Reliable®

F1FR80 Series
Quick-Response Sprinklers

K-factor 8.0 (115)

Features

- Standard coverage quick-response sprinklers
- Upright and pendent orientations
- Low profile, compact design
- Available in a wide variety of finishes
- Available as Intermediate Level sprinklers

Product Description

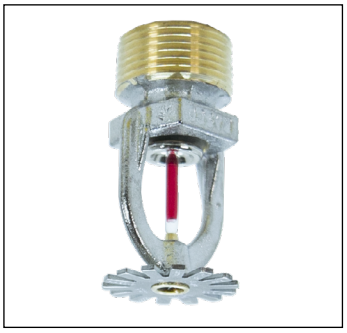
Reliable Model F1FR80 series sprinklers are quick-response standard spray automatic fire sprinklers utilizing a sensitive 3mm glass bulb thermal element.

Pendent sprinklers may be installed exposed, or surface mounted using escutcheons such as the Reliable Models B, C, or HB (reference Technical Bulletin 204). When installed recessed, the Model F1FR80 series sprinklers are specifically listed with and may only be installed with listed Reliable recessed escutcheons. Refer to the technical information on the following pages for specific listings for recessed installations and refer to Figure 3 for dimensional information.

When fitted with an approved Reliable water shield, these sprinklers may considered intermediate sprinklers for use in racks, below grated walkways, and other areas where intermediate level sprinklers are required.

Table A provides a summary of the approvals and availability of specific Model F1FR series sprinkler configurations. Additional technical information for each sprinkler model is provided on the following pages.

Model F1FR80
Upright Sprinkler



Model F1FR80 Pendent Sprinkler

Note: Not all versions of the product are shown.

F1FR80 Series Sprinkler Summary — **Table A**

Sprinkler Model	K-Factor gpm/psi$^{1/2}$ (lpm/bar$^{1/2}$)	Max. Working Pressure psi (bar)	Listings & Approvals	Orientation	Sprinkler Identification Number (SIN)
F1FR80	8.0 (115)	175 (12) 250 (17) (cULus only)	cULus, FM, LPCB, VdS, CE, UKCA	Upright	RA6322
				Pendent	RA6312

Model F1FR80 Upright Sprinkler — SIN RA6322

Technical Specifications
- **Style:** Upright
- **Threads:** 3/4" NPT or ISO 7-R3/4
- **Nominal K-Factor:** 8.0 (115)
- **Max. Working Pressure:**
  - 175 psi (12 bar)
  - 250 psi (17 bar) (cULus only)

Material Specifications
- **Thermal Sensor:** 3 mm Glass Bulb
- **Sprinkler Frame:** Brass Alloy
- **Cap:** Bronze Alloy
- **Sealing Washer:** Nickel with PTFE
- **Load Screw:** Copper Alloy
- **Deflector:** Brass Alloy

Sprinkler Finishes
(See Table B)

Sensitivity
Quick response

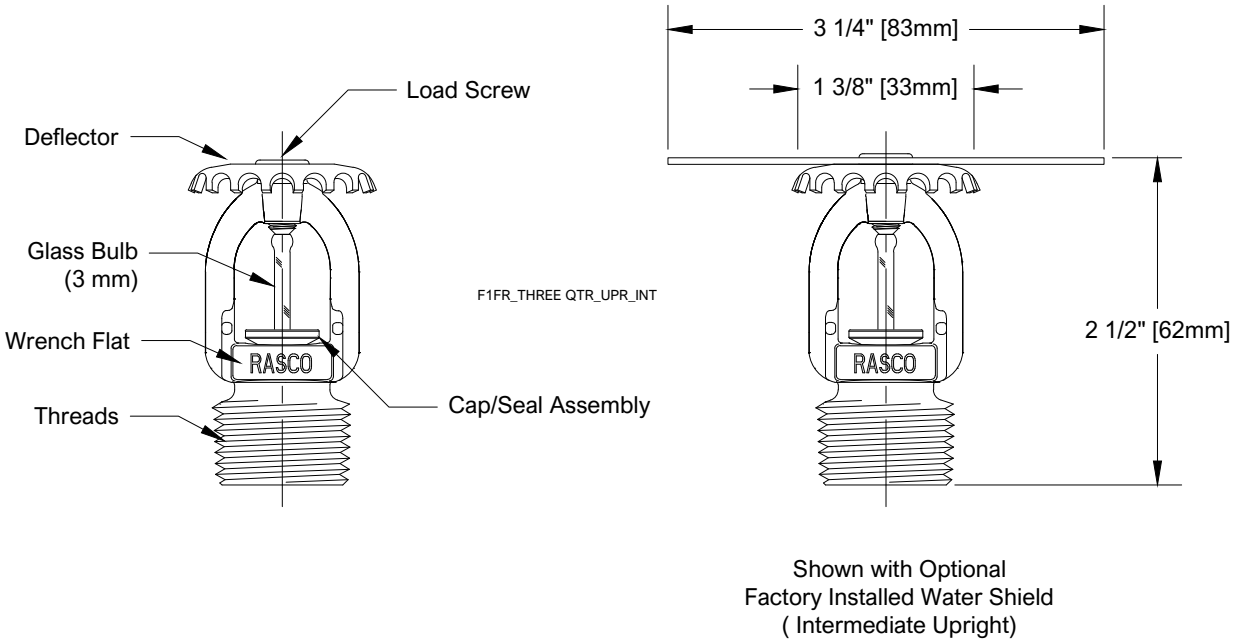
Temperature Ratings
- 135°F (57°C)
- 155°F (68°C)
- 175°F (79°C)
- 200°F (93°C)
- 286°F (141°C)

Guards & Shields
- F-1 Guard (cULus, FM)
- F-2 Guard (FM)
- F-3 Guard with Shield (cULus, FM)
- Factory Installed Shield (cULus, FM)

Sprinkler Wrenches
- Model W2
- Model W14 (with guard installed)

Listings and Approvals
- cULus
- FM
- LPCB
- VdS
- CE
- UKCA: 0832-UKCA-CPR-S5078

Model F1FR80 Upright Sprinkler Components and Dimensions — **Figure 1**



Shown with Optional
Factory Installed Water Shield
(Intermediate Upright)

Model F1FR80 Pendent Sprinkler — SIN RA6312

Technical Specifications
Style:
Pendent
Recessed Pendent
Threads: 3/4" NPT or ISO 7-R3/4
Nominal K-Factor: 8.0 (115)
Max. Working Pressure:
175 psi (12 bar)
250 psi (17 bar) (cULus only)

Material Specifications
Thermal Sensor: 3 mm Glass Bulb
Sprinkler Frame: Brass Alloy
Cap: Bronze Alloy
Sealing Washer: Nickel with PTFE
Load Screw: Copper Alloy
Deflector: Brass Alloy

Sprinkler Finishes
(See Table B)

Sensitivity
Quick response

Temperature Ratings[1]
135°F (57°C)
155°F (68°C)
175°F (79°C)
200°F (93°C)
286°F (141°C)

Recessed Escutcheons
Model F1 (cULus)
Model F2 (cULus, FM)
Model FP (cULus)

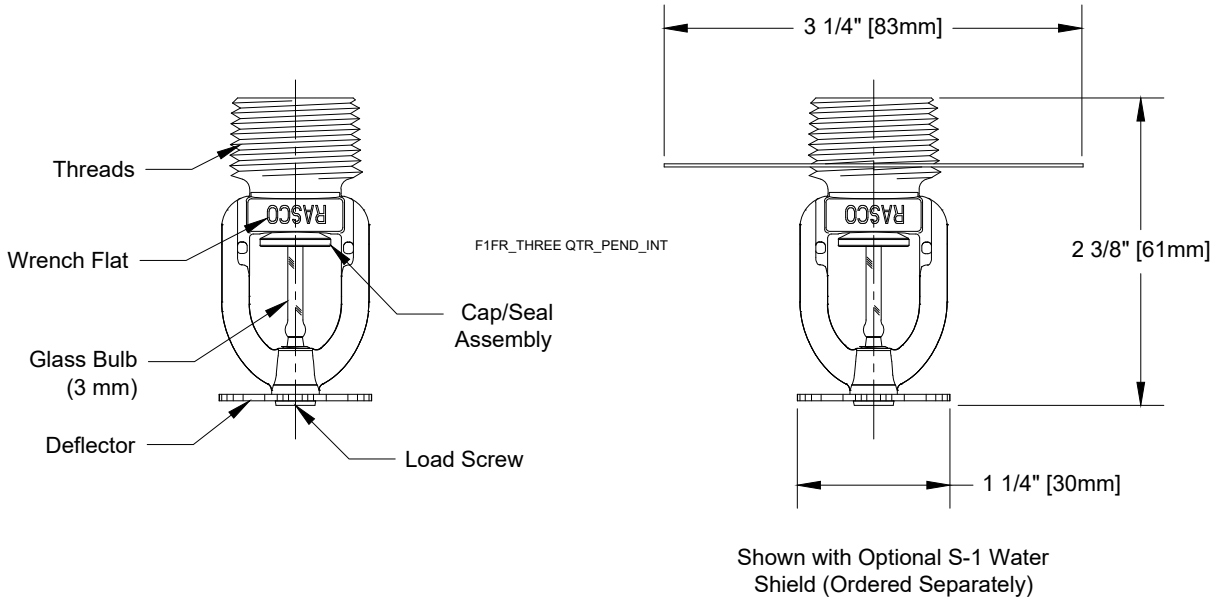
Guards & Shields[2]
F-2 Guard (FM)
F-6 Guard/Shield Kit (FM)
F-7 Guard (cULus)
F-8 Guard/Shield Kit (cULus)
S-2 Shield (cUlus, FM)

Sprinkler Wrenches
Model W2 (pendent)
Model W4 (recessed)
Model W14 (with guard installed)

Listings and Approvals[3]
cULus Listed
FM Approved
LPCB
VdS
CE
UKCA: 0832-UKCA-CPR-S5079

Notes:
1. 286°F (141°C) temperature rated sprinkler not listed for recessed use.
2. Not suitable for recessed pendent installations.
3. When used surface mounted or exposed. See Recessed Escutcheon section for specific approvals when installed recessed.

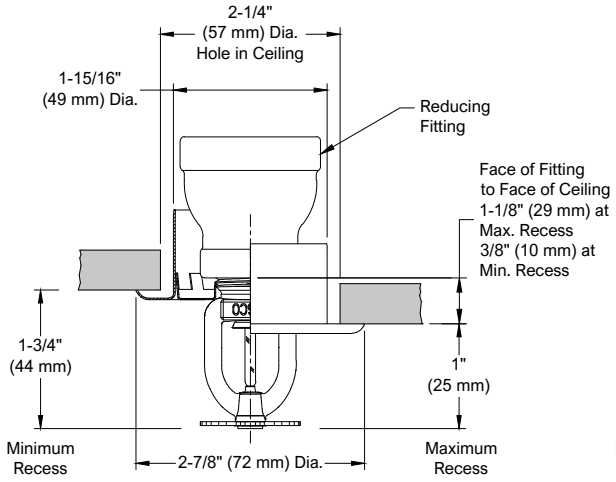
Model F1FR80 Pendent Sprinkler Components and Dimensions — **Figure 2**



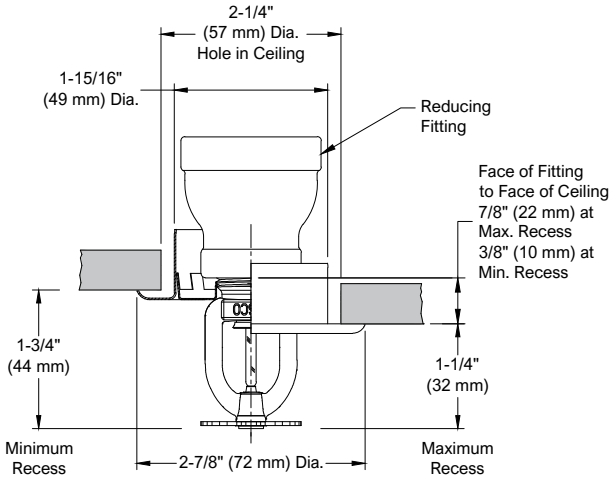
Note: Please refer to Figure 3 for recessed installation.

Recessed Installation: Pendent Sprinklers

Figure 3

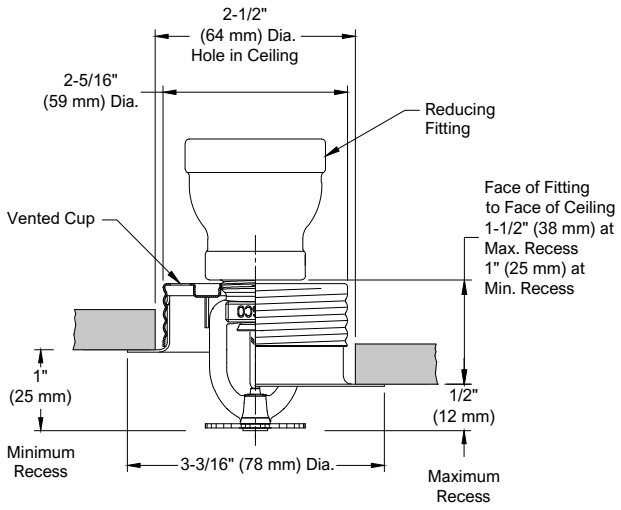


Models F1 & F1FR Pendent Sprinkler
with Model F1 Recessed Escutcheon
3/4" (19mm) Nominal Adjustment



Models F1 & F1FR Pendent Sprinkler
with Model F2 Recessed Escutcheon
1/2" (13mm) Nominal Adjustment

F1_REC_PEND



Models F1 & F1FR Pendent Sprinkler
with Model FP Recessed Escutcheon
1/2" (13mm) Nominal Adjustment

Note: Model FP recessed assemblies may not be used where the pressure in the space above the ceiling is positive with respect to the protected area. Ensure that the openings in the Model FP cup are unobstructed following installation.

F1 Escutcheon
(F2 Similar)

FP Escutcheon

Wrenches

Model W2 (upright, pendent)

Model W14 (with guard installed)

Model W4
(recessed pendent)

Finishes[1]

Table B

Standard Finishes		Special Application Finishes	
Sprinkler	**F1, F2 and FP[2] Escutcheons**	**Sprinkler**	**F1, F2 and FP[2] Escutcheons**
Bronze	Brass	Electroless Nickel PTFE[3][4]	Bright Brass
Chrome Plated	Chrome Plated	Bright Brass[5]	Satin Chrome
White Polyester[3]	White Polyester	Satin Chrome	Custom Color Polyester
		Custom Color Polyester[3][6]	

Notes:

1. Paint or any other coating applied over the factory finish will void all approvals and warranties.
2. Model FP escutcheons utilizes a galvanized steel cup with a finished trim ring.
3. cULus Listed as corrosion resistant.
4. FM Approved as corrosion resistant.
5. For 200°F (93°C) maximum temperature rated sprinklers only.
6. cULus Only.

Installation

Model F1FR Series sprinklers must be installed in accordance with NFPA13 and the requirements of all applicable authorities having jurisdiction. Model F1FR Series sprinklers must be installed with the Reliable sprinkler installation wrench identified in this Bulletin. Any other wrench may damage the sprinkler. The Models W2 and W4 wrenches have two sets of jaws. Use the smallest set of jaws that fit on the wrench flats of the sprinkler. A leak tight sprinkler joint can be obtained with a torque of 8 to 18 lb-ft (11 to 24 N·m). Do not tighten sprinklers over the maximum recommended installation torque. Exceeding the maximum recommended installation torque may cause leakage or impairment of the sprinkler.

Glass bulb sprinklers have orange bulb protectors or protective caps to minimize bulb damage during shipping, handling and installation. Reliable sprinkler installation wrenches are designed to install sprinklers with bulb protectors in place. Remove the bulb protector at the time when the sprinkler system is placed in service for fire protection. Removal of the bulb protector before this time may leave the bulb vulnerable to damage. Remove bulb protectors by undoing the clasp by hand. Do not use tools to remove bulb protectors.

Maintenance

Reliable Model F1FR series sprinklers should be inspected and the sprinkler system maintained in accordance with NFPA 25, as well as the requirements of any Authorities Having Jurisdiction.

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.

Do not clean sprinklers with soap and water, ammonia liquid or any other cleaning fluids. Remove dust by gentle vacuuming without touching the sprinkler.

Replace any sprinkler which has been painted (other than factory applied). A stock of spare sprinklers should be maintained to allow quick replacement of damaged or operated sprinklers. Failure to properly maintain sprinklers may result in inadvertent operation or non-operation during a fire event.

Guarantee

For the guarantee, terms, and conditions, visit www.reliablesprinkler.com.

