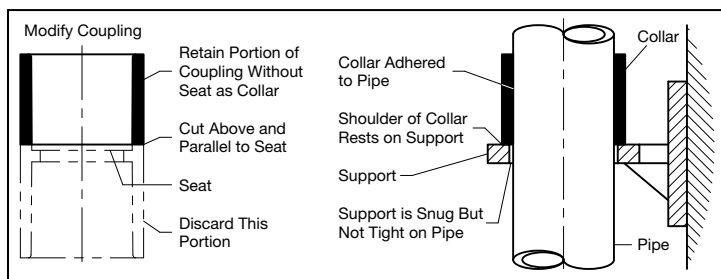
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service. The clamps must not exert compressive stresses on the pipe. If possible, the clamps should be located just below a fitting so that the shoulder of the fitting rests against the clamp. If necessary, a coupling can be modified and adhered to the pipe as a bearing support (modified riser collar) such that the shoulder of the fitting rests on the clamp (Ref. Figure 6). Follow the cure times in Tables U, V, and W.

Note: A modified riser collar shall only be used to provide support to the riser and shall not be used to join two pieces of pipe.

7. Do not use riser clamps that squeeze the pipe and depend on compression of the pipe to support the weight.
8. Hangers and straps shall not compress, distort, cut or abrade the piping and shall allow for free movement of the pipe to permit thermal expansion and contraction. The pipe can be damaged, and compression increases the likelihood of stress cracking.
9. Maintain vertical piping in straight alignment with supports at each floor level, or at 10 ft (3,1 m) intervals, whichever is less.
10. TYCO CPVC risers in vertical shafts or in buildings with ceilings over 25 ft (7,6 m), shall be aligned straightly and supported at each floor level, or at 10 ft (3,1 m) intervals, whichever is less.

Figure 6 - Riser Collar



Underground Water Pressure Service (UL & C-UL)

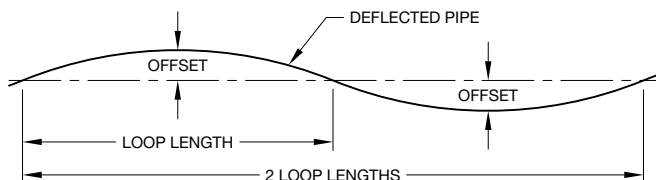
- Pipe - TYCO CPVC Pipe complies with the requirements of ASTM F442 and standard dimension ratio (SDR) 13.5. TYCO pipe is UL Listed and C-UL Listed for a rated pressure of 175 psi (12,1 bar) for underground service.
- Fittings - TYCO CPVC Fittings comply with the requirements of ASTM F438 (Schedule 40 socket), ASTM F439 (Schedule 80 socket) and ASTM F1970 (Transition fittings).
- Solvent Cement - All socket type joints shall be made in accordance with TFPF's Installation Instructions using the TFP-500 or TFP-600 One Step Solvent Cement.

Note: When using TYCO CPVC Pipe and Fittings, installation must be in accordance with ASTM D2774, the standard recommended practice for underground installation of thermoplastic pressure piping and ASTM F645, the standard guide for selection, design, and installation of thermoplastic water pressure piping systems, and all TFPF installation instructions contained within this Installation Handbook.

Table B - Ground Cover

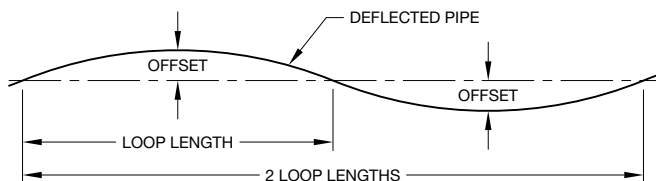
Nominal Pipe Size ANSI Inches DN	Trench Width Inches (mm)	Ground Cover Minimum Inches (mm)	
		Light Traffic	Heavy Traffic
3 DN80 and Under	8 (203,2)	12 - 18 (305,0 - 457,2)	30 - 36 (762,0 - 914,4)

Table C1 - U.S. Units
Maximum Temperature Variation, °F
Between Time of Solvent Welding and Final Use



Loop Length Feet	Temperature Variation, °F									
	10°	20°	30°	40°	50°	60°	70°	80°	90°	100°
	Offset- Inches									
20	3	4	5	5	6	6	7	7	8	8
50	7	9	11	13	14	16	17	18	19	20
100	18	18	22	26	29	32	35	37	40	42

Table C2 - Metric Units
Maximum Temperature Variation, °C
Between Time of Solvent Welding and Final Use



Loop Length Meters	Temperature Variation, °C									
	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°
	Offset- Millimeters									
5	65	83	95	105	114	123	133	143	154	164
15	164	219	266	307	343	377	409	440	469	498
30	314	424	522	609	687	758	823	884	943	999

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- **System Design** - A TYCO CPVC underground system shall be hydraulically calculated using a Hazen-Williams C-Factor of 150, and designed and installed in accordance with the "Installation of Sprinkler Systems," NFPA 13, 2007 edition, and where appropriate the "Standard for Installation of Private Fire Service Mains and Their Appurtenances," NFPA 24.
- **Installation Procedures** - The installation procedures detailed within apply to TYCO CPVC Pipe that has solvent cemented joints in sizes ranging from 3/4 in. to 3 in. (DN20 to DN80).
- **Inspection** - Before installation, TYCO CPVC Pipe and Fittings should be thoroughly inspected for cuts, scratches, gouges, or split ends. Discard damaged pipe.
- **Trenching** - The trench should be of adequate width to allow convenient installation, while at the same time being as narrow as possible. Minimum trench widths may be utilized by joining pipe outside of the trench and lowering it into the trench after adequate joint strength has been achieved.

Note: Refer to TYCO's instructions for recommended set and cure times for solvent cemented joints as found in Tables U, V, and W. Where pipe is joined in the trench, or where thermal expansion and contraction are factors, trench widths may have to be widened. For additional details on expansion and contraction, see thermal expansion characteristics in Tables H1 and H2. Table B shows the trench width and minimum ground cover required for underground installation.

All TYCO CPVC Pipe that is water filled should be buried at least 12 in. (304,8 mm) below the maximum expected frost line. It is recommended that TYCO piping be run within a metal or concrete casing when it is installed beneath surfaces that are subject to heavy-weight or constant traffic such as roadways and railroad tracks.

The trench bottom should be continuous, relatively smooth and free of rocks. Where ledge rock, hardpan or boulders are encountered, it is necessary to pad the trench bottom using a minimum of 4 in. (102,0 mm) of tamped earth or sand beneath the pipe as a cushion and to protect the pipe from damage. Sufficient cover must be maintained to keep external stress levels below maximum design stress. Reliability and safety of service is of major importance in determining minimum cover. Local, state and national codes may also govern.

- **Maintenance** - Maintenance of TYCO CPVC Pipe and Fittings for underground water service shall be in accordance with the Standard for Inspection, Testing and Maintenance of Water Based Extinguishing Systems as defined by NFPA 25.
- **Snaking of Pipe** - After TYCO CPVC pipe has been solvent cemented, it is advisable to snake the pipe according to the following recommendations beside the trench during its required drying time. BE ESPECIALLY CAREFUL NOT TO APPLY ANY STRESS THAT WILL DISTURB THE UNDRIED JOINT. Snaking is necessary to allow for any anticipated thermal contraction that will take place in the newly joined pipe line. Snaking is particularly necessary on the lengths of pipe that have been solvent cemented during the afternoon hours of a hot summer day because the drying time will extend through the cool of the night when thermal

contraction of the pipe could stress the joints to the point of pull out. This snaking is also especially necessary with pipe that is laid in its trench (necessitating wider trenches than recommended) and is back-filled with cool earth before the joints are thoroughly dry. Tables C1 and C2 show the Pipe Snaking and the Loop Offset dimensions to compensate for contraction.

- **Back-Filling** - Ideally, back-filling should only be done early in the morning during hot weather when the line is fully contracted so that there is no chance of insufficiently dried joints being subject to contraction stresses.

The pipe should be uniformly and continuously supported over its entire length with firm, stable material. Blocking should not be used to change pipe grade or to intermittently support pipe across excavated sections. Pipe is installed in a wide range of sub soils. These soils should not only be stable, but applied in such a manner so as to physically shield the pipe from damage. Attention should be given to local pipe laying experience that may indicate particular bedding problems.

Back-filled material free of rocks with a size of 1/2 in. (12,7 mm) or less should be used to surround the pipe with 6 in. to 8 in. (152,4 mm to 203,2 mm) of cover. The back-filled material should be placed in layers. Each soil layer should be sufficiently compacted uniformly to develop laterally passive soil forces during the back-fill operation. It may be advisable to have the pipe under water pressure, 15-25 psi (1,0-1,7 bar) during the back-filling.

Vibratory methods are preferred when compacting sand or gravel. Best results are obtained when the soils are in a nearly saturated condition. Where water flooding is used, the initial back-fill should be sufficient to ensure complete coverage of the pipe. Additional material should not be added until the water flooded back-fill is firm enough to walk on. Care should be taken to avoid floating the pipe.

Sand and gravel containing a significant portion of fine-grained material such as silt and clay should be compacted by hand or preferably by a mechanical tamper. The remainder of the back-fill should be placed and spread in uniform layers in such a manner as to fill the trench completely so that there will be no unfilled spaces under or about rocks or lumps of earth in the back-fill. Large or sharp rocks, frozen clods and other debris greater than 3 in. (76,2 mm) in diameter should be removed. Rolling equipment or heavy tampers should only be used to consolidate the final back-fill.

Outdoor Installations

TYCO CPVC Pipe and Fittings are not listed for outdoor applications other than underground.

FACTORY MUTUAL (FM)

TYCO CPVC Pipe and Fittings are FM Approved for use in:

- Miscellaneous non-manufacturing occupancies as described in FM Loss Prevention Data Sheet 3-26, "Fire Protection Water Demand for Non-storage Sprinklered Properties", Table 2, Section L.
- Residential occupancies as described in FM Loss Prevention Data Sheet 3-26, "Installation of Sprinkler Systems".

24 LISTINGS & APPROVALS

TYCO Fire Sprinkler Systems shall be employed in wet pipe systems only. (A wet pipe system contains water or water and glycerin [anti-freeze solution] and is connected to a water supply so that the water or water and glycerin [anti-freeze solution] will discharge immediately when the sprinkler is opened.)

Concealed Installations (FM)

In accordance with the FM Approval, protection shall be provided for TYCO CPVC Pipe and Fittings as follows:

- The minimum protection shall consist of either a permanently installed noncombustible barrier from any area protected by the system.

Note: A permanently installed barrier is one that cannot be removed without substantial cosmetic damage. Drop ceiling tiles, as used in suspended ceilings are specifically considered not be permanently installed for the purposes of this definition. Noncombustible is defined as having a minimum finish fire rating of 15 minutes when tested per ASTM E119.

- As an alternative to the protection of a permanently installed noncombustible barrier, FM has approved the use of TYCO CPVC with the SOFFI-STEEL™ covering system manufactured by Grice Engineering.
- FM Approved quick response, standard or extended coverage, or FM Approved residential sprinklers installed in accordance with their approval limitations may be used.
- Solvent cement joints shall be made with TFP-500 or TFP-600 One Step Solvent Cement.

Exposed Installations - Smooth, Flat, Horizontal Ceilings (FM)

In accordance with the FM Approval, TYCO CPVC Pipe and Fittings may be installed without protection (exposed), subject to the following additional limitations:

Note: Where piping is installed above drop ceiling tiles, the piping shall be considered exposed.

Ceilings may be combustible, or non permanently installed.

• Standard Coverage Sprinklers

- Pendent sprinklers shall be FM Approved, quick response sprinklers having deflectors installed within 8 in. (203,2 mm) of the ceiling. The maximum distance between sprinklers shall not exceed 15 ft (4,6 m). The maximum ceiling height shall not exceed 10 ft (3,0 m).
- Upright sprinklers shall be FM Approved, quick response sprinklers having deflectors installed within 4 in. (101,6 mm) of the ceiling. The maximum distance between sprinklers shall not exceed 15 ft (4,6 m). The maximum distance from the ceiling to the centerline of the main run of pipe shall not exceed 7-1/2 in. (191 mm). The distance from the centerline of the sprinkler to the closest hanger shall be 3 in. (76,2 mm). The maximum ceiling height shall not exceed 10 ft (3,0 m).
- Horizontal Sidewall Sprinklers shall be FM Approved, quick response sprinklers having deflectors installed within 12 in. (304,8 mm) of the

ceiling and within 6 in. (152,4 mm) of the side wall. The maximum distance between sprinklers shall not exceed 14 ft (4,3 m). The maximum ceiling height shall not exceed 10 ft (3,0 m).

- Solvent cement joints shall be made with TFP-500 or TFP-600 One Step Solvent Cement.

• **Extended Coverage Sprinklers**

- Pendent sprinklers shall be FM Approved, quick response sprinklers having deflectors installed within 8 in. (203,2 mm) of the ceiling. The maximum distance between sprinklers shall not exceed 20 ft (6,1 m). When the sprinklers are not on square spacings, the flow for a sprinkler should be based on the density applied over the square area calculated for the largest dimension of the sprinkler spacing. The maximum ceiling height shall not exceed 10 ft (3,0 m).
- Horizontal Sidewall Sprinklers shall be FM Approved, quick response sprinklers having deflectors installed within 12 in. (304,8 mm) of the ceiling and within 6 in. (152,4 mm) of the side wall. The maximum lateral distance between sprinklers shall not exceed 16 ft (4,9 m). The maximum ceiling height shall not exceed 10 ft (3,0 m).
- The minimum flow or pressure established for Extended Coverage Systems shall be per FM Loss Prevention Data Sheet 2-0 and 3-26.
- Solvent cement joints shall be made with TFP-500 or TFP-600 One Step Solvent Cement.

• **Residential Sprinklers**

- Pendent sprinklers shall be FM Approved, residential sprinklers having deflectors installed within 8 in. (203,2 mm) of the ceiling. The maximum distance between sprinklers shall not exceed 20 ft (6,1 m). The minimum required discharge from each sprinkler is to be the greater of either the approved flow rate applied over the square area calculated for the largest dimension of the sprinkler spacing or a minimum discharge of 0.1 gpm/sq ft (4,1 mm/min) over the actual area (S x L) covered by the sprinkler. The maximum ceiling height shall not exceed 10 ft (3,0 m).
- Horizontal Sidewall Sprinklers shall be FM Approved, quick response sprinklers having deflectors installed within 12 in. (304,8 mm) of the ceiling and within 6 in. (152,4 mm) of the side wall. The maximum lateral distance between sprinklers shall not exceed 16 ft (4,9 m). The minimum required discharge from each sprinkler is to be the greater of either the approved flow rate applied over the area calculated for the largest dimension of the sprinkler spacing or a minimum discharge of 0.1 gpm/sq ft (4,1 mm/min) over the actual area (S x L) covered by the sprinkler. The maximum ceiling height shall not exceed 10 ft (3,0 m).
- The minimum flow or pressure established for Residential Sprinkler Systems shall be per FM Loss Prevention Data Sheet 2-0 and 3-26.
- Solvent cement joints shall be made with TFP-500 or TFP-600 One Step Solvent Cement.

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System Risers (FM)

In accordance with the FM Approval, TYCO CPVC Pipe and Fittings may be installed without protection (exposed) as a vertical riser when subject to the following additional limitations:

- An automatic sprinkler (of the same type as in the area being protected) shall be located adjacent to and no further than 1 ft (0,3 m) from the riser.
- The automatic sprinkler protecting the riser shall not be considered when determining protection criteria for the floor area. The design flow for the sprinkler protecting the riser must be the same as for the other sprinklers, and must be added to the hydraulic calculation.
- Solvent cement joints shall be made with TFP-500 or TFP-600 One Step Solvent Cement.

The Loss Prevention Council (LPCB)

Use of TYCO CPVC Fire Sprinkler Systems in Accordance with The Loss Prevention Council (LPCB) "List of Approved Products and Services", Part 5, "Automatic Sprinkler, Water Spray, and Deluge Systems" Section 21.1 "Plastic Pipes and Fittings" and Section 5 of BS 5306: Part 2.

The Loss Prevention Certification Board Listing is as follows:

1. The 'scope of use' of plastic pipe should be agreed upon between the purchaser, authority having jurisdiction, and/or insurer.
2. Use of plastic pipe and fittings is subject to water authority agreement for the territory concerned.
3. LPCB Approved quick response sprinklers shall be used with exposed (e.g., fire exposure) plastic pipe and fittings.
4. Plastic pipe and fittings are suitable for use only with wet pipe systems.
5. Care should be exercised to ensure that joints are adequately cured, in accordance with the manufacturer's installation instruction, prior to pressurization.
6. Plastic pipe and fittings shall not be installed outdoors.
7. Where plastic pipe and fittings are exposed (e.g., fire exposure), the system shall be installed close to a flat ceiling construction.
8. Sprinkler systems that employ plastic pipe and fittings shall be designed where possible to ensure no "no flow" sections of pipe work in the event of sprinkler operation.
9. LPCB maximum ambient temperature of 50°C.

The Loss Prevention Certification Board listing applies to Light Hazard Classifications BS 5306: Part 2, Section 5.2 fall within the scope of NFPA 13, 13R and 13D.

In addition, TYCO fire sprinkler systems can be installed in certain ordinary classification (BS 5306: Part 2, Section 5.3) such as offices, retail shops and department stores when installed in accordance with Section 22 of LPCB "List of Approved Products and Services".

TYCO CPVC Pipe and Fittings should not be used in high hazard applications (BS 5306: Part 2, Section 5.4) and ordinary hazard applications where the

fuel load or rate of heat release is high, such as boiler rooms, kitchens, manufacturing areas, and certain warehouse applications.

Solvent cement joints shall be made with TFP-500 or TFP-600 One Step Solvent Cement.

ADDITIONAL APPROVALS

(MEA and NSF)

- TYCO CPVC Pipe and Fittings are Listed by MEA in Residential buildings as defined by NFPA 13D and 13R. The MEA listing number is 434-88-M, Vol. 2.
- TYCO CPVC Pipe and Fittings (slip style only) are tested by NSF for chemical extraction to Standard 61 and carry the NSF-pw Listing.

Solvent cement joints shall be made with TFP-500 or TFP-600 One Step Solvent Cement.

ORDINARY HAZARD INSTALLATIONS

• NFPA 13

- Pipe or tube listed for light hazard occupancies to be installed in ordinary hazard rooms of otherwise light hazard occupancies where the room does not exceed 400 ft² (37 m²).
 - Pipe or tube is permitted to be installed exposed in accordance with their listing.
- Where nonmetallic pipe is permitted to be installed in a private garage within a dwelling unit not exceeding 1000 ft² (93 m²) and permitted to be protected from the garage compartment by not less than the same wall or ceiling sheathing that is required by the applicable building code.

• NFPA 13R

- Pipe or tube listed for light hazard occupancies to be installed in ordinary hazard rooms of otherwise light hazard occupancies where the room does not exceed 400 ft² (37 m²).
 - Pipe or tube is permitted to be installed exposed in accordance with their listing.
- Pipe or tube listed for light hazard occupancies is permitted to be installed above ordinary hazard rooms as follows:
 - In rooms 400 ft² (37 m²) or less, piping is permitted to be installed either exposed in accordance with its listing, or installed concealed behind a layer of 3/8 in. (9,5 mm) thick gypsum wallboard or 1/2 in. (12,7 mm) thick plywood.
 - In rooms over 400 ft² (37 m²), piping is permitted to be installed concealed behind a layer of 3/8 in. (9,5 mm) thick gypsum wallboard or 1/2 in. (12,7 mm) thick plywood.

TYCO CPVC sprinkler pipe and fittings can be installed in these installations in accordance with the manufacturer's Installation Instructions and Technical Handbook. The local authority having jurisdiction should be consulted for additional information in regards to a specific situation.

Solvent cement joints shall be made with TFP-500 or TFP-600 One Step Solvent Cement.

TYCO CPVC SPECIFICATIONS

Pipe

TYCO CPVC sprinkler pipe conforms to the requirements of ASTM F442 and is produced to SDR 13.5. SDR (Standard Dimension Ratio) is the ratio of the outside pipe diameter to the wall thickness of the pipe. The pipe carries the NSF International (NSF-pw) mark for use in potable water systems. See Tables D1 and D2 for dimensions of pipe.

**Table D1 - U.S. Units
Dimensions for TYCO CPVC Pipe**

Nominal Pipe Size ANSI Inches	Nominal O.D. Inches	Nominal I.D. Inches	Empty Weight	Water Filled Weight	Volume Gallons / Foot
			Pounds / Foot	Pounds / Foot	
3/4	1.050	0.874	0.168	0.428	0.031
1	1.315	1.101	0.262	0.675	0.049
1 1/4	1.660	1.394	0.418	1.079	0.079
1 1/2	1.900	1.598	0.548	1.417	0.104
2	2.375	2.003	0.859	2.224	0.164
2 1/2	2.875	2.423	1.257	3.255	0.239
3	3.500	2.950	1.867	4.829	0.355

**Table D2 - Metric Units
Dimensions for TYCO CPVC Pipe**

Nominal Pipe Size DN	Nominal O.D. Millimeters	Nominal I.D. Millimeters	Empty Weight	Water Filled Weight	Volume Liters / Meter
			Kilograms/ Meter	Kilograms/ Meter	
DN20	26,7	22,0	0,250	0,637	0,102
DN25	33,4	28,0	0,390	1,000	0,161
DN32	42,4	35,4	0,622	1,606	0,260
DN40	48,3	40,6	0,816	2,109	0,342
DN50	60,3	50,9	1,278	3,310	0,538
DN65	73,0	61,5	1,871	4,844	0,786
DN80	88,9	75,0	2,778	7,186	1,166

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Fittings

TYCO CPVC sprinkler fittings conform to the requirements of ASTM F438 (Schedule 40 dimensions from 3/4 in. to 1 1/2 in. (DN20 to DN32), ASTM F439 (Schedule 80 dimensions for 1 1/2 in. to 3 in. (DN40 to DN80) and ASTM F1970 (Transition Fittings). Rapid Seal Adapter (RSA) threaded sprinkler connection fittings and slip style fittings carry the NSF International (NSF-pw) mark for use in potable water systems. All other threaded sprinkler adapter fittings feature brass inserts and are not NSF-pw rated. See Appendix A for sprinkler fittings types, sizes, socket and take-out dimensions.

Solvent Cement

TYCO CPVC socket connections shall be joined using TFP-500 or TFP-600 One Step Solvent Cement as indicated in the "Listing and Approvals" section. TFP-500 and TFP-600 One Step Solvent Cements meet ASTM F493, NSF, FM, UL and LPCB requirements. Review solvent cementing instructions within this handbook prior to installation.

PRODUCT RATINGS AND CAPABILITIES

Ambient Temperature and Heat Sources

TYCO CPVC Pipe and Fittings shall be installed in areas where the ambient temperature does not exceed 150°F (65°C). (LPCB maximum ambient temperature of 50°C)

Before penetrating fire rated walls and partitions, consult building codes and authorities having jurisdiction in your area. TYCO CPVC systems should be designed and installed so that the piping is not closely exposed to high heat producing sources, such as incandescent light, ballasts, and steam lines.

Pressure Rating

TYCO CPVC Pipe and Fittings are Listed/Approved for a rated pressure of 175 psi (12,1 bar) and a maximum ambient temperature of 150°F (65°C). (LPCB maximum ambient temperature of 50°C)

Friction Loss

TYCO CPVC Pipe has a Hazen-Williams C-Value of 150. Pipe friction loss calculations shall be made according to NFPA Standards. Tables F1 and F2 show the allowance of friction loss for fittings, expressed in equivalent feet of pipe.

Table F1 Allowance for Friction Loss in Fittings³							
Fitting Size ANSI Inches	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Tee Branch- ft	3	5	6	8	10	12	15
Elbow 90°¹- ft	4	5	6	7	9	12	13
Elbow 45°- ft	1	1	2	2	2	3	4
Coupling- ft	1	1	1	1	1	2	2
Tee Run²- ft	1	1	1	1	1	2	2

Table F2 Allowance for Friction Loss in Fittings³							
Fitting Size DN	DN20	DN25	DN32	DN40	DN50	DN65	DN80
Tee Branch- m	0,9	1,5	1,8	2,4	3,1	3,7	4,6
Elbow 90°¹- m	1,2	1,5	1,8	2,1	2,7	3,7	4,0
Elbow 45°- m	0,3	0,3	0,6	0,6	0,6	0,9	1,2
Coupling- m	0,3	0,3	0,3	0,3	0,3	0,6	0,6
Tee Run²- m	0,3	0,3	0,3	0,3	0,3	0,6	0,6

1. The above stated friction loss values are for TYCO fittings only. When using other Listed TYCO CPVC 90° elbows with BLAZEMASTER products, consult the fitting manufacturer's installation and design manuals.
2. Per manufacturer's test.

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Thermal Expansion – U.S. Units

TYCO CPVC Pipe, like all piping materials, expands and contracts with changes in temperature. The coefficient of linear expansion for TYCO CPVC Pipe is: 0.000034 in/in/°F. The coefficient of linear expansion TYCO CPVC Pipe is the same for all pipe sizes.

To determine the linear expansion of the pipe due to thermal changes use the following formula:

$$\Delta L = 12eL(\Delta T)$$

Where:

$e = 0.000034$ in/in/°F (coefficient of linear expansion)

L = Length of run in feet

ΔT = Temperature change in °F

ΔL = Inches

Example: How much will a 40 foot run of 3/4 inch TYCO CPVC Pipe increase in length (or expand) if the expected ambient temperature ranges from 35°F to 85°F? Changes in length due to fittings are insignificant relative to the pipe.

$$\Delta L = 12eL(\Delta T)$$

$$\Delta L = 12(0.000034) \times 40 \times 50$$

$$\Delta L = 0.82 \text{ inch or approximately } 13/16 \text{ inch}$$

TYCO CPVC exhibits a relatively high coefficient of thermal expansion. When designing TYCO sprinkler systems, expansion of long runs must be considered if temperature variations will be encountered (i.e., summer to winter extremes). Methods of compensating for thermal expansion are expansion loops, offsets and change of direction of the pipe run shown in Figure 7.

Loop Lengths “L” for use in Figure 7 are shown in Tables H1, J1, and K1. If the change in temperature and the maximum working temperature are lower than those used to derive the tables, the numbers will be conservative in nature. For example, for a temperature change from 60°F to 125°F use Table J1 because the maximum temperature is greater than those shown in Tables G1 and H1.

For conditions that are not covered in the Loop Length Tables, use the following formula:

$$L = \sqrt{\frac{3ED(\Delta L)}{2S}}$$

Where:

L = Length of loop, offset, or change of direction in inches

E = Modulus of elasticity at the maximum temperature (Table L1) in psi

D = Nominal outside diameter of pipe (Table D1) in inches

ΔL = Change in length of pipe due to change in temperature in inches

S = Working stress at the maximum temperature (Table L1) in psi

Example: How much expansion can be expected in a 240 foot run of 2 inch TYCO CPVC Pipe installed in 40°F given a maximum temperature change to 100°F? Additionally, how long should the expansion loop be to compensate for this expansion?

Step 1. Find the temperature change expressed as ΔT .

$$\Delta T = 100^{\circ}\text{F} - 40^{\circ}\text{F}$$

$$\Delta T = 60^{\circ}\text{F}$$

Step 2. Calculate the change in length expressed as ΔL .

$$\Delta L = 12 \text{ e L } (\Delta T)$$

$$\Delta L = 12 (0.000034) \times 240 \times 60$$

$$\Delta L = 5.88 \text{ inches}$$

Step 3. Find the length of the expansion loop or offset in inches

$$L = \sqrt{\frac{3ED(\Delta L)}{2S}}$$

L = Length of loop, offset, or change of direction in inches

E = Modulus of elasticity at maximum temperature (Table L1) in psi

D = Nominal outside diameter of pipe (Table D1) in inches

S = Working stress at maximum temperature (Table L1) psi

ΔL = Change in length of pipe due to a change in temperature from Step 2 in inches

$$L = \sqrt{\frac{3 \times (3.85 \times 10^5) (2.375) (5.88)}{2 \times 1560}}$$

$$L = 71.90 \text{ inches}$$

Step 4. Refer to Figure 7.

a- For loop length: $1/5 L = 1/5 \times 71.90 = 14.38 \text{ inches}$

$$2/5 L = 2/5 \times 71.90 = 28.76 \text{ inches}$$

b- For offset length: $1/4 L = 1/4 \times 71.90 = 17.98 \text{ inches}$

$$1/2 L = 1/2 \times 71.90 = 35.95 \text{ inches}$$

c- For change of direction length: $L = 71.90 \text{ inches}$

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Thermal Expansion – Metric Units

TYCO CPVC Pipe, like all piping materials, expands and contracts with changes in temperature. The coefficient of linear expansion TYCO CPVC Pipe is: 0,062 mm/m/°C. The coefficient of linear expansion TYCO CPVC Pipe is the same for all pipe sizes.

To determine the linear expansion of the pipe due to thermal changes use the following formula:

$$\Delta L = eL (\Delta T)$$

Where:

$e = 0,061 \text{ mm/m } ^\circ\text{C}$ (coefficient of linear expansion)

L = Length of run in meters

ΔT = Temperature change in $^\circ\text{C}$

Example: How much will a 12 m run of DN20 TYCO CPVC Pipe increase in length (or expand) if the expected ambient temperature ranges from 2°C to 32°C ? Changes in length due to fittings are insignificant relative to the pipe.

$$\Delta L = eL (\Delta T)$$

$$\Delta L = (0,061) \times 12 \times 30$$

$$\Delta L = 22,0 \text{ mm}$$

TYCO CPVC exhibits a relatively high coefficient of thermal expansion (see Table H2). When designing TYCO sprinkler systems, expansion of long runs must be considered if temperature variations will be encountered (i.e., summer to winter extremes). Methods of compensating for thermal expansion are expansion loops, offsets and change of direction of the pipe run shown in Figure 7.

Loop Lengths “L” for use in Figure 7 are shown in Tables H2, J2, and K2. If the change in temperature and the maximum working temperature are lower than those used to derive the tables, the numbers will be conservative in nature. For example, for a temperature change from 16°C to 52°C use Table J2 because the maximum temperature is greater than those shown in Tables G2 and H2.

For conditions that are not covered in the Loop Length Tables, use the following formula:

$$L = \sqrt{\frac{3ED(\Delta L)}{2S}}$$

Where:

L = Length of loop, offset, or change of direction in millimeters

E = Modulus of elasticity at the maximum temperature (Table L2) in bar

D = Nominal outside diameter of pipe (Table D2) in millimeters

ΔL = Change in length of pipe due to change in temperature in millimeters

S = Working stress at the maximum temperature (Table L2) in bar

Example: How much expansion can be expected in a 73 m run of DN50 TYCO CPVC Pipe installed in 4°C given a maximum temperature change to 38°C? Additionally, how long should the expansion loop be to compensate for this expansion?

Step 1. Find the temperature change expressed as ΔT .

$$\Delta T = 38^{\circ}\text{C} - 4^{\circ}\text{C}$$

$$\Delta T = 34^{\circ}\text{C}$$

Step 2. Calculate the change in length expressed as ΔL .

$$\Delta L = e L (\Delta T)$$

$$\Delta L = 0,061 \times 73 \times 34$$

$$\Delta L = 151,4 \text{ mm}$$

Step 3. Find the length of the expansion loop or offset in millimeters

$$L = \sqrt{\frac{3ED(\Delta L)}{2S}}$$

L = Length of loop, offset, or change of direction in millimeters

E = Modulus of elasticity at the maximum temperature (Table L2) in bar

D = Average outside diameter of pipe (Table D2) in millimeters

S = Working stress at the maximum temperature (Table L2) in bar

ΔL = Change in length of pipe due to a change in temperature from Step 2 in millimeters

$$L = \sqrt{\frac{3 \times 26546 \times 60,3 \times 151,4}{2 \times 107,6}}$$

$$L = 1838 \text{ mm}$$

Step 4. Refer to Figure 7.

a- For loop length: $1/5 L = 1/5 \times 1838 \text{ mm} = 368 \text{ mm}$

$$2/5 L = 2/5 \times 1838 \text{ mm} = 735 \text{ mm}$$

b- For offset length: $1/4 L = 1/4 \times 1838 \text{ mm} = 460 \text{ mm}$

$$1/2 L = 1/2 \times 1838 \text{ mm} = 919 \text{ mm}$$

c- For change of direction length: $L = 1838 \text{ mm}$

Table G1 - Thermal Expansion U.S. Units									
Length of Run Feet	Temperature Change ΔT °F								
	20	30	40	50	60	70	80	90	100
	Thermal Expansion, ΔL Inches								
5	0.04	0.06	0.08	0.10	0.12	0.14	0.16	0.18	0.20
10	0.08	0.12	0.16	0.20	0.24	0.29	0.33	0.37	0.41
15	0.12	0.18	0.24	0.31	0.37	0.43	0.49	0.55	0.61
20	0.16	0.24	0.33	0.41	0.49	0.57	0.65	0.73	0.82
25	0.20	0.31	0.41	0.51	0.61	0.71	0.82	0.92	1.02
30	0.24	0.37	0.49	0.61	0.73	0.86	0.98	1.10	1.22
35	0.29	0.43	0.57	0.71	0.86	1.00	1.14	1.29	1.43
40	0.33	0.49	0.65	0.82	0.98	1.14	1.31	1.47	1.63
45	0.37	0.55	0.73	0.92	1.10	1.29	1.47	1.65	1.84
50	0.41	0.61	0.82	1.02	1.22	1.43	1.63	1.84	2.04
70	0.57	0.86	1.14	1.43	1.71	2.00	2.28	2.57	2.86
90	0.73	1.10	1.47	1.84	2.20	2.57	2.94	3.30	3.67
120	0.98	1.47	1.96	2.45	2.94	3.43	3.92	4.41	4.90
160	1.31	1.96	2.61	3.26	3.92	4.57	5.22	5.88	6.53

Table G2 - Thermal Expansion Metric Units									
Length of Run Meters	Temperature Change ΔT °C								
	10	15	20	25	30	35	40	50	55
	Thermal Expansion, ΔL Millimeters								
1	0,6	0,9	1,2	1,5	1,8	2,1	2,4	3,1	3,4
2	1,2	1,8	2,4	3,1	3,7	4,3	4,9	6,1	6,7
3	1,8	2,7	3,7	4,6	5,5	6,4	7,3	9,2	10,1
4	2,4	3,7	4,9	6,1	7,3	8,5	9,8	12,2	13,4
5	3,1	4,6	6,1	7,6	9,2	10,7	12,2	15,3	16,8
7	4,3	6,4	8,5	10,7	12,8	14,9	17,1	21,4	23,5
9	5,5	8,2	11,0	13,7	16,5	19,2	22,0	27,5	30,2
12	7,3	11,0	14,6	18,3	22,0	25,6	29,3	36,6	40,3
15	9,2	13,7	18,3	22,9	27,5	32,0	36,6	45,8	50,3
20	12,2	18,3	24,4	30,5	36,6	42,7	48,8	61,0	67,1
25	15,3	22,9	30,5	38,1	45,8	53,4	61,0	76,3	83,9
30	18,3	27,5	36,6	45,8	54,9	64,1	73,2	91,5	100,7
40	24,4	36,6	48,8	61,0	73,2	85,4	97,6	122,0	134,2
50	30,5	45,8	61,0	76,3	91,5	106,8	122,0	152,5	167,8

38 TECHNICAL DATA

Table H1 - U.S. Units
Loop Length (30°F to 100°F) $\Delta T = 70^\circ F$

Length of Run Feet	Nominal Pipe Size – O.D. & ANSI Inches						
	3/4 1.050	1 1.315	1 1/4 1.660	1 1/2 1.900	2 2.375	2 1/2 2.875	3 3.500
	Length of Loop - Inches						
10	11	12	13	14	16	18	19
20	15	17	19	20	22	25	27
30	18	20	23	25	27	30	33
40	21	24	26	28	32	35	38
50	24	26	30	32	35	39	43
60	26	29	32	35	39	43	47
70	28	31	35	38	42	46	51
80	30	33	37	40	45	49	54
90	32	35	40	43	48	52	58
100	33	37	42	45	50	55	61
120	37	41	46	49	55	60	67
140	39	44	50	53	59	65	72
160	42	47	53	57	63	70	77

Note: Table based on Stress and Modulus of Elasticity at 100°F.

Refer to Table K1.

$\Delta T = 70^\circ F$, $S = 1560$ psi, $E = 3.85 \times 10^5$ psi

Table H2 - Metric Units
Loop Length (0°C to 40°C) $\Delta T = 40^\circ C$

Length of Run Meters	Nominal Pipe Size – O.D. & DN, mm						
	DN20 26,7	DN25 33,4	DN32 42,2	DN40 48,3	DN50 60,3	DN65 73,0	DN80 88,9
	Length of Loop - Meters						
3	0,3	0,3	0,3	0,4	0,4	0,4	0,5
5	0,3	0,4	0,4	0,5	0,5	0,6	0,6
10	0,5	0,5	0,6	0,7	0,7	0,8	0,9
15	0,6	0,7	0,8	0,8	0,9	1,0	1,1
20	0,7	0,8	0,9	0,9	1,0	1,1	1,3
25	0,8	0,9	1,0	1,0	1,2	1,3	1,4
30	0,9	1,0	1,1	1,1	1,3	1,4	1,6
35	0,9	1,0	1,2	1,2	1,4	1,5	1,7
40	1,0	1,1	1,2	1,3	1,5	1,6	1,8
45	1,0	1,2	1,3	1,4	1,6	1,7	1,9
50	1,1	1,2	1,4	1,5	1,6	1,8	2,0
55	1,2	1,3	1,5	1,5	1,7	1,9	2,1
60	1,2	1,3	1,5	1,6	1,8	2,0	2,2

Note: Table based on Stress and Modulus of Elasticity at 40°C.

Refer to Table K2.

$\Delta T = 38,9^\circ C$, $S = 107,6$ bar, $E = 26546$ bar

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Table J1 - U.S. Units
Loop Length (60°F to 120°F) $\Delta T = 60^\circ F$

Length of Run Feet	Nominal Pipe Size – O.D. & ANSI Inches						
	3/4 1.050	1 1.315	1 1/4 1.660	1 1/2 1.900	2 2.375	2 1/2 2.875	3 3.500
	Length of Loop - Inches						
10	10	12	13	14	16	17	19
20	15	16	18	20	22	24	27
30	18	20	22	25	27	30	33
40	21	23	26	28	31	34	38
50	23	26	29	31	35	38	42
60	25	28	32	34	38	42	46
70	27	31	34	37	41	45	50
80	29	33	37	39	44	48	54
90	31	35	39	42	47	51	57
100	33	37	41	44	49	54	60
120	36	40	45	48	54	59	66
140	39	43	49	52	58	64	71
160	41	46	52	56	62	69	76

Note: Table based on Stress and Modulus of Elasticity at 120°F.

Refer to Table K1.

$\Delta T = 60^\circ F$, $S = 1275$ psi, $E = 3.55 \times 10^5$ psi

Table J2 - Metric Units
Loop Length (15°C to 50°C) $\Delta T = 35^\circ C$

Length of Run Meters	Nominal Pipe Size – O.D. & DN, mm						
	DN20 26,7	DN25 33,4	DN32 42,2	DN40 48,3	DN50 60,3	DN65 73,0	DN80 88,9
	Length of Loop - Meters						
3	0,3	0,3	0,3	0,4	0,4	0,4	0,5
5	0,3	0,4	0,4	0,5	0,5	0,6	0,6
10	0,5	0,5	0,6	0,7	0,7	0,8	0,9
15	0,6	0,7	0,8	0,8	0,9	1,0	1,1
20	0,7	0,8	0,9	0,9	1,0	1,1	1,3
25	0,8	0,9	1,0	1,0	1,2	1,3	1,4
30	0,8	0,9	1,1	1,1	1,3	1,4	1,5
35	0,9	1,0	1,2	1,2	1,4	1,5	1,7
40	1,0	1,1	1,2	1,3	1,5	1,6	1,8
45	1,0	1,2	1,3	1,4	1,6	1,7	1,9
50	1,1	1,2	1,4	1,5	1,6	1,8	2,0
55	1,1	1,3	1,4	1,5	1,7	1,9	2,1
60	1,2	1,3	1,5	1,6	1,8	2,0	2,2

Note: Table based on Stress and Modulus of Elasticity at 50°C.

Refer to Table K2.

$\Delta T = 33,4^\circ C$, $S = 87,9$ bar, $E = 24477$ bar

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Table K1 - U.S. Units
Loop Length (70°F to 150°F) $\Delta T = 80^\circ F$

Length of Run Feet	Nominal Pipe Size – O.D. & ANSI Inches						
	3/4 1.050	1 1.315	1 1/4 1.660	1 1/2 1.900	2 2.375	2 1/2 2.875	3 3.500
	Length of Loop - Inches						
10	14	15	17	18	20	22	25
20	19	21	24	26	29	31	35
30	23	26	29	31	35	39	43
40	27	30	34	36	41	45	49
50	30	34	38	40	45	50	55
60	33	37	41	44	50	55	60
70	36	40	45	48	53	59	65
80	38	43	48	51	57	63	69
90	40	45	51	54	61	67	74
100	43	48	53	57	64	70	78
120	47	52	59	63	70	77	85
140	50	56	63	68	76	83	92
160	54	60	68	72	81	89	98

Note: Table based on Stress and Modulus of Elasticity at 150°F.
Refer to Table K1.

$\Delta T = 80^\circ F$, $S = 875$ psi, $E = 3.08 \times 10^5$ psi

Table K2 - Metric Units
Loop Length (20°C to 65°C) $\Delta T = 45^\circ\text{C}$

Length of Run Meters	Nominal Pipe Size – O.D. & DN, mm						
	DN20 26,7	DN25 33,4	DN32 42,2	DN40 48,3	DN50 60,3	DN65 73,0	DN80 88,9
	Length of Loop - Meters						
3	0,3	0,4	0,4	0,5	0,5	0,6	0,6
5	0,4	0,5	0,6	0,6	0,7	0,7	0,8
10	0,6	0,7	0,8	0,8	0,9	1,0	1,1
15	0,8	0,9	1,0	1,0	1,1	1,3	1,4
20	0,9	1,0	1,1	1,2	1,3	1,5	1,6
25	1,0	1,1	1,2	1,3	1,5	1,6	1,8
30	1,1	1,2	1,4	1,4	1,6	1,8	2,0
35	1,2	1,3	1,5	1,6	1,7	1,9	2,1
40	1,2	1,4	1,6	1,7	1,9	2,1	2,3
45	1,3	1,5	1,7	1,8	2,0	2,2	2,4
50	1,4	1,6	1,8	1,9	2,1	2,3	2,5
55	1,5	1,6	1,8	2,0	2,2	2,4	2,7
60	1,5	1,7	1,9	2,1	2,3	2,5	2,8

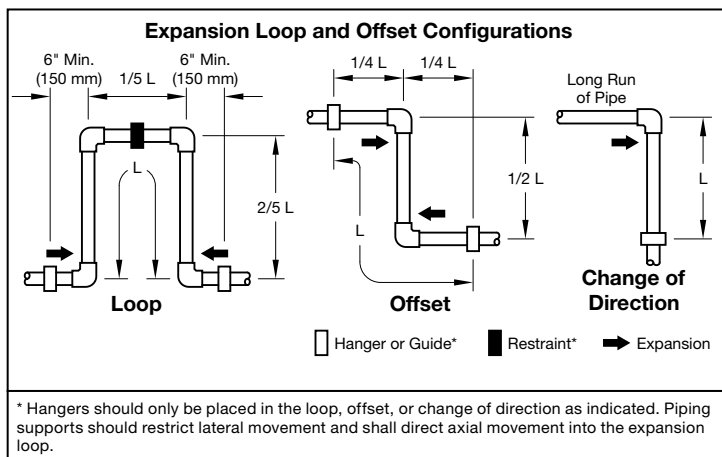
Note: Table based on Stress and Modulus of Elasticity at 65°C.

Refer to Table K2.

$\Delta T = 44,5^\circ\text{C}$, $S = 60,3$ bar, $E = 21237$ bar

Table L1 Modulus of Elasticity & Stress vs Temperature – U.S. Units								
Temperature °F	73°	80°	90°	100°	110°	120°	140°	150°
Modulus of Elasticity “E” x 10 ⁵ (psi)	4.23	4.14	3.99	3.85	3.70	3.55	3.23	3.08
Working Stress “S” (psi)	2,000	1,875	1,715	1,560	1,415	1,275	1,000	875

Table L2 Modulus of Elasticity & Stress vs Temperature – Metric Units								
Temperature °C	25°	30°	35°	40°	45°	50°	60°	65°
Modulus of Elasticity (bar)	29166	28545	27511	26546	25512	24477	22271	21237
Working Stress “S” (bar)	137,9	129,3	118,2	107,6	97,6	87,9	69,0	60,3

Figure 7


PHYSICAL AND THERMAL PROPERTIES

Table M - Physical and Thermal Properties			
Property		CPVC	ASTM
Specific Gravity	"Sp.Gr."	1.53	D792
IZOD Impact Strength (ft-lbs/in., notched)		3.0	D256A
Modulus of Elasticity, @73°F, psi	"E"	4.23 x 10 ⁵	D638
Ultimate Tensile Strength, psi		8,000	D638
Compressive Strength, psi	"o"	9,600	D695
Poisson's Ratio	"n"	.35 -.38	—
Working Stress @ 73°F, psi	"S"	2,000	D1598
Hazen Williams "C" Factor	"C"	150	—
Coefficient of Linear Expansion in/(in °F)	"e"	3.4 x 10 ⁻⁵	D696
Thermal Conductivity BTU/hr/ft ² /°F/in	"k"	0.95	C177
Flash Ignition Temperature	°F	900	D1929
Limiting Oxygen Index	"LOI"	60%	D2863
Electrical Conductivity	Non Conductor		

Permissible Bending Deflections

TYCO CPVC fire sprinkler piping while classified as a rigid piping material is inherently flexible. This flexibility allows piping to be deflected within permissible limits around or away from objects during installation.

The maximum allowable deflections for TYCO CPVC piping can be found in Tables N1 and N2 and Table P1 and P2.

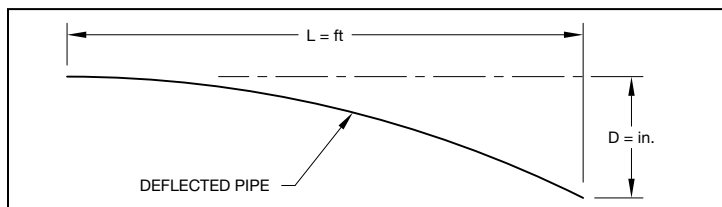


Table N1 - U.S. Units (1 of 2)
Permissible Bending Deflections SDR 13.5 at 73°F
"Bending" (One End Restrained)

(L) Length of Run Feet	Nominal Pipe Size – ANSI Inches						
	3/4	1	1 1/4	1 1/2	2	2 1/2	3
	(D) Deflection - Inches						
2	1.3	1.0	0.8	0.7	0.6	0.5	0.4
5	7.8	6.3	5.0	4.3	3.5	2.9	2.4
7	15.4	12.3	9.7	8.5	6.8	5.6	4.6
10	31.3	25.0	19.8	17.3	13.9	11.4	9.4
12	45.1	36.0	28.5	24.9	20.0	16.5	13.5
15	70.5	56.3	44.6	39.0	31.2	25.8	21.2
17	90.6	72.3	57.3	50.1	40.0	33.1	27.2
20	125.4	100.1	79.3	69.3	55.4	45.8	37.6
25	195.9	156.4	123.9	108.2	86.6	71.5	58.8
30	282.1	225.2	178.4	155.9	124.7	103.0	84.6
35	383.9	306.6	242.8	212.2	169.7	140.2	115.2
40	—	400.4	317.2	277.1	221.7	183.1	150.4
45	—	—	401.4	350.7	280.6	231.8	190.4
50	—	—	—	433.0	346.4	286.2	235.1

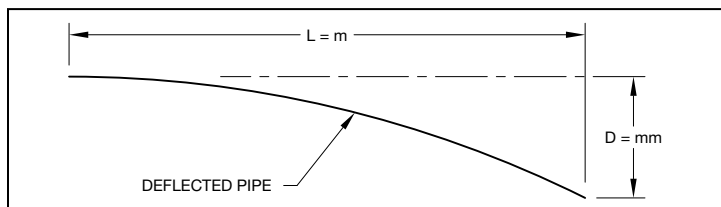


Table N2 - Metric Units
Permissible Bending Deflections SDR 13.5 at 23°C
“Bending ” (One End Restrained)

(L) Length of Run Meters	Nominal Pipe Size – DN						
	DN20	DN25	DN32	DN40	DN50	DN65	DN80
	(D) Deflection - Meters						
0.5	0,02	0,02	0,01	0,01	0,01	0,01	0,01
1	0,09	0,07	0,05	0,05	0,04	0,03	0,03
2	0,34	0,27	0,22	0,19	0,15	0,13	0,10
3	0,77	0,62	0,49	0,43	0,34	0,28	0,23
4	1,37	1,10	0,87	0,76	0,61	0,50	0,41
5	2,15	1,71	1,36	1,19	0,95	0,78	0,64
6	3,09	2,47	1,96	1,71	1,37	1,13	0,93
7	4,21	3,36	2,66	2,33	1,86	1,54	1,26
8	5,50	4,39	3,48	3,04	2,43	2,01	1,65
9	6,96	5,55	4,40	3,84	3,08	2,54	2,09
10	8,59	6,86	5,43	4,75	3,80	3,14	2,58
11	—	8,30	6,57	5,74	4,59	3,80	3,12
13	—	—	9,18	8,02	6,42	5,30	4,35
15	—	—	—	10,68	8,54	7,06	5,80

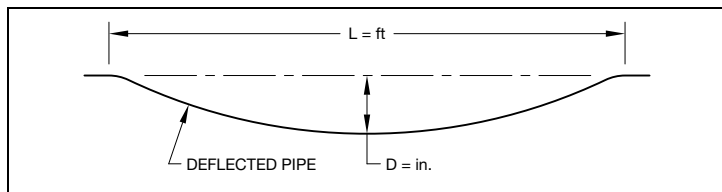


Table P1 - U.S. Units (1 of 2)
Permissible Bending Deflections SDR 13.5 at 73°F
“Snaking” (Both Ends Restrained)

(L) Length of Run Feet	Nominal Pipe Size – ANSI Inches						
	3/4	1	1 1/4	1 1/2	2	2 1/2	3
	(D) Deflection - Inches						
2	0.3	0.3	0.2	0.2	0.1	0.1	0.1
5	2.0	1.6	1.2	1.1	0.9	0.7	0.6
7	3.8	3.1	2.4	2.1	1.7	1.4	1.2
10	7.8	6.3	5.0	4.3	3.5	2.9	2.4
12	11.3	9.0	7.1	6.2	5.0	4.1	3.4
15	17.6	14.1	11.2	9.7	7.8	6.4	5.3
17	22.6	18.1	14.3	12.5	10.0	8.3	6.8
20	31.3	25.0	19.8	17.3	13.9	11.4	9.4
25	49.0	39.1	31.0	27.1	21.6	17.9	14.7
30	70.5	56.3	44.6	39.0	31.2	25.8	21.2
35	96.0	76.6	60.7	53.0	42.4	35.1	28.2
40	125.4	100.1	79.3	69.3	55.4	45.8	37.6
45	158.7	126.7	100.4	87.7	70.1	57.9	47.6
50	195.9	156.4	123.9	108.2	86.6	71.5	58.8

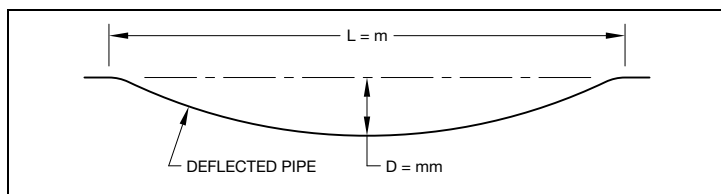


Table P2 - Metric Units
Permissible Bending Deflections SDR 13.5 at 23°C
"Snaking" (Both Ends Restrained)

(L) Length of Run Meters	Nominal Pipe Size – DN						
	DN20	DN25	DN32	DN40	DN50	DN65	DN80
	(D) Deflection - Meters						
0.61	0,008	0,006	0,005	0,004	0,004	0,003	0,002
1	0,022	0,017	0,014	0,012	0,010	0,008	0,006
2	0,086	0,069	0,054	0,048	0,038	0,031	0,026
3	0,194	0,155	0,122	0,107	0,086	0,071	0,058
4	0,344	0,275	0,218	0,190	0,152	0,126	0,103
5	0,538	0,429	0,340	0,297	0,238	0,196	0,161
6	0,774	0,618	0,490	0,428	0,342	0,283	0,232
7	1,054	0,842	0,667	0,582	0,466	0,385	0,316
8	1,377	1,099	0,871	0,761	0,609	0,503	0,413
9	1,742	1,391	1,102	0,963	0,770	0,636	0,523
10	2,151	1,718	1,361	1,189	0,951	0,786	0,645
11	—	2,078	1,646	1,438	1,151	0,951	0,781
13	—	—	2,299	2,009	1,607	1,328	1,091
15	—	—	—	2,675	2,140	1,768	1,452

SUPPORT AND HANGER REQUIREMENTS

Special care must be exercised when selecting the appropriate hanger or support method for TYCO CPVC Fire Sprinkler Systems.

TYCO CPVC Fire Sprinkler Systems may be supported as follows:

- Using the same hangers as metal piping systems that meet the requirements of this section
- Using hangers specifically listed for thermoplastic sprinkler piping
- Using any other support method acceptable to the local authority having jurisdiction

When using hangers/restraining devices, ensure that the hangers are clean, free of burrs, and free of all surface oils. Any foreign substance must be removed from the hanger.

When plumbers tape or J hooks are permitted by the authority having jurisdiction, for example NFPA 13D applications, rough edges are to be shielded.

Avoid using hangers of the incorrect size for the pipe being fastened/hung as the hanger can pinch, crush, and damage the piping system causing it to leak or crack under pressure. Leaks may not appear until after the pipe is in service.

The pipe size of the hanger shall be the same size as the supported pipe, and the hanger shall be applied to the pipe (i.e., not the fittings). Horizontal runs of piping must be braced so that stress loads (caused by bending or snaking the pipe) will not be placed on a fitting or joint. In jurisdictions that do not allow plastic to metal contact, rigid plastic sleeves should be used to isolate the materials. Strapping pipe overly tight to a structural member may cause damage to the pipe when pressurized. The pipe should be held snugly by the hanger, but cannot be pinched or crushed in any way. Pipe hangers must comply NFPA 13, NFPA 13D, NFPA 13R, or the standard recognized by the applicable Approval Agency, as appropriate.

Exception: In installations where TYCO CPVC Pipe is attached tight to a continuous ceiling with a “strap” style hanger, undue stress may be placed on the pipe. The outside dimension of the fitting is greater than that of the pipe and this size difference can create an unacceptable deflection of the pipe when the strap is located directly adjacent to the fitting. In this case only, and when the fitting is tight to the ceiling, it would be acceptable to use a hanger that is one size larger than the pipe. The use of such an oversized hanger would avoid the stress on the pipe.

Some hangers designed for metal pipe are suitable for use with TYCO CPVC Fire Sprinklers Systems. Hangers must not have rough or sharp edges that can come in contact with the pipe. Pipe hangers must have a load bearing surface at least 1/2 in. (12,7 mm) wide.

There are several types of hangers, that have been specifically listed as “Support Devices For Thermoplastic Piping,” such as Tolco (Model 22, 23, 24), Afcon (# 510, 511, 512) and Erico (No. 107, 108, 109). Consult the specific manufacturer



SHB1 Head Set

for information on the appropriateness of these devices as hangers and/or vertical restraining devices for use with TYCO CPVC Pipe and Fittings.

For complete installation and positioning requirements for the TYCO HEAD SET hangers refer to Technical Data Sheet TFP1920. They are designed for direct attachment to the side of a structural wood joist or structural composite wood joist Oriented Strand Board (OSB) web member or equivalent so as to provide accurate placement of sprinklers.

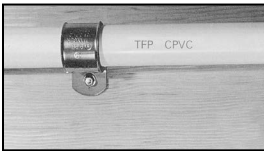
Pipe Bracing with Standard Band Hanger

Tolco, Inc., Afcon and Erico make hanger/restraining devices that are available for use with TYCO CPVC Pipe and Fittings.

A One Hole Strap, shown below, can function as a hanger and as a restraining device. As a restraining device, invert the hanger so that the fastener is downward. Installation in this manner will prevent upward movement of the sprinkler during activation.

A Two Hole Strap, shown below, can function as a hanger and as a restraining strap. UL Listed CPVC hangers incorporate features that protect the pipe from sharp edges and ease installation. The hex head self-threading screw (furnished with most UL Listed CPVC hangers) is easily installed using a rechargeable electric drill and a 5/16 in. (8,0 mm) socket attachment. No pre-drilling of a pilot hole is required.

Local codes have final authority on which types of hangers may be used.



One Hole Strap



Two Hole Strap

Hanger/Support Spacing

Because TYCO pipe is more rigid than other types of plastic pipe systems, the support spacing shown in Table R shall be adhered to when installing the system. For exposed installations, Listed support devices shall be used that mount piping directly to the ceiling or side wall, except when using upright sprinklers per the installation information in the Listings & Approvals Section of this handbook.

When the piping is supported by wood joists or trusses by laying the pipe directly on top of the structural members, the structure provides the support, assuming that the center spacing of the structural member does not exceed the requirements of Table Q.

Table Q
Maximum Support Spacing "L" (Feet) CPVC SDR 13.5

Nominal Pipe Size ANSI Inches (DN)	3/4 DN20	1 DN25	1 1/4 DN32	1 1/2 DN40	2 DN50	2 1/2 DN65	3 DN80
Support Spacing in Feet (m)	5-1/2 (1,7)	6 (1,8)	6-1/2 (2,0)	7 (2,1)	8 (2,4)	9 (2,7)	10 (3,0)

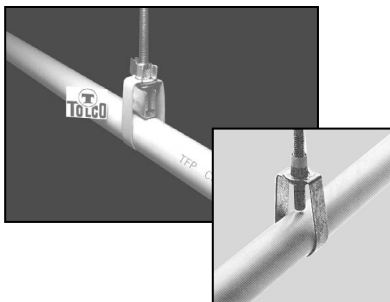
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Vertical Restraint

When a sprinkler activates, a significant reactive force is exerted on the pipe, especially at system static pressures greater than 100 psi (6,9 bar). The reactive force will cause the pipe to lift vertically if it is not properly secured, especially if the sprinkler drop is from a small diameter pipe.

When a sprinkler drop is 3/4 in. (DN19) to 1 1/4 in. (DN32) pipe, the closest hanger should brace the pipe against vertical lift. A number of techniques can be used to brace the pipe such as a standard band hanger positioning the threaded support rod to 1/16 in. (1,6 mm) above the pipe or using a split ring or a wrap-around hanger for restraint.

Note: Threaded rod shall not come in contact with CPVC when installed. It is advisable to use lift restraint devices such as those produced by Tolco and Afcon that prevent the threaded rod from coming in contact with the CPVC pipe (as shown above).

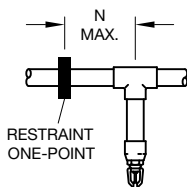
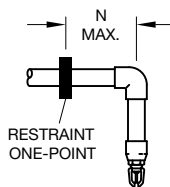


Branch lines shall be braced at a distance from a tee or elbow to prevent lift of sprinklers as shown in Tables R or S.

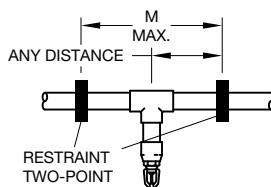
The hangers used for vertical restraint can also serve as the hangers for "Hanger/Support Spacing."

Table R - One Point of Restraint

Nominal Pipe Size ANSI Inches DN	"N" Less than 100 psi (6,9 bar)	"N" Greater than 100 psi (6,9 bar)
3/4 DN20	0'-9" (0,23 m)	0'-6" (0,15 m)
1 DN25	1'-0" (0,30 m)	0'-9" (0,23 m)
1 1/4 DN32	1'-4" (0,41 m)	1'-0" (0,30 m)
1 1/2 - 3 DN40 - DN80	2'-0" (0,61 m)	1'-0" (0,30 m)


*One-Point
Vertical
Restraint*

Table S - Two Points of Restraint

Nominal Pipe Size ANSI Inches DN	"M" Less than 100 psi (6,9 bar)	"M" Greater than 100 psi (6,9 bar)
3/4 DN20	4'-0" (1,22 m)	3'-0" (0,91 m)
1 DN25	5'-0" (1,52 m)	4'-0" (1,22 m)
1 1/4 DN32	6'-0" (1,83 m)	5'-0" (1,52 m)
1 1/2 - 3 DN40 - DN80	7'-0" (2,13 m)	7'-0" (2,13 m)

*Two-Point
Vertical
Restraint*


Sway Bracing Guidance for CPVC

Sway bracing for BLAZEMASTER CPVC shall be designed and installed per NFPA 13. Compressive load shall not be placed on CPVC pipe. Many common longitudinal sway braces exert compressive load on the pipe through a clamp and shall not be used with CPVC products. In order to avoid this, the installer should use lateral sway braces designed for use with CPVC pipe in one of the following manners. In accordance with NFPA 13, a lateral sway brace may be used as a longitudinal brace if they are within 24 in. of the centerline of the piping to be braced longitudinally and the lateral brace is on a pipe of equal or greater size than the pipe being braced longitudinally. If a line of equal or greater size is not available in the location of longitudinal bracing, a dead leg may be installed. This dead leg may be used to longitudinally brace a line with a lateral brace. Follow the procedure below to install and brace a dead leg.

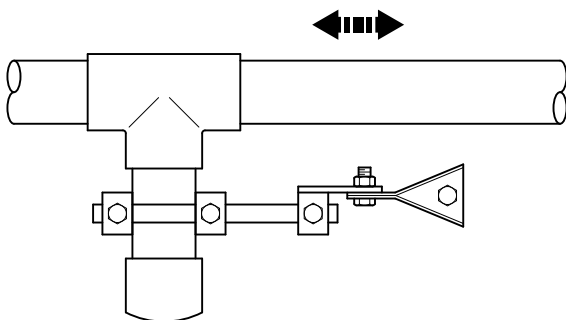
Step 1. Install a tee in the main or cross main at the point where longitudinal bracing is required.

Step 2. Cut a length of pipe with a diameter equal to or greater than the diameter of the main being longitudinally braced.

Step 3. Cap one end of the pipe using proper solvent welding technique. (See section on “Joining CPVC Pipe and Fittings with One-Step Solvent Cement.”)

Step 4. Solvent weld the pipe to the tee perpendicular to the main being longitudinally braced.

Step 5. Attach a lateral sway brace designed for use with CPVC pipe to the dead leg. The sway brace must be no greater than 24 in. from the center line of the main.



CHEMICAL COMPATIBILITY

NOTICE

Products coming in contact with CPVC systems must be chemically compatible. Products commonly used in construction, including materials ancillary to the assembly of fire sprinkler systems, may contain chemicals that are incompatible with CPVC, including but not limited to: hydrocarbons (for example, non-CPVC compatible cutting oils), termiticides and insecticides, surfactants, cooking oils, plasticizers (for example, flexible wire or hose), building caulks, and certain paints. This list is not meant to be exhaustive. Contact between CPVC and incompatible chemicals should be avoided; failure to avoid contact with incompatible chemicals may cause damage to/failure of the system. Consult The Lubrizol Corporation's FBC SYSTEM COMPATIBLE PROGRAM at www.fbcssystemcompatible.com. If the product in question is not identified in the FBC SYSTEM COMPATIBLE PROGRAM, Lubrizol recommends, as does TYCO, that the chemical compatibility be confirmed with the manufacturer of the product in question. As set forth in TYCO's Limited Warranty, TYCO does not provide a warranty for products or components which have been subject to deterioration from exposure to incompatible chemicals/materials.

NOTICE

PAINT

The Listings and Approvals do not cover any (to be installed or existing) painted CPVC fire sprinkler products.

Water-based acrylic latex paint is the preferred and recommended paint to be used on TYCO CPVC Pipe and Fittings. OIL OR SOLVENT-BASED PAINTS MAY BE CHEMICALLY INCOMPATIBLE WITH TYCO CPVC.

The installation contractor must take responsibility for obtaining approval from the authority having jurisdiction to cover the markings on the product (for example, product identification, listing marks) and to change color of the pipe and fittings from its identifiable orange. Application of oil or solvent-based paints must be individually reviewed, as there are certain types of paints and stains that contain drying oils and should not be used at all on CPVC. Contact the manufacturer of the paint for verification of compatibility of paints other than water-based acrylic latex.

INSTALLATION

NOTICE

The “Notification to Jobsite Building Trades” placard (Page 102) is to be posted from start to finish of a TYCO CPVC Fire Sprinkler System installation in a location where building trades can take notice. Upon completion of a TYCO CPVC fire sprinkler installation, the placard is to be posted in a conspicuous space adjacent to the water supply to the sprinkler system.

Sprinklers shall be installed only after all the CPVC pipe and fittings, including the sprinkler adapters, are solvent welded to the piping and allowed to cure for a minimum of 30 minutes. Sprinkler fittings should be visually inspected and probed with a wooden dowel to ensure that the water way and threads are clear of any excess cement that may restrict the flow of water before installing the sprinkler. Once installation is complete and cured per Tables U, V and W, the system shall be hydrostatically tested. It is an unacceptable practice to install sprinklers into the sprinkler adapter fittings and then solvent cement to the drop. Failure to allow sprinkler fitting joint to cure before installing sprinklers may result in cement in sprinkler waterway.

Assembly or disassembly of a threaded connection requires extreme care to avoid twisting of the CPVC pipe (for example, removal of a sprinkler from a CPVC pipe drop). A hold back device, approved for use with CPVC pipe and fittings, must be used on the threaded adapter to prevent damage to the CPVC piping.

HANDLING & STORAGE OF TYCO CPVC**Handling - Pipe and Fittings**

TYCO CPVC Pipe is protectively wrapped and fittings are packaged for ease of handling and storage, minimizing the potential damage of pipe and fittings due to transit handling and storage.

NOTICE

CPVC piping products have a lower impact strength as compared to metal piping products. Pipe fittings, packaged or loose, should never be tossed or thrown to the ground. Pipe should never be dropped or dragged on the ground (for example, when unloaded from a truck) and should remain boxed until ready for use. Impact cracks, splits or scratches can weaken or damage the pipe and fittings. Heavy or sharp objects should not be thrown into or against CPVC pipe or fittings. When handling CPVC pipe, ensure that the pipe is well supported and sagging is minimized. Failure to comply could result in damage of the CPVC pipe and in property damage due to leaks.

Very cold weather will make plastic pipe and fittings brittle. Extra care during handling should be taken to prevent damage.

TYCO CPVC Pipe and Fittings should always be inspected for damage before actual installation. Pipe or fittings with cuts, gouges, scratches, splits or other signs of damage from improper handling or storage should not be used. Damaged sections on lengths of pipe can easily be cut out using proper techniques for cutting TYCO CPVC Pipe.

Storage - Pipe & Fittings

TYCO CPVC Pipe and Fittings can be stored in their original packaging to keep them free from dirt and reduce the possibility of damage. TYCO pipe (un-packaged) must be covered with a non-transparent material when stored outdoors for extended periods of time. Brief exposure to direct sunlight on the job site may result in color fade, but will not affect physical properties. Long term exposure to direct sunlight will increase color fading and can make the pipe and fittings more brittle. Avoid long term exposure to ultra-violet light and/or direct sun exposure.

When storing inside, TYCO CPVC Pipe and Fittings should be kept in a well ventilated area, away from steam lines or other types of heat sources. TYCO CPVC Pipe and Fittings should always be stored in the original packaging until needed for use to keep them free from dirt and other contaminants, eliminate color fading, and reduce the possibility of damage.

Pipe should be stored on a clean, flat surface that provides an even support for the entire length of the pipe. When palletized pipe is stored, ensure that the wooden pallet bracings are in full contact with each other. Loose pipe should be stored in original packaging. When storing pipe on racks, the racks should have continuous or close support arms to prevent the pipe from sagging. Pipe racks should be free of oil/dirt and sharp edges that can damage the pipe when stored.

Plastic pipe fittings should be stored on pallets in their original cartons. The cartons should then be wrapped with thin plastic sheeting to prevent moisture from causing the packaging to collapse. To avoid hydrocarbon contamination and failure of the CPVC fittings under pressure, TYCO CPVC Fittings should never be stored with metal fittings.

Special care shall be taken to avoid contamination of TYCO CPVC Pipe and Fittings. (See Notice located on Page 55, Chemical Compatibility section)

Handling - Solvent Cements

⚠ CAUTION

Prior to using CPVC solvent cements, review and follow all precautions found on the container labels, material safety data sheet, and Standard Practice for Safe Handling ASTM F 402. Failure to follow precautions may result in injury.

Cements contain volatile solvents that evaporate rapidly. Avoid breathing the vapors and provide ventilation. If necessary, use a fan to keep the work area clear of fumes. Avoid skin contact. Keep the cement can closed when not in use. If the cement thickens beyond its original consistency, discard it. Do not attempt to dilute it with primer or thinner, as this may change the character of the cement and make it ineffective. Primers and thinners may also not be compatible with the TYCO CPVC and could cause failures. (See Notice located on Page 55, Chemical Compatibility section)

Before applying solvent cement, appropriate safety precautions should be taken. Cement must be stored between 40°F (4,4°C) and 90°F (32,2°C) and should be kept in the shade. Eliminate all ignition sources and do not smoke when using. Explosion proof general mechanical ventilation or local exhaust is recommended to maintain vapor concentrations below recommended exposure limits. In confined or partially enclosed areas, a NIOSH approved organic vapor cartridge respirator with full face piece is recommended. Containers of solvent cement should be closed when not in use. Wearing PVA coated protection gloves and an impervious apron are recommended. Splash proof chemical goggles are recommended. For further information refer to Technical Data Sheets TFP1990 SDS (Safety Data Sheet) for TFP-500 One Step Solvent Cement or TFP1994 SDS (Safety Data Sheet) for TFP-600 One Step Solvent Cement.

Note: TYCO's CPVC solvent cement has a shelf life of approximately one to two years.

Storage - Solvent Cements

Cement must be stored between 40°F (4,4°C) and 90°F (32,2°C) and should be kept in the shade. Eliminate all ignition sources.

Solvent - Cement Spills

The best protection from accidental spills of cement is to protect the work area with drop cloths. If cement comes in contact with fiberglass tub/shower enclosures, carpet or furniture, the excess cement must be wiped up immediately. Once the cement is dry, it is almost impossible to remove.

The use of solvents such as alcohol, M.E.K. or acetone will usually work on tile sinks or floors but can do more damage than good on some synthetic materials. Care should be used when trying any solvent to remove cement from any surface. Always protect the work area before starting, both under and around where cement spills can cause irreparable damage.

Whatever method is used, it should first be tested on a small hidden area, if it removes the shine or color or softens the surface, do not use.

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JOINING CPVC PIPE AND FITTINGS WITH ONE-STEP SOLVENT CEMENT

NOTICE

Read and understand all instructions prior to assembly. Follow all instructions. Failure to follow instructions during joining and testing may result in pipe failure, clogged waterways, or leakage.

Solvent cementing is the only method of joining rigid CPVC pipe and fittings that provides a chemically fused joint. Solvent cementing procedures must be carefully followed. Field experience has shown that problems can occur with improperly solvent cemented joints. Follow the instructions presented below carefully. Do not omit any steps and ensure that all facets of installation are fully understood prior to commencing work. Note the specific instructions and cure times for the TFP-500 or TFP-600 One Step Solvent Cement provided within this handbook. These instructions and cure times must be carefully followed. TFP offers a demonstration program for installers that is described on Page 5 of this handbook.

NOTICE

Use of solvent cement products other than TFP-500 or TFP-600 One Step Solvent Cement will void TYCO's warranty on TYCO CPVC Pipe and Fittings.

Avoid applying too much cement. Do not allow the cement to drip beyond the bottom of fitting socket. Do not allow the cement to puddle in the pipe and fitting assembly. Excessive cement on the pipe and/or fitting can weaken the wall of the pipe and/or fitting and may cause cracks when pressure is applied. Failure to comply could result in property damage due to leaks. Leaks may not appear until after the pipe and/or fitting is in service.

Estimating Cement Requirements

Guidelines to allow estimation of TYCO CPVC Cement quantities needed are provided in Table T.

Table T - Estimated Cement Requirements							
Fitting Size ANSI Inch DN	3/4 DN20	1 DN25	1 1/4 DN32	1 1/2 DN40	2 DN50	2 1/2 DN65	3 DN80
One Step Solvent Cemented Joints per Quart	260	170	125	95	65	40	30

Cutting

CPVC can easily be cut with a ratchet cutter, a wheel-type plastic tubing cutter, a power saw or a fine toothed saw. Tools used to cut CPVC must be designed for plastic use and must be in good condition in accordance with the tool manufacturer's recommendations. It is important to cut the pipe square. A square cut provides the surface of the pipe with maximum bonding area.

NOTICE

Avoid splitting the pipe when using ratchet cutters. Failure to do so may result in pipe failure or leakage.

- Only use ratchet cutters that contain a sharp blade (blades dull quickly).
- Only use ratchet cutters at temperatures of 50°F (10°C) or warmer.
- Only use well-maintained, good quality ratchet cutters capable of consistently cutting the pipe squarely.

If any indication of damage or cracking is evident at the pipe end, cut off at least 2 in. (50 mm) beyond any visible crack.

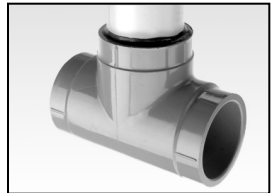
De-burring and Beveling

Burrs and filings can prevent proper contact between pipe and fitting during assembly, and must be removed from the outside and the inside of the pipe. A chamfering/reaming tool or a file is suitable for this purpose. A slight bevel (approximately 10° to 15° by 1/8 in. to 3/32 in.) shall be made at the end of the pipe along the outer diameter to ease entry of the pipe into the socket. This will also minimize the chance that the edges of the pipe will wipe solvent cement from the fitting socket during the insertion of the pipe.

Solvent Cement Application

⚠ CAUTION

Prior to using TFP-500 or TFP-600 One Step Solvent Cement, review and follow all precautions found on the container labels, Safety Data Sheet, and Standard Practice for Safe Handling ASTM F 402. Failure to follow precautions may result in injury.


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Using a clean, dry rag, wipe loose dirt and moisture from the fitting socket and pipe end. Moisture can slow the cure time and at this stage of assembly, and excessive water can reduce joint strength.

The pipe should easily enter the fitting socket one-third to two-thirds of the way. Contact between the pipe and fitting is essential in making a good joint. This contact allows the solvent cement (which is applied in the next step) to effectively join the pipe and fitting.

Use a dauber that is properly sized for the pipe. For 3/4 in. (DN20) and 1 in. (DN25) pipe, use a dauber that is 3/4 in. (19,1 mm) in size. For 1 1/4 in. (DN32) through 3 in. (DN80) pipe, use a dauber that is 1 1/2 in. (38,1 mm) in size.

Pint cans are furnished with 3/4 in. (DN20) daubers. Quart cans are furnished with 1 1/2 in. (38,1 mm) daubers. Additional daubers can be obtained through Customer Service.

All solvent cement joints shall be made with TFP-500 or TFP-600 One Step Solvent Cement, as applicable (see LISTINGS/APPROVALS).

Apply a heavy, even coat of cement to the outer wall of the pipe end. Apply a medium coat to the inside of the fitting socket. Pipe sizes 1 1/4 in. (DN32) and above shall always receive a second cement application. **FIRST APPLY CEMENT ON THE PIPE END, THEN IN THE FITTING SOCKET, AND, FINALLY, ON THE PIPE END AGAIN.**

NOTICE

Too much solvent cement can cause clogged waterways or weaken the wall of the pipe or fitting and result in pipe failure or leakage, which may not appear until after the pipe and/or fitting is in service.

- *Do not allow excess cement to puddle in the pipe and fitting assembly. To prevent this puddling, apply a lighter coating of solvent cement to the inside of the fitting socket than the outside of the pipe.*
- *Wipe off excess cement on the outside of the joint. The solvents will evaporate, but the solvent cement inside the fitting will stay there.*

Special care shall be exercised when assembling CPVC fire sprinkler systems in temperatures below 40°F (4°C). In colder temperatures extra time must be allowed for the solvent cement to set and cure. Extra care should be taken to prevent damaging the pipe during handling. (See Notice located on Page 58, Handling - Pipe and Fittings section.) When solvent cementing pipe and fittings in colder temperatures, make certain that the cement has not become lumpy or has not "gelled". Gelled cement must be discarded.

At temperatures above 80°F (27°C) make sure both surfaces to be joined are still wet with cement during assembly. Higher temperatures and/or wind accelerate the evaporation of the volatile solvents in the cement. Pipe stored in direct sunlight may have surface temperatures 20°F to 30°F (-7°C to -1°C) above the air temperature. If possible, store the pipe and fittings, or, at least the ends to be solvent welded, out of the direct sunlight prior to cementing. The solvents will penetrate hot surfaces more deeply. In such conditions, it is very important to avoid puddling the solvent cement inside the fitting socket.

Assembly

After applying cement, immediately insert the pipe into the fitting socket, while rotating the pipe one-quarter turn until the pipe bottoms out at the fitting stop. Rotate the pipe as it is inserted into the fitting, not after it has bottomed out in the fitting. Properly align the fitting for the installation at this time. Pipe must bottom to the stop. Hold the assembly for 30 seconds to ensure initial bonding. **A bead of solvent cement should be evident around the pipe and fitting juncture. If this bead is not continuous around the socket shoulder, it may indicate that insufficient cement was applied.** If insufficient cement is applied, the fitting must be cut out and discarded. Cement in excess of the bead should be wiped off with a clean, dry rag.

NOTICE

Failure to allow sprinkler fitting joints to cure before installing sprinklers may result in cement in the sprinkler waterway.

- *Install sprinklers only after all the CPVC pipe and fittings, including the sprinkler adapters, are solvent cemented and allowed to cure for a minimum of 30 minutes.*
- *Do not install sprinklers in the fittings prior to the fittings being cemented in place.*

Exercise care when installing sprinklers. Allow sprinkler head fittings and previously joined fittings to cure for a minimum of 30 minutes prior to installing the sprinkler. When installing sprinklers, be sure to anchor or hold the pipe drop securely to avoid rotating the pipe in previously cemented connections.

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NOTICE

Too much solvent cement can cause clogged waterways.

- *Visually inspect sprinkler fittings to ensure that the waterway and threads are clear of any excess cement.*
- *Once the installation is complete and cured per Table U, V or W, hydrostatically test the system.*

Set and Cure Times

NOTICE

Inadequate curing of solvent cement joints may cause pipe failure or leakage. Solvent cement set and cure times are a function of pipe size, temperature, relative humidity, and tightness of fit.

Cure times should be increased when moisture is present, such as during cut-ins to live sprinkler lines. (NOTE: A specific procedure for modifications or repairs to existing CPVC fire sprinkler lines is included in this manual.) The assembly must be allowed to set, without any stress on the joint, for 1 to 5 minutes, depending on pipe size and temperature. Following the initial set period, the assembly can be handled carefully, **avoiding significant stresses to the joint.**

See Tables U, V, and W for minimum cure times prior to pressure testing.

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Table U			
Nominal Pipe Size ANSI Inches DN	Ambient Temperature Ranges During Cure Period		
	60°F to 120°F (16°C to 49°C)	40°F to 59°F (4°C to 15°C)	0°F to 39°F (-18°C to 3°C)
	Minimum Cure Times for Systems Requiring Pressure Testing up to 100 psi (6,9 bar)		
3/4 / DN20	15 minutes	15 minutes	30 minutes
1 / DN25	15 minutes	30 minutes	30 minutes
1 1/4 / DN32	15 minutes	30 minutes	2 hours

Table V			
Nominal Pipe Size ANSI Inches DN	Ambient Temperature Ranges During Cure Period		
	60°F to 120°F (16°C to 49°C)	40°F to 59°F (4°C to 15°C)	0°F to 39°F (-18°C to 3°C)
	Minimum Cure Times for Systems Requiring Pressure Testing up to 200 psi (13,8 bar)		
3/4 / DN20	45 minutes	1-1/2 hours	24 hours
1 / DN25	45 minutes	1-1/2 hours	24 hours
1 1/4 / DN32	1-1/2 hours	16 hours	120 hours
1 1/2 / DN40	1-1/2 hours	16 hours	120 hours
2 / DN50	6 hours	36 hours	*
2 1/2 / DN65	8 hours	72 hours	*
3 / DN80	8 hours	72 hours	*

Table W			
Nominal Pipe Size ANSI Inches DN	Ambient Temperature Ranges During Cure Period		
	60°F to 120°F (16°C to 49°C)	40°F to 59°F (4°C to 15°C)	0°F to 39°F (-18°C to 3°C)
	Minimum Cure Times for Systems Requiring Pressure Testing up to 225 psi (15,5 bar)		
3/4 / DN20	1 hour	4 hours	72 hours
1 / DN25	1-1/2 hours	4 hours	72 hours
1 1/4 / DN32	3 hours	32 hours	10 days
1 1/2 / DN40	3 hours	32 hours	10 days
2 / DN50	8 hours	48 hours	*
2 1/2 / DN65	24 hours	96 hours	*
3 / DN80	24 hours	96 hours	*

* For this size pipe and fitting, the solvent cement can be applied at temperatures below 40°F (4,4°C), however, the sprinkler system temperature must be raised to a temperature of 40°F (4,4°C) or above and allowed to cure per the requirements listed above prior to pressure testing.

System Acceptance Testing (Hydrostatic Pressure Test)

⚠ WARNING

Never use compressed air or nitrogen in lieu of or to replace the required hydrostatic system acceptance testing. Any pre-testing performed with low pressure air or nitrogen should follow the recommendations on Page 65. System failure when using high-pressure compressed air or nitrogen may result in property damage, serious injury, or death.

Once an installation is completed and joints are properly cured per the above instructions, the system shall be pressure tested with water at 200 psi (13,8 bar) for 2 hours. See Table V for curing conditions at 200 psi (13,8 bar).

The system shall be pressure tested with water at 50 psi (3,4 bar) in excess of maximum pressure when the maximum system pressure is to be maintained in excess of 150 psi (10,3 bar). See Table W for curing conditions at 225 psi (15,5 bar). This requirement is in accordance with the requirements established by NFPA Standard 13, Section 24.2.1 (2013 Edition).

Sprinkler systems in one- and two-family dwellings and mobile homes may be pressure tested with water at line pressure, after following Table U curing conditions, in accordance with the requirements established by NFPA 13D, Section 4.3 (2013 Edition).

When pressure testing, the sprinkler system shall be slowly filled with water and the air bled from the highest and farthest sprinklers before pressure testing begins. Air must be removed from piping systems (plastic or metal) to prevent it from being locked in the system when pressure is applied. Entrapped air can generate excessive surge pressures that can result in bodily injury and/or property damage, regardless of the piping materials used.

If a leak is found, the leaking pipe and/or fitting must be cut out and discarded. A new section of piping can be installed using couplings or a union. Unions should be used in accessible areas only.

Limited Pressurized Air or Nitrogen Testing Allowance

⚠ WARNING

Extreme caution must be exercised when applying pressurized air or nitrogen to TYCO BLAZEMASTER CPVC systems. System failure caused by high-pressure compressed air or nitrogen can cause property damage, severe personal injury, or death.

If it is necessary to pre-test a TYCO BLAZEMASTER CPVC piping system with air or nitrogen prior to the required hydrostatic test, the following recommendations must be followed:

1. Maximum pressure (air or nitrogen) must never exceed 15 psig and must be regulated using the appropriate air maintenance device.
2. Air or nitrogen introduced into the system must not contain oils, lubricants, or other chemicals. Use an oil-less compressor. (Information regarding chemical and substance compatibility with TYCO BLAZEMASTER CPVC can be found at www.fbcssystemcompatible.com.)
3. Proper use of Personal Protective Equipment (PPE), including but not limited to safety glasses, hard hats, and protective gloves, must be worn

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while performing any air test. Prior to pressurization and for the duration of the test, all personnel must be evacuated from the test area.

Note: *This recommendation applies only when the pre-testing of a system has been deemed necessary. Pre-testing with low pressure air or nitrogen is not a substitute for hydrostatic testing, which is required by the installation standard (i.e., NFPA).*

JOINING PIPE AND FITTINGS IN ADVERSE CONDITIONS

In Cold Weather

TFP-500 and TFP-600 One Step Solvent Cements are suitable for joining TYCO CPVC Pipe and Fittings during cold weather temperatures as low as 0°F (-18°C) minimum (assembly in temperatures below 0°F (-18°C) are not permitted). The time period for bonding CPVC pipe and fittings is affected by temperature; therefore, very cold weather requires extra time to cure cemented joints.

When assembling a CPVC pipe and fitting system requiring pressure testing at 225 psi (15,5 bar) (See Table W) and the Ambient Temperature is less than 0°F (-18°C), the CPVC pipe and fittings must be conditioned in a freezer at 0°F (-18°C) for 24 hours prior to assembly. Immediately after the 24 hour conditioning period, join the pipe and fittings with TFP-500 or TFP-600 One Step Solvent Cement in the 0°F (-18°C) environment and allow to cure per Table W before pressure testing.

Very cold weather will make TYCO CPVC Pipe and Fittings brittle. Extra care should be taken during such conditions to prevent damage while handling, cutting, de-burring, beveling, and assembly.

NOTICE

Extra care must be exercised if using ratchet cutters as they may split the pipe if not properly used and maintained. See Cutting section on Page 61.

When working in cold weather, be aware that solvents formulated into TFP-500 and TFP-600 cements penetrate and soften the CPVC surfaces more slowly than in warm weather. Colder temperatures require greater cure times due to the slower evaporation of primer in solvent cements. See Tables U, V and W for cure times at various temperature ranges.

Other considerations are required when preparing for and joining CPVC pipe and fittings in cold weather conditions:

1. Carefully read and follow all instructions before installation.
2. Prefabricate as much of the system as possible in a heated working area.
3. Store cements in a warm area when not in use and make sure they remain fluid. Do not allow the cement to freeze or become "jelly-like." Gelled cement shall be discarded.
4. Take special care to remove moisture, including ice and snow.
5. When using TFP-500 or TFP-600 One Step Solvent Cement, primer shall never be used.
6. Allow a longer cure period before the system is used.

In Hot Weather

CPVC solvent cements contain volatile solvents. Higher temperatures and/or wind accelerate evaporation. Pipe stored in direct sunlight may have surface temperatures of 20°F to 30°F (-7°C to -1°C) above air temperatures. Solvents attack these hot surfaces deeper; therefore, it is very important to avoid puddling the cement inside the fitting socket. Always ensure that the excess cement is wiped from the outside of the joint.

Follow the standard installation instructions and take special note of the tips and cautions below:

1. See Tables G1 & G2 for the appropriate temperature related expansion and contraction information.
2. Store solvent/cements and primers in a cool or shaded area prior to use.
3. If possible, store pipe and fittings, or at least the ends to be solvent welded, in a shady area before cementing.
4. Make sure both surfaces to be joined are still wet with cement when putting them together. With larger size pipe more people may be required to complete the application successfully.
5. Carefully read and follow all instructions before installation.

TRANSITION TO OTHER MATERIALS

Male and female brass insert thread adapters, grooved pipe adapters, or flanges shall be used when connecting a TYCO system to other piping materials. Special brass insert threaded fittings or the Rapid Seal Adapter (RSA) series are used for connection to sprinklers.

When TYCO CPVC Pipe and Fittings are used in combination systems with steel pipe, compliance with 2013 NFPA 13 sections 6.3.7 and 6.4.3, and 2013 NFPA 13R sections 5.2.3 and 5.2.12.2 is required.

The instructions for transitioning to other materials are specifically for TYCO CPVC Fittings. Should other Listed BLAZEMASTER CPVC Fittings be used in conjunction with TYCO CPVC products, consult the fitting manufacturer's installation and design manuals.

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NOTICE

Care must be taken when transition is made to dissimilar materials. Brass inserts used in male and female threaded and grooved CPVC adapters may create galvanic reaction with steel and iron drop nipples, pipe, and cast fittings in certain water conditions. If you are unsure of the potential for galvanic reaction to occur, verify the water condition and conductivity of the water being used in the sprinkler system piping prior to installation. Brass threaded nipples are recommended when using brass inserted threaded TYCO CPVC Fittings to reduce the potential of galvanic reaction caused by dissimilar metals.

Care must be taken when transition is made from metallic pipe, fittings and flanges. When transitioning from metallic pipe system to a TYCO CPVC piping system via grooved adapter, male or female thread adapter or flanges, caution must be taken to ensure that all hydrocarbons and/or cutting oils are thoroughly removed from both inside and outside of the metallic pipe, fittings and flanges prior to assembly with TYCO CPVC Pipe and Fittings. (See Notice located on Page 55, Chemical Compatibility section.)

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Brass Threaded Connections

A thread sealant shall be used in making wrench-tightened NPT threaded connections. TEFLON thread tape is the recommended sealant. Some thread sealants other than TEFLON thread tape contain solvents or other materials that may be damaging to CPVC. For other types of thread sealants, which have been specifically investigated and confirmed to be "System Compatible," refer to the FBC System Compatible Program at www.fbcssystemcompatible.com, Underwriters Laboratory and FM Global Approvals.

Note: *The use of any other thread sealant may result in damage to the TYCO CPVC and/or the brass insert. DO NOT use a combination of tape and thread sealant on the same joint.*

When using TEFLON thread tape, TYCO recommends a thickness of 0.003 in. (3 mils) ± 0.0005 in. and the tape must meet or exceed military specification MIL-T-27730A. The tape should be wrapped in the direction of the threads. Generally 2 to 3 wraps are sufficient to obtain a leak free seal.

When using OATEY GREAT WHITE Thread Sealant, it should be applied to the male threads only. Make sure all the threads are covered and DO NOT clog the waterway with excess sealant.

Care must be taken to avoid over-torquing. Usually 1 to 2 turns beyond finger tight is all that is required to make up a threaded connection. For sprinkler torque requirements refer to the appropriate sprinkler technical data sheets.

NOTICE

A hold back device, approved for use with CPVC pipe and fittings, must be used when torquing the body of the sprinkler adapter. Failure to so may result in damage to the brass threaded connector and void the TFPP warranty. Additionally, the CPVC system may also fail or leak, resulting in property damage.

Sprinkler Installation in Rapid Seal Adapter (RSA) Fittings

Install sprinklers in RSA Fittings in accordance with the following procedure.

Refer to individual sprinkler data sheets for additional information including required sprinkler wrenches.

NOTICE

For assembly of CPVC piping and fittings, see Tables on Page 63 and Joining Pipe and Fittings in Adverse Conditions section on Page 66 for Curing Time.

⚠ CAUTION

DO NOT apply thread sealant or TEFLON thread tape on sprinklers intended to be installed in RSA Fittings. Thread Sealant or TEFLON tape may not allow the sprinkler to seat properly and cause leakage and/or equipment failure.

Step 1. Ensure the sprinkler threads are clean and do not have thread sealant such as tape or paste applied. Avoiding cross-threading, gently thread the sprinkler into the fitting and hand-tighten until the sprinkler makes contact with the gasket.

⚠ CAUTION

Do not over-torque sprinklers when wrench-tightening with the manufacturer required sprinkler wrench. Over-torquing may result in equipment damage.

For recessed applications do not attempt to compensate for insufficient sprinkler depth within the Escutcheon Plate by under- or over-tightening the sprinkler. Re-adjust the sprinkler fitting position to suit

Step 2. Adjust orientation of the sprinkler by applying the manufacturer specified sprinkler wrench to the sprinkler wrench flats and wrench-tighten an additional 1/2 to 1 full turn, or by applying a minimum-to-maximum torque of 5 to 7 ft lb (6,8 to 9,5 N·m).

Gasket Replacement in Rapid Seal Adapter (RSA) Fittings

NOTICE

Gasket Replacement and its associated tools were not evaluated as part of the UL Listing program.

In the event that a sprinkler, installed in an RSA fitting longer than six months, is removed due to damage or activation, the RSA fitting or the RSA fitting gasket must be replaced.

See Appendix A for separately ordered replacement gaskets and tools.

Step 1. Remove the sprinkler from the RSA fitting.

CAUTION

Use caution when removing the gasket to avoid damaging the adapter threads. Failure to do so may result in equipment damage or failure.

Step 2. Using the Rapid Seal Gasket Removal Pick, (see Figure 2) carefully remove the gasket from the RSA fitting. Discard the old gasket.

Step 3. Verify that the RSA fitting port is clean - free of all debris, chips, or burrs. Failure to do so may result in equipment damage or failure.

Step 4. Ensure the tool Base Socket is the correct size, 1 1/4 in. socket or 1 1/2 in. socket, for the RSA fitting.

Note: *To change the Base Socket, remove two socket head cap screws using a 3/16 in. hex head wrench.*

Step 5. Rotate the Rapid Seal Gasket Replacement Tool insertion shaft (see Figure 3) counter-clockwise until fully retracted. Place the Rapid Seal Replacement Gasket (see Figure 4) onto the shaft end boss and rotate the shaft clockwise until the gasket is flush with the surface of the base recess.

Step 6. Holding the Rapid Seal Gasket Replacement Tool (see Figure 3) base recess firmly against the face of the RSA fitting, rotate the insertion shaft until fully engaged. Remove the Rapid Seal Gasket Replacement Tool from the RSA and verify that the gasket is evenly seated and fully installed in the RSA fitting port.

Step 7. Install the replacement sprinkler in accordance with the Sprinkler Installation section in this handbook.

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Grooved Coupling Adapter Connections

The following procedures are recommended for proper assembly of the Grooved Coupling Adapter:

Inspect the fittings and pipe to ensure that they are sufficiently free of indentations, projections or roll-marks on the gasket seating areas of the fitting and pipe. The pipe should be squarely cut. Any loose scale, paint and/or dirt must be removed from the groove and seating surfaces prior to assembly.

Flexible couplings such as GRINNELL Figures 705 or 707 shall be used with grooved coupling adapters in wet pipe systems. Refer to flexible coupling Technical Data Sheets TFP1820 or TFP1840 for additional information. Use a standard grade EPDM-A gasket that is suitable for wet pipe fire sprinkler service, see TFP1895 for temperature ratings.

Flexible couplings such as GRINNELL Figures 705 or 707 shall be used with grooved coupling adapters in dry pipe systems. Refer to flexible coupling Technical Data Sheets TFP1820 or TFP1840 for additional information. Use a standard grade EPDM-A or EPDM-E gasket that is suitable for dry pipe fire sprinkler service, see TFP1895 for temperature ratings. Dry pipe systems require an external lubricant, see Notice below.

NOTICE

For dry pipe and freezer applications, the addition of a petroleum free silicone lubricant is required.

Products coming in contact with CPVC systems (for example, coupling gaskets, coupling lubricants) must be chemically compatible. (See Notice located on Page 55, Chemical Compatibility section.) Use of rigid style couplings may damage the grooved coupling adapter. Consult the grooved coupling manufacturer for proper selection and installation instructions.

Use of petroleum based lubricants will damage the gasket and may damage the adapter, resulting in stress failure of the CPVC housing that could cause property damage.

PENETRATING FIRE RATED WALLS & PARTITIONS

Consult the authority having jurisdiction and building codes prior to penetrating fire rated walls and partitions. Several through-penetration firestop systems are UL Classified for use with CPVC pipe. TFPF recommends BLAZEMASTER Caulk and Walk for use with TYCO CPVC Pipe and Fittings, as this caulking product contains a water based intumescent that will not harm the CPVC compound as verified by The Lubrizol Corporation. The use of fire-stopping materials incompatible with TYCO CPVC Pipe and Fittings may cause damage to and/or failure of the CPVC system. (See Notice located on Page 55, Chemical Compatibility section.)

TYCO CPVC piping systems shall be designed and installed so that the piping is not closely located to heat producing sources, such as light fixtures, ballasts and steam lines. Pipe must not be positioned directly over open ventilation grills. Finally, during periods of remodeling or ceiling repair, appropriate steps must be taken to shield the piping from the protected occupancy.

Because TYCO CPVC Pipe is much more flexible than metallic sprinkler pipe, it has greater capacity to withstand earthquake damage. In areas subject to earthquakes, TYCO CPVC piping systems should be designed and braced in accordance with local codes and NFPA Standard 13. For information regarding Bending Deflections and Snaking Deflections for given lengths of CPVC SDR 13.5 pipe, See Tables N1, N2, P1, and P2.

Use extreme care when passing TYCO CPVC Pipe and Fittings through metal studs, as the sharp cut edges of these studs can scar or puncture thermoplastic pipe. TFPP recommends the use of chemically compatible rubber or plastic grommets such as those commonly used in the plumbing industry for protection of the pipe when passing through such spaces. Consult your local authority having jurisdiction for additional information regarding the protection of thermoplastic pipe when passed through metal studs. (See Notice located on Page 55, Chemical Compatibility section.)

FREEZE PROTECTION

Use of Dry Type Sprinklers

When dry type sprinklers are connected to a water filled TYCO CPVC piping system protecting areas subject to freezing temperature, consideration must be given to the appropriate length of the sprinkler that will prevent freezing of the water in the connecting pipes due to conduction, as well as the compatibility of the fitting to which the dry type sprinkler will be attached. Refer to the sprinkler manufacturers' installation instructions for specific guidance on the minimum recommended lengths between the face of the sprinkler fitting and the outside surface of the protected area, as well as the appropriate fitting types for use with dry type sprinklers.

Use and Cautions with LFP® Antifreeze or Glycerin Antifreeze

TYCO CPVC Pipe and other Listed TYCO CPVC Fittings can be protected with LFP® Antifreeze only as outlined by NFPA 13 in areas that are subject to freezing. The guidelines provided in this manual must be followed when providing freeze protection for TYCO CPVC Pipe and Fittings. LFP® Antifreeze is the first UL Certified (Listed) antifreeze for use in CPVC systems. Refer to technical data sheet TFP1680 for instructions on using LFP® Antifreeze in CPVC systems.

When adequate freeze protection cannot be attained with antifreeze, TYCO CPVC systems are recommended to be protected by using batt insulation and building construction techniques that ensure adequate freeze protection and wind blocking. Batt insulation guidelines are provided by most local authorities having jurisdiction with recommendations for NFPA 13D installations provided in the Appendix of that Standard. Local building code and authorities having jurisdiction requirements must be followed carefully, as misplaced or inadequate insulation and wind blocking can create localized freeze of the system piping that can result in damage to the structure and piping system. When adequate insulation and wind blocking are not available, TYCO CPVC Pipe and other Listed TYCO CPVC Fittings can be protected with LFP® Antifreeze or Glycerin antifreeze solutions only as outlined by NFPA 13 in areas that are subject to freezing. The guidelines provided below must be followed when providing freeze protection for TYCO CPVC Pipe and Fittings.

NOTICE

Products coming in contact with CPVC systems (for example, anti-freeze, alcohol based cleaners) must be chemically compatible. (See Notice located on Page 55, Chemical Compatibility section.)

- **The use of glycol based antifreeze solutions is specifically prohibited for use with TYCO CPVC systems.**
- Prior to using Glycerin Antifreeze, consult the local authority having jurisdiction on the use of antifreeze solutions in fire sprinkler applications.
- Prior to using Glycerin antifreeze solutions, consult the NFPA 13 standard for rules and guidelines.
- If hydro testing the sprinkler system, ensure that the system is completely drained of water prior to introducing LFP® Antifreeze or Glycerin antifreeze. The antifreeze solution will not fully mix with trapped water in sprinkler drops and sprinkler system low points, potentially allowing freezing in these areas of the system.
- A Glycerin antifreeze sprinkler system is more prone to leakage than a water only sprinkler system. Glycerin characteristics increase the capacity for leakage and can be successfully addressed by using care when making threaded connections by ensuring sufficient torque is applied to the male and female threads being mated.

A thread sealant shall be used in making threaded connections. TEFLON thread tape is the recommended sealant. Some thread sealants other than TEFLON thread tape contain solvents or other materials that maybe damaging to CPVC. For other types of thread sealants, which have been specifically investigated and confirmed to be "System Compatible," refer to the FBC System Compatible Program at www.fbcssystemcompatible.com.

TYCO recommends between 14 to 21 lb-ft (19,0 to 28,5 N·m) of torque to achieve a leak free 1/2 in. (DN15) NPT seal. Do not use fittings or sprinklers with damaged threads in glycerin systems, as the damaged threads create increased leakage potential. Rapid Seal Adapter fittings are not to be used with a thread sealant. The manufacturer instructions should be followed to obtain a good seal to prevent leaking in Rapid Seal Adapter fittings.

- Glycerin antifreeze can be cleaned with alcohol based cleaners. Prior to using any cleaner on a surface, ensure compatibility with the surface material to be cleaned. If compatibility with the surface to be cleaned is questionable, a small section of the surface should be spot cleaned prior to wide spread application of the cleaner.

Batt Insulation Requirements and Suggestions

Many jurisdictions recommend the use of batt insulation for freeze protection in place of antifreeze solutions. These jurisdictions typically publish recommended batt insulation guidelines that provide the minimum thickness of insulation to be utilized. These minimum insulation recommendations should be followed. Insulation requirements may vary by geographic area given climate conditions. Batt insulation is used to maintain a minimum water temperature in the sprinkler piping of 40°F (4,4°C). The minimum insulation recommendations pictured in the Appendix of NFPA 13D are shown primarily for piping wood frame ceilings with an unheated attic or an un-insulated roof above. Many jurisdictions do not allow the installation of water filled sprinkler piping in unheated outside walls. Consult the local authority having jurisdiction prior to installing batt insulation for freeze protection with BLAZEMASTER CPVC products.

NOTICE

Products coming in contact with CPVC systems (for example, insulation) must be chemically compatible. (See Notice located on Page 55, Chemical Compatibility section.)

Batt Insulation Installation Recommendations

The 2007 edition of NFPA 13D, The Standard for the Installation of Sprinkler Systems in One and Two-Family Dwellings and Manufactured Homes, Appendix A.8.3.1 recommends the following guidelines for use of batt insulation:

In areas subject to freezing, care should be taken to cover sprinkler piping completely in unheated attic spaces with insulation. Installation should follow the guidelines of the insulation manufacturer. (Figures A.8.3.1 (a) through (e) show several installation methods that can be considered.)

- A.8.3.1 (a) "It is important that the insulation be installed tight against the joists. In unheated areas, any spaces or voids between the insulation and the joists causes the water in the fire sprinkler piping to freeze."
- A.8.3.1 (b) "For areas having temperatures of 0°F (-18°C) or lower, an additional batt of insulation covering the joist and the fire sprinkler piping should be used. If this is not done, localized freeze-ups can occur in the sprinkler piping."
- A.8.3.1 (c) "Boring holes in the joist is one of the methods for locating the fire sprinkler piping in the ceiling. As an alternative, when temperatures are expected to be 0°F (-18°C) or lower, loose pieces of insulation should be stuffed in the bored holes around the piping."
- A.8.3.1 (d) (e) "Care should be taken to avoid compressing the insulation. This reduces its R value. To prevent potential freeze-ups of the sprinkler piping, the insulation should be tight against the joists."

Minimum insulation R value requirements are typically between R19 and R30; however, the minimum requirements must be verified with the authority having jurisdiction.

CUT-IN PROCEDURE FOR SYSTEM MODIFICATION AND REPAIR

At times it may become necessary to make modifications to existing CPVC fire sprinkler systems. Cut-ins can be done safely when the proper procedures are followed. The following procedure has been developed to assure that the modifications are done successfully.

Prior to making cut-ins to existing systems, care should be used to review proper joining procedures and to follow cut-in cure schedules (Tables U, V and W) to ensure system integrity. Several methods can be utilized to tie into an existing system using a socket style tee fitting in combination with the use of socket unions, grooved coupling adapters, and flanges. Regardless of the method used, the following points must be followed to ensure system integrity:

- Using proper tools, the cut-in should be made on the smallest diameter pipe section (that is capable of adequately supplying the system changes) in close proximity to the modification being made. This approach will expedite cure times prior to pressure testing.
- The cut-in connection to the existing system should be made first, prior to proceeding with additional work.

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- Existing lines must be drained adequately prior to solvent cementing. Use a Drain Vac unit to be sure all water is removed from the system. Moisture can slow the cure time and will reduce joint strength.
- Carefully review and follow the solvent cementing procedures for proper joining techniques prior to commencing the cut-in (pipe must be cut square to proper length, de-burred, beveled and dry to ensure proper insertion depth and system integrity).
- Carefully measure and cut pipe to proper length to ensure complete insertion during assembly (first check the interference fit of the components being joined).

Note: During assembly of the cut-in tee (and other components), it is important to make a one-quarter turn when inserting the pipe into the fitting per the installation instructions. This may require the use of several components assembled in combination with the cut-in tee to create a short spool piece assembly. This can be accomplished by using socket unions, flanges, or grooved coupling adapters that will ensure that a one-quarter turn can be obtained on all pipe connections being joined.

