

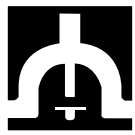
Model BV-R1

5.3 K-factor - Fast Response Residential

Pendent & Recessed Pendent Glass Bulb Automatic Sprinkler



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General Description

The Central Model BV-R1, 5.3 K-factor Residential Pendent and Recessed Pendent sprinklers are decorative glass bulb sprinklers designed for use in residential occupancies such as homes, apartments, dormitories, and hotels.

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

The recessed version of the Model BV-R1 Residential Pendent Sprinkler is obtained by utilizing the Model BV-R1 Residential Pendent Sprinkler in combination with the Model BV Res./QR Recessed Escutcheon Assembly. The recessed version of the Central Model BV-R1 using a Model BV Res./QR Recessed Escutcheon provides up to 3/8 inch (9,5 mm) of total adjustment from the flush pendent position.

Operation: The glass bulb contains a fluid which expands when exposed to heat. When the rated temperature is reached, the fluid expands sufficiently to shatter the glass bulb, which then allows the sprinkler to activate and flow water.

WARNING

The BV-R1 Residential Pendent Sprinklers described herein must be installed and maintained in compliance with this document, as well as with the applicable standards of the National Fire Protection Association, in addition to the standards of any other authorities

having jurisdiction. Failure to do so may impair the integrity of these devices.

Because of the above cited stipulations and the varied nature of residential type architecture, there will be some compartment designs which cannot be fully sprinklered in accordance with the recommendations of NFPA 13, NFPA 13D, or NFPA 13R. In the event of this condition, consult the authorities having jurisdiction for guidance and approval.

The owner is responsible for maintaining their fire protection system and devices in proper operating condition. The installing contractor or sprinkler manufacturer should be contacted relative to any questions.



Technical Data

Sprinkler Identification Number
SIN C3296

Approvals
UL & ULC Listed. NYC Approved
(Refer to the Design Criteria Section)

Maximum Working Pressure
175 psi (12,1 bar)

Pipe Thread Connection
1/2 inch NPT

Discharge Coefficient
K = 5.3 GPM/psi^{1/2} (76,3 LPM/bar^{1/2})

Temperature Ratings
155°F/68°C

Finishes
Sprinkler: White Polyester, Chrome Plated, or Natural Brass
Recessed Escutcheon: White Coated, Chrome Plated, or Brass Plated



Residential Pendent and Recessed Pendent Sprinklers

Physical Characteristics

The Model BV-R1 Residential Pendent Sprinkler utilizes a dezincification resistant (DZR) bronze frame and a 3 mm bulb. The sprinkler frame orifice is sealed with a gasketed spring plate (Belleville Seal) consisting of a beryllium nickel disc spring that is sealed on both its inside and outside edges with a Teflon™ gasket. The compression screw is bronze, and the deflector is brass.

SPRINKLERS FOR REPLACEMENT USE ONLY IN EXISTING SPRINKLER SYSTEMS

Table 1 - BV-R1 Pendent & Recessed Pendent Hydraulic Design Requirements for NFPA 13D & NFPA 13R Occupancies

| Coverage Area | Minimum Design Flow/Pressure | |
|------------------------------|---|--|
| | Single Sprinkler | Multiple Sprinklers |
| 12' x 12' (3,7 m x 3,7 m) | 22.0 gpm / 17.2 psi 83,3 Lpm / 1,19 bar | 16.0 gpm / 9.1 psi 60,6 Lpm / 0,63 bar |
| 14' x 14' (4,3 m x 4,3 m) | 24.0 gpm / 20.5 psi 90,8 Lpm / 1,41 bar | 17.0 gpm / 10.3 psi 64,4 Lpm / 0,71 bar |
| 16' x 16' (4,9 m x 4,9 m) | 33.0 gpm / 32.0 psi 124,9 Lpm / 2,21 bar | 21.0 gpm / 15.7 psi 79,5 Lpm / 1,08 bar |

Maximum Ceiling to top of Sprinkler Deflector Dim. 4 inches.



Design Criteria

The Model BV-R1 Residential Pendent and Recessed Pendent Sprinklers are UL, ULC Listed and NYC Approved (MEA 323-98-E) for use in accordance with current NFPA standards on wet pipe sprinkler systems. These sprinklers with a maximum ceiling to top of sprinkler deflector distance of 4 inches, have been investigated for use under smooth flat horizontal ceilings with slopes up to 2 inches per foot using the hydraulic design requirements found in Table 1. These sprinklers with a maximum ceiling to top of sprinkler deflector distance of 4 inches, have also been investigated for use under smooth flat sloping ceilings with slopes up to 8 inches per foot using the hydraulic design requirements found in Table 2 as well as the sloped ceiling "Specific Application Design Criteria" found in Figure 4. When conditions exist that do not meet all the parameters of the "sloped ceiling" "Specific Application Design Criteria" found in Figure 4, and when acceptable to the local authority, additional guidance on the placement of residential sprinklers on sloped ceilings has been provided in Figures 5 -14. This information will provide the minimum spacing requirements necessary for preventing the wetting (i.e., cold soldering) of the heat responsive element (Bulb) of a non-operated Central Model BV-R1, which is adjacent to one, which has operated. In these situations the minimum required single and multiple sprinkler flow rates given in Table 1 should be used. Your local authority should be consulted to determine the number of sprinklers required in the hydraulic design area.

