2010 NFPA 13D

Section 8.6 Location of Sprinklers

8.6.1 Sprinklers shall be installed in all areas except where omission is permitted by 8.6.2 through 8.6.7.

8.6.2 Sprinklers shall not be required in bathrooms of 55 ft² (5.1 m²) and less.

8.6.3 Sprinklers shall not be required in clothes closets, linen closets, and pantries that meet all of the following conditions:

1. The area of the space does not exceed 24 ft² (2.2 m²).
2. The least dimension does not exceed 3 ft (0.9 m).
3. The walls and ceilings are surfaced with noncombustible or limited-combustible materials as defined in NFPA 220, Standard on Types of Building Construction.

Square footage does not exceed 24 ft² (2.2 m²).
Sprinkler Not Required

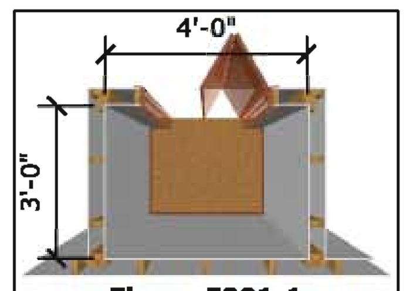


Figure F001-1

The least dimension exceeds 3 ft (0.9 m)
Sprinkler Required

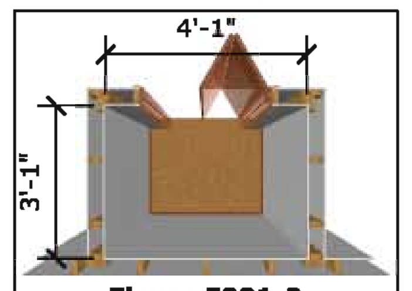


Figure F001-2

Square footage exceeds 24 ft² (2.2 m²).
Sprinkler Required

Figure F001-3

8.6.4 Sprinklers shall not be required in garages, open attached porches, carports, and similar structures.

8.6.5 Sprinklers shall not be required in attics, penthouse equipment rooms, elevator machine rooms, concealed spaces dedicated exclusively to and containing only dwelling unit ventilation equipment, floor/ ceiling spaces, elevator shafts, crawlspaces, and other concealed spaces that are not used or intended for living purposes and do not contain fuel-fired equipment.

8.6.5.1 When fuel-fired equipment is present, at least one quick-responce intermediate temperature sprinkler shall be installed above the equipment.

8.6.6 Sprinklers shall not be required in covered unheated projections of the building at entrances/ exits as long as the dwelling unit has another means of egress.

8.6.7 Sprinklers shall not be required for ceiling pockets that meet the following 100 ft³ (2.83 m³).

1. The total volume of unprotected ceiling pockets does not exceed 100 ft³ (2.83 m³).
2. The entire floor under the unprotected ceiling pocket is protected by the sprinklers at the lower ceiling elevation.
3. Each unprotected ceiling pocket is separated from any adjacent unprotected ceiling pocket by a minimum 10 ft (3.05 m) horizontal distance.
4. The interior finish of the unprotected ceiling pocket is noncombustible or limited-combustible material.
5. Skylights not exceeding 32 ft² (2.97 m²) shall be permitted to have a plastic cover.

Minimum Distances from Heat Sources

The following table provides information from NFPA 13D, Table 7.5.5.3: Minimum Distances for Ordinary Temperature Residential Sprinklers. Use this table to calculate the distance sprinklers should be from any existing heat sources in the building.

Heat Source	Min. Distance from Edge of Source to Ordinary Temp. Sprinkler	Min. Distance from Edge of Source to Intermediate Temp. Sprinkler
Side of open or recessed fireplace	36 inches	12 inches
Front or recessed fireplace	60 inches	36 inches
Coal or wood burning stove	42 inches	12 inches
Kitchen range	18 inches	9 inches
Wall oven	18 inches	9 inches
Hot air flues	18 inches	9 inches
Un-insulated heat ducts	18 inches	9 inches
Un-insulated hot water pipes	12 inches	6 inches
Side of ceiling or wall mounted hot air diffusers	24 inches	12 inches
Front of ceiling or wall mounted hot air diffusers	36 inches	18 inches
Hot water heater or furnace	6 inches	3 inches
Light fixture (0W -- 250W)	6 inches	3 inches
Light fixture (250W -- 499W)	12 inches	4 inches

Table 7.5.5.3

Concealed Assembly Sprinkler With Vapor Barrier

When a vapor barrier is required, wrap vapor barrier material over the fire sprinkler adapter and fire sprinkler head to keep insulation off fire sprinkler head.