- Prior to applying the solvent cement, use a clean dry rag to wipe moisture and dirt from the fitting socket and the pipe end (the presence of moisture on the joining surfaces will reduce joint integrity).
- Use a new can of solvent cement when making cut-in connections (verify expiration dates stamped on can prior to use).
- After all work is completed, the cut-in joints must be allowed to cure properly prior to pressure testing as shown in the Tables U, V, and W.
- After work is completed and the cut-in cure times are met, inspect work for proper alignment and hanger placement prior to pressure testing.
- After cut-in cure times are met, the system must be slowly filled with water and the air bled from the farthest and highest sprinklers before test pressure is applied. (See instructions regarding pressure testing the system.)
- After cut-in cure times are met and the air is bled from the system, pressure testing of the portion of the sprinkler system containing the cut-in tee is recommended. Prior to pressure testing, the system must be isolated off to its smallest area using floor valves, etc., to isolate the cut-in area. Additionally, the recommended test pressure to be applied is a maximum of 50 psi (3,4 bar) over the system operating pressure. Should a leak occur, this approach will minimize the potential for water damage.
- When tying into a TYCO CPVC piping system that has been painted with water based latex paint, the paint on the end of the piping should be removed with a fine grain sand paper approximately 1/4 in. to 1/2 in. (6,4 mm to 12,7 mm) beyond the make-in of the fitting being added. Care should be exercised to assure that material is evenly removed from the entire circumference of the piping. The outside diameter of the piping should be measured and compared to Tables D1 and D2. If too much material is removed at one location along the circumference, it could result in a leak point once the fitting is solvent welded to the piping. Special care should be made when selecting the fitting that will be attached to the recently cleaned piping. Check the dry fit of the pipe and fitting. The pipe should

enter the fitting socket easily 1/4 to 3/4 of the way. If the pipe bottoms in the fittings with little interference, select a different fitting. All other criteria outlined in "Installation- Cut-In Procedure for System Modification and Repair" on Page 73 should be followed to assure system integrity.

76 VISIT WWW.TYCO-FIRE.COM

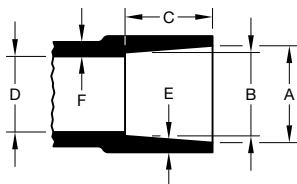
For more information about:

- BLAZEMASTER CPVC and other TYCO products/services
- The terms and conditions of sale including the BLAZEMASTER Limited Ten Year Warranty

Visit www.tyco-fire.com.

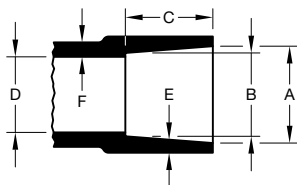
78 APPENDIX A - PIPE FITTINGS

ASTM CPVC Fitting Socket Dimensions U.S. Units

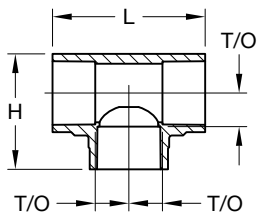


Nominal Pipe Size ANSI Inches	Nominal Inches					
	A Socket Entrance Diameter	B Socket Bottom Diameter	C Minimum Socket Depth	D Minimum Inside Diameter	Minimum Wall Thicknesses	
					E	F
3/4	1.058	1.046	0.719	0.740	0.113	0.141
1	1.325	1.310	0.875	0.990	0.133	0.166
1 1/4	1.670	1.655	0.938	1.335	0.140	0.175
1 1/2	1.912	1.894	1.375	1.446	0.220	0.250
2	2.387	2.369	1.500	1.881	0.218	0.275
2 1/2	2.889	2.868	1.750	2.250	0.276	0.345
3	3.516	3.492	1.875	2.820	0.300	0.375

ASTM CPVC Fitting Socket Dimensions Metric Units

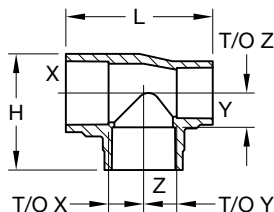


Nominal Pipe Size DN	Nominal Millimeters					
	A Socket Entrance Diameter	B Socket Bottom Diameter	C Minimum Socket Depth	D Minimum Inside Diameter	Minimum Wall Thicknesses	
					E	F
DN20	26,88	26,60	18,30	18,80	2,90	3,60
DN25	33,70	33,30	22,23	25,15	3,40	4,22
DN32	42,42	42,04	23,82	33,91	3,60	4,50
DN40	48,60	48,11	34,93	36,73	5,60	6,40
DN50	60,63	60,20	38,10	47,80	5,54	7,00
DN65	73,40	72,90	44,45	57,20	7,00	8,80
DN80	89,31	88,70	47,63	71,63	7,62	9,53

TEE


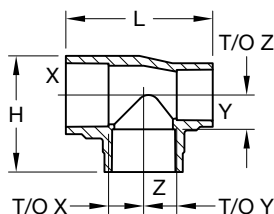
Nominal Pipe Size ANSI Inches DN	Nominal Take-Out Inches (mm)	Nominal Outside Inches (mm)		Pipe Sch.	Approx. Wt. Lbs. (kg.)	P/N
		L	H			
3/4 DN20	0.625 (15,9)	2.820 (71,6)	2.050 (52,1)	40	0.11 (0,05)	80000
1 DN25	0.687 (17,4)	3.180 (80,8)	2.405 (61,1)	40	0.19 (0,09)	80001
1 1/4 DN32	0.875 (22,2)	3.750 (95,3)	2.875 (73,0)	40	0.26 (0,11)	80002
1 1/2 DN40	1.062 (27,0)	4.900 (124,5)	3.625 (92,1)	80	0.51 (0,23)	80003
2 DN50	1.375 (34,9)	5.900 (149,9)	4.380 (111,3)	80	0.90 (0,41)	80004
2 1/2 DN65	1.562 (39,7)	6.730 (170,9)	5.110 (129,8)	80	1.59 (0,72)	80005
3 DN80	1.812 (46,0)	7.500 (190,5)	5.830 (148,1)	80	2.41 (1,09)	80006

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Nominal Pipe Size ANSI Inches DN			Nominal Take-Out Inches (mm)			Nominal Outside Inches (mm)		Pipe Sch.	Approx. Wt. Lbs. (kg.)	P/N
X	Y	Z	X	Y	Z	L	H			
3/4 DN20	3/4 DN20	1 DN25	0.750 (19,0)	0.750 (19,0)	0.625 (15,9)	2.890 (73,4)	2.140 (54,4)	40	0.14 (0,06)	80132
1 DN25	3/4 DN20	3/4 DN20	0.562 (14,3)	0.562 (14,3)	0.750 (19,0)	2.790 (70,9)	2.295 (58,3)	40	0.14 (0,06)	80133
1 DN25	3/4 DN20	1 DN25	0.750 (19,0)	0.687 (17,4)	0.750 (19,0)	3.060 (77,7)	2.415 (61,3)	40	0.17 (0,07)	80134
1 DN25	1 DN25	3/4 DN20	0.625 (15,9)	0.625 (15,9)	0.812 (20,6)	3.120 (79,2)	2.375 (60,3)	40	0.16 (0,07)	80260
1 1/4 DN32	1 DN25	3/4 DN20	0.625 (15,9)	0.625 (15,9)	0.937 (23,8)	3.330 (84,6)	2.705 (68,7)	40	0.21 (0,09)	80135
1 1/4 DN32	1 DN25	1 DN25	0.750 (19,0)	0.750 (19,0)	0.937 (23,8)	3.300 (83,8)	2.785 (70,7)	40	0.22 (0,09)	80136
1 1/4 DN32	1 DN25	1-1/4 DN32	0.937 (23,8)	0.937 (23,8)	0.875 (22,2)	3.640 (92,5)	2.795 (71,0)	40	0.26 (0,11)	80137
1 1/4 DN32	1-1/4 DN32	3/4 DN20	0.625 (15,9)	0.625 (15,9)	0.875 (22,2)	3.240 (82,3)	2.685 (68,2)	40	0.23 (0,10)	80261
1 1/4 DN32	1-1/4 DN32	1 DN25	0.750 (19,0)	0.750 (19,0)	0.875 (22,2)	3.500 (88,9)	2.825 (71,8)	40	0.26 (0,11)	80262
1 1/4 DN32	1-1/4 DN32	1-1/2 DN40	1.000 (25,4)	1.000 (25,4)	1.000 (25,4)	4.700 (119,4)	3.515 (89,3)	80	0.43 (0,19)	80138
1 1/2 DN40	1-1/4 DN32	3/4 DN20	0.562 (14,3)	0.562 (14,3)	1.000 (25,4)	3.920 (99,6)	3.255 (82,7)	80	0.36 (0,16)	80140
1 1/2 DN40	1-1/4 DN32	1 DN25	0.562 (14,3)	0.562 (14,3)	1.062 (27,0)	3.920 (99,6)	3.435 (87,2)	80	0.38 (0,17)	80141
1 1/2 DN40	1-1/2 DN40	3/4 DN20	0.562 (14,3)	0.562 (14,3)	1.000 (25,4)	4.040 (102,6)	3.255 (82,7)	80	0.36 (0,16)	80263

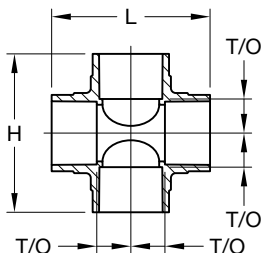
REDUCING TEE — 2 of 2



Nominal Pipe Size ANSI Inches DN			Nominal Take-Out Inches (mm)			Nominal Outside Inches (mm)		Pipe Sch.	Approx. Wt Lbs. (kg.)	P/N
X	Y	Z	X	Y	Z	L	H			
1 1/2 DN40	1-1/2 DN40	1 DN25	0.562 (14,3)	0.562 (14,3)	1.062 (27,0)	4.040 (102,6)	3.445 (87,5)	80	0.38 (0,17)	80264
1 1/2 DN40	1-1/2 DN40	1-1/4 DN32	0.875 (22,2)	0.875 (22,2)	1.000 (25,4)	4.640 (117,9)	3.505 (89,0)	80	0.45 (0,20)	80275
2 DN50	2 DN50	3/4 DN2	0.750 (19,0)	0.750 (19,0)	1.375 (34,9)	4.580 (116,3)	3.880 (98,6)	80	0.61 (0,28)	80265
2 DN50	2 DN50	1 DN25	0.875 (22,2)	0.875 (22,2)	1.375 (34,9)	4.830 (122,7)	4.010 (101,9)	80	0.66 (0,30)	80266
2 DN50	2 DN50	1-1/4 DN32	1.125 (28,6)	1.125 (28,6)	1.375 (34,9)	5.190 (131,8)	4.150 (105,4)	80	0.74 (0,33)	80274
2 DN50	2 DN50	1-1/2 DN40	0.750 (19,0)	0.687 (17,4)	0.750 (19,0)	5.400 (137,2)	4.240 (107,7)	80	0.78 (0,35)	80267
2 1/2 DN65	2-1/2 DN65	1 DN25	1.562 (39,7)	1.562 (39,7)	1.562 (39,7)	6.730 (170,9)	4.480 (113,8)	80	1.43 (0,65)	80271
2 1/2 DN65	2-1/2 DN65	1-1/4 DN32	1.562 (39,7)	1.562 (39,7)	1.562 (39,7)	6.730 (170,9)	4.680 (118,9)	80	1.46 (0,66)	80272
2 1/2 DN65	2-1/2 DN65	1-1/2 DN40	1.562 (39,7)	1.562 (39,7)	1.562 (39,7)	6.730 (170,9)	4.710 (119,6)	80	1.48 (0,67)	80273
2 1/2 DN65	2-1/2 DN65	2 DN50	1.562 (39,7)	1.562 (39,7)	1.562 (39,7)	6.730 (170,9)	4.870 (123,7)	80	1.50 (0,68)	80276
3 DN80	3 DN80	1-1/2 DN40	1.812 (46,0)	1.812 (46,0)	1.812 (46,0)	7.520 (191,0)	5.330 (135,4)	80	2.28 (1,03)	80270
3 DN80	3 DN80	2 DN50	1.812 (46,0)	1.812 (46,0)	1.750 (44,4)	7.500 (190,5)	5.440 (138,2)	80	2.25 (1,02)	80268
3 DN80	3 DN80	2-1/2 DN65	1.812 (46,0)	1.812 (46,0)	1.812 (46,0)	7.520 (191,0)	5.710 (145,0)	80	2.44 (1,11)	80269

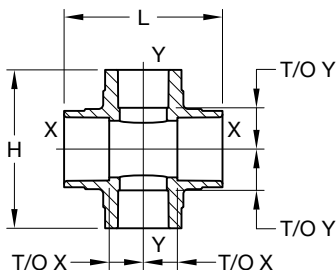
82 APPENDIX A - PIPE FITTINGS

CROSS

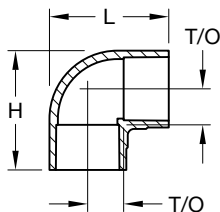


Nominal Pipe Size ANSI Inches DN	Nominal Take-Out Inches (mm)	Nominal Outside Inches (mm)		Pipe Sch.	Approx. Wt. Lbs. (kg.)	P/N
		L	H			
3/4 DN20	0.562 (14,3)	2.750 (69,9)	2.750 (69,9)	40	0.13 (0,06)	80009
1 DN25	0.687 (17,4)	3.300 (83,2)	3.300 (83,2)	40	0.23 (0,10)	80010
1 1/4 DN32	0.937 (23,8)	3.750 (95,3)	3.750 (95,3)	40	0.34 (0,15)	80011
1 1/2 DN40	1.062 (27,0)	4.900 (124,5)	4.900 (124,5)	80	0.67 (0,30)	80012
2 DN50	1.312 (33,3)	5.720 (145,3)	5.720 (145,3)	80	1.00 (0,45)	80013
2 1/2 DN65	1.562 (39,7)	6.750 (171,5)	6.750 (171,5)	80	1.91 (0,87)	80014
3 DN80	1.812 (46,0)	7.540 (191,5)	7.540 (191,5)	80	2.89 (1,31)	80008

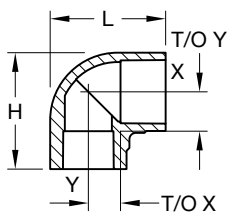
REDUCING CROSS



Nominal Pipe Size ANSI Inches DN		Nominal Take-Out Inches (mm)		Nominal Outside Inches (mm)		Pipe Sch.	Approx. Wt. Lbs. (kg.)	P/N
X	Y	X	Y	L	H			
1 DN25	3/4 DN20	0.875 (22,2)	0.875 (22,2)	3.300 (83,8)	3.300 (83,8)	40	0.28 (0,13)	80015

90° ELBOW


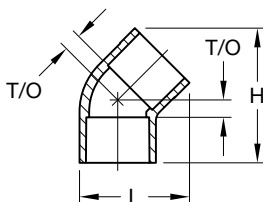
Nominal Pipe Size ANSI Inches DN	Nominal Take-Out Inches (mm)	Nominal Outside Inches (mm)		Pipe Sch.	Approx. Wt. Lbs. (kg.)	P/N
		L	H			
3/4 DN20	0.625 (15,9)	2.090 (53,1)	2.090 (53,1)	40	0.09 (0,04)	80025
1 DN25	0.750 (19,0)	2.495 (63,4)	2.495 (63,4)	40	0.14 (0,06)	80026
1 1/4 DN32	1.000 (25,4)	2.945 (74,8)	2.945 (74,8)	40	0.21 (0,09)	80027
1 1/2 DN40	1.062 (27,0)	3.625 (92,1)	3.625 (92,1)	80	0.40 (0,18)	80028
2 DN50	1.312 (33,3)	4.325 (109,9)	4.325 (109,9)	80	0.79 (0,36)	80029
2 1/2 DN65	1.562 (39,7)	5.080 (129,0)	5.080 (129,0)	80	1.14 (0,52)	80030
3 DN80	1.812 (46,0)	5.825 (148,0)	5.825 (148,0)	80	1.82 (0,82)	80031

90° REDUCING ELBOW


Nominal Pipe Size ANSI Inches DN		Nominal Take-Out Inches (mm)		Nominal Outside Inches (mm)		Pipe Sch.	Approx. Wt. Lbs. (kg.)	P/N
X	Y	X	Y	L	H			
1 DN25	3/4 DN20	0.687 (17,4)	1.812 (46,0)	2.435 (61,8)	2.435 (61,8)	40	0.16 (0,07)	80032

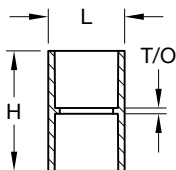
84 APPENDIX A - PIPE FITTINGS

45° ELBOW



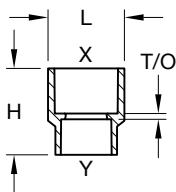
Nominal Pipe Size ANSI Inches DN	Nominal Take-Out Inches (mm)	Nominal Outside Inches (mm)		Pipe Sch.	Approx. Wt. Lbs. (kg.)	P/N
		L	H			
3/4 DN20	0.375 (9,5)	1.926 (48,9)	2.434 (61,8)	40	0.08 (0,04)	80050
1 DN25	0.375 (9,5)	2.284 (58,0)	2.799 (71,1)	40	0.11 (0,05)	80051
1 1/4 DN32	0.750 (19,0)	2.971 (75,5)	3.831 (97,3)	40	0.20 (0,09)	80052
1 1/2 DN40	0.500 (12,7)	3.318 (84,3)	4.047 (102,8)	80	0.31 (0,14)	80053
2 DN50	0.750 (19,0)	4.041 (102,6)	4.959 (126,0)	80	0.56 (0,25)	80054
2 1/2 DN65	1.812 (46,0)	4.846 (123,1)	5.713 (145,1)	80	0.89 (0,40)	80055
3 DN80	1.000 (25,4)	5.648 (143,5)	6.505 (165,2)	80	1.19 (0,54)	80056

COUPLING

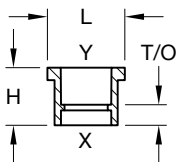


Nominal Pipe Size ANSI Inches DN	Nominal Take-Out Inches (mm)	Nominal Outside Inches (mm)		Pipe Sch.	Approx. Wt. Lbs. (kg.)	P/N
		L	H			
3/4 DN20	0.125 (3,2)	1.280 (32,5)	2.120 (53,8)	40	0.08 (0,04)	80075
1 DN25	0.125 (3,2)	1.590 (40,4)	2.500 (63,5)	40	0.11 (0,05)	80076
1 1/4 DN32	0.187 (4,7)	1.950 (49,5)	2.190 (55,6)	40	0.20 (0,09)	80077
1 1/2 DN40	0.500 (12,7)	2.310 (58,7)	3.080 (78,2)	80	0.31 (0,14)	80078
2 DN50	0.750 (19,0)	2.820 (71,6)	3.310 (84,1)	80	0.56 (0,25)	80079
2 1/2 DN65	0.812 (20,6)	3.440 (87,4)	3.850 (97,8)	80	0.89 (0,40)	80080
3 DN80	1.000 (25,4)	4.120 (104,6)	4.250 (108,0)	80	1.19 (0,54)	80081

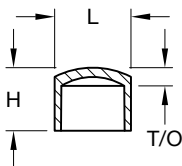
REDUCING COUPLING



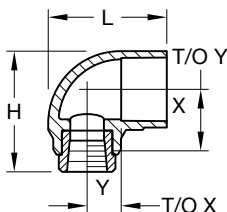
Nominal Pipe Size ANSI Inches DN		Nominal Take-Out Inches (mm)	Nominal Outside Inches (mm)		Pipe Sch.	Approx. Wt. Lbs. (kg.)	P/N
X	Y		L	H			
1 DN25	3/4 DN20	0.125 (3,2)	1.590 (40,4)	1.800 (45,7)	40	0.08 (0,04)	80220

REDUCING BUSHING

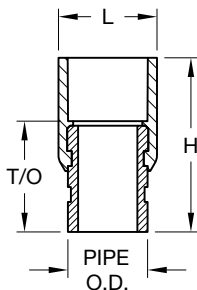
Nominal Pipe Size ANSI Inches DN		Nominal Take-Out Inches (mm)	Nominal Outside Inches (mm)		Pipe Sch.	Approx. Wt. Lbs. (kg.)	P/N
X	Y		L	H			
1 DN25	3/4 DN20	0.437 (11,1)	1.490 (37,8)	1.200 (30,5)	40	0.04 (0,06)	80200
1 1/4 DN32	3/4 DN20	0.500 (12,7)	1.840 (46,7)	1.260 (32,0)	40	0.11 (0,05)	80201
1 1/4 DN32	1 DN25	0.312 (7,9)	1.840 (46,7)	1.260 (32,0)	40	0.12 (0,05)	80202
1 1/2 DN40	3/4 DN20	0.625 (15,9)	2.090 (53,1)	1.670 (42,4)	80	0.16 (0,07)	80203
1 1/2 DN40	1 DN25	0.500 (12,7)	2.090 (53,1)	1.670 (42,4)	80	0.14 (0,06)	80204
1 1/2 DN40	1-1/4 DN32	0.375 (9,5)	2.090 (53,1)	1.670 (42,4)	80	0.17 (0,08)	80205
2 DN50	3/4 DN20	0.812 (20,6)	2.600 (66,0)	1.870 (47,5)	80	0.27 (0,12)	80206
2 DN50	1 DN25	0.687 (17,4)	2.600 (66,0)	1.870 (47,5)	80	0.26 (0,12)	80207
2 DN50	1-1/4 DN32	0.562 (14,3)	2.600 (66,0)	1.870 (47,5)	80	0.24 (0,11)	80208
2 DN50	1-1/2 DN40	0.437 (11,1)	2.600 (66,0)	1.870 (47,5)	80	0.19 (0,11)	80209
2 1/2 DN65	1 DN25	0.937 (23,8)	3.110 (79,0)	2.130 (54,1)	80	0.42 (0,19)	80215
2 1/2 DN65	1-1/4 DN32	0.812 (20,6)	3.110 (79,0)	2.140 (54,4)	80	0.45 (0,20)	80214
2 1/2 DN65	1-1/2 DN40	0.687 (17,4)	3.110 (79,0)	2.140 (54,4)	80	0.46 (0,21)	80213
2 1/2 DN65	2 DN50	0.625 (15,9)	3.110 (79,0)	2.140 (54,4)	80	0.29 (0,13)	80211
3 DN80	2 DN50	0.750 (19,0)	3.760 (95,5)	2.330 (59,2)	80	0.72 (0,33)	80210
3 DN80	2-1/2 DN65	0.500 (12,7)	3.760 (95,5)	2.330 (59,2)	80	0.47 (0,21)	80212

CAP


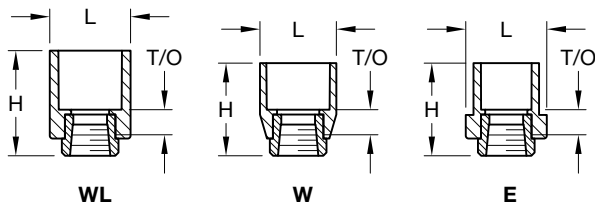
Nominal Pipe Size ANSI Inches DN	Nominal Take-Out Inches (mm)	Nominal Outside Inches (mm)		Pipe Sch.	Approx. Wt. Lbs. (kg.)	P/N
		L	H			
3/4 DN20	0.312 (7,9)	1.280 (32,5)	1.100 (27,9)	40	0.04 (0,02)	80100
1 DN25	0.375 (9,5)	1.590 (40,4)	1.314 (33,4)	40	0.06 (0,03)	80101
1 1/4 DN32	0.437 (11,1)	1.950 (49,5)	1.760 (44,7)	40	0.10 (0,04)	80102
1 1/2 DN40	0.687 (17,4)	2.310 (58,7)	2.192 (55,7)	80	0.20 (0,09)	80103
2 DN50	0.687 (17,4)	2.820 (71,6)	2.230 (56,6)	80	0.31 (0,14)	80104
2 1/2 DN65	0.875 (22,2)	3.440 (87,4)	2.770 (70,4)	80	0.58 (0,26)	80105
3 DN80	1.000 (25,4)	4.120 (104,6)	3.000 (76,2)	80	0.88 (0,40)	80106

SPRINKLER ADAPTER 90° ELBOW


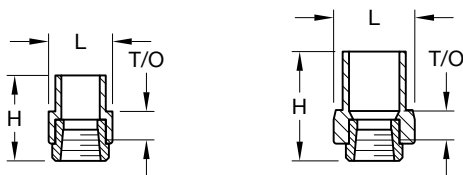
Nominal Pipe Size ANSI Inches DN	Thread Size Inch NPT	Nominal Take-Out Inches (mm)		Nominal Outside Inches (mm)		Pipe Sch.	Approx. Wt. Lbs. (kg.)	P/N
		X	Y	L	H			
3/4 DN20	1/2	0.562 (14,3)	1.000 (25,4)	2.040 (51,8)	2.160 (54,9)	40	0.20 (0,09)	80199
1 DN25	1/2	0.750 (19,0)	1.250 (31,7)	2.470 (62,7)	2.515 (63,9)	40	0.26 (0,12)	80198
1 DN25	3/4	1.062 (27,0)	1.437 (36,5)	2.875 (73,0)	2.835 (72,0)	40	0.26 (0,12)	80196

GROOVED COUPLING ADAPTER


Nominal Pipe Size ANSI Inches DN		Nominal Take-Out & Pipe O.D. Inches (mm)		Nominal Outside Inches (mm)		Pipe Sch.	Approx. Wt. Lbs. (kg.)	P/N
		T/O	Pipe O.D.	L	H			
1 1/4 DN32	1-1/4 Groove	0.875 (22,2)	1.660 (42,4)	2.050 (52,1)	3.630 (92,2)	40	0.78 (0,35)	80160
1 1/2 DN40	1-1/2 Groove	1.125 (28,6)	1.900 (48,3)	2.310 (58,7)	3.740 (95,0)	80	0.95 (0,43)	80161
2 DN50	2 Groove	0.750 (19,0)	2.375 (60,3)	2.820 (71,6)	3.870 (98,3)	80	1.42 (0,64)	80162
2 1/2 DN65	2-1/2 Groove	1.562 (39,7)	2.875 (73,0)	3.440 (87,4)	4.220 (107,2)	80	2.28 (1,03)	80163
2 1/2 DN65	76,1mm Groove	1.562 (39,7)	76,1mm 3.000	3.600 (91,4)	4.220 (107,2)	80	2.28 (1,03)	80169
3 DN80	3 Groove	1.562 (39,7)	3.500 (88,9)	4.120 (104,6)	4.320 (109,7)	80	3.00 (1,36)	80164

SPRINKLER ADAPTER


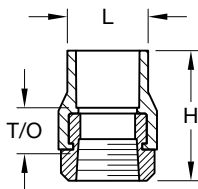
Nominal Pipe Size ANSI Inches DN	Thread Size Inch NPT	Nominal Take-Out Inches (mm)	Nominal Outside Inches (mm)		Pipe Sch.	Approx. Wt. Lbs. (kg.)	P/N
			L	H			
3/4 DN20	1/2	0.437 (11,1)	1.710 (43,4)	2.060 (52,3)	80	0.20 (0,09)	80175E
1 DN25	1/2	0.437 (11,1)	1.710 (43,4)	2.190 (55,6)	80	0.22 (0,10)	80176E
3/4 DN20	1/2	0.437 (11,1)	1.280 (32,5)	1.740 (44,2)	40	0.16 (0,07)	80175WL
1 DN25	3/4	0.812 (20,6)	1.590 (40,4)	2.500 (63,5)	40	0.43 (0,19)	80179
3/4 DN20	1/2	0.500 (12,7)	1.600 (40,6)	1.720 (43,7)	40	0.19 (0,09)	80175W
1 DN25	1/2	0.500 (12,7)	1.590 (40,4)	1.930 (49,0)	40	0.18 (0,08)	80176W

SPRINKLER ADAPTER (SPIGOT)

X (Not LPCB Approved)

Nominal Pipe Size ANSI Inches DN	Thread Size Inch NPT	Nominal Take-Out Inches (mm)	Nominal Outside Inches (mm)		Pipe Sch.	Approx. Wt. Lbs. (kg.)	P/N
			L	H			
3/4 DN20	1/2	0.500 (12,7)	1.330 (33,8)	1.780 (45,2)	40	0.16 (0,07)	80177L
1 DN25	1/2	0.562 (14,3)	1.720 (43,7)	1.920 (48,8)	40	0.20 (0,09)	80178
1 DN25	3/4	0.875 (22,2)	1.750 (44,5)	2.240 (56,9)	40	0.40 (0,18)	80180
1 DN25	1/2	0.625 (15,9)	1.720 (43,7)	2.268 (57,6)	40	0.20 (0,09)	80178X

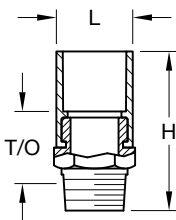
90 APPENDIX A - PIPE FITTINGS

FEMALE ADAPTER

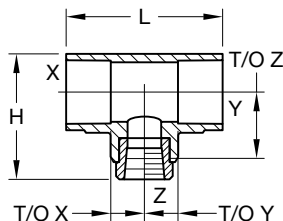


Nominal Pipe Size ANSI Inches DN	Thread Size Inch NPT	Nominal Take-Out Inches (mm)	Nominal Outside Inches (mm)		Pipe Sch.	Approx. Wt. Lbs. (kg.)	P/N
			L	H			
3/4 DN20	3/4	0.812 (20,6)	1.710 (43,4)	2.390 (60,7)	80	0.41 (0,19)	80142
1 DN25	1	0.875 (22,2)	2.050 (52,1)	2.710 (68,8)	80	0.63 (0,28)	80145
1 1/4 DN32	1-1/4	1.125 (28,6)	2.390 (60,7)	3.100 (78,7)	40	1.03 (0,47)	80146
1 1/2 DN40	1-1/2	1.375 (34,9)	2.650 (67,3)	3.440 (87,4)	80	1.42 (0,64)	80147
2 DN50	2	1.687 (42,8)	3.480 (88,4)	3.950 (100,3)	80	2.66 (1,18)	80148

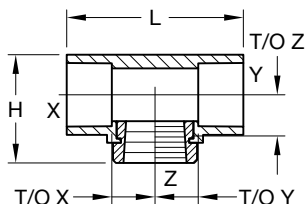
MALE ADAPTER



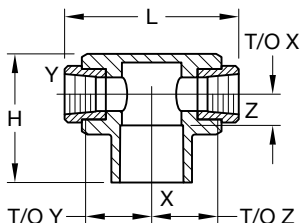
Nominal Pipe Size ANSI Inches DN	Thread Size Inch NPT	Nominal Take-Out Inches (mm)	Nominal Outside Inches (mm)		Pipe Sch.	Approx. Wt. Lbs. (kg.)	P/N
			L	H			
3/4 DN20	3/4 NPT	1.312 (33,3)	1.375 (34,9)	2.850 (72,4)	40	0.33 (0,15)	80157
1 DN25	1 NPT	1.375 (34,9)	1.690 (42,9)	3.320 (84,3)	40	0.56 (0,25)	80158

SPRINKLER ADAPTER TEE


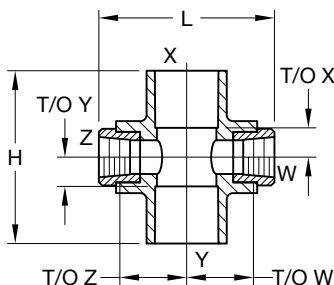
Nominal Pipe Size ANSI Inches DN		Thread Size Inch NPT	Nominal Take-Out Inches (mm)			Nominal Outside Inches (mm)		Pipe Sch.	Approx. Wt. Lbs. (kg.)	P/N
X	Y	Z	X	Y	Z	L	H			
3/4 DN20	3/4 DN20	1/2	0.562 (14,3)	0.562 (14,3)	1.000 (25,4)	2.700 (68,6)	2.139 (54,3)	40	0.22 (0,10)	80250
1 DN25	1 DN25	1/2	0.687 (17,4)	0.687 (17,4)	1.187 (30,1)	3.260 (82,8)	2.634 (66,9)	40	0.29 (0,13)	80251
1 DN25	1 DN25	1	0.937 (23,8)	0.937 (23,8)	1.562 (39,7)	3.680 (93,5)	3.005 (76,3)	40	0.73 (0,33)	80249
1 1/4 DN32	1 DN25	1/2	0.437 (11,1)	0.562 (14,3)	1.312 (33,3)	2.980 (75,7)	2.794 (71,0)	40	0.30 (0,14)	80256
1 1/4 DN32	1-1/4 DN32	1/2	0.437 (11,1)	0.437 (11,1)	1.312 (33,3)	3.000 (76,2)	2.794 (71,0)	40	0.31 (0,14)	80252
1 1/2 DN40	1-1/4 DN32	1/2	0.500 (12,7)	0.687 (17,4)	1.437 (36,5)	3.860 (98,0)	3.104 (78,8)	40	0.43 (0,19)	80257
1 1/2 DN40	1-1/2 DN40	1/2	0.500 (12,7)	0.500 (12,7)	1.437 (36,5)	3.860 (98,0)	3.104 (78,8)	80	0.46 (0,21)	80254
2 DN50	1-1/2 DN40	1/2	0.500 (12,7)	0.625 (15,9)	1.687 (42,8)	4.110 (104,4)	3.609 (91,7)	80	0.56 (0,25)	80258
2 DN50	2 DN50	1/2	0.500 (12,7)	0.500 (12,7)	1.687 (42,8)	4.100 (104,1)	3.599 (91,4)	80	0.62 (0,28)	80253

DRY SPRINKLER ADAPTER TEE


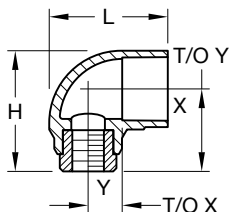
Nominal Pipe Size ANSI Inches DN		Thread Size Inch NPT	Nominal Take-Out Inches (mm)			Nominal Outside Inches (mm)		Pipe Sch.	Approx. Wt. Lbs. (kg.)	P/N
X	Y	Z	X	Y	Z	L	H			
1 DN25	1 DN25	1	0.90 (22,9)	0.90 (22,9)	0.86 (21,8)	3.680 (93,5)	2.255 (57,3)	40	0.71 (0,32)	80259

BACK TO BACK TEE


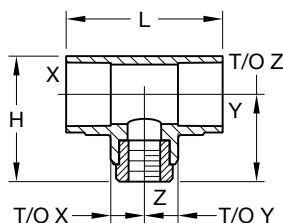
Nominal Pipe Size ANSI Inches DN	Thread Size Inch NPT		Nominal Take-Out Inches (mm)		Nominal Outside Inches (mm)		Pipe Sch.	Approx. Wt. Lbs. (kg.)	P/N
	X	Y	Z	X	Y Z	L			
1 DN25	1/2	1/2	0.562 (14,3)	1.312 (33,3)	3.628 (92,2)	2.700 (68,6)	40	0.48 (0,22)	80459
1 DN25	1/2	1/2	0.687 (17,4)	1.187 (30,1)	3.358 (85,3)	2.700 (68,6)	40	0.46 (0,21)	80460

BACK TO BACK CROSS


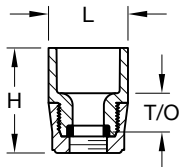
Nominal Pipe Size ANSI Inches DN		Thread Size Inch NPT		Nominal Take-Out Inches (mm)		Nominal Outside Inches (mm)		Pipe Sch.	Approx. Wt. Lbs. (kg.)	P/N
X	Y	Z	W	X Y	Z W	L	H			
1 DN25	1 DN25	1/2	1/2	0.625 (15,9)	1.187 (30,1)	3.398 (86,3)	3.600 (91,4)	40	0.46 (0,21)	80462
1 DN25	1 DN25	1/2	1/2	0.625 (15,9)	1.312 (33,3)	3.658 (92,9)	3.600 (91,4)	40	0.47 (0,21)	80463

RAVEN STUDIO SPRINKLER ADAPTER 90° ELBOW


Nominal Pipe Size ANSI Inches DN	Thread Size ISO 228	Nominal Take-Out Inches (mm)		Nominal Outside Inches (mm)		Pipe Sch.	Approx. Wt. Lbs. (kg.)	P/N
X	Y	X	Y	L	H			
1 DN25	G3/8	0.750 (19,0)	1.750 (44,5)	2.470 (62,7)	2.535 (64,4)	40	0.26 (0,12)	82198

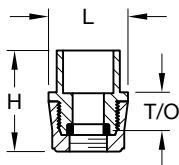
RAVEN STUDIO SPRINKLER ADAPTER TEE


Nominal Pipe Size ANSI Inches DN		Thread Size ISO 228	Nominal Take-Out Inches (mm)			Nominal Outside Inches (mm)		Pipe Sch.	Approx. Wt. Lbs. (kg.)	P/N
X	Y	Z	X	Y	Z	L	H			
1 DN25	1 DN25	G3/8	0.687 (17,4)	0.687 (17,4)	1.625 (41,3)	3.260 (82,8)	2.634 (66,9)	40	0.29 (0,13)	82251

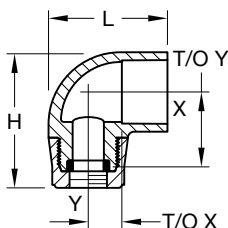
RAPID SEAL ADAPTER

NOTE: The Rapid Seal Adapter (RSA) P/Ns shown on this page will be phased out and replaced by equivalent Rapid Seal Adapter (RSA) P/Ns starting in the Fall of 2020. Replacement parts are shown on pages 95 through 97.

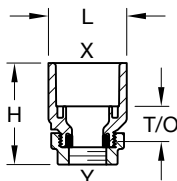
Nominal Pipe Size ANSI Inches DN	Thread Size Inch NPS	Nominal Take-Out Inches (mm)	Nominal Outside Inches (mm)		Pipe Sch.	Approx. Wt. Lbs. (kg.)	P/N
			L	H			
3/4 DN20	1/2	0.94 (23,9)	1.655 (42,0)	2.048 (52,0)	40	0.14 (0,06)	80175RS
1 DN25	1/2	0.88 (22,4)	1.630 (41,4)	2.140 (54,4)	40	0.13 (0,06)	80176RS

**RAPID SEAL ADAPTER
SPIGOT**

Nominal Pipe Size ANSI Inches DN	Thread Size Inch NPS	Nominal Take-Out Inches (mm)	Nominal Outside Inches (mm)		Pipe Sch.	Approx. Wt. Lbs. (kg.)	P/N
			L	H			
1 DN25	1/2	0.88 (22,4)	1.655 (42,0)	2.118 (53,8)	40	0.11 (0,05)	80178RS

**RAPID SEAL ADAPTER
90° ELBOW**

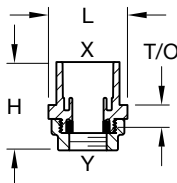
Nominal Pipe Size ANSI Inches DN	Thread Size Inch NPS	Nominal Take-Out Inches (mm)		Nominal Outside Inches (mm)		Pipe Sch.	Approx. Wt. Lbs. (kg.)	P/N
		X	Y	L	H			
3/4 DN20	1/2	0.85 (21,6)	1.62 (41,2)	2.477 (62,9)	2.838 (72,1)	40	0.24 (0,11)	80199RS
1 DN25	1/2	0.70 (17,8)	1.62 (41,2)	2.478 (62,9)	2.838 (72,1)	40	0.21 (0,10)	80198RS

RAPID SEAL ADAPTER


Nominal Pipe Size ANSI Inches DN	Thread Size Inch NPS	Nominal Take-Out Inches (mm)	Nominal Outside Inches (mm)		Pipe Sch.	Approx. Wt. Lbs. (kg.)	P/N
			L	H			
3/4 DN20	1/2	0.66 (16,8)	1.646 (41,8)	1.850 (47,0)	40	0.090 (0,041)	80175RS2 ¹
1 DN25	1/2	0.78 (19,8)	1.630 (41,4)	2.140 (54,4)	40	0.107 (0,049)	80176RS2

NOTE:

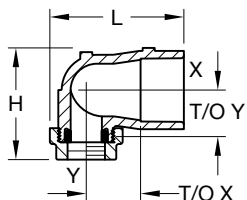
1. Part Number 80175RS is used for both the Rapid Seal Adapter and the Rapid Seal Adapter Spigot as it is a dual purpose fitting and can be used in two different applications.

**RAPID SEAL ADAPTER
SPIGOT**


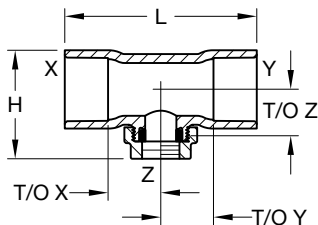
Nominal Pipe Size ANSI Inches DN	Thread Size Inch NPS	Nominal Take-Out Inches (mm)	Nominal Outside Inches (mm)		Pipe Sch.	Approx. Wt. Lbs. (kg.)	P/N
			L	H			
3/4 DN20	1/2	0.36 (9,1)	1.520 (38,6)	1.539 (39,1)	40	0.061 (0,028)	80177RS2
1 DN25	1/2	0.51 (13,0)	1.646 (41,8)	1.850 (47,0)	40	0.090 (0,041)	80175RS2 ¹

NOTE:

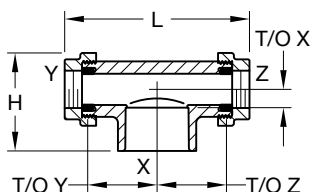
1. Part Number 80175RS is used for both the Rapid Seal Adapter and the Rapid Seal Adapter Spigot as it is a dual purpose fitting and can be used in two different applications.

RAPID SEAL ADAPTER 90° ELBOW


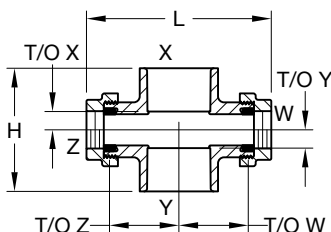
Nominal Pipe Size ANSI Inches DN	Thread Size Inch NPS	Nominal Take-Out Inches (mm)		Nominal Outside Inches (mm)		Pipe Sch.	Approx. Wt. Lbs. (kg.)	P/N
X	Y	X	Y	L	H			
3/4 DN20	1/2	0.58 (14,8)	0.92 (23,4)	2.087 (53,0)	2.086 (53,0)	40	0.099 (0,045)	80199RS2
1 DN25	1/2	1.13 (28,7)	1.01 (25,7)	2.789 (70,8)	2.327 (59,1)	40	0.148 (0,067)	80198RS2

RAPID SEAL ADAPTER TEE


Nominal Pipe Size ANSI Inches DN	Thread Size Inch NPS	Nominal Take-Out Inches (mm)		Nominal Outside Inches (mm)		Pipe Sch.	Approx. Wt. Lbs. (kg.)	P/N
X Y	Z	X Y	Z	L	H			
3/4 DN20	1/2	0.38 (9,7)	0.92 (23,4)	2.254 (57,3)	2.017 (51,2)	40	0.107 (0,049)	80250RS2
1 DN25	1/2	1.10 (27,9)	1.01 (25,7)	4.000 (101,6)	2.261 (57,4)	40	0.205 (0,093)	80251RS2

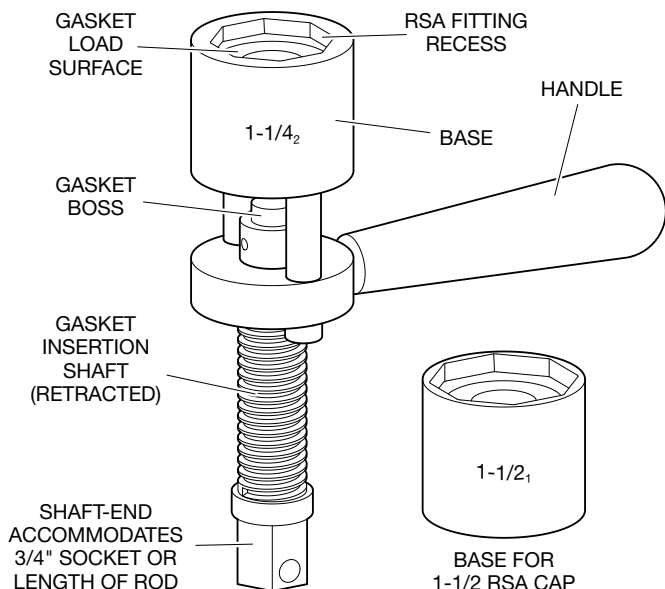
RAPID SEAL ADAPTER BACK TO BACK TEE


Nominal Pipe Size ANSI Inches DN	Thread Size Inch NPS	Nominal Take-Out Inches (mm)		Nominal Outside Inches (mm)		Pipe Sch.	Approx. Wt. Lbs. (kg.)	P/N
X	Y Z	X	Y Z	L	H			
1 DN25	1/2	0.38 (9,7)	1.37 (34,7)	3.645 (92,6)	2.042 (51,9)	40	0.190 (0,086)	80460RS2
1 DN25	1/2	0.38 (9,7)	1.49 (37,9)	3.900 (99,1)	2.042 (51,9)	40	0.200 (0,091)	80459RS2

RAPID SEAL ADAPTER BACK TO BACK CROSS


Nominal Pipe Size ANSI Inches DN	Thread Size Inch NPS	Nominal Take-Out Inches (mm)		Nominal Outside Inches (mm)		Pipe Sch.	Approx. Wt. Lbs. (kg.)	P/N
X Y	W Z	X Y	W Z	L	H			
1 DN25	1/2	0.38 (9,7)	1.37 (34,7)	3.600 (91,4)	2.566 (65,2)	40	0.207 (0,094)	80462RS2
1 DN25	1/2	0.38 (9,7)	1.49 (37,9)	3.850 (97,8)	2.566 (65,2)	40	0.217 (0,098)	80463RS2

RAPID SEAL GASKET REPLACEMENT TOOL, P/N 3060



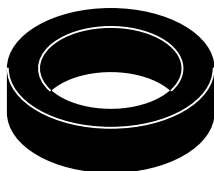
Notes:

1. 1-1/2 in. base used to replace gaskets in Version 1 adapters
2. 1-1/4 in. base used to replace gaskets in Version 2 adapters

**RAPID SEAL
GASKET REMOVAL PICK,
P/N 3061**



**RAPID SEAL
REPLACEMENT GASKET
(QTY 10), P/N 3062**



NOTICE

Gasket Replacement and its associated tools were not evaluated as part of the UL Listing program.

DO'S

- Install TYCO CPVC Pipe and Fittings according to this Installation Handbook.
- Follow recommended safe work practices.
- Make certain that any materials coming in contact with TYCO CPVC Pipe and Fittings are chemically compatible with BLAZEMASTER CPVC. (See Notice located on Page 55, Chemical Compatibility section.)
- If painting is required, use only latex based paints.
- Keep pipe and fittings in original packaging until needed and away from sources of heat.
- If stored outdoors, cover the pipe and fittings with an opaque tarp.
- Follow proper handling procedures.
- Inspect TYCO CPVC Pipe and Fittings for damage before installation.
- Use tools specifically designed for use with CPVC pipe and fittings.
- Use only TFP-500 or TFP-600 One Step Solvent Cement and follow application instructions.
- Use a drop cloth to protect interior finishes.
- Cut the pipe ends square.
- Before solvent cementing, de-burr and bevel the pipe end.
- When solvent cementing, rotate the pipe 1/4 turn when bottoming pipe in fitting socket.
- Carefully follow instructions for applying solvent cement. Do not apply too much cement.
- Avoid puddling of solvent cement in pipe and fittings. Do not allow cement to plug the sprinkler adapter or sprinkler orifice.
- Follow the recommended cure times prior to pressure testing.
- Fill lines slowly and bleed the air from the system at the farthest sprinklers prior to pressure testing.
- Use water to pressure test the CPVC system. If low-pressure air or nitrogen pre-testing is deemed necessary, guidelines can be found on Page 65 of this installation manual and must be followed.
- Support sprinkler properly to prevent excessive movement of the sprinkler when activated.
- Install TYCO CPVC Pipe and Fittings in wet systems only or specially listed dry systems.
- Use only chemically compatible insulation and/or glycerin & water solutions for freeze protection.
- When glycerine solutions are used, provide an expansion chamber or allow for thermal expansion of the solution.
- Allow for movement due to expansion and contraction.
- Renew your TYCO CPVC Pipe and Fittings installation training every two years.

10 APPENDIX B - DO'S & DON'TS

DON'TS

- Do not use cutting oils other than those represented by the cutting oil manufacturer as safe for use in conjunction with CPVC. (See Notice located on Page 55, Chemical Compatibility section.)
- Do not use edible oils such as CRISCO as a gasket lubricant.
- Do not use petroleum or solvent-based paints, sealants, lubricants or fire stop materials that are chemically incompatible with TYCO CPVC Pipe and Fittings.
- Do not use any glycol-based solutions as an antifreeze.
- Do not use glycerin-based antifreeze solutions without consulting the rules and guidelines outlined in the NFPA 13 Standard.
- Do not use both TEFLON tape and thread sealants simultaneously.
- Do not use TEFLON tape or thread sealants for Rapid Seal Adapter (RSA) sprinkler connection fittings.
- Do not use solvent cement that exceeds its shelf life or has become discolored or gelled.
- Do not allow threaded rod within 1/16 in. of the pipe.
- Do not allow solvent cement to plug the sprinkler orifice.
- Do not connect rigid metal couplers to TYCO CPVC grooved adapters.
- Do not thread or groove TYCO CPVC Pipe.
- Do not use solvent cement near sources of heat, open flame, or when smoking.
- Do not pressure test until recommended cure times are met.
- Do not use dull or broken cutting tool blades when cutting pipe.
- Do not use TYCO CPVC Pipe that has been stored outdoors, unprotected and is faded in color.
- Do not install TYCO CPVC Pipe in cold weather without allowing for expansion.
- Do not install TYCO CPVC Pipe and Fittings in dry systems, unless specifically listed for such use.

IMPORTANT INFORMATION WITH REGARDS TO YOUR TYCO CPVC FIRE SPRINKLER SYSTEM

CONGRATULATIONS, your building structure contains a state-of-the-art life safety system. Your TYCO CPVC fire sprinkler system will enhance the safety and security of your building when properly maintained. TYCO CPVC Fire Sprinkler Products resist attack from a wide range of chemicals that are corrosive to metallic piping. As with any piping material, there are, however, certain chemicals that can be detrimental to CPVC. Occasionally some of these chemicals may be found in some construction products, site preparations and building maintenance. There are certain things that you need to be mindful of in caring for or working around your TYCO CPVC fire sprinkler system.

Keep your system clear from contact with the following products and chemicals unless product labels state materials are compatible with CPVC:

NOTICE

Ordinary considerations	Property maintenance services
Cleaning Products Detergents, Oils/Lubricants/ Greases, Rubbery Materials	Fungicides, Mold Remediation Chemicals, Termiticides/Insecticides
For hired contractors & do-it-yourselfers	
Corrosion Inhibitors, Glycol-based antifreezes, Solder Flux, Thread Sealants Flexible Cable/Wiring (especially communications cabling) Caulks/Mastics, Adhesive, Vinyl/Electrical Tape Non-Approved Spray Foam Insulation Non-Water Based Paint, Paint Thinners Wood Finishes / Varnishes	

You should also avoid the following:

- Sitting, standing, hanging, leaning, or resting anything on the pipe, fittings, and sprinklers
- Grounding electrical wiring to the pipe or fittings
- Ambient temperatures below 40°F (4,4°C) where your fire sprinkler system is located. (Unless an approved compatible antifreeze or insulation method is installed.)
- Hot work around the pipe, for example, blow torches, soldering, etc.

Be certain that this document is reviewed and understood by anyone working on or around your CPVC life safety system. If you have any questions or need assistance on chemical compatibility with your TYCO CPVC fire sprinkler system, contact the manufacturer of the chemical or non-CPVC product in question.

Proper care will help your TYCO CPVC fire sprinkler system provide protection for years to come.

FOR ADDITIONAL INFORMATION VISIT
TYCO FIRE PROTECTION PRODUCTS AT WWW.TYCO-FIRE.COM

NOTICE

THIS BUILDING CONTAINS A CPVC FIRE SPRINKLER SYSTEM. THIS CPVC FIRE SPRINKLER SYSTEM IS A LIFE SAFETY ASSEMBLY AND MUST BE TREATED CAREFULLY. READ THE FOLLOWING BEFORE ANY ACTIVITY WHICH COULD CONTACT THIS SYSTEM:

CPVC piping components may be damaged by certain substances and construction practices.

- DO NOT stack, support, hang equipment, or hang flexible wire/cable, especially communications cable, or other material on the fire sprinkler system.
- ONLY system compatible materials should be used in contact with this system. For a list of products that have been tested and verified as compatible, consult the FBC™ System Compatible Program information at www.fbcssystemcompatible.com. If the product in question is not identified in the System Compatibility Program, Lubrizol recommends, as does TYCO, that the chemical compatibility be verified with the manufacturer of the product in question.
- DO NOT expose CPVC products to incompatible substances, such as cutting oils, non-water based paints, packing oils, traditional pipe thread paste and dope, fungicides, termiticides, insecticides, detergents, building caulks, adhesive tape, solder flux, flexible wire/cable (with special consideration for communications cabling), and non-approved spray foam insulation materials.
- DO NOT expose CPVC products to edible oils, solvents, or glycol-based anti-freeze fluids.
- DO NOT expose CPVC products to open flame, solder, and soldering flux.
- DO NOT drop, distort, or impact CPVC products or allow objects to be dropped on them.
- DO NOT handle CPVC products with gloves contaminated with oils (hydrocarbons) or other incompatible materials.

Failure to follow this notice may cause cracks or fractures to develop in CPVC products resulting in property damage due to leaks or flooding. The presence of any visible cracks may require partial or full system replacement. For additional information contact the general contractor or the fire sprinkler system installer.

FOR ADDITIONAL INFORMATION CONTACT TECHNICAL SERVICES AT 1-800-381-9312

Rev 3.0 Jan 21, 2008_distribut

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Regional Office

North America

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Lansdale, PA 19446
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Customer Service

Lansdale, PA
(800) 558-5236

Technical Service

Cranston, RI
(800) 381-9312
(401) 785-4213

www.tyco-fire.com



FlameGuard® CPVC FIRE SPRINKLER PRODUCTS

FG-2-0215

Complete System of Pipe, Fittings & Solvent Cement Corrosion Resistant • Superior Flow • Ease of Installation



Spears® **FlameGuard®** CPVC Fire Sprinkler Products provide a cost effective alternative to metal systems with advantages of high corrosion resistance, improved system hydraulics, ease of installation and quick assembly with common tools. CPVC Fire Sprinkler Systems are based on proven products that have been in continuous service for over 40 years. Spears® **FlameGuard®** products are approved by UL®, FM® Global, LPCB and Certified by NSF International for potable water use. Check local codes for restrictions and limitations.



Corrosion Resistant CPVC Material Does Not Sustain Biological Growth

Unlike metal systems, **FlameGuard®** CPVC products never rust, scale or pit and do not sustain biological growth - a cause of Microbiologically Influenced Corrosion (MIC) which can destroy metal fire sprinkler systems from the inside out.

Superior Flow Characteristics for Lower Friction Losses

The smooth-wall interior surfaces of **FlameGuard®** CPVC systems result in reduced friction loss over metal systems. The design flow characteristics remain constant throughout the life of the product because there is no interior corrosion in the system due to microbiological activity.

Pressure Rated to 175 psi (1200kpa) @ 150°F (65°C)

FlameGuard® CPVC Products are produced in combinations of Schedule 40 and Schedule 80 Fitting configurations con-forming to ASTM F 438 or F 439 standards and **FlameGuard®** SDR 13.5 CPVC Fire Sprinkler Pipe conforming to ASTM F 442 standards. UL® and FM® Rated working pressure is 175 psi (1200kpa) @ 150°F (65°C) (LPCB rated to 120°F (49°C)).

Easy Installation for Lower Costs

FlameGuard® CPVC system installations significantly reduce costs over conventional metal piping by virtually eliminating prefabrication. Systems can be fully installed on site using solvent cement joining methods.

UL® Listed for U.S. and Canada in NFPA 13, 13R & 13D Systems

FlameGuard® CPVC Fire Sprinkler Products are UL® listed for U.S. and Canada applications for Light Hazard occupancies as defined in NFPA 13, Residential occupancies up to and including 4-stories as defined in NFPA 13R, and Residential occupancies for one and two family dwellings and manufactured homes as defined in NFPA 13D. Consult Spears® **FlameGuard®** CPVC Fire Sprinkler Products Installation Instructions and NFPA Standards for additional applications including air plenum, system risers, concealed, exposed, underground, combustable attic, garage, basement and low pressure dry piping installations.

Full Limited Lifetime Warranty

FlameGuard® CPVC Fire Sprinkler Products carry a limited lifetime warranty against defects in material or workmanship. Consult Spears® warranty for additional details.



**PROGRESSIVE PRODUCTS FROM SPEARS®
INNOVATION & TECHNOLOGY**

Visit our website at www.spearsmfg.com



Assessed to ISO 9001: 2008
Certificate number 293

Spears® FlameGuard® . . . The Leader in Innovative CPVC Fire Sprinkler System Products

Pioneer in Molded-in Metal Insert Head Adapters Patent No. 5,437,481

Spears® pioneered the development of the **FlameGuard®** molded-in-place metal thread insert for connection of sprinkler heads to CPVC fire sprinkler systems, plus Metal FIPT threaded female adapters for metal-to-plastic transitions.

Developed the Special Reinforced (SR) Head Adapters Patent No. 5,582,439

Spears® **FlameGuard®** continuous improvement program developed the technology to produce a superior patented plastic threaded fitting - the Special Reinforced (SR) Design. This unique design incorporates a patented thermoplastic compression process that equalizes stresses generated by tapered thread joint make-up. All CPVC plastic body and threads provide a more uniform construction and improved corrosion resistance.

Revolutionary Gasket Sealed Head Adapter Choices Patent No. 8,474,472 - 8,297,663 - 7,458,613

- Requires NO Thread Sealants
- Eliminates Stress
- Prevents Over Tightening
- Provides Easy Frame Alignment

Spears® revolutionary Gasket Sealed Head Adapters feature an elastomer gasket seal at the base of the threads. The gasket seal allows a modified thread design that eliminates radial stress and associated problems typical with tapered thread joint make up. Choose from **TorqueSafe™** design with rotating brass thread insert, **SofTorque™** design with Special Reinforced (SR) plastic threads and compressible gasket or new **QuickTorque™** with similar features plus brass threads.

Full Assortment of Specialty Products & Fitting Configurations

Spears® **FlameGuard®** products provide the specialty fittings needed in today's fire sprinkler systems. The NEW **GripLoc™** Coupling and **GripLoc™** Repair Coupling for quick no-cement repairs; the Adjustable Drop Nipple for fine-tuning to finished ceiling height; and Ringed Head Adapter for ease of locating during installation. Plus a full assortment of fittings including Grooved Coupling Adapters, Unions and Flanges sizes 3/4" through 3".

Complete Size Range of CPVC Pipe

Spears® **FlameGuard®** CPVC Fire Sprinkler Pipe is available in sizes 3/4" to 3"; and conforms to ASTM F 442 standard for SDR 13.5 CPVC pipe.

Spears® Solvent Cements & Thread Sealant

FlameGuard® products should be installed using Spears® FS-5 One-Step Solvent Cement. For threaded joints, use Spears® BLUE 75™ Thread Sealant that has been tested for compatibility with **FlameGuard®** CPVC Fire Sprinkler Products. Spears® **TorqueSafe™** Gasket Sealed Adapter requires no sealant. Consult sprinkler head manufacturer prior to use.



Lead Free



TorqueSafe™, SofTorque™ &
QuickTorque™ Fittings
Lead Free



GripLoc™ Coupling & Repair Couplings
Lead Free



Important Information with Regards to Your CPVC Fire Sprinkler System

CONGRATULATIONS, your building structure contains a state of the art life safety system. Your CPVC fire sprinkler system will enhance the safety and security of your building when properly cared for. CPVC Fire Sprinkler Products resist attack from a wide range of chemicals that are corrosive to metallic piping. As with any piping material, there are however, certain chemicals that can be detrimental to CPVC. Occasionally some of these chemicals may be found in some construction products, site preparations and building maintenance. There are certain things that you need to be mindful of in caring for or working around your CPVC fire sprinkler system.

Keep your system clear from contact with the following products and chemicals unless product labels state materials are compatible with CPVC:

NOTICE

Ordinary considerations	Property maintenance services
Cleaning Products Detergents Oils/Lubricants/Greases Rubbery Materials	Fungicides Mold Remediation Chemicals Termiticides / Insecticides
For hired contractors & do-it-yourselfers	
Corrosion Inhibitors Glycol-based antifreezes Solder Flux Thread Sealants Flexible Cable / Wiring (especially communications cabling) Caulks/Mastics Adhesive Vinyl / Electrical Tape Non-Approved Spray Foam Insulation Non-Water Based Paint Paint Thinners Wood Finishes/Varnishes	

You should also avoid the following:

- Sitting, standing, hanging, leaning, or resting anything on the pipe, fittings, and sprinkler heads
- Grounding electrical wiring to the pipe or fittings
- Ambient temperatures below 40°F/4°C where your fire sprinkler system is located. (Unless an approved compatible antifreeze or insulation method is installed.)
- Hot work around the pipe, i.e. blow torches, soldering, etc.

Be certain that this document is reviewed and understood by anyone working on or around your CPVC life safety system. If you have any questions or need assistance on chemical compatibility with your CPVC fire sprinkler system, contact the manufacturer listed on the pipe.

Proper care will help your CPVC fire sprinkler system provide protection for years to come.



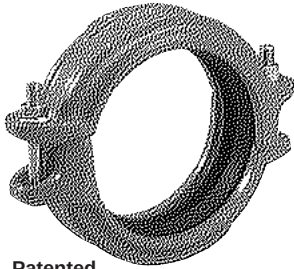
**FOR ADDITIONAL
INFORMATION CONTACT
SPEARS® MANUFACTURING
COMPANY AT 1-800-862-1499**

GROOVED FITTINGS

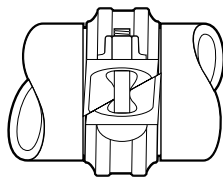
Style 005 FireLock® Rigid Coupling with Vic-Plus® Gasket System



PRODUCT DESCRIPTION



Patented



Exaggerated for clarity

FireLock® Style 005 rigid coupling has a unique, patented angle-pad design which allows the housings to offset while clamping the grooves. By permitting the housings to slide on the angled bolt pads, rigidity is obtained.

The FireLock couplings provide rigidity for valve connections, fire mains and long straight runs. Support and hanging requirements correspond to NFPA 13 Sprinkler Systems. Angle-pad design permits assembly by removing one nut/bolt and swinging the housing over the gasket. This reduces components to handle during assembly; speeds and eases installation on pipe grooved to Victaulic specifications.

Style 005 FireLock couplings with the Vic-Plus™ Gasket System are designed and recommended for use ONLY on fire protection systems.

Vic-Plus Gasket System:

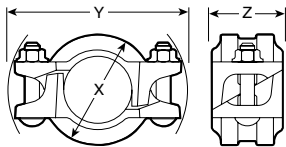
Victaulic® now offers a gasket system which requires no field lubrication on wet pipe systems. The Vic-Plus™ System (patented) is dry, clean, and non-toxic. It reduces assembly time substantially and eliminates the mess and chance of over-lubrication. Please refer to the latest copy of the Victaulic Field Installation Handbook (I-100) for supplemental lubrication requirements.



Request Victaulic publication 10.01 for details.

§ LPC and VdS Approved, see notes on page 2.

DIMENSIONS



Rated for wet and dry sprinkler systems at 350 psi (2413 kPa) for 1½ - 4" (32 - 100 mm) sizes and 300 psi (2068 kPa) for 4½ - 8" (108 - 200 mm) sizes; Schedule 10 roll grooved or Schedule 40 cut or roll grooved steel pipe. Style 005 is rigid and does not accommodate expansion, contraction or angular deflection.

Pipe Size		Max. Work. Press. § * PSI/kPa	Max. End Load* Lbs./N	Allow. Pipe End Sep. † In./mm	@ Bolt/Nut No. - Size Inches/mm	Dimensions Inches/mm			Aprx. Wgt. Ea. Lbs./kg
Nominal Diameter Inches/mm	Actual Outside Diameter Inches/mm					X	Y	Z	
1½ 32	1.660 42.4	350 2413	755 3370	0.05 1.2	2 - 3/8 X 2½/4	2.75 70	4.50 114	1.88 148	1.2 0.5
1½ 40	1.900 48.3	350 2413	990 4415	0.05 1.2	2 - 3/8 X 2½/4	3.00 76	4.75 121	1.88 148	1.2 0.5
2 50	2.375 60.3	350 2413	1550 6900	0.07 1.7	2 - 3/8 X 2½/2	3.50 89	5.25 133	1.88 148	1.6 0.7
2½ 65	2.875 73.0	350 2413	2270 10110	0.07 1.7	2 - 3/8 X 2½/2	4.00 102	5.75 146	1.88 148	1.9 0.9
76,1 mm	3.000 76,1	350 2413	2475 11010	0.07 1.7	2 - 3/8 X 2½/2	4.13 105	5.75 146	1.88 148	1.9 0.9
3 80	3.500 88,9	350 2413	3365 14985	0.07 1.7	2 - 3/8 X 2½/2	4.63 118	6.13 156	1.88 148	2.1 1.0
4 100	4.500 114,3	350 2413	5565 24770	0.16 4.1	2 - 3/8 X 2½/2	5.75 146	7.25 184	2.13 54	3.1 1.4
108,0 mm	4.250 108,0	300 2068	4255 18940	0.16 4.1	2 - 3/8 X 2½/2	5.63 143	7.25 184	2.13 54	3.1 1.4
5 125	5.563 141,3	300 2068	7290 32445	0.16 4.1	2 - 1/2 X 2¾/4	6.88 175	9.00 229	2.13 54	4.5 2.0
133,0 mm	5.250 133,0	300 2068	6495 28900	0.16 4.1	2 - 1/2 X 2¾/4	6.63 168	9.00 229	2.13 54	4.5 2.0
139,7 mm	5.500 139,7	300 2068	7125 31715	0.16 4.1	2 - 1/2 X 2¾/4	6.88 175	9.00 229	2.13 54	4.8 2.2
6 150	6.625 168,3	300 2068	10340 46020	0.16 4.1	2 - 1/2 X 2¾/4	8.00 203	10.00 254	2.13 54	5.0 2.3
159,0 mm	6.250 159,0	300 2068	9200 40955	0.16 4.1	2 - 5/8 X 4¼/4	7.63 194	10.00 254	2.13 54	5.5 2.5
165,1 mm	6.500 165,1	300 2068	9955 44295	0.16 4.1	2 - 1/2 X 2¾/4	8.15 207	10.00 254	2.13 54	5.5 2.5
8 200	8.625 219,1	300 2068	17525 78000	0.19 4.8	2 - 5/8 X 4¼/4	10.50 267	13.13 334	2.63 67	11.3 5.1

* @ § † Refer to notes on page 2.

MATERIAL SPECIFICATIONS

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.

Housing Coating: Orange enamel

Gasket:

- **Grade “E” EPDM - Type A Vic-Plus Gasket System Δ**
(Violet color code). FireLock products have been Listed by Underwriters Laboratories Inc. and Approved by Factory Mutual Research for wet and dry (oil free air) sprinkler services up to the rated working pressure using the Grade “E” Type A Vic-Plus Gasket System, requiring no field lubrication for most installation conditions.

For dry services, Victaulic continues to recommend the use of Grade “E” Type A FlushSeal® Gasket. Contact Victaulic for details.

Bolts/Nuts: Heat-treated plated carbon steel, trackhead meeting the physical and chemical requirements of ASTM A-449 and physical requirements of ASTM A-183.

Δ Standard gasket and FlushSeal gasket approved for dry pipe systems to -40°F (-40°C). Based on “typical” pipe surface conditions, supplemental lubricant is recommended for services installed below 0°F (-18°C) and for all dry pipe systems or systems to be subjected to air tests prior to being filled with water. Supplemental lubrication may also be required on pipe with raised or undercut weld seams or pipe that has voids and/or cracks at the weld seams. Victaulic continues to recommend the use of FlushSeal gaskets for dry services.

LISTINGS/APPROVALS

The information provided below is based on the latest listing and approval data at the time of publication. Listings/Approvals are subject to change and/or additions by the approvals agencies. Contact Victaulic for performance on other pipe and the latest listings and approvals.

Rated Working Pressure – PSI					Rated Working Pressure – PSI					Rated Working Pressure – PSI				
Pipe Sch.	Size Inches	UL	ULC	FM	Pipe Sch.	Size Inches	UL	ULC	FM	Pipe Sch.	Size Inches	UL	ULC	FM
5	1 ¹ / ₄ - 3	175	175	175	EL	1 ¹ / ₄ - 2	300	N/A	N/A	MT	1 ¹ / ₄ - 2	300	N/A	N/A
10, 40	1 ¹ / ₄ - 4	350	350	350	ET	1 ¹ / ₄ - 2	300	N/A	N/A	STF	1 ¹ / ₄ - 4	N/A	N/A	300
	5 - 8	300	300	300	EZ	4 - 6	300#	N/A	300	Steady Thd.	1 ¹ / ₄ - 2	N/A	N/A	300
BLT	1 ¹ / ₄ - 2	300	300	N/A	FF	1 ¹ / ₄ - 4	N/A	N/A	300	TF	3 - 8	N/A	N/A	300
DF	1 ¹ / ₄ - 4	300	300	300	GAL-7	1 ¹ / ₄ - 2	300	N/A	N/A	WLS	1 ¹ / ₄ - 2	300	300	N/A
DT	1 ¹ / ₄ - 2	300	300	N/A	MLT	1 ¹ / ₄ - 2	300	N/A	N/A	XL	1 ¹ / ₄ - 3	300	300	300
EF	1 ¹ / ₂ - 4	175@	N/A	175	MF	1 ¹ / ₄ - 4	300	N/A	300*					

* FM approved for service in 1¹/₂ - 4" pipe. # UL Listed for service up to 4" pipe only. @UL Listed for service up to 3" only.

PIPE SCHEDULE NOTES:

5 refers to Listed/Approved Schedule 5 steel sprinkler pipe
 10 refers to Listed/Approved Schedule 10 steel sprinkler pipe
 40 refers to Listed/Approved Schedule 40 steel sprinkler pipe
 BLT refers to Listed steel sprinkler pipe manufactured by Allied Tube & Conduit
 DF refers to Listed/Approved Dyna-Flow steel sprinkler pipe manufactured by Allied Tube & Conduit
 DT refers to Listed Dyna Thread steel sprinkler pipe manufactured by Allied Tube & Conduit
 EF refers to Listed/Approved Eddy Flow steel sprinkler pipe manufactured by Bull Moose Tube Co.
 EL refers to Listed Eddylyte steel sprinkler pipe manufactured by Bull Moose Tube Co.
 ET refers to Listed Eddythread 40 steel sprinkler pipe manufactured by Bull Moose Tube Co.
 EZ refers to Listed EZ-Flow steel sprinkler pipe manufactured by Northwest Pipe & Casing Co.
 FF refers to Listed Fire-Flo steel sprinkler pipe manufactured by Youngstown Tube Co.
 GAL-7 refers to Listed steel sprinkler pipe manufactured by IDOD Systems, LLC
 MLT refers to Listed steel sprinkler pipe manufactured by Wheatland Tube Company
 MF refers to Listed Mega-Flow steel sprinkler pipe manufactured by Wheatland Tube Company
 MT refers to Listed Mega-Thread steel sprinkler pipe manufactured by Wheatland Tube Company
 STF refers to Listed Steady Flow steel sprinkler pipe manufactured by AMS Tube Corporation
 Steady Thread refers to Approved steel sprinkler pipe manufactured by AMS Tube Corporation
 TF refers to Tex-Flow steel sprinkler pipe manufactured by Tex-Tube Company
 WLS refers to Listed/Approved steel sprinkler pipe manufactured by Wheatland Tube Company
 XL refers to Listed XL or XL II steel sprinkler pipe manufactured by Allied Tube & Conduit Corp.

NOTES

* Working Pressure and End Load are total, from all internal and external loads, based on standard weight (ANSI) steel pipe, standard **roll** or **cut** grooved in accordance with Victaulic specifications. Contact Victaulic for performance on other pipe.

WARNING: FOR ONE TIME FIELD TEST ONLY, the Maximum Joint Working Pressure may be increased to 1¹/₂ times the figures shown.

† For field installation only. FireLock Style 005 couplings are essentially rigid and do not accommodate expansion/contraction.

@ Number of bolts required equals number of housing segments.

Metric thread size bolts are available (color coded gold) for all coupling sizes upon request. Contact Victaulic for details.

§ Style 005 couplings are VdS and LPC Approved to 12 Bar (175 psi).

WARNING: Depressurize and drain the piping system before attempting to install, remove, or adjust any Victaulic piping products.

This product shall be manufactured by Victaulic Company. All products shall 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.

Victaulic® FireLock™ Rigid Coupling

Style 009N

Victaulic®
10.64



Patented

1.0 PRODUCT DESCRIPTION

Available Sizes

- 1 ¼ – 12"/32 – 300 mm

Pipe Material

- Carbon steel, Schedule 10, Schedule 40. For use with alternative materials and wall thicknesses please contact Victaulic.

Maximum Working Pressure

- Up to 365 psi/2517 kPa.

Function

- Joins carbon steel pipe.
- Provides a rigid pipe joint designed to restrict axial or angular movement.

2.0 CERTIFICATION/LISTINGS



C104-1a/36

EN 10311
Regulation (EU)
No. 305/2011

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

System No.		Location	
Submitted By		Date	

Spec Section		Paragraph	
Approved		Date	

victaulic.com

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Victaulic®

3.0 SPECIFICATIONS – MATERIAL

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.

Housing Coating: (specify choice)

☒ **Orange enamel** (North America, Asia Pacific)

☐☐

Gasket: (specify choice¹)

☒ **Grade “E” EPDM (Type A)**

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

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

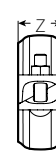
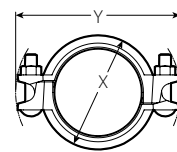
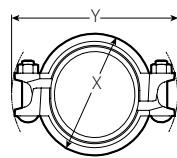
Bolts/Nuts:

☒ Standard: Carbon steel oval neck track bolts meeting the physical and chemical requirements of ASTM A449 (imperial) and ISO 898-1 Class 9.8 (metric). Carbon steel hex nuts meeting the physical and chemical requirements of ASTM A563 Grade B (imperial - heavy hex nuts) and ASTM A563M Class 9 (metric - hex nuts). Track bolts and hex nuts are zinc electroplated per ASTM B633 ZN/FE5, finish Type III (imperial) or Type II (metric).

☐

4.0 DIMENSIONS

Style 009N



Style 009N Pre-Assembled
(Push On Condition)

Style 009N Joint Assembled

Nominal Size	Actual Outside Diameter	Maximum Working Pressure ³	Maximum End Load ³	Allow. Pipe End Separation ⁴	Bolt/Nut		Dimensions					Weight
					Qty.	Size	Pre-assembled (Push On Condition)		Joint Assembled			Approx. (Each)
							X	Y	X	Y	Z	
inches mm	inches mm	psi kPa	lb N	inches mm		inches mm	inches mm	inches mm	inches mm	inches mm	lb kg	
1 ¼ 32	1.660 42.4	365 2517	790 3514	0.10 2.54	2	¾ × 2 M10 × 51	3.13 79	5.00 127	2.75 70	5.00 127	2.00 51	1.4 0.6
1 ½ 40	1.900 48.3	365 2517	1035 4604	0.10 2.54	2	¾ × 2 M10 × 51	3.38 86	5.13 130	3.00 76	5.13 130	2.00 51	1.5 0.7
2 50	2.375 60.3	365 2517	1616 7193	0.12 3.05	2	¾ × 2½ M10 × 63	4.00 102	5.63 143	3.50 89	5.63 143	2.00 51	1.9 0.9
2½ 65	2.875 73.0	365 2517	2370 10542	0.12 3.05	2	¾ × 2½ M10 × 63	4.50 114	6.13 156	4.00 102	6.13 156	2.00 51	2.1 1.0
76.1 mm	3.000 76.1	365 2517	2580 11476	0.12 3.05	2	¾ × 2½ M10 × 63	4.63 118	6.00 152	4.13 105	6.13 156	2.00 51	2.1 1.0
3 80	3.500 88.9	365 2517	3512 15622	0.12 3.05	2	¾ × 2½ M10 × 63	5.13 130	6.75 171	4.63 117	6.75 171	2.00 51	2.3 1.0
4 100	4.500 114.3	365 2517	5805 25822	0.17 4.32	2	¾ × 2½ M10 × 63	6.00 152	7.88 200	5.63 143	7.50 191	2.13 54	2.9 1.3
108.0mm	4.250 108.0	365 2517	5175 23020	0.17 4.32	2	¾ × 2½ M10 × 63	5.63 152	7.38 187	5.38 137	7.38 187	2.13 54	3.1 1.4
5 125	5.563 141.3	365 2000	8870 39456	0.17 4.32	2	½ × 3 M12 × 76	7.25 184	9.25 235	6.75 171	9.13 232	2.25 57	5.0 2.3
133.0mm	5.250 133.0	365 2517	7897 35106	0.17 4.32	2	½ × 3 M12 × 76	6.63 168	9.00 229	6.38 162	9.00 229	2.25 57	4.8 2.2
139.7mm	5.500 139.7	365 2517	8667 38529	0.17 4.32	2	½ × 3 M12 × 76	6.88 175	9.25 235	6.75 171	9.13 232	2.25 57	4.9 2.2
159.0mm	6.250 159.0	365 2517	11192 49753	0.17 4.32	2	½ × 3 ¼ M12 × 83	7.88 200	10.00 254	7.38 187	9.88 251	2.25 57	5.6 2.5
165.1mm	6.500 165.1	365 2517	12105 53813	0.17 4.32	2	½ × 3 ¼ M12 × 83	8.00 203	10.25 260	7.75 197	10.13 257	2.25 57	6.0 2.7
6 150	6.625 168.3	365 2000	12582 44469	0.17 4.32	2	½ × 3 ¼ M12 × 83	8.38 213	10.38 264	7.88 200	10.13 257	2.25 57	6.0 2.7
216.0mm	8.500 216.0	365 2517	20712 55968	0.17 4.32	2	¾ × 4 M16 × 101	10.63 270	13.25 337	10.25 260	10.13 257	2.63 67	11.4 5.2
8 200	8.625 219.1	365 1620	21326 94863	0.17 4.32	2	¾ × 4 M16 × 101	10.88 276	13.38 340	10.25 260	13.13 333	2.50 64	11.4 5.2
10 250	10.750 273.0	300 2068	27229 121121	0.25 6.4	2	7⁄8 × 6½ M22 × 165	13.75 349	17.00 432	13.25 337	17.13 435	2.75 70	22.6 10.3
12 300	12.750 323.9	300 2068	38303 170380	0.25 6.4	2	7⁄8 × 6½ M22 × 165	16.00 406	19.00 483	15.50 394	19.13 486	2.75 70	27.6 12.5

³ Working Pressure and End Load are total, from all internal and external loads, based on standard weight (ANSI) steel pipe, standard roll or cut grooved in accordance with Victaulic specifications. See the Listings/Approvals section of this publication for ratings on other pipe.

⁴ The allowable pipe separation dimension shown is for system layout purposes only. FireLock EZ™ couplings are considered rigid connections and will not accommodate expansion or contraction of the piping system.

NOTES

- When assembling FireLock EZ™ couplings onto end caps, take additional care to make certain the end cap is fully seated against the gasket end stop. For FireLock EZ™ Style 009N couplings, use FireLock No. 006 end caps containing the "EZ" marking on the inside face or No. 60 end caps containing the "QV EZ" marking on the inside face. Non-Victaulic end cap products shall not be used with Style 009N couplings. IMPORTANT: Gaskets intended for the Style 009 or Style 009V couplings cannot be used with the Style 009N coupling. There is no interchanging of gaskets or housings between coupling styles.
- Use Of Flushseal Gaskets For Dry Pipe Systems** FireLock EZ™ couplings are supplied with FireLock EZ™ Grade "E" Type A gaskets. These gaskets include an integral pipe stop, that once installed provides the similar benefits as a FlushSeal gasket for dry pipe systems. It should be noted that standard Victaulic Flush-Seal™ gaskets are not compatible and cannot be used with the FireLock EZ™ couplings.

5.0 PERFORMANCE⁶

Listings/Approval

The information provided below is based on the latest listing and approval data at the time of publication. Listings/Approvals are subject to change and/or additions by the approvals agencies. Contact Victaulic for performance on other pipe and the latest listings and approvals.

Nominal Size inches mm	cULus ¹¹			FM			Vds	LPCB
	Sch. 5 psi kPa	Sch. 10 psi kPa	Sch. 40 psi kPa	Sch. 5 psi kPa	Sch. 10 psi kPa	Sch. 40 psi kPa	psi kPa	psi kPa
1 ¼ 32	232 1600	365 2517	365 2517	175 1205	363 2502	363 2502	363 2500	363 2500
1 ½ 40	232 1600	365 2517	365 2517	175 1205	363 2502	363 2502	363 2500	363 2500
2 50	363 2502	365 2517	365 2517	175 1205	363 2502	363 2502	363 2500	363 2500
2 ½ 65	N/A	365 2517	365 2517	175 1205	363 2502	363 2502	363 2500	363 2500
76.1 mm	N/A	365 ⁶ 2517 ⁶	N/A	N/A	363 ⁷ 2502 ⁷	N/A	363 2500	363 2500
3 80	N/A	365 2517	365 2517	175 1205	363 2502	363 2502	363 2500	363 2500
4 100	N/A	365 2517	365 2517	175 1205	363 2502	363 2502	363 2500	363 2500
108.0 mm	N/A	N/A	N/A	175 1205	363 2502	363 2502	N/A	N/A
5 125	N/A	290 2000	365 2517	N/A	363 2502	363 2502	232 1600	N/A
133.0 mm	N/A	N/A	N/A	N/A	363 ⁷ 2502 ⁷	N/A	N/A	N/A
139.7 mm	N/A	290 ⁸ 2000 ⁸	N/A	N/A	363 ⁷ 2502 ⁷	N/A	232 1600	N/A
159.0 mm	N/A	N/A	N/A	N/A	363 ⁷ 2502 ⁷	N/A	N/A	N/A
165.1 mm	N/A	290 ⁹ 2000 ⁹	N/A	N/A	363 ⁷ 2502 ⁷	N/A	N/A	N/A
6 150	N/A	290 2000	365 2517	N/A	363 2502	363 2502	232 1600	N/A
216.0 mm	N/A	N/A	N/A	N/A	363 ⁷ 2502 ⁷	N/A	N/A	N/A
8 200	N/A	290 2000	365 2517	N/A	363 2502	363 2502	232 1600	N/A
216.0 mm	N/A	N/A	N/A	N/A	363 ⁷ 2502 ⁷	N/A	N/A	N/A
8 200	N/A	290 2000	365 2517	N/A	363 2502	363 2502	232 1600	N/A
10 250	N/A	300 2068	300 2068	N/A	300 2068	300 2068	N/A	N/A
12 300	N/A	300 ¹⁰ 2068 ¹⁰	300 2068	N/A	250 1724	300 2068	N/A	N/A

⁵ Listed/Approved for wet and dry pipe systems (> -40°F/-40°C) for continuous use in freezing conditions, use of Style 005H Coupling with Silicone Gasket is recommended.

Please see the Victaulic [Installation Manual I-009N/009H](#) for details concerning when supplemental lubrication is required.

⁶ cULus listed for DIN 2458 2.6 mm pipe wall.

⁷ FM approved for BS 1387 Medium 3.6 mm pipe wall.

⁸ cULus listed for EN 10220 4.0 mm pipe wall.

⁹ cULus listed for EN 10255 4.5 mm pipe wall.

¹⁰ cUL listed to 250 psi.

¹¹ With optional stainless steel fasteners, cULus Listed to 175psi. The stainless steel fasteners have a marking designation of "316" on the end face of the bolt.

6.0 NOTIFICATIONS

Not applicable – contact Victaulic with any questions.

7.0 REFERENCE MATERIALS

[05.01: Seal Selection Guide](#)

[I-009N/009H](#): Installation Instructions FireLock EZ™ Rigid Coupling

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.

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No statement contained herein concerning a possible or suggested use of any material, product, service, or design is intended, or should be constructed, 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 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.

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.



No. 20 Tee

No. 10 Elbow

1.0 PRODUCT DESCRIPTION

Available Sizes

- ¾ – 60"/DN20 – DN1500

Maximum Working Pressure

- Pressure ratings for Victaulic standard fittings conform to the ratings of Victaulic Style 177N couplings (refer to [publication 06.24](#) for more information).

Application

- Connects pipe, provides change in direction and adapts sizes or components
- Supplied with Victaulic OGS grooves
- Exclusively for use with Victaulic couplings, valves, accessories and pipe which feature ends formed with the Victaulic OGS groove profile

Pipe Materials

- Carbon steel or stainless steel

NOTE

- These fittings are not intended for use with Victaulic plain end couplings. Intended for use only in grooved piping systems. When connecting wafer or lug type butterfly valves directly to Victaulic fittings using Style 741 or Style 743 flange adapters, be sure to check disc clearance dimensions with I.D. dimension of fitting.

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

System No.		Location	
Submitted By		Date	

Spec Section		Paragraph	
Approved		Date	

2.0 CERTIFICATION/LISTINGS



NOTES

- The following Victaulic fittings are VdS approved: No.10 90° Elbow, No.11 45° Elbow, No.20 Tee and No.60 Cap.
- The following Victaulic fittings are LPCB approved: No.10 90° Elbow, No.11 45° Elbow, No.12 22 ½ Elbow, No.13 11 ¼ Elbow, No.30 45° Lateral, No.30-R Reducing Lateral, No.100 Long Radius Elbow, No.110 Long Radius Elbow, No.20 Tee, No.35 Cross, No.60 Cap, No.25 Reducing Tee, No.33 True Wye, No.50 Concentric Reducer, No.51 Eccentric Reducer and No.29M Tee with Threaded Branch.
- The following Victaulic fittings are FM approved: No.10 90° Elbow, No.11 45° Elbow, No.12 22 ½ Elbow, No.13 11 ¼ Elbow, No.30 45° Lateral, No.100 Long Radius Elbow, No.20 Tee, No.35 Cross, No.60 Cap, No.25 Reducing Tee and No.50 Concentric Reducer.

3.0 SPECIFICATIONS - MATERIAL

Fitting: (specify choice)

- ☐ Standard: Ductile iron conforming to ASTM A536, Grade 65-45-12.
- ☐ Optional: Segmentally welded steel as shown under nipples

Nipples: (specify choice)

- ☐ ¾ – 4"/DN20 – DN100: Carbon steel, Schedule 40, conforming to ASTM A53, Type F
- ☐ 5 – 6"/DN125 – DN150: Carbon steel, Schedule 40, conforming to ASTM A53, Type E or S, Gr. B
- ☐ 8 – 12"/DN200 – DN300: Carbon steel, Schedule 30 or 40, conforming to ASTM A53, Type E or S, Gr. B

Flanged Adapter Nipples: (specify choice)

- ☐ Class 125 Flange: Cast iron conforming to ANSI B16.1
- ☐ Class 150 Flange: Carbon steel conforming to ANSI B16.5, raised or flat face
- ☐ Class 300 Flange: Carbon steel conforming to ANSI B16.5, raised or flat face

Fitting Coating: (specify choice)

- ☐ Standard: Orange enamel
- ☐

Flanged Adapter Nipple Coating: (specify choice)

- ☐ Standard: None (Unfinished)
- ☐

4.0 DIMENSIONS

Elbows

No. 10 90° Elbow

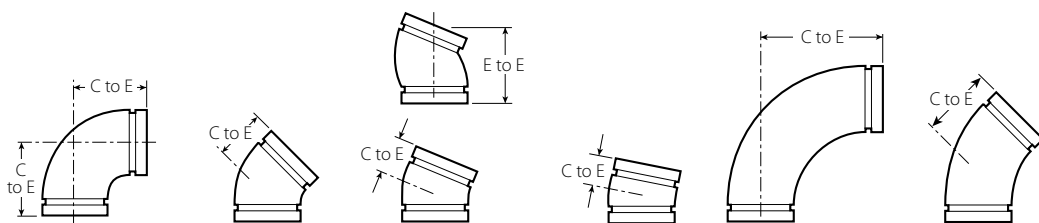
No. 11 45° Elbow

No. 12 22½° Elbow

No. 13 11¼° Elbow

No. 100 90° Long
Radius Elbow

No. 110 45° Long
Radius Elbow



Standard and
GSNK

Size		No. 10 90° Elbow		No. 11 45° Elbow		No. 12 22½° Elbow		No. 13 11¼° Elbow		No. 100 90° Long Radius Elbow		No. 110 45° Long Radius Elbow	
Nominal	Actual Outside Diameter	C to E	Approx. Wgt. (Each)	C to E	Approx. Wgt. (Each)	C to E	Approx. Wgt. (Each)	C to E	Approx. Wgt. (Each)	C to E	Approx. Wgt. (Each)	C to E	Approx. Wgt. (Each)
inches DN	inches mm	inches mm	lb kg	inches mm	lb kg	inches mm	lb kg	inches mm	lb kg	inches mm	lb kg	inches mm	lb kg
¾ DN20	1.050 26.9	2.25 57	0.5 0.2	1.50 38	0.5 0.2	1.63 (sw) 41	—	1.38 (sw) 35	—	2.50 (sw) 64	0.4 0.2	1.88 (sw) 48	0.3 0.1
1 DN25	1.315 33.7	2.25 57	0.6 0.3	1.75 44	0.6 0.3	3.25 ¹ 83	0.6 0.3	1.38 (sw) 35	0.3 0.1	2.88 (sw) 73	0.6 0.3	2.25 (sw) 57	0.5 0.2
1 ¼ DN32	1.660 42.4	2.75 70	1.0 0.5	1.75 44	0.9 0.4	1.75 44	0.8 0.4	1.38 (sw) 35	0.5 0.2	3.25 (sw) 83	1.1 0.5	2.38 (sw) 60	0.7 0.3
1 ½ DN40	1.900 48.3	2.75 70	1.2 0.5	1.75 44	0.9 0.4	1.75 44	0.8 0.4	1.38 (sw) 35	0.5 0.2	3.63 (sw) 92	2.2 1.0	2.50 (sw) 64	1.3 0.6
2 DN50	2.375 60.3	3.25 83	1.8 0.8	2.00 51	1.3 0.6	1.88 48	1.2 0.5	1.38 35	1.0 0.5	4.38 111	2.5 1.1	2.75 70	1.8 0.8
2 ½	2.875 73.0	3.75 95	3.2 1.5	2.25 57	2.2 1.0	4.00 ¹ 102	2.3 1.0	1.50 38	1.1 0.5	5.13 130	3.4 1.5	3.00 76	2.8 1.3
DN65	3.000 76.1	3.75 95	3.7 1.7	2.25 57	3.4 1.5	2.25 57	—	1.50 38	—	—	—	—	—
3 DN80	3.500 88.9	4.25 108	4.5 2.0	2.50 64	3.1 1.4	4.50 ¹ 114	3.1 1.4	1.50 38	2.1 1.0	5.88 149	6.0 2.7	3.38 86	4.9 2.2
3 ½ DN90	4.000 101.6	4.50 114	5.6 2.5	2.75 70	4.3 2.0	2.50 (sw) 64	4.0 1.8	1.75 (sw) 44	2.7 1.2	—	—	—	—
4 DN100	4.500 114.3	5.00 127	7.1 3.2	3.00 76	5.6 2.5	2.88 73	5.6 2.5	1.75 44	3.6 1.6	7.50 191	12.3 5.6	4.00 102	7.3 3.3
	4.250 108.0	5.00 127	11.0 5.0	3.00 76	5.6 2.5	—	—	—	—	—	—	—	—
	5.000 127.0	5.25 (sw) 133	10.0 4.5	3.13 (sw) 79	6.0 2.7	3.50 (sw) 89	6.6 3.0	1.88 (sw) 48	4.2 1.9	—	—	—	—
5	5.563 141.3	5.50 140	11.7 5.3	3.25 83	8.3 3.8	2.88 (sw) 73	7.8 3.5	2.00 (sw) 51	5.0 2.2	9.25 (sw) 235	18.0 8.2	4.88 (sw) 124	14.8 6.7
	5.250 133.0	5.50 140	11.7 5.3	3.25 83	8.3 3.8	—	—	—	—	—	—	—	—
DN125	5.500 139.7	5.50 140	11.7 5.3	3.25 83	8.3 3.8	2.88 73	—	2.00 51	—	—	—	—	—
6 DN150	6.625 168.3	6.50 165	17.2 7.8	3.50 89	10.8 4.9	6.25 ¹ 159	12.2 5.5	2.00 51	7.0 3.2	10.75 273	30.4 13.8	5.50 140	17.4 7.9
	6.250 159.0	6.50 165	18.6 8.4	3.50 89	10.8 4.9	—	—	—	—	—	—	—	—
	6.500 165.1	6.50 165	15.5 7.0	3.50 89	9.8 4.4	3.13 79	11.4 5.2	2.00 51	7.4 3.4	10.75 (sw) 273	29.0 13.2	5.50 (sw) 140	19.0 8.6

¹ Gooseneck design, end-to-end dimension fittings in this size, contact your nearest Victaulic sales representative.

(s) = Carbon Steel Direct Roll Groove (OGS)

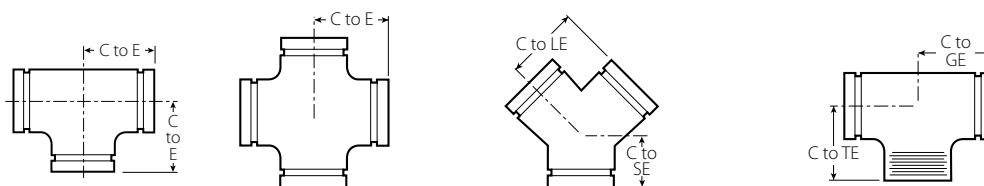
(sw) = Carbon Steel Segmentally Welded

NOTE

- All fittings are ductile iron unless otherwise noted with an (sw) or (s).

4.3 DIMENSIONS

Tees, Crosses and True Wyes



Size		No. 20 Tee		No. 35 Cross (sw)		No. 33 True Wye (sw)			No. 29M Tee with Threaded Branch		
Nominal inches DN	Actual Outside Diameter inches mm	C to E inches mm	Approx. Weight (Each) lb kg	C to E inches mm	Approx. Weight (Each) lb kg	C to LE inches mm	C to SE inches mm	Approx. Weight (Each) lb kg	C to GE inches mm	C to TE inches mm	Approx. Weight (Each) lb kg
3/4 DN20	1.050 26.9	2.25 57	0.6 0.3	2.25 57	0.9 0.4	2.25 57	2.00 51	0.7 0.3	2.25 57	2.25 (sw) 57	0.6 0.3
1 DN25	1.315 33.7	2.25 57	1.0 0.5	2.25 57	1.3 0.6	2.25 57	2.25 57	1.1 0.5	2.25 57	2.25 57	1.0 0.5
1 1/4 DN32	1.660 42.4	2.75 70	1.5 0.7	2.75 70	2.1 1.0	2.75 70	2.50 64	1.5 0.7	2.75 70	2.75 70	1.5 0.7
1 1/2 DN40	1.900 48.3	2.75 70	2.0 0.9	2.75 70	2.5 1.1	2.75 70	2.75 70	1.8 0.8	2.75 70	2.75 70	2.0 0.9
2 DN50	2.375 60.3	3.25 83	3.0 1.4	3.25 83	3.8 1.7	3.25 83	2.75 70	2.5 1.1	3.25 83	4.25 108	3.0 1.4
2 1/2 DN65	2.875 73.0	3.75 95	4.3 2.0	3.75 95	6.1 2.8	3.75 95	3.00 76	4.3 2.0	3.75 95	3.75 (sw) 95	4.3 2.0
3 DN80	3.500 88.9	4.25 108	6.8 3.0	4.25 108	10.5 4.8	4.25 108	3.25 83	6.1 2.8	4.25 108	6.00 152	6.8 3.1
3 1/2 DN90	4.000 101.6	4.50 (sw) 114	7.9 3.6	4.50 114	11.5 5.2	4.50 114	3.50 89	9.6 4.4	4.50 114	4.50 (sw) 114	7.9 3.6
4 DN100	4.250 108.0	5.00 127	15.5 7.0	—	—	—	—	—	5.00 127	5.00 (sw) 127	15.5 7.0
4 DN100	4.500 114.3	5.00 127	11.9 5.4	5.00 127	15.8 7.2	5.00 127	3.75 95	9.8 4.4	5.00 127	7.25 184	11.9 5.4
5 DN125	5.000 127.0	5.25 (sw) 133	15.0 6.8	5.25 133	18.5 8.4	—	—	—	5.25 133	5.25 (sw) 133	15.0 6.8
5 DN125	5.250 133.0	5.50 140	17.8 8.1	—	—	—	—	—	5.50 140	5.50 (sw) 140	17.8 8.1
5 DN125	5.500 139.7	5.50 140	17.8 8.1	—	—	—	—	—	5.50 140	5.50 (sw) 140	17.8 8.1
5 DN125	5.563 141.3	5.50 140	17.8 8.1	5.50 140	20.0 9.1	5.50 140	4.00 102	15.0 6.8	5.50 140	5.50 (sw) 140	17.8 8.1
6 DN150	6.250 159.0	6.50 165	27.1 12.3	—	—	—	—	—	6.50 165	6.50 (sw) 165	27.1 12.3
6 DN150	6.500 165.1	6.50 165	22.0 10.0	6.50 165	28.0 12.7	—	—	—	6.50 165	6.50 (sw) 165	22.0 10.0
6 DN150	6.625 168.3	6.50 165	25.7 11.7	6.50 165	28.0 12.7	6.50 165	4.50 114	22.3 10.1	6.50 165	6.50 (sw) 165	25.7 11.7
8 DN200	8.625 219.1	7.75 197	47.6 21.6	7.75 197	48.0 21.8	7.75 197	6.00 152	36.0 16.3	7.75 197	7.75 197	47.6 21.6
10 DN250	10.750 273.0	9.00 229	99.0 44.9	9.00 229	121.5 55.1	9.00 229	6.50 155	69.9 31.7	9.00 229	9.00 229	99.0 44.9
12 DN300	12.750 323.9	10.00 254	133.0 60.3	10.00 254	110.0 49.9	10.00 254	7.00 178	80.0 36.3	10.00 254	10.00 254	133.0 60.3

(s) = Carbon Steel Direct Roll Groove (OGS)

(sw) = Carbon Steel Segmentally Welded

NOTE

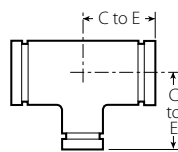
- All fittings are ductile iron unless otherwise noted with an (sw) or (s).

4.4 DIMENSIONS

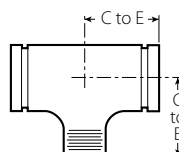
Reducing Tee

No. 25 Grooved Branch

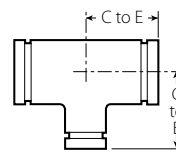
No. 29T Threaded Branch



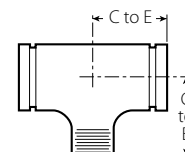
No. 25



No. 29T



No. 25



No. 29T

Size				No. 25 Std.	No. 29T w/ Thd. Branch	Approx. Weight (Each) lb kg	
Nominal inches DN				C to E inches mm	C to E inches mm		
1 DN25	x	1 DN25	x	¾ DN20	2.25 (sw) 57	2.25 (sw) 57	1.0 0.5
1 ¼ DN32	x	1 ¼ DN32	x	1 DN25	2.75 (sw) 70	2.75 (sw) 70	1.3 0.6
1 ½ DN40	x	1 ½ DN40	x	¾ DN20	2.75 (sw) 70	2.75 (sw) 70	1.5 0.7
				1 DN25	2.75 (sw) 70	2.75 (sw) 70	1.5 0.7
				1 ¼ DN32	2.75 (sw) 70	2.75 (sw) 70	1.7 0.8
2 DN50	x	2 DN50	x	¾ DN20	3.25 83	3.25 83	2.5 1.1
				1 DN25	3.25 83	3.25 83	2.7 1.2
				1 ¼ DN32	3.25 (sw) 83	3.25 (sw) 83	1.8 0.8
				1 ½ DN40	3.25 83	3.25 (sw) 83	3.0 1.4
2 ½	x	2 ½	x	¾ DN20	3.75 (sw) 95	3.75 (sw) 95	3.9 1.8
				1 DN25	3.75 95	3.75 (sw) 95	3.8 1.7
				1 ¼ DN32	3.75 95	3.75 95	4.2 1.7
				1 ½ DN40	3.75 95	3.75 95	3.9 1.8
				2 DN50	3.75 95	3.75 (sw) 95	4.5 2.0
3 DN80	x	3 DN80	x	¾ DN20	4.25 (sw) 108	4.25 (sw) 108	5.7 2.6
				1 DN25	4.25 108	4.25 108	6.1 2.8
				1 ¼ DN32	4.25 108	4.25 108	8.0 3.6
				1 ½ DN40	4.25 108	4.25 (sw) 108	6.5 2.9
				2 DN50	4.25 108	4.25 (sw) 108	6.2 2.8
				2 ½	4.25 108	4.25 (sw) 108	6.4 2.9

(s) = Carbon Steel Direct Roll Groove (OGS)

(sw) = Carbon Steel Segmentally Welded

NOTE

- Cast fitting available. Contact Victaulic for details.

Size					No. 25 Std.	No. 29T w/ Thd. Branch	Approx. Weight (Each) lb kg				
Nominal inches DN					C to E inches mm	C to E inches mm					
4 DN100	x	4 DN100	x	3/4 DN20	5.00 (sw) 127	5.00 (sw) 127	8.0 3.6				
				1 DN25	5.00 127	5.00 127	7.8 3.5				
				1 1/4 DN32	5.00 (sw) 127	5.00 (sw) 127	9.6 4.4				
				1 1/2 DN40	5.00 127	5.00 127	10.2 4.6				
				2 DN50	5.00 127	5.00 127	11.2 5.1				
				2 1/2	5.00 127	5.00 127	11.4 5.2				
				3 DN80	5.00 127	5.00 127	11.6 5.3				
				5	x	5	x	1 DN25	5.50 (sw) 140	5.50 (sw) 140	14.0 6.4
								1 1/2 DN40	5.50 (sw) 140	5.50 (sw) 140	14.3 6.5
2 DN50	5.50 (sw) 140	5.50 (sw) 140	14.5 6.6								
2 1/2	5.50 140	5.50 (sw) 140	15.2 6.9								
3 DN80	5.50 140	5.50 (sw) 140	16.6 7.5								
4 DN100	5.50 140	5.50 (sw) 140	16.7 7.6								
6 DN150	x	6 DN150	x					1 DN25	6.50 (sw) 165	6.50 (sw) 165	23.0 10.4
				1 1/2 DN40	6.50 (sw) 165	6.50 (sw) 165	24.0 10.9				
				2 DN50	6.50 165	6.50 165	21.6 9.8				
				2 1/2	6.50 165	6.50 165	21.4 11.7				
				3 DN80	6.50 165	6.50 165	26.5 12.0				
				4 DN100	6.50 165	6.50 165	25.0 11.3				
				5	6.50 165	6.50 165	23.2 10.5				
				6 1/2	x	6 1/2	x	3 DN80	6.50 165	6.50 (sw) 165	24.0 10.9
								4 DN100	6.50 165	6.50 (sw) 165	25.0 11.3

(s) = Carbon Steel Direct Roll Groove (OGS)

(sw) = Carbon Steel Segmentally Welded

NOTE

- Cast fitting available. Contact Victaulic for details.

4.10 DIMENSIONS

Cap

No. 60



No. 60



No. 60

Size		No. 60 Cap	
Nominal inches DN	Actual Outside Diameter inches mm	"T" Thickness inches mm	Approx. Weight (Each) lb kg
¾ DN20	1.050 26.9	0.88 22	0.2 0.1
1 25	1.315 33.7	0.88 22	0.3 0.1
1¼ DN32	1.660 42.4	0.88 22	0.3 0.1
1½ DN40	1.900 48.3	0.88 22	0.5 0.2
2 DN50	2.375 60.3	0.88 22	0.6 0.3
2½	2.875 73.0	0.88 22	1.0 0.5
DN65	3.000 76.1	0.88 22	1.2 0.5
3 DN80	3.500 88.9	0.88 22	1.2 0.5
3½ DN90	4.000 101.6	0.88 22	2.5 1.1
	4.250 108.0	1.00 25	2.3 1.0
4 DN100	4.500 114.3	1.00 25	2.5 1.1
	5.250 133.0	1.00 25	4.5 2.0
DN125	5.500 139.7	1.00 25	4.5 2.0
5	5.563 141.3	1.00 25	4.6 2.1

Size		No. 60 Cap	
Nominal inches DN	Actual Outside Diameter inches mm	"T" Thickness inches mm	Approx. Weight (Each) lb kg
	6.250 159.0	1.00 25	6.8 3.1
	6.500 165.1	1.00 25	7.3 3.3
6 DN150	6.625 168.3	1.00 25	6.1 2.8
8 DN200	8.625 219.1	1.19 30	13.1 5.9
10 DN250	10.750 273.0	1.25 32	21.0 9.5
12 DN300	12.750 323.9	1.25 32	35.6 16.2
14 ² DN350	14.000 355.6	9.50 (s) 241	+
16 ² DN400	16.000 406.4	10.00 (s) 254	+
18 ² DN450	18.000 457.0	11.00 (s) 279	+
20 ² DN500	20.000 508.0	12.00 (s) 305	+
24 ² DN600	24.000 610.0	13.50 (s) 343	+
14 – 60 DN350 – DN1500	For AGS fitting information, see publication 20.05 		

² For 14"/DN350 and larger roll grooved systems, Victaulic offers the Advanced Groove System (AGS). For pricing and availability of cut groove fittings in this size, contact your nearest Victaulic sales representative.

(s) = Carbon Steel Direct Roll Groove (OGS)

(sw) = Carbon Steel Segmentally Welded

+ Contact Victaulic for details.

NOTES

- No. 60 cap is not suitable for use in vacuum service with Style 72 or 750 couplings. No. 61 bull plugs should be used.
- All fittings are ductile iron unless otherwise noted with an (sw) or (s).