Ordering Information

Specify the following when ordering:

Model
- F1FR80

Deflector/Orientation
- Upright
- Upright Intermediate
- Pendent

Temperature Rating
- See sprinkler technical specifications

Sprinkler Finish
- See Table B

Recessed Escutcheon
- F1
- F2
- FP

Escutcheon Finish
- See Table B

Sprinkler Wrench
- Model W2 (upright and pendent)
- Model W4 (recessed)
- Model W14 (with guard installed)

P/N 9999970503

Reliable®

F1FR56 Series
Quick Response Sprinklers

K-factor 5.6 (80)

Features

- Standard coverage quick-response sprinklers
- Upright, pendent, horizontal sidewall, and vertical sidewall deflectors
- Low profile, compact design
- Available in a wide variety of finishes

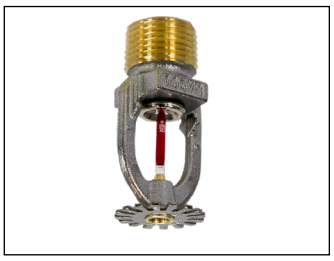
Product Description

Reliable Model F1FR56 series sprinklers are quick-response standard spray automatic fire sprinklers utilizing a sensitive 3.0 mm glass bulb thermal element.

Pendent and horizontal sidewall sprinklers may be installed exposed or surface mounted using escutcheons such as the Reliable Models B, C, or HB (reference Technical Bulletin 204). When installed recessed or concealed, the Model F1FR56 series sprinklers are specifically listed with and may only be installed with listed Reliable escutcheons and cover plates. Refer to the technical information on the following pages for specific listings for recessed and concealed installations and refer to Figures 5 and 6 for dimensional information.

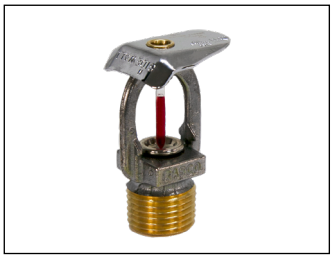
When fitted with an approved water shield, these sprinklers may considered intermediate sprinklers for use in racks, below grated walkways, and other areas where intermediate level sprinklers are required.

Table A provides a summary of the approvals and availability of specific Model F1FR series sprinkler configurations. Additional technical information for each sprinkler model is provided on the following pages.

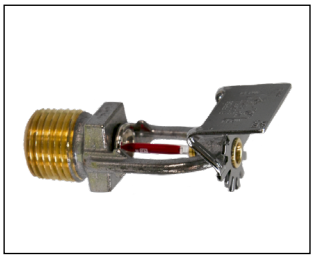


Model F1FR56 Pendent

Model F1FR56 Upright



Model F1FR56 Vertical Sidewall



Model F1FR56
Horizontal Sidewall

Note: Not all versions of the product are shown.

Note: This bulletin may contain information on New and Legacy sprinklers that reflects a dimensional change only. Sprinkler Identification Number (SIN), application, performance, and listings/approval are not otherwise affected. Sprinklers with New frames will include the suffix “N” in the order.

F1FR Series Sprinkler Summary

Table A

Sprinkler Model	K-Factor gpm/psi$^{1/2}$ (lpm/bar$^{1/2}$)	Orientation	Listings & Approvals	Max. Working Pressure psi (bar)	Sprinkler Identification Number (SIN)
F1FR56	5.6 (80)	Upright Intermediate Upright	cULus, FM, LPCB, VdS, EC, WM, UKCA	175 (12) 250 (17) (cULus only)	RA1425
		Pendent	cULus, FM, LPCB, VdS, EC, WM, UKCA	175 (12) 250 (17) (cULus only)	RA1414
		Concealed Pendent	cULus, VdS, EC, WM, UKCA	175 (12) 250 (17) (cULus only)	RA1414
		Horizontal Sidewall	cULus, FM	175 (12)	RA1435
		Vertical Sidewall	cULus, FM, LPCB, UKCA	175 (12)	RA1485

Model F1FR56 Upright Sprinkler — SIN RA1425

Technical Specifications
Style: Upright, Intermediate Upright
Threads: 1/2" NPT or ISO 7-R1/2
Nominal K-Factor: 5.6 (80 metric)
Max. Working Pressure:
175 psi (12 bar)
250 psi (17 bar) (cULus only)

Material Specifications
Thermal Sensor: 3 mm Glass Bulb
Sprinkler Frame: Brass Alloy
Cap: Bronze Alloy
Sealing Washer: Nickel with PTFE
Load Screw: Copper Alloy
Deflector: Brass Alloy

Sprinkler Finishes
(See Table B)

Sensitivity
Quick response

Temperature Ratings
135°F (57°C)
155°F (68°C)
175°F (79°C)
200°F (93°C)
286°F (141°C)

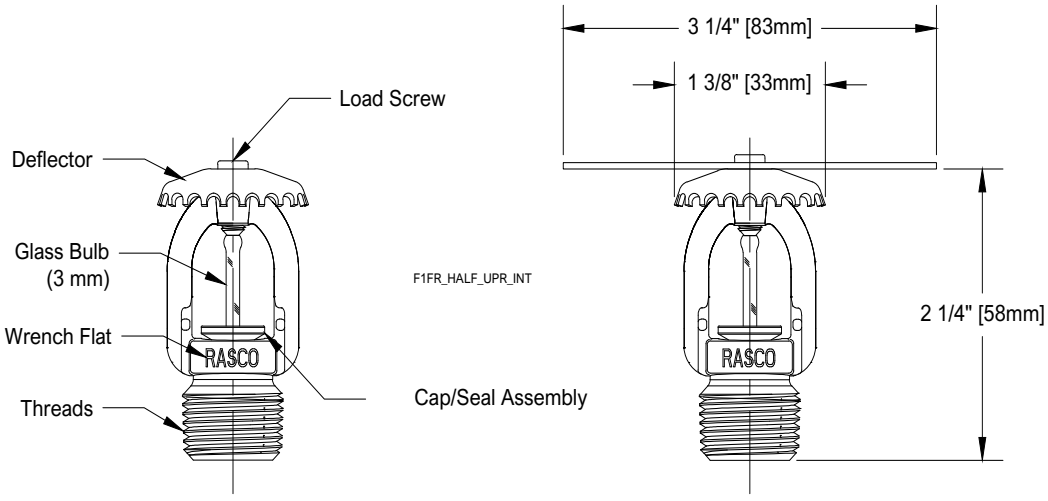
Guards & Shields (New Frames)
Factory Water Shield (cULus, FM)
F-1 Guard (cULus, FM)
F-3 Guard with Shield (cULus, FM)

Guards and Shields (Legacy Frames)
Factory Water Shield
C-1 Guard (FM)
C-3 Guard with Shield (cULus, FM)
D-1 Guard (cULus)
D-3 Guard with Shield (cULus)

Sprinkler Wrench
Model W2
Model W14 (New frame with guard installed)
Model W13 (Legacy frame with guard installed)

Listings and Approvals
cULus Listed
FM Approved
LPCB
VdS
EC
WM
UKCA: 0832-UKCA-CPR-S5045

Model F1FR56 Upright Sprinkler Components and Dimensions — **Figure 1**



Shown with Optional
Factory Installed Water Shield
(Intermediate Upright)

Model F1FR56 Pendent Sprinkler — SIN RA1414

Technical Specifications
Style:
Pendent
Recessed Pendent
Concealed Pendent
Threads: 1/2" NPT or ISO 7-R1/2
Nominal K-Factor: 5.6 (80 metric)
Max. Working Pressure:
175 psi (12 bar)
250 psi (17 bar) (cULus only)

Material Specifications
Thermal Sensor: 3 mm Glass Bulb
Sprinkler Frame: Brass Alloy
Cap: Bronze Alloy
Sealing Washer: Nickel with PTFE
Load Screw: Copper Alloy
Deflector: Brass Alloy

Sprinkler Finishes
(See Table B)

Sensitivity
Quick response

Temperature Ratings[1]
135°F (57°C)
155°F (68°C)
175°F (79°C)
200°F (93°C)
286°F (141°C)

Recessed Escutcheons
Model F1 (cULus, LPCB, VdS, CE, WM)
Model F2 (cULus, FM, LPCB, VdS, CE, WM)
Model FP (cULus, VdS, CE, WM)

Cover Plate
Model CCP (cULus, VdS[2], CE[2])

Guards & Shields (New Frames)[3]
F-1 Guard (FM)
F-5 Guard/Shield Kit (FM)
F-7 Guard (cULus)
F-8 Guard/Shield Kit (cULus)
S-1 Shield (cULus, FM)

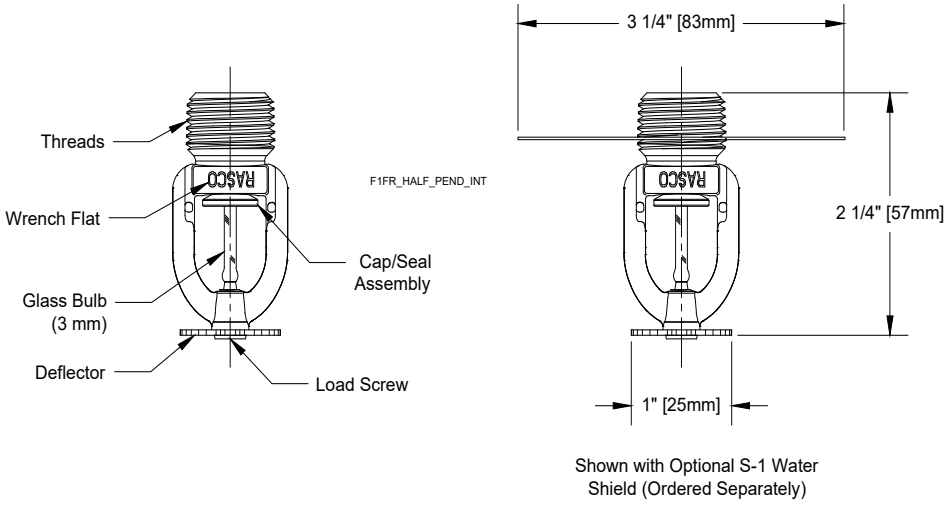
Guards & Shields (Legacy Frames)[3]
C-1 Guard (FM)
C-5 Guard/Shield Kit (FM)
D-1 Guard (cULus, FM)
D-4 Guard/Shield Kit (FM)
D-5 Guard/Shield Kit (cULus, FM)
S-1 Shield (cULus, FM)

Sprinkler Wrenches
Model W2 (pendent)
Model W4 (recessed or concealed)
Model W14 (New frame with guard installed)
Model W13 (Legacy frame with guard installed)

Listings and Approvals[4]
cULus Listed
FM Approved
LPCB
VdS
EC
WM
UKCA: 0832-UKCA-CPR-S5045, 0831-UKCA-CPR-5072 (CCP)

Notes:
1. 286°F (141°C) temperature rated sprinkler not listed for recessed or concealed use.
2. VdS and CE approval for CCP concealed use is for 155°C (68°C) sprinkler ONLY.
3. Not suitable for recessed or concealed pendent installations.
4. When used surface mounted or exposed. See Recessed Escutcheon and Cover Plate section for specific approvals when installed recessed or concealed.

Model F1FR56 Pendent Sprinkler Components and Dimensions — Figure 2



Shown with Optional S-1 Water Shield (Ordered Separately)

Note: Please refer to Figure 8 for recessed and concealed installation.

Model F1FR56 Horizontal Sidewall Sprinkler — SIN RA1435

Technical Specifications
Style:
Horizontal Sidewall
Recessed Horizontal Sidewall
Threads: 1/2" NPT or ISO 7-R1/2
Nominal K-Factor: 5.6 (80 metric)
Max. Working Pressure:
175 psi (12 bar)

Material Specifications
Thermal Sensor: 3 mm Glass Bulb
Sprinkler Frame: Brass Alloy
Cap: Bronze Alloy
Sealing Washer: Nickel with PTFE
Load Screw: Copper Alloy
Deflector: Brass Alloy

Sprinkler Finishes
(See Table B)

Sensitivity
Quick response

Temperature Ratings [1]
135°F (57°C)
155°F (68°C)
175°F (79°C)
200°F (93°C)
286°F (141°C)

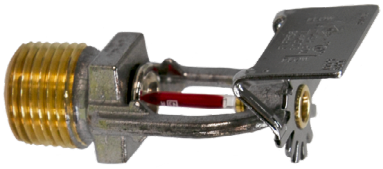
Recessed Escutcheons[2]
Model F1 (cULus)
Model F2 (cULus, FM)
Model FP (cULus)

Guards & Shields (New Frames)[3]
F-4 Guard (FM)
F-7 Guard (cULus)

Guards & Shields (Legacy Frames)[3]
C1 Guard (FM)
D1 Guard (cULus)

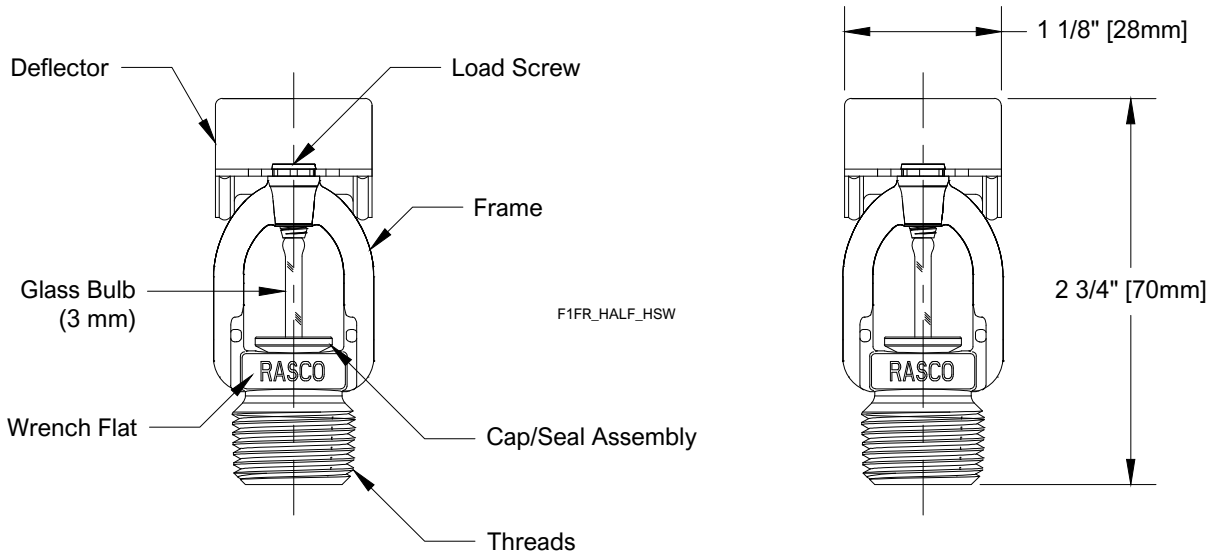
Sprinkler Wrenches
Model W2 (non-recessed)
Model W4 (recessed)
Model W14 (New frame with guard installed)
Model W13 (Legacy frame with guard installed)

Listings and Approvals
cULus Listed[4]
FM Approved[5]



Notes:
1. 286°F (141°C) temperature rated sprinkler not listed for recessed use.
2. FM approved recessed installation when used with Model F2 escutcheon ONLY.
3. Not suitable for recessed horizontal sidewall installations.
4. cULus Listed for Light and Ordinary Hazard when installed exposed or surface mounted. Listed for Light Hazard ONLY when installed recessed.
5. FM Approved for Light Hazard ONLY.

Model F1FR56 Horizontal Sidewall Sprinkler Components and Dimensions — **Figure 3**



Note: Please refer to Figure 9 for recessed installation.

