Pocket Guide

Viega® Heating and Cooling Solutions

Viega Heating and Cooling Solutions Pocket Guide

Thank you for choosing Viega. Welcome!

Viega's global legacy of excellence began in 1899 when our founder, Franz-Anselm Viegener of Attendorn, Germany, introduced an innovative brass beer tap. In 1901, Viegener's company began manufacturing home plumbing products.

In 1999, Viega came to North America, revolutionizing plumbing, heating and pipe joining systems. The Viega ProPress® system helped installers make reliable press connections in less time with less labor than conventional pipe joining methods.

Other innovative Viega solutions for plumbing include versatile PEX piping options and trustworthy PEX press fittings. Viega Heating and Cooling Solutions offer systems with complete support and service every step of the way.

By choosing to install Viega Heating and Cooling Solutions, you have joined the ranks of installers across the country who believe there is no substitute for quality. Viega has a history of bringing excellence and innovation to the hydronic industry.

It is the business of our engineers to research and develop complete systems that provide you the most effective and easy-to-use products available. In the following pages, you will be guided through the layout, installation and start-up of our residential and commercial products.

Call 800-976-9819 for your local District Manager and wholesale location.

Viega Heating and Cooling Solutions Pocket Guide

Table of contents

Design Information

Before starting your installation, ensure that a proper design has been completed. The information listed below will be required to complete a design.

If you would like Viega to complete a design for you, contact our Heating Design Dept. at www.viega.us or by calling 877-843-4262 x 351.

IMPORTANT NOTE:
• A GREEN DOT ON A VIEGA PROPRESS AND MEGAPRESS FITTING INDICATES THE SMART CONNECT FEATURE WITH AN EPDM SEALING ELEMENT.
• A GREEN DOT ON A VIEGA PEX PRESS POLYMER FITTING INDICATES THE SMART CONNECT FEATURE.
• A YELLOW DOT ON A MEGAPRESSG FITTING INDICATES THE SMART CONNECT FEATURE WITH AN HNBR SEALING ELEMENT.
FOR A CURRENT LIST OF APPLICATIONS, PLEASE VISIT WWW.VIEGA.US/APPLICATIONS.

Residential Design

(Bill of Material and Radiant Floor Heating [RFH] report)

- Contact information
- Project name
- Floor plan drawings in readable format (dwg, tif, pdf, hard copy)
- Completed design request form
- Geographic location (city and state)
- R-values
  - Ceiling
  - Wall
  - Window
  - Door
- Floor coverings
- Window / door schedule or dimensions
- Ceiling heights
- Areas marked or described – receiving radiant
- Areas that should not receive radiant (i.e. garage, mechanical room)
- Tubing installation method
- Zoning requirements (optional)

Commercial Radiant Design

(Bill of Material and RFH report)

- Contact information
- Project name
- Floor plan drawings in readable format (dwg, tif, pdf, hard copy)
- Geographic location (city and state)
- Areas marked or described – receiving radiant
- Tubing installation method
- Slab thickness
- Insulation installed below and thickness
- Floor coverings
- Indoor design temperature
- Water temperature requirements or limitations (related to heat source)
- Zoning requirements (if any)
- Control strategy (i.e. DDC or Viega Controls)
- Provided heat loss calculations (BTUh/ft^2)
- Scope of materials to be provided (tubing size w/O.C. requirements, controls, etc.)
- Manifold locations indicated on drawings

Commercial Snow Melt Design

(Bill of Material and Snow Melt Report)

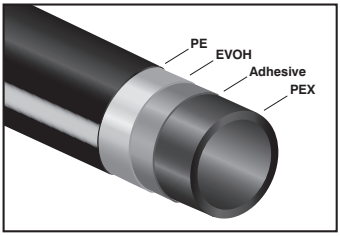
- Contact information
- Project name
- Floor plan drawings in readable format (dwg, tif, pdf, hard copy)
- Geographic location (city and state)
- Areas marked or described – receiving radiant
- Slab thickness
- Coverings (i.e. pavers, asphalt, etc.)
- Insulation installed below and thickness
- Water temperature requirements or limitations (related to heat source)
- Scope of materials and design (Tubing size w/O.C. requirements, BTUh/ft^2, glycol percentage, etc., usually found on a schedule)
- Manifold locations indicated on drawings

Tubing

Viega Barrier PEX tubing serves as an oxygen barrier for use in heating and cooling applications.

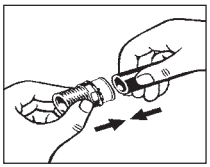
Viega Barrier PEX Tubing

- Is available coiled in sizes 5/16" to 2".
- Is available in straight lengths in sizes ¾" to 2".
- Can be easily identified by its black color and red stripe.
- Has a bend radius of 8x O.D.
- Has a UV exposure rate of six months.
- An uncoiler is typically used with Viega Barrier PEX tubing to keep the PEX tubing manageable and easy to use.
- A PEX tubing cutter must be used to cut Viega Barrier PEX tubing as it makes a straight, clean, burr-free cut.
- For use with heating and cooling applications at ratings of 73.4°F @ 160 psi, 180°F @ 100 psi and 200°F @ 80 psi.
- Has four layers: a layer of PEX, a layer of adhesive, a layer of ethylene vinyl alcohol (EVOH [which limits oxygen permeation]) and an outer layer of polyethylene.
- Viega Barrier PEX tubing is recommended for use with PEX Press fittings. For instructions on making a PEX press connection, please see Page 6.

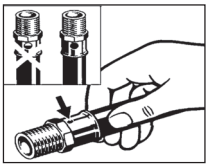


Making a PEX Press Connection

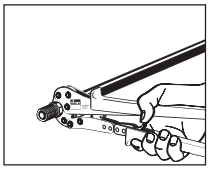
1. Square off tubing to proper length. Uneven, jagged or irregular cuts will produce unsatisfactory connections.



2. Insert PEX Press fitting with attached sleeve into tubing and engage fully.

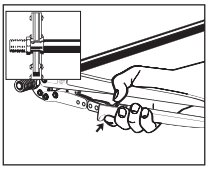


3. Ensure full tubing insertion at view holes in attached press sleeve. Full insertion means tubing must be completely visible in at least two view holes and partially visible in one.

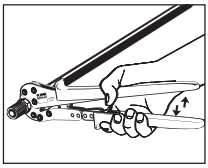


4. Position press tool perpendicular over press sleeve, resting it against the tool locator ring.

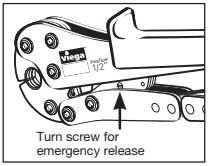
   Note: The tool locator ring must be in the factory-installed position while making a press to ensure a consistent leakproof connection. It may be necessary to rotate the tool locator ring to avoid interference between the ring and tool.



5. Close handles, using trigger to reduce grip span if desired.



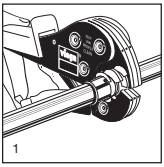
6. Extend handle and continue ratcheting until automatic tool release occurs at proper compression force.

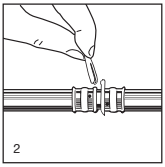


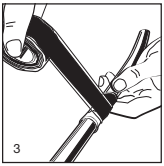
7. **Warning:** The connection is not leakproof when the tool has been opened by emergency release. The tool locator ring must be present to ensure a proper PEX Press connection.

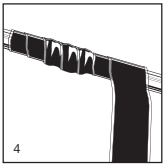
After making an in-slab or underground fitting connection, be sure to protect the fitting with pipe wrap prior to concealing the connection.

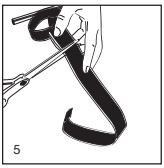
Viega PEX Repair Coupling Wrap

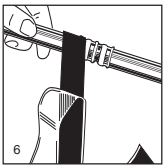


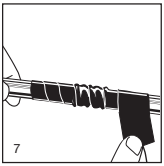












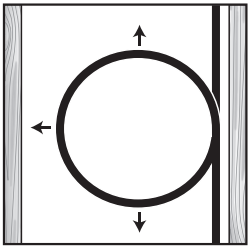
Repair coupling wrap (tape) is a self-sealing, silicone-based product designed to protect Viega PEX Press fittings from the corrosive nature of concrete. After making an in-slab fitting connection, protect the fitting with fitting wrap prior to embedding it in concrete.

1. Press fitting as per Viega's PEX Press Product Instructions.
2. If using a fitting with removable tool locator rings, remove them, otherwise they will remain in place.
3. Leave the protective film in place as you measure the amount of tape required to completely wrap and seal the fitting.
4. Measure by completely covering the fitting with tape. Overlap each row by ½" and run the wrap out over the end of the fitting and onto the tubing by 1" minimum.
5. Cut required length of tape.
6. Carefully wrap fitting with tape, removing protective film as fitting is wrapped.
7. Ensure that the fitting is completely covered.

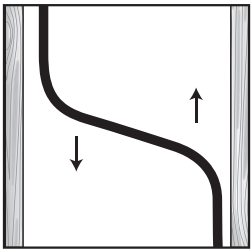
Note: The fitting wrap will bond within two minutes and create a permanent bond within 24 hours. The concrete pour will not affect the sealant's bonding process.

PEX Expansion Compensation

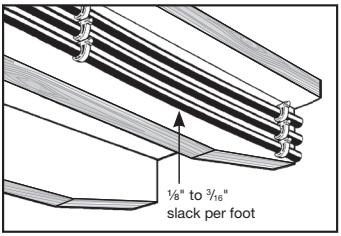
Viega Barrier PEX tubing, as with any PEX tubing, expands and contracts with temperature changes in the environment or the fluid inside the tubing. The longer the tubing run and the higher the temperature change, the more linear expansion the system will experience. This expansion and contraction can affect the appearance as well as integrity of the system by putting stress on the tubing, fittings, valves and fasteners.



Using a loop to accommodate tubing expansion.



Offsets also provide room for tubing expansion.

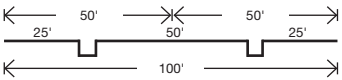


Allow some slack in all runs to prevent damage from tubing contraction.

Tubing sizes smaller than ¾" generally do not require expansion compensators with fittings and can easily be bent into loops and offsets to absorb linear expansion.

For unconstrained tubing runs (not within the floor) Viega recommends the use of expansion offsets. This can be accomplished at a corner or by using offsets or loops on straight tubing runs. Expansion compensators should be installed at the midway point of tubing runs and should be spaced no more than 50 ft. apart.

Below is an example of required offsets for a 100-ft. tubing run. Note that the expansion compensators are no more than 50 ft. apart.



There are three types of expansion offsets recommended for use with large-diameter PEX tubing: the corner expansion offset, the Z-type expansion offset and the U-type expansion loop. Descriptions, illustrations and dimensional charts for each type of offset are located in the following pages.

Tubing Fasteners:

Tubing fasteners perform two functions: providing support for the tubing and guiding the tubing during expansion and contraction. It is important to keep this in mind when installing fasteners, as an expansion compensator will not be effective if the fasteners prevent linear movement of the piping system.

Linear Expansion:
To calculate linear expansion for PEX tubing, use the following formula:

$$\Delta L = \frac{\text{PEX expansion rate}}{100' \times 10°F} \times \Delta T \times \text{tubing length ft}$$

Where:

Viega Barrier PEX tubing expansion rate = 0.96" per 100' per 10°F

ΔT = Change in temperature (in °F)

For example:
40' of 1" Viega Barrier PEX tubing going from 70°F to 130°F

$$\Delta L = \frac{0.96"}{1000} \times 60° \times 40' = 2.30"$$

$\Delta L = 2.30"$

Compensation Distance:
To calculate the dimensions of the expansion compensation offset needed, use the following formula:
$L = C\sqrt{OD \times \Delta L}$

Where:
L = length of compensation distance
C = 12 (PEX material specific constant)
OD = outer tubing diameter (⅛" + nominal tube size)
ΔL = change in length from temperature change

Corner Expansion Offset:
Where piping takes a corner after a long straight run, a simple 90° elbow in the piping will allow for the absorption of expansion.

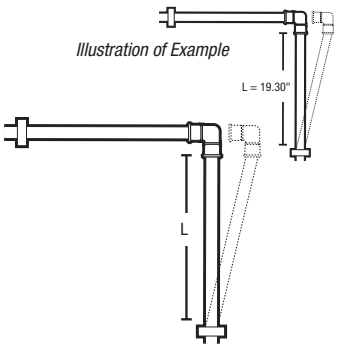
Calculate the necessary "L" dimension between elbow and nearest fastener or use the chart below, which was figured using the maximum run for a single expansion compensator (50 ft.).

Following the previous example:
$L = C\sqrt{OD \times \Delta L}$

Where:
C = 12
OD = 1.125 (1" PEX)
$\Delta L = 2.30"$

$L = 12\sqrt{1.125" \times 2.30"} = 19.30"$

$L = 19.30"$



Corner Expansion Offset (L, in) per 50 linear feet of run									
Tubing	ΔT(°F) / Tube nom.	60	80	100	120	140	160	180	200
Viega Barrier PEX	¾"	19.0	22.0	24.6	26.9	29.1	31.1	33.0	34.8
	1"	21.6	24.9	27.9	30.5	33.0	35.3	37.4	39.4
	1¼"	23.9	27.6	30.8	33.8	36.5	39.0	41.4	43.6
	1½"	26.0	30.0	33.5	36.7	39.7	42.4	45.0	47.4
	2"	29.7	34.3	38.3	42.0	45.3	48.5	51.4	54.2

Note: This chart was figured using the maximum run for a single expansion compensator (50 ft.). Refer to Viega installation manuals for recommended operating temperatures, pressures, tubing fasteners and fastener spacing.

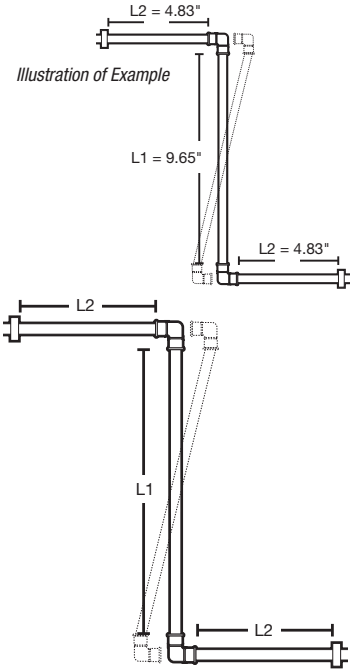
Z-type Expansion Offset:
The Z-type expansion offset integrates two 90° elbows that form a "Z" pattern.

With this type of configuration ½ of the "L" dimension is applied to the center area of the "Z" (represented as L1 in the table and illustration) while ¼ of the "L" dimension would be applied to each of the top and bottom areas (represented as L2).

Calculate the necessary L1 and L2 dimensions or use the chart below, which was figured using the maximum run for a single expansion compensator (50 ft.).

L = 19.30"
L1 = ½ (L)
L1 = 19.30"/2 = 9.65"
L1 = 9.65"

L2 = ¼ (L)
L2 = 19.30"/4 = 4.83"
L2 = 4.83"



Z-Type Expansion Offset (in) per 50 linear feet of run																	
Tubing	ΔT(°F)	60		80		100		120		140		160		180		200	
	Tube nom.	L1	L2	L1	L2	L1	L2	L1	L2	L1	L2	L1	L2	L1	L2	L1	L2
Viega Barrier PEX	¾"	9.5	4.8	11.0	5.5	12.3	6.1	13.5	6.7	14.5	7.3	15.6	7.8	16.5	8.2	17.4	8.7
	1"	10.8	5.4	12.5	6.2	14.0	7.0	15.3	7.6	16.5	8.2	17.6	8.8	18.7	9.4	19.7	9.9
	1¼"	11.9	5.9	13.8	6.9	15.4	7.7	16.9	8.4	18.2	9.1	19.5	9.7	20.7	10.3	21.8	10.9
	1½"	13.0	6.5	15.0	7.5	16.8	8.4	18.4	9.1	19.8	9.9	21.2	10.6	22.5	11.2	23.7	11.8
	2"	14.8	7.4	17.1	8.6	19.2	9.58	21.0	10.5	22.7	11.3	24.2	12.1	25.7	12.9	27.1	13.5

Note: This chart was figured using the maximum run for a single expansion compensator (50 ft.). Refer to Viega installation manuals for recommended operating temperatures, pressures, tubing fasteners and fastener spacing.

U-type Expansion Loop:
The U-type expansion loop integrates four 90° elbows that form a "U" pattern.

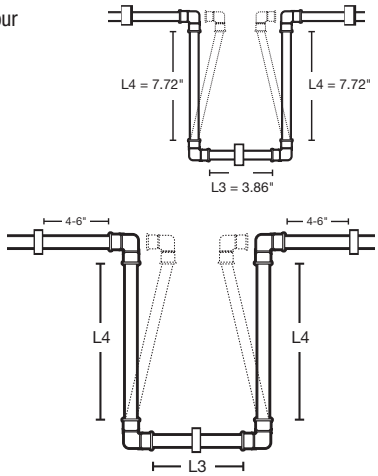
With this arrangement ⅕ of the "L" dimension is applied as the width (represented as L3) while ⅖ of "L" is applied as each leg in the other dimension (represented as L4).

Calculate the necessary L3 and L4 dimensions or use the chart below, which was figured using the maximum run for a single expansion compensator (50 ft.).

L = 19.30"
L3 = ⅕ (L)
L3 = 19.30"/5 = 3.86"
L3 = 3.86"

L4 = ⅖ (L)
L4 = 2(19.30")/5 = 7.72"
L4 = 7.72"

Illustration of Example



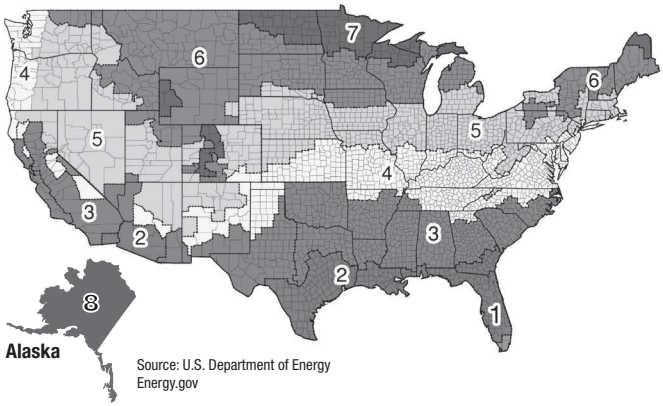
The fastener shown on the L3 leg may be required to provide additional support depending on how the expansion loop is installed (horizontal / vertical).

U-Type Expansion Loop (in) per 50 linear feet of run																	
Tubing	ΔT(°F)	60		80		100		120		140		160		180		200	
	Tube nom.	L3	L4	L3	L4	L3	L4	L3	L4	L3	L4	L3	L4	L3	L4	L3	L4
Viega Barrier PEX	¾"	3.8	7.6	4.4	8.8	4.9	9.8	5.4	10.8	5.8	11.6	6.2	12.4	6.6	13.2	7.0	13.9
	1"	4.3	8.6	5.0	10.0	5.6	11.2	6.1	12.2	6.6	13.2	7.1	14.1	7.5	15.0	7.9	15.8
	1¼"	4.8	9.6	5.5	11.0	6.2	12.3	6.8	13.5	7.3	14.6	7.8	15.6	8.3	16.5	8.7	17.4
	1½"	5.2	10.4	6.0	12.0	6.7	13.4	7.3	14.7	7.9	15.9	8.5	17.0	9.0	18.0	9.5	19.0
	2"	5.9	11.9	6.9	13.7	7.7	15.3	8.4	16.8	9.1	18.1	9.7	19.4	10.3	20.6	10.8	21.7

Note: This chart was figured using the maximum run for a single expansion compensator (50 ft.). Refer to Viega installation manuals for recommended operating temperatures, pressures, tubing fasteners and fastener spacing.

Insulation Recommendations

Before getting started, refer to the table below to ensure the proper amount of insulation is provided. Refer to the table below for residential installations.



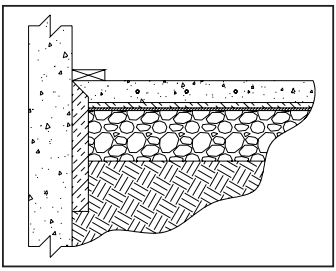
Source: U.S. Department of Energy
Energy.gov

Climate Zone	Slab with Ground Contact, Perimeter Insulation	Slab or Floor in Conditioned Space, Horizontal Insulation	Slab or Floor over Unconditioned Space, Horizontal Insulation	Wall Cavity R-Value, Exterior	Wall Cavity R-Value, Interior
1	R-5.0, 24-inch depth	R-value that is five times the value of the floor covering's R-value	R-13	R-20	R-13
2					
3			R-19		
4 except Marine	R-15, 24-inch depth				
5 and Marine 4			R-30		
6	R-15, 48-inch depth				
7-8			R-38		

Recommended R-values for residential new construction. It may not be feasible to attain these values in existing construction. All installations should comply with local code.

Application	Slab with Ground Contact, Perimeter Insulation by Climate Zone	Suspended Slab (e.g. between floors) Horizontal Insulation
Heating Only	CZ 1-2: R-7.5, 12-inch depth CZ 3: R-10, 24-inch depth CZ 4-5: R-15, 24-inch depth CZ 6-8: R-20, 48-inch depth	R-value that is five times the value of the floor covering's R-value.
Cooling Only	R-5 where chilled slab abuts unconditioned space	Same as heating
Heating and Cooling	Same as heating	Same as heating

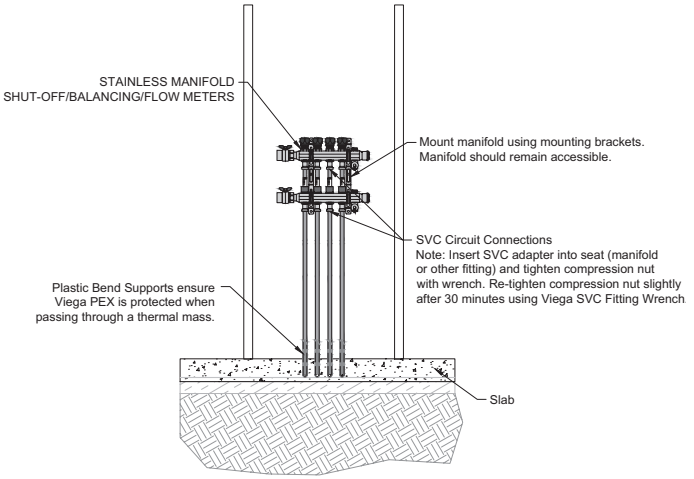
Minimum recommended R-values for slab insulation of conditioned slabs. Perimeter insulation may be applied on the interior or exterior of the foundation. Perimeter insulation should be applied vertically or a combination of vertically and horizontally, when it extends to at least the depth of the slab. Listed depths are measured from the top of the slab.



- Perimeter insulation may be applied on the interior or exterior of the foundation.
- Perimeter insulation should be applied vertically. Please refer to tables for reference of depth.
- Listed depths are measured from the top of the slab.
- Viega also recommends installing a minimum R-5 horizontal foam board insulation under the entire slab for small residential applications (<2000 ft^2).
- The top of this insulation should be cut at a 45-degree angle and be 4" higher than a piece of horizontal insulation.

Manifolds

- The manifold should be securely mounted and should remain accessible.
- Care should be taken when locating a manifold to protect it from damage. (Keep away from areas where it would be exposed to high traffic or extreme weather conditions.)
- Care should be taken when locating a manifold to protect it from job site hazards (i.e. manifold box packaging can be used to protect).
- Soldering Viega's copper manifolds should be done prior to the connection of Viega Barrier PEX. Excessive heat can cause the PEX Press connections and outlet connections to leak.
- Manifolds should be installed using isolation valves (ball valves) on the supply and return headers.
- Locate manifold in an area near the radiant system it is connected to in order to minimize leaders (closets, utility rooms, garage, basement).
- Ensure that there is enough space for manifold, accessories and fittings.
- Always use manifold brackets to secure manifold.
- Manifolds can be installed in any direction.
- Viega's 1¼" Stainless and 1" copper manifolds can be used with our manifold cabinets. See Page 21.



Stainless Manifold

Stainless Manifold Considerations

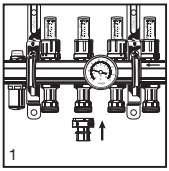
- Orientation of the manual air bleeder/ purge valve on the Stainless Manifolds can be flipped.
- Stainless Manifold end caps are 1" NPT and removable for extended and flow-through applications.
- When extending the Stainless Manifold, use thread paste and Teflon tape on the 1" NPT manifold connection.
- Make sure that the rubber inlet gasket is placed in union connection for proper seal.
- Do NOT use thread paste or Teflon tape on the union connection for Stainless Manifolds.
- Use only Viega's manifold adapters to connect to manifold.

Stainless Manifold Dimensions

	2 outlet	3 outlet	4 outlet	5 outlet	6 outlet	7 outlet	8 outlet	9 outlet	10 outlet	11 outlet	12 outlet
Width with no accessories	10.2"	10.2"	12.2"	14.1"	16.1"	18.1"	20.0"	22.0"	24.0"	25.9"	27.9"
Width with ball valve and adapter fittings	14.95"	14.95"	16.95"	18.85"	20.85"	22.85"	24.75"	26.75"	28.75"	30.65"	32.62"
Width with ball valve and adapter fittings for flow through	16.95"	16.95"	18.95"	20.85"	22.85"	24.85"	26.75"	28.75"	30.75"	32.62"	34.65"
Depth	3.6"										
Depth with ball valve handle	4.26"										

Connecting to the Stainless Manifold

SVC PEX Press Adapters 5/16" - ¾"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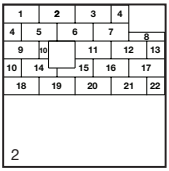

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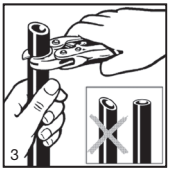
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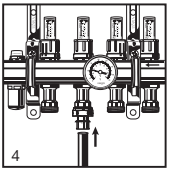
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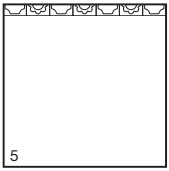
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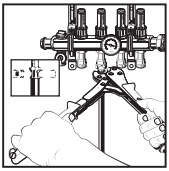
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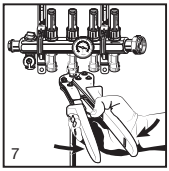
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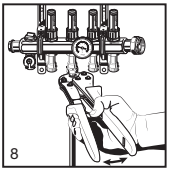
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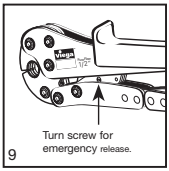

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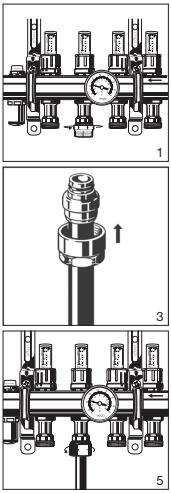
1. Insert SVC adapter into seat (manifold or other fitting).
2. Tighten nut onto seat to secure press adapter.
3. Square off tubing to proper length. Uneven, jagged or irregular cuts will produce unsatisfactory connections.
4. Insert PEX Press fitting with attached sleeve into tubing and engage fully.
5. 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.
6. Position press tool perpendicular over Press Sleeve and close tool jaws to engage ratchet.
   NOTE: It may be necessary to rotate the locator ring to avoid interference between the ring and tool.
7. Close handles, using trigger to reduce grip span if desired.
8. Extend handle and continue ratcheting until automatic tool release occurs at proper compression force.
9. **Warning:** The connection is not leakproof when the tool has been opened by emergency release.

