

Reliable®

Residential Sprinkler For Sloped Ceilings

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

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

US Patent No. 7,353,882 applies to Model F1 Res 44
HSW Sprinklers

Other Patents Pending

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.



F1 Res 49 & 58
Pendent



F1 Res 49 & 58
Recessed Pendent / F2



F1 Res 44
HSW



F1 Res 44
Recessed HSW/F2



F1 Res 49 & 58 CCP
Pendent



RFC 43 & RFC 49



RFC 43 & RFC 49

* 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 : 1/2" NPT (R1/2)
- 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):

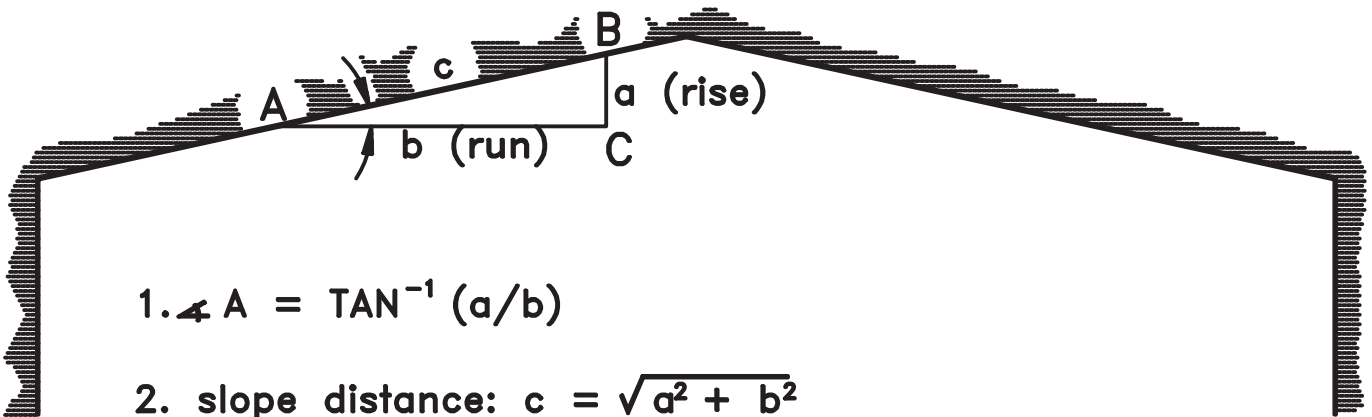
- Thermal Sensor : 165°F Fusible Link
- Sprinkler Frame : Brass Machined
- Sprinkler Pressure Rating : 175 psi
Factory Hydrostatically Tested to 500 psi
- Thread Size : 1/2" NPT (R1/2)
- K Factor : 4.3 (Actual) RFC43;
4.9 (Actual) RFC49
- Density : Minimum .05 gpm/ft²

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.

* Effective date July 12, 2002

METHOD OF CALCULATING THE CONVERSION
OF 'RISE-OVER-RUN' TO DEGREES OF AN ANGLE.



Example: $a = 4$
 $b = 12$

$$\begin{aligned}\angle A &= \text{TAN}^{-1} (a/b) \\ \angle A &= \text{TAN}^{-1} = (0.333) \\ \angle A &= 18.43^\circ\end{aligned}$$

$$\begin{aligned}\text{slope distance: } c &= \sqrt{4^2 + 12^2} \\ c &= \sqrt{160} \\ c &= 12.65\end{aligned}$$