4.11 DIMENSIONS

Flanged Adapter Nipple

No. 41 ANSI Class 125

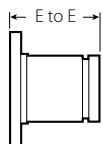
No. 45F ANSI Class 150 Flat Face

No. 45R ANSI Class 150 Raised Face

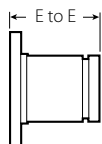
No. 46F ANSI Class 300 Flat Face

No. 46R ANSI Class 300 Raised Face

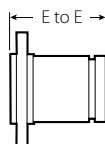
No. 45RE PN10/PN16 Raised Face



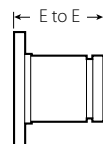
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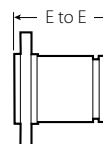
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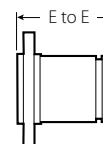
No. 45R



No. 46F



No. 46R



No. 45RE

Size		No. 41 ANSI 125 Flange Adapter Nipple		No. 45F and No. 45R ANSI 150 Flanged Adapter Nipple (s)		No. 46F and No. 46R ANSI 300 Flanged Adapter Nipple (s)		No. 45RE Flanged Adapter Nipple	
Nominal inches DN	Actual Outside Diameter inches mm	E to E inches mm	Approx. Weight (Each) lb kg	E to E inches mm	Approx. Weight (Each) lb kg	E to E inches mm	Approx. Weight (Each) lb kg	E to E inches mm	Approx. Weight (Each) lb kg
¾ DN20	1.050 26.9	3.00 76	—	3.00 76	2.3 1.0	3.00 76	3.3 1.5	—	—
1 DN25	1.315 33.7	3.00 76	2.5 1.1	3.00 76	2.7 1.2	3.00 76	3.9 1.8	—	—
1¼ DN32	1.660 42.4	4.00 102	3.0 1.4	4.00 102	3.3 1.5	4.00 102	4.8 2.2	—	—
1½ DN40	1.900 48.3	4.00 102	3.5 1.6	4.00 102	3.9 1.8	4.00 102	6.9 3.1	—	—
2 DN50	2.375 60.3	4.00 102	5.5 2.5	4.00 102	6.0 2.7	4.00 102	8.2 3.7	2.50 64	5.3 2.4
2½	2.875 73.0	4.00 102	8.0 3.6	4.00 102	9.9 4.5	4.00 102	11.9 5.4	—	—
DN65	3.000 76.1	—	—	—	—	—	—	2.50 64	6.5 2.9
3 DN80	3.500 88.9	4.00 102	9.5 4.3	4.00 102	11.7 5.3	4.00 102	16.5 7.5	2.50 64	8.2 3.7
3½ DN90	4.000 101.6	4.00 102	12.0 5.4	4.00 102	15.1 6.8	4.00 102	20.1 9.1	—	—
4 DN100	4.500 114.3	6.00 152	16.7 7.6	6.00 152	18.5 8.4	6.00 152	27.4 12.4	2.75 70	10.0 45
5	5.563 141.3	6.00 152	21.5 9.8	6.00 152	21.3 9.7	6.00 152	35.3 16.0	—	—
DN125	5.500 139.7	—	—	—	—	—	—	2.75 70	16.3 7.4
6 DN150	6.625 168.3	6.00 152	26.5 12.0	6.00 152	27.5 12.5	6.00 152	47.5 21.5	2.75 70	16.3 7.4
	6.500 165.1	—	—	—	—	—	—	—	—
8 DN200	8.625 219.1	6.00 152	39.0 17.7	6.00 152	41.3 18.8	6.00 152	70.3 31.9	—	—
10 DN250	10.750 273.0	8.00 203	57.0 25.9	8.00 203	59.3 27.1	8.00 203	100.8 45.7	—	—
12 DN300	12.750 323.9	8.00 203	41.0 18.6	8.00 203	40.0 40.0	8.00 203	146.2 66.3	—	—
14 ² DN350	14.000 355.6	8.00 203	—	8.00 203	+	8.00 203	+	—	—
16 ² DN400	16.000 406.4	8.00 203	—	8.00 203	+	8.00 203	+	—	—
18 ² DN450	18.000 457.0	8.00 203	—	8.00 203	+	8.00 203	+	—	—

² For 14"/DN350 and larger roll grooved systems, Victaulic offers the Advanced Groove System (AGS). For pricing and availability of cut groove fittings in this size, contact your nearest Victaulic sales representative.

(s) = Carbon Steel Direct Roll Groove (OGS)

(sw) = Carbon Steel Segmentally Welded

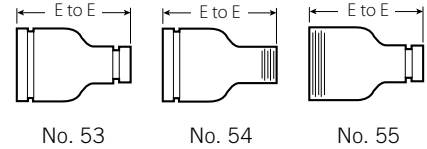
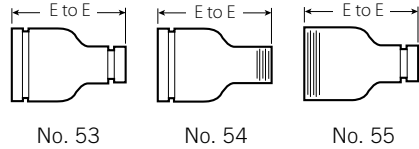
4.12 DIMENSIONS

Swaged Nipple

No. 53 Grv. x Grv.

No. 54 Grv. x Thd.

No. 55 Thd. x Grv.



Size			No. 53, 54, and 55 Swaged Nipples (s)	
Nominal inches DN			E to E inches mm	Approx. Weight (Each) lb kg
2 DN50	x	1 DN25	6.50 165	2.0 0.9
		1¼ DN32	6.50 165	2.0 0.9
		1½ DN40	6.50 165	2.0 0.9
2½	x	1 DN25	7.00 178	3.0 1.4
		1¼ DN32	7.00 178	3.0 1.4
		1½ DN40	7.00 178	3.0 1.4
		2 DN50	7.00 178	3.0 1.4
3 DN80	x	1 DN25	8.00 203	4.5 2.0
		1¼ DN32	8.00 203	4.5 2.0
		1½ DN40	8.00 203	4.5 2.0
		2 DN50	8.00 203	4.5 2.0
		2½	8.00 203	4.5 2.0
3½ DN90	x	3 DN80	8.00 203	6.8 3.1
4 DN100	x	1 DN25	9.00 229	7.5 3.4
		1¼ DN32	9.00 229	7.5 3.4
		1½ DN40	9.00 229	7.5 3.4
		2 DN50	9.00 229	7.5 3.4
		2½	9.00 229	7.5 3.4
		3 DN80	9.00 229	7.5 3.4
		3½ DN90	9.00 229	7.5 3.4

Size			No. 53, 54, and 55 Swaged Nipples (s)	
Nominal inches DN			E to E inches mm	Approx. Weight (Each) lb kg
5	x	2 DN50	11.00 279	11.5 5.2
		3 DN80	11.00 279	11.3 5.1
		4 DN100	11.00 279	11.5 5.2
6 DN150	x	1 DN25	12.00 305	17.0 7.7
		1¼ DN32	12.00 305	17.0 7.7
		1½ DN40	12.00 305	17.2 7.8
		2 DN50	12.00 305	17.4 7.9
		2½	12.00 305	17.4 7.9
		3 DN80	12.00 305	17.4 7.9
		3½ DN90	12.00 305	17.4 7.9
		4 DN100	12.00 305	17.5 7.9
		4½	12.00 305	17.5 7.9
		5	12.00 305	17.5 7.9
8 DN200	x	6 DN150	+	20.0 9.1

(s) = Carbon Steel Direct Roll Groove (OGS)

(sw) = Carbon Steel Segmentally Welded

+ Contact Victaulic for details

NOTE

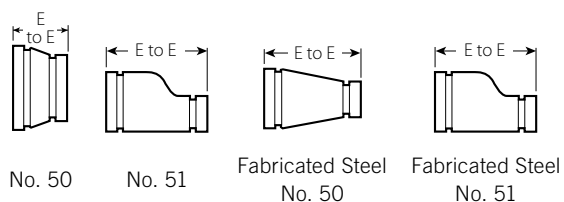
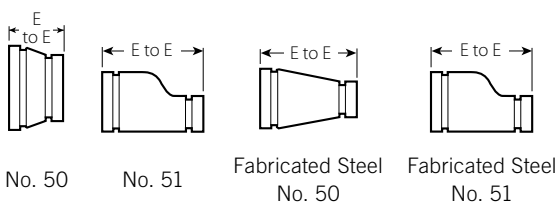
- All fittings are ductile iron unless otherwise noted with an (sw) or (s).

4.15 DIMENSIONS

Concentric/Eccentric Reducer

No. 50 Concentric

No. 51 Eccentric



Size	No. 50 Concentric Reducer			No. 51 Eccentric Reducer		
Nominal inches DN	E to E inches mm	Approx. Weight (Each) lb kg	E to E inches mm	Approx. Weight (Each) lb kg		
1¼ DN32 x ¾ DN20	+	1.9 0.9	—	—		
1 DN25	+	1.9 0.9	—	—		
1½ DN40 x ¾ DN20	+	1.4 0.6	—	—		
1 DN25	2.50 64	0.8 0.4	8.50 (sw) 216	4.5 2.0		
1¼ DN32	2.50 64	1.0 0.5	—	—		
2 DN50 x ¾ DN20	2.50 64	0.9 0.3	9.00 (sw) 229	2.0 0.9		
1 DN25	2.50 64	0.7 0.3	9.00 (sw) 229	2.3 1.0		
1¼ DN32	2.50 64	1.2 0.5	9.00 (sw) 229	4.6 2.1		
1½ DN40	2.50 64	1.0 0.5	3.50 89	1.1 0.5		
2½ x ¾ DN20	+	1.3 0.6	+	3.3 1.5		
1 DN25	2.50 64	1.1 0.5	9.50 241	3.5 1.6		
1¼ DN32	3.50 89	3.3 1.5	3.50 89	1.4 0.6		
1½ DN40	2.50 64	3.6 1.6	9.50 (sw) 241	3.7 1.7		
2 DN50	2.50 64	3.9 1.8	3.50 89	4.3 2.0		
3 DN80 x ¾ DN20	+	1.5 0.7	+	4.5 2.0		
1 DN25	2.50 64	1.3 0.6	9.50 (sw) 241	4.8 2.2		
1¼ DN32	2.50 64	1.4 0.6	+	4.8 2.2		
1½ DN40	2.50 64	5.1 2.3	9.50 (sw) 241	5.1 2.3		
2 DN50	2.50 64	1.6 0.7	3.50 89	6.0 2.7		
2½	2.50 64	1.8 0.8	3.50 89	7.0 3.2		
DN65	2.50 64	2.1 1.0	—	—		
3½ DN90 x 3 DN80	2.50 64	2.0 0.9	9.50 (sw) 241	7.0 3.2		
4 DN100 x 1 DN25	3.00 76	3.0 1.4	13.00 (sw) 330	6.5 2.9		

Size	No. 50 Concentric Reducer			No. 51 Eccentric Reducer		
Nominal inches DN	E to E inches mm	Approx. Weight (Each) lb kg	E to E inches mm	Approx. Weight (Each) lb kg		
1¼ DN32	+	4.6 2.1	—	—		
1½ DN40	3.00 (sw) 76	2.6 1.2	10.00 (sw) 254	8.1 3.7		
2 DN50	3.00 76	2.4 1.1	4.00 102	3.3 1.5		
2½	3.00 76	2.7 1.2	4.00 102	3.4 1.5		
3 DN80	3.00 76	3.2 1.4	4.00 102	3.5 1.6		
3½ DN90	3.00 76	2.9 1.3	10.00 (sw) 254	8.0 3.6		
5 x 2 DN50	11.00 (sw) 279	9.0 4.1	11.00 (sw) 279	5.2 2.4		
2½	4.00 102	4.3 2.0	11.00 (sw) 279	10.8 4.9		
3 DN80	4.00 102	5.5 2.5	11.00 (sw) 279	11.1 5.0		
4 DN100	3.50 89	4.3 1.9	5.00 127	12.0 5.4		
6 DN150 x 1 DN25	4.00 102	5.0 2.3	11.50 (sw) 292	14.5 6.6		
1½ DN40	+	5.5 2.5	+	+		
2 DN50	4.00 102	6.6 3.0	11.50 (sw) 292	14.5 6.6		
2½	4.00 102	6.4 2.9	11.50 (sw) 292	14.2 6.4		
3 DN80	4.00 102	6.4 2.9	5.50 140	15.0 6.8		
4 DN100	4.00 102	6.5 2.9	5.50 140	17.0 7.7		
5	4.00 102	6.4 2.9	5.50 140	17.0 7.7		
8 DN200 x 2½	16.00 406	7.9 3.6	12.00 (sw) 305	26.1 11.8		
3 DN80	5.00 127	9.3 4.2	12.00 (sw) 305	22.0 10.0		
4 DN100	5.00 127	10.4 4.8	12.00 (sw) 305	23.0 10.4		
5	5.00 127	11.6 5.2	12.00 (sw) 305	23.0 10.4		
6 DN150	5.00 127	11.9 5.4	6.00 152	24.0 10.9		

5.0 PERFORMANCE

Flow Data

(Frictional Resistance)

The chart expresses the frictional resistance of various Victaulic fittings as equivalent feet of straight pipe. Fittings not listed can be estimated from the data given, for example, a 22½° elbow is approximately one-half the resistance of a 45° elbow. Values of mid-sizes can be interpolated.

Size		Dimensions					
Nominal inches DN	Actual Outside Diameter inches mm	90° Elbows		45° Elbows		Tees	
		No. 10 Std. Radius feet meters	No. 100 1 ½ D Long Radius feet meters	No. 11 Std. Radius feet meters	No. 110 1 ½ D Long Radius feet meters	Branch feet meters	Run feet meters
1 DN25	1.315 33.7	1.7 0.5	—	0.8 0.2	—	4.2 1.3	1.7 0.5
2 DN50	2.375 60.3	3.5 1.1	2.5 0.8	1.8 0.5	1.1 0.3	8.5 2.6	3.5 1.1
3 DN65	3.000 76.1	4.3 1.3	—	2.1 0.7	—	10.8 3.3	4.3 1.3
4 DN80	3.500 88.9	5.0 1.5	3.8 1.2	2.6 0.8	1.6 0.5	13.0 4.0	5.0 1.5
	4.250 108.0	6.4 2.0	—	3.2 0.9	—	15.3 4.7	6.4 2.0
5 DN100	4.500 114.3	6.8 2.1	5.0 1.5	3.4 1.0	2.1 0.6	16.0 4.9	6.8 2.1
	5.250 133.0	8.1 2.5	—	4.1 1.2	—	20.0 6.2	8.1 2.5
DN125	5.500 139.7	8.5 2.6	—	4.2 1.3	—	21.0 6.4	8.5 2.6
6 DN150	5.563 141.3	8.5 2.6	—	4.2 1.3	—	21.0 6.4	8.5 2.6
	6.250 159.0	9.4 2.9	—	4.9 1.5	—	25.0 7.6	9.6 2.9
	6.500 165.1	9.6 2.9	—	5.0 1.5	—	25.0 7.6	10.0 3.0
8 DN200	6.625 168.3	10.0 3.0	7.5 2.3	5.0 1.5	3.0 0.9	25.0 7.6	10.0 3.0
10 DN250	8.625 219.1	13.0 4.0	9.8 3.0	6.5 2.0	4.0 1.2	33.0 10.1	13.0 4.0
12 DN300	10.750 273.0	17.0 5.2	12.0 3.7	8.3 2.5	5.0 1.5	41.0 12.5	17.0 5.2
14 DN350	12.750 323.9	20.0 6.1	14.5 4.4	10.0 3.0	6.0 1.8	50.0 15.2	20.0 6.1
16 DN400	14.000 355.6	24.5 ⁴ 7.5	15.8 4.8	18.5 ⁴ 5.6	11.0 3.4	70.0 21.3	23.0 7.0
18 DN450	16.000 406.4	28.0 ⁴ 8.5	18.0 5.5	21.0 ⁴ 6.4	13.0 4.0	80.0 24.4	27.0 8.2
20 DN500	18.000 457.0	31.0 ⁴ 9.5	20.0 6.1	23.5 ⁴ 7.2	14.0 4.3	90.0 27.4	30.0 9.1
24 DN600	20.000 508.0	34.0 ⁴ 10.4	22.5 6.9	25.5 ⁴ 7.8	16.0 4.9	100.0 30.5	33.0 10.1
	24.000 610.0	42.0 ⁴ 12.8	27.0 8.2	29.5 ⁴ 9.0	19.0 5.8	120.0 36.6	40.0 12.2
AGS fittings available up to 60"/DN1500. Contact Victaulic for details.							
							

⁴ Fitting flow data for 14-24"/DN350-DN600 size No. 10 and No. 11 Elbows is based on fittings for Style 07 and 77 couplings. For flow data on AGS fittings (No. W10 and No. W11 Elbows), refer to [publication 20.05](#).

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.

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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.

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.

FireLock® Fittings

PRODUCT DESCRIPTION



FireLock® products comprise a unique system specifically designed for fire protection services. FireLock full-flow elbows and tees are a CAD-developed, hydrodynamic design that has a shorter center-to-end dimension than standard fittings. A noticeable bulge allows the water to make a smoother turn to maintain similar flow characteristics as standard full flow fittings.

FireLock fittings are designed for use exclusively with Style 005 FireLock couplings. Use of other couplings or flange adapters may result in bolt pad interference.

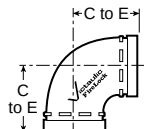
Victaulic FireLock fittings pressure ratings conform to the ratings of Victaulic FireLock Style 005 couplings.

Patented



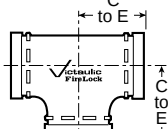
See Victaulic publication 10.01 for details.

DIMENSIONS



No. 001

No. 003



No. 002



No. 006

Fitting Size		No. 001 90° Elbow		No. 003 45° Elbow		No. 002 Straight Tee		No. 006 Cap	
Nominal Diameter Inches/mm	Actual Outside Diameter Inches/mm	C to E Inches mm	Aprx. Weight Each Lbs./kg	C to E Inches mm	Aprx. Weight Each Lbs./kg	C to E Inches mm	Aprx. Weight Each Lbs./kg	Thickness "T" Inches mm	Aprx. Weight Each Lbs./kg
1 1/4 32	1.660 42,4	2.75 70	1.0 0,5	1.75 45	0.9 4,1	2.75 70	1.5 0,7	0.82 21	0.3 0,1
1 1/2 40	1.900 48,3	2.75 70	1.2 0,5	1.75 45	0.9 4,1	2.75 70	2.0 0,9	0.82 21	0.4 0,2
2 50	2.375 60,3	2.75 70	1.7 0,8	2.00 51	1.8 0,8	2.75 70	2.4 1,1	0.88 22	0.6 0,3
2 1/2 65	2.875 73,0	3.00 76	3.1 1,4	2.25 57	2.2 1,0	3.00 76	3.6 1,6	0.88 22	1.0 0,5
76,1 mm	3.000 76,1	3.00 76	3.30 1,5	2.25 57	2.4 1,1	—	—	—	—
3 80	3.500 88,9	3.38 86	4.0 1,8	2.50 64	3.1 1,4	3.38 86	5.3 2,4	0.88 22	1.2 0,5
4 100	4.500 114,3	4.00 102	6.7 3,0	3.00 76	5.6 2,5	4.00 102	8.7 3,9	1.00 25	2.4 1,1
5 125	5.563 141,3	4.88 124	12.6 5,7	3.25 83	8.3 3,8	4.88 124	15.7 7,1	1.00 25	4.1 1,9
6 150	6.625 168,3	5.50 140	18.3 8,3	3.50 89	11.7 5,3	5.50 140	22.7 10,3	1.00 25	5.9 2,7
8 200	8.625 219,1	6.81 173	25.5 11,6	4.25 108	20.4 9,3	6.94 176	38.7 17,6	1.13 29	12.7 5,8

FLOW DATA

Fitting Size		Frictional Resistance Equivalent Feet/meters of Straight Pipe			
Nominal Diameter Inches/mm	Actual Outside Diameter Inches/mm	90° Elbow No. 001	45° Elbow No. 003	Straight Tee No. 002	
				Branch	Run
2 50	2.375 60,3	3.5 1,1	1.8 0,5	8.5 2,6	3.5 1,1
2½ 65	2.875 73,0	4.3 1,3	2.2 0,7	10.8 3,3	4.3 1,3
76,1 mm	3.000 76,1	4.5 1,4	2.3 0,7	11.0 3,4	4.5 1,4
3 80	3.500 88,9	5.0 1,5	2.6 0,8	13.0 4,0	5.0 1,5
4 100	4.500 114,3	6.8 2,1	3.4 1,0	16.0 4,9	6.8 2,1
5 125	5.563 141,3	8.5 2,6	4.2 1,3	21.0 6,4	8.5 2,6
6 150	6.625 168,3	10.0 3,0	5.0 1,5	25.0 7,6	10.0 3,0
8 200	8.625 219,1	13.0 4,0	5.0 1,5	33.0 10,1	13.0 4,0

† The flow data listed is based upon the pressure drop of Schedule 40 pipe.

MATERIAL SPECIFICATIONS

Fitting: Ductile iron conforming to ASTM A-536, grade 65-45-12

Fitting Coating: Orange enamel

This product shall be manufactured by Victaulic Company. 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.

Mechanical-T® Bolted Branch Outlets

STYLES 920 AND 920N



Victaulic Mechanical-T® Outlet provides a direct branch connection at any location a hole can be cut in pipe. The hole is cut oversize to receive a “holefinder” locating collar which secures the outlet in position permanently. A pressure responsive gasket seals on the pipe O.D.

Cross-type connections can be achieved by utilizing two upper housings of the same style and size, with the same or differing branch size connections. NOTE: Style 920 and Style 920N housings cannot be mated to each other to achieve a cross connection.

Style 920 and Style 920N Mechanical-T outlets are available with grooved or female threaded outlet. Specify choice on order. Units are supplied painted with plated bolts. Galvanized housings are available, supplied with plated bolts.

All sizes of Style 920 and 920N are rated at 500 psi/3450 kPa working pressure on Schedule 10 and 40 carbon steel pipe. They may also be used on high density polyethylene or polybutylene (HDPE) pipe. Pressure ratings on HDPE are dependent on the pipe rating. Contact Victaulic for ratings on other pipe. **Style 920 and 920N are not recommended for use on PVC plastic pipe.**

Standard piping practices dictate that the Mechanical-T Styles 920 and 920N must be installed so that the main and branch connections are a true 90° angle when permanently attached to the pipeline surface.

Additionally, the Vic-Tap II® hole cutting tool, which allows for hole cutting capabilities on pressurized systems, utilizes the Style 920 Mechanical-T in conjunction with the Series 726 Vic-Ball Valve to create the Style 931 Vic-Tap II Mechanical-T unit. See page 8 for further information.



MATERIAL SPECIFICATIONS

Housing/Coating: Ductile iron conforming to ASTM A-536, grade 65-45-12, with orange enamel coating. Ductile iron conforming to ASTM A-395, grade 65-45-15, is available upon special request.

- **Optional:** Hot dipped galvanized

Gasket: (Specify choice*)

- **Grade “E” EPDM**

EPDM (Green color code). Temperature range –30°F to +230°F/–34°C to +110°C.

Recommended for cold and hot water service within the specified temperature range plus a variety of dilute acids, oil-free air and many chemical services. UL Classified in accordance with ANSI/NSF 61 for cold +86°F/+30°C and hot +180°F/+82°C. NOT RECOMMENDED FOR PETROLEUM SERVICES.

- **Grade “T” nitrile**

Nitrile (Orange color code). Temperature range –20°F to +180°F/–29°C to +82°C.

Recommended for petroleum products, air with oil vapors, vegetable and mineral oils within the specified temperature range. Not recommended for hot water services over +150°F/+66°C or for hot dry air over +140°F/+60°C.

*Services listed are General Service Recommendations only. It should be noted that there are services for which these gaskets are not recommended. Reference should always be made to the latest Victaulic Gasket Selection Guide for specific gasket service recommendations and for a listing of services which are not recommended.

Bolts/Nuts: Heat-treated plated carbon steel, trackhead meeting the physical and chemical requirements of ASTM A-449 and physical requirements of ASTM A-183.

JOB/OWNER

System No. _____

Location _____

CONTRACTOR

Submitted By _____

Date _____

ENGINEER

Spec Sect _____ Para _____

Approved _____

Date _____

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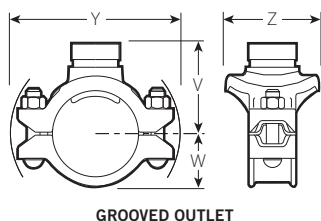


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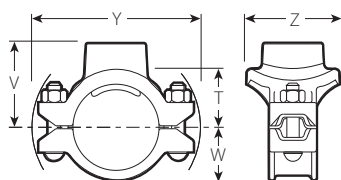
Mechanical-T® Bolted Branch Outlets

STYLES 920 AND 920N

DIMENSIONS



GROOVED OUTLET



FEMALE THREADED OUTLET

- Provides a direct branch connection at any location where a hole can be cut in the pipe
- A pressure responsive gasket provides the seal
- Request Publication 11.03 for Mechanical-T cross assemblies
- Pressure rated up to 500 psi/3450 kPa on steel pipe; also available for use with HDPE pipe
- Sizes from 2 × ½"/50 × 15 mm through 8 × 4"/200 × 100 mm

IMPORTANT NOTES:

Style 920 and Style 920N housings cannot be mated to one another to achieve cross connections.

Size Run × Branch Nominal Size Inches mm	Style No. 920 or 920N	Max. Work Pressure@ psi kPa	Dimensions							Approx. Weight Each	
			Hole Diameter +0.13 -0.00 Inches mm	T** Inches mm	V ‡ # Thd. Inches mm	V ‡ Grv. Inches mm	W Inches mm	Y Inches mm	Z Inches mm	Female Thd. Lbs. kg	Grv. Lbs. kg
2 50 × ½ (a) □	920N	500 3450	1.50 38.1	2.00 51	2.53 64	—	1.61 41	5.35 136	2.75 70	3.1 1.5	—
	920N	500 3450	1.50 38.1	1.97 50	2.53 64	—	1.61 41	5.35 136	2.75 70	3.1 1.5	—
	920N	500 3450	1.50 38.1	1.85 47	2.53 64	—	1.61 41	5.35 136	2.75 70	3.0 1.4	—
	920N	500 3450	1.75 44.5	2.05 52	2.75 70	3.00 76	1.61 41	5.35 136	3.00 76	3.5 1.7	3.2 1.5
	920N	500 3450	1.75 44.5	2.03 52	2.75 70	3.12 79	1.61 41	5.35 136	3.25 83	3.6 1.7	3.2 1.5
2½ 65 × ½ (a) § □	920N	500 3450	1.50 38.1	2.21 56	2.74 70	—	1.82 46	5.64 143	2.75 70	3.0 1.4	—
	920N	500 3450	1.50 38.1	2.18 55	2.74 70	—	1.82 46	5.64 143	2.75 70	3.0 1.4	—
	920N	500 3450	1.50 38.1	2.06 52	2.74 70	—	1.82 46	5.64 143	2.75 70	2.9 1.4	—
	920N	500 3450	1.75 44.5	2.30 58	3.00 76	3.25 83	1.82 46	6.29 160	3.00 76	3.5 1.7	3.2 1.5
	920N	500 3450	2.00 50.8	2.28 58	3.00 76	3.25 83	1.82 46	6.26 159	3.25 83	3.6 1.7	3.3 1.6
76.1 × ½ (a) □	920N	300 2065	1.50 38.1	2.22 56	2.75 70	—	2.25 57	6.46 164	3.18 81	3.9 1.8	—
	920N	300 2065	1.50 38.1	2.19 56	2.75 70	—	2.25 57	6.46 164	3.18 81	3.9 1.8	—
	920N	300 2065	1.50 38.1	2.07 53	2.75 70	—	2.25 57	6.46 164	3.18 81	3.8 1.7	—
	920N	500 3450	1.75 44.5	2.30 58	3.00 76	3.31 84	1.92 49	6.29 160	3.00 76	3.5 1.6	3.2 1.5
	920N	500 3450	2.00 50.8	2.28 58	3.00 76	3.31 84	1.92 49	6.29 160	3.25 83	3.5 1.6	3.3 1.5
3 80 × ½ (a) □	920N	500 3450	1.50 38.1	2.52 64	3.05 78	—	2.28 58	6.15 156	2.75 70	3.4 1.6	—
	920N	500 3450	1.50 38.1	2.49 63	3.05 78	—	2.28 58	6.15 156	2.75 70	3.4 1.6	—
	920N	500 3450	1.50 38.1	2.38 61	3.06 78	—	2.28 58	6.15 156	2.75 70	3.3 1.6	—
	920N	500 3450	1.75 44.5	2.55 65	3.25 83	3.56 90	2.28 58	6.15 156	3.00 76	3.8 1.8	3.7 1.8
	920N	500 3450	2.00 50.8	2.78 71	3.50 89	3.56 90	2.28 58	6.15 156	3.25 83	4.1 1.9	3.8 1.8
3½ 90 × 2 50	920N	500 3450	2.50 63.5	3.00 76	—	3.75 95	2.44 62	6.72 171	3.88 99	—	3.8 1.8

TABLE CONTINUED ON PG. 3

** Center of run to engaged pipe end, female threaded outlet only (dimensions approximate).

† Available with grooved or female threaded outlet. Specify choice on order.

‡ Center of run to end of fitting.

Female threaded outlets are available to NPT and BSPT specifications.

@ See page 7 for Fire Protection approvals and pressure ratings.

(a) British Standard female pipe threaded outlet is available as listed. Specify "BSPT" clearly on order.

(b) For 76.1 mm threaded outlet, specify 2½" BSPT clearly on order.

§ Vds approved for fire protection services

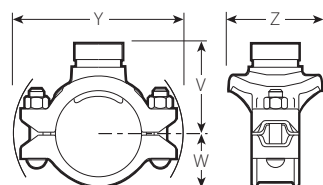
□ LPCB approved for fire protection services

Ø Approved for use in China by Tianjin Approvals Company.

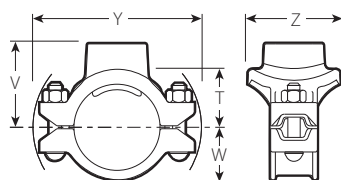
Mechanical-T® Bolted Branch Outlets

STYLES 920 AND 920N

DIMENSIONS



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IMPORTANT NOTES:

Style 920 and Style 920N housings cannot be mated to one another to achieve cross connections.

Size	Style No.	Max. Work Pressure@	Dimensions							Approx. Weight Each		
Run x Branch Nominal Size Inches mm	920 or 920N	psi kPa	Hole Diameter +0.13 -0.00	T** Inches mm	V ‡ # Thd. Inches mm	V ‡ Grv. Inches mm	W Inches mm	Y Inches mm	Z Inches mm	Female Thd. Lbs. kg	Grv. Lbs. kg	
TABLE CONTINUED FROM PAGE 2												
4 100 ×	½ (a) □ 15	920N	500 3450	1.50 38.1	3.03 77	3.56 90	—	2.69 68	7.01 178	2.75 70	3.7 1.8	—
	¾ (a) □ 20	920N	500 3450	1.50 38.1	3.00 76	3.56 90	—	2.69 68	7.01 178	2.75 70	3.7 1.8	—
	1 (a) □ 25	920N	500 3450	1.50 38.1	2.88 73	3.56 90	—	2.69 68	7.01 178	2.75 70	3.6 1.8	—
	1¼ (a) † 32 (b)	920N	500 3450	1.75 44.5	3.08 78	3.78 96	4.00 102	2.69 68	7.01 178	3.00 76	4.0 1.9	3.6 1.8
	1½ (a) † 40 (b)	920N	500 3450	2.00 50.8	3.28 83	4.00 102	4.00 102	2.69 68	7.01 178	3.25 83	4.2 2.0	3.9 1.9
	2 (a) † 50	920N	500 3450	2.50 63.5	3.25 83	4.00 102	4.00 102	2.69 68	7.01 178	3.88 99	5.0 2.3	4.6 2.1
	2½ (a) † 65	920	500 3450	2.75 69.9	2.88 73	4.00 102	4.00 102	2.69 68	7.34 186	4.63 118	5.8 2.6	5.0 2.3
	76.1 mm	920	500 3450	2.75 69.9	2.88 73	—	4.00 102	2.69 68	7.34 186	4.63 118	—	6.4 2.9
	3 (a) † 80	920	500 3450	3.50 88.9	3.31 84	4.50 114	4.12 105	2.69 68	7.73 196	5.12 130	8.4 3.8	6.4 2.9
108.0 ×	1¼ (a) □ 32	920N	500 3450	1.75 44.5	3.08 78	3.78 96	—	2.63 67	7.64 194	3.05 78	5.0 2.3	—
	1½ (a) □ 40	920N	500 3450	2.00 50.8	3.28 83	4.00 102	—	2.63 67	7.64 194	3.25 83	5.0 2.3	—
	2 (a) 50	920N	500 3450	2.50 63.5	3.25 83	4.00 102	—	2.63 67	7.64 194	4.00 102	4.0 1.9	—
	76.1 mm	920	500 3450	2.75 69.9	2.88 73	4.00 102	4.00 102	2.63 67	7.64 194	4.29 109	8.0 3.6	7.8 3.5
	3 (a) 80	920	500 3450	3.50 88.9	3.31 84	4.50 114	4.50 114	2.63 67	7.63 194	4.88 124	6.8 3.1	6.5 3.0
5 125 ×	1½ (a) † 40	920	500 3450	2.00 50.8	4.03 102	4.75 121	4.75 121	3.16 80	9.70 246	3.69 94	7.4 3.4	7.6 3.4
	2 (a) † 50	920	500 3450	2.50 63.5	4.00 102	4.75 121	4.75 121	3.16 80	9.70 246	4.38 111	8.2 3.7	8.0 3.6
	2½ (a) † 65	920	500 3450	2.75 69.9	3.63 92	4.75 121	4.75 121	3.16 80	9.70 246	4.63 118	8.3 3.8	7.9 3.6
	76.1 mm □	920	500 3450	2.75 69.9	3.75 95	—	4.75 121	3.16 80	9.70 246	4.63 118	—	8.0 3.6
	3 (a) † 80	920	500 3450	3.50 88.9	3.81 97	5.00 127	4.63 118	3.16 80	9.70 246	5.31 135	8.4 3.8	8.8 4.0
133.0 ×	2 50	920N	500 3450	2.50 63.5	3.75 95	4.50 114	—	3.17 81	8.00 203	3.88 99	8.0 3.6	—
	3 80	920	500 3450	3.50 88.9	3.81 97	5.00 127	—	3.00 76	9.46 240	5.31 135	8.0 3.6	—
TABLE CONTINUED ON PG. 4												

** Center of run to engaged pipe end, female threaded outlet only (dimensions approximate).

† Available with grooved or female threaded outlet. Specify choice on order.

‡ Center of run to end of fitting.

Female threaded outlets are available to NPT and BSPT specifications.

@ See page 7 for Fire Protection approvals and pressure ratings.

(a) British Standard female pipe threaded outlet is available as listed. Specify "BSPT" clearly on order.

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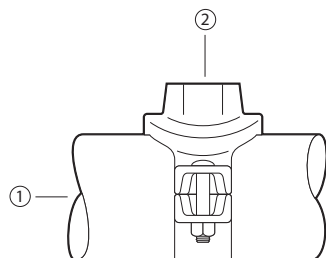
□ LPCB approved for fire protection services

∅ Approved for use in China by Tianjin Approvals Company.

Mechanical-T® Bolted Branch Outlets

STYLES 920 AND 920N

FLOW DATA



Exaggerated for clarity

Flow test data has shown that the total head loss between point (1) and (2) for the Style 920, 920N and 929 Mechanical-T® fittings can best be expressed in terms of the pressure difference across the inlet and branch. The pressure difference can be obtained from the relationship below.

C_v and K_v Values

Values for flow of water at +60°F/+16°C are shown in the table below.

Formulas for C_v/K_v Values:

$$\Delta P = \frac{Q^2}{C_v^2}$$

$$Q = C_v \times \sqrt{\Delta P}$$

Where:

Q = Flow (GPM)

ΔP = Pressure Drop (psi)

C_v = Flow Coefficient

$$\Delta P = \frac{Q^2}{K_v^2}$$

$$Q = K_v \times \sqrt{\Delta P}$$

Where:

Q = Flow (m³/hr)

ΔP = Pressure Drop (Bar)

K_v = Flow Coefficient

OUTLET SIZE		Equivalent Length of Outlet Size Schedule 40 Carbon Steel Pipe (per UL 213, Sec. 16) (C = 120)† FT		C _v /K _v Values	
NOMINAL DIAMETER In/mm	ACTUAL O.D. In/mm	GROOVED	THREADED	GROOVED	THREADED
½	0.840	-	2	-	11
15	21.3	-		-	9.4
¾	1.050	-	4	-	16
20	26.7	-		-	13.7
1	1.315	3**	8	-	21
25	33.7			-	1.8
1 ¼	1.660	5 ½	6	50	48
32	42.7			42.9	41.1
1 ½	1.900	11	11	53	53
40	98.3			45.4	45.4
2	2.375	9	10 ½	112	104
50	60.3			96	89.1
2 ½	2.875	20	12 ½	119	150
65	73.0			102	128.5
76.1 mm	3.000	16*	-	161	-
	76.1			138.1	
3	3.500	14	15 ½	249	237
80	88.9			213.4	203.1
4	4.500	20	22	421	401
100	114.3			360.8	343.6

† Hazen-Williams coefficient of friction is 120.

* Pipe with a wall thickness of 0.165in./4.2mm.

** 1" FireLock™ Innovative Groove System (IGS) outlet

Style 744 FireLock® Flange Adapter

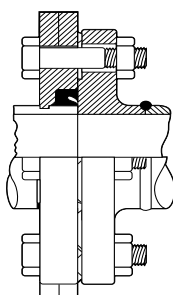
with Vic-Plus™ Gasket System



PRODUCT DESCRIPTION



2 - 8" Sizes



(Exaggerated for clarity)

Style 744 FireLock Flange adapter is designed for directly incorporating flanged components with ANSI CL. 125 or CL. 150 bolt hole patterns into a grooved pipe system. Sizes 2 - 8" (50 - 200 mm) are hinged for easy handling with integral end tabs which facilitate assembly.

The design incorporates small teeth inside the key shoulder I.D. to prevent rotation.

Because of the outside flange dimension, FireLock Flange adapters should not be used on FireLock fittings. When wafer or lug-type valves are used adjoining a Victaulic fitting, check disc dimensions to assure proper clearance.

FireLock Flange adapters should not be used as anchor points for tie-rods across nonrestrained joints. Mating rubber faced flanges, valves, etc., require the use of a FireLock Flange washer.

FireLock Flange adapters with Vic-Plus gaskets do not require lubrication. The gasket must always be assembled with the color coded lip on the pipe and the other lip facing the mating flange.

Style 744 FireLock Flange Adapters with the Vic-Plus™ Gasket System are designed and recommended for use ONLY on fire protection systems.

Vic-Plus Gasket System:

Victaulic® now offers a gasket system which requires no field lubrication on wet pipe systems. The Vic-Plus™ System (patented) is dry, clean, and non-toxic. It reduces assembly time substantially and eliminates the mess and chance of over-lubrication. Please refer to the latest copy of the Victaulic Field Installation Handbook (I-100) for supplemental lubrication requirements.

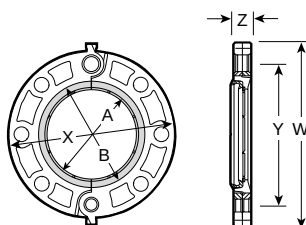


See Victaulic publication 10.01 for details.

DIMENSIONS

Style 744

Sizes 2 - 8" (50 - 200 mm)
ANSI Class 125 and 150 Flange



Note: Gray area of mating face must be free from gouges, undulations or deformities of any type for effective sealing.

Pipe Size		Max. Work Press.* PSI kPa	Max. End Load* Lbs. N	No. Bolts † Req'd.	Bolt Size † Inches	Sealing Surface Inches/mm		Dimensions Inches/millimeters				Aprx. Wgt. Each Lbs. kg
Nominal Diameter In./mm	Actual Outside Diameter In./mm					"A" Max.	"B" Min.	W	X	Y	Z	
2 50	2.375 60,3	175 1200	775 3450	4	5/8 X 2 3/4	2.38 60	3.41 87	6.75 172	6.00 152	4.75 121	0.75 19	2.7 1,2
2 1/2 65	2.875 73,0	175 1200	1135 5050	4	5/8 X 3	2.88 73	3.91 99	7.88 200	7.00 178	5.50 140	0.88 22	4.2 1,9
3 80	3.500 88,9	175 1200	1685 7500	4	5/8 X 3	3.50 89	4.53 115	8.44 214	7.50 191	6.00 152	0.94 24	4.8 2,2
4 100	4.500 114,3	175 1200	2780 11045	8	5/8 X 3	4.50 114	5.53 141	9.94 252	9.00 229	7.50 191	0.94 24	7.1 3,2
5 125	5.563 141,3	175 1200	4250 18920	8	3/4 X 3 1/2	5.56 141	6.71 171	11.00 279	10.00 254	8.50 216	1.00 25	8.3 3,8
6# 150	6.625 168,3	175 1200	6030 26840	8	3/4 X 3 1/2	6.63 168	7.78 198	12.00 305	11.00 279	9.50 241	1.00 25	9.3 4,2
8# 200	8.625 219,1	175 1200	10219 45475	8	3/4 X 3 1/2	8.63 219	9.94 252	14.63 372	13.50 343	11.75 298	1.13 29	13.9 6,3

*Refer to notes below.

†Total bolts required to be supplied by installer. Bolt sizes for conventional flange-to-flange connection. Larger bolts are required when Vic-Flange adapter is utilized with wafer-type valves.

Not available with Vic-Plus gasket system. Lubrication is required.

NOTES

* Working Pressure and End Load are total, from all internal and external loads, based on standard weight steel pipe, standard roll or cut grooved in accordance with Victaulic specifications. Contact Victaulic for performance on other pipe.

WARNING: FOR ONE TIME FIELD TEST ONLY, the Maximum Joint Working Pressure may be increased to 1 1/2 times the figures shown.

Style 744 FireLock Flange adapters provide rigid joints when used on pipe with standard roll or cut groove dimensions and consequently allow no linear or angular movement at the joint.

WARNING: Depressurize and drain the piping system before attempting to install, remove, or adjust any Victaulic piping products.

VIC-FLANGE ADAPTER NOTES

- 1 The Style 744 (2 - 8"/50 - 200 mm) design incorporates small teeth inside the key shoulder I.D. to prevent rotation.
- 2 FireLock Flange adapter should not be used on FireLock fittings. When wafer or lug-type valves are used adjoining a Victaulic fitting, check disc dimensions to assure proper clearance.
- 3 FireLock Flange adapters should not be used as anchor points for tie-rods across nonrestrained joints. Mating rubber faced flanges, valves, etc. require the use of a FireLock Flange washer.
- 4 Area A-B noted in the above drawing must be free from gouges, undulations or deformities of any type for effective sealing.
- 5 FireLock Flange adapter gaskets must always be assembled with the color coded lip on the pipe and the other lip facing the mating flange.
- 6 Flange Washers: FireLock Flange adapters require a smooth hard surface at the mating flange face for effective sealing. Some applications for which the Vic-Flange adapter is otherwise well suited do not provide an adequate mating surface. In such cases, it is recommended that a metal Flange Washer be inserted between the FireLock Flange adapter and the mating flange to provide the necessary sealing surface.

Typical applications where a Flange Washer should be used are:

- A When mating to a serrated flange: a standard flat flange gasket should be used adjacent to the serrated flange and then the Flange Washer is inserted between the FireLock Flange adapter and the flange gasket.
- B When mating to a wafer valve: where typical valves are rubber lined and partially rubber faced (smooth or not), the Flange Washer is placed between the valve and the FireLock Flange adapter.
- C When mating a rubber faced flange: the Flange Washer is placed between the FireLock Flange adapters and the rubber faced flange.
- D When mating AWWA cast flanges to IPS flanges: the Flange Washer is placed between two FireLock Flanges. The hinge points must be oriented approximately 90° to each other. If one flange is not a FireLock Flange adapter (e.g. flanged valve), then a standard flat flange gasket must be placed adjacent to that flange and the Flange Washer inserted between the flange gasket and the FireLock Flange adapter.
- E When mating to components (valves, strainers, etc.) where the component flange face has an insert: follow the same arrangement as in Application 1.
- F When mating to a Series 705-W Butterfly valve, Style 744 may only be used on one side of the connection.

When ordering Flange Washers, always specify product style (Style 744) and size to assure proper Flange Washer is supplied.

MATERIAL SPECIFICATIONS

Flange 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.

Coating: Black enamel

- **Optional:** Hot dipped galvanized

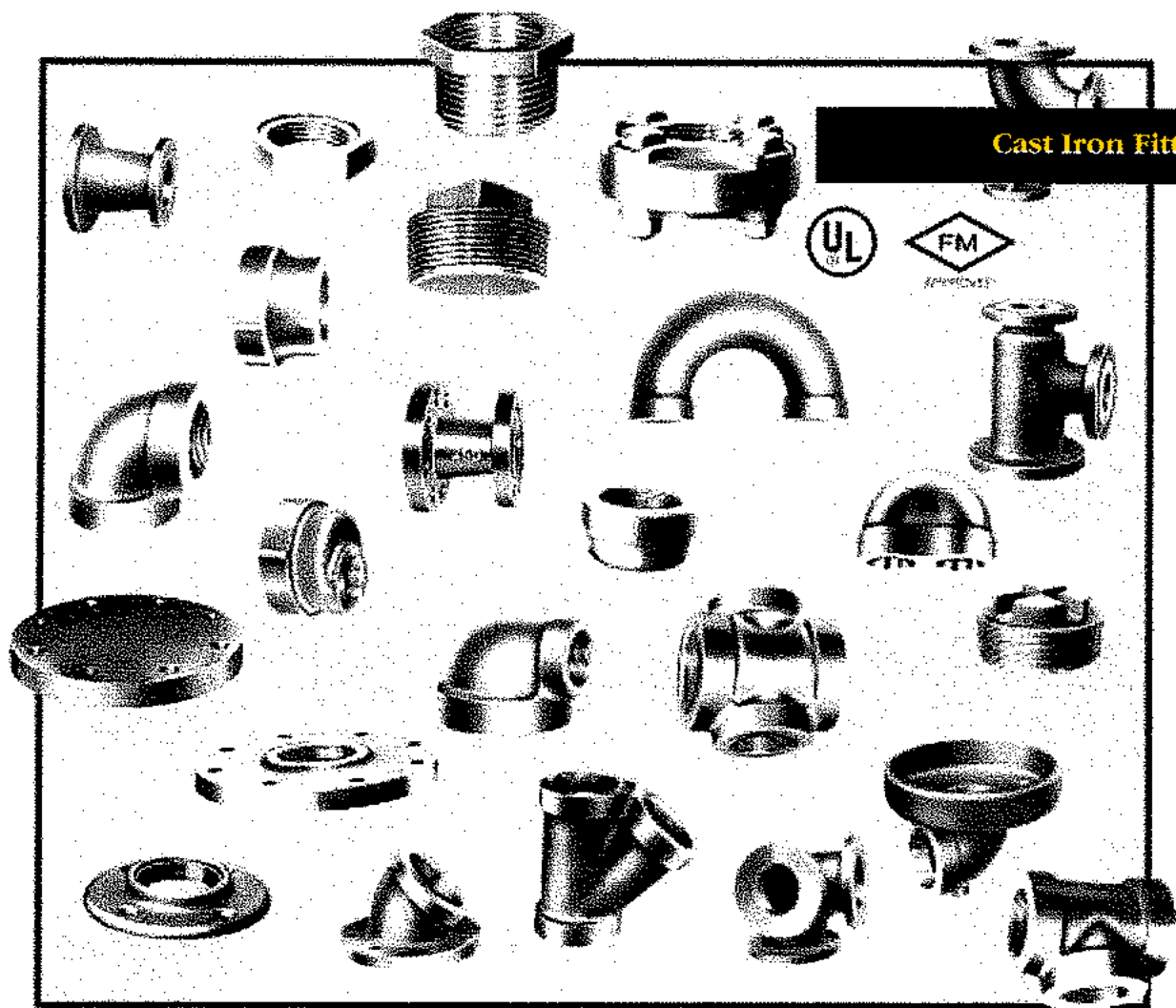
Bolts/Nuts: Supplied by installer

Gasket:

- **Grade "E" EPDM - Type A Vic-Plus Gasket System Δ**
(Violet color code). FireLock products have been Listed by Underwriters Laboratories Inc. and Approved by Factory Mutual Research for wet and dry (oil free air) sprinkler services up to the rated working pressure using the Grade "E" Type A Vic-Plus Gasket System, requiring no field lubrication for most installation conditions.

Δ Standard gasket approved for dry pipe systems to -40°F (-40°C). Based on "typical" pipe surface conditions, supplemental lubricant is recommended for services installed below 0°F (-18°C) and for all dry pipe systems or systems to be subjected to air tests prior to being filled with water. Supplemental lubrication may also be required on pipe with raised or undercut weld seams or pipe that has voids and/or cracks at the weld seams.

THREADED & FLANGED FITTINGS



Anvil standard and extra heavy cast iron threaded fittings are manufactured in accordance with ASME-B16.4 (except plugs and bushings, ASME B16.14). Dimensions also conform to Federal Specifications, WW-P-501 (except plugs and bushings WW-P-471).

Anvil standard and extra heavy fittings in this section, sizes 1/4 NPS - 12NPS (8 - 300 DN), are included in the "List of Inspected Fire Protection Equipment and Materials" issued by the Underwriters' Laboratories, Inc.

Cast Iron Threaded Fittings Pressure - Temperature Ratings					
Temperature		Pressure			
		Class 125		Class 250	
(°F)	(°C)	psi	bar	psi	bar
-20° to 150°	-28.9 to 65.6	175	12.1	400	27.6
200°	93.3	165	11.4	370	25.5
250°	121.1	150	10.3	340	23.4
300°	148.9	140	9.7	310	21.4
350°	176.7	125	8.6	300	20.7
400°	204.4	-	-	250	17.2

Cast Iron Flanged Fittings Class 125, Standard



Specifications

All standard or "Class 125" Cast Iron Flanged Fittings in sizes listed are made to ASME and are marked 125 for pipe sizes 12 NPS (300 DN) and smaller; 100 for pipe sizes 14 NPS (350 DN) and larger; and have plain faces. Unless otherwise specified, cast iron flanges and fittings are drilled and faced in accordance with ASME B 16.1.

Anvil fittings in this section, up to 16 NPS (400 DN) inclusive, are included in the "List of Inspected Fire Protection Equipment and Materials" issued by the Underwriters' Laboratories, Inc.

Coating

Flanged fittings are available both black and galvanized. Consult a Anvil representative for available sizes.

Sizes

Size of all fittings scheduled indicates nominal inside diameter of ports. standard reducing elbows carry the same dimensions center-to-face as regular elbows of largest straight size. Sizes 18, 20 and 24 NPS

(450, 500 & 600 DN) reducing on the outlet in the following sizes are to short body pattern and are to the dimensions shown as follows: All tees, crosses and laterals reducing on the run only have the same center-to-face and face-to-face dimensions as a straight fitting of the size of the largest opening. Sizes 16 NPS (400 DN) and smaller reducing on the outlet have same dimensions as a straight fitting of the size of the largest opening.

Reducing Tees and Reducing Crosses							
Nominal Pipe Size		Size of Outlet and Smaller		Center to Face Run		Center to Face Outlet or Side Outlet	
NPS	DN	in	mm	in	mm	in	mm
18	450	12	305	13	330	15½	394
20	500	14	356	14	356	17	432
24	600	16	406	15	381	19	483

Reducing Laterals							
Nominal Pipe Size		Size of Outlet and Smaller		Center to Face Run		Center to Face Branch	
NPS	DN	in	mm	in	mm	in	mm
18	450	8	203	25	635	27½	699
20	500	10	254	27	686	29½	749
24	600	12	305	31½	800	34½	876

All Reducing Fittings in the sizes 18, 20 and 24 NPS (450, 500 & 600 DN) can also be supplied to Straight Size dimensions if specified. Prices on application.

Tolerances

To order reducing companion flanges, specify threaded or reduced size first, then the outside diameter of flange wanted. For instance, if a reducing flange is required to connect a 5-inch (127mm) pipe to an 8-inch (203mm) flanged valve or fitting having a 13½-inch o.d. (343mm) flange, order: 5 x 13½-inch (127 x 343mm) standard reducing flange.

An inspection limit of plus or minus 1/32 inch (1mm) shall be allowed on all center to contact surface dimensions for sizes up to and including 10 NPS (250 DN); plus or minus 1/16 inch (2mm) on sizes larger than 10 NPS (250 DN). Inspection limit of plus or minus 1/16 inch (2mm) shall be allowed on all contact surface to contact surface dimensions for sizes up to and including 10 NPS (250 DN); plus or minus 1/8 inch (3mm) on sizes larger than 10 NPS (250 DN). The largest opening in the fitting governs the tolerance to be applied to all openings.

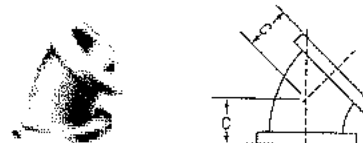
□ Patterns are designed to produce castings having the wall thicknesses given in the tables. The wall thicknesses of the castings at no point shall be less than 87.5% of the dimensions given.

90° Straight Elbow
Figure 801

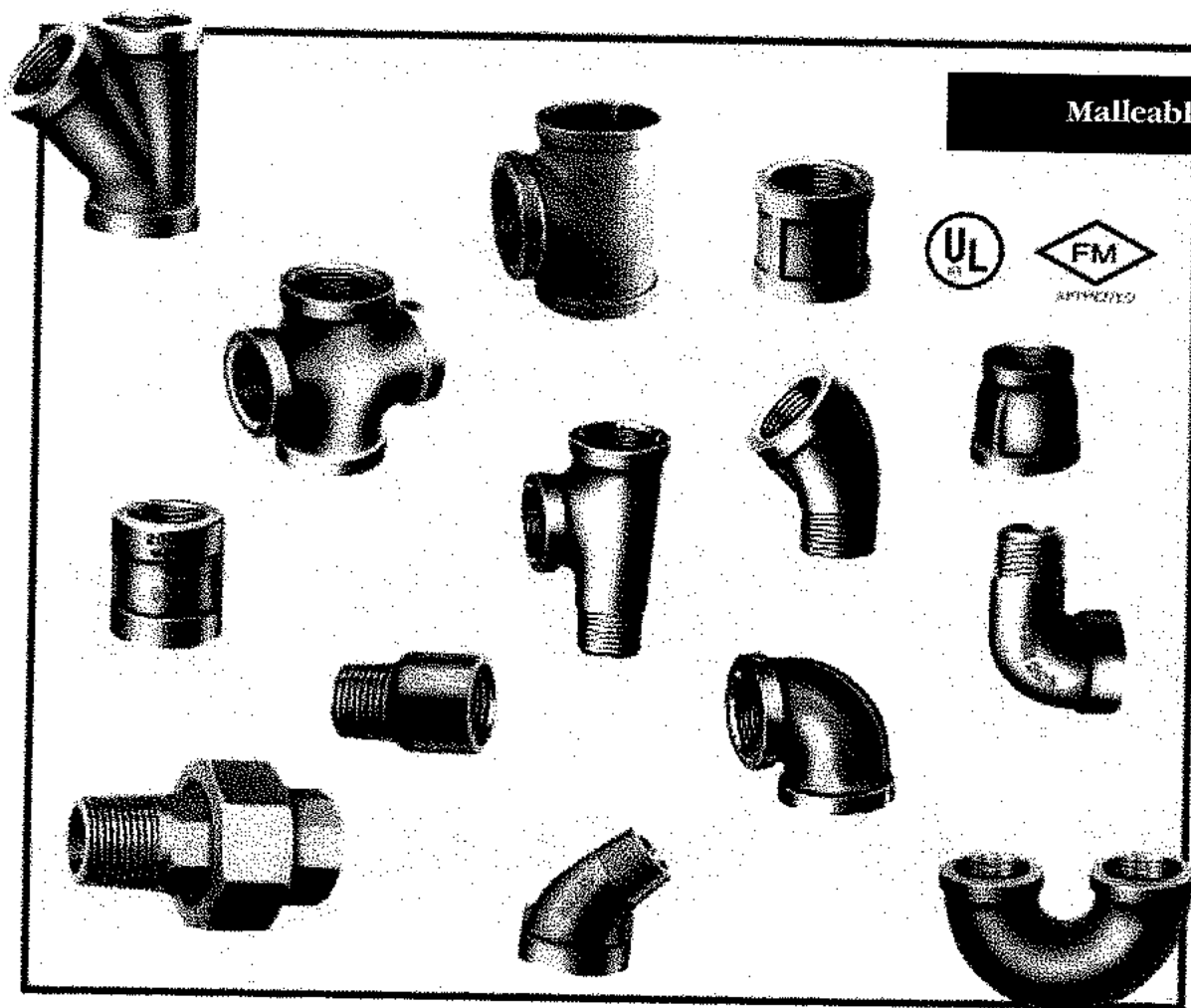


Size		A		Flange Diam.		Thickness				Weight	
NPS	DN	in	mm	in	mm	Min. Flange	Wall	in	mm	lbs	kg
1½	40	4	102	5	127	5/16	14	5/16	8	9.0	4.1
2	50	4½	114	6	152	3/8	16	3/8	8	14	6.4
2½	65	5	127	7	178	1/2	17	5/8	8	19	8.6
3	80	5½	140	7½	191	3/4	19	3/4	10	24	11
3½	90	6	152	8½	216	13/16	22	7/8	11	31	14
4	100	6½	165	9	229	15/16	24	1	13	41	19
5	125	7½	191	10	254	15/16	24	1	13	52	24
6	150	8	203	11	279	1	25	1	14	68	31
8	200	9	229	13½	343	1½	29	1½	16	110	50
10	250	11	279	16	406	1½	30	1½	19	175	79
12	300	12	305	19	483	1½	32	1½	23	250	113

45° Straight Elbow
Figure 802



Size		A		Flange Diam.		Thickness				Weight	
NPS	DN	in	mm	in	mm	Min. Flange	Wall	in	mm	lbs	kg
1½	40	2¼	57	5	127	5/16	14	5/16	8	8.0	3.6
2	50	2½	64	6	152	3/8	16	3/8	8	12	5.4
2½	65	3	76	7	178	1/2	17	5/8	8	17	7.7
3	80	3	76	7½	191	3/4	19	3/4	10	20	9.1
3½	90	3½	89	8½	216	13/16	22	7/8	11	27	12
4	100	4	102	9	229	15/16	24	1	13	36	16
5	125	4½	114	10	254	15/16	24	1	13	45	20
6	150	5	127	11	279	1	25	1	14	60	27
8	200	5½	140	13½	343	1½	29	1½	16	94	43
10	250	6½	165	16	406	1½	30	1½	19	145	66
12	300	7½	191	19	483	1½	32	1½	23	220	100



Malleable Iron Threaded Pipe With Unions Pressure - Temperature Ratings							
Temperature		Pressure					
		Class 150		Class 250		Class 300	
(°F)	(°C)	psi	bar	psi	bar	psi	bar
-20° to 150°	-28.9° to 65.6°	300	20.7	500	34.5	600	41.4
200°	93.3	265	18.3	455	31.4	550	37.9
250°	121.1	225	15.5	405	27.9	505	34.8
300°	148.9	185	12.8	360	24.8	460	31.7
350°	176.7	150	10.3	315	21.7	415	28.6
400°	204.4	110	7.6	270	18.6	370	25.5
450°	232.2	75	5.2	225	15.5	325	22.4
500°	260.0	-	-	180	12.4	280	19.3
550°	287.8	-	-	130	9.0	230	15.9

Note: Unions with Copper or Copper Alloy seats are not intended for use where temperature exceeds 450°F

Malleable Iron Threaded Fittings Pressure - Temperature Ratings									
Temperature		Pressure							
		Class 150	Class 300						
			Sizes 1/4" - 1" (6 - 25 mm)		Sizes 1 1/4" - 2" (32 - 51 mm)		Sizes 2 1/2" - 3" (64 - 76 mm)		
(°F)	(°C)	psi	bar	psi	bar	psi	bar	psi	bar
-20° to 150°	-28.9° to 65.6°	300	20.7	2,000	137.9	1,500	103.4	1,000	68.9
200°	93.3	265	18.3	1,785	123.1	1,350	93.1	910	62.7
250°	121.1	225	15.5	1,575	108.6	1,200	82.7	825	56.9
300°	148.9	185	12.8	1,360	93.8	1,050	72.4	735	50.7
350°	176.7	150	10.3	1,150	79.3	900	62.1	650	44.8
400°	204.4	-	-	935	64.5	750	51.7	560	38.6
450°	232.2	-	-	725	50.0	600	41.4	475	32.8
500°	260.0	-	-	510	35.2	450	31.0	385	26.5
550°	287.8	-	-	300	20.7	300	20.7	300	20.7

Anvil Class 150 (standard Weight) Malleable Iron Fittings conform to ASME B16.3 and Unions conform to ASME B16.39.

Anvil standard weight banded pattern fittings in this catalog, sizes 1/8 NPS to 6 NPS (6 to 150 DN) inclusive, are included in the "List

of Inspected Fire Protection Equipment and Materials" issued by the Underwriters' Laboratories, Inc.

ALL ELBOWS & TEES 1/8" (10 DN) and LARGER ARE 100% GAS TESTED AT A MINIMUM OF 100 PSI. (6.9 bar)

FireLock® Outlet-T

STYLE 922



The Style 922 Outlet-T provides a convenient method of incorporating ½, ¾, and 1" / 15, 20 and 25 mm outlets for directly connecting sprinklers, drop nipples, sprigs, gauges, drains and other outlet products. Available for 1¼ through 76.1 mm / 32 to 76.1 mm piping systems, Style 922 outlets are UL/ULC Listed, LPCB and FM Approved for branch connections and VdS Approved for direct sprinkler connection only on wet and dry systems.

The locating collar engages into the hole prepared in the pipe. When tightened, the assembly compresses the gasket onto the OD of the pipe. The Style 922 Outlet-T is UL/FM rated up to 300 psi / 2068 kPa and VdS rated up to 16 bar at the ambient temperatures typical for fire protection systems.

Style 922 is suitable for use on standard, lightwall, Schedule 5 and other specialty pipes.* Contact Victaulic for other optional coatings.

*Consult Section 10.01 for specific listings/approvals.



MATERIAL SPECIFICATIONS

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.

Gasket:

- **Grade "E" EPDM - Type A**
(Violet color code). FireLock products have been Listed by Underwriters Laboratories Inc. and Approved by Factory Mutual Research for wet and dry (oil free air) sprinkler services up to the rated working pressure using the Grade "E" Type A Gasket System.

Bolts/Nuts: Heat-treated plated carbon steel, trackhead meeting the physical and chemical requirements of ASTM A-449 and physical requirements of ASTM A-183.

Housing Coating:

- Orange enamel (North America, Latin America, Asia Pacific)
- Red enamel (Europe)

JOB/OWNER

System No. _____

Location _____

CONTRACTOR

Submitted By _____

Date _____

ENGINEER

Spec Sect _____ Para _____

Approved _____

Date _____

www.victaulic.com

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REV_G

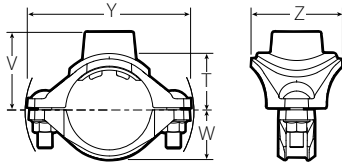


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FireLock® Outlet-T

STYLE 922

DIMENSIONS



Nominal Size inches/mm			Hole Diameter	Dimensions – inches/millimeters					Approx. Weight Each
Run X Branch FPT†			+0.06/+1.5 -0.00/-0.0	T*	V	W	Y	Z	lbs/kg
1 ¼ 32	X	½ 15	13/16 30.2	1.30 33.0	1.83 46.5	1.10 27.9	3.87 98.3	2.56 65.0	1.0 0.45
		¾ 20	13/16 30.2	1.28 32.5	1.83 46.5	1.10 27.9	3.87 98.3	2.56 65.0	1.1 0.50
		1 25	13/16 30.2	1.52 38.6	2.18 55.4	1.10 27.9	3.87 98.3	2.56 65.0	1.2 0.54
1 ½ 40	X	½ 15	13/16 30.2	1.42 36.1	1.95 49.5	1.22 31.0	4.08 103.6	2.56 65.0	1.2 0.54
		¾ 20	13/16 30.2	1.40 35.6	1.95 49.5	1.22 31.0	4.08 103.6	2.56 65.0	1.2 0.54
		1 25	13/16 30.2	1.64 41.7	2.30 58.4	1.22 31.0	4.08 103.6	2.56 65.0	1.3 0.59
2 50	X	½ 15	13/16 30.2	1.66 42.2	2.19 55.6	1.46 37.1	4.60 116.8	2.56 65.0	1.3 0.59
		¾ 20	13/16 30.2	1.64 41.7	2.19 55.6	1.46 37.1	4.60 116.8	2.56 65.0	1.4 0.64
		1 25	13/16 30.2	1.88 47.8	2.54 64.5	1.46 37.1	4.60 116.8	2.56 65.0	1.5 0.68
2 ½ 65	X	½ 15	13/16 30.2	1.91 48.5	2.44 62.0	1.71 43.4	5.40 137.2	2.56 65.0	1.6 0.73
		¾ 20	13/16 30.2	1.89 48.0	2.44 62.0	1.71 43.4	5.40 137.2	2.56 65.0	1.6 0.73
		1 25	13/16 30.2	2.13 54.1	2.79 70.9	1.71 43.4	5.40 137.2	2.56 65.0	1.6 0.73
76.1 mm	X	½ 15	13/16 30.2	1.91 48.5	2.44 62.0	1.71 43.4	5.50 139.7	2.56 65.0	1.6 0.73
		¾ 20	13/16 30.2	1.89 48.0	2.44 62.0	1.71 43.4	5.50 139.7	2.56 65.0	1.6 0.73
		1 25	13/16 30.2	2.13 54.1	2.79 70.9	1.71 43.4	5.50 139.7	2.56 65.0	1.7 0.80

† Victaulic female threaded products are designed to accommodate standard NPT or BSPT (optional) male pipe threads only. Use of male threaded products with special features, such as probes, dry pendent sprinklers, etc., should be verified as suitable for use with this Victaulic product. Failure to verify suitability in advance may result in assembly problems or leakage.

*Center of run to engaged pipe end for NPT threads (dimensions are approximate).

FireLock® Outlet-T

STYLE 922

PERFORMANCE

Run Size x Outlet Size			Equivalent Length of 1 inch Schedule 40 Steel Pipe (per UL 213, Section 16) (C=120)*, FT
Inches/mm			Feet/meters
1 ¼ 32	X	1 25	8.5 2.6
1 ½ 40	X	1 25	8.5 2.6
2 50	X	1 25	8.5 2.6
2 ½ 65	X	1 25	8.5 2.6
76.1 mm	X	1 25	8.5 2.6

* Hazen-Williams coefficient of friction is 120

FireLock® Outlet-T

STYLE 922

INSTALLATION

Reference should always be made to the I-100 Victaulic Field Installation Handbook 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.

WARRANTY

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

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.

For complete contact information, visit www.victaulic.com

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Flanged Fittings and Flanges

Flanged Fittings Class 125 & 250 Specifications

-  Branded fittings
- Flanged fittings UL Listed through 12"
- Grey iron castings conform to ASTM A126 and ASTM A48
- Flanged fitting dimensions conform to ASME B16.1 and ANSI/AWWA C110/A21.10
- Manufacturing facility is ISO 9001:2008
- Flanged fittings 6" and smaller are made from ductile iron and meet ASME B16.42 Class 150
- Galvanizing available upon request

Cast Flanges Class 125 & 250 Specifications

- Grey iron castings conform to ASTM A126 and ASTM A48
- Companion flange dimensions conform to ASME B16.1
- Hot-dipped galvanized flanges conform to ASTM A153
- Companion flange threads conform to ASME B1.20.1
- Manufacturing facility is ISO 9001:2008



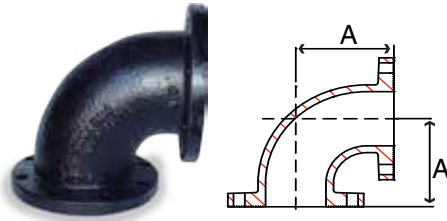


Fig. 38E 1 – 90° Elbow

Size in	Part Number	Materials	A in	Weight lb
1-1/4	38E 1012D	150 lb. Ductile Iron	3.8	9
2	38E 1020D	150 lb. Ductile Iron	4.5	14
2-1/2	38E 1024D	150 lb. Ductile Iron	5.0	19
3	38E 1030D	150 lb. Ductile Iron	5.5	25
3-1/2	38E 1034D	150 lb. Ductile Iron	6.0	25
4	38E 1040D	150 lb. Ductile Iron	6.5	45
5	38E 1050D	150 lb. Ductile Iron	7.5	52
6	38E 1060D	150 lb. Ductile Iron	8.0	65
8	38E 1080	125 lb. Cast Iron	9.0	105
10	38E 1100	125 lb. Cast Iron	11.0	165
12	38E 1120	125 lb. Cast Iron	12.0	255
14	38E 1140	125 lb. Cast Iron	14.0	353
16	38E 1160	125 lb. Cast Iron	15.0	430
18	38E 1180	125 lb. Cast Iron	16.5	450
20	38E 1200	125 lb. Cast Iron	18.0	580
24	38E 1240	125 lb. Cast Iron	22.0	900

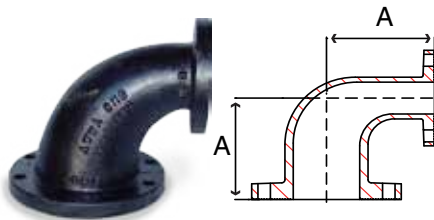


Fig. 38RE1 – 90° Reducing Elbow

Size in	Part Number	Materials	A in	Weight lb
3 x 2	38RE1030020D	150 lb. Ductile Iron	5.5	22
3 x 2-1/2	38RE1030024D	150 lb. Ductile Iron	5.5	22
4 x 2	38RE1040020D	150 lb. Ductile Iron	6.5	29
4 x 2-1/2	38RE1040024D	150 lb. Ductile Iron	6.5	31
4 x 3	38RE1040030D	150 lb. Ductile Iron	6.5	29
5 x 4	38RE1050040D	150 lb. Ductile Iron	7.5	50
6 x 3	38RE1060030D	150 lb. Ductile Iron	8.0	50
6 x 4	38RE1060040D	150 lb. Ductile Iron	8.0	55
6 x 5	38RE1060050D	150 lb. Ductile Iron	8.0	65
8 x 4	38RE1080040	125 lb. Cast Iron	9.0	80
8 x 5	38RE1080050	125 lb. Cast Iron	9.0	85
8 x 6	38RE1080060	125 lb. Cast Iron	9.0	85
10 x 6	38RE1100060	125 lb. Cast Iron	11.0	130
10 x 8	38RE1100080	125 lb. Cast Iron	11.0	150
12 x 6	38RE1120060	125 lb. Cast Iron	12.0	188
12 x 8	38RE1120080	125 lb. Cast Iron	12.0	185
12 x 10	38RE1120100	125 lb. Cast Iron	12.0	210
14 x 12	38RE1140120	125 lb. Cast Iron	14.0	275
16 x 12	38RE1160120	125 lb. Cast Iron	15.0	310

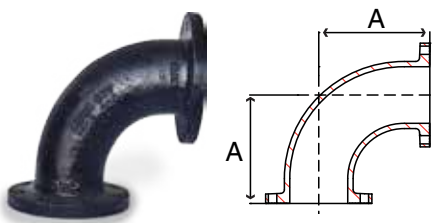
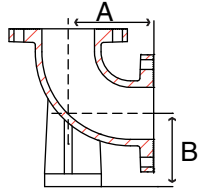


Fig. 38LE1 – 90° Long Radius Elbow

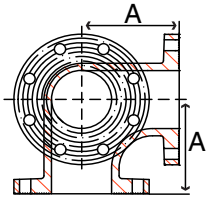
Size in	Part Number	Materials	A in	Weight lb
3	38LE1030D	150 lb. Ductile Iron	7.8	30
4	38LE1040D	150 lb. Ductile Iron	9.0	50
6	38LE1060D	150 lb. Ductile Iron	11.5	85
8	38LE1080	125 lb. Cast Iron	14.0	145
10	38LE1100	125 lb. Cast Iron	16.5	225
12	38LE1120	125 lb. Cast Iron	19.0	325
14	38LE1140	125 lb. Cast Iron	21.5	385
16	38LE1160	125 lb. Cast Iron	24.0	400
20	38LE1200	125 lb. Cast Iron	29.0	810
24	38LE1240	125 lb. Cast Iron	34.0	1,240

Fig. 38BE1 – 90° Base Elbow



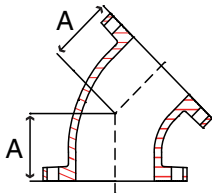
Size in	Part Number	Materials	A in	B in	Weight lb
3	38BE1030D	150 lb. Ductile Iron	5.5	4.9	35
4	38BE1040D	150 lb. Ductile Iron	6.5	5.5	55
6	38BE1060D	150 lb. Ductile Iron	8.0	7.0	85
8	38BE1080	125 lb. Cast Iron	9.0	8.8	145
10	38BE1100	125 lb. Cast Iron	11.0	9.8	220
12	38BE1120	125 lb. Cast Iron	12.0	11.3	324
16	38BE1160	125 lb. Cast Iron	15.0	13.8	445

Fig. 38OE1 – 90° Side Outlet Elbow



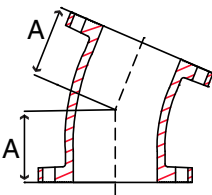
Size in	Part Number	Materials	A in	Weight lb
4	38OE1040D	150 lb. Ductile Iron	6.5	60
6	38OE1060D	150 lb. Ductile Iron	8.0	95

Fig. 38F 1 – 45° Elbow



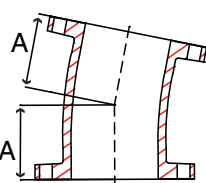
Size in	Part Number	Materials	A in	Weight lb
2	38F 1020D	150 lb. Ductile Iron	2.5	12
2-1/2	38F 1024D	150 lb. Ductile Iron	3.0	17
3	38F 1030D	150 lb. Ductile Iron	3.0	20
4	38F 1040D	150 lb. Ductile Iron	4.0	40
5	38F 1050D	150 lb. Ductile Iron	4.5	45
6	38F 1060D	150 lb. Ductile Iron	5.0	55
8	38F 1080	125 lb. Cast Iron	5.5	90
10	38F 1100	125 lb. Cast Iron	6.5	135
12	38F 1120	125 lb. Cast Iron	7.5	220
14	38F 1140	125 lb. Cast Iron	7.5	220
16	38F 1160	125 lb. Cast Iron	8.0	280
18	38F 1180	125 lb. Cast Iron	8.5	325
20	38F 1200	125 lb. Cast Iron	9.5	430
24	38F 1240	125 lb. Cast Iron	11.0	630

Fig. 38TT1 – 22-1/2° Elbow



Size in	Part Number	Materials	A in	Weight lb
4	38TT1040D	150 lb. Ductile Iron	4.0	40
6	38TT1060D	150 lb. Ductile Iron	5.0	55
8	38TT1080	125 lb. Cast Iron	5.5	90
10	38TT1100	125 lb. Cast Iron	6.5	130
12	38TT1120	125 lb. Cast Iron	7.5	195

Fig. 38EL1 – 11-1/4° Elbow



Size in	Part Number	Materials	A in	Weight lb
3	38EL1030D	150 lb. Ductile Iron	3.0	20
4	38EL1040D	150 lb. Ductile Iron	4.0	40
6	38EL1060D	150 lb. Ductile Iron	5.0	55
8	38EL1080	125 lb. Cast Iron	5.5	90
10	38EL1100	125 lb. Cast Iron	6.5	135
12	38EL1120	125 lb. Cast Iron	7.5	205

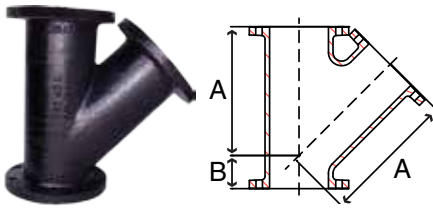


Fig. 38LT1 - Lateral

Size in	Part Number	Materials	A in	B in	Weight lb
3	38LT1030D	150 lb. Ductile Iron	10.0	3.0	45
4	38LT1040D	150 lb. Ductile Iron	12.0	3.0	75
6	38LT1060D	150 lb. Ductile Iron	14.5	3.5	120
8	38LT1080	125 lb. Cast Iron	17.5	4.5	200
10	38LT1100	125 lb. Cast Iron	20.5	5.0	335
12	38LT1120	125 lb. Cast Iron	24.5	5.5	515
16	38LT1160	125 lb. Cast Iron	30.0	6.5	805

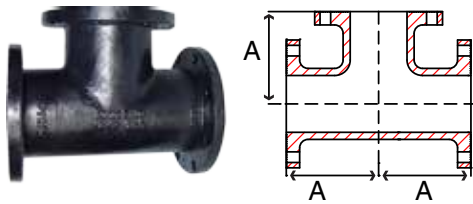


Fig. 38T 1 - Tee

Size in	Part Number	Materials	A in	Weight lb
2	38T 1020D	150 lb. Ductile Iron	4.5	20
2-1/2	38T 1024D	150 lb. Ductile Iron	5.0	30
3	38T 1030D	150 lb. Ductile Iron	5.5	40
4	38T 1040D	150 lb. Ductile Iron	6.5	65
5	38T 1050D	150 lb. Ductile Iron	7.5	85
6	38T 1060D	150 lb. Ductile Iron	8.0	95
8	38T 1080	125 lb. Cast Iron	9.0	155
10	38T 1100	125 lb. Cast Iron	11.0	270
12	38T 1120	125 lb. Cast Iron	12.0	385
14	38T 1140	125 lb. Cast Iron	14.0	435
16	38T 1160	125 lb. Cast Iron	15.0	550
18	38T 1180	125 lb. Cast Iron	16.5	665
20	38T 1200	125 lb. Cast Iron	18.0	855
24	38T 1240	125 lb. Cast Iron	22.0	1,330

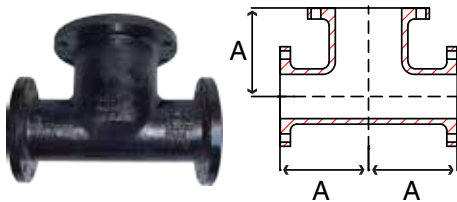


Fig. 38BT1 - Bull Head Tee

Size in	Part Number	Materials	A in	Weight lb
4 x 6	38BT1040060D	150 lb. Ductile Iron	8.00	88
6 x 8	38BT1060080	125 lb. Cast Iron	9.00	142
8 x 10	38BT1080100	125 lb. Cast Iron	11.00	240

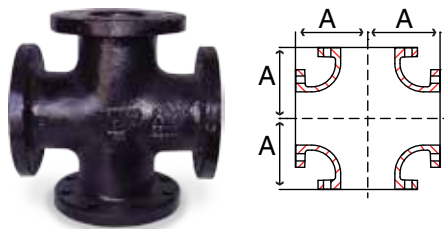
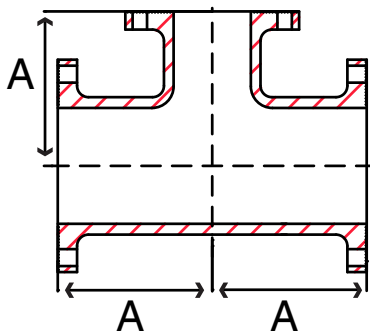


Fig. 38X 1 - Cross

Size in	Part Number	Materials	A in	Weight lb
2-1/2	38X 1024D	150 lb. Ductile Iron	5.0	37
3	38X 1030D	150 lb. Ductile Iron	5.5	50
4	38X 1040D	150 lb. Ductile Iron	6.5	80
6	38X 1060D	150 lb. Ductile Iron	8.0	120
8	38X 1080	125 lb. Cast Iron	9.0	195
10	38X 1100	125 lb. Cast Iron	11.0	330
12	38X 1120	125 lb. Cast Iron	12.0	460
14	38X 1140	125 lb. Cast Iron	14.0	530
16	38X 1160	125 lb. Cast Iron	15.0	665
18	38X 1180	125 lb. Cast Iron	16.5	795
20	38X 1200	125 lb. Cast Iron	18.0	1,001
24	38X 1240	125 lb. Cast Iron	22.0	1,570

Fig. 38RT1 – Reducing Tee cont.



Size in	Part Number	Materials	A in	Weight lb
2-1/2 x 1-1/2	38RT1024014D	150 lb. Ductile Iron	5.0	29
2-1/2 x 2 x 2	38RT1024020020D	150 lb. Ductile Iron	5.0	29
2-1/2 x 2	38RT1024020D	150 lb. Ductile Iron	5.0	50
3 x 2	38RT1030020D	150 lb. Ductile Iron	5.5	35
3 x 2-1/2	38RT1030024D	150 lb. Ductile Iron	5.5	34
4 x 2	38RT1040020D	150 lb. Ductile Iron	6.5	50
4 x 2-1/2	38RT1040024D	150 lb. Ductile Iron	6.5	55
4 x 3	38RT1040030D	150 lb. Ductile Iron	6.5	60
5 x 2	38RT1050020D	150 lb. Ductile Iron	7.5	85
5 x 4	38RT1050040D	150 lb. Ductile Iron	7.5	85
6 x 2	38RT1060020D	150 lb. Ductile Iron	8.0	85
6 x 3	38RT1060030D	150 lb. Ductile Iron	8.0	85
6 x 4 x 4	38RT1060040040D	150 lb. Ductile Iron	8.0	90
6 x 4 x 6	38RT1060040060D	150 lb. Ductile Iron	8.0	95
6 x 4	38RT1060040D	150 lb. Ductile Iron	8.0	90
6 x 5 x 5	38RT1060050050D	150 lb. Ductile Iron	8.0	85
6 x 5	38RT1060050D	150 lb. Ductile Iron	8.0	110
8 x 3	38RT1080030	125 lb. Cast Iron	9.0	135
8 x 4	38RT1080040	125 lb. Cast Iron	9.0	135
8 x 4 x 8	38RT1080040080	125 lb. Cast Iron	9.0	140
8 x 5	38RT1080050	125 lb. Cast Iron	9.0	149
8 x 6	38RT1080060	125 lb. Cast Iron	9.0	145
8 x 6 x 6	38RT1080060060	125 lb. Cast Iron	9.0	145
8 x 6 x 8	38RT1080060080	125 lb. Cast Iron	9.0	160
10 x 3	38RT1100030	125 lb. Cast Iron	11.0	210
10 x 4	38RT1100040	125 lb. Cast Iron	11.0	202
10 x 6	38RT1100060	125 lb. Cast Iron	11.0	215
10 x 8	38RT1100080	125 lb. Cast Iron	11.0	225
10 x 8 x 8	38RT1100080080	125 lb. Cast Iron	11.0	240
10 x 8 x 10	38RT1100080100	125 lb. Cast Iron	11.0	262
12 x 6	38RT1120060	125 lb. Cast Iron	12.0	295
12 x 8	38RT1120080	125 lb. Cast Iron	12.0	310
12 x 10	38RT1120100	125 lb. Cast Iron	12.0	360
14 x 6	38RT1140060	125 lb. Cast Iron	14.0	375
14 x 8	38RT1140080	125 lb. Cast Iron	14.0	390
14 x 10	38RT1140100	125 lb. Cast Iron	14.0	400
14 x 12	38RT1140120	125 lb. Cast Iron	14.0	425
16 x 8	38RT1160080	125 lb. Cast Iron	15.0	475
16 x 10	38RT1160100	125 lb. Cast Iron	15.0	495
16 x 12	38RT1160120	125 lb. Cast Iron	15.0	520
16 x 14	38RT1160140	125 lb. Cast Iron	15.0	530
18 x 6	38RT1180060	125 lb. Cast Iron	16.5	480
18 x 8	38RT1180080	125 lb. Cast Iron	16.5	495
18 x 12	38RT1180120	125 lb. Cast Iron	16.5	535
20 x 6	38RT1200060	125 lb. Cast Iron	18.0	610
20 x 10	38RT1200100	125 lb. Cast Iron	18.0	635
20 x 12	38RT1200120	125 lb. Cast Iron	18.0	778
20 x 14	38RT1200140	125 lb. Cast Iron	18.0	665
20 x 16	38RT1200160	125 lb. Cast Iron	18.0	810
24 x 16	38RT1240160	125 lb. Cast Iron	22.0	915
24 x 18	38RT1240180	125 lb. Cast Iron	22.0	1220
24 x 20	38RT1240200	125 lb. Cast Iron	22.0	1255

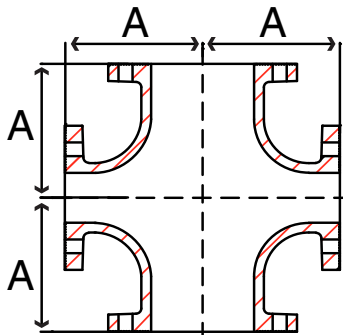


Fig. 38RX1 – Reducing Cross

Size in	Part Number	Materials	A in	Weight lb
6 x 4	38RX1060040D	150 lb. Ductile Iron	8.0	110
6 x 5	38RX1060050D	150 lb. Ductile Iron	8.0	110
8 x 4	38RX1080040	125 lb. Cast Iron	9.0	155
8 x 6	38RX1080060	125 lb. Cast Iron	9.0	165
10 x 4	38RX1100040	125 lb. Cast Iron	11.0	220
10 x 6	38RX1100060	125 lb. Cast Iron	11.0	240
10 x 8	38RX1100080	125 lb. Cast Iron	11.0	265
12 x 4	38RX1120040	125 lb. Cast Iron	12.0	310
12 x 8	38RX1120080	125 lb. Cast Iron	12.0	345
12 x 10	38RX1120100	125 lb. Cast Iron	12.0	415
14 x 6	38RX1140060	125 lb. Cast Iron	14.0	425
14 x 8	38RX1140080	125 lb. Cast Iron	14.0	425
14 x 10	38RX1140100	125 lb. Cast Iron	14.0	460
14 x 12	38RX1140120	125 lb. Cast Iron	14.0	505
16 x 6	38RX1160060	125 lb. Cast Iron	15.0	490
16 x 8	38RX1160080	125 lb. Cast Iron	15.0	520
16 x 10	38RX1160100	125 lb. Cast Iron	15.0	555
16 x 12	38RX1160120	125 lb. Cast Iron	15.0	605
16 x 14	38RX1160140	125 lb. Cast Iron	15.0	620
18 x 14	38RX1180140	125 lb. Cast Iron	16.5	680
20 x 6	38RX1200060	125 lb. Cast Iron	18.0	745
20 x 10	38RX1200100	125 lb. Cast Iron	18.0	685
20 x 18	38RX1200180	125 lb. Cast Iron	18.0	945
24 x 18	38RX1240180	125 lb. Cast Iron	22.0	1365

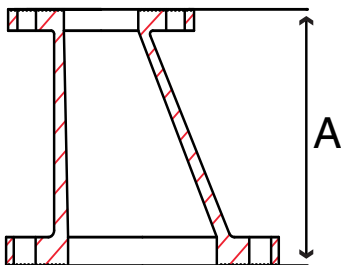
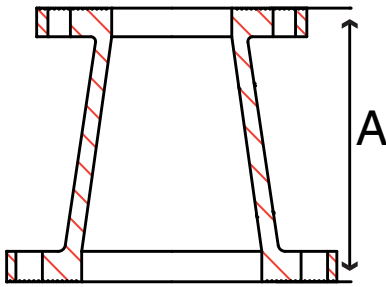


Fig. 38ER1 – Eccentric Reducer

Size in	Part Number	Materials	A in	Weight lb
3 x 2	38ER1030020D	150 lb. Ductile Iron	6.0	16
3 x 2-1/2	38ER1030024D	150 lb. Ductile Iron	6.0	20
4 x 2	38ER1040020D	150 lb. Ductile Iron	7.0	25
4 x 2-1/2	38ER1040024D	150 lb. Ductile Iron	7.0	28
4 x 3	38ER1040030D	150 lb. Ductile Iron	7.0	30
5 x 2-1/2	38ER1050024D	150 lb. Ductile Iron	8.0	35
5 x 4	38ER1050040D	150 lb. Ductile Iron	8.0	39
6 x 3	38ER1060030D	150 lb. Ductile Iron	9.0	40
6 x 4	38ER1060040D	150 lb. Ductile Iron	9.0	45
6 x 5	38ER1060050D	150 lb. Ductile Iron	9.0	50
8 x 4	38ER1080040	125 lb. Cast Iron	11.0	65
8 x 5	38ER1080050	125 lb. Cast Iron	11.0	70
8 x 6	38ER1080060	125 lb. Cast Iron	11.0	75
10 x 6	38ER1100060	125 lb. Cast Iron	12.0	90
10 x 8	38ER1100080	125 lb. Cast Iron	12.0	110
12 x 6	38ER1120060	125 lb. Cast Iron	14.0	130
12 x 8	38ER1120080	125 lb. Cast Iron	14.0	150
12 x 10	38ER1120100	125 lb. Cast Iron	14.0	170
14 x 10	38ER1140100	125 lb. Cast Iron	16.0	190
14 x 12	38ER1140120	125 lb. Cast Iron	16.0	220
16 x 12	38ER1160120	125 lb. Cast Iron	18.0	285

FLANGED

Fig. 38CR1 – Concentric Reducer



FLANGED

Size in	Part Number	Materials	A in	Weight lb
2 x 1-1/2	38CR1020014D	150 lb. Ductile Iron	5.0	12
2-1/2 x 2	38CR1024020D	150 lb. Ductile Iron	5.5	14
3 x 1-1/2	38CR1030014D	150 lb. Ductile Iron	6.0	15
3 x 2	38CR1030020D	150 lb. Ductile Iron	6.0	16
3 x 2-1/2	38CR1030024D	150 lb. Ductile Iron	6.0	20
4 x 2	38CR1040020D	150 lb. Ductile Iron	7.0	25
4 x 2-1/2	38CR1040024D	150 lb. Ductile Iron	7.0	28
4 x 3	38CR1040030D	150 lb. Ductile Iron	7.0	30
5 x 2	38CR1050020D	150 lb. Ductile Iron	8.0	26
5 x 2-1/2	38CR1050024D	150 lb. Ductile Iron	8.0	31
5 x 3	38CR1050030D	150 lb. Ductile Iron	8.0	32
5 x 4	38CR1050040D	150 lb. Ductile Iron	8.0	39
6 x 2	38CR1060020D	150 lb. Ductile Iron	9.0	34
6 x 2-1/2	38CR1060024D	150 lb. Ductile Iron	9.0	38
6 x 3	38CR1060030D	150 lb. Ductile Iron	9.0	40
6 x 4	38CR1060040D	150 lb. Ductile Iron	9.0	45
6 x 5	38CR1060050D	150 lb. Ductile Iron	9.0	50
8 x 3	38CR1080030	125 lb. Cast Iron	11.0	60
8 x 4	38CR1080040	125 lb. Cast Iron	11.0	65
8 x 5	38CR1080050	125 lb. Cast Iron	11.0	70
8 x 6	38CR1080060	125 lb. Cast Iron	11.0	75
10 x 4	38CR1100040	125 lb. Cast Iron	12.0	85
10 x 6	38CR1100060	125 lb. Cast Iron	12.0	93
10 x 8	38CR1100080	125 lb. Cast Iron	12.0	109
12 x 4	38CR1120040	125 lb. Cast Iron	14.0	130
12 x 6	38CR1120060	125 lb. Cast Iron	14.0	130
12 x 8	38CR1120080	125 lb. Cast Iron	14.0	151
12 x 10	38CR1120100	125 lb. Cast Iron	14.0	170
14 x 6	38CR1140060	125 lb. Cast Iron	16.0	185
14 x 8	38CR1140080	125 lb. Cast Iron	16.0	175
14 x 10	38CR1140100	125 lb. Cast Iron	16.0	194
14 x 12	38CR1140120	125 lb. Cast Iron	16.0	223
16 x 8	38CR1160080	125 lb. Cast Iron	18.0	210
16 x 10	38CR1160100	125 lb. Cast Iron	18.0	258
16 x 12	38CR1160120	125 lb. Cast Iron	18.0	310
16 x 14	38CR1160140	125 lb. Cast Iron	18.0	279
18 x 6	38CR1180060	125 lb. Cast Iron	19.0	195
18 x 8	38CR1180080	125 lb. Cast Iron	19.0	240
18 x 10	38CR1180100	125 lb. Cast Iron	19.0	265
18 x 12	38CR1180120	125 lb. Cast Iron	19.0	295
18 x 14	38CR1180140	125 lb. Cast Iron	19.0	310
18 x 16	38CR1180160	125 lb. Cast Iron	19.0	340
20 x 6	38CR1200060	125 lb. Cast Iron	20.0	345
20 x 10	38CR1200100	125 lb. Cast Iron	20.0	345
20 x 12	38CR1200120	125 lb. Cast Iron	20.0	345
20 x 14	38CR1200140	125 lb. Cast Iron	20.0	355
20 x 16	38CR1200160	125 lb. Cast Iron	20.0	390
20 x 18	38CR1200180	125 lb. Cast Iron	20.0	410
24 x 8	38CR1240080	125 lb. Cast Iron	24.0	420
24 x 10	38CR1240100	125 lb. Cast Iron	24.0	460
24 x 12	38CR1240120	125 lb. Cast Iron	24.0	480
24 x 14	38CR1240140	125 lb. Cast Iron	24.0	490
24 x 16	38CR1240160	125 lb. Cast Iron	24.0	525
24 x 18	38CR1240180	125 lb. Cast Iron	24.0	550
24 x 20	38CR1240200	125 lb. Cast Iron	24.0	590

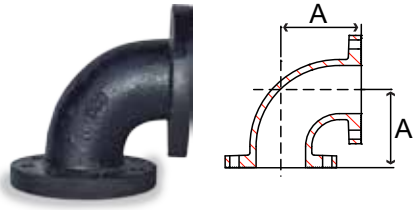


Fig. 38E 2 – 90° Elbow

Size in	Part Number	Materials	A in	Weight lb
3	38E 2030	250 lb. Cast Iron	6.0	40
4	38E 2040	250 lb. Cast Iron	7.0	65
6	38E 2060	250 lb. Cast Iron	8.5	105
8	38E 2080	250 lb. Cast Iron	10.0	185
10	38E 2100	250 lb. Cast Iron	11.5	296
12	38E 2120	250 lb. Cast Iron	13.0	410

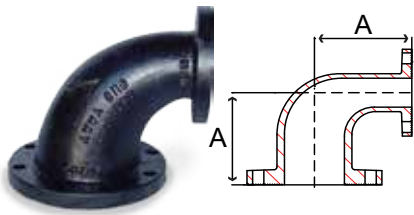


Fig. 38RE2 – 90° Reducing Elbow

Size in	Part Number	Materials	A in	Weight lb
4 x 2-1/2	38RE2040024	250 lb. Cast Iron	7.0	48
6 x 4	38RE2060040	250 lb. Cast Iron	8.5	95
8 x 6	38RE2080060	250 lb. Cast Iron	10.0	161
10 x 8	38RE2100080	250 lb. Cast Iron	11.5	240

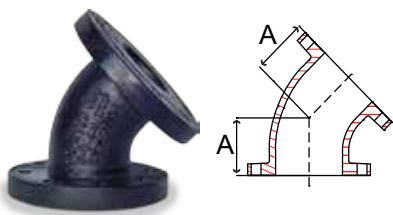


Fig. 38F 2 – 45° Elbow

Size in	Part Number	Materials	A in	Weight lb
3	38F 2030	250 lb. Cast Iron	3.5	35
4	38F 2040	250 lb. Cast Iron	4.5	58
6	38F 2060	250 lb. Cast Iron	5.5	103
8	38F 2080	250 lb. Cast Iron	6.0	158

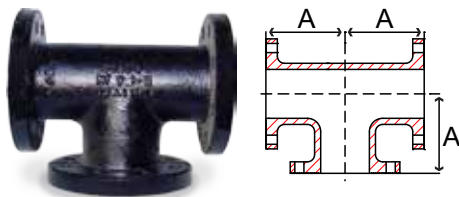


Fig. 38T 2 – Tee

Size in	Part Number	Materials	A in	Weight lb
2-1/2	38T 2024	250 lb. Cast Iron	5.5	46
3	38T 2030	250 lb. Cast Iron	6.0	58
4	38T 2040	250 lb. Cast Iron	7.0	99
5	38T 2050	250 lb. Cast Iron	8.0	135
6	38T 2060	250 lb. Cast Iron	8.5	180
8	38T 2080	250 lb. Cast Iron	10.0	280
10	38T 2100	250 lb. Cast Iron	11.5	430
12	38T 2120	250 lb. Cast Iron	13.0	620



Fig. 38CR2 – Concentric Reducer

Size in	Part Number	Materials	A in	Weight lb
3 x 2	38CR2030020	250 lb. Cast Iron	6.0	25
3 x 2-1/2	38CR2030024	250 lb. Cast Iron	6.0	29
4 x 2	38CR2040020	250 lb. Cast Iron	7.0	36
4 x 3	38CR2040030	250 lb. Cast Iron	7.0	45
6 x 4	38CR2060040	250 lb. Cast Iron	9.0	77
6 x 5	38CR2060050	250 lb. Cast Iron	9.0	85
8 x 6	38CR2080060	250 lb. Cast Iron	11.0	130
10 x 8	38CR2100080	250 lb. Cast Iron	12.0	190

PIPE HANGERS & SUPPORTS



THREADED ACCESSORIES

Fig. 20 & 21 CONTINUOUS THREADED ROD

Fig. 20* PLAIN

Fig. 21 **ELECTRO-GALVANIZED**



*Available in stainless steel. To order, specify 304 or 316 and add suffix SS to figure number.
Price on request.

FUNCTION: Useful in applications where stud lengths cannot be predetermined.

MATERIAL: Low carbon steel

ORDERING: Specify rod size, length and figure number.

Rod Size	Packaging Feet Per Bundle						Max. Rec. Load				Wt. Per Foot	
							650°F (343°C)		750°F (399°C)			
	6ft.	(1.83)	10ft.	(3.05)	12ft.	(3.66)	lbs.	kN	lbs.	kN	lbs.	kg
1/4 -20	300	(91.44)	500	(152.4)	600	(182.88)	240	(1.07)	210	(.93)	.12	(.05)
3/8 -16	150	(45.72)	250	(76.2)	240	(73.15)	730	(3.25)	540	(2.40)	.29	(.13)
1/2 -13	72	(21.95)	120	(36.58)	144	(43.90)	1350	(6.01)	1010	(4.49)	.54	(.25)
5/8 -11	48	(14.63)	80	(24.38)	96	(29.26)	1810	(8.05)	1610	(7.16)	.83	(.38)
3/4 -10	30	(9.14)	50	(15.24)	60	(18.29)	2710	(12.05)	2420	(10.76)	1.25	(.57)
7/8 -9	24	(7.32)	40	(12.19)	48	(14.63)	3770	(16.77)	3360	(14.95)	1.65	(.75)
1-8	12	(3.66)	20	(6.10)	24	(7.32)	4960	(22.06)	4420	(19.66)	2.25	(1.02)

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



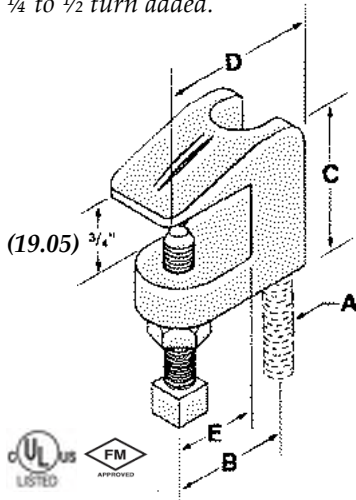
BEAM CLAMPS

**Fig. 350, 353, 354, 355, 356, & 357
DOMESTIC BEAM CLAMP**

Set Screw Torque			
Nominal Thread Size	3/8	1/2	
Rec. Torque	in-lbs 60	125	
	N-m (6.8)	(14.1)	

Caution should be taken not to over tighten the set screw

Note: When a torque wrench is unavailable, the setscrew should be tightened so it contacts the I-beam and then an additional 1/4 to 1/2 turn added.



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

APPROVALS: Underwriters' Laboratories Listed in the U.S. (UL), Canada (CUL), for sizes 3/8" to 7/8" only. Factory Mutual Approved for rod sizes 3/8" and 1/2" only. Complies with Federal Specifications A-A-1192A (Type 19) and Manufacturers' Standardization Society ANSI/SP-69 and SP-58 (Type 19). Fig. 353 sized for 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 3/8" Fig. 353 also complies with Federal Specifications A-A-1192A (Type 23) and Manufacturers' Standardization Society ANSI/SP-69 and SP-58 (Type 23). (Approvals are only valid for beam clamps with locknut).

MATERIAL: Malleable iron with hardened steel cup point set screw and locknut

FINISH: Plain or electro-galvanized

ORDERING: Specify rod size, finish, figure number, and domestic.

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

* 1/4 Fig. 350 Not UL or FM approved.

Δ 3/8 Fig. 353 Reversible design approved for bottom beam use.

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

ADJUSTABLE SWIVEL RING HANGERS



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. Fig. 141F has a layer of felt which separates the pipe from the hanger to reduce vibration and sound.

APPROVALS: Underwriters' Laboratories Listed in the U.S. (UL), Canada (CUL), and Factory Mutual Approved for sizes $\frac{3}{4}$ " to 8". Complies with Federal Specifications A-A-1192A (Type 10), and Manufacturers' Standardization Society ANSI/SP-69 and SP-58 (Type 10).

ORDERING: Specify pipe size and figure number.

Pipe Size	Rod Size A	B	Adj. C	D	E	Max. Rec. Load/lbs.	Wt. Each (in lbs.)
$\frac{1}{2}$	$\frac{3}{8}$	$1\frac{7}{8}$	$1\frac{7}{16}$	$2\frac{3}{4}$	$3\frac{1}{16}$	300	.10
$\frac{3}{4}$	$\frac{3}{8}$	$1\frac{11}{16}$	$1\frac{1}{8}$	$2\frac{1}{2}$	$3\frac{1}{16}$	300	.10
1	$\frac{3}{8}$	$1\frac{5}{8}$	1	$2\frac{1}{2}$	$3\frac{3}{16}$	300	.10
$1\frac{1}{4}$	$\frac{3}{8}$	$1\frac{15}{16}$	$1\frac{1}{16}$	$2\frac{13}{16}$	$3\frac{9}{16}$	300	.11
$1\frac{1}{2}$	$\frac{3}{8}$	$2\frac{1}{8}$	$1\frac{1}{16}$	$3\frac{1}{8}$	$3\frac{7}{8}$	300	.11
2	$\frac{3}{8}$	$2\frac{7}{16}$	$1\frac{1}{8}$	$3\frac{5}{16}$	$4\frac{3}{8}$	300	.14
$2\frac{1}{2}$	$\frac{3}{8}$	$3\frac{1}{16}$	$1\frac{5}{8}$	$3\frac{15}{16}$	$5\frac{3}{8}$	525	.19
3	$\frac{3}{8}$	$3\frac{11}{16}$	$1\frac{7}{8}$	$4\frac{9}{16}$	$6\frac{5}{16}$	525	.23
$3\frac{1}{2}$	$\frac{3}{8}$	$3\frac{3}{4}$	$1\frac{7}{8}$	$4\frac{5}{8}$	$6\frac{5}{8}$	525	.25
4	$\frac{3}{8}$	$4\frac{3}{16}$	$1\frac{7}{8}$	$5\frac{1}{16}$	$7\frac{5}{16}$	650	.30
5	$\frac{1}{2}$	$4\frac{5}{8}$	$1\frac{5}{8}$	$5\frac{5}{8}$	$8\frac{3}{8}$	1000	.50
6	$\frac{1}{2}$	$5\frac{5}{8}$	$2\frac{1}{4}$	$6\frac{1}{2}$	$9\frac{13}{16}$	1000	.58
8	$\frac{1}{2}$	$6\frac{13}{16}$	$2\frac{7}{16}$	$7\frac{15}{16}$	$12\frac{1}{4}$	1000	.90

Note: If ordering Fig. 141F felt lined hangers for pipe sizes of $3\frac{1}{2}$ " or under, order the next largest size to allow for the thickness of the felt lining.

FUNCTION: Designed for the suspension of non-insulated stationary pipe lines. The knurled insert nut, allows for vertical adjustment after installation. Fig. 151F has a layer of felt which separates the pipe from the hanger to reduce vibration and sound.

APPROVALS: Underwriters' Laboratories Listed in the U.S. (UL) and Factory Mutual Approved for all sizes. Complies with Federal Specification A-A-1192A (Type 10), and Manufacturers' Standardization Society ANSI/SP-69 and SP-58 (Type 10).

ORDERING: Specify pipe size and figure number.

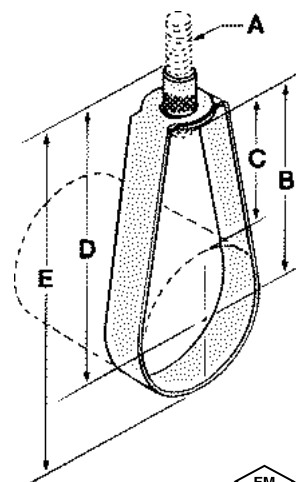
Pipe Size	Rod Size A	B	Adj. C	D	E	Max. Rec. Load/lbs.	Wt. Each (in lbs.)
$2\frac{1}{2}$	$\frac{1}{2}$	$2\frac{3}{4}$	$1\frac{1}{4}$	$3\frac{11}{16}$	$5\frac{1}{8}$	600	.33
3	$\frac{1}{2}$	$3\frac{1}{8}$	$1\frac{1}{8}$	4	$5\frac{7}{8}$	600	.35
$3\frac{1}{2}$	$\frac{1}{2}$	$3\frac{5}{8}$	$1\frac{1}{2}$	$4\frac{5}{16}$	$6\frac{5}{8}$	600	.37
4	$\frac{5}{8}$	$3\frac{7}{8}$	$1\frac{1}{4}$	$4\frac{15}{16}$	$7\frac{1}{8}$	1000	.48
5	$\frac{5}{8}$	$4\frac{3}{8}$	$1\frac{3}{8}$	$5\frac{5}{8}$	$8\frac{1}{2}$	1000	.57
6	$\frac{3}{4}$	$5\frac{5}{16}$	2	$6\frac{11}{16}$	$10\frac{1}{8}$	1250	1.06
8	$\frac{3}{4}$	$6\frac{15}{16}$	$2\frac{5}{8}$	$8\frac{5}{16}$	$12\frac{7}{8}$	1250	1.32

Note: If ordering Fig. 151F felt lined hangers for pipe sizes of $3\frac{1}{2}$ " or under, order the next largest size to allow for the thickness of the felt lining.

