RED HAWK FIRE PROTECTION, LLC

801 Valley Avenue N.W. Suite D
Puyallup, WA 98371
(253) 840-9900

Ever Vigilant

FIRE SPRINKLER EQUIPMENT SUBMITTAL

FOR

V. Kaur AFH
Puyallup, WA

RHFP JOB NO. 80303

TABLE OF CONTENTS

Section 1 - Pipe and Fittings

Description	*Comments*
Spears_CPVC Piping System	Or equal listed CPVC piping

Section 2 - Hangers and Sway Bracing

Description	*Comments*
Anvil, CPVC Hanger, Fig 187	Or equal listed CPVC Hanger
Anvil, CPVC Hanger, Fig 188R	Or equal listed CPVC Hanger
Tolco, CPVC Hanger, Fig. 29	Or equal listed CPVC Hanger

Section 3 - Valves and Accessories

Description	*Comments*
Aollo, Backflow Double Check Assembly, Model DC4A	First Option if availble
Ames, Backflow Double Check Assembly, Model 2000B	If Apollo DC4A is unavailble

Section 4 - Alarms and Supervisory Devices

Description	*Comments*
Potter, Waterflow Switch, VSR-SG	Or Listed equal
Potter, 6" 120V Electric Bell, PBA1206	Or Listed equal

Section 5 - Fire Sprinklers

Description	*Comments*
Tyco, Concealed Pendent Sprinkler, LFII, 4.9K, TY3596	
Tyco, Recessed Sidewall Sprinkler, LFII, 4.4K, TY2334	

Section 6 – Fire Pump

Tolco, Home Hydrant, Model HH4-150SP	If city/well water supply insufficient

SECTION 1

Piping and Fittings

Submittal Information for Spears® Manufacturing Company FlameGuard ® CPVC Fire Sprinkler System

GSFG-0221

Date: _____

Job Name: _____ **Location:** _____

Engineer: _____ **Contractor:** _____

Scope:
This submittal covers the Spears® FlameGuard® CPVC Fire Sprinkler System suitable for residential and light hazard occupancies in accordance with The National Fire Protection Association (NFPA). The FlameGuard® System shall be sold as a complete system which consists of pipe, fittings and a specially formulated one-step primerless cement intended for use in wet, dry and pre-action systems in residential and light hazard Applications where the operating temperature/pressure does not exceed 175psi @ 150° F. (1.2 MPa @ 66° C)

Product Specification:
All CPVC fire sprinkler fittings and pipe shall be Spears® FlameGuard®. All solvent cement shall be Spears® FS-5 One-Step, and all thread sealant shall be Spears® Blue 75™ as produced by Spears® Manufacturing Company.

All Spears® FlameGuard® CPVC fire sprinkler fittings shall be manufactured in the U.S.A. from a Chlorinated Polyvinyl Chloride (CPVC) compound having a minimum cell classification of 23447 in accordance with ASTM D1784. Fittings shall be manufactured in strict compliance to ASTM F438 or F439, as applicable. All CPVC fire sprinkler piping shall be manufactured in the U.S.A. from a Chlorinated Polyvinyl Chloride (CPVC) compound having a minimum cell classification of 23447 in accordance with ASTM D1784. Piping shall be manufactured in strict compliance to ASTM F442. All CPVC solvent cement shall be a primerless, one-step type manufactured in strict compliance to ASTM F493 and approved for use with CPVC fire sprinkler systems. All CPVC fire sprinkler fittings, pipe and solvent cement shall be listed by Underwriters Laboratories (UL®), Underwriters Laboratories Canada (ULC®) and/or Factory Mutual Research Corporation (FM Global) and/or LPCB for use in residential and light hazard wet, dry and pre-action systems and bear their authorized certification marks. Thread sealant shall be approved by the fitting manufacturer for use with CPVC fire sprinkler products. All CPVC fittings, pipe, solvent cement and thread sealant shall be certified by NSF International as applicable. Pipe and solvent cement shall be certified to UL 2818 GREENGUARD GOLD.

Product Marking:
FlameGuard® system components shall be orange in color for identification and include required markings and approvals prescribed in ASTM F442 for pipe and ASTM F438 or F439 for fittings. Pipe and cement shall have GREENGUARD GOLD marking.

Installation:
Spears® FlameGuard® CPVC Fire Sprinkler System shall carry a working pressure of 175 psi @ 150F (1.2 MPa @ 66° C) and shall be installed in accordance with Spears® Manufacturing Company FlameGuard® CPVC Fire Sprinkler Products Installation Instructions (FG-3) and Addendums. National Fire Protection Association (NFPA) Standards 13, 13D, and 13R must be referenced for design and installation requirements in conjunction with the Installation Instructions and applicable local codes. Installation practices such as pipe support spacing, bracing, allowance for thermal expansion/contraction, solvent cementing and handling and storage shall be in accordance with the manufacturer's instructions and this specification. Buried pipe shall be in accordance with NFPA 24 for supply mains. The piping system shall be joined using a chemically resistant one-step primerless solvent cement joining process conforming to ASTM F493. The system shall be protected from ultra violet (UV) light exposure from the sun or other source and protected from any chemicals that are not compatible with the CPVC materials including but not limited to fire stopping materials, plasticizers, incompatible thread sealants, etc.

NOTE: FlameGuard® CPVC piping systems can be leak tested using oil-free compressed air up to 25psi but must also be hydrostatically tested as required per NPFA standard.

Referenced Standards:
ASTM D1784 – Rigid Vinyl Compounds
ASTM F438 – CPVC Schedule 40 Fittings
ASTM F439 – CPVC Schedule 80 Fittings
ASTM F442 – CPVC SDR Pipe
ASTM F493 – Solvent Cements for CPVC Pipe & Fittings
NFPA 13, 13D, 13R – National Fire Protection Association Standards
NFPA 24 – Installation – Private Fire Service Mains
NSF International Standard 14/61 – Potable Water

Approvals:
NSF® – NSF International Standard 14/61 – Potable Water
Underwriters Laboratories – Listing Agency
FM Global –Listing Agency
UL-GREENGUARD GOLD Certified UL 2818
LPCB – Loss Prevention Council Board

SECTION 2

Hangers & Sway Bracing

Fig. 187 (Formerly Afcon Fig. 511) Two Hole 90˚ Side Mount Strap

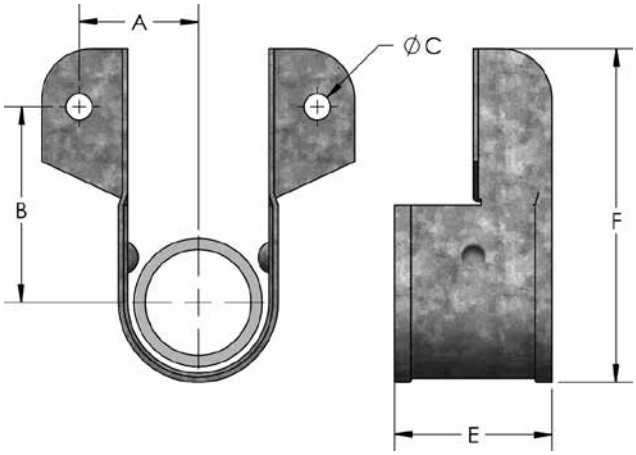
Size Range: 3/4" through 2"
Finish: Zinc Plated Steel (Hot-Dip Galvanized optional)
Service: Hanger for CPVC pipe in the horizontal position on the bottom of structural wood beams and Steel 20 Ga. (min.) (Fig. A). ***Can be used as a restrainer, only in Steel 20 Ga. (min) (Fig. B).*** During installation, adjust hanger mounting flanges such that pipe contacts both mounting surface and hanger, minimizing vertical pipe movement.
Approvals: UL and ULC Listed.
Installation:

- Snap hanger over pipe.
- Secure hanger to mounting surface with screws provided.
- Do not anchor tightly to mounting surface. Pipe must be allowed to move freely through hanger.
- Steel applications require two (2) #14 x 1" hex washer head self-drilling TEK screws. Not Supplied. Part Number STD-0090.

Features:

- Beveled edge design helps protect the CPVC pipe from any rough surface.
- Easily attaches to wood structure with #10 x 1" hex washer head self threading screw supplied with product. No pre-drilling required.

Ordering: Specify CPVC pipe size, figure number and description.



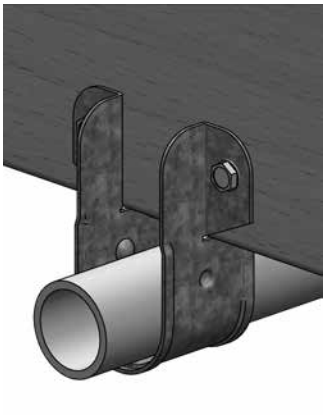


Fig. A

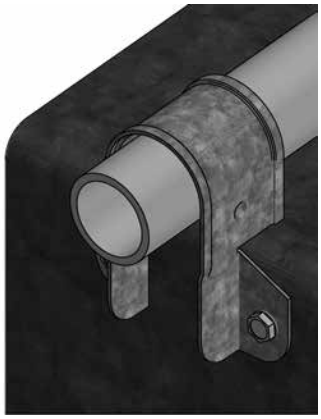


Fig. B

FIG. 187: DIMENSIONS (IN) • WEIGHT (LBS)							
CPVC Pipe Size	A	B	øC	E	F	Max. Hanger Spacing (FT.)	Approx. Weight/100 (lbs)
3/4	15/16	1 1/2	3/16	1 3/16	2 1/2	5 1/2	5
1	1	1 9/16	3/16	1 3/16	2 3/4	6	6
1 1/4	1 3/16	1 3/4	3/16	1 3/16	3 1/4	6 1/2	7
1 1/2	1 5/16	1 11/16	3/16	1 3/16	3 1/2	7	8
2	1 9/16	2 1/8	3/16	1 3/16	3 13/16	8	9

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

Fig. 188R (Formerly Afcon Fig. 514) Two Hole Standoff Hanger & Restrainer

Size Range: ¾" through 2"
Material: Carbon Steel
Finish: Pre-Galvanized per ASTM A653
Service:

- Hanger and surge restraint for horizontal CPVC, steel, and copper piping when installed on the top, bottom, and side of the supporting structure.
- Guide for vertical CPVC, steel, and copper piping when installed on the side of the supporting structure.
- Horizontal and vertical seismic restraint per NFPA 13-2016 requirements.
- May be installed with concrete, steel structural members, and other structural members with fasteners which comply with the requirements of NFPA 13.

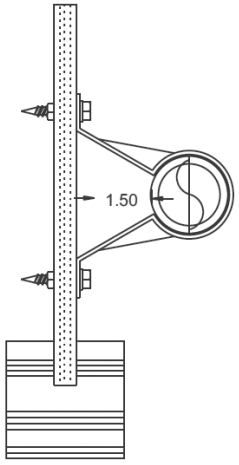
Approvals: cULus Listed
Patents: No. 6,648,278
Installation:

- Snap hanger over pipe. If needed, squeeze strap back around pipe.
- CPVC pipe must be allowed to slide freely through the Fig. 188R.
- Secure hanger to mounting surface with screws provided or with listed fasteners.

Features:

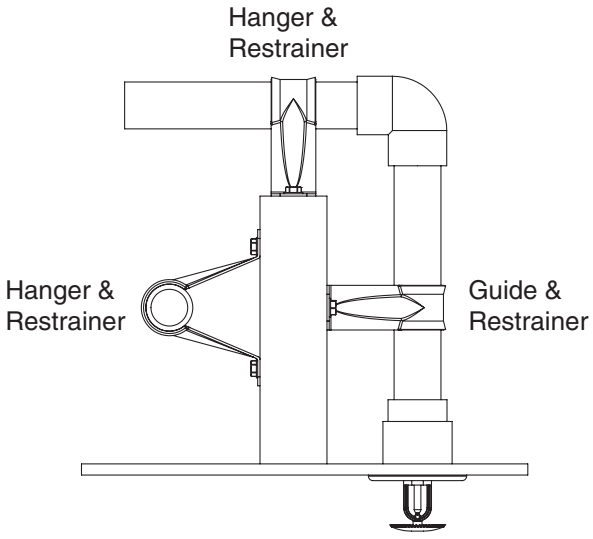
- Beveled edge design helps protect the CPVC pipe from any rough surface and eliminates pipe abrasion.
- Easily attaches to wood structure with #10 x 1" hex washer head self-threading screw supplied with product. No pre-drilling required.
- Bottom of pipe is offset 1½" from the structure. Eliminates wooden spacer blocks.

Ordering: Specify CPVC pipe size, figure number and description.



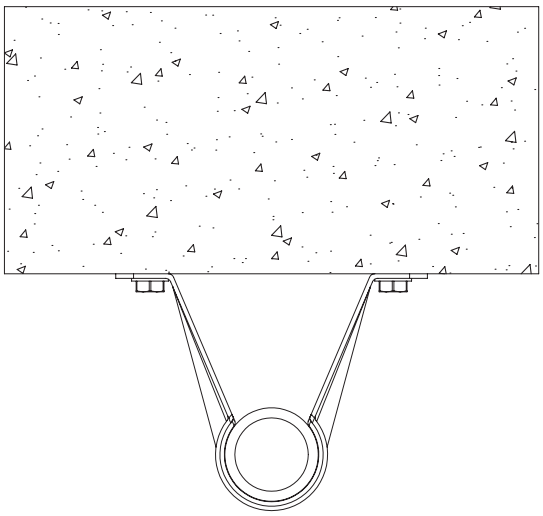
Installation - Backing Nut
Hanger = 1 - at top fastener
Restraint = 2 - on each fastener

Per NFPA-13D and NFPA-13R



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

Fig. 188R (Formerly Afcon Fig. 514) Two Hole Standoff Hanger & Restrainer (cont.)



