

Model RFC43 (SIN RA0612) Model RFC49 (SIN RA0616) Residential Flat Concealed Sprinklers

Bulletin 006 Rev. E

A Residential Flat Concealed Sprinkler engineered for a minimum design density of 0.05 gpm/ft² with low GPM requirements.

Features

- 1. Very low water flow requirements.
- 2. 1/2" (13mm) Total adjustment.
- Thread-On/Thread-Off or Push-On/Thread Off cover attachment option.
- 4. Smooth aesthetic ceiling profile.
- 5. Available in brass, chrome and black plated or painted finishes.

Listings & Approval

- 1. Listed by Underwriters Laboratories, and certified by UL for Canada (cULus)
- 2. NYC MEA 258-93-E

UL Listing Categories

Residential Automatic Sprinklers

UL Guide Number

VKKW

Product Description

Model RFC43 and RFC49 Concealed Residential Sprinklers are fast response residential fusible solder link automatic sprinklers. Residential sprinklers differ from standard sprinklers primarily in their response time and water distribution patterns.

Model RFC43 and RFC49 sprinklers discharge water in a hemispherical pattern below the sprinkler deflector. Residential distribution patterns are higher and generally contain a finer droplet size than standard sprinkler patterns.

The combination of speed of operation and high discharge pattern required for residential sprinklers has demonstrated, in fire testing, an ability for controlling residential fires, and thereby providing significant evacuation time for occupants.

The RFC43 and RFC49 Sprinklers provide the best form of fire protection by combining an attractive appearance and $\frac{1}{2}$ " (13mm) of cover adjustment for ease of installation. The small diameter cover plate is easily and posi-





tively attached and blends into the ceiling, concealing the most dependable fire protection available, an automatic sprinkler system.

The RFC43 and RFC49 are UL Listed Residential Sprinklers to be installed in the residential portions of any occupancy in accordance with NFPA 13, 13R, & 13D.

The RFC43 and RFC49 can reduce the need for precise cutting of drop nipples. The threaded cover plate assembly can be adjusted without tools to fit accurately against the ceiling. The fire protection system need not be shut down to adjust or remove the cover plate assembly.

Application and Installation

The RFC43 and RFC49, for residential installations, use a $165^{\circ}F(74^{\circ}C)$ fusible solder link in a tuning fork style sprinkler frame with a drop-down deflector. This assembly is recessed into the ceiling and concealed by a flat cover plate. The cover plate is attached to the skirt, using $135^{\circ}F(57^{\circ}C)$ ordinary temperature classification solder. When the ceil-

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ing temperature rises, the solder holding the cover plate releases the cover allowing the deflector to drop into position and exposing the sprinkler inside to ceiling temperature. The subsequent operation of the solder link opens the waterway and causes the deflector to drop into position to distribute the discharging water in a hemispherical pattern below the sprinkler deflector. Any adjustment of thread engagement between the cover plate and cup will assure that the drop-down deflector is properly located below the ceiling. The residential distribution pattern contains a finer droplet size than a standard sprinkler, and the pattern produces significantly higher wall wetting.

After a 2⁵/₈ inch diameter hole is cut in the ceiling, the sprinkler is to be installed with the Model FC Wrench. When installing a sprinkler, the wrench is first positioned into the sprinkler/cup assembly and around the hexagonal body of the sprinkler frame. The Wrench must bottom out against the cup in order to ensure proper, safe installation. The sprinkler is then tightened into the pipe fitting. When inserting or removing the wrench from the sprinkler/cup assembly, care should be taken to prevent damage to the sprinkler. DO NOT WRENCH ON ANY OTHER PART OF THE SPRINKLER/CUP ASSEMBLY. MODEL RFC43 AND RFC49 CONCEALED SPRINKLERS MUST BE INSTALLED ONLY WITH 135°F RATED COVERS.

Note: A leak tight ½" NPT (R1/2) sprinkler joint can be obtained with a torque of 8-18 ft-lbs (10,8 - 24,4 N-m). Do not tighten sprinklers over maximum recommended torque. It may cause leakage or impairment of the sprinklers. ٢

Cover assemblies provide up to 1/2" (13mm) of adjustment. Turn the cover clockwise until the flange is in contact with the ceiling. For the push-on/thread-off option, the cover assembly is pushed onto the cup and final adjustment is made by turning the cover clockwise until the skirt flange makes full contact with the ceiling. Cover removal requires turning in the counter-clockwise direction.

In ceilings that have a plenum space above the sprinkler, the plenum space may have neutral or negative pressurization but must not be positively pressurized. Inspect all sprinklers after installation to ensure that the gap between the cover plate and ceiling and the 4 slots in the cup are all open and free from any air flow impediment.

Temperature Rating

Sprinkler	Cover Plate	Max. Amblent Temp.
165°F/74°C	135°F/57°C	100°F/38°C

Installation Data: RFC43 (SIN RA0612)

Thread	K Fastar	Sprinkler	Maximum Minimum Minimum Required Distance to Distance between Sprinkler Discharge Wall Sprinklers Etow		Required Discharge	
Size inch (mm)	K Factor	ft. (m)	Wali ft. (m)	sprinkiers ft. (m)	Flow gpm (Lpm)	Press. psi (bar)
½" (15mm)	4.3	12 x 12 (3.6x3.6)	6 (1.83)	8 (2.43)	12 (45)	7.8 (0.54)
½" (15mm)	4.3	14 x 14 (4.3x4.3)	7 (2.13)	8 (2.43)	13 (49)	9.1 (0.63)
½" (15mm)	4.3	16 x 16 (4.9x4.9)	8 (2.43)	8 (2.43)	13 (49)	9.1 (0.63)
½" (15mm)	4.3	18 x 18 (5.5x5.5)	9 (2.74)	8 (2.43)	18 (68)	17.5 (1.21)
½" (15mm)	4.3	20 x 20 (6.0x6.0)	10 (3.05)	8 (2.43)	21 (79)	23.8 (1.64)

Note: 1 bar = 100 Kpa

Installation Data: RFC49 (RA0616)

Thread	K Fastar	Sprinkler	Maximum Distance to	Minimum Distance between	Minimum Sprinkler	Required Discharge
inch (mm)	K Factor	ft. (m)	Wali ft. (m)	sprinklers ft. (m)	Flow gpm (Lpm)	Press. psi (bar)
½" (15mm)	4.9	12 x 12 (3.6x3.6)	6 (1.83)	8 (2,43)	13 (49)	7.0 (0.48)
½" (15mm)	4.9	14 x 14 (4.3x4.3)	7 (2.13)	8 (2.43)	13 (49)	7.0 (0.48)
1/2" (15mm)	4.9	16 x 16 (4.9x4.9)	8 (2.43)	8 (2.43)	13 (49)	7.0 (0.48)
½" (15mm)	4.9	18 x 18 (5.5x5.5)	9 (2.74)	8 (2.43)	17 (64.3)	12.0 (0.83)
½" (15mm)	4.9	20 x 20 (6.0x6.0)	10 (3.05)	8 (2.43)	20 (75.7)	16.7 (1.14)

Note: 1 bar = 100 Kpa

FOR SLOPED CEILING APPLICATIONS SEE RASCO BULLETIN 035.

Maintenance

Model RFC43 and RFC49 Concealed Sprinklers should be inspected quarterly and the sprinkler system maintained in accordance with NFPA 25. Do not clean sprinklers with soap and water, ammonia or any other cleaning fluids. Remove dust by using a soft brush or gentle vacuuming. Remove any sprinkler cover plate assembly which has been painted (other than factory applied) or damaged in any way. A stock of spare sprinklers should be maintained to allow quick replacement of damaged or operated sprinklers. Prior to installation, sprinklers should be maintained in the original cartons and packaging until used to minimize the potential for damage to sprinklers that would cause improper operation or non-operation.

Model RFC43 and RFC49 Residential Concealed Sprinkler Specification

Sprinklers shall be cULus Listed low flow residential concealed sprinklers with drop-down deflector and adjustable flat cover plate engineered for a minimum design density of 0.05 gpm/ft². Sprinkler frame and deflector shall be of bronze frame construction having a ½" NPT thread. Thermal element shall consist of an approved black-painted beryllium-nickel fusible solder link with symmetric lever mechanism, maintaining a Teflon-coated Belleville spring washer and machined brass cap water seal assembly containing no plastic parts. Sprinkler K-factor shall be nominal 4.3 (62.4), having a ⁷/16" orifice. Temperature rating shall be Ordinary 165°F (74°C); cover plate temperature rating to be 135°F (57°C). Cover plate assembly shall consist of a brass cover plate and copper alloy retainer flange allowing a ½" cover plate adjustment. Any secure engagement between the cover plate and the cup will assure that the drop-down deflector is properly located below the ceiling. A plastic protective cap shall be provided and factory installed inside the sprinkler cup to protect the drop-down sprinkler deflector from damage, which could occur during construction before the cover plate is installed. Standard cover finish: [Chrome] [White] [Specialty – specify]. Residential concealed sprinklers shall be Reliable Model RFC43, SIN RA0612 (Bulletin 006) or Model RFC49, SIN RA0616 (Bulletin 006).

Ordering Information Specify:

1. Sprinkler Model

2. Cover Plate Finish

Thread-On or

Push-On Feature

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Cover Plate Finishes (1)

Standard Finishes Chrome White Special Application Finishes Bright Brass Black Plating Black Paint Off White

Satin Chrome

⁽¹⁾ Other colors and finishes available. Consult factory for details. **Note:** Paint or any other coatings applied over the factory finish will void all approvals and warranties.





Reliable...For Complete Protection

Reliable offers a wide selection of sprinkler components. Following are some of the many precision-made Reliable products that guard life and property from fire around the clock.

- Automatic sprinklers •
- Flush automatic sprinklers
- Recessed automatic sprinklers
- Concealed automatic sprinklers
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- Dry automatic sprinklers
- Intermediate level sprinklers
- Open sprinklers
- Spray nozzles
- Alarm valves
- Retarding chambers
- Dry pipe valves
- Accelerators for dry pipe valves
- Mechanical sprinkler alarms
- Electrical sprinkler alarm switches
- Water flow detectors

- Deluge valves
- Detector check valves
- Check valves
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- Sprinkler wrenches
- Sprinkler escutcheons and guards
- Inspectors test connections
- Sight drains
- Ball drips and drum drips
- Control valve seals
- Air maintenance devices
- Air compressors
- Pressure gaugesIdentification signs
- Fire department connection

The equipment presented in this bulletin is to be installed in accordance with the latest published Standards of the National Fire Protection Association, Factory Mutual Research Corporation, or other similar organizations and also with the provisions of governmental codes or ordinances whenever applicable. Productsmanufactured and distributed by Reliable have been protecting life and property for over 90 years, and are installed and serviced by the most highly qualified and reputable sprinkler contractors located throughout the United States, Canada and foreign countries.

Manufactured by



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Sales Offices Sales Fax Corporate Offices



Revision lines indicate updated or new data

EG. Printed in U.S.A 04/10 P/N 9999970261

Model F1 **Residential Sprinklers for** Design Density of .05 gpm/ft²

Model F1 Res Sprinklers engineered for the lowest flows to meet the minimum design density of .05 gpm/ft²

Types:

- 1. F1 Res 30 Pendent
- 2. F1 Res 30 Recessed Pendent/F2
- 3. F1 Res 30 Recessed Pendent/FP
- 4. F1 Res 49 Pendent
- 5. F1 Res 49 Recessed Pendent/F1
- 6. F1 Res 49 Recessed Pendent/FP
- 7. F1 Res 58 Pendent
- 8. F1 Res 58 Recessed Pendent/F1
- 9. F1 Res 58 Recessed Pendent/FP
- 10. F1 Res 76 Pendent
- 11. F1 Res 76 Recessed Pendent/F1
- 12. F1 Res 76 Recessed Pendent/FP
- 13. F1 Res 30 CCP Pendent
- 14. F1 Res 49 CCP Pendent
- 15. F1 Res 58 CCP Pendent
- 16. F1 Res 76 CCP Pendent
- 17. F1 Res 44 HSW
- 18. F1 Res 44 Recessed HSW/F2
- 19. F1 Res 58 HSW
- 20, F1 Res 58 HSW Recessed HSW/F2
- 21. F1 Res 44 SWC

Listings & Approvals

- Listed by Underwriters Laboratories Inc. and 1. UL Certified for Canada (cULus)
- 2. NYC MEA 258-93-E

Slope Ceiling Approvals: Refer to Bulletin 035 Sprinklers for .10 Density: Refer to Bulletin 176

UL Listing Category

Residential Automatic Sprinkler

UL Guide Number

VKKW

Patents

US Patent No. 6,516,893 applies to the Model F1 Res 49 & 58 Pendent Sprinklers

Product Description

Model F1 Res Pendent sprinklers (Figs. 1, 2, 3, & 4) are fast response sprinklers combining excellent durability, high sensitivity glass-bulb and low profile decorative design. The F1 Res Horizontal Sidewall sprinklers (Figs. 5, 6 & 7) are equally attractive when above ceiling piping cannot be used.





F1 Res 30, 49, 58 & 76 F1 Res 30, 49, 58 & 76 Recessed Pendent / F1 Recessed Pendent / FP





F1 Res 30, 49, 58 & 76 CCP Pendent

F1 Res 44 & 58 Recessed HSW/F2



F1 Res 44 SWC

The 3mm glass-bulb pendent sprinklers permit the efficient use of residential water supplies for sprinkler coverage in residential fire protection design.

The low flow F1 Res sprinklers are specially engineered for fast thermal response to meet the sensitive fire protection application needs of the latest residential market standards (UL 1626 Standard). Upon fire conditions, rising heat causes a sprinkler's heat-sensitive glass-bulb to shatter, releasing the waterway for water flow onto the deflector, evenly distributing the discharged water to control a fire.

Technical Data:

- Thermal Sensor: Nominal 3mm glass-bulb
- Sprinkler Frame : Brass Casting •
- Sprinklers' Pressure Rating: 175 psi Factory Hydrostatically Tested to 500 psi
- Thread Size: 1/2" NPT (R1/2)
- K-Factor: 3.0 (Actual) - F1 Res 30 Pendent Sprinkler 4.9 (Actual) - F1 Res 49 Pendent Sprinkler 5.8 (Actual) - F1 Res 58 Pendent & HSW Sprinkler 7.6 (Actual) - F1 Res 76 Pendent Sprinkler 4.4 (Actual) - F1 Res 44 HSW Sprinkler
- Density: Minimum 0.05 gpm/ft²

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Application

Model F1 Res Sprinklers are used for Residential Fire Protection according to UL 1626 Standard*. Be sure that orifice size, temperature rating, deflector style and sprinkler type are in accordance with the latest published standards of The National Fire Protection Association or the approving authority having jurisdiction.

Model F1 Res 30, 49, 58 & 76 Pendent

Installation

Models F1 Res sprinklers are to be installed as shown. Model F1, F2 and FP Escutcheons, illustrated herewith, are the only recessed escutcheons to be used with Model F1 Res sprinklers. Use of any other recessed escutcheon will void all approvals and warranties. For installing Model F1 Res Pendent sprinklers use only the Model D sprinkler

- Model F1 Res 30 Recessed Pendent / F2
- Model F1 Res 49, 58 & 76 Recessed Pendent / F1



F1 escutcheon, 3/4" (19mm) adjustment



Fig. 1

Fig. 2

Wrench; for installing Models F1 Res Recessed Pendent, CCP & SWC sprinklers use only the Model GFR2 sprinkler wrench; for installing Model F1 Res Recessed HSW sprinklers use only the Model GFR2 Sprinkler Wrench. Use of wrenches other than those specified may damage these sprinklers. Install F1 Res 44 with a ceiling to deflector distance of 4" - 12". Flow arrow on deflector must point away from near wall and "Top" marking must face ceiling.

Escutcheon*, F1 or F2, Data:

Туре	Adjustment Inch (mm)	"A" Inch (mm)	Face of fitting to ceiling inch (mm)
F1	3/4 (19.0)	Min.= ³ /4" (19.1) Max.=1 ¹ /2" (38.1)	³ / _{16 - ¹⁵/₁₆ (4.7 - 24.0)}
F2	1/2 (12.7)	Min.= ¹⁵ /16" (23.8) Max.=1 ¹ /2" (38.1)	³ /16 - ¹¹ /16 (4.7 - 17.4)

* Note: Escutcheons F1 or F2 may be used with

Model F1 Res 49, 58 & 76 Recessed Pendent Sprinkler

Technical Data: F1Res 30 Pendent and Recessed Pendent

Thread	Nominal Orifice	Sprii Temp.	nkler Rating	Max. Pressure	Ma Ambien	ax. It Temp.	Actual K	Sprinkler Length
3120		۴	°C	psi (bar)	°F	°C	Factor	Inch (mm)
½" NPT (R½)	²¹ /64" (8.2)	155 175	68 79	175 (12)	100	38	3,0	2.25 (57)

Deflector - to - ceiling Maximum 1" (25mm) to 4" (100mm)

Max. Sprinkler Spacing ft (m)	Flow gpm (Lpm)	Pressure psi (bar)	Sprinkler Identification Number (SIN)
12 x 12 (3,6 x 3,6)	8 (30.3)	7.0 (0,48)	D2511
14 x 14 (4,3 x 4,3)	10 (37.8)	11 (0,76)	H3511

Technical Data: F1Res 49 Pendent and Recessed Pendent.

Thread	Nominal Orifice	Sprir Temp.	nkler Rating	Max. Pressure	Ma Ambien	ax. t Temp.	Actual K	Sprinkler Length
5120	men (mm)	•F	°C	psi (bar)	۴F	តំ	Factor	Inch (mm)
½" NPT (R½)	⁷ /16" (11)	155 175	68 79	175 (12)	100 150	38 66	4.9	2.25 (57)

Deflector - to - celling Maximum 1" (25mm) to 4" (100mm)

Max. Sprinkler Spacing ft (m)	Flow gpm (Lpm)	Pressure psi (bar)	Sprinkler Identification Number (SIN)
12 x 12 (3,6 x 3,6)	13 (49)	7.0 (0,48)	
14 x 14 (4,3 x 4,3)	13 (49)	7.0 (0,48)	
16 x 16 (4,9 x 4,9)	13 (49)	7.0 (0,48)	R3516
18 x 18 (5,5 x 5,5)	17 (64.3)	12.0 (0,83)	
20 x 20 (6,1 x 6,1)	20 (75.7)	16.7 (1,14)	

Deflector - to - ceiling Maximum 4" (100mm) to 8" (203mm)

Max. Sprinkler Spacing ft (m)	Flow gpm (Lpm)	Pressure psl (bar)	Sprinkler Identification Number (SIN)
12 x 12 (3,6 x 3,6)	15 <u>(</u> 57)	9.4 (0,65)	
14 x 14 (4,3 x 4,3)	16 (60.5)	10.6 (0,73)	
16 x 16 (4,9 x 4,9)	17 (64.3)	12.0 (0,83)	R3516
18 x 18 (5,5 x 5,5)	19 (72)	15.0 (1,0)	
20 x 20 (6,1 x 6,1)	22 (83.2)	20.2 (1,4)	

*Note: The F1 Res 49 pendent and recessed pendent residential sprinklers can be installed per NFPA 13 in beamed ceilings meeting the following criteria:

1. Maximum beam depth = 7" (178mm)

2. Beam spacing at or greater than 7.5 ft. (2.3m) on center.

Technical Data: F1Res 58 Pendent and Recessed Pendent.

Thread	Nominal Orlfice	Sprir Temp.	nkler Rating	Max. Pressure	Ma Ambien	ax. t Temp.	Actual K Exctor	Sprinkler Length
Size	nicii (niin)	۴F	°C	psi (bar)	°F	°C	K Factor	Inch (mm)
½" NPT (R½)	1⁄2" (13)	155 175	68 79	175 (12)	100 150	38 66	5.8	2.25 (57)

Max. Sprinkler Spacing ft (m)	Flow gpm (Lpm)	Pressure psi (bar)	Ceiling -to- Deflector Inch (mm)	Sprinkler Identification Number (SIN)
12 x 12 (3,6 x 3,6)	16 (61)	7.6 (0,53)		
14 x 14 (4,3 x 4,3)	16 (61)	7.6 (0,53)		
16 x 16 (4,9 x 4,9)	16 (61)	7.6 (0,53)	1-4	R3513
18 x 18 (5,5 x 5,5)	19 (72)	10.8 (0,75)	(23 - 100)	
20 x 20 (6,1 x 6,1)	22 (83.3)	14.4 (1,0)		

Technical Data: F1 Res 76 Pendent and Recessed Pendent

	K	Max. Ambient Temp.		Pressure	Sprinkler Temp. Rating		Ten		Nomina	Thread
Inch (mm)	racior	⊃°C	°F	psi (bar)	C	F °	°F	(mm)	INCU	SIZE
7.6 2.25 (57)	7.6	38 66	100 150	175 (12)	58 79	55 6 75 7	155 175	13.5)	¹⁷ /32" (³/₄" NPT (R½)
100 38 7.6 2.2 150 66 7.6 2.2		100 150	175 (12)	58 79	55 6 75 7	155 175	13.5)	¹⁷ /32" (³ /4" NPT (R½) Ma	

Max. Sprinkler Spacing ft (m)	Flow gpm (Lpm)	Pressure psi (bar)	Sprinkler Identification Number (SiN)
12 x 12 (3,6 x 3,6)	21 (79.5)	7.6 (0,53)	
14 x 14 (4,3 x 4,3)	21 (79.5)	7.6 (0,53)	
16 x 16 (4,9 x 4,9)	21 (79.5)	7.6 (0,53)	R7618
18 x 18 (5,5 x 5,5)	21 (79.5)	7.6 (0,53)	
20 x 20 (6,1 x 6,1)	23 (87.1)	9.2 (0,63)	

٠ Model F1 Res 30, 49, 58 & 76 CCP Pendent



Model F1 Res 30, 49, 58 & 76 **Recessed Pendent / FP**



FP push-on/thread-off escutcheon



Fig. 3

Fig. 4

Technical Data: F1Res 30 CCP Pendent and Recessed Pendent/FP

Thread Size	Nominai Orifice Inch (mm)	Sprir Temp. •F	nkler Rating °C	CCP As Temp. °F	sembly Rating °C	Max. Pressure psi (bar)	Ma Amblen °F	ax. it Temp. ℃	K Factor	Sprinkler Length Inch (mm)
½" NPT (R½)	²¹ /64" (8.2)	155	68	135	57	175 (12)	100	38	3.0	2.25 (57)

Max. Sprinkler Spacing ft (m)	Flow gpm (Lpm)	Pressure psi (bar)	Sprinkler Identification Number (SIN)
12 x 12 (3,6 x 3,6)	8 (30.3)	7.0 (0,48)	DOE11
14 x 14 (4,3 x 4,3)	11 (41.6)	13.4 (0,92)	H3511

Technical Data: F1Res 49 CCP Pendent and Recessed Pendent/FP

Thread Size	Nominal Orifice Inch	Sprii Ter Rat	nkier np. ing	CC Asse Ter Rat	CP mbly np. ing	Max. Pressure psl (bar)	Ma Amt Ter	ax. bient np.	K Factor	Sprinkler Length Inch	CCP Options Data: "A" Cover Adjustment	"B" CCP Height	
	(mm)	°F °C		4	F •C		۴F	å		(mm)	incn (mm)		
16" NDT											1/2 (12.7)	15/16 (24)	
(R½)	7/16" (11)	155	68	135	57	175 (12)	100	38	4.9	2.25 (57)	5/16 (7.9)	³ /4 (19)	

Max.		_	Sprinkler	☐ FP Data "A":				
Sprinkler Spacing ft (m)	gpm (Lpm)	Pressure psi (bar)	Identification Number (SIN)	FP Position	"A" Inch (mm)			
12 x 12 (3,6 x 3,6)	13 (49)	7.0 (0,48)		Max. Recessed	7/16 (11)			
14 x 14 (4,3 x 4,3)	13 (49)	7.0 (0,48)		Min. Recessed	15/16 (24)			
16 x 16 (4,9 x 4,9)	14 (53)	8.2 (0,56)	R3516	Note: Sprinklers shown in Fig. 3 and Fig.				
18 x 18 (5,5 x 5,5)	18 (68.1)	13.5 (0,93)		are not suitable	e for installation in ceil-			
20 x 20 (6,1 x 6,1)	20 (75.7)	16.7 (1,14)		ings which hav	ve positive pressure in			
				the space abov	/e.			

Technical Data: F1Res 58 CCP Pendent and Recessed Pendent/FP

Thread	Nominai Orifice	Sprii Temp.	nkier Rating	CCP As Temp.	P Assembly Max. mp. Rating Pressure		Max. Amblent Temp.		K Factor	Sprinkler Length	
3120	Inch (mm)	۴F	°C	۴F	°C	psi (bar)	°F	°C	Tacior	Inch (mm)	
½" NPT (R½)	¹ /2" (13)	155	68	135	57	175 (12)	100	38	5.8	2.25 (57)	

Max. Sprinkler Spacing ft (m)	Flow gpm (Lpm)	Pressure psi (bar)	Sprinkler Identification Number (SIN)
12 x 12 (3,6 x 3,6)	16 (61)	7.6 (0,53)	
14 x 14 (4,3 x 4,3)	16 (61)	7.6 (0,53)	
16 x 16 (4,9 x 4,9)	16 (61)	7.6 (0,53)	R3513
18 x 18 (5,5 x 5,5)	19 (72)	10.8 (0,75)	
20 x 20 (6,1 x 6,1)	22 (83.3)	14.4 (1,0)	

Technical Data: F1Res 76 CCP Pendent and Recessed Pendent/FP

Thread	Nominai Orifice	Sprir Temp.	SprinklerCCP Assemblyemp. RatingTemp. Rating		sembly Rating	Max. Max. Pressure Ambient 1		ax. It Temp.	K Exctor	Sprinkler Length	
Size	Inch (mm)	۴	ç	۴F	°C	psi (bar)	°F°C		Factor	Inch (mm)	
³ /4" NPT (R ³ /4)	¹⁷ /32" (13.5)	155 175	68 79	135	57	175 (12)	100 150	38 66	7.6	2.25 (57)	

Max. Sprinkler Spacing ft (m)	Flow gpm (Lpm)	Pressure psi (bar)	Sprinkler Identification Number (SIN)
12 x 12 (3,6 x 3,6)	21 (79.5)	7.6 (0,53)	
14 x 14 (4,3 x 4,3)	21 (79.5)	7.6 (0,53)	
16 x 16 (4,9 x 4,9)	21 (79.5)	7.6 (0,53)	R7618
18 x 18 (5,5 x 5,5)	22 (83.3)	8.4 (0,58)	
20 x 20 (6,1 x 6,1)	25 (94.6)	10.8 (0,74)	





Model F1 Res 44 & 58 Recessed HSW/F2



F2 escutcheon, 1/2" (13mm) adjustment

Technical Data: F1Res 44 HSW & HSW/F2

Max. Face of Fitting Nominal Sprinkler Max. Sprinkler Adjustment Ambient κ Thread to wall Type Orifice Temp. Rating Pressure Length Inch (mm) Factor Size Temp. Inch (mm) Inch (mm) psi (bar) Inch (mm) °F °C °F °C 3/16 - 11/16 F2 1/2 (13) 1/2" NPT 155 68 100 38 (4.7 - 17.4) ³/8" (10) 175 (12) 4.4 2.45 (62) 150 66 175 79 (R1/2)

Max. Sprinkler Spacing ft (m)	"A" Ceiling to Deflector Inch (mm)	Sprinkler Temp. Rating °F (°C)		Flow gpm (Lpm)	Pressure psi (bar)	Sprinkler Identification Number (SIN)
12 x 12 (3,6 x 3,6)		155 (68)	175 (79)	12 (45,4)	7.5 (0,52)	
14 x 14 (4,3 x 4,3)		155 (68)	175 (79)	14 (53,0)	10.2 (0,71)	
16 x 16 (4,9 x 4,9)	4 - 6	155 (68)	175 (79)	16 (60,6)	13.3 (0,92)	
16 x 18 (4,9 x 5,5)	(101 - 152)	155 (68)	175 (79)	18 (68,1)	16.8 (1,16)	
18 x 18 (5,5 x 5,5)		155 (68)	175 (79)	19 (72,0)	18.7 (1,29)	
16 x 20 (4,9 x 6,1)		155 (68)	175 (79)	23 (87,1)	27.4 (1,89)	R3531
12 x 12 (3,6 x 3,6)		155 (68)	175 (79)	14 (53,0)	10.2 (0,71)	
14 x 14 (4,3 x 4,3)		155 (68)	175 (79)	16 (60,6)	13.3 (0,92)	
16 x 16 (4,9 x 4,9)	6 - 12 (152 - 305)	155 (68)	175 (79)	17 (64,4)	15.0 (1,04)	
16 x 18 (4,9 x 5,5)		155 (68)	175 (79)	20 (75,7)	20.7 (1,43)	
16 x 20 (4,9 x 6,1)		155 (68)	175 (79)	23 (87,1)	27.4 (1,89)	

Escutcheon, F2, Data:

Technical Data: F1Res 58 HSW & HSW/F2

Escutcheon, F2, Data:

	Thread Size	Nominal Orifice	Spri Temp.	nkler Rating	Max. Pressure	Max. Ambient Temp.		K Factor	Sprinkler Length		Туре
		incn (mm)	°F	°C	psi (bar)	۴F	°C	1	incn (mm)		F2
Γ	½" NPT (R½)	¹ /2" (13)	155 175	68 79	175 (12)	100 150	38 66	5.8	2.45 (62)	וו	

Туре	Adjustment Inch (mm)	Face of Fitting to wall inch (mm)
F2	¹ /2 (13)	³ /16 - ¹¹ /16 (4.7 - 17.4)

Max. Sprinkler Specing ft (m)	"A" Ceiling to Deflector Inch (mm)	"A" Sprinkler Temp. to Deflector Rating h (mm) °F (°C)		Flow gpm (Lpm)	Pressure psi (bar)	Sprinkler Identification Number (SIN)
12 x 12 (3,6 x 3,6)		155 (68)	175 (79)	16 (60,6)	7.6 (0,53)	
14 x 14 (4,3 x 4,3)		155 (68)	175 (79)	18 (68,2)	9.7 (0,67)	
16 x 16 (4,9 x 4,9)	4 - 6 (101 - 152)	155 (68)	175 (79)	21 (79,5)	13.2 (0,91)	
16 x 18 (4,9 x 5,5)		155 (68)	175 (79)	25 (94,7)	18.6 (1,28)	
16 x 20 (4,9 x 6,1)		155 (68)	175 (79)	29 (109,8)	25 (1,73)	R3533
12 x 12 (3,6 x 3,6)		155 (68)	175 (79)	22 (83,3)	14.4 (1,0)	
14 x 14 (4,3 x 4,3)	6 - 12	155 (68)	175 (79)	22 (83,3)	14.4 (1,0)	
16 x 16 (4,9 x 4,9)	(152 - 305)	155 (68)	175 (79)	26 (98,4)	20.1 (1,39)	
16 x 18 (4,9 x 5,5)		155 (68)	175 (79)	31 (117,4)	28.6 (1,97)	

• Model F1 Res 44 SWC





Fig. 6

Technical Data: F1Res 44 SWC

Thread Size	Nominal Orifice	Sprinkler Temp. Rating		Cover Temp. Rating		rer Max. np. Pressure ng nel (ber)		ng pel (bar)		ax. Dient np.	K Factor	Sprinkler Length
	inch (min)	۴F	ç	۴F	°C	par (bar)	۴	S. ℃		men (mm)		
½" NPT (R½)	³⁄⊮" (10)	155	68	135	57	175 (12)	100	38	4.4	2.45 (62)		

Max. Sprinkler Spacing ft (m)	"A" Ceiling to Deflector Inch (mm)	Flow gpm (Lpm)	Pressure psi (bar)	Sprinkler Identification Number (SIN)
12 x 12 (3,6 x 3,6)		13 (49,2)	8.7 (0,60)	
14 x 14 (4,3 x 4,3)		14 (53,0)	10.2 (0,71)	
16 x 16 (4,9 x 4,9)	4 - 6	17 (64,3)	15.0 (1,1)	
16 x 18 (4,9 x 5,5)	(101 - 132)	19 (71,8)	18.7 (1,13)	
16 x 20 (4,9 x 6,1)		23 (87,1)	27.4 (1,89)	R3531
12 x 12 (3,6 x 3,6)		14 (52,9)	10.2 (0,71)	
14 x 14 (4,3 x 4,3)	6 - 12	15 (56,7)	11.7 (0,81)	
16 x 16 (4,9 x 4,9)	(152 - 305)	18 (68,1)	16.8 (1,16)	
16 x 18 (4,9 x 5,5)		20 (75,6)	20.7 (1,43)	

Maintenance

Model F1 Res 30, 49, F1 Res 58, F1 Res 76 and F1 Res 44 Sprinklers should be inspected quarterly, and the sprinkler system maintained in accordance with NFPA 25, 13, 13D, and 13R. Do not clean sprinkler with soap and water, Ammonia or any other cleaning fluids. Remove dust by using a soft brush or gentle vacuuming. Remove any sprinkler which has been painted (other than factory applied) or damaged in any way. A stock of spare sprinklers should be maintained to allow quick replacement of damaged or operated sprinklers. Prior to installation, sprinklers should remain in the original cartons and packaging until used. This will minimize the potential for damage to sprinklers that could cause improper operation or non-operation.

Model F1 Res 30, 49 & 58 Pendent Sprinkler Specifications

Sprinklers shall be [cULus Listed] [New York City MEA Approved (258-93-E)] low flow residential pendent sprinklers engineered to provide a minimum design density of 0.05 gpm/ft² over the listed coverage area. Listed flows as specified by the manufacturer's technical data sheets are to be used. Residential sprinklers shall be installed in conformance with the manufacturer's installation guidelines and the applicable installation standard. Where pendent residential sprinklers are installed under sloped ceilings having a pitch from [4/12] to [8/12], the sprinklers shall be listed for such use. Deflector-to-ceiling distance listing shall be 1" to 8" maximum. Sprinkler frame and deflector shall be of bronze frame construction having a 1/2" NPT thread. Water seal assembly shall consist of a Teflon-coated Belleville spring washer with top-loaded extruded or cold head cup with 3 mm glass bulb containing no plastic parts, and having a temperature rating of [155°F (68°C)] [175°F (79°C)]. Sprinklers shall have a nominal K-factor of 3.0, 4.9 and 5.8. Standard finish: [Bronze] [Chrome-plated] [White Polyester] [Special finish-specify]. Residential pendent sprinklers shall be Reliable Model F1 Res 30, 49 & 58, SIN R3511, R3516 & R3513 (Bulletin 135).

Model F1 Res 49 & 58 Recessed Pendent/F1, Model F1 Res 30, 49 & 58 Recessed Pendent/F2, Model F1 Res 30, 49 & 58 Recessed Pendent/FP

Sprinklers shall be [cULus Listed] [New York City MEA Approved (258-93-E)] low flow residential recessed pendent sprinklers engineered to provide a minimum design density of 0.05 gpm/ft² over the listed coverage area. Listed flows as specified by the manufacturer's technical data sheets are to be used. Residential sprinklers shall be installed in conformance with the manufacturer's installation guidelines and the applicable installation standard. Where pendent residential sprinklers are installed under sloped ceilings having a pitch from [4/12] to [8/12], the sprinklers shall be listed for such use. Deflectorto-ceiling distance listing shall be 1" to 8" maximum. Sprinkler frame and deflector shall be of bronze frame construction having a 1/2" NPT thread. Water seal assembly shall consist of a Teflon-coated Belleville spring washer with top-loaded extruded or cold head cup with 3 mm glass bulb containing no plastic parts, and having a temperature rating of [155°F (68°C)] [175°F (79°C)]. Sprinklers shall have a nominal K-factor of 3.0, 4.9 & 5.8. Standard finish: [Bronze] [Chrome-plated] [White Polyester] [Special finish-specify]. Recessed escutcheon assembly shall

be a steel, two-piece escutcheon [with ½" adjustment (Model F2)] [with ¾" adjustment (Model F1)] [of push-on and thread off design with ½" adjustment (Model FP)]. Standard finish shall be [brass][bright chrome] [white painted]. Residential recessed pendent sprinklers shall be Reliable [Model F1 Res 30, 49 & 58 Recessed Pendent/F1] [Model F1 Res 30, 49 & 58 Recessed Pendent/F2] [Model F1 Res 30, 49 & 58 Recessed Pendent/F2] [Model F1 Res 30, 49 & 58 Recessed Pendent/F2] [Model F1 Res 30, 49 & 58 Recessed Pendent/F2] [Model F1 Res 30, 49 & 58 Recessed Pendent/F2] [Model F1 Res 30, 49 & 58 Recessed Pendent/F2] [Model F1 Res 30, 49 & 58 Recessed Pendent/F2] [Model F1 Res 30, 49 & 58 Recessed Pendent/F2] [Model F1 Res 30, 49 & 58 Recessed Pendent/F2] [Model F1 Res 30, 49 & 58 Recessed Pendent/F2] [Model F1 Res 30, 49 & 58 Recessed Pendent/F2] [Model F1 Res 30, 49 & 58 Recessed Pendent/F2] [Model F1 Res 30, 49 & 58 Recessed Pendent/F2] [Model F1 Res 30, 49 & 58 Recessed Pendent/F2] [Model F1 Res 30, 49 & 58 Recessed Pendent/F2] [Model F1 Res 30, 49 & 58 Recessed Pendent/F2] [Model F1 Res 30, 49 & 58 Recessed Pendent/F2] [Model F1 Res 30, 49 & 58 Recessed Pendent/F2] [Model F1 Res 30, 49 & 58 Recessed Pendent/F2] [Model F1 Res 30, 49 & 58 Recessed Pendent/F2] [Model F1 Res 30, 49 & 58 Recessed Pendent/F2] [Model F1 Res 30, 49 & 58 Recessed Pendent/F2] [Model F1 Res 30, 49 & 58 Recessed Pendent/F2] [Model F1 Res 30, 49 & 58 Recessed Pendent/F2] [Model F1 Res 30, 49 & 58 Recessed Pendent/F2] [Model F1 Res 30, 49 & 58 Recessed Pendent/F2] [Model F1 Res 30, 49 & 58 Recessed Pendent/F2] [Model F1 Res 30, 49 & 58 Recessed Pendent/F2] [Model F1 Res 30, 49 & 58 Recessed Pendent/F2] [Model F1 Res 30, 49 & 58 Recessed Pendent/F2] [Model F1 Res 30, 49 & 58 Recessed Pendent/F2] [Model F1 Res 30, 49 & 58 Recessed Pendent/F2] [Model F1 Res 30, 49 & 58 Recessed Pendent/F2] [Model F1 Res 30, 49 & 58 Recessed Pendent/F2] [Model F1 Res 30, 49 & 58 Recessed Pendent/F2] [Model F1 Res 30, 49 & 58 Recessed Pendent/F2] [Model F1 Res 30, 49

Model F1 Res 30, 49 & 58 CCP Pendent (Concealed)

Sprinklers shall be [cULus Listed] [New York City MEA Approved (258-93-E)] low flow residential concealed sprinklers engineered to provide a minimum design density of 0.05 gpm/ft² over the listed coverage area. Listed flows as specified by the manufacturer's technical data sheets are to be used. Residential sprinklers shall be installed in conformance with the manufacturer's installation guidelines and the applicable installation standard. Where pendent residential sprinklers are installed under sloped ceilings having a pitch from [4/12] to [8/12], the sprinklers shall be listed for such use. Sprinkler frame and deflector shall be of bronze frame construction having a 1/2" NPT thread. Water seal assembly shall consist of a Teflon-coated Belleville spring washer with top-loaded extruded or cold head cup with 3 mm glass bulb containing no plastic parts, and having a temperature rating of 155°F (68°C). Cover plate assembly shall consist of a brass cover plate and copper alloy retainer flange. Method of attaching the cover plate to the sprinkler cup shall be a pushon and thread-off design allowing a 1/2" cover plate adjustment. Cover plate temperature rating shall be 135°F (57°C). A plastic protective cap shall be provided and factory installed inside the sprinkler cup to protect the sprinkler from damage, which could occur during construction before the cover plate is installed. Standard cover plate finish: [White] [Custom Color-specify].]. Concealed pendent sprinklers shall be Reliable Model F1 Res 30, 49 & 58 CCP, SIN R3511, R3516 & R3513 (Bulletin 135).

Model F1 Res 44 Horizontal Sidewall Residential Sprinkler Specifications

Sprinklers shall be [cULus Listed] [New York City MEA Approved (258-93-E)] low flow residential horizontal sidewall sprinklers engineered to provide a minimum design density of 0.05 gpm/ft² over the listed coverage area. Listed flows as specified by the manufacturer's technical data sheets are to be used. Residential sprinklers shall be installed in conformance with the manufacturer's installation guidelines and the applicable installation standard. Where horizontal sidewall residential sprinklers are installed under sloped ceilings having a pitch from [4/12] to [8/12], the sprinklers shall be listed for such use. Sprinkler frame and deflector shall be of bronze frame construction having a 1/2" NPT thread. Water seal assembly shall consist of a Teflon-coated Belleville spring washer with top-loaded extruded or cold head cup with 3 mm glass bulb containing no plastic parts, and having a temperature rating of [155°F (68°C)] [175°F (79°C)]. Sprinklers shall have a nominal K-factor of 4.4 (62.8). Standard finish: [Bronze] [Chrome-plated] [White Polyester] [Special finish-specify]. Residential horizontal sidewall sprinklers shall be Reliable Model F1 Res 44, SIN R3531 (Bulletin 135).

Model F1 Res 44 Recessed Horizontal Sidewall Sprinkler

Use description for the Model F1 Res 44 horizontal sidewall sprinkler with the following modifications: Replace "horizontal sidewall sprinkler" with "recessed horizontal sprinkler." Add: Recessed escutcheon assembly shall be a steel, two-piece escutcheon with ½" adjustment (Model F2). Standard finish shall be [brass][bright chrome] [white painted] [Special finish- specify]. Residential recessed horizontal sidewall sprinklers shall be Reliable Model F1 Res 44/F2, SIN R3531 (Bulletin 135).

Model F1 Res 76 Pendent

Sprinklers shall be [cULus Listed] low flow residential pendent sprinklers engineered to provide a minimum design density of 0.05 gpm/ft² over the listed coverage area. Listed flows as specified by the manufacturer's technical data sheets are to be used. Residential sprinklers shall be installed in conformance with the manufacturer's installation guidelines and the applicable installation standard. Sprinkler frame and deflector shall be of bronze frame construction having a 3/4" NPT thread. Water seal assembly shall consist of a Teflon-coated Belleville spring washer with machined or cold head cup with 3 mm glass bulb containing no plastic parts, and having a temperature rating of [155°F (68°C)] [175°F (79°C)]. Sprinklers shall have a nominal K-factor of 7.6. Standard finish: [Bronze] [Chrome-plated] [White Polyester] [Special finish-specify]. Residential pendent sprinklers shall be Reliable Model F1 Res 76, SIN R7618 (Bulletin 135).

Model F1 Res 76 Recessed Pendent/F1, Model F1 Res 76 Recessed Pendent/F2, Model F1 Res 76 Recessed Pendent/FP

Sprinklers shall be [cULus Listed] low flow residential recessed pendent sprinklers engineered to provide a minimum design density of 0.05 gpm/ft² over the listed coverage area. Listed flows as specified by the manufacturer's technical data sheets are to be used. Residential sprinklers shall be installed in conformance with the manufacturer's installation guidelines and the applicable installation standard. Sprinkler frame and deflector shall be of bronze frame construction having a 34" NPT thread. Water seal assembly shall consist of a Teflon-coated Belleville spring washer with machined or cold head cup with 3 mm glass bulb containing no plastic parts, and having a temperature rating of [155°F (68°C)] [175°F (79°C)]. Sprinklers shall have a nominal K-factor of 7.6. Standard finish: [Bronze] [Chrome-plated] [White Polyester] [Special finish- specify]. Recessed escutcheon assembly shall be a steel, two-piece escutcheon [with 1/2" adjustment (Model F2)] [with 34" adjustment (Model F1)] [of push-on and thread off design with 1/2" adjustment (Model FP)]. Standard finish shall be [brass][bright chrome] [white painted]. Residential recessed pendent sprinklers shall be Reliable [Model F1 Res 76 Recessed Pendent/ F1] [Model F1 Res 76 Recessed Pendent/F2] [Model F1 Res 76 Recessed Pendent/FP] SIN R7618 (Bulletin 135).

Model F1 Res 76 CCP Pendent (Concealed)

Sprinklers shall be [cULus Listed] low flow residential concealed sprinklers engineered to provide a minimum design density of 0.05 gpm/ft² over the listed coverage Listed flows as specified by the manufacturer's area. technical data sheets are to be used. Residential sprinklers shall be installed in conformance with the manufacturer's installation guidelines and the applicable installation standard. Sprinkler frame and deflector shall be of bronze frame construction having a 34" NPT thread. Water seal assembly shall consist of a Teflon-coated Belleville spring washer with machined or cold head cup with 3 mm glass bulb containing no plastic parts, and having a temperature rating of 155°F (68°C). Cover plate assembly shall consist of a brass cover plate and copper alloy retainer flange. Method of attaching the cover plate to the sprinkler cup shall be a push-on and thread-off design allowing a 1/2" cover plate adjustment. Cover plate temperature rating shall be 135°F (57°C). A plastic protective cap shall be provided and factory installed inside the sprinkler cup to protect the sprinkler from damage, which could occur during construction before the cover plate is installed. Standard cover plate finish: [White] [Custom Color-specify].]. Concealed pendent sprinklers shall be Reliable Model F1 Res 76 CCP, SIN R7618 (Bulletin 135).

Finishes (1)

Standard Finishes						
Sprinkler F1, F2, FP Escutcheons Cover Plate						
Bronze Chrome Plated White and Black Polyester Coated	Brass Bright Chrome Plated White Painted	White Painted Chrome				
Special A	Special Application Finishes					
Sprinkler F1, F2, Escutcheons Cover F						
Bright Brass Black Plated Black Paint Off White Satin Chrome	Bright Brass Black Plated Black Paint Off White Satin Chrome	Bright Brass Black Plated Black Paint Off White Satin Chrome				

⁽¹⁾ Other finishes and colors are available on special order. Consult factory for details.

Note: Paint or any other coating applied over the factory finish will void all approvals and warranties.