035_ROR-A

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



F1 Res 49 & 58
Pendant



F1 Res 49 & 58
Recessed Pendant / F2



F1 Res 49 & 58 CCP
Pendant

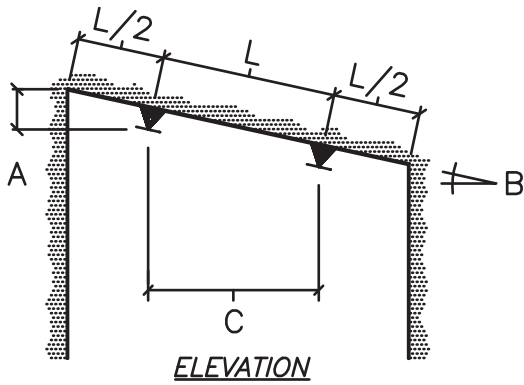


RFC 43 & RFC 49

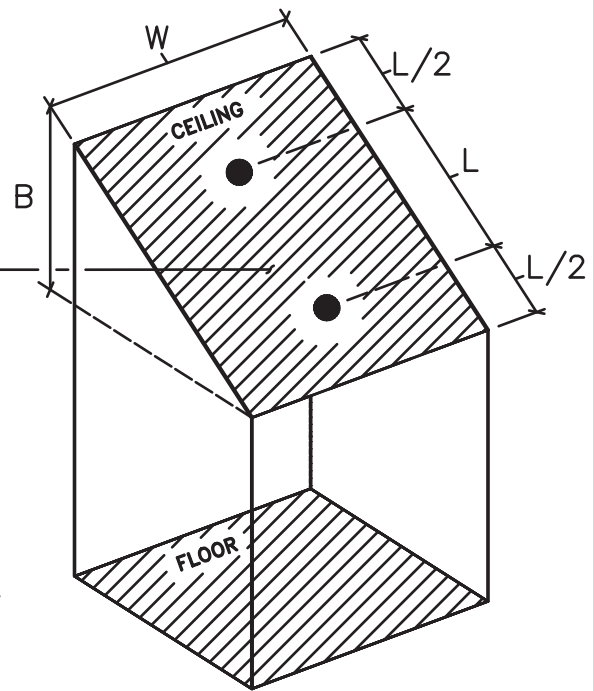


RFC 43 & RFC 49

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

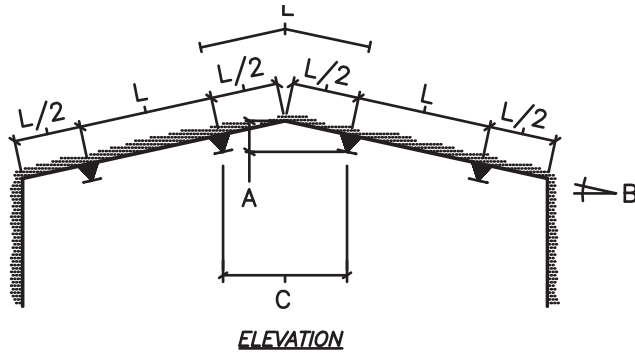


LISTED AREA OF COVERAGE
CORRESPONDS TO CEILING SLOPE

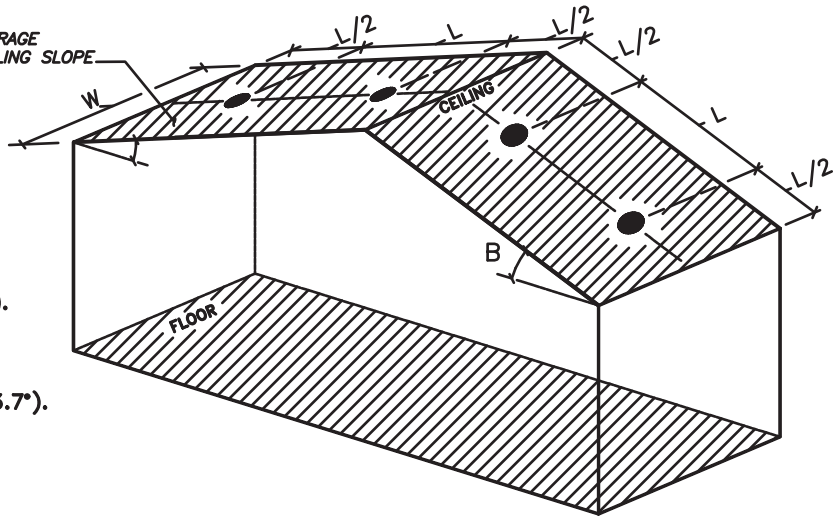


- L = THE MAXIMUM LISTED SPRINKLER SPACING, LENGTH (8'-0" MINIMUM).
- L/2 = ONE HALF THE MAXIMUM LISTED SPRINKLER SPACING (0'-4" MINIMUM).
- W = THE MAXIMUM LISTED SPRINKLER SPACING, WIDTH.
- A = 3'-0" MAXIMUM.
- B = RANGE: $\frac{2}{12}$ (9.4°) < B ≤ $\frac{8}{12}$ (33.7°).
- C = 8'-0" MINIMUM.