Hanger and Restrainer

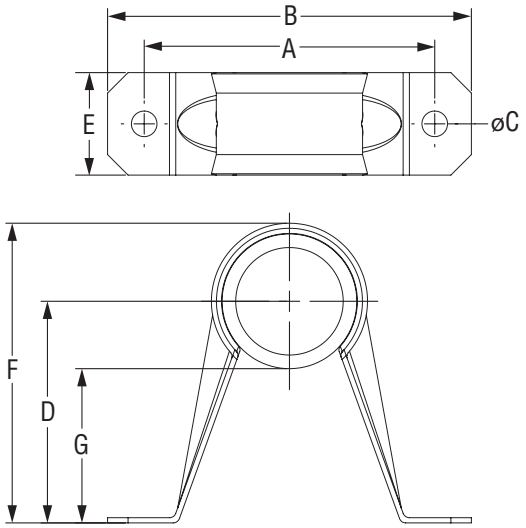


FIG. 188R: DIMENSIONS (IN) • WEIGHT (LBS)									
CPVC Pipe Size	A	B	øC	D	E	F	G	Max. Hanger Spacing (FT.)	Approx. Weight/100 (lbs)
¾	2¾	3½	¼	2	1	2⅝	1½	5½	11
1	2 13/16	3½	¼	2 3/16	1	2 15/16	1½	6	12
1¼	2 13/16	3½	¼	2 5/16	1	3¼	1½	6½	13
1½	3⅝	4¼	¼	2 7/16	1	3½	1½	7	14
2	3 11/16	4⅜	¼	2 11/16	1	4	1½	8	16

FIG. 188R: LISTED FASTENERS		
Pipe	Wood and Composite Beams	Steel (18ga. Minimum)
CPVC	Screw Supplied or #10 x 1" TEK Screw	#14 x 1" TEK Screw or ¼" x 1" TEK Screw
Steel & Copper	#14 x 1" TEK Screw or ¼" x 1½" Lag Screw	#14 x 1" TEK Screw or ¼" x 1" TEK Screw

Fig. 29 - Double Offset Hanger & Restrainer for CPVC Plastic Pipe & IPS Steel Pipe**

TOLCO

c UL us LISTED

Size Range: Available in 3/4" (20mm) and 1" (25mm) pipe sizes

Material: Pre-Galvanized Steel

Function: Intended to perform as a hanger and restrainer for CPVC, plastic fire sprinkler pipe. Provides double offset 1 1/2" (20mm) x 1 1/2" (20mm) from mounting surface. This design will ease installation by eliminating the need for wood block extension and allow retro-fit attachment of hanger to sprinkler pipe.

Features:

- Thumb tab provides protection to restrain pipe in rough job site conditions. Tab is not required to be bent for listed installation.
- Offset edge eliminates abrasion.
- Attaches easily to wood structure with two special #10 x 1" hex head self-threading screws furnished with product.
- Can be used as a single offset hanger by aligning "dimples" with top of mounting surface and utilizing two fasteners in two of the three holes provided.

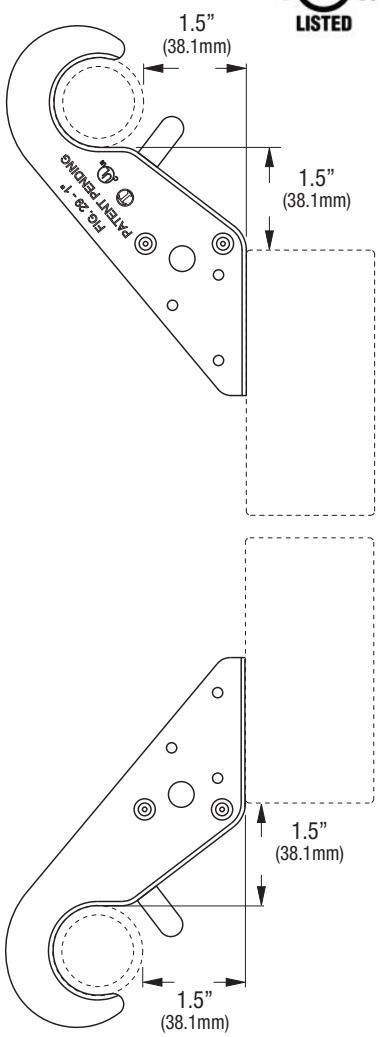
Approvals: Underwriters Laboratories Listed in the USA **(UL)** and Canada **(cUL)** as a hanger and restrainer to support fire sprinkler systems. Meets and exceeds requirements of NFPA 13, 13R and 13D.

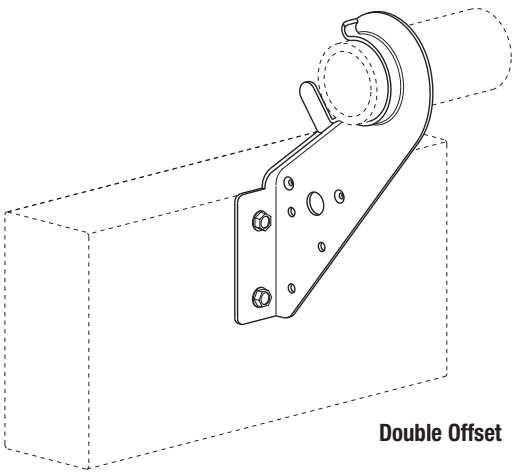
Finish: Pre-Galvanized

Order By: Figure number and pipe size.

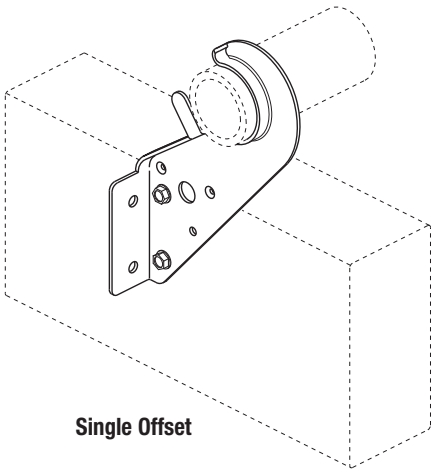
Patent Pending

** With reduced spacing, consult factory.





Double Offset



Single Offset

Install using a rechargeable electric drill fitted with a 5/16" (7.9mm) socket attachment with the special hex head self-tapping screws provided. Install screws until they bottom out. Pipe can be "snapped" into hanger before or after installation of the screws to the mounting surface. "Thumb tab" may be bent up to provide additional protection to the pipe, but is not required for performance of the hanger / restrainer function.

SECTION 3

Valves and Accessories

Job Name _____ Contractor _____

Job Location _____ Approval _____

Engineer _____ Contractor's P.O. No. _____

Approval _____ Representative _____

Series 2000B

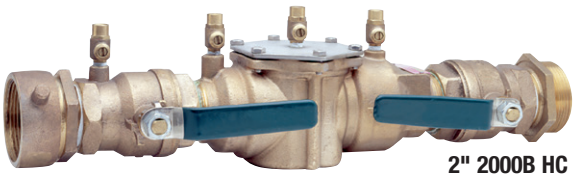
Double Check Valve Assemblies

Sizes: ½" – 2"

Series 2000B Double Check Valve Assemblies are designed to protect drinking water supplies for dangerous cross-connections in accordance with national plumbing codes and water authority requirements for non-health-hazard non-potable service applications such as irrigation, fire line, or industrial processing.

These valves meet the requirements of ASSE Std. 1015 and AWWA Std. C510 and are approved by the Foundation for Cross-Connection Control and Hydraulic Research at the University of Southern California.

¾" 2000B (20mm)



2" 2000B HC (50mm)

Features

- Ease of maintenance with only one cover
- Top entry
- Replaceable seats and seat discs
- Modular construction
- Compact design
- ½" – 2" Cast bronze body construction
- Top mounted ball valve test cocks
- Low pressure drop
- No special tools required
- ½" – 1" have tee handles

Specifications

A Double Check Valve Assembly shall be installed at each noted location. The assembly shall consist of two positive seating check modules with captured springs and rubber seat discs. The check module seats and seat discs shall be replaceable. Service of all internal components shall be through a single access cover secured with stainless steel bolts.

The assembly shall also include two resilient seated isolation valves and four top mounted, resilient seated test cocks. The assembly shall meet the requirements of ASSE Std. 1015 and AWWA Std. C510. Approved by the Foundation for Cross-Connection Control and Hydraulic Research at the University of Southern California. Assembly shall be an Ames Fire & Waterworks Series 2000B.

⚠ WARNING

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

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.

AMES FIRE & WATERWORKS

A **WATTS** *Brand*

Available Models

Suffix:

B -	Quarter turn ball valves
LBV -	less ball valves
SH -	stainless steel ball valve handles
HC -	2½" inlet/outlet fire hydrant fitting (2" valve)

Standards

AWWA Std. C510, IAPMO PS31

Approvals

1015 B64.5 ¾" - 2" (LBV Models Only)

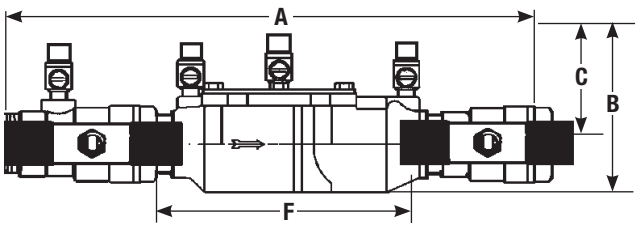
Pressure — Temperature

Temperature Range: 33°F – 140°F (0.5°C – 60°C)

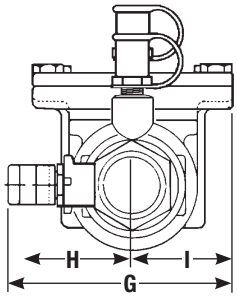
Maximum Working Pressure: 175psi (12.1 bar)

- Approved by the Foundation for Cross-Connection Control and Hydraulic Research at the University of Southern California. (Excluding all LBV Models)
- Horizontal and vertical "flow up" approval on all sizes.

Dimensions – Weights



Suffix HC — Fire Hydrant Fittings dimension "A" = 23½" (594mm)

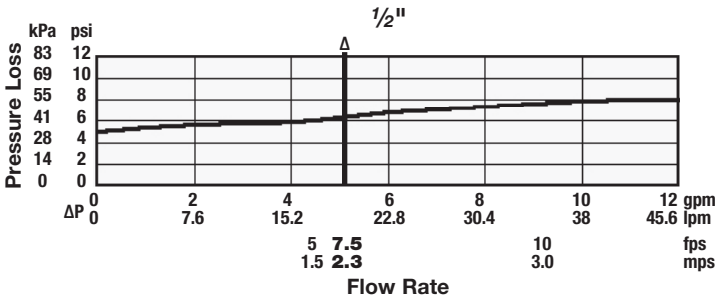


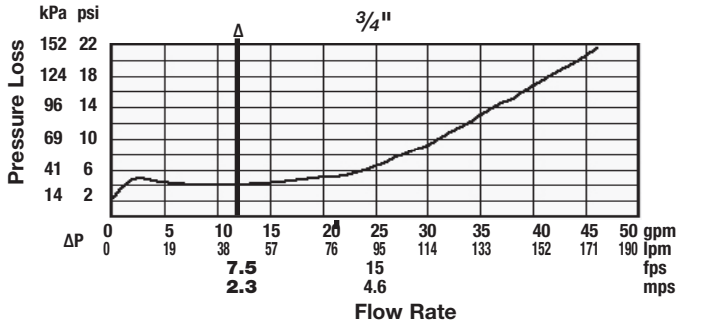
SIZE	DIMENSIONS														WEIGHT	
	A		B		C		F		G		H		I			
in.	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*lbs.*	*kgs.*
½	10	254	4⅝	117	2 7/16	62	5	127	3⅜	85	2 5/16	59	2 1/16	52	4.5	2
¾	11⅛	282	4	102	3⅛	79	6 3/16	157	3 7/16	87	2⅛	54	1 5/16	33	5	2.3
1	13¼	337	5⅛	130	4	102	7½	191	3⅜	85	11 1/16	43	11 1/16	43	12	5.4
1¼	16⅜	416	5	127	3 5/16	84	9½	241	5	127	3	76	2	50	15	6.8
1½	16¾	425	4⅞	124	3½	89	9¾	248	5 13/16	148	3⅛	79	2 11/16	68	15.86	7.2
2	19½	495	6¼	159	4	102	13⅜	340	6⅛	156	3 7/16	87	2 11/16	68	25.75	11.7

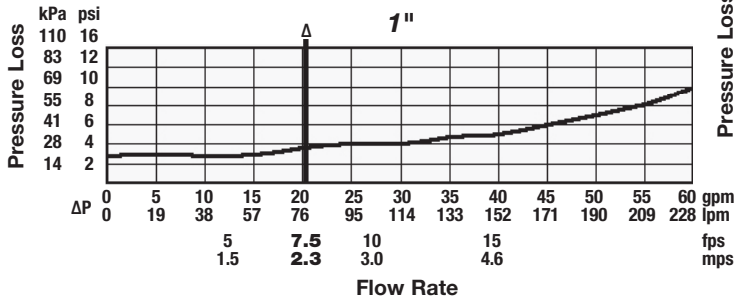
Strainer sold separately

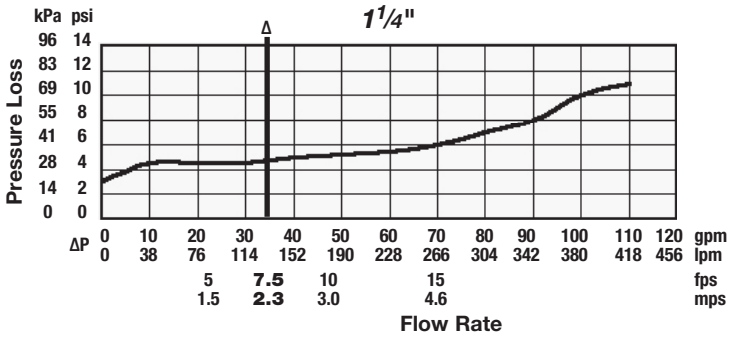
Capacities

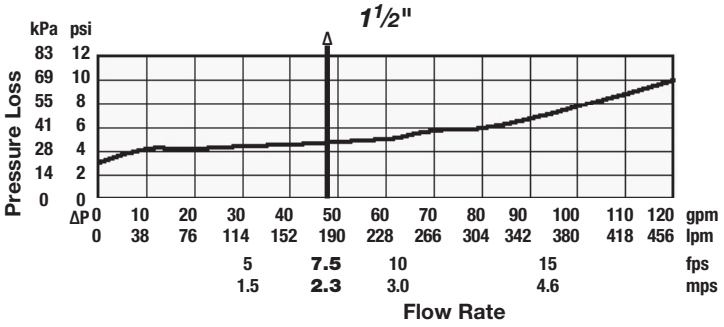
As compiled from documented Foundation for Cross-Connection Control and Hydraulic Research at the University of Southern California lab tests. ΔTypical maximum system flow rate (7.5 feet/sec., 2.3 meters/sec.)

