STATE OF CALIFORNIA

HERS VERIFIED SINGLE DWELLING UNIT HOT WATER SYSTEM DISTRIBUTION

CEC-NRCI-PLB-22-H (Revised 01/16) CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF INSTALLATION		NRCI-PLB-22-H
HERS Verified High Rise Residential/Hotel/Motel Single Dwelling Unit Hot Water System Distribution		(Page 1 of 4)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City	Zip Code

A. DHW Distribution System		
01	Water Heating System Name	
02	Distribution Type	

B. HERS-Verified Pipe Insulation Credit Requirements	
Systems that utilize this distribution type shall comply with these requirements:	
01	All hot water piping shall comply with the insulation requirements in Table 120.3-A. (RA 4.4.14)
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.	

C. HERS-Verified Parallel Piping Requirements	
Systems that utilize this distribution type shall comply with these requirements:	
01	Each central manifold has 5 feet or less of pipe between manifold and water heater. (RA 4.4.15)
02	For manifolds that include valves, the manifold must be readily accessible in accordance with the plumbing code. (RA 4.4.4)
03	Hot water distribution system piping from the manifold to the fixtures and appliances must take the most direct path. For example, piping from a second story manifold cannot supply the first floor. (RA 4.4.4)
04	The hot water distribution piping must be separated by at least 2 inches from any other hot water supply piping, and at least 6 inches from any cold water supply piping. Alternatively, the hot water supply piping must be insulated to the thicknesses shown in TABLE 120.3-A. (RA 4.4.4)
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.	

D. HERS-Verified Compact Hot Water Distribution System Requirements		
Systems that utilize this distribution type shall comply with these requirements:		
01	Total Conditioned floor area (ft^2)	
02	Maximum allowed pipe run length from the water heater to the furthest point of use for the floor area served (feet).	
03	The pipe run length from each water heater to the furthest fitting served by that water heater must be no greater than the maximum pipe run length above.	
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.		

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E. HERS-Verified Demand Recirculation Manual Control Requirements
Systems that utilize this distribution type shall comply with these requirements:

01	The system operates "on-demand", meaning that the pump begins to operate shortly before or immediately after hot water draw begins, and stops when the return water temperature reaches a certain threshold value. (RA4.4.13)
02	After the pump has been activated, the controls shall allow the pump to operate until the water temperature at the thermosensor rises to one of the following values: (RA4.4.13) • Not more than 10°F (5.6°C) above the initial temperature of the water in the pipe. • Not more than 102°F (38.9°C).
03	The controls shall limit pump operation to a maximum of 10 minutes following any activation. This is provided in the event that the normal means of shutting off the pump have failed. (RA4.4.13)
04	Pump and control placement shall meet one of the following criteria: (RA4.4.13) • When a dedicated return line has been installed the pump, controls and thermosensor are installed at the end of the supply portion of the recirculation loop; or • The pump and controls are installed on the dedicated return line near the water heater and the thermo-sensor is installed in an accessible location as close to the end of the supply portion of the recirculation loop as possible; or • When the cold water line is used as the return, the pump, demand controls and thermosensor shall be installed in an accessible location at the end of supply portion of the hot water distribution line (typically under a sink).
05	Insulation is not required on the cold water line when it is used as the return. (RA4.4.13)
06	Each control shall have standby power of 1 Watt or less. Controls may be located in individual units or on the loop. Controls may be activated by wired or wireless mechanisms, including buttons, motion sensors, door switches and flow switches. (RA4.4.13)
07	If more than one loop installed each loop shall have its own pump and controls.
08	Automatic Air release valve is installed on the inlet side of the recirculation pump per Section 110.3(c)5A.
09	A check valve is located between the recirculation pump and the water heater per Section 110.3(c)5B.
10	Hose bibb is installed between the pump and the water heating equipment with an isolation valve between the hose bibb and the water heating equipment per Section 110.3(c)5C.
11	Isolation valves are installed on both sides of the pump. One of the isolation valves may be the same isolation valve as in item 10 above per Section 110.3(c)5D.
12	The cold water supply piping and the recirculation loop piping is not connected to the hot water storage tank drain port per Section 110.3(c)5E.
13	A check valve is installed on the cold water supply line between the hot water system and the next closest tee on the cold water supply per Section 110.3(c)5F.

The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.

