HERS VERIFIED MULTIFAMILY CENTRAL HOT WATER SYSTEM DISTRIBUTION

CERTIFICATE OF VERIFICATION		NRCV-PLB-21-H
HERS Verified High Rise Residential/Hotel/Motel Central Hot Water System Distribution		(Page 1 of 6)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City	Zip Code

A. Design HERS Verified Central Water Heating Systems Information

01	02	03	04	05	06	07	08	09	10	11	12	13	14
Water Heating System ID or Name	Water Heating System Type	Water Heater Type	# of Water Heaters in system	Water Heater Storage Volume (gal)	Fuel Type	Rated Input Type	Rated Input Value	Heating Efficiency Type	Heating Efficiency Value	Standby Loss (%)	Exterior Insul. R-Value	Central DHW System Distribution Type	Dwelling Unit DHW System Distribution Type

B. Installed HERS Verified Central Water Heating Systems Information

01	02	03	04	05	06	07	08	09	10	11	12	13	14
Water Heating System ID or Name	Water Heating System Type	Water Heater Type	# of Water Heaters in system	Water Heater Storage Volume (gal)	Fuel Type	Rated Input Type	Rated Input Value	Heating Efficiency Type	Heating Efficiency Value	Standby Loss (%)	Exterior Insul. R-Value	Central DHW System Distribution Type	Dwelling Unit DHW System Distribution Type
15	Compliance Statement:												

C. Installed Water Heater Manufacturer Information

01	02	03
Water Heating System ID or Name	Manufacturer	Model Number

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D. HERS Verification Requirements for All Central Domestic Hot Water Recirculation Systems	
01	All sections of the recirculation loop, and the first five feet of all branches off the loop are insulated, to the thicknesses required by Table 120.3A, except for the following: (RA4.4.1) • Piping installed in interior or exterior walls that is surrounded on all sides by at least 1inch of insulation. • Piping installed in attics with a minimum of 4 inches (10 cm) of attic insulation on top • Piping that penetrates framing members shall not be required to have pipe insulation for the distance of the framing penetration. Metal piping that penetrates metal framing shall use grommets, plugs, wrapping or other insulating material to assure that no contact is made with the metal framing. Insulation shall butt securely against all framing members. • Insulation is not required on the cold water line when it is used as the return
02	Hot water pipes that are buried below grade are installed in a water proof and non-crushable casing or sleeve that allows for installation, removal, and replacement of the enclosed pipe and insulation. (RA4.4.1)
03	Insulation outside conditioned space is protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind. (RA4.4.1)
04	Pipe insulation fits tightly to the pipe. (RA4.4.1)
05	On insulated sections of pipe, no piping is visible due to insulation voids, and all elbows and tees are fully insulated.. (RA4.4.1)
06	The recirculation pump is mounted on a vertical section of the return line, OR an automatic air release valve is installed on a riser at least 12 inches in length, on the inlet side of the recirculation pump, no more than 4 feet from the pump. (Section 110.3(c)5A).
07	A check valve is located between the recirculation pump and the water heater. (Section 110.3(c)5B).
08	A 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. (Section 110.3(c)5C).
09	Isolation valves are installed on both sides of the pump. One of the isolation valves may be the same isolation valve as in item 12 above. (Section 110.3(c)5D).
10	The cold water supply piping and the recirculation loop piping is not connected to the hot water storage tank drain port. (Section 110.3(c)5E).
11	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. (Section 110.3(c)5F).
12	The hot water distribution system piping from the water heater(s) to the fixtures and appliances takes the most direct path. (RA 4.4.7.1)
13	Installation and operation instructions that provide details of the operation of the pump and controls are available at the jobsite for inspection. (RA 4.4.7.1)
14	More than one circulation loop may be installed. Each loop shall have its own pump and controls. (RA4.4.8, RA 4.4.9, RA 4.4.10)
15	Verification Status:
16	Correction Notes:

The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met unless otherwise noted in the Verification Status and the Corrections Notes in this table.