Figure F001-4

Insulation Recommendations

In areas subject to freezing, care should be taken in unheated attic spaces to cover Uponor AquaPEX tubing completely with insulation. Insulation should follow the guidelines of the insulation manufacturer. **Figure F001-5** through **Figure F001-7** show several methods that can be considered.

Ceiling Joist Insulation Recommendations - Option 1

To reduce labor time, Uponor recommends attaching 3/4-inch furring strips perpendicular to the bottom of the wood truss or joist. Distance between furring strips should be dictated by local codes for ceiling board installation. The furring strip reduces the need for drilling and allows for necessary duct work. This option is also applicable when a vapor barrier is installed directly to the bottom of the joist or truss. Attach gypsum board to the bottom of the furring strip or sound partition support, leaving a 3/4-inch gap for sprinkler tubing installation (see **Figure F001-5** through **Figure F001-6**).

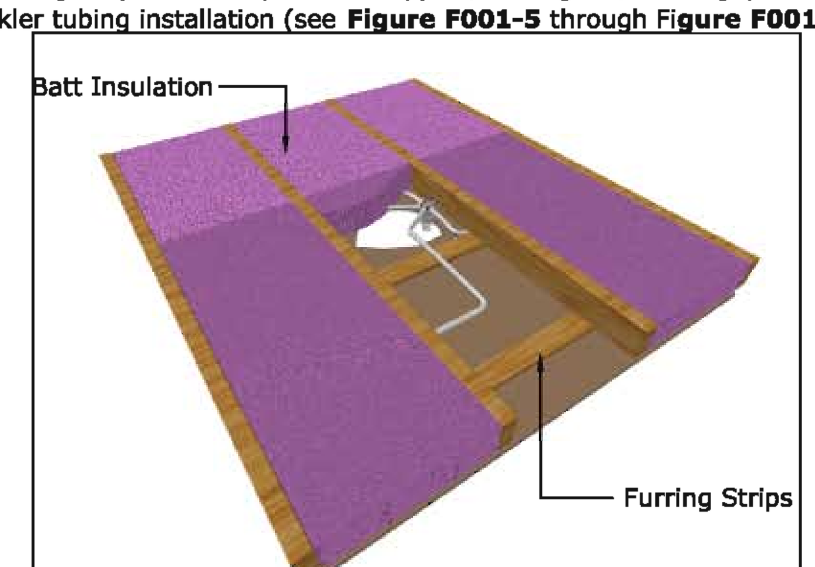


Figure F001-5

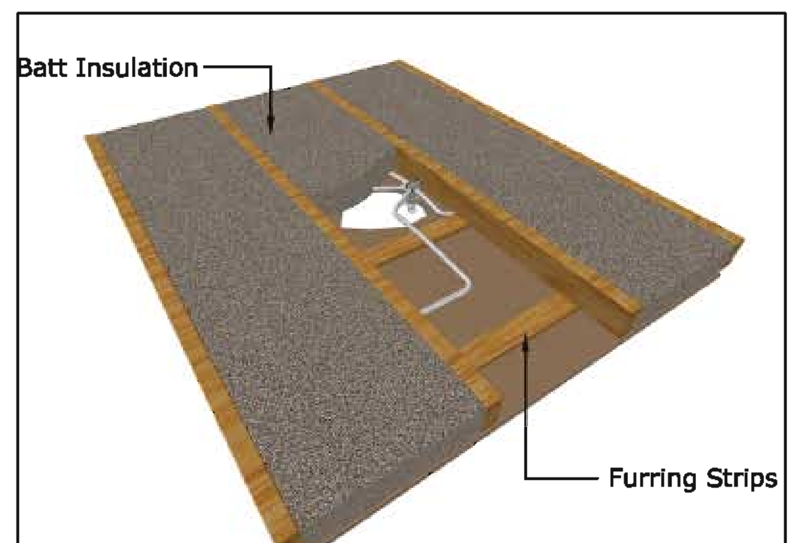


Figure F001-6

Ceiling Joist Insulation Recommendations - Option 2

Thread the tubing above the bottom of the wood truss. Install insulation over the tubing, leaving a 1-inch air space (see **Figure F001-7**).