Fig. 141 & 141F NFPA SWIVEL RING HANGER

Fig. 141 PRE-GALVANIZED

Fig. 141F PRE-GALVANIZED
WITH FELT LINING

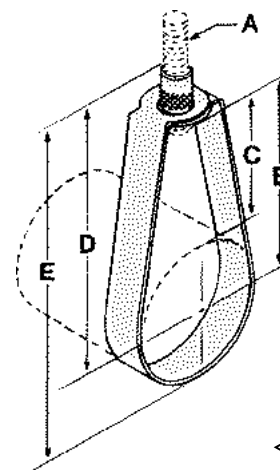


MATERIAL: Low carbon steel

Fig. 151 & 151F SWIVEL RING HANGER

Fig. 151 PRE-GALVANIZED

Fig. 151F PRE-GALVANIZED
WITH FELT LINING



MATERIAL: Low carbon steel



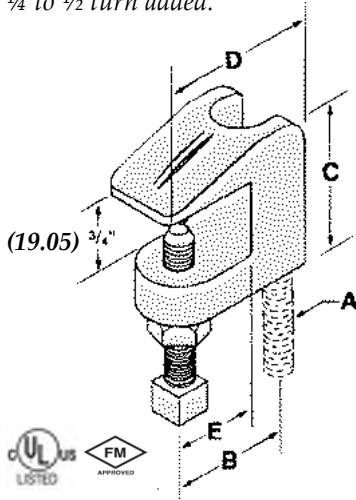
BEAM CLAMPS

**Fig. 350, 353, 354, 355, 356, & 357
DOMESTIC BEAM CLAMP**

Set Screw Torque			
Nominal Thread Size	3/8	1/2	
Rec. Torque	in-lbs 60	125	
	N-m (6.8)	(14.1)	

Caution should be taken not to over tighten the set screw

Note: When a torque wrench is unavailable, the setscrew should be tightened so it contacts the I-beam and then an additional 1/4 to 1/2 turn added.



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

APPROVALS: Underwriters' Laboratories Listed in the U.S. (UL), Canada (CUL), for sizes 3/8" to 7/8" only. Factory Mutual Approved for rod sizes 3/8" and 1/2" only. Complies with Federal Specifications A-A-1192A (Type 19) and Manufacturers' Standardization Society ANSI/SP-69 and SP-58 (Type 19). Fig. 353 sized for 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 3/8" Fig. 353 also complies with Federal Specifications A-A-1192A (Type 23) and Manufacturers' Standardization Society ANSI/SP-69 and SP-58 (Type 23). (Approvals are only valid for beam clamps with locknut).

MATERIAL: Malleable iron with hardened steel cup point set screw and locknut

FINISH: Plain or electro-galvanized

ORDERING: Specify rod size, finish, figure number, and domestic.

Figure Number	Rod Size A	B		C		D		E		Max. Pipe Size		Max. Rec. Load		Wt. Each	
												lbs.	kN	lbs.	kg
Δ 353	3/8	7/8	(22.23)	1 1/2	(38.10)	1 5/8	(41.28)	1/2	(12.70)	4	(100)	400	(1.78)	.33	(.15)

Δ 3/8 Fig. 353 Reversible design approved for bottom beam use.

HDI-P Drop-In Anchor

4.3.7.1 Product Description

The Hilti HDI-P Drop-In anchor is an internally threaded, flush mounted expansion anchor for solid and hollow concrete.

Product Features

- Optimized 3/4" anchor length to allow reliable fastenings in hollow core panels, precast plank & post tensioned slabs
- Shallow drilling enables fast installation
- Lip provides flush installation, consistent anchor depth and easy rod alignment
- Setting tool leaves mark on flange when anchor is set properly to enable inspection & verification of proper expansion

Guide Specifications

Expansion Anchor Expansion anchors shall be flush or shell type and zinc plated in accordance with ASTM B 633, SC 1, Type III. Anchors shall be Hilti HDI-P anchors as supplied by Hilti.

Installation Install shell or flush type anchors in holes drilled with Hilti carbide tipped drill bits. Install anchors in accordance with manufacturer's recommendations.

4.3.7.2 Material Specifications

The HDI-P is manufactured from mild carbon steel, which is zinc plated for corrosion protection in accordance with ASTM B 633, SC 1, Type III

4.3.7.3 Technical Data

HDI-P Specification Table

Desc.	Length in. (mm)	Bit Size ¹ in.	Average Ultimate Loads, lb (kN)				Allowable Loads, lb (kN)			
			4000 psi Concrete (27.6 MPa)		Hollow Core (Spancrete)		4000 psi Concrete (27.6 MPa)		Hollow Core (Spancrete)	
			Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear
HDI-P 3/8	3/4 (19.1)	1/2	1900 (8.5)	3000 (13.3)	2100 (9.3)	4000 (17.8)	380 (1.7)	600 (2.7)	420 (1.9)	800 (3.6)

1 For Hilti matched tolerance carbide tipped drill bits, see section 8.4.1.

4.3.7.4 Installation Instructions

1. Set depth gauge on drill.

2. Hammer-drill hole.

3. Clean hole.

4. Insert anchor.

5. Insert setting tool and strike with hammer until anchor is fully set.

6. Collar of setting tool will leave an indentation on flange of anchor when properly expanded.

4.3.7.5 Ordering Information

HDI-P Anchor

Item No.	Description	Box Qty
00283611	HDI-P 3/8	100

Setting Tools for HDI-P Anchors

Item No.	Description
00283611	HSD-G 3/8" – 3/4" Setting Tool w/ hand guard
00253784	HST-P 3/8" – 3/4" Setting Tool

4.3.7 HDI-P

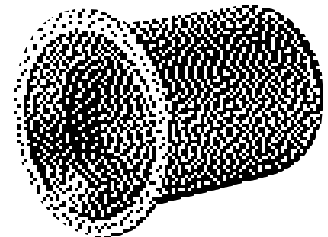
4.3.7.1 Product Description

4.3.7.2 Material Specifications

4.3.7.3 Technical Data

4.3.7.4 Installation Instructions

4.3.7.5 Ordering Information



Listings/Approvals

ICC-ES (International Code Council)
Evaluation Report No. 5264

COLA (City of Los Angeles)
Research Report No. 25350

FM (Factory Mutual)

HDI & HDI-L Drop-In Anchor

4.3.6.1 Product Description

The Hilti HDI/HDI-L Drop-In anchor is an internally threaded, flush mounted expansion anchor for use in concrete.

Product Features

HDI

- Anchor, setting tool and Hilti drill bit form a matched tolerance system to provide reliable fastenings
- Below surface setting for easy patchwork
- Allows shallow embedment without sacrificing performance

HDI-L

- Lip provides flush installation, consistent anchor depth, and easy rod alignment
- Lip allows accurate flush surface setting, independent of hole depth
- Ideal for repetitive fastenings with threaded rods of equal length
- Intelligent expansion section adapts to the base material and reduces number of hammer blows up to 50%
- Easy to read brand and size identification (red paint)

Guide Specifications

Expansion Anchor Expansion anchors shall be flush or shell type and zinc plated in accordance with ASTM B 633, SC 1, Type III. Anchors shall be Hilti HDI/HDI-L anchors as supplied by Hilti.

Installation Install shell or flush type anchors in holes drilled with Hilti carbide tipped drill bits. Install anchors as per manufacturer's recommendations.

4.3.6.2 Material Specifications

HDI/HDI-L, 1/4", 3/8", 1/2", and HDI 5/8" and 3/4" are manufactured from mild carbon steel which is plated with a zinc finish for corrosion protection in accordance with ASTM B 633, SC 1, Type III

HDI Stainless Steel material meets the requirements of AISI 303

4.3.6.3 Technical Data

HDI/HDI-L Specification Table

Details	Anchor Size	in. (mm)	HDI/HDI-L			HDI	
			1/4 (6.4)	3/8 (9.5)	1/2 (12.7)	5/8 (15.9)	3/4 (19.1)
d _{bit}	Bit diameter ¹	in.	3/8	1/2	5/8	27/32	1
h _{nom}	Std. depth of embed.	in.	1	1-9/16	2	2-9/16	3-3/16
ℓ	Anchor length	(mm)	(25)	(40)	(51)	(65)	(81)
h ₁	Hole depth						
ℓ _{th}	Useable thread length	in. (mm)	7/16 (11)	5/8 (15)	11/16 (17)	7/8 (22)	1-3/8 (34)
	Threads per inch		20	16	13	11	10
h	min. base material thickness	in. (mm)	3 (76)	3-1/8 (79)	4 (102)	5-1/8 (130)	6-3/8 (162)
T _{max}	max. tightening torque	ft-lb (Nm)	4 (5.4)	11 (14.9)	22 (29.8)	37 (50.2)	80 (108.5)

1 For Hilti matched tolerance carbide tipped drill bits, see section 8.4.1.

Combined Shear and Tension Loading

$$\left(\frac{N_d}{N_{rec}}\right)^{5/3} + \left(\frac{V_d}{V_{rec}}\right)^{5/3} \leq 1.0 \text{ (Ref. Section 4.1.2.7)}$$

4.3.6 HDI & HDI-L

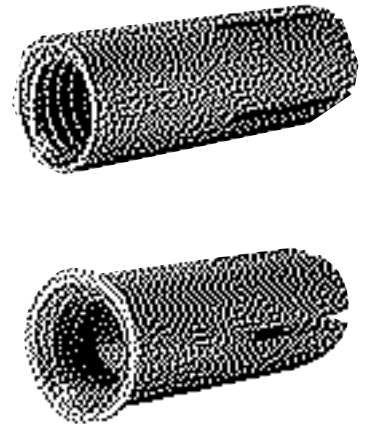
4.3.6.1 Product Description

4.3.6.2 Material Specifications

4.3.6.3 Technical Data

4.3.6.4 Installation Instructions

4.3.6.5 Ordering Information



Listings/Approvals

ICC-ES (International Code Council)
Evaluation Report No. 2895 (HDI Only)
COLA (City of Los Angeles)
Research Report No. 23709 (HDI Only)
FM (Factory Mutual)
Serial No. 22765 "Sprinkler Hanger
Components—Expansion Shields."
(HDI and HDI-L)
UL (Underwriters Laboratory)
"Pipe Hangers" (3/8"–3/4"
diameter) (HDI and HDI-L)

Carbon Steel HDI Ultimate Loads in Concrete

Anchor size in. (mm)	2000 psi (13.8 MPa)				4000 psi (27.6 MPa)				6000 psi (41.4 MPa)			
	Tension		Shear		Tension		Shear		Tension		Shear	
	HDI	HDI-L	HDI	HDI-L	HDI	HDI-L	HDI	HDI-L	HDI	HDI-L	HDI	HDI-L
1/4 (6.4)	1995 (8.9)	1995 (8.9)	1800 (8.0)	1800 (8.0)	2270 (10.1)	2270 (10.1)	2500 (11.1)	2500 (11.1)	3150 (14.0)	3150 (14.0)	2800 (12.5)	2800 (12.5)
3/8 (9.5)	3555 (15.8)	3555 (15.8)	3850 (17.1)	3850 (17.1)	4460 (19.8)	4460 (19.8)	5000 (22.2)	5000 (22.2)	5430 (24.2)	5430 (24.2)	6000 (26.7)	6000 (26.7)
1/2 (12.7)	4470 (19.9)	4470 (19.9)	6000 (26.7)	6000 (26.7)	7140 (31.8)	7140 (31.8)	8500 (37.8)	7750 (34.4)	9375 (41.7)	9375 (41.7)	10000 (44.5)	10000 (44.5)
5/8 (15.9)	7500 (33.4)	—	10000 (44.5)	—	11685 (52.0)	—	13000 (57.8)	—	14865 (66.1)	—	15000 (66.7)	—
3/4 (19.1)	10000 (44.5)	—	15500 (69.0)	—	16260 (72.3)	—	20000 (89.0)	—	22250 (99.0)	—	22000 (97.9)	—

Carbon Steel HDI Allowable Loads in Concrete

Anchor size in. (mm)	2000 psi (13.8 MPa)				4000 psi (27.6 MPa)				6000 psi (41.4 MPa)			
	Tension		Shear		Tension		Shear		Tension		Shear	
	HDI	HDI-L	HDI	HDI-L	HDI	HDI-L	HDI	HDI-L	HDI	HDI-L	HDI	HDI-L
1/4 (6.4)	500 (2.2)	500 (2.2)	450 (8.0)	450 (8.0)	570 (2.5)	570 (2.5)	625 (2.8)	625 (2.8)	790 (3.5)	790 (3.5)	700 (3.1)	700 (3.1)
3/8 (9.5)	890 (4.0)	890 (4.0)	965 (4.3)	965 (4.3)	1115 (5.0)	1115 (5.0)	1250 (5.6)	1250 (5.6)	1360 (6.0)	1360 (6.0)	1500 (6.7)	1500 (6.7)
1/2 (12.7)	1120 (5.0)	1120 (5.0)	1500 (6.7)	1500 (6.7)	1785 (7.9)	1785 (7.9)	2125 (9.5)	1940 (8.6)	2345 (10.4)	2345 (10.4)	2500 (11.1)	2500 (11.1)
5/8 (15.9)	1875 (8.3)	—	2500 (11.1)	—	2920 (13.0)	—	3250 (14.5)	—	3715 (16.5)	—	3750 (16.7)	—
3/4 (19.1)	2500 (11.1)	—	3875 (17.2)	—	4065 (18.1)	—	5000 (22.2)	—	5565 (24.8)	—	5500 (24.5)	—

Note: The ultimate shear and allowable shear values are based on the use of SAE Grade 5 bolts, ($f_y = 85 \text{ ksi}$, $F_{ult} = 120 \text{ ksi}$) with the exception of the 1/4" HDI/HDI-L in $f'_c = 6000 \text{ psi}$ concrete which is based upon the use of a SAE Grade 8 bolt ($f_y = 120 \text{ ksi}$, $F_{ult} = 150 \text{ ksi}$).

Carbon Steel HDI Allowable Loads in Lightweight Concrete and Lightweight Concrete over Metal Deck^{1, 2}

Anchor Size in. (mm)	Anchor Installed in 3000 psi (20.7 MPa) Lt. Wt. Concrete ³		Anchor Installed Through Steel Deck Upper Flute Into 3000 psi (20.7 MPa) Lt. Wt. Concrete ⁴		Anchor Installed Through Steel Deck Lower Flute Into 3000 psi (20.7 MPa) Lt. Wt. Concrete ⁴	
	Tension, lb (kN)	Shear, lb (kN)	Tension, lb (kN)	Shear, lb (kN)	Tension, lb (kN)	Shear, lb (kN)
1/4 (6.4)	465 (2.1)	340 (1.5)	530 (2.4)	335 (1.5)	375 (1.7)	250 (1.1)
3/8 (9.5)	755 (3.4)	940 (4.2)	880 (3.9)	1010 (4.5)	500 (2.2)	500 (2.2)
1/2 (12.7)	1135 (5.0)	1700 (7.6)	1105 (4.9)	1755 (7.8)	625 (2.8)	750 (3.3)
5/8 (15.9)	1465 (6.5)	2835 (12.6)	—	—	875 (3.9)	875 (3.9)
3/4 (19.1)	2075 (9.2)	3680 (16.4)	—	—	1250 (5.5)	1000 (4.4)

1 The allowable values are based on the use of SAE Grade 2 bolts installed in the anchors.

2 Based on using a safety factor of 4.0.

3 The tabulated shear and tensile values are for anchors installed in structural lightweight concrete having the designated ultimate compressive strength at the time of installation. The concrete must comply with ASTM C 330-77.

4 The tabulated shear and tensile values are for anchors installed through 20 gauge intermediate decking into structural lightweight concrete having the designated ultimate strength at the time of installation. The concrete must comply with ASTM C 330-77.

Stainless Steel HDI Ultimate Loads in Concrete

Anchor size in. (mm)	4000 psi (27.6 MPa)		6000 psi (41.4 MPa)	
	Tension lb (kN)	Shear lb (kN)	Tension lb (kN)	Shear lb (kN)
SS HDI – 1/4 (6.4)	1930 (8.6)	2400 (10.7)	2950 (13.1)	2400 (10.7)
SS HDI – 3/8 (9.5)	4170 (18.5)	4920 (21.9)	5850 (26.0)	4920 (21.9)
SS HDI – 1/2 (12.7)	7350 (32.7)	11040 (49.1)	9630 (42.8)	11040 (49.1)
SS HDI – 5/8 (15.9)	10540 (46.9)	18040 (80.2)	15100 (67.2)	18040 (80.2)
SS HDI – 3/4 (19.1)	15340 (68.2)	22320 (99.3)	20130 (89.5)	22320 (99.3)

Stainless Steel HDI Allowable Loads in Concrete

Anchor size in. (mm)	4000 psi (27.6 MPa)		6000 psi (41.4 MPa)	
	Tension lb (kN)	Shear lb (kN)	Tension lb (kN)	Shear lb (kN)
HDI – 1/4 (6.4)	480 (2.1)	600 (2.7)	740 (3.3)	600 (2.7)
HDI – 3/8 (9.5)	1040 (4.6)	1230 (5.5)	1460 (6.5)	1230 (5.5)
HDI – 1/2 (12.7)	1840 (8.2)	2760 (12.4)	2410 (10.7)	2760 (12.3)
HDI – 5/8 (15.9)	2630 (11.7)	4510 (20.1)	3770 (16.8)	4510 (20.1)
HDI – 3/4 (19.1)	3830 (17.0)	5580 (24.8)	5030 (22.4)	5580 (24.8)

Note: The ultimate and allowable shear values are based on the use of Type 18-8 bolts.

HDI & HDI-L Drop-In Anchor

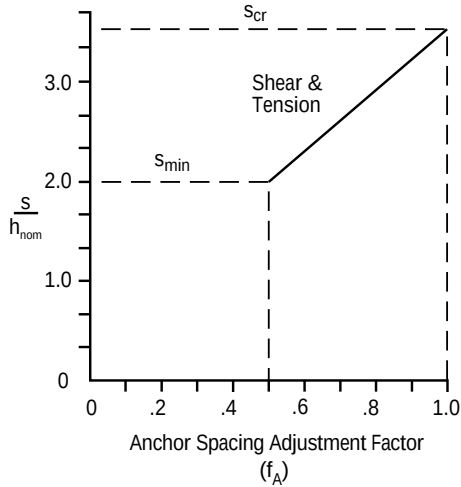
Anchor Spacing and Edge Distance Guidelines (See Anchoring Technology Section 4.1.3)

Anchor Spacing Adjustment Factors

s = Actual Spacing

$$s_{\min} = 2.0 h_{\text{nom}}$$

$$s_{\text{cr}} = 3.5 h_{\text{nom}}$$

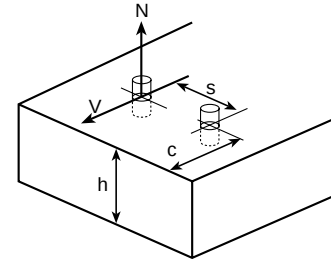
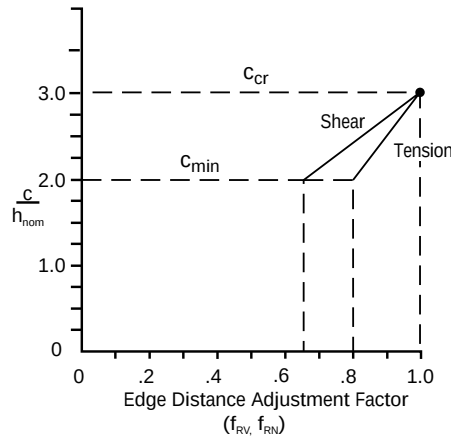


Edge Distance Adjustment Factors

c = Actual edge distance

$$c_{\min} = 2.0 h_{\text{nom}}$$

$$c_{\text{cr}} = 3.0 h_{\text{nom}}$$



Influence of Anchor Spacing & Edge Distance f_A, f_R

Anchor Size in. (mm)	h_{nom} 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)

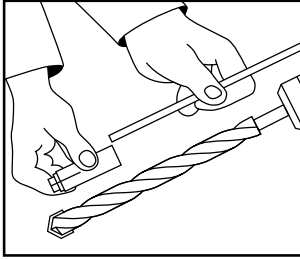
h_{nom} = standard embedment depth

Load Adjustment Factors (Anchor Spacing) f_A						Load Adjustment Factors (Edge Distance) f_R										
Tension/Shear Loads						Tension, f_{RN}					Shear, f_{RV}					
Spacing s in. (mm)	Anchor Diameter					Edge Distance c in. (mm)	Anchor Diameter					Anchor Diameter				
	1/4	3/8	1/2	5/8	3/4		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											
$s_{\min} = 2.0 h_{\text{nom}}, s_{\text{cr}} = 3.5 h_{\text{nom}}$ $f_A = 0.33 \frac{s}{h_{\text{nom}}} - 0.17$ for $s_{\text{cr}} > s > s_{\min}$						$c_{\min} = 2.0 h_{\text{nom}}, c_{\text{cr}} = 3.0 h_{\text{nom}}$ $f_{RN} = 0.2 \frac{c}{h_{\text{nom}}} + 0.4$ for $c_{\text{cr}} > c > c_{\min}$					$c_{\min} = 2.0 h_{\text{nom}}, c_{\text{cr}} = 3.0 h_{\text{nom}}$ $f_{RV} = 0.35 \frac{c}{h_{\text{nom}}} - 0.05$ for $c_{\text{cr}} > c > c_{\min}$					

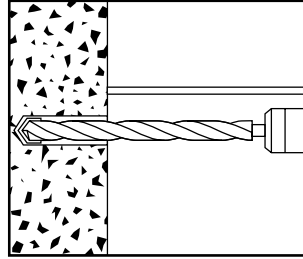
Visit Hilti Online

US www.us.hilti.com
Canada www.ca.hilti.com

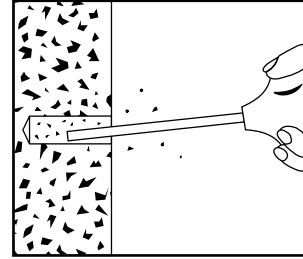
4.3.6.4 Installation Instructions



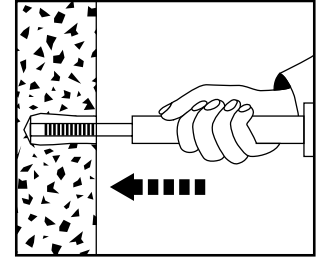
1 Adjust depth gauge so that anchor will be flush with the concrete surface when installed.



2 Hammer drill hole.



3 Clean hole.



4 Install anchor using proper setting tool. Setting tool to be driven into anchor until setting tool shoulder meets top of anchor.

4.3.6.5 Ordering Information

HDI Anchors

Anchor Thread Size	Carbon Steel				Stainless Steel		Box Qty
	Description	Item No.	Description	Item No.	Description	Item No.	
1/4"	HDI 1/4	00336425	HDI-L 1/4	00283608	HDI (SS 303) 1/4	00336430	100
3/8"	HDI 3/8	00336426	HDI-L 3/8	00283609	HDI (SS 303) 3/8	00336431	50
1/2"	HDI 1/2	00336427	HDI-L 1/2	00283610	HDI (SS 303) 1/2	00336432	50
5/8"	HDI 5/8	00336428	—	—	HDI (SS 303) 5/8	00336433	25
3/4"	HDI 3/4	00336429	—	—	HDI (SS 303) 3/4	00336434	25

Setting Tools for HDI & HDI-L Anchors

Anchor Thread Size	Description – Manual Setting Tools	Item No.
1/4"	HST 1/4 Setting Tool	00032978
3/8"	HST 3/8 Setting Tool	00032979
1/2"	HST 1/2 Setting Tool	00032980
5/8"	HST 5/8 Setting Tool	00032981
3/4"	HST 3/4 Setting Tool	00032982
Anchor Thread Size	Description – Automatic Setting Tools ¹	Item No.
3/8"	HSD-MM 3/8" (TE-C-24SD10 3/8" Setting tool)	00243751
1/2"	HSD-MM 1/2" (TE-C-24SD12 1/2" Setting tool)	00243752

1 Use automatic setting tools with TE-5, TE-5A, TE-15, TE-18 and TE-25 rotary hammer drills.



CPVC Hanging System

The nVent CADDY SOSR is designed for CPVC and is UL approved for side of joist installations and bottom of joist installations. It has a live hinge that opens to simplify installation. Some flimsy CPVC products are not approved for side of joist installations and do not meet NFPA® 13 surge requirements.



107 Wraparound Strap
for CPVC Pipe
107####**



108 2-Hole Strap
for CPVC Pipe
108####**



109 Side Mount Strap
for CPVC Pipe
109####**



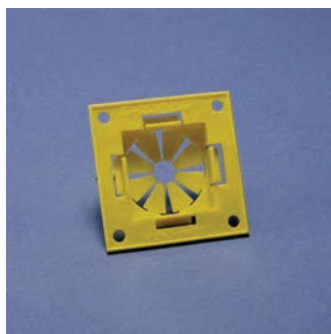
SOSR Stand Off 2-Hole Strap
for CPVC Pipe
SOSR##



Macrofix Plus NI
with Easy Closure
429####**



3TW Fastener for
SOSR Series wood
screw backing nut
3TW



Easy Snap Grommet for
Factory Punched Holes
ESGFP



Snap-On Nail Plate
304B2

= pipe size ** = Finish - ie EG
SOSR**100** = 1" pipe size, ElectroGalvanized

Pipe Fixings – CPVC

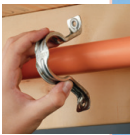


Pipe Fixings – CPVC

Pipe Fixings – CPVC

SOSR STAND OFF TWO HOLE STRAP FOR CPVC PIPE

- Includes flared edges to protect piping
- Rated for use with CPVC fire sprinkler pipe
- Includes mounting screws



Material: Steel
Finish: Pregalvanized

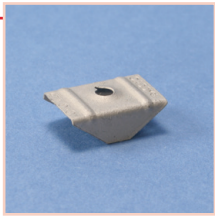


Part Number	Description	
SOSR075	3/4" Pipe	100 pc
SOSR075B10	3/4" Pipe	10 x 10 pc
SOSR100	1" Pipe	100 pc
SOSR100B10	1" Pipe	10 x 10 pc
SOSR125	1 1/4" Pipe	100 pc
SOSR125B10	1 1/4" Pipe	10 x 10 pc
SOSR150	1 1/2" Pipe	100 pc
SOSR150B10	1 1/2" Pipe	10 x 10 pc
SOSR200	2" Pipe	100 pc
SOSR200B10	2" Pipe	10 x 10 pc

Pipe Fixings – CPVC

3TW FASTENER FOR SOSR SERIES

- Backing nut for use with SOSR on composite wood joist installations



Material: Spring Steel
Finish: Armour



Part Number	Description
3TW	#10 Screw

Pipe Fixings – CPVC

107 WRAPAROUND STRAP FOR CPVC PIPE

- Includes flared edges to protect piping
- Rated for use with CPVC fire sprinkler pipe
- Includes mounting screw



Material: Steel
Finish: Pregalvanized



Part Number	Description
1070075EG	3/4" Pipe, 1.05" OD
1070100EG	1" Pipe, 1.315" OD
1070125EG	1 1/4" Pipe, 1.66" OD
1070150EG	1 1/2" Pipe, 1.9" OD
1070200EG	2" Pipe, 2.375" OD

108 TWO HOLE STRAP FOR CPVC PIPE

- Includes flared edges to protect piping
- Rated for use with CPVC fire sprinkler pipe
- Includes mounting screws



Material: Steel
Finish: Pregalvanized

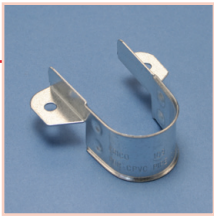


Part Number	Description
1080075EG	3/4" Pipe, 1.05" OD
1080100EG	1" Pipe, 1.315" OD
1080125EG	1 1/4" Pipe, 1.66" OD
1080150EG	1 1/2" Pipe, 1.9" OD
1080200EG	2" Pipe, 2.375" OD

Pipe Fixings – CPVC

109 SIDE MOUNT STRAP FOR CPVC PIPE

- Includes flared edges to protect piping
- Rated for use with CPVC fire sprinkler pipe
- Includes mounting screws



Material: Steel
Finish: Pregalvanized



Part Number	Description
1090075EG	3/4" Pipe, 1.05" OD
1090100EG	1" Pipe, 1.315" OD
1090125EG	1 1/4" Pipe, 1.66" OD
1090150EG	1 1/2" Pipe, 1.9" OD
1090200EG	2" Pipe, 2.375" OD

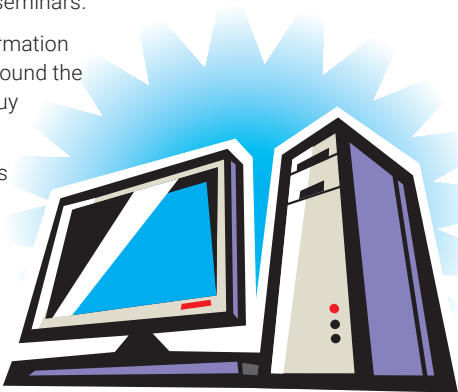
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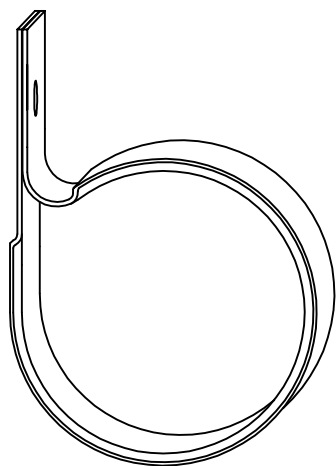
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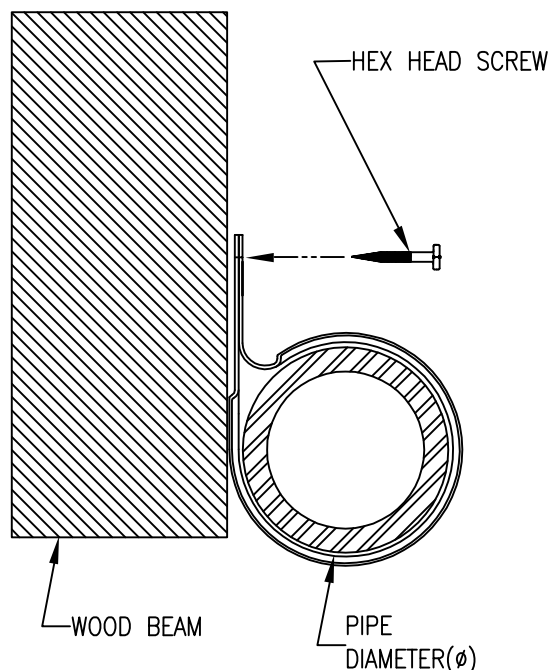
MODEL #107 SERIES ONE HOLE STRAP HANGER



PART NO.	PIPE DIA.
1070075EG	3/4"
1070100EG	1"
1070125EG	1 1/4"
1070150EG	1 1/2"
1070200EG	2"

SCREWS PROVIDED

USED FOR PVC PIPE ONLY.



1. PLACE PVC PIPE INTO HANGER.
2. MOUNT HANGER ON TO WOOD BEAM WITH SCREWS PROVIDED.

WARNING

1. These products shall be used only as illustrated and recommended in product instruction sheets (additional instruction sheets are available at www.erico.com). Misuse or misapplication may cause failure resulting in possible property damage or bodily injury.
2. These products must be used only in the manner depicted in the illustrations that accompany them and must not exceed load ratings.
3. Failure to observe these specifications may cause product malfunction resulting in property damage or bodily injury. ERICO products at the time of shipment are warranted to conform to any applicable written description furnished to the Buyer by ERICO, and to be free from defects in material and workmanship. NO OTHER WARRANTY, WHETHER EXPRESSED OR IMPLIED, (INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS), SHALL EXIST IN CONNECTION WITH THE SALE OR USE OF ANY ERICO PRODUCT.
4. All instructions must be completely followed to ensure proper and safe operation.
5. All pipe supports, hangers, intermediate components and structural attachments must ONLY be used as described herein and are NEVER to be used for any other purpose.

NOTE: All load ratings are for static conditions and do not account for dynamic loading such as wind, water or seismic loads.

The buyer and/or installer is responsible for:

- a. Application in conformance to all governing codes.
- b. The integrity of structures to which the products are attached, including their capability of safely accepting the loads imposed, as evaluated by a qualified engineer.
- c. Using appropriate industry standard hardware as noted above.

SAFETY WARNING:

SAFETY INSTRUCTIONS: All governing codes and regulations and those required by the job site must be observed. Always use appropriate safety equipment such as eye protection, hard hat, and gloves as appropriate to the application.

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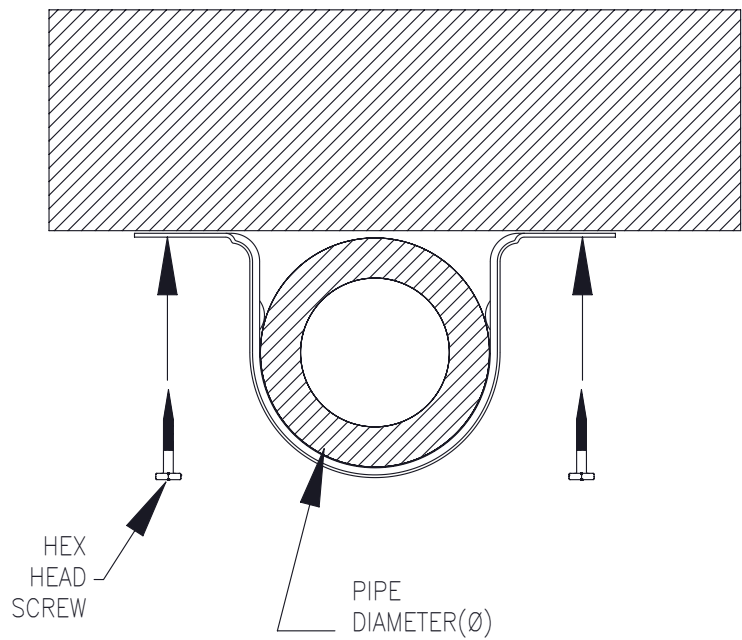
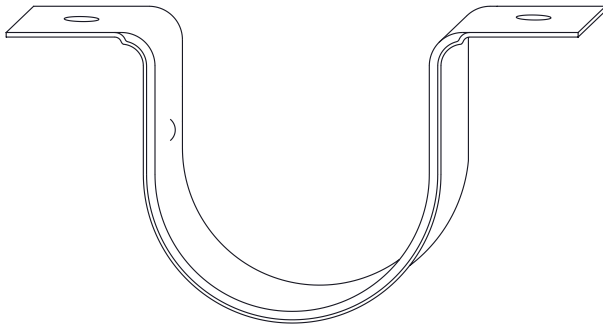
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108 SERIES

TWO HOLE STRAP HANGER

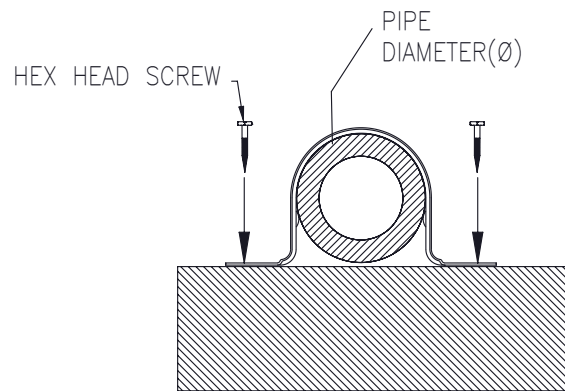
USED FOR PVC PIPE ONLY.



PART NO.	PIPE DIA.
1080075EG	3/4"
1080100EG	1"
1080125EG	1 1/4"
1080150EG	1 1/2"
1080200EG	2"

SCREWS PROVIDED

1. SNAP PVC PIPE INTO HANGER. DIMPLES HOLD PIPE IN PLACE.
2. MOUNT HANGER TO UNDER SIDE OF BEAM WITH SCREWS PROVIDED.
3. MAY ALSO BE USED ON TOP SIDE OF BEAM.(SEE BELOW)
4. INTENDED FOR USE AS A GUIDE WHEN THE PIPE IS INSTALLED ON THE TOP SIDE OF A BEAM. THIS IS DUE TO THE FACT THAT THE BEAM IS SUPPORTING THE WEIGHT OF THE PIPE, NOT THE HANGER.

**WARNING:**

1. Pentair products shall be installed and used only as indicated in Pentair product instruction sheets and training materials. Instruction sheets are available at www.erico.pentair.com and from your Pentair customer service representative.
2. PENTAIR products must never be used for a purpose other than the purpose for which they were designed or in a manner that exceeds specified load ratings.
3. All instructions must be completely followed to ensure proper and safe installation and performance.
4. Improper installation, misuse, misapplication or other failure to completely follow Pentair's instructions and warnings may cause product malfunction, property damage, serious bodily injury and/or death, and void your warranty.
5. Products that are manufactured using spring steel components shall be used only in a non-corrosive indoor environment.
6. All pipe supports, hangers, intermediate components and structural attachments must ONLY be used as described herein and are NEVER to be used for any other purpose.

NOTE: All load ratings are for static conditions and do not account for dynamic loading such as wind, water or seismic loads, unless otherwise noted.

The customer is responsible for:

- a. Conformance to all governing codes.
- b. The integrity of structures to which the products are attached, including their capability of safely accepting the loads imposed, as evaluated by a qualified engineer.
- c. Using appropriate industry standard hardware as noted above.

SAFETY INSTRUCTIONS:

All governing codes and regulations and those required by the job site must be observed.
Always use appropriate safety equipment such as eye protection, hard hat, and gloves as appropriate to the application.



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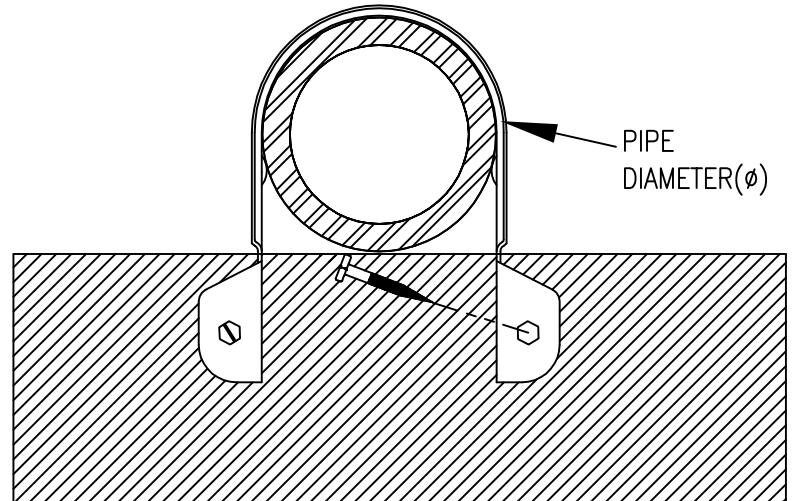
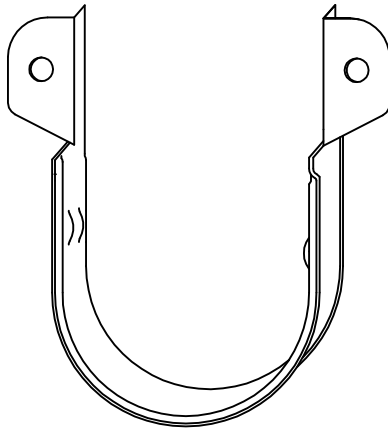
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109 SERIES SIDE MOUNT STRAP HANGER

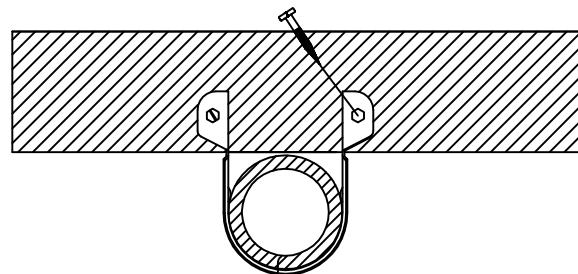
USED FOR PVC PIPE ONLY.



PART NO.	PIPE DIA.
1090075EG	3/4"
1090100EG	1"
1090125EG	1 1/4"
1090150EG	1 1/2"
1090200EG	2"

SCREWS PROVIDED

1. SNAP PVC PIPE INTO HANGER. DIMPLES HOLD PIPE IN PLACE.
2. MOUNT HANGER ONTO WOOD BEAM WITH SCREWS PROVIDED.
3. MAY ALSO BE USED ON THE UNDERSIDE OF BEAM. (SEE BELOW)
4. DO NOT ANCHOR TIGHTLY TO SURFACE, PIPE MUST SLIDE FREELY THROUGH HANGER.
5. INTENDED FOR USE AS A GUIDE WHEN THE PIPE IS INSTALLED ON THE TOP SIDE OF A BEAM. THIS IS DUE TO THE FACT THAT THE BEAM IS SUPPORTING THE WEIGHT OF THE PIPE, NOT THE HANGER.



WARNING

1. ERICO products shall be installed and used only as indicated in ERICO product instruction sheets and training materials. Instruction sheets are available at www.erico.com and from your ERICO customer service representative.
2. ERICO products must never be used for a purpose other than the purpose for which they were designed or in a manner that exceeds specified load ratings.
3. All instructions must be completely followed to ensure proper and safe installation and performance.
4. Improper installation, misuse, misapplication or other failure to completely follow ERICO's instructions and warnings may cause product malfunction, property damage, serious bodily injury and death.
5. Products that are manufactured using spring steel components shall be used only in a non-corrosive indoor environment.
6. All pipe supports, hangers, intermediate components and structural attachments must ONLY be used as described herein and are NEVER to be used for any other purpose.

NOTE: All load ratings are for static conditions and do not account for dynamic loading such as wind, water or seismic loads, unless otherwise noted.

The customer is responsible for:

- a. Conformance to all governing codes.
- b. The integrity of structures to which the products are attached, including their capability of safely accepting the loads imposed, as evaluated by a qualified engineer.
- c. Using appropriate industry standard hardware as noted above.

SAFETY INSTRUCTIONS: All governing codes and regulations and those required by the job site must be observed. Always use appropriate safety equipment such as eye protection, hard hat, and gloves as appropriate to the application.

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SOSR

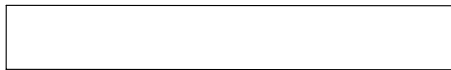
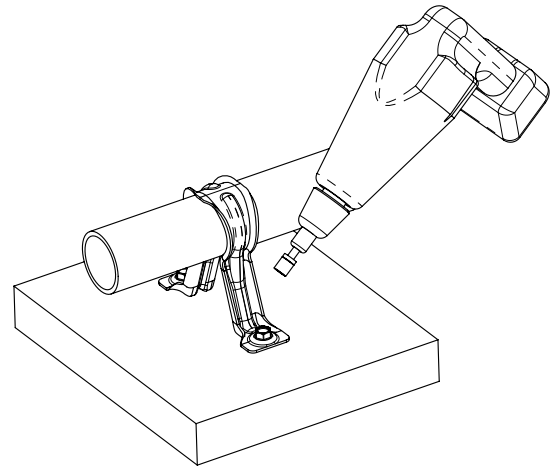
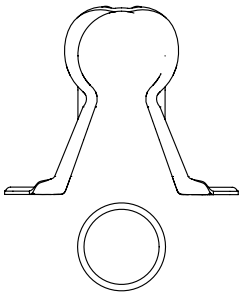
2- HOLE STAND-OFF AND SURGE RESTRAINT HANGER

Sizing Chart

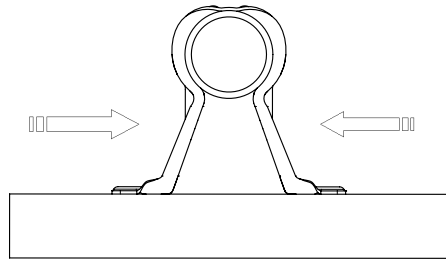
Part No.	Article No.	Description
SOSR075	597805	For 3/4" CPVC Piping
SOSR100	597806	For 1" CPVC Piping
SOSR125	597807	For 1-1/4" CPVC Piping
SOSR150	597808	For 1-1/2" CPVC Piping
SOSR200	597809	For 2" CPVC Piping



For mounting CPVC sprinkler pipe to the vertical or horizontal face of structural wood, metal, concrete, or composite wood joists with a minimum 3/8" web thickness.



1. Snap strap over CPVC pipe.



2. Squeeze strap back around pipe. Note: pipe must be allowed to slide freely.

3. Fasten the strap with appropriate hardware (chart below).

Mounting Hardware Table

Mounting Surface	Hardware
Structural Wood	#10 X 1" screws provided
Sheet Metal (min. 18 gauge)	1/4" x 1/2" long TEK type screws
Concrete	Per NFPA® : Min. load per fastener = $[5(wt) + 250 \text{ Lbs}]/2$
Composite Wood Joist	#10 X 1" screws provided with 3TW backing nuts (sold separately)

(wt) = weight of water filled pipe

WARNING:

- Pentair products shall be installed and used only as indicated in Pentair product instruction sheets and training materials. Instruction sheets are available at www.erico.pentair.com and from your Pentair customer service representative.
- PENTAIR products must never be used for a purpose other than the purpose for which they were designed or in a manner that exceeds specified load ratings.
- All instructions must be completely followed to ensure proper and safe installation and performance.
- Improper installation, misuse, misapplication or other failure to completely follow Pentair's instructions and warnings may cause product malfunction, property damage, serious bodily injury and/or death, and void your warranty.
- Products that are manufactured using spring steel components shall be used only in a non-corrosive indoor environment.
- All pipe supports, hangers, intermediate components and structural attachments must ONLY be used as described herein and are NEVER to be used for any other purpose.

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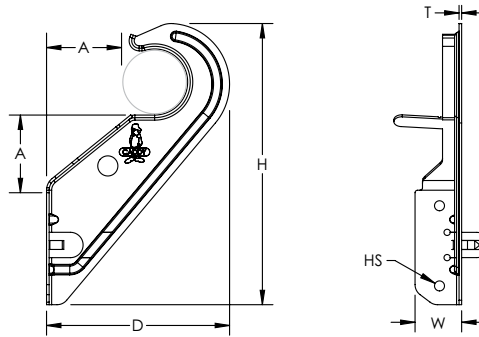
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DOSR DOUBLE OFFSET SURGE RESTRAINT FOR CPVC PIPE



- Provides quick and easy snap-in installation of pipe
- Built-in nail tab allows for fast, temporary mounting to any surface
- Rated for use with CPVC fire sprinkler pipe
- Positions pipe 1-1/2" (38 mm) out and up from the mounting surface eliminating the need for wooden spacer blocks
- Meets the UL® 203 stringent upward thrust requirement
- UL® Listed as both a hanger and restraint in the double offset orientation
- Complies with static load requirements of NFPA® 13
- Includes mounting screws
- Can be used with 3TW backing nut on composite wood joist installations



Material: Steel
Finish: Pregalvanized



Part Number	Pipe Size	Hole Size HS	Height H	Width W	Depth D	A	Thickness T	Hanger Spacing
DOSR075	3/4"	0.2"	5.2"	1"	3.5"	1 1/2"	18 GA	6' Max
DOSR100	1"	0.2"	5.8"	1"	3.4"	1 1/2"	18 GA	6' Max

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Pipe Supports



721 Pipe Support
with U-Bolt
721####PL



722 Adjustable
Pipe Support
722####PL



723 Adjustable
Pipe Support Assembly
723####PL



724 Adjustable Pipe Support
Assembly with U-Bolt
724####PL

= pipe size
721**0600**PL= 6" pipe size

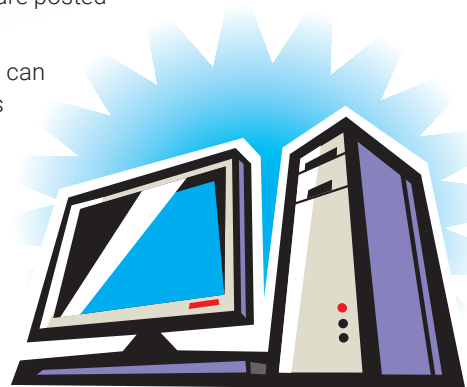
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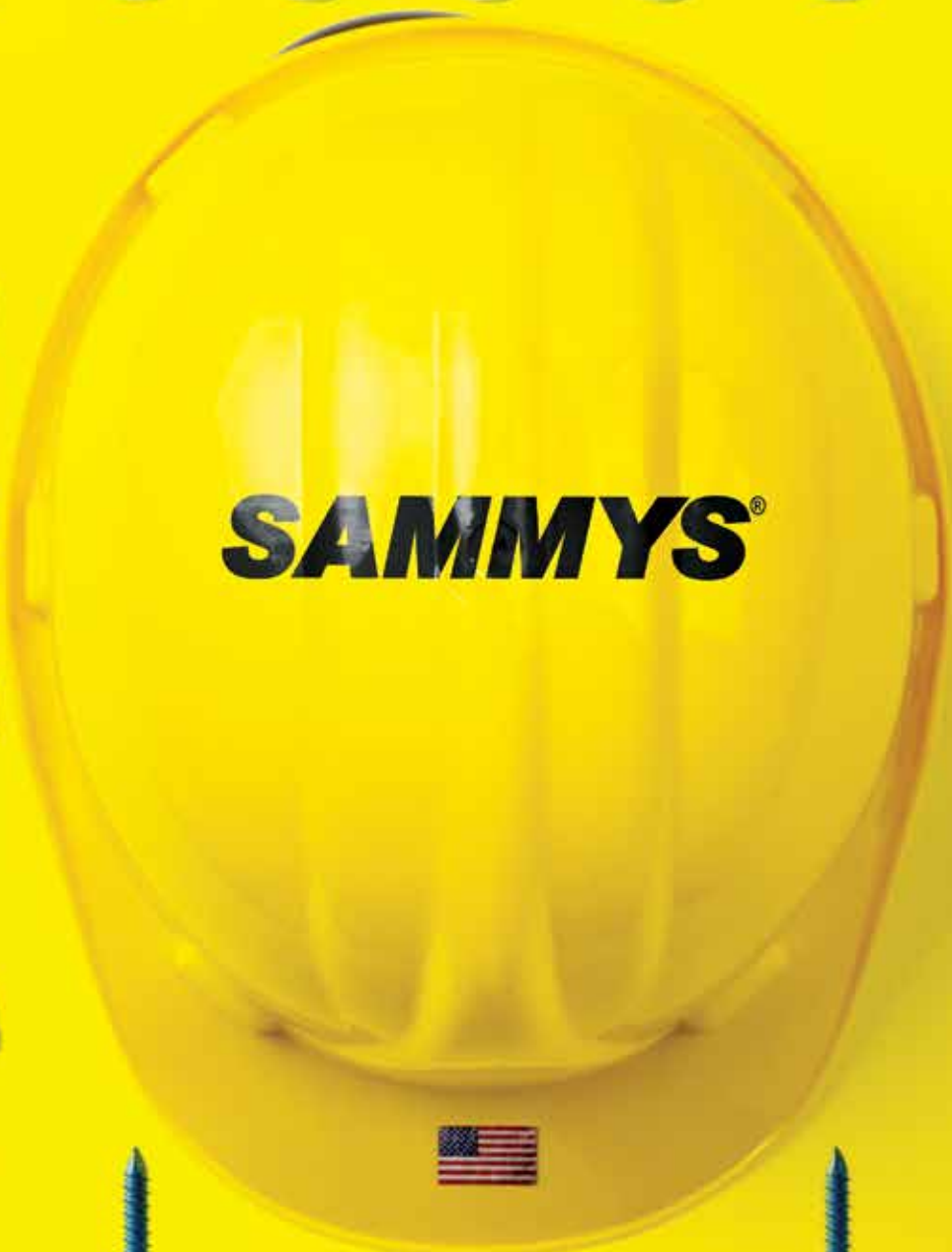
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SAMMYS®

**2018-2019
Product Catalog**

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Warranty • Disclaimer of Warranty

Proper fastener connection design takes in to account where and how fasteners are used. Allowance for special characteristics in materials, differences in materials, differences in types of materials being joined, unique or unusual environmental service or installation conditions and the safety factors required by anticipating normal or short term loading conditions must be considered. Due to possible differences in specifications, applications, and interpretation of results, purchasers and specifiers must make their own evaluation of the products, to determine the suitability of these products for intended use. All warranties of Buildex products, expressed or implied, including the warranties of merchantability and fitness for particular purposes are specifically excluded except for the following: Buildex will repair or replace any product which, within twelve months after sale by Buildex or its distributors, is found by Buildex to be defective in material or workmanship - normal wear and tear accepted. This is the sole warranty of Buildex and the sole remedy available to distributor or buyer. Buildex shall not be liable for any injury, loss or damage, direct, indirect, or consequential, arising out of the use of, or the inability to use, any Buildex product.

INSTALLATION INSTRUCTIONS FOR WOOD & STEEL

INSTALLATION STEPS - VERTICAL INTO WOOD & STEEL:

1. Insert the appropriate nut driver into a 3/8" or 1/2" portable drill.
2. Insert the SAMMYS® into the #14 (black) nut driver (p/n 8113910). Drill should be in a vertical position.
3. Push the face of the nut driver tight to the member. Begin installation when the nut driver spins freely on the SAMMYS, stop drill and remove.
4. The SAMMYS is now ready to receive 1/4", 3/8", 1/2" or metric all thread rod, bolt stock. (The 1/2" requires the #14SW red nut driver)

Note: When installing DSTR, follow the above instructions, then add retainer nut and torque to 20 inch lbs. for maximum pullout in purlin steel.



INSTALLATION STEPS - HORIZONTAL INTO WOOD & STEEL:

1. Insert the appropriate nut driver into a 3/8" or 1/2" portable drill.
2. Insert the SAMMYS into the #14SW (red) nut driver (p/n 8114910). With drill unit in a horizontal position and at a right angle to the structural member, begin installation.
3. When the nut driver spins freely on the SAMMYS, stop the drill and remove.
4. The unit is now ready to receive 1/4", 3/8", M10, M8 or metric all thread rod or bolt stock.

Note: When installing SWDR, follow the above instructions, then add retainer nut and torque to 20 inch lbs. for maximum pullout in purlin steel.



INSTALLATION INSTRUCTIONS FOR CONCRETE

INSTALLATION STEPS - VERTICAL INTO CONCRETE:

1. Using an SDS 250 carbide tip bit or a HEX RECEIVER with a #250 carbide tip bit, pre-drill the concrete member to a depth of 2" with a hammer/rotary hammer drill set on impact mode.
2. After pre-drilling has been completed, install the SLEEVE TOOL over the bit (the bit should remain in the drill), and insert the #14 (black) nut driver (p/n 8113910) into the opposite end (see Vertical Installation note above).
3. Insert the CST screw into the nut driver.
4. Place tip of screw into the pre-drilled hole, turn impact/drill unit to drill mode and begin insertion. When the nut driver spins freely on the CST screw, installation is complete. Stop and remove drill.
5. The concrete screw is ready to receive 1/4", 3/8", 1/2", or metric all thread rod or bolt stock. (#14SW red nut driver used with 1/2" screw)

Note: Use a 1200 maximum RPM drill for installation.

Note: Do not install concrete screws while the drill unit is in impact mode — doing so will destroy the pullout factor of the screw.



INSTALLATION STEPS - HORIZONTAL INTO CONCRETE:

1. Using an SDS 250 carbide tip bit or a HEX RECEIVER with a #250 carbide tip bit, pre-drill the concrete member to a depth of 2" with a hammer/rotary hammer drill set on impact mode.
2. After pre-drilling has been completed, install the SLEEVE TOOL over the bit (the bit should remain in the drill), and insert the #14SW (red) nut driver (p/n 8114910) into the opposite end.
3. Insert the SWC screw into the nut driver.
4. Place tip of screw into the pre-drilled hole, turn impact/drill unit to drill mode and begin insertion. When the nut driver spins free on the SWC screw, installation is complete. Stop and remove drill.
5. The SWC screw is ready to receive 1/4", 3/8" or metric all thread rod or bolt stock.

Note: Use a 1200 maximum RPM drill for installation.

Note: Do not install concrete screws while the drill unit is in impact mode — doing so will destroy the pullout factor of the fastener.

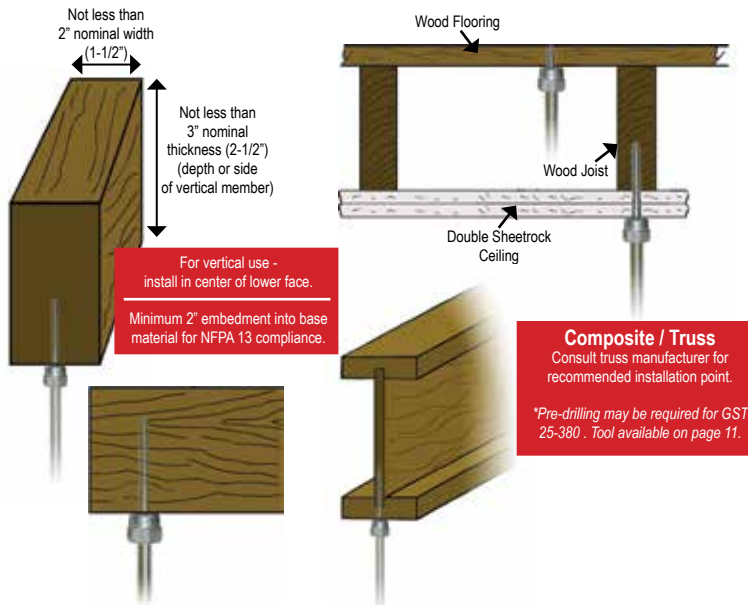


SPECIAL NUT DRIVER SYSTEM: The nut drivers were designed with a unique spin-off feature which provides a fast and safe installation each time. When the face of the driver comes into contact with the material you are installing into, continue drilling until nut driver spins free. Installation is then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

SAMMYS® FOR WOOD - Vertical Application



Application



Product Features

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

View our
installation videos!
 YouTube



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



ASSEMBLED U.S.A.



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

SIDEWINDER® FOR WOOD - Horizontal Application



Application

Not less than 2" nominal width (1-1/2" up to 3-1/2" pipe; not less than 3" (2-1/2") nominal width 4" & 5" pipe

Minimum 2-1/2" from bottom for branch lines. Minimum 3" from bottom for main lines. Exception: This requirement shall not apply to 2" or thicker nailing strips resting on top of steel beams.

Floor Joist

Product Features

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

Composite / Truss

Consult truss manufacturer for recommended installation point.

*Pre-drilling may be required for Model SWG 25-380. Tool available on page 11.

View our installation videos!



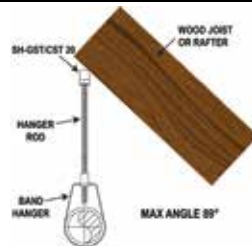
#14 SW Red
Nut Driver
Part # 8114910

Approvals	Rod Size	Part Number	Model	Screw Descriptions	Ultimate Shear (lbs)	UL Test Load (lbs)	Box Qty	Case Qty
HORIZONTAL MOUNT								
	3/8"	8020957	SWG 10	1/4 x 1"	622 (Fir)	300	25	125
	3/8"	8021957	SWG 20	1/4 x 2"	1725 (Fir)	1050	25	125
	3/8"	8022925	SWG 25-380	3/8 x 2-1/2"	2249 (Fir)	1500	25	125
	3/8"	8023925	SWG 30	1/4 x 3"	1884 (Fir)		25	125

SAMMYS SWIVEL HEAD™ FOR WOOD - Swivel Application



Application



Product Features

- Eliminates distortion of threaded rod.
- Accommodates up to 3 1/2" x 12 pitch roof.
- Allows 17° deflection from vertical.
- Saves time from traditional methods.
- Reduces installation costs.
- Assembled in the U.S.A.

#14 Black
Nut Driver
Part # 8113910



#14 SH Orange
Nut Driver
Part # 8273910

Approvals	Rod Size	Part Number	Model	Screw Descriptions	Ultimate Pullout (lbs)	UL Test Load (lbs)	FM Test Load (lbs)	Min Thickness	Box Qty	Case Qty
SWIVEL MOUNT										
	3/8"	8139957	SH-GST 20	1/4 x 2"	1257 (Fir)	1050	1475		25	125
	3/8"	8269957	SH-GST/CST 20	5/16 x 1-3/4"	1903 Dim. Lumber 1406 @ 45° off vertical Dim. Lumber	1500 850 @ 45°			25	125

* May require pre-drilling; consult joist manufacturer.

** Will not swivel until installed with black nut driver.

SAMMYS® FOR STEEL

SAMMYS® FOR STEEL - Vertical Application



Application



Product Features

- Made with Tek® self-drilling fasteners - no pre-drilling required.
- Installs into steel range from 20 gauge - 1/2" thicknesses.
- Saves time from traditional methods.
- Reduces installation costs.
- Quick to install using the Sammys Nut Driver with an 18V cordless drill/driver.
- A standard screwgun with a depth sensitive nosepiece should be used to install Tek®. For optimal fastener performance, the screwgun should be a minimum of 6 amps and have an RPM range of 0-2500.
- Assembled in the U.S.A.

View our installation videos!
 YouTube

Approvals	Rod Size	Part Number	Model	Screw Descriptions	Ultimate Pullout (lbs)	UL Test Load (lbs)	FM Test Load (lbs)	Min Thick	Max Thick	Box Qty	Case Qty
VERTICAL MOUNT											
	1/4"	8024957	DSTR 100 *	1/4-20 x 1" TEKS 3	1510 (20 ga.)			.036"-20 ga	3/16"	25	125
	1/4"	8025957	DST 100	1/4-14 x 1" TEKS 3	446 (20 ga.)			.036"-20 ga	3/16"	25	125
	1/4"	8026957	DST 150	1/4-14 x 1-1/2" TEKS 3	970 (16 ga.)			.036"-20 ga	3/16"	25	125
	1/4"	8027957	DST 200	1/4-14 x 2" TEKS 3	446 (20 ga.)			.036"-20 ga	3/16"	25	125
	3/8"	8038957	DSTR 1 *	1/4-20 x 1" TEKS 3	1510 (20 ga.)	1500	1475	.036"-20 ga	3/16"	25	125
	3/8"	8037957	DSTR 1-1/2 *	12-24 x 1-1/2" TEKS 5	1510 (3/16")	1500	1475	.060"-16 ga.	1/2"	25	125
	3/8"	8039957	DSTR 516 *	5/16-18 x 1-1/4" TEKS 3	2200 (20 ga.)	1500	1475	.036"-20 ga	3/16"	25	125
	3/8"	8040957	DST 10	1/4-14 x 1" TEKS 3	446 (20 ga.) 970 (16 ga.)			.036"-20 ga	3/16"	25	125
	3/8"	8041957	DST 15	1/4-14 x 1-1/2" TEKS 3	446 (20 ga.) 970 (16 ga.)			.036"-20 ga	3/16"	25	125
	3/8"	8044957	DST 30	1/4-14 x 3" TEKS 3	446 (20 ga.) 970 (16 ga.)			.036"-20 ga	3/16"	25	125
	3/8"	8045957	DST 516	5/16-18 x 1-1/4" TEKS 3	1500 (3/16")	1500	1475	.125"-1/8"	3/16"	25	125
	3/8"	8046957	TEK 50	12-24 x 1-1/2" TEKS 5	3125 (3/16")	1500	1475	.250"-1/4"	1/2"	25	125
	1/2"	8031925	DST 2.0	1/4-14 x 2" TEKS 3	446 (20 ga.) 970 (16 ga.)			.188"-3/16"	1/4"	25	125
	1/2"	8036925	TEK 5.0	12-24 x 1-1/2" TEKS 5	3125 (3/16")			.188"-3/16"	1/2"	25	125



*Includes retaining nut



ASSEMBLED U.S.A.



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

SIDEWINDER® FOR STEEL - Horizontal Application



Application	Product Features
	- Made with Tek® self-drilling fasteners - no pre-drilling required. - Installs into steel range from 20 gauge – 1/2" thicknesses. - A standard screwgun with a depth sensitive nosepiece should be used to install Tek®. For optimal fastener performance, the screwgun should be a minimum of 6 amps and have an RPM range of 0-2500. - Saves time from traditional methods. - Reduces installation costs. - Quick to install using the Sammys Nut Driver with an 18V cordless drill/driver. - Assembled in the U.S.A. View our installation videos!

Approvals	Rod Size	Part Number	Model	Screw Descriptions	Ultimate Shear (lbs)	UL Test Load (lbs)	FM Test Load (lbs)	Min Thickness	Max Thickness	Box Qty	Case Qty
HORIZONTAL MOUNT											
	3/8"	8050957	SWD 10	1/4-14 x 1" TEKS 3	1477 (16 ga.)			.060"-16 ga	3/16"	25	125
	3/8"	8052957	SWD 20	1/4-14 x 2" TEKS 3	1477 (16 ga.)			.060"-16 ga	3/16"	25	125
	3/8"	8055957	SWDR 1 *	1/4-20 x 1" TEKS 3	1900 (20 ga.)	1500	1475	.036"-20 ga	3/16"	25	125
	3/8"	8054957	SWDR 1-1/2 *	12-24 x 1-1/2" TEKS 5	2375 (3/16")	1500	1475	.188"-3/16"	1/2"	25	125
	3/8"	8056957	SWDR 516 *	5/16-18 x 1-1/4" TEKS 3	2480 (20 ga.)	1500	1475	.036"-20 ga	3/16"	25	125

*Includes retaining nut

SAMMYS SWIVEL HEAD™ FOR STEEL - Swivel Application



Application	Product Features
	- Eliminates distortion of threaded rod in sloped roof applications. - Accommodates 3-1/2 x 12 pitch. - Installs into angled z-purlin; allows threaded rod to hang plumb. - Allows 17° deflection from vertical. - Assembled in the U.S.A. View our installation videos!

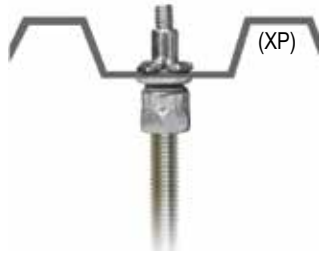
Approvals	Rod Size	Part Number	Model	Screw Descriptions	Ultimate Pullout (lbs)	UL Test Load (lbs)	FM Test Load (lbs)	Min Thick	Max Thick	Box Qty	Case Qty
SWIVEL MOUNT											
	3/8"	8137957	SH-DSTR 1*	1/4-20 X 1" TEKS 3	3220 (3/16")	1500	1475	.035"	3/16"	25	125
	3/8"	8268957	SH-TEK 50	12-24 x 1-5/8" TEKS 5	2368 (1/2" steel Vertical) 1306 (45° off Vertical) 2281 (3/16" HSS) 1585 (3/16" HSS 45° off Vertical)	1500 (Vertical) 850 (45° off Vertical)	4" 2-1/2"	3/16"	1/2"	25	125

*Does not comply with ROHS requirements / Includes retaining nut

SAMMY X-PRESS® - Vertical Application



Application



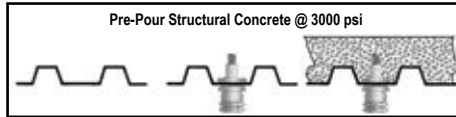
Product Features

- The **Sammy X-Press** expands to provide direct vertical attachment in:
 - light gauge steel deck or purlin (22 ga. - 1/8").
- Installs in seconds with Sammy X-Press It® Tool, saving time & installation costs.
- Use in applications where access to the back of the installed fastener is prohibited. ie. metal roof deck, tubular steel, or vapor barrier fabric.
- Less jobsite material needed.
- No retaining nut required.
- Provides design flexibility.
- Assembled in the U.S.A.

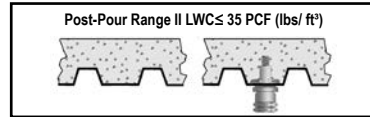
View our installation videos!
 YouTube

Approvals	Rod Size	Part Number	Model	Description	Ultimate Pullout (lbs)	UL Test Load (lbs)	UL Min Thick	FM Test Load (lbs)	FM Min Thick	Max Thick	Box Qty	Case Qty	Application
VERTICAL MOUNT													
	1/4"	8181922	XP 200	Sammy X-Press 200	1146 (22 ga)	185 (Luminaire) 250 (Luminaire)	.027" .056"			.125"	25	125	Metal Deck
	3/8"	8150922	XP 20	Sammy X-Press 20	1146 (22 ga)	850 (2 1/2" Pipe) 185 (Luminaire) 250 (Luminaire) 283 (Conduit & Cable)	.027" .027" .056" .029"	940 (2" Pipe) 1475 (4" Pipe)	.029" .104"	.125"	25	125	Metal Deck
	3/8"	8153922	XP 35	Sammy X-Press 35	1783 (16 ga)	1500 (4" Pipe) 185 (Luminaire) 250 (Luminaire) 416 (Conduit & Cable)	.060" .029" .056" .059"	940 (2" Pipe) 1475 (4" Pipe)	.029" .104"	.125"	25	125	Purlin
	3/8"	8150922	XP 20	Sammy X-Press 20	1146 (22 ga)	850 (2 1/2" Pipe)		Pre-Pour Structural Concrete @ 3000 psi			25	125	Metal Deck (Pre-Pour)
								Post-Pour Range II LWC ≤ 35 PCF (lbs/ft³)					Metal Deck (Post-Pour)

Pre-Pour Structural Concrete @ 3000 psi



Post-Pour Range II LWC ≤ 35 PCF (lbs/ft³)



SAMMY X-PRESS SIDEWINDER™ - Horizontal Application

Application



Product Features

- The **Sammy X-Press Sidewinder** expands to provide horizontal attachment in:
 - 16 ga - 3/16" steel - purlin, tubular steel.
- Installs in seconds with Sammy X-Press It® Tool, saving time & installation costs.
- Use in applications where access to the back of the installed fastener is prohibited; ie. metal roof deck, tubular steel, or vapor barrier fabric.
- Less jobsite material needed.
- No retaining nut required.
- Provides design flexibility.
- Assembled in U.S.A. of Canadian Steel

View our installation videos!
 YouTube

Approvals	Rod Size	Part Number	Model	Description	Ultimate Shear (lbs)	UL Test Load (lbs)	UL Min Thick	FM Test Load (lbs)	Max Thick	Box Qty	Case Qty	Application
HORIZONTAL MOUNT												
	3/8"	8293957	SWXP 35	Sidewinder X-Press 35	1798 (16 ga)	1250 (3 1/2" Pipe) 80 (Luminaire) 416 (Conduit & Cable)	.059"		.125"	25	125	Metal Deck/ Purlin



SAMMY X-PRESS SWIVEL™ - Swivel Application



Application	Product Features
FOR EXTREME OR VARIANT ROOF PITCHES	- The Sammy X-Press Swivel allows you to hang plumb in extreme roof pitches: - 89° in z-purlin - 45° in metal deck for 12/12 pitch - Installs in seconds with Sammy X-Press It® Tool, saving time & installation costs. - Use in applications where access to the back of the installed fastener is prohibited. ie. metal roof deck, tubular steel, or vapor barrier fabric. - Less jobsite material needed. - No retaining nut required. - Provides design flexibility. - Assembled in the U.S.A. View our installation videos! YouTube

Approvals	Rod Size	Part Number	Model	Description	Ultimate Pullout (lbs)	UL Test Load (lbs)	UL Min Thick	FM Test Load (lbs)	FM Min Thick	Max Thick	Box Qty	Case Qty	Application
SWIVEL MOUNT													
	3/8"	8294922	SXP 20	Swivel X-Press 20	1061 (22 ga Vert) 829 (45° Off Vert)	750 (2" Pipe) 170 Vertical (Luminaire) 80 @ 45° (Luminaire) 283 Vertical (Conduit & Cable) 233 @ 45° (Conduit & Cable)	.029"	635 (2" Pipe)	.029"	.125"	25	125	Metal Deck/ Purlin
	3/8"	8295922	SXP 35	Swivel X-Press 35	1675 (16 ga Vert) 1558 (89° Off Vert)	1250 (3-1/2" Pipe) 250 Vertical (Luminaire) 80 @ 90° (Luminaire) 500 Vertical (Conduit & Cable) 333 @ 89° (Conduit & Cable)	.059"	635 (2" Pipe)	.029"	.125"	25	125	Metal Deck/ Purlin
	1/2"	8272957	SXP 2.0	Swivel X-Press 2.0	1061 (22 ga Vert) 829 (45° Off Vert)		.027"	.125"			25	125	Metal Deck/ Purlin
	1/2"	8271957	SXP 3.5	Swivel X-Press 3.5	1675 (16 ga Vert) 1558 (89° Off Vert)		.060"	.125"			25	125	Metal Deck/ Purlin

SAMMY X-PRESS IT® Installation Tool

Application	Product Features
	- The Sammy X-Press expands to provide direct vertical attachment in: - metal deck (22-16 gauge) - z-purlin (18-16 gauge) - Assembled in the U.S.A. View our installation videos! YouTube



Part Number	Model	Description	Qty
8194910	UXPIT*	Universal X-Press It Tool	1
8152910	XPDB	25/64" Drill Bit	1

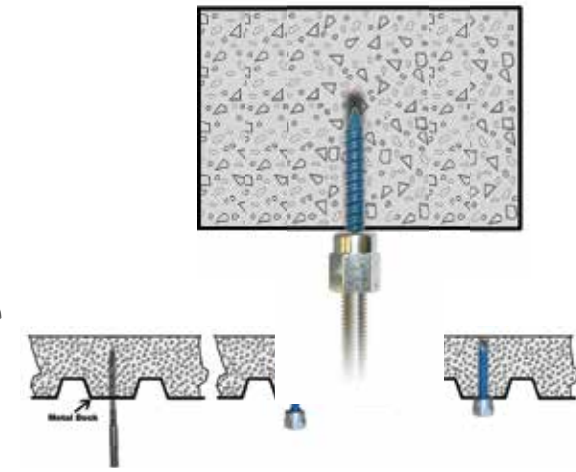
*Tool Includes: Sleeve, Bit Receiver, Hex Wrench, and 25/64" Drill Bit.

SAMMYS® FOR CONCRETE

SAMMYS® FOR CONCRETE - Vertical Application



Application



Product Features

- Easy two step process (Drill hole & drive Sammys concrete anchor).
- 1/4" pre-drilled pilot hole required.
- Concrete Installation Tool available for a one tool installation process.
- Assembled in the U.S.A.

View our
installation videos!
 YouTube

#14 Black
Nut Driver
Part # 8113910
#14SW Red
Nut Driver
Part # 8114910

Approvals	Rod Size	Part Number	Model	Screw Descriptions	Ultimate Pullout (lbs)*	FM Test Load (lbs)	Box Qty	Case Qty
VERTICAL MOUNT								
	1/4"	8058957	CST 200	5/16 x 1-3/4"	2400		25	125
	3/8"	8059957	CST 20	5/16 x 1-3/4"	2400	1475	25	125
	1/2"	8060925	CST 2	5/16 x 1-3/4"	2400		25	125
	3/8"	8306957	CCST 516	5/16-14 x 2-1/2"	857**		25	125

For complete performance data see ICC Report ESR-3699

* Tested in 3000 PSI concrete ** Pullout strength for Cracked Concrete and Seismic Zones A-F

SIDEWINDER® FOR CONCRETE - Horizontal Application



Application



Product Features

- Easy two step process (Drill hole & drive Sammys concrete anchor).
- 1/4" pre-drilled pilot hole required.
- Concrete Installation Tool available for a one tool installation process.
- Assembled in the U.S.A.

View our
installation videos!
 YouTube

#14SW Red
Nut Driver
Part # 8114910

Approvals	Rod Size	Part Number	Model	Screw Descriptions	Ultimate Shear (lbs)*	FM Test Load (lbs)	Box Qty	Case Qty
HORIZONTAL MOUNT								
	3/8"	8061957	SWC 20	5/16 x 1-3/4"	2450	1475	25	125
	3/8"	8307957	SW-CCST 516	5/16-14 x 2-1/2"	857**		25	125

* Tested in 3000 PSI concrete ** Pullout strength for cracked concrete and Seismic Zones A-F



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

SAMMYS SWIVEL HEAD™ FOR CONCRETE - Swivel Application



MADE WITH
Tapcon



#14 SH Orange
Nut Driver
Part # 8273910

Application



Product Features

- Installs vertically and swivels up to 89° in wood & concrete structures.
- Eliminates distortion of threaded rod.
- 1/4" pre-drilled pilot hole required.
- Concrete installation tool available for a one piece installation process.
- Assembled in the U.S.A.

Approvals	Rod Size	Part Number	Model	Screw Descriptions	Ultimate Shear (lbs)*	Box Qty	Case Qty
SWIVEL MOUNT							
	3/8"	8269957	SH-GST/CST 20	5/16 x 1-3/4"	2537 in 3000 psi concrete 1459 @ 45° off vertical in 3000 psi concrete 2852 in 6000 psi concrete 1636 @ 45° off vertical in 6000 psi concrete	25	125
	3/8"	8308957	SH-CCST 516	5/16-14 x 2-1/2"	857**	25	125

Note: UL Listed for wood - see page 5

* Tested in 3000 PSI concrete ** Pullout strength for cracked concrete and Seismic Zones A-F

CONCRETE / WOOD INSTALLATION KIT

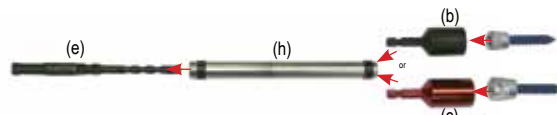


Application

Rotary Hammer Drill into concrete



Hammer Drill into concrete



Part Number	Description	Each Qty
8122910	Concrete Installation Kit (a)	1

Kit includes the following items:

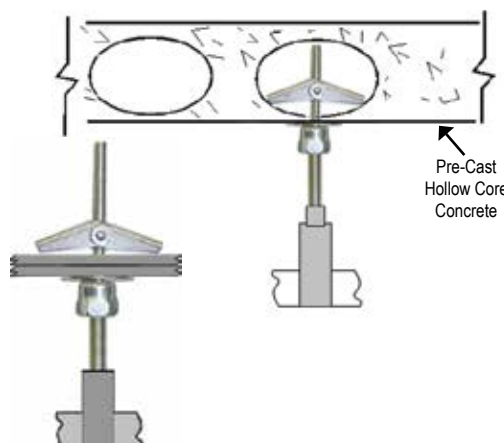
8113910	#14 Black Nut Driver (b)	1
8114910	#14 SW Red Nut Driver (c)	1
8116910c	#250 Bit (1/4") (d)	1
8117910	SDS Bit (1/4") (e)	1
8118910	7/32 Wood Bit (f)	1
8120910	HEX 250 Bit Receiver (1/4") (g)	1
8098910	SL 250 Sleeve (h)	1

ACCESSORIES

SAMMYS TOGGLE™



Application



Installation Steps

1. Pre-drill a 5/8" hole with a regular drill or hole saw.
2. Insert SST screw into #14 black nut driver. With wing nut and washer on bolt, insert wing nut through surface, and begin installation.
3. When bolt is secure and nut driver spins free, stop drill motor and remove.
4. SST screw is now ready to receive 1/4", 3/8", or Metric all thread rod or bolt stock.



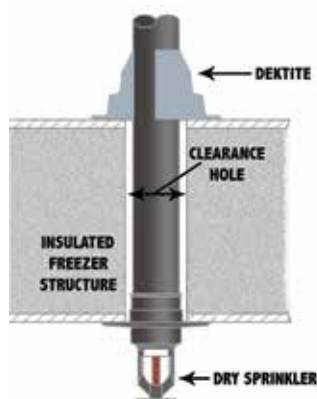
#14 Black
Nut Driver
Part # 8113910

Rod Size	Part Number	Model	Screw Descriptions	Ultimate Pullout (lbs)	Box Qty	Case Qty
3/8"	8064925	SST 30	1/4 x 3"	450 (Lath & Plaster) 404 (2 Layers 5/8 Rock)	25	125

DEKTITE® PIPE FLASHING



Application



**STAY UP TO
CODE!**
with a quicker,
more efficient way
to flash your
refrigeration/freezer units.

Product Features

- Complies with NFPA 13 Code Changes.
- Flashing for dry pendant sprinklers subject to extreme temperature changes.
- One piece construction is easy to install.
- Pipe diameter markings ensure accurate fit.
- EPDM temperature range of -65°F to +250°F.

Part Number	Description	Pipe Outside Diameter	Dektite Base Diameter	Dektite Height	Box Qty
4003910	1	1/4" - 2"	4-3/4"	3"	10
4004910	2	1-3/4" - 3-1/4"	6-1/4"	4"	10

SAMMY X-PRESS POLE TOOL KIT™



Application



For use installing
Sammy X-Press anchors
from the ground up!

Product Features

- Speed your labor by 25%
- Work from the ground up
- No scaffolding, ladders, or lifts
- Perfect for working in tight spaces, through ceiling grid, and high vaulted ceilings
- Works with any Sammy X-Press product

View our
installation videos!
 YouTube

Part Number

XPKIT*

Model

XPKIT

Description

Sammy X-Press Pole Tool Kit

Box Qty

1

* 3/4" electrical conduit needed for pole tool assembly

SAMMYS POLE TOOL™



Installation Instructions



Adjust the Pole Tool to length. The adjusting pin must be 18" below the base or the pin may interfere with the rod.



Load rod and Sammys into Pole Tool.



The socket will spin free when the screw is completely installed. Pull down to remove the Pole Tool.

Product Features

- Speed your labor by 25%
- Work from the ground up
- No scaffolding, ladders, or lifts
- Perfect for working in tight spaces, through ceiling grid, and high vaulted ceilings
- Works with any Vertical SAMMYS: Wood, Steel, or Concrete

Part Number

SP6

Description

Speedy Pole 6'-18'

Box Qty

1

WOOD

STEEL

STEEL

CONCRETE

ACCESSORIES

APPROVALS

APPROVALS

Part Number	Model	Rod Size	Mount Direction	UL Max Pipe Size	UL Test Load (lbs)	UL Min Wood Thickness	FM Max Pipe Size	FM Test Load (lbs)	FM Min Wood Thickness
SAMMYS FOR WOOD - PIPE HANGER									
8007957	GST 10	3/8"	Vertical	CPVC 1-1/2"	300	1-1/2"			
8020957	SWG 10	3/8"	Horizontal	CPVC 1-1/2"	300	1-1/2"			
8008957	GST 20	3/8"	Vertical	2-1/2"	850	1-1/2"	4"	1475	1-1/2"
8068925	GST 20-SS	3/8"	Vertical	2-1/2"	850	1-1/2"			
8010957	GST 30	3/8"	Vertical	4"	1500	1-1/2"	4"	1475	1-1/2"
8009925	GST 25-380	3/8"	Vertical	4"	1500	1-1/2"			
8022925	SWG 25-380	3/8"	Horizontal	3-1/2" - 4"	1500	1-1/2"			
8021957	SWG 20	3/8"	Horizontal	2-1/2" - 3"	1050	1-1/2"			
8073925	SWG 20-SS	3/8"	Horizontal	2-1/2"	850	1-1/2"			
8269957	SH-GST/CST 20	3/8"	45° Angle off Vertical	2-1/2"	850	1-1/2"			
8269957	SH-GST/CST 20	3/8"	45° Angle off Vertical	4"	1500	1-1/2"			
8139957	SH-GST 20	3/8"	17° Angle off Vertical	3"	1050	1-1/2"	4"	1475	1-1/2"
SAMMYS FOR STEEL - PIPE HANGER						Min Steel Thick			Max Steel Thick
8038957	DSTR 1	3/8"	Vertical	4"	1500	.035"	4"	1475	.105"
8037957	DSTR 1-1/2	3/8"	Vertical	4"	1500	.035"	4"	1475	.105"
8039957	DSTR 516	3/8"	Vertical	4"	1500	.037"	4"	1475	.105"
8045957	DST 516	3/8"	Vertical	4"	1500	.188"	4"	1475	.188"
8046957	TEK 50	3/8"	Vertical	4"	1500	.250"	4"	1475	.188"
8055957	SWDR 1	3/8"	Horizontal	4"	1500	.037"	4"	1475	.060"
8056957	SWDR 516	3/8"	Horizontal	4"	1500	.037"	4"	1475	.060"
8054957	SWDR 1-1/2	3/8"	Horizontal	4"	1500	.037"	4"	1475	.060"
8137957	SH-DSTR 1	3/8"	17° Angle off Vertical	4"	1500	.035"	4"	1475	.105"
8268957	SH-TEK 50	3/8"	Vertical 70° Angle off Vertical	2-1/2" 4"	850 1500				
8150922	XP 20	3/8"	Vertical	2-1/2"	850	.027"	2" 4"	940 1475	.029" .105"
8153922	XP 35	3/8"	Vertical	4"	1500	.060"	2" 4"	940 1475	.029" .125"
8294922	SXP 20	3/8"	Vertical or up to 45°	2"	750	.027"	2"	635	.029"
8295922	SXP 35	3/8"	Vertical or up to 89°	3-1/2"	1250	.060"	2"	635	.029"
8293957	SWXP 35	3/8"	Horizontal	3-1/2"	1250	.060"			
SAMMYS FOR CONCRETE - PIPE HANGER									
8059957	CST 20	3/8"	Vertical				4"	1475	3000
8061957	SWC 20	3/8"	Horizontal				4"	1475	3000
8150922	XP 20	3/8"	Vertical	2-1/2"	850	Pre-Pour Structural @ 3000psi			
8150922	XP 20	3/8"	Vertical	2-1/2"	850	Post-Pour Range II LWC ≤ 35 PCF (lbs/ft³)			
Part Number	Model	Rod Size	Mount Direction	UL Load Rating (lbs)		UL Min Steel Thickness			
SAMMYS FOR STEEL - LUMINAIRE FITTING									
8150922	XP 20	3/8"	Vertical	185 250		.027" .035"			
8153922	XP 35	3/8"	Vertical	185 250		.027" .035"			
8181922	XP 200	1/4"	Vertical	185 250		.027" .035"			
8294922	SXP 20	3/8"	Vertical 45°	170 80		.027" .027"			
8295922	SXP 35	3/8"	Vertical 90°	250 80		.060" .060"			
8293957	SWXP 35	3/8"	Horizontal	80		.060"			
Part Number	Model	Rod Size	Mount Direction	UL Load Rating (lbs)	UL Min. Steel Thickness	Listed Application			
SAMMYS FOR STEEL - CONDUIT, TUBING, AND CABLE									
8150922	XP 20	3/8"	Vertical	283	.027"	Max 4 trade size EMT, RMC, and IMC & 5 trade size rigid PVC conduit			
8153922	XP 35	3/8"	Vertical	500	.060"	Max 4 trade size EMT & 6 trade size RMC, IMC, and rigid PVC conduit			
8294922	SXP 20	3/8"	Vertical	283	.027"	Max 4 trade size EMT, RMC, and IMC & 5 trade size rigid PVC conduit			
8295922	SXP 35	3/8"	Vertical	500	.060"	Max 4 trade size EMT & 6 trade size RMC, IMC, and rigid PVC conduit			
8293957	SWXP 35	3/8"	Horizontal	500	.060"	Max 4 trade size EMT & 6 trade size RMC, IMC, and rigid PVC conduit			
8149957	CZ2000	1/4" or 3/8"	Onto Vertical Rod			UL Listed 4S16 - Cable Hanger, Cat. No. C-Z2000 Plenum Rated, Complies w/ NEC Standards			

Sheet Steel Gauges

Gauge No.	22 ga.	20 ga.	18 ga.	16 ga.	14 ga.	12 ga.	1/8"	3/16"	1/4"
Nominal Decimal Equivalent	.030"	.036"	.048"	.060"	.075"	.105"	.125"	.188"	.250"

*SWG 25-380 Maximum pipe size in composite wood joist allowed by UL is 3-1/2"

*SWG 25-380 Maximum pipe size in wood timber or joist allowed by UL is 4"

**SWG 20 Maximum pipe size in composite wood joist allowed by UL is 2-1/2"

**SWG 20 Maximum pipe size in wood timber or joist allowed by UL is 3"

UL compliance with NEC Standards.

UL and FM tests were performed in compliance with NFPA 13 Standards.
Fastening requirement: 5 times weight of water-filled schedule 40 pipe plus 250 pounds.

SPECIAL NOTES

Engineering Note

In 1996, the anchors listed by UL were tested in plate steel that measured .188" and .118". Subsequent testing was done for z-purlin applications in May 1997 using (.037") or 20 gauge steel. Most recently in 2008, testing with the new Sammy X-Press® was completed using (.030") or 22 gauge steel metal deck.

Sammys® Nut Drivers

Special nut drivers were designed to be used with Sammys. When the appropriate nut drivers are used for installation, the driver spins freely on the screw after installation is complete and eliminates the expected wrist snap, reduces over-torque, and prevents screw failure.

Steel Screws

Due to variations in hardness of certain metals, it should be noted that our self-drilling screws for steel will experience different drill speeds. 500-1500 RPM drill speed should be used.

Metric Products

Metric versions of the Sammy anchors are available at www.itwbuildex.com

Sammys for Seismic

Please visit www.itwbuildex.com for our current Seismic product offering.

Vibratory Environments

For attaching or anchoring in high vibratory environments, special care should be taken not just for building attachments but also for the hangers or assemblies being supported. Consult local code authorities for accepted anchoring devices.

Composite Joist/Truss

Truss manufacturers vary installation recommendations for composite joist. UL testing was completed to validate that Sammys and Sidewinders SWG 20 and SWG 25-380 can be installed into the top cord of a truss. Sammy GST 20 can be installed into the center of the lower cord of a composite joist. Penetration of the upright center web is permitted by some joist manufacturers. Consult truss manufacturer for recommended installation point.

Pre-drilling may be required by joist manufacturers. If so, pre-drill pilot hole 1/8" smaller than root diameter of fastener.

Consult the table below:

Model	Root Diameter	Hole Size
GST 20	.182"	1/8"
GST 25-380	.280"	7/32"
SWG 20	.182"	1/8"
SWG 25-380	.280"	7/32"

To increase efficiency of the installation process, sleeve tools, bit receivers, and wood bits are available for pre-drilling.

NFPA/NEC Standards

All UL and FM testing complies with NFPA 13 and NEC standards. Check with your local (AHJ) Authority Having Jurisdiction to confirm application and usage.

UL Listings / FM Approvals

UL and FM reports are available at www.itwbuildex.com



Technical Drawings

Technical drawings are available and can be downloaded at www.itwbuildex.com in the following formats: .dwg, .dxf, and .igs.

Assembled in the U.S.A. Products



Contact Information

Technical Assistance: (800) 848-5611 Option #6 (x 3259)

Customer Service: (800) 848-5611 Option #1

WOOD

STEEL

STEEL

CONCRETE

ACCESSORIES

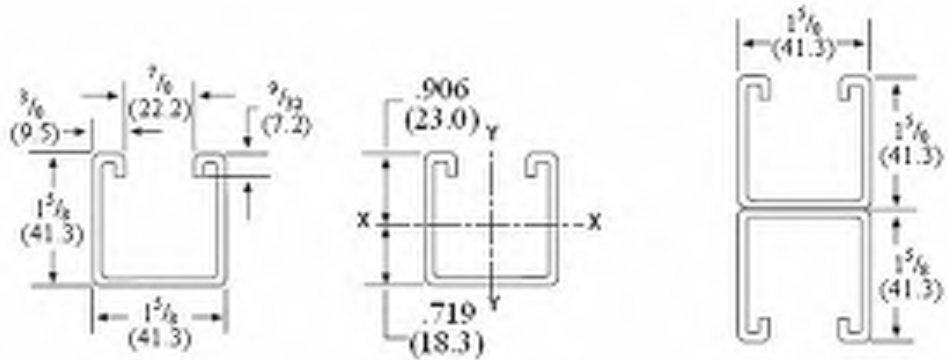
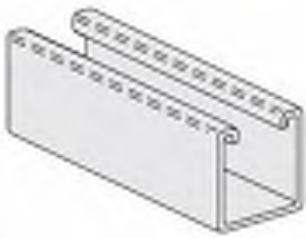
APPROVALS



CHANNEL

1001 - 1042

1⁵/₈" X 1⁵/₈" X 12 Gauge



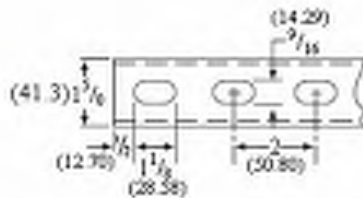
ORDERING:

Specify Figure No., finish and number of feet.

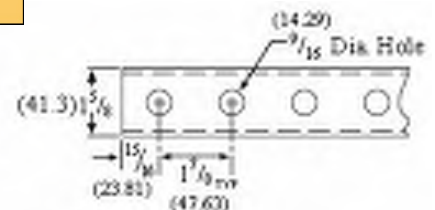
Fig. Number				Type - Description	Weight		Bundle Qty.			
10ft.	3.05m	20ft.	6.10m		lbs./ft.	kg/m	10ft.	3.05m	20ft.	6.10m
1001		1002		No Openings	1.77	(2.63)	500	(152.4)	500	(152.4)
1001A		1002A		Welded Back to Back	3.54	(5.27)	200	(61.0)	300	(91.4)
1011		1012		With 1 ¹ / ₈ " X 9/ ₁₆ " (28.58 X 14.29) slots on 2" (50.8) centers	1.70	(2.53)	500	(152.4)	500	(152.4)
1011A		1012A		Welded Back to Back	3.40	(5.06)	200	(61.0)	300	(91.4)
1021		1022		With 9/ ₁₆ " (14.29) dia. holes on 1 ⁷ / ₈ " (47.63) centers	1.70	(2.53)	500	(152.4)	500	(152.4)
1021A		1022A		Welded Back to Back	3.40	(5.06)	200	(61.0)	300	(91.4)
1031		1032		With 3" (76.20) slots	1.68	(2.50)	500	(152.4)	500	(152.4)
1041		1042		With 7/ ₈ " (22.23) Knockouts on 6" (152.40) centers	1.77	(2.63)	500	(152.4)	500	(152.4)

Available in aluminum and stainless steel. Price on request. To order aluminum, add suffix AL to fig. number. To order stainless steel, specify 304 or 316 and add suffix SS to fig. number.

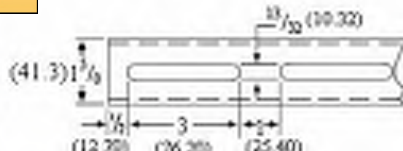
1011 - 1012



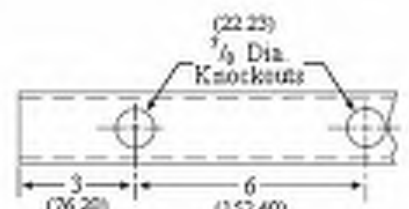
1021 - 1022



1031 - 1032



1041 - 1042



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

SEISMIC

Fig. AF035 (Formerly Afcon Fig. 035)

Model K Brace Clamp

Size Range: Carbon Steel Service Pipe: 1" through 12", DN25 through DN200
CPVC Steel Service Pipe: 1" through 3"
Brace Pipe: 1" through 2" and DN25 through DN50

Material: Carbon Steel Strap and Ductile Iron Cast Hoop Ends

Finish: ☐ Plain or ☐ Electro-Galvanized per ASTM B633

Service: Designed to rigidly brace piping systems subjected to lateral seismic loads.

Approvals: cULus Listed (UL 203a) and FM Approved (FM 1950-10 & FM 1950-13). Complies with the hanging and bracing requirements listed in NFPA 13.

Features:

- Unique design provides solutions for carbon steel and CPVC pipe.
- Beveled edge design helps protect the CPVC pipe from any rough surface and eliminates pipe abrasion.
- Large installation hole in the cast hoop ends allows the brace pipe to pass through easily without interference.
- Visual indication of proper assembly when the head of the set screw bottoms out on the cast hoop ends.

Installation Instructions:

- Place the Model K Brace Clamp over the service pipe to be braced and slide the Sch. 40 brace pipe through the cast hoop ends. The end of the brace pipe must extend at least 1" past the cast hoop ends.
- Note: The brace pipe may be installed above or below the service pipe.
- Ensure brace pipe is set to the desired installation brace angle.
- Torque the set screws alternately and equally until the head of the set screw bottoms out on the cast hoop ends.
- For riser/4-way brace installations, two Model K Brace Clamps must be installed within 6" of each other.
- For CPVC installation, ensure the legs of the Model K Brace Clamp strap are parallel to each other and perpendicular to the brace pipe prior to installation.
- Fire Protection applications shall also be installed per the requirements of NFPA 13 and local codes.

Patents: No. 7,516,922, No. 7,523,895

Ordering: Specify service pipe size, brace pipe size, figure number, finish and description.



Notes: Anvil International® brand bracing components are designed to be compatible ONLY with other Anvil International® brand bracing components, resulting in a Listed seismic bracing assembly. Updated UL listing information may be viewed at www.ul.com and updated FM approval information may be viewed at www.approvalguide.com.

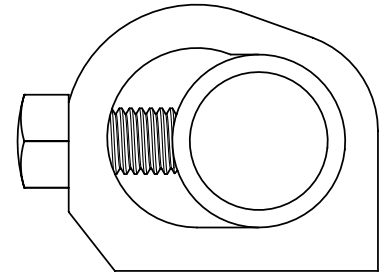
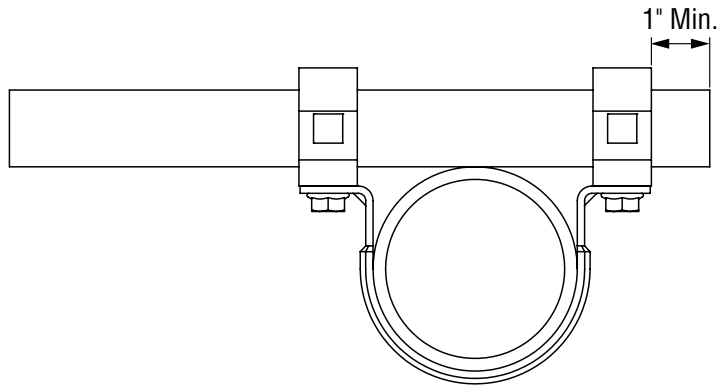
Disclaimer: Anvil International ("Anvil") does not provide any warranties and specifically disclaims any liability whatsoever with respect to Anvil bracing products and components that are used in combination with products, parts or systems not manufactured or sold by Anvil. In no event shall Anvil be liable for any incidental, direct, consequential, special or indirect damages or lost profits where non-Anvil bracing components have been, or are used.

SeisBrace® Seismic Fire Protection Design Tool may be accessed at www.seisbrace.com

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

Fig. AF035 (Formerly Afcon Fig. 035)

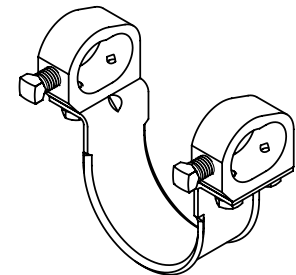
Model K Brace Clamp (cont.)



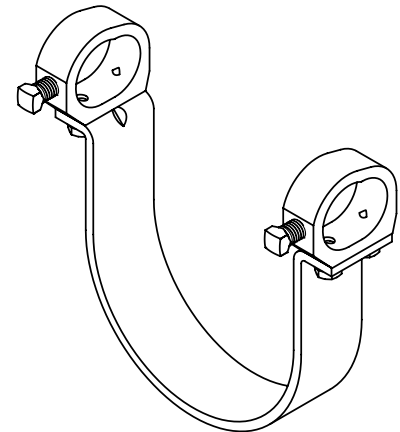
Set Screw Installation

FIG. AF035: DIMENSIONS (IN) • WEIGHT (LBS)

Service Pipe Size	1"/DN25 Brace Pipe Weight	1 1/4"/DN32 Brace Pipe Weight	1 1/2"/DN40 Brace Pipe Weight	2"/DN50 Brace Pipe Weight
1 (DN25)	1.60	1.80	2.00	2.28
1 1/4 (DN32)	1.68	1.88	2.08	2.36
1 1/2 (DN40)	1.64	1.84	2.04	2.32
2 (DN50)	1.88	2.08	2.28	2.56
2 1/2	1.90	2.10	2.30	2.58
DN65	2.00	2.20	2.40	2.68
3 (DN80)	2.10	2.30	2.50	2.78
4 (DN100)	2.20	2.40	2.60	2.88
5 (DN125)	3.40	3.60	3.80	4.08
DN150	3.80	4.00	4.20	4.48
6	3.90	4.10	4.30	4.58
DN200	4.70	4.90	5.10	5.38
8	4.80	5.00	5.20	5.48
10	5.60	5.80	6.00	6.28
12	—	6.36	6.56	6.84



1" - 4"



5" - 12"

**FIG. AF035 cULus MAX SEISMIC LATERAL LOADS:
DIMENSIONS (IN) • LOADS (LBS)**

Service Pipe Size	Brace Pipe Size	Max Seismic Brace Load		
		Specialty*	Schedule 10	Schedule 40
1 - 4 (DN25 - DN100)	1 - 2 (DN25 - DN50)	2765	2765	2765
5 - 10 (DN125 - DN200)		—		
12	1 1/4 - 2		3740	3740

NPS Brace Pipe Dimensions per ASTM A53 Sch. 40, ASTM A106 Sch. 40, or equivalent.

NPS Service Pipe Dimensions per ASTM A53, ASTM A106 or equivalent.

DN Service Pipe Dimensions per KS D 3507/3537 or equivalent listed with Sch. 10 loads.

DN Service Pipe Dimensions per KS D 3562 Sch. 40 or Equivalent listed with Sch. 40 loads.

DN Brace Pipe Dimensions per KS D 3562 Sch. 40 or equivalent.

* Specialty pipes are commonly referred to as Sch. 7 and Flow Pipe. Please visit the UL listing on the UL website for a complete list of listed specialty pipes.

Fig. AF035 (Formerly Afcon Fig. 035)

Model K Brace Clamp (cont.)

FIG. AF035 FM MAX SEISMIC LATERAL ASD LOADS*:
DIMENSIONS (IN) • LOADS (LBS) • ANGLES (DEGREES)**

Service Pipe Size	Brace Pipe Size	Pipe Schedule	Max Seismic Brace Load at Brace Pipe Angle**			
			30 - 44	45 - 59	60 - 74	75 - 90
1 - 1 1/2 (DN25 - DN40)	1 - 2 (DN25 - DN50)	LW* – Sch. 40	1680	2380	2920	3250
2 - 3 (DN50 - DN80)		LW* – Sch. 40	1800	2550	3120	3490
4 (DN100)		LW* – Sch. 40	1370	1930	2370	2640
5 - 8 (DN125 - DN200)		Sch. 10 – Sch. 40	730	1040	1270	1420

NPS Brace Pipe Dimensions per ASTM A53 Sch. 40, ASTM A106 Sch. 40, or equivalent.

NPS Service Pipe Dimensions per ASTM A53, ASTM A106 or equivalent.

DN Service Pipe Dimensions per EN 10220, GB/T 8163, or equivalent listed with LW loads.

DN Service Pipe Dimensions per GB/T 3091, GB/T 3092, EN10255M, EN10255H, KS D 3507/3537, or equivalent listed with Sch. 10 loads.

DN Service Pipe Dimensions per JIS G3452, KS D 3562 Sch. 40 or equivalent listed with Sch. 40 Loads.

DN Brace Pipe Dimensions per GB/T 3091, EN10255H, JIS G3454 Sch. 40, KS D 3562 Sch. 40, or equivalent.

* Load Rating for LW above refers to FM Approved Lightwall pipe, commonly referred to as Sch. 7 and Flow Pipe. See FM Approval Guide for approved Lightwall pipe.

** Brace Pipe Angles are determined from vertical.

*** The allowable FM approved capacity of brace subassemblies are listed in Allowable Stress Design (ASD). For Load Resistance Factor Design (LRFD) capacities, the above values will need to be multiplied by 1.5.

Fig. AF075 (Formerly Afcon Fig. 075) Sway Brace Swivel Attachment

Size Range: Brace Pipe: 1" through 2" Sch. 40, DN25 through DN50
Anchor Size: 1/2"

Material: Ductile Iron Cast Hoop End with Carbon Steel Baseplate and Hardware

Finish: ☐ Plain or ☐ Electro-Galvanized per ASTM B633

Service: A seismic swivel attachment designed to connect brace pipe to the building structure or to a seismic structural attachment. The Sway Brace Swivel Attachment rigidly braces piping systems subjected to horizontal seismic loads.

Approvals: cULus Listed (UL 203a) and FM Approved (FM 1950-10 & FM 1950-13). Complies with the hanging and bracing requirements listed in NFPA 13.

Features:

- Large installation hole in the cast hoop end allows the brace pipe to pass through easily without interference.
- Field adjustable design requires no threading of the brace pipe
- The set screw design provides a visual indication that the desired torque value has been achieved

Installation Instructions:

- Insert anchor through the mounting hole and into the structure or seismic structural attachment.
- For connection to Fig. AF085, AF086, AF087, and AF779 seismic structural attachments, the bolt and nuts shall be installed wrench tight (typically finger tight plus 1/4 to 1/2 turns).
- For connection to concrete, wood, timber, steel, and other structures, install fasteners per the fastener manufacturer's installation instructions.
- Insert Sch. 40 brace pipe into the cast hoop end. The brace pipe should extend a minimum of 0.50" past the back of the cast hoop end.
- Torque set screw until the head bottoms out on the cast hoop end.
- Check the cross bolt and nut and ensure the nut is wrench tight.
- Fire Protection applications shall also be installed per the requirements of NFPA 13 and local codes.