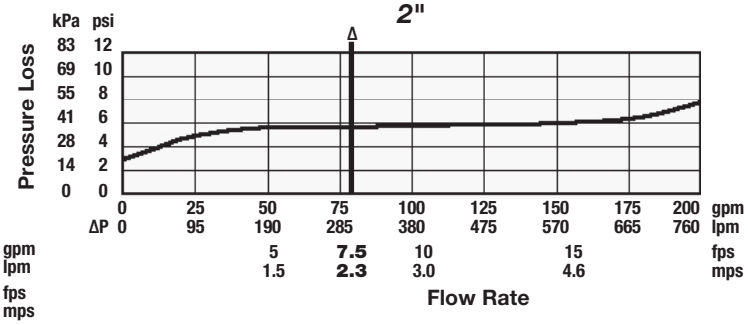












AMES
FIRE & WATERWORKS

A **WATTS** *Brand*

USA: Backflow T: (978) 689-6066 • F: (978) 975-8350 • AmesFireWater.com
USA: Control Valves T: (713) 943-0688 • F: (713) 944-9445 • AmesFireWater.com
Canada: T: (905) 332-4090 • F: (905) 332-7068 • AmesFireWater.ca
Latin America: T: (52) 81-1001-8600 • AmesFireWater.com

"Apollo"® Valves
SUBMITTAL SHEET

DCLF4A & DC4A

Double Check Valves - A Series

Job Name:	
Job Location:	
Engineer:	
Contractor:	
Tag:	
PO#:	
Rep:	
Wholesale Dist.:	

DESCRIPTION

The **Apollo® Model DC4A and DCLF4A Series Lead Free* & Non-Lead Free Double Check Valves** prevent contamination of the potable water supply due to back-siphonage or backpressure from substances that are objectionable to the potable water supply, but non-health hazards. The top accessed modular check valve cartridges provide captured springs, replaceable seats and reversible silicone seat discs. This Made in America assembly features ball valve shutoffs with stainless steel handles and nuts as standard and carries the five-year Apollo® factory warranty.

FEATURES

- Low Pressure Loss
- Captured Spring Cartridge Check Valves
- Compact, Yet Easy to Maintain
- Ball Valve Shut-Offs w/ SS Handles & Nuts Standard
- Top Access for Fast Testing & Maintenance
- Threaded Testcock Protectors
- Corrosion Resistant
- No Special Tools Required
- 5 Year Warranty
- Lead Free Option
- Chloramine-Resistant Elastomers
- **Designed, Cast, Machined, Assembled and Tested in the USA**

PERFORMANCE RATING

- Maximum Working Pressure: 175 psi
- Temperature Range: 33°F - 180°F

APPROVALS

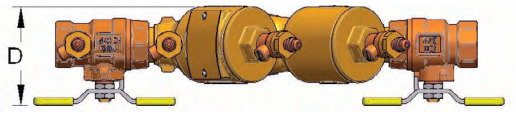
- Horizontal and Vertical Up Approvals
- AWWA C510
- Approved by the Foundation for Cross-Connection Control and Hydraulic Research at the University of Southern California
- ASSE 1015-2011
- IAPMO
- CSA B.64.5

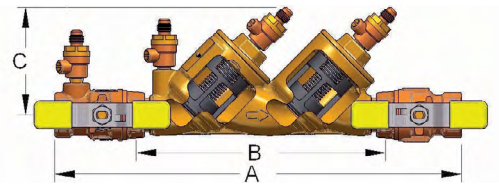
STANDARD MATERIALS LIST

BODY, CAPS	Bronze C84400 or C89836 Lead Free*
BV SHUTOFFS, TEST COCKS	Bronze C84400 or C87800 Lead Free*
CHECK VALVE CARTRIDGES	Glass-Filled PPO
SPRINGS	300 Series Stainless Steel
SEAT DISCS	Chloramine-resistant Silicone

DIMENSIONS

MODEL NUMBER	SIZE (IN.)	DIMENSIONS (IN.)				WT. (LB.)
		A	B	C	D	
4A-103-A2F	1/2"	10-7/8	7-3/8	3-1/4	2-1/2	4.1
4A-104-A2F	3/4"	12-5/8	8-1/2	3-1/2	3	5.4
4A-105-A2F	1"	14-5/8	9-1/2	4	3-1/4	9.0
4A-106-A2F	1-1/4"	17-1/2	11-3/4	4-1/2	4-3/4	9.1
4A-107-A2F	1-1/2"	18	11-5/8	4-1/2	4-3/4	12.9
4A-108-A2F	2"	20-1/8	12-3/4	5	5-3/8	16.5





PART NUMBER MATRIX

4A [X]	1 X	X	X X	X
	Y-STRAINER	SIZE	SHUT-OFF VALVES	OPTIONS (CAN BE COMBINED)
4A - STANDARD	0 - STANDARD	3 - 1/2"	A2 - W/BALL VALVES (STANDARD)	F - SAE THREADED TEST COCKS (STANDARD 1/2" -2")
4ALF - LEAD FREE	1 - W/ Y-STRAINER	4 - 3/4"	A4 - W/UNION BALL VALVES (3/4" - 2")	LL - SS LOCKING LEVER HANDLES
	(SHIPPED LOOSE)	5 - 1"		PR - PRESS CONNECTIONS (FACTORY INSTALLED)
		6 - 1-1/4"		P - PUSH (3/4" -1") CONNECTIONS (FACTORY INSTALLED)
		7 - 1-1/2"	EXAMPLE: 4A 104 A4LL = 3/4" double check valve assembly with union ball valves with locking lever handles	
		8 - 2"		

**LEAD FREE: The wetted surfaces of this product shall contain no more than 0.25% lead by weighted average. Complies with Federal Public Law 111-380. ANSI 3rd party approved and listed.*

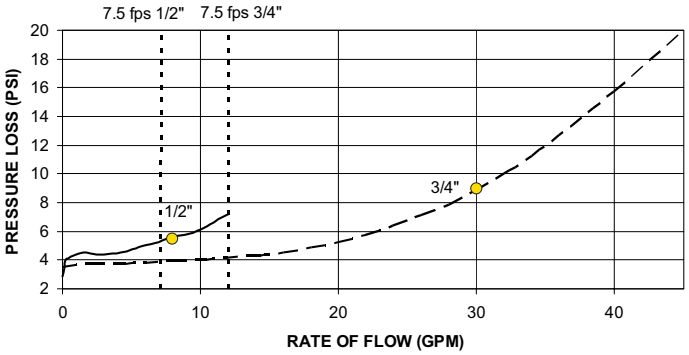
aalberts integrated piping systems

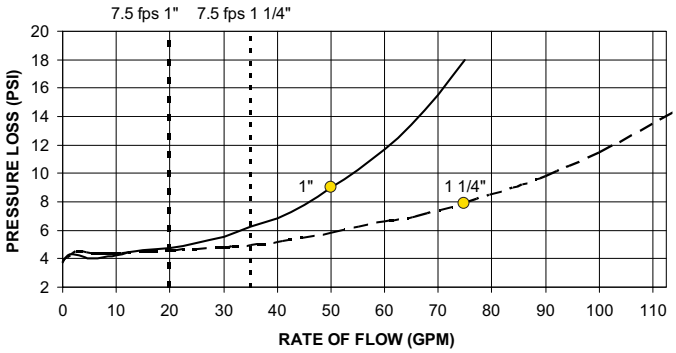
DC4A & DCLF4A

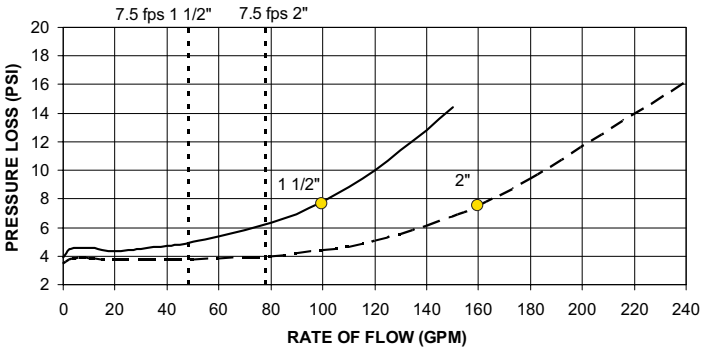
Double Check Valves - A Series

LEAD FREE

FLOW CURVES







SECTION 4

Alarms & Supervisory Devices

VSR-SG

VANE TYPE WATERFLOW ALARM SWITCH WITH RETARD AND GLUE-IN UNION

POTTER The Symbol of Protection

FOR CPVC PIPE

UL, CUL and CSFM Listed, CE Marked

Service Pressure: Up to 175 PSI (12,07 BAR)

Flow Sensitivity Range for Signal: 4-10 GPM (15-38 LPM) - UL

Maximum Surge: 18 FPS (5.5 m/s)

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

Conduit Entrances: Two openings provided for 1/2" conduit. Individual switch compartments suitable for dissimilar voltages.

Environmental Specifications:

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

Specifications subject to change without notice.

Stock Number: 1144460

Optional: Cover Tamper Switch Kit, stock no. 0090148

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

Service Use:

British Standard	B59251
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

CAUTION

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

WARNING

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

General Information

The Model VSR-SG is a vane type waterflow switch for use on wet sprinkler systems using CPVC plastic fittings (manufactured by Tyco, Nibco, Victaulic, Ipex, and Spears Manufacturing Company) that use 1", 1 ¼", 1 ½", or 2" pipe sizes. It is equipped with a union to accommodate installation in confined spaces.

The VSR-SG contains two single pole, double throw, snap action switches and an adjustable, instantly recycling pneumatic retard. The switches are actuated when a flow of 10 GPM (38 LPM) or more occurs downstream of the switch. The flow condition must exist for a period of time necessary to overcome the selected retard period.

Enclosure

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

Installation (see Fig. 1, 3, and 5)

These switches may be mounted on horizontal or vertical pipe. On horizontal pipe they shall be installed on the top side of the pipe where they will be accessible. The switch should not be installed within 6" (15 cm) of a fitting which changes the direction of the waterflow or within 24" (60 cm) of a valve or drain. The unit has a 1" male fitting for gluing into a CPVC plastic tee.

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

Loosen the union nut and separate the 1" male fitting from the VSR-SG. Glue the 1" male fitting into the TEE following the TEE manufacturer's instructions for preparation and gluing of CPVC piping systems. (Note: The 1" male fitting must bottom out on the stop of the TEE for proper operation of the VSR-SG. See Fig. 1.) Wait 2 to 4 hours to allow the glue to dry before attaching the VSR-SG to the 1" male fitting. Select the proper paddle for the pipe size and type of TEE used. See Fig. 3 for instructions on how to change paddle. **Verify that the o-ring is properly positioned in its groove**. Hand tighten the nut on the union after orienting the switch in the appropriate direction to detect waterflow as shown in Fig. 5 & Fig. 7.

The vane must not rub the inside of the TEE or bind in any way. The stem should move freely when operated by hand.

CAUTION

Do not trim the paddle. Failure to follow these instructions may prevent the switch from operating and will void the warranty.

CAUTION

Do not over-tighten the union nut, hand tighten only. Use of a wrench may damage the union nut.

Testing

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

A method of testing the VSR-SG must be provided. The valve used for testing shall be easily reached and shall produce a minimum flow of 10 GPM to activate the switch. The discharge orifice shall be equal to the smallest sprinkler used in the system.

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

Fig. 1

Glue the 1" male fitting into the TEE following the TEE manufacturer's instructions for preparation and gluing of CPVC piping systems. Wait 2 to 4 hours to allow the glue to dry before attaching the VSR-SG to the 1" male fitting.