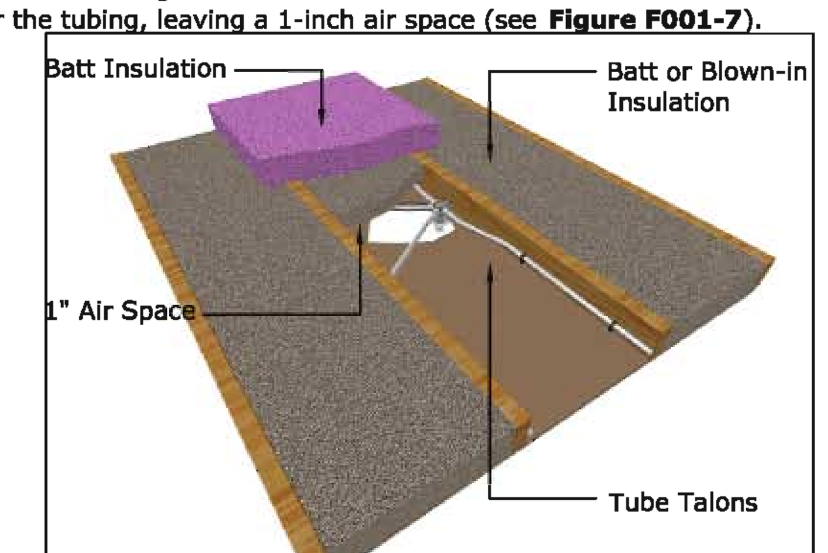


Figure F001-7

Flow Test

To ensure the system provides enough water for proper fire sprinkler performance, you should conduct a flow verification test.

Note: The NFPA 13D Installation Standard does not require flow verification.

Before performing a flow verification test, confirm the water pressures by contacting the Water and Sewer Department of your local city. Ensure the available water pressure matches the pressure used in the system design.

Note: The sprinkler plan indicates the most hydraulically remote sprinkler (or pair of sprinklers). For test requirements on other sprinklers, consult your local code.

Note: It is a good idea to notify the fire inspector at least 24 hours prior to performing a flow verification test. This may speed up the inspection process and eliminate the need to repeat the test for the inspector.

Extreme Temperature Installations

AquaSAFE Residential Fire Safety systems are often installed in attics or other areas exposed to temperature extremes of heat and/or cold. Follow the recommended extreme weather installation instructions to isolate and protect system components from extreme temperatures. Because this system also delivers domestic cold water directly to plumbing fixtures, Uponor highly recommends that you protect the tubing with adequate insulation in warm weather areas to minimize heating of the cold water supply.

Installation methods include, but are not limited to:

- Tenting over the fire sprinkler piping.
- Additional layers of batt insulation.
- Increased depth of blown-in insulation.

Caution: If you will be installing spray foam insulation, make sure to protect all components during application. Consult with the spray foam manufacturer to ensure compatibility with all products before application.

Consultation with local building officials is encouraged to ensure compliance with local building codes.

Performing the Flow Verification Test

All flow-restricting devices (water softener, etc.) must be in place when you perform a flow verification test.

1. Ensure that you have the water turned off.
2. If you have already inserted the sprinkler into the 1/2 inch threaded outlet, carefully unscrew the sprinkler from the sprinkler adapter. Place the sprinkler in a safe place to avoid any damage.
3. Assemble the PEX pieces using the threaded fittings. The flow meter must be installed above the control valve. Ensure the arrow on the flow meter is pointing in the direction of the water flow.
4. Install the correct orifice in the bottom of the flow verification kit. Refer to the design printout for the orifice with the appropriate k factor.
5. Attach the flow verification kit to the 1/2 inch NPT connection of the sprinkler adapter. Ensure the valve is closed.

Note: Install a pressure gauge at the manifold location. You must take a pressure reading from this gauge during the flow test.