Ordering Information Specify:

- 1. Sprinkler Model
- 2. Sprinkler Type
- 3. Temperature Rating
- 4. Sprinkler Finish
- 5. Escutcheon Finish
- 6. Cover Plate Finish

Reliable...For Complete Protection

Reliable offers a wide selection of sprinkler components. Following are some of the many precision-made Reliable products that guard life and property from fire around the clock.

- Automatic sprinklers
- Flush automatic sprinklers
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- Concealed automatic sprinklers
- Adjustable automatic sprinklers
- Dry automatic sprinklers
- Intermediate level sprinklers
- Open sprinklers
- Spray nozzles
- Alarm valves
- Retarding chambers
- Dry pipe valves
- Accelerators for dry pipe valves
- Mechanical sprinkler alarms
- Electrical sprinkler alarm switches
- Water flow detectors

- Deluge valves
- Detector check valves
- Check valves
- Electrical system
- Sprinkler emergency cabinets
- Sprinkler wrenches
- Sprinkler escutcheons and guards
- Inspectors test connections
- Sight drains
- Ball drips and drum drips
- Control valve seals
- Air maintenance devices
- Air compressors
- Pressure gaugesIdentification signs
- Fire department connection

The equipment presented in this bulletin is to be installed in accordance with the latest published Standards of the National Fire Protection Association, Factory Mutual Research Corporation, or other similar organizations and also with the provisions of governmental codes or ordinances whenever applicable

Productsmanufactured and distributed by Reliable have been protecting life and property for over 90 years, and are installed and serviced by the most highly qualified and reputable sprinkler contractors located throughout the United States, Canada and foreign countries.

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Bulletin 157 Rev.G



Model F3QR Quick Response Dry Sprinklers

Features

- 1. The Model F3QR sprinkler utilizes Belleville Spring Closure Technology. Reliable is the first in the industry to produce a Quick Response Dry Concealed sprinkler utilizing this technology.
- 2. Styles available
 - Pendent
 - Recessed FP Pendent
 - Recessed F1 Pendent
 - Concealed
 - Horizontal Sidewall
 - · Recessed Horizontal Sidewall FP
 - Recessed F1 Horizontal Sidewall
- 3. 11/2" (38mm) escutcheon adjustment on pendent sprinkler.
- 4. ½" (13mm) escutcheon adjustment on recessed sprinkler with push-on/ thread-off FP Model Escutcheon ring.
- 5. \mathscr{Y}^{*}_{a} (9.5mm) cover plate adjustment on concealed sprinkler with push-on/ thread-off CCP Cover Plate.
- ½" (19mm) escutcheon adjustment on recessed sprinkler with G/F1 Escutcheon.
- 7. Attractive appearance. Employs 3mm frangible glass bulb and galvanized nipple.
- Lengths available to accommodate installation dimensions from 2" - to - 48" (51mm - to - 1219mm), in 1/4" (6mm) increments.
- 9. Available in a variety of plated and painted finishes.

Approvals

1. Listed by Underwriters Laboratories Inc. and UL Certified for Canada (cULus)

Style	Response	Sprinkler System Type	Hazard
Pendent Recessed Pendent Recessed F1 Pendent CCP Concealed (R5714)	Quick	Wet Pipe Dry Pipe	Light
Horizontal Sidewall Recessed FP Horizontal Sidewall Recessed F1 Horizontal Sidewall (R5734)		All Preaction	Ordinary

2. Certified by FM Approvals

Style	Response	Sprinkler System Type	Hazard
Pendent Recessed F1 Pendent (R5714)	Quick	Wet Pipe, Single Interlock Preaction	Light Ordinary, Groups 1&2
Horizontal Sidewall Recessed F1 Horizontal Sidewall (R5734)	Quick	Wet Pipe, Single Interlock Preaction	Light

3. NYC MEA 258-93-E

The Reliable Automatic Sprinkler Co., Inc., 103 Fairview Park Drive, Elmsford NY 10523



Concealed





Recessed FP Pendent

Recessed F1 Pendent



Pendent



AT.

Horizontal Sidewall



Model F3QR Dry Pendent Sprinkler

"A" Dim. 2" to 48" (51mm to 1219mm) in 1/4" (6mm) increments

Finishes⁽¹⁾

Sprinkler	Escutcheon	
Bronze Chrome Plated White ⁶⁹	Brass Chrome Plated White	

⁽¹⁾ Other finishes and colors are available on special order.

Consult factory for details.

²⁹ White coated sprinklers will have chrome plated cans.

Standard Temperature Ratings

Classification	Sprinkler Temperature Rating		l Amble	Max. ent Temp.	Bulb Color
Ordinary	135°F	(57°C)	100°F	(38°C)	Orange
Ordinary	155°F	(68°C)	100°F	(38°C)	Red
Intermediate	200°F	(93°C)	150°F	(66°C)	Green
High	286°F	(141°C)	225°F	(107°C)	Blue

Sprinkler can and escutcheon fabricated of brass for better weather resistance in exterior applications.

Sprinkler Guard: Model C-2

Sprinkler Installation Wrench

Model G3 Sprinkler Wrench

Sprinkler Identification Number (SIN): R5714



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Note: The sprinkler Can protrudes ¼" when escutcheon is in nominal position. Escutcheon adjustment provides +¼" (+6mm) to -1¼" (-32mm) "A" dimension adjustment range.

Model F3QR Dry Recessed Pendent Sprinkler

"A" Dim. 31/2" to 48" (89mm to 1219mm) in 1/4" (6mm) increments

Finishes⁽¹⁾

Sprinkler	Escutcheon
Bronze	Brass
Chrome Plated	Chrome Plated
White	White

⁽¹⁾ Other finishes and colors are available on special order. Consult factory for details. Cup remains unfinished. Only the escutcheon will contain desired finish.

Standard Temperature Ratings

Ordinary 135°F (57°C) 100°F ((38°C)	Orange
Ordinary 155°F (68°C) 100°F ((38°C)	Red
Intermediate 200°F (93°C) 150°F (66°C)	Green
High* 286°F (141°C) 225°F (1	07°C)	Blue

Sprinkler cup and FP escutcheon fabricated of steel and recomended for interior applications.

* Listed and Certified only by cULus

Sprinkler Installation Wrench

Model G3 R/C Sprinkler Wrench

Sprinkler Identification Number (SIN): R5714



Note: Do not install the Model F3QR Dry Pendent Recessed Sprinkler in ceilings which have positive pressure in the space above.

Model F3QR Dry Pendent Concealed Sprinkler

"A" Dim. 31/2" to 48" (89mm to 1219mm) in 1/4" (6mm) increments

CCP Cover Plate⁽¹⁾ Finishes⁽²⁾

Standard Finishes	Special Application Finishes
Chrome Plated White	Bright Brass Plated Black Plated Black Paint Off White Satin Chrome

 ⁽¹⁾ Utilizes the ½ⁿ cover plate with %ⁿ total adjustment.
⁽²⁾ Other finishes and colors are available on special order. Consult factory for details.

Standard Temperature Ratings

Classification	Sprinkler Temperature Rating		Cover Plate Temp. Rating		Max. Ambient Temp.	
Ordinary	135°F	(57°C)	135°F	(57°C)	100°F	(38°C)
Ordinary	155°F	(68°C)	135°F	(57°C)	100°F	(38°C)
Intermediate	200°F	(93°C)	165°F	(74°C)	150°F	(66°C)
High*	286°F	(141°C)	165°F	(74°C)	150°F	(66°C)

Sprinkler cup fabricated of steel and CCP Cover Plate fabricated of brass and recommended for interior applications.

* Listed and Certified only by cULus.

Sprinkler Installation Wrench:

Model G3 R/C Sprinkler Wrench

Sprinkler Identification Number (SIN): R5714

Model F3QR Dry Horizontal Sidewall Sprinkler

"A" Dim. 2" to 48" (51mm to 1219mm) in 1/4" (6mm) increments

Finishes⁽¹⁾

Sprinkler	Escutcheon	
Bronze Chrome Plated White ⁽²⁾	Brass Chrome Plated White	

Other finishes and colors are available on special order. Consult factory for details.

⁽²⁾ White coated sprinklers will have chrome plated can.

Standard Temperature Ratings

			-		
Classification	Sprinkler Temperature Rating		Max. Ambient Temp.		Bulb Color
Ordinary Ordinary Intermediate High	135°F 155°F 200°F 286°F	(57°C) (68°C) (93°C) (141°C)	100°F 100°F 150°F 225°F	(38°C) (38°C) (66°C) (107°C)	Orange Red Green Blue

Sprinkler can and escutcheon fabricated of brass for weather resistance in exterior applications.

Sprinkler Installation Wrench:

Model G3 Sprinkler Wrench

Sprinkler Identification Number (SIN): R5734







Note: The sprinkler Can protrudes ¹/₄" when escutcheon is in nominal position. Escutcheon adjustment provides +¹/₄" (+6mm) to -1¹/₄" (-32mm) "A" dimension adjustment range.

Model F3QR Dry Recessed F1 Pendent Sprinkler

"A" Dim. 31/2 to 48" (89mm to 1219mm) in 1/4" (6mm) increments

Finishes⁽¹⁾

Sprinkler	Escutcheon	Collar
Chrome Plated	Chrome Plated	Chrome Plated
White	White	White

⁽¹⁾ Other finishes and colors are available on special order. Consult factory for details.

Standard Temperature Ratings

Classification	Sprinkler Temperature Rating		Ambi	Max. ent Temp.	Buib Color
Ordinary	135°F	(57°C)	100°F	(38°C)	Orange
Ordinary	155°F	(68°C)	100°F	(38°C)	Red
Intermediate	200°F	(93°C)	150°F	(66°C)	Green
	286°F	(141°C)	225°F	(107°C)	Blue

* Listed and Certified only by cULus.

Sprinkler Installation Wrench:

Model G3 R/C Sprinkler Wrench

Sprinkler Identification Number (SIN): R5714

Model F3QR Dry Horizontal Recessed F1 Sidewall Sprinkler

"A" Dim.	31/2" to 48" (89mm to 1219mm) i	n ¼" (6mm) increments

Finishes⁽¹⁾

Sprinkler	Escutcheon	Collar
Chrome Plated	Chrome Plated	Chrome Plated
White	White	White

⁽¹⁾ Other finishes and colors are available on special order. Consult factory for details.

Standard Temperature Ratings

Classification	Sprinkler Temperature Rating		Ambi	Max. ent Temp.	Bulb Color
Ordinary Ordinary Intermediate	135°F 155°F 200°F	(57°C) (68°C) (93°C)	100°F 100°F 150°F	(38°C) (38°C) (66°C)	Orange Red Green
High*	286°F	(141°C)	225°F	(107°C)	Blue

* Listed and Certified only by cULus.

Sprinkler Installation Wrench:

Model G3 R/C Sprinkler Wrench

Sprinkler Identification Number (SIN): R5734





- Listed by cULus for Quick Response. Approved by FM for Standard Response.
- Recessed Horizontal sidewall sprinklers are listed with cULus for installation of min. 4" (100mm) - to max. 6" (150mm) below ceiling and approved by FM for installation of min. 4" (100mm) - to - max. 12" (300mm) below ceiling.

Model F3QR Dry Horizontal Recessed Sidewall Sprinkler

"A" Dim. 31/2" to 48" (89mm to 1219mm) in 1/4" (6mm) increments

Finishes⁽¹⁾

Sprinkler	Escutcheon
Bronze	Brass
Chrome Plated	Chrome Plated
White	White

Other finishes and colors are available on special order. Consult factory for details. Cup remains unfinished. "See page 2"

Standard Temperature Ratings

Classification	Sprinkler Temperatu Classification Rating			Max. ent Temp.	Bulb Color
Ordinary	135°F	(57°C)	100°F	(38°C)	Orange
Ordinary	155°F	(68°C)	100°F	(38°C)	Red
Intermediate	200°F	(93°C)	150°F	(66°C)	Green
High*	286°F	(141°C)	225°F	(107°C)	Blue

* Listed and Certified only by cULus.

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Sprinkler Installation Wrench: Model G3 R/C Sprinkler Wrench

Nodel do n/C oplitikier wiench

Sprinkler Identification Number (SIN): R5734

Technical Data:

Orifice Size: ½" (15mm) Thread Size: 1" NPT per ANSI B2.1 Working Pressure: 175 psi (12 bar) Nominal K Factor - US / (Metric): 5.6 / (80)

Product Description

Reliable Model F3QR Dry Sprinklers are quick response sprinklers utilizing a durable 3mm frangible glass bulb. This quick response enables these sprinklers to apply water to a fire much sooner than standard response sprinklers of the similar temperature rating.

Model F3QR Dry Sprinklers are intended for use in dry and preaction systems and in areas subjected to freezing temperatures, such as freezers and unheated portions inside and outside buildings.

Environments wherein dry sprinklers are employed can be corrosive. For this reason, Model F3 Sprinklers have a special wax fillet placed in the gap between the cup that supports the bulb and the wrenching boss. This wax will not interfere with the operation of the sprinkler, and it prevents contaminents from entering the internal portion of the drop nipple. The wax must not be removed.

Operation

The glass bulb consists of an accurately controlled amount of special fluid hermetically sealed inside a precisely manufactured glass capsule. This glass bulb is specially constructed to provide fast thermal response. When the temperature increases sufficiently, due to a fire, the bulb shatters allowing operating parts to clear the waterway. This enables the inlet seal to release air or water and subsequently, cause water flow over the deflector in a uniform spray pattern, controlling or extinguishing the fire.



Notes: Do not install the Model F3QR Dry Horizontal Recessed Sidewall Sprinkler in walls which have positive pressure in their side space.

- Listed by cULus for Quick Response. Approved by FM for Standard Response.
- Recessed Horizontal sidewall sprinklers are listed with cULus for installation of min. 4" (100mm) - to max. 6" (150mm) below ceiling and approved by FM for installation of min. 4" (100mm) - to - max. 12" (300mm) below ceiling.

Ordering Information

Specify:

- 1. Sprinkler Type (select one):
 - (a) Model F3QR Dry Pendent
 - (b) Model F3QR Dry Recessed Pendent
 - (c) Model F3QR Dry Recessed F1 Pendent
 - (d) Model F3QR Dry Concealed Pendent
 - (e) Model F3QR Dry Horizontal Sidewall
 - (f) Model F3QR Dry Recessed Horizontal Sidewall

(g) Model F3QR Dry Recessed F1 Horizontal Sidewall

- 2. Sprinkler Temperature Rating.
- 3. Sprinkler Finish.
- 4. Escutcheon type (G/F1 or FP).
- 5. Cover Plate/Escutcheon Finish.
- Length: "A" Dimension (face of tee to face of ceiling or wall) in ¼" (6mm) increments.
- 7. Model F3QR Dry Pendent (a) is available without sprinkler can and escutcheon.

Note:

- 1. The "A" dimension is based on a nominally gauged pipe thread "make-up" of 0.600" (15mm) per ANSI B2.1 [7¹/₂ threads approximately].
- 2. All platings and paintings are decorative and intended for interior use.

General Installation Instructions

Model F3QR dry sprinklers must be installed only in standard (ANSI B 16.3 class 150 and ANSI B 16.4 class 125) pipe tees in the horizontal position, even at branch line ends. They should not be installed into elbows or pipe couplings located on drop nipples to the sprinklers. For these and other fittings including CPVC*, the dry sprinkler should be installed into a fitting to allow protrusion into the fitting in accordance with the diagrams. The "A" dimension of the dry sprinkler, which extends into the freezers or a freezing zone from wet pipe systems, should be selected to provide, as a minimum, the specified lengths in inches shown in the following table, between face of the fitting and the exterior face of the protected area. The following table is used for freezing zones when the ambient temperature around the wet pipe system is kept at 40 °F (4°C), and specifies the minimum length from fitting face to inside face of ceiling or wall for different protected area temperatures.

TABLE 1 (See Fig. 8)

Minimum Length (Face to inside Face Ceiling/Wall)	Temperature (Protected Area)**
12 inches / 300 mm	-20°F / -29°C
18 inches / 450 mm	-40°F / -40°C
24 inches / 600 mm	-60°F / -51°C
** For temperatures falling between the minimum length may be determined by	ose in the above chart, the interpolation.

During installation, the following steps must be followed:

- 1. Cut the specified size hole (see illustrations) for the sprinkler in the ceiling or wall directly in line with the tee.
- Apply pipe joint compound to the 1" (25mm) pipe threads and install sprinkler using the Model G3 or G3 R/C Sprinkler Wrench as specified.
- 3. Install the Model FP push-on / thread-off escutcheon or CCP cover plate if required.

Note: Installation of the Model F3QR Sprinklers is not recommended in copper pipe systems, as this may reduce the life expectancy of the sprinklers.

Model F3QR Concealed and Recessed Installation Instructions

- The Model G3 R/C wrench (Fig. 1) is designed to locate on the wrenching pads of the recessed sprinkler while centering in the cup. A standard ½" drive ratchet may be used to drive this wrench. Figures 1 and 2 show sequentially the insertion of the wrench. First the wrench, with its jaws above the sprinkler deflector, is moved laterally until centered with the cup. Then raise the wrench inside of the cup until its jaws engage the sprinkler's square wrenching pads (Fig. 3). To remove the wrench, follow this procedure in reverse order. Care should be taken to avoid striking the deflector, with the wrench.
- Model G3 Wrench (Fig. 4) is used for installation of Pendent and Horizontal Sidewall sprinklers.
- Glass bulb sprinklers have orange bulb protectors to minimize bulb damage during shipping, handling and installation. REMOVE THIS PROTECTION AT THE TIME THE SPRINKLER SYSTEM IS PLACED IN SERVICE FOR FIRE PROTECTION. Removal of the protectors

before this time may leave the bulb vulnerable to damage. RASCO wrenches are designed to install sprinklers when covers are in place. REMOVE PROTECTORS BY UNDOING THE CLASP BY HAND. DO NOT USE TOOLS TO REMOVE THE PROTECTORS.

Maintenance

The Model F3QR Quick Response Dry Sprinklers should be inspected quarterly and the sprinkler system maintained in accordance with NFPA 25. Do not remove the factory applied thermally sensitive wax fillet between the bulb supporting cup and the wrenching boss. Do not replace this wax with a substitute substance. An Alternate substance may interfere with proper operation of the sprinkler. Do not clean sprinklers with soap and water, ammonia or any other cleaning fluids. Remove dust by using a soft brush or gently vacuuming. Remove any sprinkler which has been painted (other than factory applied) or damaged in any way. A stock of spare sprinklers should be maintained to allow quick replacement of damaged or operated sprinklers. Prior to installation, sprinklers should be maintained in the original cartons and packaging until used to minimize the potential for damage to sprinklers that would cause improper operation or non-operation.

*Spears CPVC sprinkler adapter tees (with steel thread insert) can only be used with horizontal sidewall sprinklers which do not require protrusion into tees to prevent ice or debris blockage of sprinkler inlets. These CPVC tees do not permit sufficient sprinkler inlet protrusion as required for pendent installation.







Fig. 4 - G3 Wrench

Reliable...For Complete Protection

Reliable offers a wide selection of sprinkler components. Following are some of the many precision-made Reliable products that guard life and property from fire around the clock.

- Automatic sprinklers
- Flush automatic sprinklers
- Recessed automatic sprinklers
- Concealed automatic sprinklers
- Adjustable automatic sprinklers
- Dry automatic sprinklers
- Intermediate level sprinklers
- Open sprinklers
- Spray nozzles
- Alarm valves
- Retarding chambers
- Dry pipe valves
- Accelerators for dry pipe valves
- Mechanical sprinkler alarms
- Electrical sprinkler alarm switches
- Water flow detectors

- Deluge valves
- Detector check valves
- Check valves
- Electrical system
- Sprinkler emergency cabinets
- Sprinkler wrenches
- Sprinkler escutcheons and guards
- Inspectors test connections
- Sight drains
- Ball drips and drum drips
- Control valve seals
- Air maintenance devices
- Air compressors
- Pressure gauges
- Identification signs
- Fire department connection

The equipment presented in this bulletin is to be installed in accordance with the latest pertinent Standards of the National Fire Protection Association, Factory Mutual Research Corporation, or other similar organizations and also with the provisions of governmental codes or ordinances whenever applicable.

Products manufactured and distributed by Reliable have been protecting life and property for over 80 years, and are installed and serviced by the most highly qualified and reputable sprinkler contractors located throughout the United States, Canada and foreign countries.

Manufactured by



The Reliable Automatic Sprinkler Co., Inc.

(800) 431-1588 (800) 848-6051 (914) 829-2042 www.reliablesprinkler.com Sales Offices Sales Fax Corporate Offices Internet Address



Revision lines indicate updated or new data E.G. Printed in USA 05/09 P/N9999970175

Model F1FR Series Quick Response Standard Spray

Bulletin 014 Rev. D

Kelable

Model F1FR 56 Sprinkler Types

Standard Upright Standard Pendent Conventional Vertical Sidewall Horizontal Sidewall

Model F1FR 56 Recessed Sprinkler Types Standard Pendent/F1/F2/FP

Horizontal Sidewall

Model F1FR 56 Concealed Sprinkler Types Standard Pendent

Listing & Approvals

- 1. Underwriters Laboratories Inc. and Certified for Canada (cULus).
- 2. Factory Mutual Approvals (FM)
- 3. Loss Prevention Council (LPCB, UK)
- 4. VdS Schadenverhütung GmbH

UL Listing Category

Sprinklers, Automatic & Open (VNIV) Quick Response Sprinkler

Product Description

Reliable Models F1FR Series Sprinklers are quick response sprinklers which combine the durability of a standard sprinkler with the attractive low profile of a decorative sprinkler.

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

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

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



R



Upright



Vertical Sidewall



Horizontal Sidewall



Recessed Horizontal Sidewall

Conventional



Recessed Pendent/F1/F2



Pendent/FP

Application

Quick response sprinklers are used in fixed fire protection systems: Wet, Dry, Deluge or Preaction. Care must be exercised that the orifice size, temperature rating, deflector style and sprinkler type are in accordance with the latest published standards of the National Fire Protection Association or the approving Authority Having Jurisdiction. Quick response sprinklers are intended for installation as specified in NFPA 13. Quick response sprinklers and standard response sprinklers should not be intermixed.

The Reliable Automatic Sprinkler Co., Inc., 103 Fairview Park Drive, Elmsford, New York 10523

Pendent

Model F1FR Quick Response Upright, Pendent & Conventional Sprinklers

Installation Wrench: Model D Sprinkler Wrench Installation Data:

Nominal	Thread	Nominai	K Factor	Sprinkler	Sprinkler	Approval	Sprinkler ident (\$	lification Number SIN)
Orifice	Orifice Size US Metric Height Organization	Upright	Pendent					
	Standard-Upright (SSU) and pendent Deflectors Marked to Indicate Position							
½" (15mm)	½" NPT(R½)	5.6	80	2.25" (57mm)	1, 2, 3, 4	RA1425 ⁽¹⁾	RA1414 (1)(2)	
	Conventional-Install in Upright or Pendent Position							
15mm ⁽¹⁾	1/2" NPT(R1/2)	5.6	80	57mm	3,4	RA	1475	

(1) cULus listed corrosion resistant (Polyester coated) sprinkler.

⁽²⁾ Polyester coated FM approved sprinkler.



Upright



G

Conventional

Pendent

Model F1FR 56 Quick Response Recessed Pendent Sprinkler

Installation Wrench: Model GFR2 Sprinkler Wrench

Installation Data:

N	ominal	Thread	K Factor		Sprinkler	Sprinkler Identification Number
	Orifice	Size	US	Metric	Height	(SIN)
1/2'	' (15mm)	½" NPT(R½)	5.6	80	2.25" (57mm)	RA1414

(1) Refer to escutcheon data table for approvals and dimensions.



Model F1FR 56/F1 or F2



Model F1FR Quick Response Vertical Sidewall Sprinkler Installation Wrench: Model D Sprinkler Wrench Installation Position: Upright or Pendent Approval Type: Light Hazard Occupancy Installation Data:

Nominal		Nominal	K Factor	Sprinkler	Approval	Sprinkler	
Orifice	Thread Size	US	Metric	Helght	Organizations	Identification Numbers (SIN)	
½" (15mm)	1/2" NPT (R1/2)	5.6	8.0	2.25" (57mm)	1,2,3,4	DA1405	
15mm	1⁄2" NPT (R1/2)	5.6	8.0	2.25" (57mm)	4 ⁽¹⁾	RA 1465	

⁽¹⁾LPC Approval is for pendent position only.



Sprinkler Type	Deflector to Ceiling Distance (Min Max.)
Upright	4" (102mm) - 12" (305mm)
Pendent	4" (102mm) - 12" (305mm)

Vertical Sidewall

Model F1FR Quick Response Horizontal SIdewall Sprinkler Deflector: HSW

Installation Wrench: Model D Sprinkler Wrench Installation Data: Horizontal Sidewall

	Thread Olea	Nominal	K Factor	Sprinkler Height	Approval O and Type o	rganizations of Approval	Sprinkler
Nominal Orifice	Thread Size	US	Metric	-	Light Hazard	Ordinary Hazard	Numbers (SIN)
½" (15mm)	1/2" NPT (R1/2)	5.6	80	2.63" (67mm)	1,2	1	RA1435



Horizontal Sidewall



Model F1FR Quick Response Concealed Pendent Sprinklers

Installation Wrench: Model RC1 Sprinkler Wrench Technical Data:

Nominal	"K"	Factor	Thread		Temp.	Rating	Max. Amblent Temp	Max. Ambient Temp	Bulb		Sprinkler
Orifice	US	Metric	Size	Model	Sprinkler Cover Temp Color	Ambient Temp			Amblent Temp Color	Color	Approvals
½" (15mm)	5.6	80	1⁄2" NPT	F1FR	135°F/57°C	135°F/57°C	100°F/38°C	Orange	1, 2	RA1414	
½" (15mm)	5.6	80	1⁄2" NPT	F1FR	155°F/68°C	135°F/57℃	100°F/38°C	Red	1, 2, 4(1)	RA1414	
½" (15mm)	5.6	80	1⁄2" NPT	F1FR	175°F/79°C	165°F/74°C	100°F/38°C	Yellow	1,2	RA1414	
½" (15mm)	5.6	80	1⁄2" NPT	F1FR	200°F/93°C	165°F/74°C	100°F/38°C	Green	1,2	RA1414	

(1) For VdS only = 155°F/68°C Norbulb and 1/2" [12,7mm] adjustment.





Installation Aid

A protective cap is included for use during installation. Important: The F1FR 56 Sprinkler with Model CCP cover plate is not an FM Approved combination.

Installation

Quick response sprinklers are intended for installation as specified in NFPA 13. Quick response sprinklers and standard response sprinklers should not be intermixed.

The Model F1FR 56 Recessed Quick Response Sprinklers are to be installed as shown. The Model F1 or F2 Escutcheons illustrated are the only recessed escutcheons to be used with the Model F1FR 56 Sprinklers. The use of any other recessed escutcheon will void all approvals and negate all warranties.

When installing Model F1FR 56 Sprinklers, use the Model D Sprinkler Wrench. Use the Model GFR2 Wrench for installing F1FR 56 Recessed Pendent Sprinklers. Any other type of wrench may damage these sprinklers.

NOTE: A leak tight $\frac{1}{2}$ " NPT (R1/2) sprinkler joint can be obtained with a torque of 8-18 ft-lbs (10,8 - 24,4 N-m). Do not tighten sprinklers over maximum recommended torque. It may cause leakage or impairment of the sprinklers.

The Model F1FR 56/ CCP Concealed Sprinkler uses the ½" orifice, ½" NPT (R1/2), 135°F (57°C), 155°F (68°C), 175°F (79°C) or 200°F (93°C) Model F1FR 56 Pendent





Sprinkler with a threaded Model CCP cup which is factory attached to the sprinkler. The assembly is completed by the installation of the attractive, low profile, $135^{\circ}F$ (57°C) or $165^{\circ}F$ (74°C) rated Model CCP push on cover plate assembly. The cover plate and sprinkler cup assemblies are joined using a cover plate skirt with flexible tabs for threaded engagement. A choice of two cover plate assemblies provide either $\frac{1}{2}$ " (13mm) or $\frac{5}{16}$ " (8mm) of cover adjustment.

Do not install these sprinklers in ceiling which have positive pressure in the space above.

After a 2⁵/e" (67mm) diameter hole is cut in the ceiling, the sprinkler is easily installed with the Model RC1 Wrench. A Teflon* based thread sealant should be applied to the sprinkler threads only. The Model RC1 Wrench is then used to engage the sprinkler wrenching surfaces and to install the sprinkler in the fitting. When inserting or removing the wrench from the sprinkler/cup assembly, care should be taken to prevent damage to the sprinkler. <u>DO NOT WRENCH ON ANY OTHER PART</u> <u>OF THE SPRINKLER</u>. The cover plate is then pushed onto the cup. Final adjustment is made by hand turning the cover plate until the skirt flange makes full contact with the ceiling. Cover plate removal requires turning in the counter clockwise direction. After installation, inspect all sprinklers to ensure that there is a gap between the cover plate and ceiling and that the four cup slots are open and free from any air flow impediment to the space above.

Concealed cover plate/cup assemblies are listed only for use with specific sprinklers. The use of any other concealed cover plate/cup assembly with the Model F1FR 56 Pendent Sprinkler or the use of the Model CCP Concealed cover plate assembly on any sprinkler with which it is not specifically listed my prevent good fire protection and will void all guarantees, warranties, listings and approvals.

Glass bulb sprinklers have orange bulb protectors to minimize bulb damage during shipping, handling and installation. REMOVE THIS PROTECTION AT THE TIME THE SPRINKLER SYSTEM IS PLACED IN SERVICE FOR FIRE PROTECTION. Removal of the protectors before this time may leave the bulb vulnerable to damage. RASCO wrenches are designed to install sprinklers when covers are in place. REMOVE PROTECTORS BY UNDOING THE CLASP BY HAND. DO NOT USE TOOLS TO REMOVE THE PROTECTORS.

Temperature Ratings

Classification	Sprii Tempe	nkler erature	Max. Ambient	Bulb Color	
	°C	°F	remp.		
Ordinary	57	135	100°F (38°C)	Orange	
Ordinary	68	155	100°F (38°C)	Red	
Intermediate	79	175	150°F (66°C)	Yellow	
Intermediate	93	200	150°F (66°C)	Green	
High ⁽¹⁾	141	286	225°F (107°C)	Blue	

⁽¹⁾ Not available for recessed sprinklers.

Escutcheon Data ⁽¹⁾

Escutcheon Model	Approvals	Adjustment	"A" Dimension	Face of Fitting to Ceiling or Wall Dimension
F1	1,3,4	Max Recess Min Recess	1½" (38.1mm) ¾" (19.1mm)	³ /16" - ¹⁵ /16" (5mm - 24mm)
F2	1, 2, 3, 4	Max Recess Min Recess	1 ½" (38.1mm) 1" (25mm)	³ /16" - ¹¹ /16" (5mm - 17mm)
FP Push-on/ Thread-off	1,4	Max Recessed Min Recessed	⁷ /16" (11mm) ¹⁵ /16 (24mm)	11/2" (38.1mm) 1" (25.4mm)

⁽¹⁾ SIN: RA1435 - cULus and FM permits use with F1 or F2 escutcheons for light hazard only.

Maintenance

The Models F1FR 56 and F1FR 56 Recessed Sprinklers should be inspected quarterly and the sprinkler system maintained in accordance with NFPA 25. Do not clean sprinklers with soap and water, ammonia or any other cleaning fluids. Remove dust by using a soft brush or gentle vacuuming. Remove any sprinkler which has been painted (other than factory applied) or damaged in any way. A stock of spare sprinklers should be maintained to allow quick replacement of damaged or operated sprinklers. Prior to installation, sprinklers should be maintained in the original cartons and packaging to minimize the potential for damage to sprinklers that would cause improper operation or non-operation.

Sprinkler Types

Standard Upright Standard Pendent Conventional Recessed Pendent Vertical Sidewall Horizontal Sidewall Recessed Horizontal sidewall Concealed pendent

Finishes (1)

Standard Finishes							
Sprinkler	Escutcheon	Cover plate					
Bronze	Brass						
Chrome Plated	Chrome	Chrome					
White Polyester	Plated	White					
Coated (4)(5)	White Painted						
Specia	Application Finish	es					
Sprinkler	Escutcheon	Cover plate					
Bright Brass (3)	Bright Brass	Bright Brass					
Black Plated	Black Plated	Satin					
Black Paint (2)	Black Paint	Off White					
Off White (2)	Off White	Black Paint					
Satin Chrome	Satin Chrome	Black Plated					

⁽¹⁾ Other finishes and colors are available on special order. Consult the factory for details.

⁽²⁾ cULus Listed only.

(3) 200°F (93°C) maximum.

(4) cULus listed "corrosion resistance" applies to SIN Numbers

 RA1425 (Upright) and RA1414 (Pendent) in standard black or white.
FM Approvals finish as "Polyester coated" applies to SIN Number RA1414 (Pendent) in standard black or white.

Ordering Information Specify:

- 1. Sprinkler Model
- 2. Sprinkler Type
- 3. Orifice Size
- 4. Deflector Type
- 5. Temperature Rating
- 6. Sprinkler Finish
- 7. Escutcheon Type
- 8. Escutcheon Finish (where applicable)
- 9. Cover plate Model
- 10. Cover plate Thread size
- 11. Cover plate Temperature
- 12. Cover plate Adjustment
- 13. Cover plate Finish

13. Cover plate Fillish

Note: When Model F1FR 56 Recessed sprinklers are ordered, the sprinklers and escutcheons are packaged separately.

Reliable...For Complete Protection

Reliable offers a wide selection of sprinkler components. Following are some of the many precision-made Reliable products that guard life and property from fire around the clock.

- Automatic sprinklers
- Flush automatic sprinklers
- Recessed automatic sprinklers
- Concealed automatic sprinklers
- Adjustable automatic sprinklers
- Dry automatic sprinklers
- Intermediate level sprinklers
- Open sprinklers
- Spray nozzles
- Alarm valves
- Retarding chambers
- Dry pipe valves
- Accelerators for dry pipe valves
- Mechanical sprinkler alarms
- Electrical sprinkler alarm switches
- Water flow detectors

- Deluge valves
- Detector check valves
- Check valves
- Electrical system
- Sprinkler emergency cabinets
- Sprinkler wrenches
- Sprinkler escutcheons and guards
- Inspectors test connections
- Sight drains
- Ball drips and drum drips
- · Control valve seals
- Air maintenance devices
- Air compressors
- Pressure gaugesIdentification signs
- Fire department connection

The equipment presented in this bulletin is to be installed in accordance with the latest published Standards of the National Fire Protection Association, Factory Mutual Research Corporation, or other similar organizations and also with the provisions of governmental codes or ordinances whenever applicable. Productsmanufactured and distributed by Reliable have been protecting life and property for over 90 years, and are installed and serviced by the most highly qualified and reputable sprinkler contractors located throughout the United States, Canada and foreign countries.

Manufactured by



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



Revision lines indicate updated or new data. EG. Printed in U.S.A 02/10 P/N 9999970300



Bulletin 035 Rev. H

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Residential Sprinkler For Sloped Ceilings

Guidelines for Listed Residential Sprinkler Installations below Sloped Cellings

The installation guidelines cover Residential Sprinkler Models:

F1 Res 49 Pendent F1 Res 49 Recessed Pendent/F2 F1 Res 58 Pendent F1 Res 58 Recessed Pendent/F2 F1 Res 44 HSW F1 Res 44 Recessed HSW/F2 F1 Res 49 CCP F1 Res 58 CCP RFC 43 Flat Concealed RFC 49 Flat Concealed

Listings & Approvals

 Listed by Underwriters Laboratories inc. and UL Certified for Canada (cULus)
NYC MEA 258-93-E

UL Listing Category

Residential Automatic Sprinkler UL Guide Number VKKW

Patents: US Patent number 6,516,893 Model F1 Res 49

Product Description for F1 Res Sprinklers Model F1 Res Pendent sprinklers are fast response

sprinklers combining excellent durability, high sensitivity glass-bulb and low profile decorative design. The F1 Res Hortzontal Sidewall sprinklers are equally attractive when above celling piping cannot be used.

The 3mm glass-bulb pendent sprinklers, with a K Factor of 4.9 & 5.8 for pendent and 4.4 for horizontal sidewall, permit the efficient use of residential water supplies for sprinkler coverage in residential fire protection design.

The low flow F1 Res sprinklers are specially engineered for fast thermal response to meet the sensitive fire protection application needs of the latest residential market standards (UL 1626 Standard *). Upon fire conditions, rising heat causes a sprinkler's heat-sensitive glass-bulb to shatter, releasing the waterway for water flow onto the deflector, evenly distributing the discharged water to control a fire.





F1 Res 44 HSW





Pendent

* Effective date July 12, 2002

The Reliable Automatic Sprinkier Co., Inc., 103 Fairview Park Drive, Elmsford, New York 10523

Product Description for RFC 43 & RFC 49

Model RFC43 & RFC49 Concealed Residential Sprinkiers are fast response residential fusible solder link automatic sprinklers. Residential sprinklers differ from standard sprinklers primarily in their response time and water distribution patterns.

Model RFC43 & RFC49 sprinklers discharge water in a hemispherical pattern below the sprinkler deflector. Residential distribution patterns are higher and generally contain a finer droplet size than standard sprinkler patterns.

The combination of speed of operation and high discharge pattern required for residential sprinklers has demonstrated, in fire testing, an ability for controlling residential fires, and thereby providing significant evacuation time for occupants.

The RFC43 & RFC49 Sprinkler provides the best form of fire protection by combining an attractive appearance and ½* (13mm) of cover adjustment for ease of installation. The small diameter cover plate is easily and positively attached and blends into the ceiling, concealing the most dependable fire protection available, an automatic sprinkler system.

The RFC43 & RFC49 are UL Listed Residential Sprinkler to be installed in the residential portions of any occupancy in accordance with NFPA 13, 13R, & 13D.

The RFC43 & RFC49 can reduce the need for precise cutting of drop nipples. The threaded cover plate assembly can be adjusted without tools to fit accurately against the ceiling. The fire protection system need not be shut down to adjust or remove the cover plate assembly.

Technical Data (F1 Res Sprinklers):

- · Thermal Sensor : Nominal 3mm glass-bulb
- Sprinkler Frame : Brass Casting
- Sprinkler Pressure Rating : 175 psi Factory Hydrostatically Tested to 500 psi
- Thread Size : ½" NPT (R½)
- K Factor : 4.9 (Actual) F1 Res 49 Pendent Sprinkler 4.4 (Actual) - F1 Res 44 HSW Sprinkler 5.8 (Actual) - F1 Res 58 Pendent Sprinkler
- Density : Minimum .05 gpm/ft²

Technical Data (RFC 43 & RFC 49):

- Thermal Sensor: 165°F Fusible Link
- Sprinkler Frame : Brass Machined
- Sprinkler Pressure Rating : 175 psi Factory Hydrostatically Tested to 500 psi
- Thread Size : ½" NPT (R½)
- K Factor : 4.3 (Actual) FFC43; 4.9 (Actual) RFC49
- Density : Minimum .05 gpm/ft²

Application

2.

Model F1 Res and RFC 43 & RFC 49 Sprinklers are used for Residential Fire Protection according to UL 1626 Standard". Be sure that orifice size, temperature rating, deflector style, cover plate and sprinkler type are in accordance with the latest published standards of The National Fire Protection Association or the approving Authority Having Jurisdiction.

* Effective date July 12, 2002



F1 Res 44 Recessed HSW/F2

F1 Res 49 & 58

Recessed Pendent / F2

Model F1 Res 49 Pendent & F1 Res 49 Recessed Pendent/F2 & F1 Res 49 CCP Pendent, Model F1 Res 58 Pendent & F1 Res 58 Recessed Pendent/F2 & F1 Res 58 CCP Pendent, RFC 43 & RFC 49 Pendent Flat Concealed Sprinklers installed below Sloped Ceilings.



З.



Pendent



F1 Res 49 & 58

Recessed Pendent / F2



F1 Res 49 & 58 CCP Pendent



RFC 43 & RFC 49

Note: F1 Res 49 CCP Pendent, RFC 43 and RFC 49 sprinklers are not suitable for installation in ceilings which have positive pressure in the space above.



RFC 43 & RFC 49



Sprinkler spacing below multiple sloped ceilings with a maximum slope of %/12 (33.7°) pitch.

5.

6.

Model F1Res 49 Pendent & F1 Res 49 Recessed Pendent/F2 Installed below Sloped Celling. **Technical Data**

Thread Stze	Max. Pressure pel (bar)	Max. Amblent Temp. °F (°C)	Actual K Factor (metric)	Sprinkler Length	Escutcheon	Sprinkler Identification Number (SIN)
14" NPT (R1%)	175 (12)	100 (38)	4.9 (89,94)	2.25° (57mm)	F2 (1/2" Adjustment)	. R3516

Table 1 - Application

	M	n, Slope of %	(33.7") Pilich		Max, Slope of % (18.4") Plich		
Max. Sprinkler Specing Along Slope (W) Width x (L) Length R (m)	Min. Flow Per Sprinider Head gpm (Lpm)		Pressure pel (ber)		Sprinkler Temp. Paring "F ("C) 165 (68) & 175 (79)		
	158°# (08°C)	1757F (79°C)	155"F (66°C)	1767F (79°C)	Min. Flow Per Sprintder Head gpm (Lpm)	Pressure pei (ber)	
12 x 12 (3,6 x 3,6)	13 (49)	13 (49)	7.0 (0,48)	7.0 (0,48)	13 (49)	7.0 (0,48)	
14 x 14 (4,3 x 4,3)	13 (49)	13 (49)	7.0 (0,48)	7.0 (0,48)	13 (49)	7.0 (0,48)	
16 x 16 (4,9 x 4,9)	13 (49)	13 (49)	7.0 (0,48)	7.0 (0,48)	13 (49)	7.0 (0,48)	
18 x 18 (5,5 x 5,5)	17 (64,3)	18 (68,2)	12.0 (0,83)	13.5 (0,93)	18 (68,3)	13.5 (0,93)	
20 x 20 (6 1 x 6 1)	20 (75 7)	21 (79.5)	167 (1.15)	184 (1 28)	20 (75 7)	16.7 (1.15)	

Model F1Res 49 CCP Pendent Installed below Sloped Celling. **Technical Data**

Thread Size	Sprinkler Temp. Rating "F ("C)	CCP Assy. Temp. Rating 1F(°C)	Max. Pressure pei (bar)	Max. Amblent Temp. °F (°C)	Actual K Factor (metric)	Sprinkler Length	Sprinkler Identification Number (SIN)
%" NPT (R%)	155 (68)	135 (57)	175 (12)	100 (38)	4.9 (69,94)	2.25" (57mm)	R3516

Table 2 - Application

	Mex. Slope of %	(33.7") Plich	Max, Slop	e of %s(18.4") Plich
Along Slope (W) Width x (L) Length # (m)	Min, Flow Per Sprinker Head gpm (Lpm)	Pressure pel (bar)	Min. Flow Per Sprinkler Head gpm (Lpm)	Pressure pel (ber)
12 x 12 (3,6 x 3,6)	14 (53)	8.2 (0,57)	13 (49)	7.0 (0,48)
14 x 14 (4,3 x 4,3)	14 (53)	8.2 (0,57)	13 (49)	7.0 (0,48)
16 x 16 (4,9 x 4,9)	14 (53)	8.2 (0,57)	14 (53)	8.2 (0,56)
18 x 18 (5,5 x 5,5)	23 (87)	22 (1,52)	20 (75,7)	17 (1,17)
20 x 20 (6,1 x 6,1)	23 (67)	22 (1,52)	21 (75,7)	17 (1,17)

Model F1Res 58 Pendent & F1 Res 58 Recessed Pendent/F2 installed below Sloped Calling. Technical Data

Thread Size	Nax. Pressure pel (ber)	Max. Amblent Temp. "F ("C)	Actual K Factor (matric)	Sprinkler Length	Esculcheon	Sprinkler Identifica- tion Number (SIN)
14" NPT (R14)	175 (12)	100 (38)	5.8 (83,38)	2.25° (57mm)	F2 (1/2* Adjustment)	R3513

Table 3 - Application

		Nex. Slope of 4	4 (33.7") Plich		Max. Blope of %s (18.4*) Plich	
Nax. Sprinkler Specing Along Slope (W) Width ± (L) Longth ft (m)	Min. Flow Per Sprinider Head gpm (Lpm)		Pressure pel (ber)		Min. Flow Per Sprinkler Head gpm (Lpm)	Pressure pel (ber)
	155"F (65"C)	175 F (79 C)	156°F (68°C)	175"F (79"C)	155°F (68°C)	155"F (65"C)
12 x 12 (3,6 x 3,6)	21 (79.5)	23 (87)	13.1 (0,9)	15.7 (1,1)		
14 x 14 (4,3 x 4,3)	21 (79.5)	23 (87)	13.1 (0,9)	15.7 (1,1)		
16 x 16 (4,9 x 4,9)	21 (79.5)	23 (87)	13.1 (0,9)	15.7 (1,1)		
18 x 18 (5,5 x 5,5)	23 (87)		15.7 (1,1)		20 (75,7)	12 (0,83)
20 x 20 (6,1 x 6,1)	23 (87)		15.7 (1,1)	· .	20 (75,7)	12 (0,83)

Model F1Res 58 CCP Pendent Installed below sloped Celling.

Technical Data

Thread Size	Sprinkler Temp. Reting F(°C)	CCP Anny. Temp. Rating *F(*C)	Nax. Pressure pai (bar)	Max. Ambient Temp. "F("C)	Actual K Factor (matric)	Sprinkler Length	Sprinider identification Number (SIN)
14" NPT (R%)	155 (68)	135 (57)	175 (12)	100 (38)	5.8 (83,38)	2.25" (57mm)	R3513

Table 4 - Application

May Contrider Courses Alana Class.	Max. Slope of % (18.4*)	Pitch
Max sprinker specing Along slope	Min. How Per Sprinkler Head	Pressure
(W) WICED X (L) Lenger R (m)	apm (Lom)	.pei (bar)
18 x 18 (5.5 x 5.5)	20 (75.7)	12 (0.83)
20 x 20 (6.1 x 6.1)	20 (75.7)	12 (0.83)

Model RFC43 Pendent Flat Concealed installed below Sloped Celling.