Model F1FR56 Vertical Sidewall Sprinkler — SIN RA1485

Technical Specifications
Style:
Upright Vertical Sidewall
Pendent Vertical Sidewall
Threads: 1/2" NPT or ISO 7-R1/2
Nominal K-Factor: 5.6 (80 metric)
Max. Working Pressure: 175 psi (12 bar)

Material Specifications
Thermal Sensor: 3 mm Glass Bulb
Sprinkler Frame: Brass Alloy
Cap: Bronze Alloy
Sealing Washer: Nickel with PTFE
Load Screw: Copper Alloy
Deflector: Brass Alloy

Sprinkler Finishes
(See Table B)

Sensitivity
Quick response

Temperature Ratings
135°F (57°C)
155°F (68°C)
175°F (79°C)
200°F (93°C)
286°F (141°C)

Guards & Shields (New Frames)
F-2 Guard (FM)

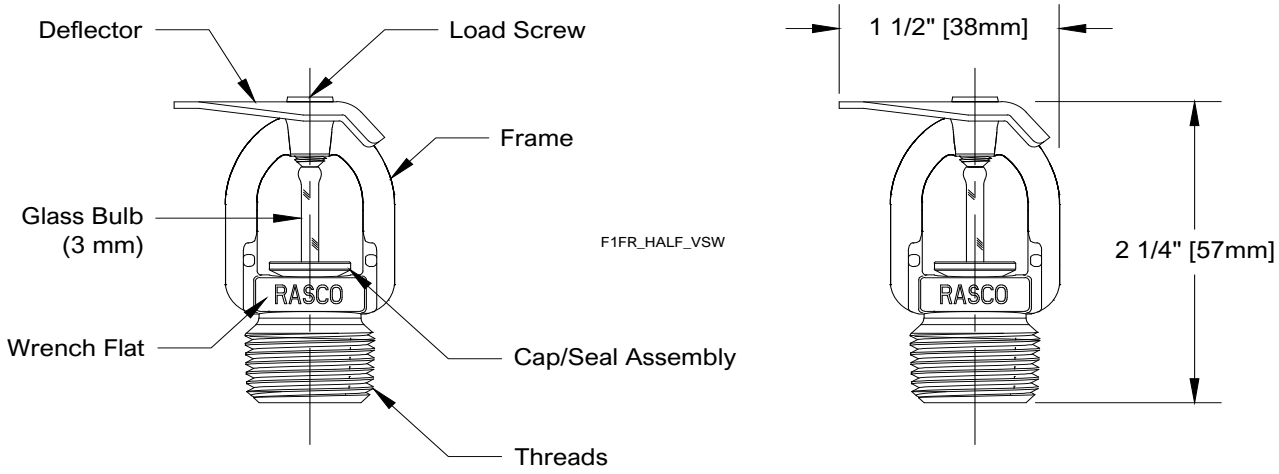
Guards & Shields (Legacy Frames)
C1 Guard (FM)

Sprinkler Wrenches
Model W2
Model W14 (New frame with guard installed)
Model W13 (Legacy frame with guard installed)

Listings and Approvals[1]
cULus Listed
FM Approved
LPCB[2]
UKCA: 0832-UKCA-CPR-S5045

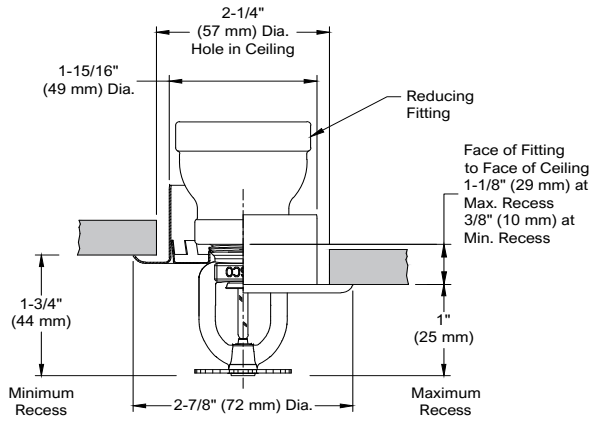
Notes:
1. Listed and approved for Light Hazard ONLY.
2. LPCB approved for use in pendent position ONLY.

Model F1FR56 Vertical Sprinkler Components and Dimensions — **Figure 4**

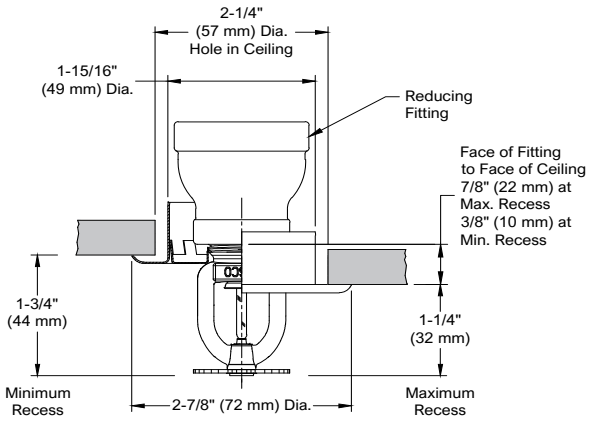


Recessed and Concealed Installation: Pendent Sprinklers

Figure 5

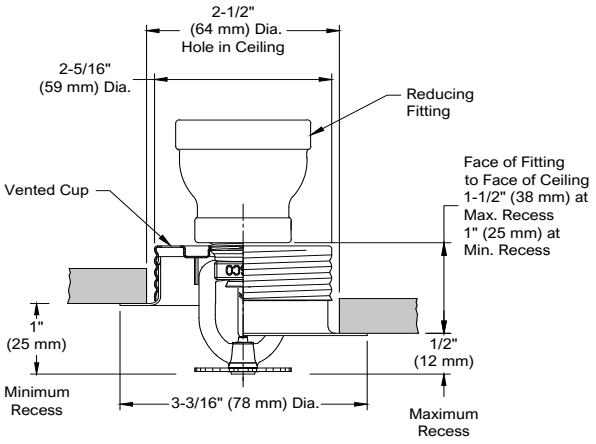


Models F1 & F1FR Pendent Sprinkler
with Model F1 Recessed Escutcheon
3/4" (19mm) Nominal Adjustment



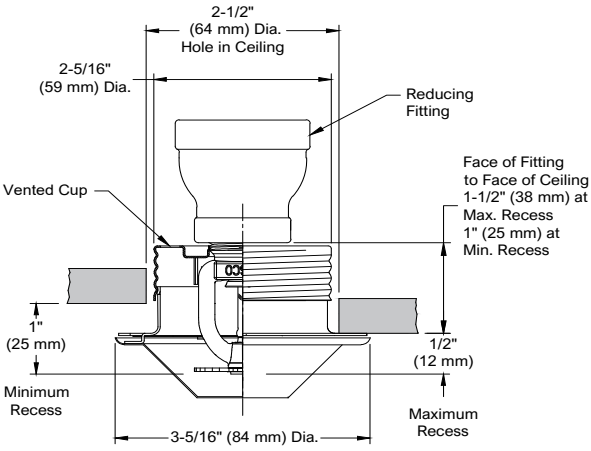
Models F1 & F1FR Pendent Sprinkler
with Model F2 Recessed Escutcheon
1/2" (13mm) Nominal Adjustment

F1_REC_PEND_CCP



Models F1 & F1FR Pendent Sprinkler
with Model FP Recessed Escutcheon
1/2" (13mm) Nominal Adjustment

Note: Model FP recessed assemblies may not be used where the pressure in the space above the ceiling is positive with respect to the protected area. Ensure that the openings in the Model FP cup are unobstructed following installation.



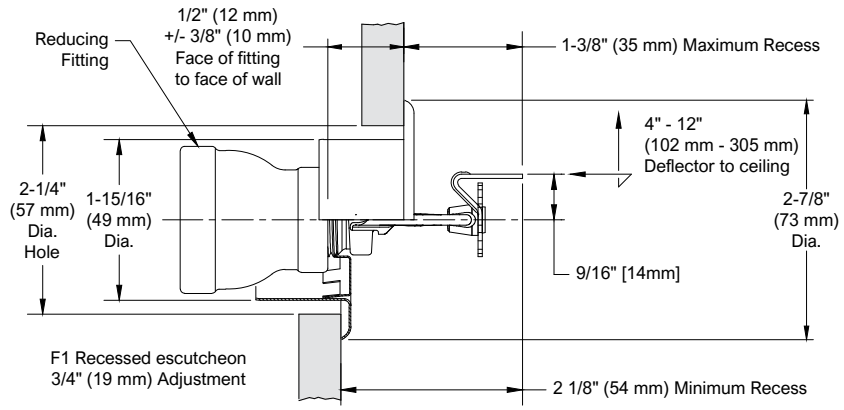
Model F1FR56 CCP Conical Concealed Sprinkler
1/2" (13mm) Nominal Adjustment
(Nominal Cover Plate Projection is 1" (25 mm))

Note: Model CCP concealed assemblies may not be used where the pressure in the space above the ceiling is positive with respect to the protected area. Ensure that the openings in the Model CCP cup are unobstructed following installation.

F1 Escutcheon
(F2 Similar)

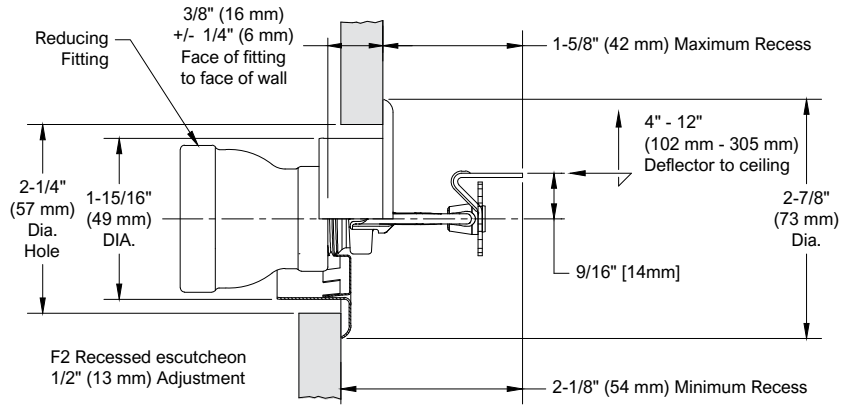
FP Escutcheon

CCP Cover Plate

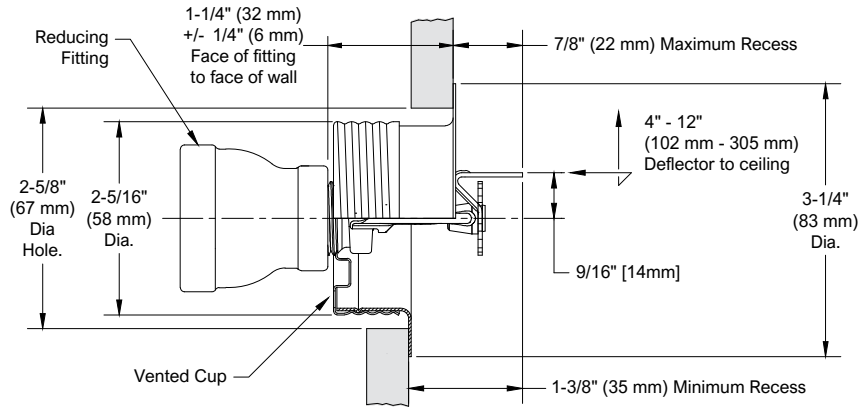


Model F1FR Horizontal Sidewall Sprinkler
with Model F1 Recessed Escutcheon
3/4" (19mm) Nominal Adjustment

F1FR_REC_HSW



Model F1FR Horizontal Sidewall Sprinkler
with Model F2 Recessed Escutcheon
1/2" (13mm) Nominal Adjustment



Model F1FR Horizontal Sidewall Sprinkler
with Model FP Recessed Escutcheon
1/2" (13mm) Nominal Adjustment

Note: Model FP recessed assemblies may not be used where the pressure in the space behind the sprinkler is positive with respect to the space in the protected area. Ensure that the openings in the Model FP cup are unobstructed following installation.

Wrenches

Model W2 (upright, pendent)

Model W13 (Legacy frame with guard installed)

Model W14 (New frame with guard installed)

Model W4
(recessed, concealed pendent)

Finishes[1]

Table B

Standard Finishes			Special Application Finishes		
Sprinkler	**F1, F2 and FP[2] Escutcheons**	**CCP Cover Plate[2]**	**Sprinkler**	**F1, F2 and FP[2] Escutcheons**	**CCP Cover Plate[2]**
Bronze	Brass	Chrome	Electroless Nickel PTFE[3][4]	Bright Brass	Bright Brass
Chrome	Chrome	White Paint	Bright Brass[5]	Satin Chrome	Satin Chrome
White Polyester[3]	White Polyester		Satin Chrome	Custom Color Polyester	Custom Color Paint
			Custom Color Polyester[3]		

Notes:
1. Paint or any other coating applied over the factory finish will void all approvals and warranties.
2. Model FP escutcheons and Model CCP sprinklers utilize a galvanized steel cup with a finished trim ring or cover plate.
3. cULus Listed as corrosion resistant.
4. FM Approved as corrosion resistant.
5. For 200°F (93°C) maximum temperature rated sprinklers only.

Installation

Model F1FR Series sprinklers must be installed in accordance with NFPA13 and the requirements of all applicable authorities having jurisdiction. Model F1FR Series sprinklers must be installed with the Reliable sprinkler installation wrench identified in this Bulletin. Any other wrench may damage the sprinkler. The Models W2 and W4 wrenches have two sets of jaws. Use the smallest set of jaws that fit on the wrench flats of the sprinkler. A leak tight sprinkler joint can be obtained with a torque of 8 to 18 lb-ft (11 to 24 N·m). Do not tighten sprinklers over the maximum recommended installation torque. Exceeding the maximum recommended installation torque may cause leakage or impairment of the sprinkler.

Glass bulb sprinklers have orange bulb protectors or protective caps to minimize bulb damage during shipping, handling and installation. Reliable sprinkler installation wrenches are designed to install sprinklers with bulb protectors in place. Remove the bulb protector at the time when the sprinkler system is placed in service for fire protection. Removal of the bulb protector before this time may leave the bulb vulnerable to damage. Remove bulb protectors by undoing the clasp by hand. Do not use tools to remove bulb protectors.

Maintenance

Reliable Model F1FR series sprinklers should be inspected and the sprinkler system maintained in accordance with NFPA 25, as well as the requirements of any Authorities Having Jurisdiction.

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.

Do not clean sprinklers with soap and water, ammonia liquid or any other cleaning fluids. Remove dust by gentle vacuuming without touching the sprinkler.

Replace any sprinkler which has been painted (other than factory applied). A stock of spare sprinklers should be maintained to allow quick replacement of damaged or operated sprinklers. Failure to properly maintain sprinklers may result in inadvertent operation or non-operation during a fire event.

Guarantee

For the guarantee, terms, and conditions, visit www.reliablesprinkler.com.

Ordering Information

Specify the following when ordering:

Model
- F1FR56

Deflector/Orientation
- Upright
- Intermediate Upright
- Pendent
- CCP Concealed Pendent
- Horizontal Sidewall
- Vertical Sidewall

Temperature Rating
- See sprinkler technical specifications

Sprinkler Finish
- See Table B

Recessed Escutcheon[1][2]
- F1
- F2
- FP

Escutcheon Finish
- See Table B

CCP Cover Plate Temperature Rating
- 135°F (57°C) [For use with 135°F (57°C) and 155°F (68°C) sprinklers.]
- 165°F (74°C) [For use with 175°F (79°C) and 200°F (93°C) sprinklers.]

CCP Cover Plate Finish
- See Table B

Sprinkler Wrench
- Model W2
- Model W4 (recessed, concealed)
- Model W14 (New frame with guard installed)
- Model W13 (Legacy frame with guard installed)

Notes:
1. 286°F (141°C) sprinklers are not listed to be used recessed or concealed.
2. For FM, recessed sprinklers must use the Model F2 escutcheon.

P/N 9999970623

Reliable®

Model G Series
Standard-Response Sprinklers

Features

- Standard coverage, standard-response sprinklers
- Upright, pendent, horizontal sidewall, and vertical sidewall deflectors
- Robust solder capsule thermal element
- Available in a wide variety of finishes

Product Description

Reliable Model G Series sprinklers are standard-response standard spray automatic sprinklers using a solder capsule thermal element. The solder is captured in the cylinder of the capsule by a stainless steel ball. When the solder melts, the ball moves into the cylinder allowing the thermal element to fall away from the sprinkler. When this occurs, the compressed strut and lever spring free from the sprinkler. System pressure then clears the waterway of all operating parts allowing the deflector to evenly distribute water.

Pendent and horizontal sidewall sprinklers may be installed exposed or surface mounted using escutcheons such as the Reliable Models B, C, or HB (reference Technical Bulletin 204).

When installed recessed, the Model G Series sprinklers are specifically listed with and may only be installed with listed Reliable escutcheons. Refer to the technical information on the following pages for specific listings for recessed installations and Figures 6 and 7 for dimensional information.

Upright

Pendent

Note: Not all versions of the product are shown.

When fitted with an approved water shield, these sprinklers may considered intermediate sprinklers for use in racks, below grated walkways, and other areas where intermediate level sprinklers are required.

