Residential Sprinkler Design & Installation Guide

Central Sprinkler Company
451 N. Cannon Avenue
Lansdale, PA 19446

Optima™, Omega™ & Glass Bulb Residential Sprinklers

I. General

Central Sprinkler Company's Residential Sprinklers are fast response automatic fire sprinklers. They are to be used only in wet-pipe sprinkler systems in occupancies where residential sprinklers are required or permitted by NFPA 13, NFPA 13R and NFPA 13D.

II. Design

The design criteria for Residential Sprinklers begins with Underwriter's Laboratories Publication UL 1626 - "Residential Sprinklers". All Central residential sprinklers are Listed under UL 1626 with specific published spacings, flows and pressures for each model of residential sprinkler. The design criteria for residential sprinklers contained in the current NFPA Standards must be followed except as modified by the individual UL 1626 listing information contained in the catalog information sheets and this installation guide. The approval of all residential sprinkler designs and installations must be made by the *Authority Having Jurisdiction* for compliance with all governmental codes and standards.

III. Spacing

When spacing Residential Sprinklers, the following criteria must be verified:

A. Spacing

A Residential Sprinkler is Listed by Underwriter's Laboratories, Inc. for various maximum spacings in accordance with minimum flows and pressures. An example is the multiple head calculation of a Model R-1M. At 9 gpm each, these heads will protect a 14' x 14' area up to 7' from a wall. While at 16 gpm each, the same heads will protect a 20' x 20' area up to 10' from a wall. It is critical to understand the intended area of coverage while using this guide. Always remember that the spacing of sprinklers under sloped ceilings is measured along the slope when determining distance from walls or between sprinklers.

B. Location

Sensitivity to heat is a key to Residential Sprinklers. Residential Sprinklers should not be located more than 3'-0" measured vertically from any peaked ceiling.

C. Cold-Solder

The minimum distance between Residential Sprinklers, per NFPA 13D is 8'-0". This requirement is based on smooth flat ceiling conditions. Sloped ceilings are cause for concern for cold-solder since the elevation of one sprinkler may be higher than another, causing a different distribution pattern than that of flat ceiling conditions. Figures 1, 2, 3, 4, 5, 6 and 12 reference the minimum acceptable distance between sprinklers under various conditions. One solution to cold-solder is to stagger the sprinklers so that the distance between two heads is increased.

D. Obstructions

Figures 8, 9, 10, 11 and 13 answer the question, "if the discharge pattern of a sprinkler at a given area of protection will be acceptable or obstructed". If the obstruction is "acceptable", then the appropriate spacing is allowed. If it is "obstructed", then the obstruction is to be considered the maximum distance away from the sprinkler and additional heads beyond the obstruction will be necessary. Omega style sprinkler deflectors drop a 1/2" and the ROC's deflector drops approximately 1". Take this into account as it may help to reduce obstructions.

E. Proximity to a Heat Source

The heat source informatin is changing slightly as NFPA has provided guidence. Take note of the intermediate temperature sprinkler as it can provide an advantage in locating sprinklers close to heat sources. Figures 14, 15, 16, 17, 18 and 19 show the area of concern for location of Residential Sprinklers. Sprinklers must be located outside of the shaded zone to prevent premature activation due to elevated temperatures.

IV Hydraulics

Hydraulic calculations shall be done in accordance with the appropriate NFPA Standard. The minimum flow and pressure required for all Central's Residential Sprinklers is Listed by Underwriter's Laboratories, Inc. and shown in each individual data sheet. For pendents with unequal sided dimensions, use the larger of the dimensions and always round up. For example, 14'-2" x 11'-6" would be

calculated at 16' x 16'. Compliance with the single head flow as well as multiple head flow for the appropriate spacing must be verified. The number of sprinklers to calculate must be verified with the appropriate NFPA Standard as well as the *Authority Having Jurisdiction*. More sprinklers may need to be calculated than the minimum NFPA Standards where unusual conditions would result in more sprinklers operating. These conditions include sloped or beamed ceilings.

V. Approvals

Central Residential Sprinklers are Listed by Underwriters Laboratories, Inc. and have passed fire tests designed to represent fire conditions for the areas listed. Refer to Underwriter's Laboratories, Inc. Publication UL 1626, *"Residential Sprinklers for Fire Protection Service",* for Residential Sprinkler performance and spray pattern standards. For Listed areas of coverage, flows and pressures use the individual data sheets and this guide.

VI. Installation

Central Residential Sprinklers must be installed according to current NFPA 13, NFPA 13D and NFPA 13R Standards for residential sprinklers. The *Authority Having Jurisdiction*, Central's Residential Installation Guide and the individual data sheets which contain specific criteria on each sprinkler should be referenced in every installation.

Prior to installation, check for the proper model, style, orifice size, and temperature rating. Install sprinklers after the piping is in place to avoid mechanical damage; replace any damaged sprinklers. Avoid installing sprinklers prior to the use of space heaters for drying of texturing or painting where expected ambient temperatures exceed 100°F/ 38°C.

Final acceptance of the installation of residential sprinklers is the responsibility of the *Authority Having Jurisdiction*.

Installation Sequence

Step 1. The sprinkler must be installed in the pendent position for pendent sprinklers, and in the sidewall position for sidewall sprinklers.