Technical Data

Thread Size	Sprinkler Temp. Rating °F (°C)	Coverplate Temp. Rating "F (°C)	Max. Pressure pel (bar)	Max. Ambient Temp. °F (°C)	Actual K Fector (metric)	Max. Adjustment	Sprinkler Identification Number (SIN)
1/2" NPT (R%)	165 (74)	135 (57)	175 (12)	100 (38)	4.3 (61.4)	1/2" (13mm)	RA0612

Table 5 - Application Max. Slope of the (33.7") % (18.4") Plich Max. Slope of Min. Flow Per Nax. Sprinkler Specing Along Slope Min. Flow Per Sprinkler Head Pressure Pressure (W) Width x (L) Length ft (m) **Sprinkler Head** pel (ber) pei (ber) gpm (Lpm) apm (Lom) 12 x 12 (3.6 x 3.6) 18 (68) 17.5 (1.21) 9.1 (0.63) 13 (49) 14 x 14 (43 x 43) 18 (68) 17.5 (1.21) 13 (49) 9.1 (0.63) 16 x 16 (4.9 x 4.9) 18 (68) 17.5 (1.21) 13 (49) 9.1 (0.63) 18 x 18 (5.5 x 5.5) 24 (91) 31 (2.14) 18 (68) 17.5 (1.21)

20 x 20 (6,1 x 6,1) 24 (91) 31 (2,14) Model RFC 49 Pendent Fist Concealed Installed below Sloped Celling.

Technical Data

Thread Size	Sprinkler Temp. Rating *F (*C)	Coverplate Temp. Rating *F (*C)	Max. Pressure pet (bar)	Max. Ambient Temp. *F (*C)	Actual K Factor (metric)	Max. Adjustment	Sprinkler Identification Number (SIN)
15" NPT (R12)	165 (74)	135 (57)	175 (12)	100 (38)	4.9 (69.94)	1/2" (13mm)	RA0616 .

Table 8 - Annilcation

May Carlokies Consing Along Close	Max. Slope of % (33.7*)	Pitch	Max. Slope of 1/1= (18.47) Pitch		
(W) Width x (L) Length R (m)	Min. Flow Per Sprinkler Head gom (Lom)	Pressure pel (bar)	Min. Flow Per Sprinkler Head gpm (Lpm)	Pressure pel (ber)	
16 x 16 (4.9 x 4.9)	28 (106)	23 (19.3)		1 A A	
18 x 18 (5.5 x 5.5)	29 (109.8)	29 (20.0)	18 (68)	13.5 (0.93)	
20 x 20 (6.1 x 6.1)	30 (113.6)	30 (30.0)	23 (87)	22 (1.52)	

Installation Guidelines

- 13D and 13R, where specific UL Listed flows are not required, consult with the local Authority Having Jurisdiction regarding the number of design sprinkiers for 7. sloped ceilings having a pitch greater than (9.4°).
- 2. Installation of UL Listed residential sprinklers under sloped ceilings shall be limited to a type of unobstructed construction consisting of smooth ceilings, as defined by NFPA 13, having a maximum pitch of 8. 4/12 (18.4°) or 8/12 (33.7°).
- 3. Spacing of residential sprinklers under sloped ceilings is measured along the slope when determining the distance off of walls and between sprinklers.
- 4. Measure listed areas of coverage along the sloped ceiling. The actual floor coverage area will be less than the listed area.
- 5. For coverage areas less than the listed coverage area shown in Tables 1 through 5, use the minimum flow requirement for the next largest listed coverage area.

1. For systems designed in accordance with NFPA 13, 6. Minimum spacing between pendent type sprinklers is 8 ft. (2.4 m). Minimum distance from a pendent type sprinkler and an adjacent wall is 4" (102 mm).

23.8 (1,64)

- Residential sprinklers located closest to the peak of the ceiling shall have the deflectors located not more than 3 ft (1m) vertically down from the peak. Align deflectors parallel with the ceiling slope 1" to 4" (25mm to 102mm) below the sloped ceiling.
- Hydraulic Requirements:

21 (79)

- a. For NFPA 13D Systems, the number of design sprinklers shall include all sprinklers within a compartment, up to a maximum of two sprinklers (where specific UL Listed flows are required) that requires the greatest hydraulic demand.
- b. For NFPA 13R Systems, the number of design sprinklers shall include all sprinklers within a compartment, up to a maximum of four (4) sprinklers (where specific UL Listed flows are required), that requires the greatest hydraulic demand.

7.

c. For NFPA 13 systems, the design area shall be the area that includes the four (4) hydraulically most demanding sprinklers. The minimum required discharge from each of the four hydraulically demanding sprinklers shall be the greater of the following:

· · · · ·

- In accordance with the minimum flow rates indicated by the individual listings (that already will provide a minimum density of 0.1 gpm/ft2); or
- (2) A calculated value based on delivering a minimum of 0.1 gpm/ft2 over the design area.
- Because of the varied nature of residential construction features, there will be some compartment designs which cannot be fully sprinklered in accordance with

NFPA 13, 13D, or 13R. In these instances, consult the Authority Having Jurisdiction (AHJ) for guidance and approval. This includes sloped cellings having a pitch greater than 8/12 (33.7°).

D. Glass bulb sprinklers have orange bulb protectors to minimize bulb damage during shipping, handling and installation. REMOVE THIS PROTECTION AT THE TIME THE SPRINKLER SYSTEM IS PLACE IN SER-VICE FOR FIRE PROTECTION. Removal of the protectors before this time may leave the bulb vulnerable to damage. RASCO wrenches are designed to install sprinklers when covers are in place. REMOVE PRO-TECTORS BY UNDOING THE CLASP BY HAND. DO NOT USE TOOLS TO REMOVE THE PROTECTORS.

Model F1Res 44 and F1 Res 44 HSW/F2 installed below Sloped Celling.







HSW Sprinkler spacing below multiple sloped ceilings with a maximum slope of \$/12 (33.7*) pitch.

10.

5

1.1.1.2

Model F1RES 44 HSW & F1RES 44 HSW Recessed HSW/F2 installed below Sloped Celling. **Technical Data**

Thread Size	Sprinkler Temp. Pating 7F (*C)	Max. Pressure pel (ber)	Max. Amblent Temp. "F ("C)	Actual K Factor (metric)	Sprinkler Lenght	Escutcheon	Sprinkler identification Number (SIN)	
%" NPT (R%)	155 (68) 175 (79)	175 (12)	100 (38)	4.4 (62,8)	2.45 (62mm)	F2 (½* Adjustment)	R3531	
Table 7 - Application								

	Max. Slope of %a (18.4") Plich						
Mex. Sprinider Specing Along Slope (W) Width x (L) Length ft (m)	Discharge Directed 4" to 6" Defiect	Across the Slope for to Calling	Discharge Directed Across the Stope 6" to 12" Deflector to Celling				
	Min. How gpm (Lpm)	Proseure pel (ber)	Min. Flow gpm (Lpm)	Pressure pel (ber)			
12 x 12 (3,6 x 3,6)	16 (60,5)	13,3 (0,92)	17 (64,3)	15 (1,04)			
14 x 14 (4,3 x 4,3)	16 (60,5)	13.3 (0,92)	17 (64,3)	15 (1,04)			
16 x 16 (4,9 x 4,9)	16 (60,5)	13.3 (0,92)	17 (64,3)	15 (1,04)			
18 x 18 (4,9 x 5,5)	18 (68,1)	16.8 (1,16)	20 (75,6)	20.7 (1,43)			
20 x 20 (4,6 x 6,1)	23 (68,1)	27.A (1.89)	23 (68,1)	27 A (1,89)			

Table 8 - Application

			Any Slope of 4	a (33.77) Pttc	1		
	Discharge	Directed	Discharge	Directed	(²⁰⁴ Diecher)	je Directed	
May Gostables Greeten Along Slope	Down th	e Slope	Down th	e Slope	Across the Slope		
	4"tx	56 "	i 6" to	12"	4" to 12"		
	Deflector to Celling		Deflector	lo Calling	Deflector to Celling		
	⁽¹⁾ Min. Flow	Pressure	Min. Flow	Procesure	⁽⁷⁾ Min. Flow	Pressure	
	(Lom)		(mg.); mgp	pel (bier)	(ma_1) map	cel (ber)	
12 x 12 (3.6 x 3.6)	12 (45.4)	7.5 (0.52)	17 (53.0)	10.2 (0.71)	16 (80.6)	13.3 (0.92)	
14 x 14 (4.3 x 4.3)	14 (53.0)	10.2 (0.71)	16 (60.6)	13.3 (0.92)	16 (60.6)	13.3 (0.92)	
16 x 18 (4.9 x 4.9)	16 (60.6)	13.3 (0.92)	17 (64.4)	15 (1.04)	16 (60.6)	13.3 (0.92)	
18 x 18 (4.9 x 5.5)	18 (68.1)	16.8 (1.16)	20 (75.6)	20.7 (1.43)			
20 x 20 (4.6 x 6.1)	23 (72.0)	27.4 (1.89)	23 (87.1)	27.4 (1.89)			

⁽¹⁾ Minimum flow per sprinkler gpm (Lpm).

²⁰ Minimum 3 head design in a compartment.

(*) 155°F only.

Installation Guidelines

- 1. For systems designed in accordance with NFPA 13, 6. Measure listed areas of coverage along the sloped 13D and 13R, where specific UL Listed flows are not required, consult with the local Authority Having Jurisdiction regarding the number of design sprinklers for 7. sloped cellings having pitch greater than (9.4*).
- 2. Installation of UL Listed residential sprinklers under sloped ceilings shall be limited to a type of unobstructed construction consisting of flat, smooth cellings, as defined by NFPA 13, having a maximum pitch of 4/12 (18.4°) or 8/12 (33.7°).
- 3. Where listed, install horizontal sidewall sprinklers 9. along the wall below the sloped ceiling when discharge is directed across the slope, and install at the peak below the sloped ceiling when discharge is directed down the slope. Always align the sprinkler deflector parallel with the direction of the sloped celling.
- 4. Residential HSW sprinklers located closed to the peak of the ceiling shall have the deflectors located not more than 3 ft. (1m) vertically down from the peak.
- 5. Spacing of residential HSW sprinklers under sloped ceilings is measured along the slope when determining the distance off of walls and between sprinklers.

- celling. The actual floor coverage area will be less than the listed area.
- For coverage areas less than the listed coverage area shown in Tables 1 through 8, use the minimum flow requirement for next largest listed coverage area.
- Minimum spacing between horizontal sidewall sprin-8. klers is 8 ft. (2.4 m). Minimum distance from a horizontal sidewall sprinkler and an adjacent wall is 4" (102 mm).
 - Hydraulic Requirements:
 - a. For NFPA 13D Systems, the number of design sprinklers shall include all sprinklers within a compartment, up to a maximum of two sprinklers (where specific UL Listed flows are required) that requires the greatest hydraulic demand.
 - b. For NFPA 13R Systems, the number of design sorinkiers shall include all sprinklers within a compartment, up to a maximum of four (4) sprinklers (where specific UL Listed flows are required), that requires the greatest hydraulic demand.

- c. For NFPA 13 systems, the design area shall be the area that includes the four (4) hydraulically most demanding sprinklers. The minimum required discharge from each of the four hydraulically demanding sprinklers shall be the greater of 11 the following:
 - (1) In accordance with the minimum flow rates indicated by the individual listings (that already will provide a minimum density of 0.1 gpm/ft2); or
- (2) A calculated value based on delivering a minimum of 0.1 com/ft2 over the design area.
- 10. Because of the varied nature of residential construction features, there will be some compartment designs which cannot be fully sprinklered in accordance with

NFPA 13, 13D, or 13R. In these instances, consult the Authority Having Jurisdiction (AHJ) for guidance and approval. This includes sloped ceilings having a pitch greater than 8/12 (33.7°).

Glass bulb sprinklers have orange bulb protectors to minimize bulb damage during shipping, handling and installation. REMOVE THIS PROTECTION AT THE TIME THE SPRINKLER SYSTEM IS PLACE IN SER-VICE FOR FIRE PROTECTION. Removal of the protectors before this time may leave the bulb vulnerable to damage. RASCO wrenches are designed to install, sprinklers when covers are in place. REMOVE PRO-TECTORS BY UNDOING THE CLASP BY HAND, DO NOT USE TOOLS TO REMOVE THE PROTECTORS.

Model F1 res 49 Pendent, F1 Recessed Pendent/F2, F1Res 49 Concealed (CCP), RFC 49 and RFC 43 installed below sloped ceiling with a maximum slope of %1 (33.7*) pitch.

Table 9 - Application

Madei	K - Fector (metric)	Max. Specing PL x Pt (m x m)	Min. Flow/Pressure gpm (tpm) / psi (ber)	Sprinkler Temperature Rating *F (*C)	Coverplate Temperature Rated*F (*C)
F1 Res 49Pendent	4.9 (69,94)	10 x 10 (3 x 3)	13(49) / 7.0(0,48)	155 (68)	-
F1 Res 49 Reccessed Pendent/F2	4.9 (69,94)	10 x 10 (3 x 3)	13(49) / 7.0(0,48)	155 (68)	
F1 Res 49CCP Pendent	4.9 (69,94)	10 x 10 (3 x 3)	13(49) / 7.0(0,48)	155 (68)	135 (57)
RFC49Pendent	4.9 (69,94)	10 x 10 (3 x 3)	14(53) / 8.2(0,57)	165 (74)	135 (57)
RFC43Pendent	4.3 (61,4)	10 x 10 (3 x 3)	18(68) / 17.5(1,21)	165 (74)	135 (57)



12.



Installation Guidelines per UL1626A

- 1. For systems designed in accordance with NFPA 13, 8. Hydraulic Requirements: 13D and 13R, where specific UL Listed flows are not required, consult with the local Authority Having Jurisdiction regarding the number of design sprinklers for sloped ceilings having pitch greater than (9.4°).
- Installation of UL Listed residential sprinklers under sloped ceilings shall be limited to a type of unobstructed construction consisting of smooth cellings, as defined by NFPA 13, having a maximum pitch of 8/12 (33.7*).
- 3. Spacing of residential sprinklers under sloped ceilings is measured along the slope when determining the distance off of walls and between sprinklers.
- 4. Measure listed areas of coverage along the sloped ceiling. The actual floor coverage area will be less than the listed area.
- 5. For coverage areas less than the listed coverage area 11. A maximum of two sprinklers installed within 3 ft. vertishown in Tables 8, use the minimum flow requirement listed.
- Minimum spacing between pendent type sprinklers is 8 ft. (2.4 m). Minimum distance from a pendent type sprinkler and an adjacent wall is 4" (102 mm).
- 7. Reidential sprinklers located closest to the peak of the ceiling shall have the deflectors located not more than 3 ft (1 m) vertically down from the peak. Align deflectors parallel with the ceiling slope 1" to 4" (25mm to 102mm) below the slope ceiling.

- a. For UL1626A, the number of design sprinklers shall include up to a maximum of two sprinklers that requires the greatest hydraulic demand.
- 9. Glass buib sprinklers have orange buib protectors to minimize bulb damage during shipping, handling and installation. REMOVE THIS PROTECTION AT THE TIME THE SPRINKLER SYSTEM IS PLACE IN SER-VICE FOR FIRE PROTECTION, Removal of the protectors before this time may leave the bulb vulnerable to damage. RASCO wrenches are designed to install sprinklers when covers are in place, REMOVE PRO-TECTORS BY UNDOING THE CLASP BY HAND. DO NOT USE TOOLS TO REMOVE THE PROTECTORS.
- 10. A maximum distance from the floor to the ceiling peak of 24 ft.
- cally of the peak.
- 12. Installation is for smooth, flat ceilings only that do not extend into or serve as a ceiling for an upper level floor in the structure.

The equipment presented in this bulletin is to be installed in accordance with the latest published Standards of the National Fire Protection Association, Factory Musual Research Corporation, or other similar organizations and also with the provisions of governmental codes or ordinances whenever applicable. Productamenufactured and distributed by Reliable have been protecting life and property for over 80 years, and are installed and serviced by the most highly qualified and reputable sprinkler contractors located throughout the United States, Canada and foreign countries.

Manufactured by



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



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13.


Model F1 Res and Model RFC Residential Sprinklers

The Reliable Automatic Sprinkler Co., Inc., 103 Fairview Park Drive, Elmsford, New York 10523

👳 General

Bulletin 140 Rev.

Reliable residential sprinklers utilize a fast response thermal element and are intended for use in only wet-pipe residential sprinkler systems designed in accordance with the following NFPA standards: NFPA 13D, Installation of Sprinkler Systems for One-and Two-Family Dwellings and Manufactured Homes: NFPA 13R, Installation of Sprinkler Systems for Residential Occupancies Up to and Including Four Stories in Height, and for the residential portions of any occupancy as permitted by NFPA 13, Installation of Sprinkler Systems. Fast response and high wall wetting characteristics of residential sprinklers improve life safety by maintaining a tenable environment, providing escape time for occupants.

NFPA 13D is appropriate for protection against fire hazards only in one-and two-family dwellings and manufactured homes. Residential portions of any other type of building or occupancy should be protected with residential sprinklers in accordance with NFPA 13, or In accordance with NFPA 13R. NFPA 13R is appropriate for use as an option to NFPA 13 only in those residential occupancies up to and including four stories in height. Where buildings are greater than four stories in height, or where buildings are of mixed use where residential is not the predominant occupancy, protect residential portions of such buildings with residential or quick response sprinklers in accordance with NFPA 13.

This document provides design guidelines for the Model F1/Res and RFC Residential Sprinklers shown in Table A, which are cULus Listed to provide a minimum density of 0.05 gpm/ft², in accordance with the above-mentioned standards, manufacturer's instructions, and technical bulletins. Where documentation for residential sprinkler systems does not exist for particular applications, information based on NIFPA 13 is used.

Residential fire sprinkler systems should only be designed and installed by competent individuals trained and experienced with automatic sprinkler system design and installation. Several criteria may apply to a given installation and the designer and/or installer must be familiar with the applicable codes, standards, and guidelines governing such an installation. The Reliable Model F1/Res and RFC residential sprinklers described herein must be installed and maintained in compliance with this document manufacturer's recommendations, with the latest published standards of the National Fire Protection Association (NFPA), and with any additional local jurisdictional requirements. Failure to comply may result in the Impairment of sprinkler integrity and proper operation. Because of the various features of residential type architecture, there will be some compartment designs which cannot be fully sprinklered in accordance with the recommendations of NFPA 13, 13D, or 13R. In these instances, consult the Authority Having Jurisdiction for guidance and approval.

The owner is responsible for maintaining their fire protection system and associated devices in proper operating condition. Refer to NFPA 25, <u>Inspection</u>, <u>Testing</u>, and <u>Maintenance</u> of <u>Water-Based</u>. Fire <u>Protection</u> Systems, for guidance on testing and maintenance of automatic sprinkler systems.

Approvals

All Reliable residential sprinklers have been designed and tested in accordance with the Third Edition of Underwriters Laboratories (UL) 1626, Standard for Residential Sprinklers for Fire Protection Service. Typically, they are cULus Listed for installation under smooth, flat ceilings of unobstructed construction, unless otherwise noted in the specific listings, with specific approved spacing, flows, and pressures. Reliable residential sprinklers are cullus Listed for installation on both horizontal ceilings with a maximum slope of 2/12 (9.4°) pitch, and sloped ceilings having maximum slopes of 4/12 (18.4°) and 8/12 (33.7°) pitch. The design criteria for residential sprinklers contained in the current NFPA 13D, 13R, and 13 Standards must be followed except as modified by the individual UL 1626 listing information. the information in the Reliable residential sprinkler bulletins, and this installation guide. The Authority Having Jurisdiction (AHJ) must make final approval for all residential sprinkler installations for compliance with all applicable codes, standards, and jurisdictional requirements.

One of the most important revisions of the Third Edition of UL 1626 is the new minimum density requirement for residential sprinklers manufactured after July 12, 2002. When establishing a minimum cULus Listed flow rate, the manufacturer must use a minimum discharge rate over the specified coverage area corresponding to a 0.05 gpm/ft density. In some cases, however, to successfully pass the UL 1626 fire tests, the UL Listed flow rate may be greater than the calculated 0.05 gpm/ft density. Increased flow rates for horizontal sidewall type sprinklers, which exceed this minimum density, is common. Because this minimum density is a listing requirement, the use of residential sprinklers meeting this criterion is

applicable to all editions of NFPA 13, 13R and 13D. The design criteria for residential sprinklers contained in the current NFPA Standards must be followed except as modified by the individual cULus Listing information provided in the technical bulletins referenced in Table A.

Definitions

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The following NFPA definitions are applicable to the terms used in this installation guide. Where terms are not included, refer to NFPA 13, NFPA 13D and NFPA 13R for official definitions:

<u>Residential Sorinkler</u> – A type of fast-response sprinkler that has a thermal element with an RTI of 50 (m-e)* or less, has been specifically tested for its ability to enhance survivability in the room of fire origin and listed for use in the protection of dwelling units. Residential sprinklers posses a fast response thermal element and produce a spray pattern that discharges water higher on the wall than a standard spray sprinkler.

<u>Dwelling</u> - Any building that contains not more than one or two dwelling units intended to be used, rented, leased, let or hired out to be occupied or that are occupied for habitation purposes.

<u>Dwelling Unit</u> - One or more rooms, arranged for the use of one or more individuals living together, as in a single housekeeping unit, that normally have cooking, living, sanitary, and sleeping facilities. Dwelling units include hotei rooms, dormitory rooms, condominiums, apartments, and similar living units.

<u>Compariment</u> – A compartment is a space completely enclosed by wails and a ceiling. The compartment enclosure is permitted to have openings (in walls) to an adjoining space, provided that soffits or lintets along the ceiling over the compartment opening has a minimum depth of 8 in. (203mm) from the ceiling. In other words, areas such as hallways, stainvells, and rooms must be separated by beams, lintels or soffits 8 or more inches in depth to be considered single compartments.

Obstructed Construction - Panel construction and other construction where beams, trusses, or other members impede heat flow or water distribution in a manner that materially affects the ability of sprinklers to control or suppress a fire. See NFPA 13 Appendix for detailed explanations of this type of construction.

<u>Unobstructed Construction</u> – Construction where beams, trusses, or other members do not impede heat flow or water distribution in a manner that materially affects the ability of sprinklers to control or suppress a fire. This type of construction has the following features: (1) horizontal structural members that are not solid; (2) openings of the structural members are at least 70% of the cross sectional area; (3) depth of the structural members do not exceed the least dimension of the openings; or (4) the spacing of structural members exceeds 7.5 feet on center. See NFPA 13 Appendix for detailed explanations of this type of construction.

Flat Ceiling - a continuous ceiling in a single plane.

<u>Smooth Ceiling</u> - A continuous ceiling free from significant irregularities, iumps or indentations.

Horizontal Ceiling - A ceiling that does not exceed a slope of 2/12 pitch (slope of 16.7% or 9.4°).

Sloped Ceiling - A ceiling exceeding a maximum slope of 2/12 (9.4°) pitch.

Installation Considerations

Residential sprinklers utilizing a glass bulb thermal element have orange protective caps and straps to provide temporary protection to the frangible glass bulb during shipping and installation.

- a. Do not install any bulb type sprinkler if the bub is cracked or there is liquid missing from the bulb. While holding the sprinkler in the horizontal position, a small air bubble having an approximate diameter of 1/16° should be visible.
- b. The sprinkler is designed for installation with the protective strap in place using the appropriate sprinkler wrench.
- c. Sprinklers that are dropped during the installation process or that are installed on piping other than that in accordance with item "a" shall be replaced, including sprinklers with protective caps or straps.
- d. Protective caps and straps shall be removed only using maans in accordance with the manufacturers installation instructions. They are not to be left on the sprinkler after the sprinkler system is blaced in service.
- e. Protective caps and straps shall be removed only when water supply is made available to the sprinkler for the purposes of fire protection and placed in service.
- f. A leak-tight ½* NPT sprinkler joint should be obtained with a maximum torque of 14 ft-lbs to 21 ft-lbs. (approximately 2 turns pest hand tight. Do not over tighten). Higher levels of torque may distort the sprinkler inlet or bend the frame, causing leakage or impairment of the sprinkler.

Where applicable, escutcheon plates must be installed. Absence of an escutcheon plate, where there is an annular space between the ceiling and the sprinkler, may delay sprinkler operation in the event of a fire.

Never introduce any leak stopping additives to any fire sprinkler system.

Residential sprinklers must be installed with the manufacturer's specified sprinkler wrench. Channel locks, crescent wrenches or anything other than the proper sprinkler wrench shall not be used.

Installing sprinklers in CPVC and copper piping systems require special considerations. Never install the perinkler into the reducing fitting prior to attaching the reducing fitting to the system piping. When installing residential sprinklers or commercial sprinklers in a CPVC piping system, sprinklers must be installed only after the reducing fitting has been installed and the CPVC manufacturer's setting time for the primer and/or cement has passed. This is to ensure that the cement does not accumulate within the sprinkler. In copper piping systems, sprinklers must be installed only after the inside of the sprinkler drop and associated fittings have been wire-brushed to remove any resklual flux. Residual flux can cause corrosion. Both of these conditions can impair and prevent proper sprinkler operation.

System Design Criteria

Permitted Sprinklers for Residential Sprinkler Systems

For NFPA 13D and 13R sprinkler systems, only listed residential sprinklers shall be used, with the following exceptions:

- Listed standard dry-pendent or dry sidewall sprinkiers shall be permitted to be extended into unheated areas not intended for living purposes.
- Quick-response sprinklers shall be permitted to be used in mechanical closets.
- 3. For NFPA 13R systems, listed quick-response sprinklers shall be permitted to be installed in dwelling units meeting the definition of a compartment where no more than four (4) sprinklers are located within the dwelling unit.

Non-residential sprinklers are to be installed in accordance with the criteria specified by NFPA 13.

Residential Sprinkler Positioning and Spacing Requirements

When locating residential sprinklers, consideration must be given to sensitivity, sprinkler spacing, obstructions to discharge, temperature rating, and prodmity to heat sources.

Sprinkler Sensitivity - Deflector Positioning

Residential pendent sprinklers not listed with specific positioning criteria must be positioned so that the deflectors are within 1 in. to 4 in. (25.4 mm to 102 mm) from the ceiling. On flat, horizontal ceilings, Reliable Model F1 Res 49 pendent and recessed pendent sprinklers may also be positioned with the deflector 4" to 8" (102 mm to 203 mm) from the ceiling, in accordance with the listed flows and pressures shown in Bulletin 135.

If located in closets, it is permitted to install pendent sprinklers so that the deflector is within 12 inches (305 mm) of the ceiling. Residential sidewall sprinklers that have not been listed with specific positioning criteria must be positioned so that the deflectors are within 4 in. to 6 in. (102 mm to 152 mm) from the ceiling. Install sidewall sprinklers having listed positioning criteria in accordance with their listing. Under both horizontal and sloped ceilings, always align sprinkler deflectors so that the deflector is parallel with the plane of the ceiling surface.

Sprinkler Spacing Under Horizontal Cellinos serves of Several maximum coverage areas are, used for residential sprinklers in accordance with minimum listed flows and pressures. The area of coverage rules be equal to or greater than both the length and wide of the hazard area. Residential sprinklers must be ideated for more than half the listed spacing nor less than 4° (102 mm) from walls. Adjacent sprinklers must be located for farther apart than the listed spacing; the midipulp distance to prevent cold soldering, unless of the specified, is 8 feet (2.44 m).

When selecting an area of coverage, the suggested practice is to select one that can be adequately supplied by the available water supply, allowing for the installation of as few sprinklers as possible while observing all guidelines pertaining to obsc. ctions and spacing. After selection of an area of coverage, sprinklers must be spaced according to the criteria set forth in the NEPA standards and this document.

Sprinkler Spacing Under Sloped Ceilings For Installation under sloped ceilings, several maximum coverage areas are also provided, but at different minimum flows and pressures than those for horizontal ceilings. The spacing of sprinklers is measured along the slope when determining the distance off of walls and between sprinklers. Residential sprinklers may, be located no more than ½ the listed spacing nor less than 4° (102 mm) from the peak of the sloped celling. Residential sprinklers located at the highest elevation must not be located more than 3 feet (0.9 m) measured vertically down from the peak. Refer to Reliable Bulletifi 035 for listed coverage areas, flow and pressGre requirements, and positioning criteria for residential sprinklers installed under sloped cellings.

Obstruction to Water Distribution

4.

Refer to Figures 1 through 13 for the location of sprinklers relative to obstructions. The discharge from residential sprinklers is directed radially outward-and downward from the sprinkler. Sprinklers must be located such that there will not be any spaces relative from distribution by walls, dividing partitions, is other dwelling construction features. If the sprinkler water distribution pattern is obstructed, the obstruction is to be considered the maximum distance of coverage for a given sprinkler. Additional sprinklers beyond the obstruction may be necessary unless the obstructors criteria contained herein can be met. Consult the appropriate NFPA standard and/or the AHJ for guidance regarding these situations.

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Reliable flat plate concealed sprinklers, the Models RFC 43 and RFC 56, utilize a drop-down style deflector. The distance the deflector drops below the ceiling is needed when determining the position of the deflector above the bottom of an obstruction. These distance are as follows:

- Nonadjusted (cover plate flush to cup) 1/1" (22mm)
- At full (1/2") adjustment 1/8" (9.5mm)

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Continuous and Noncontinuous Obstructions

A minimum distance is required to be maintained between sprinklers and continuous obstructions, such as beams, soffits, and long horizontal light fixtures. See Figures 1, 2, 4, 5, 6, 7 and/or 13.

A minimum distance is also required to be maintained between sprinklers and noncontinuous obstructions, such as celling fans and certain light fixtures. The ceiling fan motor housing is the primary element that can obstruct the sprinkler discharge pattern. Testing has demonstrated that no adverse effects occur as a result of the ceiling fan's blade rotation in either direction.

With regards to location of sprinklers near light fotures, there are two considerations; the amount of heat the light gives off and the light fixture as an obstruction. The minimum distance of a sprinkler relative to the light as a heat source is given in Table B. If the light is also an obstruction, then the obstruction criteria must be applied, relative to the minimum distance required from Table B.

For noncontinuous obstructions, apply the "four times rule" as provided in NFPA 13 where it is determined that the sprinkler can spray to at least two sides of the obstruction, either over and under or around the obstruction on both sides. Sprinklers shall be positioned away from the obstruction a minimum distance of four times the maximum dimension of the obstruction. The maximum clear distance required shall be 36" (914mm).

Temperature Ratings

Ordinary temperature rated sprinklers (135°F [57°C], 155°F [57°C]) are only permitted for installation where the maximum ambient ceiling temperature will not exceed 100°F (38°C). Where ambient ceiling temperatures are expected to exceed 100°F (38°C), use intermediate temperature-rated residential sprinklers (175°F [79°C]), which can be exposed to a maximum ambient temperature of 150°F (66°C). The following practices apply, unless higher expected ambient temperatures require a higher temperature rated sprinkler:

- Sprinklers under glass or plastic skylights exposed to direct rays of the sun shall be of the intermediate temperature classification.
- Sprinklers in an unventilated concealed space under insulated roof or in an unventilated attic shall be of the intermediate temperature classification.
- 3. Residential sprinklers must be located so as to prevent inadvertent operation due to exposure to normal heat sources. Sprinklers must be positioned a sufficient distance away from heat sources such as fireplaces, ovens, kitchen ranges, hot water pipes, water heaters, furnaces and associated ductwork, and light fixtures. The following minimum distances in accordance with NFPA 13D and 13R must be maintained as indicated in Table B.

Ta	ble B – Minimum	Distances for	Ordinary and	
Intermediate	Residential Sprin	klers Relative	to Specific He	at Sources

Heat Source	Minimum Distance from Edge of Source to Ordinary Temperature Sprinkler (135°F or 155°F)	Minimum Distance from Edge of Source to Intermediate Temperature Sprinkler (175*F)
	in, (mm)	in. (mm)
Side of open or Recessed fireplace	38 (914)	12 (305)
Front of recessed fireplace	60 (1524)	36 (914)
Cosi or wood-burning stove	42 (1067)	12 (305)
Kitchen range	18 (457)	9 (229)
Walloven	18 (457)	9 (229)
Hot air flues	18 (457)	9 (229)
Uninsulated heat ducts	18 (457)	9 (229)
Uninsulated hot water pipes	12 (305)	6 (152)
Side of ceiling or wall-mounted hot air diffusers	24 (607)	12 (305)
Front of wall-mounted hot air diffusers	36 (914)	18 (457)
Hot water heater or fumace	6 (152)	3 (76)
Light Fixture 0 W - 250 W 250 W - 499 W	6 (152) 12 (305)	3 (76) 6 (152)

Hydraulic Design Requirements

Reliable residential sprinkler listings indicate minimum flow rates for each specified coverage area. Hydraulic calculations are required to verify adequate water supply at the hydraulically most remote single sprinkler operating at the minimum flow and pressure listed for single-sprinkler operation. Where a compartment has more than one sprinkler, multiple sprinkler calculations are required, and each sprinkler must be calculated flowing identical minimum flow rates. No reduction in minimum flow requirements is provided for flowing multiple sprinklers. More design sprinklers may need to be calculated than the minimum stated by the NFPA standards where unusual conditions may result in more sprinklers operating. These conditions include sloped ceilings having a pitch greater than 8/12 (33.7°) or beamed ceilings qualifying as obstructed construction, as defined by NFPA 13. Consult with the AHJ regarding the number of "design sprinklers" for these types of applications.

NEPA 13D

The number of design sprinklers under flat, smooth, horizontal cellings shall include all sprinklers within a compartment, up to a maximum of two (2) sprinklers, that requires the greatest hydraulic demand. The cULus Listed specific coverage criteria for systems designed to NFPA 13R are given in the technical bulletins referenced in Table A, as a function of the maximum allowable coverage area and temperature rating. For actual coverage areas less than or between those indicated in the respective bulletin, it is necessary to use the minimum required flow for the next largest area, as shown above.

For example, assuming the use of a pendent sprinkler, for an actual coverage area of 12 ft x 14 ft (3.7 m x 4.2 m), the specific coverage area for a 14 ft (3.7 m x 4.2 m) coverage area must be used. For an actual coverage area of 15 ft x 15 ft (4.6 m x 4.6 m), the specific coverage area for a 16 ft x 16 ft (4.9 m x 4.9 m) coverage area must be used.

NFPA 13R

The number of design sprinklers under flat, smooth, horizontal cellings shall include all sprinklers within a compartment, up to a maximum of four (4) sprinklers, that requires the greatest hydraulic demand. The cULus Listed specific coverage criteria for systems designed to NFPA 13R are given in the technical bulletins referenced in Table A, as a function of the maximum allowable coverage area and temperature rating. For actual coverage areas less than or between those indicated in the respective bulletin, it is necessary to use the minimum required flow for the next largest area, as shown above.

NFPA 13

For residential sprinkler systems designed to NFPA 13, a minimum density of 0.1 gpm/ft2 must be provided over the "design area" that includes the four (4) hydraulically most demanding sprinklers for the actual coverage areas being protected by the 4 sprinklers. The minimum required discharge from each of the four most hydraulically demanding sprinklers shall be the <u>greater</u> of the following.

- The flow rates given in the Reliable Residential Sprinkler Technical Bulletins referenced in Table A for NFPA 13D and 13R as a function of temperature rating and maximum allowable coverage area (for actual coverage areas less than or between those indicated in the respective technical bulletin, it is required to use the minimum required flow for the next largest coverage area) or
- 2. A minimum discharge density of 0.1 gpm/ft² applied over the "design area" consisting of the four most hydraulically demanding sprinklers for the actual coverage areas being protected by the four sprinklers. The maximum dimension of the actual coverage area cannot be any greater than the maximum coverage area indicated in the technical bulletins referenced in Table A.
 Design Note: Using the A = S x L method to determine the sprinkler protection area of coverage in accordance with NFPA 13, apply the 0.1 gpm/ft² density to this area to determine the minimum required flow. Compare this flow to the minimum 0.05 gpm/ft² cULus Listed flow for the appropriate coverage area in the technical bulletin for the.

specific residential sprinkler. If the flow stated in the technical bulletin is less than the calculated 0.1 gpm/ft² density flow required, the .1_density flow must then be used in the equation Q=K/P, solving for P, to establish the minimum required pressure using the sprinkler K-factor. Note: In many cases the listed flow of individual residential sprinklers may exceed the required minimum 0.05 gpm/ft² density. Reliable has available residential sprinklers with larger K-factors (K=5.6 and K=5.8) that will provide lower pressure demands for 0.1 gpm/ft² densities in NFPA 13 residential applications.

Example No. 1

If a room is 12 ft wide x 20 ft long (3.6 m x 6.1 m), the coverage area being considered would be 240 ft (22.3 m²). Using an F1 Res 49 pendent sprinkler (1⁻⁴ ceiling-to-deflector distance), the flow for a 20 ft x 20 ft (6.1 m x 6.1 m) coverage area is 20 gpm @ 16.7 psi (75.7 L/min @ 1.14 bar). However, based on a discharge density of 0.1 gpm/ft², the flow rate required would be 24 gpm (90.8 L). Therefore, 24 gpm (90.8 L/min) would be the minimum flow required for each design sprinkler. The corresponding pressure would be 24 psi (1.65 bar)

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Example No. 2

Fractional to the second seco (1⁻⁴ ceiling-to-deflector distance), the flow for a 20 ft x20 ft (6.1 m x 6.1 m) coverage area is 22 gpm @ 14.4 psi (8.3.3 L/min @ 0.99 bar). Based on a discharge density of 0.1 gpm/fr, the flow rate required would only be 20 gpm (75.7 L/min). However, the flow of 22 gpm must still be used as the minimum flow for each design sprinkler, since this is the minimum cULus Listed flow for this sprinkler at the 20 ft x 20 ft coverage area.

Example No. 3

For a situation where the coverage area per sprinkler is 16ftx8ft(4.9mx2.4m), or 128ft" (11.9m), the F1 RES 44 HSW, having a temperature rating of 155" (68°C) and positioned 4" to 6" (101 mm to 152 mm) below the ceiling, requires a minimum flow of 16 gpm @ 13.3 psl (60.6 L/min @ .92 bar) for a 16 ft x 16 ft (4.9 m x 4.9 m) coverage grea. Based on a minimum discharge of 0.1 gpm/ft, the flow rate needed would only be 12.8 gpm @ 10.2 psl (48.4 L/min @ 0.7 bar). However, the flow rate of 16 gpm (60.6 L/min) must till be used for each dealer methods. still be used for each design sprinkler.

Sloped Ceilings Specific UL Listed flows, pressures and coverage areas for sloped ceilings are provided in Reliable Builetin 035. Refer to this builetin for hydrautic design requirements. The number of design sprinklers is the same as that specified for horizontal ceilings, with the exception of the Model F1Res 40 HSW & F1Res 44 HSW. These sprinklers require a minimum 3 sprinkler design in a compartment when discharging across the slope, as specified in Bulletin 035.

For systems designed to NFPA 13, 13D or 13R, where specific cULus Listed flows for sloped ceilings where specific CULUS LISEC nows for sloped ceilings are not required, consult with the AHJ regarding the number of "design sprinklers" for sloped ceilings having a pitch greater than 2 in 12 (9.4°). CULUS Listed flows and pressures do not exist for sloped ceilings having a pitch greater than 8/12 (33.7°). Again, consult with the AHJ regarding the number of design sprinklers" for these types of applications. Listed areas of coverage must correspond to celling slope, and spacing of sprinklers under sloped cellings is measured along the slope when determining distance off of walls and between sprinklers.

Care and Maintenance

It is recommended that automatic sprinkler systems be inspected and maintained in accordance with the criteria set forth in NFPA 25, Inspection, Testing and Maintenance of Water-Based Fire Protection Systems by a qualified inspection service.

Do not clean the sprinklers with soap and water, detergents, ammonia, or any other cleaning fluid. Remove dust by using a soft brush or feather duster, or by gentle vacuuming with a soft bristle brush.

Any sprinklers that have operated, been damaged or been painted outside of the factory shall be replaced with a new sprinkler. The new sprinkler shall have the same performance characteristics as the original sprinkler; that is the same temperature rating, nominal K-factor, coverage area, and the same or lower flow rate requirements.

Wet-pipe sprinkler systems must be maintained at a minimum temperature of 40°F (4°C). Exposure to freezing temperatures can damage system piping and residential sprinklers.

Do not hang anything from sprinklers or sprinkler piping. Do not put curtains, drapes or valences around sprinklers. Doing so will obstruct the discharge pattern of the sprinkler.





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Positioning of sidewall sprinklers to avoid obstructions along the wall.

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Positioning of HSW sprinklers relative to continuous obstructions along a wall.

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Obstruction to discharge by Intersecting horizontal celling.



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Obstruction to discharge by intersecting sloped ceiling.

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Minimum distance between sprinklers on intersecting ceilings.





Figure 12

Single sprinkler coverage criteria for cathedral ceilings.





Model MP (Multi-Purpose) 1" Residential Riser

Bulletin 414 Rev.D

Bulletin 414 Rev.

Ö

1" (25mm) Residential Riser for Providing Water Flow Alarm on Multipurpose Residential Fire Sprinkler Systems

Features

- 1. Designed to alarm on single fire sprinkler operation and not during normal household water usage.
- 2. Potable-water safe.
- Water-flow Detector is preset to operate at 12 gpm ± 1 gpm (45.4 Lpm ± 3.8 Lpm), and is factory installed with a weather-proof metal cover.
- Dedicated UL Listed water-flow detector assures optimum sensitivity while the adjustable delay device minimizes false alarms caused by pressure surges or short periods of water usage above 12 gpm.
- 5. Switch can be wired for 24 VDC or 125/250 VAC operation.
- Stainless steel 1" (25mm) manifold with NPT or Metric Inlet and Outlet Threads.
- 7. Factory assembled and tested.
- 8. Rated working pressure not to exceed 175 psi.
- 9. UL Listed Assembly. NSF-61 Approved.
- 10. When the Model MP Riser is utilized in sprinkler systems with sprinklers having K-factors less than 4.4, there must be a minimun of 15 psi of operating pressure at the system's most remote head.

Listings & Approvals

Listed by Underwriters Laboratories Inc. (cULus)
 NSF-61 Approved

Product Description

The Multi-Purpose-Riser comes factory assembled with the necessary accessories for a cost effective, complete riser assembly.

Cast-on lettering identifies manifold size and flow direction. This Riser can be used safely where domestic water and fire protection water are combined.

The water flow detector range, preset to 12 gpm \pm 1 gpm, is designed to protect the system from false tripping when multiple household fixtures are in use. When the Model MP Riser is utilized in sprinkler systems with sprinklers having K-factors less than 4.4, there must be a minimun of 15 psi of operating pressure at the system's most remote head.



Fig.1



Technical Data:

Description	Multi Purpose Riser Trim					
Manifold Size:		Weight*				
1	Α	В	С	D	Lbs (kg)	
1" (25mm)	11 (280)	10 (254)	9.5 (241)	2.75 (70)	5.7 (2.1)	

* Support Bracket Kit (optional) - 1 lb (0.45 kg)

The Reliable Automatic Sprinkler Co., Inc., 103 Fairview Park Drive, Elmsford, New York, 10523

Installation:

- 1. Install the manifold with the flow arrow pointing towards the SYSTEM side using 1" NPT threaded connections. Use potable water - safe thread sealants only (teflon tape is recommended). 2. Connect 1" Brass Ball Valve to drain.
- 3. Place the sprinkler system in service.
- 4. Follow directions on the water-flow detector switch for electrical connections.

Caution:

Automatic sprinkler systems having non-fire protection connection (permitting continual water flow) require dielectric fittings, according to NFPA 13 sect. 4-6, when dissimilar metal piping materials are joined.

Ordering Information:

- Specify
- 1. Model MP 1" (25mm) Residential Riser.
- 2. NPT (P/N 6501200120) or Metric (P/N
- 6501200121) Threads for Inlet and Outlet.
- 3. Support Bracket Kit (P/N 6899190001), if required.



Fig. 3

The equipment presented in this bulletin is to be installed in accordance with the latest pertinent Standards of the National Fire Protection Association, Factory Mutual Research Corporation, or other similar organizations and also with the provisions of governmental codes or ordinances whenever applicable. Products manufactured and distributed by Reliable have been protecting life and property for over 80 years, and are installed and serviced by the most highly qualified and reputable sprinkler contractors located throughout the United States, Canada and foreign countries.

Manufactured by



The Reliable Automatic Sprinkler Co., Inc.

(800) 431-1588 (800) 848-6051 (914) 829-2042 www.reliablesprinkler.com Sales Offices Sales Fax Corporate Offices Internet Address



Revision lines indicate updated or new data

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uponor

RESIDENTIAL FIRE SAFETY SYSTEMS

DOMESTIC WATER BYPA SS

INSTRUCTION SHEET

Sprinkler System with Domestic Water Bypass

A domestic water bypass allows the Uponor AquaSAFE™ fire sprinkler system to operate properly even when flow-restricting devices, such as water softeners and filtration systems, are present in the home.



Figure 1: Domestic Water Bypass Installation with Optional Flow Switch

When a sprinkler activates and water pressure drops significantly, a pressure-reducing valve (PRV) opens and routes the water directly to the sprinkler system, taking the path of least resistance, thus avoiding the flow-restricting device.

The PRV opens only during sprinkler activation and not domestic use. Therefore, the flow-restricting device does not negatively impact the water supply of the fire sprinkler system and allows homeowners to use regular residential plumbing devices versus commercial devices.

Note: When the flow switch detects water flow through the bypass, it can activate an optional alarm, which alerts occupants that the sprinkler system is operating.

Bypass Components

- Pressure-reducing valve (PRV)
- Pressure gauge
- · Alarm flow switch (if required)
- Electric alarm bell, horn or strobe light (if required)
- Required tubing and fittings

Domestic Water Bypass Installation Guidelines

Refer to the figure on the front page and use the following steps to properly install a domestic water bypass.

 Install the domestic water bypass line. There needs to be a straight line from the Main Shutoff Valve (1) to the PRV (4) and also from the PRV to the Softener/Filter Outlet Tee (7). This will ensure proper operation of your fire sprinkler system. If additional 90° elbows are installed on the piping through the PRV, contact the Uponor Design Department at 888.594.7726 to recalculate the system.