Ordering: Specify brace pipe, figure number, finish and description.

Notes: Anvil International® brand bracing components are designed to be compatible ONLY with other Anvil International® brand bracing components, resulting in a Listed seismic bracing assembly. Updated UL listing information may be viewed at www.ul.com and updated FM approval information may be viewed at www.approvalguide.com.

Disclaimer: Anvil International ("Anvil") does not provide any warranties and specifically disclaims any liability whatsoever with respect to Anvil bracing products and components that are used in combination with products, parts or systems not manufactured or sold by Anvil. In no event shall Anvil be liable for any incidental, direct, consequential, special or indirect damages or lost profits where non-Anvil bracing components have been, or are used.

SeisBrace® Seismic Fire Protection Design Tool may be accessed at www.seisbrace.com



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

Fig. AF075 (Formerly Afcon Fig. 075) Sway Brace Swivel Attachment (cont.)

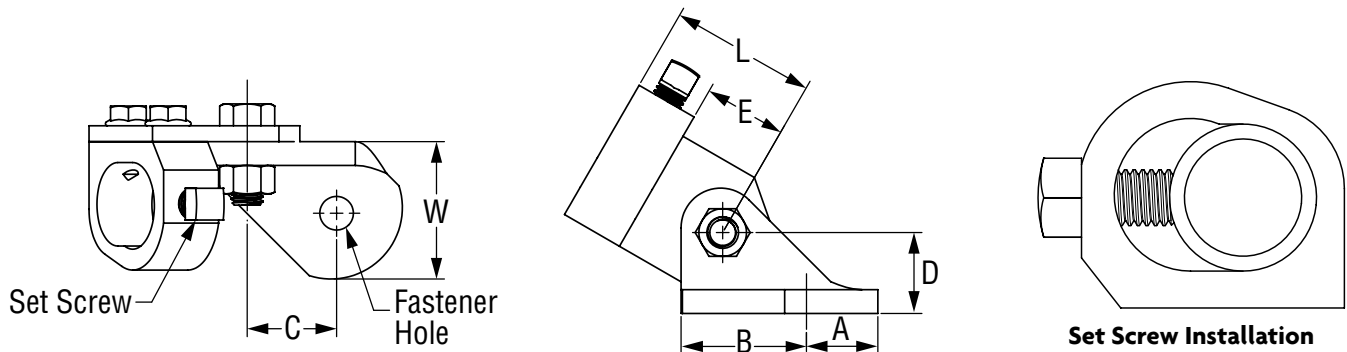


FIG. AF075: DIMENSIONS (IN) • WEIGHT (LBS)									
Brace Size	Fastener Size	A	B	C	D	E	L	W	Weight
1 (DN25)	1/2	1.00	1.83	1.25	1.38	1 5/16	2 5/16	2 1/8	1.70
1 1/4 (DN25)									1.80
1 1/2 (DN40)									1.90
2 (DN50)									2.04

FIG. AF075 cULus MAX SEISMIC HORIZONTAL LOADS: DIMENSIONS (IN) • LOADS (LBS)			
Brace Pipe Size	Fastener Size	Max Seismic Brace Load	Max Service Pipe Size
1 - 2 (DN25 - DN50)	1/2	2015	8

NPS Brace Pipe Dimensions per ASTM A53 Sch 40, ASTM A106 Sch. 40, or equivalent.
DN Brace Pipe Dimensions per KS D 3562 Sch. 40 or equivalent.

FIG. AF075 FM MAX SEISMIC HORIZONTAL ASD LOADS**: DIMENSIONS (IN) • LOADS (LBS)					
Brace Pipe Size	Fastener Size	Max Seismic Brace Load at Brace Pipe Angle*			
		30-44	45-59	60-74	75-90
1 - 2 (DN25 - DN50)	1/2	1410	2000	2450	2740

NPS Brace Pipe Dimensions per ASTM A53 Sch 40, ASTM A106 Sch. 40, or equivalent.
DN Brace Pipe Dimensions per GB/T 3091, EN10255H, JIS G3454 Sch 40, KS D 3562 Sch. 40, or equivalent.

* Brace Pipe Angles are determined from vertical.

**The allowable FM approved capacity of brace subassemblies are listed in Allowable Stress Design (ASD). For Load Resistance Factor Design (LRFD) capacities, the above values will need to be multiplied by 1.5.

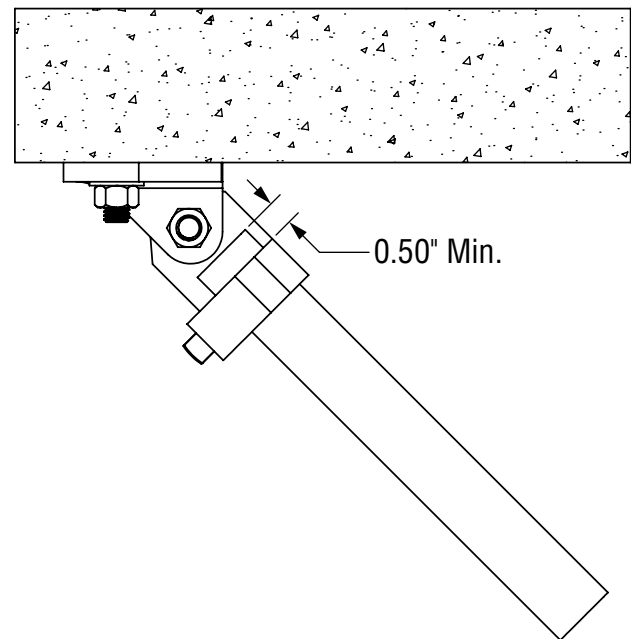


FIG. AF075 HORIZONTAL PRYING FACTORS (Pr) PER NFPA: ANGLES (DEG)									
Brace Orientation*	A	B	C	D	E	F	G	H	I
Brace Angle**	30-44	45-59	60-90	30-44	45-59	60-90	30-44	45-59	60-90
Prying Factor (Pr)	3.724	2.150	1.375	2.150	2.150	2.250	2.750	1.945	1.588

* Brace Orientation per NFPA 13-2016 Figure 9.3.5.12.1.

** Brace Pipe Angles are determined from vertical.

Fig. AF077 (Formerly Afcon Fig. 077) Sway Brace Swivel Attachment

Size Range: Brace Pipe: 1" through 1½" Sch. 40; Anchor Size: ½"

Material: Carbon Steel

Finish: ☐ Plain or ☐ Electro-Galvanized per ASTM B633

Service: A seismic swivel attachment designed to connect brace pipe to the building structure or to a seismic structural attachment. The Sway Brace Swivel Attachment rigidly braces piping systems subjected to horizontal seismic loads.

Approvals: cULus Listed (UL 203a) and FM Approved (FM 1950-10 & FM 1950-13). Complies with the hanging and bracing requirements listed in NFPA 13.

Features:

- Field adjustable design requires no threading of the brace pipe
- The set screw design provides a visual indication that the desired torque value has been achieved.

Installation Instructions:

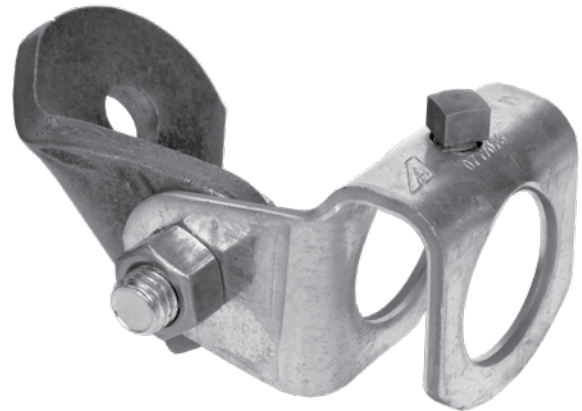
- Insert anchor through the mounting hole and into the structure or seismic structural attachment.
- For connection to Fig. AF085, AF086, AF087, and AF779 seismic structural attachments, the bolt and nuts shall be installed wrench tight (typically finger tight plus ¼ to ½ turns).
- For connection to concrete, wood, timber, steel, and other structures, install fasteners per the fastener manufacturer's installation instructions.
- Insert Sch. 40 brace pipe into the bracket end. The brace pipe should extend a minimum of 0.50" past the back of the bracket.
- Torque set screw until the head bottoms out on the bracket.
- Check the cross bolt and nut and ensure the nut is wrench tight.
- Fire Protection applications shall also be installed per the requirements of NFPA 13 and local codes.

Ordering: Specify brace pipe size, figure number, finish, and description.

Notes: Anvil International® brand bracing components are designed to be compatible ONLY with other Anvil International® brand bracing components, resulting in a Listed seismic bracing assembly. Updated UL listing information may be viewed at www.ul.com and updated FM approval information may be viewed at www.approvalguide.com.

Disclaimer: Anvil International ("Anvil") does not provide any warranties and specifically disclaims any liability whatsoever with respect to Anvil bracing products and components that are used in combination with products, parts or systems not manufactured or sold by Anvil. In no event shall Anvil be liable for any incidental, direct, consequential, special or indirect damages or lost profits where non-Anvil bracing components have been, or are used.

SeisBrace® Seismic Fire Protection Design Tool may be accessed at www.seisbrace.com



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

Fig. AF077 (Formerly Afcon Fig. 077) Sway Brace Swivel Attachment (cont.)

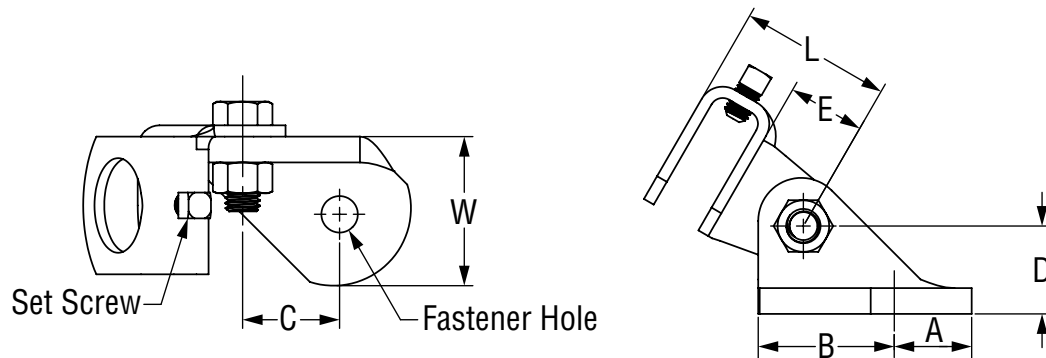


FIG. AF077: DIMENSIONS (IN) • WEIGHT (LBS)

Fastener Size	Brace Size	A	B	C	D	E	L	W	Weight
1/2	1	1.00	1.83	1.25	1.38	1 1/8	2 3/16	2 1/8	1.12
	1 1/4						2 7/16		1.28

FIG. AF077 cULus MAX SEISMIC HORIZONTAL LOADS: DIMENSIONS (IN) • LOADS (LBS)

Brace Pipe Size	Fastener Size	Max Seismic Brace Load	Max Service Pipe Size
1 - 1 1/4	1/2	1000	4

FIG. AF077 FM MAX SEISMIC HORIZONTAL ASD LOADS: DIMENSIONS (IN) • LOADS (LBS)**

Brace Pipe Size	Fastener Size	Max Seismic Brace Load at Brace Pipe Angle*			
		30-44	45-59	60-74	75-90
1 - 1 1/4	1/2	430	620	760	840

* Brace Pipe Angles are determined from vertical.

**The allowable FM approved capacity of brace subassemblies are listed in Allowable Stress Design (ASD). For Load Resistance Factor Design (LRFD) capacities, the above values will need to be multiplied by 1.5.

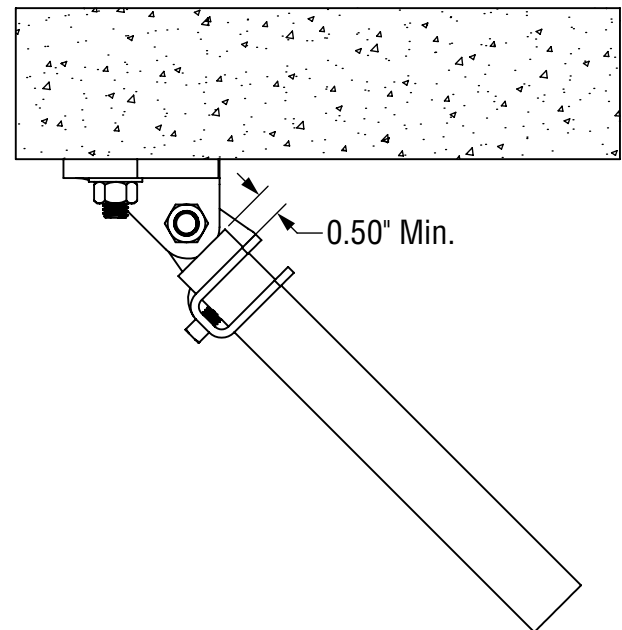


FIG. AF077 HORIZONTAL PRYING FACTORS (Pr) PER NFPA: ANGLES (DEG)

Brace Orientation*	A	B	C	D	E	F	G	H	I
Brace Angle**	30-44	45-59	60-90	30-44	45-59	60-90	30-44	45-59	60-90
Prying Factor (Pr)	3.724	2.150	1.375	2.150	2.150	2.250	2.750	1.945	1.588

* Brace Orientation per NFPA 13-2016 Figure 9.3.5.12.1.

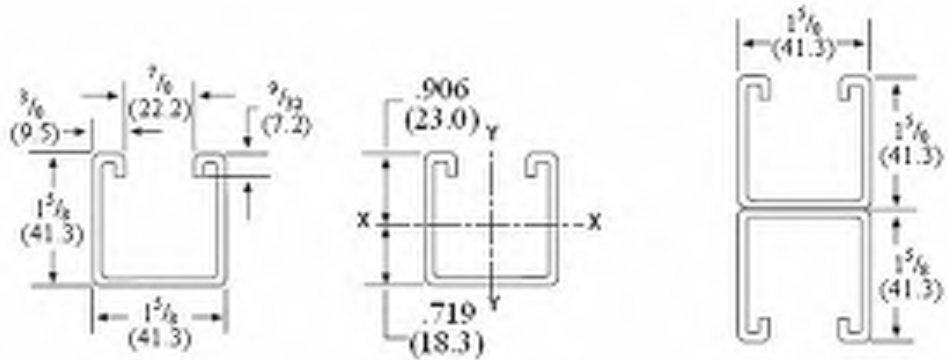
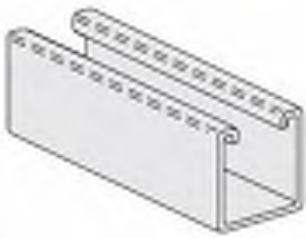
** Brace Pipe Angles are determined from vertical.



CHANNEL

1001 - 1042

1⁵/₈" X 1⁵/₈" X 12 Gauge



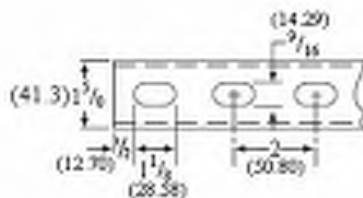
ORDERING:

Specify Figure No., finish and number of feet.

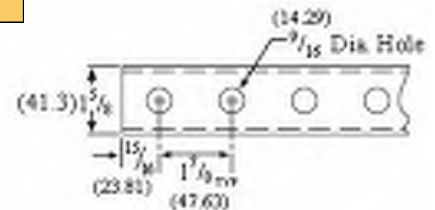
Fig. Number				Type - Description	Weight		Bundle Qty.			
10ft.	3.05m	20ft.	6.10m		lbs./ft.	kg/m	10ft.	3.05m	20ft.	6.10m
1001		1002		No Openings	1.77	(2.63)	500	(152.4)	500	(152.4)
1001A		1002A		Welded Back to Back	3.54	(5.27)	200	(61.0)	300	(91.4)
1011		1012		With 1 ¹ / ₈ " X 9/16" (28.58 X 14.29) slots on 2" (50.8) centers	1.70	(2.53)	500	(152.4)	500	(152.4)
1011A		1012A		Welded Back to Back	3.40	(5.06)	200	(61.0)	300	(91.4)
1021		1022		With 9/16" (14.29) dia. holes on 1 ⁷ / ₈ " (47.63) centers	1.70	(2.53)	500	(152.4)	500	(152.4)
1021A		1022A		Welded Back to Back	3.40	(5.06)	200	(61.0)	300	(91.4)
1031		1032		With 3" (76.20) slots	1.68	(2.50)	500	(152.4)	500	(152.4)
1041		1042		With 7/8" (22.23) Knockouts on 6" (152.40) centers	1.77	(2.63)	500	(152.4)	500	(152.4)

Available in aluminum and stainless steel. Price on request. To order aluminum, add suffix AL to fig. number. To order stainless steel, specify 304 or 316 and add suffix SS to fig. number.

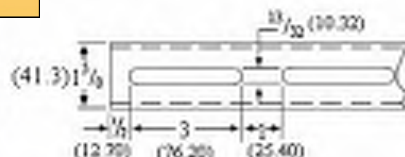
1011 - 1012



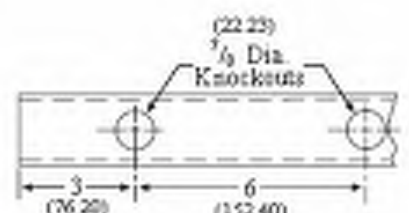
1021 - 1022



1031 - 1032



1041 - 1042



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

Elements of Selection

1001 - 1042

Figure Number	X-X Axis								Y-Y Axis					
	Area of Section		Moment Of Inertia		Section Modulus		Radius of Gyration		Moment Of Inertia		Section Modulus		Radius of Gyration	
	in. ²	cm ²	in. ⁴	cm ⁴	in. ³	cm ³	in.	cm	in. ⁴	cm ⁴	in. ³	cm ³	in.	cm
1001	0.562	(3.626)	0.1912	(7.961)	0.2125	(3.482)	0.583	(1.481)	0.2399	(9.988)	0.2953	(4.839)	0.653	(1.659)
1001A	1.124	(7.252)	0.9732	(40.519)	0.5989	(9.814)	0.931	(2.365)	0.4798	(19.977)	0.5905	(9.677)	0.653	(1.659)

Modules of Elasticity: 29,500,000 PSI (203,395.3mPa)

Beam & Column Loads

Figure Number	Beam Span or Unbraced Column Height		Maximum Column Load		Uniform Load		Deflection		Uniform Load @ 1/240 Span	
			Lbs.	kN	Lbs.	kN	in.	mm	Lbs.	kN
1001	12	(304.80)	10454	(46.50)	2610	(11.61)	.01	(0.25)	2610	(11.61)
1001A			21625	(96.19)	2610*	(11.61)	.01	(0.25)	2610*	(11.61)
1001	18	(457.20)	9950	(44.26)	2269	(10.09)	.03	(0.76)	2269	(10.09)
1001A			21433	(95.34)	2610*	(11.61)	.01	(0.25)	2610*	(11.61)
1001	24	(609.60)	9311	(41.42)	1702	(7.57)	.06	(1.52)	1702	(7.57)
1001A			21164	(94.14)	2610*	(11.61)	.02	(0.51)	2610*	(11.61)
1001	30	(762.00)	8582	(38.17)	1361	(6.05)	.09	(2.29)	1361	(6.05)
1001A			20819	(92.61)	2610*	(11.61)	.03	(0.76)	2610*	(11.61)
1001	36	(914.40)	7801	(34.70)	1135	(5.05)	.13	(3.30)	1135	(5.05)
1001A			20397	(90.73)	2610*	(11.61)	.06	(1.52)	2610*	(11.61)
1001	42	(1066.80)	6998	(31.13)	972	(4.32)	.17	(4.32)	972	(4.32)
1001A			19898	(88.51)	2610*	(11.61)	.09	(2.29)	2610*	(11.61)
1001	48	(1219.20)	6193	(27.55)	851	(3.79)	.22	(5.59)	758	(3.37)
1001A			19322	(85.95)	2405	(10.70)	.13	(3.30)	2405	(10.70)
1001	54	(1371.60)	5392	(23.98)	756	(3.36)	.28	(7.11)	599	(2.66)
1001A			18669	(83.04)	2138	(9.51)	.16	(4.06)	2138	(9.51)
1001	60	(1524.00)	4718	(20.99)	681	(3.03)	.35	(8.89)	485	(2.16)
1001A			17940	(79.80)	1924	(8.56)	.20	(5.08)	1924	(8.56)
1001	66	(1676.40)	4202	(18.69)	619	(2.75)	.42	(10.67)	401	(1.78)
1001A			17134	(76.22)	1749	(7.78)	.24	(6.10)	1749	(7.78)
1001	72	(1828.80)	3791	(16.86)	567	(2.52)	.51	(12.95)	337	(1.50)
1001A			16251	(72.29)	1603	(7.13)	.28	(7.11)	1603	(7.13)
1001	84	(2133.60)	3176	(14.13)	486	(2.16)	.69	(17.53)	248	(1.10)
1001A			14255	(63.41)	1374	(6.11)	.38	(9.65)	1255	(5.58)
1001	96	(2438.40)	2728	(12.13)	425	(1.89)	.90	(22.86)	190	(0.85)
1001A			11951	(53.16)	1202	(5.35)	.50	(12.70)	961	(4.27)
1001	108	(2743.20)	2381	(10.59)	378	(1.68)	1.13	(28.70)	150	(0.67)
1001A			9524	(42.36)	1069	(4.76)	.63	(16.00)	759	(3.38)
1001	120	(3048.00)	2101	(9.35)	340	(1.51)	1.40	(35.56)	121	(0.54)
1001A			7715	(34.32)	962	(4.28)	.78	(19.81)	615	(2.74)
1001	144	(3657.60)	1660	(7.38)	280	(1.25)	2.00	(50.80)	80	(0.36)
1001A			5040	(22.42)	800	(3.56)	1.14	(28.96)	420	(1.87)
1001	168	(4267.20)	--	--	240	(1.07)	2.72	(69.09)	60	(0.27)
1001A			--	--	680	(3.02)	1.53	(38.86)	310	(1.38)
1001	192	(4876.80)	--	--	210	(0.93)	3.55	(90.17)	50	(0.22)
1001A			--	--	600	(2.67)	2.02	(51.31)	240	(1.07)
1001	216	(5486.40)	--	--	190	(0.85)	4.58	(116.33)	40	(0.18)
1001A			--	--	530	(2.36)	2.54	(64.52)	190	(0.85)
1001	240	(6096.00)	--	--	170	(0.76)	5.62	(142.75)	--	--
1001A			--	--	480	(2.14)	3.16	(80.26)	150	(0.67)

Beam Loads: Loads listed are uniformly distributed, for loads concentrated at center of span multiply uniform load by .5 and multiply the deflection by .8. When deflection is not a factor use stress of 25,000 PSI (172.37 mPa). When deflection is a factor use deflection of 1/240 Span. *Failure determined by weld shear.

Column Loads: Column loadings are for allowable axial loads for the unsupported heights listed and include a K value of .80.

If eccentric, loads should be reduced according to standard practice.

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

For Fabricated Channels, reduce beam load values as follows:

1011 & 1012	15%
1021 & 1022	10%
1031 & 1032	30%
1041 & 1042	5%

TECHNICAL DATA

SPOT WELDING

Resistance welding of back to back strut channel is accomplished by way of an AC powered press type spot welder. This equipment produces a series of spot welds from 2-1/2" (63.5) to 3" (76.2) apart continuously down the length of the channel. Consistency is maintained by the use of a highly sophisticated constant current weld control. This processor is capable of maintaining weld sequence, duration and current control along with other variables. Any deviations in the programmed parameters will issue forth an alarm or shut down fault, which is then investigated. Weld quality is tested every 300-350 welds through the use of a destructive test method.

Through the use of modern technology, destructive and non-destructive testing, the quality of strut can be maintained. Spot weld strut is fabricated in accordance with the R.W.M.A. guidelines for resistance welding.



HEX NUTS

Fig. 110 & 110H HEX NUT

MATERIAL: Low carbon steel

FINISH: Plain or electro-galvanized

ORDERING: Specify rod size, finish and figure number.

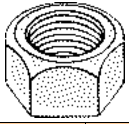


Fig. 110 STANDARD HEX NUT
Fig. 110H HEAVY HEX NUT

Available in stainless steel. To order, specify 304 or 316 and add suffix SS to figure number. Price on request.

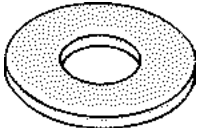
Rod Size	Wt. Each																					
	$\frac{1}{4}$		$\frac{5}{16}$		$\frac{3}{8}$		$\frac{1}{2}$		$\frac{5}{8}$		$\frac{3}{4}$		$\frac{7}{8}$		1		$1\frac{1}{8}$		$1\frac{1}{4}$		$1\frac{1}{2}$	
	lbs.	kg	lbs.	kg	lbs.	kg	lbs.	kg	lbs.	kg	lbs.	kg	lbs.	kg	lbs.	kg	lbs.	kg	lbs.	kg	lbs.	kg
Fig. 110	.01	(.01)	.01	(.01)	.02	(.01)	.04	(.02)	.07	(.03)	.12	(.05)	.19	(.09)	.28	(.13)	.40	(.18)	.54	(.24)	.94	(.43)
Fig. 110H	--	--	--	--	.03	(.01)	.07	(.03)	.12	(.05)	.19	(.09)	.30	(.14)	.43	(.20)	.59	(.27)	.79	(.36)	1.31	(.59)

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



FLAT WASHER

Fig. 130
FLAT WASHER



Available in stainless steel. To order, specify 304 or 316 and add suffix SS to figure number.
Price on request.

MATERIAL: Low carbon steel

ORDERING: Specify rod size, finish and figure number.

Rod Size		$\frac{1}{4}$		$\frac{3}{8}$		$\frac{1}{2}$		$\frac{5}{8}$	
I.D.		$\frac{5}{16}$	(7.94)	$\frac{7}{16}$	(11.11)	$\frac{9}{16}$	(14.29)	$\frac{11}{16}$	(17.46)
O.D.		$\frac{3}{4}$	(19.05)	1	(25.40)	$1\frac{3}{8}$	(34.93)	$1\frac{3}{4}$	(44.45)
Wt. Each	lbs.	.01		.02		.04		.08	
	kg	(.01)		(.01)		(.02)		(.04)	

Rod Size		$\frac{3}{4}$		$\frac{7}{8}$		1		$1\frac{1}{8}$		$1\frac{1}{4}$		$1\frac{1}{2}$	
I.D.		$\frac{13}{16}$	(20.64)	$\frac{15}{16}$	(23.81)	$1\frac{1}{16}$	(26.99)	$1\frac{1}{4}$	(31.75)	$1\frac{3}{8}$	(34.93)	$1\frac{5}{8}$	(41.28)
O.D.		2	(50.80)	$2\frac{1}{4}$	(57.15)	$2\frac{1}{2}$	(63.50)	$2\frac{3}{4}$	(69.85)	3	(76.20)	$3\frac{1}{2}$	(88.90)
Wt. Each	lbs.	.11		.15		.19		.22		.26		.38	
	kg	(.05)		(.07)		(.09)		(.10)		(.12)		(.17)	

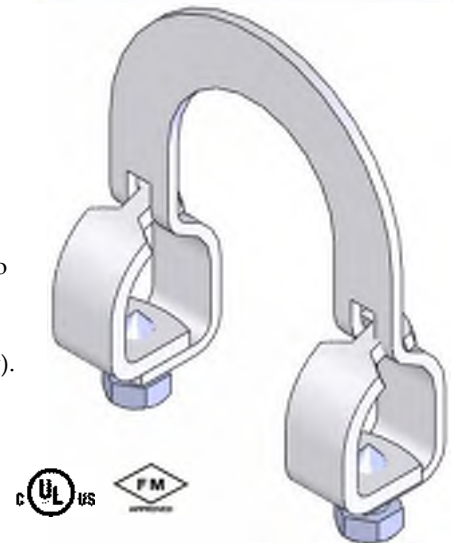
Unless otherwise specified, all dimensions on drawings and in charts are in inches and dimensions shown in parentheses are in millimeters.

SWAY BRACE FITTINGS



- FUNCTION:** Designed for bracing pipe against sway and seismic disturbance. The pipe attachment component of a sway brace system used in conjunction with a PHD Manufacturing structural attachment fitting, and joined together with a bracing pipe element forms a complete sway brace assembly. Sway brace assemblies are intended to be installed in accordance with NFPA 13 and the manufacturer's installation instructions.
- SIZE:** Pipe size 2-1/2" thru 8".
Pipe size used for bracing 1" or 1-1/4" Schedule 40 IP.
- FINISH:** Electro-galvanized
- MATERIAL:** Low Carbon Steel
- INSTALL:** Place over the pipe to be braced, adjust brace angle, and insert bracing pipe through opening leaving a minimum of 1" extending from attachment. Brace pipe can be installed on top or bottom of pipe to be braced but must be a minimum of 6" away from a pipe joint. Tighten two hex head cone point set bolts until heads bottom out on attachment, ensuring proper torque has been applied.
- APPROVALS:** Underwriters Laboratories listed for US and Canada (2-1/2" thru 6" only). Factory Mutual approved.
- ORDERING:** Listed for use with NFPA and PHD sway brace components only
Specify figure number, brace pipe size, and sprinkler pipe size
(This product is not compatible with metric pipe.)
For metric piping see Fig. 010, Fig. 031, or Fig. 040.

Fig. 015
LARGE SWAY BRACE
PIPE ATTACHMENT



FM Maximum Design Load							
Brace: 1" Thru 2" SCH40 Pipe							
Pipe Size SCH 10, 40 & Flow Pipe	Brace Angle From Vertical (Degrees)	lbs.	kN	Weight Ea.			
				1" Brace Pipe		1 1/4" Brace Pipe	
				lbs.	kg	lbs.	kg
2 1/2	30°-44°	1020	(4.53)	1.31	(0.59)	1.49	(0.68)
	45°-59°	1440	(6.40)				
	60°-74°	1770	(7.87)				
	75°-90°	1970	(8.76)				
3	30°-44°	1080	(4.80)	1.40	(0.64)	1.57	(0.71)
	45°-59°	1530	(6.80)				
	60°-74°	1870	(8.31)				
	75°-90°	2090	(9.29)				
4	30°-44°	1020	(4.53)	1.53	(0.69)	1.70	(0.77)
	45°-59°	1450	(6.44)				
	60°-74°	1770	(7.87)				
	75°-90°	1980	(8.80)				
6	30°-44°	640	(2.84)	1.81	(0.82)	1.98	(0.90)
	45°-59°	900	(4.00)				
	60°-74°	1110	(4.93)				
	75°-90°	1240	(5.51)				
8	30°-44°	570	(2.53)	2.07	(0.94)	2.24	(1.02)
	45°-59°	810	(3.60)				
	60°-74°	990	(4.40)				
	75°-90°	1100	(4.89)				

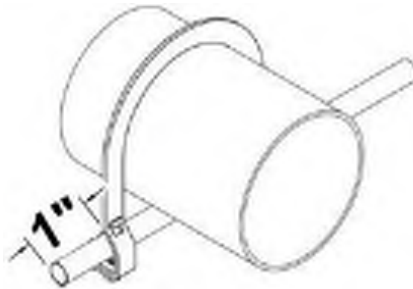
UL Maximum Design Load		
Pipe Size SCH 10 & 40	lbs.	kN
2 1/2	1000	(4.45)
3	1000	(4.45)
4	1000	(4.45)
6	1600	(7.12)



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

FIG. 015 LARGE SWAY BRACE PIPE ATTACHMENT

- Pipe Braced:** 2 1/2", 3", 4", 6", 8"
Bracing: 1" Or 1 1/4" SCH40 steel pipe
Function: Designed for bracing pipe against sway and seismic disturbance. The pipe attachment component of a sway brace system used in conjunction with a PHD Manufacturing structural attachment fitting, and joined together with a bracing pipe element forms a complete sway brace assembly. Sway brace assemblies are intended to be installed in accordance with NFPA 13 and the manufacturer's installation instructions.
Approvals: Underwriters Laboratories listed for US and Canada; Sizes 2 1/2" through 6"
 Factory Mutual approved; Sizes 2 1/2" through 8"
 Listed for use with NFPA and PHD sway brace components only
Material: Low Carbon Steel
Installation: Place over the pipe to be braced, adjust brace angle, and insert bracing pipe through opening leaving a minimum of 1" extending from attachment. Brace pipe can be installed on top or bottom of pipe to be braced but must be a minimum of 6" away from a pipe joint. Tighten two hex head cone point set bolts until heads bottom out on attachment, ensuring proper torque has been applied.
(This product is not compatible with metric pipe.)



UL Maximum Design Loads				
Pipe Size	Pipe Schedule	Brace Size	Brace Schedule	lbs.
2 1/2	10 & 40	1 & 1 1/4	40	1000
3	10 & 40	1 & 1 1/4	40	1000
4	10 & 40	1 & 1 1/4	40	1000
6	10 & 40	1 & 1 1/4	40	1600

FM Approved Loads							
Orientation	Pipe Size	Pipe Schedule	Allowable Horizontal Capacity Per Installation Angle (lbs.)				Brace Member
			Brace Angle From Vertical				
			30°-44°	45°-59°	60°-74°	75°-90°	
Lateral	2 1/2	LW, 10, 40	1020	1440	1770	1970	1" or 1 1/4" Schedule 40 Pipe
Lateral	3	LW, 10, 40	1080	1530	1870	2090	1" or 1 1/4" Schedule 40 Pipe
Lateral	4	LW, 10, 40	1020	1450	1770	1980	1" or 1 1/4" Schedule 40 Pipe
Lateral	6	LW, 10, 40	640	900	1110	1240	1" or 1 1/4" Schedule 40 Pipe
Lateral	8	LW, 10, 40	570	810	990	1100	1" or 1 1/4" Schedule 40 Pipe

NOTE: LW above refers to FM Approved Lightwall pipe, commonly referred to as Schedule 7.

SWAY BRACE FITTINGS



FUNCTION: Designed for bracing pipe against sway and seismic disturbance. Versatile design allows for attachment at any angle and the ability to be used in a lateral or longitudinal bracing configuration. The pipe attachment component of a sway brace system used in conjunction with a PHD Manufacturing structural attachment fitting and joined together with a bracing element form a complete sway brace assembly. Sway brace assemblies are intended to be installed in accordance with NFPA 13 and the manufacturer's installation instructions.

SIZE: Pipe sizes 2" thru 8".
Can use 1" thru 2" SCH 40 pipe, structural steel, and PHD 12 gauge strut channel (1001 & 1201) as sway bracing elements.

FINISH: Electro-galvanized

MATERIAL: Ductile Iron and Low Carbon Steel, Grade 5 clamping bolts
INSTALL: Place attachment around pipe to be braced, positioning brace attachment as needed, then tighten clamping bolts and nuts finger tight. Insert brace component into fitting against back of jaw. Tighten set screw finger tight, adjust brace angle as needed, then tighten set screw until hex head breaks off. Then evenly torque clamping bolts until hex portion of clamping nuts break off.

APPROVALS: Underwriters Laboratories listed for US and Canada
Factory Mutual approved

Listed for use with PHD sway brace components only
ORDERING: Specify figure number and sprinkler pipe size

**Fig. 031
CLAMPING
PIPE ATTACHMENT**



UL Maximum Design Loads				
All Pipe Sizes, SCH 10 & 40 (3 1/2 SCH 40 only)				
Lateral & Longitudinal Assemblies				
Brace Member	Member Thickness	Member Length	lbs.	kN
1" Thru 2" Pipe	SCH 40	Refer to NFPA13	2015	(8.96)
Structural Steel	1/4" & 3/8" thick	Refer to NFPA13	2015	(8.96)
1001 Series Strut	12 Ga.	See Chart Below	2015	(8.96)
1201 Series Strut	12 Ga.	See Chart Below	2015	(8.96)

FM Maximum Design Load (All Sizes)				
For Bracing SCH 10, 40 & Flow Pipe				
Brace Member		Direction	Brace Angle (Degrees)	lbs. kN
1" Thru 2" SCH 40 Pipe	(GB/T3091, EN10255H, or JISG3454)	Lateral	30°-44°	1270 (5.64)
			45°-59°	1800 (9.07)
			60°-74°	2200 (10.89)
			75°-90°	2460 (12.18)
1/4" Thru 3/8" Thick Structural Steel		Lateral & Longitudinal	30°-44°	900 (4.00)
			45°-59°	1280 (5.69)
			60°-74°	1570 (6.98)
			75°-90°	1750 (7.78)
PHD 12 Gauge Strut Channel 1001 & 1201		Lateral & Longitudinal	30°-44°	1070 (4.75)
			45°-59°	1440 (6.40)
			60°-74°	1740 (7.73)
			75°-90°	1940 (8.62)

PHD Strut Channel Maximum Horizontal Load 90° From Vertical												
Strut Fig. #	r	l/r =	100			200			300			
			Max	lbs.	kN	Max	lbs.	kN	Max	lbs.	kN	
1001	0.580	(14.73)	58"	(1473.2)	4670	(20.77)	116"	(2946.4)	1165	(5.18)	174"	(4419.6)
1201	0.297	(7.54)	29"	(736.6)	3260	(14.50)	59"	(1498.6)	785	(3.49)	89"	(2260.6)

FM Maximum Design Load						
Brace: 1" Thru 2" SCH40 Pipe (GB/T3091, EN10255H, or JISG3454)						
Pipe Size SCH 10, 40 & Flow Pipe	Brace Angle From Vertical (Degrees)	Longitudinal lbs.	kN	Weight Ea. lbs.	kg	
2 (50)	30°-44°	1370	(6.09)	2.60	(1.18)	
	45°-59°	1930	(8.58)			
	60°-74°	2370	(10.54)			
	75°-90°	2810	(12.49)			
2 1/2 (65)	30°-44°	1500	(6.67)	2.77	(1.26)	
	45°-59°	2120	(9.43)			
	60°-74°	2600	(11.56)			
	75°-90°	2900	(12.89)			
3 (80)	30°-44°	1370	(6.09)	3.00	(1.36)	
	45°-59°	1930	(8.58)			
	60°-74°	2370	(10.54)			
	75°-90°	2810	(12.49)			
3 1/2 (90)	30°-44°	1370	(6.09)	3.13	(1.42)	
	45°-59°	1930	(8.58)			
	60°-74°	2370	(10.54)			
	75°-90°	2810	(12.49)			
4 (100)	30°-44°	1370	(6.09)	3.30	(1.50)	
	45°-59°	1930	(8.58)			
	60°-74°	2370	(10.54)			
	75°-90°	2810	(12.49)			
5 (125)	30°-44°	1370	(6.09)	4.57	(2.07)	
	45°-59°	1930	(8.58)			
	60°-74°	2370	(10.54)			
	75°-90°	2810	(12.49)			
6 (150)	30°-44°	1410	(6.27)	5.42	(2.46)	
	45°-59°	2000	(8.89)			
	60°-74°	2450	(10.89)			
	75°-90°	2730	(12.14)			
8 (200)	30°-44°	1320	(5.87)	8.52	(3.86)	
	45°-59°	1870	(8.31)			
	60°-74°	2290	(10.18)			
	75°-90°	2550	(11.34)			

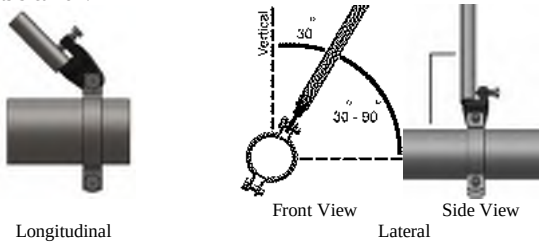
Unless otherwise specified, all dimensions on drawings and in charts are in inches and dimensions shown in parentheses are in millimeters.



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FIG. 031 CLAMPING PIPE ATTACHMENT

- Pipe Braced:** 2", 2 1/2", 3", 3 1/2", 4", 5", 6", 8"
Bracing: 1" thru 2" SCH 40 pipe, structural steel, and PHD 12 gauge strut channel (1001 & 1201)
Function: Designed for bracing pipe against sway and seismic disturbance. Versatile design allows for attachment at any angle and the ability to be used in a lateral or longitudinal bracing configuration. The pipe attachment component of a sway brace system used in conjunction with a PHD Manufacturing structural attachment fitting and joined together with a bracing element forming a complete sway brace assembly. Sway brace assemblies are intended to be installed in accordance with NFPA 13 and the manufacturer's installation instructions.
Approvals: Underwriters Laboratories listed for US and Canada
Factory Mutual approved
Listed for use with PHD sway brace components only
Material: Ductile Iron and Low Carbon Steel, Grade 5 clamping bolts
Installation: Place attachment around pipe to be braced, positioning brace attachment as needed, then tighten clamping bolts and nuts finger tight. Insert brace component into fitting against back of jaw. Tighten set screw finger tight, adjust brace angle as needed, then tighten set screw until hex head breaks off. Then evenly torque clamping bolts until hex portion of clamping nuts break off.



UL Maximum Design Loads			
Pipe Sizes 2" thru 8" SCH 10 & 40 (3 1/2 SCH 40 only)			
Lateral & Longitudinal Assemblies			
Brace Member	Member Thickness	Member Length	Max. Design Load
1" Thru 2" Pipe	SCH 40	Refer to NFPA13	2015
Structural Steel	1/4" to 3/8" thick	Refer to NFPA13	2015
1001 Series Strut	12 Ga.	See Chart Below	2015
1201 Series Strut	12 Ga.	See Chart Below	2015

FM Maximum Design Loads							
Orientation	Pipe Size	Pipe Schedule	Allowable Horizontal Capacity Per Installation Angle (lbs.)				Brace Member
			Brace Angle From Vertical				
			30°-44°	45°-59°	60°-74°	75°-90°	
Lateral	2, 2 1/2, 3, 3 1/2, 4, 5, 6, 8	LW, 10, 40	1270	1800	2200	2460	1" to 2" Schedule 40 Pipe
Longitudinal	2	LW, 10, 40	1370	1930	2370	2810	1" to 2" Schedule 40 Pipe
Longitudinal	2 1/2	LW, 10, 40	1500	2120	2600	2900	1" to 2" Schedule 40 Pipe
Longitudinal	3, 3 1/2, 4	LW, 10, 40	1370	1930	2370	2810	1" to 2" Schedule 40 Pipe
Longitudinal	5, 6	LW, 10, 40	1410	2000	2450	2730	1" to 2" Schedule 40 Pipe
Longitudinal	8	LW, 10, 40	1320	1870	2290	2550	1" to 2" Schedule 40 Pipe
Lateral or Longitudinal	2, 2 1/2, 3, 3 1/2, 4, 5, 6, 8	LW, 10, 40	900	1280	1570	1750	1/4" to 3/8" Thick Structural Steel
Lateral or Longitudinal	2, 2 1/2, 3, 3 1/2, 4, 5, 6, 8	LW, 10, 40	1070	1440	1740	1940	1001 & 1201 Strut

NOTE: LW above refers to FM Approved Lightwall pipe, commonly referred to as Schedule 7. These ratings may also be applied to EN10220 and GB/T 8163 pipe. Schedule 10 above may be applied to GB/T 3091, GB/T 3092, EN 10255 M and H, JIS G3452. Schedule 40 above may be applied to GB/T3091, EN10255H or JISG3454 brace pipe.

Strut Fig. #	Max. Horizontal Load (lbs.) 90° From Vertical							
	r	l/r =	100		200		300	
1001	0.580		58"	4670	116"	1165	174"	518
1201	0.297		29"	3260	59"	785	89"	345

NOTE: Use NFPA13 table "Allowable Horizontal Load on Brace Assemblies Based on the Weakest Component of the Brace Assembly" reduction factors for maximum loads at varying angles.

Refer to www.phd-mfg.com regarding further strut channel details

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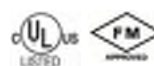
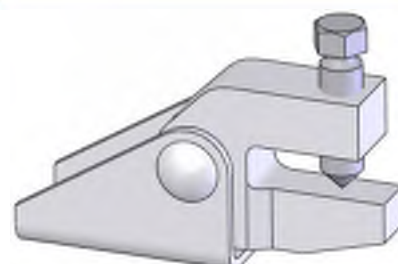
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STRUCTURE ATTACHMENT FITTINGS



- FUNCTION:** Designed for bracing pipe against sway and seismic disturbances. Universal swivel design allows for attachment at any surface angle combined with concentric loading. Structure attachment fitting designed to use 1" thru 2" SCH 40 pipe, structural steel, and PHD 12 gauge strut channel (1001 & 1201) as sway bracing elements. No bracing member thicker than 3/8" can be used in conjunction with this product. Utilize the Fig. 030 with a PHD Manufacturing pipe attachment fitting and a bracing element to form a complete sway brace assembly. Sway brace assemblies are intended to be installed in accordance with NFPA 13 and the manufacturer's installation instructions.
- SIZE:** 1/2" mounting hole
Braces up to 8" Pipe MAX
- FINISH:** Electro-galvanized
- MATERIAL:** Ductile Iron and Low Carbon Steel
- INSTALL:** Mount device to structure then insert brace element into fitting against back of jaw. Tighten set screw finger tight, then tighten until hex head breaks off. Adjust attachment to proper brace angle.
- APPROVALS:** Underwriters Laboratories listed for US and Canada
Factory Mutual approved
Listed for use with NFPA fastener tables and PHD sway brace components only
- ORDERING:** Specify figure number

**Fig. 030
C-CLAMP
STRUCTURAL
ATTACHMENT**



UL Maximum Design Loads (Up to 8" Pipe) Lateral & Longitudinal Assemblies						
Brace Member	Member Thickness	Member Length	lbs.	kN	Weight Ea.	
1" Thru 2" Pipe	SCH 40	Refer to NFPA13	2015	(8.96)	1.46	(0.66)
Structural Steel	3/8" thick MAX	Refer to NFPA13	2015	(8.96)		
1001 Series Strut	12 Ga.	See Chart Below	2015	(8.96)		
1201 Series Strut	12 Ga.	See Chart Below	2015	(8.96)		

FM Maximum Design Load For Bracing SCH 10, 40 & Flow Pipe				
Brace Member		Brace Angle From Vertical (Degrees)	lbs.	kN
1" Thru 2" SCH 40 Pipe	(GB/T3091, EN10255H, or JISG3454)	30°-44°	1270	(5.64)
		45°-59°	2040	(9.07)
		60°-74°	2450	(10.89)
		75°-90°	2740	(12.18)
1/4" Thru 3/8" Thick Structural Steel		30°-44°	900	(4.00)
		45°-59°	1280	(5.69)
		60°-74°	1570	(6.98)
		75°-90°	1750	(7.78)
PHD 12 Gauge Strut Channel 1001 & 1201		30°-44°	1070	(4.75)
		45°-59°	1440	(6.40)
		60°-74°	1740	(7.73)
		75°-90°	1940	(8.62)

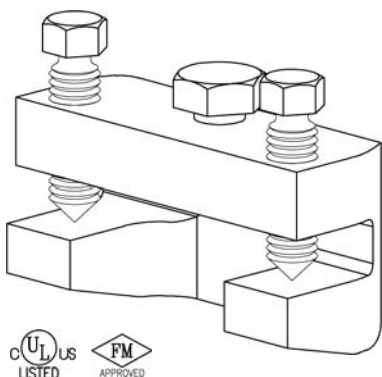
Strut Fig. #	PHD Strut Channel Maximum Horizontal Load 90° From Vertical													
	r	l/r =	100			200			300					
			Max	lbs.	kN	Max	lbs.	kN	Max	lbs.	kN			
1001	0.580	(14.73)	58"	(1473.2)	4670	(20.77)	116"	(2946.4)	1165	(5.18)	174"	(4419.6)	518	(2.30)
1201	0.297	(7.54)	29"	(736.6)	3260	(14.50)	59"	(1498.6)	785	(3.49)	89"	(2260.6)	345	(1.53)

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

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FIG. 035

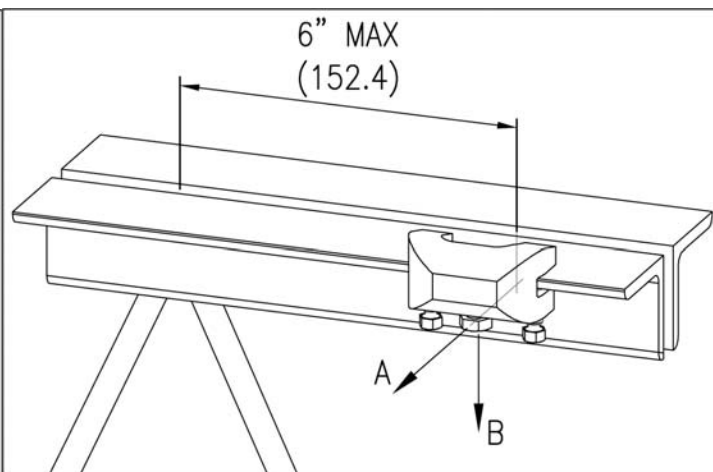
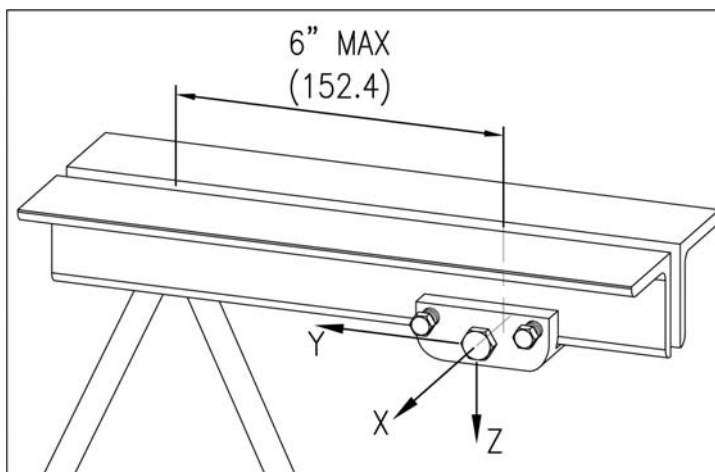
SWAY BRACE BAR JOIST ADAPTER



- Function:** Sway brace adapter used to attach a PHD Manufacturing sway brace assembly to a steel bar joist or structural member of $\frac{3}{8}$ " maximum thickness. To provide a point of connection when drilling or welding is not allowed or not practical. Sway brace assemblies are intended to be installed in accordance with NFPA 13 and the manufacturer's installation instructions.
- Size:** Braces up to 8" Pipe MAX. Attaches to $\frac{3}{8}$ " thick MAX structural members. When attaching to a structure thicker than $\frac{3}{8}$ ", please see PHD Manufacturing Fig. 045.
- Material:** Ductile iron
- Finish:** Electro-galvanized
- Install:** Steel bar joist manufacturer's warranty requires attachment within 6" of chord panel point. Place on structural member with the flange contacting the back of the jaw. Tighten set screws finger tight, then evenly tighten until hex heads break off. Attach PHD structural attachment to Fig. 035 with the supplied attachment bolt, ensuring that the attachment bolt head bottoms out securely. Please note that the maximum load will be limited by the PHD Manufacturing structural attachment utilized with this adapter.
- Approvals:** Underwriters Laboratories listed for US and Canada and Factory Mutual approved. Listed for use with NFPA fastener tables and PHD sway brace components only.
- Ordering:** Specify figure number.

UL Maximum Design Load					
Pipe Size	lbs.	kN	Wt. Each		
			lbs.	kg	
8" MAX	(200)	2015	(8.96)	2.38	(1.08)

FM Maximum Design Load							
Beam Flange Thickness	Brace Angle From Vertical (Degrees)	X-Z		Y-Z		A-B	
		lbs.	kN	lbs.	kN	lbs.	kN
$\frac{3}{8}$ " Max	30°-44°	1040	(4.62)	970	(4.31)	1150	(5.11)
	45°-59°	1490	(6.62)	1370	(6.09)	1660	(7.38)
	60°-74°	1800	(8.00)	2060	(9.16)	1990	(8.85)
	75°-90°	2010	(8.94)	2300	(10.23)	2220	(9.87)





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FIG. 035 SWAY BRACE BAR JOIST ADAPTER

Pipe Braced: 8" Pipe MAX

Function: Sway brace adapter used to attach a PHD Manufacturing sway brace assembly to a steel bar joist or structural member of 3/8" maximum thickness. To provide a point of connection when drilling or welding is not allowed or not practical. Sway brace assemblies are intended to be installed in accordance with NFPA 13 and the manufacturer's installation instructions.

Approvals: Underwriters Laboratories listed for US and Canada

Factory Mutual approved

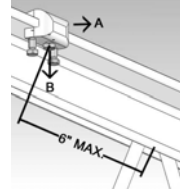
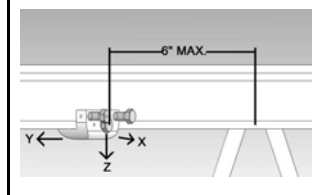
Listed for use with NFPA fastener tables and PHD sway brace components only

Material: Ductile Iron

Installation: Steel bar joist manufacturer's warranty requires attachment within 6" of chord panel point. Place on structural member with the flange contacting the back of the jaw. Tighten set screws finger tight, then evenly tighten until hex heads break off. Attach PHD structural attachment to Fig. 035 with the supplied attachment bolt, ensuring that the attachment bolt head bottoms out securely. Please note that the maximum load will be limited by the PHD Manufacturing structural attachment utilized with this adapter.

UL Maximum Design Load	
Pipe Size	lbs.
8" MAX	2015

FM Maximum Design Load						
Beam Flange Thickness	Brace Angle From Vertical (Degrees)	X-Z		Beam Flange Thickness	Brace Angle From Vertical (Degrees)	A-B
		lbs.	lbs.			
3/8" Max	30°-44°	1040	970	3/8" Max	30°-44°	1150
	45°-59°	1490	1370		45°-59°	1660
	60°-74°	1800	2060		60°-74°	1990
	75°-90°	2010	2300		75°-90°	2220



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FIG. 030 C-CLAMP STRUCTURAL ATTACHMENT

Pipe Braced: 8" Pipe MAX

Bracing: 1" thru 2" SCH 40 pipe, structural steel, and PHD 12 gauge strut channel (1001 & 1201)

Function: Designed for bracing pipe against sway and seismic disturbances. Universal swivel design allows for attachment at any surface angle combined with concentric loading. Structure attachment fitting designed to use 1" thru 2" SCH 40 pipe, structural steel, and PHD 12 gauge strut channel (1001 & 1201) as sway bracing elements. No bracing member thicker than 3/8" can be used in conjunction with this product. Utilize the Fig. 030 with a PHD Manufacturing pipe attachment fitting and a bracing element to form a complete sway brace assembly. Sway brace assemblies are intended to be installed in accordance with NFPA 13 and the manufacturer's installation instructions.

Approvals: Underwriters Laboratories listed for US and Canada

Factory Mutual approved

Listed for use with NFPA13 fastener tables and PHD sway brace components only

Material: Ductile Iron and Low Carbon Steel

Installation: Mount device to structure then insert brace element into fitting against back of jaw. Tighten set screw finger tight, then tighten until hex head breaks off. Adjust attachment to proper brace angle.

UL Maximum Design Loads (Up to 8" Pipe)			
Brace Member	Member Thickness	Member Length	lbs.
1" Thru 2" Pipe	SCH 40	Refer to NFPA13	2015
NFPA13 Structural Steel	3/8" thick MAX	Refer to NFPA13	2015
1001 Series Strut	12 Ga.	See Chart Below	2015
1201 Series Strut	12 Ga.	See Chart Below	2015

FM Maximum Design Load			
For Bracing SCH 10, 40 & Flow Pipe			
Brace Member		Brace Angle From Vertical (Degrees)	lbs.
1" Thru 2" SCH 40 Pipe	(GB/T3091, EN10255H, or JISG3454)	30°-44°	1270
		45°-59°	2040
		60°-74°	2450
		75°-90°	2740
1/4" Thru 3/8" Thick Structural Steel		30°-44°	900
		45°-59°	1280
		60°-74°	1570
		75°-90°	1750
PHD 12 Gauge Strut Channel 1001 & 1201		30°-44°	1070
		45°-59°	1440
		60°-74°	1740
		75°-90°	1940

Strut Fig. #	Max. Horizontal Load (lbs.)	90° From Vertical			
r	l/r =	100	200	300	
1001	0.580	58"	4670	116"	1165 174" 518
1201	0.297	29"	3260	59"	785 89" 345

NOTE: Use NFPA13 table "Allowable Horizontal Load on Brace Assemblies Based on the Weakest Component of the Brace Assembly" reduction factors for maximum loads at varying angles.

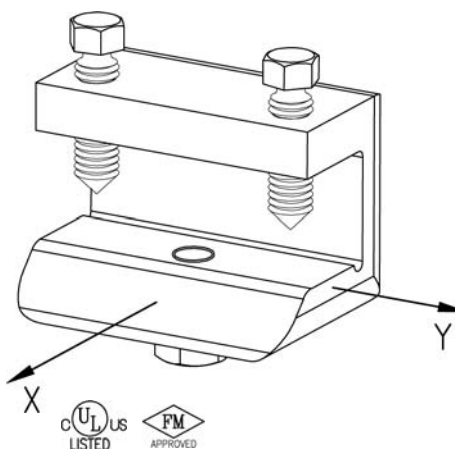
Refer to www.phd-mfg.com regarding further strut channel details

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FIG. 045

SWAY BRACE STRUCTURAL ADAPTER



Function: Sway brace adapter used to attach a PHD Manufacturing sway brace assembly to a steel structural member of $\frac{3}{8}$ " minimum and $1\frac{1}{4}$ " maximum thickness. To provide a point of connection when drilling or welding is not allowed or not practical. Sway brace assemblies are intended to be installed in accordance with NFPA 13 and the manufacturer's installation instructions.

Size: Braces up to 8" Pipe MAX. Attaches to $\frac{3}{8}$ " MINIMUM and $1\frac{1}{4}$ " MAX thick structural members. When attaching to a structure less than $\frac{3}{8}$ " thick, please see PHD Manufacturing Fig. 035.

Material: Ductile iron

Finish: Electro-galvanized

Install: Place on structural member with the flange contacting the back of the jaw. Tighten set screws finger tight, then evenly tighten until hex heads break off. Attach PHD structural attachment to Fig. 045 with the supplied attachment bolt, ensuring that the attachment bolt head bottoms out securely. Please note that the maximum load will be limited by the PHD Manufacturing structural attachment utilized with this adapter.

Approvals: Underwriters Laboratories listed for US and Canada and Factory Mutual approved. Listed for use with NFPA fastener tables and PHD sway brace components only.

Ordering: Specify figure number.

UL Maximum Design Load					
Pipe Size		lbs.	kN	Wt. Each	
				lbs.	kg
8" MAX	(200)	2015	(8.96)	3.49	(1.58)

FM Maximum Design Load					
Beam Flange Thickness	Brace Angle From Vertical (Degrees)	X		Y	
		lbs.	kN	lbs.	kN
$\frac{3}{8}$ " MIN - $1\frac{1}{4}$ " MAX	30°-44°	1150	(5.11)	900	(4.00)
	45°-59°	1800	(8.00)	1050	(4.67)
	60°-74°	2230	(9.91)	1260	(5.60)
	75°-90°	2460	(10.94)	1410	(6.27)



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FIG. 045 SWAY BRACE STRUCTURAL ADAPTER

Pipe Braced: 8" Pipe MAX

Function: Sway brace adapter used to attach a PHD Manufacturing sway brace assembly to a steel structural member of 3/8" minimum and 1 1/4" maximum thickness. To provide a point of connection when drilling or welding is not allowed or not practical. Sway brace assemblies are intended to be installed in accordance with NFPA 13 and the manufacturer's installation instructions.

Approvals: Underwriters Laboratories listed for US and Canada

Factory Mutual approved

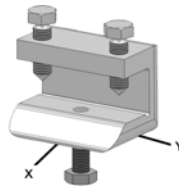
Listed for use with NFPA fastener tables and PHD sway brace components only

Material: Ductile Iron

Installation: Place on structural member with the flange contacting the back of the jaw. Tighten set screws finger tight, then evenly tighten until hex heads break off. Attach PHD structural attachment to Fig. 045 with the supplied attachment bolt, ensuring that the attachment bolt head bottoms out securely. Please note that the maximum load will be limited by the PHD Manufacturing structural attachment utilized with this adapter.

UL Maximum Design Load	
Pipe Size	lbs.
8" MAX	2015

FM Maximum Design Load			
Beam Flange Thickness	Brace Angle From Vertical (Degrees)	X	Y
		lbs.	lbs.
3/8" Min. 1 1/4" Max.	30°-44°	1150	900
	45°-59°	1800	1050
	60°-74°	2230	1260
	75°-90°	2460	1410



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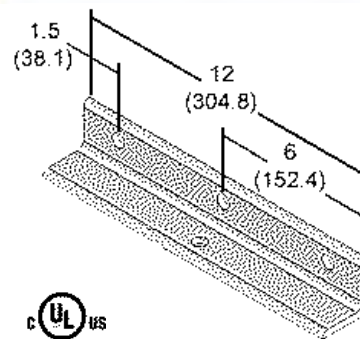
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STRUCTURE ATTACHMENT FITTINGS



- FUNCTION:** Designed for bracing pipe against sway and seismic disturbances. Sway brace adapter used to develop a greater structural connection by providing multiple fastener attachment points. Adapter allows for 2 or 3 NFPA 13 approved fasteners to be used when one fastener is too weak to anchor a sway brace assembly to a structure. Sway brace assemblies are intended to be installed in accordance with NFPA 13 and the manufacturer's installation instructions.
- SIZE:** 1/2" or 3/4" mounting holes
Braces up to 8" Pipe MAX
- FINISH:** Electro-galvanized
- MATERIAL:** Low Carbon Steel, 2 X 2 X 1/4 Angle
- INSTALL:** Attach to the structural surface as noted in NFPA13 fastener tables. Please note that the two outermost bolt holes must be used and the middle bolt hole should be used only in conjunction with both outermost bolt holes to ensure concentric loading. Attach a PHD Manufacturing structural attachment fitting to PHD Fig. 025 and follow the instructions provided with said fitting. The PHD structural attachment fitting can pivot around the mounting connection for adjustment to the desired brace angle. Please note that the maximum load will be limited by the PHD Manufacturing structural attachment utilized with this adapter.
- APPROVALS:** Underwriters Laboratories listed for US and Canada
Listed for use with NFPA fastener tables and PHD sway brace components only
- ORDERING:** Factory Mutual regards this device as part of the building structure
Specify figure number and fastener size

**Fig. 025
MULTI-FASTENER
ADAPTER**



UL Maximum Design Load (8" Pipe Max)					
Fastener Size		lbs.	kN	Weight Ea.	
				lbs.	kg
1/2	(12.7)	2015	(8.96)	3.19	(1.45)
3/4	(19.1)	2015	(8.96)	3.19	(1.45)

*NOTE: All connecting fasteners are sold separately.

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



PHD Manufacturing, Inc.

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

FIG. 025 SWAY BRACE MULTI-FASTENER ADAPTER

Bolt Hole Size: 1/2" Or 3/4"

Pipe Braced: 8" Max (Maximum load of 2015 lbs.)

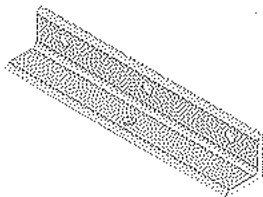
Please note that the maximum load will be limited by the PHD Manufacturing structural attachment utilized with this adapter

Function: Sway brace adapter designed to provide greater load capacities by providing multiple fastener attachments. The required type, number and size of fasteners used for the sway brace adapter shall be in accordance with NFPA 13. Sway brace assemblies are intended to be installed in accordance with NFPA 13 and the manufacturer's installation instructions.

Approvals: Underwriters Laboratories listed for US and Canada

Material: Low Carbon Steel

Installation: Attach Fig. 025 to mounting surface using appropriate fasteners. Please note that the two outermost bolt holes must be used and the middle bolt hole should be used only in conjunction with both outermost bolt holes to ensure concentric loading. Then attach a PHD structural attachment fitting to Fig. 025 and follow the instructions provided with said fitting. For use in both lateral and longitudinal brace assembly.



The Complete Line of Pipe Supports and Devices

Pipe Hangers ▲ Strut & Accessories ▲ Pipe Clamps ▲ Beam Clamps ▲ Shields

KWIK Bolt 3 Expansion Anchor 3.3.8

3.3.8.1 Product description

The KWIK Bolt 3 (KB3) is a torque controlled expansion anchor, which provides consistent performance for a wide range of mechanical anchor applications. This anchor series is available in carbon steel with zinc electroplated coating, carbon steel with hot-dip galvanized coating, 304 stainless steel and 316 stainless steel versions. The threaded stud version of the anchor is available in a variety of diameters ranging from 1/4- to 1-in. depending on the steel and coating type. Applicable base materials include normal-weight concrete, structural lightweight concrete, lightweight concrete over metal deck, and grout-filled concrete masonry.

Product features

- Length identification code facilitates quality control and inspection after installation.
- Through fixture installation and variable thread lengths improve productivity and accommodate various base plate thicknesses.
- Raised impact section (Dog Point) prevents thread damage during installation.
- Anchor size is same as drill bit size for easy installation. For temporary applications anchors may be driven into drilled holes after usage.
- Mechanical expansion allows immediate load application.

Guide specifications

Torque-controlled expansion anchor shall be Hilti KWIK Bolt 3. KWIK Bolt 3 anchors meet the description of Federal Specification A-A 1923A, Type 4. The anchor bears a length identification mark embossed on the impact section (dog point) of the anchor identifying the anchor as a Hilti KWIK Bolt 3.

Carbon steel Kwik Bolt 3 anchors have a carbon steel anchor body, carbon steel nut and carbon steel washer. Anchor body, nut and washer have zinc plating conforming to ASTM B633 with a minimum thickness of 5 µm.

AISI Type 304 stainless steel Kwik Bolt 3 anchors have an anchor body, nut and washer That conform to AISI Type 304. The expansion wedges conform to either AISI Type 304 stainless steel or either AISI Type 316 stainless steel.

AISI Type 316 stainless steel Kwik Bolt 3 anchors have an anchor body, nut and washer That conform to AISI Type 316. The expansion wedges conform to AISI Type 316 stainless steel.

Hot-dip galvanized Kwik Bolt 3 anchors have a carbon steel anchor body, carbon steel nut and carbon steel washer. Anchor body, nut and washer have zinc plating conforming to ASTM A153 with an average thickness of 53 µm. The expansion wedges conform to either AISI Type 304 stainless steel or either AISI Type 316 stainless steel.

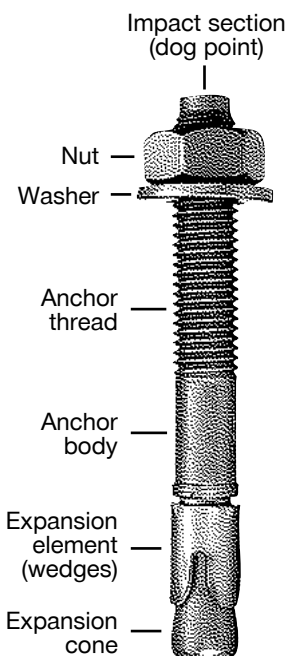
3.3.8.1 Product description

3.3.8.2 Material specifications

3.3.8.3 Technical data

3.3.8.4 Installation instructions

3.3.8.5 Ordering information



3.3.8

Listings/Approvals

ICC-ES (International Code Council)
ESR-2302

ICC-ES (International Code Council)
ESR-1385 Grout-filled concrete masonry
City of Los Angeles
Research Report No. 25577
Research Report No. 25577M
for masonry

FM (Factory Mutual)
Pipe Hanger Components for
Automatic Sprinkler for 3/8 through 3/4

UL LLC
UL 203 Pipe Hanger Equipment for Fire
Protection Services for 3/8 through 3/4
Qualified under an NQA-1 Nuclear
Quality Program



*Please refer to the reports to verify that the type and diameter specified is included

Independent code evaluation

IBC® / IRC® 2012

IBC® / IRC® 2009

IBC® / IRC® 2006

IBC® / IRC® 2003

3.3.8 KWIK Bolt 3 Expansion Anchor

3.3.8.2 Material specifications

Carbon steel with electroplated zinc

All carbon steel KWIK Bolt 3 and Rod Coupling Anchors, excluding the 3/4 x 12 and 1-inch diameter sizes, have the tensile bolt fracture loads shown in table 1.

All carbon steel 3/4 x 12 and 1 inch diameter sizes and carbon steel KWIK Bolt 3 Countersunk anchor bodies have mechanical properties as listed in table 1.

Carbon steel anchor components plated in accordance with ASTM B633 to a minimum thickness of 5 µm.

Nuts conform to the requirements of ASTM A563, Grade A, Hex.

Washers meet the requirements of ASTM F844.

Expansion wedges are manufactured from carbon steel, except the following anchors have stainless steel wedges:

- All 1/4-inch diameter anchors
- 3/4x12
- All 1-inch diameter anchors
- All KWIK Bolt 3 Countersunk

Carbon steel with hot-dip galvanized plating

Anchor bodies manufactured from carbon steel have the tensile bolt fracture loads shown in table 1.

Carbon steel anchor components have an average zinc plating thickness greater than 53 µm according to ASTM A153, Class C.

Nuts conform to the requirements of ASTM A563, Grade A, Hex.

Washers meet the requirements of ASTM F844.

Stainless steel expansion wedges are manufactured from either AISI Type 304 or Type 316.

Stainless steel

Anchor bodies smaller than 3/4-inch, excluding all KWIK Bolt 3 Countersunk, are produced from AISI Type 304 or Type 316 stainless steel having the bolt fracture loads shown in table 1.

Anchor bodies 3/4-inch and larger, and all stainless steel KWIK Bolt 3 Countersunk anchor bodies, are produced from AISI Type 304 or Type 316 stainless steel having the mechanical properties shown in table 1.

Nuts meet the dimensional requirements of ASTM F594.

Washers meet the dimensional requirements of ANSI B18.22.1, Type A, plain.

Stainless steel expansion wedges for AISI Type 304 are made from either AISI Type 304 or Type 316. Stainless steel expansion wedges for AISI Type 316 anchors are made from type 316. All stainless steel nuts and washers for AISI Type 304 or Type 316 anchors are manufactured from AISI Type 304 or 316, respectively.

Table 1 - KWIK Bolt 3 Bolt fracture load (lb)¹

Nominal anchor diameter	Carbon steel	Hot-dip galvanized	Stainless steel
1/4	2,900	no offering	2,900
3/8	7,200	no offering	7,200
1/2	12,400	12,400	12,400
5/8	19,600	19,600	21,900
3/4	28,700	28,700	$f_{uta} \geq 76, f_{ya} \geq 64^2$
1	$f_{uta} \geq 88, f_{ya} \geq 75^2$	no offering	$f_{uta} \geq 76, f_{ya} \geq 64^2$

1 Bolt fracture loads are determined by testing in a universal tensile machine for quality control at the manufacturing facility. These loads are not intended for design use. See tables 4 and 12 for the steel design strengths of carbon steel and stainless steel, respectively.

2 All 3/4-in. stainless steel, 3/4x12 carbon steel, all 1-in. carbon steel and all 1-in. stainless steel material strengths specified by the tensile and yield strengths expressed in (ksi). Bolt fracture loads not applicable for these models.

KWIK Bolt 3 Expansion Anchor 3.3.8

3.3.8.3.1 Technical data for concrete

The load values contained in this section are Hilti Simplified Design Tables. The load tables in this section were developed using the Strength Design parameters and variables of ESR-2302 and the equations within ACI 318-11 Appendix D. For a detailed explanation of the Hilti Simplified Design Tables, refer to section 3.1.7. Data tables from

ESR-2302 are not contained in this section, but can be found at www.icc-es.org or at www.us.hilti.com.

Allowable Stress Design or ASD technical information and data tables can be found at www.us.hilti.com.

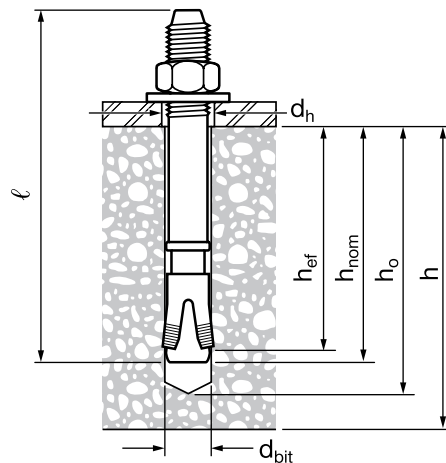


Figure 1 - KWIK Bolt 3 installation

3.3.8

Table 2 - Carbon Steel KWIK Bolt 3 specifications

Setting information	Symbol	Units	Nominal anchor diameter									
			1/4	3/8	1/2	5/8	3/4	1	1 1/4	1 1/2	1 3/4	2
Drill bit dia.	d_{bit}		1/4	3/8	1/2	5/8	3/4	1	1 1/4	1 1/2	1 3/4	2
Minimum nominal embedment	h_{nom}	in. (mm)	1-3/4 (44)	2-3/8 (60)	2-1/4 (57)	3-5/8 (92)	3-1/2 (89)	4-3/8 (111)	4-1/4 (108)	5-5/8 (143)	4-5/8 (117)	6-3/8 (162)
Minimum effective embedment	h_{ef}	in. (mm)	1-1/2 (38)	2 (51)	2 (51)	3-1/4 (83)	3-1/8 (79)	4 (102)	3-3/4 (95)	5 (127)	4 (102)	5-3/4 (146)
Minimum hole depth	h_o	in. (mm)	2 (51)	2-5/8 (67)	2-5/8 (67)	4 (102)	3-7/8 (98)	4-3/4 (121)	4-1/2 (114)	5-3/4 (146)	5 (127)	6-3/4 (171)
Fixture hole diameter	d_h	in.	5/16	7/16	9/16	11/16	13/16	1 1/8	1 1/4	1 1/2	1 3/4	2
Anchor length	ℓ		See ordering information									
Installation torque	T_{inst}	ft-lb (Nm)	4 (5)	20 (27)	40 (54)	60 (81)	110 (149)	150 (203)	200 (271)	250 (338)	300 (408)	350 (474)
Wrench size		in.	7/16	9/16	3/4	15/16	1-1/8	1-1/2	1 3/4	2	2 1/4	2 3/4

3.3.8 KWIK Bolt 3 Expansion Anchor

Table 3 - Hilti KWIK Bolt 3 carbon steel design strength with concrete / pullout failure in uncracked concrete^{1,2,3,4}

Nominal anchor diameter	Effective embed. in. (mm)	Nominal embed. in. (mm)	Tension - ϕN_n				Shear - ϕV_n			
			$f'_c = 2500$ psi lb (kN)	$f'_c = 3000$ psi lb (kN)	$f'_c = 4000$ psi lb (kN)	$f'_c = 6000$ psi lb (kN)	$f'_c = 2500$ psi lb (kN)	$f'_c = 3000$ psi lb (kN)	$f'_c = 4000$ psi lb (kN)	$f'_c = 6000$ psi lb (kN)
1/4	1-1/2 (38)	1-3/4 (44)	1,025 (4.6)	1,080 (4.8)	1,180 (5.2)	1,330 (5.9)	1,545 (6.9)	1,690 (7.5)	1,950 (8.7)	2,390 (10.6)
3/8	2 (51)	2-3/8 (60)	2,205 (9.8)	2,415 (10.7)	2,790 (12.4)	3,420 (15.2)	2,375 (10.6)	2,605 (11.6)	3,005 (13.4)	3,680 (16.4)
1/2	2 (51)	2-1/4 (57)	2,205 (9.8)	2,415 (10.7)	2,790 (12.4)	3,420 (15.2)	2,375 (10.6)	2,605 (11.6)	3,005 (13.4)	3,680 (16.4)
	3-1/4 (83)	3-1/2 (89)	4,420 (19.7)	4,840 (21.5)	5,590 (24.9)	6,845 (30.4)	9,845 (43.8)	10,785 (48.0)	12,450 (55.4)	15,250 (67.8)
5/8	3-1/8 (79)	3-1/2 (89)	4,310 (19.2)	4,720 (21.0)	5,450 (24.2)	6,675 (29.7)	9,280 (41.3)	10,165 (45.2)	11,740 (52.2)	14,380 (64.0)
	4 (102)	4-3/8 (111)	6,240 (27.8)	6,835 (30.4)	7,895 (35.1)	9,665 (43.0)	13,440 (59.8)	14,725 (65.5)	17,000 (75.6)	20,820 (92.6)
3/4	3-3/4 (95)	4-1/4 (108)	5,665 (25.2)	6,205 (27.6)	7,165 (31.9)	8,775 (39.0)	12,200 (54.3)	13,365 (59.5)	15,430 (68.6)	18,900 (84.1)
	5 (127)	5-1/2 (140)	6,880 (30.6)	7,535 (33.5)	8,705 (38.7)	10,660 (47.4)	18,785 (83.6)	20,575 (91.5)	23,760 (105.7)	29,100 (129.4)

1 See section 3.1.7.3 to convert design strength value to ASD value.

2 Linear interpolation between embedment depths and concrete compressive strengths is not permitted.

3 Apply spacing, edge distance, and concrete thickness factors in tables 6 to 10 as necessary. Compare to steel values in table 4. The lesser of the values is to be used for the design.

4 Tabular values are for normal weight concrete only. For lightweight concrete multiply design strength by λ_a as follows: for sand-lightweight, $\lambda_a = 0.68$; for all-lightweight, $\lambda_a = 0.60$

Table 4 - Steel design strength for Hilti KWIK Bolt 3 carbon steel anchors^{1,2}

Nominal anchor diameter	Nominal embedment in. (mm)	Tensile ³ ϕN_{sa} lb (kN)	Shear ⁴ ϕV_{sa} lb (kN)
1/4	1-3/4 (44)	1,590 (7.1)	1,065 (4.7)
3/8	2-3/8 (60)	4,770 (21.2)	2,905 (12.9)
1/2	2-1/4 (57)	8,745 (38.9)	4,315 (19.2)
	3-1/2 (89)		4,390 (19.5)
5/8	3-1/2 (89)	13,515 (60.1)	7,950 (35.4)
	4-3/8 (111)		
3/4	4-1/4 (108)	19,080 (84.9)	10,180 (45.3)
	5-1/2 (140)		10,785 (48.0)

1 See section 3.1.7.3 to convert design strength value to ASD value.

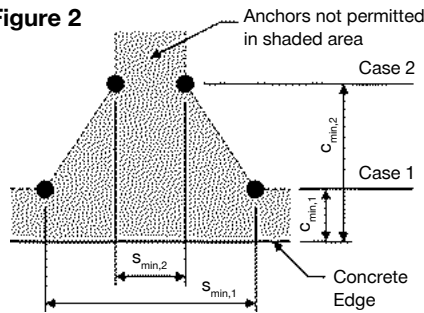
2 KWIK Bolt 3 carbon steel anchors are to be considered ductile steel elements.

3 Tensile $\phi N_{sa} = \phi A_{se,N} f_{uta}$ as noted in ACI 318 Appendix D.

4 Shear values determined by static shear tests with $\phi V_{sa} < \phi 0.60 A_{se,V} f_{uta}$ as noted in ACI 318 Appendix D.

KWIK Bolt 3 Expansion Anchor 3.3.8

Figure 2



For a specific edge distance, the permitted spacing is calculated as follows:

$$s \geq s_{\min,2} + \frac{(s_{\min,1} - s_{\min,2})}{(c_{\min,1} - c_{\min,2})} (c - c_{\min,2})$$

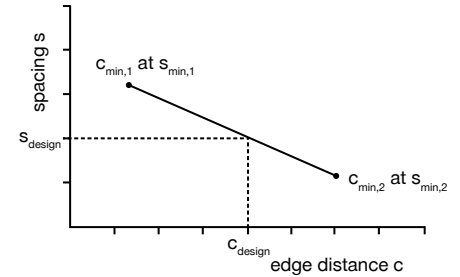


Table 5 - Carbon steel KWIK Bolt 3 installation parameters¹

Setting information	Symbol	Units	Nominal anchor diameter d _o												
			1/4	3/8	1/2				5/8		3/4				
Effective minimum embedment	h _{ef}	in. (mm)	1-1/2 (38)	2 (51)		2 (51)		3-1/4 (83)		3-1/8 (79)	4 (102)		3-3/4 (95)		5 (127)
Minimum member thickness	h _{min}	in. (mm)	4 (102)	4 (102)	5 (127)	4 (102)	5 (127)	6 (152)	8 (203)	5 (127)	6 (152)	8 (203)	6 (152)	8 (203)	8 (203)
Case 1	c _{min,1}	in. (mm)	1-3/8 (35)	2 (51)	1-1/2 (38)	2-1/8 (54)	2 (51)	1-5/8 (41)	1-5/8 (41)	2-1/4 (57)	1-3/4 (44)	1-3/4 (44)	2-3/4 (70)	2-5/8 (67)	2-1/2 (64)
	for s _{min,1} ≥	in. (mm)	1-3/4 (44)	2-7/8 (73)	3-1/2 (89)	4-7/8 (124)	4-3/4 (121)	4-1/4 (108)	4 (102)	5-1/4 (133)	4-3/4 (121)	4 (102)	6-7/8 (175)	6-1/2 (165)	6-3/8 (162)
Case 2	c _{min,2}	in. (mm)	1-5/8 (41)	2-3/8 (60)	2-3/8 (60)	2-5/8 (67)	2-3/8 (60)	2-1/4 (57)	2 (51)	3-1/8 (79)	2-3/8 (60)	2-1/4 (57)	3-3/4 (95)	3-3/8 (86)	3-3/8 (86)
	for s _{min,2} ≥	in. (mm)	1-1/4 (32)	1-3/4 (44)	1-3/4 (44)	2-1/2 (64)	2-1/4 (57)	2 (51)	1-7/8 (48)	2-3/8 (60)	2-1/8 (54)	2-1/8 (54)	3-3/4 (95)	3-3/8 (86)	3-1/4 (83)

- 1 Linear interpolation is permitted to establish an edge distance and spacing combination between Case 1 and Case 2. Linear interpolation for a specific edge distance c , where $c_{\min,1} < c < c_{\min,2}$ will determine the permissible spacings.

3.3.8

Table 6 - Load adjustment factors for 1/4-in. diameter KWIK Bolt 3 carbon steel anchor in uncracked concrete^{1,2}

1/4-in. KB3 carbon steel uncracked concrete		Spacing factor in tension f_{AN}	Edge distance factor in tension f_{RN}	Spacing factor in shear ³ f_{AV}	Edge distance in shear		Concrete thickness factor in shear ⁴ f_{HV}
					⊥ toward edge f_{RV}	To edge f_{RV}	
Embedment h_{nom}		1-3/4	1-3/4	1-3/4	1-3/4	1-3/4	1-3/4
Spacing (s) / Edge Distance (c _e) / Concrete Thickness (h) - in. (mm)	in. (mm)	(44)	(44)	(44)	(44)	(44)	(44)
	1-1/4 (32)	0.64	n/a	0.56	n/a	n/a	n/a
	1-3/8 (35)	0.65	0.58	0.57	0.26	0.51	n/a
	1-1/2 (38)	0.67	0.61	0.57	0.29	0.58	n/a
	2 (51)	0.72	0.75	0.60	0.45	0.75	n/a
	3 (76)	0.83	1.00	0.65	0.83	1.00	n/a
	3-1/2 (89)	0.89		0.67	1.00		n/a
	4 (102)	0.94		0.70			0.88
	4-1/2 (114)	1.00		0.72			0.94
	5 (127)			0.74			0.99
	5-1/2 (140)			0.77			1.00
	6 (152)			0.79			
	7 (178)			0.84			
	8 (203)			0.89			
	9 (229)			0.94			
	10 (254)			0.99			
	11 (279)			1.00			

- 1 Linear interpolation not permitted.
2 When combining multiple load adjustment factors (e.g. for a 4 anchor pattern in a corner with thin concrete member) the design can become very conservative. To optimize the design, use Hilti PROFIS Anchor Design software or perform anchor calculation using design equations from ACI 318 Appendix D.
3 Spacing factor reduction in shear, f_{AV} , assumes an influence of a nearby edge. If no edge exists, then $f_{AV} = f_{AN}$.
4 Concrete thickness reduction factor in shear, f_{HV} , assumes an influence of a nearby edge. If no edge exists, then $f_{HV} = 1.0$.

If a reduction factor value is in a shaded cell, this indicates that this specific edge distance may not be permitted with a certain spacing (or vice versa). Check with table 5 and figure 2 of this section to calculate permissible edge distance, spacing and concrete thickness combinations. Use of Hilti KWIK Bolt 3 anchors with edge distance and spacing dimensions smaller than what is noted in this table is permitted.

3.3.8 KWIK Bolt 3 Expansion Anchor

Table 7 - Load adjustment factors for 3/8-in. diameter KWIK Bolt 3 carbon steel anchor in uncracked concrete^{1,2}

3/8-in. KB3 carbon steel uncracked concrete		Spacing factor in tension f_{AN}	Edge distance factor in tension f_{RN}	Spacing factor in shear ³ f_{AV}	Edge distance in shear		Concrete thickness factor in shear ⁴ f_{HV}
					⊥ Toward edge f_{RV}	∥ To edge f_{RV}	
Embedment h_{nom}		2-3/8	2-3/8	2-3/8	2-3/8	2-3/8	2-3/8
Spacing (s) / edge distance (c _a) / concrete thickness (h) - in. (mm)	in. (mm)	(60)	(60)	(60)	(60)	(60)	(60)
	1-3/4 (44)	0.65	n/a	0.57	n/a	n/a	n/a
	2 (51)	0.67	0.50	0.58	0.35	0.50	n/a
	2-1/2 (64)	0.71	0.58	0.60	0.49	0.58	n/a
	3 (76)	0.75	0.67	0.62	0.64	0.67	n/a
	3-1/4 (83)	0.77	0.72	0.63	0.72	0.72	n/a
	3-1/2 (89)	0.79	0.78	0.64	0.81	0.81	n/a
	4 (102)	0.83	0.89	0.67	0.99	0.99	0.81
	4-1/2 (114)	0.88	1.00	0.69	1.00	1.00	0.86
	5 (127)	0.92		0.71			0.91
	6 (152)	1.00		0.75			1.00
	7 (178)			0.79			
	8 (203)			0.83			
	9 (229)			0.87			
	10 (254)			0.91			
	11 (279)			0.95			
	12 (305)			1.00			

Table 8 - Load adjustment factors for 1/2-in. diameter KWIK Bolt 3 carbon steel anchor in uncracked concrete^{1,2}

1/2-in. KB3 carbon steel uncracked concrete		Spacing factor in tension f_{AN}		Edge distance factor in tension f_{RN}	Spacing factor in shear ³ f_{AV}	Edge distance in shear				Concrete thickness factor in shear ⁴ f_{HV}	
						⊥ Toward edge f_{RV}	∥ To edge f_{RV}	⊥ Toward edge f_{RV}	∥ To edge f_{RV}		
Embedment h_{nom}		2-1/4	3-1/2	2-1/4	3-1/2	2-1/4	3-1/2	2-1/4	3-1/2	2-1/4	3-1/2
Spacing (s) / edge distance (c _a) / concrete thickness (h) - in. (mm)	in. (mm)	(57)	(89)	(57)	(89)	(57)	(89)	(57)	(89)	(57)	(89)
	1-5/8 (41)	n/a	n/a	n/a	0.39	n/a	n/a	n/a	0.07	n/a	0.15
	2 (51)	n/a	0.60	n/a	0.42	n/a	0.54	n/a	0.10	n/a	0.20
	2-1/8 (54)	n/a	0.61	0.48	0.43	n/a	0.54	0.42	0.11	0.48	0.22
	2-1/2 (64)	0.71	0.63	0.54	0.47	0.61	0.55	0.53	0.14	0.54	0.28
	3 (76)	0.75	0.65	0.62	0.52	0.63	0.55	0.70	0.19	0.70	0.37
	3-1/2 (89)	0.79	0.68	0.72	0.57	0.65	0.56	0.88	0.23	0.88	0.47
	4 (102)	0.83	0.71	0.82	0.62	0.68	0.57	1.00	0.29	1.00	0.57
	4-1/2 (114)	0.88	0.73	0.92	0.68	0.70	0.58		0.34		0.68
	5 (127)	0.92	0.76	1.00	0.74	0.72	0.59		0.40		0.74
	6 (152)	1.00	0.81		0.89	0.76	0.61		0.53		0.89
	7 (178)		0.86		1.00	0.81	0.63		0.66		1.00
	8 (203)		0.91			0.85	0.64		0.81		
	9 (229)		0.96			0.89	0.66		0.97		
	10 (254)		1.00			0.94	0.68		1.00		
	11 (279)					0.98	0.70				
	12 (305)					1.00	0.72				
	14 (356)						0.75				
	16 (406)						0.79				
	18 (457)						0.83				
	20 (508)						0.86				
	> 24 (610)						0.93				

1 Linear interpolation not permitted.

2 When combining multiple load adjustment factors (e.g. for a 4 anchor pattern in a corner with thin concrete member) the design can become very conservative. To optimize the design, use Hilti PROFIS Anchor Design software or perform anchor calculation using design equations from ACI 318 Appendix D.

3 Spacing factor reduction in shear, f_{AV} , assumes an influence of a nearby edge. If no edge exists, then $f_{AV} = f_{AN}$.

4 Concrete thickness reduction factor in shear, f_{HV} , assumes an influence of a nearby edge. If no edge exists, then $f_{HV} = 1.0$.

□ If a reduction factor value is in a shaded cell, this indicates that this specific edge distance may not be permitted with a certain spacing (or vice versa). Check with table 5 and figure 2 of this section to calculate permissible edge distance, spacing and concrete thickness combinations. Use of Hilti KWIK Bolt 3 anchors with edge distance and spacing dimensions smaller than what is noted in this table is permitted.

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Table 9 - Load adjustment factors for 5/8-in. diameter KWIK Bolt 3 carbon steel anchor in uncracked concrete^{1,2}

5/8-in. KB3 carbon steel uncracked concrete		Spacing factor in tension f_{AN}		Edge distance factor in tension f_{RN}		Spacing factor in shear ³ f_{AV}		Edge distance in shear				Conc. thickness factor in shear ⁴ f_{HV}	
								⊥ toward edge f_{RV}		to edge f_{RV}			
		Embedment h_{nom}		3-1/2 (89)	4-3/8 (111)	3-1/2 (89)	4-3/8 (111)	3-1/2 (89)	4-3/8 (111)	3-1/2 (89)	4-3/8 (111)	3-1/2 (89)	4-3/8 (111)
Spacing (s) / edge distance (c_a) / concrete thickness (h) - in. (mm)	in. (mm)												
	1-3/4 (44)	n/a	n/a	n/a	0.32	n/a	n/a	n/a	0.07	n/a	0.14	n/a	n/a
	2 (51)	n/a	n/a	n/a	0.34	n/a	n/a	n/a	0.08	n/a	0.17	n/a	n/a
	2-1/8 (54)	n/a	0.59	n/a	0.34	n/a	0.53	n/a	0.09	n/a	0.18	n/a	n/a
	2-1/4 (57)	n/a	0.59	0.39	0.35	n/a	0.54	0.14	0.10	0.27	0.20	n/a	n/a
	2-3/8 (60)	0.63	0.60	0.40	0.36	0.55	0.54	0.15	0.11	0.30	0.21	n/a	n/a
	2-1/2 (64)	0.63	0.60	0.41	0.37	0.55	0.54	0.16	0.12	0.32	0.23	n/a	n/a
	3 (76)	0.66	0.63	0.46	0.40	0.56	0.55	0.21	0.15	0.42	0.30	n/a	n/a
	4 (102)	0.71	0.67	0.55	0.47	0.58	0.56	0.32	0.23	0.55	0.47	n/a	n/a
	5 (127)	0.77	0.71	0.67	0.55	0.60	0.58	0.45	0.33	0.67	0.55	0.63	n/a
	6 (152)	0.82	0.75	0.80	0.63	0.62	0.59	0.59	0.43	0.80	0.63	0.69	0.62
	7 (178)	0.87	0.79	0.93	0.74	0.64	0.61	0.75	0.54	0.93	0.74	0.74	0.67
	8 (203)	0.93	0.83	1.00	0.84	0.66	0.63	0.91	0.66	1.00	0.84	0.79	0.71
	9 (229)	0.98	0.88		0.95	0.68	0.64	1.00	0.79		0.95	0.84	0.75
	10 (254)	1.00	0.92		1.00	0.70	0.66		0.92		1.00	0.89	0.80
	11 (279)		0.96			0.72	0.67		1.00			0.93	0.83
	12 (305)		1.00			0.74	0.69					0.97	0.87
	14 (356)					0.77	0.72					1.00	0.94
	16 (406)					0.81	0.75						1.00
	18 (457)					0.85	0.78						
	20 (508)					0.89	0.82						
	24 (610)					0.97	0.88						
	> 30 (762)					1.00	0.97						

3.3.8

Table 10 - Load adjustment factors for 3/4-in. diameter KWIK Bolt 3 carbon steel anchor in uncracked concrete^{1,2}

3/4-in. KB3 carbon steel uncracked concrete		Spacing factor in tension f_{AN}		Edge distance factor in tension f_{RN}		Spacing factor in shear ³ f_{AV}		Edge distance in shear				Conc. thickness factor in shear ⁴ f_{HV}	
								$\perp$ toward edge f_{RV}		$\parallel$ to edge f_{RV}			
		Embedment h_{nom}		4-1/4 (108)	5-1/2 (140)	4-1/4 (108)	5-1/2 (140)	4-1/4 (108)	5-1/2 (140)	4-1/4 (108)	5-1/2 (140)	4-1/4 (108)	5-1/2 (140)
Spacing (s) / edge distance (c_e) / concrete thickness (h) - in. (mm)	in. (mm)												
	2-1/2 (64)	n/a	n/a	n/a	0.42	n/a	n/a	n/a	0.09	n/a	0.18	n/a	n/a
	2-3/4 (70)	n/a	n/a	0.36	0.44	n/a	n/a	0.15	0.11	0.31	0.21	n/a	n/a
	3 (76)	n/a	n/a	0.38	0.45	n/a	n/a	0.17	0.12	0.35	0.24	n/a	n/a
	3-1/4 (83)	n/a	0.61	0.40	0.47	n/a	0.54	0.20	0.14	0.39	0.27	n/a	n/a
	3-1/2 (89)	n/a	0.62	0.41	0.49	n/a	0.55	0.22	0.15	0.41	0.30	n/a	n/a
	3-3/4 (95)	0.67	0.63	0.43	0.50	0.57	0.55	0.24	0.17	0.43	0.34	n/a	n/a
	4 (102)	0.68	0.63	0.45	0.52	0.57	0.55	0.27	0.18	0.45	0.37	n/a	n/a
	4-1/2 (114)	0.70	0.65	0.49	0.56	0.58	0.56	0.32	0.22	0.49	0.44	n/a	n/a
	5 (127)	0.72	0.67	0.53	0.59	0.59	0.57	0.38	0.26	0.53	0.52	n/a	n/a
	6 (152)	0.77	0.70	0.62	0.67	0.60	0.58	0.49	0.34	0.62	0.67	0.65	n/a
	7 (178)	0.81	0.73	0.72	0.75	0.62	0.59	0.62	0.43	0.72	0.75	0.70	n/a
	8 (203)	0.86	0.77	0.82	0.84	0.64	0.61	0.76	0.52	0.82	0.84	0.75	0.66
	9 (229)	0.90	0.80	0.92	0.95	0.66	0.62	0.91	0.62	0.92	0.95	0.79	0.70
	10 (254)	0.94	0.83	1.00	1.00	0.67	0.64	1.00	0.73	1.00	1.00	0.83	0.74
	11 (279)	0.99	0.87			0.69	0.65		0.84			0.87	0.77
	12 (305)	1.00	0.90			0.71	0.66		0.96			0.91	0.81
	14 (356)		0.97			0.74	0.69		1.00			0.99	0.87
	16 (406)		1.00			0.78	0.72					1.00	0.93
	18 (457)					0.81	0.74						0.99
	20 (508)					0.85	0.77						1.00
	24 (610)					0.92	0.82						
	30 (762)					1.00	0.91						
	> 36 (914)						0.99						

1 Linear interpolation not permitted.

2 When combining multiple load adjustment factors (e.g. for a 4 anchor pattern in a corner with thin concrete member) the design can become very conservative. To optimize the design, use Hilti PROFIS Anchor Design software or perform anchor calculation using design equations from ACI 318 Appendix D.

3 Spacing factor reduction in shear, f_{AV} , assumes an influence of a nearby edge. If no edge exists, then $f_{AV} = f_{AN}$.

4 Concrete thickness reduction factor in shear, f_{HV} , assumes an influence of a nearby edge. If no edge exists, then $f_{HV} = 1.0$.

If a reduction factor value is in a shaded cell, this indicates that this specific edge distance may not be permitted with a certain spacing (or vice versa). Check with table 5 and figure 2 of this section to calculate permissible edge distance, spacing and concrete thickness combinations. Use of Hilti KWIK Bolt 3 anchors with edge distance and spacing dimensions smaller than what is noted in this table is permitted.

3.3.8 KWIK Bolt 3 Expansion Anchor

Table 11 - Hilti KWIK Bolt 3 stainless steel design strength with concrete / pullout failure in uncracked concrete^{1,2,3,4}

Nominal anchor diameter	Effective embed. in. (mm)	Nominal embed. in. (mm)	Tension - ϕN_n				Shear - ϕV_n			
			$f'_c = 2500$ psi lb (kN)	$f'_c = 3000$ psi lb (kN)	$f'_c = 4000$ psi lb (kN)	$f'_c = 6000$ psi lb (kN)	$f'_c = 2500$ psi lb (kN)	$f'_c = 3000$ psi lb (kN)	$f'_c = 4000$ psi lb (kN)	$f'_c = 6000$ psi lb (kN)
1/4	1-1/2 (38)	1-3/4 (44)	730 (3.2)	770 (3.4)	840 (3.7)	950 (4.2)	1,545 (6.9)	1,690 (7.5)	1,950 (8.7)	2,390 (10.6)
3/8	2 (51)	2-3/8 (60)	1,925 (8.6)	2,110 (9.4)	2,440 (10.9)	2,985 (13.3)	2,375 (10.6)	2,605 (11.6)	3,005 (13.4)	3,680 (16.4)
1/2	2 (51)	2-1/4 (57)	2,150 (9.6)	2,355 (10.5)	2,720 (12.1)	3,335 (14.8)	2,375 (10.6)	2,605 (11.6)	3,005 (13.4)	3,680 (16.4)
	3-1/4 (83)	3-1/2 (89)	3,920 (17.4)	4,295 (19.1)	4,960 (22.1)	6,070 (27.0)	9,845 (43.8)	10,785 (48.0)	12,450 (55.4)	15,250 (67.8)
5/8	3-1/8 (79)	3-1/2 (89)	4,050 (18.0)	4,435 (19.7)	5,120 (22.8)	6,275 (27.9)	9,280 (41.3)	10,165 (45.2)	11,740 (52.2)	14,380 (64.0)
	4 (102)	4-3/8 (111)	5,090 (22.6)	5,575 (24.8)	6,440 (28.6)	7,885 (35.1)	13,440 (59.8)	14,725 (65.5)	17,000 (75.6)	20,820 (92.6)
3/4	3-3/4 (95)	4-1/4 (108)	5,560 (24.7)	6,090 (27.1)	7,035 (31.3)	8,615 (38.3)	12,200 (54.3)	13,365 (59.5)	15,430 (68.6)	18,900 (84.1)
	5 (127)	5-1/2 (140)	7,040 (31.3)	7,710 (34.3)	8,905 (39.6)	10,905 (48.5)	18,785 (83.6)	20,575 (91.5)	23,760 (105.7)	29,100 (129.4)
1	4 (102)	4-1/2 (114)	6,240 (27.8)	6,835 (30.4)	7,895 (35.1)	9,665 (43.0)	13,440 (59.8)	14,725 (65.5)	17,000 (75.6)	20,820 (92.6)
	5-3/4 (146)	6-1/4 (159)	10,110 (45.0)	11,070 (49.2)	12,785 (56.9)	15,660 (69.7)	23,165 (103.0)	25,375 (112.9)	29,300 (130.3)	35,885 (159.6)

1 See section 3.1.7.3 to convert design strength value to ASD value.

2 Linear interpolation between embedment depths and concrete compressive strengths is not permitted.

3 Apply spacing, edge distance, and concrete thickness factors in tables 14 to 19 as necessary. Compare to steel values in table 12. The lesser of the values is to be used for the design.

4 Tabular values are for normal-weight concrete only. For lightweight concrete multiply design strength by λ_a as follows: for sand-lightweight, $\lambda_a = 0.68$; for all-lightweight, $\lambda_a = 0.60$

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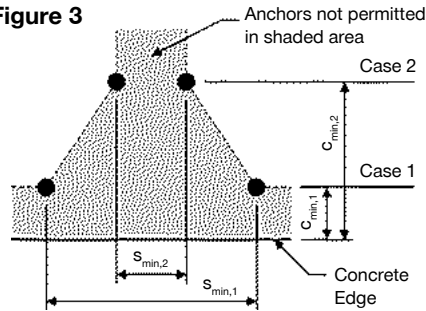
Table 12 - Steel design strength for Hilti KWIK Bolt 3 stainless steel anchors^{1,2}

Nominal anchor diameter	Nominal embedment in. (mm)	Tensile ³ ϕN_{sa} lb (kN)	Shear ⁴ ϕV_{sa} lb (kN)
1/4	1-3/4 (44)	1,725 (7.7)	1,090 (4.8)
3/8	2-3/8 (60)	5,175 (23.0)	3,235 (14.4)
1/2	2-1/4 (57)	9,490 (42.2)	2,725 (12.1)
	3-1/2 (89)		4,510 (20.1)
5/8	3-1/2 (89)	14,665 (65.2)	5,820 (25.9)
	4-3/8 (111)		9,295 (41.3)
3/4	4-1/4 (108)	16,200 (72.1)	7,735 (34.4)
	5-1/2 (140)		15,305 (68.1)
1	4-1/2 (114)	31,735 (141.2)	8,130 (36.2)
	6-1/4 (159)		17,775 (79.1)

- 1 See section 3.1.7.3 to convert design strength value to ASD value.
- 2 KWIK Bolt 3 stainless steel anchors are to be considered ductile steel elements.
- 3 Tensile $\phi N_{sa} = \phi A_{se,N} f_{uta}$ as noted in ACI 318 Appendix D.
- 4 Shear values determined by static shear tests with $\phi V_{sa} < \phi 0.60 A_{se,V} f_{uta}$ as noted in ACI 318 Appendix D.

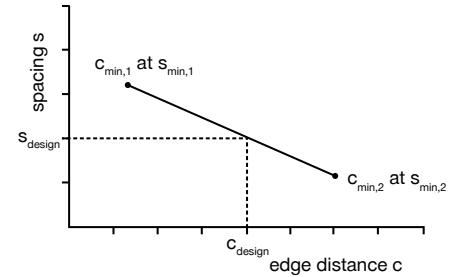
3.3.8 KWIK Bolt 3 Expansion Anchor

Figure 3



For a specific edge distance, the permitted spacing is calculated as follows:

$$s \geq s_{\min,2} + \frac{(s_{\min,1} - s_{\min,2})}{(c_{\min,1} - c_{\min,2})} (c - c_{\min,2})$$

Table 13 - Stainless steel KWIK Bolt 3 installation parameters¹

Setting information	Symbol	Units	Nominal anchor diameter d _o											
			1/4	3/8	1/2		5/8		3/4		1			
Effective minimum embedment	<i>h_{ef}</i>	in. (mm)	1-1/2 (38)	2 (51)	2 (51)	3-1/4 (83)	3-1/8 (79)	4 (102)	3-3/4 (95)	5 (127)	4 (102)	5-3/4 (146)		
Minimum member thickness	<i>h_{min}</i>	in. (mm)	4 (102)	4 (102)	5 (127)	4 (102)	6 (152)	6 (152)	8 (203)	5 (127)	6 (152)	8 (203)	6 (152)	8 (203)
Case 1	<i>c_{min,1}</i>	in. (mm)	1-3/8 (35)	2 (51)	1-5/8 (41)	2-1/2 (68)	1-7/8 (48)	1-5/8 (41)	1-5/8 (41)	3-1/4 (83)	2-1/2 (64)	2-1/2 (64)	3-1/4 (83)	3 (76)
	for <i>s_{min,1}</i> ≥	in. (mm)	1-3/4 (44)	4 (102)	3-5/8 (92)	5 (127)	4-5/8 (117)	4-1/2 (114)	4-1/4 (108)	5-5/8 (143)	5-1/4 (133)	5 (127)	7 (178)	6-7/8 (175)
Case 2	<i>c_{min,2}</i>	in. (mm)	1-5/8 (41)	1-3/4 (83)	2-1/2 (64)	2-7/8 (73)	2-3/8 (60)	2-3/8 (60)	2-1/8 (54)	3-7/8 (98)	3 (76)	2-3/4 (70)	4-1/8 (105)	3-3/4 (95)
	for <i>s_{min,2}</i> ≥	in. (mm)	1-1/4 (32)	2 (51)	1-3/4 (44)	2-1/2 (64)	2-1/4 (57)	2-1/8 (54)	1-7/8 (48)	3-1/8 (79)	2-1/8 (54)	4 (54)	3-1/2 (102)	3-1/2 (89)

¹ Linear interpolation is permitted to establish an edge distance and spacing combination between Case 1 and Case 2.

Linear interpolation for a specific edge distance *c*, where *c_{min,1}* < *c* < *c_{min,2}* will determine the permissible spacings.

