

ICC-ES Evaluation Report

ESR-1155

Effective Date: December 1, 2011

This report is subject to re-examination in one year.

www.icc-es.org | (800) 423-6587 | (562) 699-0543

A Subsidiary of the International Code Council®

**DIVISION: 23 00 00 – HEATING, VENTILATING, AND AIR
CONDITIONING (HVAC)****Section: 23 21 13 – Hydronic Piping****REPORT HOLDER:****WATTS RADIANT, INC.
4500 EAST PROGRESS PLACE
SPRINGFIELD, MISSOURI 65803
(417) 447-8072**www.wattsradiant.com
burneymn@wattsind.com**EVALUATION SUBJECT:****WATTS RADIANT PEX, WATTS RADIANT PEX+ AND
WATER PEX BY WATTS****1.0 EVALUATION SCOPE****Compliance with the following codes:**

- 2012, 2009, 2006, and 2003 *International Plumbing Code*® (IPC)
- 2012, 2009, 2006 and 2003 *International Residential Code*® (IRC)
- 2012, 2009, 2006 and 2003 *International Mechanical Code*® (IMC)
- 2009, 2006, and 2003 *Uniform Plumbing Code* (IAPMO UPC)¹
- 2009, 2006, and 2003 *Uniform Mechanical Code* (IAPMO UMC)¹

Properties evaluated:

- Water distribution piping
- Water service piping
- Radiant heat piping

2.0 USES

Watts Radiant PEX, Watts Radiant PEX+ and Water PEX by Watts are used in radiant heating systems, hot and cold water distribution systems, and for water service.

3.0 DESCRIPTION**3.1 Tubing:**

Watts Radiant PEX, Watts Radiant PEX+ and Water PEX by Watts tubing are produced from cross-linked polyethylene compound complying with ASTM F 876 and

NSF-61. Both products are available in nominal $1/4$ -, $3/8$ -, $1/2$ -, $5/8$ -, $3/4$ -, 1-, $1 1/4$ -, $1 1/2$ - and 2-inch diameters (6.4, 9.5, 12.7, 15.9, 19.1, 25.4, 32, 38 and 51 mm) and come in 100- to 1200-foot-long (30.5 to 365.8 m) coils. Some diameters of both products are also available in 5-, 10- and 20-foot-long (1.5, 3.0 and 6.1 m) straight lengths. The products are pressure-rated for 100 psi (689 kPa) at 180EF (82EC) for a standard dimension ratio of 9. Standard dimension ratio is the ratio of outside diameter to wall thickness. The Water PEX by Watts tubing is available in red, natural, blue and white colors. The Watts Radiant PEX tubing is available in orange, white, natural, red or blue, and with an oxygen barrier on the outside layer. The Watts Radiant PEX+ is Watts Radiant PEX with an oxygen barrier, and with an additional exterior PE layer.

3.2 Fittings

Fittings for Watts Radiant PEX and Water PEX by Watts tubing are consist of brass, copper or polysulphone resin insert fittings and copper crimp rings, complying with ASTM F877. Fittings are to comply with the applicable code and be recognized in a current ICC-ES evaluation report.

4.0 INSTALLATION**4.1 General:**

Installation of Watts Radiant PEX and Water PEX by Watts tubing is to comply with this report, the applicable codes and the manufacturer's published installation instructions.

4.2 Water Distribution:

Water PEX by Watts is recognized for use in water distribution systems. Horizontally laid pipe is to be secured in such a manner that temperature-induced expansion and contraction are accommodated. In areas using the IAPMO UPC, PEX tubing is not to be installed within the first 18 inches (457 mm) of piping connected to a water heater.

4.3 Water Service

Water PEX by Watts is recognized for use in water service piping. The tubing is to be installed underground in a manner that ensures external loads will not cause a decrease in the vertical dimension of the cross section exceeding five percent. Tubing installation is to provide an allowance for contraction of the tubing due to temperature change prior to backfilling. In areas with poor soil conditions (plastic clays), the trench bottom is to be prepared using granular material, to provide a stable base. Potable water service tubing is not to be located in, under or above cesspools, septic tanks, septic tank drainage fields or pits.