Step 2. Use only a non-hardening pipe joint compound or Teflon tape. Apply only to the male threads.

Step 3. Hand tighten the sprinkler into the fitting. Use the appropriate Central Sprinkler Wrench to tighten the unit into the fitting. A leak tight joint requires the application of only 7 to 14 ft.-lbs. of torque. A tangential force of 14 to 28 lbs. delivered through a 6" handle will deliver adequate torque. Torque levels over 21 ft.-lbs. may distort the orifice seal, resulting in leakage.

Do not use the push-on escutcheon plate (when applicable) to hold the unit in position. The sprinkler will function properly only when the system piping is anchored to the building structure. Otherwise, reaction forces from system initiation could alter the sprinkler alignment and disrupt the distribution pattern. Do not over or under tighten the sprinkler to compensate for inaccurate escutcheon plate adjustment. Re-adjust the sprinkler fitting as required.

CAUTION

NEVER INTRODUCE WATERGLASS OR OTHER LEAK STOPPING ADDITIVES TO ANY FIRE SPRINKLER SYSTEM.

When using Residential Sprinklers, special care must be taken when installing a CPVC system. Sprinklers must be installed after the CPVC manufacturer's recommended setting time for the primer and cement to ensure that neither accumulate within the sprinkler. Other CPVC specific requirements can be found in the CPVC Installation Guide. For example, specific kinds of pipe dope are not allowed.

When using Residential Sprinklers, special care must be taken when installing a copper system. Sprinklers must be installed only after the inside of the sprinkler drop and associated fittings have been wire brushed to remove any residual flux. Residual flux can cause corrosion and in extreme cases can impair proper sprinkler operation.

Residential fire sprinkler systems must only be designed and installed by those competent and completely familiar with automatic sprinkler system design, installation procedures and techniques.

VII. Maintenance

Residential Sprinklers must be installed and maintained in accordance with current NFPA Standards and the *Authority Having Jurisdiction.*

Central Residential Sprinklers

Model	K Factor	Maximum Spacing Between Sprinklers	Maximum Location From Any Wall	Minimum Design Flow (pressure)			
				One Sprinkler		Two or More Sprinklers	
				(GPM)	(PSI)	(GPM)	(PSI)
ROC Concealed	4.2	12' *(or less)*	6' *(or less)*	18	18.4	13	9.6
		16'	8'	18	18.4	13	9.6
		18'	9'	24	32.7	17	16.4
		20'	10'	24	32.7	17	16.4
LF ⅜" 155° Pendent	3.0	12' *(or less)*	6' *(or less)*	***10***	11.1	***8***	7.1
		14'	7'	***10***	11.1	***8***	7.1
		16'	8'	***10***	11.1	***8***	7.1
		18'	9'	***14***	21.8	***10.5***	12.3
		20'	10'	***16***	28.4	***13.5***	20.3
LF ⅜" 175° Pendent	3.0	12' *(or less)*	6' *(or less)*	10	11.1	8	7.1
		14'	7'	12	16.0	8.5	8.0
		16'	8'	12	16.0	8.5	8.0
		18'	9'	15	25.0	10.5	12.3
		20'	10'	16	28.4	13.5	20.3
LF ⅜" 155° & 175° Pendent (4"-8" Below Ceiling)	3.0	12' *(or less)*	6' *(or less)*	11	13.4	8	7.1
		14'	7'	12	16.0	9	9.0
		16'	8'	14	21.8	10.5	12.3
		18'	9'	14	21.8	12	16.0
		20'	10'	16	28.4	15	25.0
LF ⅜" Sidewall	3.5	12' *(or less)*	6' *(or less)*	***14***	16.0	***11***	9.9
		14'	7'	***14***	16.0	***12***	11.8
		16'	8'	***16***	20.9	***13***	13.8
GBR 7⁄16" Pendent	4.3	14' *(or less)*	7' *(or less)*	14	10.6	11	6.5
		16'	8'	16	13.8	12	7.8
		18'	9'	19	19.5	14	10.6
GBR 7⁄16" Recessed Pendent	4.3	14' *(or less)*	7' *(or less)*	14	10.6	11	6.5
		16'	8'	16	13.8	12	7.8
		18'	9'	19	19.5	16	13.8
GBR 7⁄16" Concealed Pendent	4.3	12' *(or less)*	6' *(or less)*	13	9.1	10	5.4
		14'	7'	16	13.8	13.5	9.9
		16'	8'	21	23.9	15	12.2
GBR S/W ½" Sidewall	5.4	12'x12' *(or less)*	6' *(or less)**	20	13.7	18	11.1
		16'x18' *(or less)*	8'*	***22***	16.6	***20***	13.7
		16'x20' *(or less)*	8'*	***30***	30.9	***25***	21.4
GBR-2 Pendent & Recessed Pendent	4.3	12'x12' *(or less)*	6' *(or less)*	13	9.1	10	5.4
		16'x16' *(or less)*	8'	18	17.5	14	10.6
		20'x20' *(or less)*	10'	20	21.6	16	13.8
Omega R-1M Pendent	3.9	12' *(or less)*	6' *(or less)*	10	6.6	9	5.3
		14'	7'	10	6.6	9	5.3
		16'	8'	14	12.9	11	8.0
		18'	9'	14	12.9	12	9.5
		20'	10'	16	16.8	16	16.8
Omega EC-20A Pendent	5.6	12' *(or less)*	6' *(or less)*	19	11.5	16	8.2
		14'	7'	25	19.9	18	10.3
		16'	8'	30	28.7	21	14.1
		18'	9'	32	32.7	29	26.8
Omega HEC-12 RES Sidewall	5.6	12'x12' *(or less)*	6' *(or less)**	26	21.6	18	10.3
		14'x14'	7'*	27	23.2	21	14.1