SVC Compression Fittings



1. If using a 5/16"-5/8" fitting, proceed to Step 2. If using a 3/4" fitting, tighten threaded adapter onto seat (manifold or other fitting).
2. Square off tubing to proper length. Slide compression nut up tubing and slip brass ferrule over tubing.
3. Slide tubing over end of SVC adapter, pushing it on fully until tubing is flush with shoulder of fitting.
4. Insert SVC adapter into seat (manifold or other fitting) and tighten compression nut with wrench. Re-tighten compression nut slightly after 30 mins. If using a 5/16"-5/8" fitting, see Step 5.

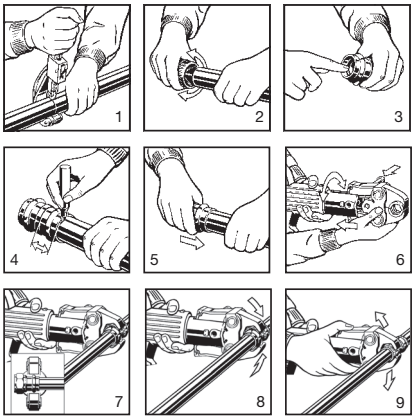
Copper Manifold Considerations

When using Viega ProPress fittings with a copper manifold, follow the instructions below.

Connecting to a Copper Manifold

ProPress Connection

For Hard Copper Tubing in ½" to 2" and Soft Copper Tubing in ½" to 1¼".



Viega ProPress Insertion Depth Chart						
Tube Size	½"	¾"	1"	1¼"	1½"	2"
Insertion Depth	¾"	⅞"	⅞"	1"	$1^{7}/_{16}$"	$1^{9}/_{16}$"

Leak Testing with Smart Connect®: Unpressed connections are located by pressurizing the system with air or water. When testing with water the proper pressure range is 15 psi to 85 psi maximum. Leak testing with air can be dangerous at high pressures. When testing with compressed air the proper pressure range is ½ psi to 45 psi maximum. Following a successful leak test, the system may be pressure tested up to 200 psi with air, or up to 600 psi with water, if required by local code requirements or project specifications.

Read and understand all instructions for installing Viega ProPress fittings. Failure to follow all instructions may result in extensive property damage, serious injury or death.

1. Cut copper tubing at right angles using displacement-type cutter or fine-toothed steel saw.
2. Remove burr from inside and outside of tubing to prevent cutting sealing element.
3. Check seal for correct fit. Do not use oils or lubricants.
   Note: For applications requiring Viega ProPress with FKM or HNBR sealing elements, remove the factory-installed EPDM sealing element and replace with the FKM or HNBR sealing element.
4. Mark proper insertion depth as indicated by the Viega ProPress Insertion Depth Chart. Improper insertion depth may result in improper seal.
5. While turning slightly, slide press fitting onto tubing to the marked depth.
   Note: End of tubing must contact stop.
6. Insert appropriate Viega jaw into the pressing tool and push in, holding pin until it locks in place.
7. Open the jaw and place at right angles on the fitting. Visually check insertion depth using mark on tubing.
8. Start pressing process and hold the trigger until the jaw has engaged the fitting.
9. After pressing, the jaw can be opened again.

Soldering Instructions

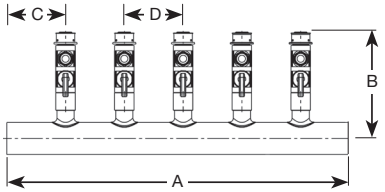
- Cut copper tubing cleanly with tube cutter.
- Ream and deburr cut copper tubing.
- Clean the inside of the Copper End Cap and copper tubing (fitting brush / emery cloth). The copper should shine.
- Brush an even layer of flux over the copper tubing and Copper End Cap.
- Push the joint together until the copper tube seats full depth. Wipe off excess flux.
- Heat the joint with a torch, moving the flame back and forth to heat evenly. Hold the solder against the joint on the side opposite the flame until it melts and flows into the joint. Touch the solder 360° around the tubing. The joint should appear full on all sides. The solder hardens as it cools.
- Avoid overfeeding the joint with solder. The amount of solder required is equivalent to the diameter of copper tubing being soldered.

Header Stock
Copper Manifold Shut-off Balancing

Part No.	Dimensions	Length with end cap and ball valve	A	B	C	D	Height	Depth
17104	2" CM x ⅝" PEX Press - 12	51.25"	39"	5.72"	3.0"	3.0"	17.7"	7.2"
17105	2" CM x ¾" PEX Press - 12	51.25"	39"	5.64"	3.0"	3.0"		
17123	1½" CM x ⅝" PEX Press - 12	50.0"	39"	5.48"	3.0"	3.0"		
17124	1½" CM x ¾" PEX Press - 12	50.0"	39"	5.40"	3.0"	3.0"		

Copper Manifold with Shut-off Valves

Part No.	Dimensions	Length with end cap and ball valve	A	B	C	D	Height	Depth
17102	2" CM x ⅝" PEX Press - 12	51.25"	39"	4.70"	3.0"	3.0"	17.7"	7.2"
17103	2" CM x ¾" PEX Press - 12	51.25"	39"	4.62"	3.0"	3.0"		
17121	1½" CM x ⅝" PEX Press - 12	50.0"	39"	4.46"	3.0"	3.0"		
17122	1½" CM x ¾" PEX Press - 12	50.0"	39"	4.38"	3.0"	3.0"		



Combining or Cutting Copper Header Stock

1½" Copper Manifolds with Brackets

Manifold Configurations	Width (in) # of Circuits					Height	Depth
	4	6	8	10	12		
No Accessories	12	18	24	30	36	17.7	7.2
w/ ECVD	16.2	22.2	28.2	34.2	40.2		
ProPress Ball Valve and ECVD	20.4	26.4	32.4	38.4	44.4		
ProPress Ball Valve, ECVD, Copper By PEX Press (87580)	21.8	27.8	33.8	39.8	45		

1½" Copper Header Stock Manifolds with Brackets

Manifold Configurations	Width (in) # of Circuits			Height	Depth
	14	16	18		
No Accessories	42	48	54	17.7	7.2
w/ ECVD	46.2	52.2	58.2		
ProPress Ball Valve and ECVD	50.4	56.4	62.4		
ProPress Ball Valve, ECVD, Copper By PEX Press (87580)	51.8	57.8	63.8		

2" Copper Manifolds with Brackets

Manifold Configurations	Width (in) # of Circuits					Estimated Height (in)	Depth (in)
	4	6	8	10	12		
No Accessories	12	18	24	30	36	17.8	7.7
w/ ECVD	16.2	22.2	28.2	34.2	40.2		
ProPress Ball Valve and ECVD	21.4	27.4	33.4	39.4	45.4		

2" Copper Manifolds with Brackets

Manifold Configurations	Width (in) # of Circuits			Estimated Height (in)	Depth (in)
	14	16	18		
No Accessories	42	48	54	17.8	7.7
w/ ECVD	46.2	52.2	58.2		
ProPress Ball Valve and ECVD	51.4	57.4	63.4		

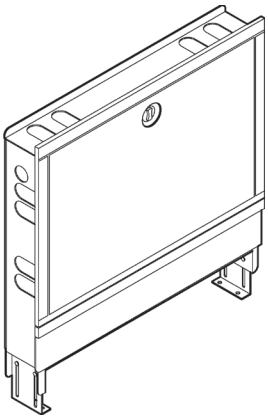
**ECVD = end cap vent drain

Viega Manifold Cabinets

Viega's Manifold Cabinet is designed to house our 1¼" stainless steel manifolds and 1" copper manifolds. The Viega Manifold Cabinet may also be used with zone controls and powerheads in some applications. See the charts below for dimensional information.

Product Overview

- Recess mount
- Adjustable wall depth (4½" - 6")
- 20-gauge galvanized sheet metal construction (1mm)
- Epoxy polyester powder coating
- Open bottom for easy connection of tubing
- Available with standard knob or optional lock and key (lock and key part number: 15217)
- Adjustable legs (0 - 7")
- When using part number 15802 the use of two locks is necessary



Manifold Cabinet Dimensions		
Part No.	Outside Dimension W x H x D	Inside Dimension W x H x D
15800	22⅝" x 31¼" x 4½"	21" x 28" x 4½"
15801	28⅝" x 31¼" x 4½"	27" x 28" x 4½"
15802	46" x 31¼" x 4¼"	45" x 28" x 4¼"

1¼" Stainless Steel Manifold Dimensional Information							
Part No.	Interior box dimension	Exterior box dimension	1¼" stainless steel manifold with no accessories	1¼" stainless steel manifold with ball valve set	1¼" stainless steel manifold with ball valve set and adapters for flow through	1¼" stainless steel manifold with no accessories and Zone Control	1¼" stainless steel manifold with ball valve set and Zone Control
15800	21"	22⅝"	2-6 outlet manifold	2-5 outlet manifold	2-4 outlet manifold	2 outlet manifold	N/A
15801	27"	28⅝"	2-9 outlet manifold	2-8 outlet manifold	2-7 outlet manifold	2-4 outlet manifold	2-3 outlet manifold
15802	45"	46"	2-12 outlet manifold	2-12 outlet manifold	2-12 outlet manifold	2-12 outlet manifold	2-12 outlet manifold

Notes: If use of a zone control is necessary, hold the manifold to one side and install the zone control vertically on the other side of the manifold cabinet. Use of a zone control in the manifold cabinet is not compatible with flow through applications.

1" Copper Manifold Dimensional Information				
Part No.	Interior box dimension	Exterior box dimension	1" copper manifold with no accessories	1" copper manifold with ProPress ball valve and end cap
15800	21"	22⅝"	2,3,4 outlet manifold	N/A
15801	27"	28⅝"	2,3,4 outlet manifold	2,3,4 outlet manifold
15802	45"	46"	2,3,4 and 12 outlet manifold	2,3,4 and 12 outlet manifold

Notes: Copper manifolds are available in 2, 3, 4 and 12 outlet configurations. Manifold brackets are sold separately for copper manifolds.

Panels, Plates, Traks and Mats

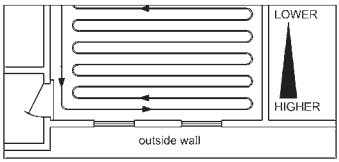
Concrete Installation

Site Prep

- Compact the sub-base where necessary.
- Install vapor barrier if specified. Viega recommends installing a vapor barrier on all heating and cooling installations.
- Final grade should be accurately leveled and covered with a polyethylene film (6 mil. minimum).
- Install insulation if specified. Please refer to local code or this installation guide.
- Install wire mesh if specified. Though wire mesh is not required for Climate Mat installations, it can be helpful for securing Climate Mat leaders near manifolds.
- Where specified, re-bar or other slab enforcement may be installed prior to or after the installation of Climate Mat.
- Depending on the slab design and construction schedule it is generally easier to sequence the installation of slab reinforcement after the Climate Mat is installed.
- Remove any unintentional obstructions and construction waste.
- Make sure all tools and materials are on site and arranged neatly.
- Use tubing cutters for even, square cuts.
- If a PEX Press coupling will be installed and encased in a thermal mass, it must be completely covered with Viega's coupling repair tape.
- Cover tubing with a protection sleeve when it is close to sharp objects.
- Protect tubing with proper guards where nailing is likely.

Planning and Installation

- Before starting the installation, ensure that the following tools and materials are on site to help the process go smoothly:
  - Tubing cutters and Viega PEX Press tool
  - Viega PEX Press couplings
  - Repair tape to wrap repair PEX Press couplings in-slab
  - Fasteners for securing leaders near manifolds
  - Tools for installing fasteners
  - Air compressor for pressure testing
  - Bend support to support slab penetration sleeve
- Run supply tubing into high heat loss areas first (i.e. closest to exterior walls, windows, sliders, etc.) and then into the interior of the room.

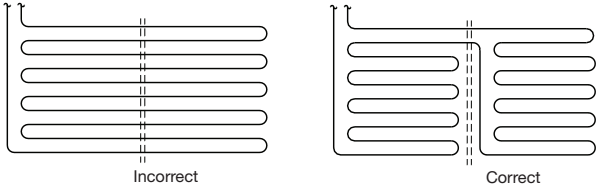


Higher water temperatures at the outside wall will provide more BTU output where it is needed. Continue the circuits, laying them out in the same direction toward the interior of the room.

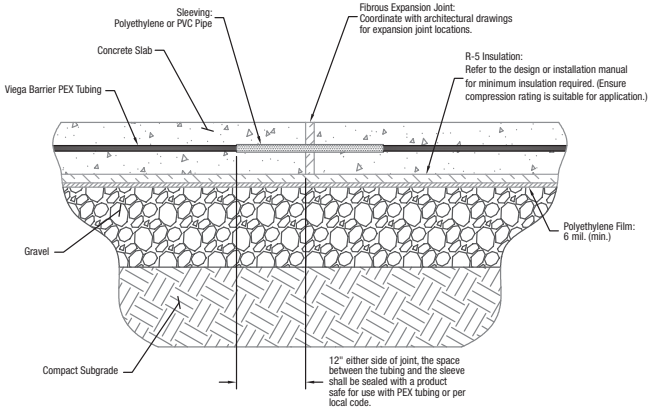
- Keep tubing at least 4" (10cm) from the edge of slabs, walls or other permanent objects.
- Label tubing and record actual circuit lengths as it is installed.
- If there are areas with high pipe concentrations, insulate pipes if the thickness of the thermal mass can accommodate the buildup.
- The slab should not be heated until curing is complete.
- Start warmup after concrete has reached its final set (curing complete).
- Set supply water temperature to 77°F for the first three days.
- Increase supply water temperature to the set point in gradual increments for the next four days (maximum of 50°F increase in a period of 24 hours).
- Slab warmup should follow the concrete manufacturer's recommendations.
- Minimize penetration of expansion joints in concrete.

Minimize Penetration of Expansion Joints

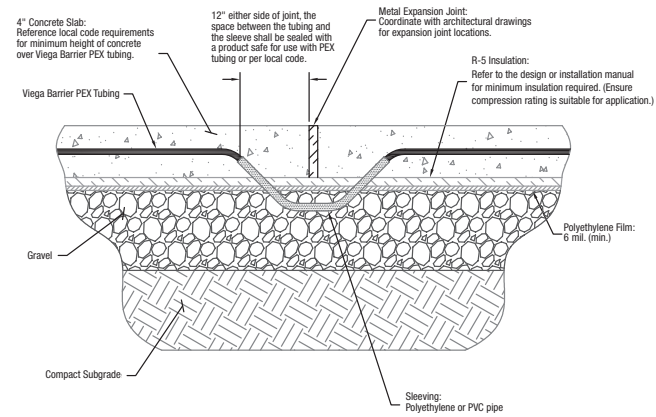
- Any tubing that passes through concrete expansion joints must be protected with a protection sleeve for a minimum of 12" (31 cm) on both sides of the joint.



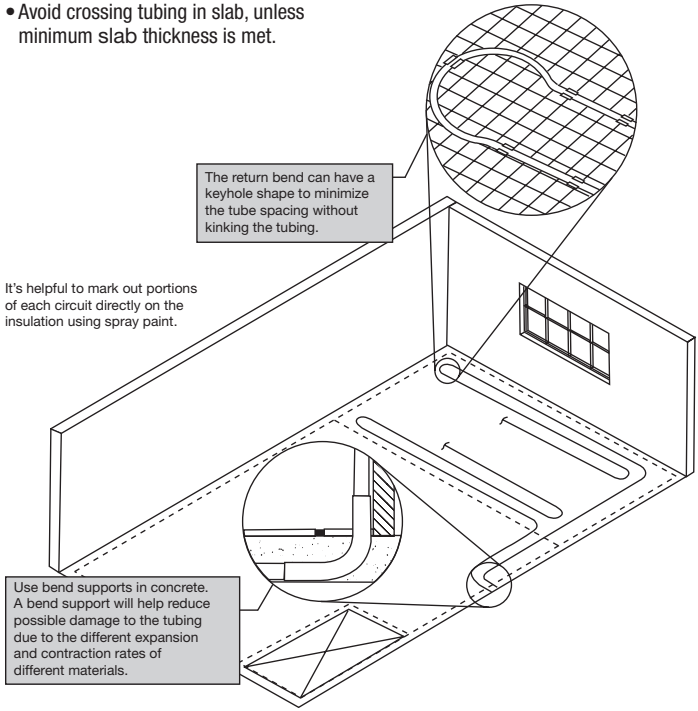
Section through Fibrous Expansion Joint (typical)



Section through Metal Expansion Joint (typical)



- The return bend can have a keyhole shape to minimize the tubing spacing without kinking the tubing.
- Fasten tubing every two feet and three times at each U-turn to hold down any return bends or other shapes created.
- Avoid crossing tubing in slab, unless minimum slab thickness is met.
- Use bend supports in concrete. A bend support will help reduce possible damage to the tubing due to the different expansion and contraction rates of different materials.



Rapid Grid

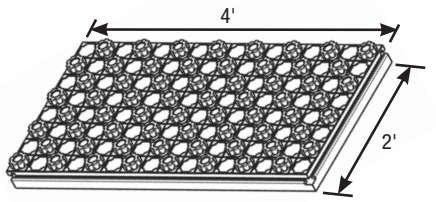
Planning and Installation

- Check with local code to ensure Rapid Grid meets the specified vapor barrier, insulation and compressive strength requirements.
- When installing Rapid Grid in outdoor conditions, add temporary weight (re-bar, lumber) to prevent wind uplift.
- Using a box cutter or keyhole saw, remove the tongue portion of the interlock from both the 4' and 2' dimensions; every time a panel touches a concrete wall, the tongue should be removed so that a full 2" of insulation is in contact with the concrete.
- Place a full panel in the upper left corner of the north wall; it is usually easiest to work from left to right.
- Place the next panel to the right of the first panel so that it locks into the groove; the 4' dimension should be at the bottom (horizontally) and the 2' to the right (vertically).
- Move along the first row, filling in the panels and interlocking them together.
- Upon reaching the east wall, measure and cut the final panel to fill that row.
- When starting the next row, begin by installing the remnants of the final panel from the previous row; this is done to eliminate waste as well as to keep the seams from lining up. If there are no remains from the previous row, a panel can be cut in half to start the next row.
- Continue filling the rows in this manner until the floor is covered with panel.

Installing the Tubing in the Panel

Review your radiant design to find the proper spacing for the tubing. To ensure that the runs are properly spaced, simply count the number of knobs and flats in between the tubing and multiply by 3.

- Place the tubing between the knobs.
- Using your hand or foot, push the tubing in between knobs.
- Make sure the tubing is fully inserted in the panel as you make a corner.
  TIP: When you make a turn, ensure the PEX is fully seated in the outside radius against the knobs before beginning or continuing a run.
- Continue installing the tubing until the entire area has been completed.
- The tubing should start and end at the manifold location.
- Before starting the installation, ensure that the following tools and materials are on site to help the process go smoothly:
  - Tubing cutters and Viega PEX Press Tool
  - Viega PEX Press Couplings
  - Repair tape to wrap repair PEX Press couplings in-slab
  - Air compressor for pressure testing
  - Bend supports for slab penetrations sleeve
  - The use of foam staples is not required for the installation of tubing in this product. However, you may find them useful in preventing the tubing from lifting at offsets or return bends.



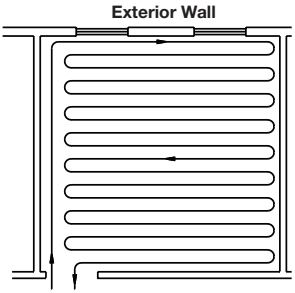
Layout Planning

To avoid waste and to have equal circuit lengths, a carefully planned layout should be done. First, determine where the manifold should be installed. Remember the manifold must be accessible. When calculating the number of circuits, always round up. Keep the length of each circuit in the same room equal.

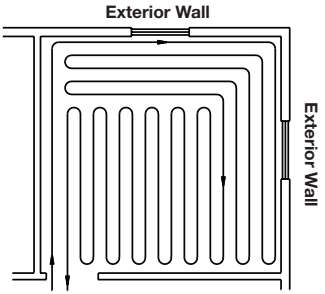
Maximum Circuit Length		
Tubing	≤ 25 Btu's / (hr x ft²)	≥ 25 Btu's / (hr x ft²)
⅜"	300'	250'
½"	400'	350'
⅝"	500'	450'
¾"	800'	750'

Calculating number of circuits:
Total amount of tubing ÷ maximum circuit length
= # of circuits

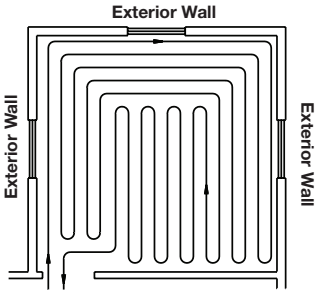
Circuit Layout Patterns for Hydronic Radiant Floor Heating



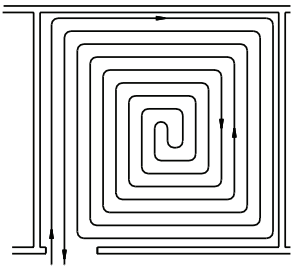
One Wall Serpentine
Room has one exterior wall



Two Wall Serpentine
Room has two exterior walls



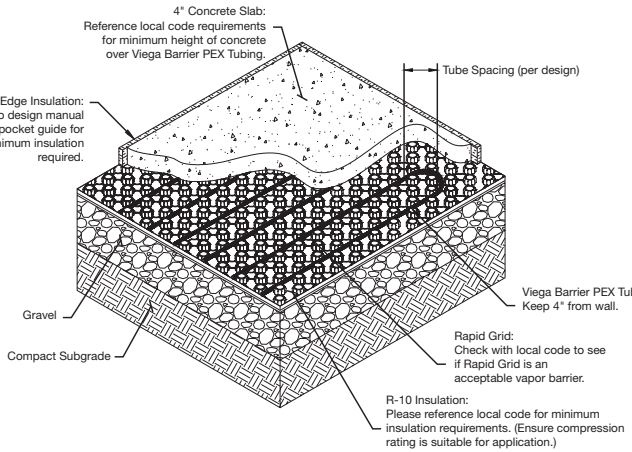
Three Wall Serpentine
Room has three exterior walls



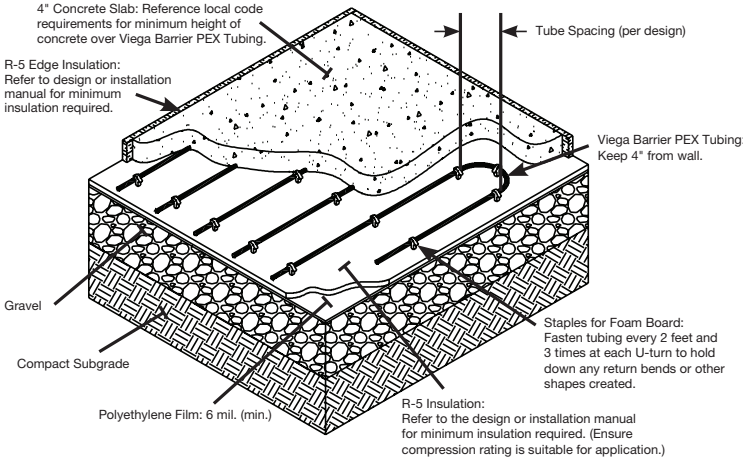
Counter Flow
Room has no exterior walls

Concrete Installation Details

Slab-on-Grade: Rapid Grid

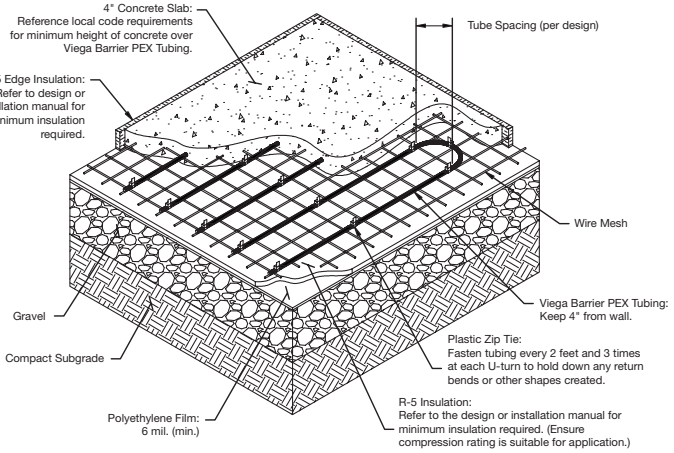


Slab-on-Grade: Foam Staples



Concrete Installation Details

Slab-on-Grade: Plastic Zip Ties



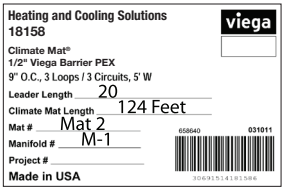
Climate Mat

Concrete Installation

Site Prep

Off-loading and Storing the Mats

- Unload the mats with care and ensure that all tubing and fittings are stored in a flat, dry and well-ventilated location that is protected from UV exposure. UV exposure must never exceed six months.
- All Climate Mat assemblies are pressure tested prior to shipment and remain under a static internal pressure of ~20 psig during shipping. (Actual gauge pressure will vary with site elevation.)
- Upon receipt of the Climate Mat, inspect each assembly for damage and verify pressure retention. Do not install any defective or damaged products.

