

# **Product Installation Guidelines**

**MARCH 2008**



# INSTALLATION MANUAL

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## Introduction

This manual contains general requirements and installation recommendations for Everhot Inc. PEX products. Its intention is to provide professional contractor with guidelines and techniques of installing Everhot Inc. systems. Failure to acknowledge these instructions may result in poor system performance and malfunctions. Everhot Inc. disclaims any liability as a result of failure to comply with these guidelines.

## Standards & Approvals

Everhot Inc. pipe and fittings are manufactured to meet and are covered by the following codes, standards and approvals:

- ASTM F876: Standard Specification for Crosslinked Polyethylene (PEX) Tubing
- ASTM F877: Standard Specification for Crosslinked Polyethylene (PEX) Plastic Hot- and Cold-Water Distribution Systems
- ASTM F2023: Standard Test Method for Evaluating the Oxidative Resistance of Crosslinked Polyethylene (PEX) Tubing and Systems to Hot Chlorinated Water
- NSF/ANSI 14, nsf-rfh: Evaluated for use in Radiant Floor Heating (NSF-rfh) Applications
- NSF/ANSI 61, nsf-pw: Complies with NSF/ANSI standard 61 for Health Effects Requirements
- NSF Protocol P171: Chlorine Resistance. Complies with Traditional Domestic End Use Conditions Intertek / Warnock Hersey to CSA B137.5
- CSA B137.5 – Cross Linked Polyethylene (PEX) Tubing Systems for Pressure Applications
- Intertek / Warnock Hersey to CSA B137.5
- UPC listed by IAPMO (International Association of Plumbing and Mechanical Officials)

## Pressure Ratings

200° F @ 80 psi  
180° F @ 100 psi  
73° F @ 145 psi

## Markings

All Everhot PEX is marked with the following:

- Brand
- Manufacture code
- Manufacture date
- PEX 0006 (1006 for Barrier PEX)
- Certifications (NSF-pw and cWHI for Non-barrier PEX; NSF-rfh for Barrier PEX)
- ASTM/CSA standards
- IAPMO/UPC
- SDR 9
- CTS and OD sizes
- Pressure ratings
- Type of tubing (end use)
- Footage

Note: It is the responsibility of the installer to assure that products described in this manual meet local codes and requirements.

## Complete System

Everhot Inc. PEX tubing and PEX fittings are designed to be used and installed as a complete system. Other fittings, such for copper and CPVC are not compatible and cannot be used with it. Everhot PEX and fittings are not compatible and must not be used with polybutylene tubing and/or fittings. Everhot Inc. cannot guarantee compatibility of its PEX products with PEX products from other manufacturers. Any improper use or misuse may void the warranty.

## Precautions

- Everhot Inc. products should only be used for purposes and application described in this manual or in the latest version of Technical Specifications Sheet (available on [www.everhotinc.com](http://www.everhotinc.com) )
- Everhot PEX tubing cannot be used for distribution of oil, mineral, chemical and acidic products.
- Never use any soldering paste, pipe thread compounds or sealants with PEX.
- PEX cannot be stored and installed in areas exposed to direct/indirect UV light (sunlight) for over 60 days. Prolonged exposure to UV light damages the tubing and may void the warranty.
- Do not expose PEX to extremely high (flame) or low temperatures.
- PEX cannot be buried underground in contaminated soil.
- Brass PEX fittings should not be installed in radiant/plumbing systems with higher than average presence of chlorine and dissolved oxygen.
- Do not crush or scratch Everhot PEX.

## Before you start

Prepare all the tools and materials you need for your project. Visually inspect them for any damage or defects. Make sure the tools are properly calibrated (as explained below) and are in a working condition.