** For sidewalls, this references width of pattern from the sprinkler to the wall off to the side.* ***Bold*** *indicates lowest flow available for orientation.*

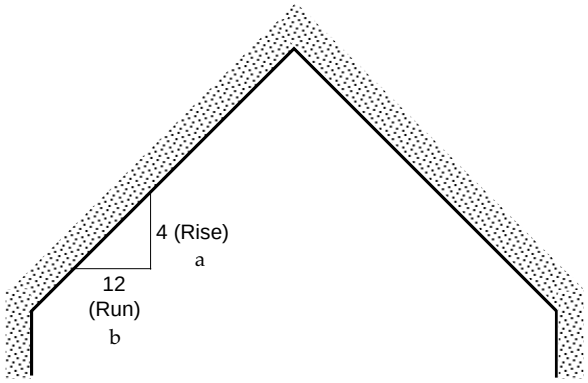
Rise Over Run Conversion to Degrees of an Angle

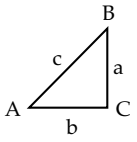
Rise (a) (in inches)	1"	2"	3"	4"	5"	6"	7"	8"	9"	10"	11"	12"	13"	14"	15"	16"	17"	18"	19"	20"
12"							60°	56°	53°	50°	47°	45°	43°	41°	39°	37°	35°	34°	32°	31°
11"							58°	54°	51°	48°	45°	43°	40°	38°	36°	35°°	33°	31°	30°	29°
10"						59°	55°	51°	48°	45°	42°	40°	38°	36°	34°	32°	30°	29°	28°	27°
9"						56°	52°	48°	45°	42°	39°	37°	35°	33°	31°	29°	28°	27°	25°	24°
8"					58°	53°	49°	45°	42°	39°	36°	34°	32°	30°	28°	27°	25°	24°	23°	22°
7"				60°	54°	49°	45°	41°	38°	35°	32°	30°	28°	27°	25°	24°	22°	21°	20°	19°
6"				56°	50°	45°	41°	37°	34°	31°	29°	27°	25°	23°	22°	21°	19°	18°	18°	17°
5"			59°	51°	45°	40°	36°	32°	29°	27°	24°	23°	21°	20°	18°	17°	16°	16°	15°	14°
4"			63°	45°	39°	34°	30°	27°	24°	22°	20°	18°	17°	16°	15°	14°	13°	13°	12°	11°
3"		56°	45°	37°	31°	27°	23°	21°	18°	17°	15°	14°	13°	12°	11°	11°	10°	9°	9°	9°
2"		45°	34°	27°	22°	18°	16°	14°	13°	11°	10°	9°	9°	8°	8°	7°	7°	6°	6°	6°
1"	45°	27°	18°	14°	11°	9°	8°	7°	6°	6°	5°	5°	4°	4°	4°	4°	3°	3°	3°	3°

Run (b) *(in inches)*

All angles have been rounded to the nearest degree.
Please verify shaded area with Central's Technical Services Department since angles greater than 60° will require design review.

Example



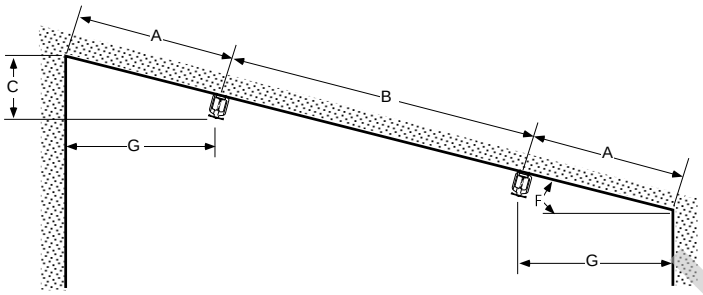


Angle A = (Tan A = $\frac{a}{b}$)

(Tan A = $\frac{4}{12}$) = 18°

Figure 1
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 "½ 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 ½ 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.

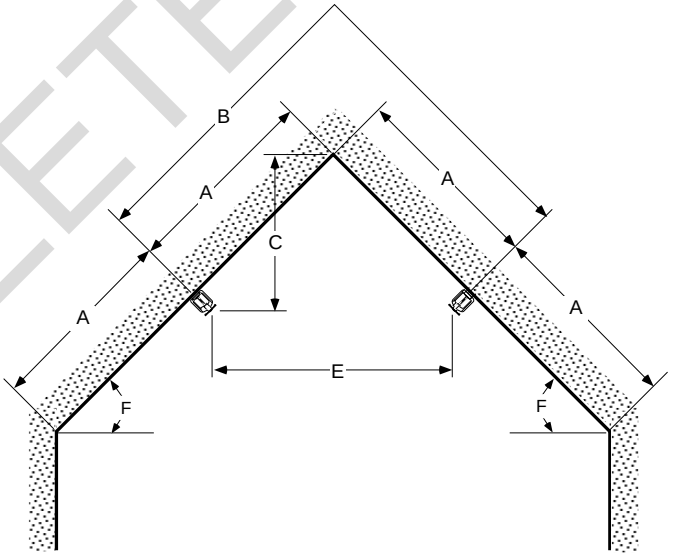
C — Maximum of 3'-0" vertically from the peak.