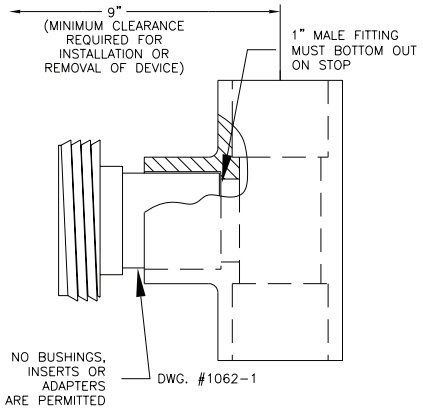


Fig. 2 Break out thin section of cover when wiring both switches from one conduit entrance.

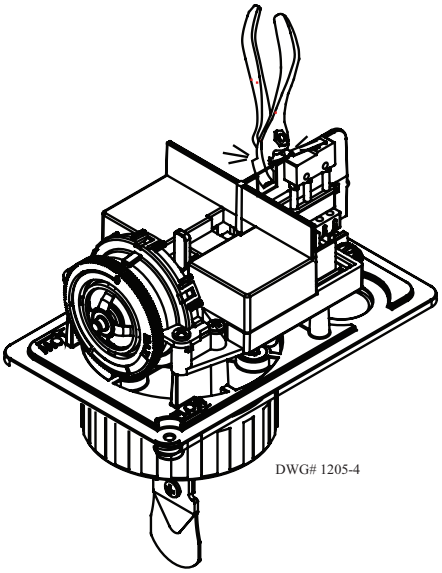
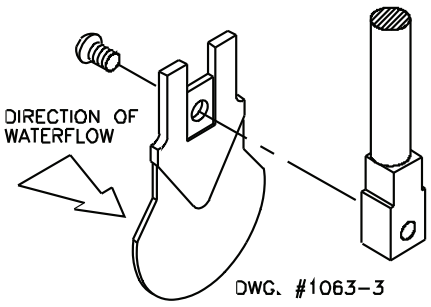


Fig. 3



Important:

11 paddles are furnished with each unit to accommodate the various sizes and manufacturers of TEES. *The paddles have raised lettering that show the pipe size and the TEE manufacturer they are to be used with. The proper paddle must be used.* The paddle must be properly attached (see Fig. 3) and the screw that holds the paddle must be securely tightened.

Fig. 4 Typical Electrical Connections

Notes:

1. The Model VSR-SG has two switches, one can be used to operate a central station, proprietary or remote signaling unit, while the other contact is used to operate a local audible or visual annunciator.
2. For supervised circuits, see "Switch Terminal Connections" drawing and warning note (Fig. 6).

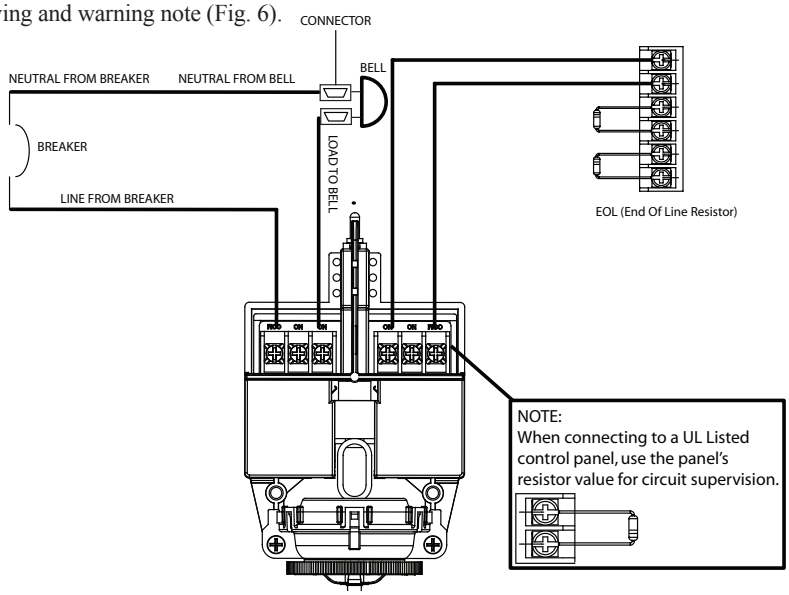


Fig. 5 Retard Adjustment

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

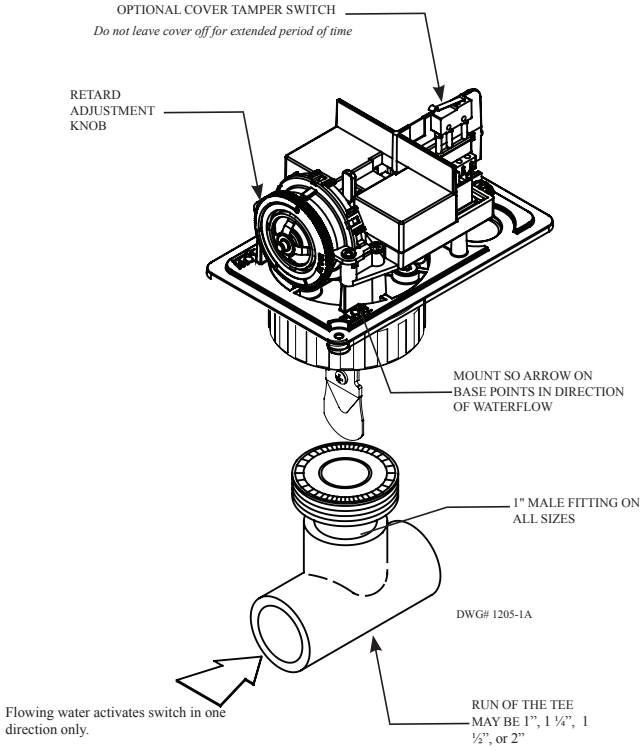
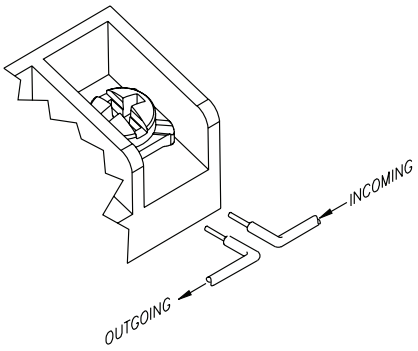


Fig. 6 Switch Terminal Connections Clamping Plate Terminal

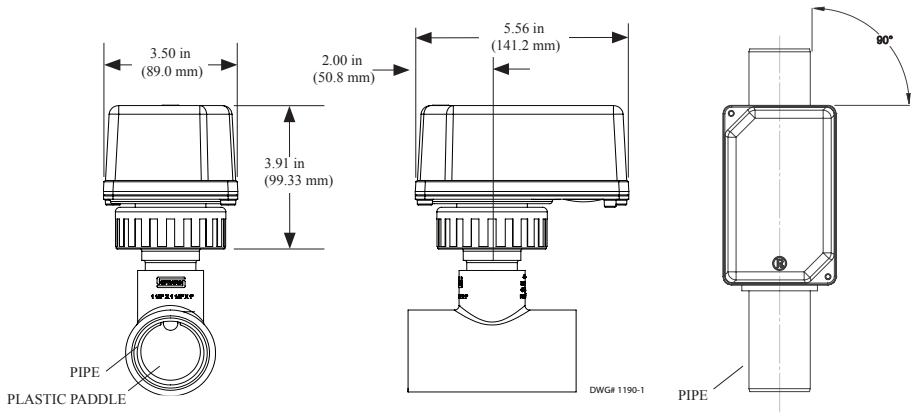


⚠ WARNING

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

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

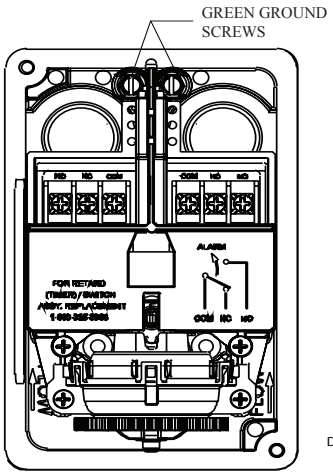
Fig. 7 Mounting Dimensions-Orientation



⚠ CAUTION

Flow switch must be properly orientated. Side of cover must be perpendicular with the pipe. Improper orientation could delay or prevent notification of waterflow.

Fig. 8



Maintenance

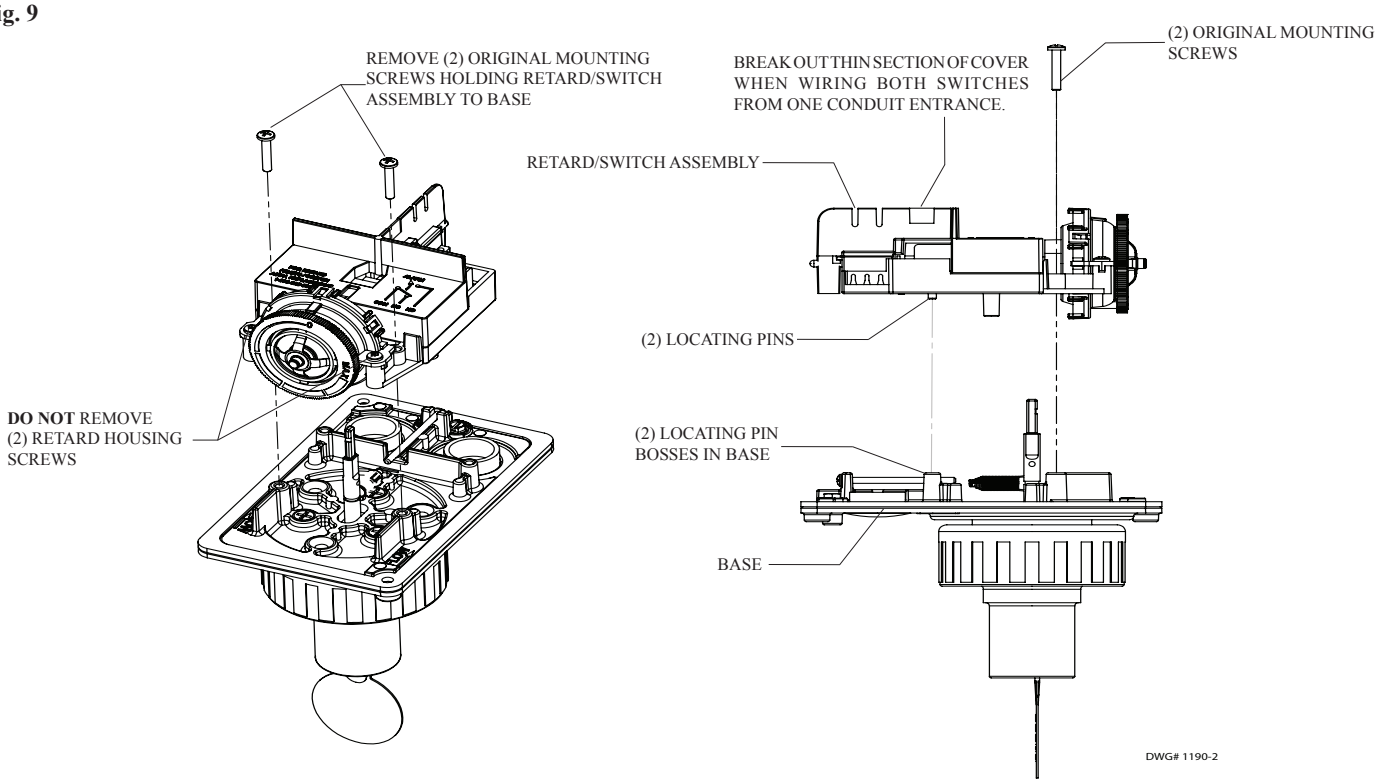
Inspect the waterflow switch monthly. If leaks are found, replace the waterflow switch. The VSR-SG waterflow switch should provide years of trouble-free service. The retard and switch assembly are easily field replaceable. In the unlikely event that either component does not perform properly, please order replacement retard switch assembly stock #1029030 (see Fig. 9). There is no maintenance required, only periodic testing and inspection.

Retard/Switch Assembly Replacement (See Fig. 9)

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

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

Fig. 9



Removal of Waterflow Switch

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

POTTER
The Symbol of Protection

BELLS

PBA-AC & PDC-DC

Features

- Listed for indoor and outdoor use
- Outdoor use requires BBK-1 or HC-BB weatherproof back box
- Indoor use mounts directly to standard 4” box
- Low current draw
- High dB output
- AC and DC models
- DC models are motor driven, polarized, and have built in transient protection for supervised alarm circuits
- Available in 6”, 8” and 10” sizes

UL, ULC*, FM** APPROVED

* ULC on PDC-DC Only
** FM on PBA-AC Only

Description

These vibrating type bells are designed for use as fire or general signaling devices. They have low power consumption and high decibel ratings. The unit mounts on a standard 4” (101mm) square electrical box for indoor use or on a model BBK-1 or HC-BB weatherproof backbox for outdoor applications. Weatherproof backbox model BBK-1 or HC-BB, Stock No. 1500001.

Notes

1. Minimum dB ratings are calculated from integrated sound pressure measurements made at Underwriters Laboratories as specified in UL Standard 464. UL temperature range is -30° to 150°F (-34° to 66°C)
2. Typical dB ratings are calculated from measurements made with a conventional sound level meter and are indicative of output levels in an actual installation.
3. ULC only applies to PDC-DC bells.