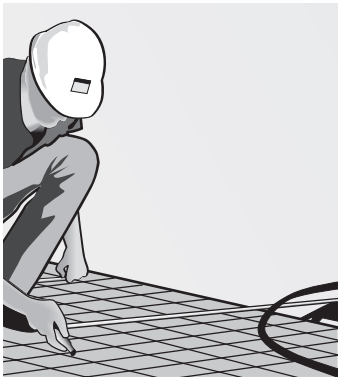


Planning and Installation

Layout and Staging

- Before starting the installation, ensure that the following tools and materials are on site to help the process go smoothly:
  - Tubing cutters and Viega PEX Press tool
  - Viega PEX Press couplings
  - Repair tape to wrap repair PEX Press couplings in-slab
  - Fasteners for securing clip strips and leaders to sub-base, wire mesh or re-bar
  - Fasteners for securing Climate Mat leaders near manifolds
  - Tools for installing fasteners
  - Air compressor for adding extra pressure to Climate Mats if necessary
  - Bend support to support slab penetration sleeve

- Each Climate Mat delivery is provided a design layout that details the location of each manifold and its corresponding Climate Mats.
- Each Climate Mat is shipped with a label that provides the specifications for that mat.
- Prior to placing the Climate Mats, measure and mark the location on the sub-base, using the first spacer strip for each Climate Mat. This location can be determined from the design layout provided by Viega.
- Also, to keep the Climate Mats straight and square during installation, the installer may find it useful to mark the sub-base to indicate the position for the outer tube of each Climate Mat.



- Using the layout provided by Viega, identify the designated manifold locations and the Climate Mats that correspond with these manifolds.

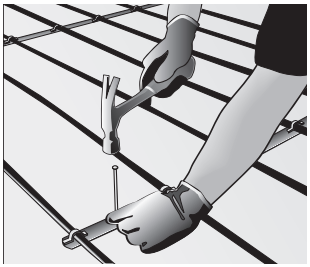
Description	Dimension	Reference Part Number #	CM Length [ft]	CM Leader Length [10,20,30]	CM #	Distance of 1st Spacer Strip to Manifold Wall	Manifold
Climate Mat, 6 ft	**½" Viega Barrier PEX, 9" O.C., 4 Loops / 4 Circuits**	18151	132	30	1	5	1
Climate Mat, 6 ft	**½" Viega Barrier PEX, 9" O.C., 4 Loops / 4 Circuits**	18151	132	30	2	5	1
Climate Mat, 6 ft	**½" Viega Barrier PEX, 9" O.C., 4 Loops / 4 Circuits**	18151	132	30	3	5	2
Climate Mat, 6 ft	**½" Viega Barrier PEX, 9" O.C., 4 Loops / 4 Circuits**	18151	132	30	4	5	2

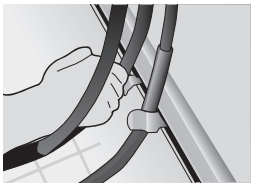
- To move the Climate Mat off the pallet, two installers can carry and place the rolled mat into position. During placement, avoid dragging or rolling the Climate Mat across long distances.
- When it's time for installation, Climate Mats will be unrolled away from the manifolds, with the Climate Mat's temporary headers placed near the manifold location.
- Heavy equipment must not be operated on top of the tubing.
- Leave at least one foot of clearance between the concrete pour and the edge of the Climate Mat to ensure that you can easily roll out subsequent sections without interference from concrete overpour.
- Once the heavy concrete equipment has moved a sufficient distance, subsequent Climate Mats may be unrolled and secured.

- If a concrete pump, boom and hose are used to install the concrete, you can generally avoid heavy equipment on the substrate. In this case, it may be possible to roll and anchor all of the Climate Mats prior to the pour.

Fastening the Climate Mat Installation

- Determine the distance from the control line indicated on the design layout to the first spacer strip location. Secure the first spacer strip to the sub-base or wire mesh near the manifold location.
- Fully unroll the Climate Mat and pull it hand-tight to ensure that it is straight and square. Attach the last spacer strip to the sub-base or wire mesh and then go back and anchor each spacer strip with at least two fasteners.
- Fastening methods will vary depending on the sub-base. Fasten leaders at two-foot intervals between the first spacer strip and the manifold.
- If attaching leaders to wire mesh or re-bar, use zip ties. For other applications, use foam staples or other appropriate fasteners.
- When anchoring leaders back to the manifold location, maintain uniform tube spacing. Tie off the temporary header so that it's not in the way when the slab is poured.
- Fastening to a compacted sub-base: Use at least two 6" landscaping spikes to anchor each spacer strip.
- Fastening to re-bar or wire mesh: Climate Mat can also be secured to wire mesh or re-bar with zip ties.
- Fastening to an existing slab: Climate Mat may be fastened to a sub-slab, with appropriate concrete fasteners, for an overpour application.

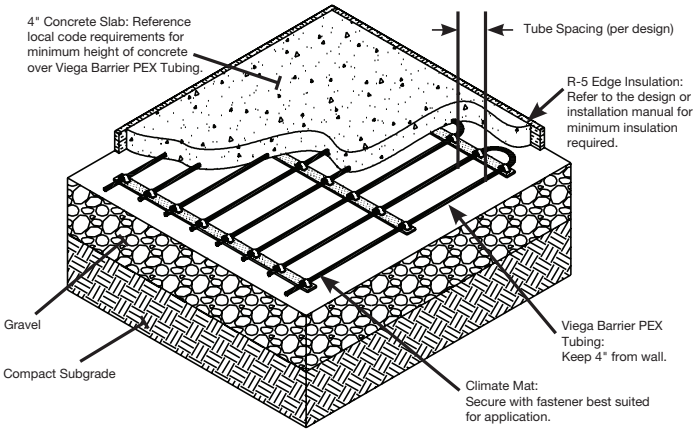




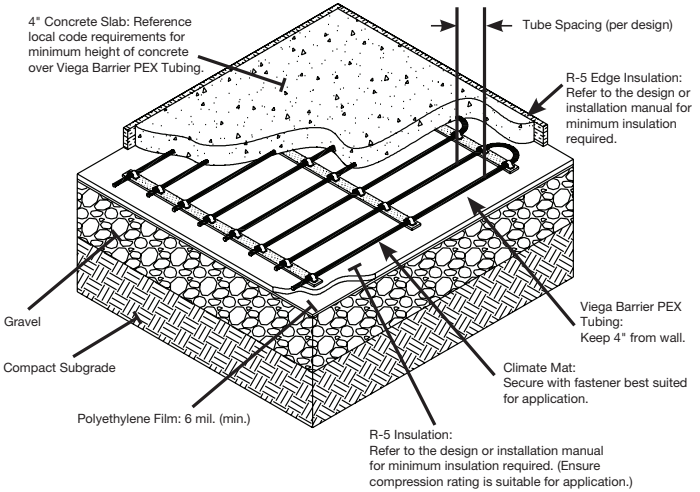
- Fastening to foam insulation: Use at least two foam staples to anchor each spacer strip. Staple tubing close to each spacer strip.
- Getting around obstacles: Where necessary, remove the tubing from the spacer strip to spread the tubing around obstacles. If this does not lend sufficient clearance, spacer strip(s) may be cut or removed to give you more flexibility.
- For the penetration of leaders at manifold locations, slide each leader's factory-installed sleeve until it is in position.

Climate Mat Concrete Installation Details

Climate Mat on Grade



Climate Mat on Grade with Insulation



Suspended Slabs and Thin Slab

Site Prep

- Ensure subfloor is structurally sound and is designed to support the added load.
- Install polyethylene sheet or treat surface of subfloor. Coordinate with thermal mass installer.
- Install insulation as specified. Please refer to local code and this installation guide.
- Note estimated back losses below for slabs that have minimal insulation.

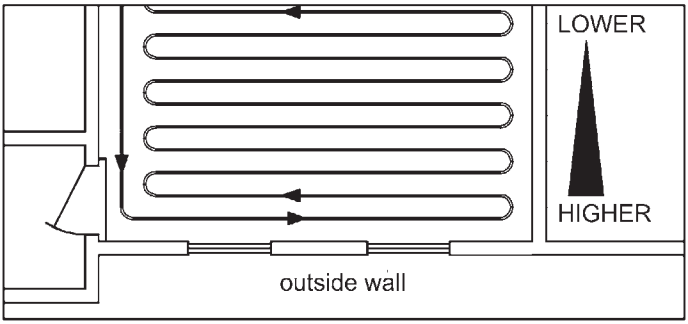
Insulation Below Suspended Slab (R-Value)	Floor Covering R-Value					
	0.25	0.5	1	1.5	2	2.5
	Suspended Slab, Back Loss in Heating					
0	44%	50%	58%	64%	69%	72%
2.5	22%	25%	32%	38%	42%	48%
5	14%	16%	22%	27%	30%	34%
7.5	10%	13%	17%	21%	24%	28%
10	8%	10%	14%	17%	20%	22%

Suspended slab back losses are percent of total heat transfer from panel, assuming a mean heating water temperature of 120°F and an air temperature above and below the suspended slab of 68°F.

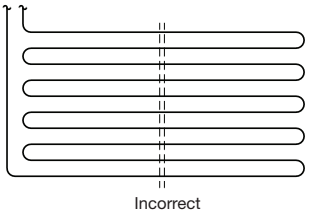
- Remove any unintentional obstructions and construction waste.
- Make sure all tools and materials are on site and arranged neatly.
- Use tubing cutters for even, square cuts.
- If a bronze PEX Press coupling will be installed and encased in a thermal mass, it must be completely covered with Viega's coupling repair tape.
- Cover tubing with a protection sleeve when it is close to sharp objects.
- Protect tubing with proper guards where nailing is likely.

Planning and Installation

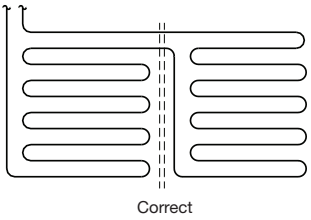
- Before starting the installation, ensure that the following tools and materials are on site to help the process go smoothly:
  - Tubing cutters and Viega PEX Press tool
  - Viega PEX Press couplings
  - Repair tape to wrap repair PEX Press couplings in-slab
  - Fasteners for securing leaders near manifolds
  - Tools for installing fasteners
  - Air compressor for pressure testing
  - Bend support to support slab penetration sleeve
- Minimum of ¾" concrete over tubing or per local code.
- Must coordinate with tightening tendons (cables) for post tension slabs.
- Run supply tubing into high heat loss areas first (i.e. closest to exterior walls, windows, sliders, etc.) and then into the interior of the room. The higher water temperatures at the outside wall will provide higher output where it is needed.



- Keep tubing at least 4" (10cm) from the edge of slabs, walls or other permanent objects.
- Label tubing and record actual circuit lengths as it is installed.
- If there are areas with high pipe concentrations, insulate pipes if the thickness of the thermal mass can accommodate the buildup.
- Minimize penetration of expansion joints in concrete applications.



Incorrect

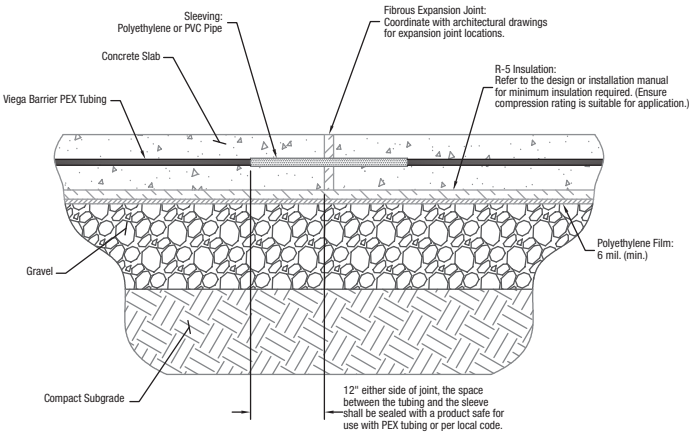


Correct

Minimize Penetration of Joints

- Any tubing that passes through concrete expansion joints must be protected with a protection sleeve for a minimum of 12" (31cm) on both sides of the joint. Cross-sections of sleeving at expansion joints are provided in the illustrations below.
- It is not necessary to sleeve tubing as it passes through control joints in radiant applications.

Section through Fibrous Expansion Joint (typical)



- The return bend can have a keyhole shape to minimize the tubing spacing without kinking the tubing.
- Fasten tubing every two feet and three times at each U-turn to hold down any return bends or other shapes created.
- Do not cross tubing in a slab unless minimum slab thickness is met.
- Use bend supports in concrete. A bend support will help reduce possible damage to the tubing due to the different expansion and contraction rates of different materials.

- **Calculate the net heated area.**
- **Use charts to make an initial materials list for the net area to be heated.**

Concrete System Tubing Estimator			
Viega Barrier PEX Tubing	**Net Heated Area**	**Multiplier**	**Estimated Amount**
6" Spacing		2.2	
9" Spacing		1.5	
12" Spacing		1.1	
Viega Barrier PEX Tubing ½", ⅝", ¾"			

Various Fasteners Available
- **Plastic Clip for Foam Board**
- **Wire Mesh Clip**
- **Zip Ties**
- **Wire Staples**
- **Foam Staples**

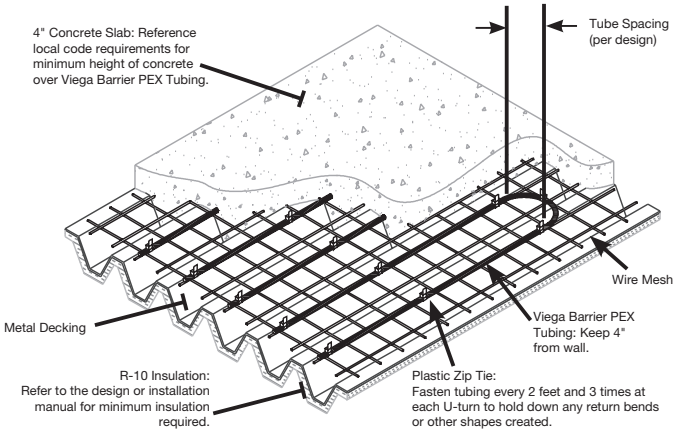
Concrete System Material List Estimator			
Fasteners	**Net Heated Area**	**Multiplier**	**Estimated Amount**
6" Spacing		1.1	
9" Spacing		.75	
12" Spacing		.55	
Fasten tubing every two feet and three times at U-turn bend			

- **Calculate the net heated area.**
- **Use charts to make an initial materials list for the net area to be heated.**
- **Rapid Grid panels are sold in packages of eight panels per package (part number 15216).**

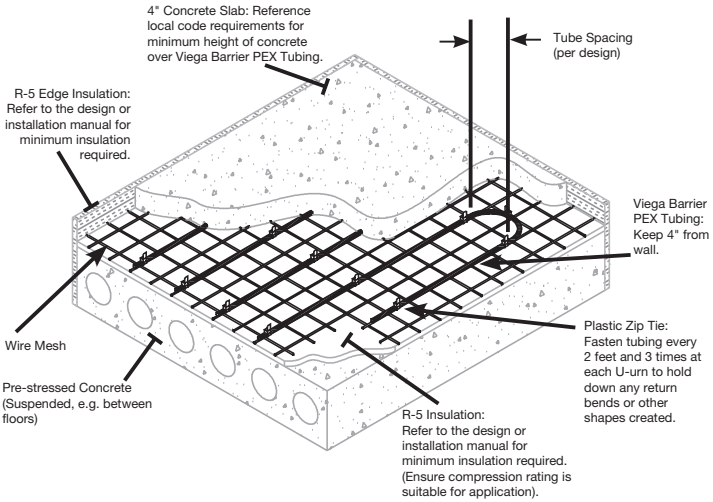
Rapid Grid Material List Estimator			
Rapid Grid	**Net Heated Area**	**Multiplier**	**Estimated Amount**
Rapid Grid		.125	
6" Spacing		2.2	
9" Spacing		1.5	
12" Spacing		1.1	
Viega Barrier PEX Tubing ⅜", ½", ⅝"			

Suspended Concrete Installation Details

Concrete on Metal Decking

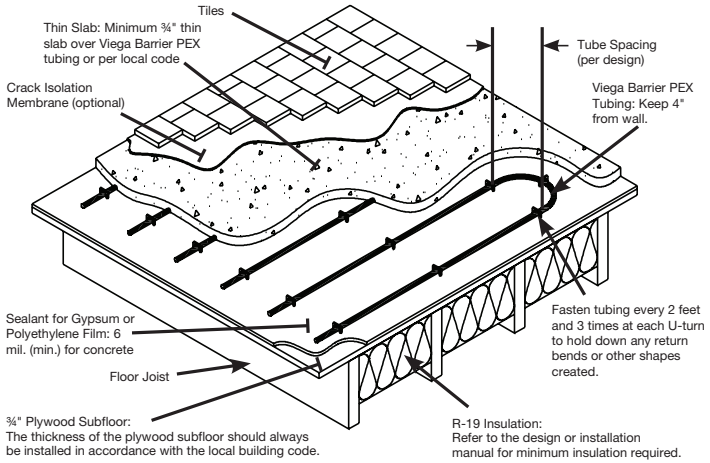


Concrete on Pre-stressed Decking

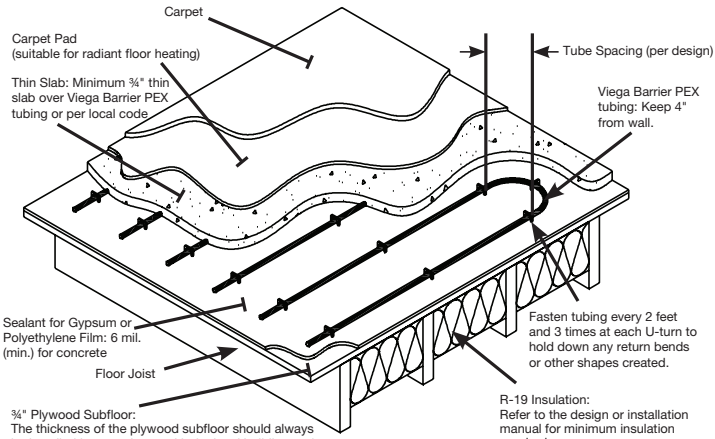


Thin Slab Installation Details

Concrete Thin Slab with Tile

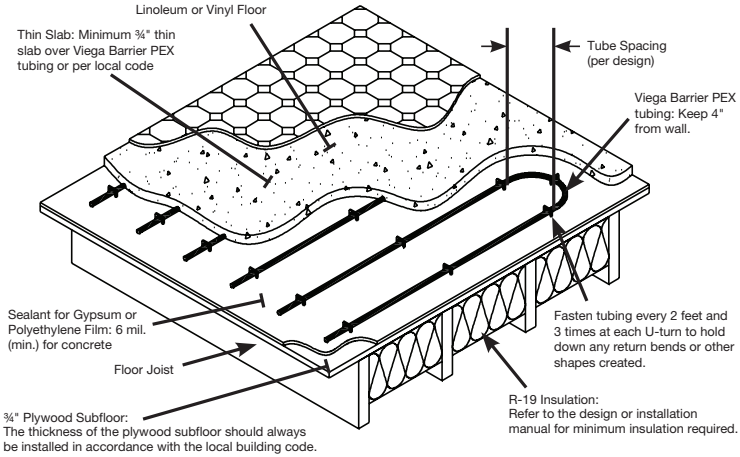


Concrete Thin Slab with Carpet

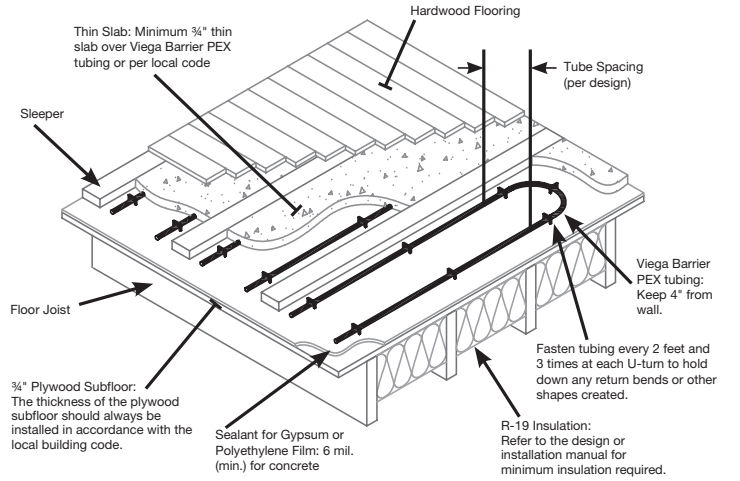


Thin Slab Installation Details

Concrete Thin Slab with Linoleum



Concrete Thin Slab with Sleepers and Hardwood



Climate Panel

Site Prep

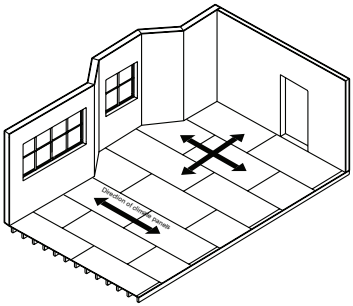
- Start by making sure your work area is dry, level and clean.
- Climate Panel may be installed directly on top of your subfloor or on top of concrete.
- When installing on top of concrete, plan on installing a vapor barrier using 6 mil. poly plastic sheeting and a layer of ¾" plywood. The Climate Panel would then attach to the ¾" plywood.
- When installing a floating floor on top of concrete, have an extra layer of foam below the Climate Panel.
- Make sure all tools and materials are on site and arranged neatly for use.

Tools

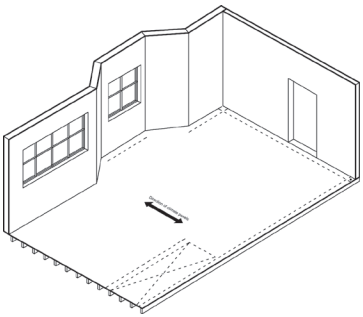
- Tape measure
- Pencil
- Chalk line
- Pneumatic PEX hammer / mallet
- Caulking gun
- Chopsaw / circular saw
- Screw gun / staple gun
- PEX tubing cutter
- PEX uncoiler

Planning and Installation

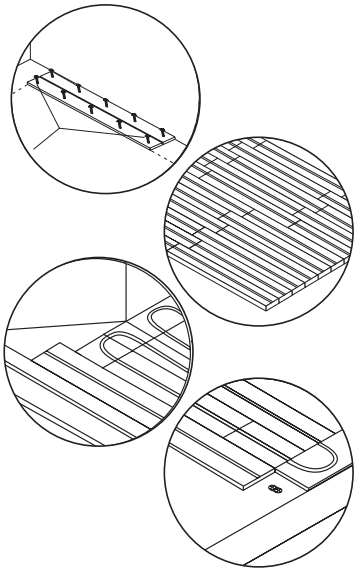
- To determine the direction of your Climate Panel installation, consider joist direction and finished flooring. Climate Panel is installed perpendicular to floor joist and flooring finishes.

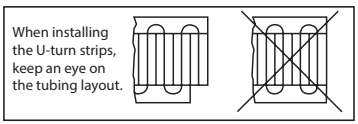


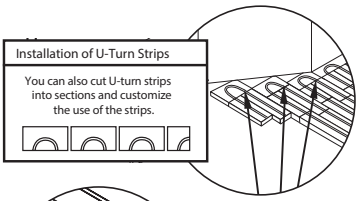
- Because most rooms are not perfectly square, lines need to be chalked to ensure proper layout of the panels.
- Begin by chalking a line along the wall where the first row of panels will be laid out. The line should be 7½" from the wall.
- Next, chalk lines along the walls where the U-turn strips will be laid out. One way to ensure that the chalk lines are perpendicular to each other is to use the right triangle rule, $a^2 + b^2 = c^2$, also known as the 3-4-5 triangle.

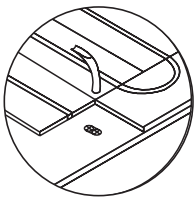


- Begin laying out the panels along the chalked lines.
- Use single panels to ensure they are lined up. This row will act as a guide for the assembled Climate Panels or additional Climate Panels.
- Fasten panels with five screws on each side (10 screws per panel), or use ½" x 1¼" crown staples.









- Always stagger the Climate Panel joints for both structural and alignment purposes.
- To begin the ACP installation, cut an unopened bundle in half to create a straight edge. Be sure the ACP is completely flush with the first row already fastened down. After the first row of ACPs has been laid out, begin to stagger the seams. (See drawing at left.)
- Install the Climate Panels one circuit at a time.
- To minimize any tubing damage, use a utility knife or chisel to nip any corners or joints where the panels didn't line up perfectly.
- After Climate Panels and U-turns are installed, vacuum the grooves thoroughly. (See Page 40.)
- Cut panels and U-turns where necessary to get around obstacles.
- If your Climate Panel system is supplied from a manifold located below, drill supply and return holes to receive a plastic elbow sleeve to protect the tubing for subfloor penetrations. (See drawing at left.)
- Install the Climate Panels then the U-turns.
- When laying down U-turn strips, be sure to first put down the aluminum sheets provided in each U-turn bundle.
- After the aluminum is laid out, align U-turns with the correct tracks and fasten.

Tube Installation
After Climate Panels and U-turn strips are installed, vacuum groove out thoroughly just prior to installing tubing.

If trapped in the groove, any debris, screws, nails, etc., will damage the tubing and keep it from laying flush with the top surface. When penetrating the floor, use a plastic elbow sleeve:

1. Figure the leader length of the supply line to the manifold area.
2. Feed leader length through plastic elbow sleeve. (Be careful not to scratch the tubing in the process.)
   Note: Feed the tubing through an unsecured plastic elbow sleeve.
3. Feed the leader length through the floor.
4. Secure the fastener clip to the floor.

Directly before installing tubing into the Climate Panels, run a ¼" bead of Viega's Groove Tube into the panel grooves.

Note: Do not add Groove Tube to return bends in Climate Panel.

- Proven not to damage PEX tubing or aluminum, the Groove Tube is strongly recommended.
- Do not use caulking or any other type of sealant or adhesive!