- 2. Close the Softener/Filter Inlet Control Valve (8). All of the water will now flow through the PRV and not through the domestic Water Softener/ Filtration System (9).
- 3. Now that the Water Softener/ Filtration System (9) is isolated, open a single plumbing fixture downstream of the PRV. The

Pressure Gauge (6) will show a pressure drop downstream of the PRV. The Pressure Gauge (6) reading will continue to drop until it reaches the point at which the PRV is preset.

- 4. If the flowing pressure on the Pressure Gauge (6) is lower or higher than the pressure indicated on the bypass detail in the Set Pressure box (13), turn the adjusting nut on the PRV until the Pressure Gauge (6) reading matches the pressure on the bypass detail. DO NOT adjust the PRV so that the downstream pressure is lower than that shown on the bypass detail. Doing so will cause the sprinkler system to fail.
- 5. Open the Softener/Filter Inlet Control Valve (8). The Pressure Gauge (6) reading will increase. The water is now flowing through the Water Softener/ Filtration System (9) only. If a sprinkler activates, the downstream pressure will drop below the PRV set point and water will flow through the PRV (4), thus introducing hard or unfiltered water into the system.
- 6. Turn off all domestic fixtures and perform the fire sprinkler flow test. If the PRV (4) has been set correctly, the flow test should be successful.
- 7. After the flow test is completed, open multiple outlets downstream of the PRV (4). Make note of how many outlets can be flowing before the pressure is equal to or below the PRV Set Pressure. Inform the customer that they will be able flow a specified number of outlets simultaneously. If the customer exceeds that number of flowing fixtures, the system will receive hard or unfiltered water.

Troubleshooting Hard or Unfiltered Water Issues

If hard or unfiltered water is introduced into the system, it could be due to the following reasons.

- 1. The customer is exceeding the maximum amount of plumbing focures they can have flowing simultaneously. Inform them that they can also test the system by repeating the process in **Step 7** of the Domestic Water Bypass Installation Guidelines.
- 2. The city pressure has changed significantly. If this occurs, the PRV will have to be readjusted.
- The water softener is too small for the customer's domestic-use needs or is malfunctioning. The customer may need to purchase a water softener with higher flow characteristics or have their softener repaired.
- The PRV has been set incorrectly (too high).

The Flow Test Does Not Work

- Make sure the PRV Set Pressure in the field is equal to or higher than the Set Pressure shown on the plan. If the actual PRV Set Pressure is lower than the Set Pressure shown on the bypass detail (13), there will not be enough pressure available to perform a successful flow test.
- 2. Contact the Uponor Design Department at 888.594.7726 to verify the friction loss across the PRV is not too great and to see if there is something else causing a flow restriction.

Uponor, Inc. 5925 148thStreet West Apple Valley MN 55124 USA Tel: 800.321.4739 Fax: 952.997.1751 Web: www.uponor-usa.com

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Uponor AquaPEX[®] White

Submittal Information

Revision C: Oct. 7, 2009

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Job Name:			
Location:		Part No. Ordered:	
Engineer:		Date Submitted:	
Contractor:		Submitted By:	
Manufacturer's Representativ	e:	Approved By:	
nee <mark>hnical/Data</mark> Material:	Crosslinked polyethylene PEX-a Engel Method;	PEX 5006	
Standard Grade Hydrostatic Ratings (PPI):	200°F (93°C) at 80 psi 180°F (82°C) at 100 psi 73 4°F (23°C) at 160 psi		

1/2", 3/4", and 1" AquaPEX® White only: 120°F (49°C) at 130 psi 1.10"/10°F (12°C)/100'

Linear Expansion Rate:

Product Information and Application Use Uponor AquaPEX White is tubing used for hot and cold domestic potable water distribution, residential fire safety and radiant heating systems containing no ferrous corrodible components or where ferrous components are isolated from the tubing. Date Number Official Weight



		State Carl Street States			ALL ALL DESCRIPTION OF A D
	1/4" Uponor AquaPEX White, 100-ft. coil	F1040250	0.241"	0.375"	4.0 lbs.
	%" Uponor AquaPEX White, 400-ft. coil	F1090375	0.350"	0.500"	20.0 lbs.
	3/8" Uponor AquaPEX White, 1,000-ft. coll	F1120375	0.350"	0.500"	44.0 lbs.
	1/2" Uponor AquaPEX White, 100-ft. coil*	F1040500	0.475"	0.625"	6.0 lbs.
1000000	1/2" Uponor AquaPEX White, 300-ft. coil*	F1060500	0.475"	0.625"	18.0 lbs.
	1/2" Uponor AquaPEX White, 1,000-ft. coil*	F1120500	0.475"	0.625"	54.0 lbs.
	%" Uponor AquaPEX White, 300-ft. coil	F1060625	0.574"	0.750"	28.0 lbs.
-	%" Uponor AquaPEX White, 1000-ft. coil	F1120625	0.574"	0.750"	86.0 lbs.
-	34" Uponor AquaPEX White, 100-ft. coil*	F1040750	0.671"	0.875"	10.0 lbs.
	¾" Uponor AquaPEX White, 300-ft. coil*	F1060750	0.671"	0.875"	34.0 lbs.
	34" Uponor AquaPEX White, 500-ft. coil*	F1100750	0.671"	0.875"	54.0 lbs.
	1" Uponor AquaPEX White, 100-ft. coil*	F1041000	0.862"	1.125"	20.0 lbs.
	1" Uponor AquaPEX White, 300-ft. coil*	F1061000	0.862"	1.125"	56.0 lbs.
	1" Uponor AquaPEX White, 500-ft. coil*	F1101000	0.862"	1.125"	93.0 lbs.
	1 ¹ / ₄ " Uponor AquaPEX White, 100-ft. coil	F1061250	1.054"	1.375"	34.0 lbs.
	11/4" Uponor AquaPEX White, 300-ft. coil	F1021250	1.054"	1.375"	106.0 lbs.
	11/2" Uponor AquaPEX White, 100-ft. coil	F1061500	1.244"	1.625"	44.0 lbs.
	11/2" Uponor AquaPEX White, 300-ft. coil	F1021500	1.244"	1.625"	133.0 lbs.
	2" Uponor AquaPEX White, 100-ft. coil	F1062000	1.629"	2.125"	68.2 lbs.
in come	2" Uponor AquaPEX White, 200-ft. coil	F1052000	1.629"	2.125"	136.4 lbs.
0.000	2" Uponor AquaPEX White, 300-ft. coil	F1022000	1.629"	2.125"	204.6 lbs.
A THE REAL	3" Uponor AquaPEX White, 100-ft. coil	F1063000	2.400"	3.125"	128.0 lbs.
	3" Uponor AquaPEX White, 350-ft. coil	F1023000	2.400"	3.125"	442.0 lbs.
1 TH	Stallation	te state a state			an a

Installation

Approved fittings are ProPEX[®] fittings¹ for sizes ³/₆" through 2" AquaPEX. Use WIPEXTM fittings for 3" AquaPEX. Refer to the AquaPEX Professional Plumbing Installation Handbook, AquaSAFETM Fire Safety Installation Guide or the Uponor Radiant Installation Handbook for details.

Standards	Codes	Listings	
CSA B137.5; ASTM F876; ASTM F877; ASTM F1960; ASTM-E84; ASTM-E119/UL 263	IPC; UPC; NSPC; NPC of Canada	*½", ¾", 1" UL 1821; *ULC/ORD - C 199 F ITS; UL; ICC; ANSI/NSF 14- and 61-certific smaller; Canada: 1" diameter and smaller	P; IAPMO; CSA; HUD; WARNOCK HERSEY; NSF; ed; CAN/ULC S102.2; U.S.: ¾" diameter and
Related Applications		Contact Information	
PEX-a Plumbing Systems AquaSAFE Fire Safety Systems		Uponor, Inc. 5925 148 th Street West Apple Valley, MN 55124 USA Phone: (800) 321-4739 Fax: (952) 891-2008 www.uponor-usa.com	Uponor Ltd. 2000 Argentia Rd., Plaza 1, Ste. 200 Mississauga, ON L5N 1W1 CANADA Phone: (888) 994-7726 Fax: (800) 638-9517 www.uponor.ca

Print Stream on Tubing	Explanation
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¹ For ½-inch tubing only

² USA, Material Type, Extruder No., Year, Month, Day

³ Footage marking in increments of three feet (3')

Table 1-1: Print Stream Identification

ProPEX[®] Sprinkler Adapters and Fittings

Uponor offers sprinkler adapter fittings specifically designed for the AquaSAFE Fire Safety system. These fittings feature ProPEX connections and a standard ½" NPT outlet for connecting fire sprinklers.

Table 1-2 shows the requiredtubing length needed toapproximate the equivalent pressureresistance of the different types ofUponor ProPEX fittings.

Calculated Equivalent Tubing Length

Fitting Turns	Tubing Size			
Fitting Type				
Tee - Run	2'	2'		
Tee - 90°	6'	6'		
90° Elbow	5'	6'		
Coupling	2'	2'		

Table 1-2: Pressure Resistance (Fittings/Tubing)



Fire Sprinkler Adapter Mounting Bracket Submittal Information

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Revision A: Dec. 3, 2009							
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Job Name:							
Location:	·	· · · · · · · · · · · · · · · · · · ·	Part No. Ordered	:			·
Engineer:			Date Submitted:				
Contractor:			Submitted By:				
Manufacturer's Representat	ive:		Approved By:				
di Minne I Operative		an Sectors of		- A			
Material:	1050 Annealed (sphe	eroidized) spring steel	B				»
Plentra (moantalah)	and Application USS				ľ		
Uponor's Fire Sprinkler Ada ProPEX [®] Lead-free Brass Fir LF7707575) in Uponor Aqua systems. ¹	pter Mounting Bracket is desig re Sprinkler Adapter Tees (LF aSAFE™ multi-purpose resider	gned to rigidly mount 7701010 an d ntial fire sprinkler				D	
						K	
Deschoud N		Part Numbe	er 🖉 👬 🔥	8	¢	.	Weight
Fire Sprinkler Adapte	er Mounting Bracket, 34" and	1" A7750700	2.48"	1.84"	3.16"	1.42"	0.21 lbs.
Fire Sprinkler Adapte	er Mounting Bracket, 34" and	1" A7750700	2.48" (************************************	1.84" 	3.16" • • • • • • • • •	1.42" ₩1.42"	0.21 lbs.
Fire Sprinkler Adapte	er Mounting Bracket, 34" and in bracket or sprinkler adapter inkler plan mounting details for alling adapter tee into bracket System Installation Guide.	1" A7750700 er to the structure with or correct placement of t, use Fire Sprinkler Ada	2.48" two #10 x 1½" Pa brackets and ada apter Push-on Nut	1.84" an Head, Full T pters, taking ir (F7000005). F	3.16" Thread Screw nto account to for more info	1.42" vs (F700150 the ceiling t prmation, re	0.21 lbs. 00) or type and fer to the
Fire Sprinkler Adapte Installation. Attach the sprinkler-mountil equivalent. Refer to the spri sprinkler model. When insta Uponor AquaSAFE Looped S Related Products	er Mounting Bracket, 34" and ng bracket or sprinkler adapte inkler plan mounting details fo alling adapter tee into bracket system Installation Guide.	1" A7750700 er to the structure with or correct placement of a, use Fire Sprinkler Ada	2.48" two #10 x 1½" Pa brackets and ada apter Push-on Nut	1.84" an Head, Full T pters, taking ir (F7000005). F	3.16" Thread Screw to account to or more info	1.42" vs (F700150 the ceiling t prmation, re	0.21 lbs. 00) or ype and fer to the
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Fire Sprinkler Adapte Installation. Attach the sprinkler-mountli equivalent. Refer to the spri sprinkler model. When insta Uponor AquaSAFE Looped S Related Products LF7701010: ProPEX Brass F LF7707575: ProPEX Brass F Standards	er Mounting Bracket, ³ 4" and ng bracket or sprinkler adapte inkler plan mounting details fo alling adapter tee into bracket system Installation Guide. " "ire Adapter Tee, 1" PEX x 1" fo "ire Adapter Tee, ³ 4" PEX x ³ 4"	1" A7750700 er to the structure with or correct placement of t, use Fire Sprinkler Ada PEX x ½" FNPT "PEX x ½" FNPT	2.48" two #10 x 1½" Pa brackets and ada apter Push-on Nut	1.84" an Head, Full T pters, taking ir (F7000005). F	3.16" Thread Screw to account to or more info	1.42" vs (F700150 the ceiling t prmation, re	0.21 lbs. 00) or ype and fer to the
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Fire Sprinkler Adapter Installation. Attach the sprinkler-mounthle equivalent. Refer to the sprinkler model. When install Uponor AquaSAFE Looped S Related Products LF7701010: ProPEX Brass F LF7701010: ProPEX Brass F Standards UL1821; ULC/ORD - C199P Codes N/A Listings	er Mounting Bracket, 34" and ng bracket or sprinkler adapter inkler plan mounting details fo alling adapter tee into bracket system Installation Guide. ire Adapter Tee, 1" PEX x 1" f ire Adapter Tee, 34" PEX x 34" (for use with brass sprinkler	1" A7750700 er to the structure with or correct placement of , use Fire Sprinkler Ada PEX x ½" FNPT " PEX x ½" FNPT adapter tees)	2.48" two #10 x 1½" Pa brackets and ada apter Push-on Nut	1.84" an Head, Full T pters, taking ir (F7000005). F	3.16" Thread Screw to account to or more info	1.42" vs (F700150 the ceiling t ormation, re	0.21 lbs. (a) or (b) or (c) or
Fire Sprinkler Adapter Installation. Attach the sprinkler-mountle equivalent. Refer to the spri sprinkler model. When insta Uponor AquaSAFE Looped S Related Products LF7701010: ProPEX Brass F LF7707575: ProPEX Brass F Standards UL1821; ULC/ORD - C199P Codes N/A Listings N/A	er Mounting Bracket, ¾" and ng bracket or sprinkler adaptr inkler plan mounting details fo alling adapter tee into bracket system Installation Guide. Tire Adapter Tee, 1" PEX x 1" F Tire Adapter Tee, ¾" PEX x ¾" (for use with brass sprinkler	1" A7750700 er to the structure with or correct placement of , use Fire Sprinkler Ada PEX x ½" FNPT "PEX x ½" FNPT adapter tees)	2.48" two #10 x 11/2" Pa brackets and ada apter Push-on Nut	1.84" an Head, Full T pters, taking ir (F7000005). F	3.16"	1.42" vs (F700150 the ceiling t prmation, re	0.21 lbs.
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Uponor

ProPEX® Lead-free (LF) Brass Male Threaded Adapter

Submittal Information

Revision A: Jan. 28, 2010 PA-(offer i Bunfiton tages idtenn. Job Name: Part No. Ordered: Location: Date Submitted: Engineer: Submitted By: Contractor: Manufacturer's Representative: Approved By: Teolinited DEtte C69300 Brass Material: Product information and Application Use ProPEX® Lead-free Male Threaded Adapters connect Uponor PEX tubing to male GILT TOIL NPT threads.¹ These adapters are safe for direct burial in soil. Patt Description Weight 4 Number 7‰" HEX ProPEX LF Brass Male Threaded Adapter, 3/8" PEX x 1/2" NPT LF4523850 1/2" NPT 1.62" 0.11 lbs. ProPEX LF Brass Male Threaded Adapter, 1/2" PEX x 1/2" NPT LF4525050 0.32 lbs. 1.73" 7/8" HEX 1/2" NPT ProPEX LF Brass Male Threaded Adapter, 1/2" PEX x 3/4" NPT LF4525075 1.78" 11/8" HEX 0.18 lbs. 34" NPT ProPEX LF Brass Male Threaded Adapter, 34" PEX x 34" NPT* 2.02" LF4527575 11/8" HEX 0.20 lbs. 34" NPT ProPEX LF Brass Male Threaded Adapter, 3/4" PEX x 1" NPT* 0.35 lbs. LF4527510 2.22" 1%" HEX 1" NPT ProPEX LF Brass Male Threaded Adapter, 1" PEX x 3/4" NPT 0.30 lbs. LF4521075 2.25" 11/4" HEX 34" NPT ProPEX LF Brass Male Threaded Adapter, 1" PEX x 1" NPT* LF4521010 13/8" HEX 0.44 lbs. 2.46" 1" NPT ProPEX LF Brass Male Threaded Adapter, 11/4" PEX x 11/4" NPT LF4521313 2.72" 1%" HEX 11/4" NPT 0.75 lbs. ProPEX LF Brass Male Threaded Adapter, 11/2" PEX x 11/2" NPT LF4521515 3.00" 2¼" HEX 11/2" NPT 0.80 lbs. ProPEX Brass Male Threaded Adapter, 2" PEX x 2" NPT LF4522020 3.86" 21/2" HEX 2" NPT 1.90 lbs. Installation The part in succes ProPEX Tool and ProPEX Rings (sold separately) are required for connecting the PEX tubing. Refer to the AquaPEX® Professional Plumbing Installation Guide or Radiant Floor Heating Installation Handbook for additional information. **iStandards** States and States S & M. 10 CAN/CSA B137.5; ASTM F877; ASTM F1960 (Codes 化学会: IPC; UPC; NSPC; NPC of Canada Listings ANSI/NSF 14- and 61-certified; HUD MR 1269; ICC ESR 1099; IAPMO 3558; U.P. Code, Annex G; *UL 1821; *ULC/ORD C199P Related Applications Contact Information PEX-a Plumbing Systems Uponor, Inc. Uponor Ltd. 5925 148th Street West Radiant Heating and Cooling Systems 2000 Argentia Rd., Plaza 1, Ste. 200 Snow and Ice Melting Systems Apple Valley, MN 55124 USA Mississauga, ON L5N 1W1 CANADA Permafrost Protection Systems Phone: (800) 321-4739 Phone: (888) 994-7726 **Turf Conditioning Systems** Fax: (952) 891-1409 Fax: (800) 638-9517 www.uponor-usa.com www.uponor.ca

ponor

ProPEX[®] Lead-free (LF) Brass Coupling

Submittal Information

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Revision A: Jan. 28, 2010

Realight A. Juli. 20, 2010						
Districted informations	a og dæge stærtler og					
Job Name:						
Location:	Part No. (Part No. Ordered:				
Engineer:		mitted:				
Contractor:		<u> </u>				
		Бу:				
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Material Co	69300 Brass			` 7		1
Ploduct Information and Application Use.		27	Treel	TTTT	22	_
ProPEX [®] Lead-free Brass Couplings are available for cold domestic potable water systems. ¹ Also approve radiant heating system. The coupling features the U Fitting for connections to Wirsbo hePEX [™] tubing or U AquaPEX [®] tubing. Couplings are safe for direct buria	use in hot and B d for use in any ponor ProPEX Jponor				~~~~)
My (Deschiption	PartiNumber	97 A .	! ~}/₿ ∕∕	*** č * 1	т р.,	Weight
ProPEX LF Brass Coupling, 3/8" PEX x 1/2" PEX	LF4543850	1.42"	0.740"	0.398"	0.280"	0.05
ProPEX LF Brass Coupling, ½" PEX x ½" PEX*	LF4545050	1.54"	0.740"	0.398"	N/A	0.07
ProPEX LF Brass Coupling, ¾" PEX x ¾" PEX*	LF4547575	2.02"	1.187"	0.595"	N/A	0.13
ProPEX LF Brass Coupling, 34" PEX x 1" PEX*	LF4547510	2.25"	1.345"	0.795"	0.595"	0.16
ProPEX LF Brass Coupling, 1" PEX x 1" PEX*	LF4541010	2.49"	1.345"	0.818"	N/A	0.20
Installation		1			nde The As Ar an	
ProPEX Tool and ProPEX Rings (sold separately) are Ring for tubing connections. For more information, refer Fire Sprinkler Installation Guide or the Radiant Floor He Standards CAN/CSA B137.5: ASTM F877: ASTM F1960	required for connecting the to the AquaPEX Professional ating Installation Handbook.	PEX tubing. Plumbing In:	Use the app stallation Gui	ropriately s de, the Aqu	ized Uponor IaSAFE™ Re	r ProPEX esidential
Çòđes						
IPC; UPC; NSPC; NPC of Canada						
IAMPO 3558; HUD MR 1269; ICC ESR 1099; NSF 14- ar	nd 61-certified; U.P. Code, An	nex G; *UL	1821; *ULC	ORD C199	P	
Related Applications	Contact Information	1993日建設				
PEX-a Plumbing Systems Uponor Residential Fire Safety Systems Radiant Heating and Cooling Systems Snow and Ice Melting Systems Permafrost Protection Systems Turf Conditioning Systems	Uponor, Inc. 5925 148 th Street West Apple Valley, MN 55124 L Phone: (800) 321-4739 Fax: (952) 891-2008 www.uponor-usa.com	U 22 JSA M P F vv	ponor Ltd. 000 Argenti lississauga, hone: (888) ax: (800) 6 ww.uponor.	a Rd., Plaza ON L5N 1V 994-7726 38-9517 ca	a 1, Ste. 20 V1 CANADA	00 A

uponor

ProPEX[®] Lead-free (LF) Brass Tee

Submittal Information

Revision B: Jan. 28, 2010		
Job Name:		
Location:		Part No. Ordered:
Engineer:		Date Submitted:
Contractor:		Submitted By:
Manufacturer's Representative:		Approved By:
શાં નવોગોન્સીગ્રેનિય વિદ્યાર્થીય વિશ્વર્થીય		
Material:	C69300 Brass	
attender terrerativeleterer (مريح المريح ا المريح المريح	

Uponor's ProPEX® Lead-free Brass Tees are ideal for use in hot and cold domestic potable water systems.1

This product is approved for use in the AquaSAFE[™] Residential Fire Safety System. Also approved for any hydronic heating system application.

Each end of the ProPEX LF Brass Tee is manufactured with the Uponor ProPEX Fitting for connections to Wirsbo hePEX[™] or Uponor AquaPEX[®] tubing. This product is safe for direct burial in soil.



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A AN A STATE OF SET DIG THE MAN AS A STATE	Part Number	dength dia	e woon a	and Weiternse
ProPEX LF Brass Tee, 1/2" PEX x 1/2" PEX x 1/2" PEX	LF4705050	2.52"	1.45"	0.20 lbs.
ProPEX LF Brass Tee, ¾" PEX x ¾" PEX x ¾" PEX	LF4707575	3.27"	1.93"	0.40 lbs.
ProPEX LF Brass Tee, 1" PEX x 1" PEX x 1" PEX	LF4701010	4.09"	2.42"	0.40 lbs.
	Carrier States and the states	the second second to the second		

ProPEX Tool and ProPEX Rings (sold separately) are required for connecting the PEX tubing. Do not solder within 18 inches of the ProPEX connection. Refer to the AquaPEX Professional Plumbing Installation Guide, AquaSAFE Homeowner Handbook or Radiant Floor Heating Installation Handbook for additional information.

Standards

CSA B137.5; ASTM F877; ASTM F1960

an company Codes

IPC; UPC; NSPC; NPC of Canada

Listings

IAPMO 3558; ANSI/NSF 14- and 61-certified; HUD MR 1269; ICC ESR 1099; UL 1821; ULC/ORD C 199P; U.P. Code, Annex G

Contact Information Related Applications

PEX-a Plumbing Systems Uponor Residential Fire Safety Systems Radiant Heating and Cooling Systems

Uponor, Inc. 5925 148th Street West Apple Valley, MN 55124 USA Phone: (800) 321-4739 Fax: (952) 891-2008 www.uponor-usa.com

Uponor Ltd. 2000 Argentia Rd., Plaza 1, Ste. 200 Mississauga, ON L5N 1W1 CANADA Phone: (888) 994-7726 Fax: (800) 638-9517 www.uponor.ca

					n ora antes Pa
Job Name:					
Location:		Part No. Or	dered:		
Engineer:		Date Subm	itted:	······································	
Contractor:		Submitted	By:		· · · · · · · · · · · · · · · · · · ·
		Approved E	by:		
Material: C69300	Brass	·	—— A		
Designed for use with ¾" or 1" Uponor AquaPEX [®] tubing, Brass Fire Sprinkler Adapter Tee connects fire sprinklers t AquaSAFE [™] Looped multipurpose fire safety system, whi with a home's potable cold-water plumbing system. Use t the connections.	the ProPEX [®] Lead-free to the Uponor residential ch combines fire sprinklers Jponor ProPEX fittings for	62222			B
🕫 - Dubic i piloj 🦛 👘 🖓 - Articia - Artici	Pa	rt Numbe	r A · · ·		Weight
ProPEX LF Brass Fire Sprinkler Adapter Tee, 1" PE	X x 1" PEX x 1⁄2" FNPT	LF7701010	4.09"	2.325"	0.62 lbs.
ProPEX LF Brass Fire Sprinkler Adapter Tee, 34" PE	EX x ¾" PEX x ½" FNPT	LF7707575	3.62"	2.325"	0.64 lbs.
nsullation	2. 包括最短的人		in the second		
Use the appropriate Uponor ProPEX Ring for the tubing. In	nstall the tee using the Fire Sportation, refer to the Uponor (orinkler Adap	ter Mounting Brad	cket (A775070 tallation Guide	0) and Fire
	, mation, refer to the openior ,	iquusini e eo			• • •
A7750700: Fire Sprinkler Adapter Mounting Bracket, ¾" a 77000005: Fire Sprinkler Adapter Push-on Nut	and 1"	y			
Standantu Martin Martin Partin State			n an an Araban an Araban An Anna an Anna	્રે ને તેનું ગુરૂદ્ધ	12-1-542 (M.S. # 26
CAN/CSA B137.5; ASTM F877; ASTM F1960; UL 1821; UI	LC/ORD - C199P		E 1998 Statements	an a	
20des , A state the NEC of Conde	and Made and Market and And				
Istings		$i \in I$			
NOTINGE 14 and C1 and G1 ACC FCD 1000; UUD MD 1					
NSI/NSF 14- and 61-certified; ICC ESR 1099; HUD MR 1		이 것이 안 가슴	Stern Att Status - Caler Inconon I ad	왕 전문 (1994) - 1914년 	이 이외 나는 아파님, 가슴

ProPEX[®] Fire Sprinkler Adapter

Submittal Information

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Revision A: Feb. 1, 2008 Job Name: Part No. Ordered: Location: Date Submitted: Engineer: Submitted By: Contractor: Approved By: Manufacturer's Representative: Teenfileal Dates did a bearing 300 Series Stainless Steel Material: zoren and and an the second and a second state and second s The ProPEX[®] Fire Sprinkler Adapter is used in conjunction with the ٩ respective Reliable[®] Sprinkler to provide a multi-purpose residential fire sprinkler system¹. The system is installed with the cold-potable portion of the Uponor plumbing system for residential applications. The connections are made with Uponor ProPEX fittings. The fittings are designed for use only with %" Wirsbo AQUAPEX® tubing or 1" Wirsbo AQUAPEX tubing in the Uponor AQUASAFE® Looped System. Part Number 0.75" 1.41" ProPEX Fire Sprinkler Adapter, 34" PEX x 1/2" FNPT 07517550 1.88' 2.50 1.82" 0.268 lbs. 1.54" 0.408 lbs. 1.88" ProPEX Fire Sprinkler Adapter, 1" PEX x 1/2" FNPT Q7511050 0.75" 2.50" 2.06" Use the appropriate Uponor ProPEX Ring for tubing. For more information, refer to the Uponor AQUASAFE® Looped System Installation Guide. Standards CAN/CSA B137.5; ASTM F877; ASTM F 1960; UL 1821; ULC/ORD - C 199 P Codes IPC; UPC; NSPC; IRC; IMC; NPC of Canada Ustings ANSI/NSF 14- and 61-certified; ICC ESR 1099; HUD MR 1269; IAPMO 3558 Related Applications Contact Information

PEX-a Plumbing Systems

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Uponor, Inc. 5925 148th Street West Apple Valley, MN 55124 USA Phone: (800) 321-4739 Fax: (952) 891-1409 www.uponor-usa.com

Uponor Ltd. 655 Park Street Regina, SK S4N 5N1 CANADA Phone: (888) 994-7726 Fax: (800) 638-9517 www.uponor.ca

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¹ Reliable[®] Sprinkler is a registered trademark of the Reliable Automatic Sprinkler Co., Inc. ProPEX[®] is a registered trademark of Uponor, Inc. ProPEX [™] is a trademark of Uponor Ltd.



AQUASAFE[™] Four-port Fitting Subassembly

5925 148th Street West Apple Valley, MN 55124 Phone: (800) 321-4739 Fax: (952) 891-1409 www.wirsbo.com

Submittal Information

Component

Part No. Ordered:
Quantity Ordered:
P.O. Number:
Date Submitted:
Submitted By:
Approved By:

Technical Data

Material ______300 Series Stainless Steel Fitting type _____Wirsbo ProPEX® (ASTM F1960) PEX tubing connection size _____1/2"

Dimensional Information				
A	B	С	Weight	
2.72"	3.09"	2.06"	0.56 lbs.	





The AQUASAFE's patented four-port fitting is used in conjunction with the respective Reliable®

Product Information and Application Use

sprinkler head to provide a multi-purpose fire sprinkler system. AQUASAFE system is installed with the cold side of the Wirsbo AQUAPEX[®] plumbing system for residential applications. The four-port design eliminates any stagnant loops within the domestic potable water system and provides guaranteed flow to the sprinkler head upon activation. The connections on the four-port fitting are made with the durable Wirsbo ProPEX fitting. The four-port fitting is designed for use only with 1/2" Wirsbo AQUAPEX tubing.

Accessories

- Q71600 and Q71800 series sprinkler heads with 0.04 gpm/ft² densities
- Q74000 and Q74900 series sprinkler heads with 0.05 gpm/ft² densities
- F1120500: 1/2" AQUAPEX tubing
- Q4690502: 1/2" ProPEX rings

Codes and Standards

- ASTM F1960
- UL Standard 1821
- ANSI/NSF Standard 14
- ANSI/NSF Standard 61
- NFPA 13D
- International Plumbing Code (IPC)
- Uniform Plumbing Code (UPC)

Installation

- The four-port fitting comes from the manufacturer with the appropriate sprinkler head installed.
- If sprinkler head replacement is required in the field, ensure the proper tools, sealant and instructions are utilized.
- Refer to the AQUASAFE Installation Handbook for additional information.



ProPEX[®] 1" Copper Branch Manifold

Submittal Information		
Revision B: March 1, 2010		
Profina Hilloninchion		
Job Name:		
Location:		Part No. Ordered:
Engineer:	· ·	Date Submitted:
Contractor:	· · · · · · · · · · · · · · · · · · ·	Submitted By:
Manufacturer's Representative:		Approved By:
Technical (Data: La		
Material:	Type L Copper	
Maximum Temperature (no pressure):	320°F (160°C)	
Maximum Working Temperature/Pressure:	210°F at 150 psi (99°C at 10.3 bar	A
Maximum Flow Rate at 5 fps:	12.8 gpm	
Maximum Flow Rate at 8 fps:	20.5 gpm	
Productantormationand/Applicat	ion Use	
The Uponor ProPEX [®] 1" Copper Branch Mani domestic potable water distribution systems	fold is used for hot and cold . ¹	
The manifold includes a 1" Copper Sweat Fit outlets feature 1/2" ProPEX Fittings.	ting Adapter supply connection. All	

4	Descript	ióh 🦈	開始な			쀖.	Part Number	A	TB AN	Ġ.	ďb - 1	Weight
	ProPEX 1" C	Copper Bran	ch Manifold wi	th ½" ProPEX	outlets, 4 o	utlets	Q2801050	8.95"	2.40"	1.50"	0.50"	0.80 lbs.
	ProPEX 1" C	Copper Bran	ch Manifold wi	th ½" ProPEX	outlets, 6 o	utlets	Q2811050	11.95"	2.40"	1.50"	0.50"	1.10 lbs.
Ľ	ProPEX 1" C	Copper Bran	ch Manifold wi	th ½" ProPEX	outlets, 8 o	utlets	Q2821050	14.95"	2.40"	1.50"	0.50"	1.40 lbs.
	ProPEX 1" C	Copper Bran	ch Manifold wi	th ½" ProPEX	outlets, 10	outlets	Q2831050	17. 95"	2.40"	1.50"	0.50"	1.70 lbs.
	ProPEX 1" C	Copper Bran	ch Manifold wi	th ½" ProPEX	outlets, 12	outlets	Q2841050	20.95"	2.40"	1.50"	0.50"	1.90 lbs.
tns	tallation			- CAPTURE		Station .	k	Second Second	. Li tadi l	N.L. Ser	un en	

Use any product designed to mount 1" copper pipe as a mounting bracket. Any bend within six inches of the ProPEX connection to the manifold requires the use of a Tube Talon (F7050750) or Bend Support (A5110500 and A5150500). Refer to the AquaPEX[®] Professional Plumbing Installation Guide or the AquaSAFE[™] Residential Fire Sprinkler Installation Guide for additional information.

CAN/CSA B137.5; ASTM F877; ASTM F1960

Codes

IPC; UPC; NSPC; NPC of Canada

Listings

UL 1821; ULC/ORD - C 199P; ICC ESR 1099; ANSI/NSF 14- and 61-certified; IAPMO

Related Applications PEX-a Plumbing Systems

Uponor Residential Fire Safety Systems

Uponor, Inc. 5925 148th Street West Apple Valley, MN 55124 USA Phone: (800) 321-4739 Fax: (952) 891-2008 www.uponor-usa.com

Contact Information

Uponor Ltd. 2000 Argentia Rd., Plaza 1, Ste. 200 Mississauga, ON L5N 1W1 CANADA Phone: (888) 994-7726 Fax: (800) 638-9517 www.uponor.ca

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Uponor

ProPEX[®] Brass Male Threaded Adapter

Submittal Information

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Kevision B: Fed. 4, 2010						
Project intermetion	a de la calendaria.	aa deba				
Job Name:						
Location:	Part No. O	rdered:	·	·		
Engineer:	Date Subn	nitted:				
Contractor:	Submitted	By:				
Manufacturer's Representative:	Approved	By:				
trechnical Data - A - A - A - A - A - A - A - A - A -	使爆发"之语	网科				
Material:	CA 360 Br	ass		······································		
Roduct Suferinetion and Application Use				to for the first		
ProPEX® Brass Male Threaded Adapters connect Uponor PEX tubing	to male NPT t	hreads.1	S			
These adapters are safe for direct burial in soil.				VIIIINA		
Description	Raft Number	. 'A ' '	đ	G UB	Weblit	
ProPEX Brass Male Threaded Adapter, 3/4" PEX x 1/2" NPT	Q4523850	1.62"	0.875" HEX	0.50" NPT	0.11 lbs.	
ProPEX Brass Male Threaded Adapter, 1/2" PEX x 1/2" NPT	Q4525050	1.73"	0.875" HEX	0.50" NPT	0.32 lbs.	
ProPEX Brass Male Threaded Adapter, 1/2" PEX x 3/4" NPT	Q4525075	1.78"	1.125" HEX	0.75" NPT	0.18 lbs.	
ProPEX Brass Male Threaded Adapter, 5%" PEX x 34" NPT	Q4526375	1.94"	1.125" HEX	0.75" NPT	0.18 lbs.	
ProPEX Brass Male Threaded Adapter, 34" PEX x 34" NPT*	Q4527575	2.02"	1.125" HEX	0.75" NPT	0.20 lbs.	
ProPEX Brass Male Threaded Adapter, 3/4" PEX x 1" NPT	Q4527510	2.22"	1.375" HEX	1.00" NPT	0.35 lbs.	
ProPEX Brass Male Threaded Adapter, 1" PEX x 3/4" NPT	Q4521075	2.25"	1.250" HEX	0.75" NPT	0.30 lbs.	
ProPEX Brass Male Threaded Adapter, 1" PEX x 1" NPT*	Q4521010	2.46"	1.375" HEX	1.00" NPT	0.44 lbs.	
ProPEX Brass Male Threaded Adapter, 1¼" PEX x 1¼" NPT	Q4521313	2.72"	1.750" HEX	1.25" NPT	0.75 lbs.	
ProPEX Brass Male Threaded Adapter, 11/2" PEX x 11/2" NPT	Q4521515	3.00"	2.250" HEX	1.50" NPT	0.80 lbs.	
ProPEX Brass Male Threaded Adapter, 2" PEX x 2" NPT	Q4522020	3.86"	2.500" HEX	2.00" NPT	1.90 lbs.	
Installation ProPEX Tool and ProPEX Rings (sold separately) are required for connecting the PEX tubing. Refer to the AquaPEX® Professional Plumbing Installation Guide or Radiant Floor Heating Installation Handbook for additional information. Standards CAN/CSA B137.5: ASTM E877: ASTM E1960						

Codes

IPC; UPC; NSPC; NPC of Canada

Listings

ANSI/NSF 14- and 61-certified; HUD MR 1269; ICC ESR 1099; IAPMO 3558; *UL 1821; *ULC/ORD C199P

Related Applications PEX-a Plumbing Systems

Radiant Heating and Cooling Systems Uponor Residential Fire Safety Systems

An West

Uponor, Inc. 5925 148th Street West Apple Valley, MN 55124 USA Phone: (800) 321-4739 Fax: (952) 891-1409 www.uponor-usa.com

Contact Information

Uponor Ltd. 2000 Argentia Rd., Plaza 1, Ste. 200 Mississauga, ON L5N 1W1 CANADA Phone: (888) 994-7726 Fax: (800) 638-9517 www.uponor.ca

JU

ProPEX[®] Brass Coupling

Submittal Information

Revision B: March 17, 2009

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ponor

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Location:	Part No. Ordered:
Engineer:	Date Submitted:
Contractor:	Submitted By:

Manufacturer's Representative:

Material: CA 360 Brass

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ProPEX[®] Brass Couplings are available for use in hot and cold domestic potable water systems and Uponor Residential Fire Safety Systems.¹ Also approved for use in any radiant heating system. Each end of the fitting is manufactured with the ProPEX fitting for connections to Uponor hePEX[™] tubing or any Uponor AquaPEX[®] tubing.



Approved By:

ý	Description		Par Number	A	B AB	G C	and and a second	Weight
	ProPEX Brass Coupling,	3∕8" PEX x 3∕8" PEX	Q4543838	1.31"	0.750"	0.260"	N/A	0.04 lbs
	ProPEX Brass Coupling,	1/2" PEX x 1/2" PEX*	Q4545050	1.54"	0.740"	0.398"	N/A	0.07 lbs
	ProPEX Brass Coupling,	5%" PEX x 5%" PEX	Q4546363	1.86"	0.910"	0.520"	N/A	0.08 lbs
	ProPEX Brass Coupling,	34" PEX x 34" PEX *	Q4547575	2.02"	1.187"	0.595"	N/A	0.13 lbs
	ProPEX Brass Coupling,	1" PEX x 1" PEX*	Q4541010	2.49"	1.345"	0.818"	N/A	0.20 lbs
	ProPEX Brass Coupling,	%" PEX x ½" PEX	Q4543850	1.42"	0.740"	0.398"	0.280"	0.05 lbs
	ProPEX Brass Coupling,	1⁄2" PEX x 3⁄4" PEX	Q4545075	1.78"	1.070"	0.614"	0.398"	0.09 lbs
	ProPEX Brass Coupling,	34" PEX x 1" PEX*	Q4547510	2.25"	1.345"	0.795"	0.595"	0.16 lbs
	ProPEX Brass Coupling,	2" PEX x 11/2" PEX	Q4542015	4.10"	2.600"	1.110"	1.580"	1.10 lbs
	ProPEX Brass Coupling,	2" PEX x 2" PEX	Q4542020	4.54"	2.600"	1.580"	N/A	1.30 lbs

installation

Use the appropriate ProPEX Ring for connecting the tubing. Refer to the AquaPEX Installation Handbook, Radiant Floor Installation Handbook or the Uponor AQUASAFE[®] Installation Guide for additional information.

Standards

ASTM F877; ASTM F1960; CAN/CSA B137.5

(Codes

IPC; UPC; NSPC; NPC of Canada

Wistings

ANSI/NSF 14- and 61-certified; *UL 1821; *ULC/ORD C199P; ICC ESR 1099; HUD MR 1269; IAPMO 3558

Related Applications

PEX-a Plumbing Systems AQUASAFE Fire Safety Systems Radiant Heating and Cooling Systems Snow and Ice Melting Systems Permafrost Protection Systems Turf Conditioning Systems Uponor, Inc. 5925 148th Street West Apple Valley, MN 55124 USA Phone: (800) 321-4739 Fax: (952) 891-2008 www.uponor-usa.com Uponor Ltd. 2000 Argentia Rd., Plaza 1, Ste. 200 Mississauga, ON L5N 1W1 CANADA Phone: (888) 994-7726 Fax: (800) 638-9517 www.uponor.ca

ProPEX[®] Brass Female Threaded Adapter

Submittal Information

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Revision B: Feb. 4, 2010	Revision B: Feb. 4, 2010					
Project Information as a state of the second s						
Job Name:						
Location:	Part No. Ordered:					
Engineer:	Date Submitted:					
Contractor:	Submitted By:	· · · · ·				
Manufacturer's Representative:	Approved By:					
technical Data	i Ri di H			A		
Material:	CA 360 Brass					
Productunformation and Application Use			gutte		KK	
The ProPEX® Brass Female Threaded Adapter connects Upond	or PEX tubing to female N	IPT				
threads. ¹ These fittings are used in hot and cold domestic pot	able water systems or in red with the Uponor Prop	any				
Fitting for connections to Wirsbo hePEX™ tubing or Uponor A	quaPEX [®] tubing. The othe	er	and the		%	
end of the adapter connects to female threaded connections.	These adapters are safe	for	1			
			2 - B	242 15 (M ¹ %)8		
	PartiNumber		B		Weight	
ProPEX Brass Female Threaded Adapter, 1/2" PEX x 1/2"	NPT Q4575050	1.57" 1.	.000" HEX	0.50" NPT	0.20 lbs.	
ProPEX Brass Female Threaded Adapter, ½" PEX x ¾"	NPT Q4575075	1.75" 1.	.187" HEX	0.75" NPT	0.40 lbs.	
ProPEX Brass Female Threaded Adapter, 5/8" PEX x 3/4"	NPT Q4576375	1.91" 1.	.187" HEX	0.75" NPT	0.20 lbs.	
ProPEX Brass Female Threaded Adapter, ¾" PEX x ¾"	NPT* Q4577575	1.87" 1.	.375" HEX	0.75" NPT	0.20 lbs.	
ProPEX Brass Female Threaded Adapter, 3/4" PEX x 1"	NPT Q4577510	2.21" 1.	.500" HEX	1.00" NPT	0.40 lbs.	
ProPEX Brass Female Threaded Adapter, 1" PEX x ¾"	NPT Q4571075	2.17" 1.	.187" HEX	0.75" NPT	0.25 lbs.	
ProPEX Brass Female Threaded Adapter, 1" PEX x 1" N	IPT Q4571010	2.44" 1.	.500" HEX	1.00" NPT	0.45 lbs.	
ProPEX Brass Female Threaded Adapter, 11/4" PEX x 13	4" NPT Q4571313	2.57" 2.	.000" HEX	1.25" NPT	1.00 lbs.	
ProPEX Brass Female Threaded Adapter, 11/2" PEX x 13	2" NPT Q4571515	2.75" 2.	.500" HEX	1.50" NPT	2.20 lbs.	
ProPEX Brass Female Threaded Adapter, 2" PEX x 2" N	PT Q4572020	3.53" 3.	.000" HEX	2.00" NPT	2.20 lbs.	
Installation			no tao ina Galeria da A			
ProPEX Tool and ProPEX Rings (sold separately) are required	for connecting the PEX tu	ubing. For m	nore informati	ion, refer <mark>to</mark> th	e AquaPEX	

ProPEX Tool and ProPEX Rings (sold separately) are required for connecting the PEX tubing. For more information, refer to the AquaPEX Professional Plumbing Installation Guide or the Radiant Floor Heating Installation Handbook.

Standards

CAN/CSA B137.5; ASTM F877; ASTM F1960

Codes

IPC; UPC; NSPC; NPC of Canada

Listings

ANSI/NSF 14- and 61-certified; ICC ESR 1099; HUD MR 1269; *UL 1821; *ULC/ORD C199P

Related Applications

PEX-a Plumbing Systems Radiant Heating and Cooling Systems Uponor Residential Fire Safety Systems

Contact Information

Uponor, Inc. 5925 148th Street West Apple Valley, MN 55124 USA Phone: (800) 321-4739 Fax: (952) 891-1409 www.uponor-usa.com Uponor Ltd. 2000 Argentia Rd., Plaza 1, Ste. 200 Mississauga, ON L5N 1W1 CANADA Phone: (888) 994-7726 Fax: (800) 638-9517 www.uponor.ca

PUL

ProPEX® Ring

chamfer and stop edge.

: :

Propex [®] King	
Submittal Information	
Revision A: March 17, 2009	
Job Name:	
Location:	Part No. Ordered:
Engineer:	Date Submitted:
Contractor:	Submitted By:
Manufacturer's Representative:	Approved By:

Material: PEX-a (Engel Method) Density: 926 to 940 kg/m³ Degree of Crosslinking: 70% to 89% theory and the first of the first where the first of the Manufactured from PEX-a material, Uponor $ProPEX^{\bullet}$ Rings are required to make a proper ProPEX connection.¹ Red print on the rings indicates hot lines. The 1/2" and 3/4" ProPEX rings with stop includes a leading edge

	n oasarianone an ar 18 - Ar an Brann	Part Number	Length	- 100 ·	, old.	Wildor
Г	ProPEX Ring, 34"	Q4690302	0.54"	0.49"	0.74"	0.005 lbs.
	ProPEX Ring with Stop, 1/2" (red print)	Q4690511	0.63"	0.63"	0.87"	0.006 lbs.
	ProPEX Ring with Stop, 1/2"	Q4690512	0.63"	0.63"	0.87"	0.006 lbs.
	ProPEX Ring, %	Q4680625	0.79"	0.75"	1.00"	0.008 lbs.
	ProPEX Ring with Stop, 34"	Q4690756	0.87"	0.88"	1.13"	0.012 lbs.
	ProPEX Ring, 1"	Q4681000	1.10"	1.13"	1.42"	0.020 lbs.
	ProPEX Ring, 1¼"	Q4681250	1.35"	1.38"	1.66"	0.030 lbs.
	ProPEX Ring, 11/2"	Q4681500	1.61"	1.63"	1.91"	0.040 lbs.
	ProPEX Ring, 2"	Q4682000	1.97"	2.14"	2.61"	0.133 lbs.

