

# Specific Application Attic Sprinklers™

## Back to Back™, Single Directional™ & HIP™

Fast Response Glass Bulb or Fusible Link Automatic Sprinklers

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## General Description

The Specific Application Attic Sprinklers are the evolution of fire sprinklers for attics. The Specific Application Attic Sprinklers provide the best fire protection in an attic while saving cost by using extended coverage spacing. The Specific Application Attic Sprinklers have undergone the most extensive fire testing ever done for attics and are allowed for use under their specific application guidelines by U.L. and NFPA.

The Specific Application Attic Sprinklers are the first sprinklers to be:

- Listed for extended coverage in combustible construction.
- Full-scale fire tested in both wet and dry system scenarios.
- Full-scale tested, for Listing in wood truss construction.
- Listed for specific pitches of roof slope.

The Specific Application Attic Sprinklers provide the best level of protection and control cost by eliminating the need for additional sprinklers and the associated cost. There is just one branch line along the ridge for the entire building unless there is a need for single directional or hip sprinklers. In that case, there is still only one line in each area. For example, a system in a 60'-0" (18,3 m) wide attic would use 5 branch lines to cover the main portion of the building and several off-set branch lines to cover the hip area. With the attic sprinklers, there is just one line down the ridge and one down each slope of the hip. This is approximately 80% less pipe that needs to be installed. This saves the cost of the pipe, fittings, hangers, and associated labor for three branch lines. Also the volume of the system is reduced. This could reduce the size of the dry pipe valve or allow the 60 second requirement to be met without an accelerator.

The other cost reduction is in the new Listing of BlazeMaster CPVC for Attic

spaces feeding the wet system sprinklers below the ceiling. Traditionally BlazeMaster CPVC has been used on the lower floors in the joist space above a ceiling that does not require sprinklers. The cost of using CPVC on those floors can now be translated to the upper floor even if sprinklers are required in the attic.

There are three (3) models of the Specific Application Attic Sprinklers, Back to Back (dual directional), a Single Directional and a Hip sprinkler. The Back to Back and Single Directional sprinklers have three separate versions that are used for different roof pitches. The pitches can vary from a minimum of 4 in 12 to a maximum of 12 in 12.

### The Back to Back (dual directional)

The Back to Back Specific Application Attic Sprinkler, named so because it performs like two sidewall sprinklers placed back to back with one operating element, throws a narrow but long pattern. The narrow spacing along the ridge serves two purposes. The response time is reduced by having the sprinklers no farther than 6'-0" (1,8 m) apart and the spray can be concentrated in the throw direction to obtain a pattern that will cover up to 30'-0" (9,1m) each side when measured horizontally. The three different styles account for different roof slopes and the two different orifice sizes allow lower flows and pressures for smaller spacing. The Back to Back requires only one line to be run down the ridge of the attic to cover both sides. Be sure that it is installed vertically, not angled with the slope, and the correct model is used to compensate for the slope.

### The Single Directional

The Single Directional is much like a conventional vertical sidewall. However, the pattern is a narrow, long throw like the Back to Back. The Single Directional is basically half a Back to Back Specific Application Attic Sprinkler. The use is primarily for attics that have shear walls running to the roof sheathing. These

(Continued on Page 2)



## Specific Application Attic Sprinklers



## General Desc. (Cont.)

situations require a pattern in only one direction. Another use is when the framing direction is parallel with the outside wall in the hip area (see figure 11). In this case, the Single Directional would be used on one side of the slope and standard sprinklers would be used to protect the other side. Be sure that it is installed vertically, not angled with the slope, and the correct model is used to compensate for the slope.

### The HIP Sprinkler

The HIP Sprinkler covers the area of the hip in the attic. This is a slightly different concept than the Back to Back or Single Directional. The HIP Sprinkler is located along the slope down the hip, and throws a 90° pattern toward the outside eaves. This allows the water to “corner” the fire and control it even at far distances. It does not throw much water directly up or down the hip but rather it throws most of the pattern out to each side (90°) down the slope of the roof and therefore can be spaced 6'-0" (1,8m) to 3'-0" (0,9m) on center down the slope without the danger of cold solder. To use the HIP™ Sprinkler, the framing must be perpendicular to the outside wall (see figure 12) and the maximum throw cannot be over 28'-0" (8,5m) measured flat. It, unlike the Back to Back and Single Directional, is run with the deflector parallel with the slope and there is only one model with flows and pressures for two different spacings.

### Operation:

BB1-<sup>17</sup>/<sub>32</sub>, BB2-<sup>17</sup>/<sub>32</sub>, BB3-<sup>17</sup>/<sub>32</sub> & HIP - 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 & flow water.

BB1, BB2, BB3, SD1, SD2 & SD3 - The fusible link assembly is comprised of two link halves which are joined by a thin layer of solder. When the rated temperature is reached, the solder melts and the two link halves separate, which then allows the sprinkler to activate and flow water.

### WARNINGS

*The Specific Application Attic 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.*

*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 C4180 - BB1-<sup>17</sup>/<sub>32</sub> (8.0 K-factor)  
SIN C4181 - BB2-<sup>17</sup>/<sub>32</sub> (8.0 K-factor)  
SIN C4182 - BB3-<sup>17</sup>/<sub>32</sub> (8.0 K-factor)  
SIN C3180 - BB1 (5.6 K-factor)  
SIN C3181 - BB2 (5.6 K-factor)  
SIN C3182 - BB3 (5.6 K-factor)  
SIN C3183 - SD1 (5.6 K-factor)  
SIN C3184 - SD2 (5.6 K-factor)  
SIN C3185 - SD3 (5.6 K-factor)  
SIN C3187 - HIP (5.6 K-factor)

### Approvals

UL & ULC Listed. (The approvals apply only to the service conditions indicated in the Design Criteria Section)

### Maximum Working Pressure

175 psi (12,1 bar)

### Pipe Thread Connection

1/2 inch NPT - (K=5.6)  
3/4 inch NPT - (K=8.0)

### Discharge Coefficient

K = 5.6 GPM/psi<sup>1/2</sup> (80,7 LPM/bar<sup>1/2</sup>)  
K = 8.0 GPM/psi<sup>1/2</sup> (115,3 LPM/bar<sup>1/2</sup>)

### Temperature Ratings

BB1-<sup>17</sup>/<sub>32</sub>, BB2-<sup>17</sup>/<sub>32</sub>, BB3-<sup>17</sup>/<sub>32</sub> & HIP  
200°F/93°C

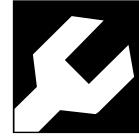
BB1, BB2, BB3, SD1, SD2 & SD3  
212°F/100°C

### Finishes

Sprinkler: Natural Brass

### Physical Characteristics

The Specific Application Attic Sprinklers utilize a dezincification resistant (DZR) bronze frame. The thermal sensitive element is either a 3 mm bulb with a two-piece brass and copper button assembly, or a monel thermal sensitive link. 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, & the deflector is brass.