F — Acceptable for angles 0° to 60°.

G — Minimum of 4", for maximum, refer to "A" and measure along slope.

Figure 2
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 ½ 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.

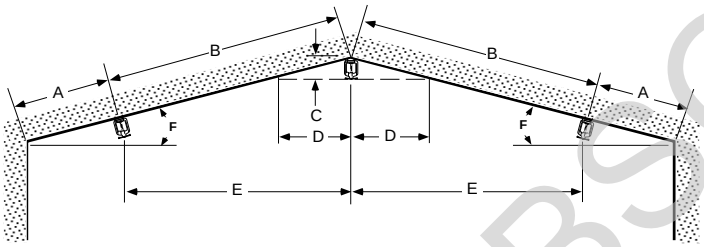
E — NFPA minimum of 8'-0" (when minimum of 8'-0" cannot be obtained due to "B", a baffle must be installed between these sprinklers to obstruct the discharge and prevent cold-solder). See "B" for maximum.

F — Acceptable for angles 0° to 60°.

** For unequal spacing down from peak, see Figure 4.*

Figure 3
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 8 Graph. Measure horizontally from the deflector to the sloped ceiling, this is equal to the "D" dimension in the Figure 8 Graph. If the "D" dimension is "Acceptable", then Figure 3 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 ½ 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.

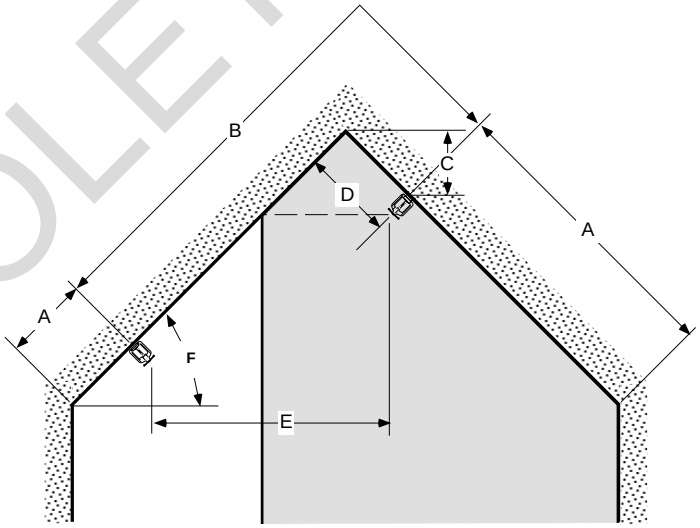
D — Horizontal distance from the deflector to the intersecting sloped ceiling.

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 4
Sprinkler Location on Opposing Slopes

First verify that the sprinkler nearest the peak is "Acceptable" or "Obstructed" per Figure 10. If "Acceptable", Figure 4 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 ½ 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.

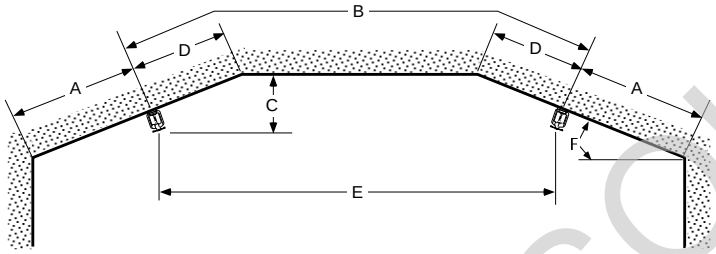
D — Minimum 4". Also, see note above.

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 5
Sprinkler Location on Coffered Ceiling

First verify that “D” is “Acceptable” or “Obstructed” per Figure 9. If “Acceptable”, Figure 5 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 ½ 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.

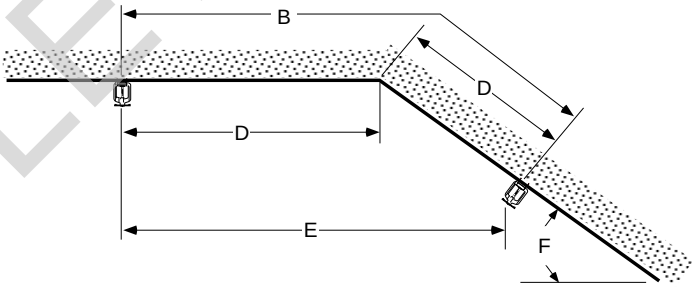
D — Refer to Figure 8.

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 6
Minimum Distance Between Sprinklers on Intersecting Ceilings

First verify that “D” is “Acceptable” or “Obstructed” per Figure 8 for the horizontal ceiling sprinkler and Figure 9 for the sloped ceiling sprinkler. If “Acceptable”, Figure 6 applies. If “Obstructed”, per Figure 8 or 9, 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.