035FG01



LISTED AREA OF COVERAGE
CORRESPONDS TO CEILING SLOPE



- L = THE MAXIMUM LISTED SPRINKLER SPACING, LENGTH (8'-0" MINIMUM).
- L/2 = ONE HALF THE MAXIMUM LISTED SPRINKLER SPACING (0'-4" MINIMUM).
- W = THE MAXIMUM LISTED SPRINKLER SPACING, WIDTH.
- A = 3'-0" MAXIMUM.
- B = RANGE: 2/12 (9.4°) < B ≤ 8/12 (33.7°).
- C = 8'-0" MINIMUM.

035FG02

Sprinkler spacing below multiple sloped ceilings with a maximum slope of 8/12 (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. Ambient Temp. °F (°C)	Actual K Factor (metric)	Sprinkler Length	Escutcheon	Sprinkler Identification Number (SIN)
½" NPT (R½)	175 (12)	100 (38)	4.9 (69,94)	2.25" (57mm)	F2 (1/2" Adjustment)	R3516

Table 1 - Application

Max. Sprinkler Spacing Along Slope (W) Width x (L) Length ft (m)	Max. Slope of 8/12 (33.7°) Pitch				Max. Slope of 4/12 (18.4°) Pitch	
	Min. Flow Per Sprinkler Head gpm (Lpm)		Pressure psi (bar)		Sprinkler Temp. Rating °F (°C) 155 (68) & 175 (79)	
	155°F (68°C)	175°F (79°C)	155°F (68°C)	175°F (79°C)	Min. Flow Per Sprinkler Head gpm (Lpm)	Pressure psi (bar)
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 Ceiling.

Technical Data

Thread Size	Sprinkler Temp. Rating °F (°C)	CCP Assy. Temp. Rating °F (°C)	Max. Pressure psi (bar)	Max. Ambient Temp. °F (°C)	Actual K Factor (metric)	Sprinkler Length	Sprinkler Identification Number (SIN)
½" NPT (R½)	155 (68)	135 (57)	175 (12)	100 (38)	4.9 (69,94)	2.25" (57mm)	R3516

Table 2 - Application

Max. Sprinkler Spacing Along Slope (W) Width x (L) Length ft (m)	Max. Slope of 8/12 (33.7°) Pitch		Max. Slope of 4/12 (18.4°) Pitch	
	Min. Flow Per Sprinkler Head gpm (Lpm)	Pressure psi (bar)	Min. Flow Per Sprinkler Head gpm (Lpm)	Pressure psi (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 F1Res 58 Pendent & F1 Res 58 Recessed Pendent/F2 installed below Sloped Ceiling.

Technical Data

Thread Size	Max. Pressure psi (bar)	Max. Ambient Temp. °F (°C)	Actual K Factor (metric)	Sprinkler Length	Escutcheon	Sprinkler Identification Number (SIN)
½" NPT (R½)	175 (12)	100 (38)	5.8 (83,38)	2.25" (57mm)	F2 (1/2" Adjustment)	R3513

Table 3 - Application

Max. Sprinkler Spacing Along Slope (W) Width x (L) Length ft (m)	Max. Slope of 8/12 (33.7°) Pitch				Max. Slope of 4/12 (18.4°) Pitch	
	Min. Flow Per Sprinkler Head gpm (Lpm)		Pressure psi (bar)		Min. Flow Per Sprinkler Head gpm (Lpm)	Pressure psi (bar)
	155°F (68°C)	175°F (79°C)	155°F (68°C)	175°F (79°C)	155°F (68°C)	155°F (68°C)
12 x 12 (3,6 x 3,6)	21 (79,5)	23 (87)	13.1 (0,9)	15.7 (1,1)	20 (75,7)	12 (0,83)
14 x 14 (4,3 x 4,3)	21 (79,5)	23 (87)	13.1 (0,9)	15.7 (1,1)	20 (75,7)	12 (0,83)
16 x 16 (4,9 x 4,9)	21 (79,5)	23 (87)	13.1 (0,9)	15.7 (1,1)	20 (75,7)	12 (0,83)
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 Ceiling.

