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DIVISION: 2200 00—PLUMBING
Section: 2211 16-Domestic Water Piping
DIVISION: 230000 -HEATING, VENTILATING AND AIRCONDITIONING (HVAC)
Section: 2321 13—Hydronic Piping

## REPORT HOLDER:

## RELIANCE WORLDWIDE CORPORATION www.rwc.com

## EVALUATION SUBJECT:

## Sharkbite ${ }^{\circledR}$ PEX TUBING AND SPEEDFIT ${ }^{\circledR}$ FITTINGS

### 1.0 EVALUATION SCOPE

Compliance with the following codes:
■ 2021, 2018, 2015, 2012, 2009 and 2006 International Plumbing Code ${ }^{\circledR}$ (IPC)

■ 2021, 2018, 2015, 2012, 2009 and 2006 International Mechanical Code ${ }^{\circledR}$ (IMC)

■ 2021, 2018, 2015, 2012, 2009 and 2006 International Residential Code ${ }^{\circledR}$ (IRC)

■ 2021, 2018, 2015, 2012, 2009 and 2006 Uniform Plumbing Code (UPC)*

■ 2021, 2018, 2015, 2012, 2009 and 2006 Uniform Mechanical Code (UMC)*
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## Compliance with the following standards:

■ ASSE 1061-2020, Performance Requirement for Pushfit fittings

- ASTM F876-2023, Standard Specification for Crosslinked Polyethylene (PEX) Tubing1

■ ASTM F877-2023, Standard Specification for Crosslinked Polyethylene (PEX) Hot- and Cold-Water Distribution Systems
■ ASTM F2854-2021, Standard Specification for Push-Fit Crosslinked Polyethylene (PEX) Mechanical Fittings for Crosslinked Polyethylene (PEX) Tubing
■ ICC-ES LC1004-2009 (editorially revised 2010), PMG Listing Criteria for PP, PEX, PEX-AI-PEX and PP-AL-PP Tube and Fittings used in Radiant Heating and Water Supply Systems
■ ICC-ES LC1009-2008 (editorially revision 2010), PMG Listing Criteria for Push-fit Fittings for Potable Water Tube and Radiant Heating Systems

- NSF/ANSI 14-2022, Plastics Piping System Components and Related Materials
■ NSF/ANSI/CAN 61-2022, Drinking Water System Components - Health Effects


### 2.0 USES

Sharkbite ${ }^{\circledR}$ PEX tubing is a cross-linked polyethylene (PEX) tubing used in radiant heating systems and potable hot- and cold-water distribution systems. Speedfit ${ }^{\ominus}$ fittings are push-fit fittings designed for use with PEX tubing, copper tube, chlorinated polyvinyl chloride (CPVC) or PEX in accordance with this report.

### 3.0 DESCRIPTION

### 3.1 General:

Sharkbite ${ }^{\circledR}$ PEX tubing is manufactured from red, white or blue cross-linked PE. Speedfit ${ }^{\circledR}$ fittings are also manufactured from white cross-linked PEX and other materials. See Table 1 for recognized fittings and materials. The Sharkbite ${ }^{\circledR}$ PEX tubing and fitting system satisfies the requirements of ASTM F 876, ASTM F 877 and NSF 14. All components in contact with potable water satisfy NSF 61. Sharkbite ${ }^{\circledR}$ PEX tube and fitting products are pressure-rated for 100 psi $(689 \mathrm{kPa})$ at $180^{\circ} \mathrm{F}\left(82^{\circ} \mathrm{C}\right)$, and $160 \mathrm{psi}(1100 \mathrm{kPa})$ at $73^{\circ} \mathrm{F}$ $\left(23^{\circ} \mathrm{C}\right)$, for a standard dimension ratio of 9 . Standard dimension ratio is the ratio of outside diameter to wall thickness and is constant for all tube sizes over $1 / 2$ inch ( 12.7 mm ).

### 3.2 Sharkbite ${ }^{\circledR}$ PEX Tubing:

The tube is available in $3 / 8,1 / 2-, 3 / 4-, 1-, 1-1 / 4-, 1-1 / 2$ - and 2-inch (9.5, 12.7, 19.1-25.4, 31.75, 38.1 and 50.8 mm ) nominal diameter sizes, in coils or in straight lengths.