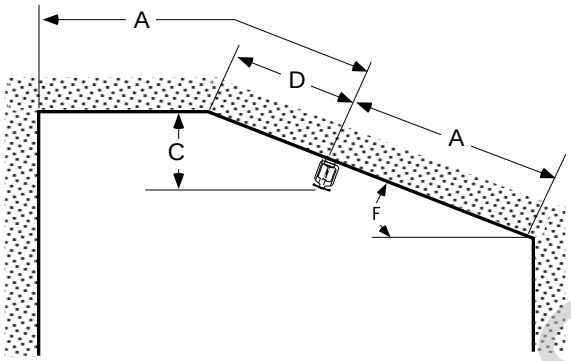
D — Distance to intersecting ceiling.

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 7
Sprinkler Location on Sloped Ceiling Intersecting a Flat Ceiling

First verify that “D” is “Acceptable” or “Obstructed” per Figure 9. If “Acceptable”, Figure 7 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 ½ of the Listed spacing that the sprinkler was calculated for.

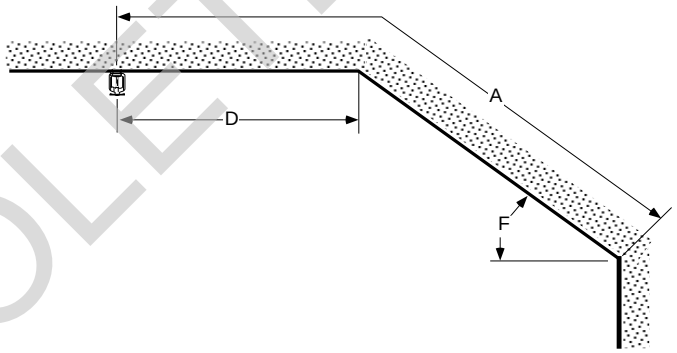
C — Maximum 3'-0" vertically from the peak.

D — Refer to Figure 8.

F — Acceptable for angles 0° to 60°.

Figure 8
Obstruction to Discharge by Intersecting Sloped Ceiling

If “D” is “Obstructed” per Figure 8 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 ½ of the maximum Listed spacing that the sprinkler was calculated for. Dimension “A” is measured along the slope.



A — Maximum ½ of the Listed spacing that the sprinkler was calculated for.

D — Distance to intersecting sloped ceiling.

F — Acceptable for angles 0° to 60°.

Figure 8 Graph

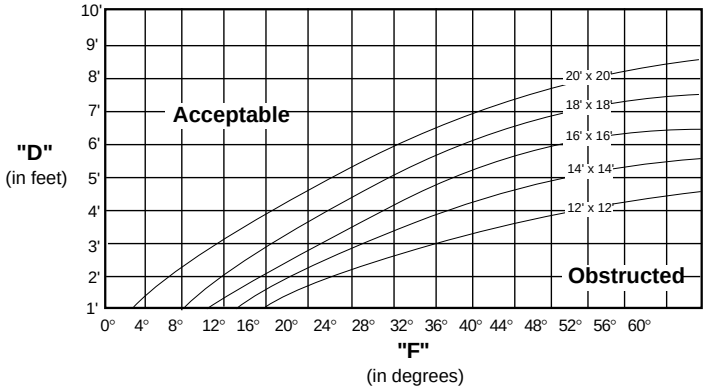
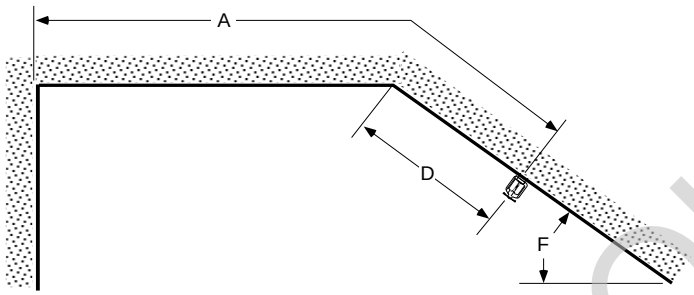


Figure 9
Obstruction to Discharge by Intersecting Flat Ceiling

If "D" is "Obstructed" per Figure 9 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 ½ of the maximum Listed spacing that the sprinkler was calculated for. Dimension "A" is measured along the slope.



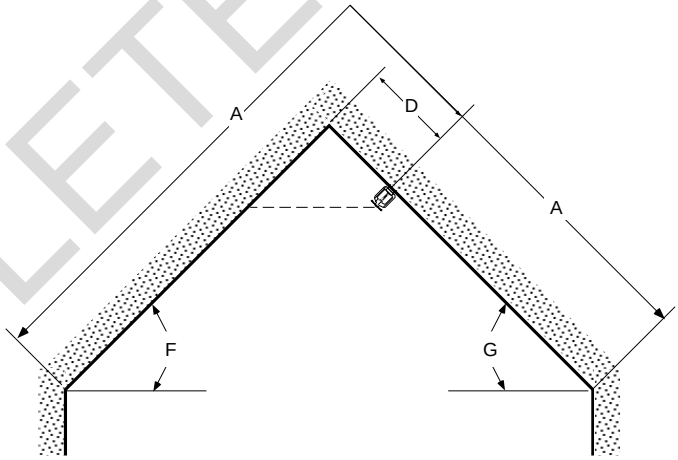
A — Maximum ½ of the Listed spacing that the sprinkler was calculated for.