The Recessed Pendent Sprinklers are only listed with the Series BV Res./QR Recessed Escutcheon Assembly. These sprinklers can be used with any metallic flush or extended escutcheon, provided the maximum ceiling to top of sprinkler deflector dimension specified in Table 1 or Table 2 is maintained.

The minimum required single and multiple sprinkler flow rates for systems designed to NFPA 13D or NFPA 13R occupancies are given in Table 1 and Table 2 as a function of temperature rating, ceiling to top of deflector distance, and the maximum allowable coverage areas. The single sprinkler flow rate is the minimum required discharge from the most hydraulically demanding single sprinkler and, the multiple sprinkler flow rate is the minimum required discharge from each of the total number of "design sprinklers" as specified in NFPA 13D or NFPA 13R.

TIA 99-1 (Tentative Interim Amendment) with an effective date of May 22, 2000 states that the minimum required discharge from

Table 2 - BV-R1 Pendent & Recessed Pendent UL Specific Application Sloped Ceiling Hydraulic Design Requirements for NFPA 13D & NFPA 13R Occupancies (For use with Figure 4)

| Coverage Area | Minimum Design Flow/Pressure | |
|------------------------------|---|--|
| | Single Sprinkler | Multiple Sprinklers |
| 12' x 12' (3,7 m x 3,7 m) | 22.0 gpm / 17.2 psi 83,3 Lpm / 1,19 bar | 16.0 gpm / 9.1 psi 60,6 Lpm / 0,63 bar |
| 16' x 16' (4,9 m x 4,9 m) | 33.0 gpm / 32.0 psi 124,9 Lpm / 2,21 bar | 21.0 gpm / 15.7 psi 79,5 Lpm / 1,08 bar |

Maximum Ceiling to top of Sprinkler Deflector Dim. 4 inches.

each of the "design sprinklers" for systems designed to NFPA 13 must be calculated based on delivering a minimum design density of 0.1 gpm/sq. ft. for each of the listed coverage areas shown in Table 1 or Table 2. Consult the authority having jurisdiction regarding the application of this TIA to the currently adopted NFPA 13.

Model BV-R1 Residential Pendent and Recessed Pendent Sprinklers must be installed using the obstruction criteria for extended coverage sprinklers found in the current edition of NFPA 13.

NOTES

Residential Fire Sprinkler Systems should only be designed and installed by those competent and completely familiar with automatic sprinkler system design, installation procedures, and techniques.

The sprinkler must be secured in position by firmly fastening the sprinkler system piping to the structure. If the sprinkler is not properly secured in position, reaction forces resulting from sprinkler operation could alter its orientation and its water distribution pattern. The sprinkler escutcheon cannot be used to hold the sprinkler in position.

Several criteria may apply to the installation and usage of each sprinkler. Consequently, it is recommended that the sprinkler system designer review and develop a working understanding of the complete list of criteria prior to initiating the design of the sprinkler system.

Questions concerning sprinkler installation and usage criteria, which are not covered by the following instructions, should be submitted to Central Sprinkler. Include sketches and technical details as appropriate.

In some instances, the requirements of this document may concern specifications which are more stringent and which take precedence over those specified in NFPA 13, NFPA 13D, NFPA 13R, or by the authority having jurisdiction.