### 3.3 Fittings:

3.3.1 Speedfit ${ }^{\circledR}$ System: Speedfit ${ }^{\circledR}$ push-fit fittings are recognized for use with Sharkbite ${ }^{\circledR}$ PEX tubing, using insert sleeves, in accordance with ASSE 1061, ICC-ES AC311 and ASTM F877 as well as NSF 61. Speedfit ${ }^{\text {® }}$ fittings have a collet with stainless steel gripping teeth and a rubber O-ring seal. Insert fittings are required and are provided in two types. The standard insert sleeve does not have any O-ring seals, whereas the Superseal Insert Sleeve has two O-ring seals. PEl fittings are recognized as having satisfied ASTM F2854 for use with pipe insert only.
3.3.2 Speedfit ${ }^{\circledR}$ Push-fit Fittings for Use with Other Materials: Speedfit ${ }^{\circledR}$ push-fit fittings are recognized as having satisfied ASSE 1061 for use with copper tubing, chlorinated polyvinyl chloride (CPVC), and PEX tubing (provided the PEX tubing is marked in accordance with

Section 5.0 of this report). See Section 5.0 for material specifications.

### 4.0 INSTALLATION

## General:

Sharkbite ${ }^{\circledR}$ PEX tubing and push-fit fittings must be installed in accordance with the applicable code and the manufacturer's published installation instructions. The pipe or tubing is cut to length, and for PEX an insert is fitted into the cut end of the tube. The pipe or tubing is pushed into the fitting up to the stop. The fitting has a cursor line on the outer surface to show the full insertion depth for the tubing.

### 4.1 Water distribution:

Horizontally laid pipe must be secured in such a manner that temperature-induced expansion and contraction are accommodated.

### 4.2 Radiant Heating Systems:

Details of the design and installation of the radiant heating system must be submitted to the code official for approval. All circuits must be formed from continuous lengths of tubing, from manifold supply to return. No splices are allowed. The system may be installed in either concrete or wood floors. When the system is embedded in concrete floors, a moisture barrier must be laid over a concretebase slab that has a minimum thickness of $3^{1 / 2}$ inches (38 mm ). Underfloor insulation and reinforcing mesh must be placed on the slab. The tubing is uncoiled and attached to the mesh using soft-steel wire or clips. A concrete topping is laid over the tubing. When embedment is in concrete, the installation, including minimum concrete cover, must comply with IBC Chapter 19 or IRC Chapter 5. When the tubing is installed over polystyrene boards, the boards must comply with IBC Chapter 26 or IRC Chapter 3.
Mounting brackets and installation hardware are provided by the manufacturer. Horizontally laid pipe must be secured in such a way that temperature-induced expansion and contraction are accommodated.

### 4.3 Inspection:

4.3.1 Water Distribution: Installed tubing must be pressure-tested and inspected as required by the applicable code.
4.3.2 Radiant Heat Piping: The tubing must be pressure-tested for leaks before installation of covering. The leak test must be witnessed by the code official or the code official's designated representative.

### 5.0 CONDITIONS OF USE

The Sharkbite ${ }^{\circledR}$ PEX Tubing and Fittings described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:
5.1 The tubing and fitting systems must be installed in accordance with this report and the applicable code.
5.2 When installation is in fire-resistance-rated assemblies, evidence of compliance with IBC Chapter 7 (penetrations) must be provided to the code official for approval.
5.3 Sharkbite ${ }^{\circledR}$ PEX tubing and fittings must be protected from exposure to direct sunlight. Tubing and fittings must be protected from physical damage with an oversized flexible corrugated sleeve at structural mass penetrations and when the tube is uncovered. Annular spaces between sleeves and pipes must be filled or tightly caulked in an approved manner.
5.4 All systems must be installed in accordance with the manufacturer's installation instructions, which are provided
with the product. Installation must conform with relevant requirements of the referenced codes and is subject to approval by the code official.
5.5 During placement of the cover over the tubing, the tube must be maintained at the greater of $11 / 2$ times the working pressure or $100 \mathrm{psi}(689.4 \mathrm{kPa})$, whichever is greater.
5.6 Manufacturer's instructions must be furnished to the code official upon request.
5.7 Clearances from heat-producing equipment must be in accordance with the applicable code.
5.8 Minimum bending radius of the tube must be six times the outside tube diameter for cold-bent tube. The outside diameter is nominal diameter plus $1 / 8$ inch ( 3.2 mm ).
5.9 Speedfit ${ }^{\circledR}$ push-fit fittings:
5.9.1 Speedfit ${ }^{\circledR}$ push-fit fittings are limited to use in interior, above-grade installations with operating pressures of $80 \mathrm{psi}(551.2 \mathrm{kPa})$ or less, and where the fittings are not embedded in concrete.
5.9.2 Pipe or tubing joined by Speedfit ${ }^{\circledR}$ push-fit fittings must not be used to support loads beyond those of the water-filled pipe and fittings.
5.9.3 Sharkbite ${ }^{\circledR}$ PEX tubing must be used only with pipe inserts.
5.9.4 Materials used with push-fit fittings:
5.9.4.1 Copper: Copper tubing must conform with ASTM B88.
5.9.4.2 CPVC: CPVC tubing must conform with ASTM D 2846.
5.9.4.3 PEX: Use of push-fit fittings is limited to PEX tubing listed as complying with ASTM F876 and ASTM F877 and labeled to indicate use with fittings complying with ASSE 1061.
5.10 The Sharkbite® PEX tubing and SPEEDFIT ${ }^{\circledR}$ fittings are manufactured by Reliance Worldwide and are under a quality control program with inspections by ICC-ES.

