Product Instructions

Viega® Insulated PEX Barrier Piping

Applications
Viega's Insulated PEX Barrier piping system is suggested for use in heating, cooling and snow melting applications where underground distribution piping is necessary. Viega's insulated piping is a bonded system utilizing closed cell polyurethane foam insulation with a proprietary membrane that greatly reduces off gassing, providing superior R-value retention. Viega's Insulated PEX Barrier piping system is available with a complete range of piping and fitting offerings.

Features
- Best in class insulation value
- Flexibility allows for reduction in fittings
- Above or below ground installation options
- 16" burial depth allows for H-20 load rating
- Shallow 12" burial depth allowed for light traffic areas
- Smooth jacket on most offerings allow for simple wall penetration seals
- Compression fittings require no special tools

Specifications
Material:

Jacket – Polyethylene
Insulation – Polyurethane
Carrier pipe – Barrier PEX
Cap – Polyethylene

Max Operating Temperature: 203° F (95° C)

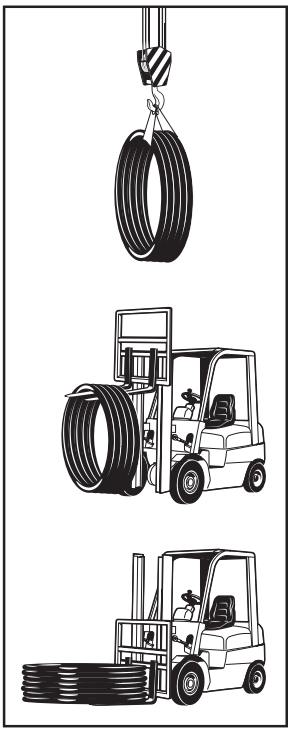
Recommended max continuous operating temperature: 185° F (85° C)

Max Operating Pressure: 87 psi (6 bar)

Thermal Conductivity:

Insulation – 0.022 W/m*K (0.012 BTU/hr*ft*°F)
Carrier pipe – 0.38 W/m*K (0.219 BTU/hr*ft*°F)

Receiving Viega insulated PEX Barrier piping
Viega insulated PEX Barrier piping, although flexible enough to bend in any direction and strong enough to withstand some compression, it can be damaged with extreme handling. Therefore, care should be taken to prevent damage when handling the piping. Please inspect all piping when received to ensure that it is in operational condition. It is normal for the insulated piping to have some small indentations on the inside radius of the piping while it is rolled tight. These small indentations will smooth out when uncoiled and will not hinder the overall performance of the piping.



Unloading
When unloading the insulated piping from the freight carrier, do not remove any packing materials, banding or the piping from the skid. If a forklift is being used to unload the piping, fork extensions can help keep the load balanced. Take care in unloading to not puncture the piping. Punctured piping, as a result of handling by the customer, although fixable, is not returnable and all materials provided to fix the piping are at the cost of the purchaser. Do not drop the piping from any height as it could result in damage.

Storage
End caps come on the ends of the piping when shipped and should remain on the piping when stored. Avoid storing the piping on any sharp or narrow surfaces. When using the insulated piping in cold weather, try to store the piping in a warm storage area prior to installation to assist in keeping the piping flexible. Keep all other accessories and installation parts in a clean, dry area.

Repair
If the jacket becomes damaged, a heat shrink can be used to fix a small puncture. It is extremely important to ensure a tight seam and water tight outer jacket so that no water can enter into the insulation. If you do not repair the damaged section of piping before use, it could result in increased heat-loss, resulting in a greater consumption of fuel. Make sure the damaged surface is clean and dry before applying the heat shrink material. If the surface is dirty or wet, it could result in a poor seal. Refer to the manufacturer's installation instruction for the application of the heat shrink.

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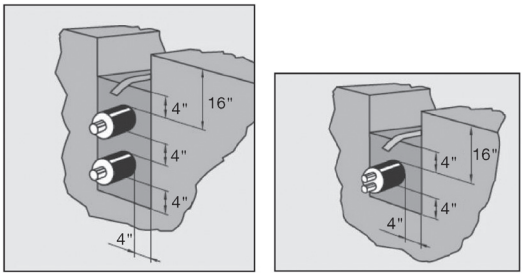
Trench layout
Before beginning the installation, you should take time to plan the layout. Take into consideration all trees, gardens, or other visible obstacles. Call dig safe or local utility providers to have all underground utilities marked. A well planned layout can save time and expense in the future.