Table 14 - Load adjustment factors for 1/4-in. diameter KWIK Bolt 3 stainless steel anchor in uncracked concrete^{1,2}

1/4-in. KB3 stainless steel uncracked concrete		Spacing factor in tension <i>f_{AN}</i>	Edge distance factor in tension <i>f_{RN}</i>	Spacing factor in shear ³ <i>f_{AV}</i>	Edge distance in shear		Concrete thickness factor in shear ⁴ <i>f_{HV}</i>
					⊥ toward edge <i>f_{RV}</i>	∥ to edge <i>f_{RV}</i>	
Embedment <i>h_{nom}</i>		1-3/4	1-3/4	1-3/4	1-3/4	1-3/4	1-3/4
Spacing (s) / edge distance (c) / concrete thickness (h) - in. (mm)	in. (mm)	(44)	(44)	(44)	(44)	(44)	(44)
	1-1/4 (32)	0.64	n/a	0.56	n/a	n/a	n/a
	1-3/8 (35)	0.65	0.53	0.57	0.26	0.51	n/a
	1-1/2 (38)	0.67	0.56	0.57	0.29	0.56	n/a
	2 (51)	0.72	0.68	0.60	0.45	0.68	n/a
	3 (76)	0.83	1.00	0.65	0.83	1.00	n/a
	3-1/2 (89)	0.89		0.67	1.00		n/a
	4 (102)	0.94		0.70			0.88
	4-1/2 (114)	1.00		0.72			0.94
	5 (127)			0.74			0.99
	5-1/2 (140)			0.77			1.00
	6 (152)			0.79			
	7 (178)			0.84			
	8 (203)			0.89			
	9 (229)			0.94			
	10 (254)			0.99			
	11 (279)			1.00			

¹ Linear interpolation not permitted.

² When combining multiple load adjustment factors (e.g. for a 4 anchor pattern in a corner with thin concrete member) the design can become very conservative. To optimize the design, use Hilti PROFIS Anchor Design software or perform anchor calculation using design equations from ACI 318 Appendix D.

³ Spacing factor reduction in shear, *f_{AV}*, assumes an influence of a nearby edge. If no edge exists, then *f_{AV}* = *f_{AN}*.

⁴ Concrete thickness reduction factor in shear, *f_{HV}*, assumes an influence of a nearby edge. If no edge exists, then *f_{HV}* = 1.0.

□ If a reduction factor value is in a shaded cell, this indicates that this specific edge distance may not be permitted with a certain spacing (or vice versa). Check with table 13 and figure 3 of this section to calculate permissible edge distance, spacing and concrete thickness combinations. Use of Hilti KWIK Bolt 3 anchors with edge distance and spacing dimensions smaller than what is noted in this table is permitted.

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Table 15 - Load adjustment factors for 3/8-in. diameter KWIK Bolt 3 stainless steel anchor in uncracked concrete^{1,2}

3/8-in. KB3 stainless steel uncracked concrete		Spacing factor in tension f_{AN}	Edge distance factor in tension f_{RN}	Spacing factor in shear ³ f_{AV}	Edge distance in shear		Concrete thickness factor in shear ⁴ f_{HV}
					⊥ toward edge f_{RV}	to edge f_{RV}	
Embedment h_{nom}		2-3/8	2-3/8	2-3/8	2-3/8	2-3/8	2-3/8
Spacing (s) / edge distance (c_a) / concrete thickness (h) - in. (mm)	in. (mm)	(60)	(60)	(60)	(60)	(60)	(60)
	2 (51)	0.67	0.51	0.58	0.35	0.51	n/a
	2-1/2 (64)	0.71	0.60	0.60	0.49	0.60	n/a
	3 (76)	0.75	0.69	0.62	0.64	0.69	n/a
	3-1/2 (89)	0.79	0.80	0.64	0.81	0.81	n/a
	4 (102)	0.83	0.91	0.67	0.99	0.99	0.81
	4-1/2 (114)	0.88	1.00	0.69	1.00	1.00	0.86
	5 (127)	0.92		0.71			0.91
	6 (152)	1.00		0.75			1.00
	7 (178)			0.79			
	8 (203)			0.83			
	9 (229)			0.87			
	10 (254)			0.91			
	11 (279)			0.95			
	12 (305)			1.00			
	14 (356)						

Table 16 - Load adjustment factors for 1/2-in. diameter KWIK Bolt 3 stainless steel anchor in uncracked concrete^{1,2}

1/2-in. KB3 stainless steel uncracked concrete		Spacing factor in tension f_{AN}		Edge distance factor in tension f_{RN}		Spacing factor in shear ³ f_{AV}		Edge distance in shear				Concrete thickness factor in shear ⁴ f_{HV}	
								⊥ toward edge f_{RV}		to edge f_{RV}			
Embedment h_{nom}		2-1/4	3-1/2	2-1/4	3-1/2	2-1/4	3-1/2	2-1/4	3-1/2	2-1/4	3-1/2	2-1/4	3-1/2
Spacing (s) / edge distance (c_a) / concrete thickness (h) - in. (mm)	in. (mm)	(57)	(89)	(57)	(89)	(57)	(89)	(57)	(89)	(57)	(89)	(57)	(89)
	1-5/8 (41)	n/a	n/a	n/a	0.39	n/a	n/a	n/a	0.07	n/a	0.15	n/a	n/a
	2 (51)	n/a	n/a	n/a	0.42	n/a	n/a	n/a	0.10	n/a	0.20	n/a	n/a
	2-1/8 (54)	n/a	0.61	n/a	0.43	n/a	0.54	n/a	0.11	n/a	0.22	n/a	n/a
	2-1/2 (64)	0.71	0.63	0.54	0.47	0.61	0.55	0.53	0.14	0.54	0.28	n/a	n/a
	3 (76)	0.75	0.65	0.62	0.52	0.63	0.55	0.70	0.19	0.70	0.37	n/a	n/a
	3-1/2 (89)	0.79	0.68	0.72	0.57	0.65	0.56	0.88	0.23	0.88	0.47	n/a	n/a
	4 (102)	0.83	0.71	0.82	0.62	0.68	0.57	1.00	0.29	1.00	0.57	0.84	n/a
	4-1/2 (114)	0.88	0.73	0.92	0.68	0.70	0.58		0.34		0.68	0.89	n/a
	5 (127)	0.92	0.76	1.00	0.74	0.72	0.59		0.40		0.74	0.94	n/a
	6 (152)	1.00	0.81		0.89	0.76	0.61		0.53		0.89	1.00	0.66
	7 (178)		0.86		1.00	0.81	0.63		0.66		1.00		0.71
	8 (203)		0.91			0.85	0.64		0.81				0.76
	9 (229)		0.96			0.89	0.66		0.97				0.81
	10 (254)		1.00			0.94	0.68		1.00				0.85
	11 (279)					0.98	0.70						0.89
	12 (305)					1.00	0.72						0.93
	14 (356)						0.75						1.00
	16 (406)						0.79						
	18 (457)						0.83						
	20 (508)						0.86						
	> 24 (610)						0.93						

1 Linear interpolation not permitted.

2 When combining multiple load adjustment factors (e.g. for a 4 anchor pattern in a corner with thin concrete member) the design can become very conservative. To optimize the design, use Hilti PROFIS Anchor Design software or perform anchor calculation using design equations from ACI 318 Appendix D.

3 Spacing factor reduction in shear, f_{AV} , assumes an influence of a nearby edge. If no edge exists, then $f_{AV} = f_{AN}$.

4 Concrete thickness reduction factor in shear, f_{HV} , assumes an influence of a nearby edge. If no edge exists, then $f_{HV} = 1.0$.

 If a reduction factor value is in a shaded cell, this indicates that this specific edge distance may not be permitted with a certain spacing (or vice versa). Check with table 13 and figure 3 of this section to calculate permissible edge distance, spacing and concrete thickness combinations. Use of Hilti KWIK Bolt 3 anchors with edge distance and spacing dimensions smaller than what is noted in this table is permitted.

3.3.8 KWIK Bolt 3 Expansion Anchor

Table 17 - Load adjustment factors for 5/8-in. diameter KWIK Bolt 3 stainless steel anchor in uncracked concrete^{1,2}

5/8-in. KB3 stainless steel uncracked concrete			Spacing factor in tension f_{AN}		Edge distance factor in tension f_{RN}		Spacing factor in shear ³ f_{AV}		Edge distance in shear				Concrete thickness factor in shear ⁴ f_{HV}	
									⊥ toward edge f_{RV}		to edge f_{RV}			
Embedment h_{nom}			3-1/2	4-3/8	3-1/2	4-3/8	3-1/2	4-3/8	3-1/2	4-3/8	3-1/2	4-3/8	3-1/2	4-3/8
Spacing (s) / edge distance (c_s) / concrete thickness (h) - in. (mm)	in.	(mm)	(89)	(111)	(89)	(111)	(89)	(111)	(89)	(111)	(89)	(111)	(89)	(111)
	2-1/8	(54)	n/a	0.59	n/a	n/a	n/a	0.53	n/a	n/a	n/a	n/a	n/a	n/a
	2-1/2	(64)	n/a	0.60	n/a	0.37	n/a	0.54	n/a	0.12	n/a	0.23	n/a	n/a
	3	(76)	n/a	0.63	n/a	0.40	n/a	0.55	n/a	0.15	n/a	0.30	n/a	n/a
	3-1/8	(79)	0.67	0.63	n/a	0.41	0.56	0.55	n/a	0.16	n/a	0.32	n/a	n/a
	3-1/4	(83)	0.67	0.64	0.49	0.42	0.56	0.55	0.24	0.17	0.47	0.34	n/a	n/a
	3-1/2	(89)	0.69	0.65	0.51	0.44	0.57	0.56	0.26	0.19	0.51	0.38	n/a	n/a
	4	(102)	0.71	0.67	0.56	0.47	0.58	0.56	0.32	0.23	0.56	0.47	n/a	n/a
	5	(127)	0.77	0.71	0.68	0.55	0.60	0.58	0.45	0.33	0.68	0.55	0.63	n/a
	6	(152)	0.82	0.75	0.81	0.63	0.62	0.59	0.59	0.43	0.81	0.63	0.69	0.62
	7	(178)	0.87	0.79	0.95	0.74	0.64	0.61	0.75	0.54	0.95	0.74	0.74	0.67
	8	(203)	0.93	0.83	1.00	0.84	0.66	0.63	0.91	0.66	1.00	0.84	0.79	0.71
	9	(229)	0.98	0.88		0.95	0.68	0.64	1.00	0.79		0.95	0.84	0.75
	10	(254)	1.00	0.92		1.00	0.70	0.66		0.92		1.00	0.89	0.80
	11	(279)		0.96			0.72	0.67		1.00			0.93	0.83
	12	(305)		1.00			0.74	0.69					0.97	0.87
	14	(356)					0.77	0.72					1.00	0.94
	16	(406)					0.81	0.75						1.00
	18	(457)					0.85	0.78						
	20	(508)					0.89	0.82						
	24	(610)					0.97	0.88						
	> 30	(762)					1.00	0.97						

Table 18 - Load adjustment factors for 3/4-in. diameter KWIK Bolt 3 stainless steel anchor in uncracked concrete^{1,2}

3/4-in. KB3 stainless steel uncracked concrete		Spacing factor in tension f_{AN}		Edge distance factor in tension f_{RN}		Spacing factor in shear ³ f_{AV}		Edge distance in shear				Concrete thickness factor in shear ⁴ f_{HV}	
								⊥ toward edge f_{RV}		to edge f_{RV}			
Embedment h_{nom}		4-1/4	5-1/2	4-1/4	5-1/2	4-1/4	5-1/2	4-1/4	5-1/2	4-1/4	5-1/2	4-1/4	5-1/2
Spacing (s) / edge distance (c_a) / concrete thickness (h) - in. (mm)	in. (mm)	(108)	(140)	(108)	(140)	(108)	(140)	(108)	(140)	(108)	(140)	(108)	(140)
	2-7/8 (73)	n/a	n/a	n/a	0.43	n/a	n/a	n/a	0.11	n/a	0.23	n/a	n/a
	3 (76)	n/a	n/a	n/a	0.44	n/a	n/a	n/a	0.12	n/a	0.24	n/a	n/a
	3-1/4 (83)	n/a	n/a	0.37	0.46	n/a	n/a	0.20	0.14	0.37	0.27	n/a	n/a
	3-1/2 (89)	n/a	0.62	0.39	0.47	n/a	0.55	0.22	0.15	0.39	0.30	n/a	n/a
	4 (102)	0.68	0.63	0.42	0.51	0.57	0.55	0.27	0.18	0.42	0.37	n/a	n/a
	4-1/2 (114)	0.70	0.65	0.45	0.54	0.58	0.56	0.32	0.22	0.45	0.44	n/a	n/a
	5 (127)	0.72	0.67	0.49	0.58	0.59	0.57	0.38	0.26	0.49	0.52	n/a	n/a
	6 (152)	0.77	0.70	0.57	0.65	0.60	0.58	0.49	0.34	0.57	0.65	0.65	n/a
	7 (178)	0.81	0.73	0.67	0.73	0.62	0.59	0.62	0.43	0.67	0.73	0.70	n/a
	8 (203)	0.86	0.77	0.76	0.82	0.64	0.61	0.76	0.52	0.76	0.82	0.75	0.66
	9 (229)	0.90	0.80	0.86	0.92	0.66	0.62	0.91	0.62	0.91	0.92	0.79	0.70
	10 (254)	0.94	0.83	0.95	1.00	0.67	0.64	1.00	0.73	1.00	1.00	0.83	0.74
	11 (279)	0.99	0.87	1.00		0.69	0.65		0.84			0.87	0.77
	12 (305)	1.00	0.90			0.71	0.66		0.96			0.91	0.81
	14 (356)		0.97			0.74	0.69		1.00			0.99	0.87
	16 (406)		1.00			0.78	0.72					1.00	0.93
	18 (457)					0.81	0.74						0.99
	20 (508)					0.85	0.77						1.00
	24 (610)					0.92	0.82						
	30 (762)					1.00	0.91						
	> 36 (914)						0.99						

1 Linear interpolation not permitted.

2 When combining multiple load adjustment factors (e.g. for a 4 anchor pattern in a corner with thin concrete member) the design can become very conservative. To optimize the design, use Hilti PROFIS Anchor Design software or perform anchor calculation using design equations from ACI 318 Appendix D.

3 Spacing factor reduction in shear, f_{AV} , assumes an influence of a nearby edge. If no edge exists, then $f_{AV} = f_{AN}$.

4 Concrete thickness reduction factor in shear, f_{HV} , assumes an influence of a nearby edge. If no edge exists, then $f_{HV} = 1.0$.

■ If a reduction factor value is in a shaded cell, this indicates that this specific edge distance may not be permitted with a certain spacing (or vice versa). Check with table 13 and figure 3 of this section to calculate permissible edge distance, spacing and concrete thickness combinations. Use of Hilti KWIK Bolt 3 anchors with edge distance and spacing dimensions smaller than what is noted in this table is permitted.

KWIK Bolt 3 Expansion Anchor 3.3.8

Table 19 - Load adjustment factors for 1-in. diameter KWIK Bolt 3 stainless steel anchor in uncracked concrete^{1,2}

1-in. KB3 stainless steel uncracked concrete		Spacing factor in tension f_{AN}		Edge distance factor in tension f_{RN}		Spacing factor in shear ³ f_{AV}		Edge distance in shear				Concrete thickness factor in shear ⁴ f_{HV}	
								⊥ toward edge f_{RV}		to edge f_{RV}			
Embedment h_{nom}		4-1/2	6-1/4	4-1/2	6-1/4	4-1/2	6-1/4	4-1/2	6-1/4	4-1/2	6-1/4	4-1/2	6-1/4
Spacing (s) / edge distance (c_a) / concrete thickness (h) - in. (mm)	in. (mm)	(114)	(159)	(114)	(159)	(114)	(159)	(114)	(159)	(114)	(159)	(114)	(159)
	3 (76)	n/a	n/a	n/a	0.43	n/a	n/a	n/a	0.10	n/a	0.20	n/a	n/a
	3-1/2 (89)	n/a	n/a	0.42	0.45	n/a	n/a	0.21	0.12	0.42	0.25	n/a	n/a
	4 (102)	n/a	n/a	0.45	0.48	n/a	n/a	0.26	0.15	0.45	0.30	n/a	n/a
	4-1/2 (114)	n/a	n/a	0.49	0.51	n/a	n/a	0.31	0.18	0.49	0.36	n/a	n/a
	4-3/4 (121)	n/a	0.64	0.50	0.53	n/a	0.56	0.34	0.20	0.50	0.39	n/a	n/a
	5 (127)	0.71	0.64	0.52	0.54	0.59	0.56	0.37	0.21	0.52	0.43	n/a	n/a
	6 (152)	0.75	0.67	0.60	0.60	0.60	0.57	0.48	0.28	0.60	0.56	n/a	n/a
	7 (178)	0.79	0.70	0.70	0.67	0.62	0.58	0.61	0.35	0.70	0.67	n/a	n/a
	8 (203)	0.83	0.73	0.80	0.74	0.64	0.60	0.74	0.43	0.80	0.74	0.74	n/a
	9 (229)	0.88	0.76	0.90	0.82	0.65	0.61	0.89	0.51	0.90	0.82	0.78	n/a
	10 (254)	0.92	0.79	1.00	0.91	0.67	0.62	1.00	0.60	1.00	0.91	0.83	0.69
	11 (279)	0.96	0.82		1.00	0.69	0.63		0.69		1.00	0.87	0.72
	12 (305)	1.00	0.85			0.70	0.64		0.79			0.91	0.76
	14 (356)		0.91			0.74	0.67		1.00			0.98	0.82
	16 (406)		0.96			0.77	0.69					1.00	0.87
	18 (457)		1.00			0.81	0.71						0.92
	20 (508)					0.84	0.74						0.98
	24 (610)					0.91	0.79						1.00
	30 (762)					1.00	0.86						
	> 36 (914)						0.93						

¹ Linear interpolation not permitted.

² When combining multiple load adjustment factors (e.g. for a 4 anchor pattern in a corner with thin concrete member) the design can become very conservative. To optimize the design, use Hilti PROFIS Anchor Design software or perform anchor calculation using design equations from ACI 318 Appendix D.

³ Spacing factor reduction in shear, f_{AV} , assumes an influence of a nearby edge. If no edge exists, then $f_{AV} = f_{AN}$.

⁴ Concrete thickness reduction factor in shear, f_{HV} , assumes an influence of a nearby edge. If no edge exists, then $f_{HV} = 1.0$.

If a reduction factor value is in a shaded cell, this indicates that this specific edge distance may not be permitted with a certain spacing (or vice versa). Check with table 13 and figure 3 of this section to calculate permissible edge distance, spacing and concrete thickness combinations. Use of Hilti KWIK Bolt 3 anchors with edge distance and spacing dimensions smaller than what is noted in this table is permitted.

3.3.8

3.3.8 KWIK Bolt 3 Expansion Anchor

Table 20 - Hilti KWIK Bolt 3 hot-dip galvanized design strength with concrete / pullout failure in uncracked concrete^{1,2,3,4}

Nominal anchor diameter	Effective embed. in. (mm)	Nominal embed. in. (mm)	Tension - ϕN_n				Shear - ϕV_n			
			$f'_c = 2500$ psi lb (kN)	$f'_c = 3000$ psi lb (kN)	$f'_c = 4000$ psi lb (kN)	$f'_c = 6000$ psi lb (kN)	$f'_c = 2500$ psi lb (kN)	$f'_c = 3000$ psi lb (kN)	$f'_c = 4000$ psi lb (kN)	$f'_c = 6000$ psi lb (kN)
1/2	2 (51)	2-1/4 (57)	2,205 (9.8)	2,415 (10.7)	2,790 (12.4)	3,420 (15.2)	2,375 (10.6)	2,605 (11.6)	3,005 (13.4)	3,680 (16.4)
	3-1/4 (83)	3-1/2 (89)	4,250 (18.9)	4,655 (20.7)	5,375 (23.9)	6,585 (29.3)	9,845 (43.8)	10,785 (48.0)	12,450 (55.4)	15,250 (67.8)
5/8	3-1/8 (79)	3-1/2 (89)	4,200 (18.7)	4,605 (20.5)	5,315 (23.6)	6,510 (29.0)	9,280 (41.3)	10,165 (45.2)	11,740 (52.2)	14,380 (64.0)
	4 (102)	4-3/8 (111)	5,860 (26.1)	6,420 (28.6)	7,415 (33.0)	9,080 (40.4)	13,440 (59.8)	14,725 (65.5)	17,000 (75.6)	20,820 (92.6)
3/4	3-3/4 (95)	4-1/4 (108)	5,665 (25.2)	6,205 (27.6)	7,165 (31.9)	8,775 (39.0)	12,200 (54.3)	13,365 (59.5)	15,430 (68.6)	18,900 (84.1)
	5 (127)	5-1/2 (140)	6,615 (29.4)	7,245 (32.2)	8,365 (37.2)	10,245 (45.6)	18,785 (83.6)	20,575 (91.5)	23,760 (105.7)	29,100 (129.4)

1 See section 3.1.7.3 to convert design strength value to ASD value.

2 Linear interpolation between embedment depths and concrete compressive strengths is not permitted.

3 Apply spacing, edge distance, and concrete thickness factors in tables 23 to 25 as necessary. Compare to steel values in table 21. The lesser of the values is to be used for the design.

4 Tabular values are for normal-weight concrete only. For lightweight concrete multiply design strength by λ_a as follows: for sand-lightweight, $\lambda_a = 0.68$; for all-lightweight, $\lambda_a = 0.60$

Table 21 - Steel design strength for Hilti KWIK Bolt 3 hot-dip galvanized anchors^{1,2}

Nominal anchor diameter	Nominal embedment in. (mm)	Tensile ³ ϕN_{sa} lb (kN)	Shear ⁴ ϕV_{sa} lb (kN)
1/2	2-1/4 (57)	8,745 (38.9)	2,925 (13.0)
	3-1/2 (89)		3,815 (17.0)
5/8	3-1/2 (89)	13,515 (60.1)	7,565 (33.7)
	4-3/8 (111)		
3/4	4-1/4 (108)	19,080 (84.9)	11,050 (49.2)
	5-1/2 (140)		

1 See section 3.1.7.3 to convert design strength value to ASD value.

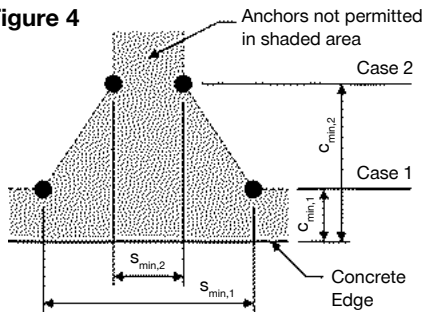
2 KWIK Bolt 3 carbon steel anchors are to be considered ductile steel elements.

3 Tensile $\phi N_{sa} = \phi A_{se,N} f_{uta}$ as noted in ACI 318 Appendix D.

4 Shear values determined by static shear tests with $\phi V_{sa} < \phi 0.60 A_{se,V} f_{uta}$ as noted in ACI 318 Appendix D.

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Figure 4



For a specific edge distance, the permitted spacing is calculated as follows:

$$s \geq s_{\min,2} + \frac{(s_{\min,1} - s_{\min,2})}{(c_{\min,1} - c_{\min,2})} (c - c_{\min,2})$$

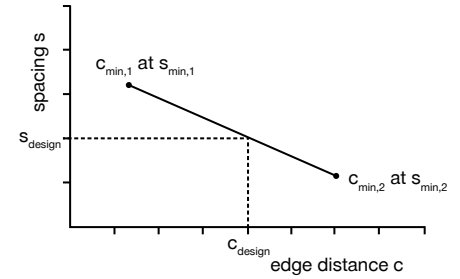


Table 22 - Hot-dip galvanized KWIK Bolt 3 installation parameters¹

Setting information	Symbol	Units	Nominal anchor diameter d _o							
			1/2		5/8			3/4		
Effective minimum embedment	h _{ef}	in. (mm)	2 (51)	3-1/4 (83)	3-1/8 (79)	4 (102)	3-3/4 (95)	5 (127)		
Minimum member thickness	h _{min}	in. (mm)	4 (102)	6 (152)	6 (152)	8 (203)	5 (127)	6 (152)	8 (203)	8 (203)
Case 1	c _{min,1}	in. (mm)	3-1/4 (83)	2-5/8 (67)	2 (51)	2-1/4 (57)	2 (51)	1-7/8 (48)	3-1/2 (89)	3-5/8 (92)
	for s _{min,1} ≥	in. (mm)	6-1/4 (158)	5-1/2 (140)	4-7/8 (124)	5-1/4 (133)	5 (127)	4-3/4 (121)	7-1/2 (191)	7-3/8 (187)
Case 2	c _{min,2}	in. (mm)	3-3/4 (95)	2-3/4 (70)	2-5/8 (67)	2-1/4 (57)	3-1/2 (89)	2-1/2 (64)	2-1/4 (57)	6-1/2 (165)
	for s _{min,2} ≥	in. (mm)	3-1/8 (79)	2-3/4 (70)	2-3/8 (60)	2-1/8 (54)	2-1/2 (64)	2-1/8 (54)	2-1/8 (54)	4 (102)

¹ Linear interpolation is permitted to establish an edge distance and spacing combination between Case 1 and Case 2. Linear interpolation for a specific edge distance c, where c_{min,1} < c < c_{min,2} will determine the permissible spacings.

3.3.8 KWIK Bolt 3 Expansion Anchor

Table 23 - Load adjustment factors for 1/2-in. diameter KWIK Bolt 3 hot-dip galvanized anchor in uncracked concrete^{1,2}

1/2-in. KB3 hot-dip galvanized uncracked concrete		spacing factor in tension f_{AN}		edge distance factor in tension f_{RN}		spacing factor in shear ³ f_{AV}		Edge distance in shear				Conc. thickness factor in shear ⁴ f_{HV}	
Embedment h_{nom}		2-1/4		3-1/2		2-1/4		3-1/2		2-1/4		3-1/2	
Spacing (s) / edge distance (c_e) / concrete thickness (h) - in. (mm)	in. (mm)	(57)	(89)	(57)	(89)	(57)	(89)	(57)	(89)	(57)	(89)	(57)	(89)
	2 (51)	n/a	n/a	n/a	0.38	n/a	n/a	n/a	0.10	n/a	0.20	n/a	n/a
	2-3/8 (60)	n/a	0.62	n/a	0.41	n/a	0.54	n/a	0.13	n/a	0.26	n/a	n/a
	2-1/2 (64)	n/a	0.63	n/a	0.42	n/a	0.55	n/a	0.14	n/a	0.28	n/a	n/a
	3 (76)	n/a	0.65	n/a	0.46	n/a	0.55	n/a	0.19	n/a	0.37	n/a	n/a
	3-1/8 (79)	0.76	0.66	n/a	0.48	0.64	0.56	n/a	0.20	n/a	0.40	n/a	n/a
	3-1/4 (83)	0.77	0.67	0.67	0.49	0.64	0.56	0.79	0.21	0.79	0.42	n/a	n/a
	3-1/2 (89)	0.79	0.68	0.72	0.51	0.65	0.56	0.88	0.23	0.88	0.47	n/a	n/a
	4 (102)	0.83	0.71	0.82	0.56	0.68	0.57	1.00	0.29	1.00	0.56	0.84	n/a
	4-1/2 (114)	0.88	0.73	0.92	0.61	0.70	0.58		0.34		0.61	0.89	n/a
	5 (127)	0.92	0.76	1.00	0.67	0.72	0.59		0.40		0.67	0.94	n/a
	6 (152)	1.00	0.81		0.80	0.76	0.61		0.53		0.80	1.00	0.66
	7 (178)	1.00	0.86		0.93	0.81	0.63		0.66		0.93		0.71
	8 (203)		0.91		1.00	0.85	0.64		0.81		1.00		0.76
	9 (229)		0.96			0.89	0.66		0.97				0.81
	10 (254)		1.00			0.94	0.68		1.00				0.85
	11 (279)					0.98	0.70						0.89
	12 (305)					1.00	0.72						0.93
	14 (356)						0.75						1.00
	16 (406)						0.79						
	18 (457)						0.83						
	20 (508)						0.86						
	> 24 (610)						0.93						

Table 24 - Load adjustment factors for 5/8-in. diameter KWIK Bolt 3 hot-dip galvanized anchor in uncracked concrete^{1,2}

5/8-in. KB3 hot-dip galvanized uncracked concrete		Spacing factor in tension f_{AN}		Edge distance factor in tension f_{RN}		Spacing factor in shear ³ f_{AV}		Edge distance in shear				Conc. thickness factor in shear ⁴ f_{HV}	
Embedment h_{nom}		3-1/2		4-3/8		3-1/2		4-3/8		3-1/2		4-3/8	
Spacing (s) / edge distance (c_e) / concrete thickness (h) - in. (mm)	in. (mm)	(89)	(111)	(89)	(111)	(89)	(111)	(89)	(111)	(89)	(111)	(89)	(111)
	2 (51)	n/a	n/a	n/a	0.34	n/a	n/a	n/a	0.08	n/a	0.17	n/a	n/a
	2-1/8 (54)	n/a	0.59	n/a	0.34	n/a	0.53	n/a	0.09	n/a	0.18	n/a	n/a
	2-1/4 (57)	n/a	0.59	0.38	0.35	n/a	0.54	0.14	0.10	0.27	0.20	n/a	n/a
	2-1/2 (64)	0.63	0.60	0.41	0.37	0.55	0.54	0.16	0.12	0.32	0.23	n/a	n/a
	3 (76)	0.66	0.63	0.45	0.40	0.56	0.55	0.21	0.15	0.42	0.30	n/a	n/a
	3-1/2 (89)	0.69	0.65	0.50	0.44	0.57	0.56	0.26	0.19	0.50	0.38	n/a	n/a
	4 (102)	0.71	0.67	0.54	0.47	0.58	0.56	0.32	0.23	0.54	0.47	n/a	n/a
	4-1/2 (114)	0.74	0.69	0.60	0.51	0.59	0.57	0.38	0.28	0.60	0.51	n/a	n/a
	5 (127)	0.77	0.71	0.66	0.55	0.60	0.58	0.45	0.33	0.66	0.55	0.63	n/a
	6 (152)	0.82	0.75	0.79	0.63	0.62	0.59	0.59	0.43	0.79	0.63	0.69	0.62
	7 (178)	0.87	0.79	0.92	0.74	0.64	0.61	0.75	0.54	0.92	0.74	0.74	0.67
	8 (203)	0.93	0.83	1.00	0.84	0.66	0.63	0.91	0.66	1.00	0.84	0.79	0.71
	9 (229)	0.98	0.88		0.95	0.68	0.64	1.00	0.79		0.95	0.84	0.75
	10 (254)	1.00	0.92		1.00	0.70	0.66		0.92		1.00	0.89	0.80
	11 (279)		0.96			0.72	0.67		1.00			0.93	0.83
	12 (305)		1.00			0.74	0.69					0.97	0.87
	14 (356)					0.77	0.72					1.00	0.94
	16 (406)					0.81	0.75						1.00
	18 (457)					0.85	0.78						
	20 (508)					0.89	0.82						
	24 (610)					0.97	0.88						
	> 30 (762)					1.00	0.97						

1 Linear interpolation not permitted.

2 When combining multiple load adjustment factors (e.g. for a 4 anchor pattern in a corner with thin concrete member) the design can become very conservative. To optimize the design, use Hilti PROFIS Anchor Design software or perform anchor calculation using design equations from ACI 318 Appendix D.

3 Spacing factor reduction in shear, f_{AV} , assumes an influence of a nearby edge. If no edge exists, then $f_{AV} = f_{AN}$.

4 Concrete thickness reduction factor in shear, f_{HV} , assumes an influence of a nearby edge. If no edge exists, then $f_{HV} = 1.0$.

■ If a reduction factor value is in a shaded cell, this indicates that this specific edge distance may not be permitted with a certain spacing (or vice versa). Check with table 22 and figure 4 of this section to calculate permissible edge distance, spacing and concrete thickness combinations. Use of Hilti KWIK Bolt 3 anchors with edge distance and spacing dimensions smaller than what is noted in this table is permitted.

KWIK Bolt 3 Expansion Anchor 3.3.8

Table 25 - Load adjustment factors for 3/4-in. diameter KWIK Bolt 3 hot-dip galvanized anchor in uncracked concrete^{1,2}

3/4-in. KB3 hot-dip galvanized uncracked concrete		Spacing factor in tension f_{AN}		Edge distance factor in tension f_{RN}		Spacing factor in shear ³ f_{AV}		Edge distance in shear				Conc. thickness factor in shear ⁴ f_{HV}	
								⊥ toward edge f_{RV}		∥ to edge f_{RV}			
		Embedment h_{nom}		4-1/4 (108)	5-1/2 (140)	4-1/4 (108)	5-1/2 (140)	4-1/4 (108)	5-1/2 (140)	4-1/4 (108)	5-1/2 (140)	4-1/4 (108)	5-1/2 (140)
Spacing (s) / edge distance (c_e) / concrete thickness (h) - in. (mm)	in. (mm)												
	3-1/2 (89)	n/a	n/a	0.41	n/a	n/a	n/a	0.22	n/a	0.41	n/a	n/a	n/a
	3-5/8 (92)	n/a	n/a	0.42	0.49	n/a	n/a	0.23	0.16	0.42	0.32	n/a	n/a
	3-7/8 (98)	n/a	0.63	0.44	0.51	n/a	0.55	0.26	0.18	0.44	0.35	n/a	n/a
	4 (102)	0.68	0.63	0.45	0.52	0.57	0.55	0.27	0.18	0.45	0.37	n/a	n/a
	4-1/2 (114)	0.70	0.65	0.49	0.56	0.58	0.56	0.32	0.22	0.49	0.44	n/a	n/a
	5 (127)	0.72	0.67	0.53	0.59	0.59	0.57	0.38	0.26	0.53	0.52	n/a	n/a
	5-1/2 (140)	0.74	0.68	0.57	0.63	0.60	0.57	0.43	0.30	0.57	0.60	n/a	n/a
	6 (152)	0.77	0.70	0.62	0.67	0.60	0.58	0.49	0.34	0.62	0.67	0.65	n/a
	7 (178)	0.81	0.73	0.72	0.75	0.62	0.59	0.62	0.43	0.72	0.75	0.70	n/a
	8 (203)	0.86	0.77	0.82	0.84	0.64	0.61	0.76	0.52	0.82	0.84	0.75	0.66
	9 (229)	0.90	0.80	0.92	0.95	0.66	0.62	0.91	0.62	0.92	0.95	0.79	0.70
	10 (254)	0.94	0.83	1.00	1.00	0.67	0.64	1.00	0.73	1.00	1.00	0.83	0.74
	11 (279)	0.99	0.87			0.69	0.65		0.84			0.87	0.77
	12 (305)	1.00	0.90			0.71	0.66		0.96			0.91	0.81
	14 (356)		0.97			0.74	0.69		1.00			0.99	0.87
	16 (406)		1.00			0.78	0.72					1.00	0.93
	18 (457)					0.81	0.74						0.99
	20 (508)					0.85	0.77						1.00
	24 (610)					0.92	0.82						
	30 (762)					1.00	0.91						
	> 36 (914)						0.99						

1 Linear interpolation not permitted.

2 When combining multiple load adjustment factors (e.g. for a 4 anchor pattern in a corner with thin concrete member) the design can become very conservative. To optimize the design, use Hilti PROFIS Anchor Design software or perform anchor calculation using design equations from ACI 318 Appendix D.

3 Spacing factor reduction in shear, f_{AV} , assumes an influence of a nearby edge. If no edge exists, then $f_{AV} = f_{AN}$.

4 Concrete thickness reduction factor in shear, f_{HV} , assumes an influence of a nearby edge. If no edge exists, then $f_{HV} = 1.0$.

 If a reduction factor value is in a shaded cell, this indicates that this specific edge distance may not be permitted with a certain spacing (or vice versa). Check with table 22 and figure 4 of this section to calculate permissible edge distance, spacing and concrete thickness combinations. Use of Hilti KWIK Bolt 3 anchors with edge distance and spacing dimensions smaller than what is noted in this table is permitted.

3.3.8 KWIK Bolt 3 Expansion Anchor

Table 26 - Hilti KWIK Bolt 3 carbon steel design strength in the soffit of uncracked lightweight concrete over metal deck^{1,2,3,4,5,6}

Nominal anchor diameter	Effective embed. in. (mm)	Nominal embed. in. (mm)	Loads according to figure 5			
			Tension - ϕN_n		Shear - ϕV_n	
			$f'_c = 3000$ psi lb (kN)	$f'_c = 4000$ psi lb (kN)	$f'_c = 3000$ psi lb (kN)	$f'_c = 4000$ psi lb (kN)
1/4	1-1/2 (38)	1-3/4 (44)	1,140 (5.1)	1,315 (5.8)	1,255 (5.6)	1,255 (5.6)
3/8	2 (51)	2-3/8 (60)	1,460 (6.5)	1,685 (7.5)	1,845 (8.2)	1,845 (8.2)
1/2	2 (51)	2-1/4 (57)	1,775 (7.9)	2,050 (9.1)	2,050 (9.1)	2,050 (9.1)
	3-1/4 (83)	3-1/2 (89)				
5/8	3-1/8 (79)	3-1/2 (89)	3,095 (13.8)	3,575 (15.9)	4,280 (19.0)	4,280 (19.0)
	4 (102)	4-3/8 (111)				

Table 27 - Hilti KWIK Bolt 3 stainless steel design strength in the soffit of uncracked lightweight concrete over metal deck^{1,2,3,4,5,7}

Nominal anchor diameter	Effective embed. in. (mm)	Nominal embed. in. (mm)	Loads according to figure 5			
			Tension - ϕN_n		Shear - ϕV_n	
			$f'_c = 3000$ psi lb (kN)	$f'_c = 4000$ psi lb (kN)	$f'_c = 3000$ psi lb (kN)	$f'_c = 4000$ psi lb (kN)
1/4	1-1/2 (38)	1-3/4 (44)	1,175 (5.2)	1,355 (6.0)	1,315 (5.8)	1,315 (5.8)
3/8	2 (51)	2-3/8 (60)	1,675 (7.5)	1,935 (8.6)	1,675 (7.5)	1,675 (7.5)
1/2	2 (51)	2-1/4 (57)	1,265 (5.6)	1,460 (6.5)	1,135 (5.0)	1,135 (5.0)
	3-1/4 (83)	3-1/2 (89)				
5/8	3-1/8 (79)	3-1/2 (89)	2,880 (12.8)	3,325 (14.8)	3,700 (16.5)	3,700 (16.5)
	4 (102)	4-3/8 (111)				

- 1 See section 3.1.7.3 to convert design strength value to ASD value.
- 2 Linear interpolation between embedment depths and concrete compressive strengths is not permitted.
- 3 Tabular value is for one anchor per flute. Minimum spacing along the length of the flute is $3 \times h_{ef}$ (effective embedment).
- 4 Tabular values are lightweight concrete and no additional reduction factor is needed.
- 5 No additional reduction factors for spacing or edge distance need to be applied.
- 6 Comparison to steel values in table 4 is not required. Values in tables 26 control.
- 7 Comparison to steel values in table 12 is not required. Values in tables 27 control.

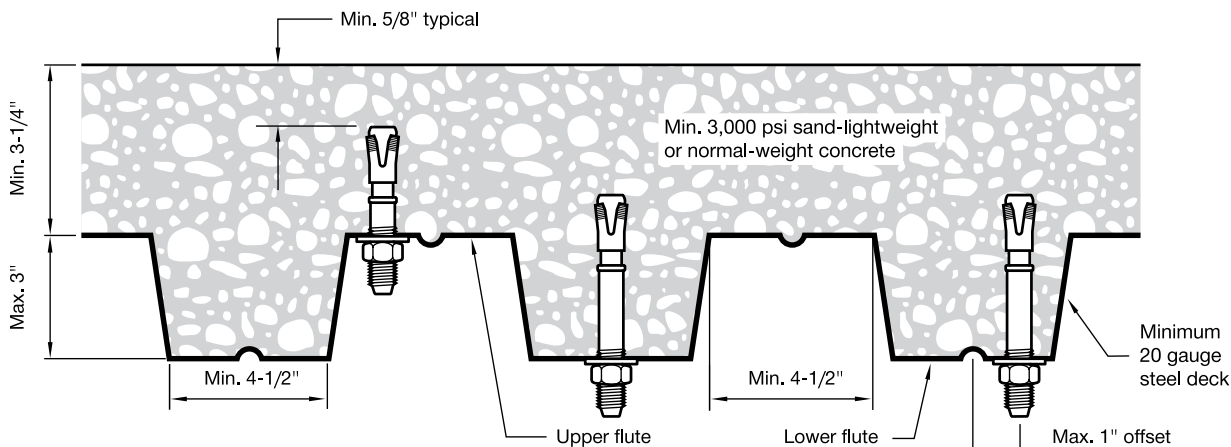


Figure 5 - Installation in concrete over metal deck

KWIK Bolt 3 Expansion Anchor 3.3.8

3.3.8.3.2 Technical data for masonry

Table 28 - KWIK Bolt 3 carbon steel allowable loads in grout-filled concrete masonry walls^{1, 2, 3, 4, 5, 6}

Nominal anchor diameter	Nominal embedment in. (mm)	Minimum distance from edge of block in. (mm)	Tension		Shear lb (kN)	
			lb	(kN)	lb	(kN)
1/4	1-1/8 (29)	4 (102)	150	(0.7)	380	(1.7)
		12 (305)				
	2 (51)	4 (102)	540	(2.4)	445	(2.0)
		12 (305)				
3/8	1-5/8 (41)	4 (102)	320	(1.4)	735	(3.3)
		12 (305)	340	(1.5)	940	(4.2)
	2-1/2 (64)	4 (102)	780	(3.5)	1,010	(4.5)
		12 (305)			1,395	(6.2)
1/2	2-1/4 (57)	4 (102)	630	(2.8)	830	(3.7)
		12 (305)	665	(3.0)	1,465	(6.5)
	3-1/2 (89)	4 (102)	905	(4.0)	1,080	(4.8)
		12 (305)			2,375	(10.6)
5/8	2-3/4 (70)	4 (102)	815	(3.6)	890	(4.0)
		12 (305)	865	(3.8)	2,165	(9.6)
	4 (102)	4 (102)	1,240	(5.5)	970	(4.3)
		12 (305)	1,295	(5.8)	2,770	(12.3)
3/4	3-1/4 (83)	4 (102)	1,035	(4.6)	785	(3.5)
		12 (305)			3,135	(13.8)
	4-3/4 (121)	4 (102)	1,645	(7.3)	825	(3.7)
		12 (305)	1,710	(7.6)	3,305	(14.7)

3.3.8

Table 29 - KWIK Bolt 3 carbon steel allowable loads for anchors installed in top of grout-filled concrete masonry walls^{1,6}

Nominal Anchor Diameter	Nominal Embedment in. (mm)	Tension lb (kN)	Shear	
			V ₁ lb (kN)	V ₂ lb (kN)
1/2	3 (76)	645 (2.9)	310 (1.4)	615 (2.7)
5/8	3-1/2 (89)	850 (3.8)	310 (1.4)	615 (2.7)

- All values are for anchors installed in fully grouted concrete masonry with minimum masonry prism strength of 1,500 psi. Concrete masonry units may be lightweight, medium-weight or normal-weight conforming to ASTM C90. Allowable loads are calculated using safety factor of 4.
- Anchors must be installed a minimum of 1-3/8 inch from any vertical mortar joint (see figure below).
- Anchor locations are limited to one per masonry cell.
- Embedment depth is measured from the outside face of the concrete masonry unit.
- Linear interpolation to determine load values at intermediate edge distances is permitted.
- All allowable loads based on safety factor of 4.

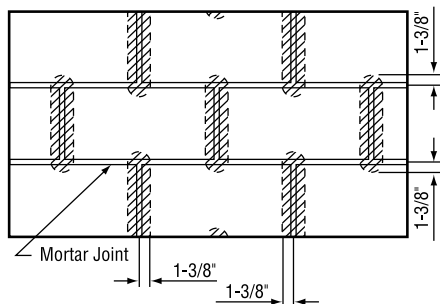


Figure 6 - Installation in grout-filled concrete masonry unit

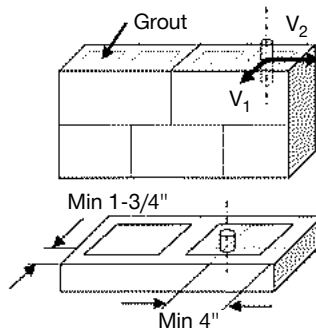


Figure 7 - KWIK Bolt 3 installed in the top of masonry walls

3.3.8.4 Installation instructions

Installation Instructions For Use (IFU) are included with each product package. They can also be viewed or downloaded online at www.us.hilti.com (US) and www.hilti.ca (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.

3.3.8 KWIK Bolt 3 Expansion Anchor

3.3.8.5 Ordering Information

KWIK Bolt 3 anchor product line

Size	Length (ℓ)		Thread length (ℓ _{th})		ID stamp	Box	Carbon steel	304 SS	316 SS	HDG
	in.	(mm)	in.	(mm)						
1/4 x 1-3/4	1-3/4	(44)	3/4	(18)	A	100	●	●		
1/4 x 2-1/4	2-1/4	(57)	7/8	(22)	B		●	●	●	
1/4 x 3-1/4	3-1/4	(83)	2	(51)	D		●	●		
			7/8	(22)					●	
1/4 x 4-1/2	4-1/2	(114)	2-7/8	(75)	G		●	●		
3/8 x 2-1/4	2-1/4	(57)	7/8	(22)	B	50	●	●		
3/8 x 3	3	(76)	1-1/4	(32)	D				●	
			1-1/2	(40)			●	●		
3/8 x 3-3/4	3-3/4	(95)	1-1/4	(32)	E				●	
			2-1/4	(59)			●	●		
3/8 x 5	5	(127)	3-1/2	(91)	H		●	●		
3/8 x 7	7	(178)	5-1/2	(142)	L		●	●		
1/2 x 2-3/4	2-3/4	(70)	1-1/4	(33)	C	25	●	●		
1/2 x 3-3/4	3-3/4	(95)	1-5/16	(35)	E				●	
			2-3/16	(56)			●	●		●
1/2 x 4-1/2	4-1/2	(114)	1-5/16	(35)	G				●	
			2-7/8	(75)			●	●		●
1/2 x 5-1/2	5-1/2	(140)	1-5/16	(35)	I				●	
			3-3/4	(96)			●	●		●
1/2 x 7	7	(178)	4-3/4	(121)	L		●	●		●
5/8 x 3-3/4	3-3/4	(95)	1-1/2	(41)	E	15	●	●	●	
5/8 x 4-3/4	4-3/4	(121)	1-1/2	(41)	G				●	
			2-3/4	(70)			●	●		●
5/8 x 6	6	(152)	1-1/2	(41)	J			●	●	
			4	(102)			●			●
5/8 x 7	7	(178)	4-3/4	(121)			●			
5/8 x 8-1/2	8-1/2	(216)	6-1/2	(166)	O		●	●		
5/8 x 10	10	(254)	7	(180)	R		●	●		
3/4 x 4-3/4	4-3/4	(121)	1-1/2	(41)	G	20		●	●	
			2-7/16	(62)		10	●			●
						20		●		
3/4 x 5-1/2	5-1/2	(140)	1-1/2	(41)	I	20		●		
			3-7/16	(85)		10	●			●
						20		●		
3/4 x 7	7	(178)	1-1/2	(41)	L	10		●		
			4-5/8	(119)			●			
3/4 x 8	8	(203)	5-3/4	(146)	N		●	●		●
3/4 x 10	10	(254)	5-7/8	(152)	R		●	●	●	
3/4 x 12	12	(305)	5-7/8	(152)	T		●	●		
1 x 6	6	(152)	2-1/4	(57)	J	5	●	●	●	
1 x 9	9	(114)	2-1/4	(57)	P		●	●		
1 x 12	12	(114)	6	(152)	T		●	●		

KWIK Bolt 3 Expansion Anchor 3.3.8

Countersunk KWIK Bolt anchor product line

Size	Length		Box	Carbon steel	304 SS
	in.	(mm)			
C1/4 x 2	2	(51)	100	•	
C1/4 x 3	3	(76)	100	•	•
C1/4 x 5	5	(127)	100	•	
C3/8 x 2-1/4	2-1/4	(57)	100	•	
C3/8 x 3	3	(76)	100	•	
C3/8 x 4	4	(102)	50	•	•
C3/8 x 5	5	(127)	50	•	

Rod Coupling KWIK Bolt 3 anchor product line

Size	Length		Thread length		Box quantity
	in.	(mm)	in.	(mm)	
3/8 x 2-1/4	2-1/4	(57)	7/8	(22)	100

HHDCA ceiling anchor product line

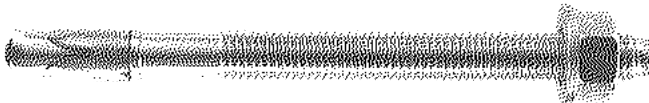
Size	Length		Eyelet size in.	Box quantity
	in.	(mm)		
1/4 x 2	2-1/32	(52)	5/16	100

3.3.8

KWIK Bolt 3 anchor



Long thread KWIK Bolt 3 anchor



Countersunk KWIK Bolt 3 anchor



Rod coupling KWIK Bolt 3 anchor 3/8 x 2 1/4



HHDCA ceiling hanger 1/4 x 2



Notes

PIPE SLEEVE SEALS

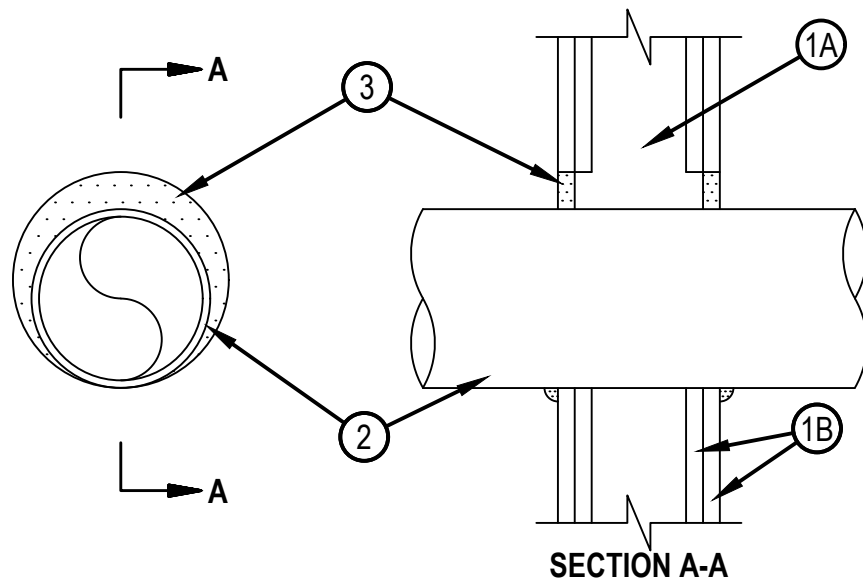


Classified by
Underwriters Laboratories, Inc.
to UL 1479 and CAN/ULC-S115

System No. W-L-1054

WL 1054

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings — 1 and 2 Hr (See Items 1 and 3)	F Ratings — 1 and 2 Hr (See Items 1 and 3)
T Rating — 0 Hr	FT Rating — 0 Hr
L Rating (Without Movement) at Ambient — Less Than 1 CFM/sq ft	FH Ratings — 1 and 2 Hr (See Items 1 and 3)
L Rating (Without Movement) at 400°F — Less Than 1 CFM/sq ft	FTH Rating — 0 Hr
M Rating (Movement) — See Table 1	FTH Rating — 0 Hr
	L Rating at Ambient — Less Than 5.1 L/s/m ²
	L Rating at 204°C — Less Than 5.1 L/s/m ²



1. Wall Assembly — The 1 or 2 hr fire-rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300 or U400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

- A. Studs — Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 2-1/2 in. (64 mm) wide and spaced max 24 in. (610 mm) OC. For M Rating, steel studs to be min 3-5/8 in. (92 mm) wide. When steel studs are used and the diam of opening exceeds the width of stud cavity, the opening shall be framed on all sides using lengths of steel stud installed between the vertical studs and screw-attached to the steel studs at each end. The framed opening in the wall shall be 4 to 6 in. (102 to 152 mm) wider and 4 to 6 in. (102 to 152 mm) higher than the diam of the penetrating item such that, when the penetrating item is installed in the opening, a 2 to 3 in. (51 to 76 mm) clearance is present between the penetrating item and the framing on all four sides.
- B. Gypsum Board* — 5/8 in. (16 mm) thick, 4 ft (122 cm) wide with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300 or U400 Series Design in the UL Fire Resistance Directory. Max diam of opening is 32-1/4 in. (819 mm) for steel stud walls. Max diam of opening is 14-1/2 in. (368 mm) for wood stud walls. The F and FH Ratings of the firestop system are equal to the fire rating of the wall assembly. The M Rating is applicable only to 1 hr rated walls.

2. Through-Penetrants — One metallic pipe, conduit or tubing to be installed either concentrically or eccentrically within the firestop system. The annular space shall be min 0 in. to max 2-1/4 in. (57 mm). Pipe may be installed with continuous point contact. Pipe, conduit or tubing to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes, conduits or tubing may be used:

- A. Steel Pipe — Nom 30 in. (762 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
- B. Iron Pipe — Nom 30 in. (762 mm) diam (or smaller) cast or ductile iron pipe.
- C. Conduit — Nom 4 in. (102 mm) diam (or smaller) steel electrical metallic tubing or 6 in. (152 mm) . diam steel conduit.
- D. Copper Tubing — Nom 6 in. (152 mm) diam (or smaller) Type L (or heavier) copper tubing.
- E. Copper Pipe — Nom 6 in. (152 mm) diam (or smaller) regular (or heavier) copper pipe.

3. Fill, Void or Cavity Material* — Sealant — Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with both surfaces of wall. At the point or continuous contact locations between pipe and wall, a min 1/2 in. (13 mm) diam bead of fill material shall be applied at the pipe wall interface on both surfaces of wall.

HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-ONE MAX Intumescent Sealant

Movement Direction	Penetrant Item	Nominal Penetrant Diameter	Annular Space	Movement	Sealant Depth	F-Rating	L Rating with Movement
Y	2A, 2C*	2 in.	Max 2-1/4 in.	5%	5/8 in.	1 hr	N/A
Z	2A, 2C*	2 in.	2-1/4 in.	0.25 in.	5/8 in.	1 hr	N/A

* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



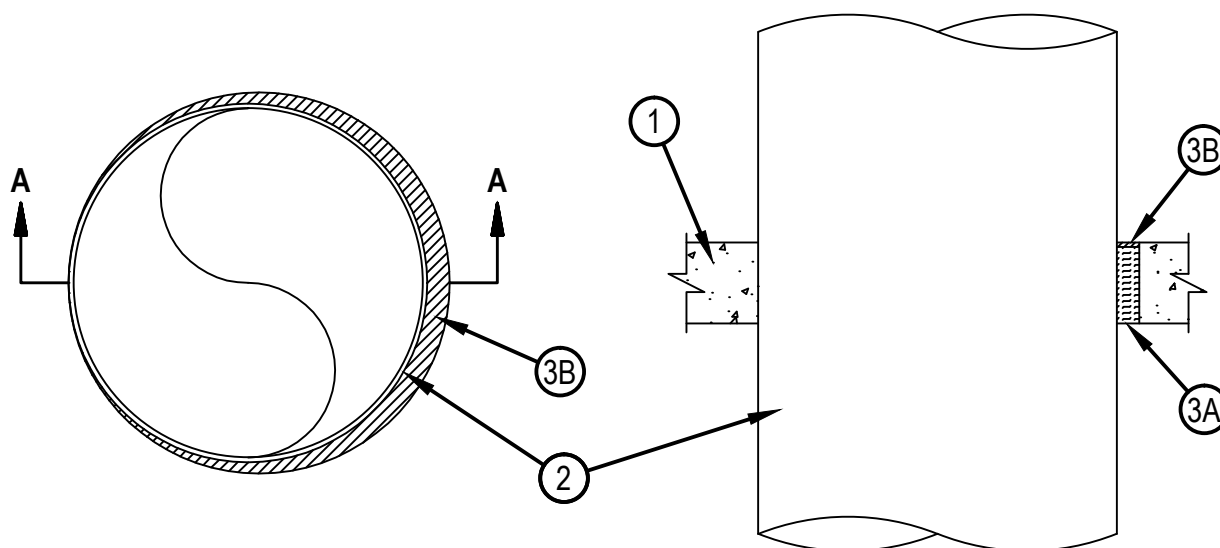


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to UL 1479 and CAN/ULC-S115

System No. C-AJ-1425

CAJ 1425

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings — 3 Hr	F Ratings — 3 Hr
T Rating — 0 Hr	FT Rating — 0 Hr
L Rating at Ambient — Less Than 1 CFM/sq ft	FH Ratings — 3 Hr
L Rating at 400 F — Less Than 1 CFM/sq ft	FTH Rating — 0 Hr
W Rating - Class I	L Rating at Ambient — Less Than 1 CFM/sq ft
	L Rating at 400 F — Less Than 1 CFM/sq ft
	W Rating - Class I



SECTION A-A

1. Floor Assembly — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) concrete. Max diameter of opening is 31-7/8 in.
2. Through Penetrants — One metallic pipe, conduit or tubing to be installed concentrically or eccentrically within the firestop system. Pipe, conduit or tubing to be rigidly supported on both sides of floor assembly. The annular space between pipe, conduit or tubing and the periphery of the opening shall be min 0 in. (point contact) to max 1-7/8 in. The following types of pipe, conduit or tubing may be used:
 - Steel Pipe — Nom 30 in. diam (or smaller) Schedule 10 (or heavier) steel pipe.
 - Iron Pipe — Nom 30 in. diam (or smaller) cast or ductile iron pipe.
 - Conduit — Nom 6 in. diam (or smaller) rigid steel conduit.
 - Conduit — Nom 4 in. diam (or smaller) steel electrical metallic conduit.
 - Copper Tubing — Nom 6 in. diam (or smaller) Type L (or heavier) copper tubing.
 - Copper Pipe — Nom 6 in. diam (or smaller) Regular (or heavier) copper pipe.
3. Firestop System — The firestop system shall consist of the following:
 - A. Packing Material — Min 4 in. thickness of 4 pcf mineral wool batt insulation tightly packed into the opening as a permanent form. Packing material to be recessed from top surface of floor or from both surfaces of wall as required to accommodate the required thickness of fill material.
 - B. Fill, Void or Cavity Materials*-Sealant — Min 1/4 in. thickness of fill material applied within the annulus, flush with top surface of floor.
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP604 Self-Leveling Firestop Sealant (floors only), CFS-S SIL GG Sealant or CFS-S SIL SL Sealant (floors only).

*Bearing the UL Classification Mark



Hilti Firestop Systems

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February 13, 2014



Underwriters Laboratories, Inc.
to UL 1479

System No. W-L-2377

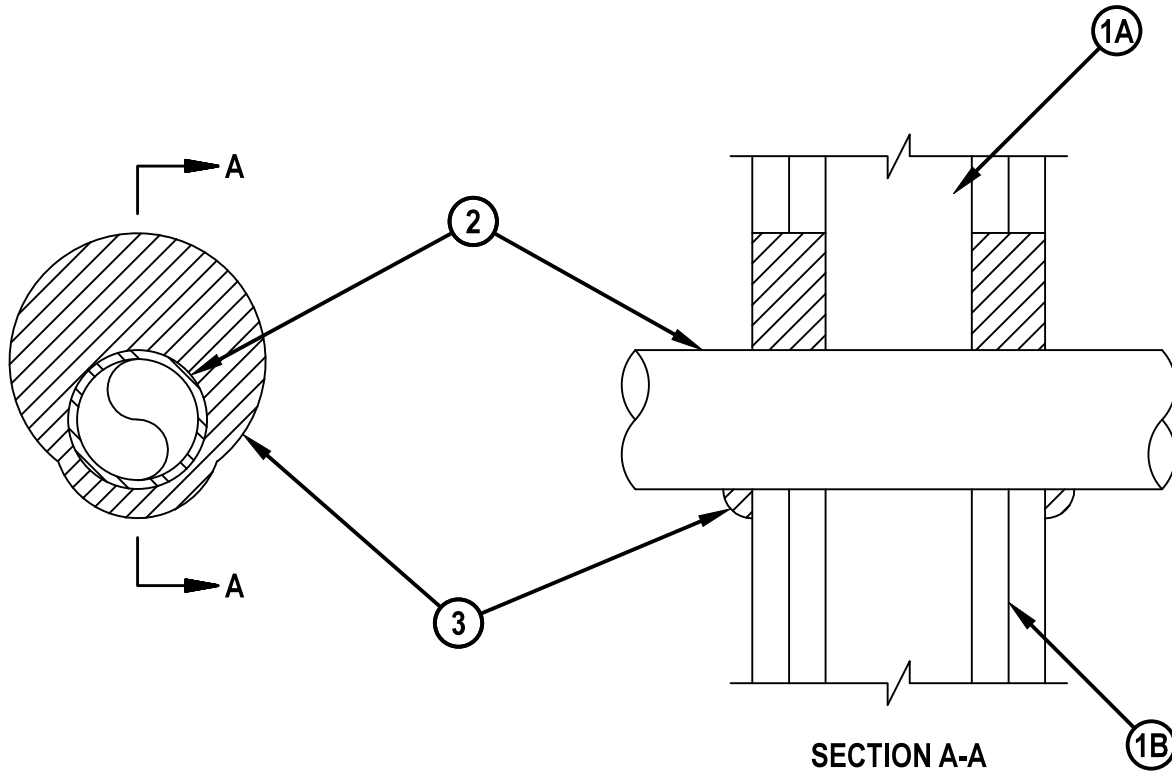
F Ratings - 1 and 2 Hr (See Items 1 and 3)

T Ratings - 1 and 2 Hr (See Items 1 and 3)

L - Rating at Ambient - Less than 1 CFM/Sq Ft

L - Rating at 400°F - 4 CFM/Sq Ft

WL 2377



1. Wall Assembly — The 1 and 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U300, U400, V400 or W400 Series Wall or Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

A. Studs — Wall framing shall consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 2-1/2 in. (64 mm) wide by 1-3/8 in. (35 mm) deep channels spaced max 24 in. (610 mm) OC.

B. Gypsum Board* — The gypsum wallboard type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300 or U400 Series Design in the UL Fire Resistance Directory. Max diam of opening is 3 in. (76 mm).

The hourly F and T Rating of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed.

2. Through Penetrant — One nonmetallic pipe, conduit or tubing installed either concentrically or eccentrically within the firestop system. The annular space between pipe and periphery of opening shall be min of 0 in. (point contact) to a max 1-1/4 in. (32 mm). Pipe to be rigidly supported on both sides of wall assembly. The following types and sizes of nonmetallic pipes may be used:

A. Chlorinated Polyvinyl Chloride (CPVC) Pipe — Nom 2 in. (51 mm) diam (or smaller) FLOWGUARD GOLD® SDR11 CPVC pipe for use in closed (process or supply) piping systems.

B. Chlorinated Polyvinyl Chloride (CPVC) Pipe — Nom 2 in. (51 mm) diam (or smaller) BLAZEMASTER® SDR13.5 CPVC pipe for use in closed (process or supply) piping systems.

3. Fill, Void or Cavity Material* - Sealant — Min 5/8 in. (16 mm) and 1-1/4 in. (32 mm) thickness of fill material applied within annulus, flush with both surfaces of wall for 1 and 2 hr rated assemblies, respectively. At point contact location, a min 1/2 in. (13 mm) diam bead of fill material shall be applied to the wall/penetrant interface on both surfaces of the wall.

HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-ONE Sealant or FS-ONE MAX Intumescent Sealant

* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



Hilti Firestop Systems

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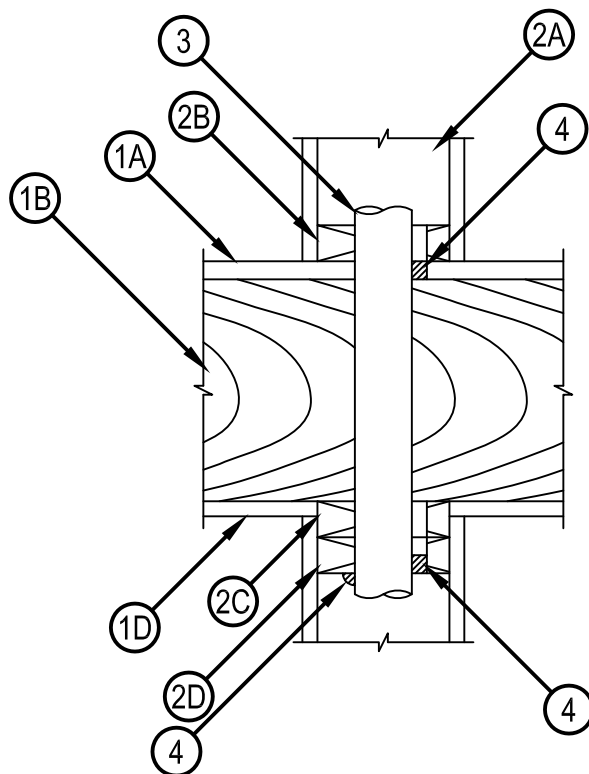
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to UL 1479

System No. F-C-2270

F Rating — 1 Hr

T Rating — 0 Hr

FC 2270



1. Floor-Ceiling Assembly — The fire-rated solid or trussed lumber joist floor-ceiling assembly shall be constructed of the materials and in the manner specified in individual L500 Series Floor-Ceiling Designs in the UL Fire Resistance Directory. The general construction details of the floor-ceiling assembly are summarized below:

- A. Flooring System — Lumber or plywood subfloor with finish floor of lumber, plywood or Floor Topping Mixture* as specified in the individual Floor-Ceiling Design. Max diam of floor opening is 3 in. (76 mm).
- B. Wood Joists — Nom 2 by 10 in. (51 by 254 mm) lumber joists spaced 16 in. (406 mm) OC with nom 1 by 3 in. (51 by 76 mm) lumber bridging and with ends firestopped. As an alternate to lumber joists, nom 10 in. (254 mm) deep (or deeper) lumber, steel or combination lumber and steel joists, trusses or Structural Wood Members* with bridging as required with ends firestopped.
- C. Furring Channels — (Not shown) — Resilient galv steel furring installed perpendicular to wood joists (Item 1B) between wallboard (Item 1D) and wood joists as required in the individual Floor-Ceiling Design.
- D. Gypsum Board* — Nom 4 ft (122 cm) wide by 5/8 in. (16 mm) thick as specified in the individual Floor-Ceiling Design.

2. Chase Wall — (Optional) - The through penetrant (Item 3) may be routed through a 1 hr fire-rated single, double or staggered wood stud/gypsum wallboard chase wall constructed of the materials and in the manner specified in the individual U300 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

- A. Studs — Nom 2 by 4 in. (51 by 102 mm) lumber studs.
- B. Sole Plate — Nom 2 by 4 in. (51 by 102 mm) lumber plates. Max diam of opening is 3 in. (76 mm).
- C. Top Plate — The double top plate shall consist of two nom 2 by 4 in. (51 by 102 mm) lumber plates. Max diam of opening is 3 in. (76 mm).
- D. Gypsum Board* — Thickness, type, number of layers and fasteners shall be as specified in individual Wall and Partition Design.



Hilti Firestop Systems

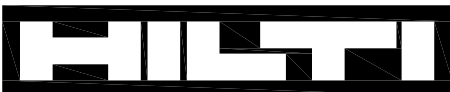
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January 28, 2015

System No. F-C-2270

FC 2270

3. Through Penetrants — One nonmetallic pipe to be installed either eccentrically or concentrically within the firestop system. The annular space between the through penetrant and the periphery of the opening shall be a min 0 in. (point contact) to a max of 5/8 in. (16 mm). Pipe to be rigidly supported on both sides of the floor-ceiling assembly. The following types and sizes of nonmetallic pipes may be used.
- A. Chlorinated Polyvinyl Chloride (CPVC) Pipe — Nom 2 in. (51 mm) diam (or smaller) FLOWGUARD GOLD® SDR11 CPVC pipe for use in closed (process or supply) piping systems.
 - B. Chlorinated Polyvinyl Chloride (CPVC) Pipe — Nom 2 in. (51 mm) diam (or smaller) BLAZEMASTER® SDR13.5 CPVC pipe for use in closed (process or supply) piping systems.
4. Fill, Void or Cavity Material* - Sealant — Min 3/4 in. (19 mm) thickness of fill material applied within the annulus, flush with top surface of floor or sole plate. Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with bottom surface of ceiling or lower top plate. At point contact location, a min 1/2 in. (13 mm) diam bead of fill material shall be applied flush with bottom surface of ceiling or lower top plate.
- HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-ONE Sealant or FS-ONE MAX Intumescent Sealant

* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



Hilti Firestop Systems

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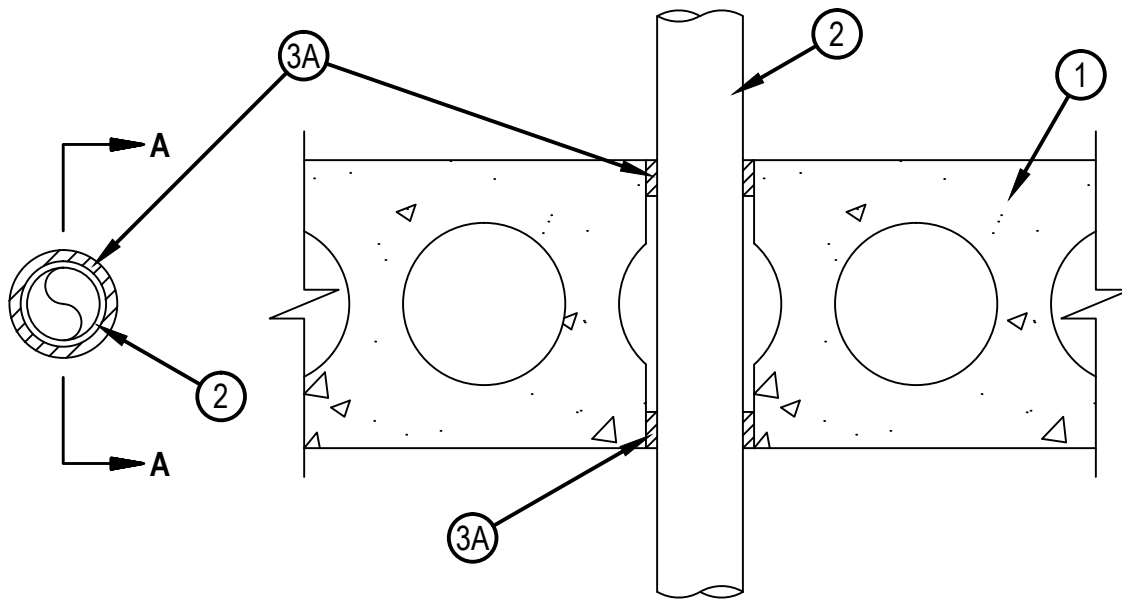


Classified by
Underwriters Laboratories, Inc.
to UL 1479

System No. C-BJ-2040

F Rating — 3 Hr
T Rating — 2-3/4 Hr

CBJ 2040



SECTION A-A

1. Floor or Wall Assembly — Min 8 in. (203 mm) thick floor or wall made from reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) concrete. Floor assembly may also be constructed of any 8 in. (203 mm) thick UL Classified hollow-core Precast Concrete Units*. Wall may also be constructed of any UL Classified Concrete Blocks*. Max diameter of opening is 3 in. (76 mm).
See Concrete Blocks (CAZT) and Precast Concrete Units (CFTV) category in the Fire Resistance Directory for names of manufacturers.
2. Through Penetrants — One nonmetallic pipe to be installed concentrically or eccentrically within the firestop system. Annular space between pipe, tubing or conduit and edge of opening to be min 1/8 in. (3 mm) and max 1/2 in. (13 mm). Pipe to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of nonmetallic pipe may be used:
 - A. Chlorinated Polyvinyl Chloride (CPVC) Pipe — Nom 2 in. (51 mm) diam (or smaller) SDR13.5 CPVC pipe for use in closed (process or supply) piping systems.
 - B. Chlorinated Polyvinyl Chloride (CPVC) Pipe — Nom 2 in. (51 mm) diam (or smaller) BLAZEMASTER® SDR13.5 CPVC for use in closed (process or supply) piping systems.
 - C. Cross Linked Polyethylene (PEX) Tubing — Nom 2 in. (51 mm) diam (or smaller) SDR 9 PEX tubing for use in closed (process or supply) piping systems.
3. Firestop System — The firestop system shall consist of the following:
 - A. Fill Void or Cavity Material* — Sealant — Min 1 in. (25 mm) thickness of fill material applied within annulus, flush with top and bottom surface of floor or both surfaces of wall.
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-ONE Sealant or FS-ONE MAX Intumescent Sealant.

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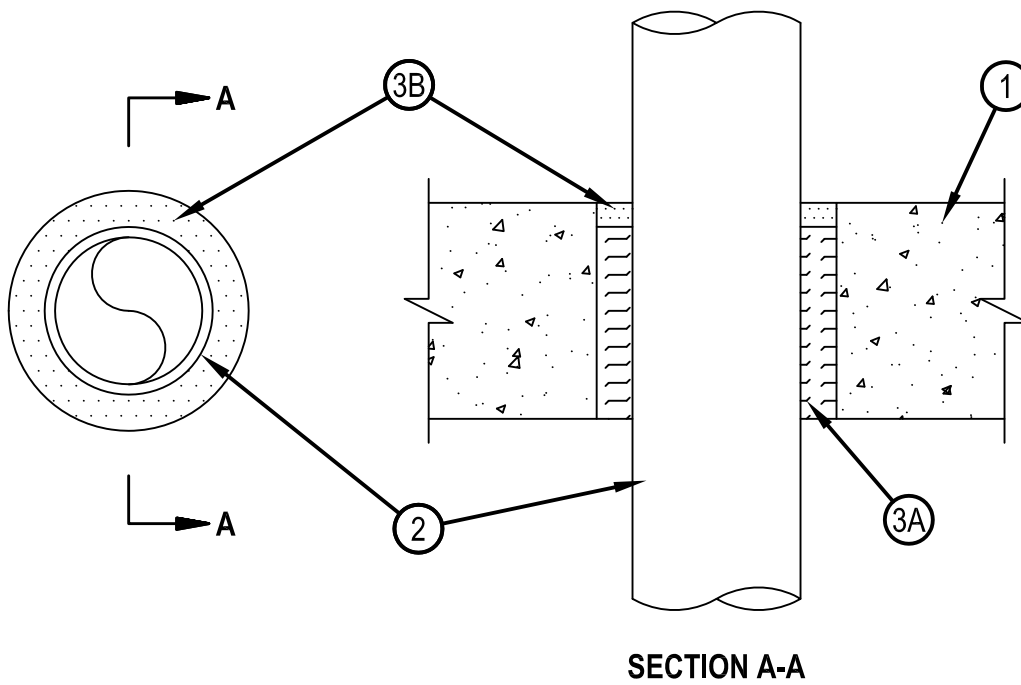


Classified by
Underwriters Laboratories, Inc.
to UL 1479

System No. C-AJ-2451

F Rating -- 3 Hr
T Rating -- 3 Hr

CAJ 2451



1. Floor or Wall Assembly — Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) concrete floor or 5 in. (127 mm) thick reinforced lightweight or normal weight concrete wall. Floor/wall may also be constructed of any UL Classified Concrete Blocks*. Max diameter of opening is 5 in. (127 mm).

See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufactures.

2. Through Penetrants — One nonmetallic pipe or conduit to be installed concentrically or eccentrically within the firestop system. Annular space between pipe or conduit and edge of opening to be min 1/4 in. (6 mm) and max 1-1/4 in. (32 mm). Pipe or conduit to be rigidly supported on both sides of floor-ceiling assembly. The following types and sizes of nonmetallic pipes or conduit may be used:

A. Chlorinated Polyvinyl Chloride (CPVC) Pipe — Nom 3 in. (76 mm) diam (or smaller) FLOWGUARD GOLD® SDR11 CPVC for use in closed (process or supply) piping systems.

B. Chlorinated Polyvinyl Chloride (CPVC) Pipe — Nom 3 in. (76 mm) diam (or smaller) BLAZEMASTER® SDR13.5 CPVC for use in closed (process or supply) piping systems.

3. Firestop System — The firestop system shall consist of the following:

A. Packing Material — Min 4 in. (102 mm) thickness of min 4 pcf (64 kg/m³) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or both surfaces of wall to accommodate the required thickness of fill material.

B. Fill Void or Cavity Materials* - Sealant — Min 1/2 in. (13 mm) thickness of fill material applied within the annulus, flush with top surface of floor or both surfaces of wall.

HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-ONE Sealant or FS-ONE MAX Intumescent Sealant

* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



Hilti Firestop Systems

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January 28, 2015

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)

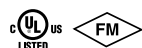
Included Components

- 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

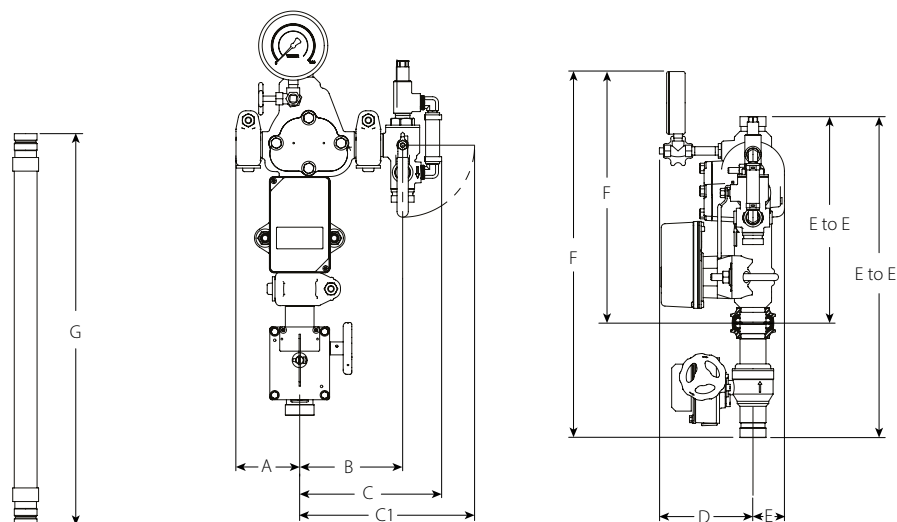
Shafts: Stainless Steel

Seat: Brass

Spring: Stainless Steel

Hose: Stainless Steel

4.0 DIMENSIONS

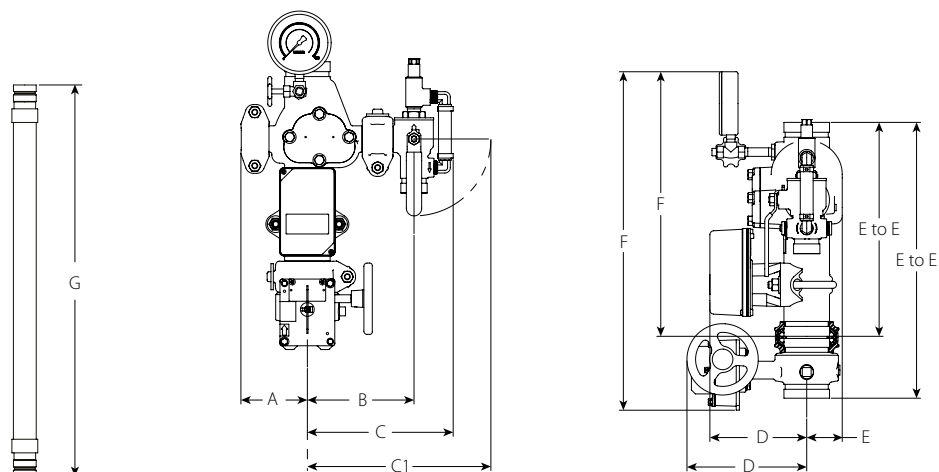


Size		Dimensions											Series UTD Valve Size (Nominal)	Series UTD Test Orifice	G Quick Drain Hose Length	Weight	
Nominal inches DN	Actual Outside Dia. inches mm	E to E with control valve	E to E without control valve	A	B	C	C-1	D with control valve	D without control valve	E	F with control valve	F without control valve	inches DN	K-Factor S.I.	inches mm	Approx. (Each) with control valve lb kg	Approx. (Each) without control valve 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

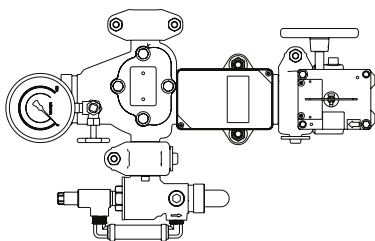
4.0 DIMENSIONS (CONTINUED)



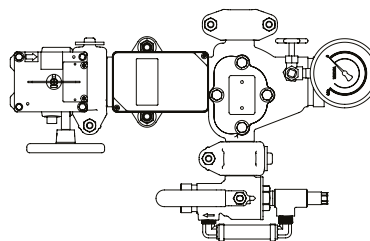
Size		Dimensions											Series UTD Valve Size (Nominal)	Series UTD Test Orifice	G Quick Drain Hose Length	Weight				
Nominal inches DN	Actual Outside Dia. inches mm	E to E with control valve	E to E without control valve	A	B	C	C-1	D with control valve	D without control valve	E	F with control valve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

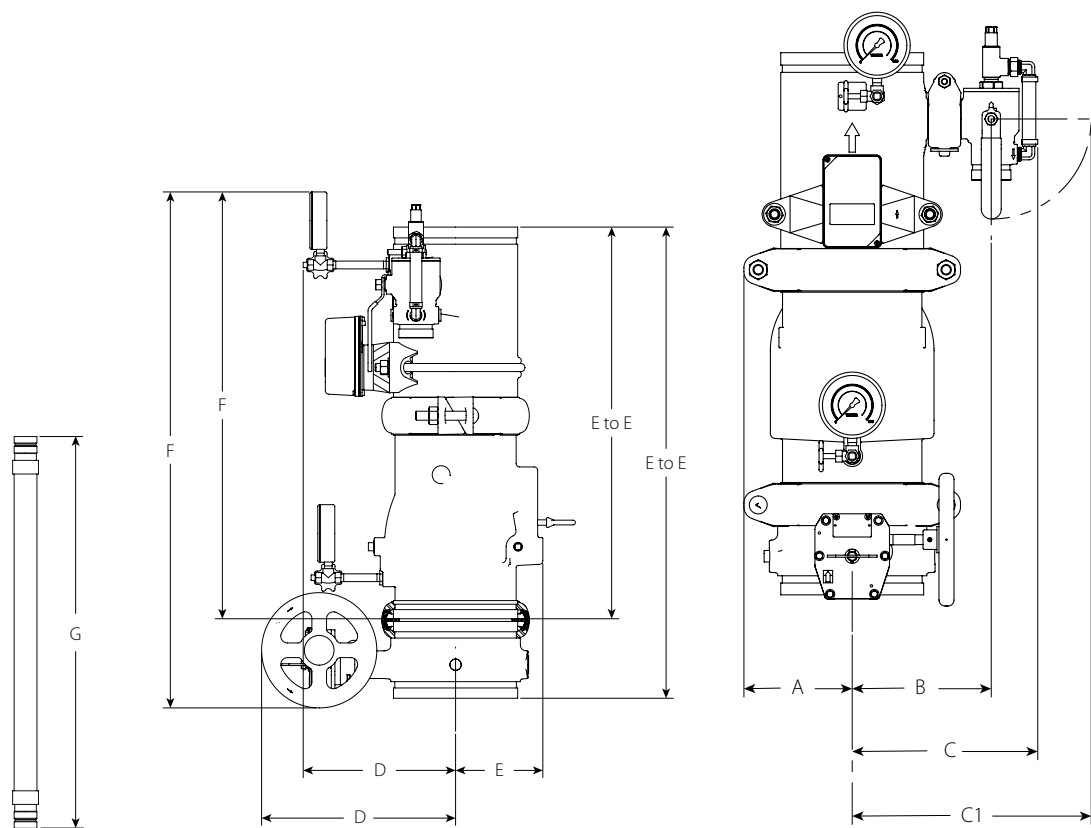


Horizontal Install Left Hand with Control Valve



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 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
8 DN200	8.625 219.1	32.75 832	27.25 692	6.50 165	8.38 213	11.25 286	14.38 365	13.50 343	10.63 270	6.00 152	35.13 892	29.63 752	2.00 51	5.6 8.1	36.00 914	178.0 80.7	136.0 61.7

NOTE

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

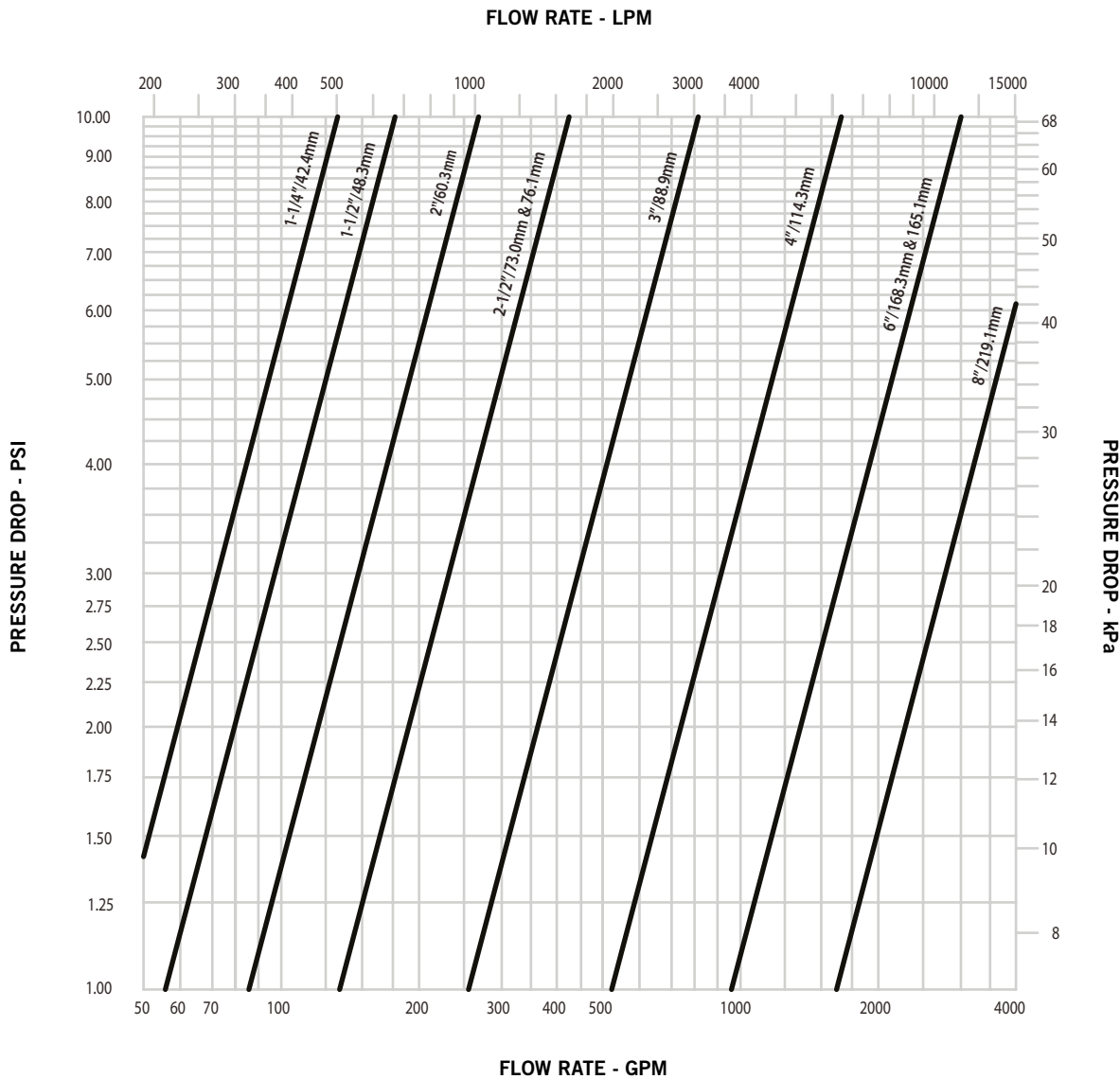
5.0 PERFORMANCE

Size		Equivalent Length of Sch. 40 Pipe ¹		Flow Characteristics		Maximum Working Pressure psi kPa
Nominal inches DN	Actual Outside Diameter inches mm	with control valve feet meters	without control valve feet meters	Cv/Kv Values with control valve	Cv/Kv Values without control valve	
				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

¹ 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

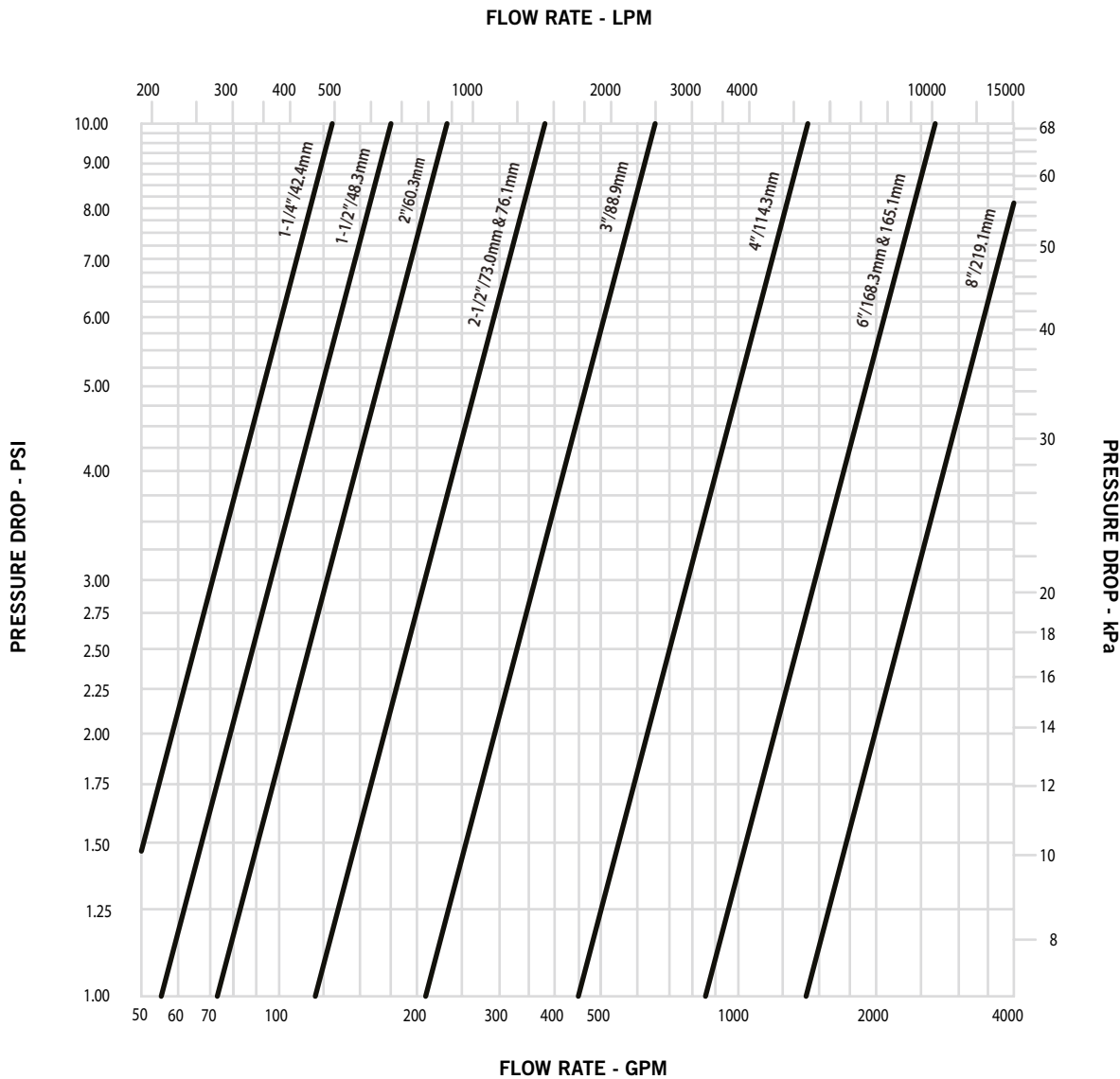


NOTE

- Includes friction loss across flow switch

5.0 PERFORMANCE (CONTINUED)

Series UMC with Control Valve



NOTE

- Includes friction loss across flow switch

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.
- Confirm that any equipment, branch lines, or sections of piping that may have been isolated for/during testing or due to valve closures/positioning are identified, depressurized, and drained intermediately prior to installation, removal, adjustment, or maintenance of any Victaulic products.
- Wear safety glasses, hardhat, and foot protection.

Failure to follow these instructions could result in death or serious personal injury and property damage.

- 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.

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.

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.

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 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.

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.

FireLock™ Check Valves

Series 717 Check Valve

Series 717H High Pressure Check Valve



10.08



Series 717H
High-Pressure Check Valve
(2 – 3"/DN50 – DN80)



Series 717
(2 ½ – 3"/73 mm – DN80)



Series 717
(4 – 12"/DN100 – DN300)

1.0 PRODUCT DESCRIPTION

Available Sizes

- 2 – 3"/DN50 – DN80 (Series 717H)
- 2 ½ – 12"/73 mm – DN300 (Series 717)

Pipe Material

- Carbon Steel, Schedule 10, Schedule 40. For use with alternative materials, please contact Victaulic.

Maximum Working Pressure

- Up to 365 psi/2517 kPa/25 bar
- Working pressure dependent on pipe size, valve size, and approval requirements.

Application

- Designed for use in fire protection systems.
- Prevents backflow.
- Single-disc mechanism incorporates a spring-assisted feature for non-slamming operation.
- Can be installed either vertically (flow upwards only) or horizontally.
- Valve body cast with arrow indicator to assist with proper valve orientation.
- Optional upstream and downstream pressure taps included on select sizes. See Section 3.0.
- Provided with grooved ends.
- Rated for ambient temperature use in fire protection systems.

Available End Connections

- Victaulic Original Groove System (OGS) groove

2.0 CERTIFICATION/LISTINGS



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



2.0 CERTIFICATION/LISTINGS

Approvals/Listings

Series 717H

Size		Approval/Listing Service Pressures				
Nominal inches DN	Actual Outside Diameter inches mm	cULus psi kPa	FM psi kPa	LPCB psi kPa	VdS psi kPa	CCC psi kPa
2 DN50	2.375 60.3	365 2517	365 2517	365 2517	363 2500	N/A
2 ½	2.875 73.0	365 2517	365 2517	365 2517	N/A	363 2500
DN65	3.000 76.1	365 2517	365 2517	365 2517	363 2500	363 2500
3 DN80	3.500 88.9	365 2517	365 2517	365 2517	363 2500	363 2500

Series 717

Size		Approval/Listing Service Pressures				
Nominal inches DN	Actual Outside Diameter inches mm	cULus psi kPa	FM psi kPa	LPCB psi kPa	VdS psi kPa	CCC psi kPa
2 ½	2.875 73.0	250 1725	N/A	N/A	N/A	N/A
DN65	3.000 76.1	250 1725	N/A	N/A	232 1600	N/A
3 DN80	3.500 88.9	250 1725	N/A	N/A	232 1600	N/A
4 DN100	4.500 114.3	365 2517	365 2517	365 2517	363 2500	363 2500
DN125	5.500 139.7	365 2517	365 2517	365 2517	363 2500	363 2500
5	5.563 141.3	365 2517	365 2517	365 2517	N/A	N/A
	6.500 165.1	365 2517	365 2517	365 2517	N/A	363 2500
6 DN150	6.625 168.3	365 2517	365 2517	365 2517	363 2500	N/A
8 DN200	8.625 219.1	365 2517	365 2517	348 2400	247 1700	363 2500
10 DN250	10.750 273.0	250 1725	250 1725	250 1725	N/A	232 1600
12 DN300	12.750 323.9	250 1725	250 1725	250 1725	N/A	N/A

3.0 SPECIFICATIONS – MATERIAL

Body:

- ☐ Ductile Iron conforming to ASTM A536, Grade 65-45-12.

Body Coating:

- ☐ Series 717H Body: Black Paint
- ☐ Series 717H Endface: Electroless Nickel conforming to ASTM B733
- ☐ Series 717 (2 ½ – 3"/73mm – DN80): PPS Coating
- ☐ Standard: Series 717 (4 – 12"/DN100 – DN300): Black Paint
- ☐ Optional: Series 717 (4 – 12"/DN100 – DN300): PPS Coating

Body Seat:

- ☐ Series 717H: Nitrile O-ring installed into an Electroless Nickel plating conforming to ASTM B733
- ☐ Series 717 (2 ½ – 3"/73 mm – DN80): PPS Coated Ductile Iron
- ☐ Series 717 (4 – 12"/DN100 – DN300): Ductile Iron with Electroless Nickel plating conforming to ASTM B733

Disc Seal or Coating: (specify choice¹)

- ☐ Nitrile (Series 717H only)
- ☐ EPDM

NOT COMPATIBLE FOR PETROLEUM SERVICES.

Discs:

- ☐ Series 717H: CF8M Cast Stainless Steel
- ☐ Series 717 (2 ½ – 3"/73 mm – DN80): Aluminum bronze with elastomer seal
- ☐ Series 717 (4 – 12"/DN100 – DN300): Elastomer encapsulated disc.

Shaft:

- ☐ Series 717H: Brass
- ☐ Series 717 (2 ½ – 3"/73 mm – DN80): Type 416 Stainless Steel
- ☐ Series 717 (4 – 12"/DN100 – DN300): Type 316 Stainless Steel

Spring:

- ☐ Type 302/304 Stainless Steel

Shaft Plug:

- ☐ Series 717H: Carbon Steel Zinc Plated
- ☐ Series 717: Carbon Steel Zinc Plated

Pipe Plug:

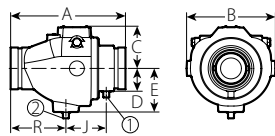
- ☐ Series 717H: Carbon Steel Zinc Plated
- ☐ Series 717: Carbon Steel Zinc Plated

Optional Pressure Taps:

- ☐ Series 717H: Available on all sizes
- ☐ Series 717: Available on sizes 4 – 12"/DN100 – DN300

4.0 DIMENSIONS

Series 717H



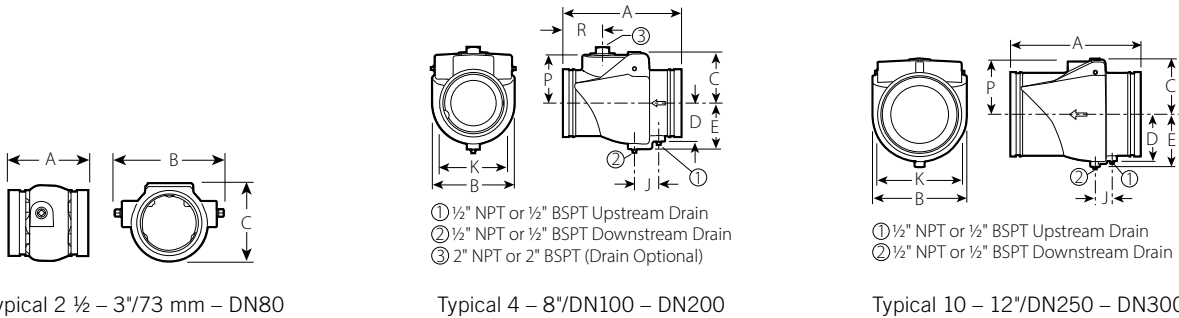
① ½" NPT or ½" BSPT Upstream Drain
② ½" NPT or ½" BSPT Downstream Drain

Typical 2 – 3"/50 – 80 mm

Size		Dimensions						Weight
Nominal inches DN	Actual Outside Diameter inches mm	E to E A inches mm	B inches mm	C inches mm	E inches mm	J inches mm	R inches mm	Approx. (Each) lb kg
2 DN50	2.375 60.3	8.66 220	6.46 165	3.23 83	3.02 77	2.80 72	4.25 108	10.7 4.9
2 ½	2.875 73.0	9.37 238	6.94 177	3.31 85	3.40 87	3.38 86	4.38 112	13.8 6.3
DN65	3.000 76.1	9.37 238	6.94 177	3.31 85	3.40 87	3.38 86	4.38 112	13.8 6.3
3 DN80	3.500 88.9	9.62 244	7.44 189	3.53 90	3.65 93	3.38 86	4.63 118	20.0 9.1

4.1 DIMENSIONS

Series 717



Size		Dimensions								Weight
Nominal inches DN	Actual Outside Diameter inches mm	E to E A inches mm	B inches mm	C inches mm	E inches mm	J inches mm	K inches mm	P inches mm	R inches mm	Approx. (Each) lb kg
2 1/2	2.875 73.0	3.88 99	4.26 109	3.57 91	– –	– –	– –	– –	– –	3.6 1.6
DN65	3.000 76.1	3.88 99	4.26 108	3.57 91	– –	– –	– –	– –	– –	3.6 1.6
3	3.500 88.9	4.25 108	5.06 129	4.17 106	– –	– –	– –	– –	– –	4.5 2.0
DN80	4.500 114.3	9.63 245	6.00 152	3.88 99	3.50 89	2.00 51	4.50 114	3.50 89	3.35 85	20.0 9.1
4	5.500 139.7	10.50 267	6.80 173	4.50 114	4.17 106	2.15 55	5.88 149	4.08 104	3.98 101	27.0 12.2
DN100	5.563 141.3	10.50 267	6.80 173	4.50 114	4.17 106	2.15 55	5.88 149	4.08 104	3.98 101	27.0 12.2
5	6.500 165.1	11.50 292	8.00 203	5.00 127	4.50 114	2.38 60	6.67 169	4.73 120	3.89 99	38.0 17.2
DN125	6.625 168.3	11.50 292	8.00 203	5.00 127	4.50 114	2.38 60	6.67 169	4.73 120	3.89 99	38.0 17.2
6	8.625 219.1	14.00 356	9.88 251	6.06 154	5.65 144	2.15 55	8.85 225	5.65 144	5.75 146	64.0 29.0
DN150	10.750 273.0	17.00 432	12.00 305	7.09 180	6.69 170	2.15 55	10.92 277	6.73 171	– –	100.0 45.4
8	12.750 323.9	19.50 495	14.00 356	8.06 205	7.64 194	2.51 64	12.81 325	7.73 196	– –	140.0 63.5
DN200										
10										
DN250										
12										
DN300										

5.0 PERFORMANCE

Flow Characteristics

The charts below express the flow of water at 60°F/16°C through valve.

Formulas for Cv/Kv values:

$$\Delta P = \frac{Q^2}{C_v^2}$$

$$Q = C_v \times \sqrt{\Delta P}$$

Where:

Q = Flow (GPM)

ΔP = Pressure Drop (psi)

C_v = Flow Coefficient

$$\Delta P = \frac{Q^2}{K_v^2}$$

$$Q = K_v \times \sqrt{\Delta P}$$

Where:

Q = Flow (m³/hr)

ΔP = Pressure Drop (Bar)

K_v = Flow Coefficient

Series 717H

Size		Flow Characteristics
Nominal inches DN	Actual Outside Diameter inches mm	Full Open C _v K _v
2	2.375	160
DN50	60.3	138
2½	2.875	215
	73.0	186
DN65	3.000	215
	76.1	186
3	3.500	315
DN80	88.9	272

Series 717

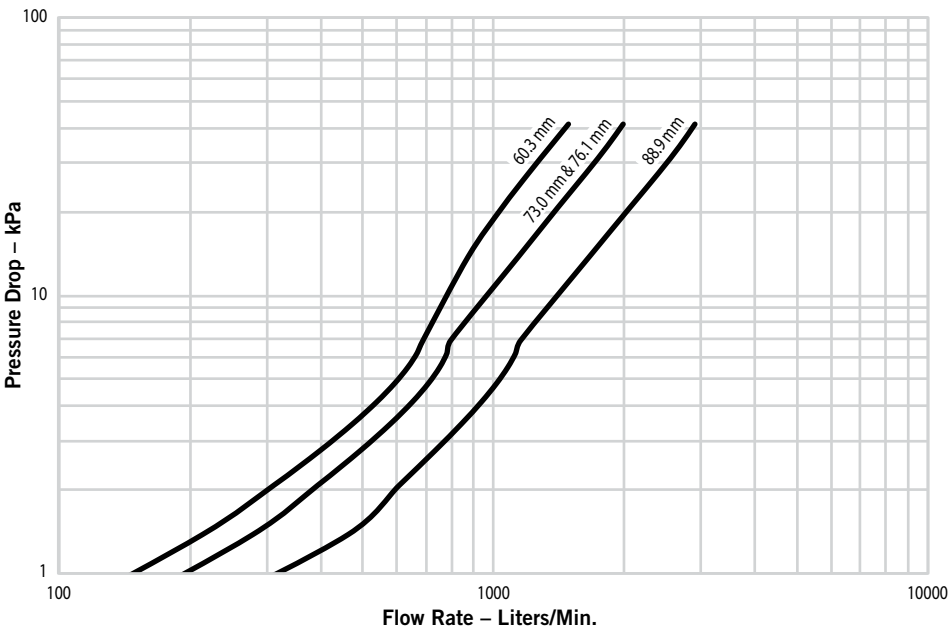
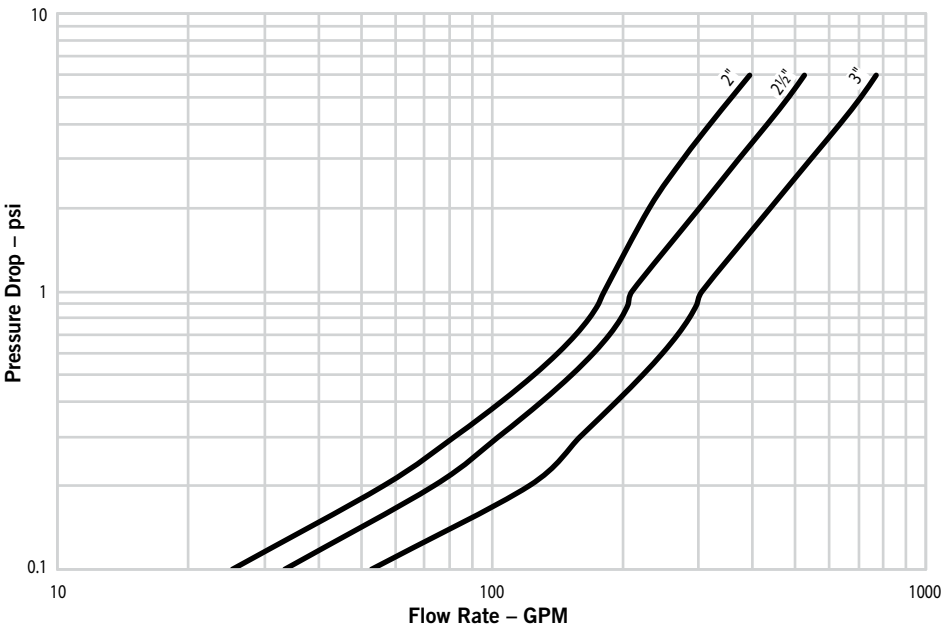
Size		Flow Characteristics
Nominal inches DN	Actual Outside Diameter inches mm	Full Open C _v K _v
2½	2.875	140
	73.0	121
DN65	3.000	140
	76.1	121
3	3.500	250
DN80	88.9	216
4	4.500	390
DN100	114.3	337
DN125	5.500	700
	139.7	606
5	5.563	700
	141.3	606
	6.500	1000
	165.1	865
6	6.625	1000
DN150	168.3	865
8	8.625	1800
DN200	219.1	1557
10	10.750	3000
DN250	273.0	2595
12	12.750	4200
DN300	323.9	3633

5.0 PERFORMANCE (CONTINUED)

Flow Characteristics

The charts below express the flow of water at 60°F/16°C through valve.

