



Viega PEX Fire Sprinkler System  
For Residential Applications  
Installation Manual

The global leader  
in plumbing, heating  
and pipe joining systems



## Viega, heritage of quality, vision for the future

Viega's heritage of superiority demands nothing but the best for our customers. Engineered to be efficient, Viega products perform at the highest possible level of quality, providing confidence and peace of mind. Viega is the only manufacturer to offer press systems in multiple pipe joining materials, including polymer. More than one million Viega press fittings are installed every day around the world and, with a Supply Chain that can process orders in less than 24 hours, Viega is positioned to provide customers the best, most versatile support in the industry.

**⚠️ MANUAL CONTENT AND USE**  
**It is the responsibility of the contractor, specifying engineer or installer to appropriately design the PEX system, determine that the selection of components in the system are the proper ones for the intended application in the locale in which they will operate and that employees working on the job site observe the proper installation practices.**

## IMPORTANT NOTICE

This installation guide is intended to assist in the design and installation of Viega multipurpose fire protection sprinkler/plumbing systems. System installation shall be done by installers trained through industry recognized or approved programs.

**NOTE:** References to ViegaPEX made throughout this publication include Black ViegaPEX Ultra and Viega PEX Press Fittings w/ attached sleeves.

**NOTE:** Zero Lead identifies Viega® products meeting the lead-free requirements of NSF 61-G through testing under NSF/ANSI 372 (0.25% or less maximum weighted average lead content).

**IN THE EVENT OF CONFLICT OR INCONSISTENCY BETWEEN THESE INSTALLATION GUIDELINES AND LOCAL BUILDING OR PLUMBING CODES, LOCAL CODES SHOULD TAKE PRECEDENCE.**


**NOTE:** Failure to follow the installation instructions will void the Viega Plumbing Warranty. Nothing in this publication is intended to create any warranty beyond Viega's applicable warranty. For additional information, contact Viega at 800-976-9819.




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**Important warning symbols**




Important, read and understand the warnings accompanying this symbol to ensure your Viega product is installed correctly and safely. Ignoring these warnings could result in product failure and/or void your warranty.



Limit direct UV exposure (sun light) to products that have this warning symbol present. Maximum UV exposure durations may vary based on the type of product being installed. Review the warning and/or limitation listed with the product being installed.



Do not expose products with these warnings to any foreign substances that include VOC (volatile organic chemical) compounds, paints, solvents, glues, cleaners and disinfectants. Products that are exposed to these types of substances are at risk of having failures (leaks).



Contact Viega Technical Services for questions concerning chemical compatibility.

**Terms Used In This Guide:**

- PEX . . . . . ViegaPEX cross-linked polyethylene tubing
- AHJ . . . . . Authority Having Jurisdiction
- NFPA . . . . . National Fire Protection Association
- NSF . . . . . NSF International, Inc. (formerly National Sanitation Foundation)
- CAN/CSA . . . . . Canadian Standards Association
- “shall” . . . . . Required; a mandatory procedure
- “may” or “should” . . . . . A suggested optional procedure



# 1. Introduction

This manual is intended as a reference guide to aid in the design and installation of Viega's PEX Press Fire Sprinkler systems.

All installations must comply with the appropriate model and local codes as well as NFPA 13D "Installation of One- and Two- Family Dwellings and Manufactured Homes."

## 1.1 Viega PEX solutions

Viega PEX systems are the most complete system solutions available on the North American market. With tubing, fittings and distribution manifolds, Viega provides everything you need for a total PEX system that is not only easy to install but also helps reduce energy costs and water waste.

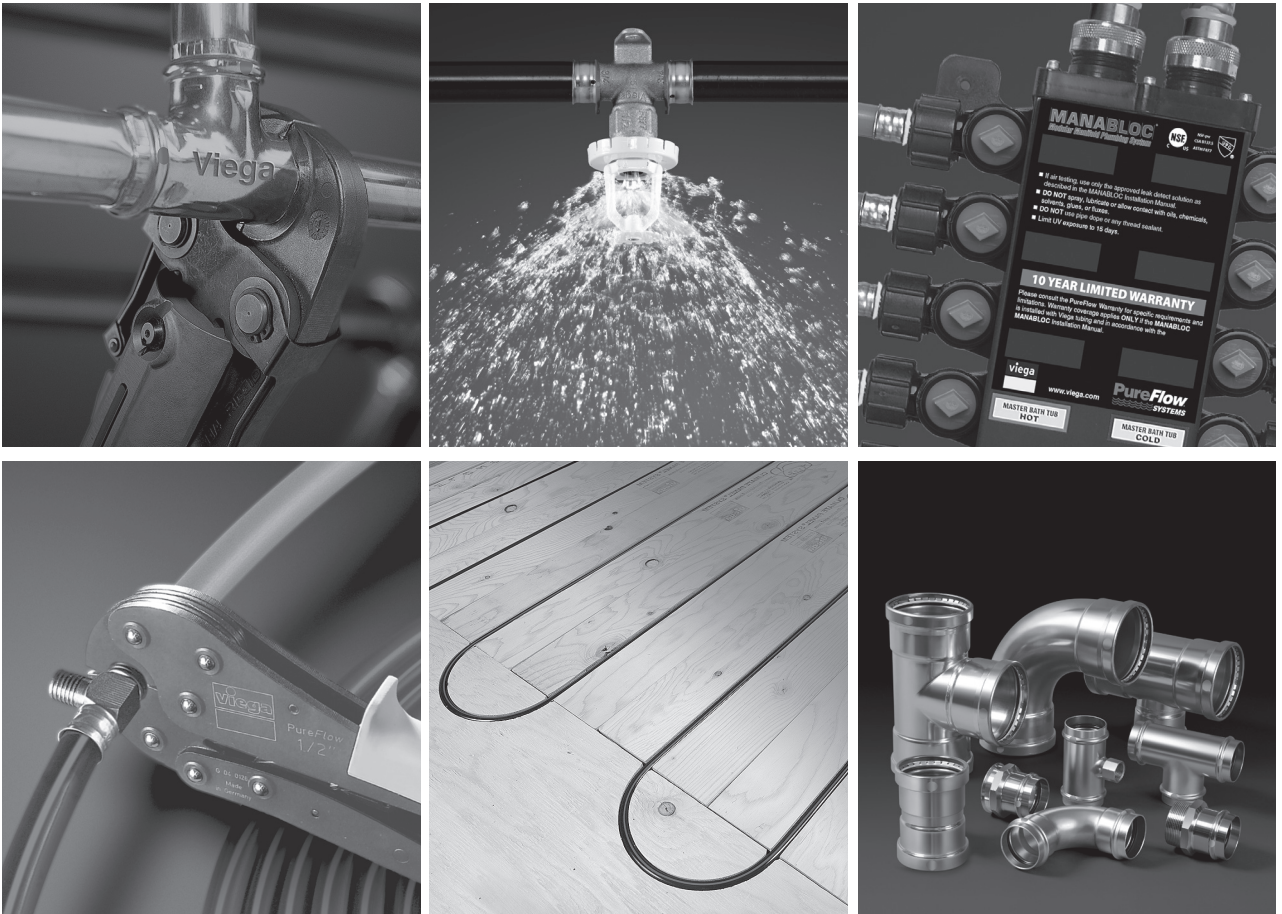
Viega provides the highest-quality PEX tubing with the best UV and chlorine ratings in the industry. Viega PEX Press fittings allow installers to make secure connections in less than seven seconds. With Viega press technology, pressure testing can be completed immediately after connections are made without waiting for glues or solvents to dry or for expansions to contract. Viega PEX Press fittings are approved for potable water and hydronic heating applications and are available in sizes

ranging from 3/8" through 2" in both Zero Lead and high-grade polymer materials. With a comprehensive 10-year transferable warranty and unmatched quality in the industry, Viega offers a complete system solution for all your plumbing needs.

### Do more with Viega

Viega press technology is consistent and reliable, providing the same quality pipe connections every time. Viega PEX Press polymer fittings incorporate the Viega Smart Connect feature, which helps installers identify unpressed connections easily. ViegaPEX tubing and Viega PEX Press polymer fittings are manufactured in the United States and provide secure, reliable connections for residential and light commercial projects, ranging from potable water to snow melting applications.

A true innovator since 1899, Viega is at the forefront of pipe joining technology. With personalized support, efficient delivery processes and trustworthy quality, no other manufacturer can provide the same level of service. The global leader in plumbing, heating and pipe joining systems, Viega is the name you can trust.





## 1.2 Viega PEX system concepts

Viega PEX is a high-quality flexible PEX system for hot and cold potable water distribution.

The Viega PEX plumbing system offers maximum security thanks to cold press and full circle crimp fitting techniques. These fittings guarantee the plumber quick installation, suitability for use in all types of applications at the construction site and vast reductions in the required number of fittings and necessary installation time.

Top quality materials such as brass, bronze, stainless steel and durable, environmentally compatible polymers provide the basis for the very highest standards of quality at Viega.

PEX tubing offers outstanding versatility. More than 655 million feet of Viega PEX tubing has been manufactured since 2006. This is conclusive evidence of this product's considerable importance in plumbing installation, in both quality and quantity.

This is clearly the result of excellent workmanship, fast and simple installation and the reliability and safety that are characteristic of the Viega system concept.

The efficiency of the integrated system concept for Viega branded products is confirmed by:

- perfectly coordinated components
- quick delivery at short notice
- time-saving installation
- complete installation of an entire system from one supplier

Viega's comprehensive services include technical support and warranty coverage, subject to the exclusive use of Viega PEX system components.

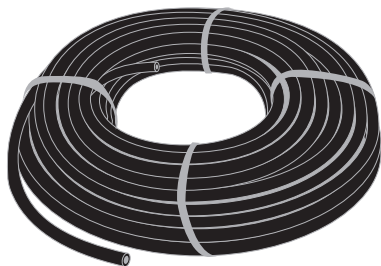
Viega PEX is a high-quality plumbing system. It is able to withstand high levels of thermal and mechanical stress.

### The systems incorporate:

- ViegaPEX Ultra tubing: red, white, blue and black cross-linked polyethylene tubing with added resistance to UV
- A range of bronze or polymer fittings for PEX Press fitting systems
- A range of inline, manifold and stop valves for Viega fitting systems
- Viega PEX Press tools and jaws for the PEX Press fitting systems



## 2. System Components and Properties



### 2.1 ViegAPEX Ultra black

ViegAPEX Ultra tubing is a high-density cross-linked polyethylene tubing (PEX). Cross-linking produces a strong, durable tubing ideal for both hot and cold potable water systems.

#### 2.1.1 PEX - The superior tubing

Cross-linked polyethylene is the ideal tubing choice for potable water systems. Compared to ordinary polyethylene tubing (PE), cross-linked tubing has higher temperature resistance and higher burst pressure.

ViegAPEX Ultra tubing is manufactured to ASTM F876/F877 standards and listed to ANSI/NSF standards 14 and 61. It is PEX 5306 (CL5) chlorine resistance rated for both traditional and continuous recirculation applications.

In addition, the smooth walls of ViegAPEX Ultra tubing are resistant to corrosion and scaling.

#### 2.1.2 Colors

ViegAPEX Ultra black tubing is the only ViegAPEX tubing approved for NFPA 13D fire sprinkler systems. The UV resistance of this tubing enables exposure of up to 6 months. It also blocks transmission of visible light, preventing most types of algae growth from occurring.

#### 2.1.3 ViegAPEX Ultra properties and performance

Linear Expansion Coefficient:

- 1.1 inch per 100 feet per 10°F

Temperature and Pressure Ratings:

- 100 psi at 180°F\*
- 130 psi at 120°F
- 160 psi at 73.4°F

UV Resistance:

- Maximum exposure 6 months

Flexibility:

ViegAPEX Ultra can be easily bent by hand 8 times the radius of the actual tubing outside diameter (O.D.).

### 2.1.4 Tubing markings

ViegAPEX Ultra tubing is marked every 2 to 5 feet with the following representative information:

Print Line Markings	
Length Marker	000 Feet
Company	Viega
Product Name	ViegAPEX™ Ultra
Nominal Tubing Size	½"
Standard Dimension Ratio Tube Size	SDR 9 CTS (copper tube size)
Material Designation Code	PEX 5306
Temperature & Pressure Rating	100 PSI @ 180F 160 PSI @ 73F
NSF Listing (Potable)	cNSF®us-pw
NSF Chlorine Listing	CL5
ASTM Tubing Standards Certification	F876/F877
Canadian Standard Assoc	CSA B137.5
Fittings System Compatibility	Viega PEX - ASTM F877/ F1807/F2159
IAPMO listing	UPC®
UL Listing Rating**	cULus 3SAV UL1821 130 PSI @ 120 F
Plenum Rating***	FS/SD 25/50 ASTM E84 CAN/ULC S102.2
Fire Resistance Ratings	CAN/ULC S101 ANSI/UL 263
ICC Listing	ES-PMG™ - 1038
AWWA Listing	C904
HUD Listing	MR 1276
Manufacturer's Date Code	1/1/2010
Material Code	X14.2
Country of Manufacture	Made in the USA

Table 2.1

\*\* ¾" through 2" Black ViegAPEX Ultra only  
\*\*\* 2" and smaller tube sizes when wrapped with ½" - 1" thick E84 rated insulation, ½" and smaller with no insulation per ULC S102.2 listing. Tubing may include fitting connections when wrapped.

### 2.1.5 ViegAPEX Ultra tubing dimensions

Nominal Size	Inner Diameter	Outer Diameter	Wall Thickness	Capacity gal/ft
¾"	.671	.875	.102	0.18
1"	.863	1.125	.131	0.30
1¼"	1.053	1.375	.160	0.45
1½"	1.243	1.625	.190	0.63
2"	1.629	2.125	.248	1.08

NOTE: Dimensions are in English units. Tolerances shown are ASTM requirements. ViegAPEX Ultra is manufactured within these specifications.

Table 2.2

\*Does not apply to fire sprinkler system



## 2.2 Viega PEX Friction loss

ViegaPEX pipe has a Hazen-Williams coefficient C-value of 150. Pipe friction loss calculations shall be performed according to the NFPA standards. The following table lists pressure loss in psi/ft of pipe for various flow rates.

Flow Rate GPM	60°F (16°C) Water				
	Pressure Loss PSI/ 100 ft of Pipe				
	¾	1	1¼	1½	2
0.5					
0.75					
1.0		Pressure Loss <1 PSI			
1.5					
2.0	1.1				
2.5	1.6				
3.0	2.3				
3.5	3.0				
4.0	3.9	1.1			
4.5	4.8	1.4			
5.0	5.9	1.7			
6.0	8.2	2.4			
7.0	10.9	3.2	1.2		
8.0	14.0	4.1	1.6		
9.0	17.4	5.1	1.9		
10.0	21.1	6.2	2.3	1.0	
11.0	25.2	7.4	2.8	1.2	
12.0	29.6	8.8	3.3	1.5	
13.0	34.3	10.1	3.8	1.7	
14.0		11.6	4.4	2.0	
15.0		13.2	5.0	2.2	
16.0		14.9	5.6	2.5	
17.0		16.7	6.3	2.8	
18.0		18.5	7.0	3.1	
19.0		20.5	7.7	3.4	
20.0		22.5	8.5	3.8	1.0
25.0			12.8	5.7	1.5
30.0	Pressure Loss Excessive as Flow velocity is > 12 ft/Sec		18.0	8.0	2.2
35.0				10.7	2.9
40.0				13.7	3.7
45.0				17.0	4.6
50.0					5.6
55.0					6.6
60.0					7.8
65.0					9.0
70.0					10.4
75.0					11.8

**NOTE:** Pressure Loss based on Hazen-Williams Formula (C = 150)

Pressure Loss for Actual Length can be calculated by following formula: Actual Length / 100 ft X Value from chart above  
½" PEX fitting connections are only to be used downstream of the sprinkler system to feed non-sprinkler applications.

