

*Now Listed and Approved
for more types of
applications than any other
non-metallic system*

BlazeMaster[®]
FIRE SPRINKLER SYSTEMS



Installation & Specification Manual

for Architectural Engineers

and Fire Sprinkler Contractors

Introduction

BlazeMaster[®] pipe and fittings are designed specifically for fire sprinkler systems. They are made from a specialty thermoplastic known chemically as post-chlorinated polyvinyl chloride (CPVC). BlazeMaster[®] pipe and fittings provide unique advantages in sprinkler installations including superior hydraulics, ease of joining, increased hanger spacing in comparison to other thermoplastics and ease of assembly. They also are based on a technology with a continuous and proven service history of more than 40 years.

This installation manual provides instructions for handling and installing a BlazeMaster[®] fire sprinkler system as well as information regarding system design. It is intended as a supplement to basic, fundamental knowledge relating to the installation and/or repair of CPVC fire sprinkler systems. It also is intended to supplement installation instructions published by manufacturers of pipe and fittings. Before commencing installation, a user should understand and confirm applicable National Fire Protection Association (NFPA) guidelines and local code approval and installation requirements for CPVC fire sprinkler systems.

BlazeMaster[®] CPVC pipe and fittings carry the markings of Underwriters Laboratories, Inc. (UL & C-UL) and Underwriters' Laboratories of Canada (ULC), Factory Mutual (FM)*, The Loss Prevention Council (LPC), and the NSF International (NSF) for use with potable water. Refer to individual manufacturers' installation instructions for specific listings and approvals.

Lubrizol produces and sells CPVC compounds to licensed manufacturers of BlazeMaster[®] pipe & fittings (see back cover for contact information). When this design manual states, "refer to manufacturer's installation instructions" please refer to the individual installation instructions published by each pipe and/or fittings manufacturer.

For additional information regarding the BlazeMaster[®] product line, please refer to the internet website, www.blazemaster.com. An electronic version of this installation guide, the most current product compatibility information,

the BlazeMaster[®] Blaster newsletter, and other BlazeMaster[®] fire sprinkler systems information can be found at this site.

Combination of BlazeMaster[®] Products with Other CPVC and Solvent Cements

All BlazeMaster[®] pipe, fittings and solvent cements have been evaluated and are listed for combination regardless of the licensed manufacturer that produces the products.

The BlazeMaster[®] products' listing does not include the combination of BlazeMaster[®] CPVC pipe with other types of specially listed CPVC fire sprinkler pipes, fittings and solvent cements.

Where to Use BlazeMaster[®] Fire Sprinkler Systems

BlazeMaster[®] CPVC pipe and fittings are **Listed by Underwriters Laboratories (UL & C-UL) and Underwriters Laboratories of Canada (ULC) for use in:**

- Light Hazard occupancies as defined in the Standard for Installation of Sprinkler Systems, NFPA 13.
- Residential occupancies as defined in the Standard for Installation of Sprinkler Systems in Residential Occupancies up to Four Stories in Height, NFPA 13R.
- Residential occupancies as defined in the Standard for Sprinkler Systems in One and Two Family Dwellings and Manufactured Homes, NFPA 13D.
- Air plenums, as defined by the Installation of Air Conditioning and Ventilating Systems, NFPA 90A.
- Installation of Private Fire Service Mains and Their Appurtenances, NFPA 24
- System risers in residential buildings up to four stories in height, NFPA 13R and 13D.
- See UL Fire Protection Equipment Directory, categories VIWT and HFYH.

BlazeMaster[®] fire sprinkler systems shall be employed in wet-pipe systems. (A wet-pipe system contains water and is connected to a water supply so that the water will discharge immediately when

*As manufactured by Harvel, IPEX, Nibco, Tyco and Viking.

the sprinkler is opened.) BlazeMaster® CPVC pipe and fittings must never be used in a system using compressed air or other gases. National Fire Protection Association Standards 13, 13R, 13D, and NFPA 24 must be referenced and followed for design and installation requirements in conjunction with this design manual.

