ICC-ES Evaluation Report

ESR-2841

Reissued November 1, 2010

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

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DIVISION: 22 00 00—PLUMBING
Section: 22 30 00—Plumbing Equipment

DIVISION 23 00 00—HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC)
Section: 23 50 00—Central Heating Equipment

REPORT HOLDER:

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EVALUATION SUBJECT:

RADIANTEC, CONCEPT OF COMBINATION POTABLE WATER HEATING SYSTEM AND SPACE HEATING SYSTEM

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2006 *International Building Code*® (IBC)
- 2006 *International Residential Code*® (IRC)
- 2006 *International Plumbing Code*® (IPC)
- 2006 *International Mechanical Code*® (IMC)
- 2006 *International Fuel Gas Code*® (IFGC)
- 2006 *International Energy Conservation Code*® (IECC)

Property evaluated:

Concept of using a potable water heater for both potable water heating and space heating

2.0 USES

Radiantec, Concept of Combination Potable Water Heating System and Space Heating System, is a concept of using a single water device to supply both potable water heating and a space heating system.

3.0 DESCRIPTION

3.1 General:

Radiantec designs, procures specific components from others, and installs and distributes closed, indirect, and open direct combination water heating and space heating systems. The systems include fixtures, piping, valves, controls, devices, heat exchangers and appliances which are designed and installed to provide hot potable water and hot water space heating. Water at a temperature above that desired for the space is pumped through a piping configuration, usually in the floor. Heat is transferred from the water in the piping system into the space.

3.2 Materials:

Selected system components must possess a current ICC-ES evaluation report indicating suitability as a component in a combined hydronic heating system and potable water system. This report excludes the sizing of the system, selection of individual components, and the system's ability to satisfy a specific hydronic or potable water heating demand.

4.0 DESIGN AND INSTALLATION

4.1 Design:

Radiantec has three basic designs: an indirect system, a closed system, and an open direct system. The indirect system provides both hot potable water and hydronic heating, using a heat exchanger to keep the two loops separate (Figure 1). The closed system provides only space heating. In this design, the water heater provides no potable water, and is used exclusively for hydronic heating (Figure 2). The open direct system provides both hot potable water and hydronic heating in a combination system which is also available in a supplemental solar energy design. The open direct system has a check valve which forces make-up water entering the system to pass through the heating loop before entering the water heater. This prevents water from stagnating in the heating loop (Figures 3 and 4). Filling connections for the indirect system and the closed system must be protected from flow from the hydronic piping loop.

4.2 Installation:

Radiantec's design details and calculations for a closed, an indirect, or an open direct potable water heating and space heating system must be furnished to the code official verifying compliance with the applicable codes and the ICC-ES evaluation reports that specifically evaluate the applicable closed, indirect, or open direct combination potable water heating and space heating system components. The details must also address the ability of the system to serve all plumbing, mechanical, electrical and energy conservation demands, required by the applicable code and intended design. The individual preparing such documents must possess the necessary credentials regarding competency and qualifications as required by the applicable code and professional registration laws of the state where the design and installation of a closed, an indirect, or an open direct combination potable water heating and space heating system are undertaken.

5.0 CONDITIONS OF USE

The Radiantec, Concept of Combination Potable Water Heating System and Space Heating System, described in this report complies with, or is a suitable alternative to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

5.1 Radiantec's closed, indirect, and open direct combination potable water heating and space heating systems must be designed and installed in accordance with Section 4.0 of this report and applicable provisions in the building, residential, plumbing, mechanical, electrical and energy conservation codes referenced herein.

5.2 Evaluation of the specific components of Radiantec's closed, indirect, and open direct systems is outside the scope of this report.

5.3 Radiantec's design details and calculations for the applicable closed, indirect, or open direct potable water heating and space heating system must be available at the jobsite during and after construction. The details and calculations must be stored in an identifiable, readily accessible and approved location.

5.4 The indirect system must be installed to maintain fluid separation between the hydronic heating loop and the potable hot water system in accordance with the applicable code.

5.5 Both the indirect system and the closed system must be installed with the potable water connections protected from backflow from the hydronic heating system, in accordance with the applicable code.

5.6 The open direct system must be installed with a check valve to force make-up water through the heating loop before it enters the water heater.