Technical Data

Thread Size	Sprinkler Temp. Rating °F (°C)	CCP Assy. Temp. Rating °F (°C)	Max. Pressure psi (bar)	Max. Ambient Temp. °F (°C)	Actual K Factor (metric)	Sprinkler Length	Sprinkler Identification Number (SIN)
½" NPT (R½)	155 (68)	135 (57)	175 (12)	100 (38)	5.8 (83,38)	2.25" (57mm)	R3513

Table 4 - Application

Max. Sprinkler Spacing Along Slope (W) Width x (L) Length ft (m)	Max. Slope of 4/12 (18.4°) Pitch	
	Min. Flow Per Sprinkler Head gpm (Lpm)	Pressure psi (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 Ceiling.

Technical Data

Thread Size	Sprinkler Temp. Rating °F (°C)	Coverplate Temp. Rating °F (°C)	Max. Pressure psi (bar)	Max. Ambient Temp. °F (°C)	Actual K Factor (metric)	Max. Adjustment	Sprinkler Identification Number (SIN)
½" NPT (R½)	165 (74)	135 (57)	175 (12)	100 (38)	4.3 (61.4)	½" (13mm)	RA0612

Table 5 - Application

Max. Sprinkler Spacing Along Slope (W) Width x (L) Length ft (m)	Max. Slope of 8/12 (33.7°) Pitch		Max. Slope of 4/12 (18.4°) Pitch	
	Min. Flow Per Sprinkler Head gpm (Lpm)	Pressure psi (bar)	Min. Flow Per Sprinkler Head gpm (Lpm)	Pressure psi (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 Flat Concealed installed below Sloped Ceiling.

Technical Data

Thread Size	Sprinkler Temp. Rating °F (°C)	Coverplate Temp. Rating °F (°C)	Max. Pressure psi (bar)	Max. Ambient Temp. °F (°C)	Actual K Factor (metric)	Max. Adjustment	Sprinkler Identification Number (SIN)
½" NPT (R½)	165 (74)	135 (57)	175 (12)	100 (38)	4.9 (69.94)	½" (13mm)	RA0616

Table 6 - Application

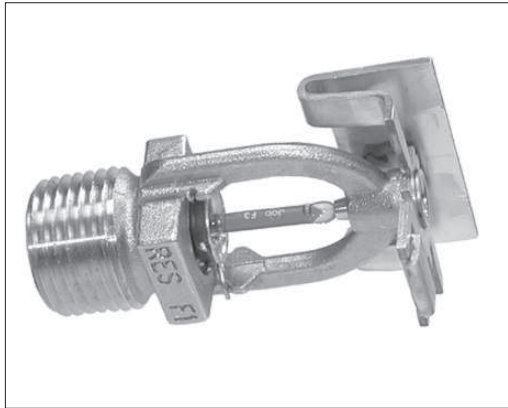
Max. Sprinkler Spacing Along Slope (W) Width x (L) Length ft (m)	Max. Slope of 8/12 (33.7°) Pitch		Max. Slope of 4/12 (18.4°) Pitch	
	Min. Flow Per Sprinkler Head gpm (Lpm)	Pressure psi (bar)	Min. Flow Per Sprinkler Head gpm (Lpm)	Pressure psi (bar)
16 x 16 (4.9 x 4.9)	28 (106)	23 (19.3)	18 (68)	13.5 (0.93)
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

- For systems designed in accordance with NFPA 13, 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 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 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).
- 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:
 - 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:
 - (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 gpm/ft² over the design area.
- 9. 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 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.

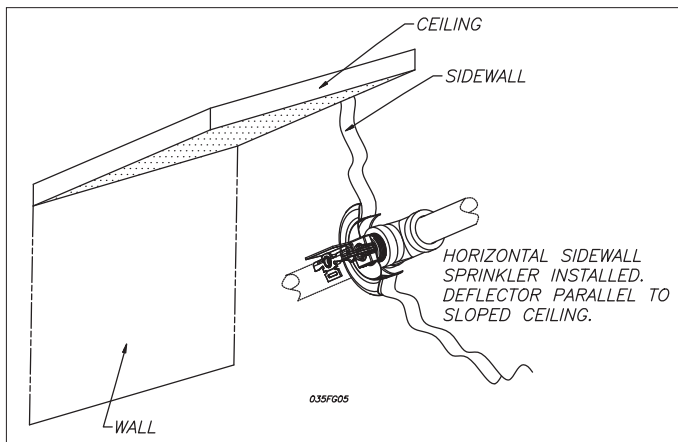
Model F1Res 44 and F1 Res 44 HSW/F2 installed below Sloped Ceiling.