S717H

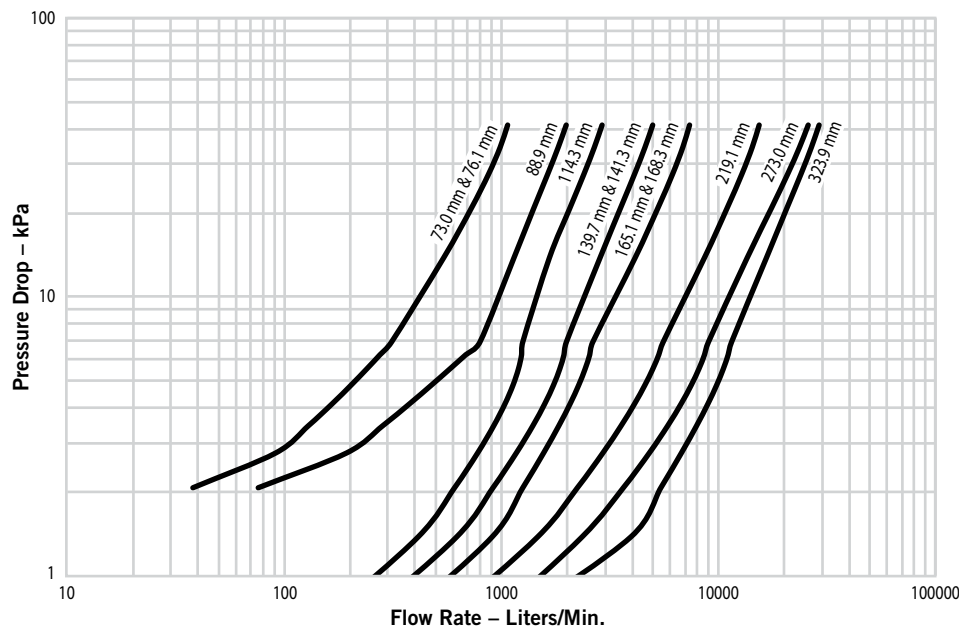
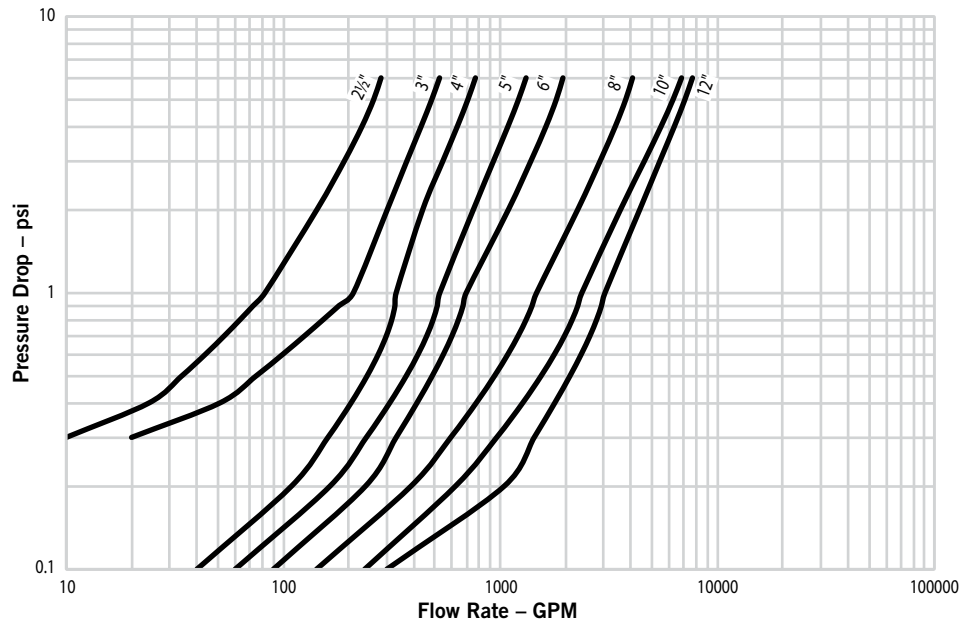


5.1 PERFORMANCE

Flow Characteristics

The charts below express the flow of water at 60°F/16°C through valve.

S717



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.
- Confirm that any equipment, branch lines, or sections of piping that may have been isolated for/during testing or due to valve closures/positioning are identified, depressurized, and drained immediately prior to installation, removal, adjustment, or maintenance of any Victaulic products.
- Wear safety glasses, hardhat, and foot protection.

Failure to follow these instructions could result in death or serious personal injury and property damage.

- These products shall be used only in fire protection systems that are designed and installed in accordance with current, applicable National Fire Protection Association (NFPA) standards, or equivalent standards, and in accordance with applicable building and fire codes. These standards and codes contain important information regarding protection of systems from freezing temperatures, corrosion, mechanical damage, etc.
- The installer shall understand the use of this product and why it was specified for the particular application.
- The installer shall understand common industry safety standards and potential consequences of improper product installation.
- It is the system designer's responsibility to verify suitability of materials for use with the intended fluid media within the piping system and external environment.
- The material specifier shall evaluate the 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.

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.

7.0 REFERENCE MATERIALS

- [05.01: Seal Selection Guide](#)
- [10.01: Regulatory Approval Reference Guide](#)
- [29.01: Terms and Conditions/Warranty](#)
- [I-100: Field Installation Handbook](#)

User Responsibility for Product Selection and Suitability

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

Installation

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

Warranty

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

Intellectual Property Rights

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

Note

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

FireLock™ High Pressure Butterfly Valve

Series 765 with Weatherproof Actuator – Supervised Open

Victaulic®
10.80



1.0 PRODUCT DESCRIPTION

Available Sizes

- 2 – 12"/DN50 – DN300

Pipe Material

- Carbon Steel, Schedule 10, Schedule 40. For use with alternative material please contact Victaulic

Maximum Working Pressure

- Up to 365 psi/2517 kPa/25 bar

Application

- High pressure butterfly valve with an approved weatherproof actuator housing for indoor and outdoor use
- Designed for fire protection services only
- Designed to be supervised open
- Exclusively for use with pipe and Victaulic products which feature ends formed with the Victaulic Original Groove System (OGS) groove profile (see section 7.0 for Reference Materials)

Available End Connection

- Victaulic Original Groove System (OGS) standard groove

2.0 CERTIFICATION/LISTINGS



LPS 1185: Issue 3.1
Cert/LPCB Ref. 104/02
846a/02



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

victaulic.com

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Victaulic®

2.0 CERTIFICATION/LISTINGS (CONTINUED)

Size		Approval/Listing Service Pressures				
Nominal inches DN	Actual Outside Diameter inches mm	Series 765 Butterfly Valve				
		cULus psi kPa	FM psi kPa	VdS psi kPa	LPCB psi kPa	CCC psi kPa
2 DN50	2.375 60.3	365 2517	365 2517	365 2517	365 2517	363 2500
2½	2.875 73.0	365 2517	365 2517	–	365 2517	–
DN65	3.000 76.1	365 2517	365 2517	365 2517	365 2517	363 2500
3 DN80	3.500 88.9	365 2517	365 2517	365 2517	365 2517	363 2500
	4.250 108.0	365 2517	365 2517	–	365 2517	–
4 DN100	4.500 114.3	365 2517	365 2517	365 2517	365 2517	363 2500
	5.250 133.0	365 2517	365 2517	–	365 2517	–
DN125	5.500 139.7	365 2517	365 2517	365 2517	365 2517	–
5	5.563 141.3	365 2517	365 2517	–	365 2517	–
	6.250 159.0	365 2517	365 2517	–	365 2517	–
	6.500 165.1	365 2517	365 2517	–	365 2517	363 2500
6 DN150	6.625 168.3	365 2517	365 2517	365 2517	365 2517	–
8 DN200	8.625 219.1	365 2517	365 2517	365 2517	365 2517	363 2500
10 DN250	10.750 273.0	365 2517	300 2068	–	365 2517	363 2500
12 DN300	12.750 323.9	365 2517	300 2068	–	365 2517	–

3.0 SPECIFICATIONS – MATERIAL

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

End Face, 2 – 6"/DN50 – DN150: Ductile iron conforming to ASTM A536, Grade 65-45-12

Seal Retainer, 8 – 12"/DN200 – DN300: Ductile iron conforming to ASTM A536, Grade 65-45-12

Coating: Black alkyd enamel

Disc: Ductile iron conforming to ASTM A536, Grade 65-45-12, with electroless nickel coating conforming to ASTM B733

Seat: EPDM

Stem Seal Cartridge: Brass

Bearings: Stainless steel with TFE lining

Stem Seals: Nitrile

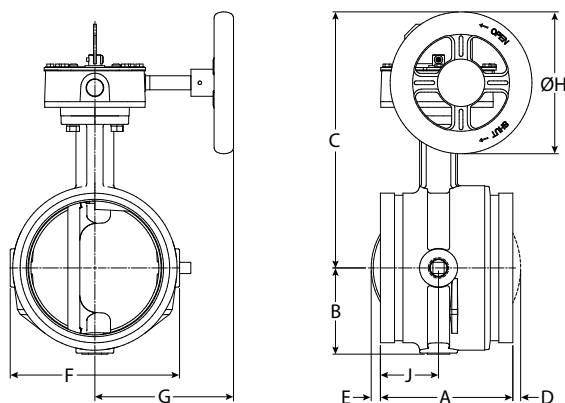
Stem Retaining Ring: Carbon steel

Actuator:

- **2 – 8"/DN50 – DN200:** Bronze traveling nut on a steel lead screw, in a ductile iron housing
- **10 – 12"/DN250 – DN300:** Steel worm and cast iron quadrant gear, in a cast iron housing

4.0 DIMENSIONS

Series 765



Size		Dimensions									Weight
Nominal	Outside Diameter	End to End									Approx. Each
inches DN	inches mm	A inches mm	B inches mm	C inches mm	D inches mm	E inches mm	F inches mm	G inches mm	H inches mm	J inches mm	lb kg
2	2.375	4.25	2.28	6.41	—	—	4.00	4.22	4.50	2.12	8.2
DN50	60.3	108	58	163	—	—	102	107	114	54	3.7
2½	2.875	3.77	2.28	7.54	—	—	4.00	4.22	4.50	1.77	9.7
	73.0	96	58	192	—	—	102	107	114	45	4.4
DN65	3.000	3.77	2.28	7.54	—	—	4.00	4.22	4.50	1.77	9.7
	76.1	96	58	192	—	—	102	107	114	45	4.4
3	3.500	3.77	2.53	7.79	—	—	4.50	4.22	4.50	1.77	10.7
DN80	88.9	96	64	198	—	—	114	107	114	45	4.9
	4.250	4.63	2.88	8.81	—	—	5.50	4.22	4.50	2.20	14.0
	108.0	118	73	224	—	—	140	107	114	56	6.4
4	4.500	4.63	2.88	8.81	—	—	5.50	4.22	4.50	2.20	14.0
DN100	114.3	118	73	224	—	—	140	107	114	56	6.4
	5.250	5.88	3.35	10.88	—	—	6.56	6.19	6.30	2.58	25.4
	133.0	149	85	276	—	—	167	157	160	66	11.5
DN125	5.500	5.88	3.35	10.88	—	—	6.56	6.19	6.30	2.58	25.4
	139.7	149	85	276	—	—	167	157	160	66	11.5
5	5.563	5.88	3.35	10.88	—	—	6.56	6.19	6.30	2.58	25.4
	141.3	149	85	276	—	—	167	157	160	66	11.5
	6.250	5.88	3.84	11.38	—	0.41	7.52	6.19	6.30	2.58	28.7
	159.0	149	98	289	—	10	191	157	160	66	13.0
	6.500	5.88	3.84	11.38	—	0.41	7.52	6.19	6.30	2.58	28.7
	165.1	149	98	289	—	10	191	157	160	66	13.0
6	6.625	5.88	3.84	11.38	—	0.41	7.52	6.19	6.30	2.58	28.7
DN150	168.3	149	98	289	—	10	191	157	160	66	13.0
8	8.625	5.33	5.07	12.63	0.80	1.47	10.00	6.19	6.30	2.33	43.0
DN200	219.1	135	129	321	20	37	254	157	160	59	19.5
10	10.750	6.40	6.37	15.64	1.41	1.81	12.25	8.10	9.00	—	80.6
DN250	273.0	163	162	397	36	46	311	206	229	—	36.5
12	12.750	6.50	7.36	16.64	2.30	2.80	14.25	8.10	9.00	—	94.6
DN300	323.9	165	187	423	58	71	362	206	229	—	42.9

NOTE

- Optional ½"/15mm tap available for all sizes. Contact Victaulic for details.

5.0 PERFORMANCE

Series 765

The chart expresses the frictional resistance of Victaulic FireLock™ Series 765 High Pressure Butterfly Valve in equivalent feet/meters of straight pipe.

Size		Equivalent Feet/M of Pipe
Nominal inches mm	Actual Outside Diameter inches mm	
2 DN50	2.375 60.3	6 1.8
2 ½	2.875 73.0	6 1.8
DN65	3.000 76.1	6 1.8
3 DN80	3.500 88.9	7 2.1
	4.250 108.0	8 2.4
4 DN100	4.500 114.3	8 2.4
	5.250 133.0	12 3.7
DN125	5.500 139.7	12 3.7
5	5.563 141.3	12 3.7
	6.250 159.0	14 4.3
	6.500 165.1	14 4.2
6 DN150	6.625 168.3	14 4.2
8 DN200	8.625 219.1	16 4.9
10 DN250	10.750 273.0	18 5.5
12 DN300	12.750 323.9	19 5.8

5.1 PERFORMANCE

Series 765

C_v values for flow of water at +60°F/+16°C with a fully open valve are shown in the table below. For additional details, contact Victaulic.

Formulas for C_v Values:

$$\Delta P = \frac{Q^2}{C_v^2}$$

$$Q = C_v \times \sqrt{\Delta P}$$

Where:

Q = Flow (GPM)

ΔP = Pressure Drop (psi)

C_v = Flow Coefficient

Formulas for K_v Values:

$$\Delta P = \frac{Q^2}{K_v^2}$$

$$Q = K_v \times \sqrt{\Delta P}$$

Where:

Q = Flow (m³/hr)

ΔP = Pressure Drop (Bar)

K_v = Flow Coefficient

Size		Flow Coefficient
Nominal inches mm	Actual Outside Diameter inches mm	Full Open C_v K_v
2	2.375	170
DN50	60.3	147
2½	2.875	260
	73.0	225
DN65	3.000	260
	76.1	225
3	3.500	440
DN80	88.9	380
	4.250	820
	108.0	710
4	4.500	820
DN100	114.3	710
	5.250	1200
	133.0	1040
DN125	5.500	1200
	139.7	1040
5	5.563	1200
	141.3	1040
	6.250	1800
	159.0	1560
	6.500	1800
	165.1	1560
6	6.625	1800
DN150	168.3	1560
8	8.625	3400
DN200	219.1	2940
10	10.750	5800
DN250	273.0	5020
12	12.750	9000
DN300	323.9	7790

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.

Failure to follow these instructions could result in death or serious personal injury and property damage.

- 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.
- It is the system designer's responsibility to verify suitability of materials for use with the intended fluid media within the piping system and external environment.
- The material specifier shall evaluate the 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.

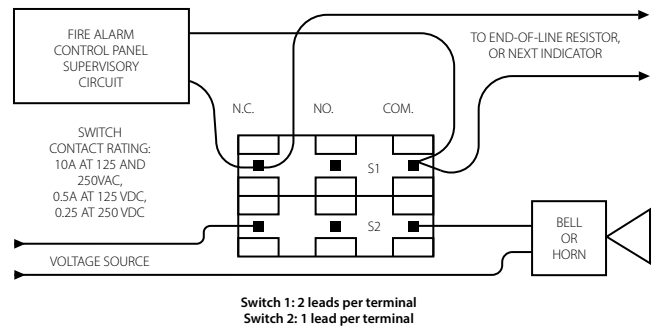
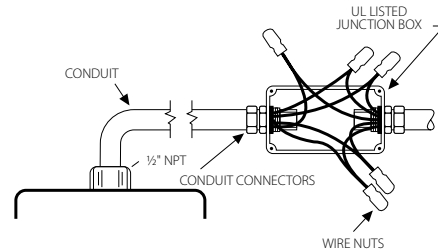
Failure to follow installation requirements and local and national codes and standards could compromise system integrity or cause system failure, resulting in death or serious personal injury and property damage.

7.0 REFERENCE MATERIALS

Switch and Wiring

1. The supervisory switch contains two, single pole, double throw, pre-wired switches.
2. Switches are rated:
10 amps @ 125 or 250 VAC/60 Hz
0.50 amps @ 125 VDC
0.25 amps @ 250 VDC
3. Switches supervise the valve in the “open” position.
4. One switch has two #18 MTW wires per terminal, which permit complete supervision of leads (refer to diagrams and notes below). The second switch has one #18 MTW wire per terminal. This double circuit provides flexibility to operate two electrical devices at separate locations, such as an indicating light and an audible alarm, in the area that the valve is installed.
5. A #14 MTW ground lead (green) is provided.
Switch #1 = S1 For connection to the supervisory circuit of a UL Listed alarm control panel
Switch #2 = S2 Auxiliary switch that may be connected to auxiliary devices, per the authority having jurisdiction

S1	{	Normally Closed: (2) Blue
		Common: (2) Yellow
S2	{	Normally Closed: Blue with Orange Stripe
		Normally Open: Brown with Orange Stripe
		Common: Yellow with Orange Stripe



NOTES

- The above diagram shows a connection between the common terminal (yellow – S1 and yellow-with-orange stripe – S2) and the normally closed terminal (blue – S1 and blue-with-orange stripe – S2). In this example, the indicator light and alarm will stay on until the valve is fully open. When the valve is fully open, the indicator light and alarm will go out. Cap off any unused wires (e.g. brown with orange stripe).
- Only S1 (two leads per terminal) may be connected to the fire alarm control panel.
- The connection of the alarm switch wiring shall be in accordance with NFPA 72 and the auxiliary switch per NFPA 70 (NEC).

7.1 REFERENCE MATERIALS

- [29.01: Victaulic Terms and Conditions of Sale](#)
- [I-100: Victaulic Field Installation Handbook](#)
- [10.01: Regulatory Approval Reference Guide](#)
- [10.81: FireLock™ Butterfly Valve Series 705 with Weatherproof Actuator](#)

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.

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No statement contained herein concerning a possible or suggested use of any material, product, service, or design is intended, or should be constructed, 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 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.

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.

FireLock™ High Pressure Butterfly Valve

Series 766 with Weatherproof Actuator – Supervised Closed

Victaulic®
10.83



1.0 PRODUCT DESCRIPTION

Available Sizes

- 2 – 8"/DN50 – DN200

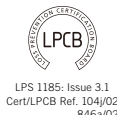
Maximum Working Pressure

- Rated up to 365 psi/2517 kPa/25 bar

Application

- High pressure butterfly valve with an approved weatherproof actuator housing for indoor or outdoor use.
- Designed for fire protection services only. Should not be installed where fluid flow is required as part of normal system operation.
- Actuation options: Hand wheel (2 – 8"/50 – 200mm).
- Exclusively for use with pipe and Victaulic products which feature ends formed with the Victaulic Original Groove System (OGS) groove profile (see section 7.0 for Reference Materials).

2.0 CERTIFICATION/LISTINGS



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

2.0 CERTIFICATION/LISTINGS (CONTINUED)

Size		Approval/Listing Service Pressures			
Nominal inches DN	Actual Outside Diameter inches mm	Series 766 Butterfly Valve			
		cULus psi kPa	FM psi kPa	VdS psi kPa	LPCB psi kPa
2 DN50	2.375 60.3	365 2517	365 2517	365 2517	365 2517
2½	2.875 73.0	365 2517	365 2517	–	365 2517
DN65	3.000 76.1	365 2517	365 2517	365 2517	365 2517
3 DN80	3.500 88.9	365 2517	365 2517	365 2517	365 2517
	4.250 108.0	365 2517	365 2517	–	365 2517
4 DN100	4.500 114.3	365 2517	365 2517	365 2517	365 2517
	5.250 133.0	365 2517	365 2517	–	365 2517
DN125	5.500 139.7	365 2517	365 2517	365 2517	365 2517
5	5.563 141.3	365 2517	365 2517	–	365 2517
	6.250 159.0	365 2517	365 2517	–	365 2517
	6.500 165.1	365 2517	365 2517	–	365 2517
6 DN150	6.625 168.3	365 2517	365 2517	365 2517	365 2517
8 DN200	8.625 219.1	365 2517	365 2517	365 2517	365 2517

3.0 SPECIFICATIONS – MATERIAL

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

End Face, 2 – 6"/DN50 – DN150: Ductile iron conforming to ASTM A536, Grade 65-45-12

Seal Retainer, 8"/DN200: Ductile iron conforming to ASTM A536, Grade 65-45-12

Coating: Black alkyd enamel

Disc: Ductile iron conforming to ASTM A536, Grade 65-45-12, with electroless nickel coating conforming to ASTM B733

Seat:

☐ **Victaulic Grade "T" Nitrile**

Nitrile (Orange stripe color code) For water related services, this gasket may be specified for temperatures rated up to +150°F/+66°C. NOT COMPATIBLE FOR USE WITH HOT WATER SERVICES OR STEAM SERVICES

Stems: 416 stainless steel conforming to ASTM A582

Stem Seal Cartridge: Brass

Bearings: Stainless steel with TFE lining

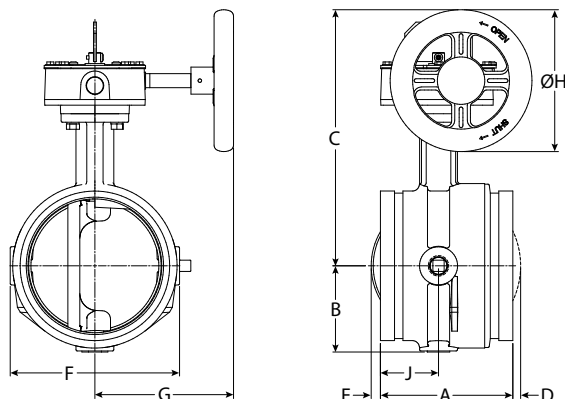
Stem Seals: Nitrile

Stem Retaining Ring: Carbon steel

Actuator:

- **2 – 8"/DN50 – DN200:** Bronze traveling nut on a steel lead screw, in a ductile iron housing

4.0 DIMENSIONS



Size		Dimensions										Weight
Nominal	Outside Diameter	End to End										Approx. Each
inches DN	inches mm	A inches mm	B inches mm	C inches mm	D inches mm	E inches mm	F inches mm	G inches mm	H inches mm	J inches mm		lb kg
2	2.375	4.25	2.28	6.41	—	—	4.00	4.22	4.50	2.12		8.2
DN50	60.3	108	58	163	—	—	102	107	114	54		3.7
2½	2.875	3.77	2.28	7.54	—	—	4.00	4.22	4.50	1.77		9.7
	73.0	96	58	192	—	—	102	107	114	45		4.4
DN65	3.000	3.77	2.28	7.54	—	—	4.00	4.22	4.50	1.77		9.7
	76.1	96	58	192	—	—	102	107	114	45		4.4
3	3.500	3.77	2.53	7.79	—	—	4.50	4.22	4.50	1.77		10.7
DN80	88.9	96	64	198	—	—	114	107	114	45		4.9
	4.250	4.63	2.88	8.81	—	—	5.50	4.22	4.50	2.20		—
	108.0	118	73	224	—	—	140	107	114	56		—
4	4.500	4.63	2.88	8.81	—	—	5.50	4.22	4.50	2.20		14.0
DN100	114.3	118	73	224	—	—	140	107	114	56		6.4
	5.250	5.88	3.35	10.88	—	—	6.56	6.19	6.30	2.58		—
	133.0	149	85	276	—	—	167	157	160	66		—
DN125	5.500	5.88	3.35	10.88	—	—	6.56	6.19	6.30	2.58		—
	139.7	149	85	276	—	—	167	157	160	66		—
5	5.563	5.88	3.35	10.88	—	—	6.56	6.19	6.30	2.58		25.4
	141.3	149	85	276	—	—	167	157	160	66		11.5
	6.250	5.88	3.84	11.38	—	0.41	7.52	6.19	6.30	2.58		—
	159.0	149	98	289	—	10	191	157	160	66		—
	6.500	5.88	3.84	11.38	—	0.41	7.52	6.19	6.30	2.58		28.7
	165.1	149	98	289	—	10	191	157	160	66		13.0
6	6.625	5.88	3.84	11.38	—	0.41	7.52	6.19	6.30	2.58		28.7
DN150	168.3	149	98	289	—	10	191	157	160	66		13.0
8	8.625	5.33	5.07	12.63	0.80	1.47	10.00	6.19	6.30	2.33		43.0
DN200	219.1	135	129	321	20	37	254	157	160	59		19.5

5.0 PERFORMANCE

The chart expresses the frictional resistance of Victaulic FireLock™ Series 766 High Pressure Butterfly Valve in equivalent feet/meters of straight pipe.

Size		Equivalent Feet/M of Pipe
Nominal inches mm	Actual Outside Diameter inches mm	
2 DN50	2.375 60.3	6 1.8
2 ½	2.875 73.0	6 1.8
DN65	3.000 76.1	6 1.8
3 DN80	3.500 88.9	7 2.1
	4.250 108.0	8 2.4
4 DN100	4.500 114.3	8 2.4
	5.250 133.0	12 3.7
DN125	5.500 139.7	12 3.7
5	5.563 141.3	12 3.7
	6.250 159.0	14 4.3
	6.500 165.1	14 4.2
6 DN150	6.625 168.3	14 4.2
8 DN200	8.625 219.1	16 4.9

5.1 PERFORMANCE

C_v values for flow of water at +60°F/+16°C with a fully open valve are shown in the table below. For additional details, contact Victaulic.

Formulas for C_v Values:

$$\Delta P = \frac{Q^2}{C_v^2}$$

$$Q = C_v \times \sqrt{\Delta P}$$

Where:

Q = Flow (GPM)

ΔP = Pressure Drop (psi)

C_v = Flow Coefficient

Formulas for K_v Values:

$$\Delta P = \frac{Q^2}{K_v^2}$$

$$Q = K_v \times \sqrt{\Delta P}$$

Where:

Q = Flow (m³/hr)

ΔP = Pressure Drop (Bar)

K_v = Flow Coefficient

Size		Flow Coefficient
Nominal inches mm	Actual Outside Diameter inches mm	Full Open C _v K _v
2 DN50	2.375 60.3	170 147
2 ½	2.875 73.0	260 225
DN65	3.000 76.1	260 225
3 DN80	3.500 88.9	440 380
	4.250 108.0	820 710
4 DN100	4.500 114.3	820 710
	5.250 133.0	1200 1040
DN125	5.500 139.7	1200 1040
5	5.563 141.3	1200 1040
	6.250 159.0	1800 1560
	6.500 165.1	1800 1560
6 DN150	6.625 168.3	1800 1560
8 DN200	8.625 219.1	3400 2940

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.

Failure to follow these instructions could result in death or serious personal injury and property damage.

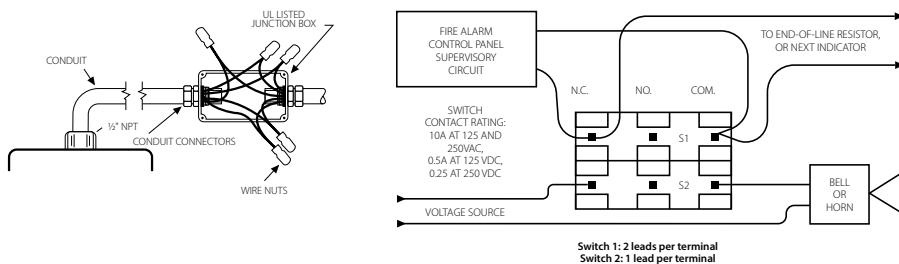
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- The installer shall understand the use of this product and why it was specified for the particular application.
- The installer shall understand common industry safety standards and potential consequences of improper product installation.
- It is the system designer's responsibility to verify suitability of materials for use with the intended fluid media within the piping system and external environment.
- The material specifier shall evaluate the 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.

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.

7.0 REFERENCE MATERIALS

1. The supervisory switch contains two, single pole, double throw, pre-wired switches.
2. Switches are rated:
10 amps @ 125 or 250 VAC/60 Hz
0.50 amps @ 125 VDC
0.25 amps @ 250 VDC
3. Switches supervise the valve in the “Closed” position.
4. One switch has two #18 MTW wires per terminal, which permit complete supervision of leads (refer to diagrams and notes below). The second switch has one #18 MTW wire per terminal. This double circuit provides flexibility to operate two electrical devices at separate locations, such as an indicating light and an audible alarm, in the area that the valve is installed.
5. A #14 MTW ground lead (green) is provided.
Switch #1 = S1 For connection to the supervisory circuit of a UL Listed alarm control panel
Switch #2 = S2 Auxiliary switch that may be connected to auxiliary devices, per the authority having jurisdiction

- S1** { Normally Closed: (2) Blue
Common: (2) Yellow
- S2** { Normally Closed: Blue with Orange Stripe
Normally Open: Brown with Orange Stripe
Common: Yellow with Orange Stripe



NOTE

- The above diagram shows a connection between the common terminal (yellow – S1 and yellow-with-orange stripe – S2) and the normally closed terminal (blue – S1 and blue-with-orange stripe – S2). In this example, the indicator light and alarm will stay on until the valve is fully closed. When the valve is fully closed, the indicator light and alarm will go out. Cap off any unused wires (e.g. brown with orange stripe). Only S1 (two leads per terminal) may be connected to the fire alarm control panel. The connection of the alarm switch wiring shall be in accordance with NFPA 72 and the auxiliary switch per NFPA 70 (NEC).

7.1 REFERENCE MATERIALS

- [10.75: FireLock™ Butterfly Valve Series 707C with Weatherproof Actuator – Supervised Closed](#)
[10.80: FireLock™ High Pressure Butterfly Valve Series 765 with Weatherproof Actuator – Supervised Open](#)
[10.81: FireLock® Butterfly Valve Series 705 with Weatherproof Actuator - Supervised Open](#)
[29.01: Victaulic Terms and Conditions of Sale](#)
[I-100: Victaulic Field Installation Handbook](#)

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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

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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.

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.

Angle Hose Valves

INSIST ON
FPPI®

UL, ULC and FM Approved

Description

Angle hose valves feature all brass* construction with forged or cast bodies for rigidity and light weight. Typical uses are in rack assemblies or any other application which requires a listed fire hose valve. Available in rough brass or polished chrome finish with a red hand wheel. **UL, ULC and FM Approved.**

Rated 300psi



Installation

Install in accordance with customary installation practices. Use an approved thread sealant such as PipeFit Thread Sealing Paste with PTFE on the male threads to which the valve is being installed.

DO NOT OVER TIGHTEN. Over tightening of the valve during installation to the male pipe threads may crack or deform the valve body. Only use tools suitable for the installation of this product. Do not use pipe wrench extenders to increase leverage on pipe wrenches. This may result in valve damage as well as personal injury.

Specifications

Material:

Cast or Forged Brass* Body

Finish:

Rough Brass

Polished Chrome*

Threads:

2½" FNPT x FNPT
FNPT x MNST*
MBCT
MQST
MONT
MPHX
MTEM
MCLV

2½" GRV x FNPT

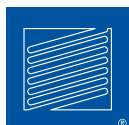
GRV x MNST

1½" FNPT x FNPT

FNPT x MNST

Friction loss is less than 3 psi thru an equivalent length of pipe per UL Standards.

*Contains lead. Not for use in water systems intended for human consumption.



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WWW.FPPI.COM



**GUARDIAN**FIRE EQUIPMENT, INC.
MIAMI, FL

Ph. 800.327.6584 • Fax 800.827.3869

DETAIL AND SUBMITTAL SHEET**6100 Series - Projecting Fire Dept. Inlet Connections**

Project/Location: _____

Date: _____

Architect/Engineer: _____

Qty: _____

Contractor: _____

☒ *Appropriate Selection*

Used as auxiliary connections through which the fire department can pump water to supplement existing water supplies. Provides 250 GPM flow (minimum), per 2 1/2" inlet.

Two and three-way - inlet connections feature clappered brass bodies (straight pattern), with female hose thread swivel inlets and female NPT outlets.

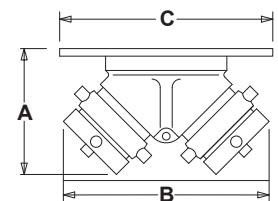
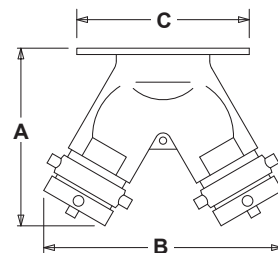
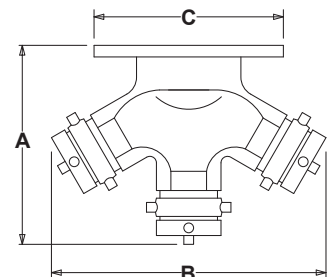
Standard components, all connections:

Plugs with chains and identification plate. Cast brass construction, standard.

Two and Three-Way Connections					
Model No.	Size	Clappers	A	B	C
☐ 6114	4" x 2 1/2" x 2 1/2"	1	5 7/8"	8 1/8"	10"
☐ 6124	4" x 2 1/2" x 2 1/2"	2	7 5/8"	10 1/2"	10"
☐ 6126	6" x 2 1/2" x 2 1/2"	2	8"	10 1/2"	11 1/4"
☐ 6134	4" x 2 1/2" x 2 1/2" x 2 1/2"	3	10 1/2"	13 3/4"	10"
☐ 6136	6" x 2 1/2" x 2 1/2" x 2 1/2"	3	11 1/4"	13 3/4"	11 1/4"
Identification Plate Lettering					
☐ AUTO SPKR	☐ AUTO SPKR & STANDPIPE				
☐ STANDPIPE	☐ DRY STANDPIPE				

Optional Finish: ☐ -B Polished Brass
☐ -C Rough Chrome Plated
☐ -D Polished Chrome Plated

Threads:

☐ NST
☐ Other _____**6114****6124/6126****6134/6136**

Victaulic® Brass Body Ball Valve

Series 722



1.0 PRODUCT DESCRIPTION

Available Sizes

- ¼ – 2"/DN8 – DN50

Maximum Working Pressure

- See section 5.0 for pressure ratings

Operating Temperature Range

- -4°F to +250°F/-20°C to +121°C
- Maximum temperature for dry saturated steam: +365°F/+185°C

Function

- Standard port, female NPT threaded end valve for on/off service
- Standard port, female BSPT threaded end valve for on/off service (CCCf approved valve only)

2.0 CERTIFICATION/LISTINGS



NOTE

- Download [publication 10.01](#) for Fire Protection Certifications/Listings Reference Guide.

3.0 SPECIFICATIONS – MATERIAL

Series 722 Brass Body Ball Valve

Body: Forged brass, per ASTM B124

Ball: Brass, chrome plated, per ASTM B124

Stem: Brass, per ASTM B124

Seat: Polytetrafluoroethylene (PTFE)

Handle: Carbon steel, zinc plated, with vinyl grip

Stem Nut: Carbon steel, zinc plated

Stem Washer: Polytetrafluoroethylene (PTFE)

O-Ring: Fluoroelastomer.

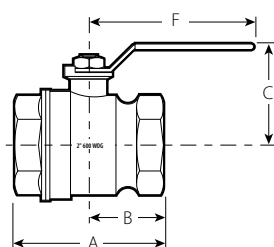
ALWAYS REFER TO ANY NOTIFICATIONS AT THE END OF THIS DOCUMENT REGARDING PRODUCT INSTALLATION, MAINTENANCE OR SUPPORT.

System No.		Location	
Submitted By		Date	

Spec Section		Paragraph	
Approved		Date	

4.0 DIMENSIONS

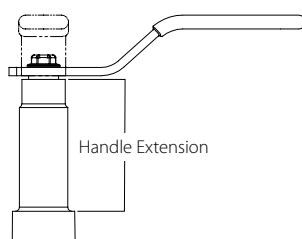
Series 722 Brass Body Ball Valve



Size		Dimensions				Weight
Nominal inches DN	Nominal Actual Outside inches mm	A inches mm	B inches mm	C inches mm	F inches mm	Approximate (Each) lb kg
1/4 DN8	0.540 13.7	1.54 39	0.77 20	1.03 26	1.65 42	0.2 0.1
3/8 DN10	0.675 17.1	1.77 45	0.88 22	1.28 33	3.07 78	0.3 0.1
1/2 DN15	0.840 21.3	2.13 54	1.06 27	1.33 34	3.07 78	0.4 0.2
3/4 DN20	1.050 26.9	2.44 62	1.22 31	1.79 45	3.78 96	0.7 0.3
1 DN25	1.315 33.7	2.95 75	1.48 37	1.95 50	3.78 96	1.0 0.5
1 1/4 DN32	1.660 42.4	3.31 84	1.65 42	2.17 55	3.78 96	1.5 0.7
1 1/2 DN40	1.900 48.3	3.66 93	1.83 46	2.68 68	5.43 138	2.1 1.0
2 DN50	2.375 60.3	4.21 107	2.11 53	2.89 73	5.43 138	2.4 1.1

4.1 OPTIONAL PART

Handle Extension (Optional)



Valve Inlet Size	2" Handle Extension
	Victaulic Part Code
3/8 - 1/2"	P0047222XT
3/4 - 1 1/4"	P0067222XT
1 1/2 - 2"	P0147222XT

5.0 PERFORMANCE

Maximum Working Pressure (At +68°F/+20°C)

- ¼ – ¾"/DN8 – DN20: 600 psi/4138 kPa/41 bar
- 1 – 2"/DN25 – DN50: 500 psi/3448 kPa/34 bar
- ½ – 2"/DN15 – DN50: UL Listed at 175 psi/1207 kPa/12 bar
- ½ – ¾"/DN15 – DN20: FM Approved at 600 psi/4138 kPa/41 bar
- 1 – 2"/DN25 – DN50: FM Approved at 500 psi/3448 kPa/34 bar
- ½ – 2"/DN15 – DN50: CCCf Approved at 365 psi/2517 kPa/25 bar

5.1 PERFORMANCE

C_v/K_v Values:

C_v/K_v values for flow of water at 60°F/16°C are shown in the table below.
For additional details contact Victaulic.

Formulas for C_v and K_v values

$$\Delta P = \frac{Q^2}{C_v^2}$$

$$Q = C_v \times \sqrt{\Delta P}$$

Where:

Q = Flow (GPM)

ΔP = Pressure Drop (psi)

C_v = Flow Coefficient

$$\Delta P = \frac{Q^2}{K_v^2}$$

$$Q = K_v \times \sqrt{\Delta P}$$

Where:

Q = Flow (m³/hr)

ΔP = Pressure Drop (Bar)

K_v = Flow Coefficient

Size		Flow
Nominal inches DN	Actual Outside Diameter inches mm	Full Open C _v K _v
¼ DN8	0.540 13.7	7.0 6.0
⅜ DN10	0.675 17.1	7.0 6.0
½ DN15	0.840 21.3	10.0 8.6
¾ DN20	1.050 26.9	25.0 21.4
1 DN25	1.315 33.7	37.0 31.7
1 ¼ DN32	1.660 42.4	50.0 42.8
1 ½ DN40	1.900 48.3	87.0 74.6
2 DN50	2.375 60.3	110.0 94.3

6.0 NOTIFICATIONS

WARNING



- Read and understand all instructions before attempting to install, remove, adjust, or maintain any Victaulic piping products.
- Depressurize and drain the piping system before attempting to install, remove, adjust, or maintain any Victaulic piping products.
- Wear safety glasses, hardhat, and foot protection.

Failure to follow these instructions could result in death or serious personal injury and property damage.

7.0 REFERENCE MATERIALS

[I-100: Victaulic 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.

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Note

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

Installation

Reference should always be made to the current IMI TA installation/assembly instructions for the product you are installing. For coupling and strainer installation, reference should always be made to the [I-100 Victaulic Field Installation Handbook](#) 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

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.

Features

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



Description

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

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

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

Technical Specifications

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

*Specifications subject to change without notice.

Installation

NOTICE

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

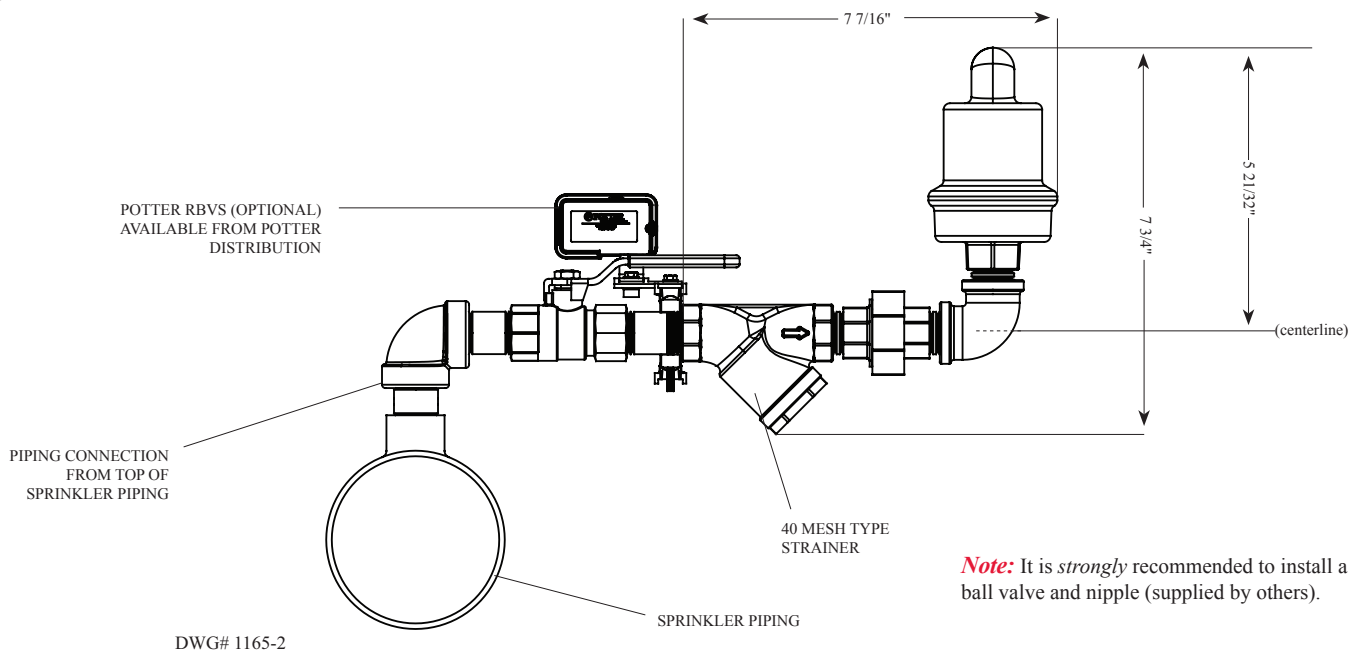
1. Read and understand the instructions provided before you proceed with installation. The PAV shall be installed in accordance with local ordinances and the applicable NFPA13, NFPA13D, or NFPA13R standard.
2. The Engineer of Record should select the Model PAV, Potter Air Vent installation location.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

PAV and Shutoff Valve Replacement

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

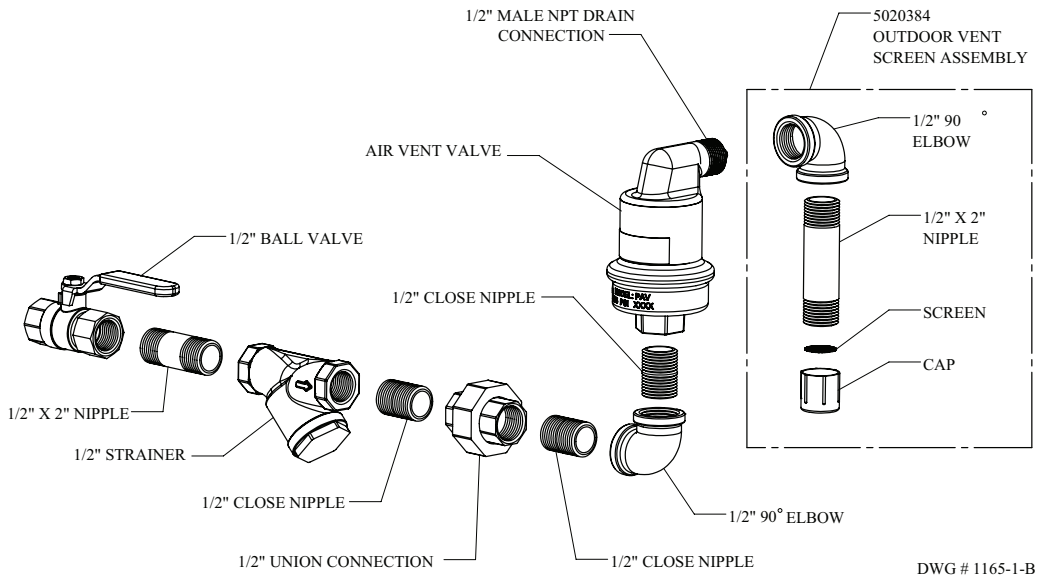
PAV Outline Drawing

Fig 1



PAV Assembly

Fig 2



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

Ordering Information

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

ELECTRICAL



SSM/SSV Series Alarm Bells

System Sensor's SSM and SSV series alarm bells are low current, high decibel notification appliances for use in fire and burglary systems or other signaling applications.



Features

- Approved for indoor and outdoor use
- Low current draw
- High dB output
- Available in six-inch, eight-inch, and ten-inch sizes
- AC and DC models
- DC models polarized for use with supervision circuitry
- Mount directly to standard four-inch square electrical box indoors
- SSM and SSV series come pre-wired

Reliable Performance. The SSM and SSV series provide loud resonant tones. The SSM series operates on 24VDC and are motor driven, while the SSV series operates on 120VAC utilizing a vibrating mechanism.

Simplified Installation. For indoor use, the SSM and SSV series mount to a standard four-inch square electrical box. For outdoor applications, weatherproof back box, model number WBB, is used.

The SSM and SSV series come pre-wired, to reduce installation time. The SSM series incorporates a polarized electrical design for use with supervision circuitry.

Agency Listings



SSM/SSV Specifications

Architectural/Engineering Specifications

Model shall be a SSM or SSV Series alarm bell. Bells shall have underdome strikers and operating mechanisms. Gongs on said bells shall be no smaller than nominal 6"8"/10" (specify size) with an operating voltage of 24VDC or 120VAC (specify by part number). Bells shall be suitable for surface or semi-flush mounting. Outdoor surface mounted installations shall be weatherproof (using optional WBB weatherproof electrical box). Otherwise bells shall mount to a standard 4" square electrical box having a maximum projection of 2½". Bells shall be located as shown on the drawings or as determined by the Authority Having Jurisdiction. Bells shall be listed for indoor/outdoor use by Underwriters Laboratories and the California State Fire Marshal, and approved by Factory Mutual and MEA.

Physical/Operating Specifications

Operating Temperature Range	-31°F to 140°F
Operating Voltage	SSM series: 24 VDC SSV series: 120 VAC
Termination	Provided with 2 sets of leads for in/out wiring
Service Use	Fire Alarm, General Signaling, Burglar Alarm
Warranty	3 years

Electrical Specifications

Model	Gong Diameter (inches)	Nominal Voltage	Operating Voltage Limit	Maximum Current	Sound Output (dBA)
SSM24-6	6	Regulated 24VDC	16 to 33VDC	DC-31.1mA/ FWR-53.5mA	82
SSM24-8	8	Regulated 24VDC	16 to 33VDC	DC-31.1mA/ FWR-53.5mA	80
SSM24-10	10	Regulated 24VDC	16 to 33VDC	DC-31.1mA/ FWR-53.5mA	81
SSV120-6	6	Regulated 120VAC	96 to 132VAC	53mA	85
SSV120-8	8	Regulated 120VAC	96 to 132VAC	53mA	82
SSV120-10	10	Regulated 120VAC	96 to 132VAC	53mA	82

* Sound output measured at Underwriter Laboratories, as specified in UL464

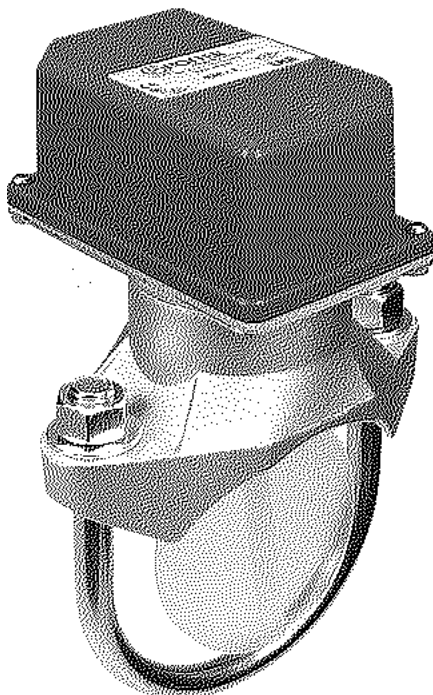
Ordering Information

UL/FM Model No.	ULC/Canadian Model No.	Description
SSM24-6	SSM24-6A	Bell, 6", 24VDC, Polarized, 82dBA
SSM24-8	SSM24-8A	Bell, 8", 24VDC, Polarized, 80dBA
SSM24-10	SSM24-10A	Bell, 10", 24VDC, Polarized, 81dBA
SSV120-6	SSV120-6A	Bell, 6", 120VAC, 85dBA
SSV120-8	SSV120-8A	Bell, 8", 120VAC, 82dBA
SSV120-10	SSV120-10A	Bell, 10", 120VAC, 82dBA
WBB		Weatherproof back box for SSM and SSV series, when installed outdoors



3825 Ohio Avenue • St. Charles, IL 60174
Phone: 800-SENSOR2 • Fax: 630-377-6495

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Product specifications subject to change without notice. Visit systemsensor.com for current product information, including the latest version of this data sheet.
A05-0260-010 • 08/11 • #2870



U.S. Pat. No. 3921989
Canadian Pat. No. 1009680
Other Patents Pending
Potter Electric, Rd., 1990

UL, UL C and CSFM Listed, FM and LPCB Approved, NYMEA Accepted, CE Marked

Service Pressure: Up to 450 PSI (31 BAR)

Minimum Flow Rate for Alarm: 10 GPM (38 LPM)

Maximum Surge: 18 FPS (5,5 m/s)

Contact Ratings: Two sets of SPDT (Form C)
15.0 Amps at 125/250VAC
2.0 Amps at 30VDC Resistive

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

Environmental Specifications:

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

Caution: This device is not intended for applications in explosive environments.

Sizes Available: Steel Pipe schedules 10 thru 40, sizes 2" thru 8"
BS 1387 pipe 50mm thru 200mm

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

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

Optional: Cover Tamper Switch Kit, Stock No. 0090018

GENERAL INFORMATION

The Model **VSR-F** is a vane type waterflow switch for use on wet sprinkler systems. It is UL Listed and FM Approved for use on steel pipe; schedules 10 through 40, **sizes 2" thru 8"** (50mm thru 200mm).

LPC approved sizes are 2" thru 8" (50mm thru 200mm).

The unit may also be used as a sectional waterflow detector on large systems.

The unit 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 gallons per minute (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 unit is 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 no. 5400775 for installation instructions of this switch.

INSTALLATION: See Fig.2

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

Drain the system and drill a hole in the pipe using a circular saw in a slow speed drill. The 2" (50mm) and 2 1/2" (65mm) devices require a hole with a diameter of 1 1/4" + 1/8" - 1/16" (33mm ±2mm). All other sizes require a hole with a diameter of 2" ±1/8" (50mm ±2mm).

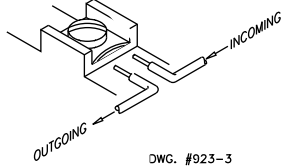
Clean the inside pipe of all growth or other material for a distance equal to the pipe diameter on either side of the hole.

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. Install the saddle strap and tighten nuts alternately to an eventual 50 ft-lbs. (68 n-m) of torque (see Fig. 2). The vane must not rub the inside of the pipe or bind in any way.

Specifications subject to change without notice.

FIG. 1

**SWITCH TERMINAL
CONNECTIONS
CLAMPING PLATE
TERMINAL**



CAUTION:

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 becomes dislodged from under the terminal.

FIG. 2

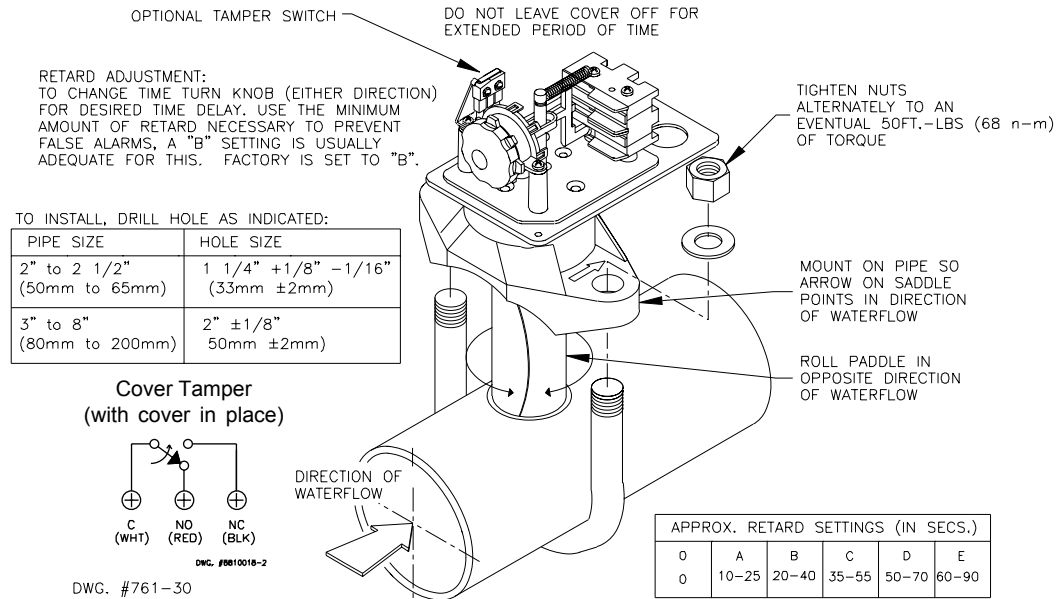
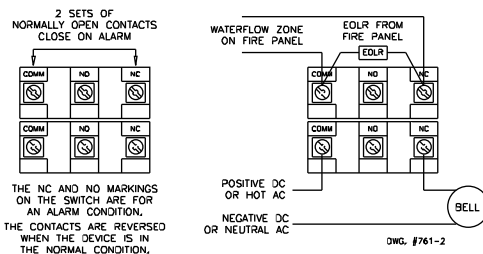


FIG. 3 TYPICAL ELECTRICAL CONNECTIONS

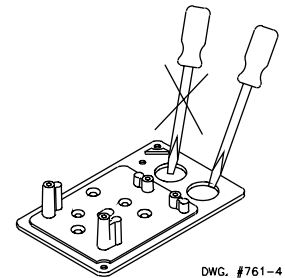


NOTES:

1. The Model VSR-F 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. A condition of LPC Approval of this product is that the electrical entry must be sealed to exclude moisture.
3. For supervised circuits see "Switch Terminal Connections" drawing and caution note (Fig. 1).

FIG. 4

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



APPLICATION WARNING!

Due to the possibility of unintended discharges caused by pressure surges, trapped air, or short retard times, waterflow switches that are monitoring wet pipe sprinkler systems should not be used as the sole initiating device to discharge AFFF, deluge, or chemical suppression systems.

TESTING

The frequency of inspection and testing for the model VSR-F and its associated protective monitoring system should 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, that is usually located at the end of the most remote branch line, should 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-F is not recommended or advisable.

A minimum flow of 10 gpm (38 Lpm) is required to activate this device.

IMPORTANT NOTICE: Please advise the person responsible for testing of the fire protection system that this system must be tested in accordance with the testing instructions.

FIRE PUMP, JOCKEY PUMP & CONTROL PANELS

Customer Technical Offer

Customer	RFQ-For Quotes C&M	Pump Size / Stages	SD08LFK / 1
Item number	001	Pump speed	3500 rpm
Customer enquiry	Hiller Fire	Quote number	637808

Pumpset

Qty	Description
1	SD08LFK - 300 USgpm @ 60 psi Order Type Order Details Order For: Pumpset Site Details Site Mains voltage (for motor/ controllers/ Engine instrumentation): 200V or 208V / 60Hz Auxillary site Voltage (for Jockey pump / controller): 3 Phase / 60 Hz / 200-208V Site Suction pressure: Enter Suction pressure here (Mandatory for order processing): 49.99 psi Accessories: Required Start-up Please select: Not Included / Quoted Pump (PKKFL08D254ULFM1) (1FL0895111111111) Materials of Construction Design: Standard MOC (Material of Construction Code) Material Code (Casing / Impeller/ Shaft): X MOC - BRONZE FITTED-(C.I. / BR / High Tensile Steel) Pump casing material: GREY CAST IRON (124) Impeller material: LEADED GUNM. CAST (445) Construction Options Suction Flange Drilling Standard: ANSI B16.1 CL 125/150 FF Delivery Flange Drilling Standard: ANSI B16.1 CL 250 FF Sealing Arrangement: Gland Packing Stuffing box sealing / flushing: Self Sealing Driver (MW0202602-8064OYD1) Driver Type Driver Selection: Electric Motor (Catalog) Motor options Motor manufacturer: WEG Motor poles: 2 pole Motor mounting: Vertical Flange Motor Enclosure: Open Drip Proof (ODP) Supply Voltage With Variation: 208 Volts Frequency: 60 Hz Motor: Electric Motor, WEG, Vertical, 20Hp, 3600 rpm, 60 Hz, 254JP, ODP Enclosure, Class F, 40 Deg C Ambient 208 Volts / 60 Hz / Y/D Accessories Accessories menu Pump Gasket Kit (GSKTKTSD08LFK): Gasket Kit for Pump Flanges Gauges Delivery side Pressure gauge Pressure Gauge selected (GGDEL300WGLY1111): 4" Pump Discharge Gauge 0-300 PSI, 1/4" NPT - Liquid Filled Suction side Pressure gauge Compound Gauge selected (GGSUC300WGLY1111): 4" Pump Suction Gauge 30-0-300 PSI, 1/4" NPT - Liquid Filled QC/Testing Plans/Painting/Packing Testing Details Hydro Test: Required Hydro Test: Non-Witness Hydrotest Fix Speed Performance Test: Required Fix Speed Performance Test: Non-Witness Fixed Speed Performance NPSH Test: Not Required Noise Test: Not Required Vibration Test: Not Required Painting selection Painting selection: Standard Painting Packing selection: Standard Palletized Packing

Pump

Qty	Description
1	Order Type Order Details HazMat Certification: Not Required

Casing Relief Valve

Qty	Description
1	Accessories Accessories menu Casing Relief Valve (CRV3-4175111111): Casing Relief Valve, Bronze, UL/FM, 3/4", Adjustment range 20-200 psi

Main Fire Pump Controller

Qty	Description
1	Accessories Accessories menu Motor Controller Motor Controller Make: Any Starting Type: Wye-Delta Closed Voltage: Motor Voltage 200 V / 208 V Controller Enclosure (Cabinet): Nema 2 Standard Transfer Switch: TS Not Required Normal Source withstand rating: Controller standard Space Heater (Anti condensation Device): None Nameplate / Labels Language: English Labels (Standard) Motor Controller: Motor Controller, FT30-500-E, Wye-Delta Closed, No Transfer Switch

Jockey Pump

Qty	Description
1	Accessories Accessories menu Jockey Pump and / or Controller {JWNV6-760F311111} Enter the duty parameters for jockey pump Select the desired duty flow (usgpm): 5 Enter the desired Head (psi)70: 70 Jockey Pump / Controller Frequency: 60 Hz Jockey Pump: Jky Pump, Webtrol, NV6B7FE3T, 60 Hz, 0.75 HP, Flanged - Class 300, 208-230/460 V, 3 Phase Jockey Pump Gasket Kit(JPFLANGEKIT-1-1/4): 1-1/4" class 250 jockey pump flange kit

Jockey Pump Controller

Qty	Description
1	Accessories Accessories menu Jockey Pump and / or Controller {JWNV6-760F311111} Jockey Pump Controller (TJ50071931) Jockey Controller Make: Any Jockey Controller Phase: 3 Phase Jockey Controller Voltage: 460 V / 480 V Jockey PumpController Enclosure: Nema 2 Jockey Controller Labels: English Jockey Controller: Jky Cntrlr-XTJP-0.75-D 0.75Hp/460V/60Hz

Taper Spool Pieces

Qty	Description
1	Accessories Accessories menu Taper Spool Pieces for - SD08LFK - 3 Inch ANSI B16.1 CL 125/150 FF X 3 Inch ANSI B16.1 CL 250 FF Eccentric Decreaser (R040312111111111) End Type: Flanged Flange Rating: CL 125 X CL 125 Eccentric Suction Reducer: Ecc Suc Reducer, 4"x3", #125x125 Concentric Increaser (I030421111111111) End Type: Grooved Flange Rating: CL 250 X Grooved Concentric Discharge Increaser: Con Dis Increaser, 3"x4", 250xGrooved

Hose Header

Qty	Description
1	Accessories Accessories menu Hose Header (H040231111111111) Hose header: Hose Head with valves, 4",Grooved, 2 Outlet Hose Valves for Hose (Test) header: 2-1/2" Hose Valve with Cap and chain

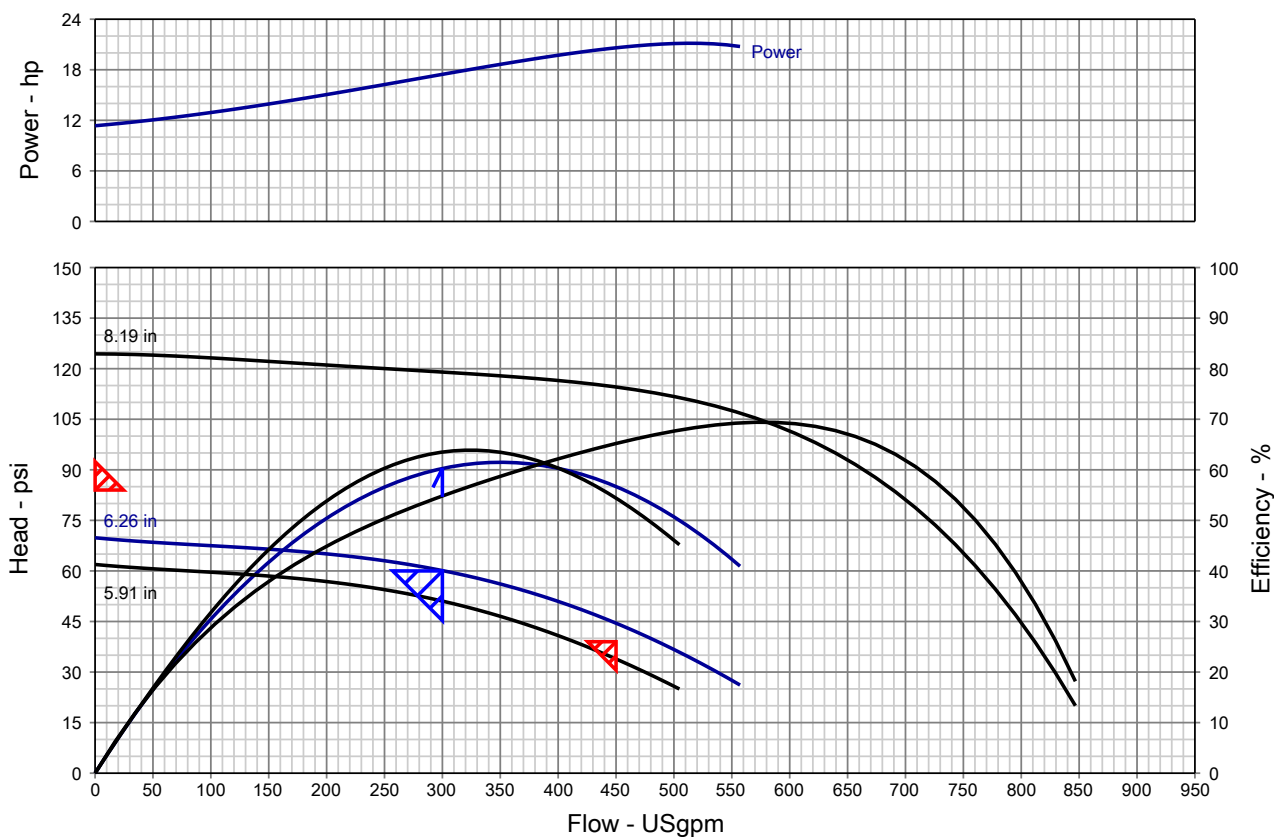
Freight

Qty	Description
1	Order Type Order Details Freight Freight Options: Freight Included (Delivered to site for Domestic USA shipments only)

Pump Performance Datasheet

Customer	: RFQ-For Quotes C&M	Quote number	: 637808
Customer enquiry	: Hiller Fire	Pump Size	: SD08LFK
Item number	: 001	Stages	: 1
Usage - Tertiary	:	Based on curve number	: KFL08D
Quantity	: 1	Date last saved	: 26 Sep 2025 00:06

Operating Conditions		Liquid	
Flow, rated	: 300.0 USgpm	Liquid Type/ Application	: Water
Differential Head (requested)	: 60.00 psi	Additional liquid description	:
Suction pressure, rated / max	: 50.00 / 50.00 psi.g	Temperature, max	: 68.00 deg F
NPSH available, rated	: Ample	Fluid density, rated / max	: 1.000 / 1.000 SG
Site Supply Frequency	: 60 Hz	Viscosity, rated	: 1.00 cP
NFPA Limits		Performance	
Flow, rated	: 300.0 USgpm	Speed, rated	: 3500 rpm
Head, rated	: 60.11 psi	Impeller diameter, rated (approx.)	: 6.26 in
Power, rated	: 17.46 hp	Impeller diameter, maximum	: 8.19 in
NPSHr, rated	: -	Impeller diameter, minimum	: 5.91 in
Efficiency, rated	: 60 %	Efficiency	: 60 %
Flow at 150%	: 450.0 USgpm	NPSH required / margin required	: - / 0.00 ft
Head at 150%, actual/limit	: 44.50 psi	Head, maximum, rated diameter (approx.)	: 69.83 psi
Efficiency at 150%	: 57 %	Diameter ratio (rated / max)	: 76.44 %
NPSHr at 150% flow	: -	Driver & Power Data (@Max density)	
Power required at 150% flow	: 20.60 hp	Power, hydraulic	: 10.52 hp
Peak power	: 21.15 hp	Power, rated	: 17.46 hp
Closed valve pressure	: 119.8 psi.g	Power, maximum, rated diameter	: 21.15 hp
140% Head at shutoff	: 84.00 psi	Material	
65% Head at 150% flow	: 39.00 psi	Material selected	: Code X - CI / BR /SS
Cooling flow (None)	: 0.00 USgpm	Selection status	
Pressure Data		FM/UL/cUL approved	: FM/UL
Maximum working pressure	: 119.8 psi.g	Near miss reasons	:
Maximum allowable working pressure	: 206.0 psi.g		
Maximum allowable suction pressure	: 75.00 psi.g		
Hydrostatic test pressure	: 250.0 psi.g		

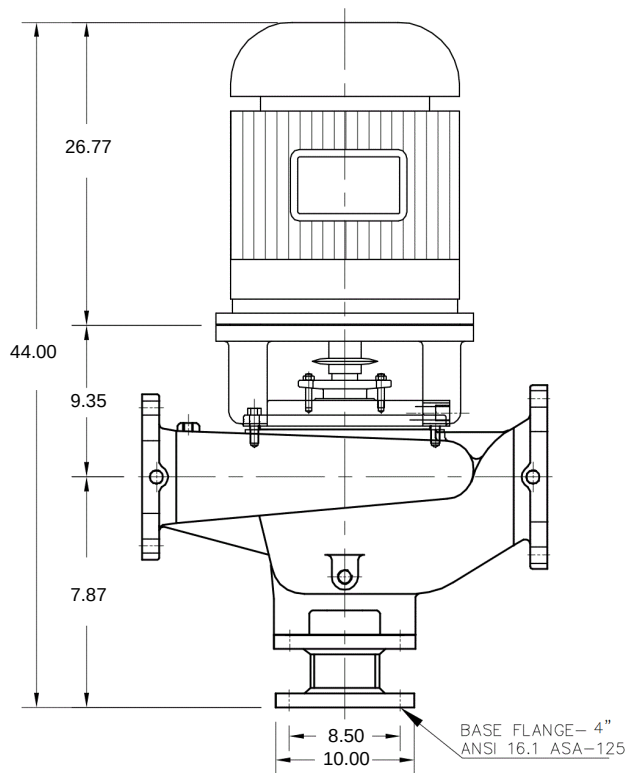


Pump Performance Datasheet

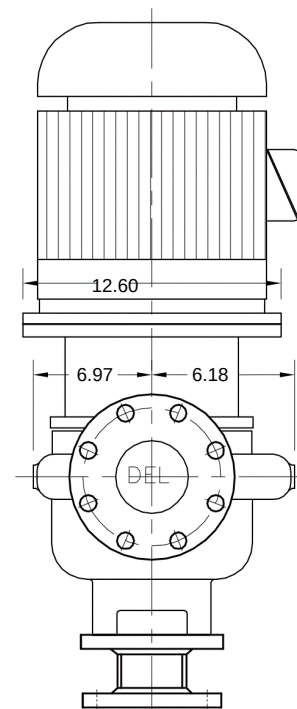
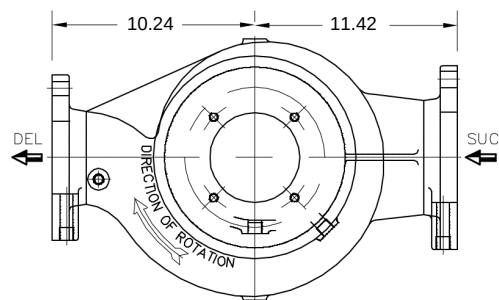
Customer	: RFQ-For Quotes C&M	Quote number	: 637808
Customer enquiry	: Hiller Fire	Pump Size	: SD08LFK
Item number	: 001	Stages	: 1
Usage - Tertiary	:	Based on curve number	: KFL08D
Quantity	: 1	Date last saved	: 26 Sep 2025 00:06

Operating Conditions		Liquid	
Flow, rated	: 300.0 USgpm	Liquid Type/ Application	: Water
Differential Head (requested)	: 60.00 psi	Additional liquid description	:
Suction pressure, rated / max	: 50.00 / 50.00 psi.g	Temperature, max	: 68.00 deg F
NPSH available, rated	: Ample	Fluid density, rated / max	: 1.000 / 1.000 SG
Site Supply Frequency	: 60 Hz	Viscosity, rated	: 1.00 cP

Flow (USgpm)	Head (psi)	Pump Efficiency (%)	Power Required (hp)	NPSH required (ft)
0.00	69.83	0	11.35	-
69.64	68.08	22	12.38	-
139.3	66.70	40	13.71	-
208.9	64.75	52	15.26	-
278.5	61.48	59	16.94	-
348.2	56.30	61	18.60	-
417.8	48.81	59	20.07	-
487.5	38.78	52	21.03	-
557.1	26.15	41	20.76	-



FRONT VIEW



SIDE VIEW

PUMP DUTIES				FLANGE DRILLING STANDARD AND DETAILS		
Capacity	300.0 USgpm	Efficiency	60 %	BRANCH	Nom Size	Flange drilling std
Total Head	60.00 psi	Peak Power	60.26 %	Suction	3 Inch	ANSI B16.1 CL 125/150 FF
				Delivery	3 Inch	ANSI B16.1 CL 250 FF
Note1: This drawing is not to be used for installation purpose until it has been certified by Kirloskar Brothers Limited.						
Note2: All dimensions are in inches unless stated otherwise.						
Note3: Refer to the Kirloskar Brothers Limited installation guide for advice on pump installation.						
Note4: Dimensions without tolerances for welded parts are as per ISO13920-D.						

Pump	SD08LFK	Static load	567.5 lb
Driver Rating	20 Hp	Dynamic load	709.4 lb
Driver Size	254JP	GD2	0.00 lb.ft2
Rated Speed	3500RPM	Rotation	CLOCKWISE
Enquiry No/Date	Hiller Fire /	Quantity	1
Quotation No /	637808	Item no	-

Customer	RFQ-For Quotes C&M		
Project	Home2 Suites Greenwood		
Service	-		



2905 PACIFIC DRIVE NORCROSS GA 30071 USA

GENERAL ARRANGEMENT DRAWING

Eaton EPCT Fire

Touchscreen based electric fire pump controllers



Powering Business Worldwide

Product Description

The EPCT Fire features an advanced, 7" color touchscreen that incorporates both the fire pump controller (FPC) and automatic transfer switch (ATS) functionality into one, intuitive display.

Designed solely with the consumer in mind, the EPCT Fire enables technicians to commission the fire pump controller faster; troubleshooting is made easier and is more effective through the use on-screen history filtering and diagnostic monitoring.

All full-service fire pump controllers can be offered in either full-voltage or reduced voltages starting methods:

- FD/FT20 - Limited service
- **FD/FT30 - Across-the-line**
- FD/FT40 - Part winding
- FD/FT50 - Primary resistor
- FD/FT60 - Autotransformer
- FD/FT70 - WYE-Delta (Star-Delta) open transition
- FD/FT80 - WYE-Delta (Star-Delta) closed transition
- FD/FT90 - Soft start

Product Features

Touchscreen Display

General

Speed of commissioning, configuration and troubleshooting are more critical to businesses today more than ever. Through the use of a 7" touchscreen, users can easily program all site specific setpoints through an intuitive menu structure, view all critical system information, and troubleshoot quickly and accurately via on-screen diagnostics.

Automatic Transfer Switch Integration

Going away from the multiple screen approach, the EPCT Fire touchscreen integrates both the Fire Pump Controller and Automatic Transfer Switch into one display enabling the user to effectively manage programming and operation from one source.

Commissioning Simplified

The Startup tab features all controller related commissioning tasks such as: Quick Setup, Setup Phase Reversal, Flow Test, Manual/Automatic Starts, and Test Alarms.

UL Type Rating

The touchscreen display has been tested in accordance with UL and achieves a type 4X rating.

Programming Menu

Startup tab

This tab system enables the user to complete all controller related commissioning tasks. Each sub-menu within the Startup tab guides the user through step-by-step, intuitive screens to quickly and effectively complete the startup and commissioning process.

Panel Setup tab

All variables relating to the panel, such as language, date and time, nominal voltage, etc., are located in the Panel Setup tab. For all programming points within the Panel Setup tab, refer to the instruction manual: MN124016EN.

Help tab

The help tab provides end users service contact information from the company that commissioned the unit (if programmed), factory contact information, and a QR code to download the instruction manual onto a mobile device.

Pressure Settings tab

Contains a variety of pressure settings that may be programmed to suit site requirements. Some key settings include: Start Pressure, Stop Pressure, Low Pressure Alarm, High Pressure Alarm, Low Suction Shutdown, Low Foam Shutdown, Pressure Units, and the ability to calibrate the transducer.

Timer Values tab

This tab system contains the programming point for all fire pump controller related timers. These timers are: Minimum Run Time, Acceleration Time, Sequential Start Time, Fail to Start Time, Fail to Stop Time, and Weekly Motor Test Timer.

ATS Settings tab (if equipped)

The ATS Settings tab will only be enabled on units equipped with an automatic transfer switch. Programming points within this tab only pertain to the operation of the transfer switch.

Alarm Setpoints tab

There are seven (7) programmable alarm points within this tab system: Phase Reversal, Phase Failure Alarm Setpoint, Motor Overload Setpoint, Transducer Fail Pump Start, Abort Motor Test on Low Voltage, Voltage Alarm Settings, and Frequency Alarm Settings.

Inputs/Outputs tab

The I/O board is capable of accepting ten (10) custom inputs that can be programmed for seventeen (17) predefined conditions. The output relays can be programmed for sixty-one (61) separate conditions. Additional relays can be added through the use of a single or multiple optional relay boards.

History/Statistics/Diagnostics tab

This tab system allows the customer/technician to view historical data, controller statistics, controller diagnostics, and startup information. To assist, the controller can filter for specific events or between certain dates to speed up troubleshooting.

I/O Board

Power Supply

The redesigned I/O board is equipped with a full voltage power supply capable of accepting voltage inputs between 200-600VAC three phase, or 240VAC single phase.

Customer Input Connections

Connection terminals are provided at the top of the I/O board for external customer connections that can be programmed through the touchscreen display.

Output Relays

The I/O board features four (4), 250VAC, 8A, 2 Form-C relays designated for the following: Common Alarm, Power/Phase Failure, Phase Reversal, and Pump Run. Each relay socket has a surface mount LED to indicate the relay's coil status.

Optional Boards

The controller can accept up to four (4) additional option boards: optional relay board, MODBUS communication board, secondary 4-20mA device board, and an alarm board. The controller has provisions to allow future optional boards to be added with plug-and-play functionality.

Other Components

Drain Valve Solenoid

All full-service EPCT Fire controllers are equipped with a drain valve solenoid used for manual or automatic motor tests.

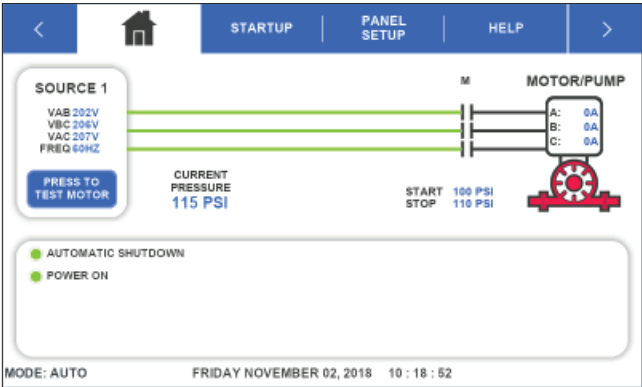
External USB Port

The USB port allows the user to download historical messages, statistics, diagnostic information, startup file, and current controller configuration to any USB device with FAT16 or FAT 32 formatting.

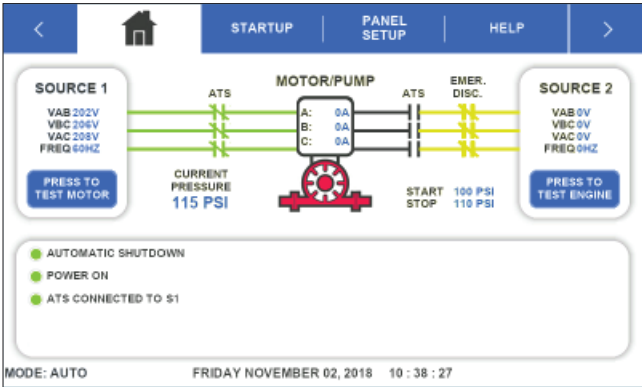
Enclosures

The EPCT Fire controllers come standard with UL type 2 (drip-proof) enclosures. Optional enclosures are available and include: type 3, 3R, 4, 4X, and 12.

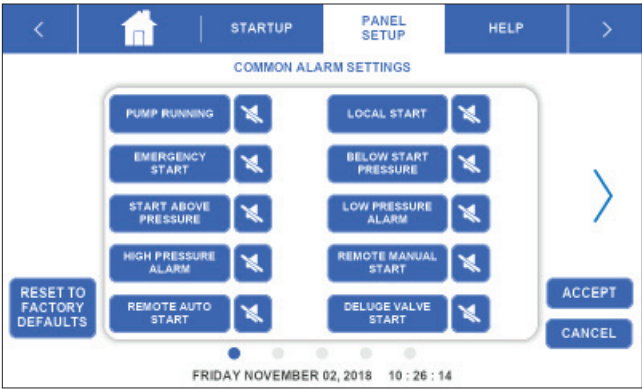
Display Screens



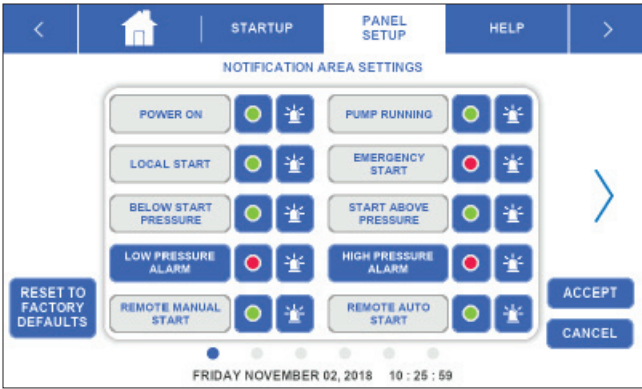
Home tab - without ATS



Home tab - with ATS



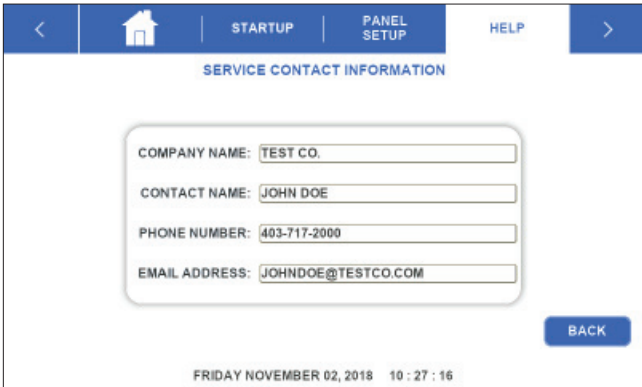
Common Alarm Settings



Notification Area Settings



Message History



Customer Service Contact

Emergency Start Operator

A mechanically operated emergency start handle (ESH) will mechanically activate the motor contactor(s) independently from any electrical control circuits.

Standards & Certifications

All EPCT Fire full-service, electric fire pump controllers meet or exceed the requirements of Underwriters Laboratories and Underwriters Laboratories Canada [UL218 and UL1008], Factory Mutual, the Canadian Standards Association, New York City building code, CE mark, U.B.C./C.B.C. seismic requirements, and are built to the latest edition of NFPA 20 standards. The EPCT Fire electric fire pump controllers are suitable for use as service entrance equipment - does not meet CEC requirements for Canada.

Quick Specification Overview

Starting Conditions					Withstand Ratings		
Starting Method	Starting Voltage	Starting Current	Starting Torque	Motor Connections	Voltage	HP	Short Circuit Withstand Rating
FD/FT20 Limited Service	Full	600%	100%	2 (SP) or 3	200-208V	5-30	25,000
					220-240V	5-30	25,000
					380-415V	5-30	25,000
					440-480V	5-30	25,000
					575-600V	5-30	18,000
					240V (SP)	5-15	10,000
FD/FT30 Across-the-Line	Full	600%	100%	3	200-208V	5-150	100,000
					220-240V	5-200	100,000
					380-415V	5-300	100,000
					440-480V	5-400	100,000
					575-600V	5-500	25,000
FD/FT40 Part Winding	Reduced	65%	50%	6	200-208V	5-250	100,000
					220-240V	5-300	100,000
					380-415V	5-500	100,000
					440-480V	5-600	100,000
					575-600V	5-700	25,000
FD/FT50 Primary Resistor	Reduced	50%	42%	3	200-208V	5-150	100,000
					220-240V	5-200	100,000
					380-415V	5-300	100,000
					440-480V	5-400	100,000
					575-600V	5-500	25,000
FD/FT60 Autotransformer	Reduced	45%	42%	3	200-208V	5-150	100,000
					220-240V	5-200	100,000
					380-415V	5-300	100,000
					440-480V	5-400	100,000
					575-600V	5-500	25,000
FD/FT70 WYE-Delta (Star-Delta) Open Transition	Reduced	33%	33%	6	200-208V	5-250	100,000
					220-240V	5-300	100,000
					380-415V	5-500	100,000
					440-480V	5-600	100,000
					575-600V	5-700	25,000
FD/FT80 WYE-Delta (Star-Delta) Closed Transition	Reduced	33%	33%	6	200-208V	5-250	100,000
					220-240V	5-300	100,000
					380-415V	5-500	100,000
					440-480V	5-600	100,000
					575-600V	5-700	25,000
FD/FT90 Soft Start	Reduced	Adjustable	Adjustable	3	200-208V	5-150	100,000
					220-240V	5-200	100,000
					380-415V	5-300	100,000
					440-480V	5-400	100,000
					575-600V	5-500	25,000

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Printed in Canada
Publication No. BR124053EN / 001
January 2018

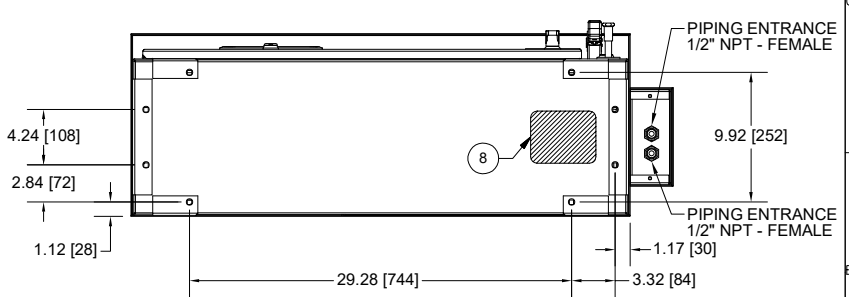
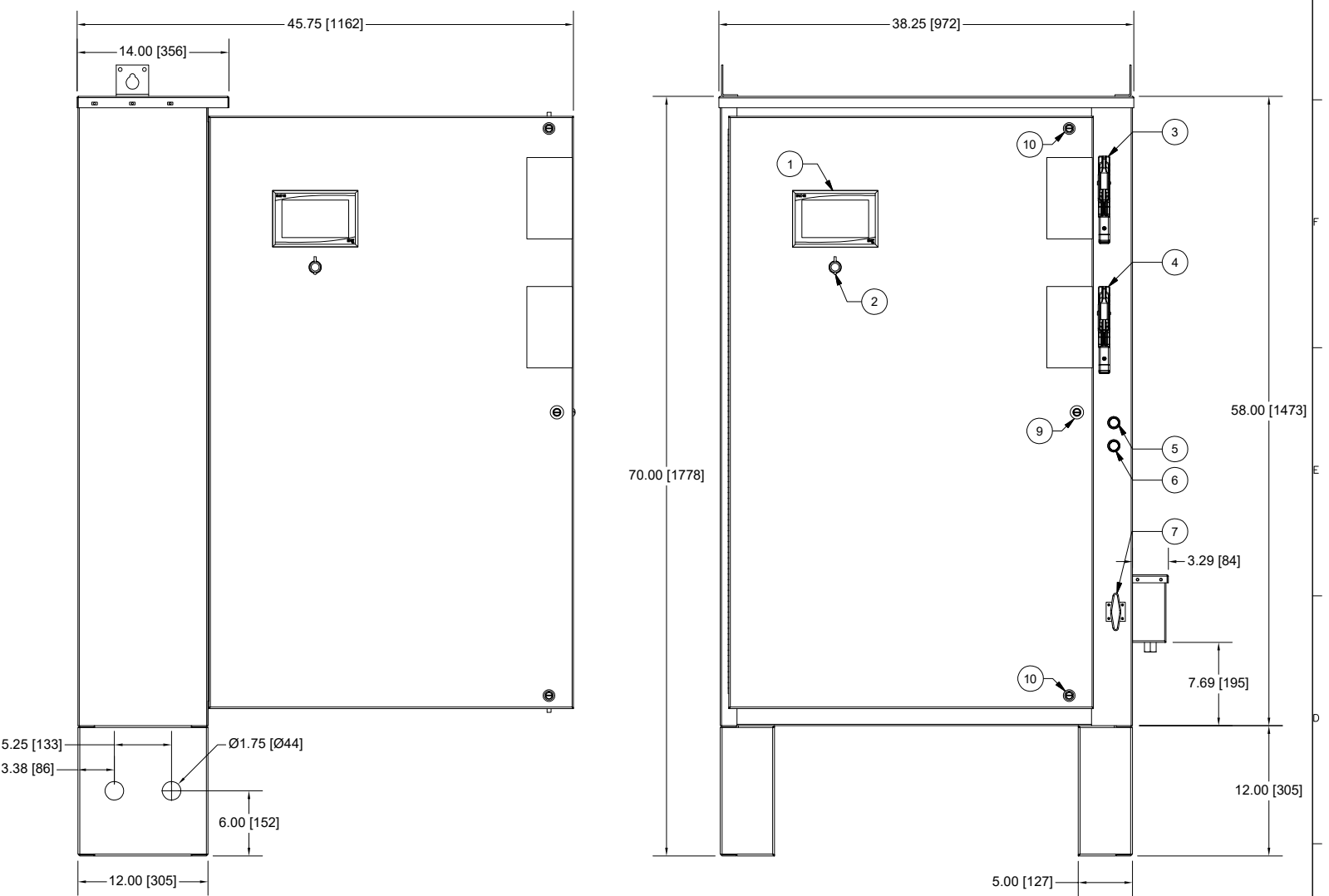
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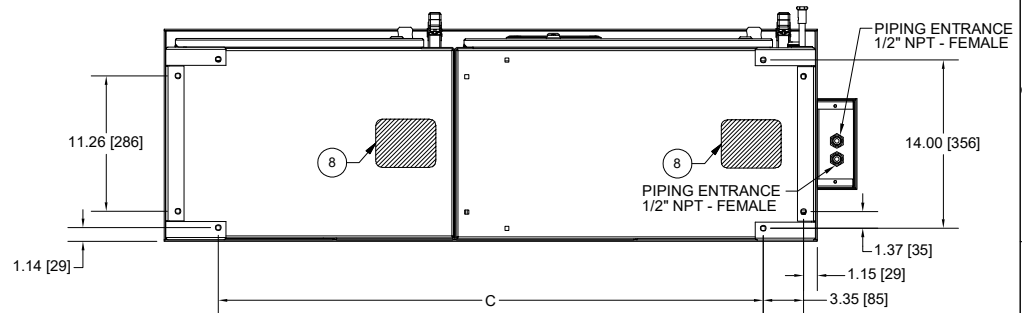
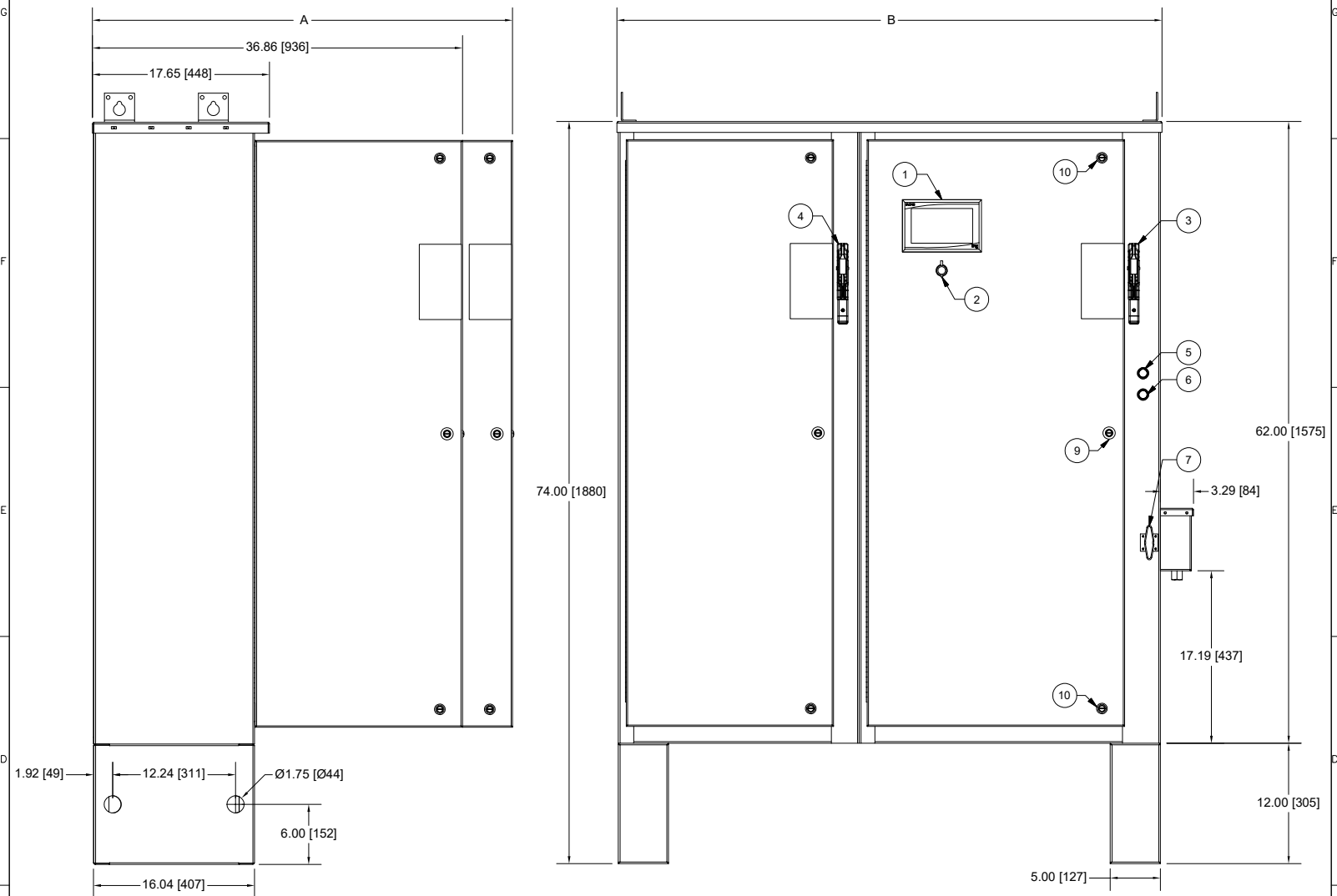
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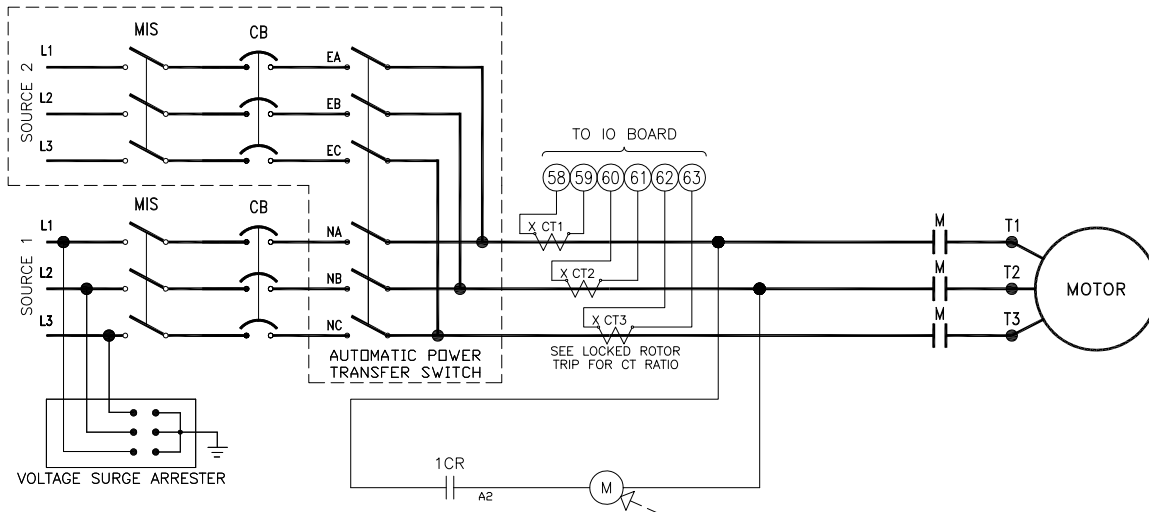
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Motor HP	Line voltage	Withstand rating			Approximate weight Lbs. (Kg)
		Standard	Intermediate	High	
5 - 40	200 - 208V	100,000	150,000	200,000	315 (143)
5 - 50	220 - 240V				
5 - 75	380 - 415V				
5 - 100	440 - 480V				
5 - 100	550 - 600V	25,000	100,000		

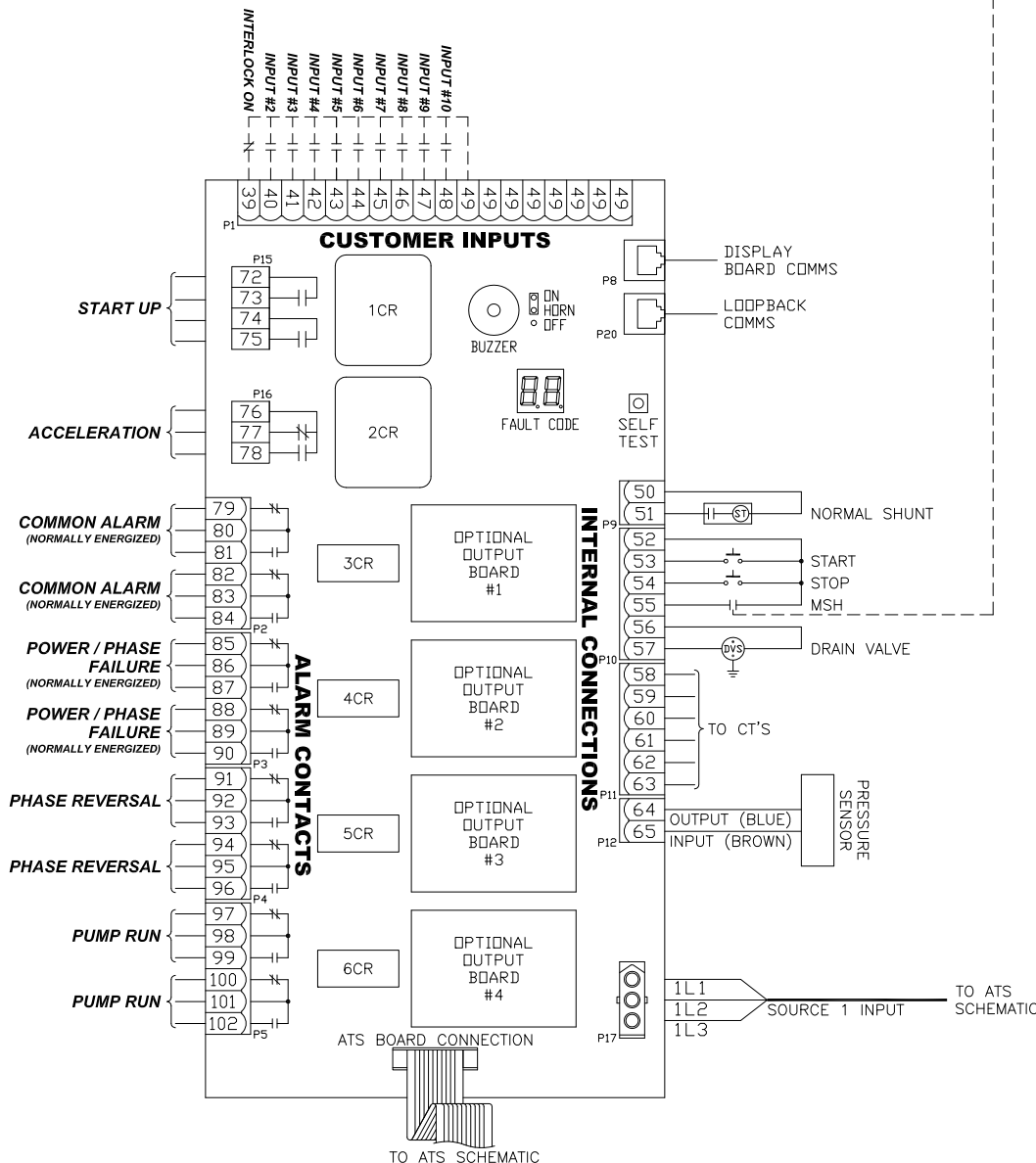


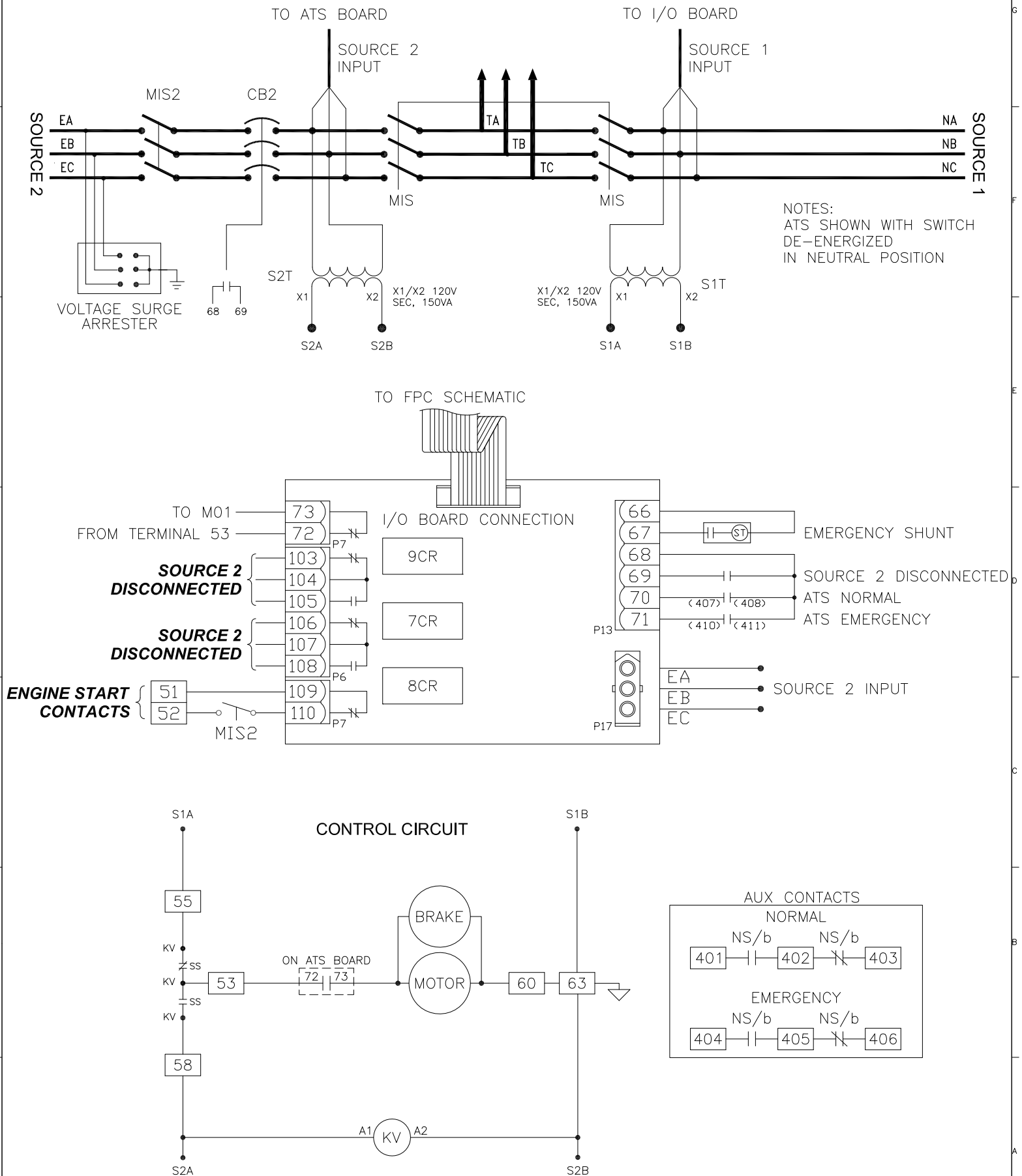
Motor HP	Line voltage	Withstand rating			Approximate weight Lbs. (Kg)	A	B	C
		Standard	Intermediate	High				
50 - 100	200 - 208V	100,000	150,000	200,000	515 (233)	41.83 [1062]	54.3 [1379]	39.15 [994]
60 - 125	220 - 240V							
100 - 200	380 - 415V							
125 - 250	440 - 480V							
125 - 300	550 - 600V	25,000	100,000					
125 - 150	200 - 208V	100,000	150,000	200,000	630 (286)	54.83 [1393]	67.30 [1709]	45.65 [1160]
150 - 200	220 - 240V							
250 - 300	380 - 415V							
300 - 400	440 - 480V							
350 - 400	550 - 600V	25,000	100,000					



NOTES:
 1. POWER/PHASE FAILURE AND COMMON ALARM RELAYS ARE ENERGIZED UNDER NORMAL CONDITIONS.
 2. ALL RELAY CONTACTS ARE SHOWN IN NO POWER CONDITION.