6.0 EVIDENCE SUBMITTED

6.1 Radiantec Design & Construction Suggestions, copyright 2003, revised on January 28, 2004. Installation Supplements 230, 220, 250, 260, 270, 280, 295. General Supplements 410, 440.

6.2 Concept diagrams of the Radiantec closed system, indirect system, and open direct potable water heating and space heating systems.

7.0 IDENTIFICATION

Each component of the closed, indirect, and open direct combination potable water heating and space heating system must be identified in accordance with the requirements of the applicable code and the applicable ICC-ES evaluation report that specifically evaluates each system component. Upon completion of the installation, Radiantec must provide a certificate of conformance for each installation.

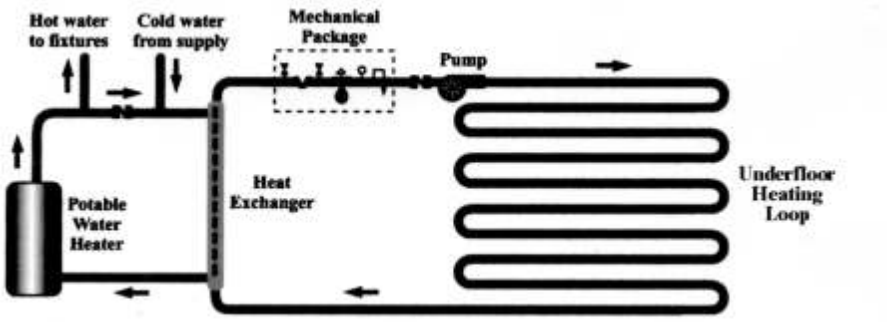

FIGURE 1—INDIRECT SYSTEM

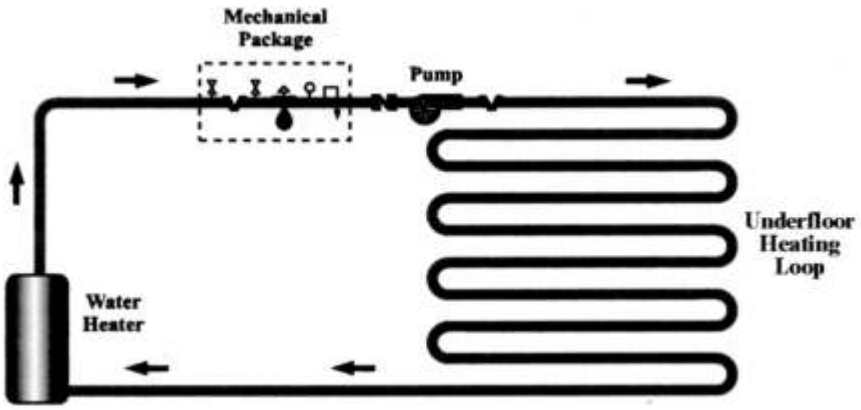

FIGURE 2—CLOSED SYSTEM

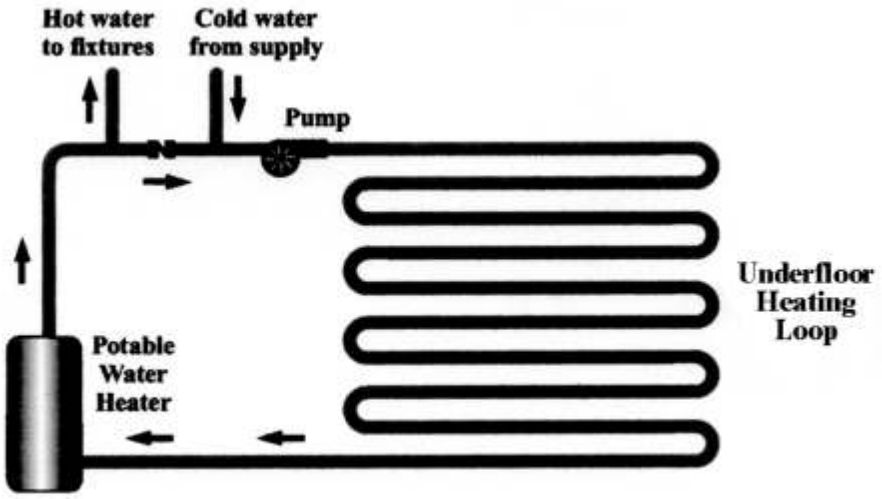

FIGURE 3—OPEN DIRECT SYSTEM

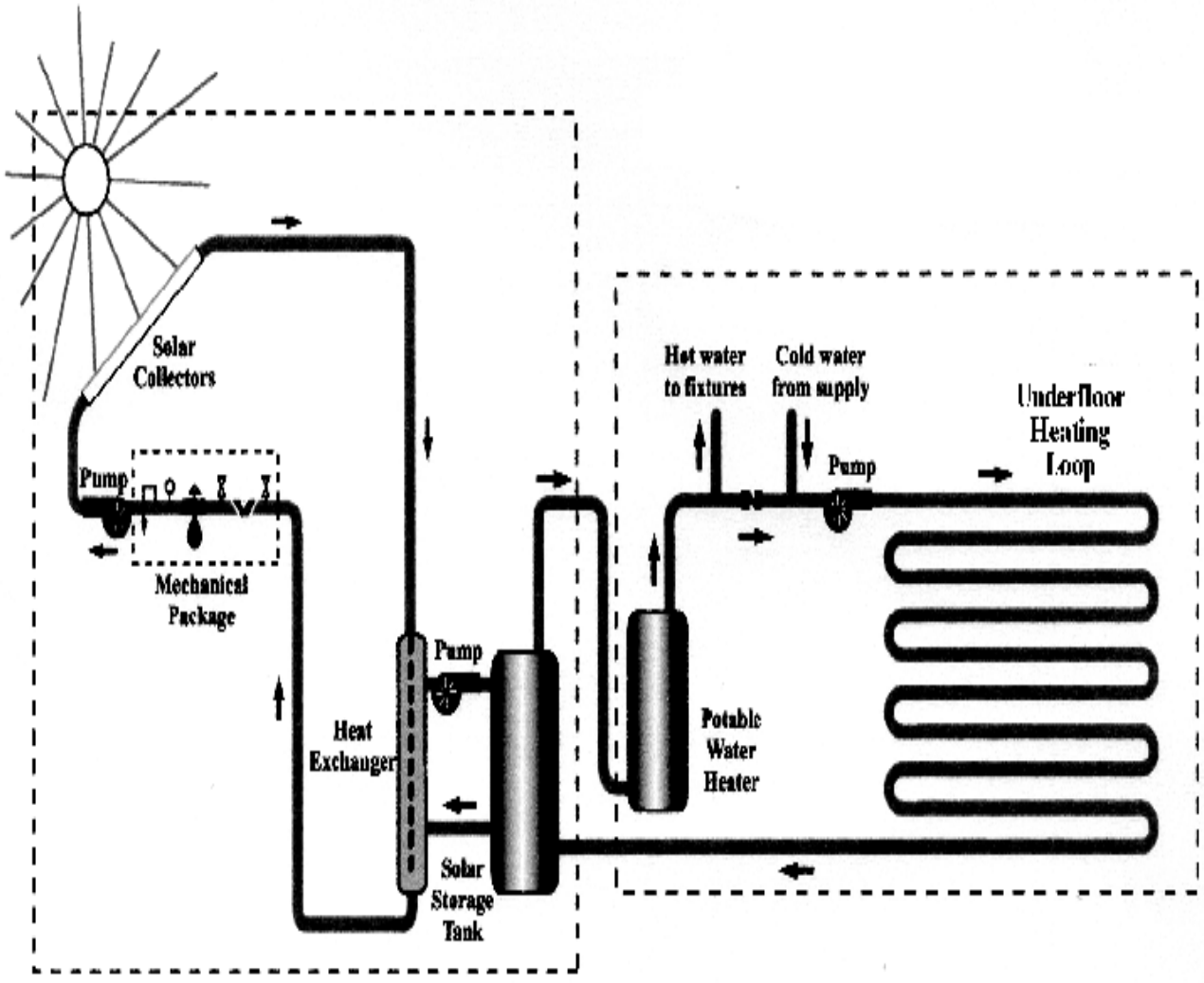

FIGURE 4—OPEN DIRECT SYSTEM WITH SOLAR ENERGY SUPPLEMENT