## Installation

The Specific Application Attic 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 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" NPT sprinklers. A leak tight 3/4 inch NPT sprinkler joint should be obtained with a torque of 10 to 20 ft.lbs. (13,4 to 26,8 Nm). A maximum of 30 ft.lbs. (40,7 Nm) of torque is to be used to install 3/4" NPT sprinklers. Higher levels of torque may distort the sprinkler inlet with consequent leakage or impairment of the sprinkler.*

**Step 1.** All Specific Application Attic Sprinklers except the HIP must be installed in the upright position with the frame arms vertical. The deflector takes into account the slope. The HIP sprinkler is installed with the deflector parallel with the slope of the hip. All Sprinklers must be installed so the frame arms are parallel with the branch line pipe.

**Step 2.** 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 the following wrenches:

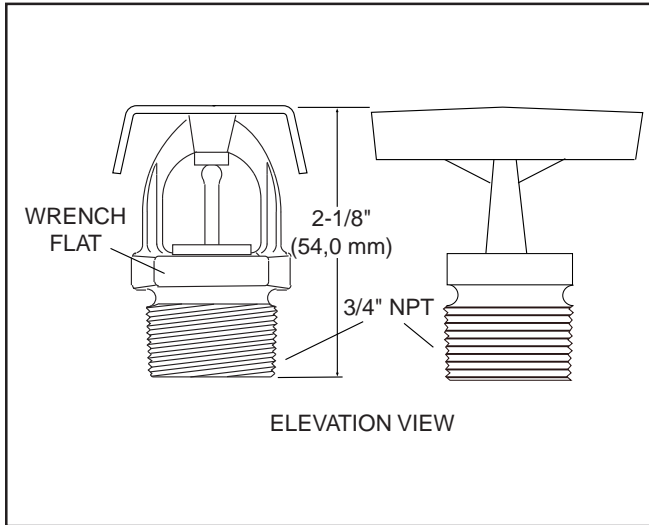
BB1-<sup>17</sup>/<sub>32</sub>, BB2-<sup>17</sup>/<sub>32</sub> & BB3-<sup>17</sup>/<sub>32</sub> - W-Type 3 Sprinkler Wrench (1073)

HIP - Combination Wrench (1106)

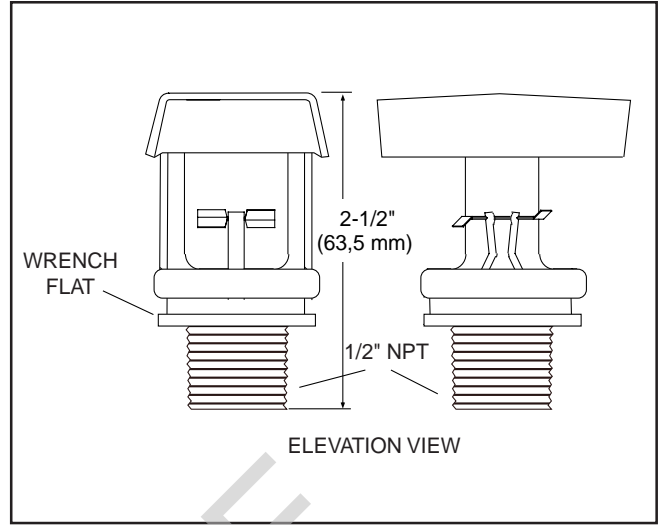
BB1, BB2, BB3, SD1, SD2 & SD3 - use an open end adjustable wrench

Wrenches are to be applied to the sprinkler wrench flats (Ref. Page 3) only.

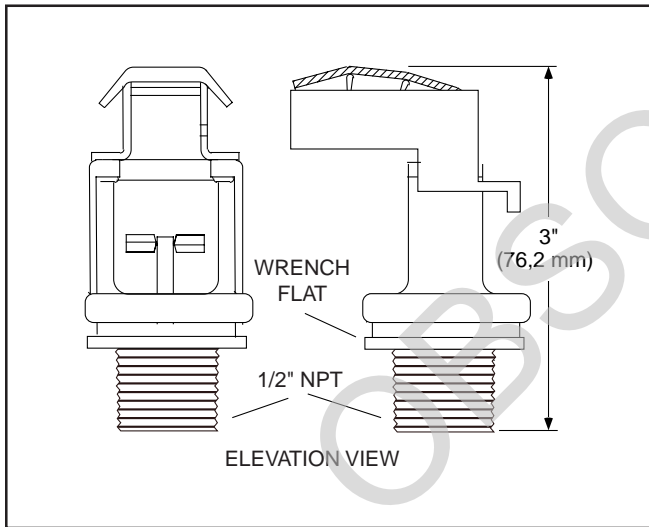
**Back to Back  
Dual Directional Attic Sprinkler  
BB1-1<sup>7</sup>/<sub>32</sub>" , BB2-1<sup>7</sup>/<sub>32</sub>" , BB3-1<sup>7</sup>/<sub>32</sub>"**



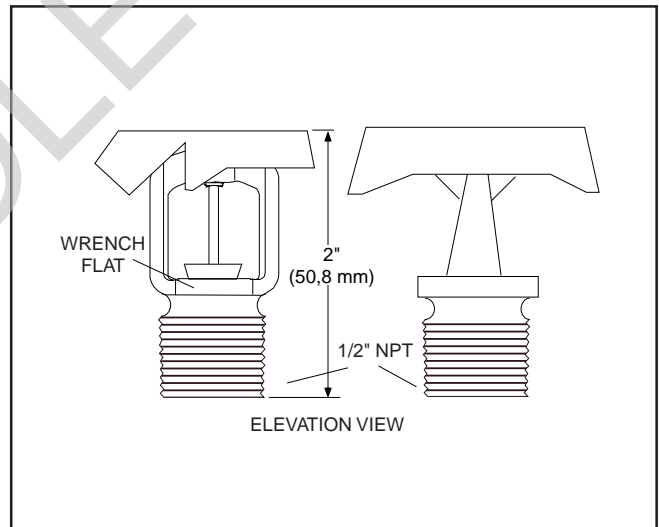
**Back to Back  
Dual Directional Attic Sprinkler  
BB1, BB2, BB3**



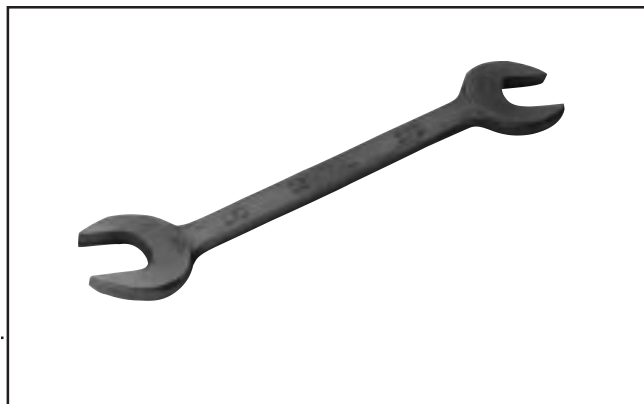
**Single Directional Attic Sprinkler  
SD1, SD2, SD3**



**HIP Sprinkler**



**W-Type 3, Sprinkler Wrench (Part #1073)  
Combination Sprinkler Wrench (Part #1106)**



## Specific Application Guidelines

### **Area of Use:**

Roof structures, **combustible and non-combustible** including wood joist and wood trussed attics **with** a ceiling below.