Table 2.3

### 2.3 Viega PEX Press fittings

Viega PEX Press fittings are available in Zero Lead Bronze and polymer and include a factory-assembled stainless steel sleeve with three viewing holes and a tool locator ring to ensure a proper press connection. The following design criteria make Viega PEX Press fittings ideal for use in potable water applications:

- High corrosion resistance
- Excellent strength properties
- Resistant to stress corrosion
- Superior wear properties
- Compatible with all materials

All Viega PEX tubing, fittings and manifolds are NSF certified for use in potable water systems.

#### 2.3.1 Viega PEX Press bronze

Viega PEX Press bronze fittings are manufactured from a high-quality Zero Lead material specifically designed for press technology meeting or exceeding all manufacturing requirements.

#### 2.3.2 Viega PEX Press polymer

Viega PEX Press polymer fittings are manufactured from Radel R<sup>®</sup> and incorporate the Viega Smart Connect feature.

#### 2.3.3 Viega Smart Connect feature

The Viega PEX Press polymer fitting system incorporates the Viega Smart Connect feature, which is designed to identify unpressed connections by intentionally leaking under test pressures of .5 psi to 100 psi. This can be visually identified by water leaking from the unpressed fitting joint. Press any connections that may have been missed and/or replace connections found to be in question. Repeat the pressure test.

#### 2.3.4 Viega PEX Press fitting markings

Each Viega PEX Press fitting is marked where space permits with the following information:

Manufacturer	VIEGA
ASTM standard	ASTM F877
Temperature rating	180°F (Potable) 200°F (Hydronic heating)
Certifications	cNSF <sup>®</sup> us pw-G, CSA B137.5 UPC <sup>®</sup> or UP Code, cULus <sup>®</sup> ICC-ES PMG™ 1038 / 1015

**NOTE:** All fittings may not be listed with each organization shown.

### 2.4 Viega PEX Press Friction loss

Hydraulic calculations for the sizing of ViegaPEX pipe and Viega PEX Press fittings shall be calculated by using the Hazen-Williams C-value of 150. Pipe friction loss calculations shall be made according to NFPA Standard 13. The following table shows the allowance of friction loss for fittings, expressed as equivalent length of pipe.

#### Viega PEX Press Bronze Friction Loss Equivalent Feet of SDR9 PEX Tubing

Size	Coupling	90° Elbow
¾"	1	8
1"	1	10
1¼"	2	11
1½"	2	13
2"	1	19

Size	Tee Flow Through	Tee Turned 90°
¾"	1	9
1"	2	10
1¼"	2	11
1½"	2	12
2"	2	18

Size	Horizontal Sprinkler Tee	Vertical Sprinkler Tee
¾"	2	2
1"	2	6

#### Viega PEX Press Polymer Friction Loss Equivalent Feet of SDR9 PEX Tubing

Size	Coupling	90° Elbow
¾"	2.5	18.9
1"	3.1	17.7
1¼"	4.0	18.6
1½"	5.2	29.4
2"	8.9	36.4

Size	Tee Run	Tee Branch
¾"	3.6	19.1
1"	3.8	18.4
1¼"	6.4	18.7
1½"	7.9	28.3
2"	10.2	37.5

Size	Sprinkler Tee
¾"	4.6
1"	5.6

This information is based on tubing nominal flow rate. (@ 8 fps flow velocity)



## 2.5 PEX Press tools

### 2.5.1 PEX Press hand tools

The Viega PEX Press connection must always be carried out with the aid of a Viega PEX Press tool. The hand tool incorporates a forced compression mechanism to complete a secure connection each time. A ratchet inside the tool prevents the tool from being opened until the proper force has been applied to the press sleeve. A safety release screw allows the tool to be opened at any time, but any connection made without full tool compression must be redone.

The reduced grip feature permits one-handed operation, making the Viega PEX Press system perfect for tight spaces and awkward locations. The compression of the tool also allows press connections to be made in temperatures as low as -4°F.



### 2.5.2 RIDGID power tools with PEX Press jaws

The Viega PEX Press connection may also be carried out with one of the RIDGID power tools. These tools are designed to make the same consistent press as the Viega PEX Press hand tools. The compression of the tool also allows press connections to be made in temperatures as low as 23°F.



*Compact Power Tool*



**Use only Viega stainless steel attached PEX Press sleeves and press tools with Viega PEX Press fittings.**



**Viega PEX Press polymer fittings must be protected from UV exposure, which can damage them. In the event of incidental UV exposure during storage, installation and handling, combined exposure of PEX Press fittings shall not exceed 15 days.**



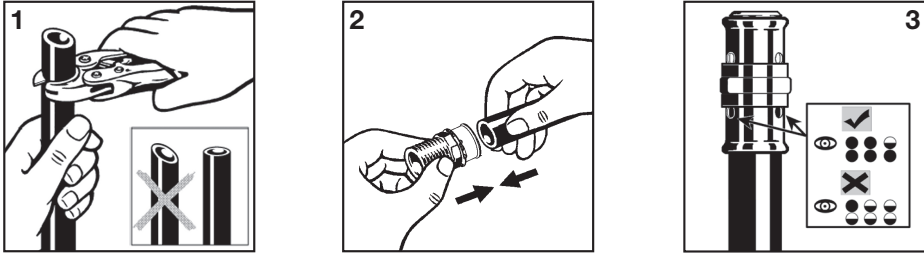
**Do not expose Viega products to any foreign substance that includes but is not limited to VOC (volatile organic chemical) compounds, paints, solvents, glues, cleaners and disinfectants.**



**Viega products that are exposed to these types of substances are at risk of having failures (leaks).**

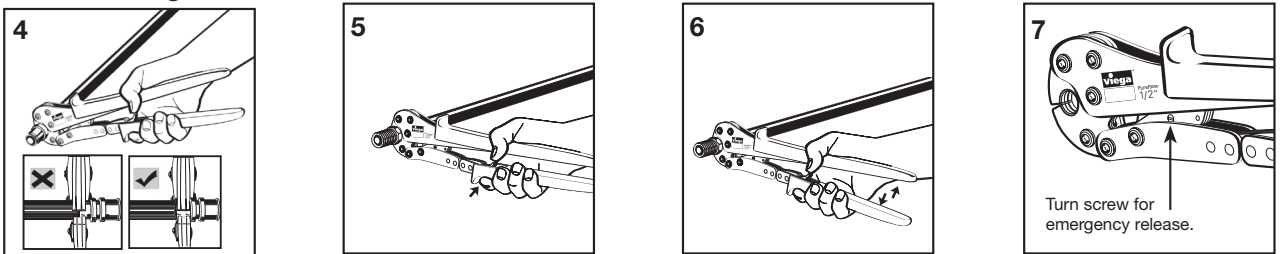
## 2.6 Making a Viega PEX Press connection

### 2.6.1 Trimming and inserting the tubing



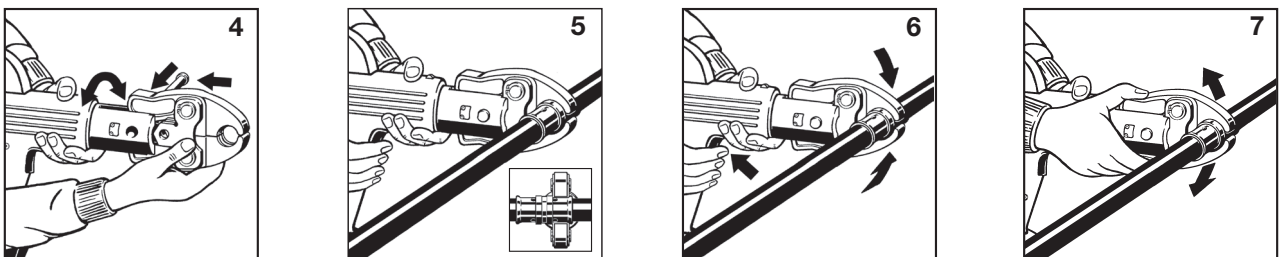
1. Square off tubing to proper length. Uneven, jagged or irregular cuts will produce unsatisfactory connections.
2. Insert PEX Press fitting with attached sleeve into tubing and engage fully.
3. Ensure full tubing insertion at view holes in attached press sleeve. Full insertion means tubing must be completely visible in at least two view holes and partially visible in the one.

### 2.6.2 Pressing with a hand tool



4. Position press tool perpendicular over press sleeve, resting it against the tool locator ring.  
**Note:** The tool locator ring must be in the factory-installed position while making a press to provide a consistent leakproof connection. It may be necessary to rotate the tool locator ring to avoid interference between the ring and tool.
5. Close handles, using trigger to reduce grip span if desired.
6. Extend handle and continue ratcheting until automatic tool release occurs at proper compression force.
7. **Warning:** The connection is not leakproof when the tool has been opened by emergency release. The tool locator ring must be present to ensure a proper PEX Press connection.

### 2.6.3 Pressing with a power tool



4. Insert the appropriate Viega PEX Press jaw into the press tool and push in the holding pin until it locks.
5. Open jaw and position perpendicular over press sleeve, resting it against the tool locator ring.  
**Note:** The tool locator ring must be in the factory-installed position while making a press to provide a consistent leakproof connection. It may be necessary to rotate the tool locator ring to avoid interference between the ring and tool.
6. Start pressing process; hold the trigger until the jaw has automatically released.
7. When press connection is complete, open and remove jaw.
8. **Warning:** The tool locator ring must be present to ensure a proper PEX Press connection.



## 2.7 Sprinklers

Automatic sprinkler heads are heat-actuated suppression devices that when exposed to temperatures at or above its thermal rating, automatically allow water to flow through the sprinkler head which disperses water onto the heat source. Residential fire sprinklers are primarily designed to save lives by providing adequate time for occupants to exit the area experiencing the fire.

Viega only recommends listed residential fire sprinkler heads as defined by their ratings (temperature / flow rate). Installation of these heads shall be per the manufacturer's specified listings and or limitations.

### 2.7.1 Types of sprinklers

Residential fire sprinkler installations primarily have four types of sprinkler heads; Flush concealed, concealed recessed pendent, recessed pendent, and horizontal sidewall sprinklers.

Each type of sprinkler head is intended for a specific mounting application and has distinct advantages focused mostly on aesthetic in the home. Cover plates are also available and may come in various colors direct from the manufacturer.

Sprinkler head design typically utilizes either a fusible link or a heat-sensitive glass bulb that upon sensing heat, expands and bursts triggering the water to flow.

Residential fire sprinkler head must have all appropriate listings and must comply with the appropriate model and local codes as well as NFPA 13D "Installation of One- and Two- Family Dwellings and Manufactured Homes."

### 2.7.2 Sprinkler temperature ratings

There are two types of sprinkler head temperature ratings defined as ordinary or intermediate.

Recessed pendants and horizontal side wall type heads are considered ordinary having a rating of 155°F (68°C). These shall not be installed where ceiling temperatures can exceed 100°F (38°C). Cover plate assemblies on concealed pendent sprinklers shall have a temperature rating of 135°F (57°C).

Flush concealed sprinkler heads have a temperature rating of 140°F (60°C) and their cover plate assembly is rated at 135°F (57°C).

Intermediate sprinkler heads have a temperature rating of 175°F (79°C) and shall be installed when ceiling temperature range from 101°F (39°C) and 150°F (66°C). Temperatures shall not exceed 120°F (49°C) to be in accordance with the UL and C-UL Listing.

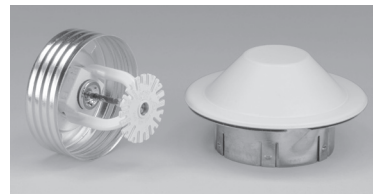
Sprinkler heads shall not be stored in areas that could experience temperatures above 100°F (38°C).

Each type of sprinkler head and associated cover plate has an maximum application temperature rating that must be specified within the design. Ambient temperature exposure must be taken into account during the design of the fire sprinklers system.



*Flush concealed sprinklers with components*

Flush concealed sprinklers are designed to be concealed behind a ceiling surface. A cover plate mounts flush with the ceiling.



*Concealed recessed pendent sprinklers with components*

Concealed recessed pendent sprinklers typically have a conical shaped trim plate cover that extends down from the finished ceiling surface.



*Recessed pendent sprinklers with components*

Recessed pendent sprinklers remain visible once installed (no cover plate).



*Horizontal sidewall sprinklers with components*

Horizontal sidewall sprinklers remain visible once installed in the wall (no cover plate).

### 2.7.3 Sprinkler orifice size (K-factor)

Sprinkler flow rates are typically expressed using a K-factor, and this is used to calculate the sprinklers flow rate based on a specific pressure. The size of a sprinklers orifice is proportional to the size of its K-factor and the larger the orifice the higher the K-factor. Typical residential fire sprinkler heads have K-factors ranging between 5.5, 5.2, 4.9, 4.3 and 4.1. This relation can be shown in the formula below:

$$P = (F/K)^2$$

P = pressure (psi)

F = flow from sprinkler (gpm)

K = K-factor of sprinkler head

### 2.7.4 Additional requirements

It is important to handle the sprinkler heads with extreme care protecting them from any type of damage. As these are life safety devices, never install a sprinkler head that has been damaged in any way if suspicion of damage has occurred. Some examples of damage include prolonged exposed to maximum ambient temperatures and cracked glass bulbs. If a damage is head is found, it should be permanently disposed of.

#### Sprinkler protection

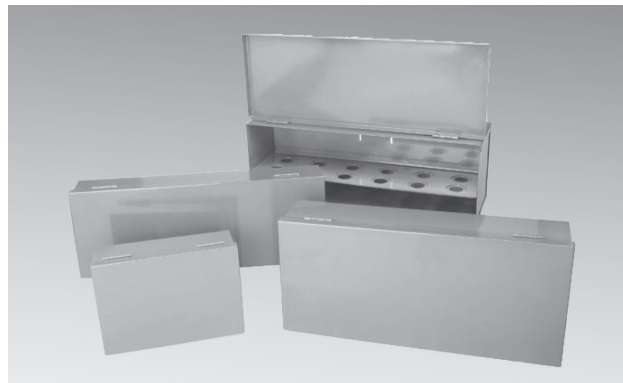
Sprinkler heads are generally shipped with a removable cover that protects the heat-sensing element from damage. It is recommended that this plastic cover be kept in place during all phases of construction including painting or texturing of the ceiling and walls. Removal of these plastic shells must be done prior to placing the system in service. It may be helpful to keep spare protective caps in the sprinkler cabinet for future use.



*Keep heads within protective shell during installation*

### Spare sprinkler

While spare sprinklers are not typically required to be left on site consult with your AHJ as local requirements may differ.