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E. Multiple Dwelling Units – Recirculation Temperature Modulation Control Requirements Systems that utilize this distribution type shall comply with these requirements		
01	Controls have been installed that reduce the hot water supply temperature when hot water demand is determined to be low by the control system. The control system may use a fixed control schedule or dynamic control schedules based measurements of hot water demand. (RA4.4.11).	
02	Daily hot water supply temperature reduction (which is defined as the sum of temperature reduction by the control in each hour within a 24-hour period) shall be more than 50 degrees Fahrenheit. (RA4.4.11)	
03	Verification Status:	
04	Correction Notes:	
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met unless otherwise noted in the Verification Status and the Corrections Notes in this table.		

F. Multiple Dwelling Units – Recirculation Continuous Monitoring Systems Requirements Systems that utilize this distribution type shall comply with these requirements		
01	The water heating system must have a means of communicating with the remote monitoring facility. (RA4.4.12)	
02	The monitoring system must record no less frequently than hourly measurement of key system operation parameters, including hot water supply and return temperatures, and status of gas valve relays. (RA4.4.12)	
03	A current contract must be available that demonstrate the system will be monitored. (RA4.4.12)	
04	Verification Status:	
05	Correction Notes:	
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met unless otherwise noted in the Verification Status and the Corrections Notes in this table.		

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G. Multiple Dwelling Units – Demand Recirculation 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 thermo-sensor rises to one of the following values: (RA4.4.13) • Not more than 10 degrees Fahrenheit (5.6 degrees Celsius) above the initial temperature of the water in the pipe • Not more than 102 degrees Fahrenheit (38.9 degrees Celsius).	
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 thermo-sensor 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	Manual or sensor controls shall be installed and, if powered, each control has 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	Verification Status:	
08	Correction Notes:	
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met unless otherwise noted in the Verification Status and the Corrections Notes in this table.		

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H. Multiple Dwelling Units – Non-demand control Recirculation Systems Requirements
Systems that utilize this distribution type shall comply with these requirements

01	The active control shall be either: timer, temperature, or time and temperature. Timers shall be set to less than 24 hours. The temperature sensor shall be connected to the piping and to the controls for the pump.	
02	Verification Status:	
03	Correction Notes:	

The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met unless otherwise noted in the Verification Status and the Corrections Notes in this table.

I. HERS Verified Multiple Recirculation Loops for DHW Systems Serving Multiple Dwelling Unit Requirements
All distribution systems listed on this form shall comply with these requirements

01	All buildings with 8 or more dwelling units have a **minimum** of 2 recirculation loops.	
02	Each loop roughly serves the same number of dwellings.	
03	Verification Status:	
04	Correction Notes:	

The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met unless otherwise noted in the Verification Status and the Corrections Notes in this table.

J. Determination of HERS Verification Compliance
All applicable sections of this document shall indicate compliance with the specified verification protocol requirements in order for this Certificate of Verification as a whole to be determined to be in compliance.

01	

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DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

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

Name:	Signature:
Company:	Date:
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 Verification is true and correct.
2. I am the certified HERS Rater who performed the verification identified and reported on this Certificate of Verification (responsible rater).
3. The installed features, materials, components, manufactured devices, or system performance diagnostic results that require HERS verification identified on this Certificate of Verification comply with the applicable requirements in Reference Nonresidential Appendices NA1 and NA2, and the requirements specified on the Certificate of Compliance for the building approved by the enforcement agency.
4. The information reported on applicable sections of the Certificate(s) of Installation (NRCI), signed and submitted by the person(s) responsible for the construction or installation conforms to the requirements specified on the Certificate(s) of Compliance (NRCC) approved by the enforcement agency.
5. I will ensure that a registered copy of this Certificate of Verification 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 Verification is required to be included with the documentation the builder provides to the building owner at occupancy.

