

ICC-ES Evaluation Report

ESR-1931

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This report is subject to re-examination in two years.

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DIVISION: 15—MECHANICAL
Section: 15140—Domestic Water Piping
Section: 15180—Heating and Cooling Piping
Section: 15411—Fittings, Trim and Accessories
REPORT HOLDER:

JOHN GUEST LTD.
HORTON ROAD
WEST DRAYTON, MIDDLESEX UB78JL
UNITED KINGDOM
+44 1895-449233
www.johnguest.co.uk
Info@johnguest.co.uk

EVALUATION SUBJECT:
SPEEDFIT® TUBING AND FITTINGS
1.0 EVALUATION SCOPE
Compliance with the following codes:

- 2009 *International Plumbing Code*® (2009 IPC)
- 2009 *International Mechanical Code*® (2009 IMC)
- 2009 *International Residential Code*® (2009 IRC)
- 2009 *IAPMO Uniform Plumbing Code* (2009 IAPMO UPC)
- 2009 *IAPMO Uniform Mechanical Code* (2009 IAPMO UMC)
- 2006 *International Plumbing Code*® (2006 IPC)
- 2006 *International Mechanical Code*® (2006 IMC)
- 2006 *International Residential Code*® (2006 IRC)
- 2006 *IAPMO Uniform Plumbing Code* (2006 IAPMO UPC)
- 2006 *IAPMO Uniform Mechanical Code* (2006 IAPMO UMC)

Properties evaluated:

- Temperature and pressure ratings
- Physical properties
- Drinking water system component - health effects

2.0 USES

Speedfit® 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 Speedfit® tubing, copper tube, chlorinated polyvinyl chloride (CPVC) or PEX in accordance with this report.

3.0 DESCRIPTION
3.1 General:

Speedfit® tubing is manufactured from red, white or blue cross-linked PEX. Speedfit® fittings are also manufactured from white cross-linked PEX and other materials. See Table 1 for recognized fittings and materials. The Speedfit® 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. Speedfit® 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 Speedfit® PEX Tubing:

The tube is available in 1/2-, 3/4- and 1-inch (12.7, 19.1 and 25.4 mm) nominal diameter sizes, and in coils 100 feet (30.4 m) long, or in straight lengths 10 feet (3.04m) long.

3.3 Fittings:

3.3.1 Speedfit® System: Speedfit® push-fit fittings are recognized for use with Speedfit® PEX tubing, using insert sleeves, in accordance with ASSE 1061, ICC-ES AC311 and ASTM F 877 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.

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

4.0 INSTALLATION
General:

Speedfit® 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 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 Section 1906.3 or IRC Section R506. When the tubing is installed over polystyrene boards, the boards must comply with IBC Section 2603 or Section R316 of the 2009 IRC (Section 314 of the 2006 IRC).

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 Speedfit® 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 Section 712 (penetrations) must be provided to the code official for approval.
- 5.3 Speedfit® 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 1 1/2 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 Materials used with push-fit fittings:

5.9.3.1 Copper: Copper tubing must conform with ASTM B 88.

5.9.3.2 CPVC: CPVC tubing must conform with ASTM D 2846.

5.9.3.3 PEX: Use of push-fit fittings is limited to PEX tubing listed as complying with ASTM F 876 and ASTM F 877 and labeled to indicate use with fittings complying with ASSE 1061.

5.10 The Speedfit® tubing is manufactured by John Guest, Ltd., in Maidenhead, Berkshire, United Kingdom; and the Speedfit® fittings are manufactured by John Guest, Ltd., in West Drayton, Middlesex, United Kingdom, under a quality control program with inspections by NSF International (AA-633).

6.0 EVIDENCE SUBMITTED

6.1 Data in accordance with the ICC-ES PMG Listing Criteria for PP, PEX, PEX-AL-PEX, and PP-AL-PP Piping, Tubing and Fittings Used in Radiant Heating and Water Supply Systems (LC1004), dated November 2009.

6.2 Data in accordance with the ICC-ES PMG Listing Criteria for Push-fit Fittings for Potable Water Tube and Radiant Heating Systems (LC1009), dated April 2008 (editorially revised April 2010).

7.0 IDENTIFICATION

7.1 Speedfit® Tubing:

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

- The John Guest logo (see Figure 1)
- The name "Speedfit®"
- Nominal tube size
- Material designation (PEX)
- Potable water designation (PW)
- Standard dimension ratio (SDR9)
- Temperature and pressure ratings
- ASTM F 876/F 877 designation
- ASSE 1061 fitting mark
- Production code
- The name of the inspection agency (NSF International)
- The evaluation report number (ESR-1931)

7.2 Speedfit® Fittings:

Speedfit® fittings are marked with the following:

- The John Guest logo (see Figure 1)
- Nominal diameter
- Potable water marking (PW)
- Letter designation of fitting manufacturer
- The designations ASTM F 877 and CSA B137.5

Packaging for the fittings is marked with:

- The evaluation report number (ESR-1931)
- The designations ASTM F 877, CSA B 137.5 and ASSE 1061.