Sprinkler Summary — **Table A**

Model	K-Factor gpm/psi$^{1/2}$ (lpm/bar$^{1/2}$)	Listings & Approvals	Threads	Sprinkler Identification Number (SIN)
G Upright	2.8 (40)	UL, FM	1/2" NPT, ISO 7-R1/2	R1021
	4.2 (60)	UL	1/2" NPT, ISO 7-R1/2	R1023
	5.6 (80)	UL, FM, LPCB, EC, UKCA	1/2" NPT, ISO 7-R1/2	R1025
	8.0 (115)	UL, FM	1/2" NPT, ISO 7-R1/2	R1026
	8.0 (115)	UL, FM, LPCB, EC, UKCA	3/4" NPT, ISO 7-R3/4	R1027
G Upright Intermediate	5.6 (80)	UL, FM	1/2" NPT, ISO 7-R1/2	R1425
	8.0 (115)	UL, FM	3/4" NPT, ISO 7-R3/4	R1427
G Pendent	2.8 (40)	UL, FM	1/2" NPT, ISO 7-R1/2	R1011
	4.2 (60)	UL	1/2" NPT, ISO 7-R1/2	R1013
	5.6 (80)	UL, FM, LPCB, EC, UKCA	1/2" NPT, ISO 7-R1/2	R1015
	8.0 (115)	UL, FM, LPCB, EC, UKCA	3/4" NPT, ISO 7-R3/4	R1017
G Horizontal Sidewall	2.8 (40)	UL	1/2" NPT, ISO 7-R1/2	R1231
	4.2 (60)	UL	1/2" NPT, ISO 7-R1/2	R1233
	5.6 (80)	UL, FM, LPCB	1/2" NPT, ISO 7-R1/2	R1235
	8.0 (115)	UL	1/2" NPT, ISO 7-R1/2	R1236
	8.0 (115)	UL	3/4" NPT, ISO 7-R3/4	R1237
G Vertical Sidwall	5.6 (80)	FM, LPCB, EC, UKCA	1/2" NPT, ISO 7-R1/2	R1285

Model G Upright Sprinkler

Technical Specifications
- **Style:** Upright
- **Threads:** (see Table B)
- **Nominal K-Factor:** (See Table B)
- **Max. Working Pressure:** 175 psi (12 bar)

Material Specifications
- **Thermal Sensor:** Solder capsule
- **Sprinkler Frame:** Brass Alloy
- **Cap:** Bronze Alloy with PTFE
- **Load Screw:** Brass Alloy
- **Deflector:** Brass Alloy

Sprinkler Finishes
(See Table F)

Sensitivity
Standard response

Temperature Ratings
135°F (57°C)
165°F (74°C)
212°F (100°C)
286°F (141°C)

Guards & Shields
D-1 Guard (UL)
C-1 Guard (FM)
C-3 Guard with Shield (UL, FM on R1025, R1026, and R1027 only)

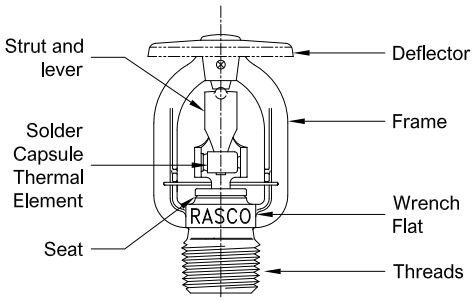
Sprinkler Wrench
Model W2

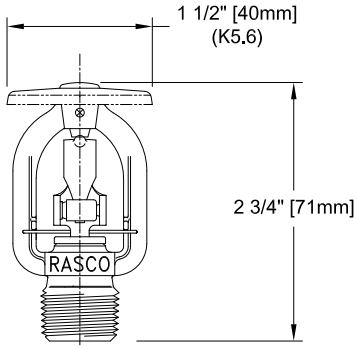
Listings and Approvals
(See Table B)

Model G Upright Sprinkler Components and Dimensions

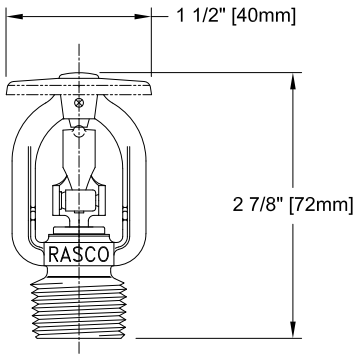
Figure 1

Note: Deflector on K2.8 and K4.2 Model G Upright is 1-1/4" (32 mm) diameter.





Shown with 1/2" Threads



Shown with 3/4" Threads

Model G Upright Sprinklers

Table B

SIN	K-factor (US)	K-factor (Metric)	Threads	Approvals
R1021	2.8	40	1/2” NPT, ISO 7-R1/2	UL, FM
R1023	4.2	60	1/2” NPT, ISO 7-R1/2	UL
R1025	5.6	80	1/2” NPT, ISO 7-R1/2	UL, FM, LPCB, EC: 1438-CPR-0053 UKCA: 0832-UKCA-CPR-S5104
R1026	8.0	115	1/2” NPT, ISO 7-R1/2	UL, FM
R1027	8.0	115	3/4” NPT, ISO 7-R3/4	UL, FM, LPCB, EC: 1438-CPR-0053 UKCA: 0832-UKCA-CPR-S5104

Model G Intermediate Upright Sprinkler

Technical Specifications
- **Style:** Intermediate Upright
- **Threads:** (See Table C)
- **Nominal K-Factor:** (See Table C)
- **Max. Working Pressure:** 175 psi (12 bar)

Material Specifications
- **Thermal Sensor:** Solder Capsule
- **Sprinkler Frame:** Brass Alloy
- **Cap:** Bronze Alloy with PTFE
- **Load Screw:** Brass Alloy
- **Deflector:** Brass Alloy

Sprinkler Finishes
Bronze (Only)

Sensitivity
Standard response

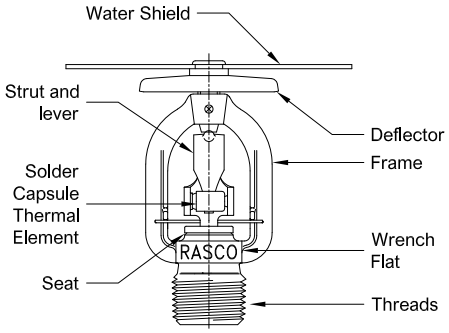
Temperature Ratings
135°F (57°C)
165°F (74°C)
212°F (100°C)
286°F (141°C)

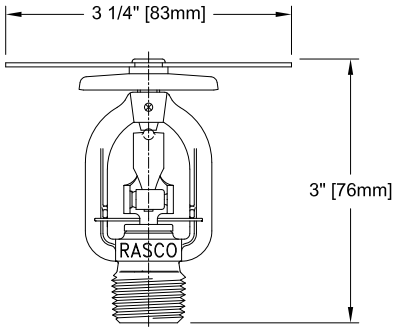
Guards & Shields
Factory Water Shield (cULus, FM)

Sprinkler Wrenches
Model W2

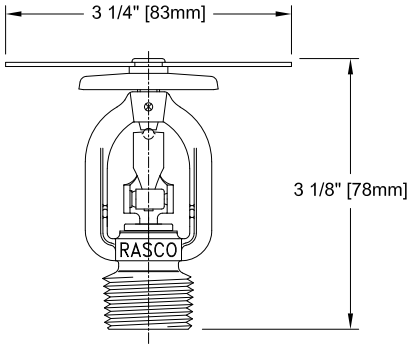
Listings and Approvals
(See Table C)

Model G Intermediate Upright Sprinkler Components and Dimensions — **Figure 2**





Shown with 1/2" Threads



Shown with 3/4" Threads

Model G Intermediate Upright Sprinklers — **Table C**

SIN	K-factor (US)	K-factor (Metric)	Threads	Approvals
R1425	5.60	80	1/2” NPT, ISO 7-R1/2	UL, FM
R1427	8.00	115	3/4” NPT, ISO 7-R3/4	UL, FM

Model G Pendent Sprinkler

Technical Specifications
- **Style:**
  - Pendent
  - Recessed Pendent
- **Threads:** (See Table D)
- **Nominal K-Factor:** (See Table D)
- **Max. Working Pressure:**
  - 175 psi (12 bar)

Material Specifications
- **Thermal Sensor:** Solder Capsule
- **Sprinkler Frame:** Brass Alloy
- **Cap:** Bronze Alloy with PTFE
- **Load Screw:** Brass Alloy
- **Deflector:** Brass Alloy

Sprinkler Finishes
(See Table F)

Sensitivity
Standard response

Temperature Ratings
135°F (57°C)
165°F (74°C)
212°F (100°C)
286°F (141°C)[1]

Recessed Escutcheons
G (cULus, all SIN)
G (FM, SIN R1015 only)[2]
F1 (cULus, all SIN)
F1 (LPCB, SIN R1015 only)

Guards & Shields[3]
D-1 Guard (UL)
D-5 Guard and Shield (UL, R1015 and R1017)
C-1 Guard (FM)
C-5 Guard with Shield (FM on R1015 and R1017 only)
S-1 (1/2") Shield (cULus, FM, R1015 only)
S-2 (3/4") Shield (cULus, FM, R1017 only)

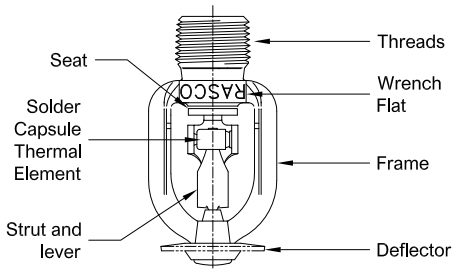
Sprinkler Wrenches
Model W2 (non-recessed pendent)
Model RC1 (recessed pendent)

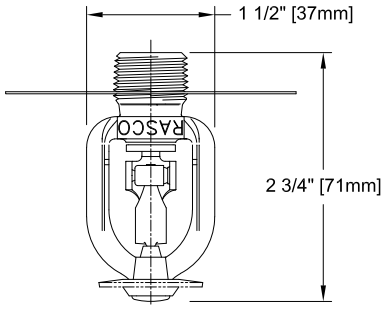
Listings and Approvals
(See Table D)

Notes:
1. 286°F (141°C) temperature rated sprinklers not approved for recessed installations.
2. FM Approval of Model G Recessed sprinkler for ordinary and extra hazard occupancies is limited to wet pipe systems only.
3. Not suitable for recessed installations.

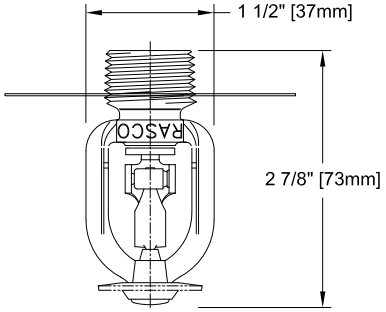
Model G Pendent Sprinkler Components and Dimensions

Figure 3





Shown with 1/2" threads and optional 3-1/4" (83mm) diameter S1 Water Shield (order separately)



Shown with 3/4" threads and optional 3-1/4" (83mm) diameter S2 Water Shield (order separately)

Model G Pendent Sprinklers

Table D

SIN	K-factor (US)	K-factor (Metric)	Threads	Approvals
R1011	2.8	40	1/2" NPT, ISO 7-R1/2	UL, FM
R1013	4.2	60	1/2" NPT, ISO 7-R1/2	UL
R1015	5.6	80	1/2" NPT, ISO 7-R1/2	UL, FM, LPCB, EC: 1438-CPR-0053 UKCA: 0832-UKCA-CPR-S5104
R1017	8.0	115	3/4" NPT, ISO 7-R3/4	UL, FM, LPCB, EC: 1438-CPR-0053 UKCA: 0832-UKCA-CPR-S5104

Model G Horizontal Sidewall Sprinkler

Technical Specifications
- **Style:** Horizontal Sidewall
- **Threads:** (See Table E)
- **Nominal K-Factor:** See Table E
- **Max. Working Pressure:** 175 psi (12 bar)

Material Specifications
- **Thermal Sensor:** Solder Capsule
- **Sprinkler Frame:** Brass Alloy
- **Cap:** Bronze Alloy with PTFE
- **Load Screw:** Brass Alloy
- **Deflector:** Brass Alloy

Sprinkler Finishes
(See Table F)

Sensitivity
Standard response

Temperature Ratings
135°F (57°C)
165°F (74°C)
212°F (100°C)
286°F (141°C)

Recessed Escutcheons[1][2]
F1 (UL)

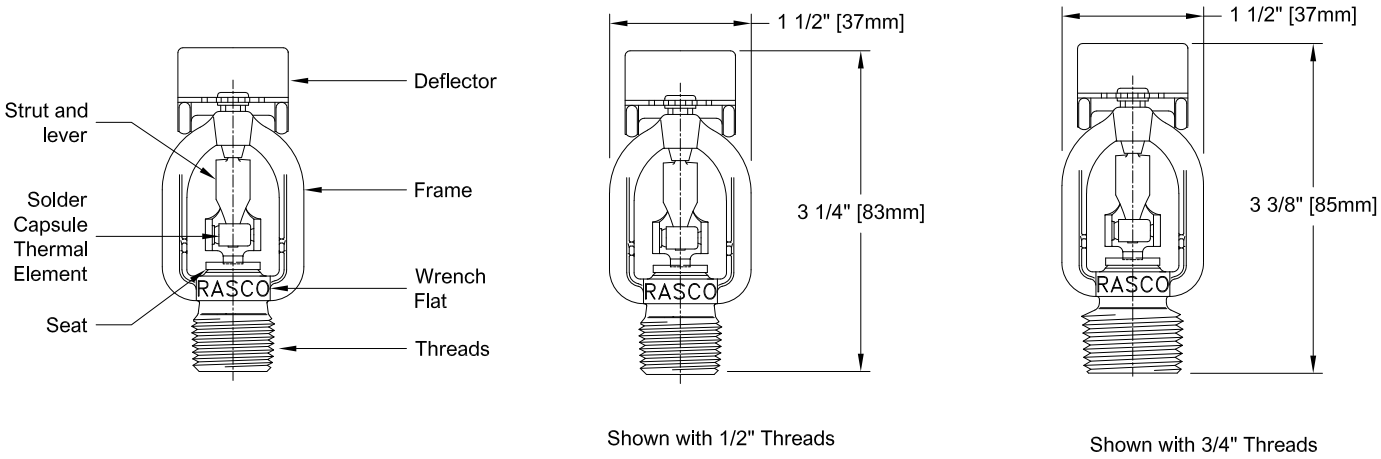
Guards & Shields[3]
D-1 Guard (UL, all SIN)
C-1 Guard (FM, SIN R1235 only)

Sprinkler Wrenches
Model W2 (non-recessed sidewall)
Model RC-1 (recessed sidewall)

Listings and Approvals[4]
(See Table E)

Notes:
1. Listed for use with 135°F (57°C) temperature rated sprinkler only.
2. Listed for Light Hazard ONLY when installed recessed.
3. Not suitable for recessed horizontal sidewall installations.
4. Listed for light hazard only, except for SIN R1235 is cULus Listed for ordinary hazard when exposed or surface mounted.

Model G Horizontal Sidewall Sprinkler Components and Dimensions — **Figure 4**



Note: Please refer to Figure 7 for recessed installation.