## Calibration - Crimp Tool

Everhot Inc. supplies only high quality and professional grade tools. These tools, however, are subject to a normal wear and may require calibration from time to time to insure proper connection. To check whether the calibration is needed, you should make a test crimp connection and check it with a Go-No-Go gage. If the connection gages properly, there is no need in adjusting the tool. However, if the connection does not gage properly, the tool must be adjusted:

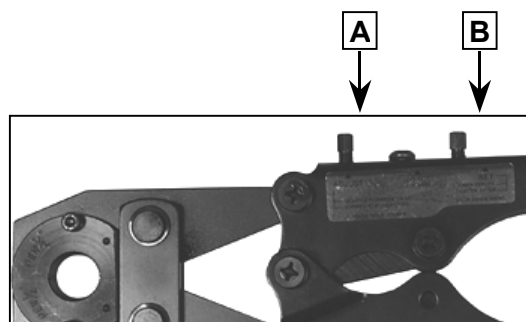
1. Open the tool jaws and using the crescent wrench supplied with it, loosen the **B** setscrew 2-4 turns.

2. Start closing the tool up to the point where the jaws touch and a substantial difference in resistance is felt.

3. Using the crescent wrench, adjust the **A** setscrew until distance between the ends of the handles is ~6 inches (for 15" long tool).

4. Tighten the **B** setscrew.

5. Make a test connection and check it with a Go-No-Go gage. If the tool is adjusted properly, crimp should be a "Go". If crimp is a "No-Go", remove the crimp ring with a Decrimping Tool and repeat these steps while changing the distance between tool handles as described above.



## Making a crimp connection



### Step 1.

Measure and cut the tubing squarely. Irregular and jagged cut may result in an improper connection.



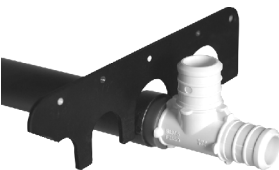
### Step 2.

Slide a proper size crimp ring onto the end of the tubing 2-3 inches.



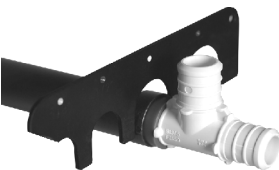
### Step 3.

Push the fitting into the pipe until the tubing touches the fitting's shoulder and position the crimp ring 1/8"-1/4" from the end of the pipe.



### Step 4.

Fully open the crimp tool jaws and center them tool over the ring. Hold the tool 90° to the tubing. Close the tool jaws completely.



### Step 5.

Use the go-no-go gage to check every crimp connection. Position the gage over the crimp ring at a 90° angle to the tubing. If crimp connection is a "Go", the connection was made properly. If crimp connection is a "No-Go", or the ring looks deformed, connection was made improperly. Remove the crimp ring with a decrimping tool and repeat steps 1-5.

## Removing crimp rings



If connection failed to pass a go-no-go gage testing, crimp ring must be removed and connection must be done again.

Some of the reasons for an improper connection are:

- Improper positioning of the ring over the fitting (if the ring is too close to or too far from the fitting shoulder, not enough fitting barbs will be covered).
- Improper positioning of the tool over the crimp ring (if the tool was

at an angle other than 90° to the tubing, the ring will deform).

- Improper positioning of the tool jaws over the crimp ring (the jaws have to be centered on the crimp ring, otherwise, the ring will be compressed unevenly).

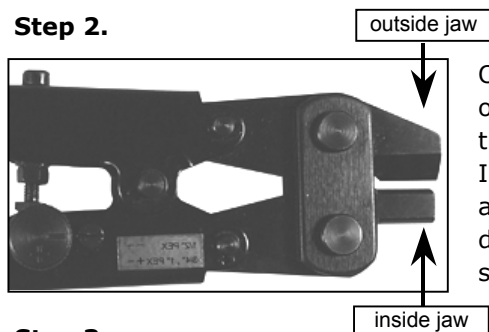
Important: do not use a decrimping tool to remove stainless steel clamps. Decrimping tool can only be used for a purpose of removing copper crimp rings. Any other use or misuse may damage the blade.

### Step 1.

Cut the tubing ~1" from the fitting shoulder. Do not cut the tubing too close to a crimp ring, as it may damage the cutter's blade and the fitting. Do not force the cutter. If you feel resistance while cutting the tubing, open the cutter and move it slightly away from the fitting.