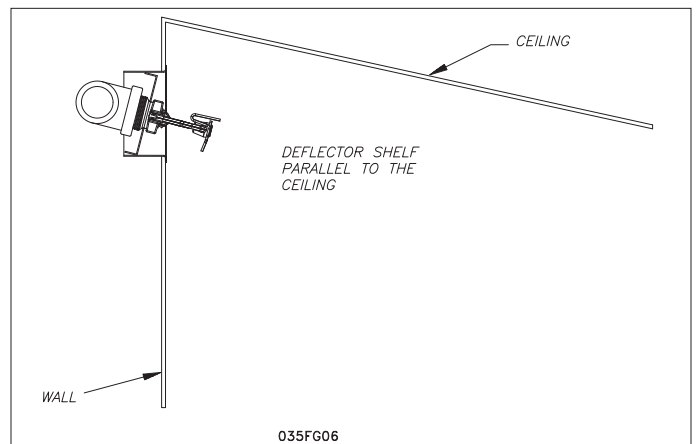
F1 Res 44
HSW



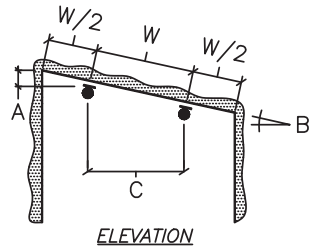
F1 Res 44
Recessed HSW/F2



Horizontal Sidewall Sprinkler
(with discharge directed across the slope)

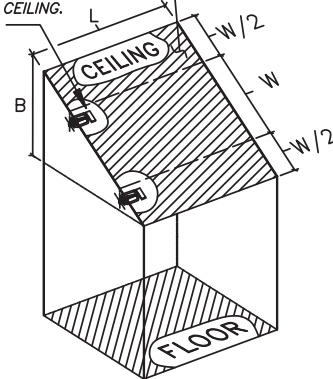


Horizontal Sidewall Sprinkler
(with discharge directed down the slope)

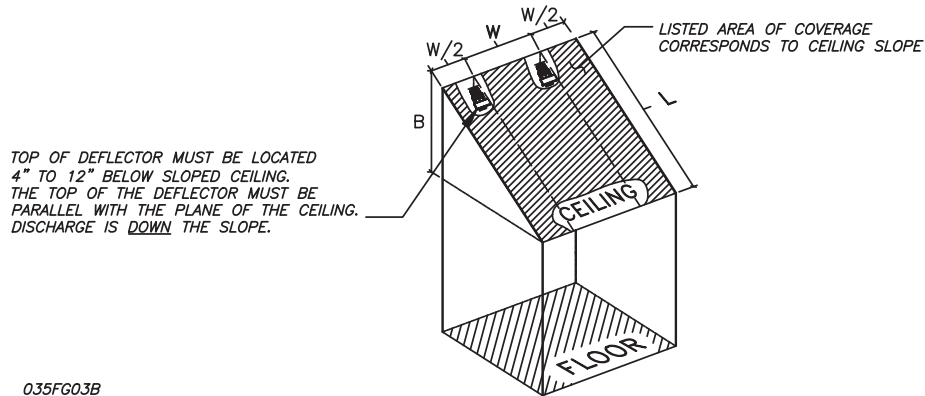


LISTED AREA OF COVERAGE
CORRESPONDS TO CEILING SLOPE

TOP OF DEFLECTOR MUST BE LOCATED
4" TO 12" BELOW SLOPED CEILING.
THE TOP OF THE DEFLECTOR MUST BE
PARALLEL WITH THE PLANE OF THE CEILING.
DISCHARGE IS ACROSS THE SLOPE.



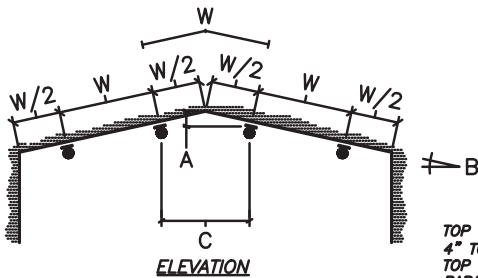
- L = THE MAXIMUM LISTED SPRINKLER SPACING, LENGTH.
- W = THE MAXIMUM LISTED SPRINKLER SPACING, WIDTH.
- W/2 = ONE-HALF THE MAXIMUM LISTED SPRINKLER SPACING, WIDTH (0'-4" MINIMUM).
- A = 3'-0" MAXIMUM.
- B = RANGE: 2/12 (9.4°) < B ≤ 8/12 (33.7°).
- C = 8'-0" MINIMUM.