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Square cut the Uponor ProPEX tubing. Remove excess material. Slide the ProPEX Ring over the end of the tubing (maximum $\eta_{\rm 16}$ over-hang). When using the ½" ProPEX Ring with stop edge, slide the ring on (i.e., chamfered edge first) until the end of the tubing contacts the stop edge. Expand tubing and ring. Rotate tool a quarter turn after each expansion to prevent the formation of grooves. Remove the expansion tool and fully seat the tubing and ring against the shoulder of the fitting. You should make ProPEX connections at temperatures above 5°F /-15°C. For more information, refer to the AquaPEX[®] Professional Plumbing Installation Handbook, AQUASAFE[®] Fire Safety Installation Guide or the Uponor Radiant Installation Handbook.

Standards

ASTM F1960

Codes

IPC; UPC; NSPC; NPC of Canada

Listings

UL 1821 (1/2", 3/4" and 1"); ULC/ORD - C 199 P (1/2", 3/4" and 1"); HUD MR 1269; ICC ESR 1099; ANSI/NSF 14- and 61-certified

Related Applications Contact Information

PEX-a Plumbing Systems Radiant Heating and Cooling Systems AQUASAFE Fire Safety Systems

Uponor, Inc. 5925 148th Street West Apple Valley, MN 55124 USA Phone: (800) 321-4739 Fax: (952) 891-2008 www.uponor-usa.com

Uponor Ltd. 2000 Argentia Rd., Plaza 1, Ste. 200 Mississauga, ON L5N 1W1 CANADA Phone: (888) 994-7726 Fax: (800) 638-9517 www.uponor.ca

JOUOOU

ProPEX[®] Brass Tee

Submittal Information Revision B: March 17, 2009

Prestard Building House

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		_

Location:	Part No. Ordered:	
Engineer:	Date Submitted:	
Contractor:	Submitted By:	
Manufacturer's Representative:	Approved By:	

Material:

NechnicalData CA 360 Brass / EN12165 Brass



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Product Information and Application Use

ProPEX® Brass Tee makes diverting connections for Uponor PEX tubing in supply and return mains.¹ Available for use in hot and cold domestic potable water systems, AQUASAFE® Residential Fire Safety Systems and in any hydronic heating system. Each end of the fitting is manufactured with the ProPEX fitting for connections to hePEX[™] or any AquaPEX[®] tubing. Branch size is listed last in the part description.

ProPEX Brass Tee 1/4" PEX x 1/4" PEX x 1/4" PEX * 04705050 2.52" 1.45" 0.20 lbs	
	•
ProPEX Brass Tee, ¾" PEX x ¾" PEX x ¾" PEX* Q4707575 3.27" 1.93" 0.20 lbs	
ProPEX Brass Tee, 1" PEX x 1" PEX x 1" PEX* Q4701010 4.09" 2.42" 0.40 lbs	
ProPEX Brass Tee, 2" PEX x 2" PEX x 2" PEX Q4702000 7.43" 4.43" 2.40 lbs	

Installation

Use appropriate PEX Ring for connecting the tubing. Refer to the AquaPEX Installation Handbook, the Uponor AQUASAFE Installation Guide or the Uponor Radiant Floor Installation Handbook for additional information.

Standards

ASTM F877; ASTM F1960; CAN/CSA B137.5

Codes

UPC; IPC; NSPC; NPC of Canada

Listings

ANSI/NSF 14 & 16 Certified; ICC ESR 1099; HUD MR 1269; IAPMO 3558; *UL 1821; *ULC/ORD C199P

Related Applications

Contact Information

PEX-a Plumbing Systems AQUASAFE Fire Safety Systems Radiant Heating and Cooling Systems

Uponor, Inc. 5925 148th Street West Apple Valley, MN 55124 USA Phone: (800) 321-4739 Fax: (952) 891-2008 www.uponor-usa.com

Uponor Ltd. 2000 Argentia Rd., Plaza 1, Ste. 200 Mississauga, ON L5N 1W1 CANADA Phone: (888) 994-7726 Fax: (800) 638-9517 www.uponor.ca

¹ProPEX[®] is a registered trademark of Uponor, Inc. ProPEX[™] is a trademark of Uponor Ltd.

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ProPEX® Brass Reducing Tee

Submittal Information

Revision B: March 1	.7, 2009		a sharada sa Abadaya sa sa		
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Job Name:					
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Roducation	ation and Application Use		matternall		777777
ProPEX [®] Brass Reduc	cing Tee makes diverting connections for Uponor PEX	8			
domestic potable wa	return mains." Available for use in not and cold ter systems, AOUASAFE® Residential Fire Safety	Ì	and the second		
Systems and in any	hydronic heating system. Each end of the fitting is			F B	
manufactured with the	he ProPEX fitting for connections to hePEX'" or any			88	
Aquarex tubing, bi					
Description	te de tradectarie de la constance de la constan	art Number	. ` ∧ .≓`s	В	Weight
ProPEX Brass F	Reducing Tee, ½" PEX x ½" PEX x ¾" PEX	Q4705575	2.80"	1.93"	0.40 lbs.
ProPEX Brass	Reducing Tee, ¾" PEX x ½" PEX x ½" PEX	Q4707555	3.03"	1.69"	0.40 lbs.
ProPEX Brass	Reducing Tee, ¾" PEX x ½" PEX x ¾" PEX	Q4707557	3.03"	1.93"	0.40 lbs.
ProPEX Brass I	Reducing Tee, ¾" PEX x ¾" PEX x ½" PEX	Q4707550	3.27"	1.69"	0.40 lbs.
ProPEX Brass F	Reducing Tee, ¾" PEX x ¾" PEX x 1" PEX*	Q4707710	3.62"	2.42"	0.50 lbs.
ProPEX Brass F	Reducing Tee, 1" PEX x ¾" PEX x ¾" PEX*	Q4701775	3.86"	2.18"	0.30 lbs.
ProPEX Brass F	Reducing Tee, 1" PEX x ¾" PEX x 1" PEX*	Q4701751	3.86"	2.42"	0.40 lbs.
ProPEX Brass F	Reducing Tee, 1" PEX x 1" PEX x ½" PEX*	Q4701150	4.09"	1.95"	0.40 lbs.
ProPEX Brass F	Reducing Tee, 1" PEX x 1" PEX x ¾" PEX*	Q4701175	4.09"	2.18"	0.40 lbs.
ProPEX Brass I	Reducing Tee, 2" PEX x 2" PEX x 1½" PEX	Q4702215	7.43"	3.99"	2.40 lbs.
ProPEX Brass F	Reducing Tee, 2" PEX x 2" PEX x 1¼" PEX	Q4702213	7.43"	3.73"	2.40 lbs.
ProPEX Brass F	Reducing Tee, 2" PEX x 2" PEX x 1" PEX	Q4702210	7.43"	3.47"	2.40 lbs.
ProPEX Brass F	Reducing Tee, 2" PEX x 2" PEX x ¾" PEX	Q4702275	7.43"	3.23"	2.40 lbs.
ProPEX Brass F	Reducing Tee, 2" PEX x 1½" PEX x 1½" PEX	Q4702055	6.99"	3.99"	2.40 lbs.
ProPEX Brass F	Reducing Tee, 2" PEX x 1½" PEX x 1¼" PEX	Q4702053	6.99"	3.73"	2.40 lbs.
ProPEX Brass F	Reducing Tee, 2" PEX x 1½" PEX x 1" PEX	Q4702051	6.99"	3.47"	2.40 lbs.
ProPEX Brass F	Reducing Tee, 2" PEX x 11/2" PEX x 34" PEX	Q4702575	6.99"	3.23"	2.40 lbs.
Installation	And the second				
Use appropriate PEX Radiant Floor Installa	Ring for connecting the tubing. Refer to the AquaPEX ation Handbook for additional information.	Installation Ha	ndbook, the AQU	JASAFE Installat	ion Guide or the
Standards				r i ki Al	at server a the

CAN/CSA B137.5; ASTM F877; ASTM F1960

Codes - 清清:11 1. 24

IPC; UPC; NSPC; NPC of Canada

leistings

IAPMO 3558; ANSI/NSF 14- and 61-certified; HUD MR 1269; ICC ESR 1099; *UL 1821; *ULC/ORD C 199P

Related Applications

PEX-a Plumbing Systems Radiant Heating and Cooling Systems AQUASAFE Fire Safety Systems

Contact Information

The second s

Uponor, Inc. 5925 148th Street West Apple Valley, MN 55124 USA Phone: (800) 321-4739 Fax: (952) 891-2008 www.uponor-usa.com

Uponor Ltd. 2000 Argentia Rd., Plaza 1, Ste. 200 Mississauga, ON L5N 1W1 CANADA Phone: (888) 994-7726 Fax: (800) 638-9517 www.uponor.ca

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Uponor

ProPEX[®] Fire Sprinkler Adapter

Submittal Information

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Revision B: March 17, 2009

	an a
Job Name:	
Location:	Part No. Ordered:
Engineer:	Date Submitted:
Contractor:	Submitted By:
Manufacturer's Representative:	Approved By:
Istenticationata Material: 300 Series Stainless Steel	
Productiononion and application.Use	
Use the ProPEX [®] Fire Sprinkler Adapter in conjunction with the appropriate sprinkler to provide a multi-purpose residential fire sprinkler system ¹ . For residential applications, the system is installed with the cold-potable portion of the Uponor plumbing system. Make connections with Uponor ProPEX fittings. These fittings are designed for use only with ³ / ₄ " or 1" AquaPEX [®] White tubing in the Uponor AQUASAFE [®] Looped System.	
M DASTROOM	Dant A. B. C. D. E. Weight
ProPEX Fire Sprinkler Adapter, 34" PEX x 1/2" FNPT Q	7517550 0.75" 1.88" 2.50" 1.82" 1.41" 0.268 lbs.
ProPEX Fire Sprinkler Adapter, 1" PEX x ½" FNPT Q	7511050 0.75" 1.88" 2.50" 2.06" 1.54" 0.408 lbs.
	en la seconda en la companyata haredeta forma ta
Use appropriate ProPEX Ring for connecting the tubing. Refer to	the AquaPEX Installation Handbook or the Uponor AQUASAFE®

Installation Guide for additional information.

Standards

CAN/CSA B137.5; ASTM F877; ASTM F 1960

Codes

IPC; UPC; NSPC; IRC; IMC; NPC of Canada

Listings

ANSI/NSF 14- and 61-certified; U.P. Code; ICC ESR 1099; HUD MR 1269; UL 1821; ULC/ORD - C 199 P

Related Applications Contact Information

PEX-a Plumbing Systems AQUASAFE Fire Safety Systems Uponor, Inc. 5925 148th Street West Apple Valley, MN 55124 USA Phone: (800) 321-4739 Fax: (952) 891-2008 www.uponor-usa.com Uponor Ltd. 2000 Argentia Rd., Plaza 1, Ste. 200 Mississauga, ON L5N 1W1 CANADA Phone: (888) 994-7726 Fax: (800) 638-9517 www.uponor.ca

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ProPEX[®] Fire Sprinkler Adapter Tees

Submittal Information Revision B: March 17, 2009

Job Name: Location: Part No. Ordered: Date Submitted: Engineer: Contractor: Submitted By: Manufacturer's Representative: Approved By: THAT IS NO. R. Material: 300 Series Stainless Steel %"NPT Tapped Hole ·利用自我自己的了你了你没有这些有效的问题的,我们的自己的事件。"这些我的意思的是我们的有利的原 Use the ProPEX® Fire Sprinkler Adapter Tee in conjunction with the appropriate sprinkler to provide a multi-purpose residential fire %"NPT Tapped Hole sprinkler system¹. The system is installed with the cold-potable portion of the Uponor plumbing system for residential applications. Make the connections with Uponor ProPEX fittings. The fittings are designed for use only with 34" or 1" AquaPEX[®] White tubing in the Uponor AQUASAFE® Looped System. ProPEX Fire Sprinkler Adapter Tee, 34" PEX x 34" PEX x 1/2" FNPT 2.89" Q7527575 1.41' 2.25" 1.88' 2.50" 0.408 lbs. ProPEX Fire Sprinkler Adapter Tee, 34" PEX x 34" PEX x 1/2" FNPT Q7521010 3.61" 1.54" 2.63" 1.88" 2.50" 0.268 lbs.

NUSHURROUT STATE

Use appropriate PEX Ring for connecting the tubing. Refer to the AquaPEX Installation Handbook, the Uponor AQUASAFE® Installation Guide for additional information.

SCONCIARES CAN/CSA B137.5; ASTM F877; ASTM F1960

Codes

IPC; UPC; NSPC; IRC; IMC; NPC of Canada

Listings

ANSI/NSF 14- and 61-certified; U.P. Code; ICC ESR 1099; HUD MR 1269; UL 1821; ULC/ORD - C 199 P

Related Applications

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PEX-a Plumbing Systems AQUASAFE Fire Safety Systems Uponor, Inc. 5925 148th Street West Apple Valley, MN 55124 USA Phone: (800) 321-4739 Fax: (952) 891-2008 www.uponor-usa.com Uponor Ltd. 2000 Argentia Rd., Plaza 1, Ste. 200 Mississauga, ON L5N 1W1 CANADA Phone: (888) 994-7726 Fax: (800) 638-9517 www.uponor.ca

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ProPEX[®] Fire Sprinkler Adapter Elbow

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Submittal Information Revision B: March 17, 2009									·	
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lacolus intermetion and Applicat	tion Use and s	L	that		<u>41</u>	L	<u>h</u> trí	MIL	41	
Use the ProPEX [®] Fire Sprinkler Adapter El conjunction with the appropriate sprinkler multipurpose residential fire sprinkler sys system is installed with the cold-potable p Uponor plumbing system for residential a Make connections using Uponor ProPEX fi fittings are designed for use only with ¾" AquaPEX [®] White tubing in the Uponor AQ Looped System.	bow in to provide a tem ¹ . The portion of the pplications. ttings. The or 1" UASAFE [®]			; <u></u>						
C Description		AN A	. Part Number	` A ';	₿.	¢	B	∦Ê	÷¢ ?	Weight .
ProPEX Fire Sprinkler Adapter Right E	lbow, ¾" PEX x ½"	FNPT	Q7537550	2.25"	1.95"	1.41"	2.25"	1.95"	1.41"	0.410 lbs.
ProPEX Fire Sprinkler Adapter Right E	lbow, 1" PEX x ½" F	NP	Q7531050	2.63"	2.43"	1.54"	2.63"	2.43"	1.54"	0.783 lbs.
ProPEX Fire Sprinkler Adapter Left Elb	oow, ¾" PEX x ½" FI	NPT	Q7547550	2.25"	1.95"	1.41"	2.25"	1.95"	1.41"	0.410 lbs.
ProPEX Fire Sprinkler Adapter Left Elb	00w, 1" PEX x ½" FN	IPT	Q7541050	2.63"	2.43"	1.54"	2.63"	2.43"	1.54"	0.783 lbs.
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Use appropriate ProPEX Ring when conne for additional information.	cting the tubing. Re	fer to the	e AquaPEX II	nstallatior	n H a ndbo	ok or the	Uponor	AQUASA	FE Install	ation Guide
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Related Applications	Conta	ict İnfo	ormation							
PEX-a Plumbing Systems AQUASAFE Fire Safety Systems	Upono 5925 1 Apple Phone Fax: (9 www.u	r, Inc. L48 th Stre Valley, M : (800) 3 952) 891 Iponor-u:	eet West IN 55124 US 21-4739 -2008 sa.com	A	Uponor 2000 Au Mississa Phone: Fax: (8 www.up	Ltd. rgentia Ra auga, ON (888) 99 00) 638-9 ponor.ca	d., Plaza L5N 1W 4-7726 9517	1, Ste. 2 1 CANAD	200 A	

uponor

Tube Talon

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		Jp	0	no

Submittal Information Tubing Support Revision A: 01/MAR/20

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vision A: 01/MAR/2007	•
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Job Name:	
Location:	Part No. Ordered:
Engineer:	Date Submitted:
Contractor:	Submitted By:
Mfg Rep:	Approved By:
MEGHINIC/ALID/AUA SHI MANMAR PULATER AT	
PRODUCT INFORMATION & APPLICATION USE The Uponor Tube Talons are designed to attach Wirsbo PEX tubing to a desired surface	
(X) DESCRIPTION PART NUM	BER A B C D WEIGHT
[] Tube Talon (1/2", 5/8", 3/4" PEX) F7050750 [] Tube Talon (1" PEX) F7051000	1.55" 2.00" N/A N/A 1.60 lbs N/A N/A 1.66" 2.38" 1.10 lbs

Steres

INSTALLATION

- Mount the tube talon over the tubing and surface it is to be supported on.

- Attach the tube talon to the desired surface with the provided nail.

- Refer to the <u>Uponor Radiant Floor Installation Handbook</u> or the <u>Uponor AQUAPEX Professional Plumbing Installation Guide</u> for

Uponor AQUAPEX Professional Plumbing Installation Guide for additional information.

CODES / STANDARDS / LISTINGS

N/A

RELATED APPLICATIONS

AQUAPEX - Hot & Cold Potable Water Systems Uponor Radiant Floor Heating Systems

CONTACT INFORMATION

Uponor Canada, Ltd. 655 Park Street Regina, SK S4N 5N1 Phone: 888-994-7726 Fax: 800-638-9517 www.uponor.ca.com

uponor

FIRE SAFETY SYSTEMS AQUASAFE™ FLOW TEST VERIFICATION

FORM

AquaSAFE[™] Flow Test Verification Form

Alliance Member ID: 1416 Company Name: ALL ASPEC Contact: PETER S Phone: 207.632 Fax:	-2857	Important: Instal completed form. system warranty to the Uponor Fi at <u>technical.servi</u> For questions, co 888.594.7726 or	lling contractor mu Failure to do so n . E-mail or fax con re Safety Design I <u>ices@uponor.com</u> ontact Uponor Tec <u>technical.services@</u>	est submit this ullifies the opleted form Department or 952.997.1731. hnical Services at <u>Puponor.com</u> .
Job Name: <u>DZL-KZE</u> Project Number: <u>110308</u>	- 5T - 40L	Color of test orific Static pressure (new atter supply into	te used: ot flowing) reading home or at main sh	at incoming nutoff:
Job Address: <u>27 UZLU</u> City: <u>PORTLAN</u>	ZE ST	Residual pressure supply into home	(flowing) reading a or at main shutoff:	t incoming water
For designs not provided by Uponor, co following information. Designer's Name: Company: Phone: Fax: Is the warning sign permanently attach main shutoff valve? Qryes Q No Was this system required by code? Qryes	ed close to the	What time of day Flow test method Flow test gpm: How many gallons as required? Did the test meet Which sprinkler di Location of head: Date left in service	was the flow test ta used? Bucket s of water did the d or exceed design fl d you flow? Number e with all valves ope	aken? Flow Meter lesign predict low? Yes No er: en:
Test Witnessed and Verified by: Name	Signature	(Occupation	Date
Additional Explanations and Note	 			

Uponor, Inc. 5925 148th Street West Apple Valley, MN 55124 USA Tel: 800.321.4739 Fax: 952.997.1731 Web: www.uponor-usa.com

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RESIDENTIAL FIRE SAFETY SYSTEMS

DOMESTIC WATER BYPA SS

INSTRUCTION SHEET

Sprinkler System with Domestic Water Bypass

A domestic water bypass allows the Uponor AquaSAFE[™] fire sprinkler system to operate properly even when flow-restricting devices, such as water softeners and filtration systems, are present in the home.



When a sprinkler activates and water pressure drops significantly, a pressure-reducing valve (PRV) opens and routes the water directly to the sprinkler system, taking the path of least resistance, thus avoiding the flow-restricting device.

The PRV opens only during sprinkler activation and not domestic use. Therefore, the flow-restricting device does not negatively impact the water supply of the fire sprinkler system and allows homeowners to use regular residential plumbing devices versus commercial devices.

Note: When the flow switch detects water flow through the bypass, it can activate an optional alarm, which alerts occupants that the sprinkler system is operating.

Bypass Components

- Pressure-reducing valve (PRV)
- Pressure gauge
- Alarm flow switch (if required)
- Electric alarm bell, horn or strobe light (if required)
- Required tubing and fittings

Figure 1: Domestic Water Bypass Installation with Optional Flow Switch

Domestic Water Bypass Installation Guidelines

Refer to the figure on the front page and use the following steps to properly install a domestic water bypass.

 Install the domestic water bypass line. There needs to be a straight line from the Main Shutoff Valve (1) to the PRV (4) and also from the PRV to the Softener/Filter Outlet Tee (7). This will ensure proper operation of your fire sprinkler system. If additional 90° elbows are installed on the piping through the PRV, contact the Uponor Design Department at 888.594.7726 to recalculate the system.



- 2. Close the Softener/Filter Inlet Control Valve (8). All of the water will now flow through the PRV and not through the domestic Water Softener/ Filtration System (9).
- Now that the Water Softener/ Filtration System (9) is isolated, open a single plumbing fixture downstream of the PRV. The

Pressure Gauge (6) will show a pressure drop downstream of the PRV. The Pressure Gauge (6) reading will continue to drop until it reaches the point at which the PRV is preset.

- 4. If the flowing pressure on the Pressure Gauge (6) is lower or higher than the pressure indicated on the bypass detail in the Set Pressure box (13), turn the adjusting nut on the PRV until the Pressure Gauge (6) reading matches the pressure on the bypass detail. DO NOT adjust the PRV so that the downstream pressure is lower than that shown on the bypass detail. Doing so will cause the sprinkler system to fail.
- 5. Open the Softener/Filter Inlet Control Valve (8). The Pressure Gauge (6) reading will increase. The water is now flowing through the Water Softener/ Filtration System (9) only. If a sprinkler activates, the downstream pressure will drop below the PRV set point and water will flow through the PRV (4), thus introducing hard or unfiltered water into the system.
- Turn off all domestic fixtures and perform the fire sprinkler flow test. If the PRV (4) has been set correctly, the flow test should be successful.
- 7. After the flow test is completed, open multiple outlets downstream of the PRV (4). Make note of how many outlets can be flowing before the pressure is equal to or below the PRV Set Pressure. Inform the customer that they will be able flow a specified number of outlets simultaneously. If the customer exceeds that number of flowing fixtures, the system will receive hard or unfiltered water.

Troubleshooting Hard or Unfiltered Water Issues

If hard or unfiltered water is introduced into the system, it could be due to the following reasons.

- The customer is exceeding the maximum amount of plumbing fixtures they can have flowing simultaneously. Inform them that they can also test the system by repeating the process in Step 7 of the Domestic Water Bypass Installation Guidelines.
- The city pressure has changed significantly. If this occurs, the PRV will have to be readjusted.
- The water softener is too small for the customer's domestic-use needs or is malfunctioning. The customer may need to purchase a water softener with higher flow characteristics or have their softener repaired.
- The PRV has been set incorrectly (too high).

The Flow Test Does Not Work

- Make sure the PRV Set Pressure in the field is equal to or higher than the Set Pressure shown on the plan. If the actual PRV Set Pressure is lower than the Set Pressure shown on the bypass detail (13), there will not be enough pressure available to perform a successful flow test.
- 2. Contact the Uponor Design Department at 888.594.7726 to verify the friction loss across the PRV is not too great and to see if there is something else causing a flow restriction.

Uponor, Inc. 5925 148thStreet West Apple Valley MN 55124 USA Tel: 800.321.4739 Fax: 952.997.1751 Welx www.uponor-usa.com

uponor



A Concealed Residential Sprinkler engineered for a

requirements.

Features

minimum design density of 0.05 gpm/ft² with low GPM

1. Very low water flow requirements.

black plated or painted finishes.

 ½" (13mm) Total adjustment.
 Thread-On/Thread-Off or Push-On/Thread Off cover attachment option.
 Smooth aesthetic ceiling profile.
 Available in brass, chrome and Model RFC43 (SIN RA0612) Model RFC49 (SIN RA0616) Flat Concealed Residential Sprinklers

Bulletin 008 Rev

Butletin 006 nev.D

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UL Listing Categories Residential Automatic Sprinklers

 Listed by Underwriters Laboratories, and certified by UL for Canada (cULus)

UL Guide Number VKKW

Listings & Approval

2. NYC MEA 258-93-E

Product Description

Model FIFC43 and FIFC49 Concealed Residential Sprinklers are fast response residential fusible solder link automatic sprinklers. Residential sprinklers differ from standard sprinklers primarily in their response time and water distribution patierns.

Model RFC43 and RFC49 spinklers discharge water in a hemispherical pattern below the spinkler deflector. Residential distribution patterns are higher and generally contain a finer droplet size than standard spinkler patterns. The combination of speed of operation and high discharge pattern required for residential spinklers has demonstrated, in fire testing, an ability for controlling residential fires, and thereby providing significant evacuation time for occupants. The RFC43 and RFC49 Spinklers provide the best form of fire protection by combining an attractive appearance and the return of cover adjustment for ease of instalation. The small diameter cover plate is easily and positively attached and blends into the ceiling, concealing the most dependable fire protection available, an automatic spinkler system. The RFC43 and RFC49 are UL Listed Residential Sprinklers to be installed in the residential portions of any occupancy in accordance with NFPA 13, 13R, & 13D. The RFC43 and RFC49 can reduce the need for precise

The HPC43 and HPC49 can reduce the need to precise cutting of drop nipples. The threaded cover plate assembly can be adjusted without tools to fit accurately against the ceiling. The fire protection system need not be shut down to adjust or remove the cover plate assembly.

Application and Installation

The RFC43 and RFC49, for residential installations, use a 165°F (74°C) fusible solider link in a tuning fork style sprinkler frame with a crop-down deflector. This assembly is recessed into the coiling and concealed by a flat cover plate. The cover plate is attached to the skirt, using 135°F (57°C) ordinary temperature classification solder. When the coiling temperature rises, the solder holding the cover plate releases the cover allowing the deflector to drop into position and

The Reliable Automatic Sprinkler Co., Inc., 103 Fairview Park Drive, Elmsford, New York 10523

exposing the sprinkler inside to ceiling temperature. The subsequent operation of the solder link opens the waterway and causes the deflector to drop into position to distribute the discharging, water in a hemispherical pattern below the sprinkler deflector. Any adjustment of thread engagement between the cover plate and cup will assure that the drop-down deflector is properly located below the ceiling. The residential distribution pattern contains a finer droptet size than a standard sprinkler, and the pattern produces. similicantly binkner wall wetting.

than a standard sprinkler, and the pattern produces significantly higher wall wetting. After a 2 5/8 inch dismeter hole is cut in the ceiling, the sprinkler is to be installed with the Model FC Wrench. When installing a sprinkler, the wrench is first positioned into the sprinkler/cup assembly and around the hexagonal body of the sprinkler frame. The Wrench must bottom cut against the cup in order to ensure proper, safe installation. The sprinkler is then tightened into the pipe fitting. When inserting or removing the wrench from the sprinkler/cup assembly, care

Temperature Rating

Sprinkler	Cover Plate	Max. Ambient Temp.
165F/74°C	135'F/57'C	100TF/38*C

| Installation Data: RFC43 (SIN RA0612)

	Thread Size	к	Sprinkler	Maximum	Minimum	Minimum Sprinkler	Required Discharge
	inch (mm)	Factor Spacing ft. (m)		to Wall fL (ra)	sprinklers, ft. (m)	Flow gpm (Lpm)	Press. psi (bar)
•	¥" (15mm) ¥" (15mm) ¥" (15mm) ¥" (15mm)	4.3 4.3 4.3 4.3	12 x 12 (3.6x3.6) 14 x 14 (4.3x4.3) 16 x 16 (4.9x4.9) 18 x 18 (5.5x5.5) 20 x 20 (6.0x5.5)	6 (1.83) 7 (2.13) 8 (2.43) 9 (2.74) 10 (3.05)	8 (2.43) 8 (2.43) 8 (2.43) 8 (2.43) 8 (2.43) 8 (2.43)	12 (45) 13 (49) 13 (49) 18 (68) 21 (79)	7.8 (0.54) 9.1 (0.63) 9.1 (0.63) 17.5 (1.21) 23.8 (1.64)

Note: 1 bar = 100 Koa

Installation Data: RFC49 (RA0616)

Thread Size	ĸ	Sprinkier	Maximum	Minimum	Minimum Sprinkler	Required Discharge
inch (rem)	Factor	Specing ft. (m)	to Wall ft. (m)	sprinklers, ft. (m)	Flow gpm (Lpm)	Press. pei (bar)
¥* (15mm) ½* (15mm) ½* (15mm) ½* (15mm)	4.9 4.9 4.9 4.9	12 x 12 (3.6x3.6) 14 x 14 (4.3x4.3) 16 x 16 (4.9x4.9) 18 x 18 (5.5x5.5) 20 x 20 (6 0.06 0)	6 (1.83) 7 (2.13) 8 (2.43) 9 (2.74) 10 (3.05)	8 (2.43) 8 (2.43) 8 (2.43) 8 (2.43) 8 (2.43) 8 (2.43)	13 (49) 13 (49) 13 (49) 17 (64.3) 20 (75.7)	7.0 (0.48) 7.0 (0.48) 7.0 (0.48) 12.0 (0.83) 16.7 (1.14)

Note: 1 bar = 100 Kpa

FOR SLOPED CEILING APPLICATIONS SEE RASCO BULLETIN 035.

2

should be taken to prevent damage to the sprinkler. DO NOT WRENCH ON ANY OTHER PART OF THE SPRINKLEY/CLP ASSEMBLY. MODEL RFC43 AND RFC49 CONCEALED SPRINKLERS MUST BE INSTALLED ONLY WITH 135F RATED COVERS.

Cover assemblies provide up to "%" (13mm) of adjustment. Turn the cover clockwise until the flange is in contact with the caling. For the push-or/thread-off option, the cover assembly is pushed onto the cup and final adjustment is made by turning the cover clockwise until the skint flange makes full contact with the ceiling. Cover removal requires turning in the counter-clockwise direction.

In ceilings that have a plenum space above the sprinkler, the plenum space may have neutral or negative pressurization but must not be positively pressurized. Inspect al sprinklers after installation to ensure that the gap between the cover plate and ceiling and the 4 slots in the cup are all open and free from any air flow impediment.

Maintenance

Model RFC43 and RFC49 Concealed Sprinklers should be inspected quarterly and the sprinkler system maintained in accordance with NFPA 25. Do not clean sprinklers with soap and water, ammonia or any other cleaning fluids. Remove clust by using a soft brush or gentle vacuuming. Remove any sprinkler cover plate assembly which has been painted (other than factory applied) or damaged in any way. A stock of spare sprinklers should be maintained to allow guick replacement of damaged or operated sprinklers. Prior to installation, sprinklers should be maintained in the original cartons and packaging until used to minimize the potential for damage to sprinklers that would cause improper operation or non-operation.

Model RFC43 and RFC49 Residential

Concealed Sprinkler Specification

Sprinklers shall be cULus Listed low flow residential concealed sprinklers with drop-down deflector and adjustable flat cover plate engineered for a minimum design density of 0.05 gprwft. Sprinkler frame and deflector shall be of bronze frame construction having a 1/2" NPT thread. Thermal element shall consist of an approved black-painted barylium-nickel fusible solder link with symmetric lever mechanism, maintaining a Tefton-coated Belleville spring washer and machined brass cap water seal assembly contraining to plassic parts. Sprinkler K-factor shall be nominal 4.3 (62.4), having a 7/16° orfice. Temperature rating shall be Ordinary 165°F (74°C); cover plate temperature rating to be



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135°F (57°C). Cover plate assembly shall consist of a brass cover plate and copper alloy retainer flange allowing a 1/2" cover plate aciustment. Any secure engagement between the cover plate aciustment. Any secure engagement between the cover plate and the cup will assure that the drop-down deflector is properly located below the ceiling. A plastic protective cap shall be provided and factory installed inside the sprinkler cup to protect the drop-down sprinkler deflector from damage, which could occur during construction before the cover plate is installed. Standard cover finish: [Chrome] [White] [Specially -- specify]. Residential conceeled sprinklers shall be Reliable Model RFC43, SIN RA0612 (Bulletin 006) or Model RFC49, SIN RA0616 (Bulletin 006).

Ordering Information Specify:

1. Sprinkler Model 2. Cover Plate Finish 3. Thread-On

-	
inread-On or	Burnlat Analised
Push-On Feature	Special Appecation Finishes

Bright Brass Black Plating Black Paint Off White Satin Chrome

¹⁰ Other colors and finishes available. Consult factory for details. Note: Paint or any other costings applied over the factory finish will void all

Cover Plate Finishes

Randard Finishes

Chrome

محطلا

approvals and warranties

Reliable...For Complete Protection

Reliable offers a wide selection of sprinkler components. Following are some of the many precision-made Reliable products that guard life and property from fire around the clock.

- Automatic sprinklers
- Flush automatic sprinklers
- Recessed automatic sprinklers
- Concealed automatic sprinklers
- Adjustable automatic sprinklers
- Drv automatic sprinklers
- Intermediate level sprinklers
- Open sprinklers
- Spray nozzles
 - Alarm valves
 - Retarding chambers
 - Dry pipe valves
 - Accelerators for dry pipe valves
 - Mechanical sprinkler alarms
 - Electrical sprinkler alarm switches
 - Water flow detectors

- Deluge valves
- Detector check valves
- Check valves
- Superirol electrical system
- Sprinkler emergency cabinets
- Sorinkler wrenches
- Sprinkler escutcheons and guards

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- Inspectors test connections
- Sight drains
- Ball drips and drum drips
- Control valve seals
- Air maintenance devices
- Air compressors
- Pressure gauges
- Identification signs
- Fire department connection

ote of the Historial Fire Projection As one and also with the pro na of co a or other sh ntel co buted by RELIABLE have been protecting life and property in located throughout the United States, Caracta and form ty for over 80 years, and are and and dis and reputable sorial ian count



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C . C . K



Model F1 Residential Sprinklers for Design Density of .05 gpm/ft²

F1 Res 30, 49, 58 & 76

Recessed Pendent/F1

F1 Res 30, 49, 58 & 76

CCP Pendent

F1 Res 44 SWC

Technical Data:

Application

jurisdiction.

The low flow F1 Res sprinklers are specially

engineered for fast thermal response to meet the sensitive fire protection application needs of the latest

residential market standards (UL 1626 Standard). Upon fire conditions, rising heat causes a sprinkler's

heat-sensitive glass-bulb to shatter, releasing the

waterway for water flow onto the deflector, evenly distributing the discharged water to control a fire.

K-Factor: 3.0 (Actual) - F1 Res 30 Pendent Sprinkler
 4.9 (Actual) - F1 Res 49 Pendent Sprinkler
 5.8 (Actual) - F1 Res 58 Pendent & HSW Sprinkler

7.6 (Actual) - F1 Res 76 Pendent Sprinkler.

4.4 (Actual) - F1 Res 44 HSW Sprinkler 4.0 (Actual) - F1 Res 40 HSW Sprinkler

Model F1 Res Sprinklers are used for Residential Fire Protection according to UL 1626 Standard*. Be sure

that orifice size, temperature rating, deflector style and

sprinkler type are in accordance with the latest

published standards of The National Fire Protection Association or the approving authority having

Thermal Sensor: Nominal 3mm glass-bulb
 Sprinkler Frame : Brass Casting

Factory Hydrostatically Tested to 500 psi

Sprinklers' Pressure Rating : 175 psi

Thread Size: ½" NPT (R½)

Density: Minimum 0.05 gpm/ft²

Bulletin 135 Rev.G

F1 Res 30, 49, 58 & 76

Recessed Pendent/FF

F1 Res 44 & 58

Recessed HSW/F2

F1 Res 40 Recessed

HSW/F2

Model F1 Res Sprinklers engineered for the lowest flows to meet the minimum design density of .05 gpm/ft²

Types:

1. F1 Res 30 Pendent 2. F1 Res 30 Recessed Pendent/F2 3. F1 Res 30 Recessed Pendent/FP 4. F1 Res 49 Pendent 5. F1 Res 49 Recessed Pendent/F1 6. F1 Res 49 Recessed Pendent/FP 7. F1 Res 58 Pendent 8. F1 Res 58 Recessed Pendent/F1 9. F1 Res 58 Recessed Pendent/FP 10. F1 Res 76 Pendent 11. F1 Res 76 Recessed Pendent/F1 12. F1 Res 76 Recessed Pendent/FP 13. F1 Res 30 CCP Pendent 14. F1 Res 49 CCP Pendent 15. F1 Res 58 CCP Pendent 16. F1 Res 58 CCP Pendent 16. F1 Res 76 CCP Pendent 17. F1 Res 44 HSW 18. F1 Res 44 Recessed HSW/F2 19. F1 Res 58 HSW 20. F1 Res 58 HSW Recessed HSW/F2 21. F1 Res 44 SWC 22. F1 Res 40 HSW 23. F1 Res 40 Recessed HSW/F2

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Listings & Approvals

1. Listed by Underwriters Laboratories Inc. and UL Certified for Canada (cULus)

2. NYC MEA 258-93-E

Slope Ceiling Approvals: Refer to Bulletin 035

Sprinklers for .10 Density: Refer to Bulletin 176

UL Listing Category

Residential Automatic Sprinkler UL Guide Number

VKKW

Patents

US Patent No. 6,516,893 applies to the Model F1 Res 49 & 58 Pendent Sprinklers

Product Description

Model F1 Res Pendent sprinklers (Figs. 1, 2, 3, & 4) are fast response sprinklers combining excellent durability, high sensitivity glass-bulb and low profile decorative design. The F1 Res Horizontal Sidewall sprinklers (Figs. 5, 6 & 7) are equally attractive when above ceiling piping cannot be used.

The 3mm glass-bulb pendent sprinklers permit the efficient use of residential water supplies for sprinkler coverage in residential fire protection design.

The Reliable Automatic Sprinkler Co., Inc., 103 Fairview Park Drive, Elmsford, New York 10523

Installation

Models F1 Res sprinklers are to be installed as shown. Model F1, F2 and FP Escutcheons, Illustrated herewith, are the only recessed escutcheons to be used with Model F1 Res sprinklers. Use of any other recessed escutcheon will void all approvals and warrantiles. For installing Model F1 Res Pendent sprinklers use only the Model D sprinkler Wrench; for installing Models F1 Res Recessed Pendent, CCP &

Model F1 Res 30, 49, 58 & 76 Pendent



SWC sprinklers use only the Model GFR2 sprinkler wench; for installing Model F1 Res. Recessed HSW sprinklers use only the Model GFR2 Sprinkler Wrench. Use of wrenches other than those specified may damage these sprinklers. Install F1 Res 44 and 40 HSW with a ceiling to deflector distance of 4" - 12". How arrow on deflector must point away from near wall and "Top" marking must face ceiling.

- Model F1 Res 30 Recessed Pendent / F2
- Model F1 Res 49, 58 & 76 Recessed Pendent / F1



F1 escutcheon, 3/" (19mm) adjustment





Fig. 2

Fig. 1



Escutcheon*, F1 or F2, Data:									
Туре	Adjustment Inch (mm)	"A" inch (mm)	Face of fitting to ceiling Inch (mm)						
F1	% (19.0)	Min.= ½ (19.1) Max.=1½ (38.1)	¥a - 1‰ (4.7 - 24.0)						
F2	¥ (12.7)	Min.= 1% (23.8) Max.=1% (38.1)	% -1% (4.7 - 17,4)						
Note: Esculcheons F1 or F2 may be used with									

Technical Data: F1 Res 30 Pendent and Recessed Pendent

Thread Size	vead Orifice Stas Inch		nkler np. ing	Max. Pressure pei	Max. Ambient Temp.		Actual K	Sprinkie Length Inch
	(mm)	Ŧ	Ŷ	(bar)	Ŧ	ç		(m=n)
X" NPT	% (8.2)	155	68	175 (12)	100	38	3.0	2.25 (57

Deflector - to - ceiling

Maximum 1" (25mm) to 4" (100mm)

Max. Sprinkler Spacing ft (m)	Flow gpm (Lpm)	Pressure pel (bar)	Sprinkler Identification Number (SIN)
12 x 12 (3.6x3.6)	8 (30.3)	7.0 (0.48)	DOCAL
14 x 14 (4.3x4.3)	10 (37.8)	11 (0.76)	H3511

Technical Data: F1 Res 49 Pendent and Recessed Pendent

Thread Size	Nominal Ortfice Inch	Springer Failer	nider mp. ting	Max. Pressure pel	Mi Ami Te	noc. Dient mp.	Actual K Factor	Sprinkler Length Inch
K" NPT	X a* (11)	155 175	68 79	175 (12)	100 150	38 66	4.9	2.25 (57)

Deflector - to - ceiling Maximum 1" (25mm) to 4" (100mm)

Max. Sprinkler Spacing ft (m)	Fiow gpm (Lpm)	Pressure pel (bar)	Sprinkler identification Number (SIN)
12 x 12 (3.6x3.6)	13 (49)	7.0 (0.48)	
14 x 14 (4.3x4.3)	13 (49)	7.0 (0.48)	
16 x 16 (4.9x4.9)	13 (49)	7.0 (0.48)	R3516
18 x 18 (5.5x5.5)	17 (64.3)	12.0 (0.83)	
20 x 20 (6.1x6.1)	20 (75.7)	16.7 (1.14)	

*Deflector - to - ceiling Maximum 4" (100mm) to 8" (203mm)

Max. Sprinkler Spacing ft (m)	Flow gpm (Lpm)	Pressure psi (bar)	Sprinkler Identification Number (SIN)
12 x 12 (3.6x3.6)	15 (57)	9.4 (0.65)	
14 x 14 (4.3x4.3)	16 (60.5)	10.6 (0.73)	
16 x 16 (4.9x4.9)	17 (64.3)	12.0 (0.83)	B3516
18 x 18 (5.5x5.5)	19 (72)	15.0 (1.0)	
20 x 20 (6,1x6,1)	22 (83.2)	202(14)	

*Note: The F1 Res 49 pendent and recessed pendent residential sprinklers can be installed per NFPA 13 in beamed ceilings meeting the following criteria: 1. Maximum beam depth = 7° (178mm) 2. Beam spacing at or greater than 7.5 ft. (2.3m) on center.

Technical Data: F1 Res 58 Pendent and Recessed Pendent

Thread Nominal Size Inch		Sprinider Temp. Rating		Max. Pressure pei Max. Ambient Temp.		K Factor	Sprinkler Length Inch	
	(mm)	4F	•C	(bar)	4	•C		(mm)
W"NPT (R%)) (13)	155 175	68 P	175 (12)	<u>188</u>	36	5.8	2.25 (57)

Max. Sprinkler Spacing ft (m)	Flow gpm (Lpm)	Pressure pel (bar)	Ceiling-to- Deflector Inch (mm)	Sprinkler Identification Number (SIN)
12 x 12 (3.6x3.6)	16 (61)	7.6 (0.53)		R3513
14 x 14 (4.3x4.3)	16 (61)	7.6 (0.53)		
16 x 16 (4.9x4.9)	16 (61)	7.6 (0.53)	1-4 (25.100)	
18 x 18 (5.5x5.5)	19 (72)	10.8 (0.75)	(00)-634	
20 x 20 (6.1x6.1)	22 (83.3)	14.4 (1.0)		



Technical Data: F1 Res 76 Pendent and Recessed Pendent

Thread Orifice Size Inch (mm)		Spri Ter Pal F		Max. Pressure pei (bar)	Marc Amblant Temp. *F *C		K Factor	Sprinkler Length Inch (mm)	
Y NPT	17/2 (13.5)	155 175	68 79	175 (12)	100 150	3866	7.6	2.25 (57)	

Max, Sprinkler Spacing ft (m)	Flow gpm (Lpm)	Preisure pei (ber)	Sprinider Identification Number (SIN)
12 x 12 (3.6x3.6)	21	7.6 (0.53)	
14 x 14 (4.3x4.3)	21	7.6 (0.53)	
18 x 16 (4.9x4.9)	21	7.6 (0.53)	R7618
18 x 18 (5.5x5.5)	21	7.6 (0.53)	
20 x 20 (6.1x6.1)	23	9.2 (0.63)	





Model F1 Res 30, 49, 58 & 76 Recessed Pendent / FP

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FP push-on/thread-off escutcheon



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Technical Data: F1 Res 30 CCP Pendent and Reces	sed	Pendent /	FP
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1	Thread Size	Nominal Orifice Inch (mm)	Sprin Tern Rail	ikler np. ing	CCP Assembly Temp. Bating		Max. Ar Pressure T pai(bar) *		ax. bient mp.	K Factor	Sprinkler Length Inch (mm)	
	1/2" NPT (R%)	²‰* (8.2)	155	68	135	57	175 (12)	100	38	3.0	2.25 (57)	
	Max. Sprinkler Spacing ft (m)			Fi pm	ow (Lpn	2	Pressur psi (ba	те 1)		Sprink dentific lumber	der ation (SIN)	
12 x 12 (3.6x3.6)		<u> </u>	8 (30.3)			7.0 (0.4	R3511		1			

Technical Data: F1 Res 49 CCP Pendent and Recessed Pendent / FP

Thread Size	Nominal Orifice Inch (mm)	Spri Ter Ra		Ci Assa Te Ba	ambiy mp.	Marc Pressure psi (bar)	M Am Te		K Factor	Sprinkler Length Inch (mm)	
が。 NPT (R)か)	%; (11)	155	68	135	57	175 (12)	100	38	4.9	2.25 (57)	

CCP Options Dat	CCP Options Data:									
"A" Cover Adjustment Inch (mm)	"B" CCP Height Inch (mm)									
¥ (12.7)	5 <u>6 (24)</u>									
54 (7.9)	3/(19)									

Max. Sprinkler Spacing ft (m)	Flow gpm (Lpm)	Pressure psi (bar)	Sprinkler Identification Number (SIN)
12 x 12 (3.6x3.6)	13 (49)	7.0 (0.48)	
14 x 14 (4.3x4.3)	13 (49)	7.0 (0.48)	
16 x 16 (4.9x4.9)	14 (53)	8.2 (0.56)	R3516
18 x 18 (5.5x5.5)	18 (68.1)	13.5 (0.93)	
20 x 20 (6.1x6.1)	20 (75.7)	16.7 (1.14)	

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FP Position	*A*
Max. Recessed	3% (11)
Min. Recessed	1% (24)
Note: Sprinklers shown i	Bot 3 and Fot 4 are no

suitable for installation in ceilings which have positive pressure in the space above.