Digging the trench
When digging the trench, plan where all excess soil will be piled. It is easier to install the piping from one side of the trench, therefore you should attempt to pile the soil on the opposite side. The insulated piping can bend in any direction up to a certain curvature; be sure to dig your trench clearly around and trees or shrubs that may pose a potential concern. The minimum recommended depth from the top of the pipe to ground level is 12” for no or light traffic areas.



High traffic or weight load areas
Viega insulated PEX Barrier piping is suitable for H-20 loading at depth of greater than 16". If you are installing insulated piping under a high traffic or weight load area, it is recommended that you prepare and excavate the trench to a depth of 16" below the deepest point of the traffic road bed. It would be recommended to surround the insulated piping in a 4" cushion of sand to prevent rocks or debris from puncturing the outer jacket.

Backfilling the trench
When backfilling the trench be sure to fill the trench in layers with the same material excavated. This will allow for even distribution of the soil, allowing for less soil settling. Do not mechanically compact the soil directly on the piping until there is a sufficient amount of soil directly above the piping. It is recommended to have a 4" – 6" bed of sand around the piping in high stone concentration areas. Take extra care in ensuring that there are no sharp objects such as tree roots, rocks, frozen lumps of soil, or man-made objects in the trench which could puncture the piping.

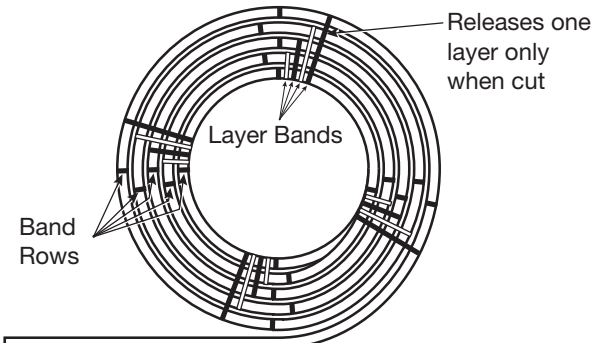
Above ground installations
The jacket of the insulated piping is UV stable so above ground installations are possible. They must be properly supported with either fixed or sliding supports. Local code may define the maximum distances between supporting devices, otherwise, horizontal and vertical runs should be supported every 40 inches (1m).

Fixed Supports – Typically applied at fitting locations. Attach the fixed support to the fitting or to the bolt and nut on the compression portion of the fitting.

Sliding Supports – Allow for expansion and contraction that occurs in non-buried insulated installations. Support devices should allow for movement with slide fittings accommodating for the outside diameter of the casing and not squeeze the piping unnecessarily. Make sure the material in contact with the insulated piping is not abrasive and does not allow sharp edges to protrude into the jacket.

Laying the insulated piping
Before laying the piping in the trench, take note of how the roll is banded together. Each layer of piping is banded to assist you by maintaining a tight coil while you roll out the piping. Only one section of piping will release when subsequent bands are cut.

Before you begin cutting the bands on the roll, make sure the end caps are in place then securely fasten the outer end of the piping to a stable object at the beginning of the roll. Because the piping is shipped in a coil, the piping will have a certain degree of memory and will want to bend back. Once the end is secure, begin unrolling the insulated piping adjacent to the open trench, systematically cutting each band during each revolution. Once you have enough piping unrolled to fulfill your installation, measure and cut to length.



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Measuring
Viega insulated PEX piping comes pre marked every meter (3.28 ft.). Full roll lengths are dependent on diameter, ranging from 164 to 1132 ft. (50 to 345m). It is recommended to roll out piping next to trench or cut longer than is required to ensure unnecessary coupling will not be needed.

Cutting
When cutting the piping be sure to secure at the point where you will be cutting to stop the piping from moving back to its pre-rolled form. Using a saw, cut through the insulated piping at the desired position from one side through to the other. Do not cut from both sides as this could give you an uneven cut. Once you have cut the piping, wipe the end and then cover to make sure that no debris enters the line.