*Storage cabinets for spare heads and wrenches*

### Sprinkler wrenches

As with any specialty system, special tools are required. Residential fire sprinkler systems utilize various wrenches designed for each type of head. These wrenches are essential to proper installation by ensuring proper leverage and minimizing slippage. The use of standard wrenches will increase the potential of damage to the head. Check with your sprinkler head manufacturer / supplier for the appropriate installation tool required.



*Sprinkler wrenches*

### 3.1 General

Prior to the installation of the system, the building plans outlining the piping layout, hydraulic flow / pressure demand (expressed in GPM and PSI) and sprinkler head locations shall be submitted to, and approved by the Authority Having Jurisdiction (AHJ). All deviations from the approved plans will require permission from local authorities. The system design, including the piping layout, sprinkler head location and hydraulic demand calculations, shall conform to the NFPA 13D Standard.

The following steps will assist in proper design and planning of your system:

- Identify local jurisdiction requirements, including determination of pertinent building codes, fire protection codes and plumbing codes.
- Obtain information on the residence including “Use Group Classification” and specifics on the type of residence in which the system will be installed.
- Identify the water supply source and available flow in gallons per minute and supply pressure in psi.
- Identify the water supply service line including elevation difference between connections and routing of the service line into the residence.
- Determine the specifications for the sprinkler heads including water flow and operating pressure requirements and coverage area specifications.
- Lay out the piping system in the residence as a looped or gridded system.
- Lay out the piping system for the cold water distribution and hot water distribution.
- Perform the hydraulic calculations on the system to determine system performance.

### 3.2 Local jurisdiction requirements

The first step in starting a sprinkler system design is you must determine the local authorities requirements, to include getting clarification of which pertinent plumbing codes and NFPA sprinkler installation standards are being followed by the AHJ. This also includes identifying the required licensing need to be a qualified sprinkler system installer.

**Note:** Fire sprinkler plans for NFPA 13D systems are reviewed by the local AHJ, therefore, It is the responsibility of a qualified sprinkler designer to be familiar with all local requirements for the system design and layout.

### 3.3 Residence information

The next step is to ensure the residence characteristics qualify for being protected by an NFPA 13D sprinkler system. These are typically categorized as being one-family dwellings, two-family dwellings, multiple single-family dwellings, modular homes and manufactured housing.

**Note:** Confirm with the local AHJ as to whether any local building codes requirements, such as the use of fire separation walls, could allow more than two dwelling units to be protected by a NFPA 13D sprinkler system.

After verifying that the residence qualifies to be protected by an NFPA 13D system the remaining construction details of the residence must be identified. This encompasses being familiar with every level of home as identified on the building plan for the over all layout, room sizes, ceiling heights (type, pitch and or slope) including crawl space, basement, garages, attics and individual levels.

### 3.4 Water supply source

All Multipurpose systems shall have at least one automatic water supply as identified by the NFPA 13D standard. Any of the following automatic water supply systems are acceptable:

- A connection to a reliable waterworks system (with or without automatic pump)
- An elevated water storage tank
- A pressure tank designed to ASME standards for a pressure vessel and connected to a reliable pressure source
- A stored water source with an automatically operated pump

For systems using stored water as the sole source supply, the minimum water volume required to be stored in the supply shall be equal to the maximum system flow demand rate multiplied by 10 minutes, which includes 5 GPM for domestic use. The total capacity typically works out to be 350 gallons. This is based off the flow demand of two sprinkler heads at 15 GPM each plus the 5 GPM domestic (35 GPM total) multiplied by 10 minutes. Refer to NFPA 13D for additional stored water supply requirements.

Upon identifying the type of water supply source being used, the next step is to determine its available gallons per minute flow and pressure. This can be measured at a near by hydrant or obtained by contacting the local water works authority.



When determining the system supply pressure, minimum pressure conditions occurring during periods of heavy use, such as overnight or summer, must be considered. An accurate assessment of the available flow and supply pressure is critical for proper design and layout of the sprinkler system.

The desirable range for available water flow to the systems is 30 to 50 GPM. The desirable range for system supply pressure is 60 to 80 psi. Hydraulic calculations are required to determine the exact requirements for each system.

### 3.5 Water supply service line

Use standard sizing practices per local code to identify your water service supply, then determine the layout of the piping. This should include all typical pressure losses associated with both the plumbing and fire sprinkler system demand.

Using standard code sizing practices for service line sizing includes pressure drop caused by any elevation (0.433 psi/ft) differences between the service system and shall include other conditions affecting pressure as follows:

#### 3.5.1 Shut-off valve

The NFPA requires that a single control valve in the main service supply line be present to shut off both the plumbing and sprinkler systems. If separate valves are used for these systems the sprinkler valve shall be locked in the open position or observed by a monitoring system.

The main shut off valve shall have a an attached sign adjacent to it with lettering ¼" or larger stating the following:

“Warning, the water system for this home supplies fire sprinklers that require certain flows and pressures to fight a fire. Devices that restrict to flow or decrease the pressure or automatically shut off the water to the fire sprinkler system, such as water softeners, filtration systems, and automatic shutoff valves, shall not be added to this system without a review of the fire sprinkler system by a fire protection specialist. Do not remove this sign.”

This requirement may vary based on local AHJ for clarification.

#### 3.5.2 Water meters

When sizing water meters for multipurpose systems, always take into consideration their pressure and flow limitations, exceeding these could result in poor or improper system operation.

It is the responsibility of the installer to verify that the pressure loss and flow rate through the selected meter is within the acceptable limits. Refer to the below table for general water meter pressure losses.

Meter (in)	18 GPM	23 GPM	26 GPM
¾	7	11	14
1	2	3	3
1½	1	1	2
2	1	1	1

Meter (in)	31 GPM	39 GPM	52 GPM
¾	22	35	-
1	4	6	10
1½	2	4	7
2	1	2	3

*Common pressure loss through water meters at various flows shown in psi*

#### 3.5.3 Pressure reducing valves

Use a pressure reducing valve (PRV) for systems exceeding a supply pressure above 80 psi. To insure proper system operation, it is the responsibility of the installer to account for any pressure and/or flow losses associated with the PRV.

#### 3.5.4 Backflow requirements

Back flow prevention is not required for service lines supplying both domestic and sprinkler systems. It is the responsibility of the installer to check with the local AHJ for any additional back flow requirements.

#### 3.5.5 Water softeners

It is the responsibility of the installer to account for any additional pressure loss or flow restriction caused by a water softener present in the water supply system. Improper operation of the fire sprinkler system could result if the softener is not properly accounted for in the system design.

#### 3.5.6 Smoke detectors and waterflow alarms

A waterflow alarm on a multipurpose piping system is not required under the NFPA standard when the dwelling has smoke detectors installed in accordance with NFPA 72, National Fire Alarm and Signaling Code.

#### 3.5.7 Sprinkler head requirements

Viega does not currently offer sprinklers, therefore, installers are welcome to source any brand they prefer.

Sprinkler head performance requirements are designated by the amount of coverage area they can achieve based on available water flow and operating pressure. Its recommended practice to source a sprinkler head with the lowest flow providing the greatest coverage area. A favorable sprinkler coverage area ranges from 12' x 12' to 20' x 20' at 13-15 gpm with a 7-9 psi operating pressure. Refer to the NFPA13D standard and the residential sprinkler head manufacturers listing for proper minimum and maximum head spacing. If the heads are mounted too close the spray from one hitting the other can interfere with the heads ability to operate properly. Do not exceed the maximum spacing requirements of the sprinklers listing.

**Note:** Consider proper clearance from ceiling fans, duct work, DWV piping, fireplaces, lights and registers when locating the sprinkler heads.

### 3.6 Piping system layout

NFPA 13D defines several types of wet pipe system layouts, these include multipurpose, passive purge and stand alone.

#### *Multipurpose*

A system that combines cold water plumbing supply lines off from the sprinkler piping.

#### *Passive Purge*

A system that uses a single cold water plumbing supply line connected to the sprinkler piping.

#### *Stand Alone*

The stand alone system's above ground piping is dedicated to supplying the sprinkler system only, it does not have any plumbing lines connected to it.

Check with the local AHJ for acceptability when using PEX tubing.

The fire sprinkler system shall be appropriately sized taking into account system flow and pressure requirements utilizing 3/4" as the minimum pipe size per NFPA 13D.

#### 3.6.1 Piping configurations

The NFPA 13D Standard allows three types of multipurpose sprinkler system configurations to be used in residential occupancies: gridded, looped, straight run or combinations thereof.

#### *Gridded*

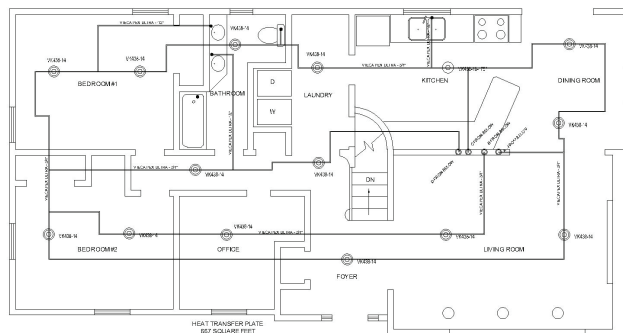
This system is connected by multiple branch lines. An activated sprinkler is provided with water from both sides, while other branch lines help transfer the water. This method is not commonly used due to the complexity of its design.

#### *Looped*

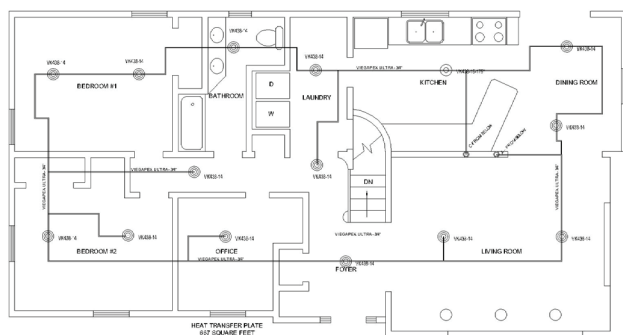
In this system, multiple cross mains are connected, but the branch lines are not. This method improves the hydraulic characteristics of the system by providing additional water paths through the main piping.

#### *Straight Run*

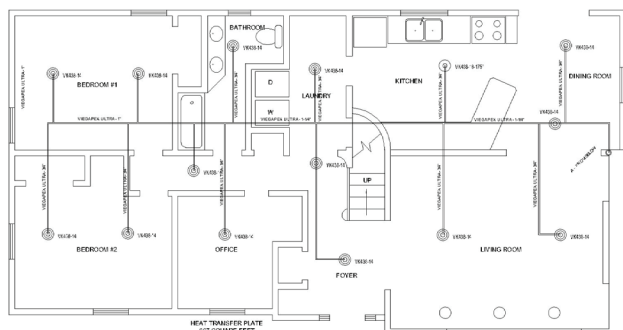
In this system, also known as a tree-type system, each sprinkler head is served by only one water flow path. This piping method is most common for stand alone systems. Due to its inefficiency it can require larger supply lines.



Gridded System



Looped System



Straight Run System

### 3.6.2 Plumbing system connections

Piping systems intended to serve both fire protection and domestic plumbing needs is a multipurpose piping system as defined in NFPA 13D.

Local plumbing codes may apply to these types of systems. Consult your local AHJ for applicable requirements.

### 3.6.3 System pressure gauge

Although not mandatory, a system pressure gauge can be installed to monitor system pressure. This pressure is considered to be the working (static pressure) or non-flowing pressure.

### 3.6.4 Connections to domestic cold water plumbing systems

If allowed by the AHJ, Viega PEX Press tees may be installed in the ViegaPEX fire sprinkler main for connecting potable water fixture supplies. It is required by NFPA 13D that the plumbing supply piping comply with local plumbing codes. ViegaPEX tubing and Viega fittings meet all requirements for domestic plumbing applications.

### 3.6.5 Hot water distribution system layout

The domestic hot water system sizing and layout is to be determined by the governing local plumbing codes. Viega PEX Press Polymer fire sprinkler adapters are for use in domestic cold water systems only.



**Do not use in hot water systems.**

### 3.6.6 Required hydraulic calculations

In order to ensure proper sprinkler head operation, hydraulic calculations must be performed. NFPA 13D establishes required design criteria. The layout, calculations and installation of systems installed in accordance with this standard shall only be performed by knowledgeable people trained through industry recognized or approved programs. Check with the local AHJ whether specific credentials are required (NICET III or PE).

Viega Technical Services provide fire sprinkler designs. Please call: 877-843-4262.

The following information is required prior to obtaining a fire sprinkler design:

Service Line / Source:

- Street Pressure (PSI)
- Distance from street to house (ft)
- Distance from meter to house (ft)
- Material for Service (copper/PEX PVC)
- Service line size
- Location of service, where entering house
- Additional in line devices adding pressure drop
- Elevation change from street to base of house
- Water supply type (city / well)

Approval / System Design:

- Material AHJ approved?
- Type of installer AHJ approved?
- Is plumbing integrated?
- Is a NICET III stamp required on design?
- Preferred Head type (concealed, pendent, sidewall)
- Brand preference for heads (Tyco, Viking, Reliable)

Construction Details:

- Ceiling height (ft)
- Architectural features on plans (tray ceilings, knee walls..)
- Vaulted ceilings / stairs (peak location and pitch)
- Plans available in AutoCAD?
- Are appliances and heat sources shown on plans?
- Should areas not required to have sprinklers be considered? (baths under 55 sq ft., all closets)



### 4.1 Installation

Black ViegaPEX Ultra is available in sizes  $\frac{3}{4}$ " - 2" and is UL and cUL listed for use in residential fire protection systems per NFPA 13D. ViegaPEX Ultra is also listed for potable water applications. Consult the local AHJ for any additional requirements.

### 4.2 Additional information / guidelines

Below are important guidelines that must be followed when using ViegaPEX Ultra and PEX Press fittings:

1. ViegaPEX Ultra (black only) and PEX Press fittings, sizes  $\frac{3}{4}$ " - 2" are approved for use in potable water applications and have a UL listing for use in residential fire sprinkler systems per NFPA 13D.
2. Viega fire sprinkler fittings are intended for use in residential fire sprinkler applications only per NFPA 13D. Installations should not include a fire department connection and shall be designed to withstand a maximum working pressure and temperature of 130 psi at 120°F.
3. Adequate protection must be provided for the Viega tubing and fittings and must include a minimum of  $\frac{3}{8}$ " gypsum wallboard, a metal gridded suspended ceiling utilizing lay-in tiles having a weight of not less than 0.35 lbs/sq ft, or  $\frac{1}{2}$ " plywood soffits. Viega offers a ProPress® fitting system for copper tubing that may be acceptable for use in exposed areas. Consult with your AHJ for approval and or any additional requirements for this type of installation.
4. For remodels, adequate protection must be provided for all Viega tubing and fittings to prevent damage.
5. Viega fire sprinkler systems shall not be used in concealed combustible areas where sprinklers are required by NFPA 13D.
6. Maintain 24" minimum clearance from openings in the ceiling such as return grilles.
7. Viega fire sprinkler systems are not intended for outdoor use and are intended for wet pipe systems only.