Technical Data: F1 Res 58 CCP Pendent and Recessed Pendent/FP

Thread Size	Nominai Orifice Inch	Sprinkler Temp. Rating		Assembly Temp Rating		Max. Pressure psi	Max. Ambient Temp.		K Factor	Sprinkler Length Inch
	ųning	Ŧ	£	¥	Ŷ	(car)	Ŧ	ç		finera i
がNPT (R%)	<u>۶</u> , (13)	155	68	135	57	175 (12)	100	38	5.8	2.25 (57)

Max. Sprinkler Spacing ft.(m)	Flow gpm (Lpm)	Pressure psi (bar)	Sprinkler Identification Number (SIN)
12 x 12 (3.6x3.6)	16(61)	7.6 (0.53)	
14 x 14 (4.3x4.3)	16 (61)	7.6 (0.53)	
16 x 16 (4.9x4.9)	16 (61)	7.6 (0.53)	R3513
18 x 18 (5.5x5.5)	19(72)	10.8 (0.75)	
20 x 20 (6.1x6.1)	22 (83.3)	14.4 (1.0)	

Technical Data: F1 Res 76 CCP Pendent and Recessed Pendent/FP

Thread Size	Nominal Orifice Inch (mm)	Sprinkler Temp. Rating Ra		CP Max. mbiy Pressure ting pai		Max. Ambient Temp.		K Factor	Sprinkler Length	
		¥.	ç	ĥ	ç	(02)	Ŧ	ę	I	
¥" NPT (R3/4)	(13.5)	155 175	88	135	57	175 (12)	100 150	38 66	7.6	2.25 (57)

Max. Sprinkler Spacing ft (m)	Flow gpm (Lpm)	Pressure psi (bar)	Sprinkler Identification Number (SIN)
12 x 12 (3.6x3.6)	21	7.6(0.53)	
14 x 14 (4.3x4.3)	21	7.6 (0.53)	
16 x 16 (4.9x4.9)	21	7.6 (0.53)	R7618
18 x 18 (5.5x5.5)	22	8.4 (0.58)	
20 x 20 (6.1x6.1)	25	10.8 (0.74)	
			5.

· Model F1 Res 44 & 58 HSW



 Model F1 Res 44 & 58 Recessed HSW/F2



Technical Data: F1 Res 44 HSW & HSW/F2

ſ	Thread Size	Nominal Orifice Inch	Spi Te Ra	nidar mp. ling	Max. Pressure pel	N Arr Te	lax. Ibient mp.	K Factor	Sprinkler Length Inch
		(mm)	£	ç	(bar)	Ŧ	¢		(mm)
[%" NPT (R%)	%" (10)	155 175	68,29	175 (12)	100 150	3868	4.4	2.45 (62)

Escu	tcheon, F	heon, F2, Data:				
Туре	Adjustment Inch (mm)	Face of Fitting to wall Inch (mm)	, A			
F2	13)	× -1× (4.7 - 17.4)				

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Max. Sprinkler Spacing ft (m)	"A" Ceiling-lo- Deflector Inch (mm)	Sprinkler Temp. Rating *F (*C)		Flow gpm (Lpm)	Pressure pel (bar)	Sprinkler Identification Number (SIN)
12 x 12 (3.6x3.6)		155 (68)	175 (79)	12 (45.4)	7.5 (0.52)	
14 x 14 (4.3x4.3)		155 (68)	175 (79)	14 (53.0)	10.2 (0.71)	
16 x 16 (4.9x4.9)	4-6	155 (68)	175 (79)	16 (60.6)	13.3 (0.92)	
16 x 18 (4.9x5.5)	(101-152)	155 (68)	175 (79)	18 (68.1)	16.8 (1.16)	
18 x 18 (5.5x5.5)		155 (68)	175 (79)	19 (72.0)	18.7 (1.29)	
15 x 20 (4.9x6.1)		155 (68)	175 (79)	23 (87.1)	27.4 (1.89)	R3531
12 x 12 (3.6x3.6)		155 (68)	175 (79)	14 (53.0)	10.2 (0.71)	
14 x 14 (4.3x4.3)		155 (68)	175 (79)	16 (60.6)	13.3 (0.92)	
16 x 16 (4.9x4.9)	6 - 12 (152-305)	155 (68)	175 (79)	17 (64.4)	15.0 (1.04)	
16 x 18 (4.9x5.5)		155 (68)	175 (79)	20 (75.7)	20.7 (1.43)	
16 x 20 (4.9x6.1)		155 (68)	175 (79)	23 (87.1)	27.4 (1.89)	

Technical Data: F1 Res 58 HSW & HSW/F2

Thread Size	Nominal Orifice Inch (mm)	31 년 22 Y 14 (2) Y	nider TPL ling 1C	Max. Pressum pei (bar)	Ma Ami Ter F	ax. bient TPL *C	K Fector	Sprinklær Length Inch (ram)
½" NPT (R½)); (13)	155 175	68 79	175 (12)	100 150	38 66	5.8	2.45 (62)

Escu	tcheon, F	2, Data:		
Туре	Adjustment Inch (mm)	Face of Fitting to wall inch (mm)		
F2	3 (13)	Xa - 1Xa (4.7 - 17.4)		

Max. Sprinkler Spacing ft (m)	"A" Ceiling-lo- Deflector Inch (mm)	Sprinkler Temp. Railing °F (°C)		Flow gpm (Lpm)	Pressure psi (ber)	Sprinkier Identification Number (SIN)
12 x 12 (3.6x3.6)		155 (68)	175 (79)	16 (60.6)	7.6 (0.53)	
14 x 14 (4.3x4.3)		155 (68)	175 (79)	18 (68.2)	9.7 (0.67)	
16 x 16 (4.9x4.9)	4-6	155 (68)	175 (79)	21 (79.5)	13.2 (0.91)	
16 × 18 (4.9x5.5)	(101-182)	155 (68)	175 (79)	25 (94.7)	18.6 (1.28)	
16 x 20 (4.9x6.1)	1	155 (66)	175 (79)	29 (109.8)	25 (1.73)	R3533
12 x 12 (3.6x3.6)		155 (68)	175 (79)	22 (83.3)	14.4 (1.0)	1
14 x 14 (4.3x4.3)	6.12	155-(68)	175 (79)	22 (83.3)	14.4 (1.0)	1
16 x 16 (4.9x4.9)	(152-305)	155 (68)	175 (79)	26 (98.4)	20.1 (1.39)	
16 x 18 (4.9x5.5)	1	155 (68)	175 (79)	31 (117.A)	28.6 (1.97)	1

7.

Model F1 Res 44 SWC





Technical Data: F1 Res 44 SWC

Thread Size	Nominal Orifice Inch (mm)	Sprinkler Temp. Reling		CoverTemp. Rating		Mar. Pressure	Mar. Ambient Temp.		K Fector	Sprinkler Length Inch
		-	Ŷ	Ŧ	ç	(bar)	Ŧ	ç		(mm)
K" NPT (R%)	36 (10)	155	68	135	57	175 (12)	100	38	4.4	2.45 (62)

Max. Sprinkler Spacing ft (m)	"A" Ceiling-to- Deflector Inch (mm)	Flow gpm (Lpm)	Pressure pel (bar)	Sprinkler Identification Number (SIN)	
12 x 12 (3.6x3.6)		13 (49.2)	8.7 (0.60)		
14 x 14 (4.3x4.3)		14 (53.0)	10.2 (0.71)		
16 x 16 (4.9x4.9)	4-6 (101-152)	17 (64.3)	15.0 (1.1)]	
18 x 18 (4.9x5.5)		19 (71.8)	18.7 (1.13)		
16 x 20 (4.9x6.1)		23 (87.1)	27.4 (1.89)	R3531	
12 x 12 (3.6x3.6)		14 (52.9)	10.2 (0.71)		
14 x 14 (4.3x4.3)	6 - 12 (152-305)	15 (58.7)	11.7 (0.81)		
16 x 16 (4.9x4.9)		18 (68.1)	16.8 (1.16)		
16 x 18 (4.9x5.5)		20 (75.6)	20.7 (1.43)		







F2 escutcheon, 1/2" (13mm) adjustment



Technical Data: F1 Res 40 HSW & HSW/F2

				_					Escu	itcheon, F	2, Data:
Thread	Nominal Orifice Inch	Spri Ter Ref	ider IP.	Nax. Passase col	Mi Ant Ter	ac. Dient 1121	K	K Length Factor Inch		Adjustment Inch (mm)	Face of to w Inch (
	(mm)	Ŧ	÷C.	(bar)	Ŧ	÷		(mm)	F2	¥ (13)	× -1× (4.
水 NPT (月½)	% (10)	155 175	68 79	175 (12)	100 150	38 66	4.0	2.45 (62)			

Туре	Adjustment Inch (mm)	Face of Fitting to wall Inch (mm)
F2	¥ (13)	3/a -1%a (4.7 - 17.4

Max. Sprinkler Spacing ft (m)	"A" Ceiling-lo- Deflector Inch (mm)	Sprinkter Temp. Rating *F (*C)		Fiow gpm (Lpm)	Pressure pel (bar)	Sprinider Identification Number (SIN)
12 x 12 (3.6x3.6)		155 (68)	175 (79)	13 (49.0)	10.6 (0.73)	r
14 x 14 (4.3x4.3)		155 (68)	175 (79)	16 (60.5)	16.0 (1.10)	
16 x 16 (4.9x4.9)		155 (68)		17 (64.3)	18.1 (1.24)	R3538
16 x 16 (4.9x4.9)	4-6		175 (79)	18 (68.1)	20.2 (1.39)	
16 x 18 (4.9x5.5)	(101-132)	155 (68)	175 (79)	20 (75,7)	25.0 (1,72)	
18 x 18 (5,5x5,5)]	155 (68)	175 (79)	22 (83.3)	30 2 (2.08)	
16 x 20 (4.9x6.1)		155 (68)	175 (79)	23 (87.0)	33.1 (2.28)	
12 x 12 (3.6x3.6)	6 - 12 (152-305)	155 (68)	175 (79)	13 (49 0)	10.6 (0.73)]
14 x 14 (4,3x4.3)		155 (68)	175 (79)	17 (64.3)	18.1 (1.24)	1
16 x 16 (4.9x4.9)		155 (68)	175 (79)	20 (75.7)	25.0 (1.72)	i i

Finishes⁽¹⁾

	Standard Finishes	
Sprinkler	F1, F2, FP Escutcheons	Cover Plates
Bronze Chrome Plated White Polyester Coated	Brase Bright Chrome Plated White Painted	While Painted Chrome
Sp	ecial Application Fini	ishes
Sprinkler	F1, F2, Escutcheons	Cover Plates
Bright Brass Black Pieted Black Paint Off White Satio Churge	Bright Brass Black Plated Black Paint Off White Safe Channe	Bright Brass Black Plated Black Paint Off White Satio Chrome

Other finishes and colors are available on special order.

Consult factory for details. Note: Paint or any other coating applied over the factory finish will void all approvals and warranties.

Maintenance

Model F1 Res 30, 49, F1 Res 58, F1 Res 76, F1 Res 44 and F1 Res 40 Sprinklers should be inspected quarterly. and the sprinkler system maintained in accordance with NFPA 25, 13, 13D, and 13R. Do not clean sprinkler with scap and water, Ammonia or any other cleaning fluids. Remove dust by using a soft brush or gentle vacuuming. Remove any sprinkler which has been painted (other than factory applied) or damaged in any way. A stock of spare sprinklers should be maintained to allow quick replacement of damaged or operated sprinklers. Prior to installation, sprinklers should remain in the original cartons and packaging until used. This will minimize the potential for damage to sprinklers that could cause improper operation or non-operation.

Model F1 Res 30, 49 & 58 Pendent Sprinkler Specifications

Sprinklers shall be [cULus Listed] [New York City MEA Approved (258-93-E)] low flow residential pendent sprinklers engineered to provide a minimum design density of 0.05 gpm/ft² over the listed coverage area. Listed flows as specified by the manufacturer's technical data sheets are to be used. Residential sprinklers shall be installed in conformance with the manufacturer's Installation guidelines and the applicable installation standard. Where pendent residential sprinklers are installed under sloped ceilings having a pitch from [4/12] to [8/12], the sprinklers shall be listed for such use. Deflector-to-ceiling distance listing shall be 1 to 8 maximum. Sprinkler frame and deflector shall be of bronze frame construction having a ½" NPT thread. Water seal assembly shall consist of a Teflon-coated Belleville spring. washer with top-loaded extruded or cold head cup with 3 mm glass bulb containing no plastic parts, and having a temperature rating of [1557F (68°C)] [1757F (79°C)]. Sprinklers shall have a nominal K-factor of 3.0, 4.9 and 5.8. Standard finish: [Bronze] [Chrome-plated] [White Polyester] [Special finish- specify]. Residential pendent sprinklers shall be Reliable Model F1 Res 30, 49 & 58, SIN R3511, R3516 & R3513 (Bulletin 135).

Ordering Information Specify: 1. Sprinkler Model

2. Sprinkler Type

3. Temperature Rating

4. Sprinkler Finish

5. Escutcheon Finish

6. Cover Plate Finish

Model F1 Res 49 & 58 Recessed Pendent/F1, Model F1 Res 30, 49 & 58 Recessed Pendent/F2, Model F1 Res 30, 49 & 58 Recessed Pendent/FP

Sprinklers shall be [cULus Listed] [New York City MEA Approved (258-93-E)] low flow residential recessed pendent sprinklers engineered to provide a minimum design density of 0.05 gpm/lf over the listed coverage area. Listed flows as specified by the manufacturer's technical data sheets are to be used. Residential sprinklers shall be installed in conformance with the manufacturer's installation guidelines and the applicable installation standard. Where pendent residential sprinklers are installed under sloped ceilings having a pitch from [4/12] to [8/12], the sprinklers shall be listed for such use. Deflector to ceiling distance listing shall be 1" to 8" maximum. Sprinkler frame and deflector shall be of bronze frame construction having a 1/2" deflector shall be of bronze frame construction having a ½ NPT thread. Water seal assembly shall consist of a Teflon-coated Belleville spring washer with top-loaded extruded or cold head cup with 3 mm glass bulb containing no plastic parts, and having a temperature rating of [155°F (68°C)] [175°F (79°C)]. Sprinklers shall have a nominal K-factor of 3.0, 4.9 & 5.8. Standard finish: [Bronzel (Chrome-plated] [White Polyester] [Specifi finish- specify]. Recessed escutcheon assembly shall be a steel, two-place escutcheone furth 14° adji tribunt (Mordel E20) [with 34° escutcheon (with ½" adjustment (Model F2)) (with %" adjustment (Model F1)) (of push-on and thread of design with ½" adjustment (Model FP)). Standard finish shall be War 2 exposure in (Woole IPP), Selficero Inisis shall be [brass][bright chrome] (white painted). Residential recessed pendent sprinklers shall be Reliable [Model F1 Res 3.0, 49 & 58 Recessed Pendent/F1][Model F1 Res 3.0, 49 & 58 Recessed Pendent/FP] SIN R3511, R3516 & R3513 (Chrome 100) (Bulletin 135).

Model F1 Res 30, 49 & 58 CCP Pendent (Concealed)

Sprinklers shall be [cULus Listed] [New York City MEA Approved (258-93-E)) low flow residential concealed sprinklers engineered to provide a minimum design density of 0.05 gpm/ft² over the listed coverage area. Listed flows as specified by the manufacturar's technical data sheets are to be used. Residential sprinklers shall be installed in conformance with the manufacturer's installation guidelines and the applicable installation standard. Where pendent residential sprinklers are installed under sloped cellings having a pitch from [4/12] to [8/12], the sprinklers shall be listed for such use. Sprinkler frame and deflector shall be of bronze frame construction having a 1/2" NPT thread. Water seal assembly shall consist of a Teflon-coated Belleville spring washer with top-loaded extruded or cold head cup with 3 mm glass bulb containing no plastic parts, and having a temperature rating of 155°F (68°C). Cover plate assembly shall consist of a brass cover plate and copper alloy retainer flange. Method of attaching the cover plate to the sprinkler cup shall be a push-on and thread-off design allowing a 1/2" cover plate adjustment. Cover plate temperature rating shall be 135°F (57°C). A plastic protective cap shall be provided and factory installed inside the sprinkler cup to protect the sprinkler from damage, which could occur during construction before the cover plate is installed. Standard cover plate finish: [White] [Custom Color- specify].]. Concealed pendent sprinklers shall be Reliable Model F1 Res 30, 49 & 58 CCP, SIN R3511, R3516 & R3513 (Bulletin 135).

Model F1RES 40 and F1 Res 44 Horizontal Sidewall Residential Sprinkler Specifications

Model F1 Res 40 Horizontal Sidewall Sprinkler

Sprinklers shall be [cULus Listed] [New York City MEA Approved (258-93-E)] low flow residential horizontal sidewall sprinklers engineered to provide a minimum design density of 0.05 gprn/f² over the listed coverage area. Listed flows as specified by the manufacturer's technical data sheets are to be used. Residential sprinklers shall be installed in conformance with the manufacturer's installation guidelines and the applicable installation standard. Where horizontal sidewail residential sprinklers are installed under sloped ceilings having a pitch from [4/12] to [8/12], the sprinklers shall be of bronze frame construction having a ½" NPT thread. Water seal assembly shall consist of a Teflon-coated Believille spring washer with top-loaded extruded or cold head cup with 3 mm glass bulb containing no plastic parts, and having a temperature rating of [155#; (68*C)] [175#; (79*C)]. Sprinklers shall have a nominal K-factor of 4.0 (57.1). Standard finish: [Bronze] [Chrome-plated] [White Polyester] [Special finish- specify]. Residential horizontal sidewail sprinklers shall be Reliable Model F1 Res 40, SIN R3538 (Bulletin 135).

Model F1 Res 40 Recessed Horizontal Sidewall Sprinkler

Use description for the Model F1 Res 40 horizontal sidewall sprinkler with the following modifications: Replace Trorizontal sidewall sprinkler with "recessed horizontal sprinkler." Add: Recessed escutcheon assembly shall be a steel, two-piece escutcheon with ½" adjustment (Model F2). Standard finish shall be (Drass)[Dright chrome] (white painted] [Special finish- specify]. Residential recessed horizontal sidewall sprinklers shall be Reliable Model F1 Res 40/F2. Skin RdS8 (Bulletin 135).

Model F1 Res 44 Horizontal Sidewall Sprinkler

Sprinklers shall be [cULus Listed] [New York City MEA Approved (258-93-E)] low flow residential horizontal sidewall sprinklers engineergd to provide a minimum design density of 0.05 gpm/ft⁻ over the listed coverage area. Listed flows as specified by the manufacturer's technical data sheets are to be used. Residential sprinklers shall be installed in conformance with the manufacturer's installation guidelines and the applicable installation standard. Where horizontal sidewall residential sprinklers are installed under sloped ceilings having a pitch from [4/12] to [8/12], the sprinklers shall be listed for such use. Sprinkler frame and deflector shall be of bronze frame construction having a ½ NPT thread. Water seal assembly shall consist of a Teflon-coated Beleville spring washer with top-loaded extruded or cold head cup with 3 mm glass bulb containing no plastic parts, and having a temperature rating of [155°F (68°C)] [175°F (79°C)]. Sprinklers shall have a nominal K-factor of 4.4 (62.8). Standard finish: [Bronze] [Chrome-plated] [White Polyester] [Special finish- specifty]. Residential horizontal sidewall sprinklers shall be Reliable Model F1 Res 44, SIN R353.1 (Bulletin 135).

Model F1 Res 44 Recessed Horizontal Sidewall Sprinkler

Use description for the Model F1 Res 44 horizontal sidewall sprinkler with the following modifications: Replace Thorizontal sprinkler. Add: Recessed escutcheon assembly shall be a steel, two-piece escutcheon with ½ adjustment (Model F2). Standard finish shall be (brass)[bright chrome) (white painted) [Special finishspecify). Residential recessed horizontal sidewall sprinklers shall be Reliable Model F1 Res 44/F2, SIN R3531 (Builetin 135).

Model F1 Res 76 Pendent

Sprinklers shall be (cULus Listed) low flow residential pendent sprinklers engineered to provide a minimum design density of 0.05 gpmth² over the listed coverage area. Listed flows as specified by the manufacturer's technical data sheets are to be used. Residential sprinklers shall be installed in conformance with the manufacturer's installation guidelines and the applicable installation standard. Sprinkler frame and deflector shall be installation standard. Sprinkler frame and deflector shall be of bronze frame construction having a 4th NPT thread. Water seal assembly shall consist of a Teflon-coated Beleville spring washer with machined or cold head cup with 3 mm glass bub containing no plastic parts, and having a temperature rating of [1557F (68°C)] [1757F (79°C)]. Sprinklers shall have a nominal K-factor of 7.6. Standard finish: [Bronze] [Chrome-plasted] [White Polyester] [Special finish- specify]. Residential pendent sprinklers shall be Reliable Model F1 Res 76, SIN R7618 (Bulletin 155).

Model F1 Res 76 Recessed Pendent/F1, Model F1 Res 76 Recessed Pendent/F2, Model F1 Res 76 Recessed Pendent/FP

Sprinklers shall be [cULus Listed] low flow residential recessed pendent sprinklers engineered to provide a minimum design density of 0.05 gpm/ft² over the listed coverage area. Listed flows as specified by the manufacturer's technical data sheets are to be used. Residential sprinklers shall be installed in conformance with the manufacturer's installation guidelines and the applicable installation standard. Sprinkler frame and deflector shall be of bronze frame construction having a 34" NPT thread. Water seal assembly shall consist of a Teflon-coated Belleville spring washer with machined or cold head cup with 3 mm glass bulb containing no plastic parts, and having a temperature rating of [155°F (68°C)] [175°F (79°C)]. Sprinklers shall have a nominal K-factor of 7.6. Standard finish: [Bronze] [Chrome-plated] [White Polyester] [Special finish-Chrome-pared (White Polyster) (3pecial Initial specify). Recessed escutcheon assembly shall be a steel, two-piece escutcheon (with ½ adjustment (Model F2)) (with ¼ adjustment (Model F1)) (of push-on and thread off design with ½ adjustment (Model FP)). Standard finish shall be (brass)(bright chrome) (white painted). Residential recessed pendent sprinklers shall be Reliable [Model F1 Res 76 Recessed Pendent/F1] [Model F1 Res 76 Recessed Pendent/F2] [Model F1 Res 76 Recessed Pendent/FP] SIN R7618 (Bulletin 135).

Model F1 Res 76 CCP Pendent (Concealed)

1.1.1

Sprinklers shall be [cULus Listed] low flow residential concealed sprinklers engineered to provide a minimum design density of 0.05 gpm/ft² over the listed coverage area. Listed flows as specified by the manufacturer's technical data sheets are to be used. Residential sprinklers shall be installed in conformance with the manufacturer's installation guidelines and the applicable installation standard. Sprinkler frame and deflector shall be of bronze frame construction having a ¼" NPT thread. Water seal assembly shall consist of a Teflon-coated Belleville spring washer with machined or cold head cup with 3 mm glass bulb containing no plastic parts, and having a temperature rating of 155°F (68°C). Cover plate assembly shall consist of a brass cover plate and cooper alloy retainer flange. Method of attaching the cover plate to the sprinkler cup shall be a push-on and thread-off design allowing a 1/2" cover plate adjustment. Cover plate temperature rating shall be 1357 (57°C). A plastic protective cap shall be provided and factory installed inside the sprinkler cup to protect the sprinkler from damage, which could occur during construction before the cover plate is installed. Standard cover plate finish: [White] [Custom Color-specify].]. Conceeled pendent sprinklers shall be Reliable. Model F1 Res 76 CCP, SIN R7618 (Bulletin 135).

The equiprent presented in this bulletin is to be installed in accordance with the latent pertinent Standards of the National Fee Protection Association, Fectory Mutual Researc Corporation, or other almain experizations and also with the providence of governmental codes or addressore, whenever applicable. Products menufactured and distributed by RELABLE have been protecting the and property to over 80 years, and are installed and serviced by the most highly qualified and reputation spiritive contractive located description. The United States, Canada and Toreign countries.

Manufactured by



Sales Offices (800) 431-1598 Sales Offices (800) 849-8051 Sales Fax (914) 829-2042 Corporate Offices manual Mithematika com Internat Address

Revision lines indicate updated or new data. EG. Privad in U.S.A. 06/08 PM 9566070235

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Concealed

Recessed FP Pendent

Pendent

Recessed FP

Horizontal Sidewall

Features

The Model F3OR sprinkler utilizes Belleville Spring Closure Technology. Reliable is the first in the industry to groduce a Quick Response Dry Concealed sprinkler utilizing this technology.

2. Styles available

- Pendent
- Recessed FP Pendent
- Recessed F1 Pendent
- Concealed
- Horizontal Sidewall
- Recessed Horizontal Sidewall FP
- Recessed F1 Horizontal Sidewall
- 3. 11/2 (39mm) escutcheon adjustment on pendent sprinkler.
- ½" (13mm) escutcheon adjustment on recessed sprinkler with push-on/ thread-off FP Model Escutcheon ring.
- 37 (9.5mm) cover plate adjustment on concealed sprinkler with push-on/ thread-off CCP Cover Plate.
- % (19mm) escutcheon adjustment on recessed sprinkler with G/F1 Escutcheon.
- 7. Attractive appearance. Employs 3mm frangible glass bulb and galvanized nipple.
- Lengths available to accommodate installation dimensions from 2'- to 48' (51mm to 1219mm), in ¼" (6mm) increments.
- 9. Available in a variety of plated and painted finishes.

Approvals

	ers Laboratories Inc. and	1. Listed by Underwriters
UL Centined for Canada (CULUS)	ada (cULus)	UL Certified for Canad

		System Type	
Pendent Recessed Pendent Recessed PI Pendent (PS714) Hortzortel Sideweil Recessed PI Hotzortel Sideweil (PS734)	Quick	Wet Pipe Dry Pipe All Preaction	Light Ordinary

2. Certified by FM Approvals

Style	Response	Sprinider System Type	Hazaro
Pendent Recessed F1 Pendent (RS714)	Quick	Wet Pipe, Single Interlock Preaction	Light Ordinar Groups 182
Horizontal Sidewall Recessed F1 Horizontal Sidewall (RS734)	Quick	Wet Pipe, Single Interlock Preaction	Light

3. NYC MEA 258-93-E

The Reliable Automatic Sprinkler Co., Inc., 103 Fairview Park Drive, Elmsford NY 10523

Model F3QR Dry Pendent Sprinkler

"A" Dim. 2' to 48' (51mm to 1219mm) in 14' (6mm) increments

Finishes⁽¹⁾

Bulletin

1 11101100	
Sprinkler	Escutcheon
Bronze Chrome Plated White ^{an}	Brass Chrome Plated White

¹⁰ Other finishes and colors are available on special order. Consult factory for details. Write coated sprinklers will have chrome plated cans.

Standard Temperature Ratings

Classification	Sprinkler Temperature Rating		l Ambie	Bulb Color	
Ordinary	135°F	(57°C)	100°F	(38°C)	Orange
Ordinary	155°F	(68°C)	100°F	(38°C)	Red
Intermediate	200°F	(93°C)	150°F	(66°C)	Green

Sprinkler can and excutcheon fabricated of brass for better weather resistance in exterior applications.

Sprinkler Guard: Model C-2

Sprinkler Installation Wrench Model G3 Sprinkler Wrench Sprinkler Identification Number (SIN): R5714

Model F3QR Dry Recessed Pendent Sprinkler

"A" Dim. 3/2 to 45' (89mm to 1219mm) in 1/2 (8mm) increments

Finishes⁽¹⁾

Sprinkler Escutcheon

Bronze Brass Chrome Plated Chrome Plated White White

¹⁰ Other finishes and colors are available on special order. Consult factory for details, Cup remains unfinished. Only the escutcheon will contain desired finish.

Standard Temperature Ratings

Classification	Sprinkler Temperature Rating		Mar. Ambient Temp.		Bulb Color
Ordinary	135°F	(57°C)	100°F	(38°C)	Orange
Ordinary	155°F	(68°C)	100°F	(38°C)	Red
Intermediate	200°F	(93°C)	150°F	(66°C)	Green
High*	286°F	(141°C)	225°F	(107°C)	Blue

Sprinkler cup and FP interior applications.

* Listed and Certilied only by cULus

Sprinkler Installation Wrench Model G3 R/C Sprinkler Wrench Sprinkler Identification Number (SIN): R5714



Note: The sprinkler Can protrudes 1/4" when escutcheon is in nominal position. Escutcheon adjustment pro-vides +1/4" (+6mm) to -11/4" (-32mm) "A" dimension adjustment range.



Note: Do not install the Model F3QR Dry Pendent Recessed Sprinkler in ceilings which have positive. pressure in the space above.

7. S

2.

Recessed F1 Pendent

Horizontal Sidewall

Recessed F1

Horizontal Sidewall

Model F3QR Dry Pendent Concealed Sprinkler

"A" Dim. 3/K" to 48"(89mm to 1219mm) in ¼" (6mm) increments

CCP Cover Plate⁽¹⁾ Finishes⁽²⁾

Standard Finishes	Special Application Finishes
Chrome Plated White	Bright Brass Plated Black Plated Black Plated Disck Paint Off White Satin Chrome

¹⁰ Utilizes the <u>y</u>^{*} cover plate with <u>y</u>^{*} total adjustment.
¹⁰ Other finishes and colors are available on special order. Consult factory for details.

Standard Temperature Ratings

Classification	Sprinider Temperature Rating		Cover Pinte Temp. Rating		Max. Ambient Temp.	
Ordinary Ordinary Intermediate High*	135 F 155 F 200 F 286 F	(57°C) (68°C) (93°C) (141°C)	135°F 136°F 166°F	(57°C) (57°C) (74°C) (74°C)	100°F 100°F 150°F 150°F	(38°C) (38°C) (86°C) (86°C)

Sprinkler cup fabricated of steel and CCP Cover Plate fabricated of brass and recommended for interior applications.

* Listed and Certified only by cullus.

Sprinkler Installation Wrench:

Model G3 R/C Sprinkler Wrench

Sprinkler Identification Number (SIN): R5714

Model F3QR Dry Horizontal Sidewall Sprinkler

"A" Dim. | 2 to 48" (51mm to 1219mm) in 1/2" (8mm) increments

Finishes⁽¹⁾

Sprinkler	Escutcheon
Bronze	Brass
Chrome Plated	Chrome Plated

White White

¹⁹ Other finishes and colors are available on special order. Consult factory for details.

" White costed apriniders will have chrome plated can.

Standard Temperature Ratings

Classification	Spi Temp Pi	inider serature sling	l Ambie	lax. Int Temp.	Bulb Color
Ordinary Ordinary Intermediate	135 F 155 F 200 F	(57°C) (68°C) (93°C)	100°F 100°F 150°F 225°F	(38°C) (38°C) (66°C) (107°C)	Orange Red Green Blue

Sprinker can and escutcheon fabricated of brass for weather resistance in exterior applications.

Sprinkler Installation Wrench: Model G3 Sprinkler Wrench

Sprinkler Identification Number (SIN): R5734



Note: Do not install the Model F3OR Dry Pendent Concealed Sprinkler in ceilings which have positive pressure in the space above.

Note: The sprinkler Can protrudes ¼" when escutcheon is in nominal position. Escutcheon adjustment provides +¼" (+6mm) to -1¼" (-32mm) "A" dimension adjustment range.



"A" Dim. 31/11048 (89mm to 1219mm) in 1/1 (8mm) increments

Finishes⁽¹⁾

Sprinider	Escutcheon	Collar
Chrome Plated	Chrome Plated	Chrome Plated
White	White	White

¹⁹ Other finishes and colors are available on special order. Consult factory for details.

Standard Temperature Ratings

Classification	Sprinkler Temperature Raling		Ambi	Buib Color	
Ordinary	135°F	(57°C)	100 F	(38°C)	Orange
Ordinary	155°F	(68°C)	100 F	(38°C)	Red
Intermediate	200°F	(93°C)	150 F	(66°C)	Green
High*	286°F	(141°C)	225 F	(107°C)	Blue

* Listed and Certified only by cLiLus.

Sprinkler Installation Wrench: Model G3 R/C Sprinkler Wrench Sprinkler Identification Number (SIN): R5714

Model F3QR Dry Horizontal Recessed F1 Sidewall Sprinkler

"A" Dim. 31/2 to 48 (99mm to 1219mm) in 14" (9mm) increments

Sorinidar	Esculpheon	Collar
Chrome Plated	Chrome Plated	Chrome Plated
White	White	White

¹⁹ Other finishes and colors are available on special order. Consult factory for details.

Standard Temperature Ratings

Cisselfication	Sprinkler Temperature Reling		Ambi	Bulb Color	
Ordinary Ordinary Intermediate	135°F 155°F 200°F 206°F	(57°C) (66°C) (93°C) (141°C)	100°F 100°F 150°F 225°F	(38°C) (38°C) (65°C) (107°C)	Orange Red Green Blue

* Listed and Cartilled only by cULus.

Sprinkler Installation Wrench: Model G3 R/C Sprinkler Wrench Sprinkler Identification Number (SIN): R5734



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 Listed by cullus for Quick Response. Approved by FM for Standard Response.

 Recessed Horizontal sidewall sprinklers are listed with cullus for installation of min. 4" (100mm) - to max. 6" (150mm) below ceiling and approved by FM for installation of min. 4" (100mm) - to - max. 12" (300mm) below ceiling.



3/10" (4.76

3/16*

Model F3QR Dry Horizontal Recessed Sidewall Sprinkler

"A" Dim. 3/2 to 48 (89mm to 1219mm) in 1/4" (6mm) increments

Finishes⁽¹⁾

Sprinkler Escutcheon Bronze Brass Chrome Plated Chrome Plated

White White ¹Other finishes and colors are available on special order. Consult factory for details. Cup remains unfinished. "See page 2"

Standard Temperature Ratings

Classification	Sprinkler Temperature Flatting		Ambi	Bulb Color	
Ordinary	135°F	(57°C)	100°F	(38°C)	Orange
Ordinary	155°F	(68°C)	100°F	(38°C)	Red
Intermediate	200°F	(93°C)	150°F	(66°C)	Green
High*	286°F	(141°C)	225°F	(107°C)	Blue

* Listed and Certified only by cULus.

Sprinkler Installation Wrench: Model G3 R/C Sprinkler Wrench

Sprinkler Identification Number (SIN): R5734

Technical Data:

Orifice Size: 1/2" (15mm) Thread Size: 1" NPT per ANSI B2.1 Working Pressure: 175 psi (12 bar) Nominal K Factor - US / (Metric): 5.6 / (80)

Product Description

Reliable Model F3OR Dry Sprinklers are quick response sprinklers utilizing a durable 3mm frangible glass bulb. This cluick response enables these sprinklers to apply water to a fire much sconer than standard response sprinklers of the similar temperature rating.

Model F3QR Dry Sprinklers are intended for use in dry and preaction systems and in areas subjected to freezing temperatures, such as freezers and unheated portions inside and outside buildings.

Environments wherein dry sprinklers are employed can be correctly. For this reason, Model F3 Sprinklers have a special wax filet placed in the gap between the cup that supports the butb and the wrenching boss. This wax will not interfere with the operation of the spinkler, and it prevents contaminents from entering the internal portion of the drop nipple. The wax must not be removed.

Operation

The glass bulb consists of an accurately controlled amount of special fluid hermetically sealed inside a precisely manufactured glass capsule. This glass bulb is specially constructed to provide fast thermal response. When the temperature increases sufficiently, due to a fire, the build shatters allowing operating parts to clear the waterway. This enables the interseat to release air or water and subsequently, cause water flow over the deflector in a uniform spray pattern, controlling or extinguishing the fire.



Notes: Do not install the Model F3QR Dry Horizontal Recessed Sidewall Sprinkler in walls which have positive pressure in their side space.

- · Listed by cULus for Quick Response. Approved by FM for Standard Response.
- Recessed Horizontal sidewall sprinklers are listed with cULus for installation of min. 4" (100mm) - to max. 6" (150mm) below ceiling and approved by FM for installation of min. 4" (100mm) - to - max. 12° (300mm) below ceiling.

Ordering Information

Specify:

- 1. Sprinkler Type (select one): (a) Model F3QR Dry Pendent (b) Model F3QR Dry Recessed Pendent (c) Model F3QR Dry Recessed F1 Pendent (d) Model F3QR Dry Concealed Pendent (e) Model F3QR Dry Horizontal Sidewall (1) Model F3QR Dry Recessed Horizontal Sidewall
 - (g) Model F3QR Dry Recessed F1 Horizontal Sidewall
- 2. Sprinkler Temperature Rating.
- Sprinkler Finish. З.
- 4. Escutcheon type (G/F1 or FP).
- 5. Cover Plate/Escutcheon Finish.
- 6.
- Length: "A" Dimension (face of tee to face of ceiling or wall) in ¼" (6mm) increments.
- 7. Model F3QR Dry Pendent (a) is available without sprinkler can and escutcheon.

Note:

- 1. The "A" dimension is based on a nominally gauged pipe thread "make-up" of 0.600" (15mm) per ANSI B2.1 [71/2 threads approximately].
- 2. All platings and paintings are decorative and intended for interior use.

General Installation Instructions

General installation instructions Model F3QR dry sprinklers must be installed only in standard (ANSI B 16.3 class 150 and ANSI B 16.4 class 125) pipe tees in the horizontal position, even at branch line ends. They should not be installed into elbows or pipe couplings located on drop nipples to the sprinklers. For these and other fittings including CPVC⁻, the dry sprinkler should be installed into a fitting to allow protu-sion into the fitting in accordance with the diagrams. The "A" dimension of the dry sprinkler, which extends into the fitting zone from wet pipe systems should freezers or a freezing zone from wet pipe systems, should be selected to provide, as a minimum, the specified lengths in inches shown in the following table, between face of the fitting and the exterior face of the protected area. The following table is used for freezing zones when the ambient temperature around the wet pipe system is kept at 40 °F (4°C), and specifies the minimum length from fitting face to inside face of celling or wall for different protected area temperatures.

TABLE 1 (See Fig. 8)							
Minimum Length (Face to inside Face Ceiling/Wall)	Temperature (Protected Area)**						
12 inches / 300 mm	-20"F / -29"C						
18 inches / 450 mm	-40°F/-40°C						
24 inches / 600 mm	-60°F/-51°C						
** For temperatures falling between those in the above chart, the minimum length may be determined by interpolation.							

During Installation, the following steps must be followed:

- 1. Cut the specified size hole (see illustrations) for the sorinkler in the celling or wall directly in line with the
- 2. Apply pipe joint compound to the 1" (25mm) pipe threads and install sprinkler using the Model G3 or G3 R/C Sprinkler Wrench as specified.
- 3. Install the Model FP push-on / thread-off escutcheon or CCP cover plate if required.

Note: Installation of the Model F3QR Sprinklers is not recommanded in copper pipe systems, as this may reduce the life expectancy of the sprinklers.

Model F3QR Concealed and Recessed Installation instructions

- · The Model G3 R/C wrench (Fig. 1) is designed to locate on the wrenching pack of the recessed sprinkler while centering in the cup. A standard ½ drive ratchet may be used to drive this wrench. Figures 1 and 2 show sequentially the insertion of the wrench. First the wrench, with its jaws above the sprinkler deflector, is moved laterally until centered with the cup. Then raise the wrench inside of the cup until its jaws engage the sprinkler's square wrenching pads (Fig. 3). To remove the wrench, follow this procedure in reverse order. Care should be taken to avoid striking the deflector, with the wrench.
- Model G3 Wrench (Fig. 4) is used for installation of Pendent and Horizontal Sidewall sprinklers.
- · Glass bulb sprinklers have orange bulb protectors to minimize but damage during shipping, handling and installation. REMOVE THIS PROTECTION AT THE TIME THE SPRINKLER SYSTEM IS PLACED IN SERVICE FOR FIRE PROTECTION. Removal of the protectors

before this time may leave the bulb vulnerable to damage. RASCO wrenches are designed to install sprinklers when covers are in place. REMOVE PROTECTORS BY UNDOING THE CLASP BY HAND. DO NOT USE TOOLS TO REMOVE THE PROTECTORS.

Maintenance

The Model F3OR Quick Response Dry Sprinklers should be inspected quarterly and the sprinkler system maintained in accordance with NFPA 25. Do not remove the factory applied thermally sensitive wax fillet between the bulb supporting cup and the wrenching boss. Do not replace this wax with a substitute substance. An Alternate substance may interfere with proper operation of the sprinkler. Do not clean sprinklers with soap and water, ammonia or any other cleaning fluids. Remove dust by sprinkler which has been painted (other than factory applied) or damaged in any way. A stock of spare sprinklers should be maintained to allow quick replacement of damaged or operated sprinklers. Prior to installation, sprinklers should be maintained in the original cartons and packaging until used to minimize the potential for damage to sprinklers that would cause improper operation or non-operation.

*Spears CPVC sprinkler adapter tees (with steel thread insert) can only be used with horizontal sidewall sprinklers which do not require protrusion into tees to prevent ice or debris blockage of sprinkler inlets. These CPVC tees do not permit sufficient sprinkler inlet protrusion as required for pendent installation.









Fig. 3 - G3 R/C Wrench



Fig. 4 - G3 Wrench

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Reliable...For Complete Protection

Reliable offers a wide selection of sprinkler components. Following are some of the many precision-made Reliable products that guard life and property from fire around the clock.

- Automatic sprinklers
- Flush automatic sprinklers
- Recessed automatic sprinklers
- · Concealed automatic sprinklers
- · Adjustable automatic sprinklers
- Dry automatic sprinklers
- Intermediate level sprinklers
- Open sprinklers
- Spray nozzles
- Alarm valves
- Retarding chambers
- Dry pipe valves
- Accelerators for dry pipe valves
- Mechanical sprinkler alarms
- Electrical sprinkler alarm switches
- Water flow detectors

- Deluge valves
- Detector check valves
- Check valves
- Electrical system
- Sprinkler emergency cabinets.
- · Sprinkler wrenches
- Sprinkler escutcheons and guards

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- Inspectors test connections
- Sight drains
- · Ball drips and drum drips
- Control valve seals
- Air maintenance devices
- Air compressors
- Pressure gauges
- Identification signs
- Fire department connection

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Guidelines for Listed Residential Sprinkler installations below Sloped Ceilings

The installation guidelines cover **Residential Sprinkler Models:**

F1 Res 49 Pendent

F1 Res 49 Recessed Pendent/F2 F1 Res 58 Pendent F1 Res 58 Recessed Pendent/F2 F1 Res 44 HSW F1 Res 44 Recessed HSW/F2 F1 Res 49 CCP F1 Res 58 CCP **RFC 43 Flat Concealed RFC 49 Flat Concealed**

Listings & Approvals

1. Listed by Underwriters Laboratories Inc. and UL Certified for Canada (cULus) 2. NYC MEA 258-93-E **UL Listing Category**

Residential Automatic Sprinkler UL Guide Number VKKW

Patents: US Patent number 6,516,893 Model F1 Res 49

Product Description for F1 Res Sprinklers

Model F1 Res Pendent sprinklers are fast response sprinklers combining excellent durability, high sensitivity glass-bulb and low profile decorative design. The F1 Res Horizontal Sidewall sprinklers are equally attractive when above ceiling piping cannot be used.

The 3mm glass-bulb pendent sprinklers, with a K Factor of 4.9 & 5.8 for pendent and 4.4 for horizontal sidewall, permit the efficient use of residential water supplies for sprinkler coverage in residential fire protection design.

The low flow F1 Res sprinklers are specially engineered for fast thermal response to meet the sensitive fire protection application needs of the latest residential market standards (UL 1626 Standard *). Upon fire conditions, rising heat causes a sprinkler's heat-sensitive glass-bulb to shatter, releasing the waterway for water flow onto the deflector, evenly distributing the discharged water to control a fire.

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Residential Sprinkler For Sloped Ceilings



Recessed Pendent / F2



Recessed HSW/F2



Pendent

Pendent

F1 Res 44

HSW



* Effective date July 12, 2002

The Reliable Automatic Sprinkler Co., Inc., 103 Fairview Park Drive, Elmsford, New York 10523

Product Description for RFC 43 & RFC 49

Model RFC43 & RFC49 Concealed Residential Sprinklers are fast response residential fusible solder link automatic sprinklers. Residential sprinklers differ from standard sprinklers primarily in their response time and water distribution patterns.

Model RFC43 & RFC49 sprinklers discharge water in a hemispherical pattern below the sprinkler deflector. Residential distribution patterns are higher and generally contain a finer droplet size than standard sprinkler patterns.

The combination of speed of operation and high discharge pattern required for residential sprinklers has demonstrated, in fire testing, an ability for controlling residential fires, and thereby providing significant evacuation time for occupants.

The RFC43 & RFC49 Sprinkler provides the best form of fire protection by combining an attractive appearance and 1/2" (13mm) of cover adjustment for ease of installation. The small diameter cover plate is easily and positively attached and blends into the ceiling, concealing the most dependable fire protection available, an automatic sprinkler system.

The RFC43 & RFC49 are UL Listed Residential Sprinkler to be installed in the residential portions of any occupancy in accordance with NFPA 13, 13R, & 13D,

The RFC43 & RFC49 can reduce the need for precise cutting of drop nipples. The threaded cover plate assembly can be adjusted without tools to fit accurately against the ceiling. The fire protection system need not be shut down to adjust or remove the cover plate assembly.

Technical Data (F1 Res Sprinklers):

- Thermal Sensor : Nominal 3mm glass-bulb
- Sprinkler Frame : Brass Casting
- Sprinkler Pressure Rating : 175 psi Factory Hydrostatically Tested to 500 psi
- Thread Size : ½" NPT (R½)
- K Factor : 4.9 (Actual) F1 Res 49 Pendent Sprinkler 4.4 (Actual) - F1 Res 44 HSW Sprinkler 5.8 (Actual) - F1 Res 58 Pendent Sprinkler
- Density : Minimum .05 gpm/ft²

Technical Data (RFC 43 & RFC 49):

- Thermal Sensor: 165°F Fusible Link
- Sprinkler Frame : Brass Machined
- Sprinkler Pressure Rating : 175 psi Factory Hydrostatically Tested to 500 psi
- Thread Size : ½" NPT (R½)
- K Factor : 4.3 (Actual) RFC43; 4.9 (Actual) RFC49
- Density : Minimum .05 gpm/ft^{*}

Application

Model F1 Res and RFC 43 & RFC 49 Sprinklers are used for Residential Fire Protection according to UL 1626 Standard*. Be sure that orifice size, temperature rating, deflector style, cover plate and sprinkler type are in accordance with the latest published standards of The National Fire Protection Association or the approving Authority Having Jurisdiction.