Concealed Installations

With concealed installation the **minimum** protection shall consist of one layer of 3/8" (9.5 mm) gypsum wallboard, or a suspended membrane ceiling with lay-in panels or tiles having a weight of not less than 0.35 pounds per square foot (1.7 kg per square meter) when installed with metallic support grids, or 1/2" (12.7 mm) plywood soffits.

For residential occupancies defined in NFPA 13R and 13D, the minimum protection may consist of one layer of 1/2" (12.7 mm) plywood. During periods of remodeling and renovation, appropriate steps must be taken to protect the piping from fire exposure if the ceiling is temporarily removed.

Exposed Installations (Where Sprinklers are Required)

Note: It is always acceptable to install BlazeMaster® products in areas where sprinklers are not required. Refer to the manufacturer's installation instructions.

As an alternative to the protection requirements, BlazeMaster® CPVC pipe and fittings may be installed without protection (exposed) when subject to the following additional limitations:

A. Standard Coverage and Residential Sprinklers

These installations shall be below a smooth, flat, horizontal ceiling construction and require the use of BM-5, CSC-500, TFP-500 or HVC-500 one step solvent cement. Pendent and horizontal sidewall sprinkler (170°F (77°C) maximum temperature rated) installations may use CSC-400 or TFP-400 one step solvent cement. Upright sprinkler installations (155°F(68°C) maximum temperature rated) may use CSC-400 or TFP-400 one step solvent cement.

1. Light Hazard or Residential Pendent Sprinklers

Listed quick response, 170°F (77°C) maximum temperature rated, pendent sprinklers having deflectors installed within 8 inches (203 mm) from the ceiling or Listed residential, 170°F (77°C) maximum temperature rated, pendent sprinklers located in accordance with their Listing and a maximum distance between sprinklers not to exceed 15 feet (4.57 m). The piping shall be mounted directly to the ceiling.

2. Light Hazard or Residential Horizontal Sidewall Sprinklers

Listed quick response, 200°F (93°C) maximum temperature rated, horizontal sidewall sprinklers having deflectors installed within 12 inches (304 mm) from the ceiling and within 6 inches (152 mm) from the sidewall or Listed residential, 200°F (93°C) maximum temperature rated, horizontal sidewall sprinklers located in accordance with their Listing and a maximum distance between sprinklers not to exceed 14 feet (4.27 m). The piping shall be mounted directly to the sidewall.

3. Light Hazard Upright Sprinklers

Listed quick response, 155°F (68°C) maximum temperature rated, upright sprinklers having deflectors installed within 4 inches (101 mm) from the ceiling and a maximum distance between sprinklers not to exceed 15 feet (4.57 m). The maximum distance from the ceiling to the centerline of the main run of pipe shall not exceed 7-1/2 inches (190 mm) and the distance from the centerline of a sprinkler head to a hanger shall be 3 inches (76 mm).

B. Light Hazard Extended Coverage and Residential Sprinklers

These installations shall be below a smooth, flat, horizontal ceiling construction, are limited to unobstructed construction, require the use of Schedule 80 fittings for sizes 1-1/2 in. and greater, and require the use of BM-5, CSC-500,

TFP-500, or HVC-500 one step solvent cement. For pendent sprinkler installations, the piping shall be mounted directly to the ceiling. For horizontal sidewall sprinkler installations, the piping shall be mounted directly to the sidewall.

1. **Light Hazard Extended Coverage or Residential Pendent Sprinklers**

Listed light hazard, extended coverage, quick response, 155°F (68°C) maximum temperature rated, pendent sprinklers having deflectors installed within 8 inches (203 mm) from the ceiling, a maximum distance between sprinklers not to exceed 20 feet (6.09 m), and an application density not less than 0.10 gpm/ft² (4.08 ml/min).

Listed residential, 155°F (68°C) maximum temperature rated, pendent sprinklers having deflectors installed within 8 inches (203 mm) from the ceiling, a maximum distance between sprinklers not to exceed 20 feet (6.09 m), and an application density not less than 0.10 gpm/ft² (4.08 ml/min).