4.4 Radiant Heating Systems:

Watts Radiant PEX and Watts Radiant PEX+ are recognized for use in radiant heating systems. Installation is to comply with the applicable chapters in the referenced mechanical codes and with the manufacturer's published installation instructions. Details of the design and installation of the radiant heating system are to be submitted to the code official for approval. All circuits are to 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 is to be laid over a concrete base slab a minimum of 3¹/₂ inches (89 mm) thick. Under-floor insulation and reinforcing mesh is then to be placed on the slab. The tubing is uncoiled and attached to the mesh using plastic fasteners. A concrete topping is then laid over the tubing. When embedment is in concrete, installation, including minimum concrete cover, is to comply with IBC Section 1906.3 or UBC Section 1906.3, as applicable. When the tubing is installed over polystyrene foam plastic boards, the boards are to comply with IBC Section 2603, IRC Section R314, or UBC Section 2602, as applicable.

Mounting brackets and installation hardware are provided by the manufacturer. Horizontally laid pipe is to be secured in such a way that temperature-induced expansion and contraction are accommodated.

4.5 Inspection:

4.5.1 Water Distribution and Water Service Tubing:

Installed tubing is to be pressure-tested and inspected as required by IPC Section 606.6, IRC Section P2503.6 or IAPMO UPC Section 103.5.3, as applicable.

4.5.2 Radiant Heat Tubing: The tubing is to be pressure tested for leaks before installation of covering, as noted in IRC Section M2103.3, IMC Section 1208, UMC Section 1208 or IAPMO UMC Section 1207, as applicable. The leak test is to be witnessed by the code official or the code official's designated representative.

5.0 CONDITIONS OF USE

The Watts Radiant PEX, Watts Radiant PEX+ and Water PEX by Watts tubing 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 Installation must comply with this report, the manufacturer's published installation instructions and the applicable code. In the event of a conflict between the manufacturer's published installation instructions and this report, this report governs.
- 5.2 When installation is in fire-resistance rated assemblies, evidence of compliance with IBC Section 712 (penetrations), UBC Section 709 (walls and partitions), or UBC Section 710 (floor/ceiling or roof/ceiling), as applicable, must be provided to the code official for approval at time of permit application.

- 5.3 Tubing must not be installed or stored in locations exposed to direct sunlight. Tubing 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 Each tubing installation must be pressure-tested for leaks in the presence of the code official or the official's designated representative and is subject to approval by the code official.

- 5.5 During placement of concrete cover over the hydronic tubing, pressure must be maintained in the tubing as the greater of 1¹/₂ times the working pressure or 100 psi (689 kPa).

- 5.6 Details on the design and installation of the system must be submitted to the code official for approval at time of permit application.

- 5.7 Use of Watts Radiant PEX and Watts Radiant PEX+ tubing in hydronic systems is limited to applications using potable water as the transfer fluid.

- 5.8 Clearances from heat-producing equipment are to be maintained in accordance with the applicable code.

- 5.9 Minimum bending radius of the tube must be eight times the outside tube diameter. The outside diameter is the nominal diameter plus 1¹/₈ inch (3.2 mm).

- 5.10 Fittings for use with the Watts Radiant PEX, Watts Radiant PEX+ and Water PEX by Watts tubing must comply with Section 3.2 of this report, be installed in accordance with the manufacturer's published installation instructions and be recognized in a current ICC-ES evaluation report.

- 5.11 Watts Radiant PEX, Watts Radiant PEX+ and Water PEX by Watts tubing are manufactured by Watts Radiant, Inc., in Springfield, Missouri under a quality control program with inspections by NSF International (AA-633).

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for PP, PEX, and PEX-AL-PEX Piping, Tube and Fittings Used in Radiant Heating and Water Distribution Systems (AC122), dated February 2006.

7.0 IDENTIFICATION

The tubing must be marked at maximum intervals of 5 feet (1524 mm) with the manufacturer's name (Watts Radiant Inc.), the product name (Watts Radiant PEX, Watts Radiant PEX+ or Water PEX by Watts), nominal tube size, material designation (PEX), standard dimension ratio (SDR-9), temperature and pressure ratings, ASTM F 876/F 877 designation, production code, potable water designation (for Water PEX by Watts), the name of the inspection agency (NSF International) and the evaluation report number (ESR-1155).