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* Effective date July 12, 2002



Model F1 Res 49 Pendent & F1 Res 49 Recessed Pendent/F2 & F1 Res 49 CCP Pendent, Model F1 Res 58 Pendent & F1 Res 58 Receased Pendent/F2 & F1 Res 58 CCP Pendent, RFC 43 & RFC 49 Pendent Flat Concealed Sprinklers Installed below Sloped Cellings.



F1 Res 49 & 58 Pendent



Recessed Pendent / F2



F1 Res 49 & 58 CCP Pendent



RFC 43 & RFC 49

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Note: F1 Res 49 CCP Pendent, RFC 43 and RFC 49 sprinklers are not suitable for installation in ceilings which have positive pressure in the space above.



RFC 43 & RFC 49





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Sprinkler spacing below multiple sloped ceilings with a maximum slope of % (33.7°) pitch.

Model F1Res 49 Pendent & F1 Res 49 Recessed Pendent/F2 Installed below Sloped Ceiling.

Technical Data

Thread Size	Max. Pressure psi (bar)	Max. Amblent Temp. *F (*C)	Actual K Factor (metric)	Sprinkler Length	Escutcheon	Sprinkler klentification Number (SIN)
12" NPT (R%)	175 (12)	100 (38)	4.9 (69,94)	2.25° (57mm)	F2 (1/2" Adjustment)	R3516

Table 1 - Application

	Ma	or. Slope of %	(33.7") Plich	Max, Slope of %s (18.4") Plich		
Max. Sprinkler Spacing Along Signs	Min. Flow Per Sprinider Head gpm (Lpm)		Pressure pel (bar)		Sprinkler Temp. Paling *F (*C) - 155 (46) & 175 (79)	
(W) Width x (L) Longth ft (m)	156 77 (68°C)	175°F (79°C)	155°F (68°C)	1767F (79°C)	Min. Flow Per Sprinider Head gpm (Lpm)	Pressure pel (ber)
12 x 12 (3,6 x 3,6)	13 (49)	13 (49)	7.0 (0,48)	7.0 (0,48)	13 (49)	7.0 (0,48)
14 x 14 (4,3 x 4,3)	13 (49)	13 (49)	7.0 (0,48)	7.0 (0,48)	13 (49)	7.0 (0,48)
16 x 16 (4,9 x 4,9)	13 (49)	13 (49)	7.0 (0,48)	7.0 (0,48)	13 (49)	7.0 (0,48)
18 x 18 (5,5 x 5,5)	17 (64,3)	18 (68,2)	12.0 (0,83)	13.5 (0,93)	18 (68,3)	13.5 (0,93)
20 x 20 (6,1 x 6,1)	20 (75,7)	21 (79.5)	16.7.(1,15)	18.4 (1,28)	20 (75,7)	16.7 (1,15)

Model F1Res 49 CCP Pendent Installed below Sloped Celling. Technical Data

Thread Size	Sprinkler Temp. Rating *F (*C)	CCP Assy. Temp. Rating "F ("C)	Max. Pressure psi (bar)	Max. Amblent Temp. °F (°C)	Actual K Factor (metric)	Sprinkler Length	Sprinkler identification Number (SiN)
12" NPT (R1%)	155 (68)	135 (57)	175 (12)	100 (38)	4.9 (69,94)	2.25" (67mm)	R3516

Table 2 - Application

New Contrider Constant	Max. Slope of %	(33.7") Plich	Max, Slope of % (18.4") Plich		
Along Slope (W) Width X (L) Length ft (m)	Min. Flow Per Sprinkler Head gpm (Lpm)	Pressure pel (ber)	Min. Flow Per Sprinkler Head gam (Lpm)	Pressure pai (bar)	
12 x 12 (3,6 x 3,6)	14 (53)	8.2 (0,57)	13 (49)	7.0 (0,48)	
14 x 14 (4,3 x 4,3)	14 (53)	8.2 (0.57)	13 (49)	7.0 (0,48)	
16 x 16 (4,9 x 4,9)	14 (53)	8.2 (0,57)	14 (53)	8.2 (0,56)	
18 x 18 (5,5 x 5,5)	23 (87)	22 (1,52)	20 (75,7)	17 (1,17)	
20 x 20 (6,1 x 6,1)	23 (87)	22 (1,52)	21 (75,7)	17 (1,17)	

Model F1Ree 58 Pendent & F1 Res 58 Recessed Pendent/F2 Installed below Sloped Celling. Technical Data

Thread Size	Max. Pressure pel (ber)	Max. Ambient Temp. 97 (*C)	Actual K Factor (matric)	Sprinkler Length	Esculcheon	Sprinkler Identifica- tion Number (SIN)
14" NPT (R%)	175 (12)	100 (38)	5.8 (83,38)	2.25" (57mm)	F2 (1/2" Adjustment)	R3613

Table 3 - Application

		Max. Slope of 4	Max. Slope of % (18.4") Pilch			
Max. Sprinkler Specing Along Slope (W) Width x (L) Longth 2 (m)	Min. Plow Per Sprinkler Head gpm (Lpm)		Pressure pai (bir)		Min. Flow Per Sprinkler Head gpm (Lpm)	Pressuare pel (ber)
	166"F (66"C)	176"F (79"C)	155"F (68"C)	176°F (79°C)	155"F (68"C)	155°F (88°C)
12 x 12 (3,6 x 3,6)	21 (79.5)	23 (87)	13.1 (0,9)	15.7 (1,1)		
14 x 14 (4,3 x 4,3)	21 (79.5)	23 (87)	13.1 (0,9)	15.7 (1,1)		
16 x 16 (4,9 x 4,9)	21 (79.5)	23 (87)	13.1 (0,9)	15.7 (1,1)		
18 x 18 (5,5 x 5,5)	23 (87)		15.7 (1,1)		20 (75,7)	12 (0,83)
20 x 20 (6,1 x 6,1)	23 (87)		15.7 (1,1)		20 (75,7)	12 (0,83)

Model F1Res 58 CCP Pendent Installed below sloped Celling.

Technical Date

Tivesd Size	Sprinkler Temp. Rating 7F (*C)	CCP Asey. Temp. Rating *F(*C)	Max. Pressure pel (bar)	Max. Ambient Temp. TC)	Actual K Factor (metric)	Sprinkler Langth	Sprinkler kientification Number (SIN)
14" NPT (814)	155 (65)	135 (57)	175 (12)	100 (38)	5.8 (83,38)	2.25° (57mm)	R3513

Table 4 - Application

Max. Sprinkler Specing Along Slope (W) Width x (L) Length 12 (m)	Min. Flow Per Sprinkler Head com (Lom)	Pressure pai (bar)
18 x 18 (5.5 x 5.5)	20 (75,7)	12 (0.83)
20 x 20 (6.1 x 6.1)	20 (75.7)	12 (0.83)

Model RFC43 Pendent Flat Concealed Installed below Sloped Celling.

Technical Data

	Thread Size	Sprinkler Temp. Rating	Coverplate Temp. Rating	Max. Pressure pei (bar)	Max. Ambient Temp. *F (*C)	Actual K Fector (metric)	Max. Adjustment	Sprinkler identification Number (SIN)
ļ	14" NPT (R%)	165 (74)	135 (57)	175 (12)	100 (38)	4.3 (61.4)	16" (13mm)	RA0612

Table 5 - Application

	Max. Slope of 1/1 (33.7") Plich		Max, Slope o	"% (18.4") Plich
Max. Sprinkler Specing Along Slope (W) Width x (L) Length R (m)	Min. Flow Per Sprinkler Head gpm (Lpm)	Pressure pel (ber)	Min. Plow Per Sprinkler Head com (Lom)	Pressure pai (bar)
12 x 12 (3.6 x 3.6)	18 (68)	17.5 (1.21)	13 (49)	9.1 (0.63)
14 x 14 (4.3 x 4.3)	18 (68)	17.5 (1.21)	13 (49)	9.1 (0.63)
16 x 16 (4 9 x 4 9)	18 (68)	17.5 (1.21)	13 (49)	9.1 (0.63)
18 x 18 (5.5 x 5.5)	24 (91)	31 (2.14)	18 (68)	17.5 (1.21)
20 x 20 (6 1 x 6 1)	24 (91)	31 (2.14)	21 (79)	23.8 (1,64)

Model RFC 49 Pendent Fist Concealed Installed below Sloped Celling.

Technical Data

Thread S	ize Sprinkler Temp. Rating	Coverplate Temp. Rating	Max. Pressure	Max. Ambient Temp. "F ("C)	Actual K Factor (metric)	Max. Adjustment	Sprinkler Identification Number (SIN)
W" NPT (F	165 (74)	135 (57)	175 (12)	100 (38)	4.9 (69.94)	14" (13mm)	RA0616
Table 6							

	Max. Slope of %a (33.7")	Pitch	Max Slope of %= (1)	4") Plich
(W) Width x (L) Length 12 (m)	Min. Flow Per Sprinkler Head	Pressure pei (bar)	Min. Now Per Sprinkler Head gpm (Lpm)	pel (ber)
16 x 16 (4.9 x 4.9)	28 (106)	23 (19.3)		
18 x 18 (5.5 x 5.5)	29 (109.6)	29 (20.0)	18 (68)	13.5 (0.93)
20 x 20 (6.1 x 6.1)	30 (113.6)	30 (30.0)	23 (87)	22 (1.52)

installation Guidelines

- For systems designed in accordance with NFPA 13, 6.
 13D and 13R, where specific UL Listed flows are not required, consult with the local Authority Having Jurisdiction regarding the number of design sprinklers for sloped ceilings having a pitch greater than (9.4°).
- Installation of UL Listed residential sprinklers under sloped ceilings shall be limited to a type of unobstructed construction consisting of smooth ceilings, as defined by NFPA 13, having a maximum pitch of 4/12 (18.4*) or 8/12 (33.7*).
- Spacing of residential sprinklers under sloped cellings is measured along the slope when determining the distance off of walls and between sprinklers.
- Measure listed areas of coverage along the sloped ceiling. The actual floor coverage area will be less than the listed area.
- For coverage areas less than the listed coverage area shown in Tables 1 through 5, use the minimum flow requirement for the next largest listed coverage area.

 Minimum spacing between pendent type sprinklers is 8 ft. (2.4 m). Minimum distance from a pendent type sprinkler and an adjacent wall is 4" (102 mm).

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- Residential sprinklers located closest to the peak of the ceiling shall have the deflectors located not more than 3 ft (1m) vertically down from the peak. Align deflectors parallel with the ceiling slope 1" to 4" (25mm to 102mm) below the sloped ceiling.
 Hydraulic Requirements:
 - a. For NFPA 13D Systems, the number of design sprinklers shall include all sprinklers within a compartment, up to a maximum of two sprinklers (where specific UL Listed flows are required) that requires the greatest hydraulic demand.
 - b. For NFPA 13R Systems, the number of design sprinklers shall include all sprinklers within a compartment, up to a maximum of four (4) sprinklers (where specific UL Listed flows are required), that requires the greatest hydraulic demand.

- c. For NFPA 13 systems, the design area shall be the area that includes the four (4) hydraulically most demanding sprinklers. The minimum required discharge from each of the four hydraulically demanding sprinklers shall be the greater of the following:
 - In accordance with the minimum flow rates indicated by the individual listings (that already will provide a minimum density of 0.1 gpm/ft2); or
 - (2) A calculated value based on delivering a minimum of 0.1 gpm/ft2 over the design area.
- Because of the varied nature of residential construction features, there will be some compartment designs which cannot be fully sprinklered in accordance with

NFPA 13, 13D, or 13R. In these instances, consult the Authority Having Jurisdiction (AHJ) for guidance and approval. This includes sloped ceilings having a pitch greater than 8/12 (33.7°).

10. Glass bulb sprinklers have orange bulb protectors to minimize bulb damage during shipping, handling and installation. REMOVE THIS PROTECTION AT THE TIME THE SPRINKLER SYSTEM IS PLACE IN SER-VICE FOR FIRE PROTECTION. Removal of the protectors before this time may leave the bulb vulnerable to damage. RASCO wrenches are designed to install sprinklers when covers are in place. REMOVE PRO-TECTORS BY UNDOING THE CLASP BY HAND. DO NOT USE TOOLS TO REMOVE THE PROTECTORS.

Model F1Res 44 and F1 Res 44 HSW/F2 installed below Sloped Ceiling.





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Model F1RES 44 HSW & F1RES 44 HSW Recessed HSW/F2 Installed below Sloped Celling, Technical Data

Thread Size	Sprinkier Temp. Rating 'F (*C)	Max. Pressure pel (bar)	Mex. Amblent Temp. "F ("C)	Actual K Factor (metric)	Sprinkler Lenght	Eaculoheon	Sprinkler identification Number (SIN)
12" NPT (R1%)	155 (68) 175 (79)	175 (12)	100 (38)	4.4 (62,8)	2.45" (62mm)	F2 (1/2" Adjustment)	R3531

		Max, Slope o	# %= (18.4") Plich		
Max. Sprinkler Specing Along Slope	Discharge Directed 4" to 6" Defect	Across the Slope or to Calling	Discharge Directed Across the Slo 6" to 12" Deflector to Celling		
(w) widen X (L) Langen # (m)	Min. Row gpm (Lpm)	Pressure pel (ber)	Min. Plow gpm (Lpm)	Pressure pel (ber)	
12 x 12 (3,6 x 3,6)	16 (60,5)	13.3 (0,92)	17 (64,3)	15 (1,04)	
14 x 14 (4,3 x 4,3)	16 (60,5)	13.3 (0,92)	17 (64,3)	15 (1,04)	
16 x 16 (4,9 x 4,9)	16 (60,5)	13.3 (0,92)	17 (64,3)	15 (1,04)	
18 x 18 (4,9 x 5,5)	18 (68,1)	16.8 (1,16)	20 (75,6)	20.7 (1,43)	
20 x 20 (4,6 x 6,1)	23 (68,1)	27.4 (1,89)	23 (68,1)	27,4 (1,89)	

Table 8 - Application

			Mar. Slope of 4	5 (33.7") Pile		
	Diecharge	Directed	Discharge	Directed	Olechan	ge Directed
	Down th	e Sicce	Down th	e Slope	Across the Slope	
Max. Sprinkler Specing Along Slope	4" to 6" Deflector to Ceiling		6" to 12" Deflector to Ceiling		4" to 12" Deflector to Ceiling	
(W) Width X (L) Length π (m)						
	(1) Min. Flow	Pressure	⁽⁴⁾ Min. Flow	Pressure	⁴⁹ Min. Flow	Pressure
	com (Lom)	pel (ber)	apm (Lom)	pei (ber)	(ma_l) map	cel (ber)
12 x 12 (3.6 x 3.6)	12 (45.4)	7.5(0.52)	17 (53.0)	10.2 (0.71)	16 (60.6)	13.3 (0.92)
14 x 14 (4.3 x 4.3)	14 (53.0)	10.2 (0.71)	16 (60.6)	13.3 (0.92)	16 (80.6)	13.3 (0.92)
16 x 16 (4.9 x 4.9)	16 (60.6)	13.3 (0.92)	17 (64.4)	15(1.04)	16 (60.6)	13.3 (0.92)
18 x 18 (4.9 x 5.5)	18 (68.1)	16.8 (1.16)	20 (75.6)	20.7 (1.43)		
20 x 20 (4 6 x 6 1)	23 (72.0)	27.4(1.89)	23 (87.1)	27.4 (1.89)		

(1) Minimum flow per sprinkler gpm (Lpm).

⁽²⁾ Minimum 3 head design in a compartment.

(3) 155°F only.

Installation Guidelines

- For systems designed in accordance with NFPA 13, 6. 13D and 13R, where specific UL Listed flows are not required, consult with the local Authority Having Jurisdiction regarding the number of design sprinklers for sloped ceilings having pitch greater than (9.4°).
- Installation of UL Listed residential sprinklers under sloped ceilings shall be limited to a type of unobstructed construction consisting of flat, smooth ceilings, as defined by NFPA 13, having a maximum pitch of 4/12 (18.4°) or 8/12 (33.7°).
- 3. Where listed, install horizontal sidewall sprinklers 9. along the wall below the sloped ceiling when discharge is directed across the slope, and install at the peak below the sloped ceiling when discharge is directed down the slope. Always align the sprinkler deflector parallel with the direction of the sloped ceiling.
- Residential HSW sprinklers located closed to the peak of the ceiling shall have the deflectors located not more than 3 ft. (1m) vertically down from the peak.
- Spacing of residential HSW sprinklers under sloped ceilings is measured along the slope when determining the distance off of walls and between sprinklers.

- Measure listed areas of coverage along the sloped ceiling. The actual floor coverage area will be less than the listed area.
- For coverage areas less than the listed coverage area shown in Tables 1 through 6, use the minimum flow requirement for next largest listed coverage area.
- Minimum spacing between horizontal sidewall sprinkiers is 8 ft. (2.4 m). Minimum distance from a horizontal sidewall sprinkler and an adjacent wall is 4" (102 mm).
- Hydraulic Requirements:
- a. For NFPA 13D Systems, the number of design sprinklers shall include all sprinklers within a compartment, up to a maximum of two sprinklers (where specific UL Listed flows are required) that requires the greatest hydraulic demand.
- b. For NFPA 13R Systems, the number of design sprinklers shall include all sprinklers within a compartment, up to a maximum of four (4) sprinklers (where specific UI. Listed flows are required), that requires the greatest hydraulic demand.

- c. For NFPA 13 systems, the design area shall be the area that includes the four (4) hydraulically most demanding sprinklers. The minimum required discharge from each of the four hydraulically demanding sprinklers shall be the greater of the following:
 - In accordance with the minimum flow rates indicated by the individual listings (that already will provide a minimum density of 0.1 gpm/ft2); or

(2) A calculated value based on delivering a minimum of 0.1 gpm/ft2 over the design area.

 Because of the varied nature of residential construction features, there will be some compartment designs which cannot be fully sprinklered in accordance with

Model F1 res 49 Pendent, F1 Recessed Pendent/F2, F1Res 49 Concealed (CCP), RFC 49 and RFC 43 installed below sloped celling with a maximum slope of 1/12 (33.7*) pitch.

1

NEPA 13, 13D, or 13R. In these instances, consult.

the Authority Having Jurisdiction (AHJ) for guidance

and approval. This includes sloped ceilings having a

Glass bulb somklers have orange bulb protectors

to minimize bulb damage during shipping, handling

and installation, REMOVE THIS PROTECTION AT THE

TIME THE SPRINKLER SYSTEM IS PLACE IN SER-

VICE FOR FIRE PROTECTION. Removal of the pro-

tectors before this time may leave the bulb vulnerable to damage. RASCO wrenches are designed to install

sprinklers when covers are in place. REMOVE PRO-

TECTORS BY UNDOING THE CLASP BY HAND. DO

NOT USE TOOLS TO REMOVE THE PROTECTORS.

pitch greater than 8/12 (33.7°).

L	Table 9 - Application					
	Model	K - Factor (metric)	Max. Specing PL x Pt (m x m)	Min. Ficw/Pressure gpm (ipim) / pel (bar)	Sprinkler Temperature Rating °F (°C)	Coverplate Temperature Rated*F (*C)
	PI Res 40Pendent	4.9 (69.94)	10 x 10 (3 x 3)	13(49) / 7.0(0,48)	155 (68)	
	FI Rec 40 Reccessed Pendent/F2	4.9 (69,94)	10 x 10 (3 x 3)	13(49) / 7.0(0,48)	155 (68)	-
	F1 Res 49CCP Pendent	4.9 (69,94)	10 x 10 (3 x 3)	13(49) / 7.0(0,48)	155 (68)	135 (57)
	RFC49Pendent	4.9 (69.94)	10 x 10 (3 x 3)	14(53) / 8.2(0,57)	165 (74)	135 (57)
	RFC43Pendent	4.3 (61,4)	10 x 10 (3 x 3)	18(68) / 17.5(1,21)	165 (74)	135 (57) .



12.



Installation Guidelines per UL1626A

- 1. For systems designed in accordance with NFPA 13, 8. Hydraulic Requirements: 13D and 13R, where specific UL Listed flows are not required, consult with the local Authority Having Jurisdiction regarding the number of design sprinklers for sloped ceilings having pitch greater than (9.4°).
- 2. Installation of UL Listed residential sorinklers under sloped ceilings shall be limited to a type of unobstructed construction consisting of smooth ceilings, as defined by NFPA 13, having a maximum pitch of 8/12 (33.7*).
- 3. Spacing of residential sprinklers under sloped cellings is measured along the slope when determining the distance off of walls and between sprinklers.
- 4. Measure listed areas of coverage along the sloped ceiling. The actual floor coverage area will be less than the listed area.
- 5. For coverage areas less than the listed coverage area shown in Tables 8, use the minimum flow requirement listed.
- 6. Minimum spacing between pendent type sprinklers is 8 ft. (2.4 m). Minimum distance from a pendent type sprinkler and an adjacent wall is 4" (102 mm).
- 7. Reidential sprinklers located closest to the peak of the ceiling shall have the deflectors located not more than 3 ft (1 m) vertically down from the peak. Align deflectors parallel with the ceiling slope 1" to 4" (25mm to 102mm) below the slope ceiling.

- - a. For UL1626A, the number of design sprinklers shall include up to a maximum of two sprinklers. that requires the greatest hydraulic demand.
- 9. Glass bulb sprinklers have orange bulb protectors. to minimize bulb damage during shipping, handling and installation. REMOVE THIS PROTECTION AT THE TIME THE SPRINKLER SYSTEM IS PLACE IN SER-VICE FOR FIRE PROTECTION. Removal of the protectors before this time may leave the bulb vulnerable to damage. RASCO wrenches are designed to install sprinklers when covers are in place. REMOVE PRO-TECTORS BY UNDOING THE CLASP BY HAND, DO NOT USE TOOLS TO REMOVE THE PROTECTORS. 10. A maximum distance from the floor to the ceiling peak
- of 24 ft.
- 11. A maximum of two sprinklers installed within 3 ft. vertically of the peak.
- 12. Installation is for smooth, flat ceilings only that do not extend into or serve as a celling for an upper level floor in the structure.

The equipment presented in this bulletin is to be installed in accordance with the latest published Standards of the National Fire Protection Association, Factory Mutual Research Corporation, or other similar organizations and also with the provisions of governmental codes or ordinances whenever applicable. Productamenufactured and distributed by Reliable have been protecting life and property for over 60 years, and are installed and serviced by the most highly qualified and reputable sprinkler contractors located throughout the United States, Canada and foreign countries.

Manufactured by



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

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Model F1 Res and Model RFC Residential Sprinklers

The Reliable Automatic Sprinkler Co., Inc., 103 Fairview Park Drive, Elmsford, New York 10523

🛛 General

Reliable residential sprinklers utilize a fast response thermal element and are intended for use in only wet-pipe residential sprinkler systems designed in accordance with the following NFPA standards: NFPA 13D, installation of Sprinkler. Systems for One-and Two-Family Dwellings and Manufactured Homesi. NFPA 13R, Installation of Sprinkler Systems for Residential Occupancies Up to and lestucing four Sprinkler. Systems. Fast response and high wall wetting characteristics of residential portions of any improve lite safety by maintaining a tenable environment, providing escape time for occupants.

NFPA 13D is appropriate for protection against fire hazards only in one-and two-family dweilings and manufactured homes. Residential portions of any other type of building or occupancy should be protected with residential sprinklers in accordance with NFPA 13, or in accordance with NFPA 13R. NFPA 13R is appropriate for use as an option to NFPA 13R. NFPA 13R is appropriate for use as an option to NFPA 13R. NFPA 13R is appropriate for use as an option to NFPA 13R. NFPA 13R is appropriate for use as an option to NFPA 13R. NFPA 13R is appropriate for use as an option to NFPA 13R. NFPA 13R is appropriate for use as an option to NFPA 13R. NFPA 13R is appropriate for use as an option to NFPA 13R. NFPA 13R is appropriate for use as an option to NFPA 13R. NFPA 13R is appropriate for use as an option to NFPA 13R. NFPA 13R is appropriate for use as an option to NFPA 13R. NFPA 13R is appropriate for use as an option to NFPA 13R. NFPA four stories in height, or where buildings are greater than four stories in height, or where buildings are of mode use where residential is not the predominant occupancy, protect residential portions of such buildings with residential or quick response sprinklers in accordance with NFPA 13.

This document provides design guidelines for the Model F1/Res and RFC Residential Sprinklers shown in Table A, which are cullus Listed to provide a minimum density of 0.05 gpm/ft, in accordance with the above-mentioned standards, manufacturer's instructions, and technical bulletins. Where documentation for residential sprinkler systems does not exist for particular applications, information based on NFPA 13 is used.

Residential fire sprinkler systems should only be designed and installed by competent individuals trained and experienced with automatic sprinkler system design and installation. Several criteria may apply to a given installation and the designer and/or installer must be familiar with the applicable codes, standards, and guidelines governing such an installation. The Reliable Model F1/Res and RFC residential sprinklers described herein must be installed and maintained in compliance with this isocument manufacturer's recommendations, with the latest published standards of the National Fire Protection Association (NFPA), and with any additional local juriadictional requirements. Failure to comply and result in the impairment of sprinkler integrity and proper operation. Because of the various features of residential type architecture, there will be some compartment designs which cannot be fully sprinklered in accordance with the recommendations of NFPA 13, 13D, or 13R. In these instances, consult the Authority Having Jurisdiction for guidance and approval.

The owner is responsible for maintaining their fire protection system and associated devices in proper operating conditions. Reter to NFPA 25, inspection. Testing, and Maintenance of Water-Based Fire. Protection Systems, for guidance on testing and maintenance of automatic sprinkler systems.

Approvals

All Reliable residential sprinklers have been designed and tested in accordance with the Third Edition of Underwriters Laboratories (UL) 1626. Standard for Residential Sprinklers for Fire Protection Service. Typically, they are cULus Listed for installation under smooth, flat cellings of unobstructed construction, unless otherwise noted in the specific listings, with specific approved spacing, flows, and pressures. Reliable residential sprinklers are cullus Listed for installation on both horizontal ceilings with a maximum slope of 2/12 (9.4*) pltch, and sloped ceilings having maximum slopes of 4/12 (18.4°) and 8/12 (33.7") pitch. The design criteria for residential sprinklers contained in the current NFPA 13D, 13R, and 13 Standards must be followed except as modified by the individual UL 1626 listing information, the information in the Reliable residential sprinkler bulletins, and this installation guide. The Authority Having Jurisdiction (AHJ) must make final approval for all residential sprinkler installations for compliance with all applicable codes, standards, and jurisdictional requirements.

One of the most important revisions of the Third Edition of UL, 1625 is the new minimum density requirement for residential sprinklers manufactured after July 12, 2002. When establishing a minimum cULus Listed flow rate, the manufacturer must use a minimum discharge rate over the specified coverage area corresponding to a 0.05 gpryft density. In some cases, however, to successfully pass the UL 1628 fire tests, the UL Listed flow rate may be greater than the calculated 0.05 gpr/ft density. Increased flow rates for horizontal sidewall type sprinklers, which exceed this minimum density is common. Because this minimum density is a listing requirement, the use of residential sprinklers meeting this criterion is

applicable to all editions of NFPA 13, 13R and 13D. The design criteria for residential sprinklers contained in the current NFPA Standards must be followed except as modified by the individual cULus Listing information provided in the technical bulletins referenced in Table A.

Definitions

The following NFPA definitions are applicable to the terms used in this installation guide. Where terms are not included, refer to NFPA 13, NFPA 13D and NFPA 13R for official definitions:

Residential Sprinkler – A type of fast-response sprinkler that has a thermal element with an RTI of 50 (m-s)*or less, has been specifically tested for its ability to enhance survivability in the room of fire origin and listed for use in the protection of dwelling units. Residential sprinklers posses a fast response thermal element and produce a spray pattern that discharges water higher on the wall than a standard spray sprinkler.

<u>Dwelling</u> – Any building that contains not more than one or two dwelling units intended to be used, rented, leased, let or hired out to be occupied or that are occupied for habitation purposes.

<u>Dwelling Unit</u> – One or more rooms, arranged for the use of one or more individuals living together, as in a single housekeeping unit, that normally have cooking, living, sanitary, and sleeping facilities. Dwelling units include hotel rooms, domitory rooms, condominiums, apartments, and similar living units.

<u>Compartment</u> – A compartment is a space completely enclosed by walls and a ceiling. The compartment enclosure is permitted to have openings (in walls) to an adjoining space, provided that soffits or lintels along the ceiling over the compartment opening has a minimum depth of 8 in. (203mm) from the ceiling. In other words, areas such as hallways, stairwells, and rooms must be separated by beams, lintels or soffits 8 or more inches in depth to be considered single compartments.

Obstructed Construction – Panel construction and other construction where beams, trusses, or other members impede heat flow or water distribution in a manner that materially affects the ability of sprinklers to control or suppress a fire. See NFPA 13 Appendix for detailed explanations of this type of construction.

<u>Unobstructed Construction</u> – Construction where beams, trusses, or other members do not impede heat flow or water distribution in a manner that materially affects the ability of sprinklers to control or suppress a fire. This type of construction has the following features: (1) horizontal structural members that are not solid; (2) openings of the structural members are at least 70% of the cross sectional area; (3) depth of the structural members do not exceed the least dimension of the openings; or (4) the spacing of structural members exceeds 7.5 feet on center. See NFPA 13 Appendix for detailed explanations of this type of construction.

Elat Ceiling - a continuous ceiling in a single plane.

<u>Smooth Ceiling</u> – A continuous ceiling free from significant irregularities, lumps or indentations.

<u>Horizontal Ceiling</u> – A ceiling that does not exceed a slope of 2/12 pltch (slope of 16.7% or 9.4°).

<u>Sloped Ceiling</u> - A ceiling exceeding a maximum slope of 2/12 (9.4°) pitch.

Installation Considerations

Residential sprinklers utilizing a glass bulb thermal element have orange protective caps and straps to provide temporary protection to the frangible glass bulb during shipping and installation.

- a. Do not install any bulb type sprinkler if the bulb is cracked or there is liquid missing from the bulb. While holding the sprinkler in the horizontal position, a small air bubble having an approximate diameter of 1/16" should be visible.
 - b. The sprinkler is designed for installation with the protective strap in place using the appropriate sprinkler wrench.
- c. Sprinklers that are dropped during the installation process or that are installed on piping other than that in accordance with item "a" shall be replaced, including sprinklers with protective caps or straps.
- d. Protective caps and straps shall be removed only using means in accordance with the manufacturers installation instructions. They are not to be left on the sprinkler after the sprinkler system is placed in service.
- e. Protective caps and straps shall be removed only when water supply is made available to the sprinkler for the purposes of fire protection and placed in service.
- f. A leak-tight ½* NPT sprinkler joint should be obtained with a maximum torque of 14 ft-bs to 21 ft-bs. (approximately 2 turns past hand tight. Do not over tighten). Higher levels of torque may distort the sprinkler inlet or bend the frame, causing leakage or impairment of the sprinkler.

Where applicable, escutcheon plates must be installed. Absence of an escutcheon plate, where there is an annular space between the ceiling and the sprinkler, may delay sprinkler operation in the event of a fire.

Never introduce any leak stopping additives to any fire sprinkler system. Residential sprinklers must be installed with the manufacturer's specified sprinkler wrench. Channel locks, crescent wrenches or anything other than the proper sprinkler wrench shall not be used.

Installing sprinklers in CPVC and copper piping systems require special considerations. Never install the sprinkler into the reducing fitting prior to attaching the reducing fitting to the system piping. When installing residential sprinklers or commercial sprinklers in a CPVC piping system, sprinklers must be installed only after the reducing fitting has been installed and the CPVC manufacturer's setting time for the primer and/or cernent has passed. This is to ensure that the cement does not accumulate within the sprinkler. In copper piping systems, sprinklers must be installed only after the inside of the sprinkler drop and associated fittings have been wire-brushed to remove any residual flux... Residual flux can cause corosion. Both of these conditions can impair and orevent proper sprinkler operation.

System Design Criteria

Permitted Sprinklers for Residential Sprinkler Systems

For NFPA 13D and 13R sprinkler systems, only listed residential sprinklers shall be used, with the following exceptions:

- Listed standard dry-pendent or dry sidewall sprinklers shall be permitted to be extended into unheated areas not intended for living purposes.
- Quick-response sprinklers shall be permitted to be used in mechanical closets.
- For NFPA 13R systems, listed quick-response sprinklers shall be permitted to be installed in dwelling units meeting the definition of a compartment where no more than four (4) sprinklers are located within the dwelling unit.

Non-residential sprinklers are to be installed in accordance with the criteria specified by NFPA 13.

Residential Sprinkler Positioning and Spacing Requirements

When locating residential sprinklers, consideration must be given to sensitivity, sprinkler spacing, obstructions to discharge, temperature rating, and proximity to heat sources.

Sprinkler Sensitivity - Deflector Positioning

Residential pendent sprinklers not listed with specific positioning criteria must be positioned so that the deflectors are within 1 in. to 4 in. (25.4 mm to 102 mm) from the ceiling. On flat, horizontal ceilings, Reliable Model F1 Res 49 pendent and recessed pendent sprinklers may also be positioned with the deflector 4" to 8" (102 mm to 203 mm) from the ceiling, in accordance with the listed flows and pressures shown in Bulletin 135.

If located in closets, it is permitted to install pendent sprinklers so that the deflector is within 12 inches (305 mm) of the ceiling. Residential sidewall sprinklers that have not been listed with specific positioning criteria must be positioned so that the deflectors are within 4 in. to 6 in. (102 mm to 152 mm) from the ceiling. Install sidewall sprinklers having listed positioning criteria in accordance with their listing. Under both horizontal and sloped ceilings, always align sprinkler deflectors so that the deflector is parallel with the plane of the ceiling surface.

Sorinkler Spacing Under Horizontal Ceilings Several maximum coverage areas are used of a residential sprinklers in accordance with minimum listed flows and pressures. The area of coverage must be equal to or greater than both the length and width of the hazard area. Residential sprinklers must be located that more than half the listed spacing nor less than 4" (402 mm) from walls. Adjacent sprinklers must be located by

mm) from walls. Adjacent sprants of more than the listed spacing; the minimum distance to prevent cold soldering, unless otherwise specified, is 8 feet (2.44 m).

practice is to select one that can be adequately supplied by the available water supply, allowing for the installation of as few sprinklers as possible while observing all guidelines pertaining to obstructions and spacing. After selection of an area of coverage; sprinklers must be spaced according to the criteria set forth in the NFPA standards and this document.

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Sprinkler Spacing Under Sloped Ceilings

For installation under sloped ceilings, several maximum coverage areas are also provided, but at different minimum flows and pressures than those for horizontal ceilings. The spacing of sprinklers is measured along the slope when determining the distance off of walls and between sprinklers. Residential sprinklers may, be located no more than ½ the listed spacing nor less than 4° (102 mm) from the peak of the sloped ceiling: Residential sprinklers located at the highest elevation must not be located more than 3 feet (0.9 m) measured vertically down from the peak. Refer to Reliable Bulletin 035 for listed coverage areas, flow and pressure requirements, and positioning criteria for residential sprinklers installed under sloped ceilings.

Obstruction to Water Distribution

4.

Refer to Figures 1 through 13 for the location of sprinklers relative to obstructions. The discharge from residential sprinklers is directed radially outward, and downward from the sprinkler. Sprinklers must be located such that there will not be any spaces shielded from distribution by walls, dividing partitions, or other dwelling construction features. If the sprinkler water distribution pattern is obstructed, the obstruction is to be considered the maximum distance of coverage for; a given sprinkler. Additional sprinklers beyond; the obstruction may be necessary unless the obstruction criteria contained herein can be met. Consult the appropriate NFPA standard and/or the AHJ, for guidance regarding these situations. Reliable flat plate concealed sprinklers, the Models RFC 43 and RFC 56, utilize a drop-down style deflector. The distance the deflector drops below the ceiling is needed when determining the position of the deflector above the bottom of an obstruction. These distance are as follows:

Nonadjusted (cover plate flush to cup) - 1/2" (22mm)

At full ()² adjustment - ³ (9.5mm)

Continuous and Noncontinuous Obstructions

A minimum distance is required to be maintained between sprinklers and continuous obstructions, such as beams, soffits, and long horizontal light fixtures. See Figures 1, 2, 4, 5, 6, 7 and/or 13.

A minimum distance is also required to be maintained between sprinklers and noncontinuous obstructions, such as ceiling fans and certain light fixtures. The ceiling fan motor housing is the primary element that can obstruct the sprinkler discharge pattern. Testing has demonstrated that no adverse effects occur as a result of the ceiling fan's blade rotation in either direction.

With regards to location of sprinklers near light fixtures, there are two considerations; the amount of heat the light gives off and the light fixture as an obstruction. The minimum distance of a sprinkler relative to the light as a heat source is given in Table B. If the light is also an obstruction, then the obstruction criteria must be applied, relative to the minimum distance required from Table B.

For noncontinuous obstructions, apply the "four times rule" as provided in NFPA 13 where it is determined that the sprinkler can spray to at least two sides of the obstruction, either over and under or around the obstruction on both sides. Sprinklers shall be positioned away from the obstruction a minimum distance of four times the maximum dimension of the obstruction. The maximum clear distance required shall be 36" (914mm).

Temperature Ratings

Ordinary temperature rated sprinklers (135°F [57°C], 155°F [57°C]) are only permitted for installation where the maximum ambient celling temperature will not exceed 100°F (38°C). Where ambient ceiling temperatures are expected to exceed 100°F (38°C), use intermediate temperature-rated residential sprinklers (175°F [79°C]), which can be exposed to a maximum ambient temperature of 150°F (66°C). The following practices apply, unless higher expected ambient temperatures require a higher temperature rated sprinkler:

- Sprinklers under glass or plastic skylights exposed to direct rays of the sun shall be of the intermediate temperature classification.
- Sprinklers in an unventilated concealed space under insulated roof or in an unventilated attic shall be of the intermediate temperature classification.
- 3. Residential sprinklers must be located so as to prevent inadvertent operation due to exposure to normal heat sources. Sprinklers must be positioned a sufficient distance away from heat sources such as fireplaces, ovens, kitchen ranges, hot water pipes, water heaters, furnaces and associated ductwork, and light fotures. The following minimum distances in accordance with NFPA 13D and 13R must be maintained as indicated in Table B.

Table B - Minimum Distances for Ordinary and Intermediate Residential Sprinklers Relative to Specific Heat Sources

Heat Source	Minimum Distance from Edge of Source to Ordinary Temperature Sprinider (135% or 155%)	Minimum Distance from Edge of Source to intermediate Temperature Sprinkler (175°F)		
	in. (mm)	in. (mm)		
Side of open or Recessed fireplace	36 (914)	12 (305)		
Front of recessed fireplace	60 (1524)	36 (914)		
Coal or wood-burning alove	42 (1067)	12 (305)		
Kitchen range	18 (457)	9 (229)		
Wall oven	18 (457)	9 (229)		
Hot air flues	18 (457)	9 (229)		
Uninsulated heat ducts	18 (457)	9 (229)		
Uninsulated hot water pipes	12 (305)	6 (152)		
Side of celling or wall-mounted hot air diffusers	24 (607)	12 (305)		
Front of wall-mounted hot air diffusers	36 (914)	18 (457)		
Hot water heater or furnace	6 (152)	3 (76)		
Light Foture 0 W 250 W 250 W 499 W	6 (152) 12 (305)	3 (76) 6 (152)		

Hydraulic Design Requirements

Reliable residential sprinkler listings indicate minimum flow rates for each specified coverage area. Hydraulic calculations are required to verify adequate water supply at the hydraulically most remote single sprinkler operating at the minimum flow and pressure listed for single-sprinkler operation. Where a compartment has more than one sprinkler, multiple sprinkler calculations are required, and each sprinkler must be calculated flowing identical minimum flow rates. No reduction in minimum flow requirements is provided for flowing multiple sprinklers. More design sprinklers may need to be calculated than the minimum stated by the NFPA standards where unusual conditions may result in more sprinklers operating. These conditions include sloped ceilings having a pitch greater than 8/12 (33.7°) or beamed cellings qualifying as obstructed construction, as defined by NFPA 13. Consult with the AHJ regarding the number of "design sprinklers" for these types of applications.

NEPA 13D

The number of design sprinklers under flat, smooth, horizontal ceilings shall include all sprinklers within a compartment, up to a maximum of two (2) sprinklers, that requires the greatest hydraulic demand. The cULus Listed specific coverage criteria for systems designed to NFPA 13R are given in the technical builetins referenced in Table A, as a function of the maximum allowable coverage area and temperature rating. For actual coverage areas less than or between those indicated in the respective builetin, it is necessary to use the minimum required flow for the next largest area, as shown above.

For example, assuming the use of a pendent spinkler, for an actual coverage area of 12 ft x 14 ft (3.7 m x 4.2 m), the specific coverage area must be used. For an actual coverage area of 15 ft x 15 ft (4.6 m x 4.6 m), the specific coverage area for a 16 ft x 16 ft (4.9 m x 4.9 m) coverage area must be used.

NEPA 13R

The number of design sprinklers under flat, smooth, horizontal ceilings shall include all sprinklers within a compartment, up to a maximum of four (4) sprinklers, that requires the greatest hydraulic demand. The cULus Listed specific coverage criteria for systems designed to NFPA 13R are given in the technical builetins referenced in Table A, as a function of the maximum allowable coverage area and temperature rating. For actual coverage areas less than or between those indicated in the respective builetin, it is necessary to use the minimum required flow for the next largest area, as shown above.

NFPA 13

For residential sprinkler systems designed to NFPA 13, a minimum density of 0.1 gpm/ft2 must be provided over the "design area" that includes the four (4) hydraulically most demanding sprinklers for the actual coverage areas being protected by the 4 sprinklers. The minimum required discharge from each of the four most hydraulically demanding sprinklers shall be the greater of the following;

....

- The flow rates given in the Reliable Residential Sprinkler Technical Bulletins referenced in Table A tor NFPA 13D and 13R as a function of temperature rating and maximum allowable coverage areas (for actual coverage areas less than or between those indicated in the respective technical bulletin, it is required to use the minimum required flow for the next largest coverage area); or
- 2. A minimum discharge density of 0.1 gpm/ft² applied over the "design area" consisting of the four most hydraulically demanding sprinklers for the actual coverage areas being protected by the four sprinklers. The maximum dimension of the actual coverage area cannot be any greater than the maximum coverage area indicated in the technical builteins referenced in Table A.

Design Note: Using the A = S x L method to determine the sprinkler protection area of coverage in accordance with NFPA 13, apply the 0.1 gpm/ft² density to this area to determine the minimum required flow. Compare this flow to the minimum 0.05 gom/ft² cullus Listed flow for the appropriate coverage area in the technical bulletin for the specific residential sprinkler. If the flow stated in the technical bulletin is less than the calculated 0.1 gpm/(t density flow required, the .1_density flow must then be used in the equation Q=KvP, solving for P, to establish the minimum required pressure using the sprinkler K-factor. Note: In many cases the listed flow of individual residential sprinklers may exceed the required minimum 0.05 gom/it density. Reliable has available residential sprinklers with larger K-factors (K=5.6 and K=5.8) that will provide lower pressure demands for 0.1 gpm/ft³ densities in NFPA 13 residential applications.

Example No. 1

If a room is 12 ft wide x 20 ft long (3.6 m x 6.1 m), the coverage area being considered would be 240 ft (22.3 m). Using an F1 Res 49 pendent sprinkler (1"4" (ceiling-to-deflector distance), the flow for a 20 ft x 20 ft (6.1 m x 6.1 m) coverage area is 20 gpm @ 16.7 psi (75.7 L/min @ 1.14 bar). However, based on a discharge density of 0.1 gpm/ft, the flow rate required would be 24 gpm (90.8 L). Therefore, 24 gpm (90.8 L/min) would be the minimum flow required for each design sprinkler. The corresponding pressure would be 24 psl (1.65 bar)

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Example No. 2

If a room is 10 ft wide x 20 ft long (3.0 m x 6.1 m), the coverage area being considered would be 200 ft² (18.6 m²). Using an F1 Res 58 pendent sprinkler (1-4 ceiling-to-deflector distance), the flow for a 20 ft x 20 ft (6.1 m x 6.1 m) coverage area is 22 gpm @ 14.4 x 2011(0.1 m x 0.1 m) coverage area is 22 gpm (44.4 psi (83.3 L/min @ 0.99 bar). Based on a discharge density of 0.1 gpm/ft², the flow rate required would only be 20 gpm (75.7 L/min). However, the flow of 22 gpm must still be used as the minimum flow for each denies the interminitum flow for each denies the interminitum flow for each denies. design sprinkler, since this is the minimum cULus Listed flow for this sprinkler at the 20 ft x 20 ft coverage area.

Example No. 3

For a situation where the coverage area per sprinkler is $16 \text{ ft} \times 8 \text{ ft} (4.9 \text{ m} \times 2.4 \text{ m})$, or $128 \text{ ft}^2 (11.9 \text{ m}^2)$, the F1 RES 44 HSW, having a temperature rating of 155°F (68°C) and positioned 4" to 6" (101 mm to 152 mm) below the ceiling, requires a minimum flow of 16 gpm @ 13.3 psi (60.6 L/min @ .92 bar) for a 16 ftx 16 ft (4.9 m x 4.9 m) coverage area. Based on a minimum discharge of 0.1 gpm/ft, the flow rate needed would only be 12.8 gpm @ 10.2 psi (48.4 L/min @ 0.7 bar). However, the flow rate of 16 gpm (60.6 L/min) must fill be used for a before a minifular still be used for each design sprinkler.