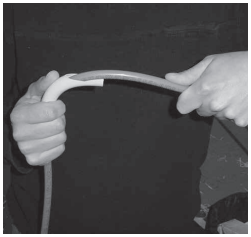
Installers: Since Groove Tube becomes tacky in 8-10 minutes, it is recommended to only apply it to areas that can be covered in this amount of time.

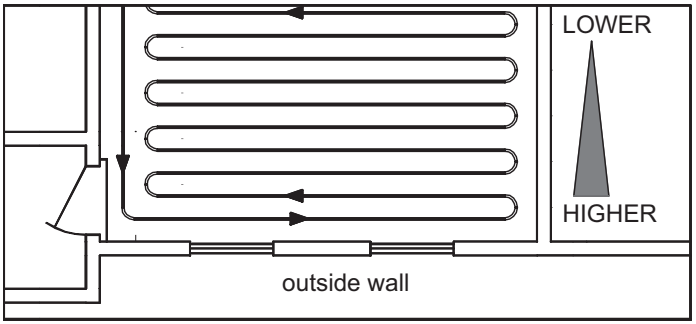
Note: Tubing may have to be hammered in using a rubber mallet or a pneumatic soft-tipped palm hammer.

Run supply tubing from manifold supply valves into high heat loss areas first (i.e. closest to exterior walls, windows, sliders, etc.) and then into the interior of the room.

This will provide more BTU output where it is needed due to higher water temperatures. Continue the circuits, laying them out in the same direction toward the interior of the room.

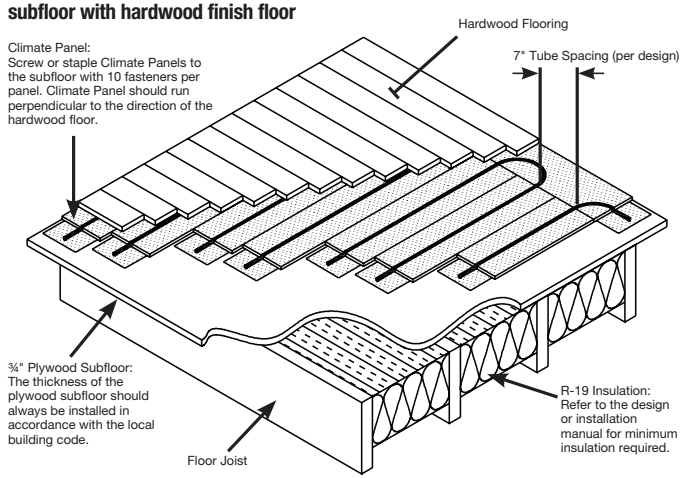




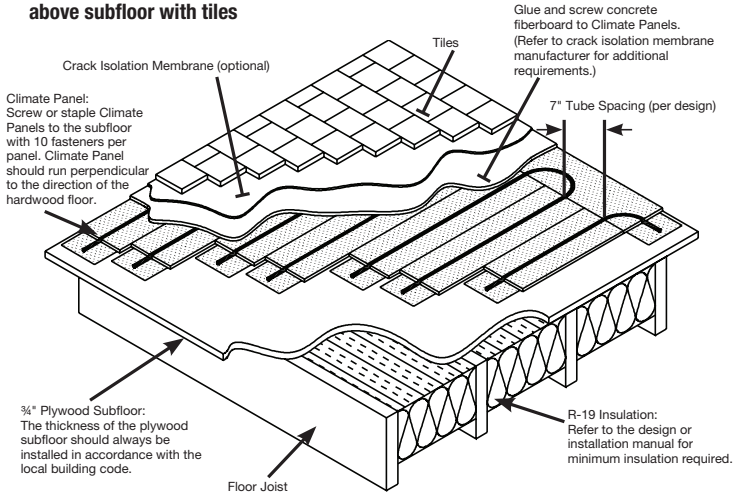


Climate Panel Installation Details

Section through Climate Panel installation above subfloor with hardwood finish floor

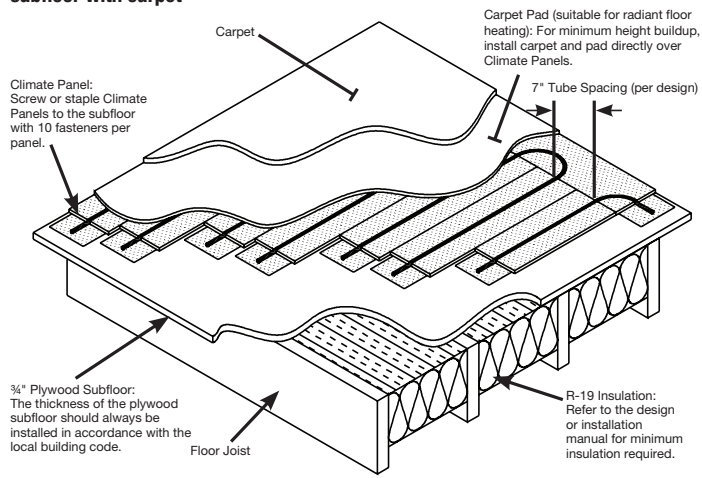


Section through Climate Panel installation above subfloor with tiles

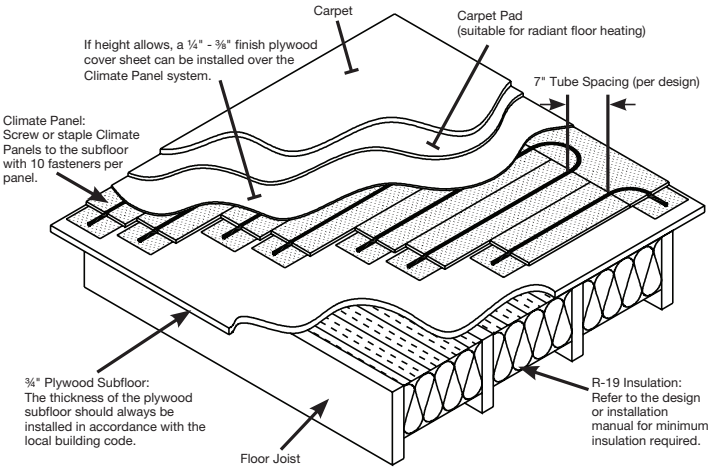


Climate Panel Installation Details

Section through Climate Panel installation above subfloor with carpet

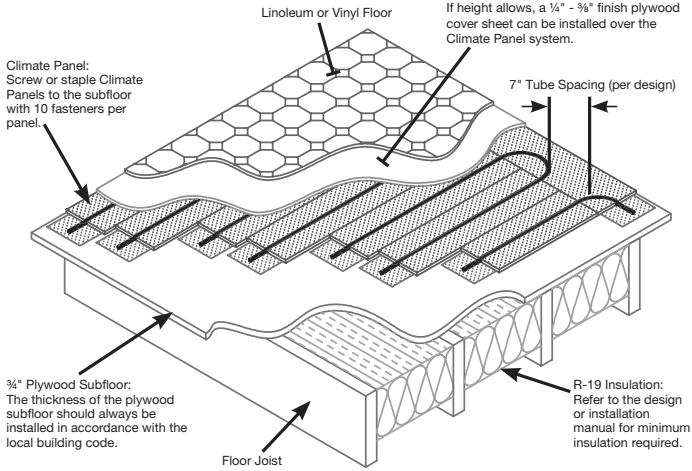


Section through Climate Panel installation above subfloor with carpet and finished plywood

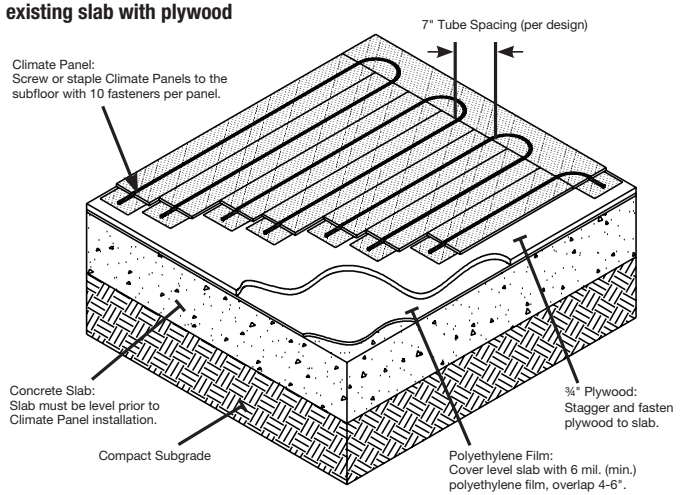


Climate Panel Installation Details

Section through Climate Panel installation above subfloor with linoleum or vinyl finish floor

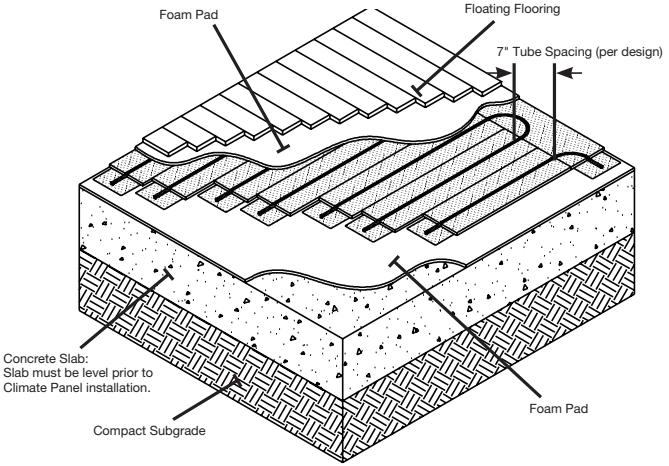


Section through Climate Panel installation on existing slab with plywood

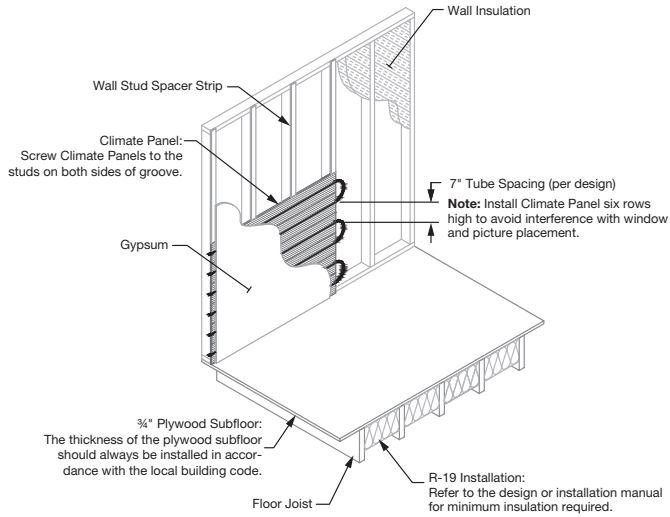


Climate Panel Installation Details

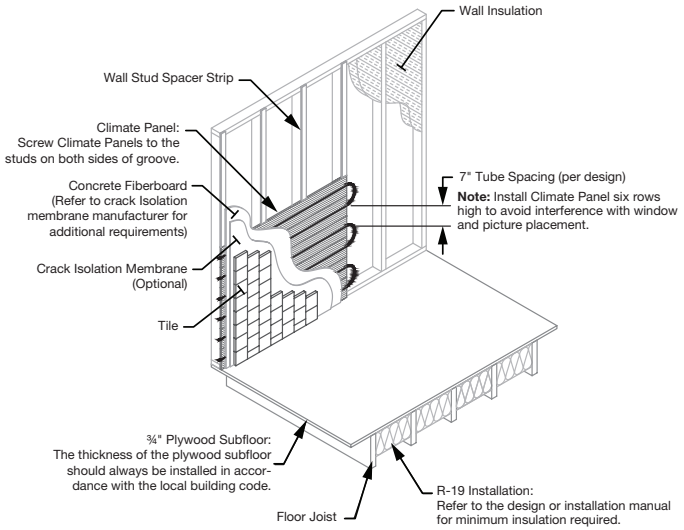
Section through Climate Panel installation on existing slab with floating floor



Section through Climate Panel installation in Gypsum Wall



Section through Climate Panel installation in Tile Wall



Climate Panel - Material Calculations

Material Calculations	
Material	**Multiplier**
7" Panels	0.4
7" ACPs	0.07
U-Turns	0.04
* 5/16" tubing 7" spacing	1.9
Groove Tube	0.02
Screws or Staples	5.4

* Climate Panel uses 5/16" tubing only

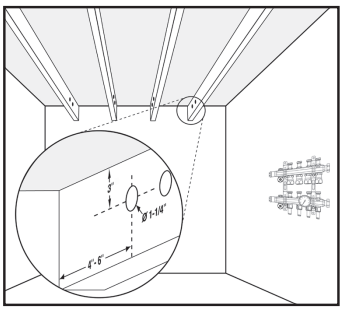
Climate Trak

Site Preparation

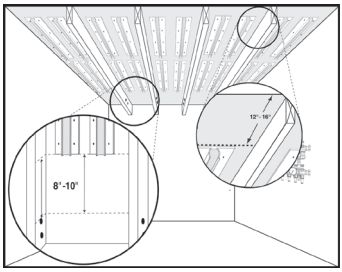
- Remove nails from bays
- Determine location of manifold
- Decide which end of bays the tubing will be returning down

Planning and Installation

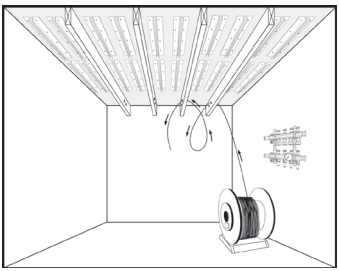
- Before drilling and/or modifying any structural members, please check with local building codes.
- Using a right-angle drill with a 1¼" bit, drill a series of holes through the center of each floor joist (keep at least 3" from subfloor).



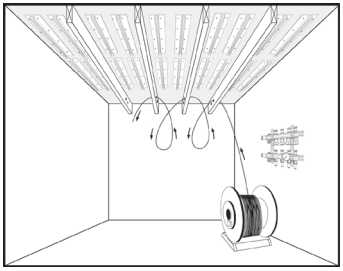
- Place the Climate Traks as shown below at left for the most even heat distribution.
- Dimensions in drawing above are based on standard 2" x 8", 2" x 10" or 2" x 12" floor joists on 16" centers. Adjust spacing as needed when using engineered joists or different spacing.



- Begin attaching the traks via zip screws (zip screws ¾" - 1", depending on subfloor thickness); five per side per 4' trak and 10 per side for 8'.
- Install both Climate Trak or heat transfer plates and tubing above crosses in bay.
- Begin attaching traks 8" - 10" from the closest hole that was drilled to allow ample room for tubing to turn.
- Stop trak installation 12" - 16" short of where you want circuit to end to allow for expansion and contraction.

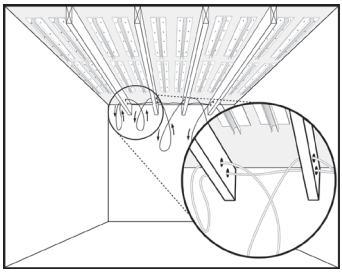


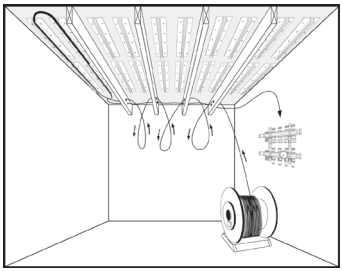
- Begin to make nonstressful teardrop-type loops for each of the bays, keeping loops small and manageable.
- Continue making loops. Be sure not to install any of the tubing into the traks. Keep loops fairly small and manageable to prevent



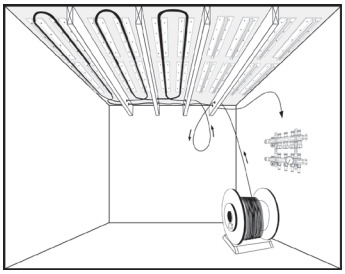
twisting while keeping the loops easy to transfer the tubing through the holes.

- Transfer tubing from the decoiler through loops until there is enough tubing to fill the final bay and make the run back to the manifold.





- Once the final bay is installed, transfer tubing from coil to fill the next bay and so on. **NOTE:** Tubing can be installed into traks using a rubber mallet or a pneumatic PEX hammer with a medium plastic tip.



- Continue transferring the tubing until all bays are filled and run the end to connect to the manifold.

Climate Trak - Post-Installation Tip Page

Insulation should always be used in a staple-up radiant installation. Ideally there should be a 1" to 2" air gap in between the insulation and the traks/plates.

However, the air gap should be left only if that space is considered a dead air space (absolutely no air current through it, whether it be from an outside wall, from below or through holes in the subfloor).

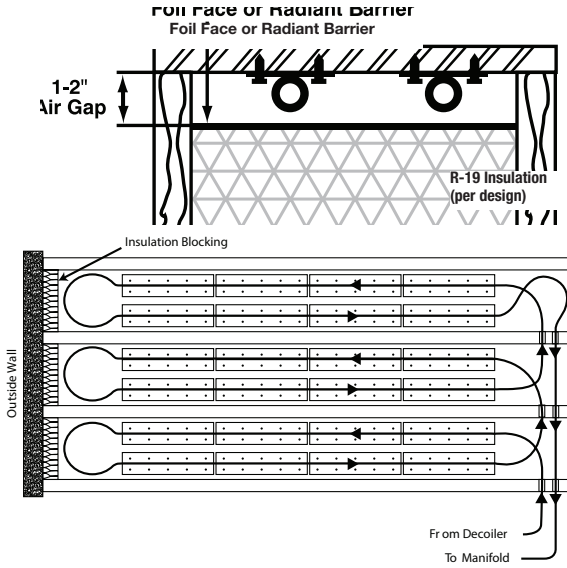
To create a dead air space, begin by insulating the outside ends of the joist bays with a separate piece of insulation (insulation blocking) between the top of the foundation and the bottom of the subfloor to keep cold air from entering through sills and outside walls.

Any air current through this space will decrease the performance of the system and the insulation. By insulating outside walls, sealing any large gaps in the subfloor and ensuring that the insulation is tight against the joist, this will create a situation where the air gap is beneficial to the performance of the system.

If a dead air space cannot be achieved, then the insulation should be pushed up lightly against the traks/plates.

Note: When using expanding foam insulation on and around the PEX tubing, please contact the manufacturer of the foam or Viega for PEX compatibility issues. Some foams may cause damage to the PEX.

For help, contact Technical Services, 1-877-843-4262 ext. 350.



Climate Trak - Creating a Material List

Chart is intended for conceptual purposes in developing an initial material list; you may use LoopCAD to create a final material list.

Products			Net Heated Area (ft^2)	Multiplier	Estimated Amount
Distribution System Tubing	Viega Barrier PEX, ⅜" or ½"	6" Spacing		2.2	
		8" Spacing		1.7	
		9" Spacing		1.5	
		12" Spacing		1.1	
		16" Spacing		0.85	
		18" Spacing		0.75	
Fasteners				4.6	
Groove Tube Silicone (for heat transfer plates only)				0.02	
Climate Traks	6" Spacing	4" Plate		0.47	
		8" Plate		0.23	
	8" Spacing	4" Plate		0.35	
		8" Plate		0.18	
	9" Spacing	4" Plate		0.31	
		8" Plate		0.16	
	12" Spacing	4" Plate		0.23	
		8" Plate		0.12	
	16" Spacing	4" Plate		0.18	
		8" Plate		0.09	
	18" Spacing	4" Plate		0.16	
		8" Plate		0.08	
Heat Transfer Plates	6" Spacing			0.93	
	8" Spacing			0.70	
	9" Spacing			0.62	
	12" Spacing			0.47	
	16" Spacing			0.35	
	18" Spacing			0.31	

Notes: Tubing is sold in coils and fasteners in packages. Where multipliers are located in the table, multiply the net heated area by the corresponding multiplier to derive the estimated amount. Use the Maximum Circuit Length Table to calculate the number of circuits required for the net heated area. Tubing multipliers include 10% overage for leaders.

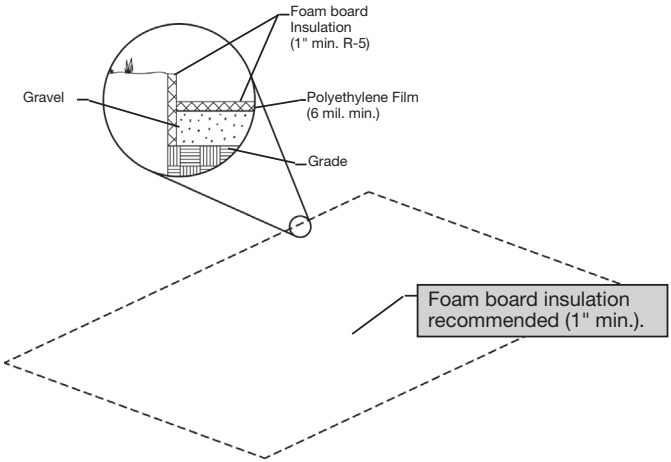
Maximum Circuit Length		
Tubing Diameter	≤25 Btu/ft^2	26-35 Btu/ft^2
⅜"	300	250
½"	400	350

Snow Melt

Site Preparation

- Compact the sub-base where necessary.
- Final grade should be accurately leveled. It should be covered with a polyethylene film.
- Install vapor barrier if specified (6 mil. minimum). This step is not recommended for paver or other porous surface applications.
- When using foam board to insulate under slabs, weigh down the boards to prevent wind uplift. In some jobs this can be done by installing wire mesh as soon as foam boards are placed.
- Install minimum R-5 insulation rated for required compressive strength and moisture resistance. Check local codes for additional requirements.

Cross section of insulation under concrete slab with snow melt



- Install wire mesh, re-bar or other slab reinforcement where specified.
- Depending on the slab design and construction schedule, it is generally easier to sequence the installation of slab reinforcement after the Snow Melt System.
- Remove any unintentional obstructions and construction waste.
- Make sure all tools and materials are on site and arranged neatly.
- Use tubing cutters for even, square cuts.
- If a bronze PEX Press coupling will be installed and encased in a thermal mass, it must be completely covered with Viega's coupling repair tape.
- Cover tubing with a protection sleeve when it is close to sharp objects.

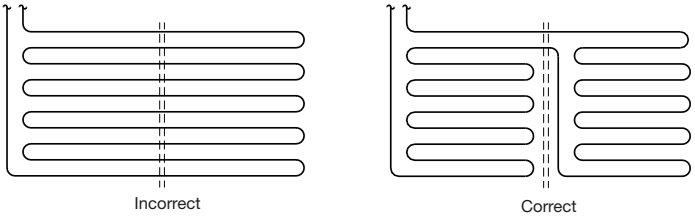
Planning and Installation

Before starting the installation, ensure that the following tools and materials are on site to help the process go smoothly:

- Tubing cutters and Viega PEX Press tool
- Viega PEX Press couplings
- Extra mounting strips and clips
- Repair tape to wrap repair PEX Press couplings in-slab
- Fasteners for securing leaders near manifolds
- Tools for installing fasteners
- Air compressor for pressure testing
- Bend support to support slab penetration sleeve

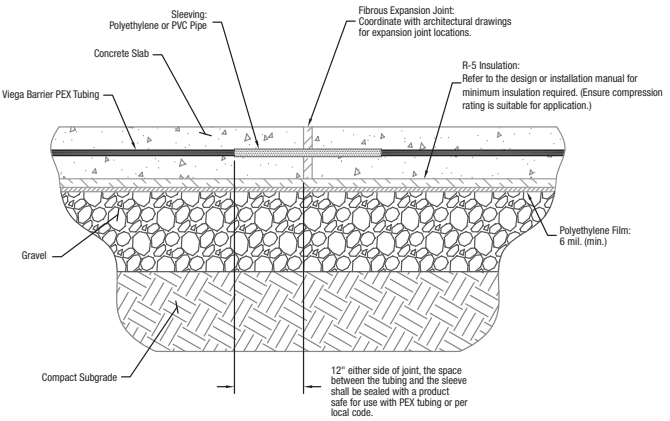
- Keep tubing at least 4" (10cm) from the edge of slabs, walls or other permanent objects.
- Label tubing and record actual circuit lengths as it is installed.
- If there are areas with high pipe concentrations, insulate pipes if the thickness of the thermal mass can accommodate the buildup.
- The slab should not be heated until curing is complete.
- Minimize penetration of expansion joints in concrete.

Minimize Penetration of Joints

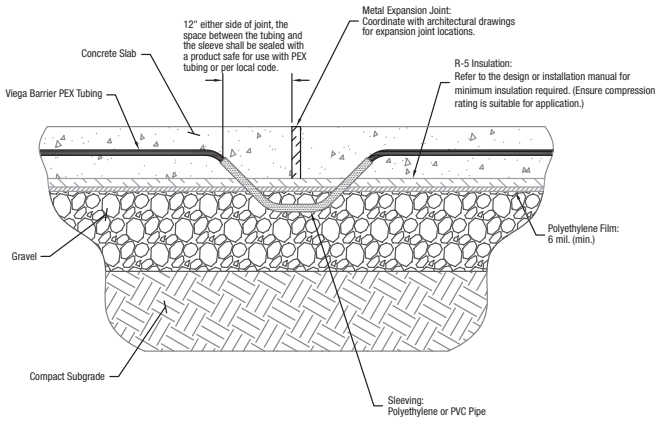


- Any tubing that passes through concrete expansion joints must be protected with a protection sleeve for a minimum of 12" (15cm) on both sides of the joint. Cross-sections of sleeving at expansion joints are provided below.

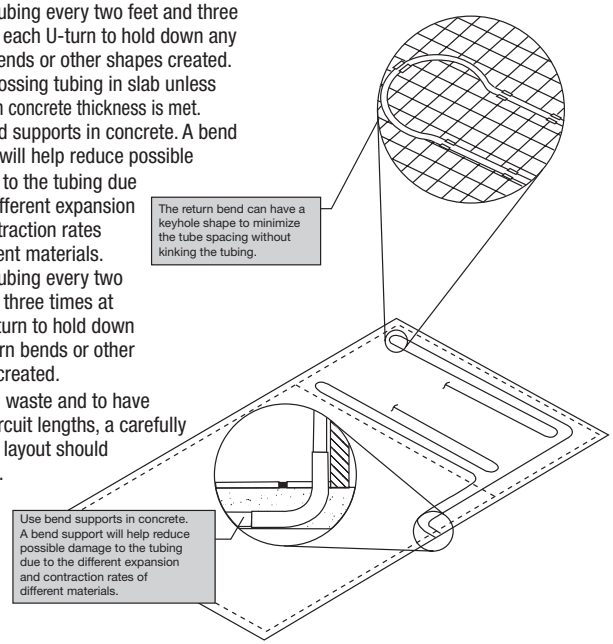
Section through Fibrous Expansion Joint (typical)



Section through Metal Expansion Joint (typical)



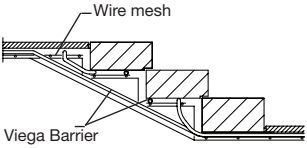
- The return bend can have a keyhole shape to minimize the tubing spacing without kinking the tubing.
- Fasten tubing every two feet and three times at each U-turn to hold down any return bends or other shapes created.
- Avoid crossing tubing in slab unless minimum concrete thickness is met.
- Use bend supports in concrete. A bend support will help reduce possible damage to the tubing due to the different expansion and contraction rates of different materials. Fasten tubing every two feet and three times at each U-turn to hold down any return bends or other shapes created.
- To avoid waste and to have equal circuit lengths, a carefully planned layout should be done.