D — Distance to intersecting horizontal ceiling.

F — Acceptable for angles 0° to 60°.

Figure 10
Obstruction to Discharge by an Opposing Sloped Ceiling

If "D" is "Obstructed" per Figure 10 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 ½ of the maximum Listed spacing that the sprinkler was calculated for. Dimension "A" is measured along the slope.



A — NFPA minimum of 4", maximum ½ of the Listed spacing that the sprinkler was calculated for.

D — Distance to opposing sloped ceiling.

F & G — Acceptable for angles 0° to 60°.

Figure 9 Graph

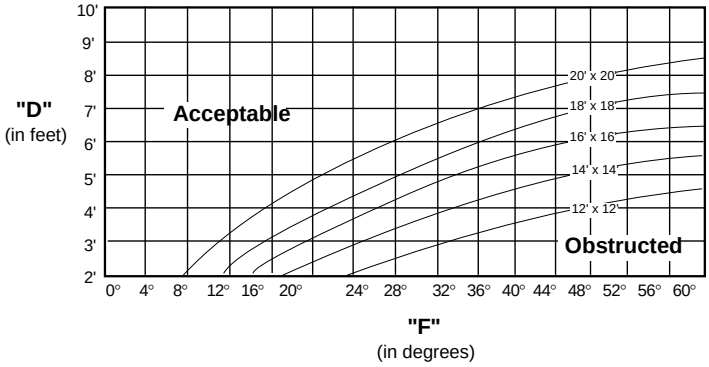


Figure 10 Graph

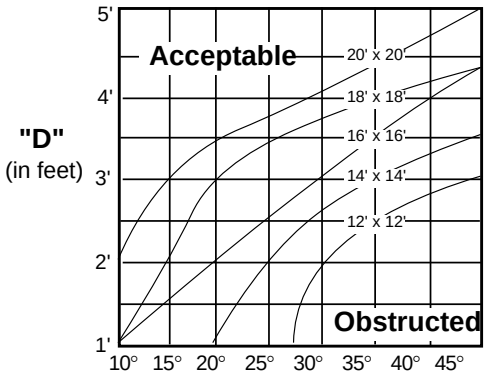


Figure 11
Beam Obstructions for Pendent Sprinklers

Obstructions to discharge patterns can be beams, light fixtures, ceiling offsets and ornamental decorations. The key to using Figure 11 is to verify the distance of the deflector above the bottom of the obstruction "C" and the distance away from the edge of the obstruction "D". If obstructed per Figure 11 Graph, additional sprinklers will be necessary beyond the obstruction.

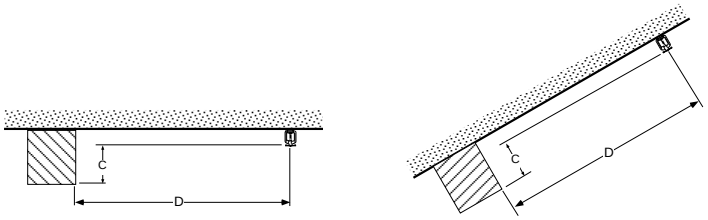


Figure 11 Graph

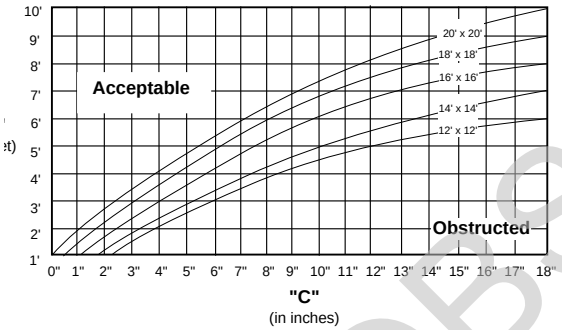
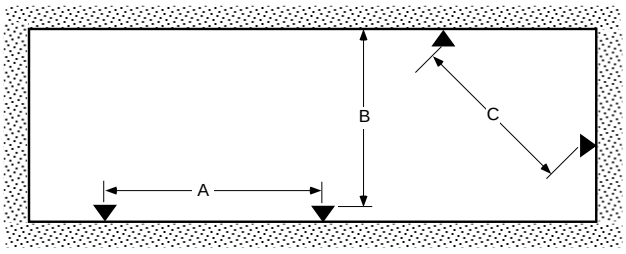


Figure 12
Sidewall Sprinkler Spacing

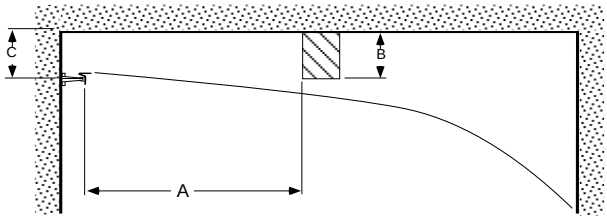


A — NFPA minimum of 8'-0", maximum ½ of the Listed spacing that the sprinkler was calculated for.