6. Ensure that you have installed the proper sprinkler orifice adapter to the bottom of the flow verification kit.
7. Pressurize the system to its working pressure.
8. Open the valve and bleed air from the system.
9. Close the valve completely.
10. Record the static pressure reading on the gauge near the manifold.
11. Open the valve until the plunger on the flow meter settles into position. This may take less than one minute. Using the markers on the flow meter, determine the flow through the test device. Record the residual pressure reading on the manifold gauge while the water is flowing.
12. Compare the results with the gallons per minute required on the sprinkler data sheet. Test results must equal or exceed the required flow for proper operation and warranty coverage.
13. Pull all Teflon tape off detached sprinkler.
14. Apply new Teflon tape to the threads of the sprinkler (three wraps).
15. Using the appropriate sprinkler wrench and following the sprinkler installation instructions, carefully tighten the sprinkler head into the sprinkler adapter. You should obtain a leak-tight connection with a maximum torque of 14 ft.-lbs. to 21 ft.-lbs. (approximately 2 turns past hand tight). Do not over-tighten.
16. Once you have verified the proper flow rate, fill out the Flow Test Verification form and fax to Uponor Technical Services Department at 952.997.1731. Keep a copy for your own records. The AHJ may also require a copy.

In-line Flow Test Kit

The In-line Flow Test Kit performs a flow test to ensure proper system operation and flow. The kit contains two straight lengths of 3/4" Uponor AquaPEX tubing, five orifices, a 1" ball valve, a flow meter, assorted hardware, and assembly and installation instructions (see **Figure F001-8**).

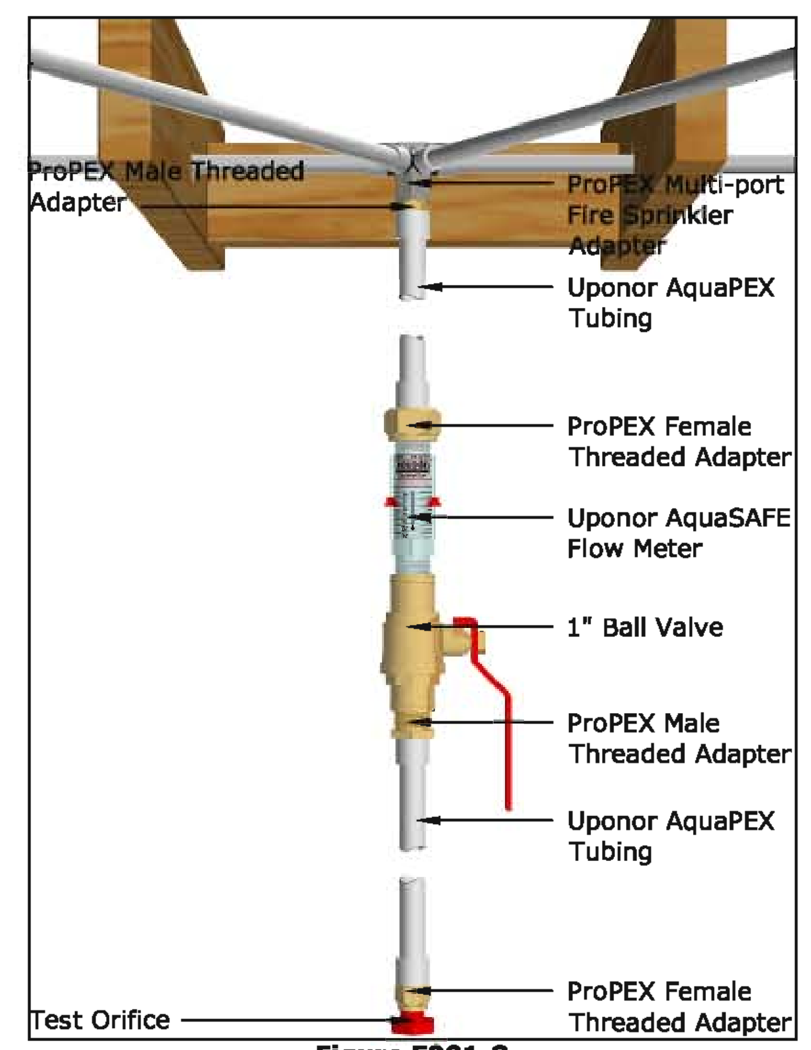


Figure F001-8

Test Orifice

To verify proper the test orifice to use in the flow verification test, refer to the Uponor AquaSAFE Installation Manual or see **Table F001-1**.

Test Orifice		
Test Orifice	**K-factor**	**Identification**
Test Orifice for F1/Res 30 Sprinkler	3.0	White
Test Orifice for F1/Res 40 Sprinkler	4.0	Gray
Test Orifice for RFC 43 Sprinkler	4.3	Red
Test Orifice for F1/Res 44 Sprinkler	4.4	Blue
Test Orifice for F1/Res 49 or RFC 49 Sprinkler	4.9	Black

Table F001-1

Performing the Flow Verification Test Without the Flow Meter

The installer can also conduct the flow verification test without the use of the Flow Test Kit, a practice sometimes referred to as the Bucket Test Method, using the following steps.