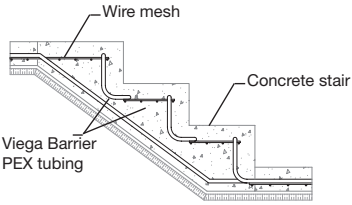


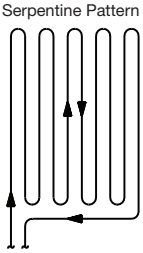
Installing the Tubing

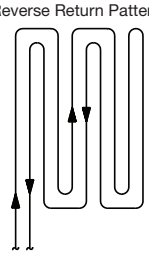
Special considerations for stairs and grades are given below.

Section through Stairs (side / plan view)



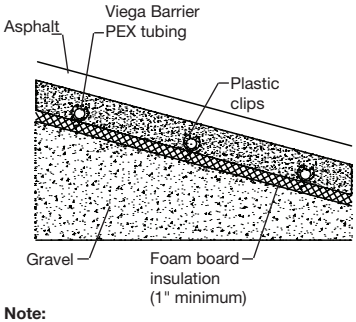




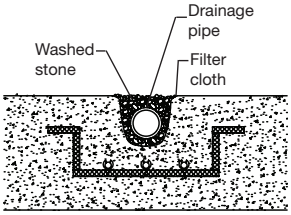


Note:
Reverse return pattern recommended for Level III applications.

Section through Asphalt Slope and Drainage



Note:
Appropriate surface drainage is necessary for snow melting systems.



Note:
Drainage pipe should be heated as shown or be installed below the frost line.

Snow Melt - Material List

- **Calculate the net snow melted area.**
- **Use charts to make an initial materials list for the net area to be heated.**

NOTE: Estimate does not include controls.

Snow Melt System Tubing Estimator

Viega Barrier PEX Tubing	Net Heated Area	Multiplier	Estimated Amount
6" Spacing		2.2	
9" Spacing		1.5	
12" Spacing		1.1	

Various Fasteners Available

- **Plastic Clip for Foam Board**
- **Wire Mesh Clip**
- **Zip Ties**
- **Foam Staples**

NOTE: Fasten tubing every two feet and three times at each U-turn bend.

Snow Melt System Material List Estimator

Fasteners	Net Heated Area	Multiplier	Estimated Amount
6" Spacing		1.1	
9" Spacing		0.75	
12" Spacing		0.55	

Calculating number of circuits:

Calculating number of circuits:
Total amount of tubing ÷ maximum circuit length
= # of circuits

Tubing Size	Max. Circuit Length (ft)
⅝"	200
¾"	300

Pressure Testing

The radiant or snow melt system must be tested before, during and after the concrete pour, and before the flooring finishes are applied. Air or water may be used as the test medium. The following procedure is recommended by Viega. Check the local building codes for compliance or additional test requirements.

- Do not use water as a test medium in situations where it may freeze.
- Check that all manifold connections are tight and properly sealed.
- Make sure all valves are in the open position to test the integrity of the entire system.
- Connect manifold pressurization kit (part # 21210) to the manifold(s).
- Pressurize the system to not less than 100 psi or 1.5 times the working pressure.
- After initial pressurization, ensure pressure has not dropped after 20 minutes. Fluctuations may occur due to temperature fluctuations and tubing expansion. If a drop has occurred add pressure to the system.
- Carry out test for a minimum of one hour.
- For leak detection, original Palmolive dishwashing soap may be used. (Use ratio of two oz. soap to one gal. water).
- Pressure must be maintained during the pour and floor covering installation.
- Once system is deemed leak-free the concrete pour and/or flooring finishes may be applied.

Pressure Drop

Example

Determining the pressure drop in a system using a glycol solution is achieved in the same manner as for a 100% water system, except that different pressure drop charts must be used based on the % glycol solution. Pressure drop tables for piping using glycol solution are provided below. Also, don't forget to account for the pressure drop from accessories. Once the pressure drop and design flow rate are known, selecting a circulator involves the same steps as for a 100% water system.

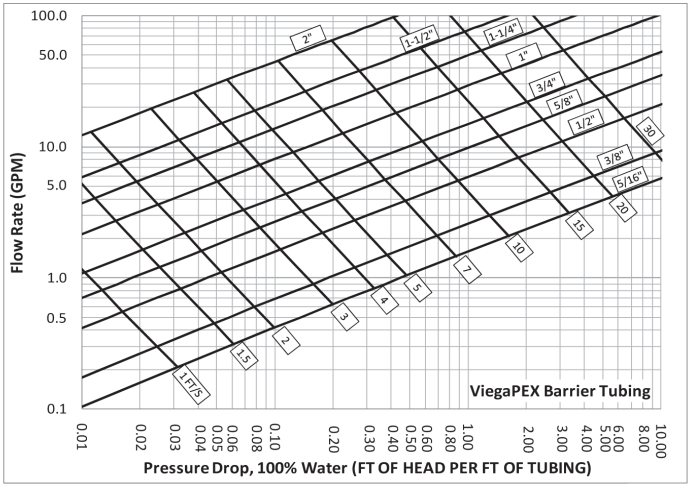
Maximum Circuit Length		
Tubing	**≥25 Btu/h/ft.²**	**≤25 Btu/h/ft.²**
5/16"	200'**	250'
3/8"	250'**	300'
1/2"	350'**	400'
5/8"	450'**	500'
3/4"	750'**	800'

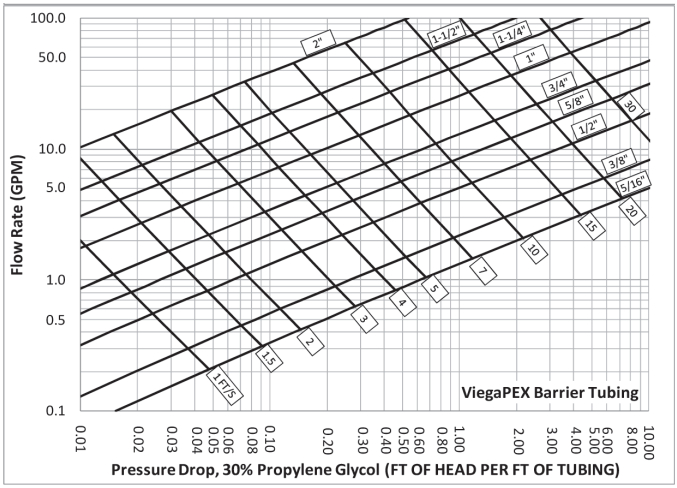
** Maximum Btu/h/ft.²: 25-35 Btu/h/ft.²

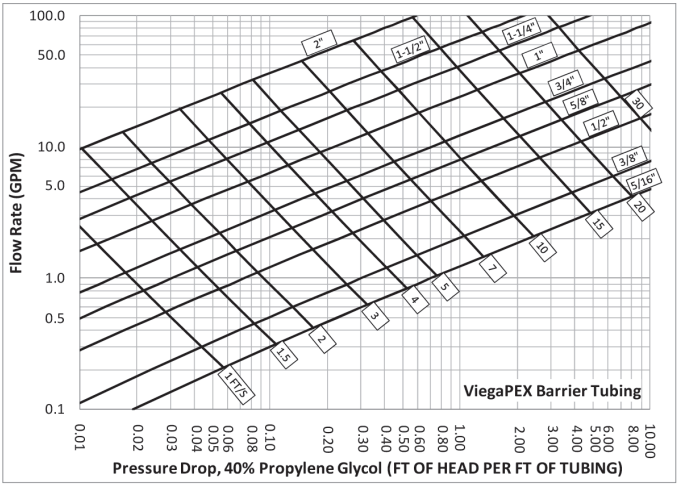
Determine the pressure drop associated with 200 feet of ½" tubing at a maximum flow rate of one gpm:

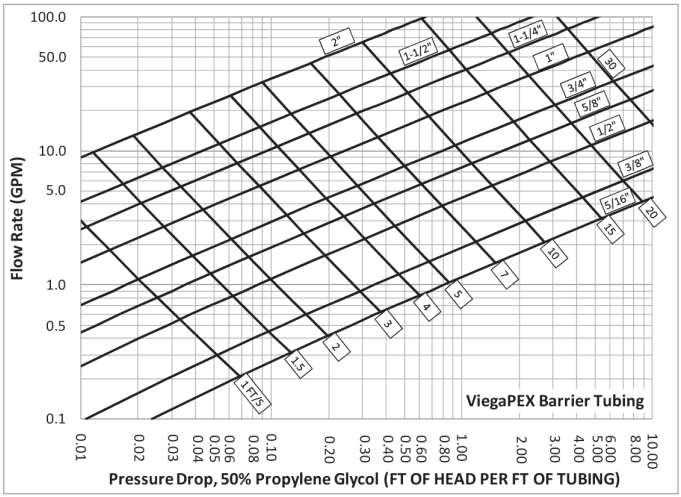
- Locate desired one gpm flow rate for the tubing on the left vertical axis.
- Follow to the right until you reach the diagonal line corresponding to ½" tubing.
- Move down to the horizontal axis and read the pressure drop in feet of head per foot of tubing (~0.05 feet of head per foot of tubing).
- Multiply the pressure drop per foot by the length of tubing to find the feet of head for the circuit (0.05*200=10 feet of head).

Account for all valves, fittings, heating source and other piping accessories (expansion tanks, air separators, etc.) when sizing circulator.


Flow Rate (GPM)
100.0
50.0
10.0
5.0
1.0
0.5
0.1
2"
1-1/2"
1-1/4"
1"
3/4"
5/8"
1/2"
3/8"
5/16"
30
20
15
10
7
5
4
3
2
1.5
1 FT/S
ViegaPEX Barrier Tubing
0.01
0.02
0.03
0.04
0.05
0.06
0.08
0.10
0.20
0.30
0.40
0.50
0.60
0.80
1.00
2.00
3.00
4.00
5.00
6.00
8.00
10.00
Pressure Drop, 100% Water (FT OF HEAD PER FT OF TUBING)


Flow Rate (GPM)
100.0
50.0
10.0
5.0
1.0
0.5
0.1
2"
1-1/2"
1-1/4"
1"
3/4"
5/8"
1/2"
3/8"
5/16"
30
20
15
10
7
5
4
3
2
1.5
1 FT/S
ViegaPEX Barrier Tubing
0.01
0.02
0.03
0.04
0.05
0.06
0.08
0.10
0.20
0.30
0.40
0.50
0.60
0.80
1.00
2.00
3.00
4.00
5.00
6.00
8.00
10.00
Pressure Drop, 30% Propylene Glycol (FT OF HEAD PER FT OF TUBING)


Flow Rate (GPM)
100.0
50.0
10.0
5.0
1.0
0.5
0.1
2"
1-1/2"
1-1/4"
1"
3/4"
5/8"
1/2"
3/8"
5/16"
30
20
15
10
7
5
4
3
2
1.5
1 FT/S
ViegaPEX Barrier Tubing
0.01
0.02
0.03
0.04
0.05
0.06
0.08
0.10
0.20
0.30
0.40
0.50
0.60
0.80
1.00
2.00
3.00
4.00
5.00
6.00
8.00
10.00
Pressure Drop, 40% Propylene Glycol (FT OF HEAD PER FT OF TUBING)


Flow Rate (GPM)
100.0
50.0
10.0
5.0
1.0
0.5
0.1
2"
1-1/2"
1-1/4"
1"
3/4"
5/8"
1/2"
3/8"
5/16"
30
20
15
10
7
5
4
3
2
1.5
1 FT/S
ViegaPEX Barrier Tubing
0.01
0.02
0.03
0.04
0.05
0.06
0.08
0.10
0.20
0.30
0.40
0.50
0.60
0.80
1.00
2.00
3.00
4.00
5.00
6.00
8.00
10.00
Pressure Drop, 50% Propylene Glycol (FT OF HEAD PER FT OF TUBING)

Approximate Friction Loss Allowances for Viega PEX Press and Viega ProPress Fittings in Feet of Straight Tube

The tables below express friction loss for Viega fittings as equivalent lengths of tube, in feet. For example, a ¾" ProPress 90° elbow would impose the same friction as one foot of ¾" copper tube.

Viega PEX Press Bronze Fittings (Equivalent Length of PEX Tubing in Feet)				
Size	**Coupling**	**90° Elbow**	**Tee Run**	**Tee Branch**
5/16"	5.9	-	-	-
⅜"	2.9	9.2	2.9	9.4
½"	2	9.4	2.2	10.4
⅝"	2.3	7.4	-	-
¾"	1	8	1	9
1"	1	10	2	10
1¼"	2	11	2	11
1½"	2	13	2	12
2"	1	19	2	18

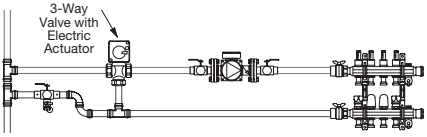
Viega PEX Press Polymer Fittings (Equivalent Length of PEX Tubing in Feet)				
Size	**Coupling**	**90° Elbow**	**Tee Run**	**Tee Branch**
⅜"	4.5	14.3	6.5	14.7
½"	2.6	12.6	3.9	14.0
¾"	2.1	12.5	3.1	14.0
1"	2.5	14.5	3.5	16.0
1¼"	3.1	17.5	4.0	18.4
1½"	3.7	22.4	5.3	25.1
2"	5.8	32.6	8.0	33.2

Viega ProPress Copper Fittings (Equivalent Length of Copper Tubing in Feet)				
Size	**90° Elbow**	**45° Elbow**	**Tee Run**	**Tee Branch**
½"	½	½	½	1
¾"	1	½	½	2
1"	1	1	½	3
1¼"	2	1	½	4
1½"	2	2	1	5
2"	2	2	1	7
2½"	2	3	2	9
3"	3	4	-	-
4"	-	-	-	-

Valve Sizing Chart

Mixing Valve – A mixing valve is controlled by an electronic actuator that receives a signal from a reset control.

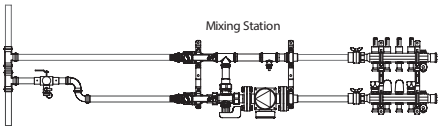
This control varies the temperature being supplied to the manifold by adjusting the amount of hot supply or cold return water that is permitted to flow through the valve.



3-Way Mixing Valve						
Cv	**Dimension**	**Part No.**	**Flow (GPM)**	**Heat Capacity (BTU/h)**	**Pressure Drop (psi)**	**Pressure Drop (ft of Hd)**
4.7	¾"	20080	5	50,000	1.1	2.6
			7	70,000	2.2	5.0
11.7	1"	20081	12	120,000	1.0	2.4
			17	170,000	2.1	4.8
18.7	1¼"	20082	19	190,000	1.0	2.3
			24	240,000	1.6	3.7
29.3	1½"	20083	29	290,000	1.0	2.2
			38	380,000	1.7	3.8
46.8	2"	20084	47	468,000	1.0	2.3
			65	650,000	1.9	4.4

Note: Heat capacity is based on using water at a ΔT of 20°F. The fluid used to calculate the pressure drop across the valve is water at 100°F.

Diverting Valve – A diverting valve is controlled by an electronic actuator that receives a signal from a reset control. This control varies the temperature being supplied to the manifold by adjusting the volume of return water being diverted back into the supply stream.

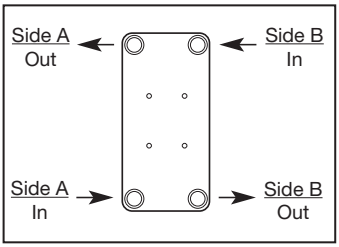


Diverting Valve						
Cv	**Dimension**	**Part No.**	**Flow (GPM)**	**Heat Capacity (BTU/h)**	**Pressure Drop (psi)**	**Pressure Drop (ft of Hd)**
5.3	¾"	20001	5	50,000	0.9	2.04
			6	60,000	1.3	2.94
7.6	1"	20002	7	70,000	0.8	1.95
			9	90,000	1.4	3.22
11.1	1¼"	20003	10	100,000	0.8	1.86
			12	120,000	1.2	2.68
11.1	1½"	20041	13	130,000	1.4	3.15
			14	140,000	1.6	3.65

Note: Heat capacity is based on using water at a ΔT of 20°F. The fluid used to calculate the pressure drop across the valve is water at 100°F.

Heat Exchanger Information

- Heat exchangers can be used in radiant and snow melt applications.
- Heat exchangers can be installed vertically or horizontally.
- A water strainer must be installed on the inlet connection (20 - 40 mesh recommended) to the Heat Exchanger.
- Water quality should be pH 6.5 - 8.
- Heat exchangers should be piped in a counterflow arrangement.
- Ethylene or propylene glycol can be used with heat exchangers. (Glycol should be tested annually.)
- Heat exchangers using glycol should not exceed temperatures of 285°F on the inlet side of the exchanger. (On the source side do NOT exceed maximum recommendations of the PEX you are using.)
- To properly size a heat exchanger, determine the total BTU/h load/demand from the system and compare that with the table below.



For snow melt system, 100°F in - 130°F out (40% Propylene Glycol) Connected to boiler, 180°F in - 150°F out						
Part Number	Description	BTU/h	Boiler		Snow Melt Circuit	
			Flow (GPM)	Pressure Drop (psi)	GPM	Pressure Drop (psi)
22006	5x12,16	125,000	8.6	2.9	9.0	3.1
22007	5x12, 36	250,000	17.2	2.2	18.0	2.7
22008	5x12, 70	500,000	34.4	2.8	36.1	3.6

Note: For 200°F boiler water, use the above chart.

Circulator Sizing

To select the correct circulator for the system, the flow and pressure drop must be calculated.

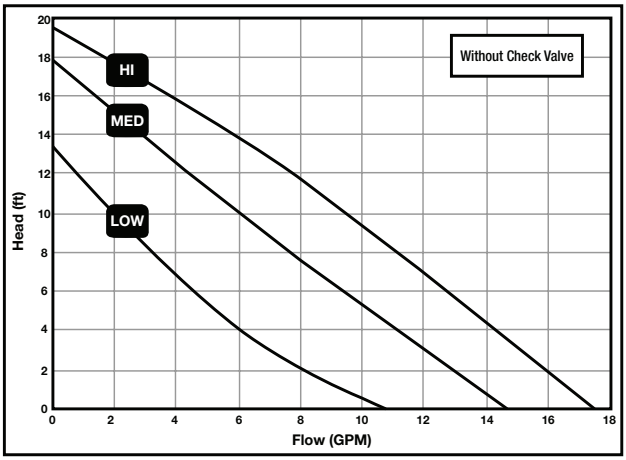
- Calculate desired flow rate being supplied by the circulator.
  $GPM_{water} = BTU/h(500x\Delta t)$
  $GPM_{30\%\ glycol} = BTU/h(480x\Delta t)$
  $GPM_{40\%\ glycol} = BTU/h(465x\Delta t)$
  $GPM_{50\%\ glycol} = BTU/h(450x\Delta t)$
- Locate the pressure drop on the left vertical axis.
- Locate the total system flow rate on the bottom horizontal axis.
- Follow to the intersection of both variables.
- Select a pump with a curve just higher than this intersection. If there are multiple pumps with curves higher than this point, then consider selecting the pump with the lowest watts for the best energy performance.

Example

A system design calls for a circulator that can move five gallons per minute at a pressure drop of 10 feet of head. Identify a Viega circulator that will satisfy this application.

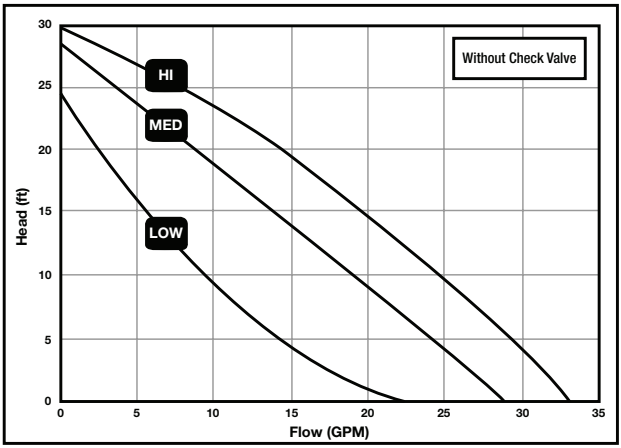
- On the pump curve for model 12126, identify the intersection of 10 feet of head on the vertical axis and five gpm on the horizontal axis. This point is below the medium speed curve, which has a power consumption of 80 watts.
- On the pump curve for model 12127, identify the intersection of 10 feet of head on the vertical axis and five gpm on the horizontal axis. This point is below the low speed curve, which has a power consumption of 150 watts.
- Select model 12126, which will satisfy the design objectives and save 70 watts during its operation.

Low Head



Part Number	SPEED	AMPS	WATTS	HP
12126	HI	0.75	87	1/25
	MED	0.66	80	1/25
	LOW	0.55	60	1/25

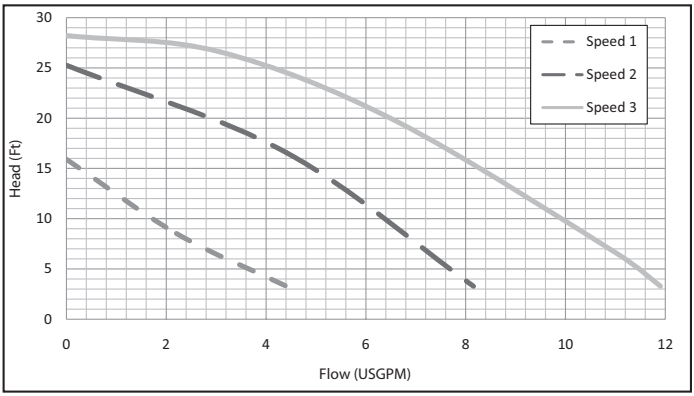
High Head



Part Number	SPEED	AMPS	WATTS	HP
12127	HI	1.8	197	1/6
	MED	1.5	179	1/6
	LOW	1.3	150	1/6

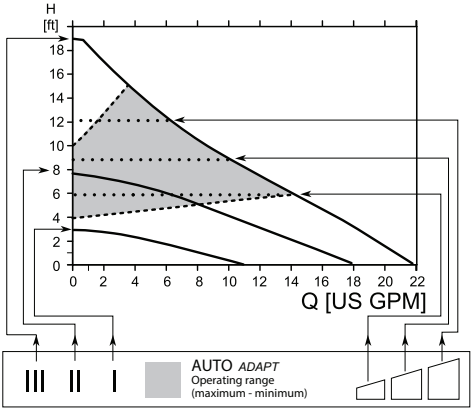
Note: This pump is used in Viega's mixing stations

Hydronic mixing block pump curve



Enhanced Mixing Station

Performance* and Operation Mode Selection



*Hydraulic performance without check valve

Performance and Operation Mode Selection

Pos.	Description
	• **Push-button for selection of pump setting** • **Every time the push-button is pressed, the circulator setting is changed**
III	**High Fixed Speed** • Runs at a constant speed and consequently on a constant curve. In Speed III, the pump is set on the maximum curve under all operating conditions. Quick vent of the pump can be obtained by setting the pump to Speed III for a short period.
II	**Medium Fixed Speed** • Runs at a constant speed and consequently on a constant curve. In Speed II, the pump is set on the medium curve under all operating conditions.
I	**Low Fixed Speed** • Runs at a constant speed and consequently on a constant curve. In Speed I, the pump is set on the minimum curve under all operating conditions.
	Constant Pressure I • The duty point of the pump will move left and right along the lowest constant-pressure curve depending on water demand in the system. The pump head (pressure) is kept constant, irrespective of the water demand.
	Constant Pressure II • The duty point of the pump will move left and right along the middle constant-pressure curve depending on water demand in the system. The pump head (pressure) is kept constant, irrespective of the water demand.
	Constant Pressure III • The duty point of the pump will move left and right along the highest constant-pressure curve depending on water demand in the system. The pump head (pressure) is kept constant, irrespective of the water demand.
AUTO ADAPT	**AutoADAPT (Factory Setting)** • This function controls the pump performance automatically within the defined performance range (shaded area). AutoADAPT will adjust the pump performance to system demands over time.

Approximate Power Usage:

Speed Setting		Min.	Max.
High fixed speed	III	39W	45W
Medium fixed speed	II	15W	30W
Low fixed speed	I	5W	8W
Constant pressure		8W	45W
Constant pressure		14W	45W
Constant pressure		22W	45W
AutoADAPT	AUTO ADAPT	5W	45W

Selecting the Percent Glycol Mixture

- Use table to determine the percent glycol solution necessary based on the freezing point of the solution as a function of the percent glycol by volume.

Glycol (% by volume)	0%	10%	20%	30%	40%	50%
Ethylene	32	25	16	3	-12	-35
Propylene	32	26	18	8	-7	-28

Freezing point (°F) of glycol solutions, based on type and percent by volume.

- The chart below can be used to figure volume per foot of tube for glycol considerations.