Figure 1 - Model BV-R1 Pendent

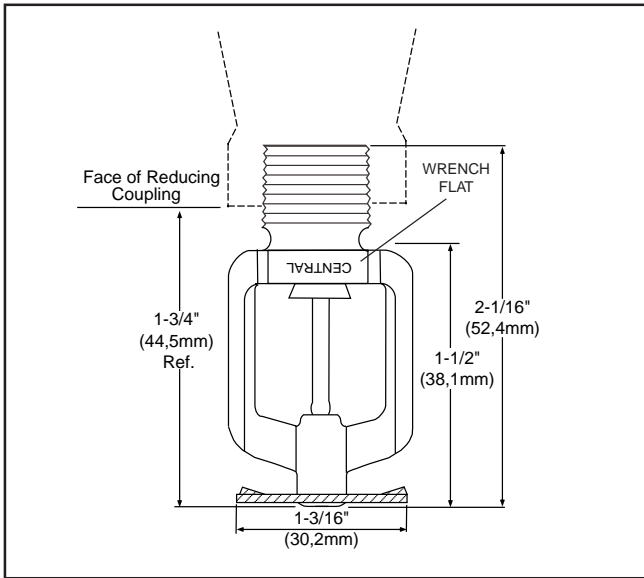


Figure 2 - Model BV-R1 Recessed Pendent

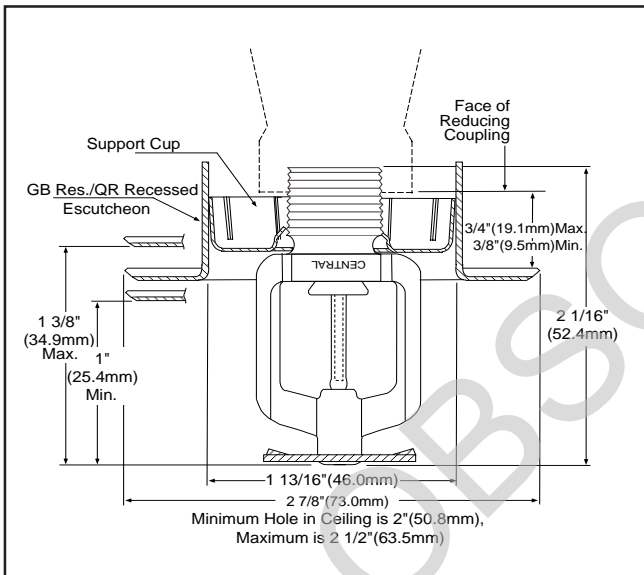
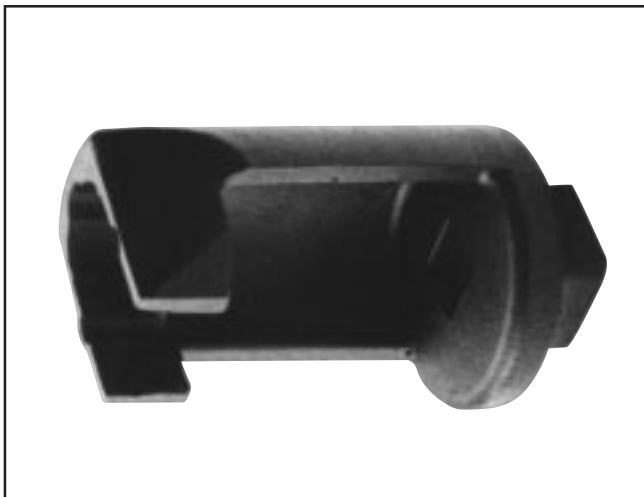


Figure 3 - BV Sprinkler Wrench (1099)



Installation

The Central Model BV-R1 Residential Pendent Sprinklers must be installed in accordance with the following instructions:

NOTES

Do not install any bulb type sprinkler if the bulb is cracked or there is a loss of liquid from the bulb. With the sprinkler held horizontally, a small air bubble with an approximate diameter of 1/16 inch should be present.

A leak tight 1/2 inch NPT sprinkler joint should be obtained with a torque of 7 to 14 ft.lbs. (9,5 to 19,0 Nm). A maximum of 21 ft.lbs. (28,5 Nm) of torque is to be used to install 1/2 inch NPT sprinklers. Higher levels of torque may distort the sprinkler inlet with consequent leakage or impairment of the sprinkler.

Step 1. The sprinkler must only be installed in the pendent position and with the deflector parallel to the mounting surface.

Step 2. After installing the BV Res./QR Recessed Support Cup (or other acceptable escutcheon, as applicable) over the sprinkler pipe threads and with pipe thread sealant applied to the pipe threads, hand tighten the sprinkler into the sprinkler fitting.

Step 3. Wrench tighten the sprinkler using only a BV Sprinkler Wrench (1099 - Ref. Figure 3). The wrench recess of the BV Sprinkler Wrench is to be applied to the sprinkler wrench flats (Ref Figure 1).

Step 4. For Recessed Pendent Sprinkler Applications, a Protective Cap is available which helps to prevent damage to the sprinkler during ceiling installation and/or during application of the finish coating of the ceiling. Place the Protective Cap over the Recessed Support Cup and push it upwards until it bottoms out against the sprinkler deflector.