Model G Horizontal Sidewall Sprinklers — **Table E**

SIN	K-factor (US)	K-factor (Metric)	Threads	Approvals
R1231	2.8	40	1/2” NPT, ISO 7-R1/2	UL
R1233	4.2	60	1/2” NPT, ISO 7-R1/2	UL
R1235	5.6	80	1/2” NPT, ISO 7-R1/2	UL, FM, LPCB
R1236	8.0	115	1/2” NPT, ISO 7-R1/2	UL
R1237	8.0	115	3/4” NPT, ISO 7-R3/4	UL

Model G Vertical Sidewall Sprinkler — SIN R1285

Technical Specifications
- **Style:**
  - Upright Vertical Sidewall
  - Pendent Vertical Sidewall
- **Threads:** 1/2" NPT or ISO 7-R1/2
- **Nominal K-Factor:** 5.6 (80 metric)
- **Max. Working Pressure:** 175 psi (12 bar)

Material Specifications
- **Thermal Sensor:** Solder Capsule
- **Sprinkler Frame:** Brass Alloy
- **Cap:** Bronze Alloy with PTFE
- **Load Screw:** Brass Alloy
- **Deflector:** Brass Alloy

Sprinkler Finishes
(See Table F)

Sensitivity
Standard response

Temperature Ratings
135°F (57°C)
165°F (74°C)
212°F (100°C)
286°F (141°C)

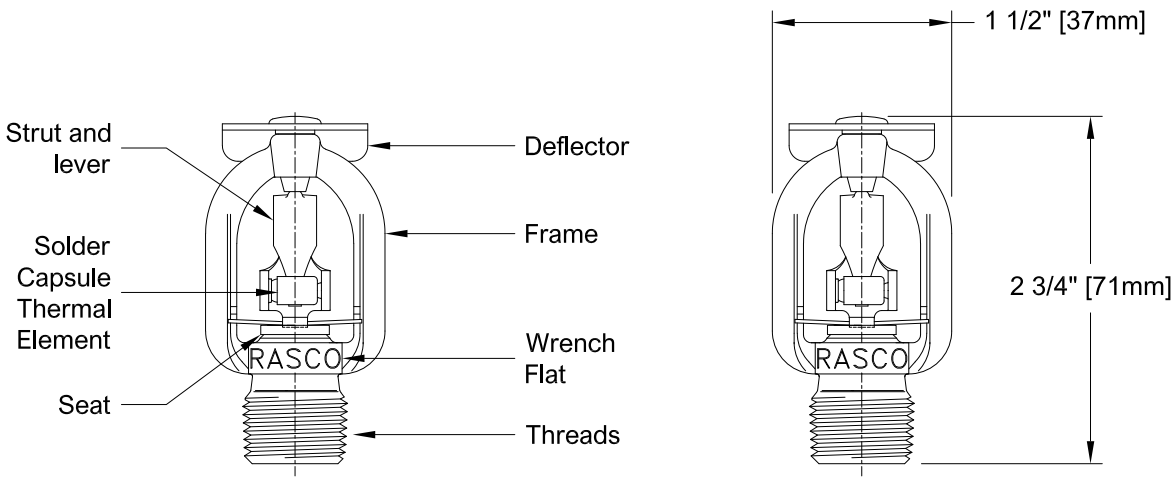
Guards & Shields
C-1 Guard (FM)

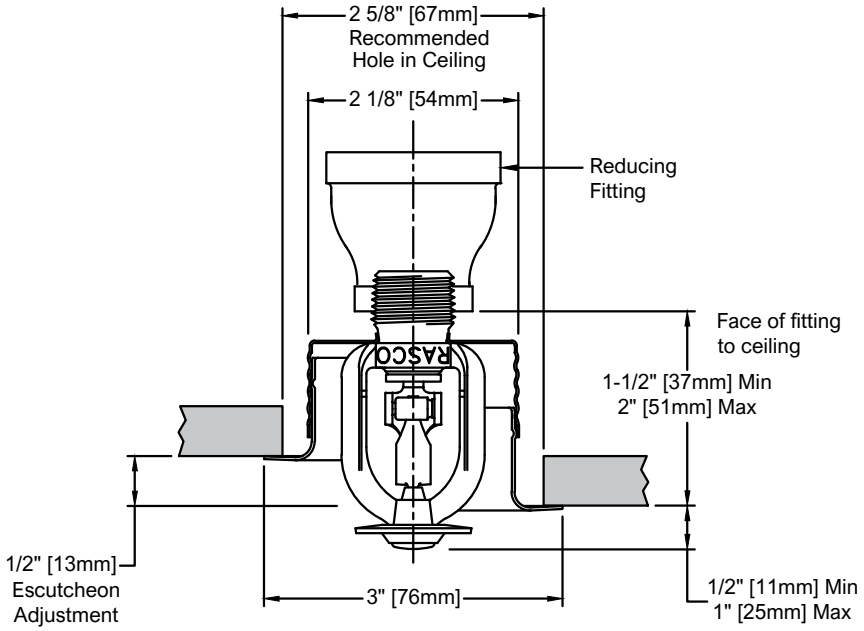
Sprinkler Wrenches
Model W2

Listings and Approvals[1]
FM Approved
LPCB
EC (1438-CP-0055)
UKCA: 0832-UKCA-CPR-S5104

Notes:
1. Listed and approved for Light Hazard ONLY.

Model G Vertical Sprinkler Components and Dimensions — Figure 5

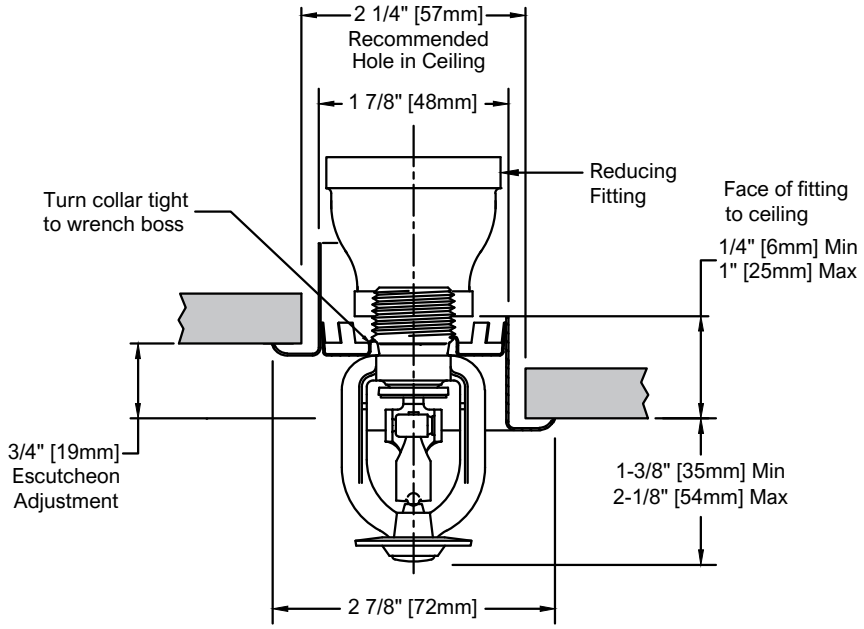




MODEL G RECESSED SPRINKLER

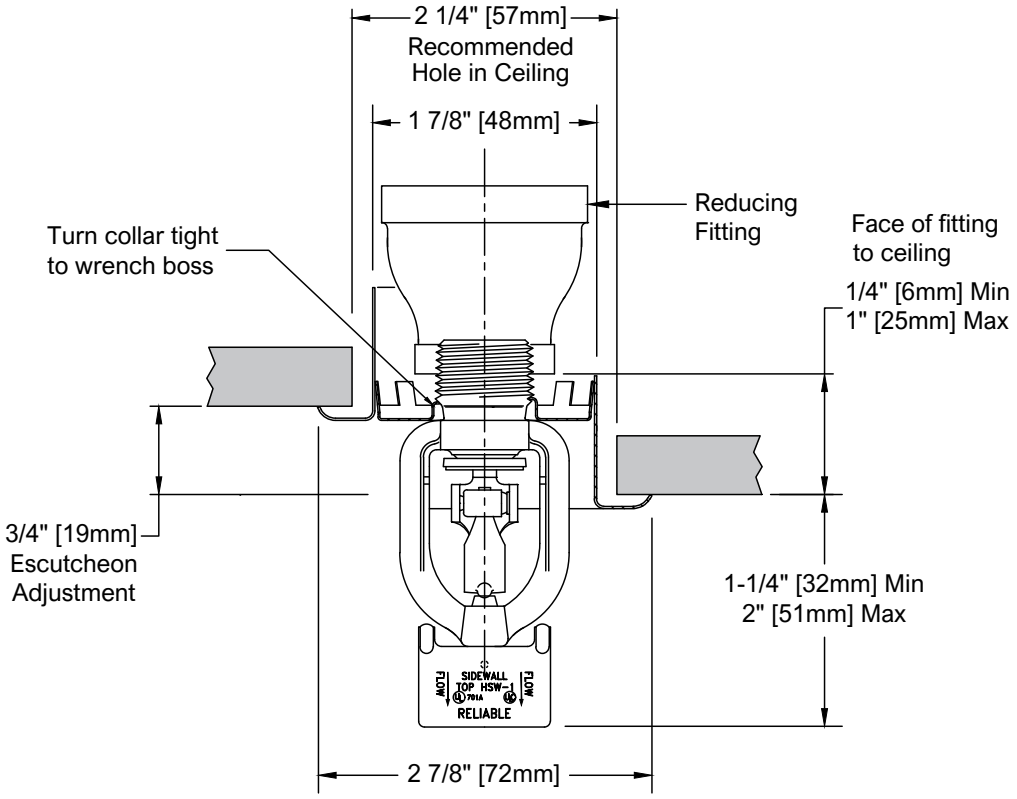
110RECPEND

Note: Model G Recessed sprinklers utilizing vented cups may not be used where the pressure in the space above the ceiling is positive with respect to the protected area. Ensure that the openings around the sprinkler cup are unobstructed following installation.



MODEL G PENDENT SPRINKLER
WITH MODEL F1 RECESSED ESCUTCHEON

110RECPEND



MODEL G HORIZONTAL SIDEWALL SPRINKLER
WITH MODEL F1 RECESSED ESCUTCHEON
(TOP VIEW)

110RECHSW

G Escutcheon

F1 Recessed

Wrenches

Model W2 (upright, pendent, sidewall)

Model RC1 (recessed)

Finishes[1][2] **Table F**

Standard Finishes		Special Application Finishes	
Sprinkler	**G and F1 Recessed Escutcheons**	**Sprinkler**	**G and F1 Recessed Escutcheons**
Bronze	Brass	Bright Brass[5]	Bright Brass
Chrome	Chrome	Satin Chrome	Satin Chrome
White Polyester[3][4]	White Polyester	Custom Color Polyester[3][4]	Custom Color Polyester
		Lead Plated[6][7]	
		Wax Coated[6][7][8]	
		Wax Over Lead[6][7][8]	

Notes:
1. Other finishes and colors are available on special order. Consult your Reliable sales representative for details.
2. Paint or any other coating applied over the factory finish will void all approvals and warranties.
3. The Model G Recessed assembly consists of a sprinkler mounted in a galvanized steel cup with a finished trim ring.
4. Only frame and deflector are coated, operating parts are chrome plated.
5. For 212°F (100°C) maximum temperature rated sprinklers only.
6. Not suitable for use with recessed installations.
7. cULus Listed as corrosion resistant.
8. Clear wax used on ordinary temperature rated sprinklers; brown wax used on intermediate temperature rated sprinklers. Brown wax may be used on high temperature rated sprinklers where the ambient temperature does not exceed 150°F (66°C).

Maintenance

Reliable Model G series sprinklers should be inspected and the sprinkler system maintained in accordance with NFPA 25, as well as the requirements of any authorities having jurisdiction.

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.

Do not clean sprinklers with soap and water, ammonia liquid or any other cleaning fluids. Remove dust by gentle vacuuming without touching the sprinkler.

Replace any sprinkler which has been painted (other than factory applied). A stock of spare sprinklers should be maintained to allow quick replacement of damaged or operated sprinklers. Failure to properly maintain sprinklers may result in inadvertent operation or non-operation during a fire event.

Application

Model G Series standard spray upright and pendent sprinklers having K-factors of 5.6 (80) and higher are permitted to be used in all occupancy classifications and building construction types unless otherwise noted.

Model G Series standard spray upright and pendent sprinklers having K-factors less than 5.6 (80) are limited to light hazard occupancies.

Model G Series sidewall sprinklers shall only be installed in light hazard occupancies with smooth, horizontal or sloped, flat ceilings unless otherwise noted.

Installation

Model G Series sprinklers must be installed in accordance with NFPA 13 and the requirements of all applicable authorities having jurisdiction

Model G Series sprinklers must be installed with the Reliable sprinkler installation wrench identified in this Bulletin. Any other wrench may damage the sprinkler. A leak tight sprinkler joint can be obtained with a torque of 8 to 18 lb-ft (11 - 24 N·m) for 1/2" sprinklers and a torque of 14-20 lb-ft (19 - 27 N·m) for 3/4" sprinklers after applying appropriate thread sealant.

Do not tighten sprinklers over the maximum recommended installation torque. Exceeding the maximum recommended installation torque may cause leakage or impairment of the sprinkler.

Guarantee

For the guarantee, terms, and conditions, visit www.reliablesprinkler.com.

Ordering Information

Specify the following when ordering:

Model
- G

Deflector/Orientation
- Upright
- Upright Intermediate
- Pendent
- G Recessed
- Horizontal Sidewall
- Vertical Sidewall

Temperature Rating
- See sprinkler technical specifications

Sprinkler Finish
- See Table F

Recessed Escutcheon*
- G
- F1

Escutcheon Finish
- See Table F

Sprinkler Wrench
- Model W2 (upright, non-recessed pendent, and sidewall)
- Model RC1 (recessed)

Guards and Shields
- See sprinkler technical specifications

***Note:** 286°F (141°C) sprinklers are not listed to be used recessed.

P/N 9999970005

SUBMITTAL PACKAGE

FLEXHEAD® INDUSTRIES

A PART OF atkore INTERNATIONAL

We invented the concept of flexible fire protection™

The FlexHead® Advantage

FLEXHEAD® QUALITY

- **Best corrosion resistance**
  Made from 100% 304 stainless steel
- **Excellent friction loss values**
  One-inch true-bore ID reducing the need to upsize mains and branch lines, 1¼" available
- **Pressure surge protection**
  Fully braided connection improves pressure capability and prevents hose damage
- **Highest maximum working pressure**
  Rated up to 300 psig
- **No o-rings or gaskets**
  Welded connections reduce potential leak points at the inlet and outlet fitting
- **Tightest thread tolerances**
  Outlet fitting threads are machined from solid bar stock reducing potential leaks at the sprinkler head fit-up
- **Extra stability**
  Bracket has a full 6-inch base to stabilize the sprinkler head during installation, pressurization or activation

FLEXHEAD® FEATURES

- Is **seismically qualified** for use, eliminating the need for an oversized ring around the sprinkler head in seismic areas
- Has the same product design that is **dual listed** by both UL and FM
- Can be **produced domestically** to meet all your project requirements
- Has **serial identification** with complete audit tracking of finished goods
- Has a **comprehensive limited warranty** backed by an A++ insurance company
- Offers a variety of flexible fire sprinkler connections, suspended ceilings, gypsum board ceilings, institutional applications, cleanroom and duct applications
- Offers 1.25" FlexHead® hose for superior friction loss numbers

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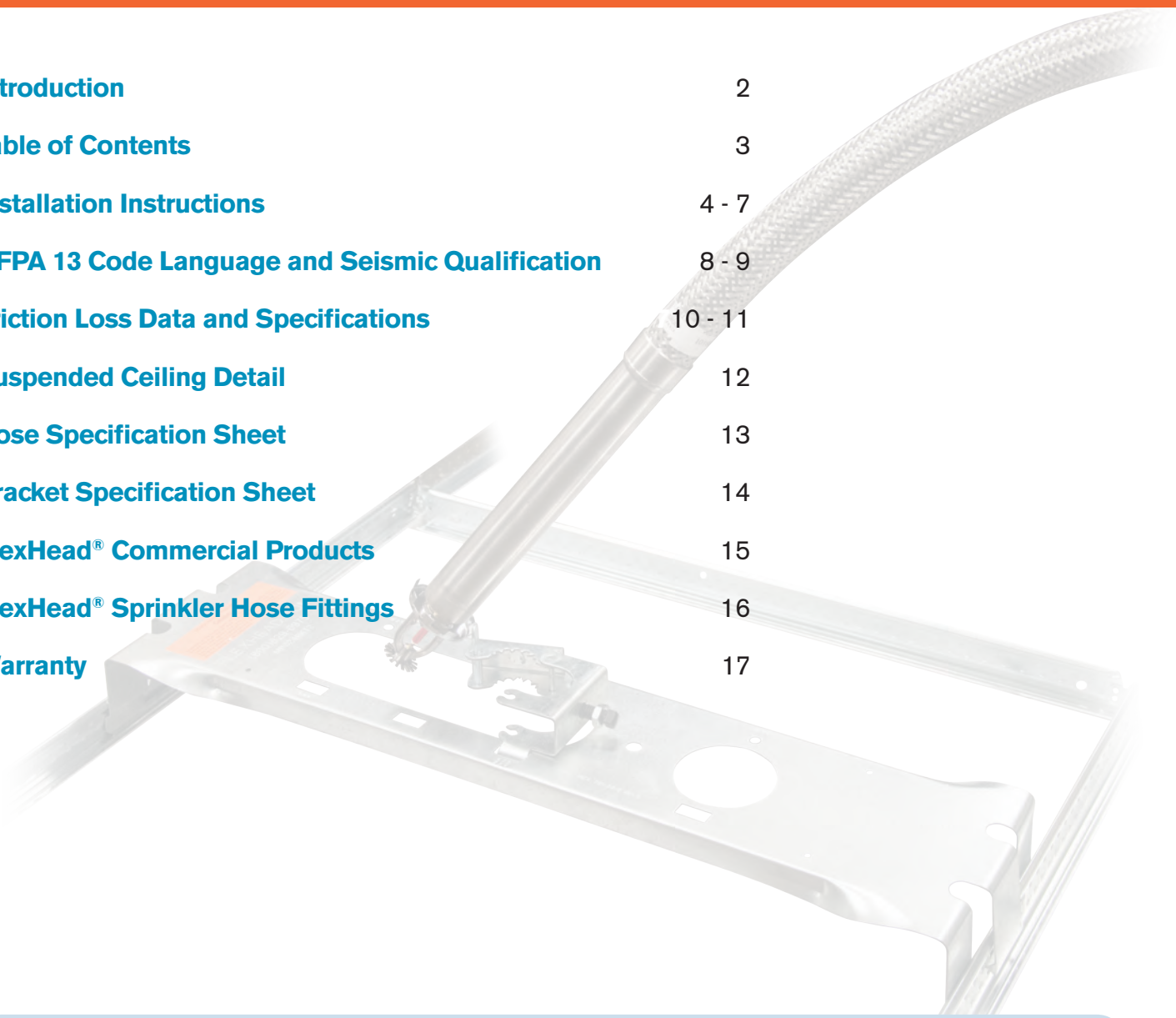


Whether your application is commercial, industrial, clean room, or institutional, FlexHead® flexible sprinkler systems can save you time and money by offering reliable, highly efficient, seismically qualified, and environmentally responsible products.