**Hazard:** Light hazard.

### **Maximum Roof Span:**

60 feet (18,3 m) for BB model sprinklers and 40 feet (12,2 m) for SD model sprinklers and 28 feet (8,5 m) for HIP™ sprinklers (see figures 1, 2 & 12). See table on page 5 for minimum sprinkler flows and pressures. Roof span may be up to 80'-0" (24,2 m) by using additional standard spray sprinklers (see figure 13 & 14).

### **Minimum Distance Between Attic Sprinklers:**

4 feet (1,2 m) as measured along branch line for BB<sup>17/32"</sup>, BB or SD (see fig. 3). 3 feet (0,9 m) as measured along branch line for HIP (see figure 11).

### **Maximum Distance Between Attic Sprinklers:**

6 feet (1,8 m) on center along the branch line (see figure 3).

### **Minimum Distance Between Standard and Attic Sprinklers:**

6 feet (1,8 m) as measured along the peak/ridge direction (see figure 4) and 26 feet (7,9 m) in the slope direction for BB<sup>17/32"</sup>, BB and HIP versions (see figure 6).

### **Deflector Installation Position Below Peak/Ridge:**

22" (558,8 mm) maximum, 16" (406,4 mm) minimum (see figure 5).

### **Minimum Distance Away From Trusses:**

Attic Sprinklers must be installed 6" (152,4 mm) away from the face of trusses (see figure 7).

### **Maximum Distance From the Center Line of Ridge:**

6" (152,4 mm) (see figure 8).

### **Maximum Distance For HIP Sprinklers From the Center Line of the Hip:**

6" (152,4 mm) (see figure 8).

### **Use of U.L. Listed CPVC Piping:**

To use BlazeMaster™ CPVC in the attic to feed the wet system ceiling sprinklers on the floor below, there must be 6" (152,4 mm) of insulation covering the pipe extending 12" (304,8 mm) on each side away from the centerline of the pipe and the area above the CPVC must be protected by Attic Sprinklers (see figure 9). If the pipe is located inside the ceiling joist, the joist channel must be covered or filled with 6" (152,4 mm) of non-combustible insulation on top of the pipe and the

area above must be protected by Attic Sprinklers (see figure 10). Insulation is for fire protection purposes. It is not freeze protection. BlazeMaster CPVC must be installed in accordance with the BlazeMaster installation guide instructions with respect to heat sources. (Note: The Specific Application Attic Sprinklers cannot be installed on BlazeMaster CPVC)

**System Type:** Wet or Dry

### **Hydraulic Requirements:**

For hydraulic requirements see page 11.

### **To Determine the Correct Flow and Pressure:**

Determine the model span (measured flat) and the slope of the roof. Use this information with the chart on page 4. There is no interpolation of the flow and pressure shown. Round all cases to the next higher spacing. For example, a 45'-0" (13,7 m) span with the BB<sup>17/32"</sup> would be calculated at the 60'-0" (18,3 m) span.

### **Obstructions:**

See page 9 for guidelines. (For guidance on the size of piping to which a Specific Application Attic Sprinkler can be directly attached, reference NFPA 13 - 1999 Section 5-8.5.2.2 Exception No. 4)

**Maximum Coverage Area:** 400 square feet (37,2 m<sup>2</sup>).

Spacing for Back to Back Attic Sprinklers is determined by twice the distance of the furthest throw measured along the slope, multiplied by the distance along the branchline (*maximum distance along branch line is 6'-0" (1,8 m) regardless of the length of the throw*). **Note: The distance along the branchline may have to be reduced to less than the maximum of 6'-0" (1,8 m) to remain under 400 sq. ft. (37,2 m<sup>2</sup>) maximum depending on the slope and the span. In no case can the span exceed 60'-0" (18,3 m) without additional standard spray sprinklers.**

Spacing for the Single Directional Attic Sprinklers is the distance along the branchline multiplied by the distance of the throw down the slope. Regardless of the throw, the maximum distance along the branchline is 6'-0" (1,8 m) the maximum throw, measured horizontally is 40'-0" (12,2 m), and the maximum spacing per sprinkler is 400 square feet (37,2 m<sup>2</sup>).

Spacing for the Hip sprinkler is the distance down the larger slope multiplied by two multiplied by the distance between the sprinklers as measured along the slope of the hip.

## Specific Application Attic Sprinkler Design Data

Sprinkler	Roof Span* ***	Flow GPM(Lpm)	Pressure psi (bar)	Pitch
BB1-17/32	60' (18,3 m) (or less)	38 (144)	23.7 (1,6)	4:12 (102mm:305mm) to less than 7:12 (178mm:305mm)
BB2-17/32	60' (18,3 m) (or less)	38 (144)	23.7 (1,6)	7:12 (178mm:305mm) to less than 10:12 (254 mm:305mm)
BB3-17/32	60' (18,3 m) (or less)	40 (152)	26.3 (1,8)	10:12 (254mm:305mm) to 12:12 (305mm:305mm)
BB1	60' (18,3 m) (to more than 40' (12,2 m))	38 (144)	46.0 (3,2)	4:12 (102mm:305mm) to less than 7:12 (178mm:305mm)
BB2	60' (18,3 m) (to more than 40' (12,2 m))	38 (144)	46.0 (3,2)	7:12 (178mm:305mm) to less than 10:12 (254 mm:305mm)
BB3	60' (18,3 m) (to more than 40' (12,2 m))	38 (144)	46.0 (3,2)	10:12 (254mm:305mm) to 12:12 (305mm:305mm)
BB1	40' (12,2 m) (or less)	25 (95)	20.0 (1,4)	4:12 (102mm:305mm) to less than 7:12 (178mm:305mm)
BB2	40' (12,2 m) (or less)	25 (95)	20.0 (1,4)	7:12 (178mm:305mm) to less than 10:12 (254 mm:305mm)
BB3	40' (12,2 m) (or less)	25 (95)	20.0 (1,4)	10:12 (254mm:305mm) to 12:12 (305mm:305mm)
SD1	40' (12,2 m) (to more than 30' (9,1 m))	35 (132)	39.0 (2,7)	4:12 (102mm:305mm) to less than 7:12 (178mm:305mm)
SD2	40' (12,2 m) (to more than 30' (9,1 m))	35 (132)	39.0 (2,7)	7:12 (178mm:305mm) to less than 10:12 (254 mm:305mm)
SD3	40' (12,2 m) (to more than 30' (9,1 m))	35 (132)	39.0 (2,7)	10:12 (254mm:305mm) to 12:12 (305mm:305mm)
SD1	30' (9,1 m) (to more than 10' (3,0 m))	25 (95)	20.0 (1,4)	4:12 (102mm:305mm) to less than 7:12 (178mm:305mm)
SD2	30' (9,1 m) (to more than 10' (3,0 m))	25 (95)	20.0 (1,4)	7:12 (178mm:305mm) to less than 10:12 (254 mm:305mm)
SD3	30' (9,1 m) (to more than 10' (3,0 m))	25 (95)	20.0 (1,4)	10:12 (254mm:305mm) to 12:12 (305mm:305mm)
SD1	10' (3,0 m) (or less)	19 (72)	11.5 (0,8)	4:12 (102mm:305mm) to less than 7:12 (178mm:305mm)
SD2	10' (3,0 m) (or less)	19 (72)	11.5 (0,8)	7:12 (178mm:305mm) to less than 10:12 (254 mm:305mm)
SD3	10' (3,0 m) (or less)	19 (72)	11.5 (0,8)	10:12 (254mm:305mm) to 12:12 (305mm:305mm)
HIP	**28' (8,5 m) (to more than 20' (6,0 m))	34 (129)	36.9 (2,5)	4:12 (102mm:305mm) to less than 12:12 (305mm:305mm)
HIP	**20' (6,1 m) (or less)	25 (95)	20.0 (1,4)	4:12 (102mm:305mm) to less than 12:12 (305mm:305mm)