Size inches (mm)	Voltage	Model Number	Stock Number	Current (Max.)	Typical dB at 10 ft. (3m) (2)	Minimum dB at 10 ft. (3m) (1)
6 (150)	12VDC	PDC-6-12	1750500	200mA	96	76
8 (200)	12VDC	PDC-8-12	1750502	.200mA	96	77
10 (250)	12VDC	PDC-10-12	1750504	.200mA	96	78
6 (150)	24VDC	PDC-6-24	1750501	.20mA	95	77
8 (200)	24VDC	PDC-8-24	1750503	20mA	83	79
10 (250)	24VDC	PDC-10-24	1750505	20mA	85	80
6 (150)	24VAC	PBA246	1806024*	.17A	91	78
8 (200)	24VAC	PBA248	1808024*	.17A	94	77
10 (250)	24VAC	PBA2410	1810024*	.17A	94	78
6 (150)	120VAC	PBA1206	1806120*	.05A	92	83
8 (200)	120VAC	PBA1208	1808120*	.05A	99	84
10 (250)	120VAC	PBA12010	1810120*	.05A	99	86

All DC bells are polarized and have built-in transient protection. * Does not have ULC listing.

Technical Specifications

Dimensions	6” (150mm), 8” (200mm) and 10” (250mm)
Enclosure	Cover: Steel Finish: Red Powder Coat Base: non-corrosive composite material All parts have corrosion resistant finishes Model BBK-1 or HC-BB weatherproof backbox (optional)
Voltages Available	24VAC 120VAC 12VDC (10.2 to 15.6) Polarized 24VDC (20.4 to 31.2) Polarized
Environmental Limitations	Indoor or outdoor use (See Note 1) -40° to 150°F (-40° to 66°C) (Outdoor use requires weatherproof backbox.)
Termination	AC Bells - 4 No. 18 AWG stranded wires DC Bells - 18 AWG stranded wire
Service Use	NFPA 13, 72, local AHJ

*Specifications subject to change without notice.

⚠ WARNING

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

⚠ WARNING

In outdoor or wet installations, bell must be mounted with weatherproof backbox, BBK-1 or HC-BB. Standard electrical boxes will not provide a weatherproof enclosure. If the bell and/or assembly is exposed to moisture, it may fail or create an electrical hazard.

Installation

The bell shall be installed in accordance with NFPA 13, 72, or local AHJ. The top of the device shall be no less than 90" AFF and not less than 6" below the ceiling.

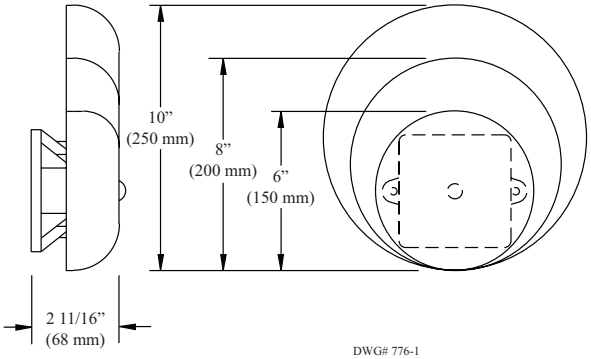
1. Remove the gong.
2. Connect wiring (see Fig. 3).
3. Mount bell mechanism to backbox (bell mechanism must be mounted with the striker pointing down).
4. Reinstall the gong (be sure that the gong positioning pin, in the mechanism housing, is in the hole in the gong).
5. Test all bells for proper operation and observe that they can be heard where required (bells must be heard in all areas as designated by the authority having jurisdiction).

⚠ WARNING

Failure to install striker down will prevent bell from ringing.

Bell Dimension Inches (mm)

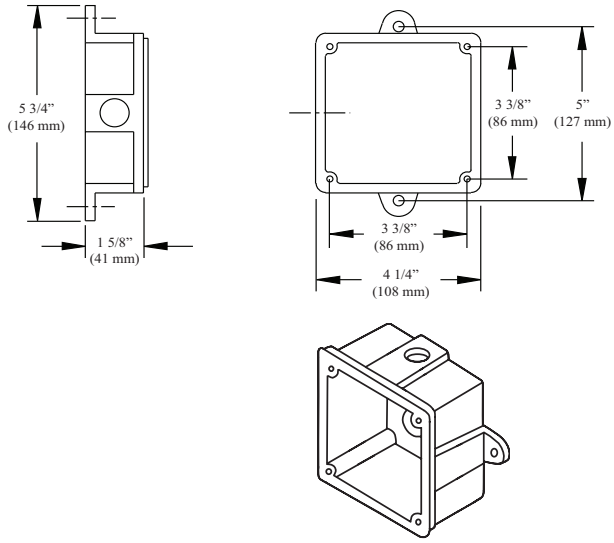
Fig 1



Weatherproof Backbox Dimensions Inches (mm)

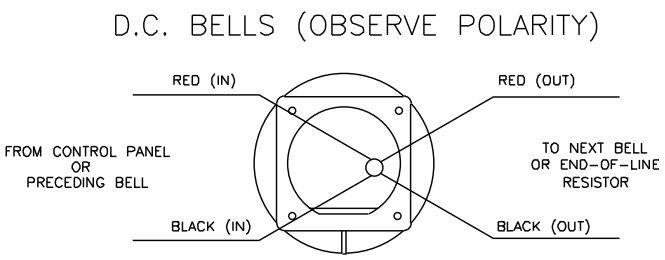
MODEL BBK-1 OR HC-BB

Fig 2



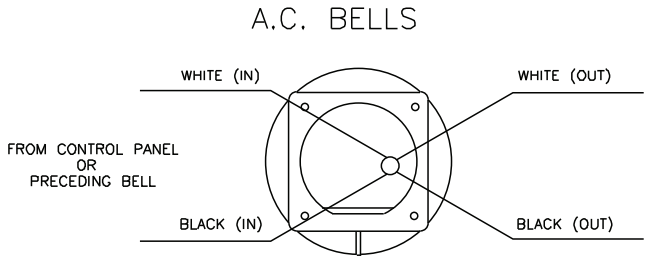
Wiring Rear View

Fig 3



NOTES:

1. OBSERVE POLARITY TO RING D.C. BELLS.
2. RED WIRES POSITIVE (+).
3. BLACK WIRES NEGATIVE (-).
4. EOL RESISTOR IS SUPPLIED BY FIRE ALARM CONTROL PANEL.



NOTES:

1. WHEN USING A.C. BELLS, TERMINATE EACH EXTRA WIRE SEPERATELY AFTER LAST BELL.
2. END-OF-LINE RESISTOR IS NOT REQUIRED ON AC BELLS .

SECTION 5

Sprinklers

RAPID RESPONSE Series LFII Residential 4.9 K-factor Concealed Pendent Sprinkler Flat Plate, Wet Pipe and Dry Pipe Systems

General Description

The TYCO RAPID RESPONSE Series LFII Residential 4.9K Concealed Pendent Sprinklers (TY3596) are decorative, fusible solder sprinklers, available in both ordinary 160°F (71°C) and intermediate 212°F (100°C) temperature rated configurations. They are designed for use in residential occupancies such as homes, apartments, dormitories, and hotels.

The cover plate assembly conceals the sprinkler operating components above the ceiling. The flat profile of the cover plate provides the optimum aesthetically appealing sprinkler design. In addition, the concealed design of the Series LFII Residential Concealed Pendent Sprinklers provides 1/2 in. (12,7 mm) vertical adjustment. This adjustment provides a measure of flexibility when cutting fixed sprinkler drops.

The Series LFII Residential Concealed Pendent Sprinklers are intended for use in the following scenarios:

- Wet and dry pipe residential sprinkler systems for one and two family dwellings and mobile homes per NFPA 13D
- Wet and dry pipe residential sprinkler systems for residential occupancies up to and including four stories in height per NFPA 13R
- Wet and dry pipe sprinkler systems for the residential portions of any occupancy per NFPA 13

The Series LFII Residential Concealed Pendent Sprinklers have been designed with heat sensitivity and water distribution characteristics proven to help in the control of residential fires and to improve the chance for occupants to escape or be evacuated.

The Series LFII Residential Concealed Pendent Sprinklers (TY3596) are shipped with a Disposable Protective Cap. The Protective Cap is temporarily removed for installation, and then it can be replaced to help protect the sprinkler while the ceiling is being installed or finished. The tip of the Protective Cap can also be used to mark the center of the ceiling hole into the plaster board, ceiling tiles, and so on, by gently pushing the ceiling product against the Protective Cap. When the ceiling installation is complete the Protective Cap is removed and the Cover Plate Assembly is installed.

Dry Pipe System Application

The 160°F (71°C) temperature rated Series LFII Residential Concealed Pendent Sprinklers offer a laboratory approved option for designing dry pipe residential sprinkler systems, whereas, most residential sprinklers are laboratory approved for wet systems only.

Through extensive testing, it has been determined that the number of design sprinklers (hydraulic design area) for the Series LFII Residential Concealed Pendent Sprinklers need not be increased over the number of design sprinklers (hydraulic design area) as specified for wet pipe sprinkler systems, as is accustomed for density/area sprinkler systems designed per NFPA 13.

IMPORTANT

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

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

Consequently, the Series LFII Residential Concealed Pendent Sprinklers offer the features of non-water filled pipe in addition to not having to increase the number of design sprinklers (hydraulic design area) for systems designed to NFPA 13, 13D, or 13R.

NOTICE

The Series LFII Residential Concealed Pendent Sprinklers (TY3596) described herein must be installed and maintained in compliance with this document and with the applicable standards of the NATIONAL FIRE PROTECTION ASSOCIATION (NFPA), in addition to the standards of any authorities having jurisdiction. Failure to do so may impair the performance of these devices.

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

Sprinkler Identification Number (SIN)

TY3596

Technical Data

Approvals
UL and C-UL Listed
NYC Approved under MEA 44-03-E-2NSF
Certified to all requirements of
NSF/ANSI 61
Australian WaterMark Certified

The TYCO RAPID RESPONSE Series LFII Residential Concealed Pendent Sprinklers are Listed only when installed with LFII Concealed Cover Plates having factory-applied finishes.

Sprinklers and Cover Plates are separately ordered. See the Ordering Procedure section for more information.

Maximum Working Pressure
175 psi (12,1 bar)

Discharge Coefficient
K=4.9 GPM/psi½ (70,6 LPM/bar½)

Temperature Rating

Ordinary
160°F (71°C) Sprinkler/
139°F (59°C) Cover Plate

NOTE: Maximum Ambient Ceiling Temperature for the ordinary temperature configuration is 100°F (38°C)

Intermediate*
212°F (100°C) Sprinkler/
165°F (74°C) Cover Plate

*For wet pipe systems only
NOTE: Maximum Ambient Ceiling Temperature for the intermediate temperature configuration is 150°F (65°C)

Vertical Adjustment
1/2 in. (12,7 mm)

Finishes
See the Ordering Procedure section

Physical Characteristics

Body	Brass
Cap	Bronze
Saddle	Brass
Sealing Assembly	Beryllium Nickel w/TEFLON
Soldered Link Halves	Nickel
Lever	Bronze
Compression Screw	Brass
Deflector	Copper or Brass
Guide Pin Housing	Bronze
Guide Pins	Stainless Steel or Bronze
Support Cup	Steel
Cover Plate	Copper/Brass**
Retainer	Copper
Cover Plate Ejection Spring	Stainless Steel

** Brass Cover Plate is offered for Intermediate Temperature 165°F (74°C) only.

Operation

When exposed to heat from a fire, the Cover Plate, which is normally soldered to the Retainer at three points, falls away to expose the sprinkler assembly. At this point the Deflector supported by the Arms drops down to its operated position. The fusible link of the sprinkler assembly is comprised of two link halves that are soldered together with a thin layer of solder. When the rated temperature is reached, the solder melts and the two link-halves separate allowing the sprinkler to activate and flow water.

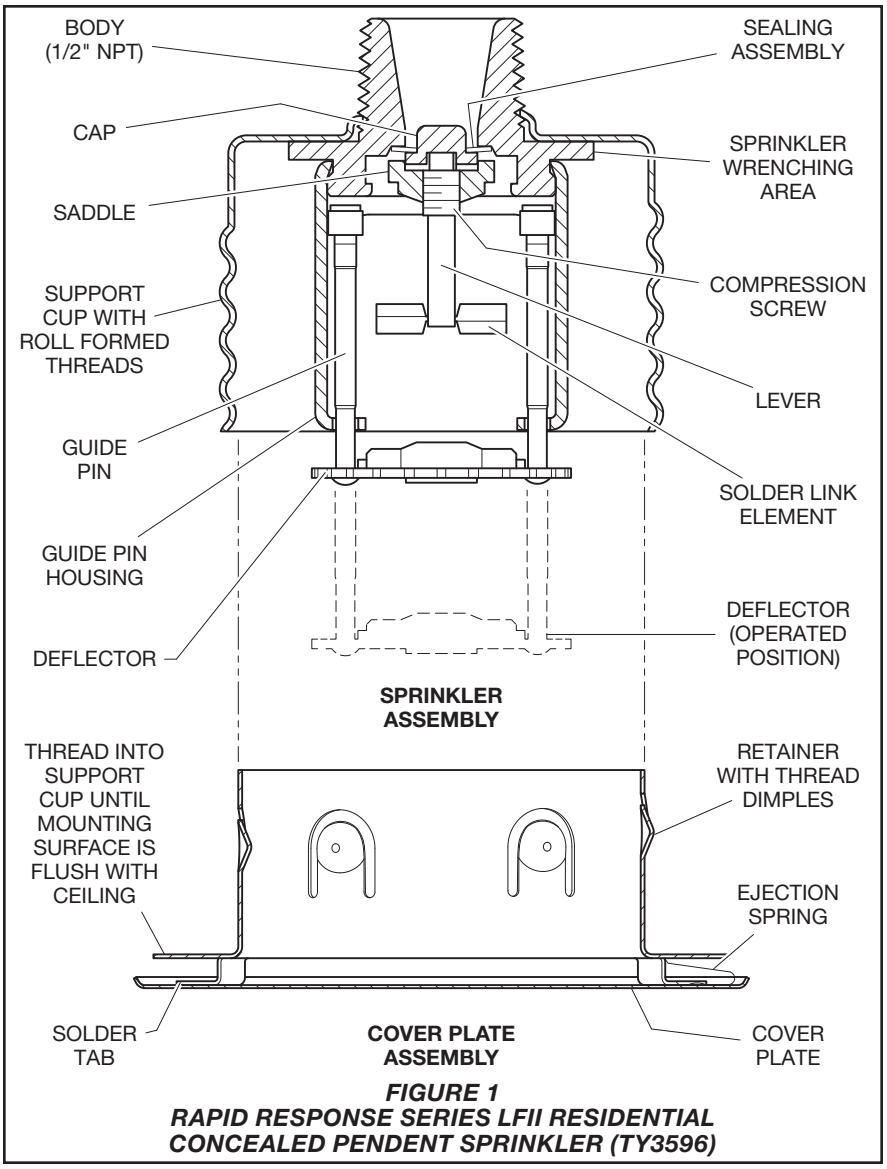


FIGURE 1
RAPID RESPONSE SERIES LFII RESIDENTIAL CONCEALED PENDENT SPRINKLER (TY3596)

Design Criteria

The TYCO RAPID RESPONSE Series LFII Residential Concealed Pendent Sprinklers (TY3596) are UL and C-UL Listed for installation in accordance with this section.