TOP OF DEFLECTOR MUST BE LOCATED
4" TO 12" BELOW SLOPED CEILING.
THE TOP OF THE DEFLECTOR MUST BE
PARALLEL WITH THE PLANE OF THE CEILING.
DISCHARGE IS DOWN THE SLOPE.

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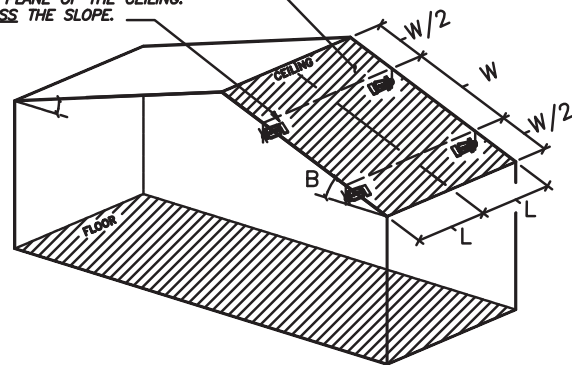
HSW sprinkler spacing below single sloped ceilings with a maximum slope of $\frac{8}{12}$ (33.7°) pitch.



LISTED AREA OF COVERAGE
CORRESPONDS TO CEILING SLOPE

TOP OF DEFLECTOR MUST BE LOCATED
4" TO 6" BELOW SLOPED CEILING. THE
TOP OF THE DEFLECTOR MUST BE
PARALLEL WITH THE PLANE OF THE CEILING.
DISCHARGE IS ACROSS THE SLOPE.

- L = THE MAXIMUM LISTED SPRINKLER SPACING, LENGTH.
- W = THE MAXIMUM LISTED SPRINKLER SPACING, WIDTH (0'-4" MINIMUM).
- W/2 = ONE-HALF THE MAXIMUM LISTED SPRINKLER SPACING, WIDTH (0'-4" MINIMUM).
- A = 3'-0" MAXIMUM.
- B = RANGE: 2/12 (9.4°) < B ≤ 8/12 (33.7°).
- C = 8'-0" MINIMUM.



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HSW Sprinkler spacing below multiple sloped ceilings with a maximum slope of $\frac{8}{12}$ (33.7°) pitch.

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

Thread Size	Sprinkler Temp. Rating °F (°C)	Max. Pressure psi (bar)	Max. Ambient Temp. °F (°C)	Actual K Factor (metric)	Sprinkler Length	Escutcheon	Sprinkler Identification Number (SIN)
½" NPT (R½)	155 (68) 175 (79)	175 (12)	100 (38)	4.4 (62,8)	2.45" (62mm)	F2 (½" Adjustment)	R3531

Table 7 - Application

Max. Sprinkler Spacing Along Slope (W) Width x (L) Length ft (m)	Max. Slope of 4/12 (18.4°) Pitch			
	Discharge Directed Across the Slope 4" to 6" Deflector to Ceiling		Discharge Directed Across the Slope 6" to 12" Deflector to Ceiling	
	Min. Flow gpm (Lpm)	Pressure psi (bar)	Min. Flow gpm (Lpm)	Pressure psi (bar)
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)
16 x 18 (4,9 x 5,5)	18 (68,1)	16.8 (1,16)	20 (75,6)	20.7 (1,43)
16 x 20 (4,9 x 6,1)	23 (68,1)	27.4 (1,89)	23 (68,1)	27,4 (1,89)

Table 8 - Application

Max. Sprinkler Spacing Along Slope (W) Width x (L) Length ft (m)	Max. Slope of 8/12 (33.7°) Pitch					
	Discharge Directed Down the Slope 4" to 6" Deflector to Ceiling		Discharge Directed Down the Slope 6" to 12" Deflector to Ceiling		⁽²⁾⁽³⁾ Discharge Directed Across the Slope 4" to 12" Deflector to Ceiling	
	⁽¹⁾ Min. Flow gpm (Lpm)	Pressure psi (bar)	⁽¹⁾ Min. Flow gpm (Lpm)	Pressure psi (bar)	⁽¹⁾ Min. Flow gpm (Lpm)	Pressure psi (bar)
12 x 12 (3,6 x 3,6)	12 (45,4)	7.5 (0,52)	14 (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 (60,6)	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)
16 x 18 (4,9 x 5,5)	18 (68,1)	16.8 (1,16)	20 (75,6)	20.7 (1,43)	--	--
16 x 20 (4,9 x 6,1)	23 (72,0)	27.4 (1,89)	23 (87,1)	27,4 (1,89)	--	--