1. Ensure that you have the water turned off.
2. If you have already inserted the sprinkler into the 1/2 inch threaded outlet, carefully unscrew the sprinkler from the sprinkler adapter. Place the sprinkler in a safe place to avoid any damage.
3. Construct a flow test assembly using a 1 inch full port ball valve with threaded adapters and 3/4 inch PEX tubing, that threads into the 1/2 inch NPT sprinkler adapter and terminates with the correct test orifice.
4. Using a one-gallon container, carefully mark the fill-lines in a large bucket (such as a 20 or 30 gallon garbage container) with a permanent marker. You should mark at the 5, 8 and 10 gallon levels; then at each gallon up to or exceeding the minimum required flow from the sprinkler (as identified on the sprinkler plan).
5. Attach the flow test assembly to the 1/2 inch NPT connection of the sprinkler adapter. Ensure the valve is closed.

Note: Install a pressure gauge at the manifold location. You must take a pressure reading from this gauge during the flow test.

6. Ensure that you have installed the proper sprinkler orifice adapter to the bottom of the flow verification kit.
7. Pressurize the system to its working pressure.
8. Open the valve and bleed air from the system.
9. Close the valve completely.
10. Record the static pressure reading on the gauge near the manifold.
11. Open the valve and start a timer or stopwatch. Flow water for one minute and record the number of gallons in the bucket. If the minimum volume of water is reached as indicated on the sprinkler plan before one minute has elapsed, the test may be stopped as the flow rate exceeds the requirements.
12. Compare the results with the gallons per minute required on the sprinkler data sheet. Test results must equal or exceed the required flow for proper operation and warranty coverage.
13. Pull all Teflon tape off detached sprinkler.
14. Apply new Teflon tape to the threads of the sprinkler (three wraps).
15. Using the appropriate sprinkler wrench and following the sprinkler installation instructions, carefully tighten the sprinkler head into the sprinkler adapter. You should obtain a leak-tight connection with a maximum torque of 14 ft.-lbs. to 21 ft.-lbs. (approximately 2 turns past hand tight). Do not over-tighten.
16. Once you have verified the proper flow rate, fill out the Flow Test Verification form and fax to Uponor Technical Services Department at 952.997.1731. Keep a copy for your own records. The AHJ may also require a copy.

Standard Riser Assembly

In a multi-purpose system a single control valve controls both domestic and fire safety needs (see **Figure F001-9**).