### 6.0 IDENTIFICATION

### 6.1 Sharkbite ${ }^{\circledR}$ PEX Tubing:

The tubing is marked every 3 feet ( 914 mm ) with the following:

- The Sharkbite logo (see Figure 1)
- The name "Sharkbite ${ }^{\circledR}$ "
- Nominal tube size
- Material designation (PEX5306)
- Potable water designation (PW or NSF61)
- Standard dimension ratio (SDR9)
- Temperature and pressure ratings
- ASTM F876/F877 designation
- ASSE 1061 fitting mark
- Production code
- The evaluation report number (ESR-1931)


### 6.2 Speedfit ${ }^{\circledR}$ Fittings:

Speedfit ${ }^{\circledR}$ fittings are marked with the following:

- The John Guest logo (see Figure 1)
- Nominal diameter
- Potable water designation (PW or NSF61)
- Letter designation of fitting manufacturer
- The designations ASTM F877 and CSA B137.5
- ASTM F2854 when space permits (PEI models only)

Packaging for the fittings is marked with:

- The evaluation report number (ESR-1931)

■ The designations ASTM F877, CSA B137.5 and ASSE 1061.

- The designation ASTM F2854 (PEI models only)
7.0 The report holder's contact information is the following:

RELIANCE WORLDWIDE CORPORATION 2300 DEFOOR HILLS ROAD NW ATLANTA, GA 30318
www.rwc.com

TABLE 1-FITTING DESCRIPTION

| PEX * |  | PEX * |  |
| :---: | :---: | :---: | :---: |
| PEI0220 | $11 ⁄ 2$ " CTS UNION TEE - WHITE | PEI222828 | ${ }^{3} / 4{ }^{\prime \prime}$ CTS STEM ELBOW CONNECTOR |
| PEI0228 | 3/4" CTS UNION TEE- WHITE | PEI3028A | $3^{3} 4^{\prime \prime} \times 3 / 4$ " $11 / 2$ " CTS REDUCING TEE |
| PEI0236 | 1" CTS UNION TEE-WHITE | PEI3028B | $3 / 4{ }^{\prime \prime} \times 1 / 2^{\prime \prime} \times 1 / 2^{\prime \prime}$ CTS REDUCING TEE |
| PEI0320 | $1122^{\prime \prime}$ CTS UNION ELBOW | PEI3028C | $1 / 2^{\prime \prime} \times 1 / 2^{\prime \prime} \times{ }^{3} 4^{\prime \prime}$ CTS REDUCING TEE |
| PEI0328 | 3/4" CTS UNION ELBOW - WHITE | PEI3028D | $3 / 44^{\prime \prime} \times 1 / 2^{\prime \prime} \times 1 / 4^{\prime \prime}$ CTS REDUCING TEE |
| PEI0336 | 1" CTS UNION ELBOW - WHITE | PEI532020 | $1 / 2{ }^{\prime \prime}$ CTS $\times 1 / 22^{\prime \prime}$ STEM $\times 1 / 2$ " CTS TEE |
| PEI0420 | $11 / 2$ CTS UNION CONNECTOR - WHITE | PEI532820 | $11 / 2$ " CTS $\times 1 / 2{ }^{\prime \prime}$ STEM $\times 1 / 22^{\prime \prime}$ CTS TEE |
| PEI0428 | 3/4" CTS UNION CONNECTOR - WHITE | PEI532828 | $3 / 4{ }^{\prime \prime}$ CTS ${ }^{3} / 4^{\prime \prime}$ STEM $x^{3} / 4^{\prime \prime}$ CTS TEE |
| PEI0436 | 1" CTS UNION CONNECTOR - WHITE | PEIBTC2034 | $1122^{\prime \prime}$ CTS x $1 / 22^{\prime \prime}$ NPSM FEMALE STRAIGHT CONNECTOR |
| PEI062820 | $3 / 4{ }^{\prime \prime}$ CTS TO $1122^{\prime \prime}$ CTS REDUCER | PEIBTC20C75 | $\begin{aligned} & \begin{array}{l} 1 / 2 " \text { CTS } \times 7 / 8^{\prime \prime} \text { BALLCOCK ELBOW CONNECTOR - } \\ 15 /{ }_{16} \text { UNS } \end{array} \\ & \hline \end{aligned}$ |