Note: *When conditions exist that are outside the scope of the provided criteria, refer to the Residential Sprinkler Design Guide TFP490 for the manufacturer's recommendations that may be acceptable to the authority having jurisdiction.*

System Types
Per the UL and C-UL Listing, the 160°F (71°C) and 212°F (100°C) LFII Residential Concealed Pendent Sprinklers may be utilized in wet pipe systems. Only the 160°F (71°C) LFII Residential Concealed Pendent Sprinklers may be utilized in dry pipe systems, per the UL and C-UL Listing.

Refer to Technical Data Sheet TFP485 about the use of residential sprinklers in residential dry pipe systems.

Ceiling Types
Smooth flat horizontal, beamed, or sloped in accordance with NFPA 13D, 13R, or 13 as applicable.

Hydraulic Design
(NFPA 13D and 13R)
For systems designed to NFPA 13D or NFPA 13R, the minimum required sprinkler flow rates are given in Tables A and B as a function of temperature rating and the maximum allowable coverage areas.

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.

Maximum Coverage Area [1] ft x ft (m x m)	Maximum Spacing ft (m)	WET PIPE SYSTEM Minimum Flow and Residual Pressure [2, 3]				
		Temp. Rating 160°F (71°C), 212°F (100°C)		Deflector to Ceiling	Installation Type	Minimum Spacing ft (m)
		Flow GPM (LPM)	Pressure psi (bar)			
12 x 12 (3,7 x 3,7)	12 (3,7)	13 (49,2)	7.0 (0,48)	Smooth Ceilings 7/8 to 1-1/8 in. Beamed Ceilings per NFPA 13D or 13R, or 13. Installed in beam 7/8 to 1-1/8 in. below bottom of beam	Concealed	8 (2,4)
14 x 14 (4,3 x 4,3)	14 (4,3)	13 (49,2)	7.0 (0,48)			
16 x 16 (4,9 x 4,9)	16 (4,9)	13 (49,2)	7.0 (0,48)			
18 x 18 (5,5 x 5,5)	18 (5,5)	17 (64,3)	12.0 (0,83)			
20 x 20 (6,1 x 6,1)	20 (6,1)	20 (75,7)	16.7 (1,15)			

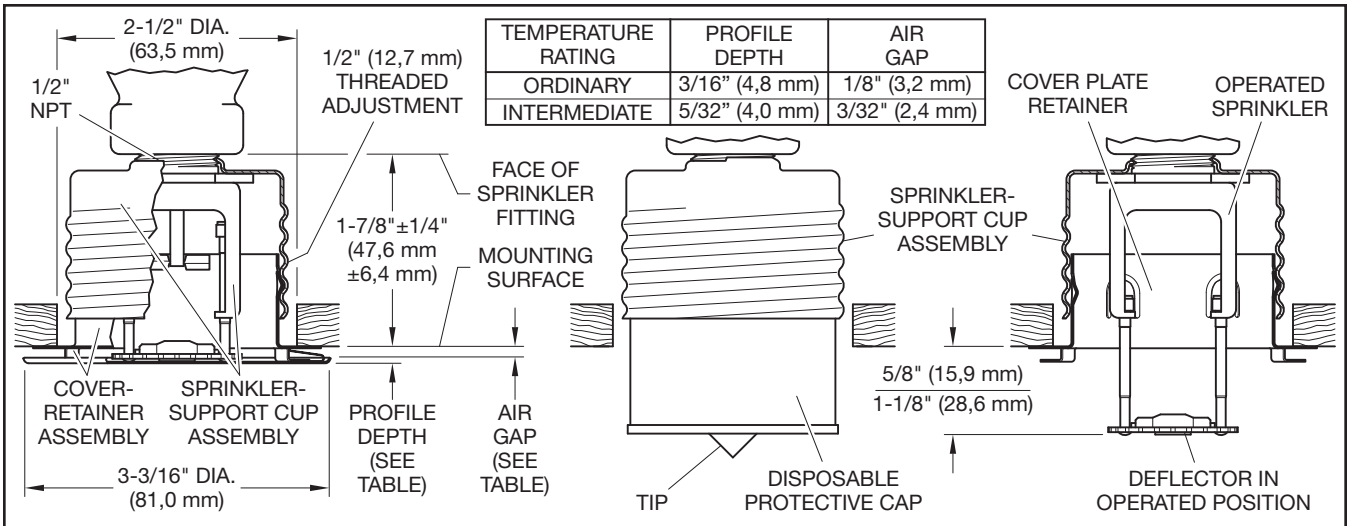
Notes:
1. For coverage area dimensions less than or between those indicated, use the minimum required flow for the next highest coverage area for which hydraulic design criteria are stated.
2. Requirement is based on minimum flow in GPM (LPM) from each sprinkler. The associated residual pressures are calculated using the nominal K-factor. See Hydraulic Design under the Design Criteria section.
3. For NFPA 13 residential applications, the greater of 0.1 GPM/ft² over the design area or the flow in accordance with the criteria in this table must be used.

TABLE A
WET PIPE SYSTEM
SERIES LFII RESIDENTIAL 4.9 K-FACTOR FLAT PLATE CONCEALED PENDENT SPRINKLER (TY3596)
NFPA 13D, 13R, AND 13 HYDRAULIC DESIGN CRITERIA

Maximum Coverage Area [1] ft x ft (m x m)	Maximum Spacing ft (m)	DRY PIPE SYSTEM Minimum Flow and Residual Pressure [2, 3]				
		Ordinary Temp. Rating 160°F (71°C)		Deflector to Ceiling	Installation Type	Minimum Spacing ft (m)
		Flow GPM (LPM)	Pressure psi (bar)			
12 x 12 (3,7 x 3,7)	12 (3,7)	13 (49,2)	7.0 (0,48)	Smooth Ceilings 7/8 to 1-1/8 in. Beamed Ceilings per NFPA 13D or 13R, or 13. Installed in beam 7/8 to 1-1/8 in. below bottom of beam	Concealed	8 (2,4)
14 x 14 (4,3 x 4,3)	14 (4,3)	14 (53,0)	8.2 (0,57)			
16 x 16 (4,9 x 4,9)	16 (4,9)	15 (56,8)	9.4 (0,65)			
18 x 18 (5,5 x 5,5)	18 (5,5)	18 (68,1)	13.5 (0,93)			
20 x 20 (6,1 x 6,1)	20 (6,1)	21 (79,5)	18.4 (1,27)			

Notes:
1. For coverage area dimensions less than or between those indicated, use the minimum required flow for the next highest coverage area for which hydraulic design criteria are stated.
2. Requirement is based on minimum flow in GPM (LPM) from each sprinkler. The associated residual pressures are calculated using the nominal K-factor. See Hydraulic Design under the Design Criteria section.
3. For NFPA 13 residential applications, the greater of 0.1 GPM/ft² over the design area or the flow in accordance with the criteria in this table must be used.

TABLE B
DRY PIPE SYSTEM
RAPID RESPONSE SERIES LFII RESIDENTIAL 4.9 K-FACTOR FLAT PLATE CONCEALED PENDENT (TY3596)
NFPA 13D, 13R, AND 13 HYDRAULIC DESIGN CRITERIA



TEMPERATURE RATING	PROFILE DEPTH	AIR GAP
ORDINARY	3/16" (4,8 mm)	1/8" (3,2 mm)
INTERMEDIATE	5/32" (4,0 mm)	3/32" (2,4 mm)

FIGURE 2
RAPID RESPONSE SERIES LFII RESIDENTIAL CONCEALED PENDENT SPRINKLER (TY3596)
INSTALLATION DIMENSIONS, PROTECTIVE CAP, AND ACTIVATED DEFLECTOR

The number of "design sprinklers" specified in NFPA 13D and 13R for wet pipe systems is to be applied when designing dry pipe systems.

Hydraulic Design (NFPA 13)
For systems designed to 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 Tables A and B as a function of temperature rating and the maximum allowable coverage area
- A minimum discharge of 0.1 GPM/ft^2 over the design area comprised of the four most hydraulically demanding sprinklers for actual coverage areas protected by the four sprinklers

The number of design sprinklers specified in NFPA 13 for wet pipe systems is to be applied when designing dry pipe systems.

Dry Pipe System Water Delivery
When using the Series LFII Residential Concealed Pendent Sprinklers in dry pipe sprinkler systems, the time for water delivery must not exceed 15 seconds for the most remote operating sprinkler.

Obstruction to Water Distribution
Sprinklers are to be located in accordance with the obstruction rules of NFPA 13D, 13R, and 13 as applicable for residential sprinklers as well as with the obstruction criteria described within the Technical Data Sheet TFP490.

Operational Sensitivity
The sprinklers are to be installed relative to the ceiling mounting surface as shown in Figure 2.

Sprinkler Spacing
The minimum spacing between sprinklers is 8 ft (2,4 m). The maximum spacing between sprinklers cannot exceed the length of the coverage area (see Table A or B) being hydraulically calculated, for example, maximum 12 ft for a 12 ft x 12 ft coverage area, or 20 ft for a 20 ft x 20 ft coverage area.

The Series LFII must not be used in applications where the air pressure above the ceiling is greater than that below. Down drafts through the Support Cup could delay sprinkler operation in a fire situation.

Installation

The TYCO RAPID RESPONSE Series LFII Residential Concealed Pendent Sprinklers (TY3596) must be installed in accordance with this section.

General Instructions
Damage to the fusible Link Assembly during installation can be avoided by handling the sprinkler by the support cup only. Therefore, do not apply pressure to the fusible Link Assembly.

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

Do not attempt to compensate for insufficient adjustment in the Cover Plate Assembly by under-or over-tightening the Sprinkler. Readjust the position of the sprinkler fitting to suit.

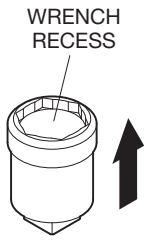


FIGURE 3
W-TYPE 18
SPRINKLER WRENCH

Step 1. The sprinkler must only be installed in the pendent position and with the centerline of the sprinkler perpendicular to the mounting surface.

Step 2. Remove the Protective Cap.

Step 3. With pipe thread sealant applied to the pipe threads, and using the W-Type 18 Wrench shown in Figure 3, install and tighten the Sprinkler/ Support Cup Assembly into the fitting. The W-Type 18 Wrench will accept a 1/2 in. ratchet drive.

Step 4. Replace the Protective Cap by pushing it upwards until it bottoms out against the Support Cup. The Protective Cap helps prevent damage to the Deflector and Guide Pins during ceiling installation and/or during application of the finish coating of the ceiling. It may also be used to locate the center of the clearance hole by gently pushing the ceiling material against the center point of the Cap.

Note: *As long as the protective Cap remains in place, the system is considered to be "Out Of Service."*

Step 5. After the ceiling has been completed with the 2-1/2 in. (63 mm) diameter clearance hole and in preparation for installing the Cover Plate Assembly, remove and discard the Protective Cap, and verify that the Deflector moves up and down freely.

If the sprinkler has been damaged and the Deflector does not move up and down freely, replace the entire sprinkler assembly. Do not attempt to modify or repair a damaged sprinkler.

Step 6. Push on the Cover Plate Assembly until its flange comes in contact with the ceiling.

Do not continue to push on the Cover Plate Assembly such that it lifts a ceiling panel out of its normal position.

If the Cover Plate Assembly cannot be engaged with the Mounting Cup or the Cover Plate Assembly cannot be engaged sufficiently to contact the ceiling, the Sprinkler Fitting must be repositioned.

Care and Maintenance

The TYCO RAPID RESPONSE Series LFII Residential Concealed Pendent Sprinklers (TY3596) must be maintained and serviced in accordance with this section.

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

Absence of a Cover Plate may delay the sprinkler operation in a fire situation.

When properly installed, there is an air gap between the lip of the Cover Plate and the ceiling. The Ordinary Temperature Cover Plate assembly has a nominal 1/8 in. (3,2 mm) air gap. The Intermediate Temperature Cover Plate has a nominal 3/32 (2,4 mm) air gap, as shown in Figure 2. This air gap is necessary for proper operation of the sprinkler by allowing heat flow from a fire to pass below and above the Cover Plate to help assure appropriate release of the Cover Plate in a fire situation. If the ceiling is to be repainted after the installation of the Sprinkler, care must be exercised to ensure that the new paint does not seal off any of the air gap.