2. **Light Hazard Extended Coverage or Residential Horizontal Sidewall Sprinklers**

Listed light hazard, extended coverage, quick response, 175°F (79°C) maximum temperature rated, horizontal sidewall sprinklers having deflectors installed within 12 inches (304 mm) from the ceiling and within 6 inches (152 mm) from the sidewall, a maximum distance between sprinklers not to exceed 16 feet (4.87 m), and an application density not less than 0.10 gpm/ft² (4.08 ml/min).

Listed residential, 165°F (74°C) maximum temperature rated, horizontal sidewall sprinklers having deflectors installed within 12 inches (304 mm) from the ceiling and within 6 inches (152 mm) from the sidewall, a maximum distance between sprinklers not to exceed 18 feet (5.48 m), and an application density not less than 0.10 gpm/ft² (4.08 ml/min).

Listed light hazard, extended coverage, quick-response, 165°F (74°C) maximum temperature rated, horizontal sidewall sprinklers having deflectors installed within 12 inches (304 mm) from the ceiling and within 6 inches (152 mm) from the sidewall, a maximum distance between sprinklers not to exceed 18 feet (5.48 m), and an application density not less than 0.10 gpm/ft² (4.08 ml/min).

Listed light hazard, extended coverage, quick response, 155°F (68°C) maximum temperature rated, horizontal sidewall sprinklers (manufactured by Reliable Automatic Sprinkler Co Inc, SIN RA0362) having deflectors installed within 12 inches (304 mm) from the ceiling and within 6 inches (152 mm) from the sidewall, a maximum distance between sprinklers not to exceed 24 feet (7.31 m), and a flow not less than 40 gpm (152 L/min) per sprinkler.

C. Unfinished Basements

BlazeMaster[®] CPVC pipe and fittings may be installed without protection (exposed) in unfinished basements in accordance with NFPA 13D when subject to the following additional limitations:

1. The ceiling shall be horizontal and constructed utilizing nominal 2 in. x 10 in. solid wood joists on 16 in. centers.

OR

The ceiling shall be horizontal and constructed utilizing nominal 2 in. x 12 in. solid wood joists on 16 in. centers. When installing BlazeMaster[®] CPVC pipe and fittings in conjunction with 2 in. x 12 in. solid wood joists, the maximum system working pressure under flowing conditions shall not exceed 100 psi and the maximum system working pressure under static (nonflowing) conditions shall not exceed 175 psi.

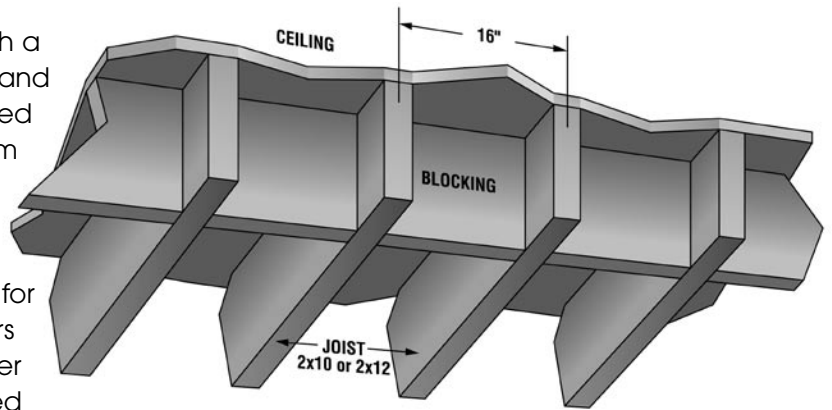
2. The distance from the floor to the bottom of the solid wood joists shall be between 7 ft. and 8 ft.