SDR-9 PEX Tubing ASTM F876/F877/CTS-OD SDR-9					
Tubing Size	O.D.	Wall Thickness	Nom. I.D.	Weight Per Ft.	Vol. (gal.)/ 100 Ft.
5/16"	.430±.003	.064+.010	0.292	.0340	0.34
3/8"	.500±.003	.070+.010	0.350	.0413	0.50
1/2"	.625±.004	.070+.010	0.475	.0535	0.92
5/8"	.750±.004	.083+.010	0.574	.0752	1.34
3/4"	.875±.004	.097+.010	0.671	.1023	1.82
1"	1.125±.005	.125+.010	0.862	.1689	3.04
1 1/4"	1.375±.005	.153+.015	1.053	.2523	4.52
1 1/2"	1.625±.006	.181+.019	1.243	.3536	6.30
2"	2.125±.006	.236+.024	1.629	.6026	10.83

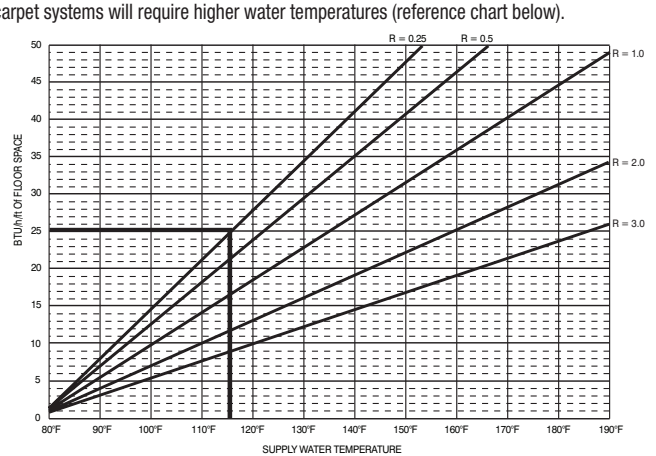
Note: Dimensions are in English units. Tolerances are ASTM requirements. Viega PEX is manufactured within these specifications.

Viega Barrier PEX tubing is available in both straight lengths and coils.

Dimensions and Physical Characteristics of Copper Tube: TYPE M								
Nominal or Standard Size, inches	Nominal Dimensions, inches			Calculated Values (based on nominal dimensions)				
	Outside Diameter	Inside Diameter	Wall Thickness	Cross Sectional Area of Bore, sq. inches	Weight of Tube Only, pounds per linear ft.	Weight of Tube & Water, pounds per linear ft.	Contents of Tube per linear ft.	
							Cu ft.	Gal.
⅜"	.500	.450	.025	.159	.145	.214	.00110	.00826
½"	.625	.569	.028	.254	.204	.314	.00176	.0132
¾"	.875	.811	.032	.517	.328	.551	.00359	.0269
1"	1.125	1.055	.035	.874	.465	.843	.00607	.0454
1¼"	1.375	1.291	.042	1.31	.682	1.25	.00910	.0681
1½"	1.625	1.527	.049	1.83	.940	1.73	.0127	.0951
2"	2.125	2.009	.058	3.17	1.46	2.83	.0220	.165
2½"	2.625	2.495	.065	4.89	2.03	4.14	.0340	.254
3"	3.125	2.981	.072	6.98	2.68	5.70	.0485	.363
3½"	3.625	3.459	.08	9.40	3.58	7.64	.0653	.488
4"	4.125	3.935	.095	12.2	4.66	9.83	.0847	.634
5"	5.125	4.907	.109	18.9	6.66	14.8	.131	.982
6"	6.125	5.881	.122	27.2	8.92	20.7	.189	1.41
8"	8.125	7.785	.170	47.6	16.5	37.1	.331	2.47
10"	10.125	9.701	.212	73.9	25.6	57.5	.513	3.84
12"	12.125	11.617	.254	106	36.7	82.5	.736	5.51

Floor Coverings

- There are many types of finished flooring materials used in construction, though the four most popular types include: wood floors, tile, vinyl and carpet.
- When picking a finished floor material, the lower the R-value the more efficient the system. This is due to reduced water temperatures.
- Typically, based on their R-values, tile and wood floors will require lower water temperatures; carpet systems will require higher water temperatures (reference chart below).



Note: Chart above is for 4" slab with ½" barrier tubing with R-5 insulation.

- The chart below references some of the most common floor coverings with their R-values listed.

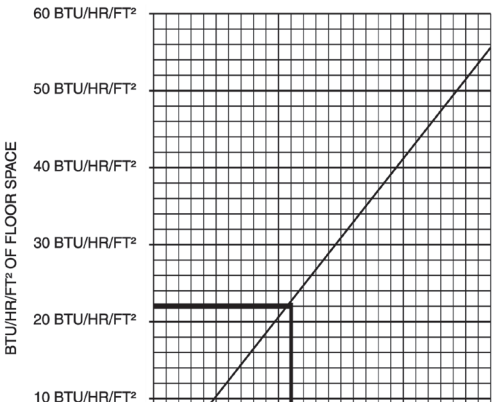
R-Value Table Floor Coverings								
	1/8"	1/4"	3/8"	1/2"	5/8"	3/4"	7/8"	1"
Building Board								
Gypsum or Plaster Board	0.11	0.23	0.32	0.45	0.56	0.68	0.79	0.90
Plywood	0.16	0.31	0.47	0.62	0.77	0.93	1.09	1.24
Particleboard, low density	0.18	0.35	0.53	0.71	0.88	1.06	1.23	1.41
Particleboard, medium density	0.13	0.27	0.40	0.53	0.66	0.80	0.93	1.06
Particleboard, high density	0.11	0.21	0.32	0.43	0.53	0.64	0.74	0.85
Waferboard	0.20	0.40	0.60	0.80	0.99	1.19	1.39	1.59
Wood Subfloor	0.16	0.31	0.47	0.62	0.78	0.93	1.09	1.24
Cement Board	0.03	0.06	0.09	0.12	0.15	0.18	0.21	0.24
Tile								
Ceramic Tile	0.02	0.03	0.05	0.07	0.08	0.10	0.12	0.13
Marble	0.01	0.01	0.02	0.03	0.03	0.04	0.04	0.05
Granite	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08
Slate	0.01	0.03	0.04	0.05	0.06	0.08	0.09	0.10
Linoleum or Vinyl	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40
Rubber, hard	0.12	0.24	0.36	0.48	0.60	0.72	0.84	0.96
Cork Tile	0.28	0.56	0.84	1.12	1.40	1.68	1.96	2.24
Carpet Pad								
Waffled Sponge Rubber	0.20	0.41	0.61	0.81	1.01	1.22	1.42	1.62
Synthetic Jute	0.43	0.86	1.28	1.71	2.14	2.57	2.99	3.42
Bonded Urethane, 4 lb. density	0.52	1.05	1.57	2.09	2.61	3.14	3.66	4.18
Bonded Urethane, 8 lb. density	0.55	1.10	1.65	2.20	2.75	3.30	3.85	4.40
Prime Urethane, 2.2 lb. density	0.54	1.08	1.61	2.15	2.69	3.23	3.76	4.30
Carpet								
Acrylic Level Loop	0.52	1.04	1.56	2.08	2.60	3.12	3.64	4.16
Acrylic Level Loop w/Foam Back	0.51	1.02	1.53	2.04	2.55	3.06	3.57	4.08
Acrylic Plush	0.43	0.86	1.29	1.72	2.15	2.58	3.01	3.44
Polyester Plush	0.48	0.96	1.44	1.92	2.40	2.88	3.36	3.84
Nylon Level Loop	0.68	1.36	2.04	2.72	3.40	4.08	4.76	5.44
Nylon Plush	0.26	0.52	0.78	1.04	1.30	1.56	1.82	2.08
Nylon Shag	0.27	0.54	0.81	1.08	1.35	1.62	1.89	2.16
Nylon Saxony	0.44	0.88	1.32	1.76	2.20	2.64	3.08	3.52
Wool Plush	0.55	1.10	1.65	2.20	2.75	3.30	3.85	4.40
Hardwood								
Ash	0.15	0.30	0.45	0.60	0.75	0.90	1.05	1.20
Beech	0.12	0.24	0.36	0.48	0.60	0.72	0.84	0.96
Cherry	0.15	0.30	0.45	0.60	0.75	0.90	1.05	1.20
Elm	0.14	0.28	0.42	0.56	0.70	0.84	0.98	1.12
Maple	0.13	0.26	0.39	0.52	0.65	0.78	0.91	1.04
Oak	0.15	0.30	0.45	0.60	0.75	0.90	1.05	1.20
Cedar	0.23	0.46	0.69	0.92	1.15	1.38	1.61	1.84
Fir	0.15	0.30	0.45	0.60	0.75	0.90	1.05	1.20
Hemlock	0.18	0.36	0.54	0.72	0.90	1.08	1.26	1.44
Pine	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60
Redwood	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60
Spruce	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60
Engineered Flooring								
Laminated Parquet Flooring	0.11	0.23	0.34	0.45	0.57	0.68	0.79	0.91

Floor Coverings

- Another aspect to keep in mind when dealing with floor coverings is the floor surface temperature.
- The floor surface temperature should never exceed 85°F because the floor can be uncomfortable to the touch and/or potential flooring damage can occur.
- Please reference the chart below for calculating surface temperatures.

Procedure	Example
• Locate desired output (from LoopCAD or other source) on left vertical axis. • Follow to the right until you reach the curve. • Then move down to the horizontal axis and read the ΔT between the room temperature and the floor surface temperature. • Add the room temperature and the ΔT to get the floor surface temperature.	• Output needed: 25 BTU/h/ft.^{2} • Room temperature: 68°F • Temperature ΔT (from chart): ~ 12°F • Floor surface temperature: 68°F + 12°F = 80°F • The floor surface temperature will be 80°F with 25 BTU/h/ft.^{2} output and 68°F room temperature.

Floor Surface Temperature Chart

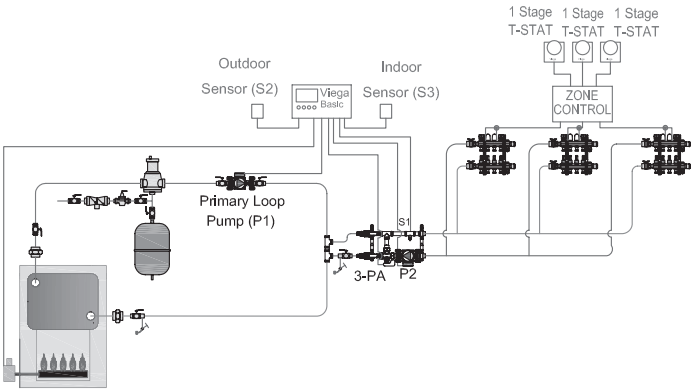


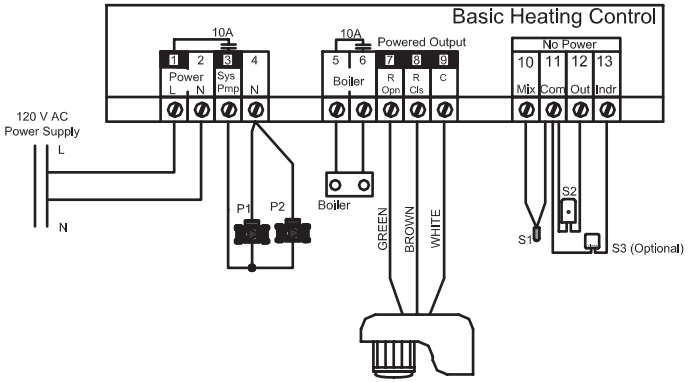
**For more information on installation, refer to:

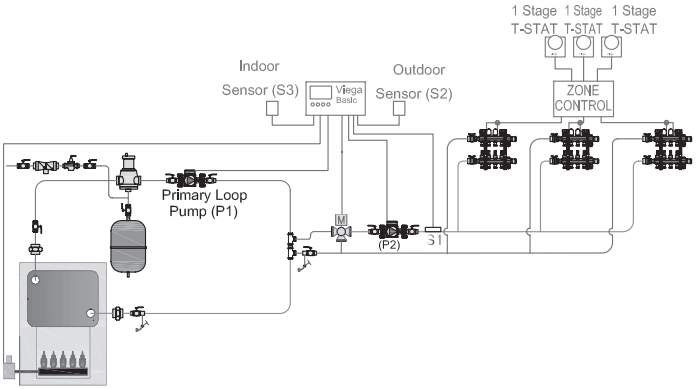
- The flooring manufacturer and one of the following resources for installation guidance:
  - Standard Guidelines for the Design and Installation of Residential Radiant Panel Heating Systems. The Radiant Panel Association.
  - TCA Handbook for Ceramic Tile Installation. The Tile Council of North America.
  - The Marble Institute of America.
  - www.concretenetwork.com

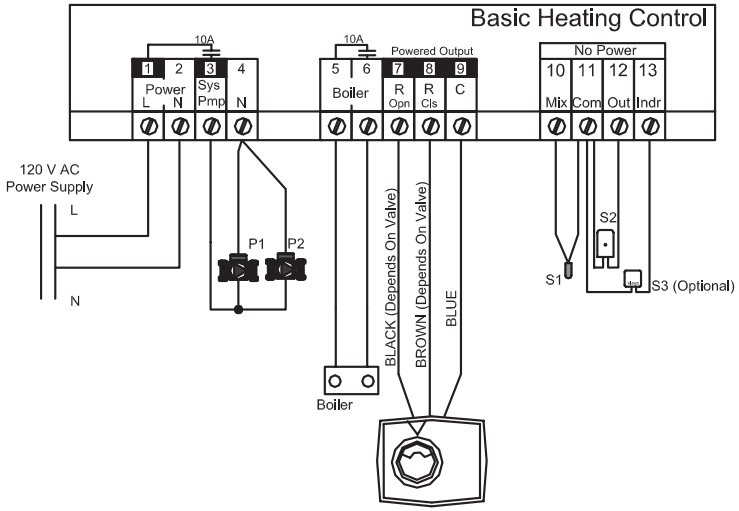
Controls

Basic Heating Control

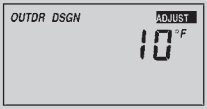
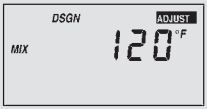
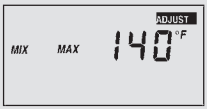





1 Stage T-STAT
1 Stage T-STAT
1 Stage T-STAT
ZONE CONTROL
Indoor Sensor (S3)
Outdoor Sensor (S2)
Viega Basic
Primary Loop Pump (P1)
(P2)
S1


Basic Heating Control
10A
10A
Powered Output
No Power
1 2 3 4
Power L N
Sys Pmp N
5 6 7 8 9
Boiler
R Opn
R Cls
C
10 11 12 13
Mix Com Out Indr
120 V AC Power Supply
L
N
P1
P2
BLACK (Depends On Valve)
BROWN (Depends On Valve)
BLUE
Boiler
S1
S2
S3 (Optional)

Settings for Basic Heating Control

Symptom	Cause	User Settings
	**ROOM** The desired room temperature.	
	**OUTDR DSGN** The design outdoor temperature used for calculating heat loss. Obtained from the Design Outdoor Temperature Chart, or Viega's LoopCAD Software*.	
	**MIX DSGN** The design supply water temperature obtained from the Supply Water Temperature / BTU Output Chart, or Viega's LoopCAD software.	
	**MIX INDR** The design indoor air temperature used in the heat loss calculation* for the heating system (only visible with the Advanced/Installer DIP switch set to Advanced). Should be equal to "ROOM," the desired room temperature.	
	**MIX MAX** The maximum supply temperature for the mixing system (only visible with the Advanced/Installer DIP switch set to Advanced). This setting should not be relied upon for a safety high limit.	
	**WWSD** Warm Weather Shutdown; the design outdoor air temperature at which the control operates only in exercising mode (only visible with the Advanced/Installer DIP switch set to Advanced).	
	**UNITS** The units of measure that all of the temperatures are to be displayed in the control (either °F or °C).	

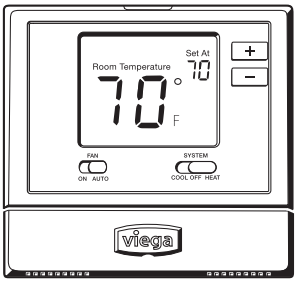
*See corresponding installation manuals, i.e. Concrete System, Climate Panel or Climate Trak, for appropriate charts.

Viega Thermostats

Viega Non-Programmable and Programmable Heat/Cool Thermostat

Part numbers 15116 and 15117

The Viega non-programmable and programmable heat/cool thermostats are easy to install, easy to wire and easy to program. They can be used for single-stage heating and cooling projects.



Part number 15116 pictured

Thermostat Applications Guide

Description	
Gas or Oil Heat	Yes
Electric Furnace	Yes
Heat Pump (No Aux. or Emergency Heat)	Yes
Heat Pump (with Aux. or Emergency Heat)	No
Multi-stage Systems	No
Heat Only Systems	Yes
Cool Only Systems	Yes

Technical Data

The display range of temperature. . . 41°F to 95°F (5°C to 35°C)

The control range of temperature. . . 44°F to 90°F (7°C to 32°C)

Loading Rate . . . . . 1 amp per terminal, 1.5 amp maximum all terminals combined

Wiring Specifications . . . . . Use shielded or non-shielded 18-22 gauge thermostat wire.

Display accuracy. . . . . ±1°F

Swing (cycle rate or differential). . . . Heating is adjustable from 0.2°F to 2.0°F. Cooling is adjustable from 0.2°F to 2.0°F.

Power source . . . . . 18 to 30 VAC, NEC Class II, 50/60 Hz for hardwire (common wire) 3 wire, 3 wire with battery backup, 2 wire with battery, battery power from 2 AA alkaline batteries

Operating ambient . . . . . 32°F to +105°F (0°C to +41°C)

Operating humidity . . . . . 90% non-condensing maximum

Dimensions of thermostat. . . . . 4.7"W x 4.4"H x 0.8"D

Scheduling . . . . . Non-programmable (not available) part number 15116 Programmable 5+1+1, part number 15117

Thermostat Wiring: Part Number 15116 and 15117

1. If you are replacing a thermostat, make note of the terminal connections on the thermostat that is being replaced. In some cases the wiring connections will not be color coded. For example, the green wire may not be connected to the G terminal.
2. Loosen the terminal block screws. Insert wires then re-tighten terminal block screws.

Power Type

- 3 wire
- 3 wire with battery backup
- 2 wire with battery

Terminal Designations

W - Heat relay

Y - Compressor relay

G - Fan relay

O - Heat pump changeover valve energized in cooling

RC - Transformer power for cooling

RH - Transformer power for heating

B - Heat pump changeover valve energized in heating

C - Common wire from secondary side of cooling system transformer

Wiring Tips:

RH & RC terminals

For single transformer systems, leave the jumper wire in place between RH and RC. Remove jumper wire for two transformer systems.

Heat pump systems

If wiring to a heat pump, use a small piece of wire (not supplied) to connect terminals W and Y.

C terminal

The C (common wire) terminal does not have to be connected when the thermostat is powered by batteries.

Wire specifications

Use shielded or non-shielded 18-22 gauge thermostat wire.

Caution: Electrical hazard

Failure to disconnect the power before beginning to install this product can cause electrical shock or equipment damage.

Warning:

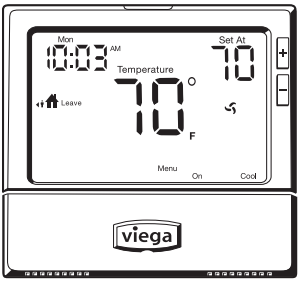
All components of the control system and the thermostat installation must conform to Class II circuits per the NEC Code.

Programmable Thermostat: Part Number 15117

Feature	Filter Change Reminder	Room Temperature Calibration	Minimum Compressor On Time	Compressor Short Cycle Delay	Cooling Swing	Heating Swing
Feature Description	This feature will flash "FILT" in the display after the elapsed run time to remind the user to change the filter. A setting of "off" will disable this feature.	This feature allows the installer to change the calibration of the room temperature display. For example, if the thermostat reads 70° and you would like it to read 72° then select +2.	This feature allows the installer to select the minimum run time for the compressor. For example: A setting of 4 will force the compressor to run for at least 4 minutes every time the compressor turns on, regardless of the room temperature.	The compressor short cycle delay protects the compressor from "short cycling." This feature will not allow the compressor to be turned on for 5 minutes after it was last turned off.	The swing setting, often called "cycle rate," "differential" or "anticipation," is adjustable. A smaller swing setting will cause more frequent cycles and a larger swing setting will cause fewer cycles.	The swing setting, often called "cycle rate," "differential" or "anticipation," is adjustable. A smaller swing setting will cause more frequent cycles and a larger swing setting will cause fewer cycles.
LCD Will Show						
Adjustment Options	You can adjust the filter change reminder from "off" to 2000 hours of runtime in 50-hour increments. Tap the second button from the top left side of the thermostat to display the current filter.	You can adjust the room temperature display to read -4°F to +4°F above or below the factory calibrated reading.	You can select the minimum compressor run time from "off," "3", "4," or "5" minutes. If 3, 4, or 5 is selected, the compressor will run for at least the selected time before turning off.	Selecting "on" will not allow the compressor to be turned on for 5 minutes after the last time the compressor was on. Select "off" to remove this delay.	The cooling swing setting is adjustable from ±0.2°F to ±2°F. For example: A swing setting of 0.5°F will turn the cooling on at approximately 0.5°F above the setpoint and turn the cooling off at approximately 0.5°F below the setpoint.	The heating swing setting is adjustable from ±0.2°F to ±2°F. For example: A swing setting of 0.5°F will turn the heating on at approximately 0.5°F below the setpoint and turn the heating off at approximately 0.5°F above the setpoint.
Factory Default Settings	Off	0°F	Off	On	0.5°F	0.4°F

Viega Multifunctional Heat/Cool Thermostat
Part Number 15118

The Viega multifunctional heat/cool thermostat is easy to install, easy to wire and easy to program. It can be used for three stages of heating and two stages of cooling.



Thermostat Applications Guide

Description	
Gas or Oil Heat	Yes
Electric Furnace	Yes
Heat Pump (No Aux. or Emergency Heat)	Yes
Heat Pump (with Aux. or Emergency Heat)	Yes
Multi-stage Systems	Yes
Heat Only Systems	Yes
Cool Only Systems	Yes

Technical Data

The display range of temperature. . . . . 41°F to 95°F (5°C to 35°C)

The control range of temperature. . . . . 44°F to 90°F (7°C to 32°C)

Loading Rate . . . . . 1 amp per terminal, 1.5 amp maximum all terminals combined

Wiring Specifications . . . . . Use shielded or non-shielded 18-22 gauge thermostat wire.

Display accuracy. . . . . ±1°F

Swing (cycle rate or differential). . . . . Heating is adjustable from 0.2°F to 2.0°F. Cooling is adjustable from 0.2°F to 2.0°F.

Power source . . . . . 18 to 30 VAC, NEC Class II, 50/60 Hz for hardwire (common wire) 3 wire, 3 wire with battery backup, 2 wire with battery, battery power from 2 AA alkaline batteries

Operating ambient . . . . . 32°F to +105°F (0°C to +41°C)

Operating humidity . . . . . 90% non-condensing maximum

Dimensions of thermostat. . . . . 4.7"W x 4.4"H x 1.1"D

Scheduling . . . . . 5+1+1, 7 day, none

Thermostat Wiring: Part Number 15118

1. If you are replacing a thermostat, make note of the terminal connections on the thermostat that is being replaced. In some cases the wiring connections will not be color coded. For example, the green wire may not be connected to the G terminal.
2. Loosen the terminal block screws. Insert wires then retighten terminal block screws.

Power Type

- 3 wire
- 3 wire with battery backup
- 2 wire with battery

Wire Specifications

Use shielded or non-shielded 18-22 gauge thermostat wire.

Wiring Tips

C Terminal

The C (common wire) terminal does not have to be connected when the thermostat is powered by batteries.

NOTE: In systems with no emergency heat relay, a jumper can be installed between E and W2 to turn thermostat into a single-stage control.

Terminal Designations

This thermostat is shipped from the factory to operate a conventional heating and cooling system. See the "heat pump" configuration step to configure the thermostat for heat pump applications.

Terminal	2 Heat 2 Cool Conventional System	2 Heat 2 Cool Heat Pump System	3 Heat 2 Cool Heat Pump System
RC	Transformer power (cooling)	Transformer power (cooling)	Transformer power (cooling)
RH	Transformer power (heating)	Transformer power (heating)	Transformer power (heating)
C	Transformer common	Transformer common	Transformer common
B	Energized in heating	Heat pump changeover valve energized in cooling	Heat pump changeover valve energized in heating
O	Energized in heating	Heat pump changeover valve energized in cooling	Heat pump changeover valve energized in heating
G	Fan relay	Fan relay	Fan relay
W/E	First stage of heat	Emergency heat relay	Emergency heat relay
Y	First stage of cool	First stage of heat & cool	First stage of heat & cool
Y2	Second stage of cool	Second stage of cool	Second stage of cool & second stage of heat
W2	Second stage of heat	Auxiliary heat relay, second stage of heat	Auxilary heat relay, third stage of heat

Warning: All components of the control system and the thermostat installation must conform to Class II circuits per the NEC Code.

Part Number 15118

Technician Setup Steps

Filter Change Reminder	Room Temperature Calibration	Minimum Compressor On Time	Compressor Short Cycle Delay	Cooling Swing	Heating Swing	Keypad Lockout
This feature will flash "FILT" in the display after the elapsed run time to remind the user to change the filter. A setting of "off" will disable this feature.	This feature allows the installer to change the calibration of the room temperature display. For example, if the thermostat reads 70° and you would like it to read 72° then select +2.	This feature allows the installer to select the minimum run time for the compressor. For example: A setting of 4 will force the compressor to run for at least 4 minutes every time the compressor turns on, regardless of the room temperature.	The compressor short cycle delay protects the compressor from "short cycling." This feature will not allow the compressor to be turned on for 5 minutes after it was last turned off.	The swing setting, often called "cycle rate," "differential" or "anticipation," is adjustable. A smaller swing setting will cause more frequent cycles and a larger swing setting will cause fewer cycles.	The swing setting, often called "cycle rate," "differential" or "anticipation," is adjustable. A smaller swing setting will cause more frequent cycles and a larger swing setting will cause fewer cycles.	Keypad lockout allows you to configure the thermostat so that none or some of the keys do not function.
LCD Will Show						
						
Adjustment Options						
You can adjust the filter change reminder from "off" to 2000 hours of runtime in 50-hour increments.	You can adjust the room temperature display to read -4°F to +4°F above or below the factory-calibrated reading.	You can select the minimum compressor run time from "off," "3," "4" or "5" minutes. If 3, 4 or 5 is selected, the compressor will run for at least the selected time before turning off.	Selecting "on" will not allow the compressor to be turned on for 5 minutes after the last time the compressor was on. Select "off" to remove this delay.	The cooling swing setting is adjustable from ±0.2°F to ± 2°F. For example: A swing setting of 0.5°F will turn the cooling on at approximately 0.5°F above the setpoint and turn the cooling off at approximately 0.5°F below the setpoint.	The heating swing setting is adjustable from ±0.2°F to ± 2°F. For example: A swing setting of 0.5°F will turn the heating on at approximately 0.5°F below the setpoint and turn the heating off at approximately 0.5°F above the setpoint.	Pick PA or FU PA = Partial keypad lockout, which locks all the keys except the [+] or [−] keys. FU = Full keypad lockout, which locks out all the keys. Note: Keypad lockout instructions are below.
Factory Default Settings						
Off	0°F	Off	On	0.5°F	0.4°F	PA

NOTE: To lock the keypad, hold down the [+] and [−] keys for 3 seconds. You will see a lock in the display. To unlock the keypad, hold down the [+] and [−] keys for 3 seconds.