**Note:** For detailed information, please consult NFPA 13D, the local building codes and the AHJ.

### 4.3 Handling ViegaPEX tubing

The properties of ViegaPEX tubing make it very easy to work with and install in most types of construction. Some care must be taken to prevent damage to the tubing before and during installation:

- Use care to protect ViegaPEX and tubing from physical damage during storage and installation. Keep the tubing away from sharp objects, open flames, etc., and do not place heavy objects on the tubing.
- Damaged sections of tubing should be cut out and discarded.
- Do not expose ViegaPEX tubing to sunlight or any UV source for extended periods of time (less than 6 months for ViegaPEX Ultra).
- Do not store ViegaPEX tubing outdoors where it may be exposed to UV light.

### 4.4 Uncoiling ViegaPEX tubing

An uncoiler should be used to prevent twisting when removing tubing from  $\frac{3}{8}$ "-1" coils. Roll coils out and use care to avoid twisting  $1\frac{1}{4}$ ",  $1\frac{1}{2}$ " and 2" coils or when a uncoiler is unavailable. If larger diameter tubing is used for short run sections, straight lengths are also available which can assist in this type installation.



*Uncoiler, Stock Code 53509*

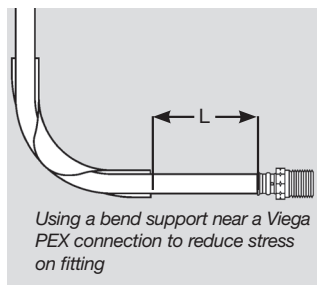
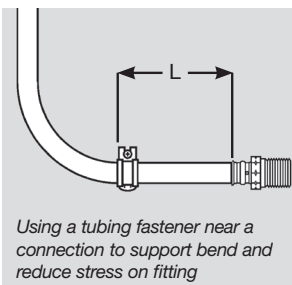
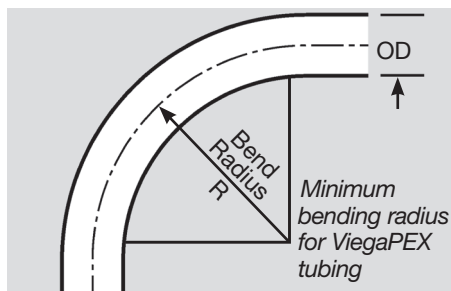
### 4.5 Bending ViegaPEX tubing

UL listed ViegaPEX tubing can be free bent (unsupported bend) to a minimum radius of 8x the actual tubing O.D. ViegaPEX that is not UL rated can be bent to a minimum radius of 5x the tubing O.D. with the use of a Viega approved bend support. The tubing O.D. can be calculated by adding 1/8" to the PEX nominal size (ex: 1" PEX + 1/8" = 1 1/8" O.D.).

To calculate the minimum bend radius multiply the O.D. dimension by the bend factor (8x) (ex: 1 1/8" x 8 = 9" bend radius). If bending against a PEX coil bend direction, the bending radius is 24x the tubing O.D.

To reduce damaging stress on Viega PEX fittings, bend supports or tubing fasteners must be used to anchor all bends made close to fittings. Support must be provided for tubing bends located closer to fittings than distance "L" in table below. See the diagrams below for typical installation examples. This will ensure the fire sprinkler fitting stays aligned within the mounting bracket the pendants remain even with the finished ceiling.

Tubing size	Distance from fitting to bend
3/8" PEX	L = 6 inches
1/2" PEX	L = 8 inches
3/4" PEX	L = 10 inches
1" PEX	L = 12 inches
1 1/4" PEX	L = 14 inches
1 1/2" PEX	L = 16 inches
2" PEX	L = 18 inches



### 4.6 Installation temperature range

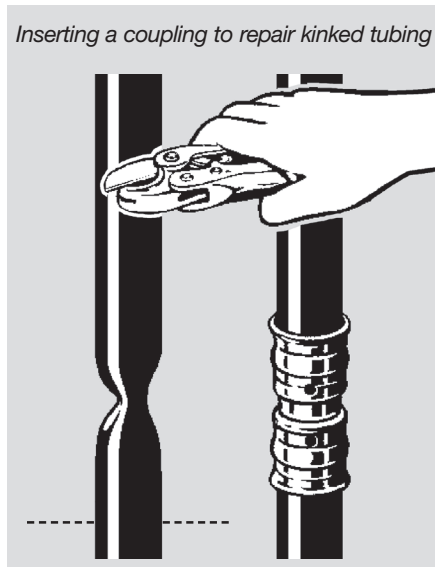
The flexibility of ViegaPEX tubing and the strength of the Viega PEX connections combine to provide a system that can be installed during any weather. The positive compression provided by the Viega PEX Press hand tools allow installation in temperatures down to -4°F (23°F for power tools).

### 4.7 Removing Viega PEX Press connections (attached sleeves)

Should a mistake be made, simply cut out the PEX fitting and replace with a new one. Do not reuse Viega PEX Press fittings.

### 4.8 Repairs

Sections of kinked tubing should be repaired by cutting out the damaged section and installing a repair coupling.

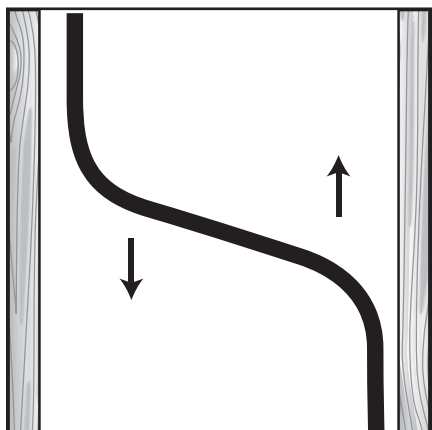


### 4.9 Tubing expansion

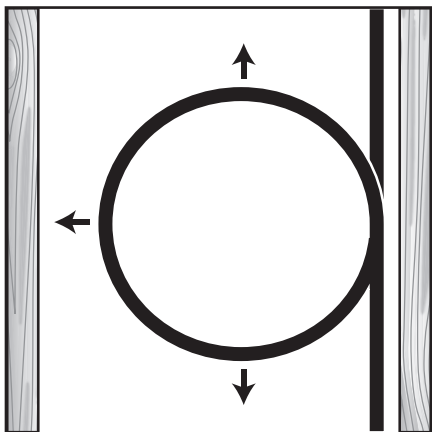
When installing ViegaPEX tubing, expansion and contraction of the material must be considered. ViegaPEX tubing should not be pulled tight when installed, as cold water will cause tubing to shrink slightly as the system is filled. A slight amount of slack should be left in each run to allow for this contraction without stressing the fittings.

Expansion of the tubing in hot water lines should be accommodated by using expansion loops or offsets. Fasteners should not grip tubing tightly so that it can move slightly as expansion takes place. Expansion loops or offsets will give tubing a place to grow without stressing fittings. Using suspension clip fasteners at all penetrations will allow tubing to move without creating noise.

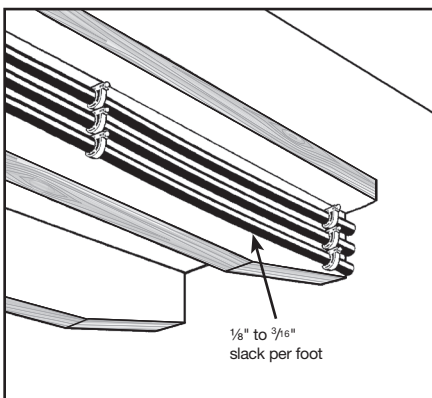
ViegaPEX expands or contracts 1.1" in length per 100 feet of tubing for every 10°F change in temperature.



*Offsets also provide room for tubing expansion*



*Using a loop to accommodate tubing expansion*



*Allow some slack in all runs to prevent damage from tubing contraction.*

#### 4.10 Freezing

The flexibility of ViegaPEX tubing makes it resistant to damage from freezing, but precautions to prevent freezing should be taken when low temperatures might be encountered.

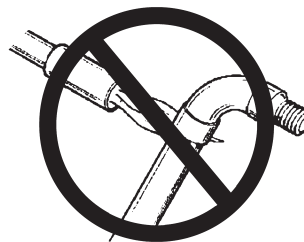
Insulating each PEX tube individually or as a group is not generally necessary if the PEX tubing is installed within the insulation envelope of the structure, i.e. the heated area. For example, the tubing may be installed under the insulation in the attic or within an interior wall of a heated space.

Typically, local codes dictate the type and amount of insulation required in ceiling spaces. All piping, fittings and sprinkler heads shall be installed within the building insulation envelope on the "warm side" of the insulation. Installation of the insulation shall follow the guidelines of the insulation manufacturer.

PEX tubing systems should not be intentionally installed in areas subjected to freezing.

Do not use open torch or excessive heat to thaw PEX tubing. Tubing failure or damage can result.

Heat (DO NOT USE A TORCH) must be applied



directly to the frozen tubing section. Temperature on tubing shall not exceed 180°F.

#### Several suitable methods exist to thaw PEX tubing.

They include:

- Hot water
- Wet hot towels
- Hand-held hair dryer
- Low wattage electrical heating tape (self limiting)
- A commercial system that pumps heated water through a tube to the ice blockage, and returns the cooled water for reheating

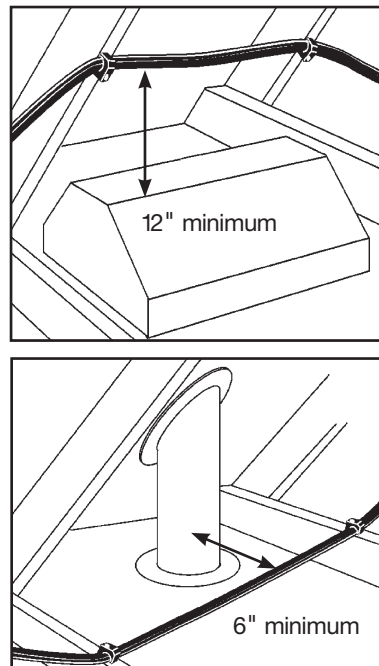


#### 4.11 Heaters, flues, vents and recessed lights

Keep ViegaPEX tubing a MINIMUM of 12" vertically and 6" horizontally from sources of high heat such as gas flue vents, heating appliances or electric motors. Concerning recessed lighting (including low voltage types) and proper installation clearance, Viega recognizes the following types of lighting fixtures: "Type IC," or "Inherently Protected," which allow direct contact with thermal insulation and other combustible materials, and "Type Non-IC," which require a minimum clearance of 3" to thermal insulation. If room does not allow for the minimum clearance spacing specified by Viega, then the PEX tubing must be insulated with a suitable pipe insulation capable of withstanding the specific maximum temperatures generated by the fixture. Minimum clearance between any pipe insulation and fixture shall be per the requirements of the fixture type and local building codes.

Forced air heating ducts and PVC power vent flues are not generally considered sources of high heat. These areas of installation should be rechecked after further construction and other mechanical systems have been installed.

In cases where light leakage (direct beam) from a UV generating light source (special lighting or heating type lamps) is possible tubing must be adequately protected with light blocking insulation.



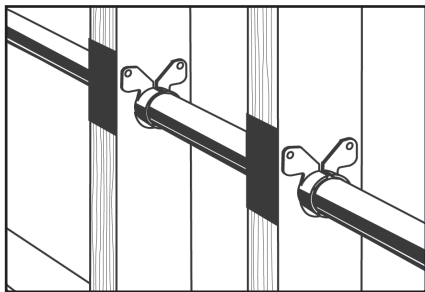
*Maintain a minimum 12" of vertical and 6" of horizontal clearance from recessed lights and appliance or heater vents.*

### 5.1 Wood frame construction

ViegaPEX tubing is ideal for use in wood frame construction. The ability to bend the tubing around corners and obstacles greatly simplifies installation. This system eliminates the expensive and time-consuming use of fittings where tubing turns within a wall, and eliminates the potential fire hazard of soldering close to exposed framing members.

A few rules should be followed when running ViegaPEX tubing in wood frame construction:

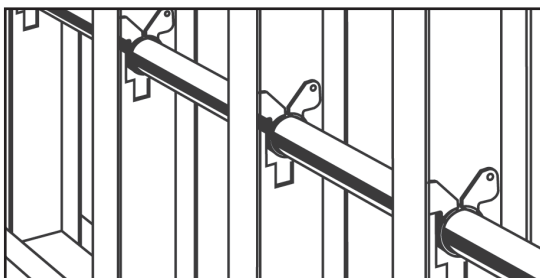
- Use nailing plates to protect the tubing from nails and screws where it passes through studs
- Suspension clips are optional but can reduce the potential for noise
- When turning tubing sharply to exit from a wall, a bend support must be provided. Either use a drop ear bend support, drop ear elbow or a stub out. Neglecting to use a support will place excessive stress on the fitting, and the tubing will not exit perpendicular to the wall.



*Nailing plates protect tubing passing through studs and joists from nails*

### 5.2 Steel construction

The Viega system works as well in steel frame construction as it does in wood. Where tubing runs through metal studs, suspension clip fasteners must be used to protect tubing from sharp stud edges (see illustration below). Follow the same guidelines for fastening and supporting the tubing as for wood frame construction.



*Suspension clip fasteners used to protect tubing from abrasion when passing through steel studs*

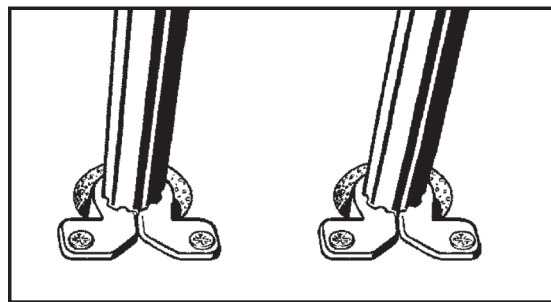
### 5.3 Supporting ViegaPEX tubing

Use only plastic tubing supports. Metal supports may damage tubing.

When running tubing, leave a small amount of slack between fasteners to account for tubing contraction.

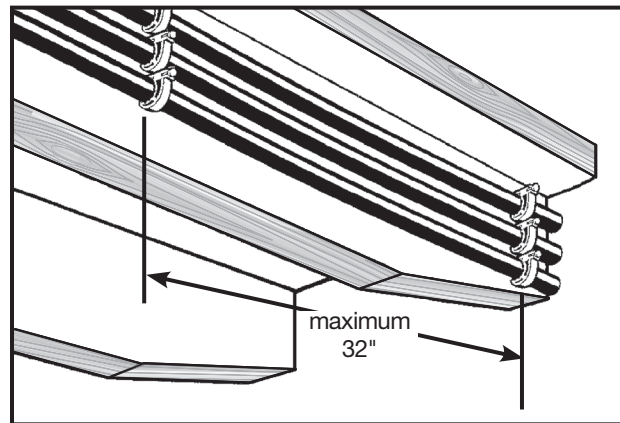
Note that ViegaPEX tubing will expand or contract 1.1" per 100 feet for every 10°F of temperature change. In long straight runs allow adequate clearance for this.

Tubing should be allowed freedom to move slightly as it expands. Do not clip it tightly into place or locate it where it will be tightly constrained. Use suspension clips or an approved plastic insulator where tubing passes through studs or joists to prevent abrasion and possible noise as tubing moves.