NOTE

As long as the Protective Cap remains in place, the system is considered to be "Out of Service"

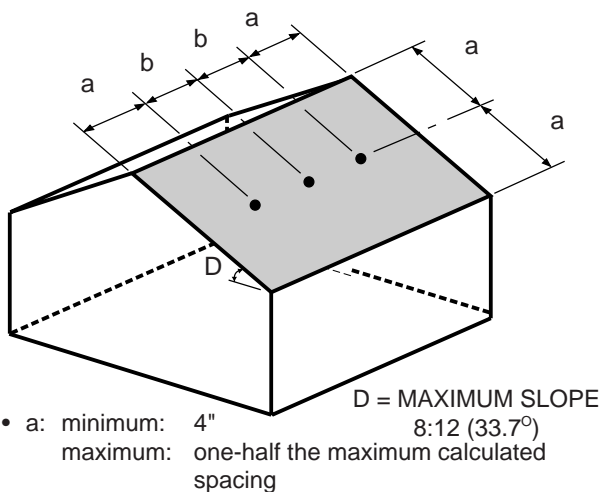
Step 5. After the ceiling has been completed, remove and discard the Protective Cap. If the Sprinkler has been damaged, replace the entire Sprinkler assembly. Do not attempt to modify or repair a damaged sprinkler.

Step 6. Push the outer ring of the Recessed Escutcheon over the Recessed Support Cup. Do not continue to push on the Recessed Escutcheon such that it lifts a ceiling panel out of its normal position. If the Recessed Escutcheon cannot be engaged with the Support Cup or the Recessed Escutcheon cannot be engaged sufficiently to contact the ceiling, the Sprinkler Fitting must be repositioned.

Figure 4 - UL Specific Application Sloped Ceiling Design Criteria

Pendants Located Along Multiple Slopes

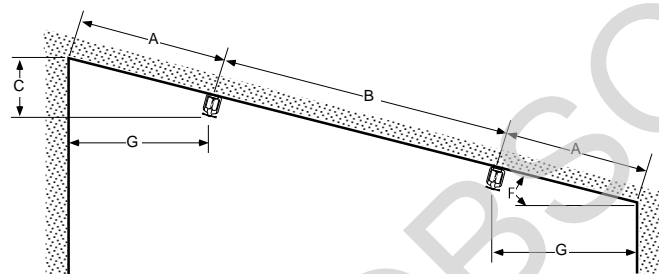
- Spacing is measured along the slope.
- One row of sprinklers is shown on the sloping ceiling for clarity. Actual number of sprinklers within a compartment is unlimited.
- Cathedral ceiling applications: An 8" minimum beam or lintel is required at the peak.
- If a loft adjoins the sloped ceiling compartment, a minimum 8" deep lintel is required between the loft and the ceiling.
- Hydraulic calculations shall conform to the appropriate NFPA standard. Calculate the two (NFPA 13D) or four (NFPA 13R) most demanding sprinklers along one slope. If there are less than two (NFPA 13D) or four (NFPA 13R) sprinklers along one slope, calculate all the sprinklers along one slope. For ceilings with adjoining lofts, add one sprinkler in the loft to the hydraulic calculations.
- Openings in the perimeter walls, such as a doorway or adjoining hallway, must maintain a maximum height of 8 feet or less.



- a: minimum: 4" maximum: one-half the maximum calculated spacing
- b: minimum: 8'-0" maximum: 16'-0"
- The minimum lateral distance between sprinklers on opposing slopes is 8'-0"

Figure 5 - Sprinkler Location for Sloped Ceiling

Note the minimum distance between sprinklers changes by the angle of the slope. Verify the Listed flows and pressures for "maximum" and "1/2 maximum" distances. Dimensions "A" and "B" are measured along the slope. For angles greater than 60°, verify with Central's Technical Services Department.



- A** — NFPA minimum of 4" (verify "G" dimension minimum of 4"), maximum 1/2 of the Listed spacing that the sprinkler was calculated for. (i.e., 18' x 18' spacing is maximum of 9'-0" from a wall).
- B** — For angles 0° to 39° minimum B = 8'-0". For angles 40° to 45° minimum B = 9'-0". For angles 46° to 60° minimum B = 9'-6". Maximum Listed spacing that the sprinkler was calculated for.
- C** — Maximum of 3'-0" vertically from the peak.
- F** — Acceptable for angles 0° to 60°.
- G** — Minimum of 4", for maximum, refer to "A" and measure along slope.

Figure 6 - Symmetric Sprinkler Location on Opposing Slopes*

The minimum distance between sprinklers on opposing slopes is measured horizontally, some difficult conditions can be solved by staggering the sprinklers, thus increasing the horizontal distance. Remember to measure along the slope for "A" and "B". For angles greater than 60°, verify with Central's Technical Services Department.