INSTALLATION INSTRUCTIONS – MPO & ADO BRACKET

Installation of FlexHead® Commercial Ceiling Flexible Sprinkler Drop System

For use with FlexHead® hoses; 2024T, 2036T, 2048T, 2060T, 2072T 2024ET, 2036ET, 2048ET, 2060ET, 2072ET

T-Bar Ceiling Grid Installation

The bracket is designed for use on ceiling grids conforming to ASTM C635.

1) Locate the center of the ceiling tile marking, then align the screw hole for true center of tile installation.
2) Clip the bracket on the T-Bar Ceiling Grid.
3) Center of the leg section must be on the outside of the T-Bar (Figure 1).
4) Secure each bracket leg to the T-Bar with #2 Head self tapping screw.

Fig. 1
MPO Bracket Shown

FlexHead® Flexible Hose Installation

1. Apply Teflon® tape and pipe sealant to the 1" NPT thread. Install into branch outlet. Any direction is acceptable, ensure the hose is allowed at least one bend per installation to allow for seismic movement.
2. Tighten hose using the pipe drop section, never apply a wrench to the braided hose for installation.

Fig. 2

Do not wrench on braided hose

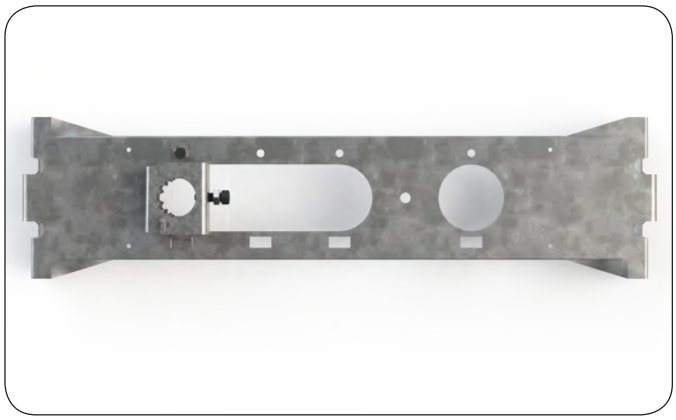
Secure the FlexHead® Sprinkler Drop to the Bracket

1. Maneuver the flexible sprinkler drop from the branch to the bracket. Review that the hose length, number of bends, and bend radius are applicable for the installation per NFPA guidelines. (See corresponding hose technical data sheet for installation information on pages 10-11.)
2. The bracket has an open hub for ease of installation. Open the hinge apparatus by turning the locking shaft ¼ turn. Slide the flexible hose into the hub. Ensure the drop is vertical and the SS Flexible® hose is not applying a substantial moment on the bracket, causing sprinkler misalignment. Latch the hinge door close and adjust the sprinkler drop for desired ceiling height. Tightening the set screw till hand tight plus 1 full revolution, (100 in-lbs).
3. Install desired sprinkler head per the manufacturer's installation instructions.

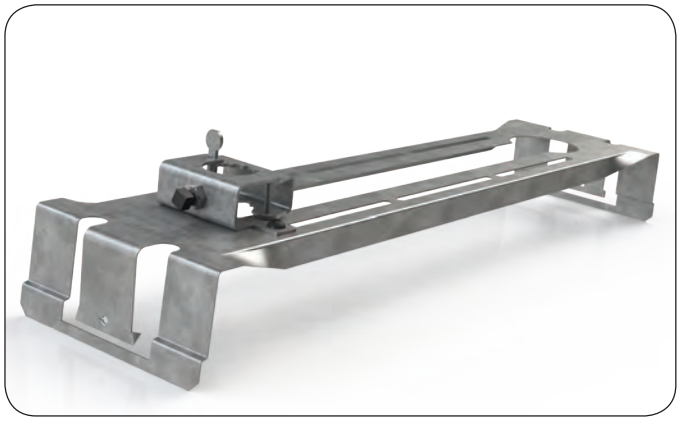
Fig. 3
MPO Bracket Shown

Bracket Adjustment for Multiple Positions

1. **MPO Hub Adjustment** - Remove the nut and screw on the hub assembly. Slide out the tab and move to desired position. Insert tab into square opening at desired position and install screw from below. Install nut and tighten to hand tight plus one turn.



2. **ADO Hub Adjustment** - Loosen screw and nut on each side of the hub, do not remove. Slide the hub to the desired position and tighten screw on each side. Tighten the nut to hand tight plus one turn.



U.S. and International Patent Pending: #6,123,154, #6,119,784, #6,752,218, #7,032,680, #6,488,097

INSTALLATION INSTRUCTIONS – ADJT-24-BKT1

Installation of FlexHead® Commercial Ceiling Flexible Sprinkler Drop System

Multi Position Tall Bracket (MPT) TO Red Bar ADJT-24-BKT is approved for use with the standard FlexHead® Flexible Sprinkler hose. See corresponding technical data sheet for installation information.

FlexHead® Standard Tall
2024T, 2036T, 2048T, 2060T, 2072T

FlexHead® Standard Tall Elbow
2024ET, 2036ET, 2048ET, 2060ET, 2072ET

The MPT bracket is set for 24" center of tile installation. (See next page for additional installation configurations)

T Bar Ceiling Grid Installation

The MPT bracket is designed for use on ceiling grids conforming to ASTM C 635.

A. Locate the center of the ceiling tile marking, align the offset screw with that marking for true center of tile installation.
Insert one bracket leg at a time, applying a downward pressure on the bracket leg and T-Bar, screw the self-tapping screw using a #2 square head driver. Place the second leg on the T-Bar and repeat process. **(Fig. 1)**

FlexHead® Flexible Hose Installation

A. Apply Teflon® tape and pipe sealant to the 1" NPT thread. Install into branch outlet. Any direction is acceptable, ensure the hose is allowed at least one bend per installation to allow for seismic movement.

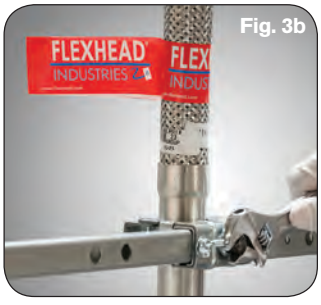
B. Tighten hose using the pipe drop section, never apply a wrench to the braided hose for installation. **(Fig. 2)**

Secure the FlexHead® Sprinkler Drop to MPT Bracket

A. Maneuver the flexible sprinkler drop from the branch to the MPT bracket. Review that the hose length, number of bends, and bend radius are applicable for the installation per NFPA guidelines. (See Corresponding hose technical data sheet for installation information on pages 10-11.)

B. The MPT bracket has an open hub for ease of installation. Open the hinge apparatus by turning the locking shaft ¼ turn. Slide the flexible hose drop into the hub. Ensure the drop is vertical, and the SS Flexible hose is not applying a substantial moment on the bracket causing sprinkler misalignment. Latch the hinge door close and adjust the sprinkler drop for desired ceiling height. Tightening the set screw till hand tight plus 2 full revolutions, (130 in-lbs). **(Fig. 3a and 3b)**

C. Install desire sprinkler head, per the manufactures installation instructions.



Do not wrench on braided hose

Ceiling Tile Installation

A. The flexible sprinkler drop system with MPT Bracket is able to be installed prior to the ceiling tile installation, preventing the need for sprinkler contractor tile adjustment.

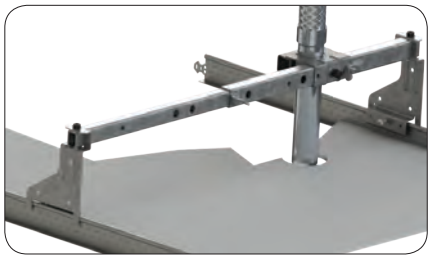
B. For ease of tile installation, cut the largest sprinkler hole recommended by the manufacture. The largest hole that is still covered by the sprinkler escutcheon allows for an easier install.

C. Angle the tile at 45 degree and push the tile through the hole and up above the ceiling T-bar, maneuver the tile and allow it to drop in the proper location. **(Fig. 4)**

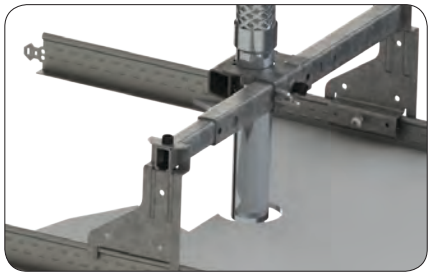
Fig. 4

Installation Complete

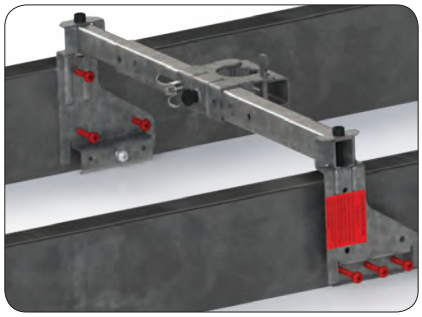
Installation Configuration



24” Tile – 24/4 Quarter Mark Position



16” Tile – 16/2 Center Position



16” Metal Stud (Web Size > 5”) Center Position

14-1/2” Wood Stud Center Position

U.S and International Patent Pending: #6,123,154, #6,119,784, #6,752,218, #7,032,680, #6,488,097

NFPA 13 CODE LANGUAGE & SEISMIC QUALIFICATION

NFPA 13 STANDARD FOR INSTALLATION OF SPRINKLER SYSTEMS 2016 EDITION

9.2.1.3.3 Flexible® Sprinkler Hose Fittings.

9.2.1.3.3.1 Listed flexible sprinkler hose fittings and their anchoring components intended for use in installations connecting the sprinkler system piping to sprinklers shall be installed in accordance with the requirements of the listing, including any installation instructions.

9.2.1.3.3.2 When installed and supported by suspended ceilings, the ceiling shall meet ASTM C 635, *Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings*, and shall be installed in accordance with ASTM C 636, *Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.*

9.2.1.3.3.3 When flexible sprinkler hose fittings exceed 6 ft (1.83 m) in length and are supported by a suspended ceiling in accordance with 9.2.1.3.3.2, a hanger(s) attached to the structure shall be required to ensure that the maximum unsupported length does not exceed 6 ft. (1.83 m).

9.2.1.3.3.4 Where flexible sprinkler hose fittings are used to connect sprinklers to branch lines in suspended ceilings, a label limiting relocation of the sprinkler shall be provided on the anchoring component.

A. 9.2.1.3.3.3 The committee evaluation of flexible sprinkler hose fittings supported by suspended ceilings was based on a comparison of the weight of a 6 ft, 1 in (1.8 m) diameter Schedule 40 water-filled unsupported armover weighing approximately 13 lb (5.9 kg) to the weight of a 6 ft, 1 in. (1.8 m) diameter water-filled flexible hose fitting weighing approximately 9 lb (4.1 kg). The information provided to the committee showed that the maximum load shed to the suspended ceiling by the flexible hose fitting was approximately 6 lb (2.7 kg) and that a suspended ceiling meeting ASTM C 635, *Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems of Acoustical Tile and Lay-In Panel Ceilings,* and installed in accordance with ASTM C 636, *Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels,* can substantially support that load. In addition, the supporting material showed that the flexible hose connection can be attached to the suspended ceilings because it allow the necessary deflections under seismic conditions.

A.9.2.1.3.3.4 An example of language for the label is as follows:

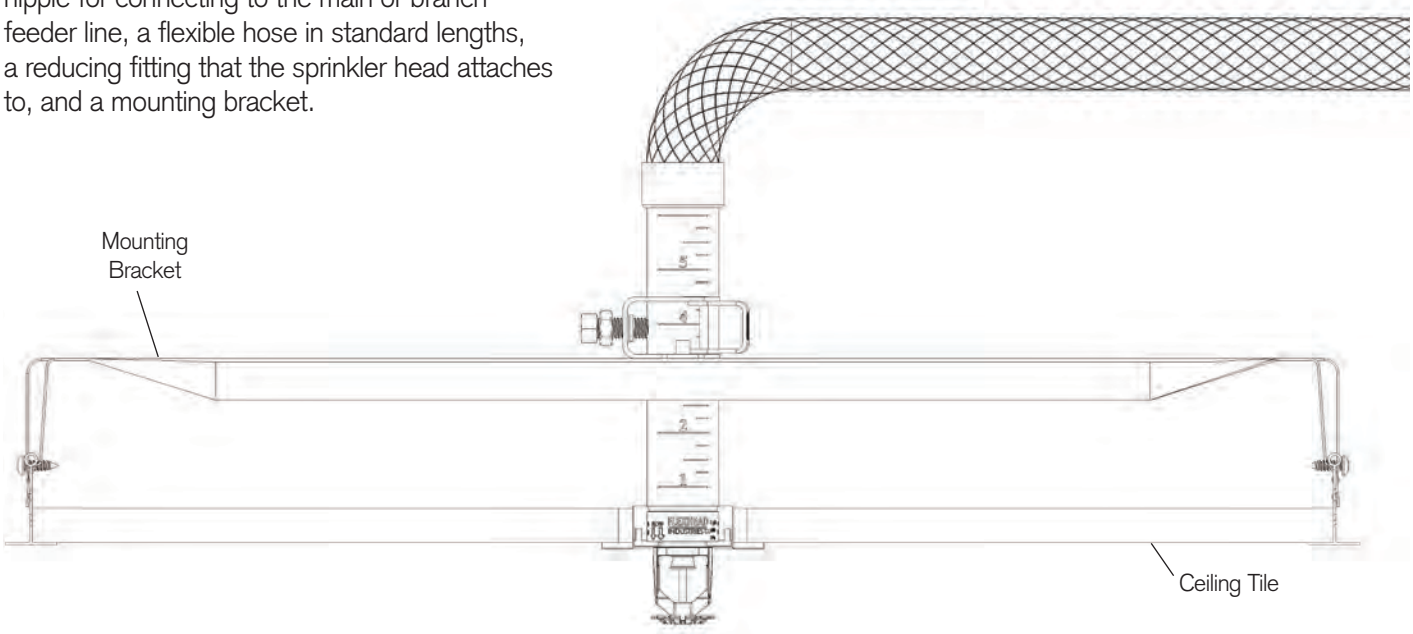
CAUTION: DO NOT REMOVE THIS LABEL.

Relocation of this device should only be performed by qualified and/or licensed individuals that are aware of the original system design criteria, hydraulic criteria, sprinkler head listing parameters, and knowledge of the state and local codes including NFPA 13 installation standards. Relocation of the device without this knowledge could adversely affect the performance of this fire protection and life safety system.

FLEXHEAD® SATISFIES SEISMIC CODE REQUIREMENTS

Typically, each unit consists of a threaded pipe nipple for connecting to the main or branch feeder line, a flexible hose in standard lengths, a reducing fitting that the sprinkler head attaches to, and a mounting bracket.

The FlexHead® hose allows the head to move in any direction during a seismic event without causing damage to the sprinkler system.



FlexHead® Industries recently satisfactorily completed full-scale seismic qualification testing at the Structural Engineering Earthquake Simulation Laboratory located at the State University of New York at Buffalo. Tests were conducted using the International Code Council (ICC) acceptance criteria "ICC-ES AC-156 Seismic Qualification Testing of Nonstructural Components".

- More than 90% of the states in the U.S. are adopting the International Building Code (IBC) that address, among other things, the installation of fire sprinkler systems in seismic zones.
- The latest version of the IBC defers to ASCE 7 for the sprinkler/ceiling design in Seismic Design Categories 9SDC) C and D, E & F.
- In Seismic Design Category C, suspended ceilings are to be designed and installed in accordance with Ceilings & Interior Systems Construction Association (CISCA) recommendations for Zones 0-2; and sprinkler heads and other penetrations shall have a minimum of 1/4-inch clearance on all sides.
- In Seismic Design Categories D, E & F, suspended ceilings are to be designed and installed in accordance with CISCA recommendations for seismic Zones 3 and 4 with some additional requirements. Except where rigid braces are used to limit lateral deflections, sprinkler heads and other penetrations shall have a 2-inch oversized ring, sleeve, or adapter through the ceiling to allow for free movement of at least 1 inch of ceiling movement in all horizontal directions.
- Flexible sprinkler connection provide characteristics that exceed the most stringent seismic code requirements. The flexibility of the hose allows the head to move with the ceiling in any direction during a seismic event without causing damage to the sprinkler system.