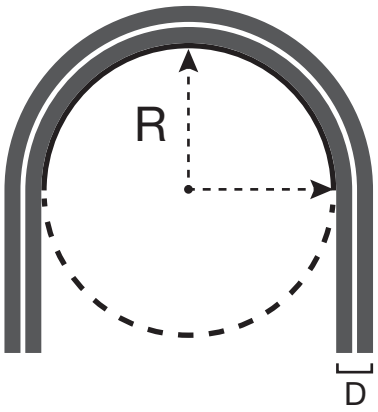
Removing the outer jacket
To expose the insulation you must first remove the outer polyethylene jacket. In order to remove the protective jacket, take a sharp utility knife, or equivalent, and cut lengthwise down the piping to your desired length to strip. Cut around the diameter of the piping through the outer jacket. Use extreme care in cutting the outer jacket so you do not penetrate to the PEX carrier piping. Pry up and peel the jacket from the foam insulation.

Removing the insulation
Taking care not to damage the carrier pipe; use a knife, scraper, or equivalent, to remove the excess foam insulation from the piping if not possible by hand. For dual pipe it may be easier to remove the insulation if the supply and return carrier piping is separated. Score the insulation on the end of the piping between the supply and return carrier piping and pry the two carrier pipes apart creating two separate pieces.

Preparing the insulated piping
Before attaching the carrier piping to the adapters, you must make sure that the pipe outer surface is clean and any burrs are removed. Make sure to de-burr the inside of the piping and thoroughly clean the outside. Sand cloth or an emery pad may be used to help clean any insulation residue from the carrier pipe. Clean piping will help promote a dry, tight seal; reducing the possibility for leaks.

Bending insulated piping
A major benefit of Viega's insulated piping is the ability to bend around obstacles and to avoid using multiple fittings in a single run. Ensure that the trench is laid out to prevent bend with radius smaller than the minimum allowed; carrier pipe damage or loss of insulating value can result.

In open areas it can be easier to secure the two ends of the piping and then bend the middle sections of the run. If the piping runs under an immovable object, such as a wood boiler, place the end of the piping under the object and pull up on the end while feeding from the other side. You may increase the depth of the trench to allow for minimum curvature or maneuvering.



Jacket O.D. in (mm)	Minimum Bend Radius ft (m)
3.5 (90)	3.0 (0.9)
4.3 (110)	3.5 (1.1)
4.9 (125)	4.0 (1.2)
5.5 (140)	4.5 (1.4)
6.3 (160)	5.2 (1.6)
7.0 (180)	5.9 (1.8)

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Wall penetration

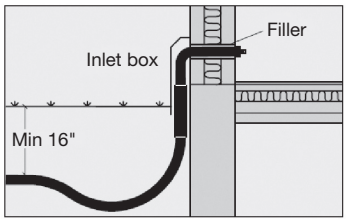
When seal rings are used to prevent water penetration, the opening for the inlet must be big enough to ensure good, tight casing.

If the service line inlet is made by drilling with a core drill, a rubber filler must be used to protect against water penetration.

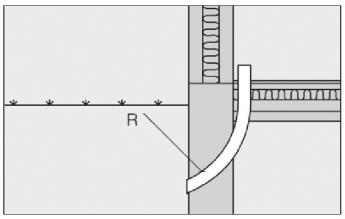
The figures below are schematic diagrams of service line inlets.

Note: Viega does not provide recommendations on core hole size or sealing method. Please reference the seal manufacturer's literature to ensure a leak free wall penetration.

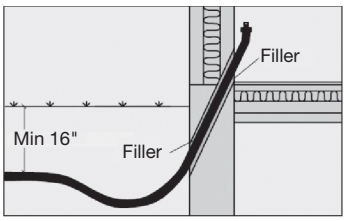
Above ground Inlet



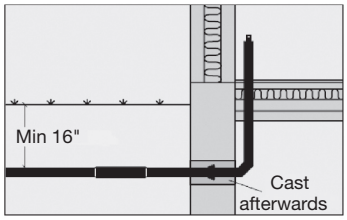
Inlet pipe



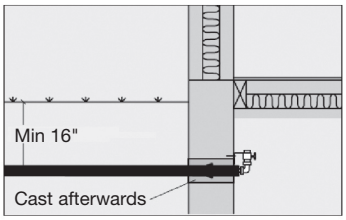
Oblique drilling in wall



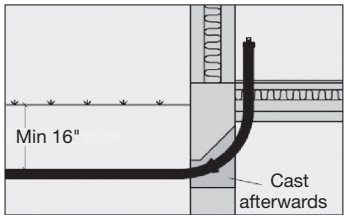
Inlet with bend



Basement inlet



PEX bend upwards



Flushing the lines

Before attaching the insulated piping to any system, it is a good idea to flush the supply and return carrier lines to remove any loose debris from the piping to avoid damage to the system.