- A** — NFPA minimum of 4", maximum 1/2 of the Listed spacing that the sprinkler was calculated for.
- B** — See "E" for minimum spacing. Maximum Listed spacing that the sprinkler was calculated for.
- C** — Maximum 3'-0" vertically from the peak.
- E** — NFPA minimum of 8'-0" (when minimum of 8'-0" cannot be obtained due to "B", a baffle must be installed between these sprinklers to obstruct the discharge and prevent cold-solder). See "B" for maximum.
- F** — Acceptable for angles 0° to 60°.

* For unequal spacing down from peak, see Figure 8.

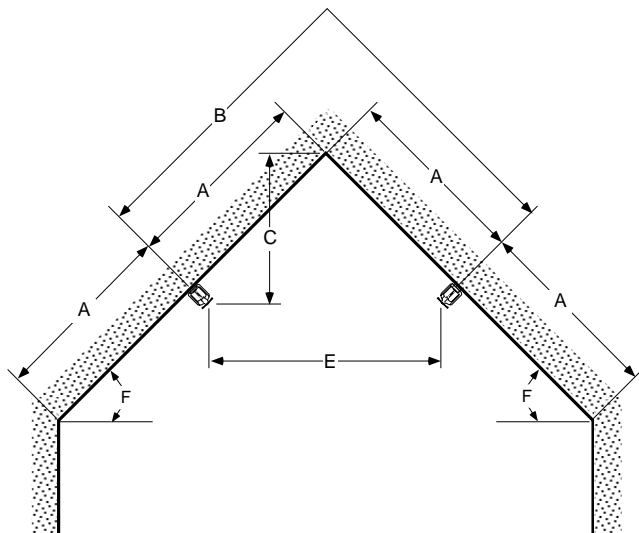
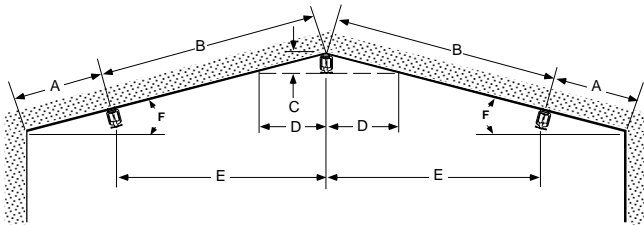


Figure 7 - Spacing for Sprinkler at the Peak of a Sloped Ceiling

First verify that the sprinkler at the peak is considered to be "Acceptable" or "Obstructed" by the sloped ceiling in accordance with Figure 12 Graph. Measure horizontally from the deflector to the sloped ceiling, this is equal to the "D" dimension in the Figure 12 Graph. If the "D" dimension is "Acceptable", then Figure 7 applies. If "D" is "Obstructed", then the protection area of the sprinkler at the peak will be the horizontal distance to the obstructing ceiling. The minimum distance between sprinklers is measured horizontally. Staggering sprinklers will help maintain minimum horizontal distances in difficult situations. Dimensions "A" and "B" are measured along the slope. For angles greater than 60°, verify with Central's Technical Services Department.



- A — NFPA minimum 4", maximum 1/2 of the Listed spacing that the sprinkler was calculated for.
- B — See "E" for minimum spacing. Maximum Listed spacing that the sprinkler was calculated for.
- C — Maximum of 3'-0" vertically from the peak.
- D — Horizontal distance from the deflector to the intersecting sloped ceiling.
- E — NFPA minimum of 8'-0" (when minimum of 8'-0" cannot be obtained due to "B", a baffle must be installed between these sprinklers to obstruct the discharge and prevent cold-solder). See "B" for maximum.
- F — Acceptable for angles 0° to 60°.

Figure 8 - Sprinkler Location on Opposing Slopes

First verify that the sprinkler nearest the peak is "Acceptable" or "Obstructed" per Figure 14. If "Acceptable", Figure 8 applies. If "Obstructed", the horizontal distance to the opposing slope is to be considered as the protected area. The minimum distance between sprinklers is measured horizontally, shown as dimension "E". Staggering the sprinklers will help maintain minimum horizontal distances in difficult situations. Dimensions "A" and "B" are measured along the slope. For angles greater than 60°, verify with Central's Technical Services Department.

- A — NFPA minimum of 4", maximum 1/2 of the Listed spacing that the sprinkler was calculated for.
- B — See "E" for minimum spacing. Maximum Listed spacing that the sprinkler was calculated for.
- C — Maximum of 3'-0" vertically from the peak.
- D — Minimum 4". Also, see note above.
- E — NFPA minimum of 8'-0" (when minimum of 8'-0" cannot be obtained due to "B", a baffle must be installed between these sprinklers to obstruct the discharge and prevent cold-solder). See "B" for maximum.
- F — Acceptable for angles from 0° to 60°.

