

## *Joint Appendix JA14*

# Appendix JA14 – Qualification Requirements for Central Heat Pump Water Heater Systems

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### **JA14.1**      *Purpose and Scope*

Joint Appendix JA14 provides the qualification requirements to meet the standards for central heat pump water heater (Central HPWH) systems set forth in Title 24, Part 6, Section 170.2(d)2 and in performance standards set forth in Section 140.1 and 170.1.

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### **JA14.2**      *Definitions*

**Basic Model** means, with respect to a central HPWH, all units of a given type of product manufactured by one manufacturer; having the same primary energy source; and, which have essentially identical electrical, physical, and functional (or hydraulic) characteristics that affect energy consumption, energy efficiency, water consumption, or water efficiency.

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### **JA14.3**      *Qualification Requirements*

To qualify as a central HPWH for use for compliance, the central HPWH products shall be certified to the Energy Commission to meet the following requirements:

#### **JA14.3.1 Determination of Performance Data**

Manufacturers shall determine central HPWH performance data for each basic model either by testing pursuant to the requirements in (a) or by simulating pursuant to the requirements in (b) below:

- (a) Testing shall be conducted in accordance with the test setup, installation, calculation procedures, and instruments described in Appendix E to Subpart G of 10 CFR Part 431 for each of the test conditions described in JA14.3.3; or
- (b) Simulated performance shall be conducted using an alternative efficiency determination methods (AEDM) as described in 10 CFR part 429.70(a)-(c) to generate the performance data described in JA14.3.2. In addition, manufacturers shall only simulate the performance of other central HPWH basic models sharing the same series compressor, same type of heat exchangers, and same architecture as the tested basic model.

### **JA14.3.2 Performance Data Reporting**

The following performance specifications shall be submitted to the Energy Commission:

- a) Water heater input power;
- b) Water heater output capacity; and
- c) Water heater COP.

The performance data shall be provided at the following conditions:

- d) Inlet ambient air temperature: Maximum, minimum, and two midpoint temperatures of the manufacturer specified operating range.
- e) Inlet water temperature: Maximum, minimum, and two midpoint temperatures of the manufacturer specified operating range.
- f) Outlet water temperature: Maximum, midpoint, and minimum of outlet water (setpoint) temperatures of the manufacturer specified operating range.

For conditions where defrost strategies operate, reported data shall include at least one complete defrost cycle, or alternatively, for each model submitted for approval, provide a description of the defrost strategy including method, cycle length, and process.

### **JA14.3.3 Basic Model Test Condition**

The Central HPWH basic model shall be tested at the following conditions:

- (a) Inlet ambient air temperature: If the minimum operating temperature is above 40°F, the following three test conditions are required: the DOE test Procedure condition, the minimum, and one midpoint temperatures within the manufacturer specified operating range. If the minimum operating temperature limit is below 40°F, the following four test conditions are required: the DOE test procedure condition, the minimum, and two midpoint temperatures within the manufacturer specified operating range.
- (b) Two inlet water temperatures: maximum and minimum within the manufacturer specified operating range.
- (c) Two outlet water temperatures: Maximum and minimum outlet water (setpoint) temperatures within the manufacturer specified operating range.

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### **JA14.4 *Design Condition Documentation Requirements***

The Central HPWH system shall be capable of supplying hot water at design outlet water temperature under specified operating ranges for:

- a) Minimum and maximum ambient air temperature;
- b) Minimum and maximum cold-water temperature;

- c) Minimum and maximum building demand at design draw and recovery conditions and duration; and
- d) Recirculation loop heat loss.

Design documentation shall specify the operating conditions at which the primary heat pump water heater can supply hot water at design outlet water temperature without engaging auxiliary heating mechanism.