## Removing crimp rings (continued)

### Step 2.



Open tool jaws and insert inside jaw into the fitting so that the outside (cutting) jaw is positioned over the crimped ring. Close the tool jaws.

Important: Everhot Decrimping Tool has an adjusting pin which allows to adjust it to a proper crimp ring size. Do not use the decrimper adjusted to a small size on larger size crimp rings, since it may cause damage to the barbs of the fitting.

### Step 3.

Rotate the tool so that it becomes positioned over the opposite side of the crimp ring. Repeat step 2. Force the fitting out of the tubing by hand.

### Step 4.

Visually inspect the fitting at the points where the crimped ring was cut. If the barbs of the fitting were damaged due to improper use of the decrimping tool, such fitting can no longer be used.

## Making a clamp connection



### Step 1.

Measure and cut the tubing squarely. Irregular and jagged cut may result in an improper connection.

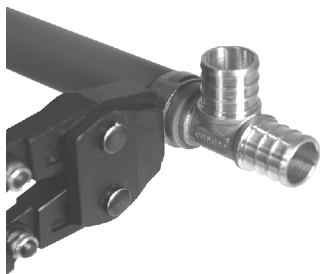


### Step 2.

Slide a proper size stainless steel clamp over the end of the tubing 2-3".

### Step 3.

Push the fitting into the pipe until the tubing touches the fitting's shoulder and position the clamp 1/8"-1/4" from the end of the pipe.



### Step 4.

Fully open the clamp tool jaws and position them tool over the pinch head of the clamp. Set the tool 90° to the tubing. Slowly and firmly close the tool. When the connection is done, tool jaws will release automatically. Note: Clamp tool will only open when jaws are completely closed. Never force the clamp tool to open. In the event of emergency, use the release pin to open tool jaws.



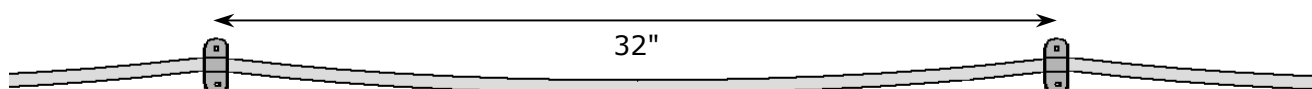
### Step 5.

Visually check the connection. The steel band should be of a constant width and the pinch head should not be twisted to the side. In the event when connection was made improperly, remove the clamp with wire cutter, recalibrate the tool and repeat steps 1-5.

## Removing stainless steel clamps

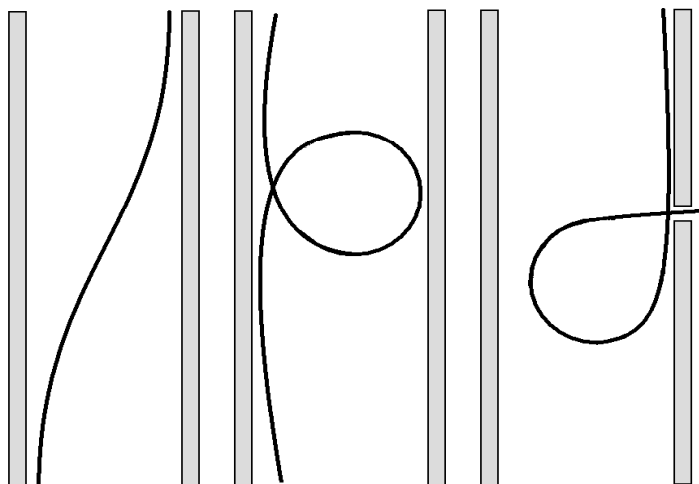
To remove a stainless steel clamp, cut off the pinch head with a regular wire cutter and pry the clamp tabs open. Note: always cut off a previously clamped section of the pipe.

## Pipe supports



Everhot PEX must be properly supported both vertically and horizontally to avoid excessive strain. Horizontal pipe runs must be supported every 32" or less, vertical runs - every 3-4 feet. A little slack ( $\sim 1/4"$ ) must always be left between the support points to allow the tubing to expand and contract. Use only supports approved for plastic pipe, such as plastic pipe straps, tube talons, snap-in clips or bend supports, or any other type of supports approved for use with plastic pipes. Never use sharp or rigid objects such as nails, metal staples, hangers, clamps or any other supports that may kink, scratch or pierce the pipe.