\* This is the span as measured horizontal, not along the slope as shown in figure 1.

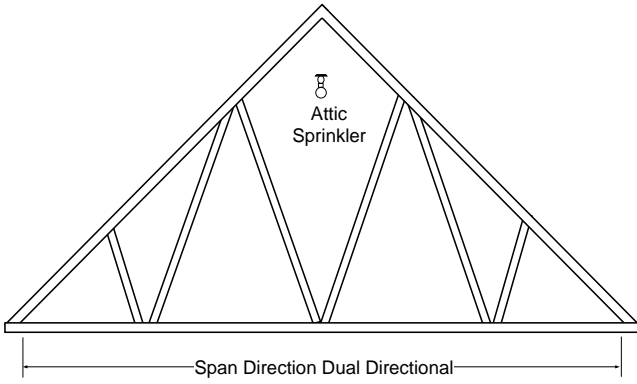
\*\* The HIP sprinkler spacing is measured as shown in figure 12.

\*\*\* For BB and HIP sprinklers in attics greater than 60' (18,3 m) and equal or less than 80' (24,4 m) see Figures 13 & 14.

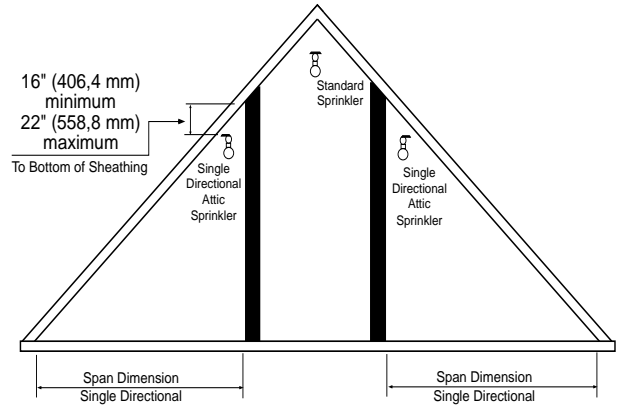
### **Use of U.L. Listed CPVC Piping**

To use BlazeMaster CPVC in the attic to feed the wet system ceiling sprinklers on the floor below, there must be 6" (152,4 mm) of insulation covering the pipe extending 12" (304,8 mm) on each side away from the centerline of the pipe and the area above the CPVC must be protected by Specific Application Attic Sprinklers (see figure 9). If the pipe is located inside the ceiling joist, the joist channel must be covered or filled with 6" (152,4 mm) of non-combustible insulation on top of the pipe and the area above must be protected by Attic Sprinklers (see figure 10).