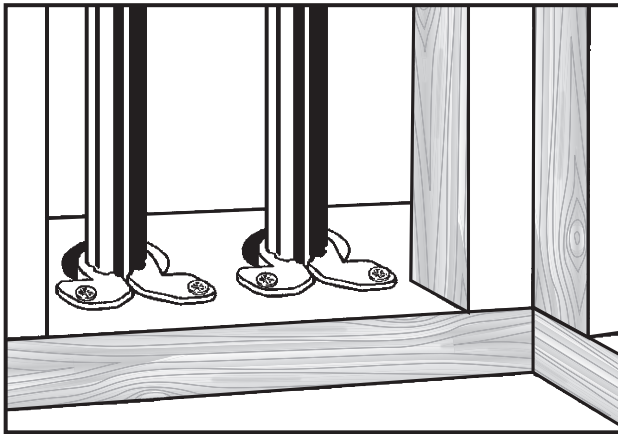


*Suspension clips support tubing in joist penetrations or anywhere abrasion is a concern*

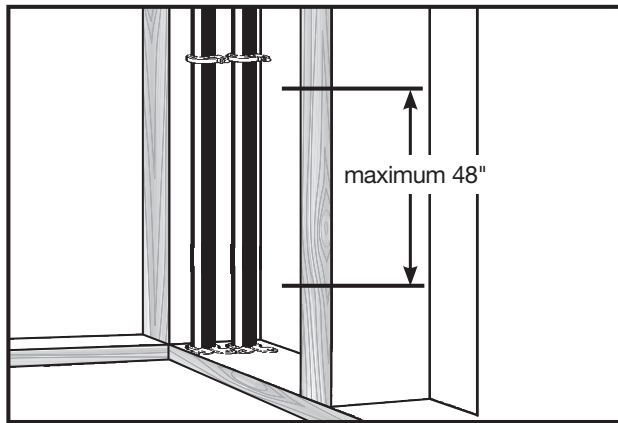
Local codes typically define the maximum distances between support devices. As a requirement per the UL Listing, supports shall be installed every 32" for horizontal pipe runs. For vertical runs, supports shall be installed every 48" as well as at each floor and mid-story guide.



*Tubing supported with U-clip or lock clip fasteners on horizontal runs*



Suspension clip fasteners used at floor plate



J-clamp or lock clip fasteners used to support tubing in vertical runs between floors

### 5.3.1 Fixed support points

Appropriate support is required on all residential fire sprinkler systems. All piping near a Viega PEX plug or transition fitting shall be supported at the location. Either a locking clip, where ViegaPEX pipe snaps in place when pushed into the clip, or a full clamp, which completely encircles the pipe, can be used to support ViegaPEX. Locking clips require a #6 panhead wood screw (1" length) for mounting. Note: support points should not be directly on the fitting or the associated sleeve.

Residential fire sprinkler fitting supports have additional limitations which are outlined in the table below.

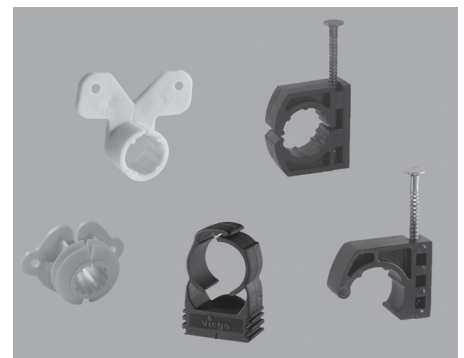
### 5.3.2 Sliding sleeve support device

Adequate expansion and contraction must be accommodated in the fire sprinkler piping. Appropriate sized supports shall be utilized maintaining safe distances away from objects that could damage the pipe such as sharp edges or abrasive surfaces.

Additional support accessories are also available for a variety of applications such as wood or metal framework. Choose the right support device appropriate for the intended application.

Support and Hanger Mounting Table

Description	Horizontal	Vertical	Inverted
Lock Clip			
Full Clamp			
J-Clamp			



Supports and hangers



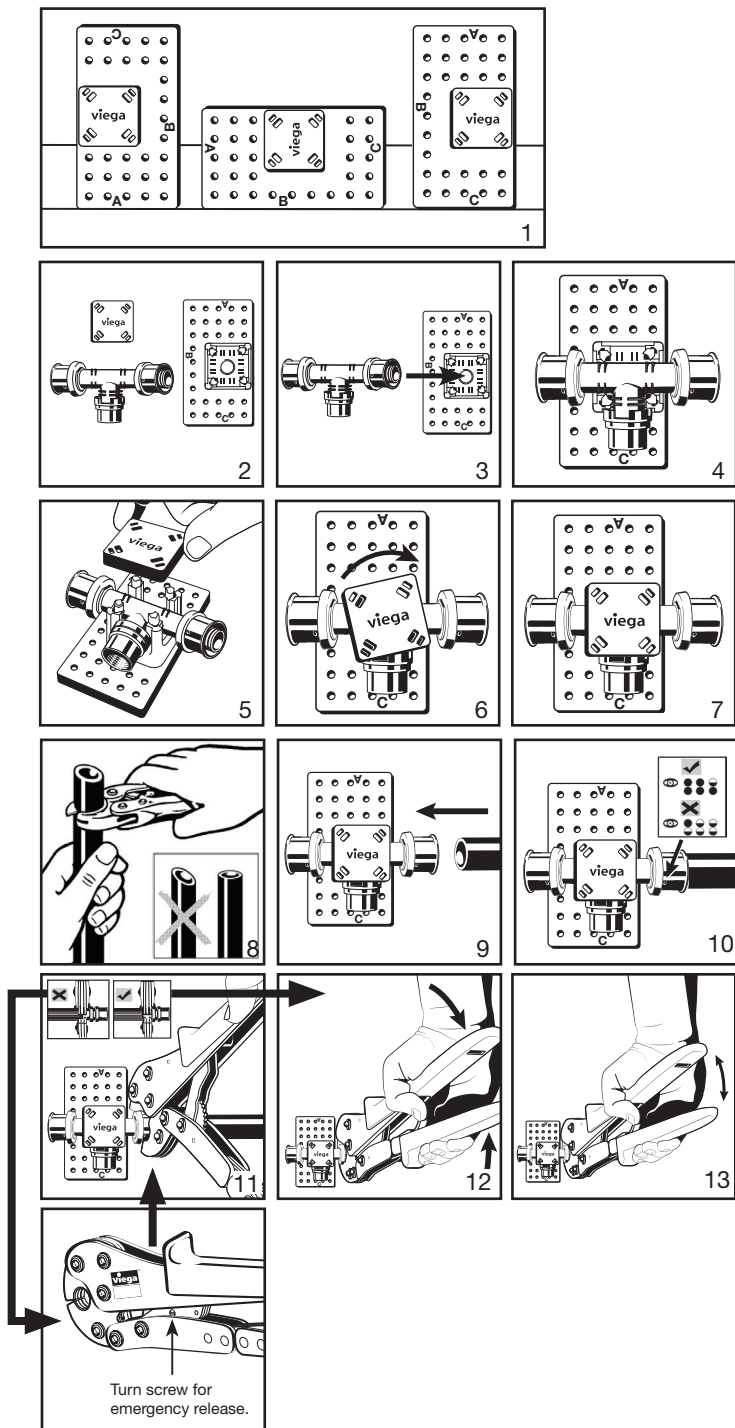
### 6.1 Viega plastic fire sprinkler bracket

Viega's plastic fire sprinkler brackets incorporate mounting reference designators to assist in their proper installation for each pendent type. These designators (A,B, or C) should be oriented per the mounting details outlined in Section 7. Mounting Sprinkler Fittings on page 25. While this bracket has not been evaluated by UL, nor is it covered by Viega's listing, it is an acceptable method for mounting Viega's fire sprinkler adapters in NFPA 13D systems.

#### 6.1.1 Tee and elbow adapter installation



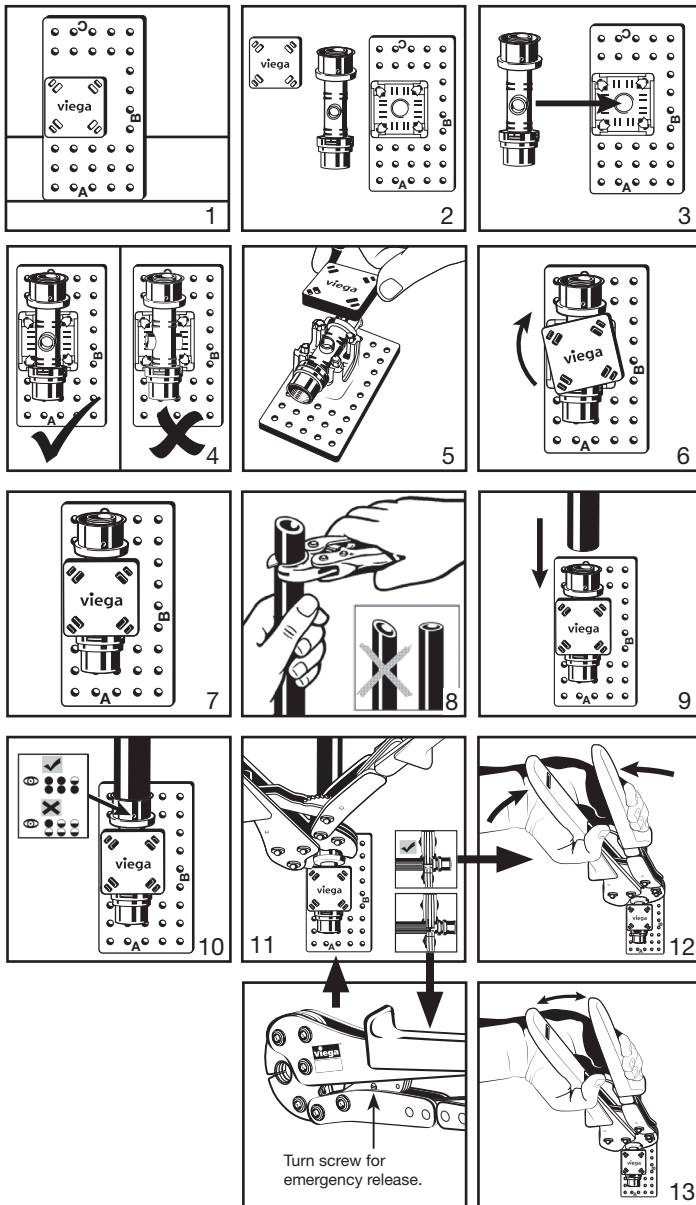
**Do not remove factory packaging until ready to install fittings**



1. Select the desired mounting orientation for the Fire Sprinkler Bracket based on the construction type present. See Viega Fire Sprinkler Manual for more detailed mounting instructions.
2. Remove the bracket cover and any plastic wrapping from the fire sprinkler adapter.
3. Place the fire sprinkler adapter into the bracket as shown.
4. Ensure the fire sprinkler adapter is fully inserted into the bracket before installing the bracket cover.
5. Place the bracket cover onto the locking lugs.
6. Turn the cover clock wise  $\frac{1}{8}$ <sup>th</sup> of a turn until it snaps into place.
7. Verify the cover sets flush with the installed fire sprinkler adapter and is square with the bracket.
8. Square off tubing to proper length. Uneven, jagged or irregular cuts will produce unsatisfactory connections.
9. Insert PEX Press fitting with attached sleeve into tubing and engage fully.
10. Ensure full tubing insertion at view holes in attached press sleeve. Full insertion means tubing must be completely visible in at least two view holes and partially visible in the one.
11. Position press tool perpendicular over Press Sleeve and close tool jaws to engage ratchet.
12. Close handles, using trigger to reduce grip span if desired.
13. Extend handle and continue ratcheting until automatic tool release occurs at proper compression force.

**Warning:** The connection is not leakproof when the tool has been opened by emergency release.

### 6.1.2 Straight adapter installation



**Do not remove factory packaging until ready to install fittings**

1. Select the desired mounting orientation for the Fire Sprinkler Bracket based on the construction type present. See Viega Fire Sprinkler Manual for more detailed mounting instructions.
2. Remove the bracket cover and any plastic wrapping from the fire sprinkler adapter.
3. Place the fire sprinkler straight adapter into the bracket as shown.
4. Ensure that the anchoring studs on the straight adapter are inserted properly before installing the bracket cover.
5. Place the bracket cover onto the locking lugs.
6. Turn the cover clock wise  $\frac{1}{8}$ <sup>th</sup> of a turn until it snaps into place.
7. Verify the cover sets flush with the installed fire sprinkler adapter and is square with the bracket.
8. Square off tubing to proper length. Uneven, jagged or irregular cuts will produce unsatisfactory connections.
9. Insert PEX Press fitting with attached sleeve into tubing and engage fully.
10. Ensure full tubing insertion at view holes in attached press sleeve. Full insertion means tubing must be completely visible in at least two view holes and partially visible in the one.
11. Position press tool perpendicular over Press Sleeve and close tool jaws to engage ratchet.
12. Close handles, using trigger to reduce grip span if desired.
13. Extend handle and continue ratcheting until automatic tool release occurs at proper compression force.

**Warning:** The connection is not leakproof when the tool has been opened by emergency release.

### 7.1 Mounting sprinkler fittings

Sprinkler heads must be connected to Viega Fire Sprinkler fittings that have mounting flanges for attachment. These fittings must be fastened as described below to prevent movement of the sprinkler head upon system activation.

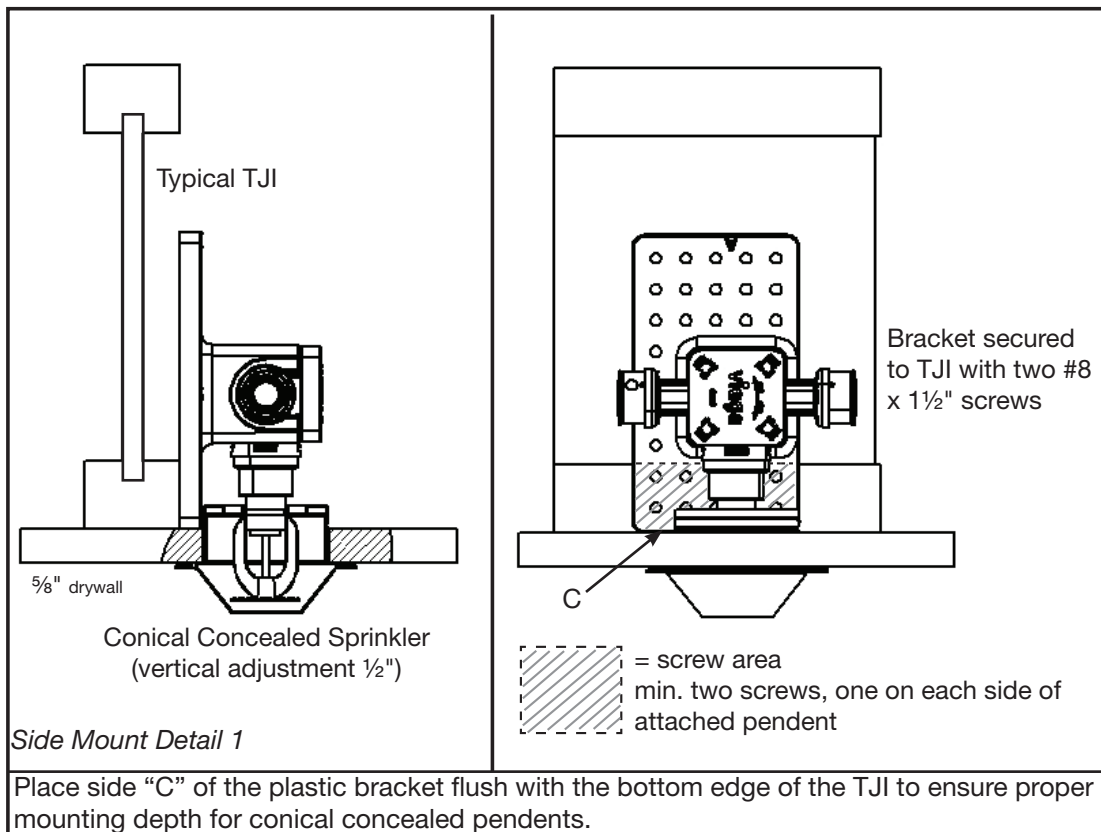
Viega fire sprinkler fittings must be affixed to solid supports using #8 x 1½" or longer flat-head wood or hex head screws. Installing fittings with the plastic bracket requires a minimum of two screws, one on each side of the attached pendent. Any fitting incorporating an integral mounting bracket must use a minimum of 3 screws.