| PEI063628 | 1" CTS - $3 / 4$ " CTS REDUCER | PEISTC2034 | $1 / 2$ " CTS x $1 / 2$ " NPSM FEMALE STRAIGHT CONNECTOR |
| PEI202820 | $3 / 4{ }^{\prime \prime}$ CTS - 112" CTS REDUCING UNION | PEISTC20C75 | $1 / 22^{\prime \prime} x^{7 / 8 "}$ FEMALE BALLCOCK CONNECTOR ${ }^{15} /{ }_{16}$ UNS |
| PEI203628 | 1" CTS TO³/4" CTS REDUCING UNION | 112SC | 11/2" CTS SLIP CONNECTOR |
| PEI212820 | $3 / 44$ CTS TO $1 / 22^{\prime \prime}$ CTS REDUCING UNION ELBOW | $3 / 4 \mathrm{SC}$ | 3/4" CTS SLIP CONNECTOR |
| PEI222020 | ½" CTS STEM ELBOW CONNECTOR | *PEI products are also available in black. The part number has an "E" suffix |  |
|  | POLYSULFONE | POLYSULFONE |  |
| NC2723 | 3/8" $\times 3 / 4$ " NATIONAL HOSE ELB | PSEI3028A | 3/4" - 3/4"-1/2" CTS TEE |
| PSEI011624 | 3/8" CTS x 1/2" NPT MALE CONN | PSEI3028B | 3/4" - 1/2" - 1/2" CTS TEE |
| PSEI012024 | 1/2" CTS X 1/2" NPT STRAIGHT ADAPTOR | PSEI3028C | 1/2" - 1/2" - 3/4" CTS TEE |
| PSEI012026 | 1/2" CTS X 3/4" NPT STRAIGHT ADAPTOR | PSEI3028D | 3/4" - 1/2" - 3/4" CTS TEE |
| PSEI012824 | 3/4" CTS x 1/2" NPT MALE CONN | PSEI3036A | 1" - 1"-3/4" CTS TEE |
| PSEI012826 | 3/4" CTS X 3/4" NPT STRAIGHT ADAPTOR | PSEI452826 | 3/4" CTS X 3/4 NPS FEMALE CONNECTOR |
| PSEI012828 | 3/4" CTS x 1" NPT MALE CONN | PSEI4616 | 3/8" CTS END CAP |
| PSEI013626 | 1" CTS X 3/4" NPT STRAIGHT ADAPTOR | PSEI4620 | 1/2" CTS END CAP |
| PSEI013628 | 1" CTS X 1" NPT STRAIGHT ADAPTOR | PSEI4628 | 3/4" CTS END CAP |
| PSEI0216 | 3/8" CTS UNION TEE | PSEI4636 | 1" CTS END CAP |
| PSEI0220 | 1/2" CTS UNION TEE | PSEI482024 | 1/2" CTS X 1/2" NPT FIXED ELBOW CONNECTOR |
| PSEI0228 | 3/4" CTS UNION TEE | PSEI482826 | 3/4" CTS x 3/4" NPT MALE ELBOW |
| PSEI0236 | $1{ }^{\prime \prime}$ CTS UNION TEE | PSEI502034 | 1/2"CTS x 1/2" NPSM FEM STEM |
| PSEI0316 | 3/8" CTS UNION ELBOW | PSEI502034 | 1/2"CTS x 1/2" NPSM FEM STEM |
| PSEI0320 | 1/2" CTS UNION ELBOW | PSEI532020 | $1 / 2^{\prime \prime} \times 1 / 2^{\prime \prime}$ STEM $\times 1 / 2^{\prime \prime}$ CTS TEE |
| PSEI0328 | 3/4" CTS UNION ELBOW | PSEI532820 | 3/4" $\times 3 / 4$ " STEM $\times 1 / 2$ " CTS TEE |
| PSEI0336 | 1" CTS UNION ELBOW | PSEI532828 | 3/4" $\times 3 / 4$ " STEM $\times 3 / 4$ " CTS TEE |
| PSEI0416 | 3/8" CTS UNION CONNECTOR | PSEI533628 | 1" $\times 1$ 1" STEM $\times 3 / 4$ " CTS TEE |
| PSEI0420 | 1/2" CTS UNION CONNECTOR | PSEI6012U9 | 3/8" OD x 9/16-24 FEMALE |
| PSEI0428 | 3/4" CTS UNION CONNECTOR | PSEI601634 | 3/8" $\times 1 / 2$ " NPS FEM ADAP (BRASS) |
| PSEI0436 | 1" CTS UNION CONNECTOR | PSEI602034 | 1/2"CTSx1/2" NPS FEM AD (BRASS) |
| PSEI062016 | 1/2" CTS - 3/8" CTS REDUCER | PSEI602036 | 3/4" CTS x1/2 NPS FEM AD (BRASS) |
| PSEI062820 | 1" CTS - 3/4" CTS REDUCER | PSEI602834 | 1/2" CTS x3/4 NPS FEM AD (BRASS) |