## Thermal expansion/contraction



Since Everhot PEX will expand and contract  $\sim 1"$  for every 100ft of tubing at a  $10^{\circ}\text{F}$  temperature change, a proper slack must be provided to offset such thermal changes. For longer pipe runs the latter can be done by making a loop or an offset as shown on the picture (left).

Such loops must be supported as explained above to avoid contact with joists or studs. During thermal expansion / contraction, loops will also expand and contract, so the minimum loop diameter should be large enough to allow for a lesser diameter, but small enough to provide room for expansion and prevent friction with joists/studs.

Do not bundle PEX tubing without necessity, as it may cause problems associated with heat transfer or uneven thermal expansion/contraction. In places where PEX has to be bundled, provide individual sleeving for every pipe in the area of potential abrasion. You may consider using nylon wire ties to secure the sleeving or the bundled pipes together.

## Concrete slab installations

When using Everhot PEX in concrete slabs, always provide non-metallic and non-rigid sleeving when entering and exiting the slab. Larger diameters of Everhot PEX will work well for such purpose. Use only continuous lengths of PEX in a slab. Avoid any connections and always pressure test before pouring concrete.

## PEX to copper transitions

When making a transition between a copper pipe and PEX using sweat fittings, always solder the fitting first, cool it off, and only then connect it to PEX. Keep open flames away from PEX during all times.

## PEX to thread transitions

As with copper, when making a transition between PEX and a metal threaded pipe (fitting) using an MPT/FPT fitting, always secure the threaded part first and only then connect PEX.

## Insulation

Everhot PEX should be kept away from sources of heat such as gas vents, chimneys, light fixtures, water heaters and boilers. Always maintain a minimum distance of 12" vertically and 6" horizontally from mentioned sources of heat. To connect Everhot PEX to a water heater, use 12" long water heater connectors or copper pipes of equal length. Do not route the tubing in areas where maintaining a safe distance with high heat sources is not possible.

If there is a doubt whether such distance meets the requirements above, always provide insulation approved by your local building code.

For fire insulation purposes, use silicone based caulks, expanding foam of closed cell insulation.

## Fixture connections

Everhot PEX can be connected to stub-out elbows, stop valves, ball valves, icemaker and washing machine valves as long as they meet ASTM F1807.

## Drilling holes for PEX tubing

When it is necessary to drill holes for PEX pipe in structural components of the building, make sure to comply with local building code requirements.

Provide sleeving every time tubing runs through a wall, joist or a stud. For concrete, block and brick walls, use larger size PEX tubing. For joists and studs, use "butterfly" type plastic pipe straps.

If you're running PEX through the floor joists or wall studs, make holes at least 2 inches away from the nailing surface. Use steel plate protectors every time where such distance requirements cannot be met.

## Pressure Testing

After the installation process is complete, the whole PEX plumbing/radiant system has to be pressure tested.

When choosing between water and compressed air pressure testing, only use air in cases where there exists a risk of water freezing in the pipes (such as during winter).

Always consult your local code for requirements of a proper pressure testing.

- Test pressure should be equal or greater than the systems' normal operating pressure, but should not be less than 40 psi and not greater than 200 psi @ 73°F.
- Test duration should be not less than 15 minutes.

When using compressed air, the pressure should not exceed 100 psi. Be sure to use safe testing practices and wear eye protection.

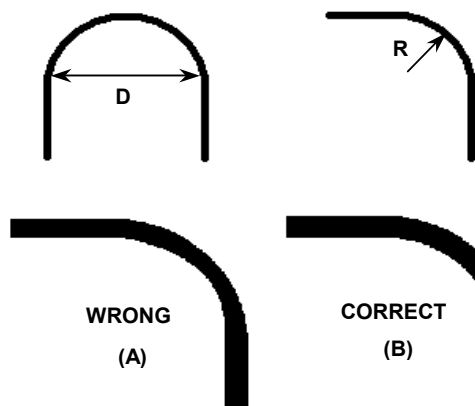
## Minimum bending radius

When routing Everhot PEX, always consider the minimum bending radius for the tubing. Both for Barrier and Non-barrier PEX, the bending radius is the same and it is 8 times the outside diameter of the tubing.