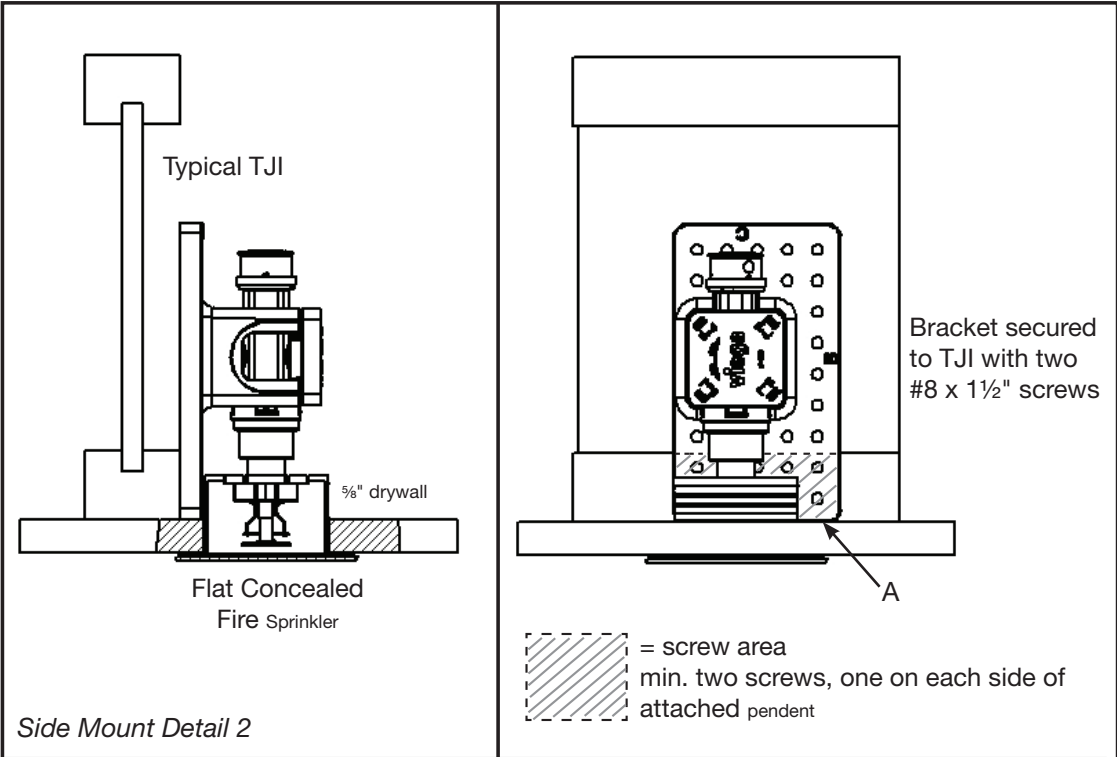
The mounting details shown are typical TJI installations but also apply for other construction methods.

Each standard fitting (without mounting flange) must have approved fasteners placed on the tubing on all connections directly adjacent to the fitting. Affix the fasteners to the tubing, not over the fitting or press sleeves.

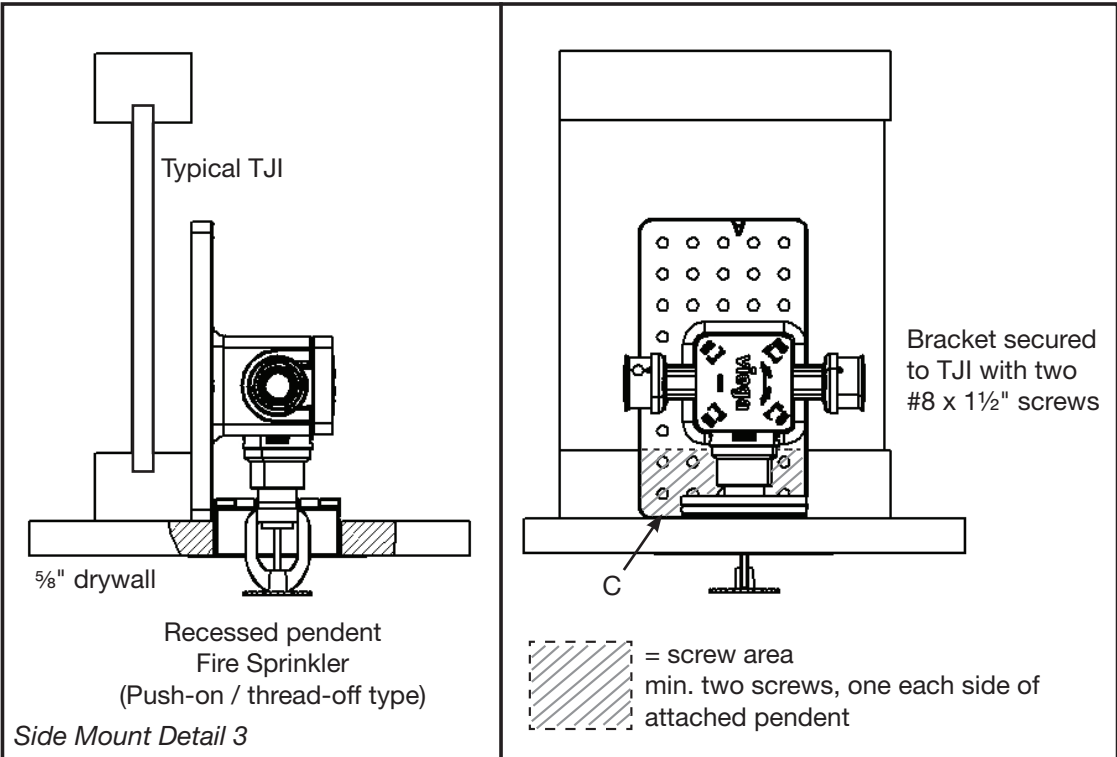
In addition, the Viega sprinkler fittings are specially designed to affix the sprinkler head in place so that during activation, the reaction forces caused by the flow of water through the sprinkler head will not displace the sprinkler head.

#### 7.1.1 Plastic bracket



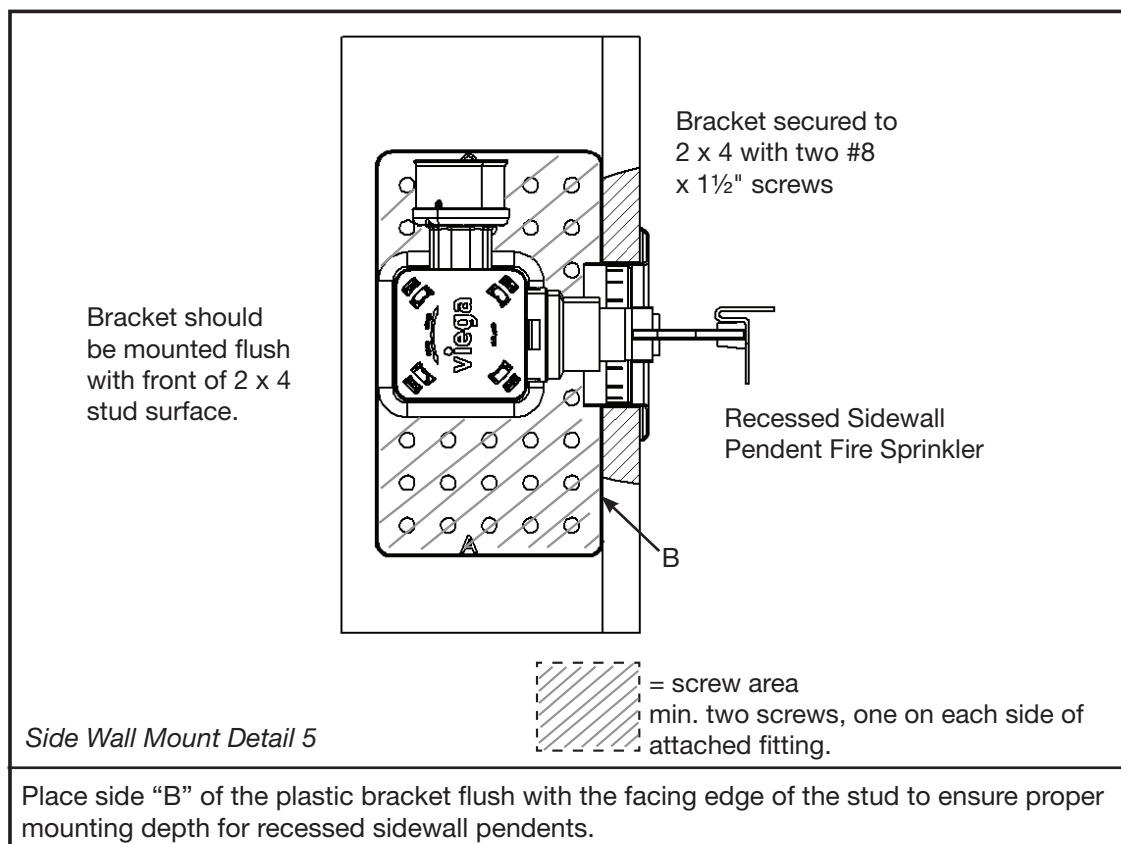
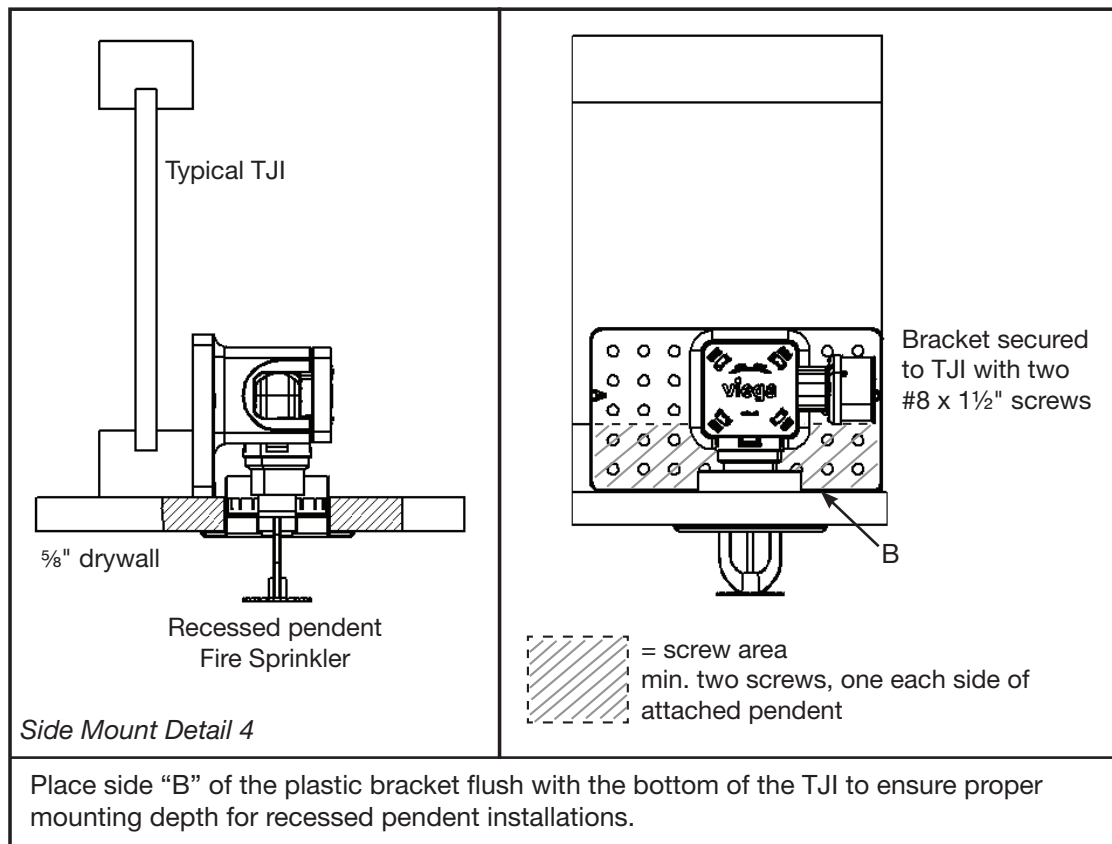


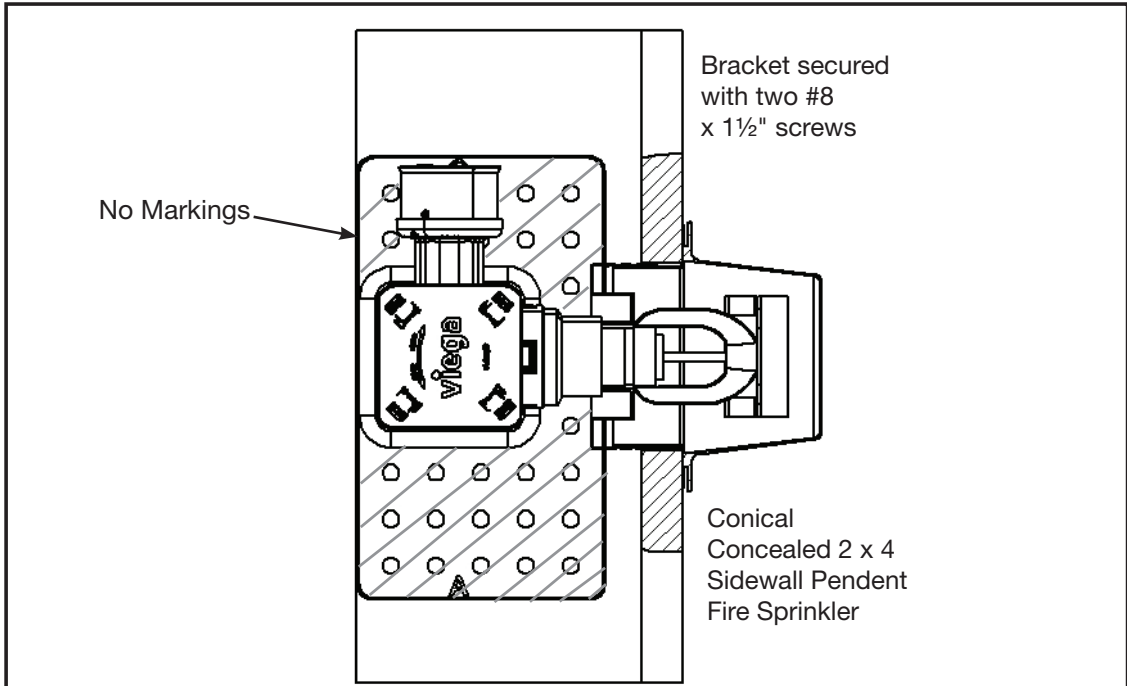
Place side "A" of the plastic bracket flush with the bottom edge of the TJI to ensure proper mounting depth for flat concealed pendants.