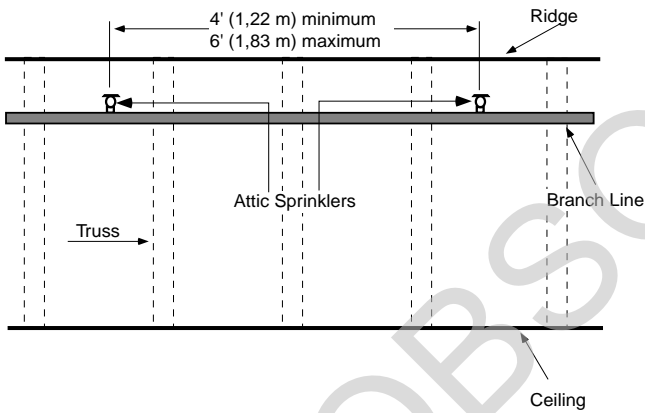
**Figure 1**



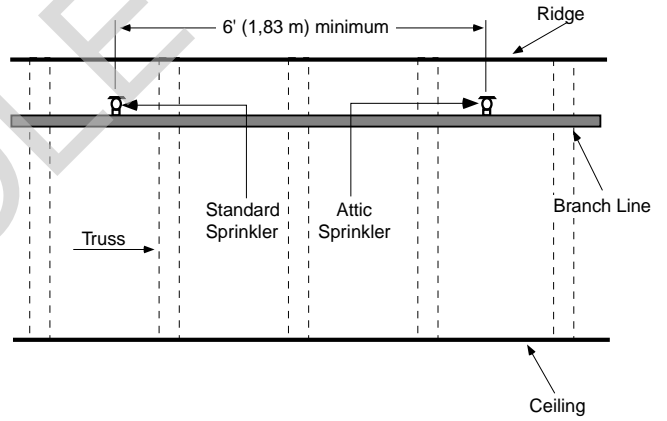
**Figure 2**



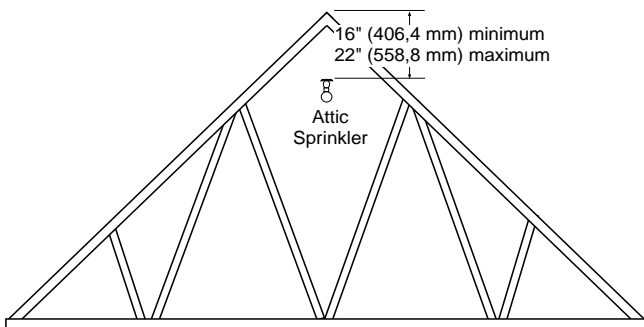
**Figure 3**



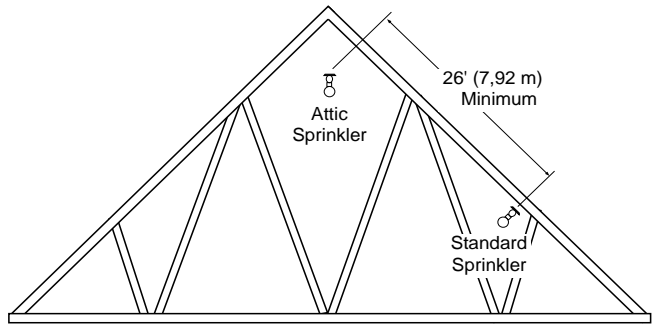
**Figure 4**



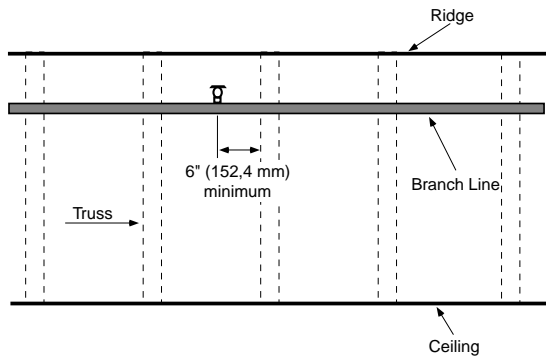
**Figure 5**



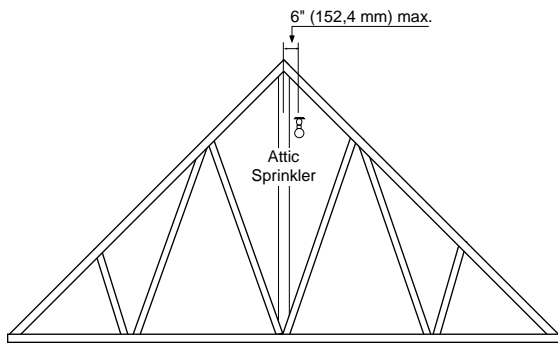
**Figure 6**



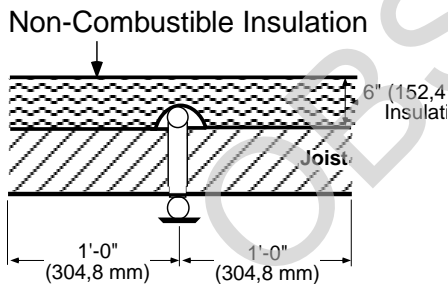
**Figure 7**



**Figure 8**

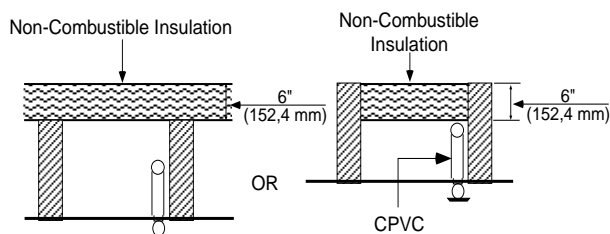


**Figure 9**



**Insulation of piping is for fire protection, not freeze protection.**

**Figure 10**



**Design Guidelines**

To design a project with attic sprinklers use these steps as a guideline:

- Determine if single, dual directional or hip sprinkler is needed.
- Determine the roof slope is between 4:12 to 12:12. If more than one slope is being used on a project, select the correct sprinkler for each area.
- Follow the guidelines for each type of sprinkler as follows:

**For Back to Back (dual directional)**

- Determine the throw needed (see spacing requirements on page 5). If over 20'-0" (6,1 m) up to 60'-0" (18,3 m) is required, use the 8.0 K-factor back to back dual directional to reduce the pressure required, or if pressure is not a concern, use the 5.6 K-factor Sprinklers to minimize over discharge.
- If less than 20'-0" (6,1 m) is required, use the 5.6 K-factor back to back dual directional to minimize pressure and flow requirements.
- Determine the distance along the slope. If the distance is not equal, use the longer side. Multiply the longer side by two to determine the spacing down the slope. Four hundred divided by this value will determine the maximum spacing along the ridge. The maximum is distance is 6'-0" (1,8 m). For example, a 12:12 slope at the maximum span of 60 feet (18,3 m) will produce a slope length of approximately 42.5 feet (13,0 m). That number multiplied by two produces a 85'(25,9 m) throw. Four hundred square feet maximum divided by an 85'(25,9 m) throw only allows a 4'-8"(1,4 m) spacing along the ridge. Using the maximum spacing, space the sprinklers along the ridge.
- Avoid obstructions as shown on page 9. If necessary, add standard sprinklers to maintain coverage around obstructions.
- Calculate the sprinkler system in accordance with the appropriate flow and pressure information on page 5. There is no interpolation of the flows and pressures shown on the chart.