Factory painted Cover Plates must not be repainted. They should be replaced, if necessary, by factory painted units. Non-factory applied paint may adversely delay or prevent sprinkler operation in the event of a fire.

Do not pull the Cover Plate relative to the Enclosure. Separation may result.

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

Automatic sprinklers must never be painted, plated, coated, or otherwise altered after leaving the factory. Modified or over heated sprinklers must be replaced.

Care must be exercised to avoid damage before, during, and after installation. Sprinklers damaged by dropping, striking, wrench twist/slippage, or the like, must be replaced.

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

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

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

Limited Warranty

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

Ordering Procedure

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

Sprinkler Assemblies
Specify: Series LFII (TY3596) 4.9K Residential Concealed Pendent Sprinkler, P/N (specify):

160°F (71°C). 51-112-1-160
212°F (100°C). 51-112-1-212

Note: *Sprinkler and Cover Plates are separately sold. See below for Cover Plate ordering information.*

Cover Plate Assemblies
Specify: LFII Concealed Sprinkler Cover Plate Assembly, temperature rating (specify), (specify) finish, P/N (specify):

139°F (59°C)
Ivory (RAL1015) 56-204-0-135
Bright Chrome 56-204-1-135
Beige (RAL1001) 56-204-2-135
Pure White (RAL9010)* 56-204-3-135
Signal White (RAL9003)** 56-204-4-135
Grey White (RAL9002). 56-204-5-135
Brown (RAL8028). 56-204-6-135
Black (RAL9005) 56-204-7-135
Brushed Brass 56-204-8-135
Brushed Chrome 56-204-9-135
Custom Paint 56-204-X-135

165°F (74°C)
Ivory (RAL1015) 56-204-0-165
Bright Chrome 56-204-1 165
Beige (RAL1001) 56-204-2-165
Pure White (RAL9010)* 56-204-3-165
Signal White (RAL9003)** 56-204-4-165
Grey White (RAL9002). 56-204-5-165
Brown (RAL8028). 56-204-6-165
Black (RAL9005) 56-204-7-165
Brushed Brass 56-204-8-165
Brushed Chrome 56-204-9-165
Custom Paint 56-204-X-165

*Eastern Hemisphere sales only
**Previously known as Bright White

Note: *All Custom Cover Plates are painted using SHERWIN-WILLIAMS Interior Latex Paint. Contact Johnson Controls Customer Service with any questions related to custom orders.*

Sprinkler Wrench
Specify: W-Type 18 Sprinkler Wrench, P/N 56-000-1-265

1400 Pennbrook Parkway, Lansdale, PA 19446 | Telephone +1-215-362-0700

Johnson Controls

RAPID RESPONSE Series LFII Residential Sprinklers 4.4 K-factor Horizontal Sidewall Wet Pipe Systems

General Description

The TYCO RAPID RESPONSE Series LFII Residential Horizontal Sidewall Sprinklers (TY2334) are decorative, fast response, frangible bulb sprinklers designed for use in residential occupancies such as homes, apartments, dormitories, and hotels. When aesthetics and optimized flow characteristics are the major consideration, the Series LFII Residential Sprinklers (TY2334) should be the first choice.

The Series LFII Residential Sprinklers are intended for use in the following scenarios:

- wet pipe residential sprinkler systems for one-and two-family dwellings and mobile homes per NFPA 13D
- wet pipe residential sprinkler systems for residential occupancies up to and including four stories in height per NFPA 13R
- wet pipe sprinkler systems for the residential portions of any occupancy per NFPA 13

The recessed version of the Series LFII Residential Sprinklers is intended for use in areas with finished walls. It employs a two-piece Style 20 Recessed Escutcheon. The Recessed Escutcheon provides 1/4 in. (6,4 mm) of recessed adjustment or up to 1/2 in. (12,7 mm) of total adjustment from the flush mounting surface position. The adjustment provided by the Recessed Escutcheon reduces the accuracy to which the pipe nipples to the sprinklers must be cut.

The Series LFII Residential Sprinklers has been designed with heat sensitivity and water distribution characteristics proven to help in the control of residential fires and to improve the chance for occupants to escape or be evacuated.

Corrosion-resistant coatings, where applicable, are utilized to extend the life of copper alloy sprinklers beyond that which would otherwise be obtained when exposed to corrosive atmospheres. Although corrosion-resistant coated sprinklers have passed the standard corrosion tests of the applicable Approval agencies, the testing is not representative of all possible corrosive atmospheres. Consequently, it is recommended that the end user be consulted with respect to the suitability of these coatings for any given corrosive environment. The effects of ambient temperature, concentration of chemicals, and gas/chemical velocity should be considered, as a minimum, along with the corrosive nature of the chemical to which the sprinklers will be exposed.

IMPORTANT

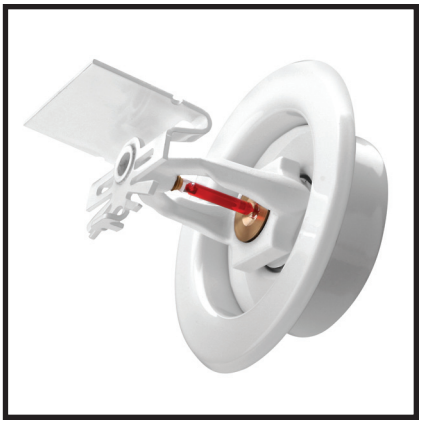
Refer to Technical Data Sheet TFP2300 for warnings pertaining to regulatory and health information.

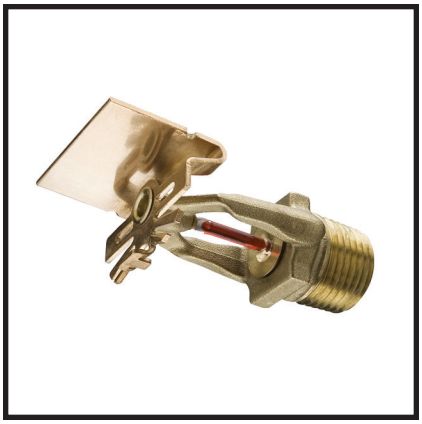
Always refer to Technical Data Sheet TFP700 for the "INSTALLER WARNING" that provides cautions with respect to handling and installation of sprinkler systems and components. Improper handling and installation can permanently damage a sprinkler system or its components and cause the sprinkler to fail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

NOTICE

The Series LFII Residential Horizontal Sidewall Sprinklers (TY2334) described herein must be installed and maintained in compliance with this document and with the applicable standards of the NATIONAL FIRE PROTECTION ASSOCIATION (NFPA), in addition to the standards of any authorities having jurisdiction. Failure to do so may impair the performance of these devices.

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





Certified to NSF/ANSI 61

Sprinkler Identification Number (SIN)

TY2334

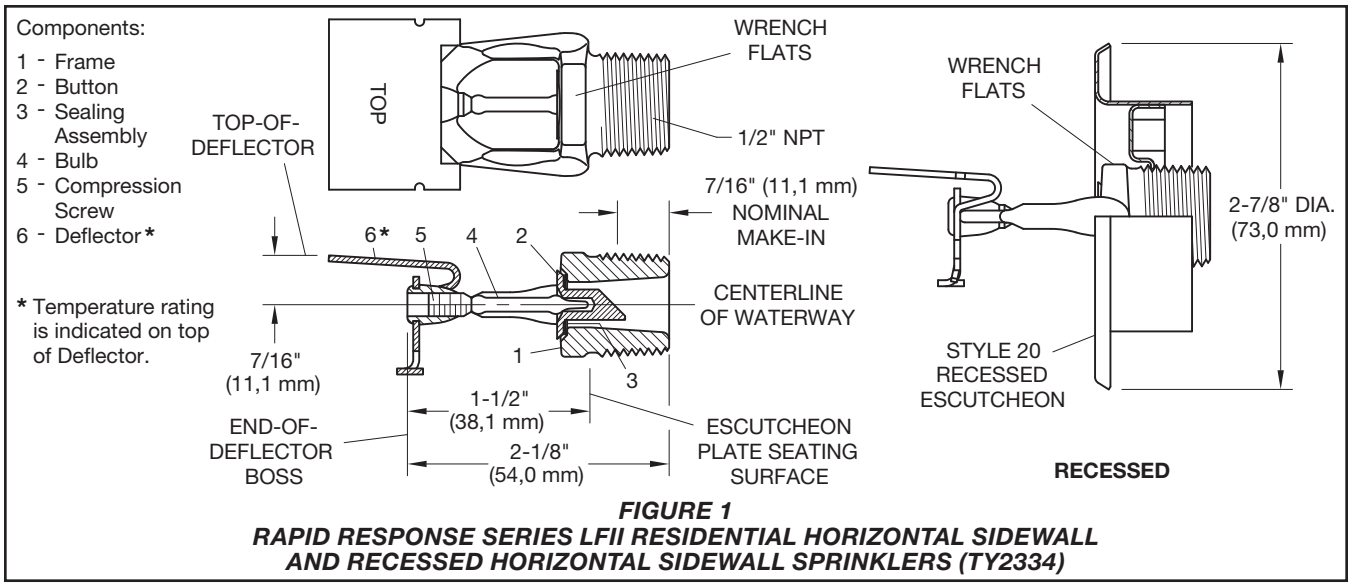


FIGURE 1
RAPID RESPONSE SERIES LFII RESIDENTIAL HORIZONTAL SIDEWALL AND RECESSED HORIZONTAL SIDEWALL SPRINKLERS (TY2334)

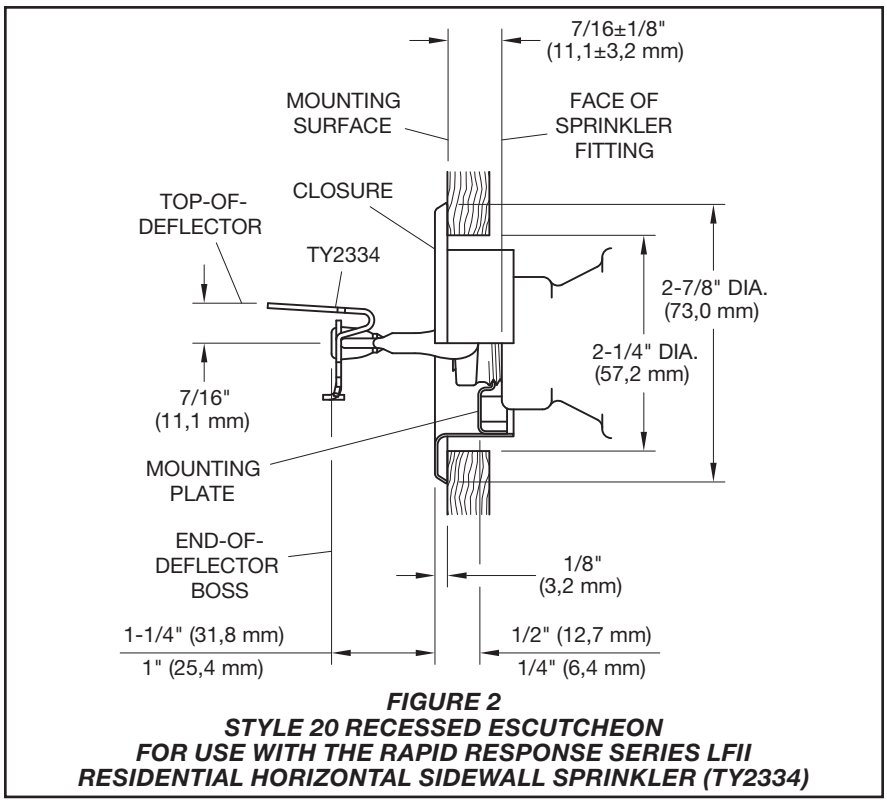


FIGURE 2
STYLE 20 RECESSED ESCUTCHEON FOR USE WITH THE RAPID RESPONSE SERIES LFII RESIDENTIAL HORIZONTAL SIDEWALL SPRINKLER (TY2334)

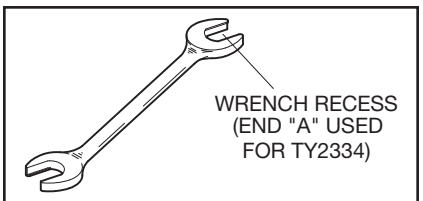


FIGURE 3
W-TYPE 6
SPRINKLER WRENCH

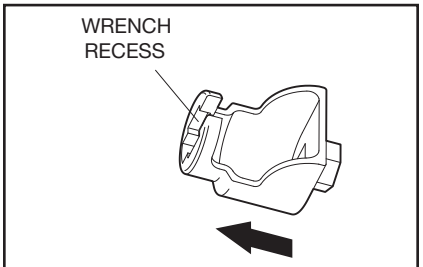


FIGURE 4
W-TYPE 7 RECESSED
SPRINKLER WRENCH

Technical Data

Approvals
UL and C-UL Listed
Certified to all requirements of NSF/ANSI 61
Australian WaterMark Certified

Note: *Sprinklers with a polyester finish are UL Listed as corrosion-resistant sprinklers.*

See the Design Criteria section for details on these approvals.