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F. HERS-Verified Demand Recirculation Sensor Control Requirements Systems that utilize this distribution type shall comply with these requirements	
01	The system operates "on-demand", meaning that the pump begins to operate shortly before or immediately after hot water draw begins, and stops when the return water temperature reaches a certain threshold value. (RA4.4.13)
02	After the pump has been activated, the controls shall allow the pump to operate until the water temperature at the thermosensor rises to one of the following values: (RA4.4.13) • Not more than 10°F (5.6°C) above the initial temperature of the water in the pipe. • Not more than 102°F (38.9°C).
03	The controls shall limit pump operation to a maximum of 10 minutes following any activation. This is provided in the event that the normal means of shutting off the pump have failed. (RA4.4.13)
04	Pump and control placement shall meet one of the following criteria: (RA4.4.13) • When a dedicated return line has been installed the pump, controls and thermosensor are installed at the end of the supply portion of the recirculation loop; or • The pump and controls are installed on the dedicated return line near the water heater and the thermo-sensor is installed in an accessible location as close to the end of the supply portion of the recirculation loop as possible; or • When the cold water line is used as the return, the pump, demand controls and thermosensor shall be installed in an accessible location at the end of supply portion of the hot water distribution line (typically under a sink).
05	Insulation is not required on the cold water line when it is used as the return. (RA4.4.13)
06	Each control shall have standby power of 1 Watt or less. Controls may be located in individual units or on the loop. Controls may be activated by wired or wireless mechanisms, including buttons, motion sensors, door switches and flow switches. (RA4.4.13)
07	If more than one loop installed each loop shall have its own pump and controls.
08	Automatic Air release valve is installed on the inlet side of the recirculation pump per Section 110.3(c)5A.
09	A check valve is located between the recirculation pump and the water heater per Section 110.3(c)5B.
10	Hose bibb is installed between the pump and the water heating equipment with an isolation valve between the hose bibb and the water heating equipment per Section 110.3(c)5C.
11	Isolation valves are installed on both sides of the pump. One of the isolation valves may be the same isolation valve as in item 8 above per Section 110.3(c)5D.
12	The cold water supply piping and the recirculation loop piping is not connected to the hot water storage tank drain port per Section 110.3(c)5E.
13	A check valve is installed on the cold water supply line between the hot water system and the next closest tee on the cold water supply per Section 110.3(c)5F.
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.	

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DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

1. I certify that this Certificate of Installation documentation is accurate and complete.

Documentation Author Name:	Documentation Author Signature:
Documentation Author Company Name:	Date Signed:
Address:	CEA/HERS Certification Identification (If applicable):
City/State/Zip:	Phone:

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of Installation is true and correct.
2. I am eligible under Division 3 of the Business and Professions Code in the applicable classification to accept responsibility for the system design, construction, or installation of features, materials, components, or manufactured devices for the scope of work identified on this Certificate of Installation and attest to the declarations in this statement (responsible builder/installer), otherwise I am an authorized representative of the responsible builder/installer.
3. The constructed or installed features, materials, components or manufactured devices (the installation) identified on this Certificate of Installation conforms to all applicable codes and regulations, and the installation conforms to the requirements given on the plans and specifications approved by the enforcement agency.
4. I understand that a HERS rater will check the installation to verify compliance, and that if such checking identifies defects; I am required to take corrective action at my expense. I understand that Energy Commission and HERS Provider representatives will also perform quality assurance checking of installations, including those approved as part of a sample group but not checked by a HERS rater, and if those installations fail to meet the requirements of such quality assurance checking, the required corrective action and additional checking/testing of other installations in that HERS sample group will be performed at my expense.
5. I reviewed a copy of the Certificate of Compliance approved by the enforcement agency that identifies the specific requirements for the scope of construction or installation identified on this Certificate of Installation, and I have ensured that the requirements that apply to the construction or installation have been met.
6. I will ensure that a registered copy of this Certificate of Installation shall be posted, or made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a registered copy of this Certificate of Installation is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Builder/Installer Name:	Responsible Builder/Installer Signature:	
Company Name: (Installing Subcontractor or General Contractor or Builder/Owner)	Position With Company (Title):	
Address:	CSLB License:	
City/State/Zip:	Phone:	Date Signed:
Third Party Quality Control Program (TPQCP) Status:	Name of TPQCP (if applicable):	

NRCI-PLB-22 User Instructions

A. DHW Distribution System

Enter the water heating system name and the distribution type in this table.
The type of distribution system that require for this compliance document are:

* HERS-Verified Pipe Insulation Credit
* HERS-Verified Parallel Piping
* HERS-Verified Compact Hot Water Distribution System
* HERS-Verified Demand Recirculation Manual Control
* HERS-Verified Demand Recirculation Sensor Control

B. HERS-Verified Pipe Insulation Credit Requirements

This table only applies to systems indicated in Table A as **HERS-Verified Pipe Insulation Credit.** In additional the mandatory requirements in Table E, the HERS rater must ensure the requirements on this table are met.

C. HERS-Verified Parallel Piping Requirements

This table only applies to systems indicated in Table A as **HERS-Verified Parallel Piping.** In additional the mandatory requirements in Table E, the HERS rater must ensure the requirements on this table are met.

D. HERS-Verified Compact Hot Water Distribution System Requirements

This table only applies to systems indicated in Table A as **HERS-Verified Compact Hot Water Distribution System.** In additional the mandatory requirements in Table D, the HERS rater must ensure the distance between the water heater to furthest point of water use does not exceed the maximum indicated in Table D1 below. Calculated the Floor Area Served by dividing the conditioned floor area by the number of installed water heaters (Floor Area Served= CFA/# of WH). In addition all hot water lines shall be insulated.

TABLE D1
Compact Hot Water Distribution System-(CHWDS)

Floor Area Served (ft2)	Maximum Measured Water Heater To Use Point Distance (ft)
< 1000	28
1001 – 1600	43
1601 – 2200	53
2201 – 2800	62
>2800	68

E. HERS-Verified Demand Recirculation Manual Control Requirements

This table only applies to systems indicated in Table A as **HERS-Verified Demand Recirculation Manual Control.** In additional the mandatory requirements in Table E, the HERS rater must ensure the requirements on this table are met.

F. HERS-Verified Demand Recirculation Sensor Control Requirements

This table only applies to systems indicated in Table A as **HERS-Verified Demand Recirculation Sensor Control.** In additional the mandatory requirements in Table F, the HERS rater must ensure the requirements on this table are met.