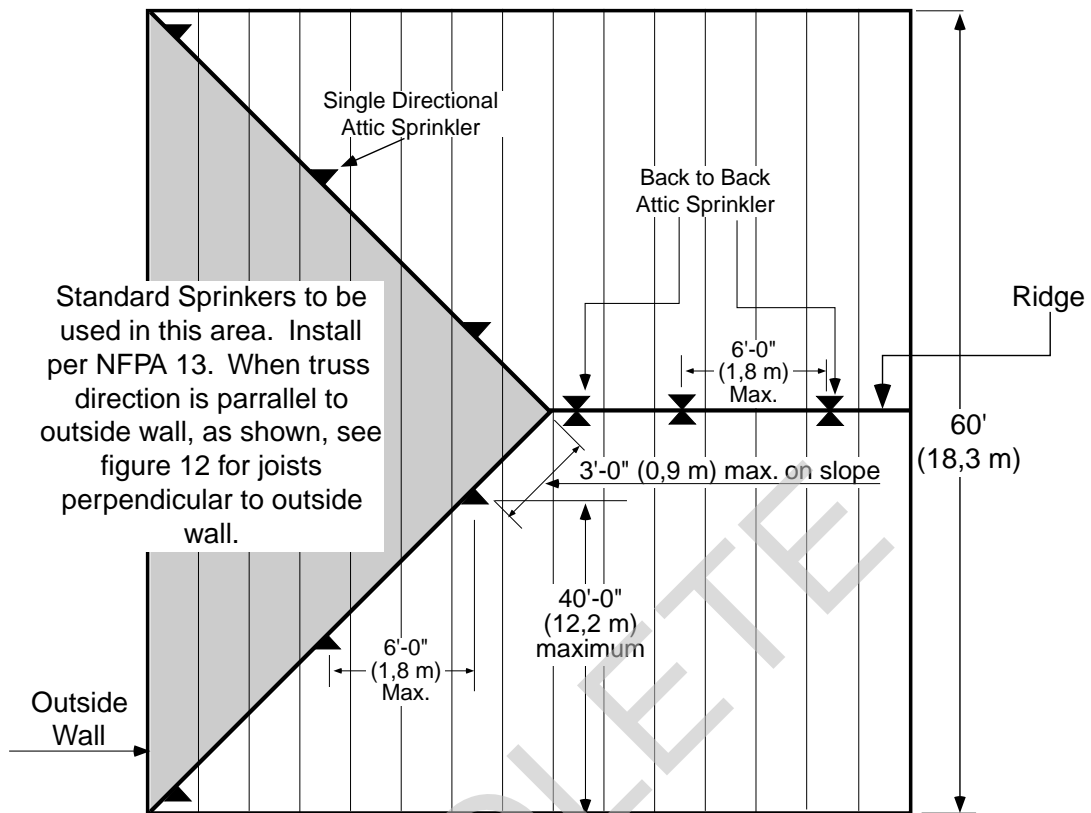
**For Single Directional**

- Determine the throw needed.
- As the 400 square feet (37,2 m<sup>2</sup>) is not a factor with the Single Directional, the maximum spacing is 6'-0" (1,8 m) and the minimum is 4'-0" (1,2 m) (see figures 2 & 11). (The reason 400 square feet is not an issue with the single directional is because at its maximum spacing, 6'-0" (1,8 m) on center/covering 40'-0" (12,2 m) flat / a 12:12 slope / and the throw being 56.5 feet (17,2 m), the 400 square foot (37,2 m<sup>2</sup>) maximum would not be exceeded.)
- Avoid obstructions as shown on page 9. If necessary, add standard sprinklers to maintain coverage around obstructions.
- Calculate the sprinkler system in accordance with the appropriate flow and pressure information on page 5. There is no interpolation of the flows and pressures shown on the chart.

**For HIP Sprinkler (see figure 11)**

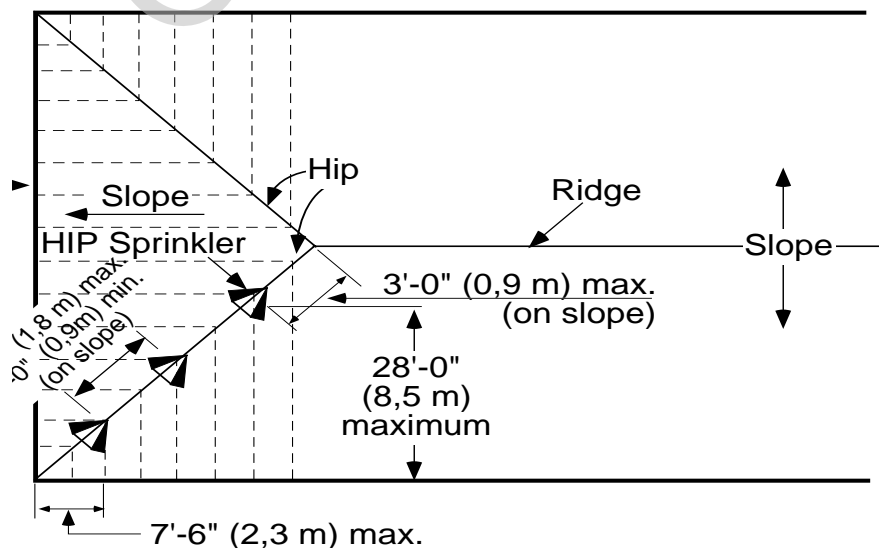
- Verify framing direction is perpendicular to outside wall (see figures 11 & 12). If not, cover that area with standard sprinklers.
- From the intersection of the top of the hip and the ridge the maximum distance down the slope of the hip is 3'-0" (0,9 m). Start the layout with the first sprinkler as close to that point as possible, but no further, while staying 6" (152,4 mm) away from the face of the trusses. Remember the slope of the hip is not equal to the slope of the roof from the ridge to the outside wall. Continue to space sprinklers down the hip at a maximum of 6'-0" (1,8 m) on center as measured along the slope of the hip. When the bottom of the hip is encountered, the last sprinkler must be within 7'-6" (2,3 m) of the outside wall as measured flat (plan view). If this pipe is "cut to fit" remember to take into account the different slopes the hip and the roof as well as distances measured along the slope verses horizontal in plan view.
- Avoid obstructions as shown on page 9. If necessary, add standard sprinklers to maintain coverage around obstructions.

**Figure 11**  
**HIP Installation if Framed Parallel to Outside Wall**



Be sure that single directional sprinklers are installed vertical as the deflector compensates for the slope.

**Figure 12**  
**HIP Installation if Framed Perpendicular to Outside Wall**



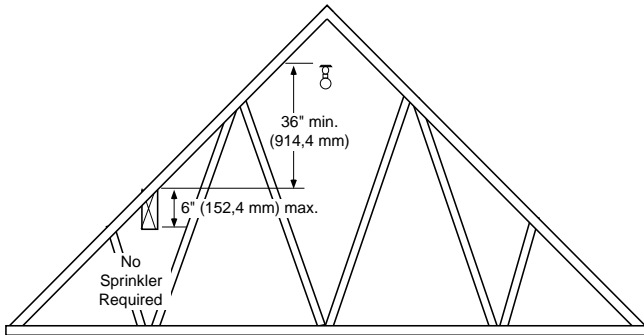


## **Obstructions**

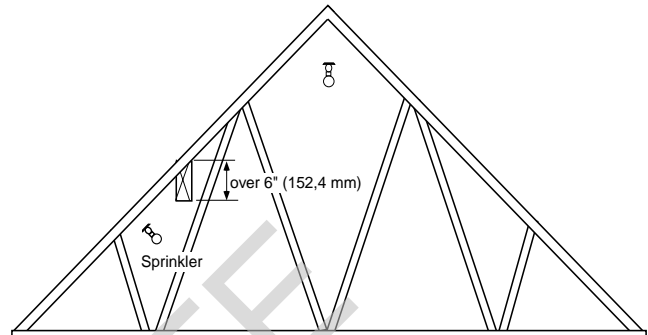
Obstructions to Attic Sprinkler differ from standard sprinklers and the following criteria shall be used.

There can be up to a 6" (152,4mm) obstruction, measured vertically, as long as it is 36" (914,4mm), measured vertically, below the Attic Sprinkler. If the obstruction is closer or larger, there must be a sprinkler on the other side of the obstruction. See figure A & B. This does not limit the top cord of the trusses or the depth of the rafter, but rather obstructions that run across the trusses or rafters.