B — If another sprinkler is on the opposite wall, minimum 10'-0". Otherwise, the maximum Listed spacing that the sprinkler was calculated for.

C — NFPA minimum of 8'-0".

Figure 13
Beam Obstruction - Sidewall Sprinklers



A — The distance from the deflector to the beginning of the obstruction.

B — The depth of the beam obstruction.

C — The NFPA minimum for the deflector distance from the ceiling line is 4" with a maximum of 6" unless Listed otherwise.

Minimum Allowable	
A	**B - C***
8'	1"
9'	3"
10'	6"
11'	11"
12'	16"
13'	20"
14'	24"

* B minus C equals the difference between the depth of the obstruction and the placement of the sprinkler deflector from the finished ceiling line.

VI. Proximity of Sprinklers to Heat Sources

Sprinklers installed too close to heat sources can operate prematurely, and so must be placed a sufficient distance away from the heat source. Common heat sources in residential occupancies include kitchen ranges, wall ovens, fire places, stoves, light fixtures, hot water pipes, water heaters, furnaces, and associated flues and ducts. More specifically, keep sprinklers at least:

- 1'-6" laterally from the surfaces of kitchen ranges and wall ovens (Figure 18).
- 3'-0" laterally from the edges of fireplaces and 5'-0" laterally from the front of a recessed hearth fireplace (Figure 14 and 15).
- 3'-6" laterally from the surfaces of a stove (Figure 17).
- 6" laterally 2'-0" above the surfaces of furnaces, water heaters and light fixtures (Figure 16 and 19).
- 1'-0" laterally from the surfaces of hot air flues, un-insulated heating ducts, and un-insulated water pipes (Figure 16).
- 2'-0" laterally from the edges of a ceiling mounted hot air diffuser, and 2'-0" laterally from the sides and 3'-0" laterally from the front of wall-mounted hot air diffusers (Figure 19).

Figure 14
Open Hearth or Fireplace

Sprinklers must be spaced at least (3'-0" ordinary temp.), (`1'-0" intermediate temp.) laterally from the edges of fireplaces.

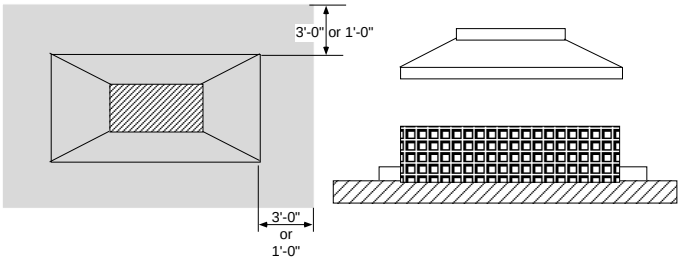


Figure 15
Recessed Hearth or Fireplace

Sprinklers must be spaced at least (7'-0" ordinary temp.) (3'-0" intermediate temp.) laterally from the front of a recessed hearth or fireplace. Sprinklers must be spaced at least (3'-0" ordinary temp.) (1'-0" intermediate temp.) laterally from the edge of the side of an open or recessed hearth or fireplace.

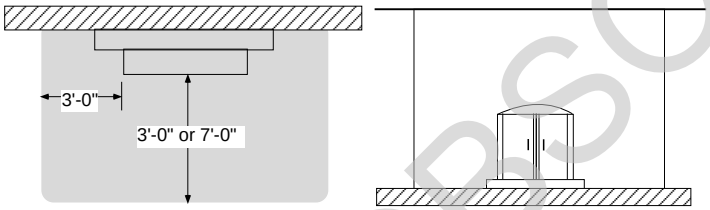


Figure 16
Furnace or Water Heater

Sprinklers must be spaced at least (0'-6" ordinary temp.), (0'-3" intermediate temp.) laterally from the edge surfaces of furnaces and water heaters and (1'-6" ordinary temp.), (0'-9" intermediate temp.) laterally from the surfaces of hot air flues, un-insulated heating ducts and (0'-6" ordinary temp.), (0'-3" intermediate temp.) laterally from the edge surfaces or uninsulated hot water pipes.

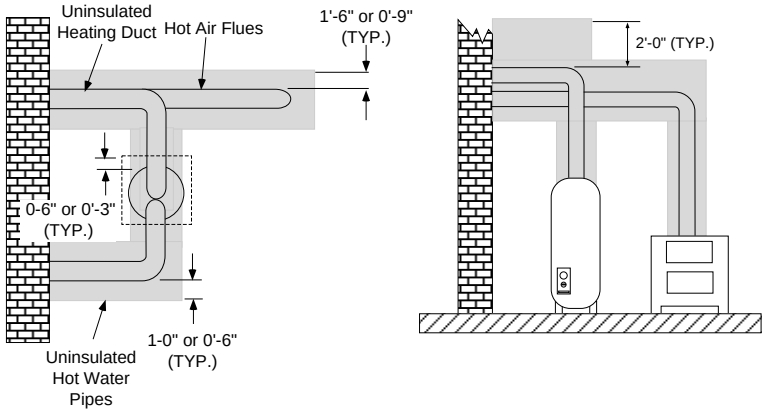


Figure 17
Coal or Wood Burning Stove

Sprinklers must be spaced at least (3'-6" ordinary temp.), (1'-0" intermediate temp.) laterally from the surfaces of a stove.