Maximum Working Pressure
Maximum 175 psi (12,1 bar)

Discharge Coefficient
K= 4.4 GPM/psi½ (63,4 LPM/bar½)

Temperature Rating
155°F (68°C) or 175°F (79°C)

Finishes
Natural Brass, Signal White Polyester Coated, or Chrome Plated

Physical Characteristics

Frame	Brass
Button	Bronze
Sealing Assembly	Beryllium Nickel w/ TEFLON
Bulb	3 mm Glass
Compression Screw	Bronze
Deflector	Copper

Operation

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

Design Criteria

The TYCO RAPID RESPONSE Series LFII (TY2334) Residential Horizontal Sidewall Sprinklers are UL and C-UL Listed for installation in accordance with this section.

Residential Sprinkler Design Guide
When conditions exist that are outside the scope of the provided criteria, refer to the Residential Sprinkler Design Guide TFP490 for the manufacturer's recommendations that may be acceptable to the local authority having jurisdiction.

System Type
Only wet pipe systems may be utilized.

Ceiling Type
Smooth flat horizontal, or beamed, or sloped, in accordance with the 2013 Edition of NFPA 13D, 13R, or 13 as applicable.

Hydraulic Design (NFPA 13D and 13R)
For systems designed to NFPA 13D or NFPA 13R, the minimum required sprinkler flow rate are given in Table A as a function of temperature rating and the maximum allowable coverage areas. 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.

Hydraulic Design (NFPA 13)
For systems designed to 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 Table A as a function of temperature rating and the maximum allowable coverage area.
- A minimum discharge of 0.1 gpm/ft^2 over the "design area" comprised of the four most hydraulically demanding sprinklers for the actual coverage areas being protected by the four sprinklers.

Obstruction to Water Distribution
Sprinklers are to be located in accordance with the obstruction rules of NFPA 13D, 13R, and 13 as applicable for residential sprinklers as well as with the obstruction criteria described within the Technical Data Sheet TFP490.

Operational Sensitivity
The sprinklers are to be installed with an end of defector-boss to wall distance of 1-1/8 in. to 6 in.

In addition the top-of-deflector-to-ceiling distance is to be within the range (see Table A) being hydraulically calculated.

Sprinkler Spacing
The minimum spacing between sprinklers is 8 ft (2,4 m). The maximum spacing between sprinklers cannot exceed the width of the coverage area (see Table A) being hydraulically calculated, for example, maximum 12 ft for a 12 ft x 12 ft coverage area, or 16 ft for a 16 ft x 20 ft coverage area.

Installation

The TYCO RAPID RESPONSE Series LFII (TY2334) Residential Horizontal Sidewall Sprinklers must be installed in accordance with this section.

General Instructions
Do not install any bulb-type sprinkler if the bulb is cracked or there is a loss of liquid from the bulb. With the sprinkler held horizontally, a small air bubble should be present. The diameter of the air bubble is approximately 1/16 in. (1,6 mm).

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

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

Series LFII Residential Horizontal Sidewall Sprinklers
The Series LFII Horizontal Sidewall Sprinklers must be installed in accordance with the following instructions.

Step 1. Horizontal sidewall sprinklers are to be installed in the horizontal position with their centerline of waterway perpendicular to the back wall and parallel to the ceiling. The word "TOP" on the Deflector is to face towards the ceiling with the front edge of the Deflector parallel to the ceiling.

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

Step 3. Tighten the sprinkler into the sprinkler fitting using only the W-Type 6 Sprinkler Wrench (see Figure 3). With reference to Figure 1, the W-Type 6 Sprinkler Wrench is to be applied to the wrench flats.

Series LFII Residential Recessed Horizontal Sidewall Sprinklers
The Series LFII Recessed Horizontal Sidewall Sprinklers must be installed in accordance with the following instructions.

Step A. Recessed horizontal sidewall sprinklers are to be installed in the horizontal position with their centerline of waterway perpendicular to the back wall and parallel to the ceiling. The word "TOP" on the Deflector is to face towards the ceiling.

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

Step C. Tighten the sprinkler into the sprinkler fitting using only the W-Type 7 Recessed Sprinkler Wrench (see Figure 4). With reference to Figure 1, the W-Type 7 Recessed Sprinkler Wrench is to be applied to the sprinkler wrench flats.

Step D. After the wall has been installed or the finish coat has been applied, slide on the Style 20 Closure over the Series LFII Sprinkler and push the Closure over the Mounting Plate until its flange comes in contact with the wall.

Max. Coverage Area [a] Width x Length [d] ft x ft (m x m)	Max. Spacing ft (m)	WET PIPE SYSTEM Minimum Flow and Residual Pressure[b, c]				Deflector to Ceiling	Installation Type	Minimum Spacing ft (m)
		Ordinary Temp. Rating 155°F (68°C)		Intermediate Temp. Rating 175°F (79°C)				
		Flow GPM (L/min)	Pressure PSI (bar)	Flow GPM (L/min)	Pressure PSI (bar)			
12 x 12 (3,7 x 3,7)	12 (3,7)	13 (49,2)	8.7 (0,60)	13 (49,2)	8.7 (0,60)	4 in. to 6 in.	Recessed using Style 20 Escutcheon or non-recessed per NFPA 13D, 13R, or 13	8 (2,4)
14 x 14 (4,3 x 4,3)	14 (4,3)	14 (53,0)	10.1 (0,70)	14 (53,0)	10.1 (0,70)			
16 x 16 (4,9 x 4,9)	16 (4,9)	16 (60,6)	13.2 (0,91)	16 (60,6)	13.2 (0,91)			
16 x 18 (4,9 x 5,5)	16 (4,9)	19 (71,9)	18.6 (1,28)	19 (71,9)	18.6 (1,28)			
16 x 20 (4,9 x 6,1)	16 (4,9)	23 (87,1)	27.3 (1,88)	23 (87,1)	27.3 (1,88)			
18 x 18 (5,5 x 5,5)	18 (5,5)	23 (87,1)	27.3 (1,88)	23 (87,1)	27.3 (1,88)			
18 x 20 (5,5 x 6,1)	18 (5,5)	26 (98,4)	34.9 (2,41)	26 (98,4)	34.9 (2,41)			
12 x 12 (3,7 x 3,7)	12 (3,7)	13 (49,2)	8.7 (0,60)	13 (49,2)	8.7 (0,60)	6 in. to 12 in.		
14 x 14 (4,3 x 4,3)	14 (4,3)	14 (53,0)	10.1 (0,70)	14 (53,0)	10.1 (0,70)			
16 x 16 (4,9 x 4,9)	16 (4,9)	17 (64,3)	14.9 (1,03)	17 (64,3)	14.9 (1,03)			
16 x 18 (4,9 x 5,5)	16 (4,9)	20 (75,7)	20.7 (1,43)	20 (75,7)	20.7 (1,43)			
16 x 20 (4,9 x 6,1)	16 (4,9)	23 (87,1)	27.3 (1,88)	23 (87,1)	27.3 (1,88)			
18 x 18 (5,5 x 5,5)	18 (5,5)	23 (87,1)	27.3 (1,88)	23 (87,1)	27.3 (1,88)			
18 x 20 (5,5 x 6,1)	18 (5,5)	26 (98,4)	34.9 (2,41)	26 (98,4)	34.9 (2,41)			

Notes:

a. For coverage area dimensions less than or between those indicated, use the minimum required flow for the next highest coverage area for which hydraulic design criteria are stated.

b. Requirement is based on minimum flow in GPM (LPM) from each sprinkler. The associated residual pressures are calculated using the nominal K-factor. See Hydraulic Design under the Design Criteria section.

c. For NFPA 13 residential applications, the greater of 0.1 gpm/ft^2 over the design area or the flow in accordance with the criteria in this table must be used.

d. The Width x Length dimension refers to the Width (backwall where the sprinkler is located) times the Length (horizontal throw of sprinkler).

TABLE A
WET PIPE SYSTEMS
SERIES LFII (TY2334) RESIDENTIAL HORIZONTAL SIDEWALL
AND RECESSED HORIZONTAL SIDEWALL SPRINKLERS
NFPA 13D, 13R AND 13 WET PIPE HYDRAULIC DESIGN CRITERIA

Care and Maintenance

The TYCO RAPID RESPONSE Series LFII (TY2334) Residential Horizontal Sidewall Sprinklers must be maintained and serviced in accordance with this section.

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

Absence of an Escutcheon Plate may delay the sprinkler operation in a fire situation.

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

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

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

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

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

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

Limited Warranty

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

Ordering Procedure

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

Sprinkler Assembly
Specify: Series LFII (TY2334), K=4.4, Residential Horizontal Sidewall Sprinkler, (specify) temperature rating, (specify) finish, P/N (specify):

155°F (68°C)
Natural Brass 51-215-1-155
Signal White (RAL9003)
Polyester[1] 51-215-4-155
Chrome Plated 51-215-9-155

175°F (79°C)
Natural Brass 51-215-1-175
Signal White (RAL9003)
Polyester[1] 51-215-4-175
Chrome Plated 51-215-9-175

1. UL Listed as corrosion-resistant.

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

* Refer to Technical Data Sheet TFP770.

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

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

1400 Pennbrook Parkway, Lansdale, PA 19446 | Telephone +1-215-362-0700

Johnson Controls

SECTION 6

Fire Pump

TALCO FIRE SYSTEMS
RESIDENTIAL & COMMERCIAL FIRE PUMP SPECIALISTS
6040 NE 112TH AVE. PORTLAND, OR 97220
800-878-8055 WWW.TALCOFIRE.COM

Home Hydrant

NFPA-13D Packaged Residential Fire Pump & Tank
U.S. Patents #8,678,032 & 8,905,069

HH4-150SP

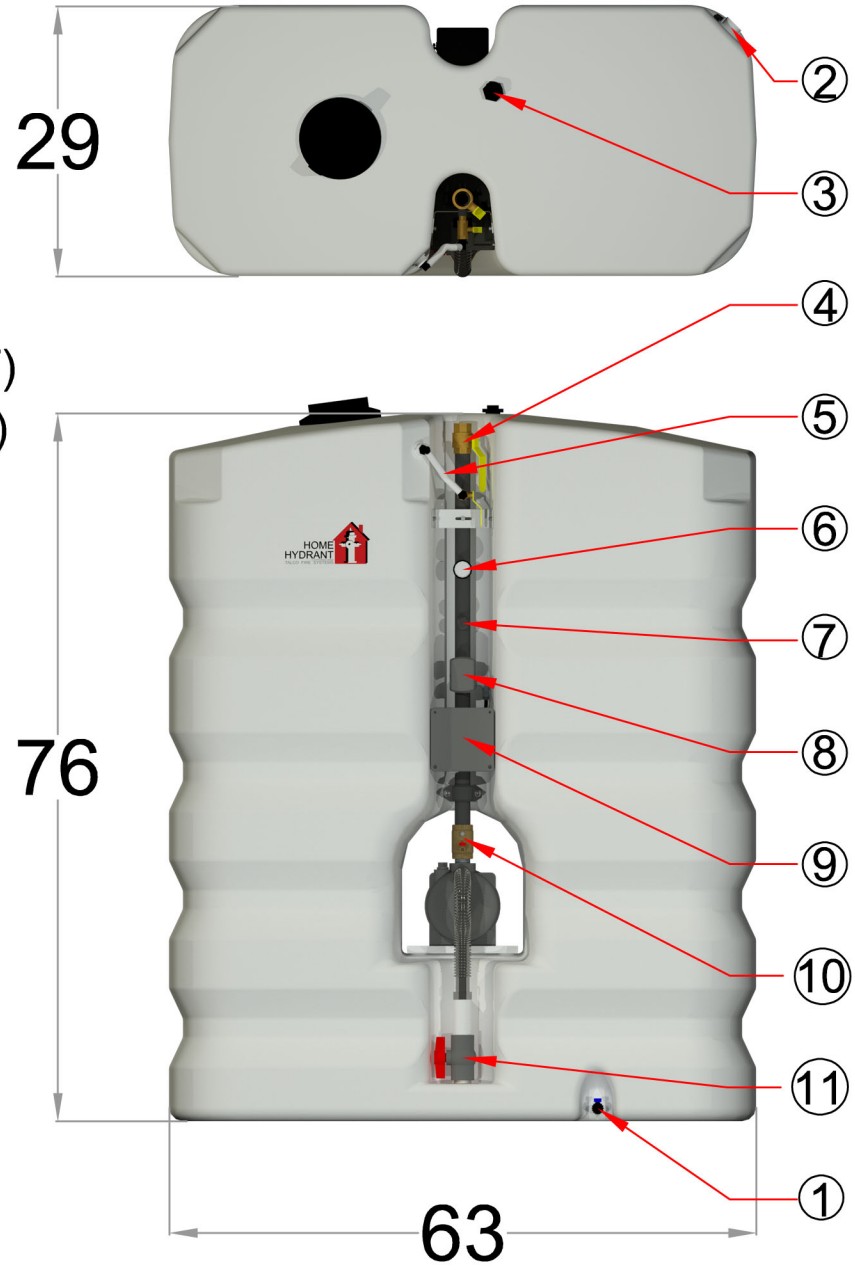
50GPM @ 40PSI

450 Gallon Water Tank

① Tank Drain ½"(GHT)
② Overflow Fitting 1"(FNPT)
③ Auto-Fill Valve ¾"(FNPT)

1.5HP Electric Motor
240 Volt Single-Phase
10.9 Amp (Full Load)

1 ¼" Discharge (FNPT)
Smart Riser Control System
④ Isolation Ball Valve
⑤ Test Line/System Drain
⑥ Pressure Gauge
⑦ Flow Switch (Optional)
⑧ Pressure Switch
⑨ Run-Time Controller
⑩ Discharge Check Valve
⑪ Suction Shut-off Valve



Performance

Performance values based on multiple pump tests. Not for certification purposes.

GPM	0	20	25	30	35	40	45	50
PSI	55	52	51	50	48	46	43	40