**Figure A**

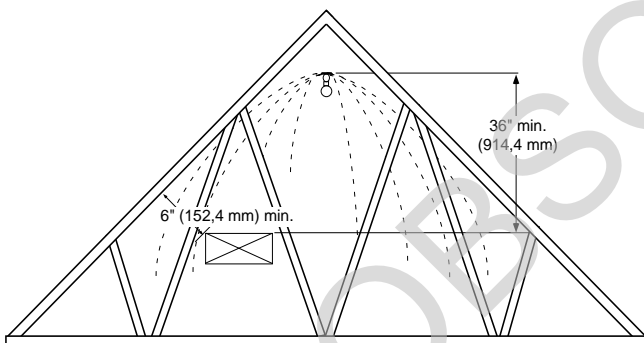


**Figure B**

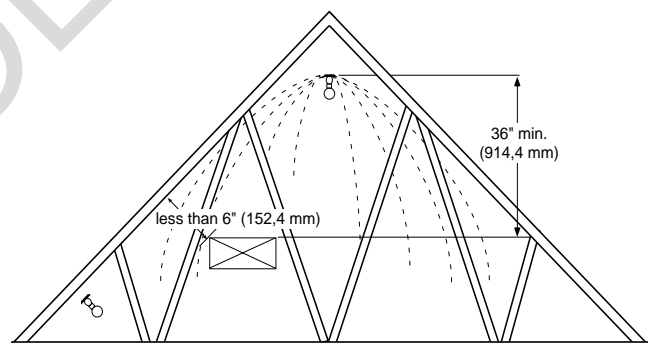


If the obstruction is below the sprinkler, there must be 6" (152,4mm) clearance over the top of the obstruction to allow water to pass both over and under the obstruction. The 6" (152,4mm) is measured perpendicular to the slope from the bottom of the joist. If there is not 6" (152,4mm) clearance, a sprinkler must be added on the opposite side of the obstruction.

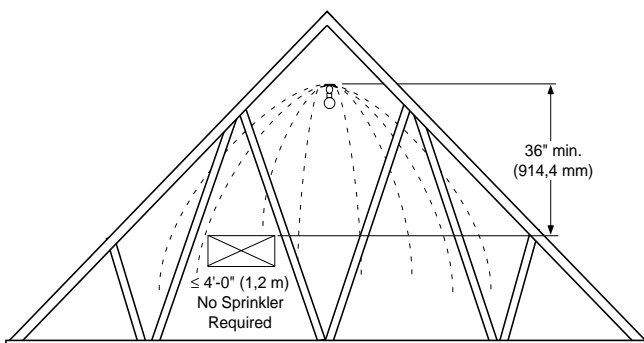
**Figure C**



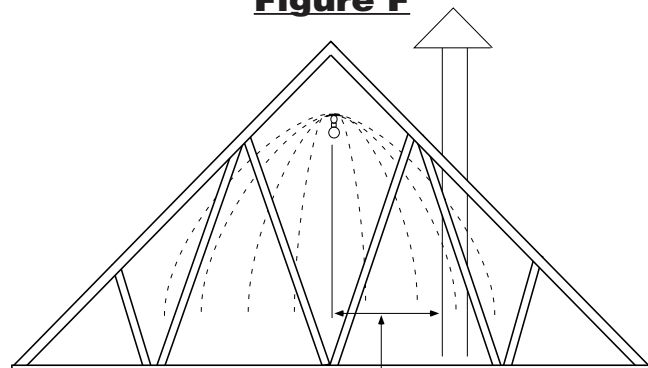
**Figure D**



**Figure E**



**Figure F**



Ducts, as per NFPA 13, require a sprinkler under them if they are over 4'-0" (1,2m) wide. If they are not, then no sprinkler underneath is required.

For Vertical Obstruction, See Table 1 on Page 10. The maximum dimension of the obstruction is the width of the obstruction and the horizontal distance away from the obstruction is measured flat.

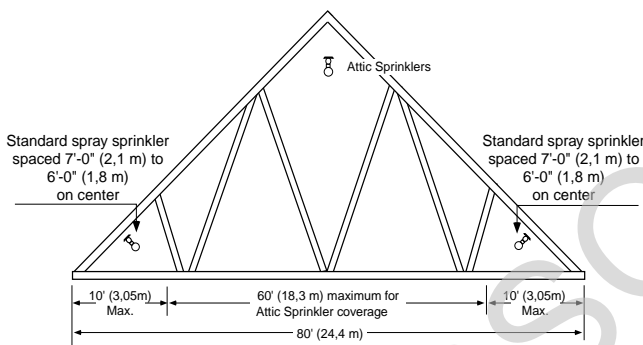
**Table 1\* — Spacing for Vertical Obstructions**

Maximum Dimension of Obstruction	Minimum Horizontal Distance to Obstruction
½"-1" (12,7mm-25,4mm)	6" (152 mm)
>1"-4" (25,4mm-101,6mm)	12" (305 mm)
>4"-8" (101,6mm-203,2mm)	24" (610 mm)
>8"-10" (203,6mm-254mm)	5' (1,5 m)
>10"-20" (254mm-508mm)	10' (3,0 m)
>20"-30" (508mm-762mm)	15' (4,6 m)
>30"-40" (762mm-1016mm)	20' (6,1 m)
>40"-48" (1016mm-1219,2mm)	25' (7,6 m)
>48" (1219,2mm)	sprinkler required beyond

\* When minimum horizontal distance is less than Table 1, an additional sprinkler is required beyond the obstruction.

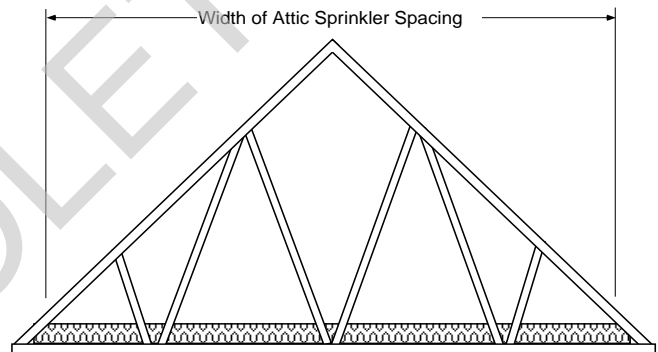
**Figure 13**

**BB and HIP Sprinklers for Attics Greater Than 60' (18,3m) and Equal or Less Than 80' (24,4m)**



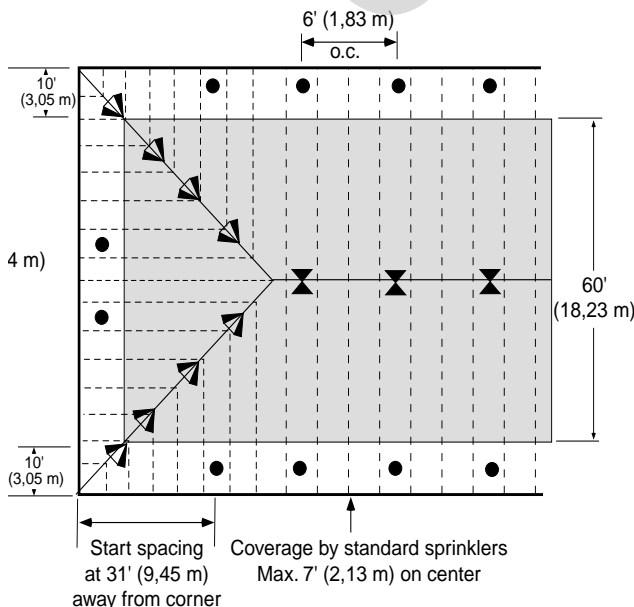
**Figure 14**

If the attic has noncombustible insulation on the ceiling below the attic sprinklers, the area of coverage is measured from the top of the insulation.



