

**ICC-ES PMG Listing****PMG-1014***Effective Date: April 1, 2011**This listing is subject to re-examination in one year.***www.icc-es.org/pmg | (800) 423-6587 | (562) 699-0543***A Subsidiary of the International Code Council®*

CSI: Division: 22 00 00—PLUMBING  
Section: 22 11 16—Domestic Water Piping  
Division: 23 00 00— HVAC  
Section: 23 21 13—Hydronic Piping

**Product certification system:**

The ICC-ES product certification system includes testing samples taken from the market or supplier's stock, or a combination of both, to verify compliance with applicable codes and standards. The system also involves factory inspections, and assessment and surveillance of the supplier's quality system.

Products: AQUATHERM GREENPIPE®, FUSIOTHERM® and CLIMATHERM® POLYPROPYLENE (PP-R) Pipe and Fittings

Listee: Aquatherm GmbH  
Biggen I-5  
Attendorn D-57439  
Germany  
[www.aquatherm-pipe.com](http://www.aquatherm-pipe.com)

**Compliance with the following codes:**

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

**Compliance with the following standards:**

NSF 14  
ASTM F 2389-07e1  
LC1004

**Identification:****Piping:**

The piping must be marked every 5 feet (1524 mm) with the following: the name Aquatherm Greenpipe®, Fusiotherm® or Climatherm®; nominal pipe diameter; material designation (PP-R); potable water designation (PW); standard dimensional ratio (SDR 6, 7.3 or 11); temperature and pressure ratings; ASTM F 2389 designation; production code; the name of the inspection agency (NSF International); the ICC-ES evaluation report number (ESR-1613) and the ICC-ES PMG listing mark. The ICC-ES PMG listing number (PMG-1014) is optional.

*Listings are not to be construed as representing aesthetics or any other attributes not specifically addressed, nor are they to be construed as an endorsement of the subject of the listing or a recommendation for its use. There is no warranty by ICC Evaluation Service, LLC, express or implied, as to any finding or other matter in this listing, or as to any product covered by the listing.*



**Fittings:**

Aquatherm Greenpipe<sup>®</sup>, Fusiotherm<sup>®</sup> and Climatherm<sup>®</sup> fittings must be marked with the nominal diameter, the Aquatherm logo (see Figure 1) and the type of material (PP-R).

Packages containing Aquatherm Greenpipe<sup>®</sup>, Fusiotherm<sup>®</sup> or Climatherm<sup>®</sup> fittings must be marked with the following: name or logo of the inspection agency (NSF International); ASTM F 2389 designation; and either the ICC-ES evaluation report number (ESR-1613) or the ICC-ES PMG listing number (PMG-1014) or the ICC-ES PMG listing mark.

**Installation:**

Aquatherm Greenpipe<sup>®</sup>, Fusiotherm<sup>®</sup> and Climatherm<sup>®</sup> piping and fittings are socket heat-welded and must be installed in accordance with the manufacturer's published installation instructions, the applicable codes and this listing. Where differences exist, the instructions in this listing must govern. The minimum cold bending radius is six times the nominal diameter.

**Water Distribution:** Horizontally laid pipe must be secured in such a manner that temperature-induced expansion and contraction are accommodated. In areas using the IAPMO UPC, PP piping must not be installed within the first 18 inches (457 mm) of piping connected to a water heater.

**Water Service:** Buried piping must be installed in such a manner that external loads do not decrease the vertical dimension of the cross section by more than 5 percent. Piping must be installed to provide an allowance for contraction of the line due to temperature change prior to backfilling. In areas with poor soil conditions (plastic clays), the trench bottom must be prepared using granular material to provide a stable base. Potable water service piping must not be located in, under or above cesspools, septic tanks, septic tank drainage fields or pits.

**Water Distribution and Water Service Piping:** Installed piping must be pressure-tested and inspected as required by IPC Section 606.6, IRC Section R2503.6 or IAPMO UPC Section 103.5.

