



DIVISION: 22 00 00—PLUMBING

Section: 22 11 16—Domestic Water Piping

DIVISION: 23 00 00 —HEATING, VENTILATING AND AIR-CONDITIONING (HVAC)

Section: 23 21 13—Hydronic Piping

REPORT HOLDER:

RELIANCE WORLDWIDE CORPORATION

www.rwc.com

EVALUATION SUBJECT:

Sharkbite® PEX TUBING AND SPEEDFIT® FITTINGS

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2024, 2021, 2018, 2015, 2012, 2009 and 2006 *International Plumbing Code*® (IPC)
- 2024, 2021, 2018, 2015, 2012, 2009 and 2006 *International Mechanical Code*® (IMC)
- 2024, 2021, 2018, 2015, 2012, 2009 and 2006 *International Residential Code*® (IRC)
- 2024, 2021, 2018, 2015, 2012, 2009 and 2006 *Uniform Plumbing Code* (UPC)*
- 2024, 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 Push-fit fittings
- ASTM F876-2024, Standard Specification for Crosslinked Polyethylene (PEX) Tubing1
- ASTM F877-2024, 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 14-2023, Plastics Piping System Components and Related Materials

- NSF/ANSI/CAN 61-2023, Drinking Water System Components - Health Effects

2.0 USES

Sharkbite® PEX tubing is a cross-linked polyethylene (PEX) tubing used in radiant heating systems and potable hot- and cold-water distribution systems. Speedfit® 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® PEX tubing is manufactured from red, white or blue cross-linked PE. Speedfit® fittings are also manufactured from white cross-linked PEX and other materials. See Table 1 for recognized fittings and materials. The Sharkbite® 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® PEX tube and fitting products are pressure-rated for 100 psi (689 kPa) at 180°F (82°C), and 160 psi (1100kPa) at 73°F (23°C), 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® 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® System: Speedfit® push-fit fittings are recognized for use with Sharkbite® PEX tubing, using insert sleeves, in accordance with ASSE 1061, ICC-ES AC311 and ASTM F877 as well as NSF 61. Speedfit® 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. PEI fittings are recognized as having satisfied ASTM F2854 for use with pipe insert only.

3.3.2 Speedfit® Push-fit Fittings for Use with Other Materials: Speedfit® 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

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

4.0 INSTALLATION

General:

Sharkbite® 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 concrete-base slab that has a minimum thickness of 3½ 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® 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® 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 1½ times the working pressure or 100 psi (689.4 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® push-fit fittings:

5.9.1 Speedfit® push-fit fittings are limited to use in interior, above-grade installations with operating pressures of 80 psi (551.2 kPa) or less, and where the fittings are not embedded in concrete.

5.9.2 Pipe or tubing joined by Speedfit® push-fit fittings must not be used to support loads beyond those of the water-filled pipe and fittings.

5.9.3 Sharkbite® 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® fittings are manufactured by Reliance Worldwide and are under a quality control program with inspections by ICC-ES.

6.0 IDENTIFICATION

6.1 Sharkbite® PEX Tubing:

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

- The Sharkbite logo (see Figure 1)
- The name "Sharkbite®"
- 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® Fittings:

Speedfit® 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	1/2" CTS UNION TEE - WHITE	PEI222828	3/4" CTS STEM ELBOW CONNECTOR
PEI0228	3/4" CTS UNION TEE- WHITE	PEI3028A	3/4" x 3/4" x 1/2" CTS REDUCING TEE
PEI0236	1" CTS UNION TEE-WHITE	PEI3028B	3/4" x 1/2" x 1/2" CTS REDUCING TEE
PEI0320	1/2" CTS UNION ELBOW	PEI3028C	1/2" x 1/2" x 3/4" CTS REDUCING TEE
PEI0328	3/4" CTS UNION ELBOW - WHITE	PEI3028D	3/4" x 1/2" x 3/4" CTS REDUCING TEE
PEI0336	1" CTS UNION ELBOW - WHITE	PEI532020	1/2" CTS x 1/2" STEM x 1/2" CTS TEE
PEI0420	1/2" CTS UNION CONNECTOR - WHITE	PEI532820	1/2" CTS x 1/2" STEM x 1/2" CTS TEE
PEI0428	3/4" CTS UNION CONNECTOR - WHITE	PEI532828	3/4" CTS x 3/4" STEM x 3/4" CTS TEE
PEI0436	1" CTS UNION CONNECTOR - WHITE	PEIBTC2034	1/2" CTS x 1/2" NPSM FEMALE STRAIGHT CONNECTOR
PEI062820	3/4" CTS TO 1/2" CTS REDUCER	PEIBTC20C75	1/2" CTS x 7/8" BALLCOCK ELBOW CONNECTOR - 15/16 UNS
PEI063628	1" CTS - 3/4" CTS REDUCER	PEISTC2034	1/2" CTS x 1/2" NPSM FEMALE STRAIGHT CONNECTOR
PEI202820	3/4" CTS - 1/2" CTS REDUCING UNION	PEISTC20C75	1/2" x 7/8" FEMALE BALLCOCK CONNECTOR - 15/16 UNS
PEI203628	1" CTS TO 3/4" CTS REDUCING UNION	1/2SC	1/2" CTS SLIP CONNECTOR
PEI212820	3/4" CTS TO 1/2" CTS REDUCING UNION ELBOW	3/4SC	3/4" CTS SLIP CONNECTOR
PEI222020	1/2" CTS STEM ELBOW CONNECTOR	* PEI products are also available in black. The part number has an "E" suffix	
POLYSULFONE		POLYSULFONE	
NC2723	3/8" x 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" 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" x 1/2" STEM x 1/2" CTS TEE
PSEI0328	3/4" CTS UNION ELBOW	PSEI532820	3/4" x 3/4" STEM x 1/2" CTS TEE
PSEI0336	1" CTS UNION ELBOW	PSEI532828	3/4" x 3/4" STEM x 3/4" CTS TEE
PSEI0416	3/8" CTS UNION CONNECTOR	PSEI533628	1" x 1" STEM x 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" x 1/2" NPS FEM ADAP (BRASS)
PSEI0436	1" CTS UNION CONNECTOR	PSEI602034	1/2" CTS x 1/2" NPS FEM AD (BRASS)
PSEI062016	1/2" CTS - 3/8" CTS REDUCER	PSEI602036	3/4" CTS x 1/2" NPS FEM AD (BRASS)
PSEI062820	1" CTS - 3/4" CTS REDUCER	PSEI602834	1/2" CTS x 3/4" 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" CTS x1 NPS FEM AD (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" x 3/8" CTS ELBOW	PSEI621234	3/8" OD x 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" x 3/8" 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 npt STR. ADAPTOR	MWI013628LF	1" X 1 NPT BRASS MALE
MWI012026LF	1/2" CTS X 3/4 npt STR. ADAPTOR	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 npt STEM ADAPTOR
MWI012826LF	3/4"CTS x 3/4 npt STR. ADAPTOR	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	1/2" CTS SUPERSEAL PIPE INSERT	TSI16	3/8" CTS PIPE INSERT
STSI28	3/4" CTS SUPERSEAL PIPE INSERT	TSI20	1/2" CTS PIPE INSERT
STSI36	1" CTS SUPERSEAL PIPE INSERT	TSI28	3/4" CTS PIPE INSERT
		TSI36	1" CTS PIPE INSERT