For Exposed BlazeMaster® Applications

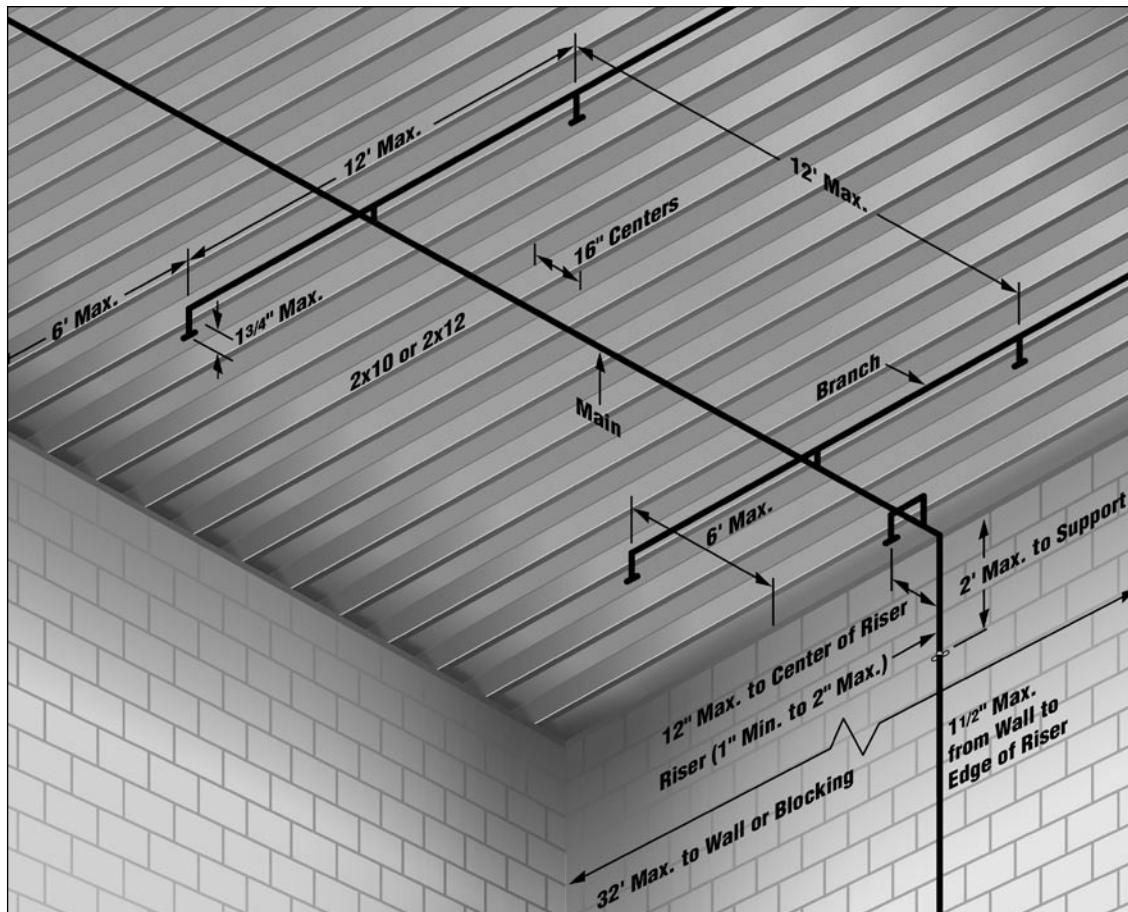
(Use in unfinished basements, system risers and mechanical tees and crosses are not included by this table)

Sprinkler Configuration	Type of Sprinkler	Spacing Between Sprinklers (ft.)	Maximum Deflector Distance From Ceiling (in.)	Maximum Deflector Distance From Sidewall (in.)	Maximum Sprinkler Temperature Rating (°F)	Application Density (gpm/sq. ft.)	Additional Limitations
Extended Coverage Sprinklers							
Pendent	Light Hazard, Quick Response	≤20	8	n/a	155	0.10	
Horizontal Sidewall	Light Hazard Quick Response	≤ 16	12	6	175	0.10	
		≤ 18	12	6	165	0.10	
	Light Hazard, Quick Response Listed Reliable Sprinkler (SIN RA0362)	≤ 24	12	6	155	flow rate of 40 gpm and maximum coverage area of 24' x 14'	
Residential Sprinklers							
Pendent	Residential	≤15	per sprinkler Listing	n/a	170		
		≤20	8	n/a	155	0.10	
Horizontal Sidewall	Residential	≤14	per sprinkler Listing	per sprinkler Listing	200		
		≤ 18	12	6	165	0.10	
Standard Coverage Sprinklers							
Pendent	Quick Response	≤ 15	8	n/a	170		
Horizontal Sidewall	Quick Response	≤ 14	12	6	200		
Upright	Quick Response	≤ 15	4 in addition the distance from the ceiling to centerline of pipe must be a maximum of 7 1/2 inches		155		a hanger must be installed 3 inches from the centerline of the sprinkler head