**Hydronic Piping Systems:** The installation must comply with Chapter 12 of the applicable mechanical code(s) and the manufacturer's published installation instructions. Details of the design and installation of the hydronic piping system must be submitted to the code official for approval. All circuits must be formed from continuous lengths of piping, 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 a minimum of 3<sup>1</sup>/<sub>2</sub> inches (38 mm) thick. Under-floor insulation and reinforcing mesh must then be placed on the slab. The piping must be uncoiled and attached to the mesh using soft steel wire. A concrete topping is then laid over the piping. When embedment is in concrete, installation, including minimum concrete cover, must comply with IBC Section 1906.3, or IRC Section R506.1, as applicable. When the piping is installed over polystyrene boards, the boards must comply with IBC Section 2603, or IRC Section R314, as applicable.

Antifreeze protection may be achieved by the addition of chemicals detailed in Item 1 of the Conditions of Listing, below. The quantity of these allowed chemicals required to achieve a specific freeze protection level is beyond the scope of this listing. Addition of antifreeze to the radiant heating loop must be in accordance with the manufacturer's installation instructions and the material safety data sheet (MSDS).

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.

**Hydronic Piping:** The piping must be pressure-tested for leaks before installation of covering, as noted in Section 1208 of the IMC, Section 1207 of the IAPMO UMC, or Section M2103.3 of the IRC, as applicable. The leak test must be witnessed by the code official or the code official's designated representative.

## Models:

**Pipe and Fittings:** Fusiotherm® pipe and fittings are manufactured from random copolymer polypropylene pipe (PP-R) materials satisfying NSF 14 and 61 as well as ASTM F 2389.

Aquatherm Greenpipe® and Fusiotherm® pipe and fittings are identical and are green in color with longitudinal dark green or blue stripes. Climatherm pipe is identical to the Aquatherm Greenpipe® and Fusiotherm products except it is blue in color with longitudinal green stripes.

The pipe and fittings are available in nominally 20-, 25-, 32-, 40-, 50-, 63-, 75-, 90-, 110-, 125-, 140- and 160- millimeter (0.787, 0.984, 1.26, 1.575, 1.96, 2.48, 2.95, 3.54, 4.33, 4.92, 5.51 and 6.3 inches) outside-diameter sizes in 4-meter (13.1 feet) straight lengths. The 20- and 25-millimeter (0.787 and 0.973 inch) sizes are also available in coils of 100-meter (328 feet) length. The pipe and fitting products are pressure-rated for a minimum of 100 psi (690 kPa) at 180°F (82°C) for standard dimension ratios (SDRs) of 6 and 7.3, and for a minimum 160 psi (1100 kPa) at 73°F (23°C) for SDRs of 6, 7.3 and 11. SDR is the ratio of outside diameter to wall thickness and is constant for all Fusiotherm® pipe sizes. Fittings and pipe must be joined by heat welding with a proprietary device.

## Conditions of Listing:

1. Where used in radiant heating systems, the pipe and fittings are recognized for use with potable water, as well as aqueous solutions of ethylene glycol or propylene glycol for antifreeze, up to 100 percent concentrations of either glycol.
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.
3. During placement of cover over the piping, the pipe must be maintained at the greater of 1½ times the working pressure or 100 psi (689.4 kPa).
4. Each installation must be pressure-tested for leaks in the presence of the code official or the code official's designated representative.
5. Clearances from heat-producing equipment must be in accordance with the applicable code.
6. Hydronic piping systems that utilize a nonpotable heat transfer fluid must not be connected to the potable water system except through the use of approved devices such as backflow preventers or double-walled heat exchangers.
7. For jurisdictions enforcing the IPC, for water supply and distribution, heat-fusion joints must be installed in accordance with IPC Section 605.21.1.
8. The piping is manufactured in Attendorn, Germany, under a quality control program with inspections by NSF International (AA-633).



FIGURE 1—AQUATHERM LOGO