| PSEI063628 | 3/4" CTS - 1/2" CTS REDUCER | PSEI602836 | 3/4" CTS x3/4 NPS FEM AD (BRASS) |
| :---: | :---: | :---: | :---: |
| PSEI202016 | 1/2" CTS x 3/8" CTS STR CONN | PSEI603638 | $1 \mathrm{CTS} \mathrm{x1} \mathrm{NPS} \mathrm{FEM} \mathrm{AD} \mathrm{(BRASS)}$ |
| PSEI202820 | 3/4" - 1/2" CTS STRAIGHT | PSEI612034 | 1/2"x1/2 NPS FEM ELB (BRASS) |
| PSEI203628 | 1" - $3 / 4$ " CTS STRAIGHT | PSEI612836 | 3/4"x3/4 NPS FEM ELB (BRASS) |
| PSEI212016 | 1/2" $\times 3 / 8$ " CTS ELBOW | PSEI621234 | 3/8" OD $\times 1 / 2$ NPS FEMALE CONN |
| PSEI212820 | 3/4"-1/2" CTS ELBOW | PSEI6212C75 | 3/8" OD x 7/8" BALLCOCK CONN |
| PSEI213628 | 1" - 3/4" CTS ELBOW | PSEI622036 | 1/2"x3/4 NPS FEM CON(PLASTIC) |
| PSEI222020 | 1/2" CTS STEM ELBOW | PSEI622836 | 3/4"x3/4 NPS FEM CON(PLASTIC) |
| PSEI222828 | 3/4" CTS STEM ELBOW | PSEI623638 | 1" x 1 NPS FEM CON(PLASTIC) |
| PSEI223636 | 1" CTS STEM ELBOW | PSEI632836 | 3/4"x3/4NPS FEM ELB(PLASTIC) |
| PSEI3016A | 1/2" x 1/2" $\times 3 / 8{ }^{\prime \prime}$ CTS TEE | *PSEI products are also available in black. The part number has an "E" suffix |  |
|  | LEAD FREE BRASS PARTS* |  | LEAD FREE BRASS PARTS* |
| MWI011624LF | 3/8" X 1/2 NPT BRASS MALE | MWI013626LF | 1" X 3/4 NPT BRASS MALE |
| MWI012024LF | $1 / 2$ "CTS x $1 / 2 \mathrm{npt} \mathrm{STR}$. | MWI013628LF | 1" X 1 NPT BRASS MALE |
| MWI012026LF | 1/2" CTS X $3 / 4 \mathrm{npt} \mathrm{STR}$. | MWI052024LF | 1/2"CTS x 1/2 npt STEM ADAPTOR |
| MWI012824LF | 3/4" X 1/2 NPT BRASS MALE | MWI052826LF | 3/4"CTS x $3 / 4 \mathrm{npt} \mathrm{STEM} \mathrm{ADAPTOR}$ |
| MWI012826LF | 3/4"CTS x $3 / 4 \mathrm{npt} \mathrm{STR}$. | MWI502034LF | 1/2"CTS x 1/2 npsm FEMALE ADAPTOR |
| MWI012828LF | 3/4" X 1 NPT BRASS MALE | *MWI products are also available with a black collet. The part number has an "E" suffix |  |
| SUPERSEAL INSERTS |  | INSERTS |  |
| STSI20 | ½" CTS SUPERSEAL PIPE INSERT | TSI16 | 3/8" CTS PIPE INSERT |
| STSI28 | $3 / 4{ }^{\prime \prime}$ CTS SUPERSEAL PIPE INSERT | TSI20 | $11 / 22^{\prime \prime}$ CTS PIPE INSERT |
| STSI36 | 1" CTS SUPERSEAL PIPE INSERT | TSI28 | 3/4" CTS PIPE INSERT |
|  |  | TSI36 | 1" CTS PIPE INSERT |