Place side "C" of the plastic bracket flush with the bottom of the TJI to ensure proper mounting depth for recessed pendent installations.

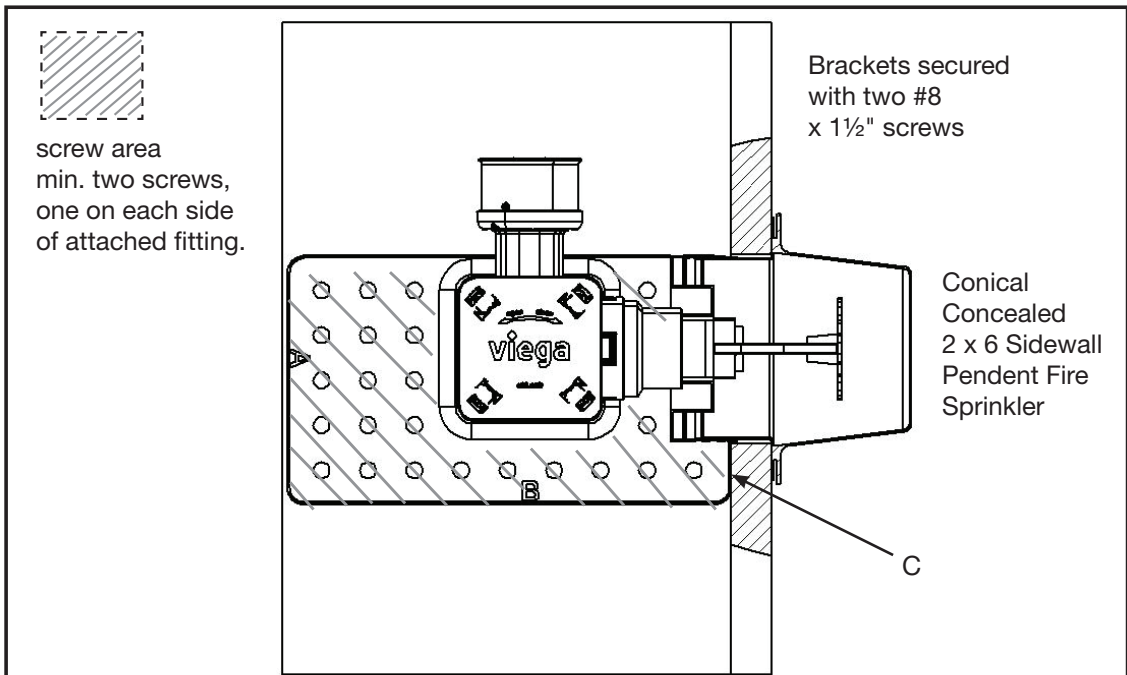






*Side Wall Mount Detail 6* Bracket should be mounted flush with back of 2x4 stud surface.

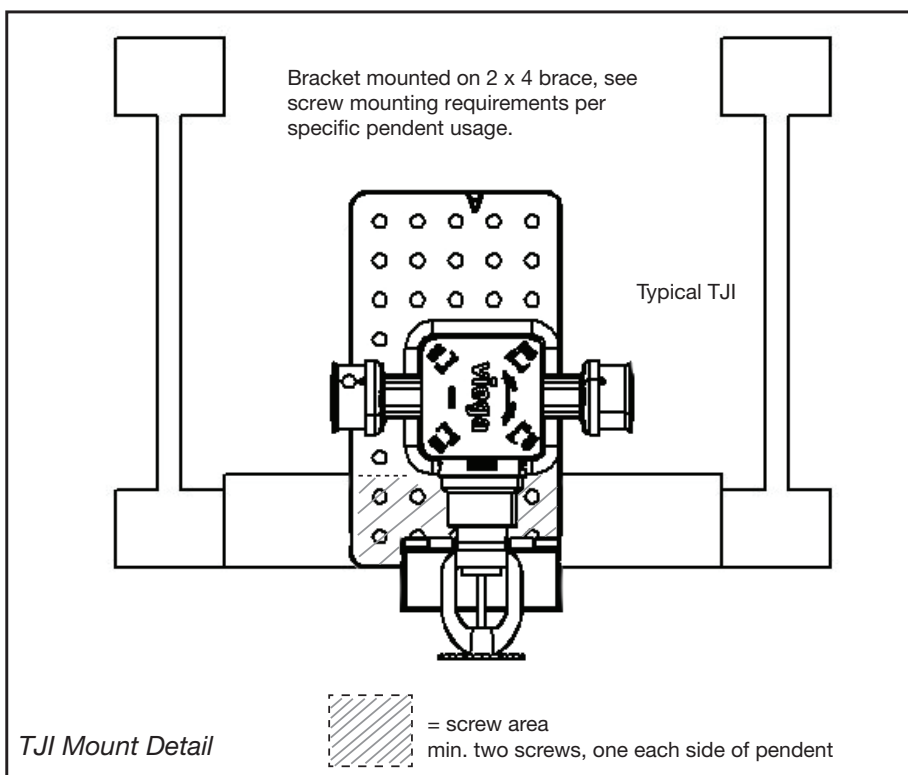
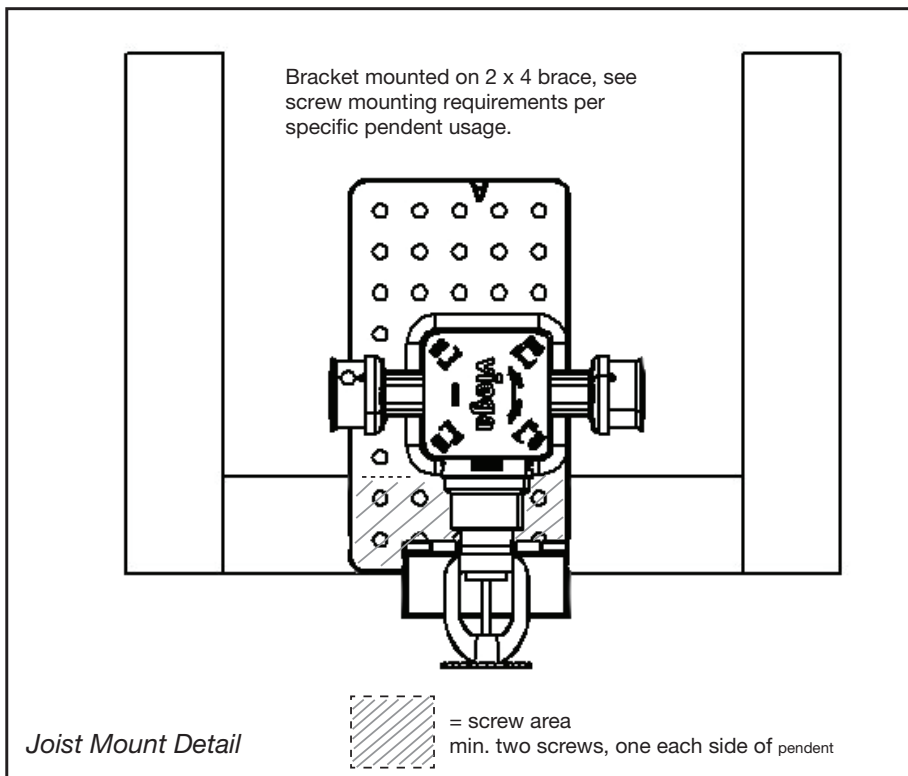
Place side of bracket with no reference marks flush with the back edge of the stud to ensure proper mounting depths for conical concealed sidewall pendants.



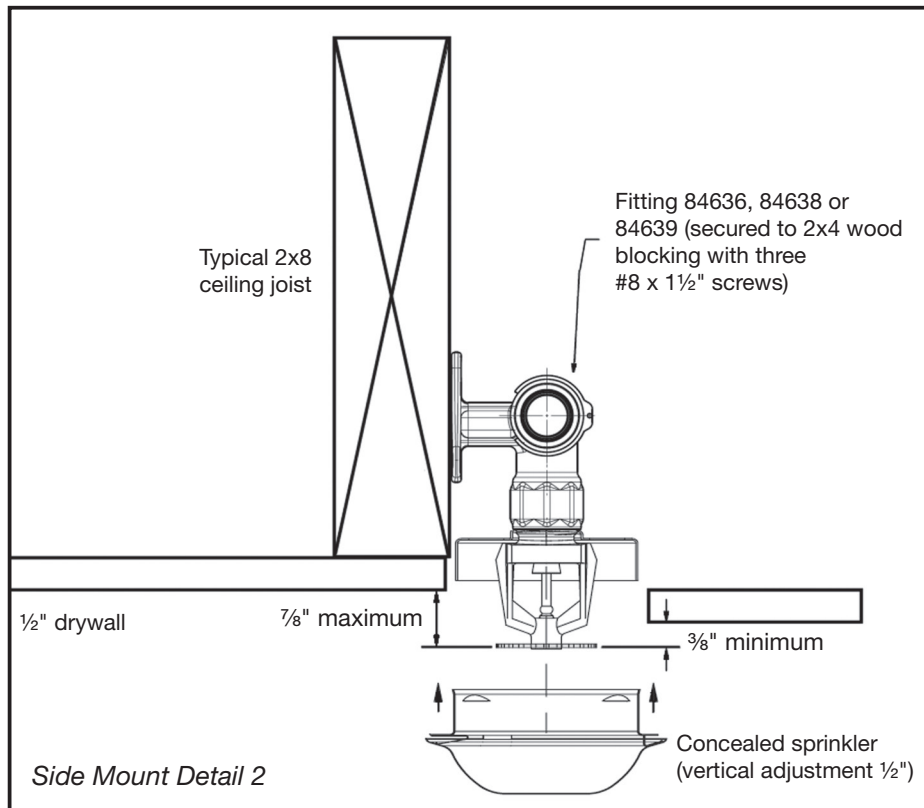
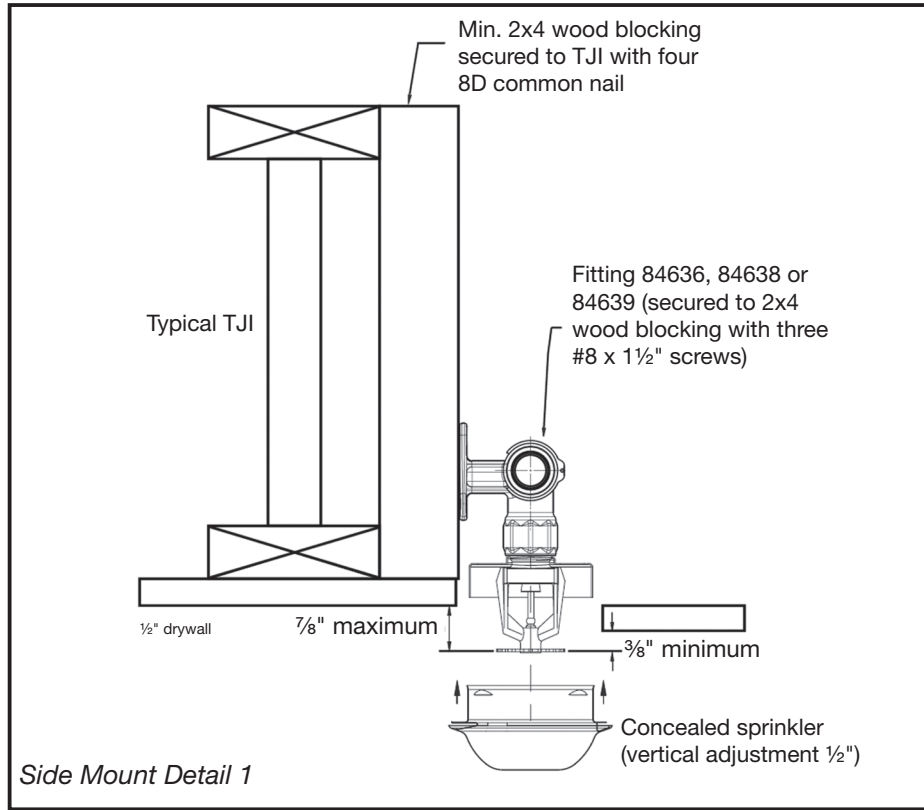
*Side Wall Mount Detail 7*

Place side "C" of the plastic bracket flush with the front edge of the stud to ensure proper mounting depth of conical concealed sidewall pendants.