FRICTION LOSS DATA & SPECIFICATIONS

Model Number	Outlet Orifice Size *in (cm)*	Hose Assembly Length *in (mm)*	Minimum Bend Radius		Maximum Number of 90° Bends		Equivalent Length of 1in. Diameter Schedule 40 Pipe (Ft)							Max Rated Pressure *PSI (Kpa)*	
			FM *in (mm)*	UL *in (mm)*	UL	FM	(UL) *Ft (m)*	(FM) 5.6k-factor *Ft (m)*	(FM) 8.0k-factor *Ft (m)*	(FM) 11.2k-factor *Ft (m)*	(FM) 14.0k-factor *Ft (m)*	(FM) 16.8k-factor *Ft (m)*	(FM) 22.4k-factor *Ft (m)*	UL *PSI (Kpa)*	FM *PSI (Kpa)*
1" INTERNAL DIAMETER (I.D.) HOSE SERIES															
2024T-50	½ (1.27)	24 (610)	8 (200)	3 (76.2)	3	1	11	18.4 (5.6)	7.7 (2.3)	7.6 (2.3)	-	-	-	175 (1205)	175 (1205)
2036T-50		36 (914)			3	2	16	26.6 (8.1)	11.5 (3.5)	11.5 (3.5)	-	-	-		
2048T-50		48 (1219)			4	3	24	30.3 (9.2)	15.3 (4.6)	15.4 (4.7)	-	-	-		
2060T-50		60 (1524)			4	4	29	35.8 (10.9)	19.1 (5.8)	19.3 (5.8)	-	-	-		
2072T-50		72 (1828)			4	4	35	45.6 (13.9)	23.0 (7)	23.2 (7)	-	-	-		
2024T-75	¾ (1.90)	24 (610)	8 (200)	3 (76.2)	3	1	12	-	-	-	14.7 (4.5)	7.1 (2.1)	-	175 (1205)	175 (1205)
2036T-75		36 (914)			3	2	18	-	21.5 (6.5)	21.6 (6.6)	21.8 (6.6)	10.9 (3.3)	-		
2048T-75		48 (1219)			4	3	23	-	30.5 (9.3)	30.6 (9.3)	29 (8.8)	14.8 (4.5)	-		
2060T-75		60 (1524)			4	4	29	-	39.5 (12)	39.6 (12)	36.1 (11)	18.7 (5.6)	-		
2072T-75		72 (1828)			4	4	32	-	48.5 (14.7)	48.8 (14.9)	43.2 (13.1)	22.6 (6.8)	-		
2024ET-50	½ (1.27)	24 (610)	8 (200)	3 (76.2)	3	1	19	26.4 (8.0)	6.8 (2)	7.4 (2.2)	-	-	-	175 (1205)	175 (1205)
2036ET-50		36 (914)			3	2	23	30.1 (9.1)	11.8 (3.6)	12.5 (3.8)	-	-	-		
2048ET-50		48 (1219)			4	3	27	33.8 (10.3)	16.9 (5.1)	17.6 (5.3)	-	-	-		
2060ET-50		60 (1524)			4	4	32	37.5 (11.4)	21.9 (6.6)	22.7 (6.9)	-	-	-		
2072ET-50		72 (1828)			4	4	35	41.2 (12.5)	27.0 (8.2)	27.8 (8.4)	-	-	-		
2024ET-75	¾ (1.90)	24 (610)	8 (200)	3 (76.2)	3	1	18	-	-	-	14.7 (4.5)	8.2 (2.5)	-	175 (1205)	175 (1205)
2036ET-75		36 (914)			3	2	23	-	25.2 (7.7)	26 (7.9)	21.8 (6.6)	13 (3.9)	-		
2048ET-75		48 (1219)			4	3	23	-	32.9 (10)	33 (10)	29 (8.8)	17.8 (5.4)	-		
2060ET-75		60 (1524)			4	4	29	-	40.6 (12.3)	40 (12.1)	36.1 (11.0)	22.6 (6.8)	-		
2072ET-75		72 (1828)			4	4	32	-	48.5 (14.7)	47 (14.3)	43.2 (13.1)	27.5 (8.3)	-		
2024E-50	½ (1.27)	24 (610)	8 (200)	3 (76.2)	3	1	19	26.4 (8.0)	-	-	-	-	-	175 (1205)	175 (1205)
2036E-50		36 (914)			3	2	23	30.1 (9.2)	-	-	-	-	-		
2048E-50		48 (1219)			4	3	27	33.8 (10.3)	-	-	-	-	-		
2060E-50		60 (1524)			4	4	32	37.5 (11.4)	-	-	-	-	-		
2072E-50		72 (1828)			4	4	35	41.2 (12.6)	-	-	-	-	-		
2024E-75	¾ (1.90)	24 (610)	8 (200)	3 (76.2)	3	1	18	-	14.7 (4.5)	-	-	-	-	175 (1205)	175 (1205)
2036E-75		36 (914)			3	2	23	-	21.8 (6.6)	-	-	-	-		
2048E-75		48 (1219)			4	3	23	-	29.0 (8.8)	-	-	-	-		
2060E-75		60 (1524)			4	4	29	-	36.1 (11.0)	-	-	-	-		
2072E-75		72 (1828)			4	4	32	-	43.2 (13.2)	-	-	-	-		

Chart continued on the next page

Notes:

- Model Numbers: The "T" designates tall drops length hose series. The "ET" designates tall elbow drop hose series. THE "E" designates elbow drop hose series. The "H" designates high pressure 300PSI working pressure hose series. The "HE" designates high pressure 300PSI elbow hose series. The "F" designates high flow rate using 1-¼ I.D. hose series. The "DPS" designates dry pendent system hose series.
- Max ambient temperature rating on all model numbers are 300 F (148 C).
- Equivalent lengths are shown with maximum number of 90 degree bends at the minimum bend-radius per agency. Different values were obtained by FM and UL due to the difference in minimum bend radius, testing protocol and calculation methods. Please see individual standards for more information relative to friction loss (equivalent length of pipe).
- **FM equivalent length calculation includes sprinkler head friction loss.**
- See listing(s) approval agency for the latest approval details.
- FlexHead products are intended for use in hydraulically designed wet, pre-action, deluge or dry pipe sprinkler connections per NFPA 13, 13R and 13D guidelines.

FRICTION LOSS DATA & SPECIFICATIONS (cont'd)

Model Number	Outlet Orifice Size *in (cm)*	Hose Assembly Length *in (mm)*	Minimum Bend Radius		Maximum Number of 90° Bends		Equivalent Length of 1in. Diameter Schedule 40 Pipe (Ft)							Max Rated Pressure *PSI (Kpa)*	
			FM *in (mm)*	UL *in (mm)*	UL	FM	(UL) *Ft (m)*	(FM) 5.6k-factor *Ft (m)*	(FM) 8.0k-factor *Ft (m)*	(FM) 11.2k-factor *Ft (m)*	(FM) 14.0k-factor *Ft (m)*	(FM) 16.8k-factor *Ft (m)*	(FM) 22.4k-factor *Ft (m)*	UL *PSI (Kpa)*	FM *PSI (Kpa)*
1" INTERNAL DIAMETER (I.D.) HOSE SERIES															
2024H-50	½ (1.27)	24 (610)	8 (200)	3 (76.2)	3	2	11	18.4 (5.6)	7.7 (2.3)	7.6 (2.3)	-	-	-	300 PSI (2068Kpa)	300 PSI (2068Kpa)
2036H-50		36 (914)			3	3	16	26.6 (8.1)	11.5 (3.5)	11.5 (3.5)	-	-	-		
2048H-50		48 (1219)			4	4	24	30.3 (9.2)	15.3 (4.6)	15.4 (4.7)	-	-	-		
2060H-50		60 (1524)			4	4	29	35.8 (10.9)	19.1 (5.8)	19.3 (5.8)	-	-	-		
2072H-50		72 (1828)			4	4	35	45.6 (13.9)	23 (7)	23.2 (7)	-	-	-		
2024H-75	¾ (1.90)	24 (610)	8 (200)	3 (76.2)	3	2	12	-	14.7 (4.5)	14.7 (4.5)	14.7 (4.5)	7.1 (2.1)	-	300 PSI (2068Kpa)	300 PSI (2068Kpa)
2036H-75		36 (914)			3	3	18	-	21.8 (6.6)	21.6 (6.6)	21.8 (6.6)	10.9 (3.3)	-		
2048H-75		48 (1219)			4	4	23	-	29 (8.8)	30.6 (9.3)	29 (8.8)	14.8 (4.5)	-		
2060H-75		60 (1524)			4	4	29	-	36.1 (11.0)	39.6 (12)	36.1 (11.0)	18.7 (5.7)	-		
2072H-75		72 (1828)			4	4	32	-	43.2 (13.1)	48.8 (14.8)	43.2 (13.1)	22.6 (6.8)	-		
2024HE-50	½ (1.27)	24 (610)	8 (200)	3 (76.2)	3	2	19	14.7 (4.5)	6.8 (2)	7.4 (2.2)	-	-	-	300 PSI (2068Kpa)	300 PSI (2068Kpa)
2036HE-50		36 (914)			3	3	23	21.8 (6.6)	11.8 (3.6)	12.5 (3.8)	-	-	-		
2048HE-50		48 (1219)			4	4	27	29.0 (8.8)	16.9 (5.1)	17.6 (5.3)	-	-	-		
2060HE-50		60 (1524)			4	4	32	36.1 (11)	21.9 (6.6)	22.8 (6.9)	-	-	-		
2072HE-50		72 (1828)			4	4	35	43.2 (13.1	27 (8.2)	27.8 (8.4)	-	-	-		
2024HE-75	¾ (1.90)	24 (610)	8 (200)	3 (76.2)	3	2	18	-	14.7 (4.5)	-	14.7 (4.5)	8.2 (2.5)	-	300 PSI (2068Kpa)	300 PSI (2068Kpa)
2036HE-75		36 (914)			3	3	23	-	21.8 (6.6)	26 (7.9)	21.8 (6.6)	13 (3.9)	-		
2048HE-75		48 (1219)			4	4	23	-	29 (8.8)	33 (10)	29 (8.8)	17.8 (5.4)	-		
2060HE-75		60 (1524)			4	4	29	-	36.1 (11.0)	40 (12.2)	36.1 (11.0)	22.6 (6.8)	-		
2072HE-75		72 (1828)			4	4	32	-	43.2 (13.1)	47 (14.3)	43.2 (13.1)	27.5 (8.3)	-		
2024-DPS	½ (2.54)	24 (610)	7 (180)	-	-	1	-	18.4 (5.6)	7.7 (2.3)	7.6 (2.3)	-	7.1 (2.1)	10.7 (3.3)	-	175 (1205)
2036-DPS		36 (914)			-	2	-	26.6 (8.1)	11.5 (2.3)	11.5 (3.5)	-	10.9 (3.3)	15.1 (4.6)		
2048-DPS		48 (1219)			-	3	-	30.3 (9.2)	15.3 (3.5)	15.4 (4.7)	-	14.8 (4.5)	21.5 (6.5)		
2060-DPS		60 (1524)			-	4	-	35.8 (10.9)	19.1 (5.8)	19.3 (5.9)	-	18.7 (5.7)	25.3 (7.7)		
2072-DPS		72 (1828)			-	4	-	45.6 (13.9)	23 (7)	23.2 (7)	-	22.6 (6.9)	26.9 (8.1)		
1" INTERNAL DIAMETER (I.D.) HOSE SERIES															
2036F-50	½ (1.27)	36 (914)	7 (180)	-	-	1	-	4.1 (1.2)	4.1 (1.2)	4.1 (1.2)	-	-	-	-	175 (1205)
2048F-50		48 (1219)			-	2	-	5.4 (1.6)	5.6 (1.7)	5.7 (1.7)	-	-	-		
2072F-50		72 (1828)			-	4	-	8.0 (2.4)	8.6 (2.6)	9.1 (2.7)	-	-	-		
2036F-75	¾ (1.90)	36 (914)	7 (180)	-	-	1	-	-	-	-	3.4 (1.0)	3.4 (1.0)	-	-	175 (1205)
2048F-75		48 (1219)			-	2	-	-	-	-	4.8 (1.5)	4.8 (1.4)	-		
2072F-75		72 (1828)			-	4	-	-	-	-	7.6 (2.3)	7.6 (2.3)	-		
2036F-100	1 (2.54)	36 (914)	7 (180)	-	-	2	-	-	-	-	-	-	3.4 (1.0)	-	175 (1205)
2048F-100		48 (1219)			-	3	-	-	-	-	-	-	4.8 (1.4)		
2072F-100		72 (1828)			-	4	-	-	-	-	-	-	7.6 (2.3)		

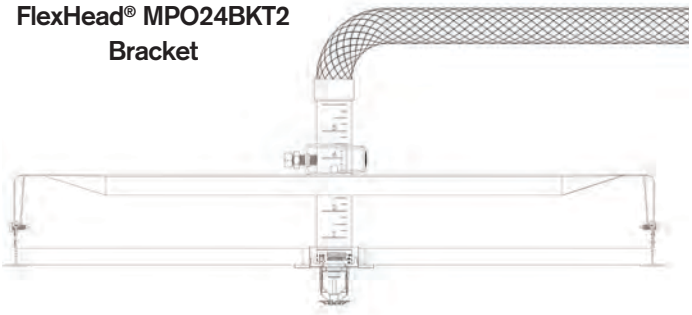
Notes:

- Model Numbers: The "T" designates tall drops length hose series. The "ET" designates tall elbow drop hose series. THE "E" designates elbow drop hose series. The "H" designates high pressure 300PSI working pressure hose series. The "HE" designates high pressure 300PSI elbow hose series. The "F" designates high flow rate using 1-¼ I.D. hose series. The "DPS" designates dry pendent system hose series.
- Max ambient temperature rating on all model numbers are 300 F (148 C).
- Equivalent lengths are shown with maximum number of 90 degree bends at the minimum bend-radius per agency. Different values were obtained by FM and UL due to the difference in minimum bend radius, testing protocol and calculation methods. Please see individual standards for more information relative to friction loss (equivalent length of pipe).
- **FM equivalent length calculation includes sprinkler head friction loss.**
- See listing(s) approval agency for the latest approval details.
- FlexHead products are intended for use in hydraulically designed wet, pre-action, deluge or dry pipe sprinkler connections per NFPA 13, 13R and 13D guidelines

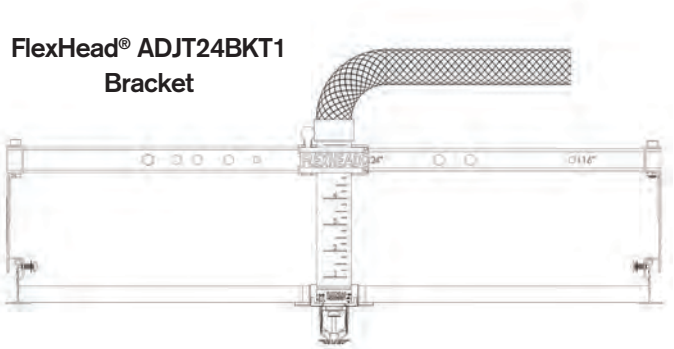
FLEXHEAD® CEILING DETAIL

FlexHead® Suspended Ceiling Detail

FlexHead® MPO24BKT2 Bracket



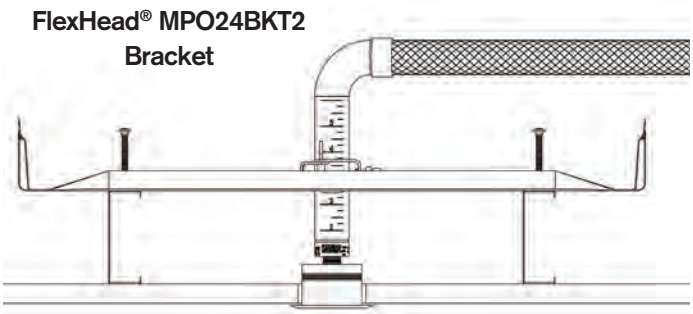
FlexHead® ADJT24BKT1 Bracket



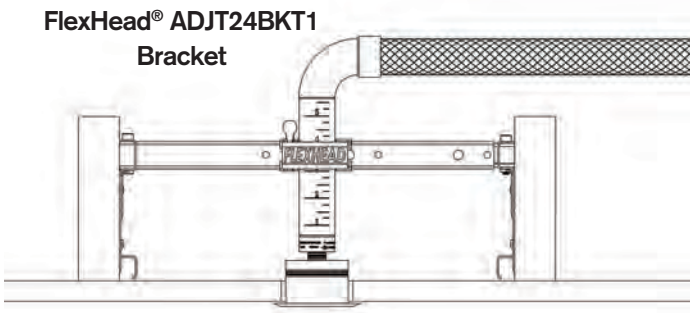
*Allows for bracket installation without pre-installing the ceiling tile