Part Number 15118

Technician Setup Steps (continued from the previous page)

Heating Temperature Setpoint Limit	Cooling Temperature Setpoint Limit	°F or °C	12- or 24-Hour Clock	Fan Operation	Morning Recovery	Program Options
This feature allows you to set maximum heat setpoint value. The setpoint temperature cannot be raised above this value.	This feature allows you to set a minimum cool setpoint value. The setpoint temperature cannot be lowered below this value.	This feature allows you to display temperatures in either Fahrenheit or Celsius.	You can select either a 12- or 24-hour clock setting.	Select GAS for systems that control the fan during a call for heat. Select ELEC to have the thermostat control the fan during a call for heat.	This feature turns your system on before the WAKE programming time to ensure the environment is at the WAKE setpoint when the WAKE time period begins. The recovery period will change based on previous days knowledge. For 2 time periods, the system will turn on before the occupied programmable time.	You can configure this thermostat to have a 7-day program, a 5+1+1 program or nonprogrammable.
LCD Will Show						
						
Adjustment Options						
Use the + or − key to select the maximum heat setpoint. Range 44°F - 90°F	Use the + or − key to select the minumum cool setpoint. Range 44°F - 90°F	Select °F for Fahrenheit or °C for Celsius	Use the + or − key to select 12- or 24-hour clock.	GAS or ELEC	Use the + or − key to turn on or off.	Use the + or − key to select 7d for 7 day, 5d for 5+1+1 or 0d for nonprogrammable.
Factory Default Settings						
90°F	44°F	°F	12-Hour Clock	GAS	ON	5d

Part Number 15118

Technician Setup Steps (continued from the previous page)

Time Periods	Display Light	Contractor Call Number	Beep	Heat Pump	Operating Modes Selection	Gas Auxiliary for Heat Pump
You can configure this thermostat to have 2 or 4 programmable time periods per day. 2 time periods is Occupied/ Unoccupied. 4 time periods is Wake, Leave, Return, Sleep.	The display light can be configured to stay on at all times or come on when any key is pressed. NOTE: HARDWIRE ONLY Keeping the display light continually "ON" will greatly reduce battery life.	Allows you to put your phone number in the display. You can choose ON or OFF	When any key is pressed, an audible beep will sound. You can choose ON or OFF	When turned on the thermostat will operate a heat pump. 1. EM. Heat will show as an option in the system switch. 2. Y will be first stage of heat & cool, W/E will be emergency heat relay & W2 will be auxiliary heat relay.	You can configure the system switch for the particular application: Heat - Off - Cool, Heat - Off, Cool - Off, Heat-Off-Cool-Auto NOTE: EM, Heat will show if in heat pump mode.	This option will turn the heat pump off 45 seconds after the auxiliary heat relay turns on. For 2-stage heat applications, the first stage will turn off 45 seconds after the auxiliary stage turns on. For 3-stage heat applications, the first and second stage will turn off 45 seconds after the auxiliary stage turns on.
LCD Will Show						
						
Adjustment Options						
Use the + or − key to select 2 or 4 time periods per day.	OFF configures display light to come on when the light key or any other key is pressed. ON configures the display light to stay on. Use the + or − key to turn on or off.	If selected on, you will see the input screen after pressing next step. Use the + or − key to select the desired number and the FAN or SYSTEM key to move from one character to another. See note below operation.	ON is selected, the beep will sound. OFF is selected, there is no sound.	OFF configures the thermostat for non-heat pump systems. ON configures the thermostat for heat pump systems.	Use the + or − key until the desired application is flashing.	For heat pump systems that are "dual fuel" (use a gas furnace for auxiliary stage heat), you can turn this feature on to turn off the heat pump when the auxiliary stage of heating has been called for.
Factory Default Settings						
4	OFF	OFF	ON	OFF	Heat-Off-Cool	OFF

Swing Setting Tip

The second stage will turn on at 2x the swing setting. The second stage will turn off when 1x the swing is reached. For example, if the swing setting is .8 degrees for heating and the thermostat is set at 70°F, the first stage will turn on at approximately 69.2°F and the first will turn off at 70.8°F. If third stage is used, it will turn on at 3x the swing and turn off at approximately 2x the swing.

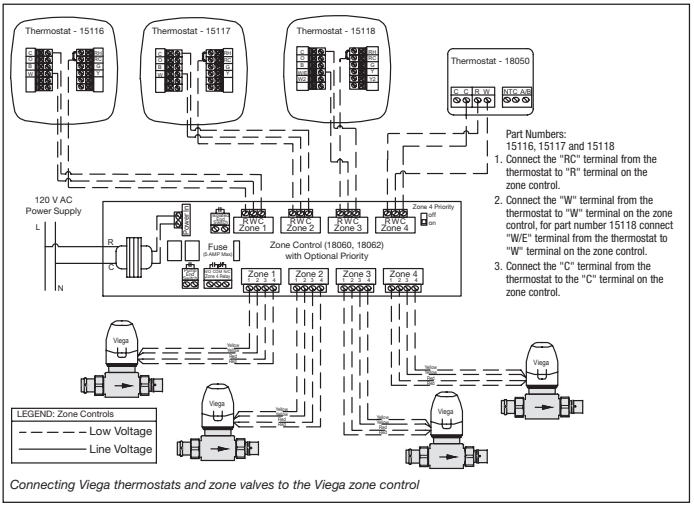
NOTE: If contractor Call Number is selected ON, your phone number will show in the display if there has been a continuous call for heating or cooling for 24 hours or if the light button is held down for 3 seconds. To remove the phone number from the display, hold the light button for 3 seconds.

Part Number 15118

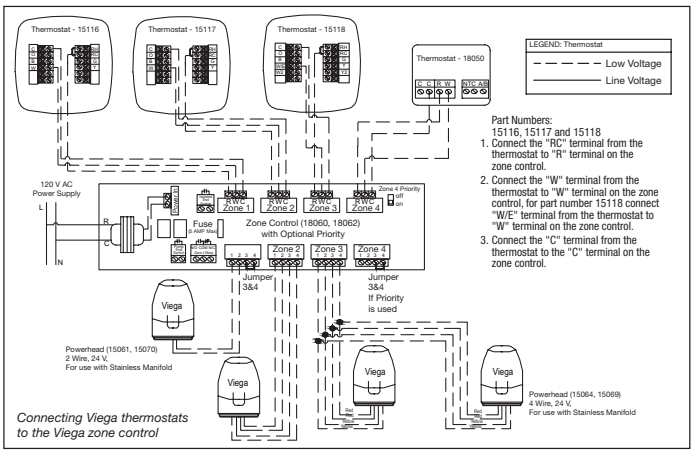
Technician Setup Steps (continued from the previous page)

Stages of Heat	Cooling Fan Delay	Satisfy Setpoint	Staging Delay
You can configure the thermostat to operate a 3-stage heat pump system. 2H 2C = 2 heat, 2 cool 3H 2C = 3 heat, 2 cool	The cooling fan delay setting will delay the fan from coming on in cool mode and keep running after the compressor shuts off for a short time to save energy in some systems.	This feature allows the thermostat to keep multiple stages of heat or cool energized until setpoint is satisfied.	This feature allows a delay to occur when a second and third stage is needed. This allows the previous stage extra time to satisfy setpoint.
LCD Will Show			
			
Adjustment Options			
Use the ⊞ or ⊟ key to change between 2 heat and 3 heat 2 heat will use Y1 as first stage and W2 as auxiliary. 3 heat will use Y1 as first stage, Y2 as second stage and W2 as auxiliary.	You can select the Cooling Fan Delay from “Off,” “15,” “30,” “60” or “90” seconds. If 15, 30, 60 or 90 is selected the fan will not turn on for that many seconds when there is a call for cool and will run for that many seconds after satisfying a call for cool.	Use the ⊞ or ⊟ key to turn on or off.	Use the ⊞ or ⊟ key to select OFF, 5, 10, 15, 30, 45, 62, 90.
Factory Default Settings			
2 Stages	OFF	OFF	OFF

Viega Thermostat Wiring: Part Number 15116, 15117, 15118

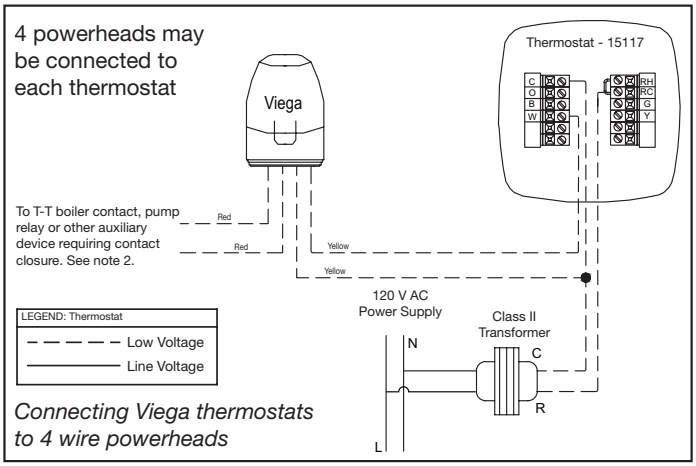


Connecting Viega thermostats and zone valves to the Viega zone control

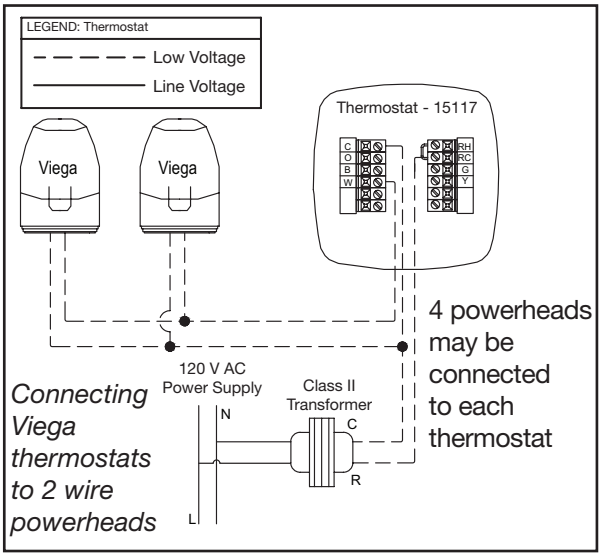


Connecting Viega thermostats to the Viega zone control

Part Number 15116, 15117, 15118

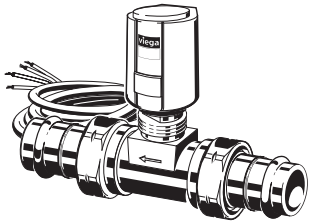


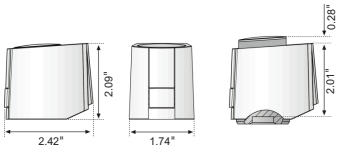
Note: Part number 15118 "W" terminal is labeled "W/E"



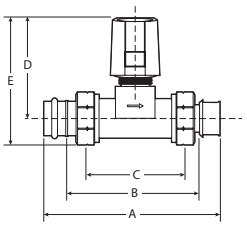
Viega Zone Valve

Viega zone valves are used to control the flow of fluid within a hydronic heating or cooling system. They do so by opening when there is a thermostat demand and closing when the demand has been met. Viega zone valves are available in ¾" and 1", with three different connection types, ProPress x ProPress, ProPress x PEX Press and solder x PEX Press.





Dimensions **Installation Height**



Technical Data:

Voltage: . . . . . 24 Volts
Max inrush current:. . . . . 300 mA, for 2 min.
Operating power: 1w
Closing/opening time:. . . . Approximately 3 min.
Max pressure differential: . 50 psi
Cv rating ¾" valve:. 4.0
Cv rating 1" valve: 8.5
Fluid temperature: . . . . . 32°-212°F
Stem travel: 4mm
Actuating force: . . . . . 21 lbs
Body material: . . . . . Low zinc bronze, alloy C84400

Zone Valve Dimensions

Part No.	Description	A	B	C	D	E
17230	¾" Solder x PEX Press	4.70"	3.25"	2.50"	3.60"	4.25"
17231	1" Solder x PEX Press	6.25"	4.60"	3.60"	3.75"	4.60"
17232	¾" PP X PP	5.60"	3.80"	2.50"	3.60"	4.25"
17233	1" PP X PP	6.86"	5.20"	3.60"	3.75"	4.60"
17234	¾" PP X PEX Press	5.10"	3.80"	2.50"	3.60"	4.25"
17235	1" PP X PEX Press	6.62"	5.28"	3.60"	3.75"	4.60"

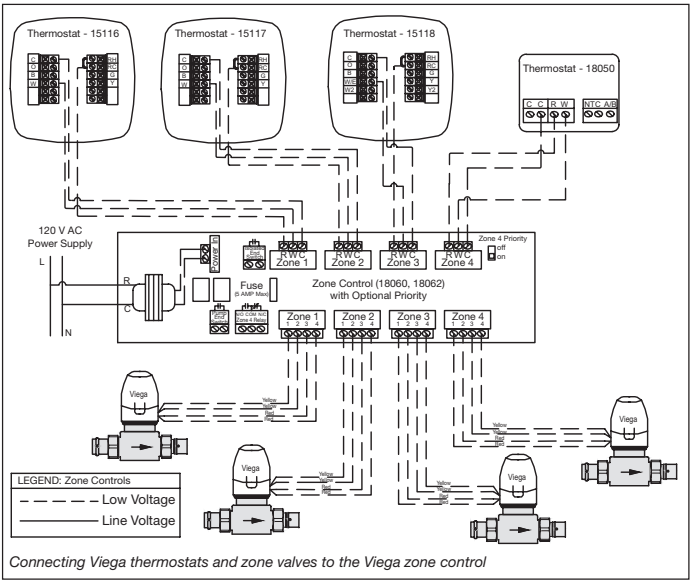
On/Off Indicator

The zone valve powerhead has a cylinder on the top that will raise and expose blue when the valve is open. You will be unable to see any blue when the valve is in its normal closed position.

Initially-Open Function

The zone valve is delivered in the open position. This allows for easier installations and also allows for the installer to pressure and flow test each circuit before connection to the power. This function is disengaged automatically after the first 6 minutes of powered use.

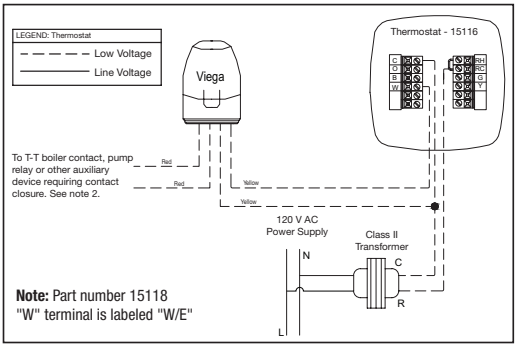
Wiring the Zone Valve to the Zone Control



Connecting Viega thermostats and zone valves to the Viega zone control

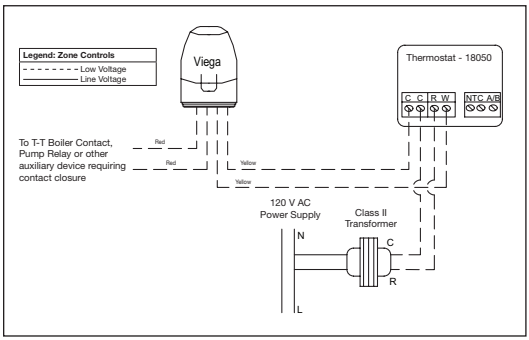
1. Connect a yellow wire from the zone valve powerhead to terminal 1 on the zone control.
2. Connect the other yellow wire from the zone valve powerhead to terminal 2 on the zone control.
3. Remove and discard the jumper installed between terminal 3 and 4.
4. Connect a red wire from the zone valve powerhead to terminal 3 on the zone control.
5. Connect the other red wire from the zone valve powerhead to terminal 4 on the zone control.

Wiring the Zone Valve Powerhead to a Viega Digital Thermostat 15116, 15117, 15118



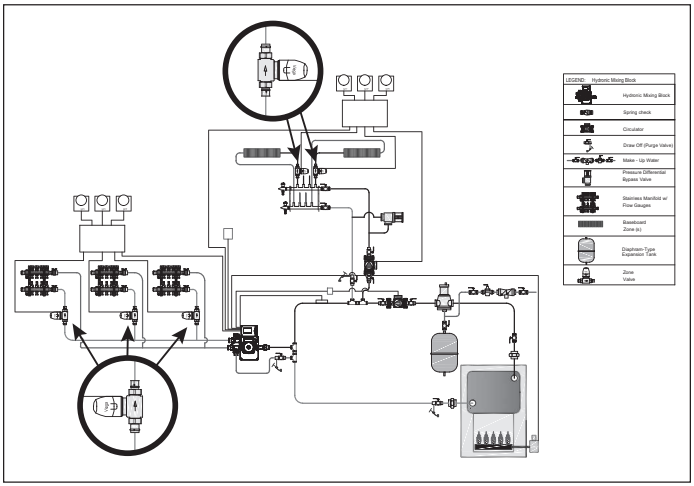
1. Connect a yellow wire from the zone valve powerhead to the C terminal on the digital thermostat.
2. Connect the other yellow wire from the zone valve powerhead to the W terminal on the thermostat. This terminal is labeled W/E on thermostat part number 15118.
3. The red wires can be connected to the boiler contact (TT), pump relay or other auxiliary device requiring contact closure.
4. Connect the C terminal from the transformer to the C terminal on the thermostat.
5. Connect the R terminal from the transformer to the RC terminal on the thermostat.

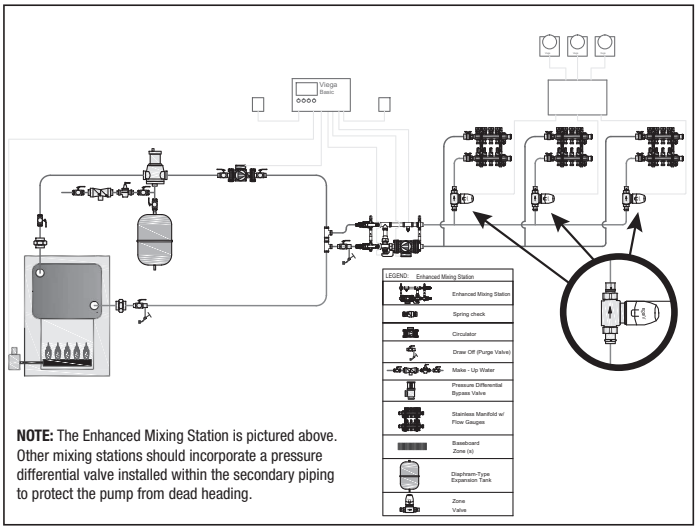
Wiring the Zone Valve Powerhead to a Viega Digital Thermostat 18050



1. Connect a yellow wire from the zone valve powerhead to the C terminal on the digital thermostat.
2. Connect the other yellow wire from the zone valve powerhead to the W terminal on the thermostat.
3. The red wires can be connected to the boiler contact (TT), pump relay or other auxiliary device requiring contact closure.
4. Connect the C terminal from the transformer to the C terminal on the thermostat.
5. Connect the R terminal from the transformer to the R terminal on the thermostat.

Piping the Zone Valve

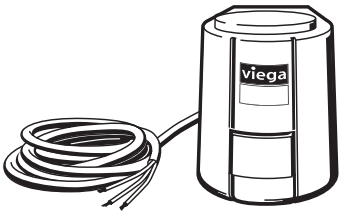




NOTE: The Enhanced Mixing Station is pictured above. Other mixing stations should incorporate a pressure differential valve installed within the secondary piping to protect the pump from dead heading.

Viega 0-10V Powerhead for 1¼" Stainless Manifold

The Viega 0-10V powerhead is a thermo-electric powerhead that mounts on the return valve of a Viega 1¼" stainless manifold. A 24-volt signal powers the unit open while controlled by a 0-10V DC signal, usually from either a thermostat or a central DDC building management system. This powerhead is compatible with 1¼" stainless manifolds of either shutoff/balancing or shutoff/balancing flow meter types.

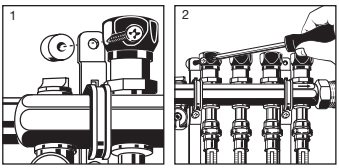


Part Number 15068

When using a 0-10V powerhead in conjunction with a stainless steel manifold it is necessary to use spacers. Different lengths of spacers are required depending on whether the manifold is mounted to a wall surface or in a cabinet.

Installing a Stainless Steel Manifold on the Wall with Spacers:

1. Using the ⅝" spacers, install four spacers between the manifold bracket and the wall.
2. Install screws through the manifold bracket hole, spacer and into the wall.

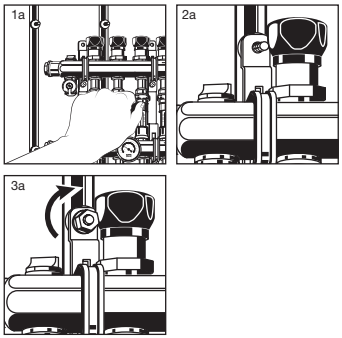


Installing a Stainless Steel Manifold in a Cabinet with Spacers:

1a. Using the ¼" spacers, place spacers over the manifold mounting bolts.

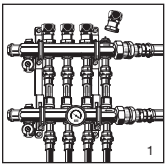
2a. Align and place the manifold bracket on the mounting bolts.

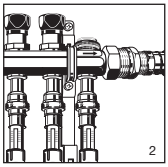
3a. Install nuts over the bracket and tighten.

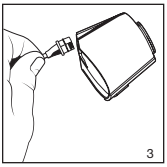


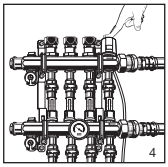
Installing the Powerhead

1. Remove the blue return valve cap from the return valve on the 1¼" stainless manifold.
2. Hand-tighten the adapter ring onto the return valve.
3. Install the connection cable to powerhead.
   NOTE: The plug end is configured so it can only be attached one way.
4. Place the 0-10V powerhead over the adapter ring and push downward. The powerhead will snap onto the adapter ring. The powerhead can be installed in any position: vertically, horizontally or upside down.
5. Connect the wire ends to control unit (i.e. thermostat or building management system with 0-10V DC control signal).



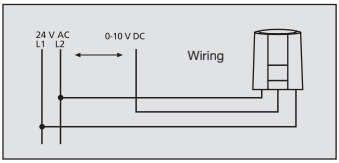






Wiring

1. Connect the black wire to 24 volts (typically labeled "R" on most hydronic equipment).
2. Connect the blue wire to ground (24 volt common, typically labeled "C" on most hydronic equipment).
3. Connect the red wire to the 0-10V control (usually thermostat or DDC building management system).



Extending the Connecting Cable

The powerhead cable may be extended. The length is dependent on the number of powerheads and the gauge of the wire used. The chart below lists recommendations for extending the powerhead cable.

Length powerhead can be extended (ft)			
# of 0-10V Powerheads	**20 AWG**	**18 AWG**	**16 AWG**
1	134'	200'	269'
2	67'	100'	134'
3	44'	67'	89'
4	33'	50'	67'
5	26'	40'	53'
6	22'	33'	44'

NOTE: If your project requires something outside of what is suggested above, please use the information below for your calculations.

L = C x A/N

L= Maximum cable run length

C= Constant (269)

A= Conductor cross section (from chart below)

N= Number of powerheads

Conductor Cross Section (MM)	Substitute this American Wire Gauge
0.5	20
0.75	18
1.0	16
1.5	14
2.5	12

Transformer

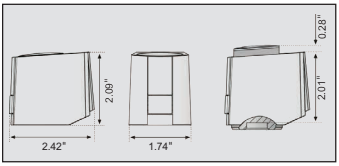
The table below shows how many 0-10V powerheads can be connected to each Viega transformer.

Transformer sizing

Part No.	Rating	Number of powerheads per transformer
18008	40 VA	6
18020	75 VA	12

NOTE: The table above is figured based on 6 W per powerhead.

Dimensions



Specifications

Voltage:	24 VAC 50/60 Hz
Control voltage:	0-10 VDC
Max inrush current:	< 320 mA during max. 2 min.
Operating power	1 W
Actuating force:	21 lbs.
Stroke:	4 mm
Fluid temperature:	32°F - 212°F
Max pressure differential:	50 psi
Connecting cable length:	3'

Initially Open Function

The 0-10V powerhead is delivered in the open position. This allows for easier installation and allows the installer to pressure test and purge each circuit before connecting power. This function disengages automatically after 6 minutes of powered use and will return the powerhead to its normally closed position.

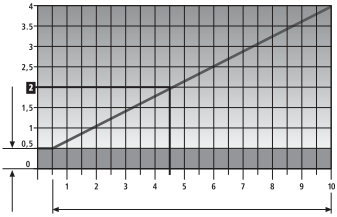
Normal Operation

When a control voltage of 0.5 - 10V DC is applied, the powerhead opens the valve by retracting its piston, causing the valve stem to rise. An internal optical stroke measurement controls the temperature required for the maximum stroke and, consequently, the energy use of the wax element. No excess energy is stored inside the wax element. Once the control voltage is reduced, the powerhead adapts the heat input to the wax element, allowing the integral spring to drive the valve closed. In the range of 0 - 0.5V, the powerhead remains stationary in order to ignore ripple voltage occurring in long cables.

The closing force of the compression spring is matched to the closing force of the stainless manifold, allowing the valve to stay closed when de-energized (NC).

The chart below shows the valve position based on the DC voltage applied.

Example: 4.5 volts applied to the powerhead would result in a 2 mm valve stroke, causing the valve to open approximately 50%.