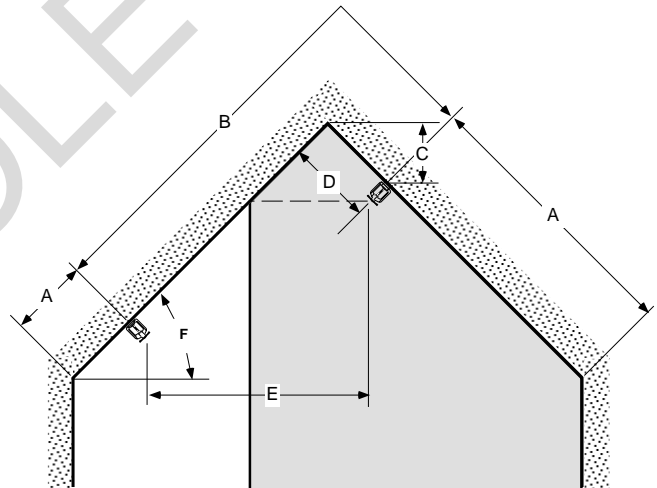
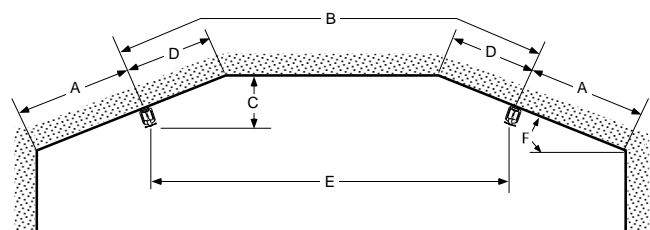


Figure 9 - Sprinkler Location on Coffered Ceiling

First verify that "D" is "Acceptable" or "Obstructed" per Figure 13. If "Acceptable", Figure 9 applies. If "Obstructed", additional sprinklers will be necessary to protect the flat ceiling area. The minimum distance between sprinklers is measured horizontally. Staggering sprinklers will help maintain minimum horizontal distances in difficult situations. Dimensions "A" and "B" are measured along the slope. For angles greater than 60°, verify with Central's Technical Services Department.

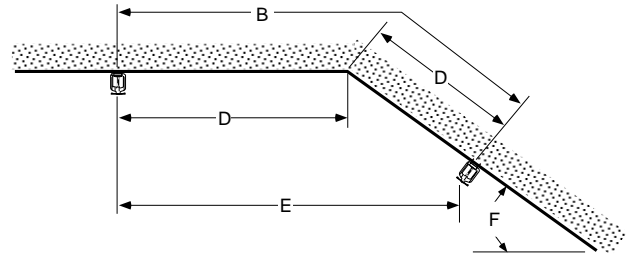
- A — NFPA minimum of 4", maximum 1/2 of the Listed spacing that the sprinkler was calculated for.
- B — See "E" for minimum spacing. Maximum Listed spacing that the sprinkler was calculated for.
- C — Maximum 3'-0" vertically from the peak.
- D — Refer to Figure 13.



- E — NFPA minimum of 8'-0" (when minimum of 8'-0" cannot be obtained due to "B", a baffle must be installed between these sprinklers to obstruct the discharge and prevent cold-solder). See "B" for maximum.
- F — Acceptable for angles 0° to 60°.

Figure 10 - Minimum Distance Between Sprinklers on Intersecting Ceilings

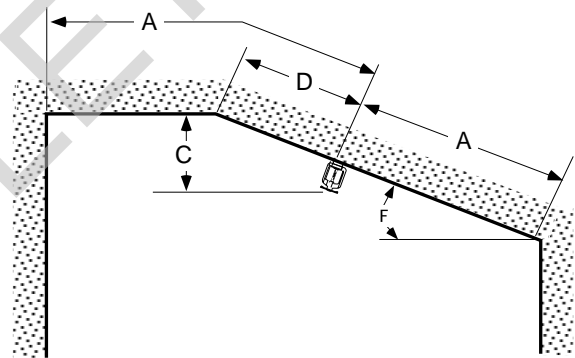
First verify that "D" is "Acceptable" or "Obstructed" per Figure 12 for the horizontal ceiling sprinkler and Figure 13 for the sloped ceiling sprinkler. If "Acceptable", Figure 10 applies. If "Obstructed", per Figure 12 or 13, then "D" is to be considered the area of coverage. The minimum distance between sprinklers is measured horizontally. Staggering sprinklers will help maintain maximum horizontal distances in difficult situations. Dimension "B" is measured along the slope. For angles greater than 60°, verify with Central's Technical Services Department.



- B** — See "E" for minimum spacing. Maximum Listed spacing that the sprinkler was calculated for.
- D** — Distance to intersecting ceiling.
- E** — NFPA minimum of 8'-0" (when minimum of 8' cannot be obtained due to "B", a baffle must be installed between these sprinklers to obstruct the discharge and prevent cold-solder) see "B" for maximum.
- F** — Acceptable for angles 0° to 60°.