FlexHead® Sheetrock Ceiling Detail

FlexHead® MPO24BKT2 Bracket



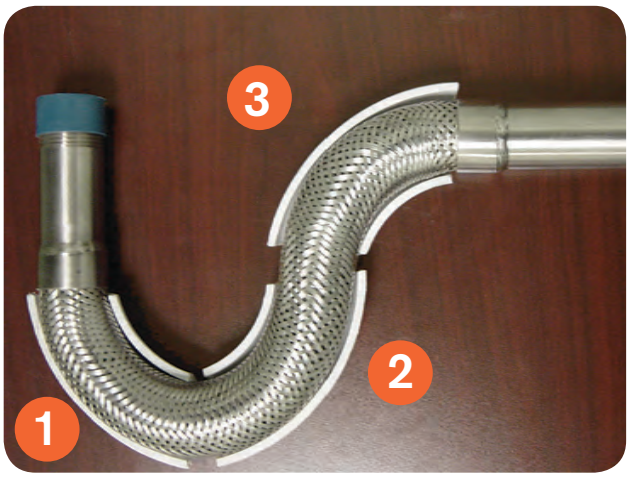
FlexHead® ADJT24BKT1 Bracket



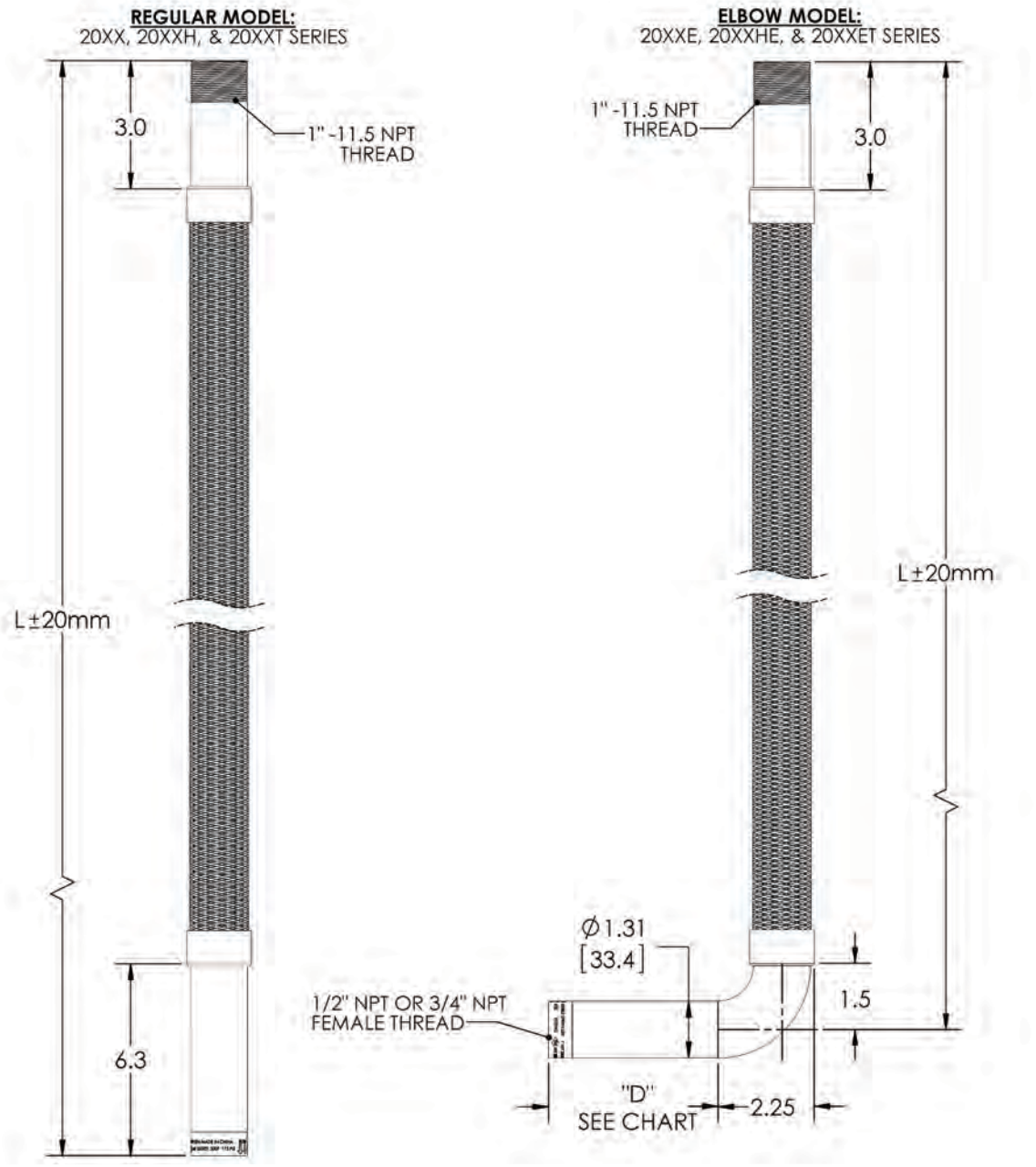
Each FM approved and UL listed unit is ready to install, pressure- and leak-tested, and comes complete with a flexible stainless steel hose and mounting bracket with adjustable hub.

FlexHead® 3" Bend Radius per UL Guidelines (2 Bends Shown)

FlexHead® Shown with 3 Bends



HOSE SPECIFICATION SHEET

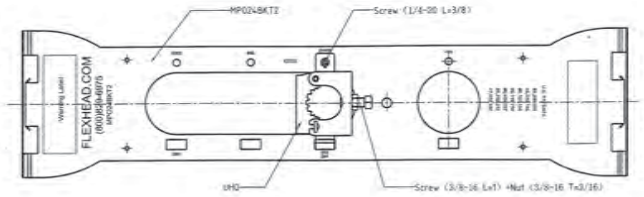


MODEL #	"Hose Assembly (L) Length Inches (mm)"	"Drop ""D"" Size (Inches)"
2024E/2024HE	24 (610)	1.5, 3.0, & 4.0
2036E/2036HE	36 (914)	
2048E/2048HE	48 (1219)	
2060E/2060HE	60 (1524)	
2072E/2072HE	72 (1828)	
2024ET	24 (610)	5.71
2036ET	36 (914)	
2048ET	48 (1219)	
2060ET	60 (1524)	
2072ET	72 (1828)	

BRACKET SPECIFICATION SHEET

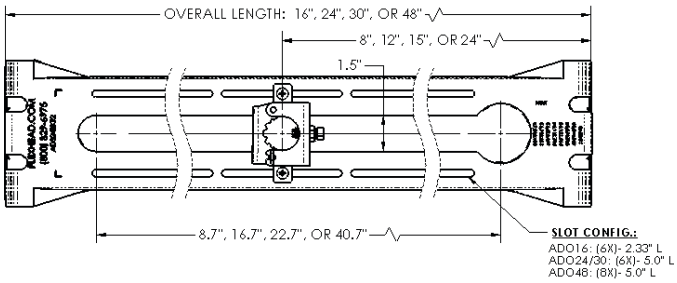
Multiport Design (For use with T-bar and Metal Stud Applications)

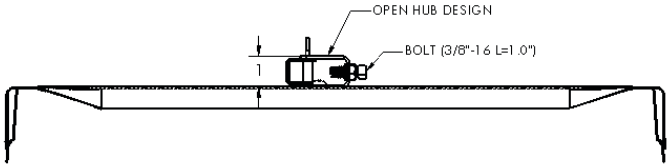
Model # MP024BKT2



Adjustable Design (For use with T-bar, Metal Stud and Chicago Grid Applications): standard sizes are 16”, 24”, 30” and 48” long

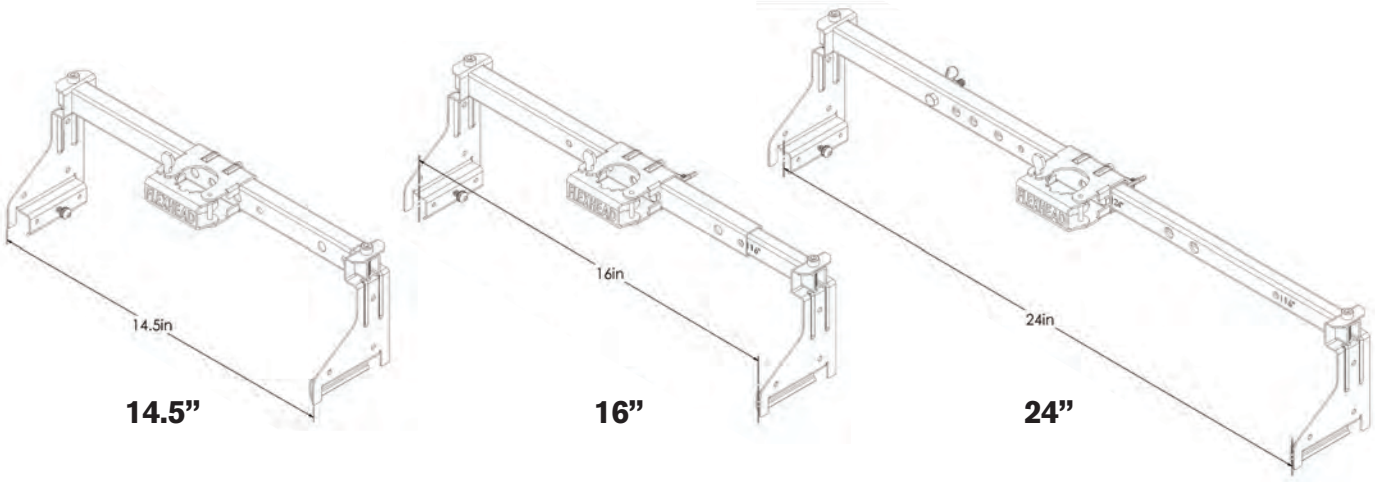
Model # AD016BKT2, AD024BKT2, AD030BKT2, AD048BKT2





Multi-Position Tall Bracket (For use with T-bar, Wood and Metal Studs): Standard sizes are 14.5”, 16” and 24” long.

Model # ADJT24BKT1

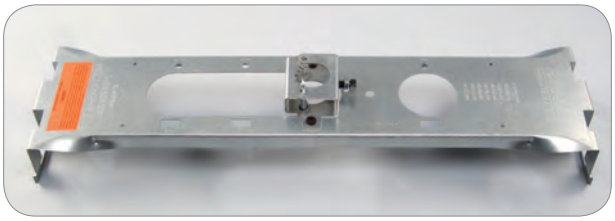


14.5” **16”** **24”**

FLEXHEAD® COMMERCIAL PRODUCTS

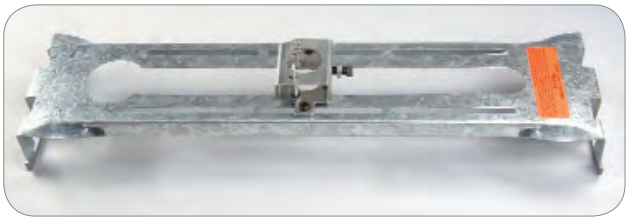
24”, 36”, 48”, 60”, 72” hose lengths,
Rated working pressure 175psi, optional 300psi.
Straight model,
Standard 1” I.D., optional 11⁄4” I.D.

24”, 36”, 48”, 60”, 72” hose lengths.
Rated working pressure 175psi, optional 300psi.
Elbow model.



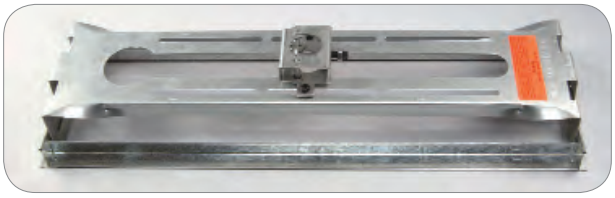
24” Multiport Bracket for T-bar Grid or Metal Stud applications.

Model #: MP024BKT2 (standard bracket)



16”/24”/30”/48” Adjustable Bracket for T-bar Grid, Chicago Grid or Metal Stud applications.

Model #s: AD016BKT2/AD024BKT2/AD030BKT2/ ADO48BKT2



Hat Channel Bracket System for Metal Stud or Hat Channel applications.

Model #: ADO24BKT2 with BKT-HTA

24” Multi-Position Tall Bracket

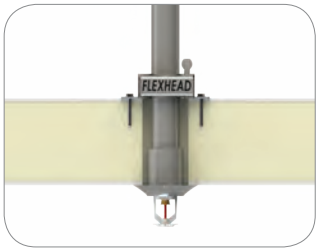
Model #: ADJT24BKT1

Bracket for Confined Space applications having a concrete deck above the ceiling.

Model #: UH-2

Armstrong® TechZone Ceiling Bracket for use with Armstrong TechZone Ceiling systems.
Available in 6” long.

Model #: SP06TZBKT2



Dry Pendent System for Freezer and Cold Storage applications

Model #: 20XX-DPS-UH01

FLEXIBLE SPRINKLER HOSE FITTINGS USE EXAMPLES

FM APPROVED

UL

Suspended Ceilings

FM APPROVED

Exhaust Ducts

FM APPROVED

UL

Institutional

FM APPROVED

Cleanroom Ceilings

Flexible Sprinkler Hose Fittings were developed to satisfy specific needs of the industry, save the industry millions in losses, provide superior seismic protection and promote the installation of sprinklers. They have been evaluated for use by both Underwriters Laboratory and FM approvals and are tested to approval standards that were independently developed by the testing laboratories. The first listing for a Flexible Sprinkler Hose Fitting was in 1990.

WARRANTY

FLEXHEAD® PRODUCTS LIMITED WARRANTY

Flexhead Industries, Inc. warrants that its products will be free from defects in materials and workmanship under normal conditions of use and service when properly installed for a period of one year from date of sale. Our obligation under this warranty is limited to repairing or replacing any product that is returned to us with transportation charges prepaid within one year after the date of original sale and that our examination shows to our satisfaction to have been defective in materials or workmanship under normal conditions of use and service. The decision as to whether to repair or to replace any product shall be made by us, and any repair shall be made at our facility. Notwithstanding the foregoing, the following are specifically excluded from the coverage of this warranty:

(a) Any product not manufactured by Flexhead Industries, Inc., including any sprinkler head(s) installed with or attached to a Flexhead Industries, Inc. product, provided, however, Flexhead Industries Inc. hereby assigns the right to enforce any original manufacturer's warranty of such product to the original purchaser of the Flexhead Industries, Inc. product(s). For the avoidance of doubt, Flexhead Industries, Inc. does not manufacture sprinkler heads and, therefore, does not warrant any such products.

(b) defects resulting from ordinary wear and tear, including, without limitation, the replacement of the so-called poly bag components of any Flexhead Industries, Inc. product

(c) products that have been altered in any manner by the buyer or by anyone other than Flexhead Industries, Inc.

(d) products that have been subjected to misuse, abusive use, or damage by accident or casualty

(e) products that have been installed or used in a manner contrary to our specifications, instructions or recommendation

(f) products that have been installed or used in a manner that is not in compliance with all applicable requirements of any code, law, regulation or rule of any federal, state or local governmental or industry authority; and

(g) products that have not been inspected and maintained in accordance with our specifications, instructions or recommendations, including, without limitation, our recommendations as to following the inspection and maintenance standards published by Factory Mutual Research Corporation (FMRC) and the National Fire Protection Association (NFPA); and

(h) products that have been affected by Microbiologically Influenced Corrosion (MIC).

This warranty is not assignable and shall benefit only the original purchaser of a Flexhead Industries, Inc. product. If any provision hereof or any portion of any provision shall be held invalid, the remainder of this Limited Warranty shall not be affected thereby, and all provisions of this Limited Warranty shall remain valid and in full force and effect to the fullest extent permitted by law. THIS WARRANTY IS IN LIEU OF ALL IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, WARRANTIES OF MERCHANTABILITY AND WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE. NOTWITHSTANDING ANY PROVISION TO THE CONTRARY HEREIN OR ANY APPLICABLE LAW TO THE CONTRARY, IN NO EVENT SHALL FLEXHEAD INDUSTRIES, INC. BE LIABLE FOR SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES UNDER ANY CIRCUMSTANCES WHATSOEVER, WHETHER ARISING FROM ANY BREACH OF THIS LIMITED WARRANTY OR OTHERWISE ARISING FROM OR IN CONNECTION WITH THE USE OR OPERATION OF, OR ANY DEFECT IN, ANY FLEXHEAD INDUSTRIES, INC. PRODUCT, OR OTHERWISE. The risk of damages from any breach of warranty with respect to injury to any person will be born by the purchaser of Flexhead Industries, Inc. product.

NOTES

NOTES

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