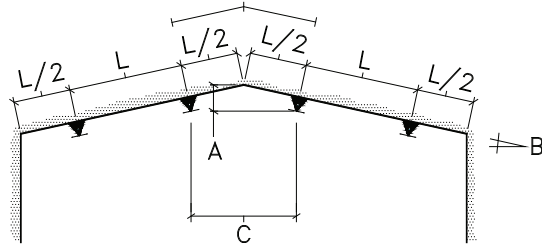
⁽¹⁾ Minimum flow per sprinkler gpm (Lpm).

⁽²⁾ Minimum 3 head design in a compartment.

⁽³⁾ 155°F only.

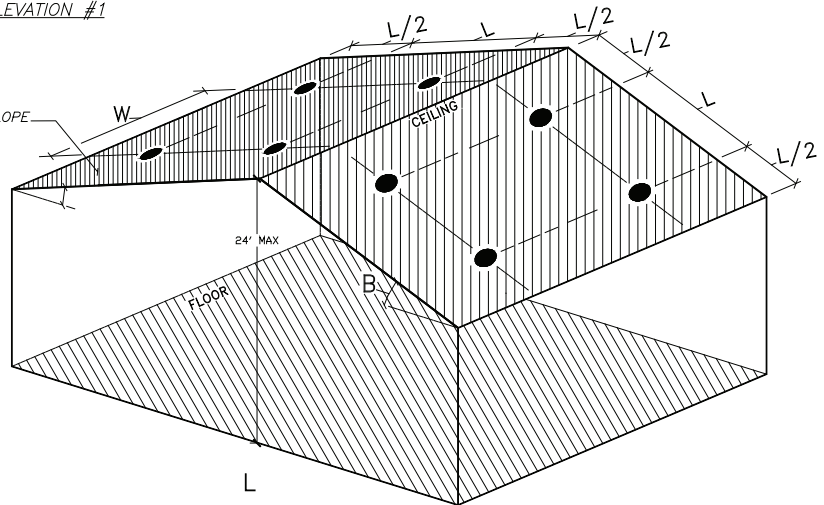
Installation Guidelines

- For systems designed in accordance with NFPA 13, 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°).
- Where listed, install horizontal sidewall sprinklers 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 sprinklers is 8 ft. (2.4 m). Minimum distance from a horizontal sidewall sprinkler and an adjacent wall is 4" (102 mm).
- Hydraulic Requirements:
 - 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.
 - 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.

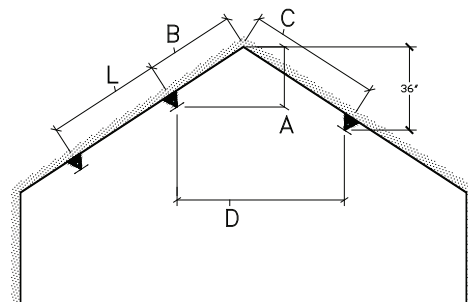


ELEVATION #1

LISTED AREA OF COVERAGE
CORRESPONDS TO CEILING SLOPE



- L = THE MAXIMUM LISTED SPRINKLER SPACING, LENGTH (10'-0" MAXIMUM) (8'-0" MINIMUM).
- L/2 = ONE HALF THE MAXIMUM LISTED SPRINKLER SPACING (5'-0" MAXIMUM) (4'-0" MINIMUM)
- W = THE MAXIMUM LISTED SPRINKLER SPACING, WIDTH (10'-0").
- A = 3'-0" MAXIMUM.
- B = RANGE: $2/12$ (9.4°) < B ≤ $8/12$ (33.7°).
- C = 8'-0" MINIMUM.



ELEVATION #2

- L = B + C
- D = 8' - 0" MINIMUM
- A = 3' - 0" MAXIMUM

035FG08

Fig. 8

Installation Guidelines per UL1626A

1. For systems designed in accordance with NFPA 13, 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 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 8/12 (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 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. Residential 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.
8. Hydraulic Requirements:
 - 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 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.
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 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 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 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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