LEGEND:
 CB - CIRCUIT BREAKER
 CT - CURRENT TRANSFORMER
 M - RUN CONTACTOR
 MIS - MAIN ISOLATING SWITCH
 MSH - MANUAL START HANDLE (EMERGENCY) MICRO SWITCH





Line Terminals Connections

Max HP	Line Voltage					Line Lugs (QTY.) & Cable Size per Ø	Service Ground Lugs (QTY.) & Cable Size per Ø
	200-208	220-240	380-415	440-480	575-600		
	25	30	40	60	75	(1) #14 - 1/0 (CU/AL)	(1) #14 - 2/0 (CU/AL)
	40	50	75	100	100	(1) #4 - 4/0 (CU)	(1) #4 - 350MCM (CU/AL)
	75	75	150	200	200	(1) #3 - 350MCM (CU/AL)	(1) #4 - 350MCM (CU/AL)
	100	125	200	250	300	(2) 3/0 - 350MCM (CU/AL)	(2) 1/0 - 750MCM (CU/AL)
	150	200	300	400	500	(2) 250 - 350MCM (CU/AL)	(2) 1/0 - 750MCM (CU/AL)

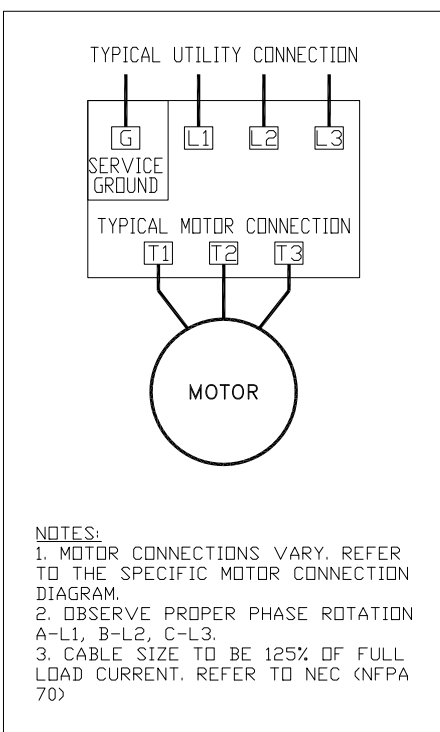
Load Terminals Connections

Max HP	Line Voltage					Single Run Cable Sizes	Double Run Cable Sizes
	200-208	220-240	380-415	440-480	575-600		
	10	10	15	20	25	#14 - #8 (CU/AL)	#14 - #8 (CU/AL)
	20	25	30	50	60	#14 - #1 (CU/AL)	#14 - #2 (CU/AL)
	40	60	75	125	100	#8 - 3/0 (CU/AL)	#8 - 2/0 (CU/AL)
	75	100	150	200	200	#2 - 750MCM (CU/AL)	1/0 - 250MCM (CU/AL)
	150	200	300	400	500	1/0 - 500MCM (CU/AL)	1/0 - 500MCM (CU/AL)

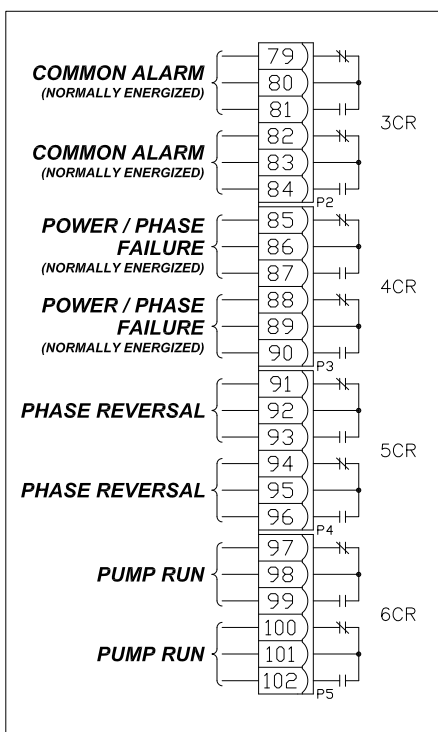
For ambient temperatures exceeding 30C (86F), the temperature rating of motor conductors is recommended to be a minimum of 90C (194F)

For proper cable size, refer to the National Electric Code (NEC - NFPA70)

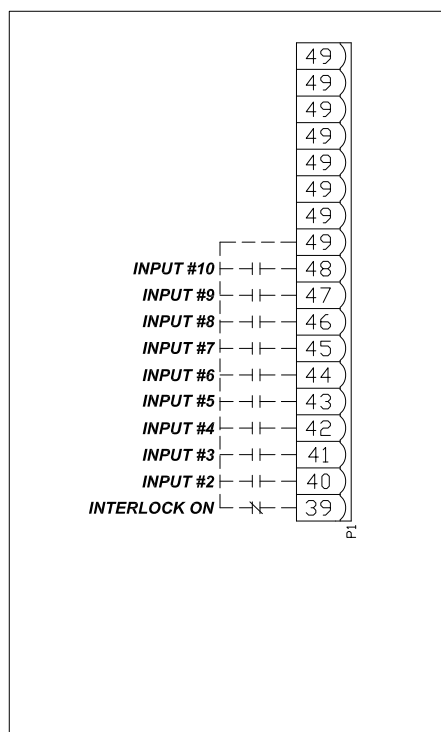
CONTROLLER CONNECTIONS



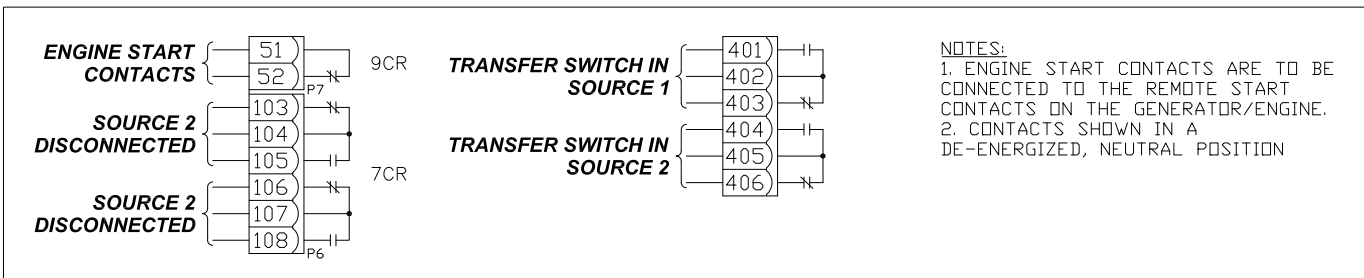
ALARM CONTACTS



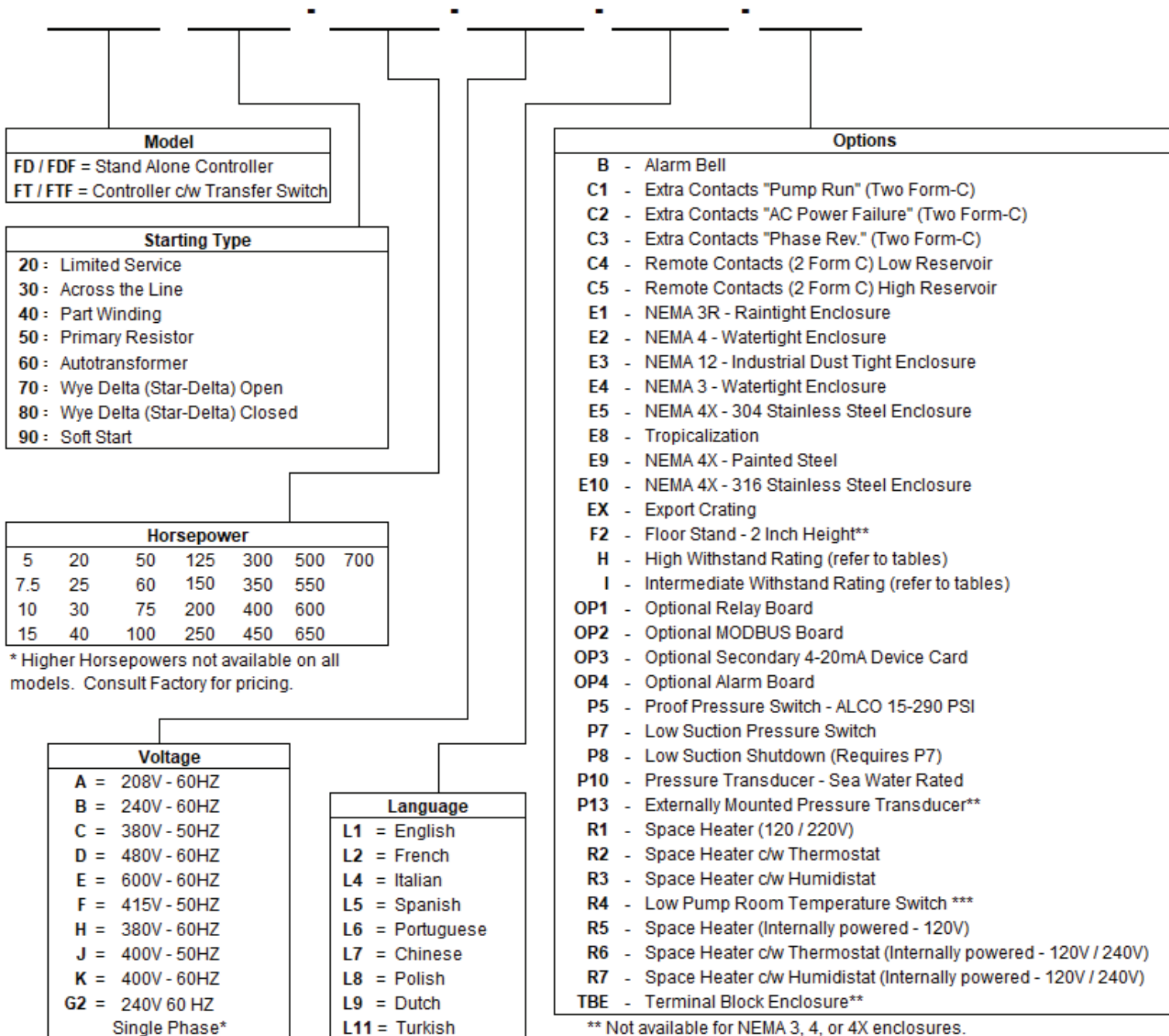
CUSTOMER INPUTS



TRANSFER SWITCH CONNECTIONS (IF EQUIPPED)



EPCT Fire option selection matrix



* Higher Horsepowers not available on all models. Consult Factory for pricing.

* Only available on Limited Service Controllers

** Not available for NEMA 3, 4, or 4X enclosures.

*** When ordered with a NEMA 3, 4, or 4X enclosure, the temperature switch is shipped loose with 20 feet of wire.



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 Printed in Canada
 Publication No. PS124001EN / 001
 Article No. XXXXX
 February 2019

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EPCT Fire electric fire pump controllers

Typical specifications

1. Approvals

- A. The Fire Pump Controller shall meet the requirements of the latest edition of NFPA 20 and shall be listed by [Underwriters Laboratories (UL)] and approved by [Factory Mutual Research (FM)] [Canadian Standards Association (CSA)] [New York Department of Buildings (NYSB)] and carry the CE marking for fire pump service.

2. Starting type

- A. The controller shall be of the combined manual and automatic type designed for [Limited Service - 1P or 3P] [Full Voltage Starting] [Part Winding Starting] [Primary Resistor Starting] [Autotransformer Starting] [Wye-Delta (Star-Delta) Open Transition Starting] [Wye-Delta (Star-Delta) Closed Transition Starting] [Solid State Soft Start Starting]

3. Ratings

- A. The Controller shall have a withstand rating of 100,000 RMS symmetrical amperes @ [208V] [240V] [380V] [400V] [415V] [480V] [25,000 @ 600VAC].
- B. Temperature:
4 to +50 deg. C (39 to +122 deg. F)

4. Construction

- A. The controller shall include a motor rated combination isolating switch and circuit breaker, mechanically interlocked and operated with a single externally mounted handle.
- B. The isolating switch shall be rated to disconnect the motor load.
- C. The isolating switch/circuit breaker combination shall be mechanically interlocked such that the enclosure door cannot be opened when the handle is in the on position except by a tool operated defeater mechanism.
- D. The controller manufacturer shall manufacture the contactor, isolating switch, circuit breaker, pushbuttons, and enclosures. Brand-labeled components will not be accepted.

5. Enclosure

- A. The controller shall be housed in a Type 2 (IEC IP11) drip-proof, powder baked finish, freestanding enclosure.

B. Optional enclosures:

- 1. Type 3R (IEC IP14) rain-tight enclosure
- 2. Type 3 (IEC IP55) water-resistant enclosure
- 3. Type 4 (IEC IP66) watertight enclosure
- 4. Type 4X (IEC IP66) watertight 304 stainless steel enclosure
- 5. Type 4X (IEC IP66) watertight 316 stainless steel enclosure
- 6. Type 4X (IEC IP66) watertight corrosion resistant enclosure
- 7. Type 12 (IEC IP52) dust-tight enclosure

6. Microprocessor control

- A. The controller shall come complete with a 7", 800x480, color touchscreen. The touchscreen shall be type 4X rated.
 - 1. Home tab capable of displaying system pressure, three phase voltage and amperage readings for both sources, system frequency, date, and time, configurable notifications in the notification area, displaying current start and stop set points, and visual representation of the transfer switch position, source 2 disconnect handle, and contactor.
 - 2. Virtual buttons to manually test the pump motor and/or the backup power supply engine.
 - 3. Controller statistics screen, including:
 - A. Total Powered Time
 - B. Total Motor Run Time
 - C. Last Motor Run Time
 - D. Calls to Start
 - E. Motor Starts
 - F. Maximum Starting Current A
 - G. Maximum Starting Current B
 - H. Maximum Starting Current C
 - I. Maximum Run Current A
 - J. Maximum Run Current B
 - K. Maximum Run Current C
 - L. Last LR Current A
 - M. Last LR Current B
 - N. Last LR Current C
 - O. Minimum System Pressure
 - P. Maximum System Pressure
 - Q. Minimum S1 Voltage AB



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Fire pump controllers Features

- R. Minimum S1 Voltage BC
 - S. Minimum S1 Voltage CA
 - T. Maximum S1 Voltage AB
 - U. Maximum S1 Voltage BC
 - V. Maximum S1 Voltage CA
 - W. Minimum S2 Voltage AB
 - X. Minimum S2 Voltage BC
 - Y. Minimum S2 Voltage CA
 - Z. Maximum S2 Voltage AB
 - AA. Maximum S2 Voltage BC
 - AB. Maximum S2 Voltage CA
 - AC. Minimum S1 Frequency
 - AD. Maximum S1 Frequency
 - AE. Minimum S2 Frequency
 - AF. Maximum S2 Frequency
 - AG. Last System Startup
 - AH. Last Motor Start
 - AI. Last Low Pressure Start
 - AJ. Last Locked Rotor Trip
 - AK. Last S1 Phase Failure
 - AL. Last S2 Phase Failure
 - AM. Last S1 Phase Reversal
 - AN. Last S2 Phase Reversal
 - AO. Last S1 Undervoltage
 - AP. Last S1 Overvoltage
 - AQ. Last S2 Undervoltage
 - AR. Last S2 Overvoltage
 - AS. Last S1 Under Frequency
 - AT. Last S1 Over Frequency
 - AU. Last S2 Under Frequency
 - AV. Last S2 Over Frequency
 - AW. Last Generator Start
 - AX. Last Generator Stop
 - AY. Last transfer to S1
 - AZ. Last transfer to S2
 - BA. Last S2 Disconnect
4. Controller diagnostics screen, including:
- A. Controller Serial Number
 - B. Logic Board Firmware Version
 - C. I/O Board Firmware Version
 - D. I/O Board Supply Voltage
 - E. I/O Board Communication
 - F. CT1 Secondary Amperage
 - G. CT2 Secondary Amperage
 - H. CT3 Secondary Amperage
 - I. Transducer Input Voltage
 - J. Transducer Output Current
 - K. Transducer Setpoint Current 2
 - L. Transducer Setpoint Current 1
- M. All Input Status (Open or Closed) (Can be selected to override for one minute and manually change the state of the input)
 - N. All Output Relay Status (Energized or De-energized) (Can be selected to override for one minute and manually energize or de-energize the relay)
 - O. Test the display board's communication.
5. Archive message screen that will display up to 65,000 alarms/messages stored in the controllers' memory
- B. The microprocessor logic board shall be available with a USB port for transference of message history, controller status, diagnostics, startup and statistic files and the ability to update firmware.
 - C. A Fail-to-Start alarm shall occur if the motor controller sees less than 20% of the motor full load amps after an adjustable time delay of 1-99 seconds.
 - D. Locked rotor protection shall be provided. After a trip condition and restoration of power, the display shall indicate the voltage, current, and date and time at the moment that the controller tripped.
 - E. A sequential start timer and weekly test timer shall be provided as standard.
 - F. A restart time delay of one (1) second shall be provided to allow the residual voltage of the motor to decay prior to re-starting the motor. In the event that the pump motor continues to run after a request to stop, then the controller must display a fail to stop message to indicate this condition.
 - G. Overvoltage (0-100%) and undervoltage (0-100%) sensing and alarming shall be provided as standard.
 - H. The controller shall be supplied with interlock and shutdown circuits as standard. A green LED in the notification area shall indicate an interlock on condition.
 - I. Where shutdown of the pump(s) due to low suction pressure is required, it shall be accomplished without the addition of a separate panel or enclosure. The display shall indicate low suction shutdown. Resetting of the condition shall be automatic or manual as selected by the user.
7. Programming Menu
- A. The programming menu shall have the ability to enable an entry password.
 - B. The controller shall have nine (9) languages as a standard: English, French, Spanish, Portuguese, Turkish, Italian, Dutch, Chinese, and Polish.
 - C. The programming menu shall be grouped into ten (10) tabs as follows:
 - 1. Home
 - 2. Startup
 - 3. Panel Setup
 - 4. Help
 - 5. Pressure Settings
 - 6. Timer Values

- 7. ATS Settings
- 8. Alarm Setpoints
- 9. Inputs/Outputs
- 10. History/Statistics/Diagnostics

8. Pressure sensor

- A. A solid-state 4-20mA pressure sensor shall be provided. The pressure Start and Stop points shall be adjustable in increments of one (1) PSI.

9. Custom inputs/outputs

- A. The controller shall come standard with ten (10) programmable inputs, four (4) programmed outputs with the ability to add up to another sixteen (16) outputs via optional relay boards.
- B. The user shall be able to program the inputs/outputs through the main programming menu.
- C. The inputs shall be selectable based on the following criteria:
 - 1. User selected message or seventeen (17) predetermined messages
 - 2. Link to a future relay and/or LED indicator
 - 3. Alarm latched until reset
 - 4. Normally open or closed input
 - 5. On and/or off-delay timer
- D. The future relays shall be selectable based on the following criteria:
 - 1. Output based on a minimum of sixty-one (61) predetermined alarms, controller status or a custom input
 - 2. Latched until reset
 - 3. Energized under normal conditions
 - 4. On and/or off delay timer on the output

10. Alarm relays

- A. All relays shall be soldered on the PCB. An LED on the relay panel shall indicate the energized state of the relay. All relay contacts shall be rated @ 8A, 277VAC/30VDC. Two (2) sets of Form-C contacts shall be provided for each of the following:
 - 1. Common Alarm
 - 2. Power/Phase Failure
 - 3. Phase Reversal
 - 4. Pump Run
- B. The Common Alarm and Power/Phase Failure relays shall be energized under normal conditions.

11. Audible alarm buzzer

An audible alarm buzzer, capable of being heard

while the motor is operating, shall operate if Fail to Start, Hardware Malfunction or any Common Alarm condition exists.

12. Manufacturer

- A. The controller shall be of the EPCT Fire type as manufactured by Eaton Corporation.



There when you need us most

NV SERIES VERTICAL BOOSTER PUMPS

304/316 Stainless Steel Booster Pumps



Space saving NV Series pumps provide you with reliable solutions for a variety of industrial, commercial, and agricultural applications.

The quality and performance you expect, along with industry best lead times and personalized service, only from Webtrol!

Features and Benefits

- In-line, space saving design, with suction and discharge on the same plane
- Maintenance-free cartridge type mechanical seals
- All wetted parts constructed of 304 or 316 stainless steel
- Drop-in replacement for existing installations
- Standard TEFC motor enclosure
- Meets NSF/ANSI 61 and 372 standards



Performance

HP Range: .5 - 60 HP, 60Hz.

Capacities to 600 GPM

Pressures to 380 PSI

Temperatures to 248 °F



Typical Services

- | | |
|-------------------|---------------------|
| • Water Supply | • Plants |
| • Reverse Osmosis | • Boiler Feed |
| • Water Boosting | • Hot & Cold Water |
| • Washing Systems | • Circulation |
| • Jockey Pump | • Irrigation |
| • Water Treatment | • Sprinkler Systems |
| • Filtration | • Heat Exchangers |

BOOSTER PUMPS

Construction & Design Features

Series	Stages	Max. Working Pressure	Stages	Max. Inlet Pressure
NV6	2 - 27	362	2 - 26	150
		362	27	220
NV12	2 - 25	362	2 - 15	150
			17 - 25	220
NV25	2 - 24	362	2 - 9	150
			10 - 24	220
NV45	1 - 10	232	1 - 5	118
	12 - 17	362	6 - 18	150
NV65	1 - 8	232	1 - 2	118
	9 - 12	362	3 - 12	150
NV85	1 - 7	232	1	118
	8 - 10	362	2 - 10	150
NV120	1 - 5	232	1 - 2	59
	6 - 10	465	3 - 6	150
			7 - 10	220
NV180	1 - 4	232	1	59
	5 - 7	465	2 - 3	150
			4 - 7	220
NV280	1 - 3	232	(1 - 1)	59
	4 - 5	465	1 - (2 - 1)	150
			2 - 5	220
NV400	1 - 3	232	1 - (2 - 2)	150
	4	465	(2 - 1) - 4	220

MODEL NO.: NV25B9FE3T

Series/Nominal Rated Flow
(GPM)

Construction
B = 304SS S = 316SS

Number of Stages

Connection
F = Flanged V = Victaulic

Elastomers
E = EPDM V = Viton

Phase / Hz (PH)
1 = 1PH / 60Hz 3 = 3PH / 60Hz

Motor Enclosure
D = ODP T = TEFC

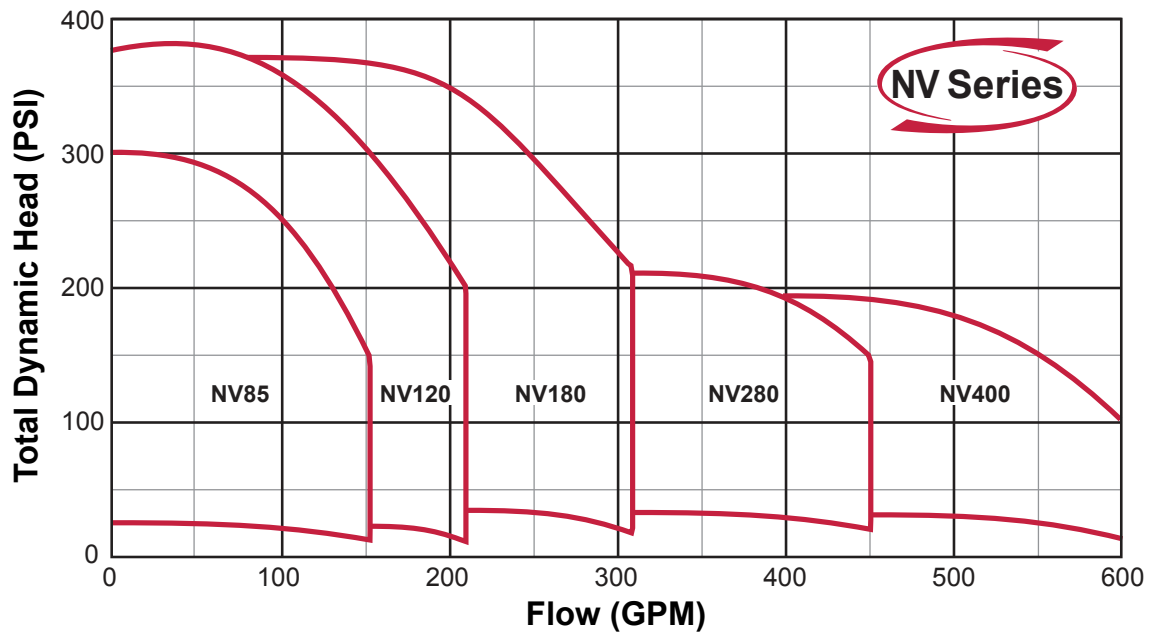
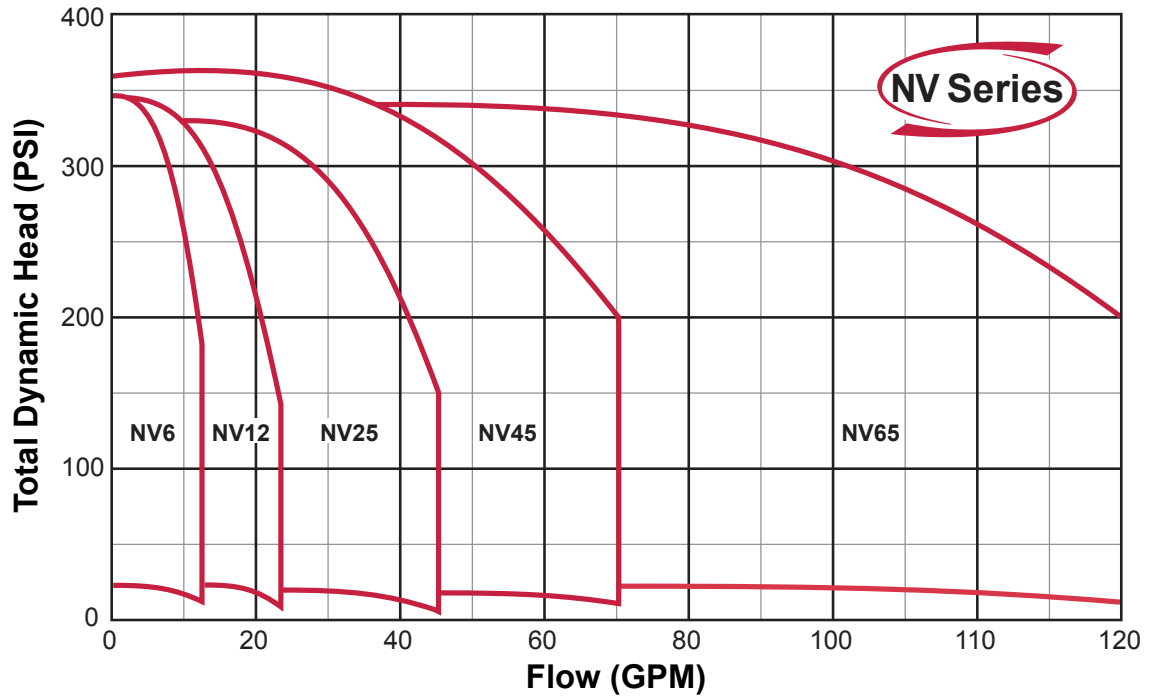


Component	304 SS Models		316 SS Models	
	NV6B thru NV85B	NV120B thru NV400B	NV6S thru NV85S	NV120S thru NV400S
Motor Bracket	Cast Iron	Cast Iron	Cast Iron	Cast Iron
Pump Head	304 SS	304 SS	316 SS	316 SS
Impeller	304 SS	304 SS	316 SS	316 SS
Diffuser	304 SS	304 SS	316 SS	316 SS
Neck Ring	Teflon	Carbon Reinforced Teflon	Teflon	Carbon Reinforced Teflon
Shaft	431 SS	431 SS	316 SS	316 SS
Casing	304 SS	304 SS	316 SS	316 SS
O-Ring	EPDM	EPDM	EPDM	EPDM
Pump Base	304 SS	304 SS	316 SS	316 SS
Base Plate	Cast Iron	Cast Iron	Cast Iron	Cast Iron
Mech Seal	Silicon Carbide/Silicon Carbide/EPDM			



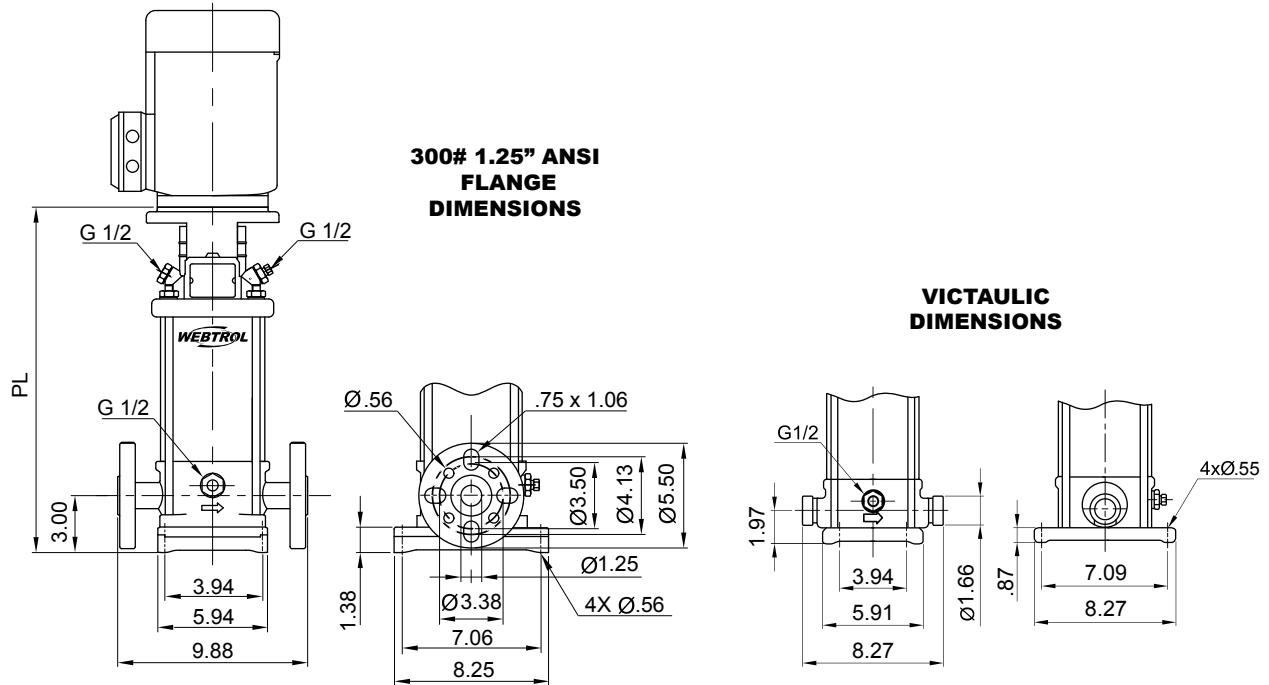
There when you need us most

SERIES FAMILY CURVES



Note:
NV Series curves in this catalog are based on 60 Hz 3450 rpm motors. 50 Hz 2875 rpm curves are available. These curves are for general guidance only, individual pump curves are available upon request. A certified curve may be requested for an additional cost. Webtrol will build pumps to fit your specific needs, contact factory for pricing.

NV6 PUMP DIMENSIONS



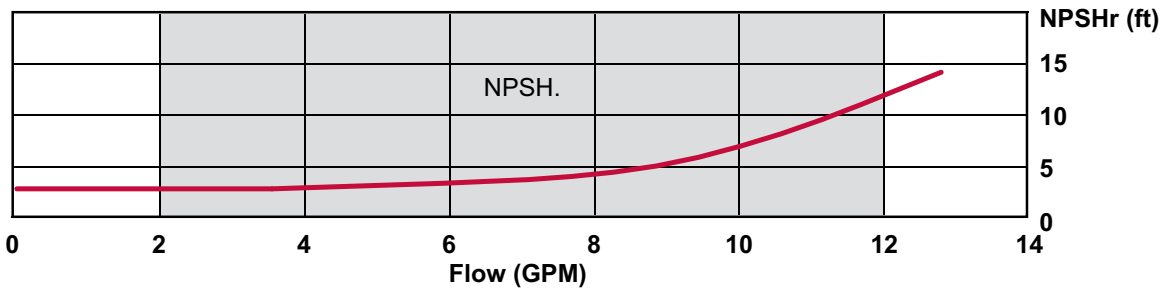
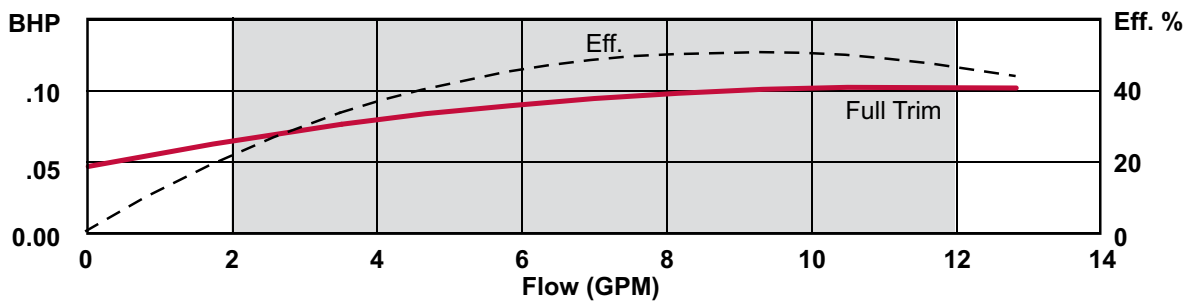
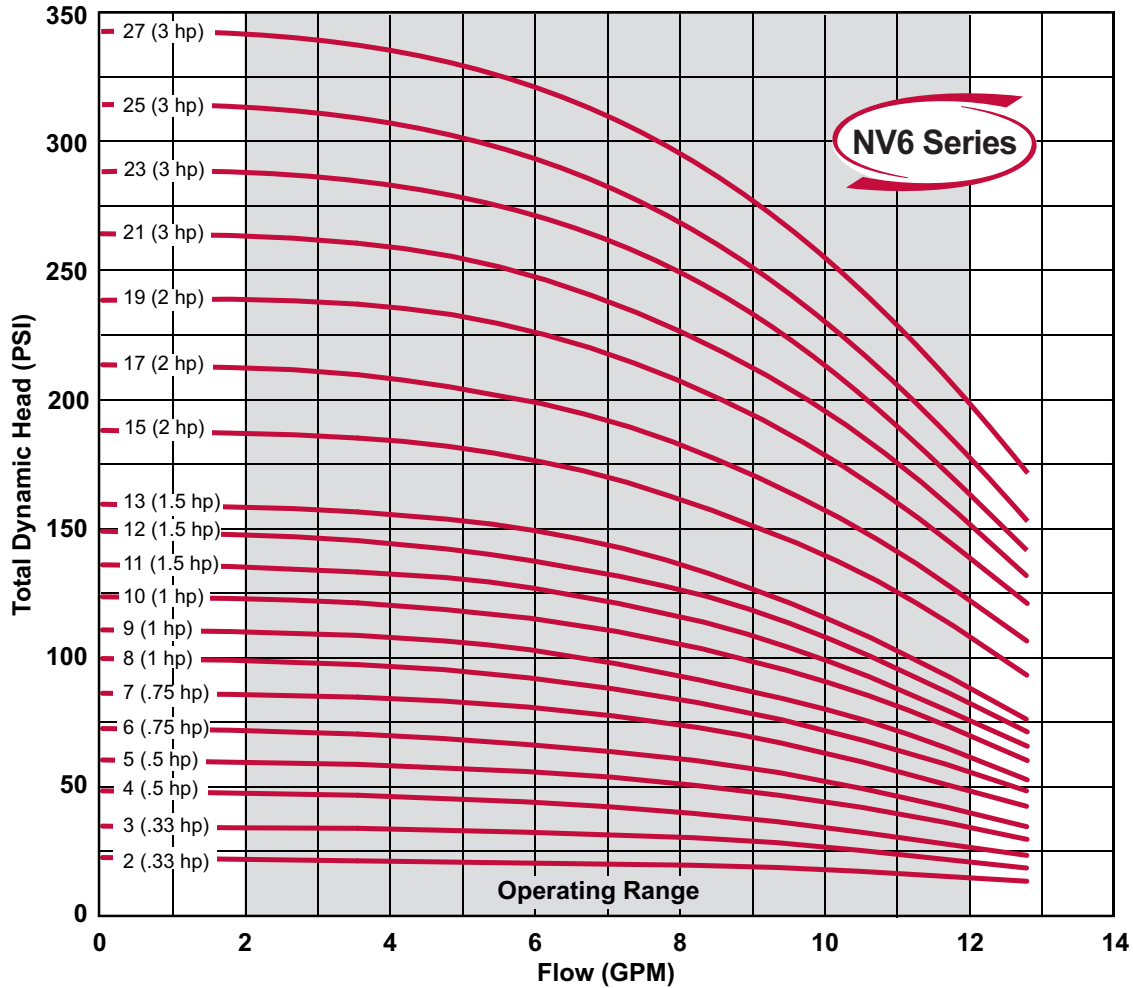
NOTES: All dimensions are in inches unless otherwise noted. Please contact factory for specific motor manufacturer dimensions

Model	HP	Motor Frame	Pump Length (PL) - in. Flange	Pump Length (PL) - in. Victaulic	Pump End Weight - lbs. Flange	Pump End Weight - lbs. Victaulic
NV6B2	.5	56C	12.05	11.06	33	31
NV6B3	.5	56C	12.05	11.06	34	32
NV6B4	.5	56C	12.76	11.77	34	32
NV6B5	.5	56C	13.46	12.48	35	33
NV6B6	.75	56C	14.17	13.19	36	34
NV6B7	.75	56C	14.84	13.86	37	35
NV6B8	1	56C	15.55	14.57	37	35
NV6B9	1	56C	16.26	15.28	38	36
NV6B10	1	56C	16.97	15.98	39	37
NV6B11	1.5	56C	17.68	16.69	40	38
NV6B12	1.5	56C	18.39	17.40	41	39
NV6B13	1.5	56C	19.09	18.11	42	39
NV6B15	2	56C	20.55	19.57	44	42
NV6B17	2	56C	21.97	20.98	45	43
NV6B19	2	56C	23.39	23.33	52	50
NV6B21	3	182TC	25.73	24.74	54	52
NV6B23	3	182TC	27.15	26.16	55	53
NV6B25	3	182TC	28.56	27.58	57	55
NV6B27	3	182TC	29.98	29.00	58	56



There when you need us most

NV6 SERIES GROUP CURVES





There when you need us most

(800) 769-7867

8417 New Hampshire Ave. | St. Louis, MO 63123

Web: webtrol.com | **E-mail:** customerservice@webtrol.com | **Fax:** (314) 631-3738

WEBTROL is a Division of Weber Industries, Inc.

Jockey Pump Controllers

JOCKEY
Touch™

Microprocessor Based with Color Touchscreen



Product Description

ACROSS THE LINE

JOCKEY PUMP CONTROLLERS

The JOCKEY Touch - Jockey Pump Controllers operate across-the-line. Full voltage is applied to the motor for starting by the use of a single motor starter. Starting inrush current is approximately 600% of rated full load amperes.

WYE-DELTA (Star-Delta)

JOCKEY PUMP CONTROLLERS

When six or twelve-lead delta connected jockey pump motors are started wye (star) connected, approximately 58% of line voltage is applied to each winding. The motor develops 33% of full-voltage starting torque and draws 33% of normal locked-rotor current from the line. After an adjustable time delay (during which the motor accelerates), it is reconnected for normal operation.

Product Features

Combination Motor Controllers

All JOCKEY Touch controllers are supplied with Eaton combination motor controllers, which combine the circuit breaker and overload in one device.



Sealed Rotary Handle Mechanism

The rotary handle mechanism can be padlocked in the OFF position.

XT Power Controls

The JOCKEY Touch - Jockey Pump Controllers incorporate Eaton's XT Power Controls which are designed for the global marketplace. The XT controls carry global ratings, are small in size and are available in a wide variety of operating voltages. They are easy to install and maintain, due to their modular, plug-in design.

Universal Supply Voltage

The controllers will auto-detect three phase voltage supply from 200VAC to 600VAC, 50/60Hz and single phase from 110VAC to 240VAC, 50/60Hz, without the use of a control transformer.

NEMA 2 Enclosures

Enclosures have an oven baked powder paint finish and are supplied with NEMA 2 rating, unless otherwise ordered. Available options include: NEMA 3R, 4, 4X, 12.

Programmable Functions

Inputs, Outputs, Timers and Virtual LED's are programmable via the touchscreen display.

Starting Methods

There are four methods of starting the controller: Auto, Hand, Remote Start and Pump Start.

Diagnostics / Statistics

Eight diagnostics and seven statistics parameters can be monitored.

Alarm Setpoints

Four alarm setpoints can be programmed from the Alarm Setpoints sub-menu.

Color Touchscreen Display

The JOCKEY Touch - Jockey Pump Controllers are supplied with a microprocessor based, color touchscreen. The touchscreen display allows the user to monitor and program functions and values.

Pressure input is provided by a 4-20mA pressure sensor.



Technical Data

ACROSS-THE-LINE (Direct On Line)

JOCKEY PUMP CONTROLLERS

Line Voltage						
200-208V	220-240V	380-415V	440-480V	550-600V	120V-1Ph	240V-1Ph
Motor Horsepower						
1/3-20Hp	1/3-20Hp	1/3-40Hp	1/3-50Hp	1/3-50Hp	1/3-2Hp	1/3-5Hp

WYE-DELTA (Star-Delta)

JOCKEY PUMP CONTROLLERS

Line Voltage				
200-208V	220-240V	380-415V	440-480V	550-600V
Motor Horsepower				
1/3-40Hp (0.74-29.42Kw)	1/3-40Hp (0.74-29.42Kw)	1/3-50Hp (0.74-36.78Kw)	1/3-50Hp (0.74-36.78Kw)	1/3-50Hp (0.74-36.78Kw)

Standards & Certification

The JOCKEY Touch - Jockey Pump Controllers meet the requirements of the latest edition of NFPA 20 as well as meeting CE mark requirements. They meet or exceed the requirements of UL 508 [Underwriters Laboratories (UL)] and are approved by [Canadian Standards Association (CSA)].


EATON

Powering Business Worldwide

Microprocessor - Color Touchscreen Display

Supply Voltage

3 phase – 200VAC to 600VAC, 50/60Hz

1 phase – 110VAC to 240VAC, 50/60Hz

True RMS measurement of 3 phase voltage inputs

Power Supply Output

Two 24VDC outputs

1 Power the pressure sensor

2 Energize the contactor coil

Ratings

NEMA 4 / 4X

Memory

Programmed settings saved in Non Volatile memory

Battery Backup

Real Time Clock kept intact during power failures

Ambient Temperature Rating

0C to 55C

Languages *

English

French

Spanish

Portuguese

Turkish

* Other languages available - consult factory for details

USB Port

Download Message History

Upload Firmware Updates

Programmable Inputs (2)

Each input can be programmed for one of seven different functions.

- | | |
|---|----------------|
| 1 | Interlock |
| 2 | Motor Overload |
| 3 | Fail to Start |
| 4 | Remote Start |
| 5 | Pump Start |
| 6 | Input = Output |
| 7 | Disabled |

Programmable Outputs (2)

Each output can be programmed for one of twenty three different functions.

- | | | | |
|----|---------------------|----|--------------------|
| 1 | Power On | 13 | Overvoltage |
| 2 | Pump Run | 14 | Transducer Failure |
| 3 | Hand Mode | 15 | Motor Overload |
| 4 | Off Mode | 16 | Common Alarm |
| 5 | Auto Mode | 17 | Acceleration Timer |
| 6 | Low Pressure Alarm | 18 | Remote Start |
| 7 | High Pressure Alarm | 19 | Pump Start |
| 8 | Below Start Point | 20 | Interlock On |
| 9 | Phase Reversal | 21 | Input #1 |
| 10 | Phase Failure | 22 | Input # 2 |
| 11 | Fail to Start | 23 | Disabled |
| 12 | Undervoltage | | |

Timers (5)

Programmable Types

- | | |
|---|------------------------|
| 1 | Minimum Run Timer |
| 2 | Sequential Start Timer |
| 3 | Pump Run Restart Timer |
| 4 | Acceleration Timer |
| 5 | Fail to Start Timer |

Virtual LED's (2)

Programmable Functions (22)

- | | | | |
|----|---------------------|----|--------------------|
| 1 | Power On | 12 | Undervoltage |
| 2 | Pump Run | 13 | Overvoltage |
| 3 | Hand Mode | 14 | Transducer Failure |
| 4 | Off Mode | 15 | Motor Overload |
| 5 | Auto Mode | 16 | Common Alarm |
| 6 | Low Pressure Alarm | 17 | Remote Start |
| 7 | High Pressure Alarm | 18 | Pump Start |
| 8 | Below Start Point | 19 | Interlock On |
| 9 | Phase Reversal | 20 | Input #1 |
| 10 | Phase Failure | 21 | Input # 2 |
| 11 | Fail to Start | 22 | Disabled |

Programmable Indication (5)

- | | |
|---|--------|
| 1 | Red |
| 2 | Orange |
| 3 | Yellow |
| 4 | Green |
| 5 | Blue |

Operation

Starting Methods (4)

- | | |
|---|--------------|
| 1 | Auto |
| 2 | Hand |
| 3 | Remote Start |
| 4 | Pump Start |

Alarm Set Points (4)

- | | |
|---|---------------------|
| 1 | Phase Reversal |
| 2 | Phase Failure |
| 3 | Over Voltage Alarm |
| 4 | Under Voltage Alarm |

Message History (10K)

Messages time and date stamped

Diagnostics (8)

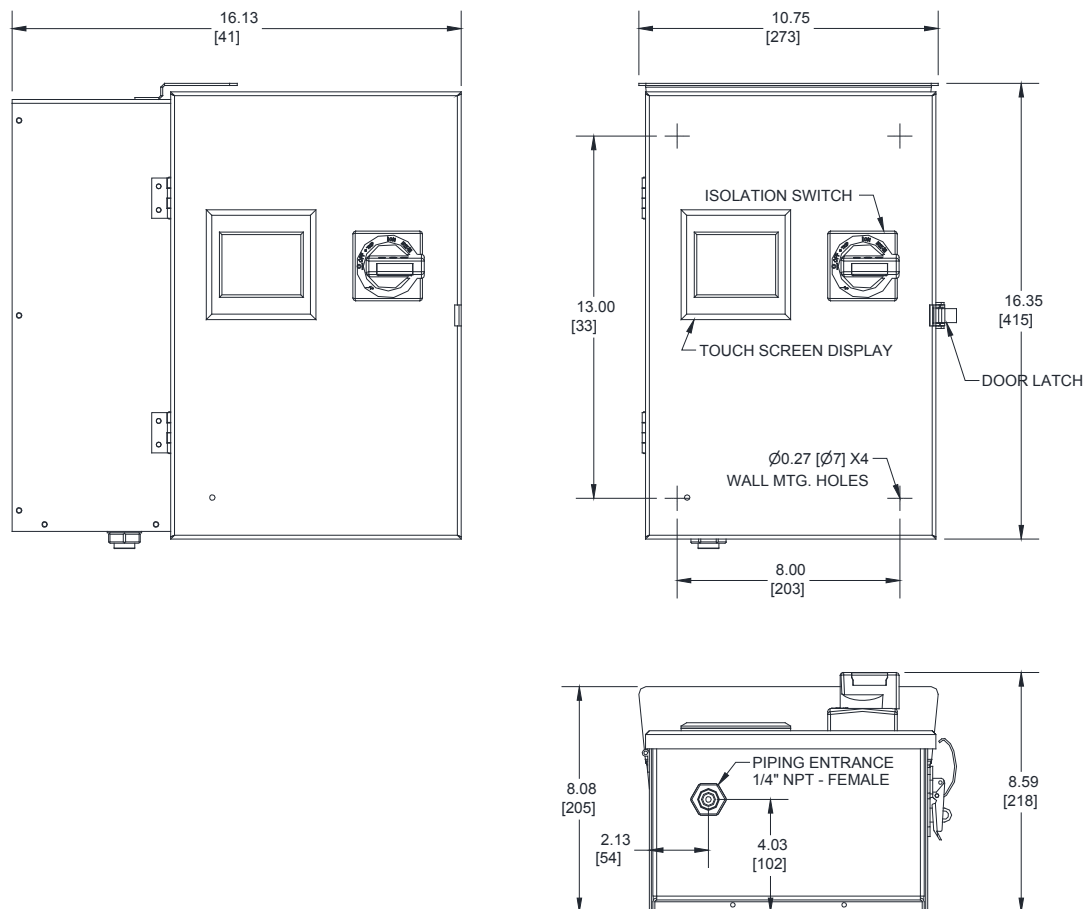
- | | |
|---|----------------------|
| 1 | Firmware Version |
| 2 | Transducer Output |
| 3 | Transducer Current 1 |
| 4 | Transducer Current 2 |
| 5 | Input #1 Status |
| 6 | Input #2 Status |
| 7 | Relay #1 Status |
| 8 | Relay #2 Status |
| 9 | 24VDC Output |

Statistics (7)

- | | |
|---|---------------------|
| 1 | Total Powered Time |
| 2 | Pump Run Total Time |
| 3 | Motor Starts |
| 4 | Minimum Voltage |
| 5 | Maximum Voltage |
| 6 | Minimum Pressure |
| 7 | Maximum Pressure |



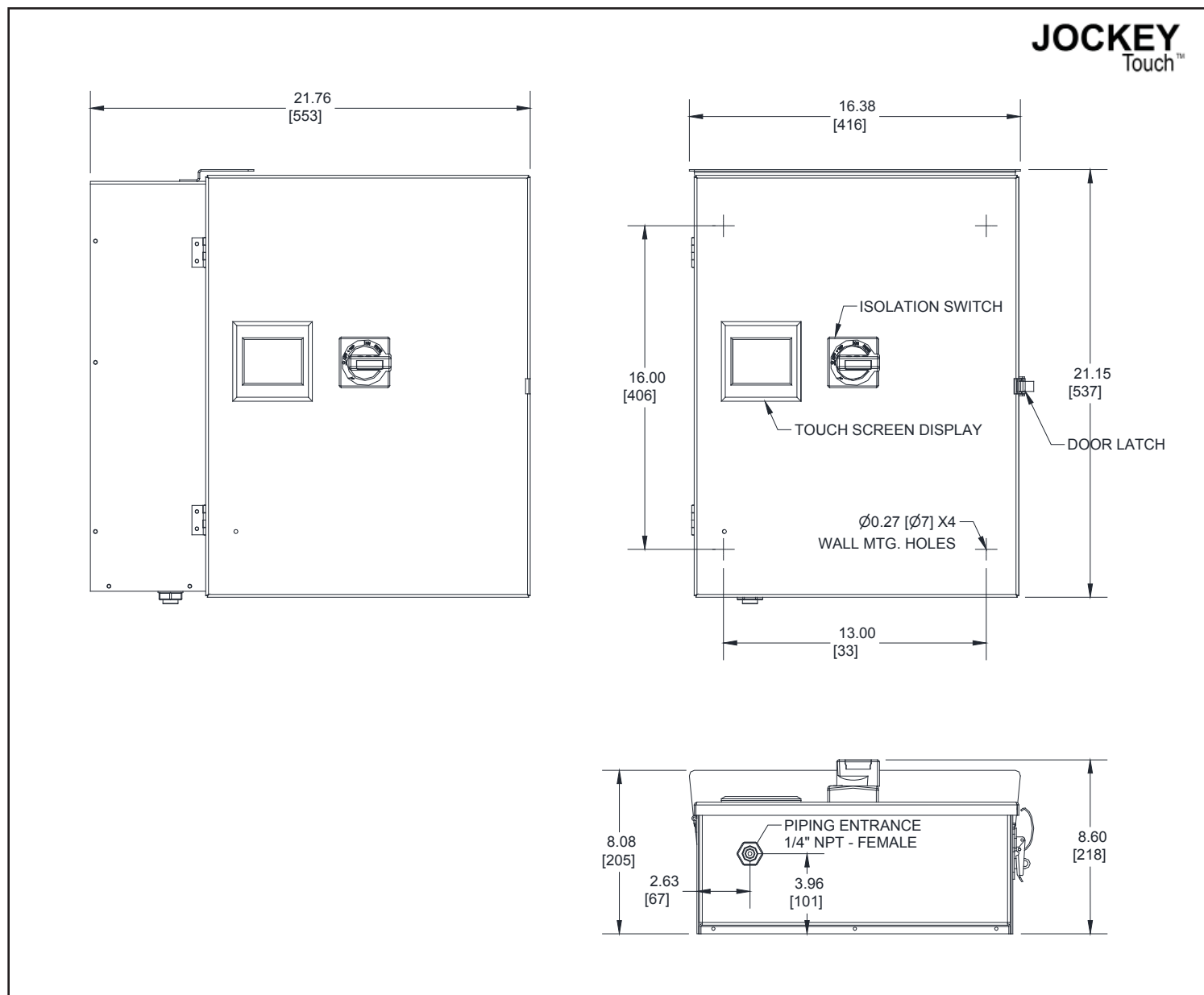
JOCKEY
Touch™



200-208V		220-240V		380-415V		440-480V		550-600V	
Motor Hp	Withstand Rating (kA)	Motor Hp	Withstand Rating (kA)	Motor Hp	Withstand Rating (kA)	Motor Hp	Withstand Rating (kA)	Motor Hp	Withstand Rating (kA)
0.33 - 0.75	50	0.33 - 0.75	50	0.33 - 1.5	50	0.33 - 2	50	0.33 - 7.5	50
1 - 2	65	1 - 3	65	2 - 5	65	3 - 5	65	10 - 30	10 *
3 - 4	42	4 - 5	42	7.5	42	7.5 - 10	42		
5 - 10	18	7.5 - 10	18	10 - 15	18	15 - 20	18		

120V 1ph		208V 1ph		240V 1ph		Approx. Weight
Motor Hp	Withstand Rating (kA)	Motor Hp	Withstand Rating (kA)	Motor Hp	Withstand Rating (kA)	Lbs (Kg)
0.33 - 0.5	65	0.33 - 1	65	0.33	50	18 (8)
0.75 - 1	42	1.5 - 2	42	0.5 - 1.5	65	
1.5 - 2	18	3 - 4	18	2	42	
				3 - 5	18	

NOTES:
 1. * Upstream circuit breaker required to maintain kA rating.
 2. All enclosures finished in FirePump red.
 3. Cable Entrance either top or bottom.
 4. Standard Enclosure type NEMA 2

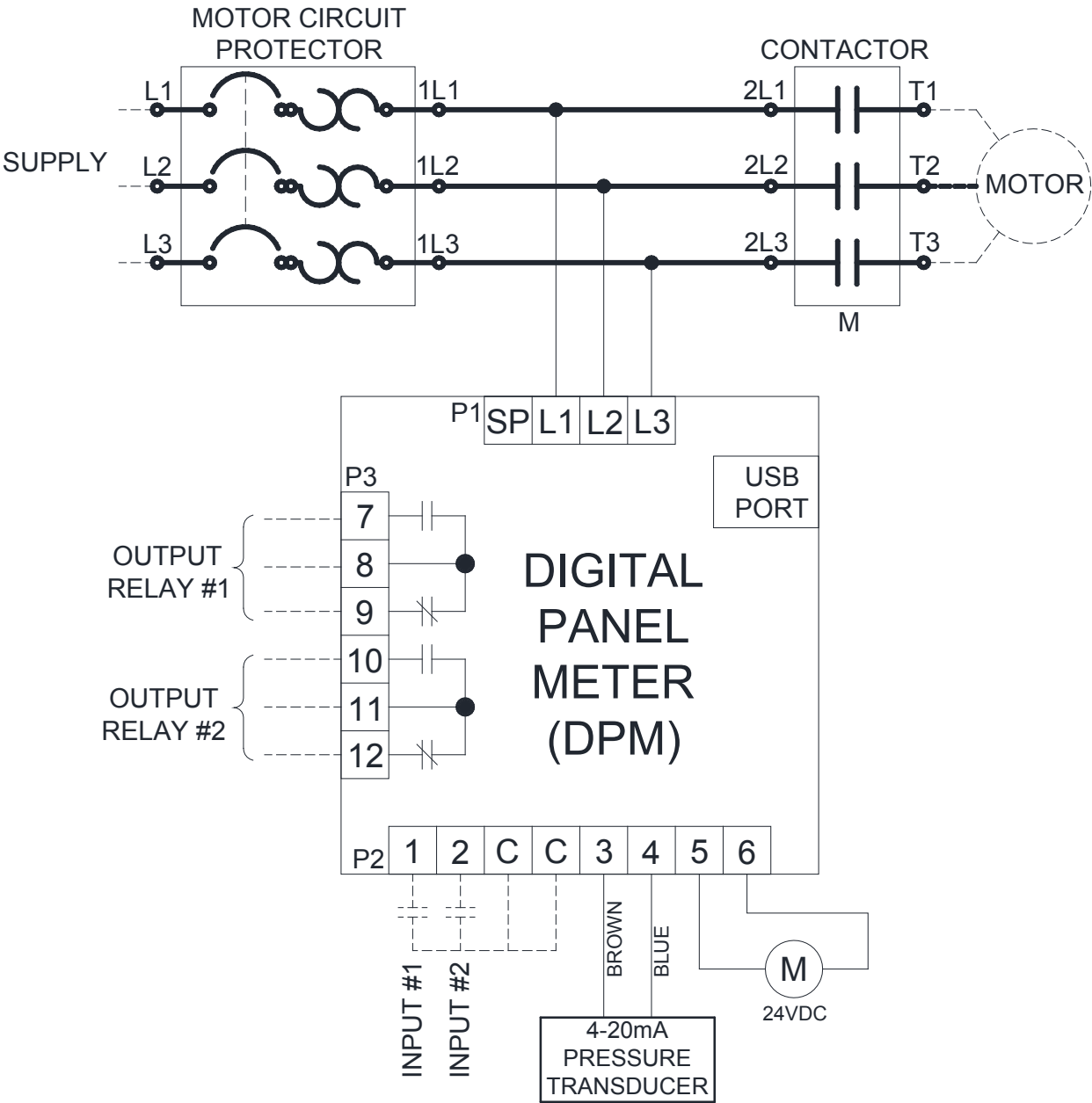


200-208V		220-240V		380-415V		440-480V		550-600V	
Motor Hp	Withstand Rating (kA)	Motor Hp	Withstand Rating (kA)	Motor Hp	Withstand Rating (kA)	Motor Hp	Withstand Rating (kA)	Motor Hp	Withstand Rating (kA)
0.33 - 0.75	50	0.33 - 0.75	50	0.33 - 1.5	50	0.33 - 2	50	0.33 - 7.5	50
1 - 2	65	1 - 3	65	2 - 5	65	3 - 5	65	10 - 30	10 *
3 - 4	42	4 - 5	42	7.5	42	7.5 - 10	42		
5 - 10	18	7.5 - 10	18	10 - 15	18	15 - 20	18		

120V 1ph		208V 1ph		240V 1ph		Approx. Weight
Motor Hp	Withstand Rating (kA)	Motor Hp	Withstand Rating (kA)	Motor Hp	Withstand Rating (kA)	Lbs (Kg)
0.33 - 0.5	65	0.33 - 1	65	0.33	50	18 (8)
0.75 - 1	42	1.5 - 2	42	0.5 - 1.5	65	
1.5 - 2	18	3 - 4	18	2	42	
				3 - 5	18	

- NOTES:
- * Upstream circuit breaker required to maintain kA rating.
 - All enclosures finished in FirePump red.
 - Cable Entrance either top or bottom.
 - Standard Enclosure type NEMA 2

JOCKEY
Touch™



JOCKEY
Touch™**XTJP**
XTJY

NOTE: To select a proper part number - refer to the current Eaton Pricing Guidelines for available combinations.

Amperage Range		Options	
Three Phase			
G01	0.6-1.0	C1	Extra Contacts "Pump Run"
G02	1.1-1.6	C2	Extra Contacts "AC Power Failure"
G03	1.7-2.5	CX	Extra Contacts (One Form-C; Specify Function)
G04	2.6-4.0	E1	NEMA 3R - Raintight Enclosure
G05	4.1-6.3	E2	NEMA 4 - Watertight Enclosure
G06	6.4-10.0	E3	NEMA 12 - Industrial Dust Tight Enclosure
G07	10.1-16.0	E5	NEMA 4X - 304 Stainless Steel Enclosure
G08	16.1-20.0	E8	Tropicalization
G09	20.1-25.0	E9	NEMA 4X - Painted Steel
G10	25.1-32.0	E10	NEMA 4X - 316 Stainless Steel Enclosure
G11	32.1-40.0	EX	Export Crating
G12	40.1-50.0	FTS	Extra Contacts "Fail to Start"
G13	50.1-65.0	LX	Virtual LED (Specify Description)
Single Phase		POL	"Power-On" Virtual LED
G14	2.6-4.0	PRL	"Pump Run" Virtual LED
G15	4.1-6.3	P7	Low Suction Pressure Switch & Alarm Virtual LED
G16	6.4-10.0	P8	Low Suction Shutdown (Requires P7)
G17	10.1-16.0	P10	Pressure Transducer - Sea Water Rated
G18	16.1-20.0	R1	Space Heater (120 / 220V) - Externally Powered
G19	20.1-25.0	R2	Space Heater c/w Thermostat - Externally Powered
G20	25.1-32.0	R3	Space Heater c/w Humidistat - Externally Powered
G21	32.1-40.0	USB	Externally Mounted USB Port
G22	40.1-50.0		
G23	50.1-65.0		
Horsepower (KW) *		Languages	
15	(11)	L1 = English	
20	(15)	L2 = French	
25	(18.6)	L5 = Spanish	
30	(22)	L6 = Portuguese	
40	(30)	L11 = Turkish	
50	(37)	Other Languages available. Consult factory for details.	
		Voltage *	
		A = 208V - 60HZ	
		B = 240V - 60HZ	
		C = 380V - 50HZ	
		D = 480V - 60HZ	
		E = 600V - 60HZ	
		F = 415V - 50HZ	
		H = 380V - 60HZ	
		J = 400V - 50HZ	
		K = 400V - 60HZ	

* NOTE: Voltage letter designations are only used when a Horsepower (KW) is selected.

XTJP / XTJY Jockey Pump Controllers

Typical Jockey Pump Controller Specifications

Approvals

The Jockey Pump Controller shall meet the requirements of the latest edition of NFPA 20 as well as meeting CE mark requirements. It shall meet or exceed the requirements of UL 508 [Underwriters Laboratories (UL)] standards and be approved by [Canadian Standards Association (CSA)].

Starting Type

The controller shall be Across-the-Line or Wye-Delta (Star Delta) type designed for full voltage starting.

Ratings

The Controller shall have a minimum withstand rating of 10,000 symmetrical amperes @ [208V] [240V] [380V] [400V] [415V] [480V] [600V] [120V Single Phase] [240V Single Phase].

The horsepower rating of the controller shall not exceed 50Hp for three (3) phase units or 10Hp on single phase units.

Construction

The controller shall include a combination Circuit Breaker / Overload Motor Protector.

The motor circuit protector shall be mechanically interlocked such that the enclosure door cannot be opened when the handle is in the on position except by a tool operated defeater mechanism.

The controller manufacturer shall manufacture the contactor, motor circuit protector, touchscreen display, and enclosure. Brand-labeled components will not be accepted.

Supply Voltage

The jockey pump controller shall auto-detect three phase voltage supply from 200VAC to 600VAC, 50/60Hz and single phase from 110VAC to 240VAC, 50/60Hz, without the use of a control transformer.

Coil Voltages

The jockey pump controller shall have the following available coil voltages
120VAC 50/60 Hz or 24VDC

Enclosure

The controller shall be housed in a NEMA Type 2 (IEC IP11) drip-proof, powder baked finish, freestanding enclosure.

Optional Enclosures

1. NEMA 3R (IEC IP14) rain-tight enclosure.
2. NEMA 4 (IEC IP66) watertight enclosure.
3. NEMA 4X (IEC IP66) watertight 304 stainless steel enclosure.
4. NEMA 4X (IEC IP66) watertight 316 stainless steel enclosure.
5. NEMA 4X (IEC IP66) watertight corrosion resistant enclosure.
6. NEMA 12 (IEC IP52) dust-tight enclosure.

Languages

The controller shall be available in a variety of languages including, but not limited to:
English, French, Spanish, Portuguese, Turkish.

Touchscreen Display

The controller shall be supplied with a color touchscreen display that shall indicate the following: Supply Voltage on all phases, Current Pressure, Start Pressure and Stop Pressure.

The touchscreen display shall be supplied with a solid-state 4-20mA pressure sensor. The pressure Start and Stop points shall be adjustable in increments of one (1) PSI or 0.1 BAR.

The touchscreen display shall be a door-mount type that permits exterior programming with the controller door secured.

Options

The jockey pump controller shall have provision to be supplied with the following options:

- C1 Extra Contacts " Pump Run"
- C2 Extra Contacts "AC Power Failure"
- CX Extra Contacts (One Form-C; Specify Function)
- E1 NEMA 3R – Raintight Enclosure
- E2 NEMA 4 – Watertight Enclosure
- E3 NEMA 12 – Industrial Dust Tight Enclosure
- E5 NEMA 4X – 304 Stainless Steel Enclosure
- E8 Tropicalization
- E9 NEMA 4X - Painted Steel
- E10 NEMA 4X - 316 Stainless Steel Enclosure
- EX Export Crating
- FTS Extra Contacts "Fail to Start"
- LX Virtual LED (Specify Description)
- POL "Power On" Virtual LED
- PRL "Pump Run" Virtual LED
- P7 Low Suction Pressure Switch and Alarm Virtual LED
- P8 Low Suction Shutdown (Requires P7)
- P10 Pressure Transducer – Sea Water
- R1 Space Heater (120 / 220V)
- R2 Space Heater c/w Thermostat
- R3 Space Heater c/w Humidistat

Manufacturer

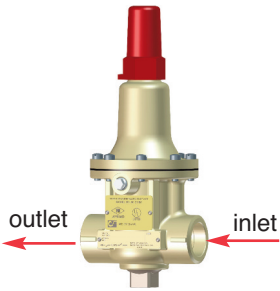
The controller shall be of the XTJP Across-the-Line or XTJY Wye Delta (Star-Delta) type as manufactured by EATON.



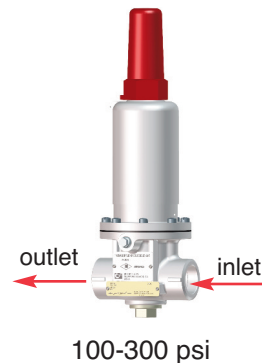
— MODEL — **55L-60**

Pressure Relief Valve/ Pump Casing Relief Valve

**1/2" and 3/4"
Globe
Configuration**

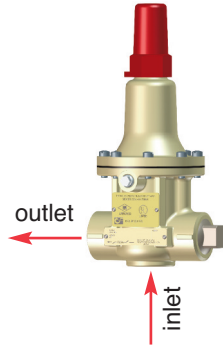


0-75 psi
20-200 psi
20-300 psi

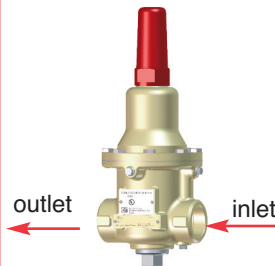


100-300 psi

**1/2", 3/4" and 1"
Angle Configuration**



1" Size
20-75 psi
40-200 psi
100-300 psi



more materials
available

- Sizes 1/2" and 3/4" are UL Listed and FM Approved for use as Fire Pump Casing Relief Valves
- The 1" model is UL Listed for use as a Fire Pump Casing Relief Valve
- Direct Acting - Precise Pressure Control
- Drip Tight Closure
- No Packing Glands or Stuffing Boxes
- Globe or Angle configurations available
- Sensitive to Small Pressure Variations
- Meets low lead requirements
- Available in Cast Bronze, 316 Stainless Steel, Monel & Super Duplex Stainless Steel

The Cla-Val Model 55L-60 (UL Listed, FM Approved) Pressure Relief Valve is a direct-acting, spring loaded, diaphragm type relief valve. The valve may be installed in any position and will open and close within very close pressure limits. The bottom plug may be removed and installed in the inlet to convert it to an angle pattern flow path.

The Model 55L-60 is normally held closed by the force of the compression spring above the diaphragm. When the controlling pressure applied under the diaphragm exceeds the spring setting, the disc is lifted off its seat, permitting flow through the control. When control pressure drops below the spring setting, the spring forces the control back to its normally closed position. The controlling pressure is applied to the chamber beneath the diaphragm through an internal passage. A gauge port is provided for accurate pressure setting.

Pressure adjustment is done by turning the adjusting screw to vary the spring load on the diaphragm. The 55L-60 is available in pressure ranges suited to agency approval tests. To prevent tampering, the adjustment cap can be wire sealed by using the lock wire holes provided in the cap and cover.



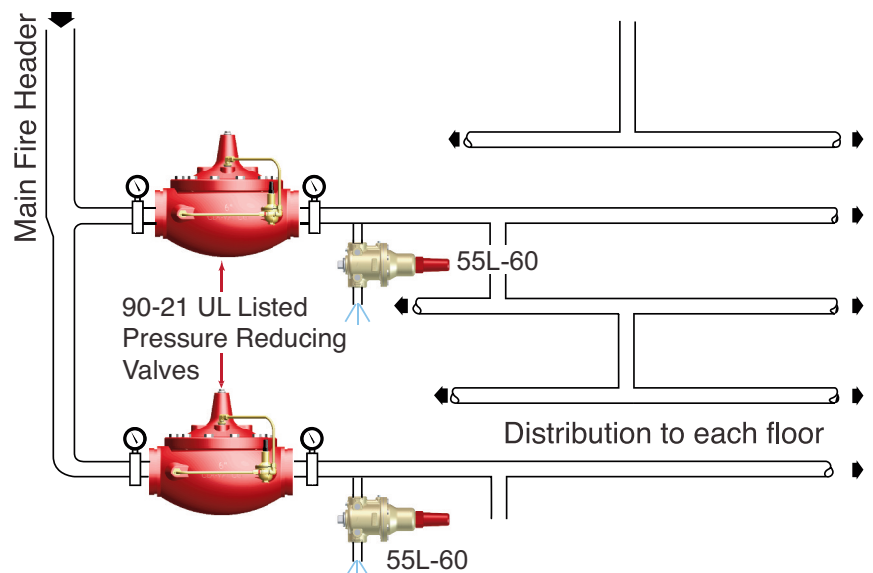
Fire Protection System Service

The **Model 55L-60** is typically used in a fire protection system to trim water pressure, thus preventing pressure build-up whenever line pressure exceeds the setting of the spring.

The 55L-60 will relieve excess pressure to atmosphere to prevent damage to the distribution network.

NOTE: Model 55L-60 is not suitable for discharging the full-rated pump capacity of a fire pump. See Model 50B-4KG1 Fire Pump Relief Valve for such applications.

Typical Application for Fresh Water or Seawater Service



Specifications

Size	1/2", 3/4" and 1" Threaded NPT
Temperature Range	Water, Air: to 180°F Max.
Materials	
Body & Cover:	Cast Bronze UNS C87850 -Standard Stainless Steel ASTM A743-CF-16F Monel Super Duplex Stainless Steel
Trim:	303 Stainless Steel Monel
Rubber:	Buna-N® Synthetic Rubber
Pressure Ratings	Cast Bronze 400 psi Max. Stainless Steel 400 psi Max.
Other Materials	Available on special order

Adjustment Ranges UL Listed

10 to 75 psi • 20 to 200 psi • 20 to 300 psi • 100 to 300 psi

Adjustment Ranges FM Approved

0 to 75 psi • 20 to 200 psi • 20 to 300 psi • 100 to 300 psi

Pressure Drop Chart (Full Open Valve)

Valve Size	C _v Factor	Max Flow (GPM)
1/2"	6	25
3/4"	8.5	40
1"	12.8	65

Standard Factory Set Points* (1/2", 3/4", 1")

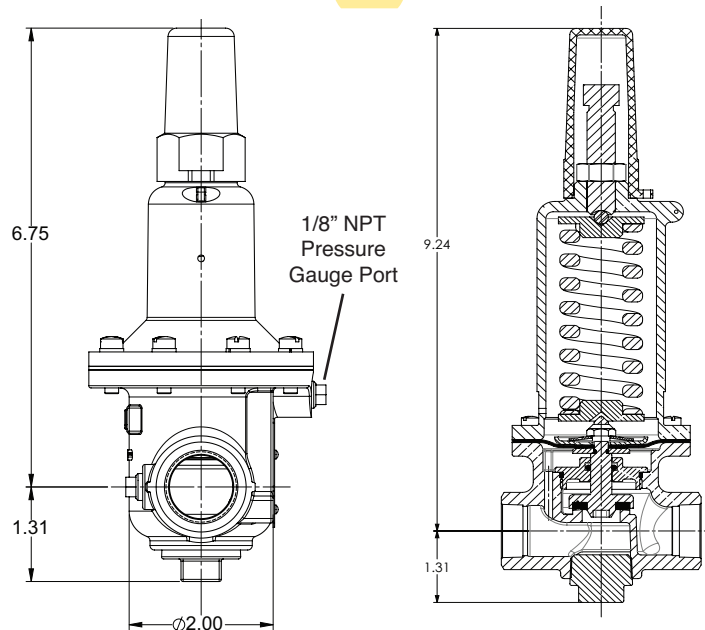
0 - 75 psi	20 - 200 psi	20 - 300 psi	100 - 300 psi
50 psi	60 psi	60 psi	100 psi

* Custom set points available upon request

When Ordering, Please Specify

1. Catalog No. 55L-60
2. Valve Size
3. Adjustment Range Desired
4. Optional Materials

Dimensions (1/2" and 3/4")



0 to 75 psi

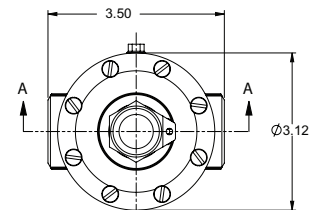
20 to 200 psi

20 to 300 psi

100 to 300 psi

(applies to both configurations)

dimensions shown in inches



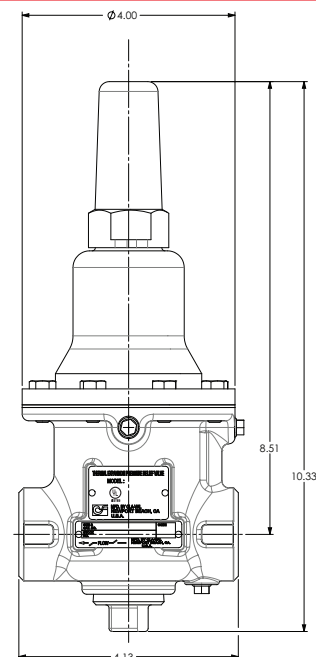
Dimensions (1"):

Spring Range:

20-75

40-200

100-300



E-55L-60 (R-03/2021)

CLA-VAL

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800-942-6326 • Web Site: www.cla-val.com • E-mail: info@cla-val.com

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www.cla-val.com
E-mail: sales@cla-val.ca

CLA-VAL EUROPE
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Lausanne, Switzerland
Phone: 41-21-643-15-55
www.cla-val.ch
E-mail: cla-val@cla-val.ch

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Tunbridge Wells
Kent TN1 2 DH England
Phone: 44-1892-514-400
www.cla-val.ch
E-mail: info@cla-val.ch

CLA-VAL FRANCE
Porte du Grand Lyon 1
ZAC du Champ du Pérrier
France - 01700 Neyron
Phone: 33-4-72-25-92-93
www.cla-val.ch
E-mail: cla-val@cla-val.ch

CLA-VAL ASIA PACIFIC
45 Kennaway Road
Woolston, Christchurch, 8023
New Zealand
Phone: 64-39644860
www.cla-valpacific.com
E-mail: info@cla-valpacific.com

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— MODEL — **TH Series** Test Headers



- Manufactured in Accordance with NFPA 20 Requirements
- Developed for UL/FM Approved Fire Systems
- Available in sizes 4", 6", 8" and 10"
- Designed to allow 250 gpm per test connection
- Use with **Cla-Val HV-100-25 Hose Valves**



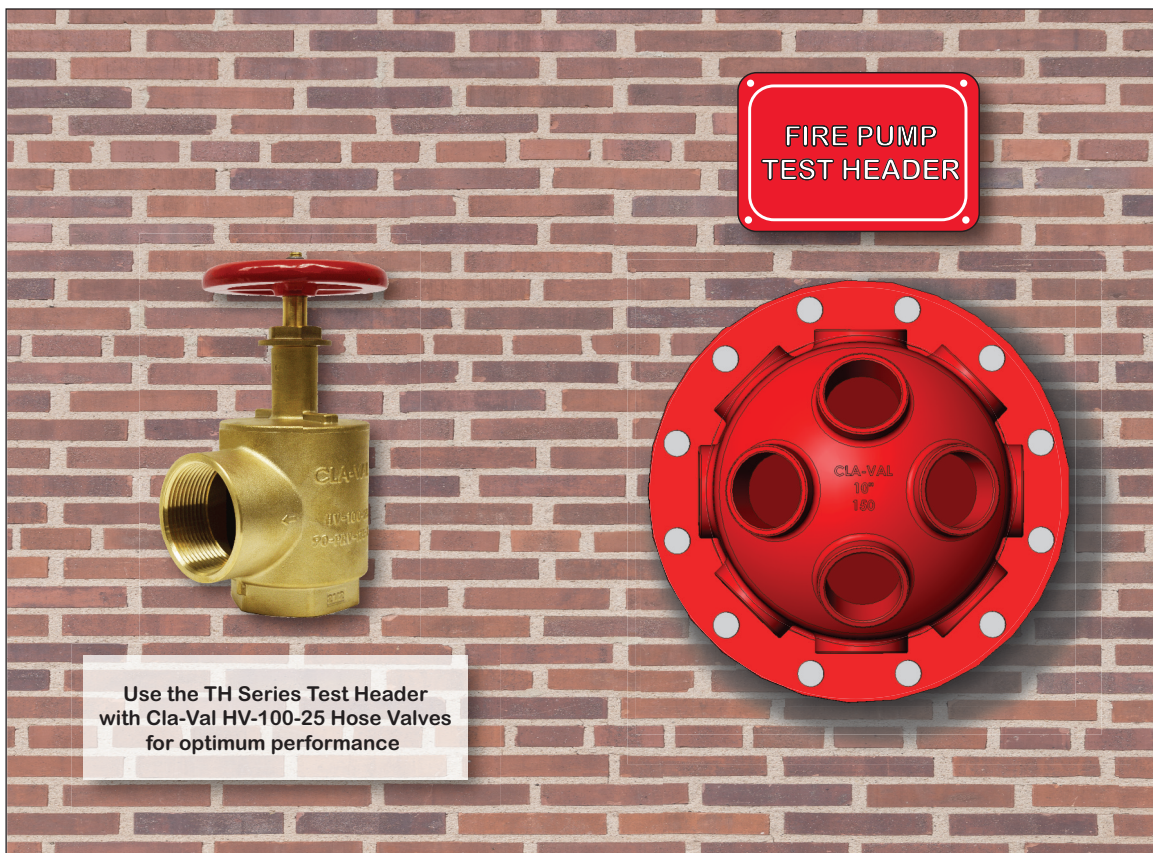
Specifications

- Fusion Bonded Red Epoxy Coated
- Ductile Iron - ASTM A536-65
- Single Body Casting (No Welding)

Flanges

- 150# Class (FF Standard)
- 300# Class (RF Standard)
- Grooved Ends

Typical Application: Fire Pump Test Connections



TH Series Test Header Dimensions

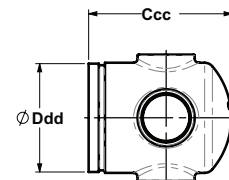
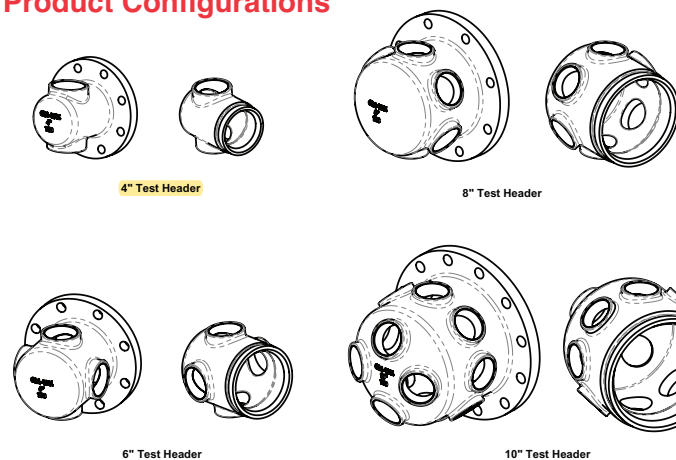
Size (inches)	Pressure Class	ØA (B,C,D)	B		C	Cc	Ccc	ØD	ØDd	ØDdd	E		F		Weight (lbs.)
			# of Holes	Ø Hole							# of Ports	NPT	# of Ports (10" only)	NPT (10" only)	
4	150lb Flat Face	7.500	8	.750	7.16	-	-	9.00	-	-	2	2 1/2" - 8	-	-	22
	300lb Grooved	-	-	-	-	-	7.16	-	-	4.545/4.469	2	2 1/2" - 8	-	-	12
6	150lb Flat Face	9.500	8	.875	8.80	-	-	11.00	-	-	4	2 1/2" - 8	-	-	34
	300lb Raised Face	10.625	12	.875	-	9.24	-	-	12.50	-	4	2 1/2" - 8	-	-	50
	300lb Grooved	-	-	-	-	-	8.80	-	-	6.688/6.594	4	2 1/2" - 8	-	-	20
8	150lb Flat Face	11.750	8	.875	10.06	-	-	13.50	-	-	6	2 1/2" - 8	-	-	56
	300lb Raised Face	13.000	12	1.000	-	10.56	-	-	15.00	-	6	2 1/2" - 8	-	-	79
	300lb Grooved	-	-	-	-	-	10.06	-	-	8.688/8.594	6	2 1/2" - 8	-	-	33
10	150lb Flat Face	14.2250	12	1.000	12.22	-	-	16.00	-	-	8	2 1/2" - 8	4	2 1/2" - 8	98
	300lb Grooved	-	-	-	-	-	12.25	-	-	10.813/10.719	8	2 1/2" - 8	4	2 1/2" - 8	73

Pressure Ratings (Recommended Maximum Pressure - psi)

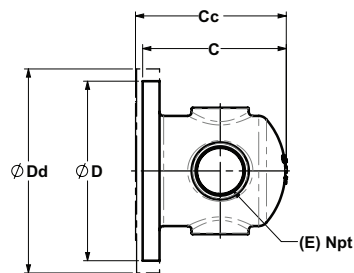
Test Headers		Pressure Class				
		Flanged			Grooved	Threaded
Grade	Material	ANSI Standards*	150 Class	300 Class	300 Class	End† Details
ASTM A536	Ductile Iron	B16.42	250	400	400	400
ASTM A216-WCB	Cast Steel	B16.5	285	400	400	400
UNS 87850	Bronze	B16.24	225	400	400	400

Note: * ANSI standards are for flange dimensions only.
Flanged products are available faced but not drilled.
† End Details machined to ANSI B2.1 specifications.

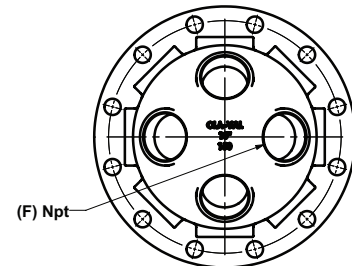
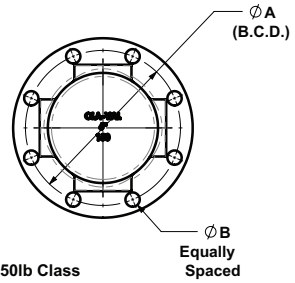
Product Configurations



6" Test Header 300lb Class
Grooved Ends Shown



6" Test Header 150lb Class
Flat Face Shown



10" Test Header 150lb Class
Flat Face Shown



E-TH Series (03-2019)

CLA-VAL

1701 Placentia Avenue • Costa Mesa CA 92627
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Woolston, Christchurch, 8023
New Zealand
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www.cla-valpacific.com
E-mail: info@cla-valpacific.com

UNDERGROUND VALVES & FITTINGS

**THE FOLLOWING IS PROVIDED BY THE
UNDERGROUND CONTRACTOR
(USE FOR HYDRAULIC REFERENCE ONLY)**

Engineering Specification

Job Name _____

Contractor _____

Job Location _____

Approval _____

Engineer _____

Contractor's P.O. No. _____

Approval _____

Representative _____

Series 709DCDA

Double Check Detector Assemblies

3" – 10"

Series 709DCDA Double Check Detector Assemblies are designed exclusively for use in accordance with water authority containment requirements. The series is mandatory to prevent the reverse flow of fire protection system substances, such as glycerin wetting agents, stagnant water, and water of non-potable quality from being pumped or siphoned into the potable water line. The valve body is fused with ArmorTek™ coating technology to resist corrosion due to microbial induced corrosion (MIC) or exposed metal substrate. All sizes are standardly equipped with resilient seated OSY shutoff valves, $\frac{5}{8}$ " x $\frac{3}{4}$ " meter, and ball type test cocks.

Benefits

- Detects leaks, with emphasis on the cost of unaccountable water
- Incorporates a meter allowing the water utility to (1) detect leaks underground that historically create great annual cost due to waste and (2) provide a detection point for unauthorized use, helping locate illegal taps
- Modular check design concept facilitates maintenance and assembly access.

Features

- Body construction fused epoxy coated cast iron
- Replaceable bronze seats
- Maximum flow at low pressure drop
- Compact for economy combined with performance
- Design simplicity for easy maintenance
- Advanced ArmorTek™ coating technology to resist corrosion of internals
- Furnished with $\frac{5}{8}$ " x $\frac{3}{4}$ " bronze meter
- No special tools required for servicing

Specification

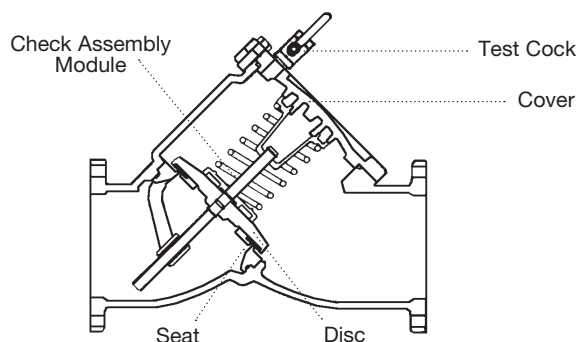
A Double Check Detector Assembly shall be installed on fire protection systems when connected to a potable water supply. Degree of hazard present is determined by the local authority having jurisdiction. The unit shall be a complete assembly including UL Listed resilient seated OSY shutoff valves and test cocks. The unit shall be UL Classified and FM Approved with UL Classified and FM Approved OSY shutoff valves. The auxiliary line shall consist of an approved backflow preventer and water meter. The assembly shall meet the basic requirements of ASSE 1048; AWWA Std. C510 for Double Check Valves. The valve body shall utilize a coating system with built-in electrochemical corrosion inhibitor and microbial inhibitor. Approved by the Foundation for Cross-Connection Control and Hydraulic Research at the University of Southern California. Assembly shall be a Watts Series 709DCDA.



709DCDAOSY

Check Assembly Module

The check assembly features a modular design concept that facilitates complete maintenance and assembly by retaining the spring load. The first and second check valve spring modules are not interchangeable.



Now Available
WattsBox Insulated Enclosures
 For more information, download ES-WB.

NOTICE

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

Inquire with governing authorities for local installation requirements.

Materials

Body:	Epoxy coated cast iron
Seat:	Bronze
Disc Holder:	Bronze
Trim:	Stainless steel
Check Valve Discs:	Rubber
Test Cocks:	Bronze
Coating:	ArmorTek™

Models

Suffix:

OSY	UL Classified and FM Approved outside stem and yoke resilient seated gate valves
CFM	Cubic feet per minute meter
GPM	Gallons per minute meter
LF	4" – 10" without shutoff valves

Pressure – Temperature

Temperature Range: 33°F – 110°F (0.5°C – 43°C) continuous,
140°F (60°C) intermittent
Maximum Working Pressure: 175 psi (12.1 bar)

Standards

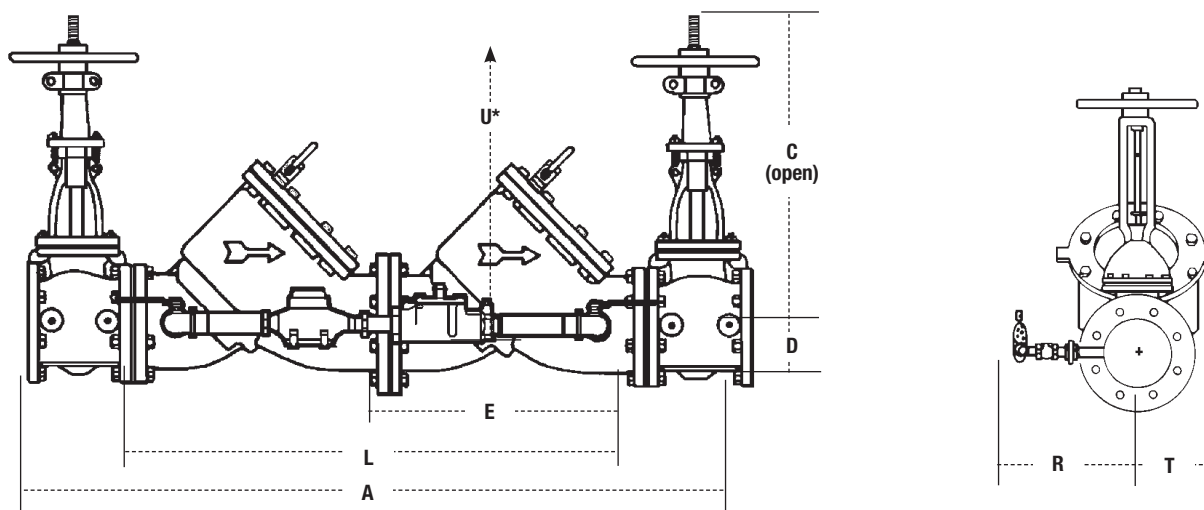
AWWA Standard C510

Approvals



Approved by the Foundation for Cross-Connection Control and Hydraulic Research at the University of Southern California.
Sizes 4" – 10" approved for horizontal and vertical "flow up."
Size 3" approved for horizontal only.
FM Approved 4" – 10" vertical "flow up."

Dimensions – Weights



SIZE			DIMENSIONS												WEIGHT			
	A		C		D		E		L		R		T		U*		W/OSY† gates	
In.	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	lb	kg
3	40	1016	18 ⁷ / ₈	479	3 ¹ / ₂	89	12	305	24	610	14	356	3	76	14	356	190	86
4	52	1321	22 ³ / ₄	578	3 ³ / ₄	95	17	432	34	864	15	381	6	152	14	356	403	183
6	62 ¹ / ₂	1588	30 ¹ / ₈	765	4 ¹ / ₂	114	21	533	41 ¹ / ₂	1054	16	406	7 ¹ / ₂	191	16	406	727	330
8	75	1905	37 ³ / ₄	959	5 ¹ / ₂	140	26	660	52	1321	17	432	9	229	21	533	1327	602
10	90	2286	45 ³ / ₄	1162	6 ¹ / ₂	165	32	813	64	1626	18	457	10 ¹ / ₄	260	25	635	2093	949

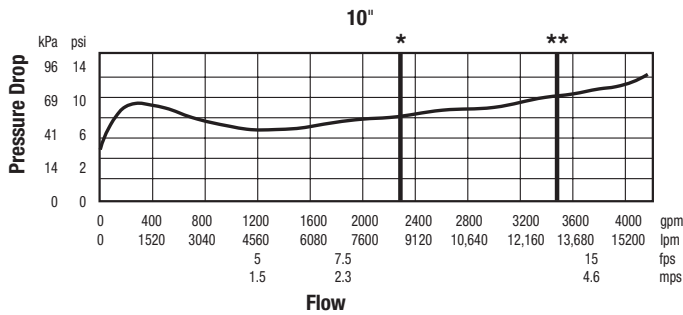
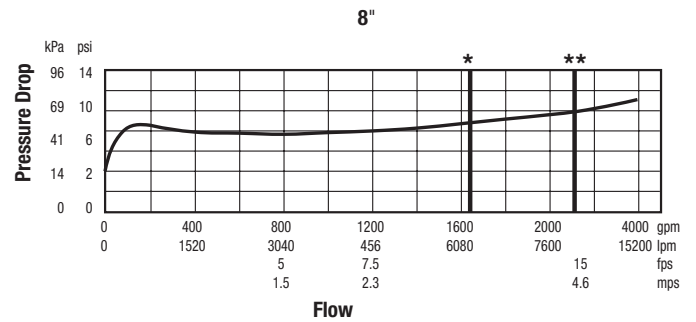
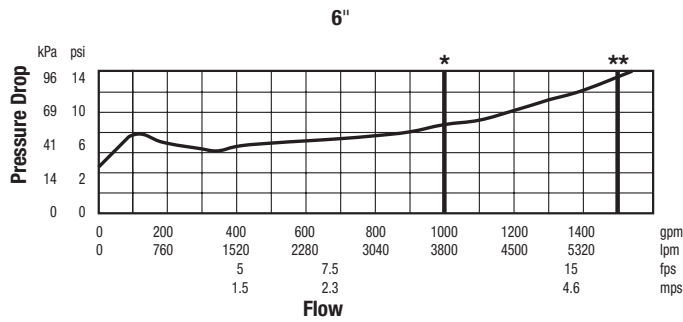
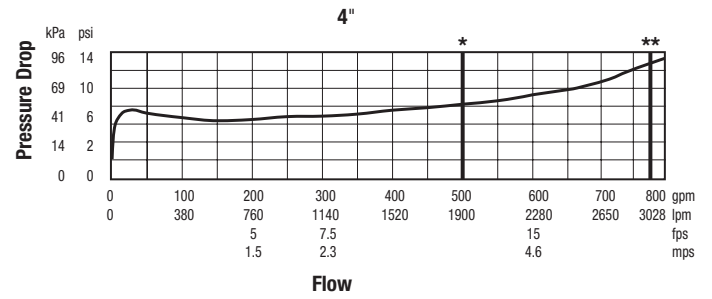
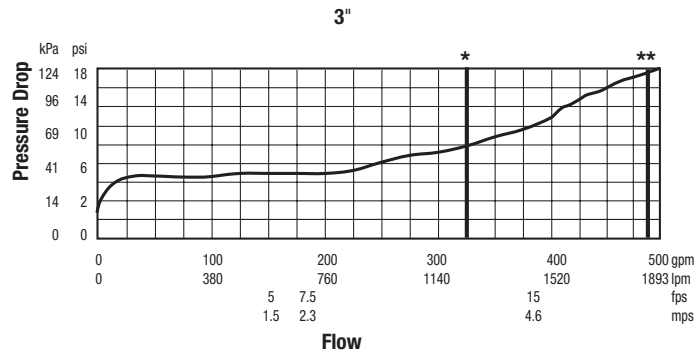
* Service clearance for check assembly from center.

†UL Classified and FM Approved backflow preventers must include UL Classified and FM Approved OSY.

Capacity

*Rated flow

**UL rated flow



USA: T: (978) 689-6066 • Watts.com

Canada: T: (888) 208-8927 • Watts.ca

Latin America: T: (52) 55-4122-0138 • Watts.com

Engineering Specification

Job Name _____

Contractor _____

Job Location _____

Approval _____

Engineer _____

Contractor's P.O. No. _____

Approval _____

Representative _____

LEAD FREE*

Series IBR In-Building Risers Customizable

Sizes: 4" – 10"

Series IBR In-Building Risers are used to connect the main fire supply to the building overhead fire system. The fitting passes under the foundation without joints and extends up through the floor. Provided with installation tabs, the unit has a CIPS (Cast Iron Pipe Size) coupler for easy connection to the underground supply (AWWA C900 PVC and Ductile Iron Pipe) and industry standard grooved-end connection (AWWA C606) on the building side for easy connection to the overhead fire sprinkler system. The IBR features Lead Free* construction to comply with Lead Free* installation requirements.

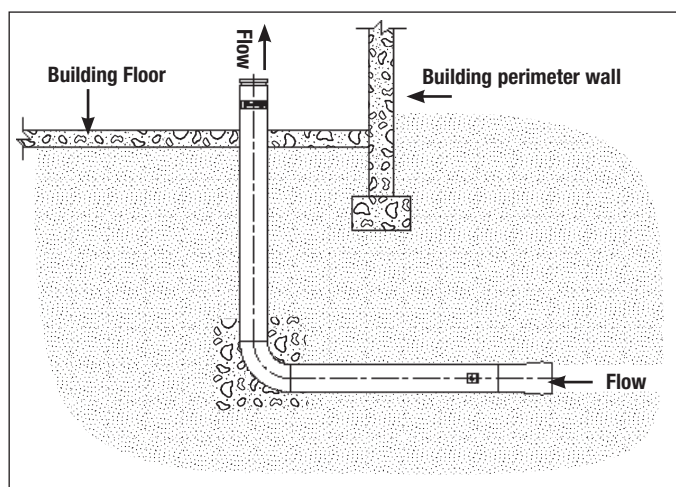
Ames In-Building Risers are precision engineered and manufactured to provide exceptional reliability and reduce installation time & labor costs associated with field assembly. In accordance with NFPA 24, the UL/FM approved In-Building Risers replace numerous fittings, elbows & spools and reduces the possibility of leaks or failure in comparison to traditional installation methods and materials. Factory tested integrity ensures the highest quality installation. The use of stainless steel significantly increases the reliability and life of the riser.

Features

- Cost savings
- Corrosion resistant stainless steel construction, type 304
- Ease of installation and light weight allows one person to position and handle the riser
- Minimal site preparation; joint restraint one-piece construction reduces time and labor; no missing parts, no leaks; easily identifiable for approvals
- Includes Test Cap and Coupler
- UL/FM approved
- Sizes: available in 4" – 10" with various lengths to meet local requirements
- Designed to meet NFPA 24
- AWWA C900 Inlet/DIP
- AWWA C606 Outlet



6'x6' standard length
(custom lengths from 3' – 20' available)



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

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

AMES
FIRE & WATERWORKS
A WATTS Brand

Specifications

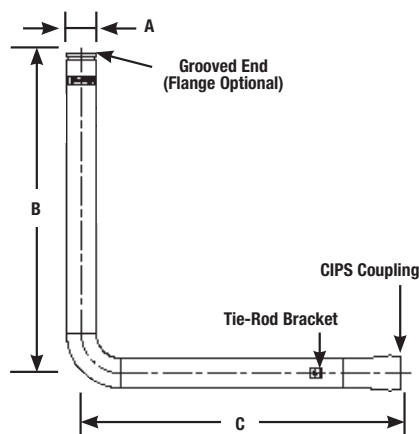
In-Building Riser shall be installed as indicated on the plans. Riser shall be composed of a single extended 90 degree fitting of fabricated ASTM A312 304 stainless steel tubing, maximum working pressure 200psi (14 bar). The fitting shall have a grooved-end connection on the outlet (building) side and a CIPS coupler on the inlet (underground) side. The grooved end shall include a coupler and cap to facilitate testing of the underground piping. The In-Building Riser shall be an Ames Fire & Waterworks Series IBR.

Approvals

Fittings FM class 1920
UL HKQA (4"-10")



Dimensions – Weights



SIZE				WEIGHT			
	A (OD)		B		C		
in.	in.	mm	ft.	cm	ft.	cm	lbs. kg
4	4½	114	6	183	6	183	71 32
4	4½	114	8'-6"	183	6	183	85 39
4	4½	114	9	274	6	183	88 40
4	4½	114	5	152	7	213	71 32
6	6¾	168	6	183	6	183	98 44
6	6¾	168	8'-6"	259	6	183	122 56
6	6¾	168	9	274	6	183	127 58
6	6¾	168	5	152	7	213	98 44
8	8¾	219	6	183	6	183	129 59
8	8¾	219	8'-6"	259	6	183	163 74
8	8¾	219	9	274	6	183	170 77
8	8¾	219	5	152	7	213	129 59
10	10¾	273	6	183	6	183	202 92
10	10¾	273	9	274	6	183	258 117
10	10¾	273	5	152	7	213	202 92

**Each B (vertical) and C (horizontal) leg is customizable from 3' to 20' with UL/FM approvals. Consult with your factory representative for details.



A WATTS Brand

Standards

NFPA — Designed to allow the contractor to conform to NFPA 24

Where a riser is close to building foundations, underground fittings of proper design and type shall be used to avoid pipe joints being located under the foundations.

End Connections

Horizontal End: Mates with Ductile Iron Pipe and AWWA C900 Pipe (PVC Pipe with Ductile Iron Pipe Equivalent OD's)

Utilizes Gasket conforming to UL 157 with "Lock in" gasket configuration

SIZE	MATING PIPE OD	
	in.	mm
4	4.8	122
6	6.9	175
8	9.1	230
10	11.1	282

Vertical End:

Meets AWWA C-606 dimensions for roll grooved pipe
Meets AWWA C-207 class D for flanges

Ratings

Meets AWWA C-900 pressure class 200, DR 14 Pipe

Testing

Welds are 100% leak tested at the factory

NOTICE

Inquire with governing authorities for local installation requirements

NOTICE

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

USA: Backflow Tel: (978) 689-6066 • Fax: (978) 975-8350 • AmesFireWater.com
USA: Control Valves Tel: (713) 943-0688 • Fax: (713) 944-9445 • AmesFireWater.com
Canada: Tel: (905) 332-4090 • Fax: (905) 481-2316 • AmesFireWater.ca
Latin America: Tel: (52) 55-4122-0138 • AmesFireWater.com

For Use as an Auxiliary Inlet Connection.

STORZ FIRE DEPT. INLET CONNECTIONS, hard coat anodized aluminum with stainless steel internal screen provides a range from 500/1000 to 1000/3785 GPM/lpm per inlet. A storz connection provides a means of rapid supply through large diameter hose. Size selected by model number. 250psi rated

STORZ BLIND CAPS WITH CHAINS, hard coated aluminum as selected by model number.

STORZ 30 DEGREE ANGLED CONNECTIONS, for use where piping constraints or requirements specify angle. 250psi rated

MODEL SELECTION

STORZ FIRE DEPT. INLET CONNECTIONS

Straight	Size	30 Degree
☐ 5795-01	4" STORZ x 4" NPT	☐ 5795-01-30
☐ 5795-02	5" STORZ x 4" NPT	☐ 5795-02-30
☐ 5795-03	6" STORZ x 4" NPT	☐ 5795-03-30
☐ 5795-04	4" STORZ x 6" NPT	☐ 5795-04-30
☐ 5795-05	5" STORZ x 6" NPT	☐ 5795-05-30
☐ 5795-06	6" STORZ x 6" NPT	☐ 5795-06-30

FREESTANDING STORZ CONNECTIONS, hard coat anodized aluminum 90° body with stainless steel internal screen provides a range from 500/1000 to 1000/3785 GPM/lpm per inlet. A storz connection provides a means of rapid supply through large diameter hose. Unit consists of adapter, cap, sleeve, and plate. 250psi rated



MODEL SELECTION (Cont.)

STORZ BLIND CAPS WITH CHAINS

- ☐ 5799-01 4" STORZ
- ☐ 5799-02 5" STORZ
- ☐ 5799-03 6" STORZ

PRODUCT OPTIONS

- ☐ -UL (Available in models 5795-01 and 5795-02 only)

PRODUCT OPTIONS

LETTERING AVAILABLE:

- ☐ -S STANDPIPE
- ☐ -DS DRY STANDPIPE
- ☐ -A AUTO. SPKR.
- ☐ -AS/SP AUTO. SPKR. STANDPIPE

FINISHES:

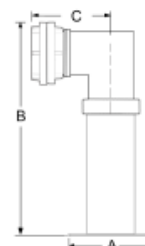
- ☐ -C Chrome adapter, cap, sleeve, plate
- ☐ -120 120° body

MODEL DIMENSIONS

Model	Size	A	B	C
5795-01-FS	4" STORZ x 4" FNPSH	9-3/4"	28-3/4"	9-3/4"
5795-02-FS	5" STORZ x 4" FNPSH	10"	29-1/8"	9-3/4"
5795-05-FS	5" STORZ x 6" FNPSH	10-1/4"	29-3/4"	12"



5795-02-FS



Call Potter Roemer - Fire Pro for current listings and approvals. Dimensions are subject to manufacturer's tolerance and may change without notice. Potter Roemer - Fire Pro assumes no responsibility for use of void or superseded data. © Copyright Potter Roemer - Fire Pro, Member of Morris Group International™ Please visit potterroemer.com for most current specifications.

5795-5799 SERIES

Date: 10/24/24

MEMBERSHIP



FIRE EQUIPMENT
MANUFACTURERS'
ASSOCIATION



ONFSA
NATIONAL FIRE SPRINKLER ASSOCIATION, INC.



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