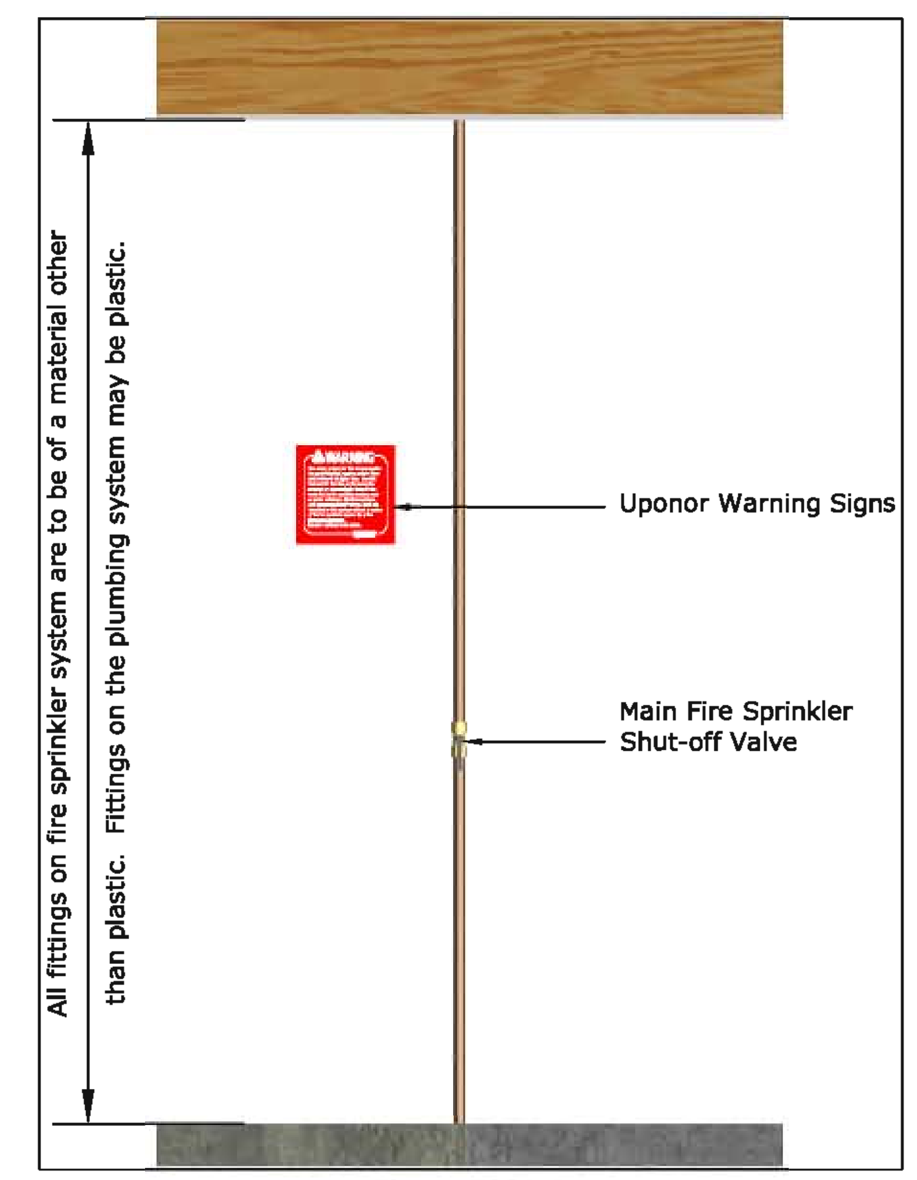


Figure F001-9

Warning Sign

The Uponor AquaSAFE Homeowner Handbook and a red warning sign are provided with the sprinkler design. The red warning label advises the homeowner that modifications to the system should not be made without consulting a fire protection specialist. Leave the homeowner handbook in the home and affix the warning sign adjacent to the primary shutoff valve (see **Figure F001-10**).

Figure F001-10

Important: The warning sign must be affixed adjacent to the main shutoff valve per NFPA 13D requirements. If a replacement warning sign is needed, please contact the Uponor Design Department.

Connect Plumbing Runs

To feed plumbing fixtures, install a ProPEX brass tee in the AquaSAFE loop. From this tee, you can feed Uponor AquaPEX tubing into a multiport tee to supply cold water to multiple fixtures, or you can install a dedicated run to supply an individual fixture. Ensure plumbing runs have been plugged to allow pressure and flow verification testing.

Optional Multipurpose Flow Switch

Use when needed to activate an electrical alarm, send a signal to a monitoring company, or send a signal to other devices upon activation of fire sprinklers. Refer to flow switch manufacture for supporting flow switch. Typical PEX connection method (see **Figure F001-11**).

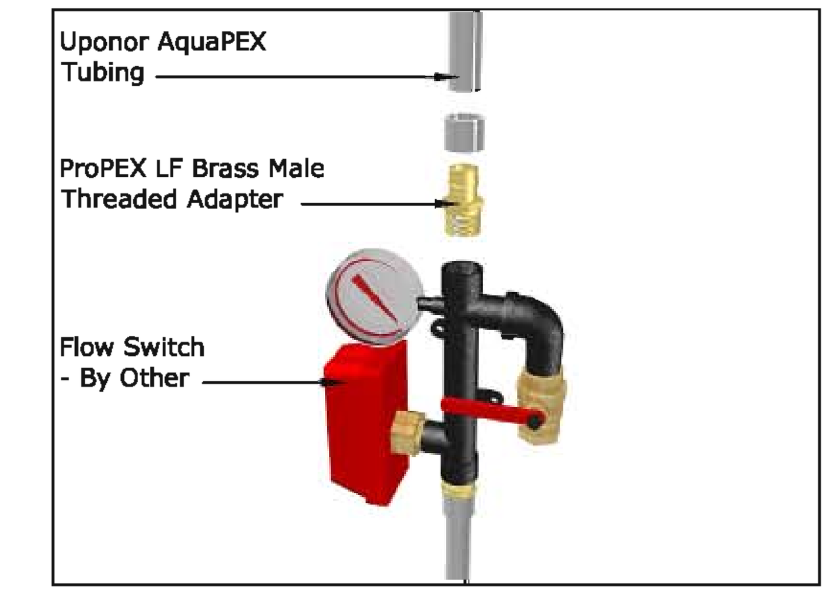


Figure F001-11

Residential Sprinklers

Only National Sanitation Foundation (NSF)-listed residential fire sprinklers are compatible with AquaSAFE Fire Safety systems.