Sloped Ceilinas

Specific UL Listed flows, pressures and coverage areas for sloped ceilings are provided in Reliable Bulletin 035. Refer to this bulletin for hydrautic design requirements. The number of design sprinklers is the same as that specified for horizontal ceilings, with the exception of the Model F1Res 40 HSW & F1Res 44 HSW. These sprinklers require a minimum 3 sprinkler design in a compartment when discharging across

design in a compartment when discrarging across the slope, as specified in Bulletin 035. For systems designed to NFPA 13, 13D or 13R, where specific cULus Listed flows for sloped ceilings are not required, consult with the AHJ regarding the number of "design sprinklers" for sloped ceilings humber of cesign sprinklers to sloped ceilings having a pitch greater than 2 in 12 (9.4°). cULus Listed flows and pressures do not exist for sloped ceilings having a pitch greater than 8/12 (33.7°). Again, consult with the AU regarding the number of "design sprinklers" for these types of applications. Listed areas of coverage must correspond to ceiling slope, and spacing of sprinklers under sloped ceilings is measured along the slope when determining distance off of walls and between sprinklers.

Care and Maintenance

It is recommended that automatic sprinkler systems be inspected and maintained in accordance with the criteria set forth in NFPA 25, Inspection, Testing and Maintenance of Water-Based Fire Protection Systems by a qualified inspection service.

Do not clean the sprinklers with soap and water, detergents, ammonia, or any other cleaning fluid. Remove dust by using a soft brush or feather duster, or by gentle vacuuming with a soft bristle brush.

Any sprinklers that have operated, been damaged or been painted outside of the factory shall be replaced with a new sprinkler. The new sprinkler shall have the same performance characteristics as the original sprinkler; that is the same temperature rating. nominal K-factor, coverage area, and the same or lower flow rate requirements.

Wet-pipe sprinkler systems must be maintained at a minimum temperature of 40°F (4°C). Exposure to freezing temperatures can damage system piping and residential sprinklers.

Do not hang anything from sprinklers or sprinkler piping. Do not put curtains, drapes or valences around sprinklers. Doing so will obstruct the discharge pattern of the sprinkler.



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Position of sprinklers to avoid obstructions to discharge radially from pendent sprinklers.



Figure 2 Positioning of pendent type sprinklers relative to obstructions against walls.



Sprinkler spacing for pendent sprinklers located at the peak.





Figure 5

Positioning of sidewall sprinklers to avoid obstructions along the wali.

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Positioning of HSW sprinklers relative to continuous obstructions along a wall.

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Minimum distance between sprinklers on intersecting cellings.



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Figure 12

Single sprinkler coverage criteria for cathedral cellings.



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1" (25mm) Residential Riser for **Providing Water Flow Alarm on Multipurpose Residential Fire Sprinkler Systems**

Features

- 1. Designed to alarm on single fire sprinkler operation and not during normal household water usage.
- 2. Potable-water safe.
- Water-flow Detector is preset to operate at 12 gpm \pm 1 gpm (45.4 Lpm \pm 3.8 Lpm), and is factory in-З. stalled with a weather-proof metal cover.
- 4. Dedicated UL Listed water-flow detector assures optimum sensitivity while the adjustable delay device minimizes false alarms caused by pressure surges or short periods of water usage above 12 gpm.
- Switch can be wired for 24 VDC or 125/250 5. VAC operation.
- 6. Stainless steel 1" (25mm) manifold with NPT or Metric Inlet and Outlet Threads.
- 7. Factory assembled and tested.
- 8. Rated working pressure not to exceed 175 psi.
- UL Listed Assembly. NSF-61 Approved.
- 10. When the Model MP Riser is utilized in sprinkler systems with sprinklers having K-factors less than 4.4, there must be a minimun of 15 psi of operating pressure at the system's most remote head.

Listings & Approvals

1. Listed by Underwriters Laboratories Inc. (cULus) 2. NSF-61 Approved

Product Description

The Multi-Purpose-Riser comes factory assembled with the necessary accessories for a cost effective, complete

riser assembly. Cast-on lettering identifies manifold size and flow direction. This Riser can be used safely where domestic water and fire protection water are combined.

The water flow detector range, preset to 12 gpm ± 1 gpm, is designed to protect the system from false tripping when multiple household fidures are in use. When the Model MP Riser is utilized in sprinkler systems with sprinklers having K-factors less than 4.4, there must be a minimun of 15 psi of operating pressure at the system's most remote head.

Bulletin 414 Rev.D Model MP (Multi-Purpose) 1" Residential Riser





Technical Data:

Description	Multi Purpose Riser Tit	n
Manifold Size:	Dimensione insis (mm)	Weight*
	ABCD	Lbs (kg)
1" (25mm)	11 (280) 10 (254) 95 (241) 2 75 (57 (2 1)

The Reliable Automatic Sprinkler Co., Inc., 103 Fairview Park Drive, Elmsford, New York, 10523

Installation:

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- Install the manifold with the flow arrow pointing towards the SYSTEM side using 1" NPT threaded connections. Use potable water - safe thread sealants only (tellon tape is recommended). 2. Connect 1" Brass Ball Valve to drain.
- 3. Place the sprinkler system in service.
- 4. Follow directions on the water-flow detector switch for electrical connections.

Caution:

Automatic sprinkler systems having non-fire protection connection (permitting continual water flow) require dielectric fittings, according to NFA 13 sect. 48, when dissimilar metal piping materials are joined.

Ordering Information:

- Specify 1. Model MP 1" (25mm) Residential Riser. 2. NPT (P/N 6501200120) or Metric (P/N 6501200121) Threads for Inlet and Outlet. 3. Support Bracket Kit (P/N 6899190001), if required.



inted in this burner organiza in, or other similar organization distributed by Relia ns and also with the pro ns of go Reliable have been protecting life and property for over 80 years ad throughout the United States, Canada and foreign countries. ty for over 80 years, and are raciona loc ler Co. Inc.



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The Rei (800) 431-1588 (800) 848-6051 (914) 629-2042

Sales Offices Sales Fax Corporate Offices Internet Address

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delos lines indicate undated or new data E.G. Printed in LISA OB(0)

Uponor

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AQUASAFE® Fire Safety System

Uponor 5925 148th Street West

Apple Valley, MN 55124 800-321-4739

Job Name: WILKYS ST - One Head Calculation (H.12)Drawing: RESIDENTIALLocation: PORTLAND ME 04102Remote Area: LOOPEDContract: 110308-40LData File: 110308-40L 27 Wilkie Street.wx1

Computer Programs by Hydratec Inc. Route 111 Windham N.H. USA 03087

Uponor WILKYS ST - One Head Calculation (H.12)	Page Date	1 3/16/2011
HYDRAULIC DESIGN INFORMATION SHEET		
Name - WILKYS STDate - 03/16/11Location - PORTLAND ME 04102Building - RESIDENTIALSystem No LOOPEDContractor - ALL ASPECTSContract No 110308-401Calculated By - DEVON HUYNHDrawing No 1Construction: (X) Combustible () Non-CombustibleCeiling Height VARIEOCCUPANCY - RESIDENTIALContract No 1	IS	
S Type of Calculation: ()NFPA 13 Residential ()NFPA 13R (X)NFPA 13D Y Number of Sprinklers Flowing: (X)1 ()2 ()4 () S ()Other T ()Specific Ruling Made by Date E M Listed Flow at Start Point - 17 Gpm System Type Listed Pres. at Start Point - 12.03Psi (X) Wet () Dry D MAXIMUM LISTED SPACING 18 x 18 () Deluge () PreActior E Domestic Flow Added - 0 Gpm Sprinkler or Nozzle S Additional Flow Added - Gpm Make RELIABLE Model RFC49 I Elevation at Highest Outlet - 128 Feet Size 3/8 K-Factor 4.9 G Note: Temperature Rating 155	1	
CalculationGpm Required 17Psi Required 56.91At Ref Pt STRSummaryC-Factor Used:Overhead 150Underground 150		
WWater Flow Test:Pump Data:Tank or Reservoir:ADate of Test - xRated Cap.Cap.TTime of Test - x@ PsiElev.EStatic (Psi) - 80Elev.Elev.RResidual (Psi) - 75OtherWellFlow (Gpm) - 300Proof Flow GpmSElevation - 100		
P Location: x P L Source of Information: CITY SUPPLY Y		

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Fittings Used Summary

Uponor WILKYS ST - One Head Calculation (H.12)													Pa Da	ge 3 ite 3	3 3/16/2011						
Fitting Le Abbrev.	egend Name	1/2	3/4	1	1¼	1½	2	21/2	3	3½	4	5	6	8	10	12	14	16	18	20	24
_		_					_	_	_												
E	90' Standard Elbow	2	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
G	Generic Gate Valve	1	1	1	1	1	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
Т	90' Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
Utb	Aquapex Tee - Branch	2	6	6	9.08	12.88	13.22	0	0	0	0	Ō	0	0	0	0	0	0	0	0	0
Utr	Aquapex Tee - Run	1	2	2	1.64	2.39	2.39	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Units Summary

Inches
Feet
US Gallons per Minute
Pounds per Square Inch
Flow Summary - NFPA 2007

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Uponor WILKYS ST - One Head Calculation (H.12)

Page 4 Date 3/16/2011

SUPPLY ANALYSIS							
Node at Source	Static Pressure	Residual Pressure	Flow	Available Pressure	Total Demand	Required Pressure	
STR	80.0	75	300.0	79.975	17.0	56.91	

NODE ANALYSIS

Node Tag	Elevation	Node Type	Pressure at Node	Discharge at Node	Notes	
H.12	128.0	4.9	12.03	17.0		_
T.46	128.0		16.79			
T.36	118.0		21.48			
H.5	118.0		22.07			
H.4	118.0		22.61			
T.32	118.0		22.76			
T.31	118.0		22.92			
T.27	108.0		28.06			
T.28	108.0		28.69			
S.1	104.0		32.08			
MTR	100.0		45.87			
STR	100.0		56.91			
T.43	128.0		13.95			
H.13	128.0		14.31			
H.14	128.0		16.23			
T.44	128.0		16.71			
H.15	128.0		17.21			
T.45	128.0		17.61			
T.34	118.0		22.22			
T.29	108.0		26.75			
T.26	108.0		28.03			
H.19	128.0		17.03			
T.50	128.0		17.46			
T.38	118.0		22.01			
T.33	108.0		26.58			
H.8	108.0		26.98			
H.7	108.0		27.28			
H.2	108.0		27.7			
T.25	108.0		28.03			
H.1	108.0		28.43			
T.47	128.0		17.12			
H.17	128.0		17.31			
H.16	128.0		17.46			
H.18	128.0		17.15			
T.48	128.0		17.17			
H.23	128.0		17.25			
T.51	128.0		17.3			
H.22	128.0		17.32			
H.21	128.0		17.36			
H.24	128.0		17.39			
H.20	128.0		17.42			
H.11	118.0		21.59			

Flow Summary - NFPA 2007

Uponor	
WILKYS ST - One Head Calculation (H.12	2)

NODE ANALYSIS (cont.)

Node Tag	Elevation	Node Type	Pressure at Node	Discharge at Node	Notes	
T.41	118.0		21.63			
H.10	118.0		21.79			
T.40	118.0		21.89			
T.39	118.0		21.91			
T.37	118.0		22.01			
H.6	118.0		22.12			
T.35	118.0		22.23			
H.9	118.0		21.91			
H.3	108.0		28.03			

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Page 5 Date 3/16/2011 ٠

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Uponor WILKYS S	ST - One He	ad Calculatior	n (H.12)					Page 6 Date 3/16/2011
Hyd. Ref. Point	Qa	Dia. "C" Bf/Et	Fitting or)	Pipe Ftng's	Pt Pe Pf	Pt Pv Po	******* Notes ******
	Qt	P1/F1	Eqv.	Ln.	lotal	PI	Pn	
H.12	9.64	0.67	1Utb	6.0	18.000	12.030		K Factor = 4.90
T 46	9 64	0 1982		0.0	24 000	0.0 4 756		Vel = 877
T /6	-3.60	0.86		0.0	15 000	16 786		
to	-0.00	150.0		0.0	0.0	4.331		
T.36	5.95	0.0241		0.0	15.000	0.361		Vel = 3.29
T.36	-1.40	0.67	1Utb	6.0	6.000	21.478		
to		150.0		0.0	6.000	0.0		
H.5	4.55	0.0494		0.0	12.000	0.593		Vel = 4.14
H.5	0.0	0.67	1Utr	2.0	9.000	22.071		
	4 55	0.0494		0.0	2.000	0.0		Vel = 414
н 4	<u>4.00</u>	0.67	11 ltr	2.0	1 000	22 614		VCI
to	0.0	150.0	100	0.0	2.000	0.0		
T.32	4.55	0.0493		0.0	3.000	0.148		Vel = 4.14
T.32	3.16	0.86	1Utr	2.0	2.000	22.762		
to		150.0		0.0	2.000	0.0		
<u></u>	7.71	0.0390		0.0	4.000	0.156		Vel = 4.26
T.31	0.0	0.86	1Utb	6.0	15.000	22.918		
10 T 27	7 71	150.0		0.0	21 000	4.331		Vel = 4.26
T 27	6.80	0.86	11 ltr	2.0	3 000	28.065		VCI = 4.20
to	0.00	150.0	100	0.0	2.000	0.0		
T.28	14.51	0.1252		0.0	5.000	0.626		Vel = 8.01
T.28	2.49	0.86	1T	2.871	7.000	28.691		
to		150.0		0.0	2.871	1.732		
<u>S.1</u>	17.0	0.1677		0.0	9.871	1.655		Vel = 9.39
S.1	0.0	0.86	2E	2.297	10.000	32.078		* Fixed loss = 10
MTR	17.0	0.1678		0.0	12.297	2.063		Vel = 9.39
MTR	0.0	0.911	1E	1.521	10,000	45.873		
to	0.0	150.0	1T	3.801	6.082	9.000		* Fixed loss = 9
STR	17.0	0.1267	1G	0.76	16.082	2.037		Vel = 8.37
	0.0 17.00					56.910		K Factor = 2.25
H.12	7.35	0.67	1Utr	2.0	14.000	12.030		
to		150.0		0.0	2.000	0.0		
	7.35	0.1201		0.0	16.000	1.921		Vel = 6.69
T.43	0.0	0.67	1Utr	2.0	1.000	13.951		
H.13	7.35	0.1200		0.0	3.000	0.360		Vel = 6.69
H 13	0.0	0.67	1Utr	2.0	14,000	14.311		
to		150.0		0.0	2.000	0.0		
H.14	7.35	0.1201		0.0	16.000	1.922		Vel = 6.69
H.14	0.0	0.67	1Utr	2.0	2.000	16.233		
to	7.25	150.0		0.0	2.000	0.0		Val - 6.60
T 44	7.55	0.1200	41146	6.0	4.000	16 71 2		vei - 0.09
1.44 to	-3.01	150.0	TOID	0.0	6 000	0.713		
H.15	3.54	0.0311		0.0	16.000	0.497		Vel = 3.22

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Uponor WILKYS S	T - One He	ad Calculation	(H.12)					Page 7 Date 3/16/2011
Hyd.	Qa	Dia.	Fitting		Pipe	Pt	Pt	
Ref.	-	"C"	or		Ftng's	Pe	Pv	******* Notes ******
Point	Qt	Pf/Ft	Eqv.	Ln.	Total	Pt	Pn	
H.15	0.0	0.67	1Utr	2.0	5.000	17.210		110- p
to		150.0	1Utb	6.0	8.000	0.0		
T.45	3.54	0.0312		0.0	13.000	0.405		Vel = 3.22
T.45	2.28	0.86		0.0	12.000	17.615		
to	5 00	150.0		0.0	0.0	4.331		Val - 2.21
1.34	5.82	0.0230	4114-	0.0	12.000	0.276		Vel = 3.21
T.34	-1.34	0.86	10tr	2.0	12.000	22.222		
T.29	4.48	0.0143		0.0	14.000	0.200		Vel = 2.47
T 29	1.87	0.67	2Utb	12.0	2,000	26,753		
to	1.07	150.0	2010	0.0	12.000	0.0		
T.26	6.35	0.0915		0.0	14.000	1.281		Vel = 5.78
T.26	0.45	0.86		0.0	1.000	28.034		
to		150.0		0.0	0.0	0.0		
	6.8	0.0310		0.0	1.000	0.031		Vel = 3.76
	0.0 6.80					28.065		K Factor = 1.28
T.44	3.81	0.67	1Utr	2.0	7.000	16.713		
to		150.0		0.0	2.000	0.0		
H.19	3.81	0.0356		0.0	9.000	0.320		Vel = 3.47
H.19	0.0	0.67	1Utr	2.0	10.000	17.033		
to	0.04	150.0		0.0	2.000	0.0		Val = 2.47
1.50 T.50	3.81	0.0356		0.0	12.000	0.427		Vei = 3.47
1.50 to	1.06	0.80		0.0	13.000	4 331		
T.38	4.87	0.0166		0.0	13.000	0.216		Vel = 2.69
T.38	-0.07	0.86	1Utr	2.0	13.000	22.007		
to	••••	150.0		0.0	2.000	4.331		
T.33	4.8	0.0162		0.0	15.000	0.243		Vel = 2.65
T.33	-1.86	0.67	1Utr	2.0	10.000	26.581		
to		150.0	1Utb	6.0	8.000	0.0		
<u>H.8</u>	2.94	0.0219		0.0	18.000	0.395		Vei = 2.68
H.8	0.0	0.67		0.0	14.000	26.976		
ю Н7	2.94	0.0220		0.0	14.000	0.308		Vel = 2.68
Н7	0.0	0.67	11.Jtr	2.0	17 000	27 284		
to	0.0	150.0	104	0.0	2.000	0.0		
H.2	2.94	0.0219		0.0	19.000	0.417		Vel = 2.68
H.2	0.0	0.67	1Utr	2.0	13.000	27.701		
to		150.0		0.0	2.000	0.0		
T.25	2.94	0.0219		0.0	15.000	0.329		Vel = 2.68
T.25	-0.46	0.67	1Utr	2.0	17.000	28.030		
ю н 1	2 / 2	150.0	TUTD	6.0 0.0	8.000 25.000	0.0		Vel = 2.26
<u> </u>	<u>2.40</u>	0.0101	11.1+6	6.0	10.000	28 /22		VGI - 2.20
to	0.0	150.0	1010	0.0	6.000	0.0		
T.28	2.48	0.0161		0.0	16.000	0.258		Vel = 2.26
	0.0							

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Uponor WILKYS S	T - One He	ad Calculation	n (H.12)					Page 8 Date 3/16/2011
Hyd. Ref. Point	Qa	Dia. "C" Pf/Ft	Fitting or Eav.	; Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
			-41.					
	2.48					28.691		K Factor = 0.46
T.46	3.70	0.67	1Utb	6.0	2.000	16.786		
to		150.0	1Utr	2.0	8.000	0.0		
T.47	3.7	0.0336		0.0	10.000	0.336		Vel = 3.37
T.47	-1.43	0.67	1Utb	6.0	8.000	17.122		
to	0.07	150.0		0.0	6.000	0.0		
H.17	2.21	0.0137		0.0	14.000	0.192		Vei = 2.07
H.17	0.0	0.67	1Utr	2.0	9.000	17.314		
H 16	2 27	0.0136		0.0	11,000	0.150		Vel = 2.07
H 16	0.0	0.67	11.)tr	2.0	3 000	17 464		V01 2.01
to	0.0	150.0	1Utb	6.0	8.000	0.0		
T.45	2.27	0.0137		0.0	11.000	0.151		Vel = 2.07
	0.0 2.27					17.615		K Factor = 0.54
T.47	1.42	0.67	1Utr	2.0	3.000	17.122		
to		150.0	104	0.0	2.000	0.0		
H.18	1.42	0.0058		0.0	5.000	0.029		Vel = 1.29
H.18	0.0	0.67	1Utr	2.0	1.000	17.151		
to		150.0		0.0	2.000	0.0		
<u>T.48</u>	1.42	0.0057		0.0	3.000	0.017		Vel = 1.29
T.48	0.0	0.67	1Utr	2.0	12.000	17.168		
to L 22	1 40	150.0		0.0	2.000	0.0		$V_{0} = 1.20$
п.23	1.42	0.0057	4114.	0.0	7.000	0.060		Vei - 1.29
H.23	0.0	0.67	TUtr	2.0	7.000	17.248		
T.51	1.42	0.0058		0.0	9.000	0.052		Vel = 1.29
T.51	-0.36	0.67	1Uth	6.0	1.000	17.300		
to	0.00	150.0		0.0	6.000	0.0		
H.22	1.06	0.0034		0.0	7.000	0.024		Vel = 0.96
H.22	0.0	0.67	1Utr	2.0	10.000	17.324		
to		150.0		0.0	2.000	0.0		
H.21	1.06	0.0033		0.0	12.000	0.040		Vel = 0.96
H.21	0.0	0.67		0:0	9.000	17.364		
to	1.06	150.0		0.0	0.0	0.0		$V_{cl} = 0.96$
<u> </u>	1.00	0.0033	4114-	0.0	9.000	0.030		Ver - 0.90
H.24	0.0	0.67	TUtr	2.0	2 000	17.394		
H.20	1.06	0.0032		0.0	8.000	0.026		Vel = 0.96
H 20	0.0	0.67	1Utr	2.0	4,000	17,420		
to	0.0	150.0	1Utb	6.0	8.000	0.0		
T.50	1.06	0.0033		0.0	12.000	0.040		Vel = 0.96
	0.0 1.06					17 460		K Factor = 0.25
Т 36	1 /0	0.67	11 Hr	20	13 000	21 478		
to	1.70	150.0	1Utb	6.0	8.000	0.0		
H.11	1.4	0.0055		0.0	21.000	0.116		Vel = 1.27
H.11	0.0	0.67	1Utb	6.0	1.000	21.594		
to		150.0		0.0	6.000	0.0		
T.41	1.4	0.0056		0.0	7.000	0.039		Vel = 1.27

Computer Programs by Hydratec Inc. Route 111 Windham N.H. USA 03087

Uponor WILKYS S	T - One He	ad Calculation	(H.12)					Page 9 Date 3/16/2011
Hyd.	Qa	Dia.	Fitting		Pipe Etnglo	Pt Pc	Pt	******* Notoo ******
Point	Qt	Pf/Ft	Eqv.	Ln.	Total	Pf	Pn	Notes
T 41	0.36	0.67	11.1tb	60	12 000	21 633		
to	4.70	150.0	1010	0.0	6.000	0.0		$V_{0} = 1.60$
H.10	1.70	0.0085	41.14	0.0	10.000	0.155		ver - 1.00
H.10 to	0.0	0.67	10tr	2.0	2 000	21.780		
T.40	1.76	0.0085		0.0	12.000	0.102		Vel = 1.60
T.40	-0.79	0.67	1Utb	6.0	1.000	21.888		
to		150.0	1Utr	2.0	8.000	0.0		
T.39	0.97	0.0029		0.0	9.000	0.026		Vel = 0.88
T.39	0.79	0.67	1Utb	6.0	3.000	21.914		
τ.37	1.76	0.0085	100	2.0	11.000	0.093		Vel = 1.60
T.37	0.06	0.67	1Utb	6.0	6.000	22.007		
to		150.0		0.0	6.000	0.0		
H.6	1.82	0.0091		0.0	12.000	0.109		Vel = 1.66
H.6	0.0	0.67	1Utr	2.0	5.000	22.116		
to T 35	1 82	150.0	1Utb	6.0	8.000	0.0		Vel = 1.66
T 35	1 34	0.67	21.lth	12.0	9 000	22 234		
to	1.04	150.0	2010	0.0	12.000	0.0		
T.32	3.16	0.0251		0.0	21.000	0.528		Vel = 2.88
	0.0 3.16					22.762		K Factor = 0.66
T.51	0.36	0.86		0.0	13.000	17.300		
to T 41	0.36	150.0		0.0	0.0	4.331		Vel = 0.20
1.41	0.00	0.0002		0.0	10.000	0.002		101 0.20
	0.36					21.633		K Factor = 0.08
T.40	0.79	0.67	1Utr	2.0	2.000	21.888		
to		150.0	1Utb	6.0	8.000	0.0		
H.9	0.79	0.0020		0.0	10.000	0.020		Vel = 0.72
H.9	0.0	0.67		0.0	3.000	21.908		
T.39	0.79	0.0020		0.0	3.000	0.006		Vel = 0.72
	0.0				<u>.</u>	21 014		K Eactor = 0.17
т 38	0.79	0.86	11.lth	6.0	3 000	22.007		
to	0.00	150.0	1010	0.0	6.000	0.0		
T.37	0.06	0.0		0.0	9.000	0.0		Vel = 0.03
	0.0 0.06					22.007		K Factor = 0.01
T.34	1.34	0.86	1Utb	6.0	2.000	22.222		
to		150.0		0.0	6.000	0.0		
T.35	1.34	0.0015		0.0	8.000	0.012		Vel = 0.74
	0.0 <u>1.34</u>					22.234		K Factor = 0.28
T.33	1.87	0.67	2Utb	12.0	6.000	26.581		
to	4 0-	150.0		0.0	12.000	0.0		
1.29	1.87	0.0096		0.0	18.000	0.172		$ve_1 = 1.70$

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Computer Programs by Hydratec Inc. Route 111 Windham N.H. USA 03087

Uponor WILKYS ST - One Head Calculation (H.12)						Pag Date	e 10 e 3/16/2011		
Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.) Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes *****
	0.0								
	1.87		- -			26.753		K Factor =	= 0.36
T.25	0.45	0.67		0.0	1.000	28.030			
to		150.0		0.0	0.0	0.0			
H.3	0.45	0.0010		0.0	1.000	0.001		Vel = 0.4	1
H.3	0.0	0.67	1Utr	2.0	2.000	28.031			
to		150.0		0.0	2.000	0.0			
T.26	0.45	0.0008		0.0	4.000	0.003		Vel = 0.4	1
	0.0								
	0.45					28.034		K Factor =	= 0.08

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AQUASAFE® Fire Safety System

Uponor 5925 148th Street West

Apple Valley, MN 55124 800-321-4739

Job Name:WILKYS ST - Two Head Calculation (H.21 & H.22)Drawing:RESIDENTIALLocation:PORTLAND ME 04102Remote Area:LOOPEDContract:110308-40LData File:110308-40L 27 Wilkie Street.wx2

			•••••
HYDRAULIC DESIGN INFORMATION S	HEET		
Name - WILKYS ST Location - PORTLAND ME 04102 Building - RESIDENTIAL Contractor - ALL ASPECTS Calculated By - DEVON HUYNH Construction: (X) Combustible OCCUPANCY - RESIDENTIAL	() Non-Combus	Date - 03/16/11 System No LOOPED Contract No 110308-40L Drawing No 1 tible Ceiling Height VARIES	
S Type of Calculation: ()NF Y Number of Sprinklers Flowin S ()Other T ()Specific Ruling	P A 13 Residential ng: ()1 (X)2 Made	()NFP A 13 R (X)NFPA 13D ()4 () by Date	
M Listed Flow at Start Poin Listed Pres. at Start Point - D MAXIMUM LISTED SPACING E Domestic Flow Added S Additional Flow Added I Elevation at Highest Outl G Note: N	t - 13 Gpm 7.04 Psi (16 x 16 - 0 Gpm - Gpm M et - 128 Feet S T	System Type X) Wet () Dry () Deluge () PreAction Sprinkler or Nozzle ake RELIABLE Model RFC49 ize 3/8 K-Factor 4.9 emperature Rating 155	
Calculation Gpm Required 26. Summary C-Factor Used:	2235 Psi Requir Overhead 1	ed 63.59 At Ref Pt STR 50 Underground 150	
W Water Flow Test: A Date of Test - x T Time of Test - x E Static (Psi) - 80 R Residual (Psi) - 75 Flow (Gpm) - 300 S Elevation - 100	Pump Data: Rated Cap. @ Psi Elev. Other	Tank or Reservoir: Cap. Elev. Well Proof Flow Gpm	
P Location: x P L Source of Information: CIT Y	Y SUPPLY		

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Water Supply Curve (C)

Uponor WILKYS ST - Two Head Calculation (H.21 & H.22) Page 2 Date 3/16/2011

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City Water Supply: C1 - Static Pressure : 80 C2 - Residual Pressure: 75 C2 - Residual Flow : 300		Demand: D1 D2 D2 Hos Hos Safe	Demand: 12.127 D1 - Elevation 12.127 D2 - System Flow 26.2235 D2 - System Pressure 63.591 Hose (Adj City) Hose (Demand) D3 - System Demand 26.2235 Safety Margin 16.354		
150			· · · · · · · · · · · · · · · · · · ·		
140					
130					
P 120					
R 110					
F 100					
s 90			·····		
s ⁸⁰					
U 70 D2					
R 60			*		
E 50					
40					
30					
20			· · · · · · · · · · · · · · · · · · ·		
10 D1			· · · · · · · · · · · · · · · · · · ·		
5 0 100 150 20	250 300 34 FLOW (N ^ 1.85)		450		

Fittings Used Summary

Uponor WILKYS ST - Two Head Calculation (H.21 & H.22)

Page 3 Date 3/

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ate	3/16/2011

Fitting Le Abbrev.	egend Name	1/2	3/4	1	1¼	1½	2	21/2	3	3½	4	5	6	8	10	12	14	16	18	20	24
E G T Utb Utr	90' Standard Elbow Generic Gate Valve 90' Flow thru Tee Aquapex Tee - Branch Aquapex Tee - Run	2 1 3 2 1	2 1 4 6 2	2 1 5 6 2	3 1 6 9.08 1.64	4 1 8 12.88 2.39	5 1 10 13.22 2.39	6 1 12 0 0	7 1 15 0	8 1 17 0 0	10 2 20 0 0	12 2 25 0 0	14 3 30 0 0	18 4 35 0 0	22 5 50 0	27 6 60 0	35 7 71 0 0	40 8 81 0 0	45 10 91 0 0	50 11 101 0 0	61 13 121 0 0

Units Summary

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

Flow Summary - NFPA 2007

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Uponor WILKYS ST - Two Head Calculation (H.21 & H.22)

Page 4 Date 3/16/2011

	SUPPLY ANALYSIS												
Node at Source	Static Pressure	Residual Pressure	Flow	Available Pressure	Total Demand	Required Pressure							
STR	80.0	75	300.0	79.945	26.22	63.591							

NODE ANALYSIS

Node Tag	Elevation	Node Type	Pressure at Node	Discharge at Node	Notes
H.21	128.0	4.9	7.04	13.0	
H.24	128.0		9.02		
H.20	128.0		10.78		
T.50	128.0		13.42		
T.38	118.0		18.27		
T.33	108.0		23.31		
H.8	108.0		24.26		
H.7	108.0		25.0		
H.2	108.0		26.01		
T.25	108.0		26.81		
H.1	108.0		27.71		
T.28	108.0		28.29		
S.1	104.0		33.72		
MTR	100.0		50.05		
STR	100.0		63.59		
H.22	128.0	4.9	7.28	13.22	
T.51	128.0		10.83		
T.41	118.0		15.99		
H.10	118.0		16.92		
T.40	118.0		17.55		
T.39	118.0		17.7		
T.37	118.0		18.27		
H.6	118.0		18.75		
T.35	118.0		19.26		
T.32	118.0		20.48		
T.31	118.0		20.81		
T.27	108.0		26.89		
H.23	128.0		11.57		
T.48	128.0		12.71		
H.18	128.0		12.96		
T.47	128.0		13.37		
H.17	128.0		13.82		
H.16	128.0		14.18		
T.45	128.0		14.54		
T.34	118.0		19.26		
T.29	108.0		23.94		
T.26	108.0		26.82		
H.11	118.0		16.46		
T.36	118.0		17.87		
H.5	118.0		19.07		
H.4	118.0		20.18		
H.9	118.0		17.66		

Uponor WILKYS ST - Two Head Calculation (H.21 & H.22)

Page 5 Date 3/16/2011

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			NODE ANA	LYSIS (cont.)		
Node Tag	Elevation	Node Type	Pressure at Node	Discharge at Node	Notes	
T.46	128.0		13.51		· · · · · · · · · · · · · · · · · · ·	
H.12	128.0		13.59			
T.43	128.0		13.64			
H.13	128.0		13.65			
H.14	128.0		13.7			
T.44	128.0		13.72			
H.15	128.0		14.17			
H.19	128.0		13.59			
H.3	108.0		26.81			

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Hyd. Bof	Qa	Dia.	Fitting		Pipe Etog's	Pt	Pt Pv	****** Notes ******
Point	Qt	Pf/Ft	Eqv.	Ln.	Total	Pe	Pn	NOLES
	40.00	0.67		0.0	0.000	7.040		K Footor = 4.00
H.21	10.20	0.67		0.0	9.000	7.040		K Factor - 4.90
о Н.24	10.2	0.2199		0.0	9.000	1.979		Vel = 9.28
H.24	0.0	0.67	1Utr	2.0	6.000	9.019		
D	••••	150.0		0.0	2.000	0.0		
H.20	10.2	0.2200		0.0	8.000	1.760		Vel = 9.28
H.20	0.0	0.67	1Utr	2.0	4.000	10.779		
2	40.0	150.0	1Utb	6.0	8.000	0.0		
1.50	10.2	0.2199	·	0.0	12.000	2.639		Vei = 9.28
T.50	-2.32	0.86		0.0	13.000	13.418		
) T 38	7 88	0.0405		0.0	13,000	4.331		Vel = 4.35
T 38	0.63	0.86	11 ltr	2.0	13,000	18 275		
1.50	0.05	150.0	101	0.0	2.000	4.331		
T.33	8.51	0.0467		0.0	15.000	0.700		Vel = 4.70
Т.33	-3.78	0.67	1Utr	2.0	10.000	23.306		
D		150.0	1Utb	6.0	8.000	0.0		
H.8	4.73	0.0531		0.0	18.000	0.956		Vel = 4.30
H.8	0.0	0.67		0.0	14.000	24.262		
D	4 70	150.0		0.0	0.0	0.0		Val - 4.20
H.7	4.73	0.0531		0.0	14.000	0.743		Vei = 4.30
H.7	0.0	0.67	1Utr	2.0	17.000	25.005		
) H 2	4 73	0.0531		0.0	19 000	1.009		Vel = 4.30
H 2	0.0	0.67	11 ltr	2.0	13,000	26.014		
). <u>~</u>	0.0	150.0	104	0.0	2.000	0.0		
T.25	4.73	0.0531		0.0	15.000	0.796		Vel = 4.30
T.25	-0.89	0.67	1Utr	2.0	17.000	26.810		
D		150.0	1Utb	6.0	8.000	0.0		
H.1	3.84	0.0361		0.0	25.000	0.903		Vel = 3.49
H.1	0.0	0.67	1Utb	6.0	10.000	27.713		
	0.04	150.0		0.0	6.000	0.0		1/21 = -2.40
1.28	3.84	0.0361	4 7	0.0	10.000	0.577		Vei - 3.49
T.28	22.38	0.86	11	2.871	7.000	28.290		
5 S 1	26 22	0 3741		0.0	9.871	3.693		Vel = 14.48
<u>s 1</u>	0.0	0.86	2F	2 297	10 000	33,715		
0.1	0.0	150.0		0.0	2.297	11.732		* Fixed loss = 10
MTR	26.22	0.3741		0.0	12.297	4.600		Vel = 14.48
MTR	0.0	0.911	1E	1.521	10.000	50.047		
D		150.0	1T	3.801	6.082	9.000		* Fixed loss = 9
STR	26.22	0.2826	1G	0.76	16.082	4.544		Vel = 12.91
	0.0					00 504		
	26.22					63.591		K Factor = 3.29
H.21	2.80	0.67	1Utr	2.0	10.000	7.040		
0 H 22	2 0	150.0		0.0	2.000 12.000	0.0		Vel = 2.55
L 22	42.0	0.67	11.046	6.0	1 000	7 292		K = 4.90
n.22	13.22	150.0	1010	0.0	6.000	0.0		11 1 20101 - 4.30
T 51	16.02	0.5071		0.0	7 000	3 550		Vel = 14 58

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Uponor WILKYS S	T - Two He	ad Calculation		Page 7 Date 3/16/2011						
Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.) Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******	Notes	*****
T.51	-5.97	0.86		0.0	13.000	10.832				
to	10.05	150.0		0.0	0.0	4.331				
<u> </u>	<u> </u>	0.0034	41.146	0.0	13.000	15 097		Vei = 5.55		
1.41 to	-5.57	150.0	1010	0.0	6.000	0.0				
H.10	4.68	0.0519		0.0	18.000	0.935		Vel = 4.26		
H.10	0.0	0.67	1Utr	2.0	10.000	16.922				
to		150.0		0.0	2.000	0.0				
T.40	4.68	0.0520	······	0.0	12.000	0.624		Vel = 4.26		
T.40	-2.11	0.67	1Utb	6.0	1.000	17.546				
to T 20	0.57	150.0	1Utr	2.0	8.000	0.0				
<u> </u>	2.57	0.0171	41146	0.0	9.000	0.154		Vei - 2.34		
1.39 to	2.11	0.67	10tb 11.itr	0.0 2.0	3.000	17.700				
T.37	4.68	0.0519	TOU	0.0	11.000	0.571		Vel = 4.26		
T.37	-0.64	0.67	1Utb	6.0	6.000	18.271				
to		150.0		0.0	6.000	0.0				
<u>H.6</u>	4.04	0.0397		0.0	12.000	0.476		Vel = 3.68		
H.6	0.0	0.67	1Utr	2.0	5.000	18.747				
to		150.0	1Utb	6.0	8.000	0.0				
1.35	4.04	0.0397	01.01	0.0	13.000	0.516		Vel = 3.68		
1.35 to	0.92	0.67	20tb	12.0	9.000	19.263				
T.32	4.96	0.0580		0.0	21.000	1.218		Vel = 4.51		
T.32	6.68	0.86	1Utr	2.0	2,000	20.481				
to		150.0		0.0	2.000	0.0		•		
T.31	11.64	0.0832		0.0	4.000	0.333		Vel = 6.43		
T.31	0.0	0.86	1Utb	6.0	15.000	20.814				
to	44.04	150.0		0.0	6.000	4.331				
1.27	11.64	0.0833		0.0	21.000	1.749		Vel = 6.43		
1.27 to	10.74	0.86	1Utr	2.0	3.000	26.894				
T.28	22.38	0.2792		0.0	5.000	1.396		Vel = 12.36	3	
	0.0									
	22.38					28.290		K Factor =	4.21	
T.51	5.98	0.67	1Utr	2.0	7.000	10.832				
to		150.0		0.0	2.000	0.0				
H.23	5.98	0.0818		0.0	9.000	0.736		Vel = 5.44		
H.23	0.0	0.67	1Utr	2.0	12.000	11.568				
τ 48	5 98	0.0819		0.0	2.000	0.0		Vel = 544		
T 48	0.0	0.67	11 Jtr	2.0	1 000	12 714				
to	0.0	150.0	100	0.0	2.000	0.0				
H.18	5.98	0.0817		0.0	3.000	0.245		Vel = 5.44		
H.18	0.0	0.67	1Utr	2.0	3.000	12.959				
to		150.0		0.0	2.000	0.0				
T.47	5.98	0.0818		0.0	5.000	0.409		Vel = 5.44		
Т.47	-2.35	0.67	1Utb	6.0	8.000	13.368				
ю Н.17	3.63	0.0325		0.0	6.000 14.000	0.0		Vel = 3.30		

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Uponor WILKYS S	T - Two He	ad Calculation		Page 8 Date 3/16/2011						
Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******	Notes	*****
					····					
H.17	0.0	0.67	1Utr	2.0	9.000	13.823			·····	
to H.16	3.63	150.0 0.0325		0.0 0.0	2.000	0.0 0.357		Vel = 3.3	0	
H.16	0.0	0.67	1Utr	2.0	3.000	14.180				
to T.45	3.63	150.0 0.0325	1Utb	6.0 0.0	8.000 11.000	0.0 0.357		Vel = 3.3	0	
T.45	3.36	0.86		0.0	12.000	14.537				
to	0.00	150.0		0.0	0.0	4.331) / - I - 0 0		
T 34	-0.99	0.0324	11 ltr	2.0	12.000	10 257		Vei = 3.0	0	
to	-0.52	150.0	101	0.0	2.000	4.331				
T.29	6.07	0.0249		0.0	14.000	0.349		Vel = 3.3	5	
T.29	3.78	0.67 150.0	2Utb	12.0	2.000	23.937				
T.26	9.85	0.2061		0.0	14.000	2.886		Vel = 8.9	6	
T.26	0.89	0.86	·	0.0	1.000	26.823				
to T 27	10 74	150.0		0.0	0.0	0.0		\/el = 5.9	3	
1.21	0.0	0.0710		0.0	1.000	0.071		Vei - 0.5	<u> </u>	
	10.74					26.894		K Factor =	= 2.07	
T.41	5.37	0.67	1Utb	6.0	1.000	15.987				
το Η.11	5.37	150.0 0.0671		0.0	6.000 7.000	0.0 0.470		Vel = 4.8	9	
H.11	0.0	0.67	1Utr	2.0	13.000	16.457	a			
to	5 07	150.0	1Utb	6.0	8.000	0.0			~	
1.36 T 26	5.37	0.067	11.46	<u>0.0</u>	<u>21.000</u>	1.410		Vel = 4.8	9	
to	1.51	150.0	1010	0.0	6.000	0.0				
<u>H.5</u>	6.68	0.1006		0.0	12.000	1.207		Vel = 6.0	8	
H.5	0.0	0.67	1Utr	2.0	9.000	19.074				
H.4	6.68	0.1005		0.0	11.000	1.105		Vel = 6.0	8	
H.4	0.0	0.67	1Utr	2.0	1.000	20.179				
to T 32	6 68	150.0		0.0	2.000	0.0		Vel - 60	9	
1.52	0.00	0.1007		0.0	5.000	0.302		Ver - 0.0	0	
	6.68					20.481		K Factor =	1.48	
T.40	2.11	0.67	1Utr	2.0	2.000	17.546				
to H 9	2 11	150.0 0.0118	10tb	6.0 0.0	8.000	0.0 0.118		Vel = 19	2	
H.9	0.0	0.67		0.0	3.000	17.664			-	
to		150.0		0.0	0.0	0.0			_	
Т.39	2.11	0.0120		0.0	3.000	0.036		Vel = 1.9	2	
	0.0 2.11					17.700		K Factor =	0.50	
T.47	2.35	0.67	1Utb	6.0	2.000	13.368				
to	0.05	150.0	1Utr	2.0	8.000	0.0				
1.46	2.35	0.0146		0.0	10.000	0.146		Vel = 2.1	4	

Uponor WILKYS S	T - Two He	ad Calculation) (H.21 & F	1.22)				Page 9 Date 3/16/2011	1
Hyd. Ref.	Qa	Dia. "C"	Fitting or	g	Pipe Ftng's	Pt Pe	Pt Pv	******* Notes ***	***
Point	Qt	Pt/Ft	Eqv.	Ln.	lotai	Pt	Pn		
T.46	-1.31	0.67	1Utb	6.0	18.000	13.514			<u></u>
to H 12	1 04	150.0		0.0	6.000 24.000	0.0		Vel = 0.95	
H 12	0.0	0.67	1Utr	2.0	14 000	13.592			
to	0.0	150.0	104	0.0	2.000	0.0			
	1.04	0.0032		0.0	16.000	0.051		Vel = 0.95	
T.43	0.0	0.67	1Utr	2.0	1.000	13.643			
to	4.04	150.0		0.0	2.000	0.0			
<u>H.13</u>	1.04	0.0033		0.0	3.000	0.010	<u> </u>	Vei = 0.95	
H.13	0.0	0.67	10tr	2.0	14.000	13.653			
H.14	1.04	0.0032		0.0	16.000	0.051		Vel = 0.95	
H.14	0.0	0.67	1Utr	2.0	2.000	13.704			
to		150.0		0.0	2.000	0.0			
T.44	1.04	0.0032		0.0	4.000	0.013		Vel = 0.95	
T.44	2.32	0.67	1Utb	6.0	10.000	13.717			
to LI 15	3 36	150.0		0.0	6.000	0.0		Vel = 3.06	
<u> </u>	0.0	0.0205	11 ltr	2.0	5 000	14 170		Vei - 5.00	
to	0.0	150.0	1Utb	2.0 6.0	8.000	0.0		× ·	
T.45	3.36	0.0282		0.0	13.000	0.367		Vel = 3.06	
	0.0 3.36					14.537		K Factor = 0.88	
T.50	2.32	0.67	1Utr	2.0	10.000	13.418		<u></u>	
to		150.0		0.0	2.000	0.0			
<u>H.19</u>	2.32	0.0142		0.0	12.000	0.171		Vel = 2.11	
H.19	0.0	0.67	1Utr	2.0	7.000	13.589			
	2 32	150.0		0.0	2.000	0.0		\/el = 211	
1.77	2.52	0.0142		0.0	3.000	0.120	,	Vei – 2.11	
	2.32					13.717		K Factor = 0.63	
T.46	1.31	0.86		0.0	15.000	13.514	· · · · · · · · · · · · · · · · · · ·		
to		150.0		0.0	0.0	4.331			
T.36	1.31	0.0015		0.0	15.000	0.022		Vel = 0.72	
	0.0					47.007			
	1.31					17.867	<u> </u>	K Factor = 0.31	
T.37	0.64	0.86	1Utb	6.0 0.0	3.000	18.271			
T.38	0.64	0.0004		0.0	9.000	0.004		Vel = 0.35	
	0.0	<u> </u>		•					
	0.64					18.275		K Factor = 0.15	
T.33	3.78	0.67	2Utb	12.0	6.000	23.306			
to		150.0		0.0	12.000	0.0			
T.29	3.78	0.0351	······	0.0	18.000	0.631		Vel = 3.44	
	0.0					00.007			
T 0.4	3.78	0.00	41.00		0.000	23.937		h = 0.77	
1.34 to	0.92	0.86		0.0 0.0	2.000	0.0			
T.35	0.92	0.0008		0.0	8.000	0.006		Vel = 0.51	

4

Uponor WILKYS ST	T - Two Hea	ad Calculation	(H.21 & H	.22)				Page Date	e 10 e 3/16/201	1
Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes **	****
	0.0 0.92		State of Area			19.263		K Factor =	• 0.21	
T.25 to H.3	0.89 0.89	0.67 150.0 0.0030		0.0 0.0 0.0	1.000 0.0 1.000	26.810 0.0 0.003		Vel = 0.8	1	
H.3 to T.26	0.0 0.89	0.67 150.0 0.0025	1Utr	2.0 0.0 0.0	2.000 2.000 4.000	26.813 0.0 0.010		Vel = 0.8	1	
	0.0 0.89					26.823		K Factor =	• 0.17	