Figure 11 - Sprinkler Location on Sloped Ceiling Intersecting a Flat Ceiling

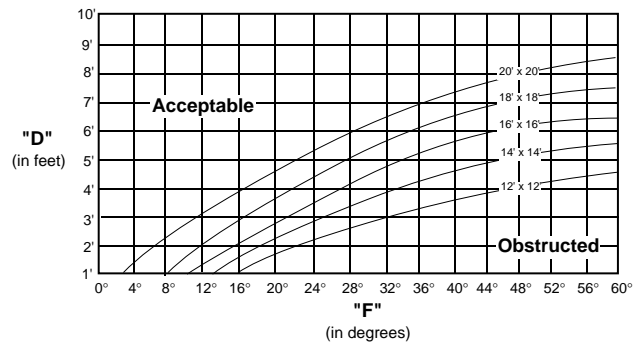
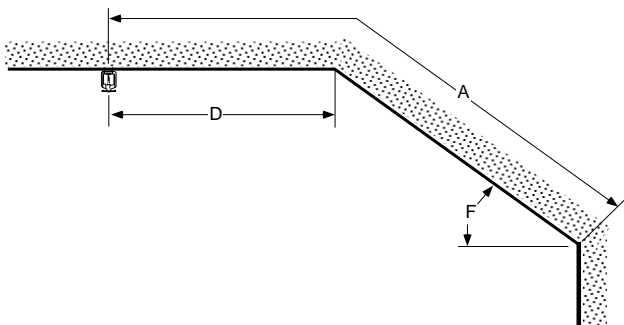
First verify that "D" is "Acceptable" or "Obstructed" per Figure 13. If "Acceptable", Figure 11 applies. If "Obstructed", additional sprinklers will be necessary to protect the flat ceiling area. Dimension "A" is measured along the slope. For angles greater than 60°, verify with Central's Technical Services Department.



- A** — NFPA minimum of 4", maximum 1/2 of the Listed spacing that the sprinkler was calculated for.
- C** — Maximum 3'-0" vertically from the peak.
- D** — Refer to Figure 13.
- F** — Acceptable for angles 0° to 60°.

Figure 12 - Obstruction to Discharge by Intersecting Sloped Ceiling

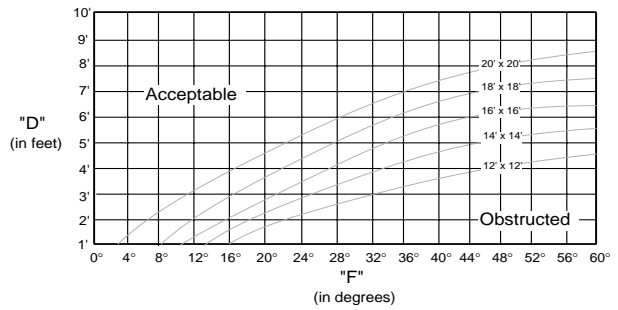
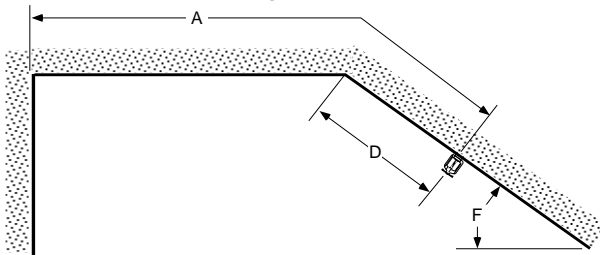
If "D" is "Obstructed" per Figure 12 Graph, then "D" is to be considered the area of coverage and additional sprinklers along the sloped ceiling will be necessary. Only if "D" is "Acceptable" can "A" be considered 1/2 of the maximum Listed spacing that the sprinkler was calculated for. Dimension "A" is measured along the slope.



- A** — Maximum 1/2 of the Listed spacing that the sprinkler was calculated for.
- D** — Distance to intersecting sloped ceiling.
- F** — Acceptable for angles 0° to 60°.