**Figure 15 — BB and HIP Sprinklers Plan View Perimeter Protection**

**Plan View Parimeter Protection**



**Attic sprinklers in buildings over 60'-0" (18,3m) up to 80'-0" (24,4m) wide**

Attic sprinklers in conjunction with standard sprinklers can be used to protect attics over 60'-0" (18,3m) up to 80'-0" (24,4m) wide. Attics over 80'-0" (24,4m) wide must use standard sprinklers throughout as attic sprinklers have not completed testing in this scenario. To use attic sprinklers in these attics, space attic sprinklers to protect the center portion of the building, add standard sprinklers around the perimeter at a maximum of 7'-0" (2,1m) and a minimum of 6'-0" (1,8m) on center. The HIP™ sprinklers can continue down the hip. Start spacing standard sprinklers 31'-0" (9,4m) away from the corner.

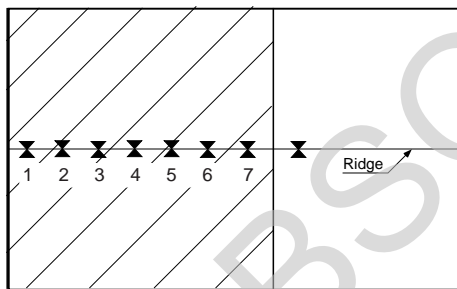
**Hydraulic Calculations**

Attic sprinklers must be calculated in conformance with these guidelines. In all cases, the design area shall include the most hydraulic demanding sprinklers. More than one set of calculations may be required to prove different situations.

1. Attics Protected Entirely with Back to Back Attic Sprinklers - For wet systems, calculate the most demanding 5 sprinklers. For dry systems, calculate the most demanding 7 sprinklers (see Fig. 16).
2. Attics Protected Entirely with a Mixture of Back to Back and HIP Attic Sprinklers - For wet systems, calculate the most demanding 5 sprinklers. For dry systems, calculate the most demanding 9 sprinklers with a maximum of 7 to be Back to Back sprinklers (see Fig. 17).
3. Attics Protected with Single Directional Attic Sprinklers - For wet systems, calculate the most demanding 5 sprinklers. For dry systems, calculate the most demanding 9 Single Directional Attic Sprinklers or standard sprinklers, whichever is more demanding (see Fig. 18).

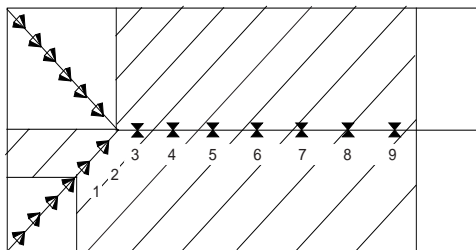
4. Attics Having HIP Roofs with the HIP Joists Parallel to Outside Wall (see Fig. 11) or attics having a mixture of standard spray sprinklers and Specific Application Attic Sprinklers™ - The design area requirements of NFPA 13 shall apply to all sprinkler types.
5. Attics having a Width Greater than 60 ft.(18.3m), but in no Case Greater than 80 ft.(24.4m) - For attics having HIP roofs with joists parallel to outside wall, the requirements in Item 4 above apply. For other attics, the requirements in Items 1 or 2 above shall be used plus two additional standard type sprinklers installed along the eave included in the calculation (see Fig. 19).

**Figure 16**  
**Back to Back Calculation Example**  
*(Dry System Shown)*

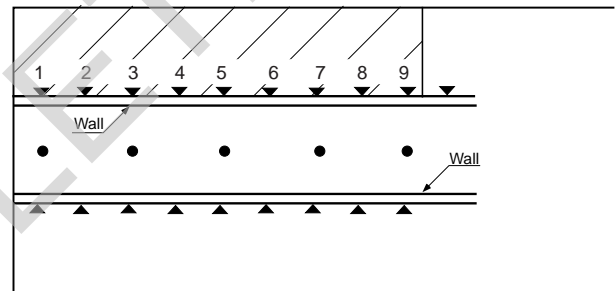


Example: Calculate the 7 most demanding back to back sprinklers along the ridge.

**Figure 17**  
**Mixed Attic Sprinkler Example**  
*(Dry System Shown)*

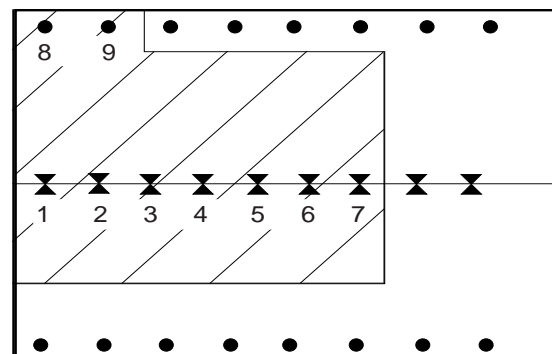


**Figure 18**  
**Single Directional Example**  
*(Dry System Shown)*



Example: Calculate the 9 most demanding single directional attic sprinklers.

**Figure 19**  
**Attics Greater Than 60 Ft.**  
*(Dry System Shown)*



Example: When mixing back to back and standard sprinklers at the eave, calculate the 7 most demanding back to back sprinklers for dry systems or 5 most demanding for wet systems, plus the most demanding 2 additional standard sprinklers at the eave.



## Care & Maintenance

The Specific Application Attic Sprinklers must be maintained and serviced in accordance with the following instructions.

### NOTES

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

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 their temperatures will exceed 100°F/38°C and they must never be painted, plated, coated or otherwise altered after leaving the factory. Modified, or over-heated fusible link sprinklers must be replaced. Glass Bulb sprinklers that have been exposed to corrosive products of combustion, but have not operated, should be replaced if they cannot 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 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

Products manufactured by Tyco Fire Products are warranted solely to the original Buyer for ten (10) years against defects in material and workmanship when paid for and properly installed and maintained under normal use and service. This warranty will expire ten (10) years from date of shipment by Tyco Fire Products. No warranty is given for products or components manufactured by companies not affiliated by ownership with Tyco Fire Products or for products and components which have been subject to misuse, improper installation, corrosion, or which have not been installed, maintained, modified or repaired in accordance with applicable Standards of the National Fire Protection Association, and/or the standards of any other Authorities Having Jurisdiction. Materials found by Tyco Fire Products to be defective shall be either repaired or replaced, at Tyco Fire Products' sole option. Tyco Fire Products neither assumes, nor authorizes any person to assume for it, any other obligation in connection with the sale of products or parts of products. Tyco Fire Products shall not be responsible for sprinkler system design errors or inaccurate or incomplete information supplied by Buyer or Buyer's representatives.

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**THE FOREGOING WARRANTY IS MADE IN LIEU OF ANY AND ALL OTHER WARRANTIES EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.**



## 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.

**Patents:** U.S.A. Patent Number 5,669,449 is applicable to the Central Specific Application Attic Sprinklers. Other Patents are pending with regard to other design features.

*Teflon is a trademark of the DuPont Corp.*