Pressure testing

A pressure test must always be performed prior to and during filling of the trench to ensure the connections are leak-free. Air or water can be used to perform the test. Check with local building codes for compliance or additional requirements.

- Perform an initial pressure test to either 1.5 times the system operating pressure or 100 psi, whichever is greater, for 1 hour.
- As the piping expands restore pressure at 10 minutes and then again at 20 minutes if necessary.
- At the end of 1 hour the pressure should not have fallen more than 5 psi. If so – it is leak-free.

Tools

It will be necessary to have the following tools on hand to properly install the Viega Insulated piping system:

- Tape measure
- Hand saw or reciprocating saw
- Utility knife
- Screw driver
- PEX piping cutter
- Emory cloth or scotch bright pad
- Rubber mallet
- Pipe wrenches
- Crescent wrenches
- Compressor
- Gauge and testing assembly
- De-burring tool

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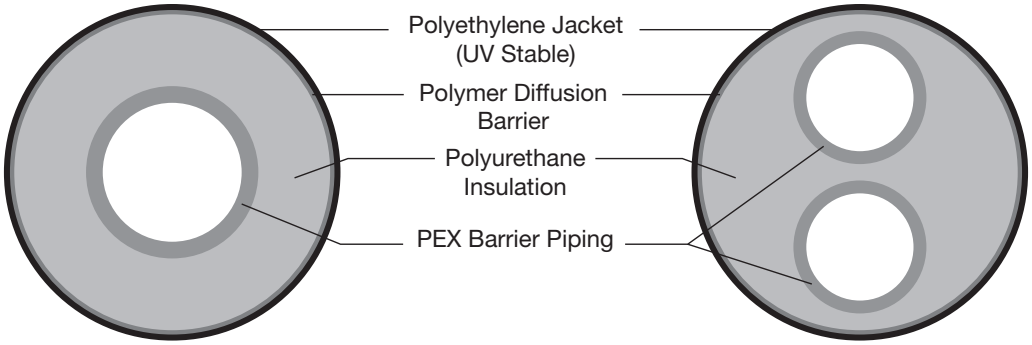

Pipe dimensional data

	Carrier Pipe Nominal		Carrier Pipe ID		Carrier Pipe Wall Thickness		Carrier Pipe OD		Jacket OD		Unit Weight	
	in	mm	in	mm	in	mm	in	mm	in	mm	lb/ft	kg/m
Single Pipe	¾	25	0.79	20.0	0.098	2.5	0.98	25	3.5	90	0.7	1.0
	1	32	1.03	26.2	0.114	2.9	1.26	32	3.5	90	0.8	1.2
	1¼	40	1.28	32.6	0.145	3.7	1.57	40	3.5	90	0.9	1.3
	1½	50	1.61	40.8	0.181	4.6	1.97	50	4.3	110	1.3	1.9
	2	63	2.02	51.4	0.228	5.8	2.48	63	4.9	125	1.6	2.4
	2½	75	2.41	61.2	0.272	6.9	2.95	75	5.5	140	2.2	3.3
	3	90	2.9	73.6	0.323	8.2	3.54	90	6.3	160	3.8	4.2
	4	110	3.54	90.0	0.393	10	4.33	110	6.3	160	3.7	5.5
Dual Pipe	¾	25	0.79	20.0	0.098	2.5	0.98	25	4.3	110	1.4	2.1
	1	32	1.03	26.2	0.114	2.9	1.26	32	4.3	110	1.5	2.2
	1¼	40	1.28	32.6	0.145	3.7	1.57	40	4.9	125	1.8	2.7
	1½	50	1.61	40.8	0.181	4.6	1.97	50	6.3	160	2.8	4.1
	2	63	2.02	51.4	0.228	5.8	2.48	63	7.0	180	3.7	5.5

Note: All sizes are metric, neither IPS nor CTS sizes; imperial adapters are supplied as required.

1½ and 2 inch dual pipe have corrugated jackets.

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Coil dimensional data

Jacket OD	Max Coil Length		Max Coil Height		Coil ID		Coil OD		Height 100m coil	
mm	ft	m	ft	m	ft	m	ft	m	ft	m
90	984	300	8	2.4	5.24	1.6	7.54	2.3	1.55	0.47
110 (single)	656	200			5.9	1.8			2.62	0.8
110 (dual)	1134	346							2.62	0.8
125	656	200							3.7	1.13
140	328	100			6.6	2			7.38	2.25
160	328	100							7.87	2.4
180	328	100							7.87	2.4

Note: All sizes are metric, neither IPS nor CTS sizes; imperial adapters are supplied as required.