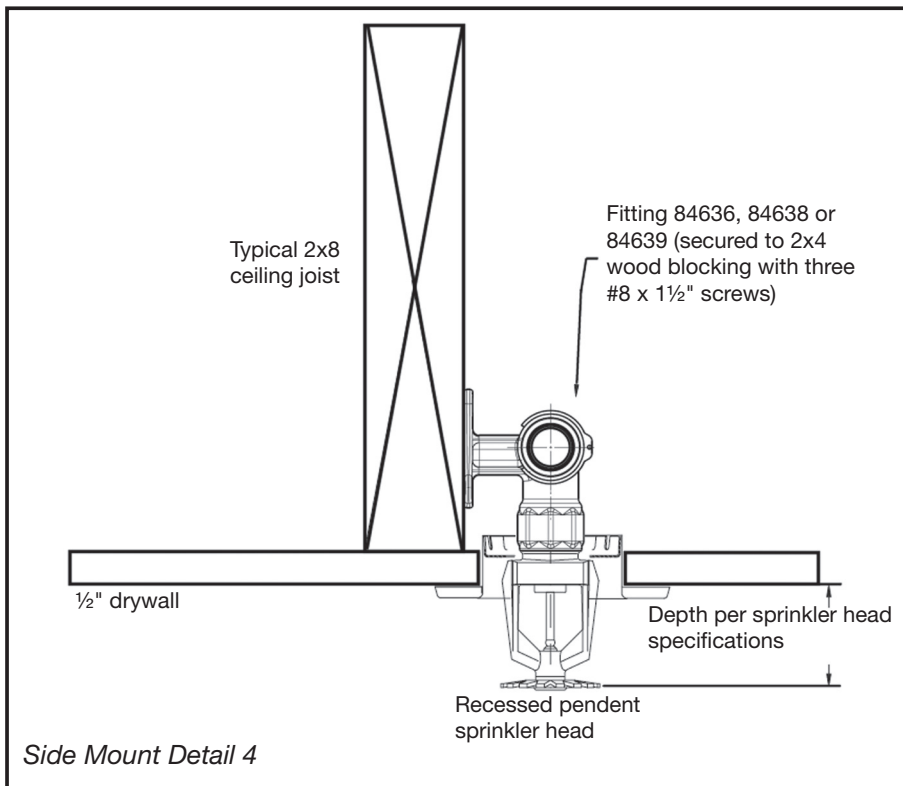
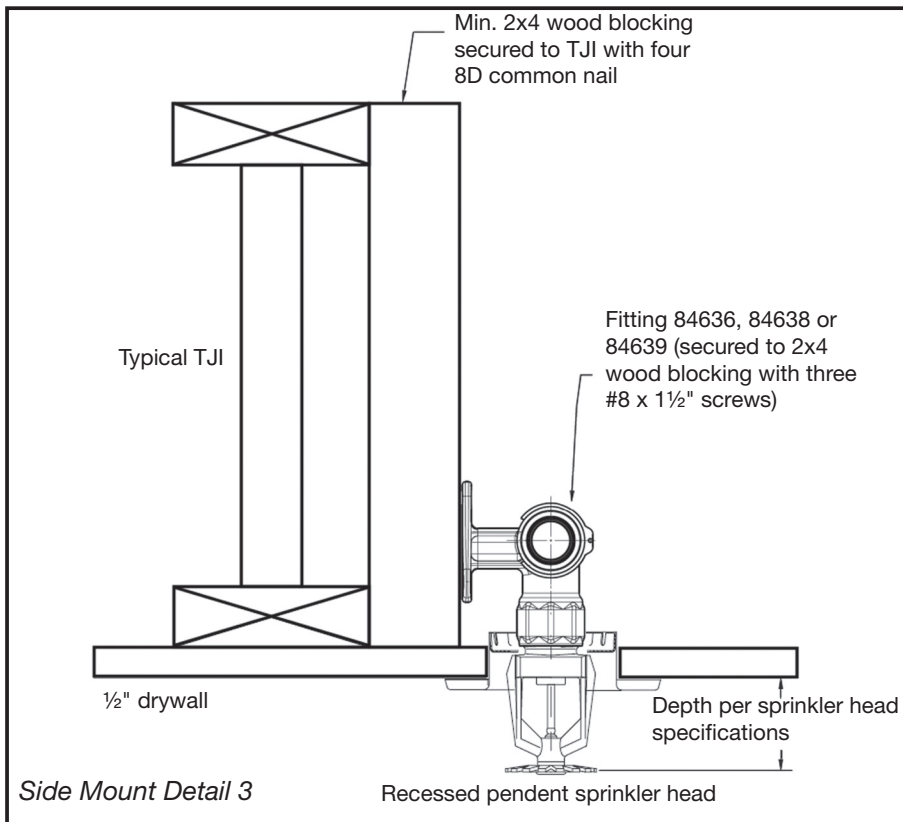
Occasionally sprinkler designs may require pendants to be located between support structures (TJI / Joist), for these instances a cross brace shall be used. Below are examples of how these braces can be mounted. Keep in mind the fire sprinkler needs to be mounted in the predetermined orientation noted in the earlier details dictated by the type of pendent that is being used.

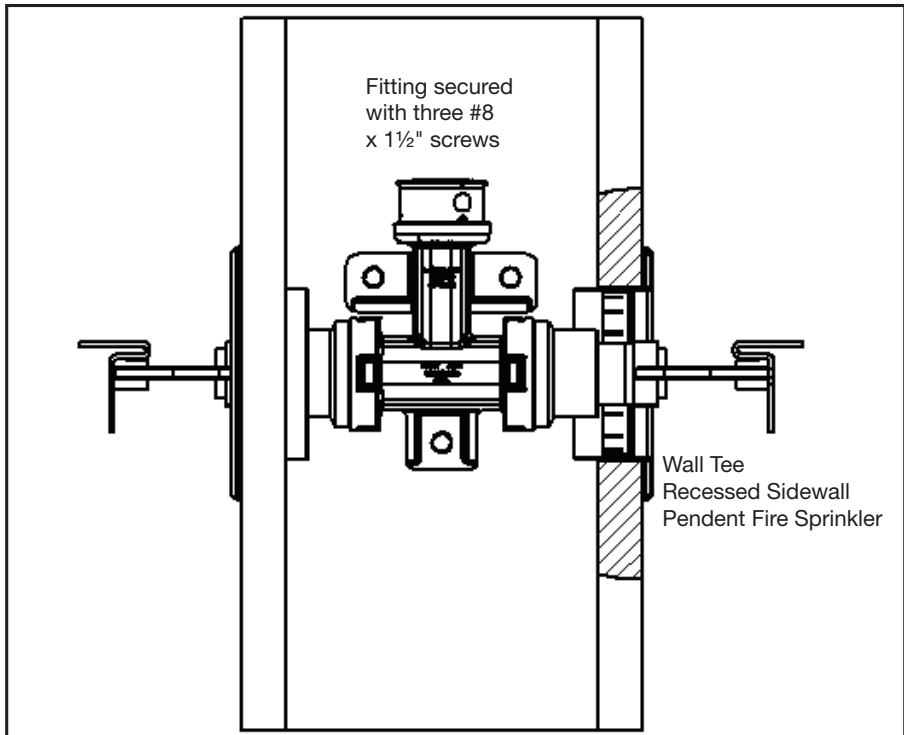
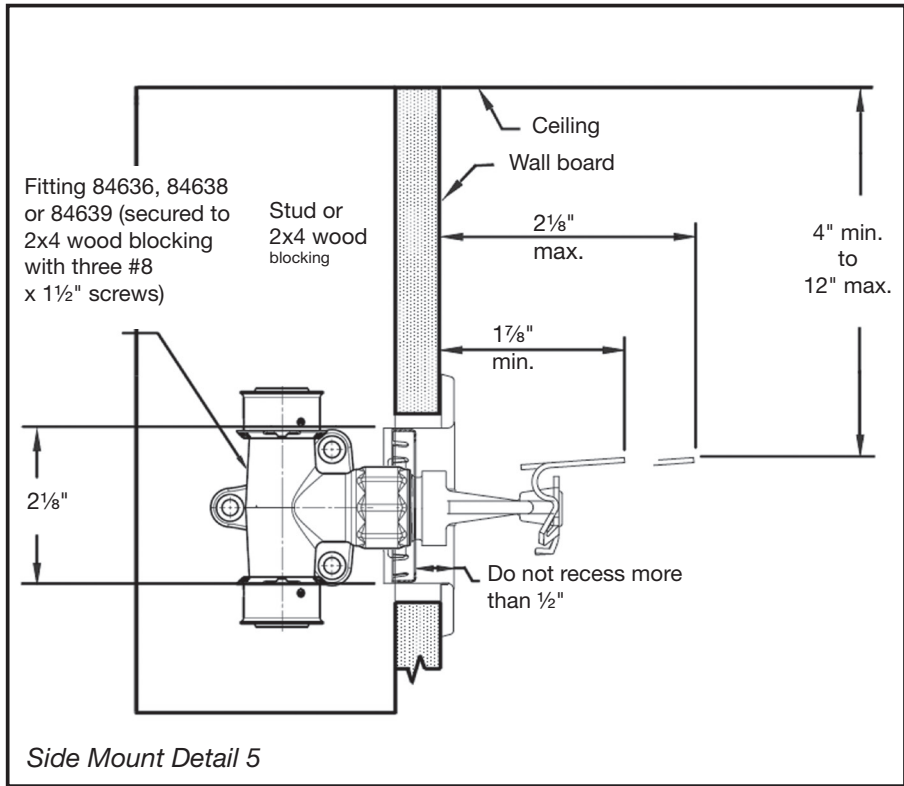


**7.1.2 Fittings with integral mounting bracket**









*Wall Tee Detail 6*



Fittings may not feed more than one sprinkler in the same compartment.

Place wall tee centered on stud to ensure proper mounting depth for recessed side wall pendants.

### 8.1 Pressure testing

Upon completion of the fire sprinkler system, a pressure test is required. Refer to model, local and NFPA 13D requirements for additional information.

#### 8.1.1 Leak detection

Viega has identified the leak detect solutions listed below as being compatible for use with Viega PEX Press system components. Consult leak detect manufacturer for proper application and product instructions. To determine the compatibility of other leak detect solutions not listed below, contact Viega Technical Services prior to their use.

- megabubble® Leak Detector
- Oatey® All Purpose Leak Detector
- Snoop Liquid Leak Detector

As an alternative leak detect a mixture of Original Palmolive Green™ dishwashing soap (#46100-46200) or Palmolive Ultra™ (#356140 or 46128) mixed with potable water at a ratio of two ounces of soap to one gallon of water (mix Ultra at a ratio of 1.5 ounces per gallon) may be used.

**NOTE:** If the solution does not show a leak on any of the caps or fittings, isolate the ManaBloc by turning the valves to the “OFF” position, repressurize if needed and apply the same solution to the ManaBloc manifold components.

### 8.2 Flow testing

After a successful completion of the pressure test, a flow test is required. Refer to your AHJ for additional information. This test ensures that the most hydraulically remote sprinkler head operates as intended in the design. The AHJ must be notified of the test and is typically required to witness all tests.

### 8.3 System flushing

Viega recommends flushing the piping system with water prior to head installation. This should eliminate debris left behind in the pipe during installation.

### 8.4 Visual inspection

All Viega PEX systems must be visibly inspected prior to being concealed behind the walls. If any damage is visible, or there is a suspicion of damage, the section of pipe and fittings will need to be replaced.

### 8.5 System maintenance

It is the responsibility of the property owner to adequately maintain and understand the operation of the fire sprinkler system as a life safety system. NFPA 13D recommends a monthly inspection with the following actions:

- Complete visual inspection
- Smoke alarm testing
- Inspect sprinkler head integrity
- Check system pressure
- Ensure main shut-off valve position is “open”
- Water supply flow verification
- If booster pumps are present, visible inspection is required

## 9. Codes, Standards and Certifications

### 9.1 Codes

The Viega PEX system is accepted by the following model codes for use in potable hot and cold water distribution systems.

ICC – International Code Council

IPC – International Plumbing Code

IMC – International Mechanical Code

IRC – International Residential Code

UPC – Uniform Plumbing Code

UMC – Uniform Mechanical Code

NSPC – National Standard Plumbing Code

HUD – Housing for Urban Development

NPCC – National Plumbing Code of Canada

NBCC – National Building Code of Canada

NFPA - National Fire Protection Association

Check with your local Viega representative for code compliance in your area.

### 9.2 Standards

#### ASTM - American Society for Testing and Materials

**ASTM F876/F2023: Standard Specification for Cross-linked Polyethylene (PEX) Tubing** - This standard contains finite dimensional requirements for SDR9 PEX tubing in addition to burst, sustained pressure, chlorine resistance and other relevant performance tests at different water temperatures.

**ASTM F877: Standard Specification for Cross-linked Polyethylene (PEX) Plastic Hot- and Cold-Water Distribution Systems** - This standard contains performance requirements for SDR9 PEX tubing and fitting systems. The standard contains finite dimensional requirements for tubing, in addition to burst, sustained pressure and other relevant performance tests at different water temperatures.

**ASTM E84** - Standard Test Method for Surface Burning Characteristics of Building Materials

**ASTM E119** - Standard Test Method for Fire Testing of Building Construction and Materials

**ASTM E814** - Standard Test Method for Fire Test of Through-Penetration Firestop Systems

#### NSF International

**ANSI/NSF 14: Plastics Piping System Components and Related Materials** - This standard establishes minimum physical and performance requirements for plastic piping components and related materials. These criteria were established for the protection of public health and the environment.

**ANSI/NSF 61: Drinking Water System Components - Health Effects** - This standard establishes minimum health effects requirements for the chemical contaminants and impurities that are indirectly imparted to drinking water from products, components and materials used in drinking water systems. This standard does not establish performance or taste and odor requirements for drinking water system products, components or materials.

#### American Water Works Association (AWWA)

**AWWA C904** - Cross-linked Polyethylene (PEX) Pressure Pipe, ½" through 2" for Water Service

#### ISO - International Standards Organization

**ISO 9001** - This standard is intended to establish, document and maintain a system for ensuring production output quality. ISO 9001 certification is a tangible expression of a firm's commitment to quality that is internationally understood and accepted. All PureFlow PEX Press fittings are manufactured in ISO 9001 certified facilities.

### 9.3 Certifications

#### PPI - Plastic Pipe Institute

##### TR 4 Listed Materials

Listing of Hydrostatic Design Bases (HDB), Strength Design Bases (SDB), Pressure Design Bases (PDB) and Minimum Required Strength (MRS) Ratings for Thermoplastic Piping Materials or Pipe.

Pressure/Temperature Ratings:

- 160 psi at 73.4°F
- 100 psi at 180°F\*
- 80 psi at 200°F\*

\*Does not apply to fire sprinkler system.



## NSF International

**NSF-pw certification mark** - Product meets all applicable performance standards for pressure-rated potable water applications required in ANSI/NSF Standard 14 and complies with ANSI/NSF Standard 61 for health effects.

**cNSF<sup>®</sup>us pw-G** - Product meets Zero Lead listing meeting California AB 1953 and Vermont Act 193

**CSA B137.5** - This standard specifies requirements for thermoplastic pressure piping. It includes reference publications, definitions, abbreviations, general requirements for materials and manufactured pipe and fittings, relevant test methods, and marking requirements.

**CAN/ULC - S101** - Standard Methods of Fire Endurance Tests of Building Construction and Materials.

**CAN/ULC - S102.2** - Standard Method of Test for Surface Burning Characteristics of Flooring, Floor Covering and Miscellaneous Materials and Assemblies.

**CAN/ULC** - Product meets requirements of Canadian ULC S101 & S102.2 listing.

**NSF U.P. Code** - Product meets requirements of the Uniform Plumbing Code™.

**PEX 5306** - Tested and certified to the NSF-pw 5306 chlorine resistance rating for an end use condition of 100% @ 140°F per ASTM F876, which is the highest chlorine resistance rating available through ASTM. When the product is marked with the PEX 5306 designation it affirms the product is approved for use in continuous domestic hot-water circulation systems with up to 140°F water temperatures and has a maximum UV rating of 6 months.

## Underwriters Laboratories Inc. (UL)

**ANSI/UL 263** - Standard for Safety for Fire Tests for Building Construction and Materials

**cULus UL 1821 130 psi / 120°F** - Product meets the requirements of UL for NFPA 13D residential multipurpose fire sprinkler systems.

**CAN/ULC – S115** - Standard Method of Fire Tests of Firestop Systems

**CAN/ULC/ORD/-C199P** - Combustible Piping for Sprinkler Systems

**IAPMO R&T - International Association of Plumbing and Mechanical Officials Research and Testing**

**Certificate of Listing** - Product meets the requirements of the Uniform Plumbing Code™.

**ICC - ES - International Code Council - Evaluation Services**

**ICC ES-PMG™** - Product complies with International Plumbing Code.

**Note:** Certifications available at:

[www.nsf.org](http://www.nsf.org)

[www.spec-direct.com](http://www.spec-direct.com) (Intertek)

[www.ul.com](http://www.ul.com)

[www.canada.ul.com](http://www.canada.ul.com)

Check with your local Viega representative for further information or copies of above-mentioned listings and certifications.

## Viega LLC

100 N. Broadway, 6<sup>th</sup> Floor  
Wichita, KS 67202

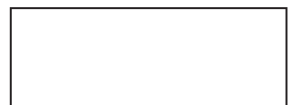
Phone: 1-800-976-9819

Fax: 1-316-425-7618

[www.viega.us](http://www.viega.us)

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IM-PF 724572 0615 (Fire Sprinkler)