NOTE: The Viega 0-10V powerhead is capable of modulation. However, the 1¼" stainless manifold that it attaches to is suggested for simple two-position on/off activation.

Open/Closed Indicator

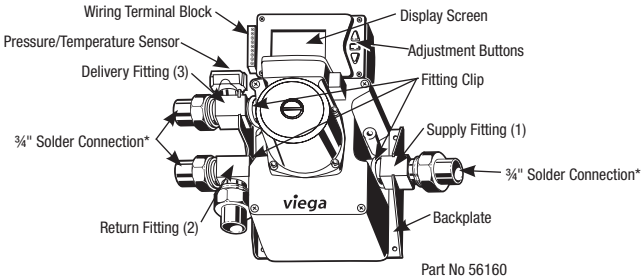
The 0-10V powerhead has a cylinder on top that will raise or lower depending on the powerhead's position. When flush, it indicates that the valve is closed, and when raised, that the valve is open.

Mixing Equipment

Viega Hydronic Mixing Block

The Hydronic Mixing Block is a mixing device and boiler control, with a built-in circulator and system controller.

The block can provide either a fixed or reset water temperature via start/stop or constant fluid circulation.



Part No 56160

* ProPress tailpieces may be used in place of solder connections. ProPress tailpieces are available for sale separately.

⚠ Only suitably qualified individuals with formal training in electrical and HVAC controls should attempt the installation of this equipment. Incorrect wiring and installation will affect the warranty provided with this unit. Wiring must be completed in accordance with the codes and practices applicable to the jurisdiction for the actual installation.

⚠ The Hydronic Mixing Block is a microprocessor-based controller and as such is not to be regarded as a safety (limit) control. Please consult and install the heating or cooling appliance in accordance with the manufacturer's recommendations.

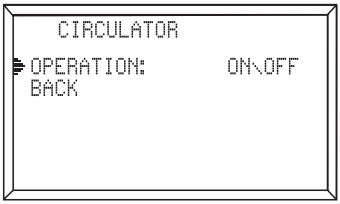
Programming

SETUP MENU

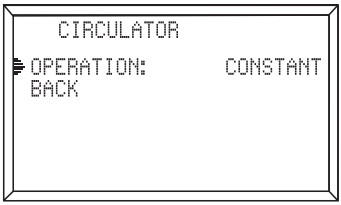
```
   SETUP MENU

 CIRCULATOR CONTROL
 DESIGN TEMPS
 WATER TEMP CONTROL
 BOILER SETTINGS
 DEFAULTS\PURGE
▶BACK
```

1. The SETUP MENU is used for entering the design values as well as assigning different control options to the circulator and boiler. To access the SETUP MENU, push the middle rectangular button ▬ on the STATUS MENU. Use the up ▲ and down ▼ arrow keys to scroll through the various settings.
2. To select an item, align the cursor arrow ▶ with the item you wish to select and press the middle rectangular button ▬. The arrow will become solid, which indicates that an item has been selected.
3. Once adjustment is complete, push the middle rectangular button. This will de-select the item.
4. To go to the previous screen, select BACK and press the middle rectangular button.
5. If the SETUP MENU is left idle for more than 90 seconds, the display will change to the STATUS MENU and the Hydronic Mixing Block will begin operating.

CIRCULATOR CONTROL



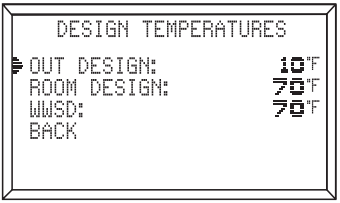
- **OPERATION: ON/OFF** — The circulator is turned on/off as demand requires. Default is set to ON/OFF.



- **OPERATION: CONSTANT** — The circulator is constantly on and will only be shut off with warm-weather shutdown (WWSD). Usually used with RESET mode.

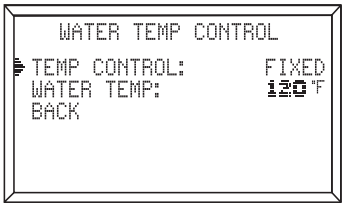
  NOTE: This function is not available with BOILER AQUASTAT mode.

DESIGN TEMPS



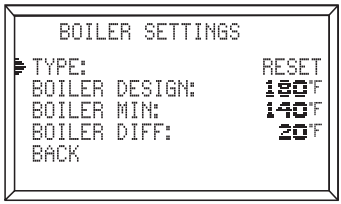
- **OUT DESIGN** — Outdoor temperature used to calculate heat loss. This temperature is based on location and can be obtained from outdoor design charts.
  Range: -40°F to 70°F
  Default: 10°F
- **ROOM DESIGN** — Desired room temperature used in heat loss calculation.
  Range: 35°F to 120°F
  Default: 70°F
- **WWSD** — Temperature at which the building does not need heat and the control will no longer activate the circulator.
  Range: 35°F to 120°F
  Default: 70°F

WATER TEMP CONTROL



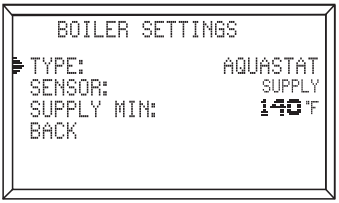
- **TEMP CONTROL: FIXED** — The control will maintain a constant (FIXED) water temperature.
- **WATER TEMP** — The fixed water temperature.
  Range: 50°F to 180°F
  Default: 120°F

BOILER SETTINGS

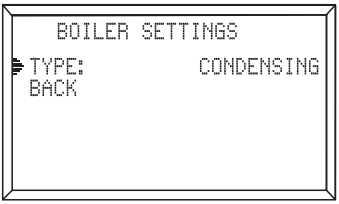


- **TYPE: RESET** — This setting allows for the boiler to change supply water temperature based on outdoor temperatures.
- **BOILER DESIGN** — The water temperature needed on design day.
  Range: 70°F to 200°F
  Default: 180°F
- **BOILER MIN** — Lowest temperature the boiler is allowed to supply. This temperature needs to be set high enough for the boiler to be able to maintain mixed water temperatures.
  Range: 70°F to 200°F
  Default: 140°F

- **BOILER DIFF** — Determines turn-on and shut-off temperatures. This setting will allow the boiler to go above the boiler target by half of this setting. Example: If the BOILER DIFF is set at 20°F, the boiler will run until the temperature is 10°F above the boiler target setting, and turn on when the temperature is 10° below the boiler target temp.
  Range: 10°F to 50°F
  Default: 20°F

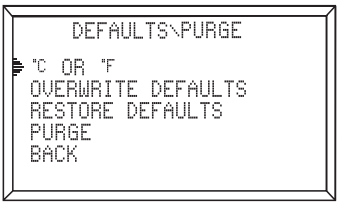


- **TYPE: AQUASTAT** — Used when the boiler is a non-condensing boiler that maintains its own temperature settings. This mode is not available with constant circulation.
- **SENSOR** — Installed on either SUPPLY or RETURN. Installation must be properly identified in this setting.
- **SUPPLY MIN/RETURN MIN** — Minimum supply/return temperature.
  Range: 70°F to 200°F
  Default: 140°F



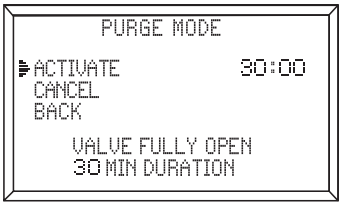
- **TYPE: CONDENSING** — Used when the boiler is a condensing boiler that maintains its own temperature settings.

DEFAULTS\PURGE



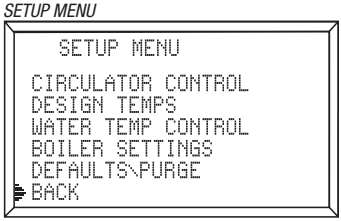
- **F OR C** — Select between FAHRENHEIT or CELSIUS.
  Default: Fahrenheit
- **OVERWRITE DEFAULTS** — Will allow you to change the DEFAULTS within the control.
- **RESTORE DEFAULTS** — RESTORE the current DEFAULTS.
- **PURGE** — Selecting this feature will bring you to PURGE MODE.

PURGE MODE



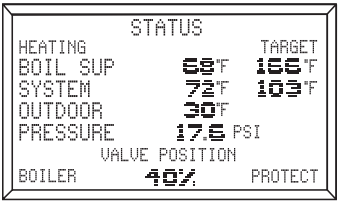
- **ACTIVATE** — Will open the internal valve for 30 minutes to allow for purging.
- **CANCEL** — Will end the PURGE MODE, end the timer and close the internal valve.

SETUP MENU



- To view the STATUS screen, select BACK with the cursor arrow ▶ in the SETUP MENU and push the middle rectangular button ■.

STATUS SCREEN



The STATUS screen shows the actual temperatures as read by the sensors and the target temperatures the control is trying to obtain.

- **HEATING** — If the display screen is red and heating is displayed on the upper left corner of the STATUS menu, the control is in heating mode and there is a boiler demand. If the display screen is blue, it means there is a heating demand but the boiler is off. If the screen is white, there is no heating demand.
- **BOIL SUP/RET** — The temperature of the boiler supply/return. This will be dictated by the sensor location. If on the supply this will read: BOIL SUP. If on the return it will read BOIL RET. When the boiler sensor is bad or there is a broken/ shorted wire, it will be represented by 5 dashes ----- in the supply field and the control display will blink red. The block will supply 80°F to the floor/ emitter to keep the system from freezing.
- **SYSTEM** — The mixed water temperature that the Hydronic Mixing Block will supply. This symbol: ----- present in the field means the sensor is bad or the wire is broken or shorted.
- **OUTDOOR** — The outdoor temperature as read by the outdoor sensor.
- **PRESSURE** — The system pressure is read by the temperature/pressure sensor located to the left of the display screen. The number displayed in this field is the system pressure. If the word LOW is present in the pressure field for one minute, the control will shut the block down to prevent damage. If the symbol: ----- is present it indicates the sensor is bad or the wire is broken or shorted.
- **VALVE POSITION** — Identifies the position of the internal valve.
- **BOILER PROTECT** — If the display screen is yellowish/green and BOILER PROTECT is present in the lower left and right of the screen, the boiler is in protection mode.

Screen Color Indicator	Status
Light Blue/Gray	No heat demand
Solid Red	Heat demand, boiler running
Yellow/Green	Heat demand, boiler running but in boiler protection mode
Dark Blue	Heat demand, boiler satisfied
Blinking Red	Failed boiler sensor or broken/shorted wire. Under this condition the block will supply 80°F fluid to the floor/emitter to keep the system from freezing
Blinking Purple	PURGE MODE, will open valve for 30-min. duration to allow for purging

Testing the Hydronic Mixing Block

When piping is complete, test the Hydronic Mixing Block and system piping.

1. Ensure air vent cap is tight before testing.
2. Pressurize the system to a maximum of 100 psi for one hour.
3. Once the system maintains 100 psi for one hour, carefully remove air pressure from the system and fill with fluid.

Purging

1. Shut the power off to the boiler.
2. Purge with only cool water. If the boiler is hot it should be cooled down prior to purging. This is done to protect the floor coverings from surface temperatures above 85°F.
3. Plug in the Hydronic Mixing Block. Allow it to run through its initial setup and bring you to the STATUS screen.
4. From the STATUS screen push the middle rectangular button. ▬
5. DEFAULTS/PURGE
6. Select PURGE
7. Select ACTIVATE
   - Selecting ACTIVATE will cause the screen to turn purple, at which time the internal valve will open. Once the valve is open, the screen will blink purple and start a 30-minute timer to allow for purging.
   - If more time is needed, ACTIVATE may be selected as many times as necessary to complete system purging.
   - If less time is needed purge can be canceled by selecting CANCEL.
8. Allow the Hydronic Mixing Block to be filled with fluid from the supply side piping.
9. Close the valve on the return piping to the boiler.
10. Open the purge valve to allow trapped air to be eliminated.
11. Continue to allow fluid to run into the block and out the purge valve until all air is removed from the system.
12. Once purging is complete, return all valves to normal operating position.
13. Open the air vent cap to allow air to escape under normal operation. **NOTE**: See Page 94 for piping and purge valve configurations.
14. Once the Hydronic Mixing Block, boiler and piping have been purged and properly pressurized, restart the boiler.

Testing the Sensors

OUTDOOR SENSOR / BOILER SENSOR

1a. Outdoor Sensor

- Use a thermometer to read the outdoor temperature.

1b. Boiler Sensor

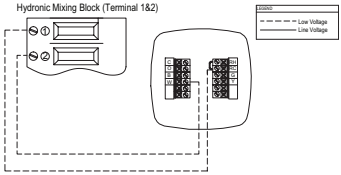
- Use an infrared or digital thermometer to read the temperature where the boiler sensor attaches.

2. Using an ohm meter capable of measuring 10kΩ, measure the resistance present at the sensor.

3. Using the resistance chart on Page 18 of the Hydronic Mixing Block Product Instructions, compare the measured temperature/ohm reading to what is in the chart. If reading is off by ± 5% the sensor is bad.

NOTE: Do not apply voltage to the sensors as this will damage them.

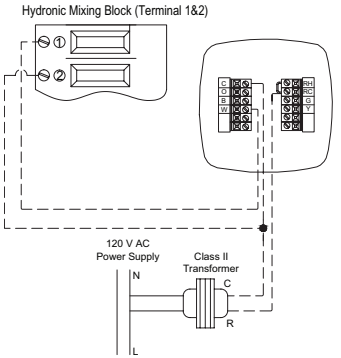
Connecting a Thermostat



Two wire with battery thermostat wiring schematic for part numbers 15116, 15117, 15118:

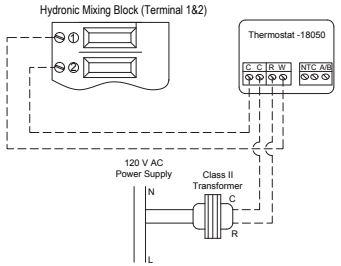
1. Connect RC terminal on thermostat to terminal 1 on the Hydronic Mixing Block.
2. Connect W terminal on thermostat to terminal 2 on the Hydronic Mixing Block. (Part number 15118 W terminal is labeled W/E).

   NOTE: Thermostat batteries must be installed and working for this configuration.



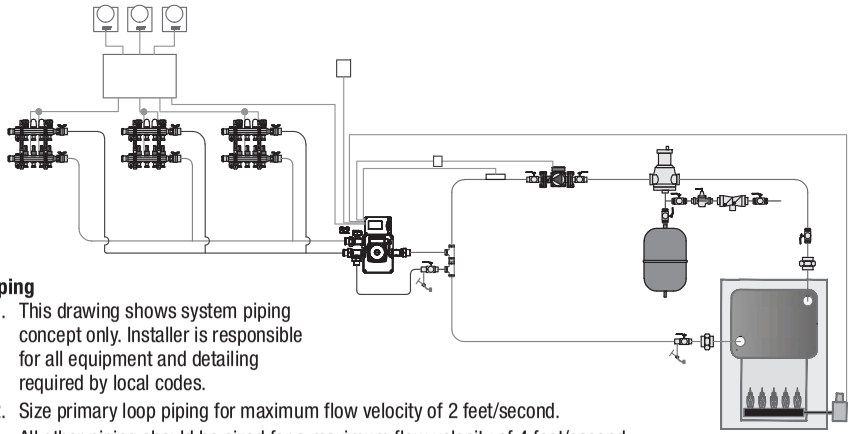
Three wire thermostat wiring schematic for part numbers 15116, 15117, 15118:

1. Connect R from the transformer to the RC terminal on the thermostat.
2. Connect the C from the transformer to the C terminal on the thermostat.
3. Connect the W terminal on thermostat to Terminal 1 on the Hydronic Mixing Block. (Part number 15118 W terminal is labeled W/E).
4. Connect Terminal 2 from the Hydronic Mixing Block to the C terminal on the thermostat/transformer.



Three wire thermostat wiring schematic for part number 18050:

1. Connect R from the transformer to the R terminal on the thermostat.
2. Connect C from the transformer to C terminal on the thermostat.
3. Connect W terminal on the thermostat to Terminal 1 on the Hydronic Mixing Block.
4. Connect C terminal on the thermostat to Terminal 2 on the Hydronic Mixing Block.



LEGEND: Hydronic Mixing Block	
	Hydronic Mixing Block
	Spring check
	Circulator
	Draw Off (Purge Valve)
	Make - Up Water
	Pressure Differential Bypass Valve
	Stainless Manifold w/ Flow Gauges
	Baseboard Zone (s)
	Diaphram-Type Expansion Tank
	Zone Valve

Piping

1. This drawing shows system piping concept only. Installer is responsible for all equipment and detailing required by local codes.
2. Size primary loop piping for maximum flow velocity of 2 feet/second.
3. All other piping should be sized for a maximum flow velocity of 4 feet/second.
4. Install a minimum of 12 diameters of straight pipe upstream of all circulators and check valves.
5. Install isolating flanges or isolating valves on all circulators.
6. Install purging valve(s) on all circuits.
7. All closely spaced tees shall be within 4 pipe diameter center to center spacing.
8. Install minimum of 6 pipe diameters of straight pipe upstream and downstream of all closely spaced tees.
9. Differential pressure bypass valve prevents flow noise under partial load conditions (some circuits closed).
10. Set differential pressure bypass valve to delta P of distribution system with all zones open +1 psi.
11. Not all components may be required depending on control strategy (i.e. constant circulation).

Wiring

Connecting to the wiring terminal block

All wiring shall be done through the wiring terminal block. The wiring terminal block has 9 terminals and should be connected as follows:

Terminal 1,2 - Thermostat or end switch (Terminal 1 and 2 can accept a dry contact or 24v powered contact)

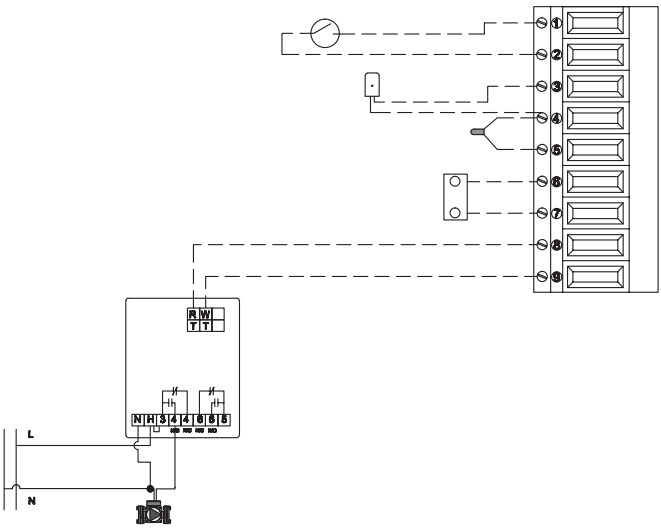
Terminal 3,4 - Outdoor sensor

Terminal 4,5 - Boiler sensor

Terminal 6,7 - Boiler contact (TT) relay rated for 24VAC 1.0 Max AMPS

Terminal 8,9 - Internal relay rated for 24VAC 1.0 Max Amps. With the addition of a pump and boiler relay, this contact can be used for low head primary loop pump control.

Plug cord into 120 VAC Standard wall outlet. (Altering the cord will void the warranty.)



Viega Product Glossary

0-10VDC Powerhead: The Viega 0-10V powerhead is a thermo-electric powerhead that mounts on the return valve of a Viega 1¼" stainless manifold. A 24-volt signal powers the unit open while controlled by a 0-10V DC signal, usually from either a thermostat or a central DDC building management system. This powerhead is compatible with 1¼" stainless manifolds of either shutoff/balancing or shutoff/balancing flow meter types.

3-Speed Circulator Pump: Viega offers two (low and high head) three-speed, wet rotor, direct drive in-line circulator pumps designed for residential and light commercial applications. These circulators are quiet and maintenance-free, making them ideal to use in primary and/or secondary loop piping.

Advanced Snow Melt Control: The Viega Advanced Snow Melt Control provides full automatic snow and ice detection in open-air spaces such as driveways, parking areas, ramps, stairs and flat roofs. The control operates a floating action actuator or a variable speed injection pump to provide both boiler and slab protection. Viega's Advanced Snow Melt Control is equipped with a Snow Melt Sensor that measures the slab temperature, surface temperature and surface moisture level. When the control is not in Melting mode, the system can either be shut down or it can be maintained at an idle temperature for faster response and improved safety.

Assembled Climate Panels (ACP): Climate Panels that are sold pre-assembled as an easier method of installation.

Basic Digital Setpoint Control II: General-purpose temperature control with a wide range of applications in the HVAC industry. This control provides two isolated SPDT relay contacts. The two relays are controlled by a watertight sensor. Included with the Basic Digital Setpoint Control. This control is commonly used as basic heating and/or cooling system control for commercial and residential slab application.

Basic Heating Control: The Viega Basic Heating Control is designed to control the supply water temperature to a hydronic system in order to provide outdoor reset operation. The Basic Heating Control uses a floating action actuator mounted on a diverting or mixing valve to regulate the supply water temperature. The control has a Liquid Crystal Display (LCD) to view system status and operating information.

Climate Panel: A dry heating panel that uses grooved plywood panels backed with aluminum as an attachment media for $\frac{5}{16}$" PEX tubing. Designed to go under any type of floor covering – hardwood, carpet, tile or vinyl. This gives homeowners a great deal of flexibility when designing their new home.

Climate Mat: A pre-engineered, pre-assembled roll-out radiant loop, used in concrete pour radiant applications. Climate Mats are available in 10 different configurations and shipped to the customer tested and ready to install.

Climate Trak: A extruded aluminum track system used for radiant heating applications in both new construction and retrofit applications. The product is designed to strongly grip the PEX tubing without air gaps or the need for sealant/adhesives, ensuring high heat conduction. Climate Traks are fastened tightly to the underside of subfloor for maximum system performance. Available in 4' and 8' lengths, this system utilizes ⅜" and ½" tubing.

Constant Circulation: Technology employed by the Hydronic Mixing Block and the Basic Heating Control where the pump is active throughout entire heating or cooling season to maintain constant flow through heated area. Temperature is controlled by resetting the water temperature to match the desired output.

Diverting Valve: Used to adjust fluid temperature in hydronic applications. Diverting valves are available from Viega in ¾" - 1½" sizes. These valves are used in Viega mixing stations.

Groove Tube: Groove Tube is a silicone-based caulking with additives that aid in heat transfer. It is used in Climate Panel and Heat Transfer Plates for installations.

Heat Exchanger: A product that transfers heat from one fluid to another without mixing them.

Heat Transfer Plates: Light-gauge aluminum plates intended to be secured under the subfloor in between the floor joists, and used for radiant heating. The plates are 5" wide, 19" long and are available for use with ⅜" and ½" tubing.

Hydronic Mixing Block: The Hydronic Mixing Block is a mixing device and boiler control with a built-in circulator and system controller. The block can provide either a fixed or reset water temperature via start/stop, or constant fluid circulation.

Mixing Station: A Viega component that supplies water temperature modulation when connected to a variety of heat sources such as conventional or condensing boilers, water heaters or geothermal heat pumps.

Mixing Valve: A valve used to regulate fluid temperature. These valves are ideal for mixing fluid to control temperature in heating, cooling and snow-ice melting system applications. The valves can be controlled both manually or automatically with the use of an actuator.

Mixing Valve Actuator: A 24-volt motorized control device used to adjust the outlet fluid temperature from a three- or four-way mixing valve.

Outdoor Reset Control: A control method that adjusts the mixed water temperature based on the outdoor temperature.

Proportional Actuator: An actuator is used in electronic temperature control systems that use hot and/or cold water as the controlled medium in radiant heating systems, snow melting or other temperature mixing applications. The actuator is designed for operation by a 0-10 V DC controller such as a DDC system. This actuator will not work with Viega controls such as the Basic Heating Control.

Powerhead: A two-position actuator for zone control that mounts on the return valve of the Stainless Manifold. A 24 VAC signal actuates the head to open the valve. The position of the valve is normally closed. Upon opening the valve, the integral SPST contacts close. Viega offers a two- and four-wire model.

Pump and Boiler Relay: An electrical device that, through the use of a thermostat or other switching device, can trigger a call for heat as well as circulator activation.

Secondary Piping: Piping that is either directly connected to primary piping or originates off manifolds fed by primary piping but is not located within a radiant emitter.

Series Piping: Piping that connects manifolds or radiant emitters from end to end, creating one continuous loop.

SVC: Abbreviation for Standard Viega Connection. This is important to know as any threaded connection with this identification will be a standard proprietary Viega thread. These threads are used on Viega manifolds as well as a variety of threaded fittings.

Thermostatic Mixing Valve: Used to adjust fluid temperature in a hydronic application. This type of valve will maintain a constant supply temperature when supplied with varying supply and return fluid temperatures.

Three-Position Actuator: A 24-volt motorized control device used to adjust the output fluid temperature from the Viega diverting valve.

Viega Barrier PEX: Tubing produced from cross-linkable, high-density polyethylene resin. This cross-linkable resin is produced by grafting organo-silane molecules onto a base polyethylene chain. A catalyst that initiates the cross-linking process is blended with the resin before extrusion. Cross-linking is conducted after extrusion by exposing the tubing to heat and moisture (steam). Viega Barrier PEX includes four layers. The first layer is the cross-linked, high-density polyethylene. The second layer is an adhesive for the third layer, the ethylene vinyl alcohol layer (EVOH oxygen barrier). The fourth layer is another thin layer of polyethylene, put on the outside to protect the EVOH layer from damage. EVOH is highly resistant to the passage of oxygen.

Zone Control: A wiring and switching center for individual and/or multiroom control. The zone control simplifies wiring between thermostats and powerheads. LED lights on housing indicate individual zone heat demand. Available as a 4 or 6 zone, both with priority. Zone control includes optional circulator activation function and built-in transformer.

Zone Valve: Viega zone valves are used to control the flow of fluid within a hydronic heating or cooling system. They do so by opening when there is a thermostat demand and closing when the demand has been met. Viega zone valves are available in ¾" and 1" with three different connection types: ProPress x ProPress, ProPress x PEX Press and solder x PEX Press.

This document is subject to updates. For the most current Viega technical literature please visit www.viega.us.

Viega LLC

585 Interlocken Blvd.
Broomfield, CO 80021
Phone (800) 976-9819
Fax (800) 976-9817
www.viega.us
insidesales@viega.us

PG-PR 724888 0621 Heating and Cooling Solutions