3. Listed residential pendent sprinklers with a maximum temperature rating of 155°F and a minimum K-factor of 3.0 are to be used for this type of installation. The maximum sprinkler spacing shall not exceed 12 feet. The system is to be designed based upon the Listed flows for the sprinkler selected except that the flow for a single sprinkler or for multiple sprinklers flowing is to be not less than 11 gpm per sprinkler. The sprinklers are to be installed with their deflectors a maximum of 1³/₄ in. below the bottom of the solid wood joists in anticipation of future installation of a finished ceiling. (reference NFPA 13D, Section 8.2.4, 2007 Edition)
4. All system mains shall be run perpendicular to the joists. All branch lines shall be run parallel to the joists. Schedule 80 fittings shall be used for sizes 1-1/2 inch and larger.
5. All solvent cement joints shall be made with BlazeMaster One Step Solvent Cement (TFP-500, BM-5, CSC-500, or HVC-500).

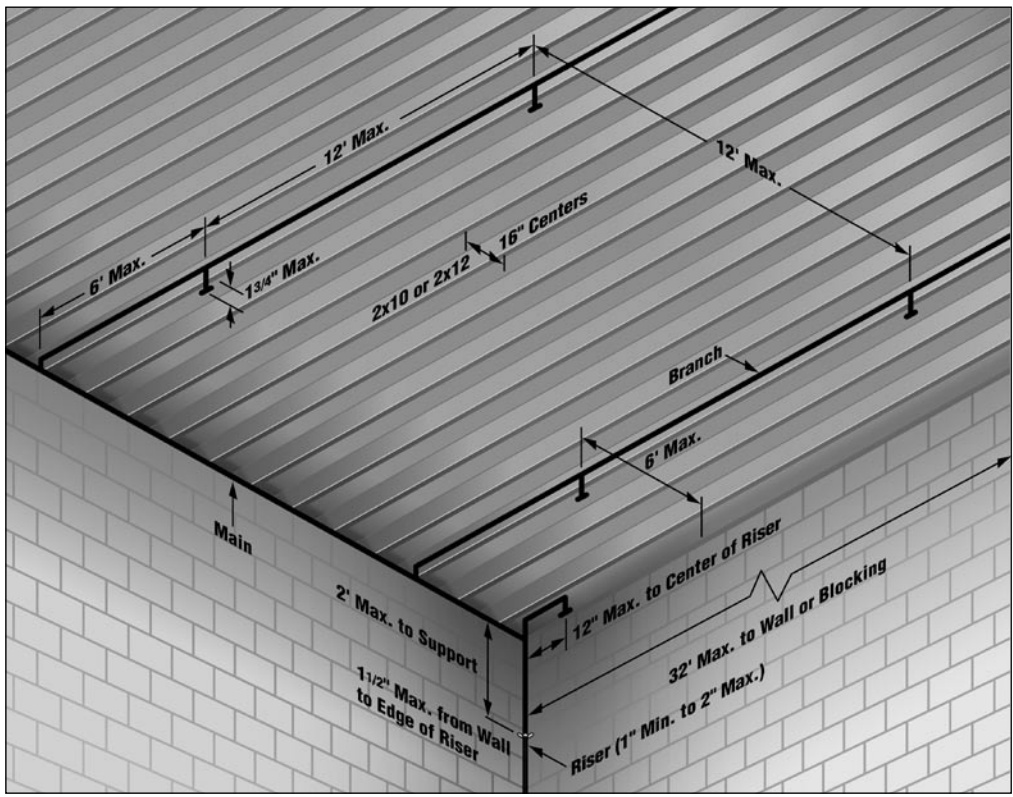
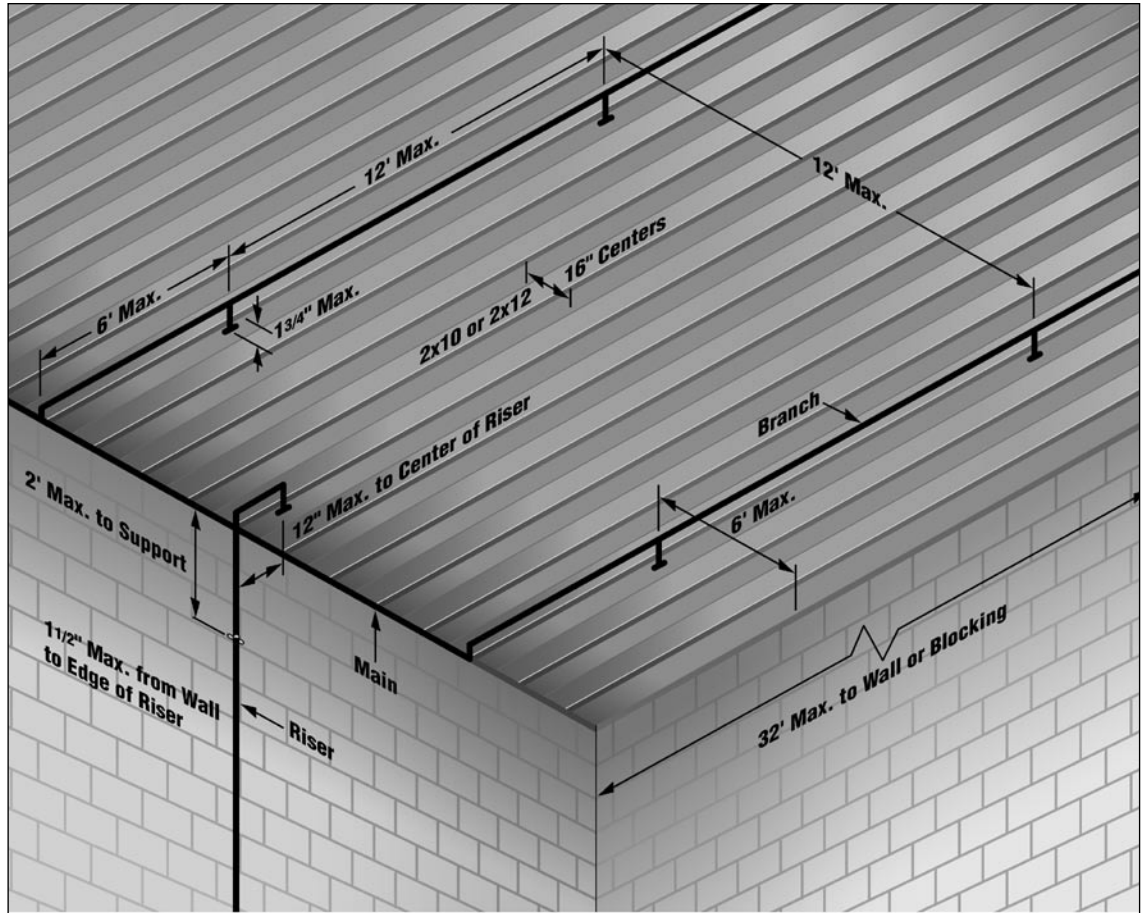


6. When the total protected area exceeds 1,000 square feet, blocking shall be utilized to divide the area into individual compartments not exceeding 1,000 square feet. The maximum length along the joist shall not exceed 32 feet. When the length exceeds 32 feet, blocking shall be utilized. The blocking shall be constructed of minimum 1/2 in. plywood and shall be the full depth of the wood joists.