## Minimum bending radius (continued)

Do not confuse bending radius and bending diameter (both shown below).



R: Bending Radius  
D: Bending Diameter ( $D = 2 \times R$ )

Example:

Minimum bending radius for 1/2" PEX tubing is  
 $8 \times 5/8" = 5"$

TUBING SIZE	O.D.	MIN BENDING RADIUS
3/8"	1/2"	4"
1/2"	5/8"	5"
5/8"	3/4"	6"
3/4"	7/8"	7"
1"	1 1/8"	9"

Overbending the tubing as shown above (Fig. A) may kink the pipe, restrict flow and cause long-term damage. A correct way to bend Everhot PEX is shown of Fig. B (tubing is of a constant diameter throughout the whole bend).

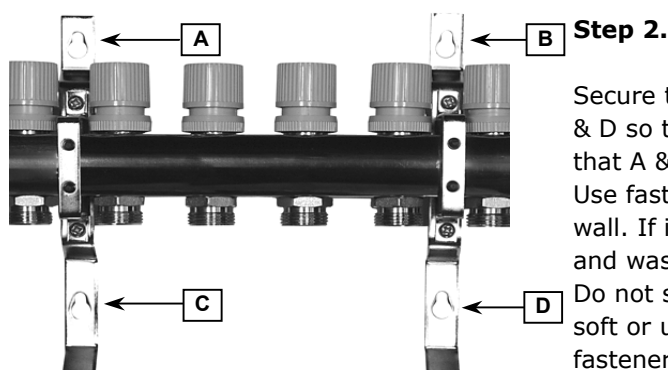
To assure proper bending radius, Everhot Inc. recommends using bend supports.

## Manifold installation

Everhot Stainless Steel manifolds are sold fully pre-assembled and ready for installation.

### Step 1.

Visually inspect the manifold for any damages. All flow meters should be intact and in place. Do not install the manifold if any parts are missing, or if it has any broken parts or signs of such.



### Step 2.

Secure the manifold to a vertical surface at points A,B,C & D so that the branch outlets face the floor. Make sure that A & B as well as C & D points are in line. Use fasteners and washers to secure the manifold to the wall. If installing onto a concrete wall, use anchor bolts and washers.

Do not secure to plasterboard, foam, fiber board or other soft or unstable surfaces. Use only corrosion resistant fasteners.

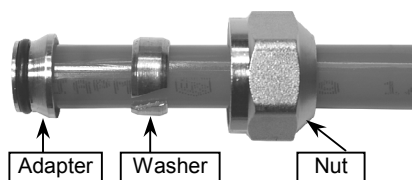
If installing a manifold onto a wooden stud wall, position

the studs so that they match manifold brackets.

Never use nails or any other type of fasteners different from those mentioned above.

If you need to make holes for fasteners (such as for anchor bolts in concrete/brick wall), place the manifold against the wall, mark the A, B, C & D points first, remove the manifold and then drill the holes.

## Manifold installation (continued)



### Step 3.

Measure and cut the tubing squarely.  
Slide the nut over the tubing ~3 inches from the end of the pipe.  
Slide the washer over the tubing ~2 inches from the end of the pipe.  
Firmly push the adapter into the pipe until it touches the adapters' shoulder.

### Step 4.

Before connecting PEX to the manifold, assure that the tubing is properly marked. Each PEX line has to be identified with the following:

- Loop (zone) it belongs to.
- Whether it is a supply or return line.

All supply lines must be connected to a lower manifold (with flow meters), while all the return lines must be connected to an upper manifold (with valves/actuators).

Always connect 1 loop (zone) at a time, starting from the return line. Make sure the tubing length is sufficient enough to reach the manifold outlets without stressing the pipe.