TABLE 1—FITTING DESCRIPTION

PEX *		PEX *	
PEI0220	1/2" CTS UNION TEE - WHITE	PEI3028B	3/4" x 1/2" x 1/2" CTS REDUCING TEE
PEI0228	3/4" CTS UNION TEE- WHITE	PEI3028C	1/2" x 1/2" x 3/4" CTS REDUCING TEE
PEI0236	1" CTS UNION TEE-WHITE	PEI3028D	3/4" x 1/2" x 3/4" CTS REDUCING TEE
PEI0320	1/2" CTS UNION ELBOW	PEI4620	1/2" CTS END CAPS
PEI0328	3/4" CTS UNION ELBOW - WHITE	PEI4628	3/4" CTS END CAPS
PEI0336	1" CTS UNION ELBOW - WHITE	PEI4636	1" CTS END CAPS
PEI0420	1/2" CTS UNION CONNECTOR - WHITE	PEI532020	1/2" CTS x 1/2" STEM x 1/2" CTS TEE
PEI0428	3/4" CTS UNION CONNECTOR - WHITE	PEI532820	1/2" CTS x 1/2" STEM x 1/2" CTS TEE
PEI0436	1" CTS UNION CONNECTOR - WHITE	PEI532828	3/4" CTS x 3/4" STEM x 3/4" CTS TEE
PEI062820	3/4" CTS TO 1/2" CTS REDUCER	PEIBTC2034	1/2" CTS x 1/2" NPSM FEMALE STRAIGHT CONNECTOR
PEI063628	1" CTS - 3/4" CTS REDUCER	PEIBTC20C75	1/2" CTS x 7/8" BALLCOCK ELBOW CONNECTOR - 15/16 UNS
PEI202820	3/4" CTS - 1/2" CTS REDUCING UNION	PEISTC2034	1/2" CTS x 1/2" NPSM FEMALE STRAIGHT CONNECTOR
PEI203628	1" CTS TO 3/4" CTS REDUCING UNION	PEISTC20C75	1/2" x 7/8" FEMALE BALLCOCK CONNECTOR - 15/16 UNS
PEI212820	3/4" CTS TO 1/2" CTS REDUCING UNION ELBOW	1/2SC	1/2" CTS SLIP CONNECTOR
PEI222020	1/2" CTS STEM ELBOW CONNECTOR	3/4SC	3/4" CTS SLIP CONNECTOR
PEI222828	3/4" CTS STEM ELBOW CONNECTOR	*	PEI products are also available in black. The part number has an "E" suffix
PEI3028A	3/4" x 3/4" x 1/2" CTS REDUCING TEE		
POLYSULFONE		POLYSULFONE	
PSEI012024	1/2" CTS x 1/2" NPT STRAIGHT ADAPTOR	PSEI452826	3/4" CTS X 3/4" NPS FEMALE CONNECTOR
PSEI012026	1/2" CTS x 3/4" NPT STRAIGHT ADAPTOR	PSEI4620	1/2" CTS END CAP
PSEI012826	3/4" CTS x 3/4" NPT STRAIGHT ADAPTOR	PSEI4628	3/4" CTS END CAP
PSEI013626	1" CTS x 3/4" NPT STRAIGHT ADAPTOR	PSEI4636	1" CTS END CAP
PSEI013628	1" CTS x 1 NPT STRAIGHT ADAPTOR	PSEI482024	1/2" CTS x 1/2" NPT FIXED ELBOW CONNECTOR
BRASS		BRASS	
MWI012024	1/2" CTS x 1/2" NPT STRAIGHT ADAPTOR	MWI052826	3/4" CTS X 3/4" NPT STEM ADAPTOR
MWI012026	1/2" CTS X 3/4" NPT STR. ADAPTOR	MWI502034	1/2" CTS X 1/2" NPSM FEMALE STEM ADAPTOR
MWI012826	3/4" CTS X 3/4" NPT STRAIGHT ADAPTOR	WBI2024	1/2" CTS X 1/2" NPT DROP EAR ELBOW
MWI052024	1/2" CTS X 1/2" NPT STEM ADAPTOR		
LEAD FREE BRASS		LEAD FREE BRASS	
MWI012024LF	1/2" CTS x 1/2" NPT STRAIGHT ADAPTOR	MWI052024LF	1/2" CTS x 1/2" NPT STEM ADAPTOR
MWI012026LF	1/2" CTS x 3/4" NPT STRAIGHT ADAPTOR	MWI052826LF	3/4" CTS x 3/4" NPT STEM ADAPTOR
MWI012826LF	3/4" CTS x 3/4" NPT STRAIGHT ADAPTOR	MWI502034LF	1/2" CTS x 1/2" NPSM FEMALE STEM ADAPTOR
INSERTS		INSERTS	
STSI20	1/2" CTS SUPERSEAL PIPE INSERT	TSI20	1/2" CTS PIPE INSERT
STSI28	3/4" CTS SUPERSEAL PIPE INSERT	TSI28	3/4" CTS PIPE INSERT
STSI36	1" CTS SUPERSEAL PIPE INSERT	TSI36	1" CTS PIPE INSERT



FIGURE 1—JOHN GUEST LOGO