Basement Installation with Center Wall Riser with Center Room Main

Basement Installation
with Center Wall Riser
with Main at Wall



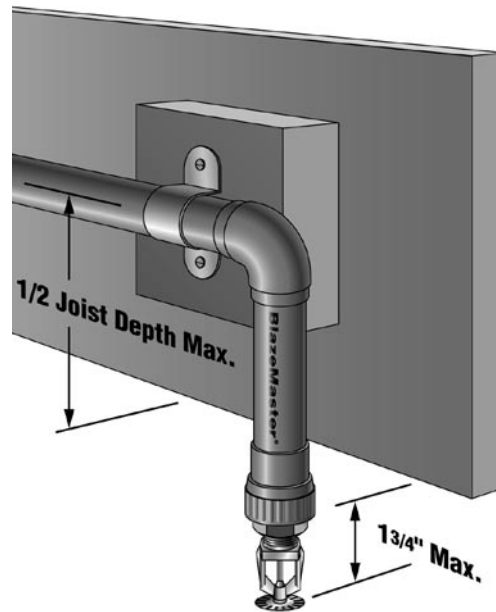
Basement Installation
with Riser in Corner

It is acceptable for items such as piping, wires, ducts, etc. to penetrate the blocking. The gap between the item penetrating the blocking and the blocking should be minimized. For installations where the gap exceeds 1/4 in., the gap shall be filled with insulation, caulking, or other suitable material.

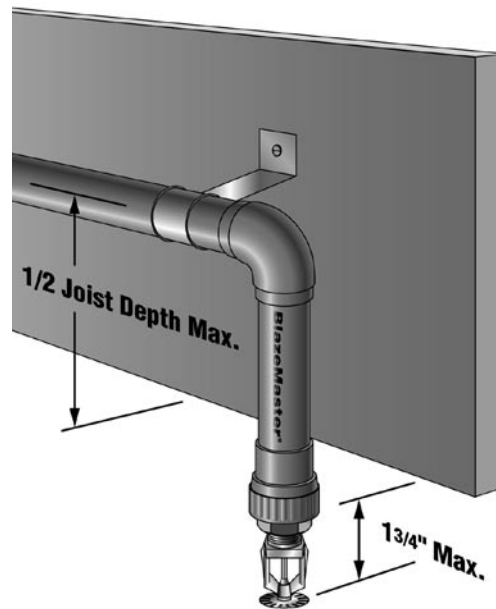
7. When installing BlazeMaster[®] CPVC pipe and fittings perpendicular (system mains) to the solid wood joists, listed support devices for thermoplastic sprinkler piping or other listed support devices shall be used which mount the piping directly to the bottom of the solid wood joists. As an alternative to mounting the pipe and fittings below the solid wood joists, it is also acceptable to cut holes in the solid wood joists at or below the center of the depth of the solid wood joist for support - the holes should be oversized to allow for movement and located to not impair the structural integrity of the joists.

CAUTION: When drilling holes in the solid wood joists, the structural integrity must be maintained. Consult the Authority Having Jurisdiction (AHJ) or building code for requirements.

8. When installing BlazeMaster[®] CPVC pipe and fittings parallel (branch lines) to the solid wood joists, the pipe and fittings shall be installed in the cavity below the bottom of the ceiling and above the bottom of the joist. The branch lines shall be located at or below the center of the depth of the solid wood joist. The pipe shall be installed utilizing listed support devices for thermoplastic sprinkler piping or other listed support devices which mount the piping directly to nominal 2 in. wood blocking or listed support devices for thermoplastic sprinkler piping which offset the pipe a nominal distance of 1 1/2 in. from the solid wood joists.



Branches Supported with Blocking



Branches Supported with Hangers

Use of BlazeMaster[®] CPVC pipe and fittings is limited to basements where the quantity and combustibility of contents is low and fires with relatively low rates of heat release are expected. For additional information regarding the assembly and installation of BlazeMaster[®] CPVC pipe and fittings, please refer to the manufacturer's installation instructions.