Figure 13 - Obstruction to Discharge by Intersecting Flat Ceiling

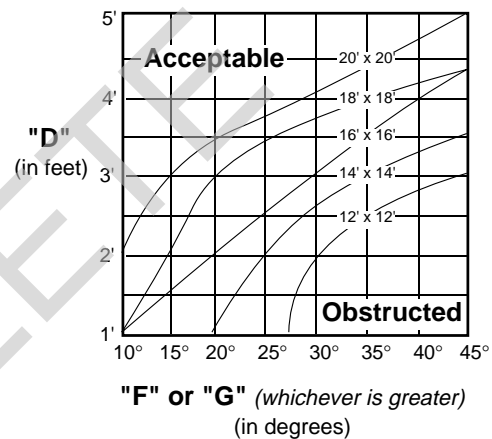
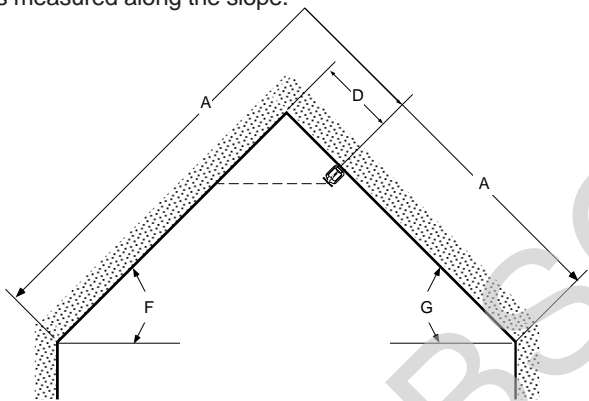
If "D" is "Obstructed" per Figure 13 Graph, then "D" is to be considered the area of coverage and additional sprinklers along the horizontal ceiling will be necessary. Only if "D" is "Acceptable" can "A" be considered 1/2 of the maximum Listed spacing that the sprinkler was calculated for. Dimension "A" is measured along the slope.



- A** — Maximum 1/2 of the Listed spacing that the sprinkler was calculated for.
- D** — Distance to intersecting horizontal ceiling.
- F** — Acceptable for angles 0° to 60°.

Figure 14 - Obstruction to Discharge by an Opposing Sloped Ceiling

If "D" is "Obstructed" per Figure 14 Graph, then the horizontal distance to the opposing slope is the extent of coverage and additional sprinklers will be necessary to protect the remainder of the opposing slope. Only if "D" is "Acceptable" can "A" equal 1/2 of the maximum Listed spacing that the sprinkler was calculated for. Dimension "A" is measured along the slope.



- A** — NFPA minimum of 4", maximum 1/2 of the Listed spacing that the sprinkler was calculated for.
- D** — Distance to opposing sloped ceiling.
- F & G** — Acceptable for angles 0° to 60°.



Care & Maintenance

The Central Model BV-R1 must be maintained and serviced in accordance with the following instructions:

NOTES

Wet pipe sprinkler systems must be maintained at a minimum temperature of 40°F/4°C to prevent freezing and bursting of the pipe and/or sprinklers.

Automatic sprinklers are not to be tested with a heat source. Operation of the heat responsive element (bulb) can result.

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

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

Do NOT enclose sprinklers within drapes, curtains, or valances.

Do NOT hang anything from the sprinklers.

Do NOT cleanse the sprinklers with soap and water, detergents, ammonia, cleaning fluids, or other chemicals. Remove dust, lint, cobwebs, cocoons, insects, and larvae by gently brushing with a feather duster or gently vacuuming with a soft bristle (i.e., dusting) brush attachment.

Exercise suitable safety precautions in the use and storage of highly flammable materials. The rapid rate of fire development and spread of which can be caused by such materials can reduce the ability of the sprinkler system to aid in the control of a fire in which they are involved.



Care & Maintenance (Continued)

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

Automatic sprinklers must never be shipped or stored where its temperature will exceed 100°F/38°C and they must never be painted, plated, coated, or otherwise altered after leaving the factory. Modified sprinklers must be replaced. Sprinklers that have been exposed to corrosive products of combustion, but have not operated, should be completely cleaned by wiping the sprinkler with a cloth or by brushing it with a soft bristle brush.

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

The Central Model BV-R1 must only be replaced with pendent sprinklers which are listed for residential fire protection service and which have the same nominal K-factor, the same coverage area, and the same or lower flow ratings (as indicated under "Design Criteria").

When remodeling, such as by adding false beams or light fixtures or changing the location of compartment walls, first verify that the new construction will not violate the installation requirements stated under WARNINGS. Alter the new construction and/or the sprinkler system to suit the requirements of this document.

The owner is responsible for the inspection, testing, and maintenance of their fire protection system and devices in compliance with this document, as well as with the applicable standards of the National Fire Protection Association (e.g., NFPA 25), in addition to the standards of any other authorities having jurisdiction. The installing contractor or sprinkler manufacturer should be contacted relative to any questions.

It is recommended that automatic sprinkler systems be inspected, tested, and maintained by a qualified Inspection Service.

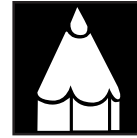


Limited Warranty

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Ordering Information

Ordering Information: When placing an order, indicate the full product name. Please specify the quantity, model, style, orifice size, temperature rating, type of finish or coating, and sprinkler wrench. Refer to price list for complete listing of Part Numbers.

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