If PEX lines run parallel to the manifold and have to make sharp turns in order to be connected to its outlets, use bend supports or secure the tubing before connecting it to the manifold.

To connect the tubing to the manifold, push the adapter all the way into the manifold branch and tighten the nut with a crescent wrench as shown on the picture above.

Repeat Steps 1-4 until all PEX lines are tied to the manifold.

### Step 5.

Connect boiler supply and return lines to the manifold and pressure test the system (see "Pressure testing" part of this manual).

Always install the manifold in a way that will allow for an easy connection of its main supply and return lines with the supply and return lines of the boiler.

If a transition has to be made between copper pipes and manifold ball valves, follow these steps:

- Weld the adapter onto the copper pipe.
- Connect the ball valve with adapter (always use approved pipe thread sealant and/or tape).
- Connect the ball valve with manifold by tightening the compression nut.

If a transition has to be made between PEX tubing and manifold ball valves, follow these steps:

- Connect the ball valve with adapter (always use approved pipe thread sealant and/or tape).
- Connect the ball valve with manifold by tightening the compression nut.
- Connect PEX tubing to the adapter as described in "Making a crimp connection" or "Making a clamp connection" parts of this manual.

### Everhot Stainless Steel Manifolds Don'ts:

- Do not disassemble the manifold.
- Don't install manifold in hard to reach areas.
- Don't use manifold brackets as a support for other system components (pumps, pipes, valves, etc.)
- Don't install the manifold upside down.

## Technical data

**PIPE DIMENSIONS AND FLUID CAPACITY**

Tubing size	O.D.	Wall thickness	I.D.	Volume gal/100'	Weight lbs/100'
3/8"	0.500	0.070	0.350	0.50	4.50
1/2"	0.625	0.070	0.475	0.92	5.80
5/8"	0.750	0.083	0.574	1.34	8.38
3/4"	0.875	0.097	0.677	1.83	11.00
1"	1.125	0.125	0.863	3.03	17.06

**PRESSURE DROP TABLE (psi per 100ft)**

Flow rate, GPM	3/8"	1/2"	5/8"	3/4"	1"
0.5	2.50	0.51	0.21	0.05	0.02
1.0	7.50	1.70	0.71	0.34	0.10
2.0	26.1	5.30	2.12	1.02	0.35
3.0	54.1	11.0	4.36	2.10	0.63
4.0		18.4	7.36	3.53	1.06
5.0		27.4	11.0	5.26	1.58
6.0		38.1	15.3	7.30	2.19
7.0			20.1	9.63	2.89
8.0			25.6	12.3	3.68
9.0			31.7	15.1	4.55
10.0				18.3	5.50
11.0				21.7	6.52
12.0				25.4	7.63
13.0					8.81
14.0					10.1
15.0					11.4
16.0					12.8
17.0					14.3
18.0					15.8
19.0					17.5

## PEX packing information

TUBING SIZE, in.	COIL/STICK LENGTH, ft	WIDTH, in.	LENGTH, in.	HEIGHT, in.	WEIGHT, lbs	PACKING	PALLET / BUNDLE qty
3/8"	300	22	22	10	17	box	24-26
3/8"	500	24	24	10	26	box	24-26
3/8"	1000	30	30	10	50	box	10-14
1/2"	20	10	242	10	134	bundle	100/bundle
1/2"	100	22	22	8	7	unboxed	40
1/2"	300	24	24	10	21	box	24-26
1/2"	500	26	26	10	32	box	14-24
1/2"	1000	32	32	10	62	box	10-13
5/8"	300	26	26	10	30	box	14-24
5/8"	500	30	30	10	46	box	10-14
3/4"	20	10	242	10	127	bundle	50/bundle
3/4"	100	27	27	8	12	unboxed	20
3/4"	300	32	32	10	37	box	10-14
3/4"	500	34	34	10	59	box	10-14
3/4"	1000	39	39	13	116	box	5-6
1"	20	10	242	10	134	bundle	30/bundle
1"	100	32	32	8	18	unboxed	14
1"	300	36	36	11	62	box	10-11

## Everhot Inc. limited warranty

As a part of this warranty, Everhot Inc. reserves the right to change the design and pricing of its products without notice, as well as make any improvements to products and changes to packing of such, as well as discontinue them without obligation to replace or upgrade any existing products with new ones.