Note: Ensure that all sprinklers are installed within their listing limitations. Additionally, ensure that the Uponor Sprinkler Cabinet that remains in the home contains sprinklers identical to those installed in the system. Do not store sprinklers in areas that may experience excessive heat (over 100°F/ 37.3°C).

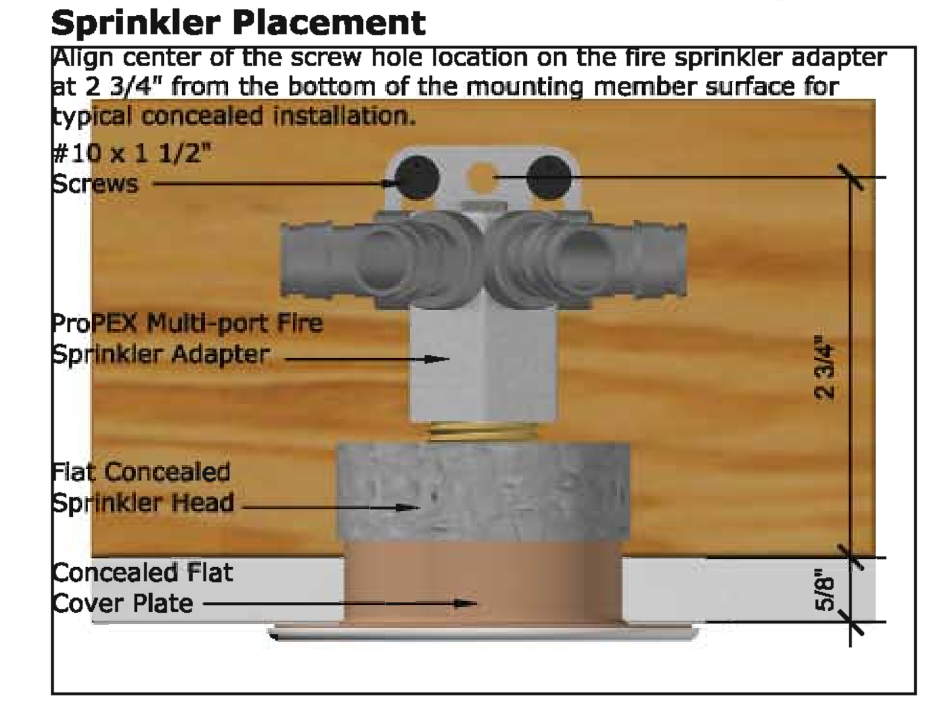
Sprinkler Cabinet

Uponor recommends installing an Uponor Sprinkler Cabinet near the main water shut-off valve. Keep at least one spare sprinkler of each type in the cabinet for easy access to replacements. Check local code requirements for any additional spare sprinkler or cabinet requirements.

Caution: Do not store sprinklers in areas that may experience excessive heat (over 100°F/ 37.3°C).

Stainless Steel Flat Concealed Assembly Sprinkler Placement

Align center of the screw hole location on the fire sprinkler adapter at 2 3/4" from the bottom of the mounting member surface for typical concealed installation.



Caution: Do not paint over the sprinklers cover plates. Paint may interfere with the heat sensitivity of the sprinkler, and disturbances may damage the sprinkler.

uponor

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SALES REP:

25A SUMAC

25A SUMAC
PORTLAND, ME

DRAWN BY:	DH	CONTACT PH. NUMBER:	207-252-0698
CHECKED BY:	DAN HUBBARD	ALLIANCE ID:	TBD
CERTIFICATION LEVEL:	SET IV	PLOT DATE:	3/05/12
CERTIFICATION NUMBER:	115052	SHEET SCALE:	N/A
COMPANY:	SPB PLB & HTG	PROJECT NUMBER:	120228-41N
CONTACT:	STEVEN	SQUARE FEET:	2388 SQ. FT.

REVISIONS

NO.	DATE	DESCRIPTION

SHEET DESCRIPTION

FIRE SAFETY NOTES, DETAILS, AND TABLES

SHEET NUMBER

F001