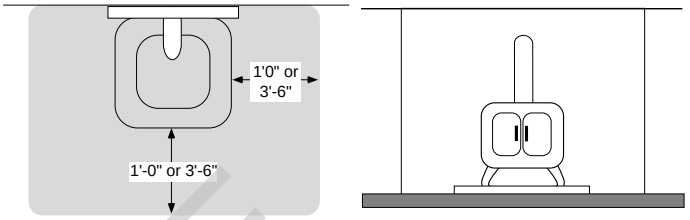


Figure 18
Range or Wall Oven

Sprinklers must be spaced at least (1'-6" ordinary temp.), (0'-9" intermediate temp.) laterally from the surfaces of kitchen ranges and wall ovens.

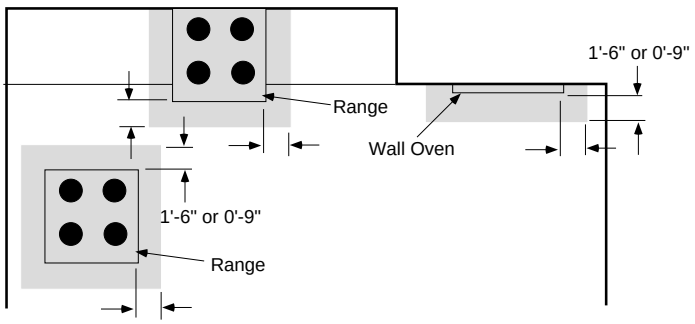


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Figure 19
Light Fixture or Hot Air Diffuser

Sprinklers must be spaced at least (3'-0" ordinary temp.), (1'-6" intermediate temp.) laterally from the edges of a ceiling and wall mounted hot air diffusers. Sprinklers must be spaced at least (3'-0" ordinary temp.), (1'-6" intermediate temp.) laterally from the front of wall-mounted hot air diffusers (0'-6" ordinary temp.), (0'-3" intermediate temp.) laterally from the edge of a 0-250 watt light fixture and (1'-0" ordinary temp.), 0'-6" intermediate temp. laterally from the edge of a 250-499 watt light fixture.

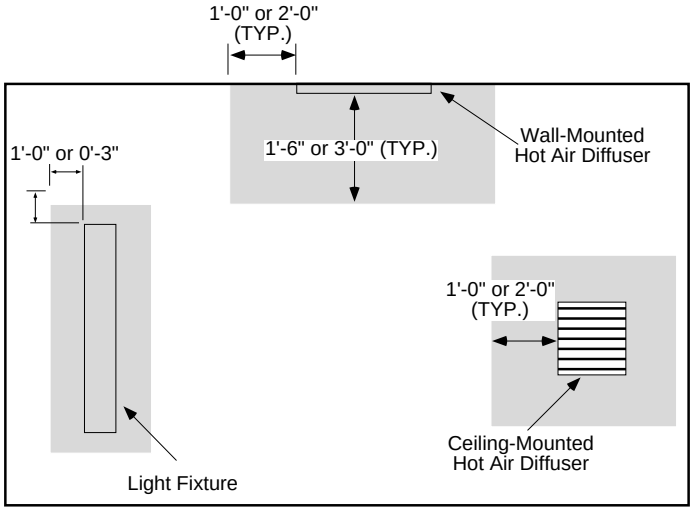
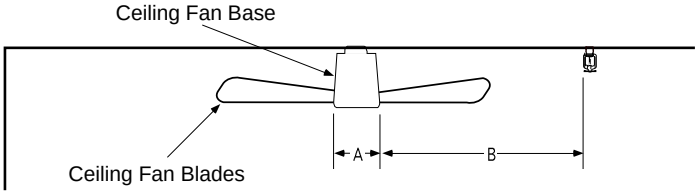


Figure 20
Ceiling Fan

For a ceiling mounted fan, consider the base attached to the ceiling an obstruction, but not the blades. See minimum distance from fan base table below.



Minimum Distance from Fan Base

A Maximum Dimension of Obstruction	B Minimum Horizontal Distance
1/2" - 1"	6"
>1"-4"	12"
>4"	24"

Heat Source	Minimum Distance From Edge of Source To Ordinary Temp. Sprinkler	Minimum Distance Fron Edge of Source To Intermediate Temp. Sprinkler	Residential Sprinkler Design & Installation Guide Figure #
Side of open or Recessed Fireplace	36"	12"	Figure 14 & 15
Front of Recessed Fireplace	84"	36"	Figure 15
Coal or Wood Burning Stove	42"	12'	Figure 17
Kitchen Range	18"	9"	Figure 18
Wall Oven	18"	9"	Figure 18
Hot Air Flues	18"	9"	Figure 16
Uninsulated Heat Ducts	18"	9"	Figure 16
Uninsulated Hot Water Pipes	12"	6"	Figure 16
Side of Ceiling or Wall Mtd. Hot Air Diffusers	24"	12"	Figure 19
Front of Wall Mounted Hot Air Diffusers	36"	18"	Figure 19
Hot Water Heater of Furnace	6"	3"	Figure 16
Light Fixture 0-250W	6"	3"	Figure 19
250-499W	12"	6"	Figure 19

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