Subject to limitations in this warranty, Everhot Inc. warrants the products listed below to be free of defects in material and workmanship for the time periods indicated when used and installed in accordance with the requirements set by Everhot Inc.

- Everhot Inc. PEX Tubing (with Oxygen Barrier and Non-barrier) - for a period of 20 years from the date of purchase.
- Everhot Inc. Brass PEX Fittings - for a period of 10 years from the of date of purchase.
- Everhot Inc. Stainless Steel Manifolds for Radiant Heating - for a period of 5 years from the date of purchase.
- Everhot Inc. Tools - for a period of 1 year from the date of purchase.
- Everhot Inc. Accessories - for a period of 90 days from the date of purchase.

In order for this warranty to take effect, Everhot Inc. products listed above must be installed by a licensed professional, in accordance with all applicable building codes and installation guidelines. Failure to comply will void this and other applicable warranties.

This warranty shall be considered valid under normal conditions such as: (a) proper installation as per local and official building codes requirements; (b) use of tubing, fittings and manifolds only at designated temperatures and pressure ratings as stated in the guidelines and instructions published by Everhot Inc.; (c) use of Everhot Inc. products only for the purposes designated by Everhot Inc. and no other purposes; (d) proper storage, handling and defect-free condition.

All reports of failures must be accompanied by a written explanation of a believed reason for failure. Such reports must be submitted to Everhot Inc. within (30) days upon recognition of a system defect or malfunction along with a defective product at owner's expense. Within a reasonable time period after receipt of notification, Everhot Inc. will determine whether this warranty applies. If conditions of this warranty are met, and inspection proves that a submitted product is defective, Everhot Inc. will provide a replacement free of charge. All redemptions provided by Everhot Inc., as a part of this warranty, are subject to approval before being in effect. Any additional allowances, such as freight, labor and repairs cost shall be exclusively the options of Everhot Inc. and are not covered by this warranty. Note that Everhot Inc. will only warrant its PEX tubing, fittings, manifolds, accessories and tools. Everhot Inc. does not warrant connections due to wide variety of installation practices.

Everhot Inc. does not warrant: (a) defects caused by failure to install the pipe in accordance with current installation guidelines; (b) damages caused by exposure to unauthorized antifreeze, rust inhibitor or other treatment fluids or by failure to provide recommended freeze protection or recommended water temperature levels or other misuse or abuse of the pipe; (c) any component or part not sold by Everhot Inc. ; (d) damages by a disaster such as fire, wind, lightning, etc.; (e) improper installations resulted from use of worn, damaged or poorly calibrated tools; (f) damages caused by failure to follow applicable building(plumbing) codes and good plumbing practices.

Although Everhot Inc. offers its products as a complete system for majority of applications, installer may choose the option of using components (such as tubing, fittings, manifolds, etc.) of other manufacturers, if they comply with ASTM F1807/877 standards and are third-party certified for use in any given installation. For such installations, Everhot Inc. products will still be covered by this warranty, however, Everhot Inc. does not warrant any products from other manufacturers and in the event such products are found to be defective in material or workmanship, deems no liability for any direct or indirect damage caused by these products and is not to be held responsible for product replacement or any compensation.

Everhot Inc. shall not be liable for any consequential, special or incidental damages based upon breach of warranty, breach of contract, negligence, strict tort or any other legal theory. Such damages include, damage of the property and other economic loss, but do not include personal injury damage.

Some states do not allow the limitation of duration of warranty and exclusion of incidental or consequential damages. Therefore, such limitations may not apply to you. This warranty gives you specific legal rights and depending on the state of residence/installation, you may have other legal rights.

IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE LIMITED IN DURATION TO ONE YEAR FROM THE DATE OF PURCHASE (OR, IF NOT AVAILABLE, FROM THE DATE OF MANUFACTURE).

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