Estimating labor

One of the greatest benefits of using Viega insulated PEX Barrier piping is the savings in installation time. A long coil length means fewer connections in a properly designed system. The flexibility of Viega insulated PEX Barrier piping allows you to avoid obstacles such as boulders and landscaping – not to mention hidden objects below the surface that might otherwise require extensive cost and time to remove. Use the tables on this page to estimate the time required to install the piping. The quick learning curve associated with Viega insulated PEX Barrier piping will enhance this estimate dramatically.

Estimated Installation Time per 100m - Piping				
	Carrier Pipe		Mechanics	Time
	in	mm	number	hr
Single Pipe	¾	25	2	1
	1	32	2	1
	1¼	40	2	1
	1½	50	2	1
	2	36	2	1.25
	2½	75	2	1.25
	3	90	3	1.5
	4	110	3	1.5
Dual Pipe	¾	25	2	1
	1	32	2	1
	1¼	40	2	1.25
	1½	50	3	1.5
	2	63	3	1.5

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Heat Loss
Conditions:

Soil Temperature:
32°F (0°C)

Soil Cover:
2 ft. (600 mm)

Soil thermal conductivity:
2.78 Btu/hr-ft2-F
(1.6 W/mK)

MHWT - Mean Heating Water Temperature

Carrier Tubing		Jacket Tubing		Heat Loss with ΔT=30°F (W/m)			
in	mm	in	mm	MHWT=90°F	MHWT=100°F	MHWT=110°F	MHWT=120°F
¾	25	3.5	90	4.28	4.87	5.45	6.04
1	32	3.5	90	5.28	6.00	6.72	7.44
1¼	40	3.5	90	6.68	7.59	8.51	9.62
1½	50	4.3	110	6.93	7.88	8.83	9.78
2	63	4.9	125	7.85	8.92	10.00	11.08
2½	75	5.5	140	8.57	9.74	10.92	12.09
3	90	6.3	160	9.29	10.56	11.84	13.11
4	110	6.3	160	13.92	15.83	17.73	19.64
¾ x ¾	25 x 25	4.3	110	4.98	5.84	6.70	7.56
1 x 1	32 x 32	4.3	110	6.76	7.93	9.09	10.26
1¼ x 1¼	40 x 40	4.9	125	7.59	8.90	10.20	11.51
1½ x 1½	50 x 50	6.3	160	7.50	8.80	10.09	11.38
2 x 2	63 x 63	7.0	180	9.50	11.14	12.78	14.42

*1 W/m = 0.578 Btu/hr*ft*°F*

Flow vs velocity

Carrier Pipe Nominal		Velocity 1.22 m/s (4 ft/s)			Velocity 1.52 m/s (5 ft/s)			Velocity 2 m/s (6.6 ft/s)		
		Flow rate		Pressure Loss	Flow rate		Pressure Loss	Flow rate		Pressure Loss
in	mm	USGPM	l/s	psi/100ft	USGPM	l/s	psi/100ft	USGPM	l/s	psi/100ft
¾	25	6.08	0.38	3.7	7.57	0.48	5.2	9.96	0.63	8.9
1	32	10.43	0.66	2.5	12.99	0.82	3.8	17.09	1.08	6.2
1¼	40	16.14	1.02	2	20.11	1.27	3.2	26.46	1.67	4.5
1½	50	25.28	1.60	1.5	31.5	1.99	2.2	41.45	2.61	3.8
2	63	40.13	2.53	1.1	49.99	3.15	1.7	65.78	4.15	2.8
2½	75	56.89	3.59	0.9	70.88	4.47	1.4	93.26	5.88	2.2
3	90	82.27	5.19	0.7	102.51	6.47	1.1	134.88	8.51	1.8
4	110	123.02	7.76	0.6	153.28	9.67	0.9	201.68	12.72	1.4

Maximum recommended velocity to avoid couplings erosion = 2 m/s (6.6 ft/s)

Pressure Correction Factors			
100% Water	30% Glycol	40% Glycol	50% Glycol
1.00	1.24	1.33	1.40

Viega products are designed to be installed by licensed and trained plumbing and mechanical professionals who are familiar with Viega products and their installation. *Installation by non-professionals may void Viega LLC's warranty.*

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