BUILDER OR INSTALLER INFORMATION AS SHOWN ON THE CERTIFICATE OF INSTALLATION

Company Name (Installing Subcontractor or General Contractor or Builder/Owner):	
Responsible Builder/Installer Name:	CSLB License:

HERS PROVIDER DATA REGISTRY INFORMATION

Sample Group Number (if applicable):	Dwelling Test Status in Sample Group (if applicable)

HERS RATER INFORMATION

HERS Rater Company Name:	
Responsible Rater's Name:	Responsible Rater's Signature:
Responsible Rater's Certification Number w/ this HERS Provider	Date Signed:

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NRCV-PLB-21-H User Instructions

A. Design Central Water Heating Systems Information

This table reports the water heating system features that were specified on the NRCC-PRF-01 compliance document for this project.

01 Water Heating System ID or Name – User input
02 Water Heating System Type – User input. The different kinds of water heating system type are DHW or Combined Hydronic
03 Water Heater Type – User input. The different kinds of water heaters are Large Storage, Small Storage, Heat Pump, Boiler, Large Instantaneous, Small Instantaneous or Indirect
04 # of Water Heaters in system – User input.
05 Water Heater Storage Volume (gal) – User input. Value may be N/A if water heater type is instantaneous with zero storage.
06 Fuel Type – User input. The different kinds of fuel types are natural gas, propane, oil, or electricity.
07 Rated Input Type – User input. For natural gas, propane and oil fuel type the input type is Btu/Hr. For electric the input type is kW
08 Rated Input Value – User input. Numerical value of the rated input. Must be equal to or less than value indicated on the NRCC-PRF-01
09 Heating Efficiency Type – User input. Different efficiency types are Energy Factor, AFUE, and Thermal Efficiency
10 Heating Efficiency Value – User input. Numerical value of the Heating Efficiency. Must be equal to or higher efficiency than value indicated on the NRCC-PRF-01
11 Standby Loss – User input. Value may be N/A if NRCC-PRF-01 value is N/A.
12 Exterior Insul. R-Value – User input. Value may be N/A if NRCC-PRF-01 value is N/A.
13 Central DHW System Distribution Type - User input from list
* Recirculation Temperature Modulation Control with HERS-Verified Multiple Loops
* Recirculation Continuous Monitoring Systems with HERS-Verified Multiple Loops
* Demand Recirculation with HERS-Verified Multiple Loops
* Non-demand control Recirculation Systems with HERS-Verified Multiple Loops
14 Dwelling Unit DHW System Distribution Type - User input from list.
*Standard Distribution System
*Pipe Insulation
*HERS-Verified Pipe Insulation

B. Installed Central Water Heating Systems Information

This table reports the water heating system information that is being installed. Require one line for each central system.

01 Water Heating System ID or Name – Reference information from Table A
02 Water Heating System Type – Reference information from Table A
03 Water Heater Type – Reference Information from Table A
04 # of Water Heaters in system – Reference information from Table A
05 Water Heater Storage Volume (gal) – User input. Value may be N/A if water heater type is instantaneous with zero storage..
06 Fuel Type – Reference information from Table A
07 Rated Input Type – Reference information from Table A
08 Rated Input Value – User input. Numerical value of the rated input. Must be equal to or less than value indicated on the NRCC-PRF-01
09 Heating Efficiency Type – Reference information from Table A
10 Heating Efficiency Value – User input. Numerical value of the Heating Efficiency. Must be equal to or higher efficiency than value indicated on the NRCC-PRF-01
11 Standby Loss – User input. Must be equal to or less than value indicated on the NRCC-PRF-01. Value may be N/A if NRCC-PRF-01 value is N/A.

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12 Exterior Insul. R-Value – User input. Must be equal to or higher than value indicated on the NRCC-PRF-01. Value may be N/A if NRCC-PRF-01 value is N/A.
13 Central DHW System Distribution Type - Reference information from Table A
14 Dwelling Unit DHW System Distribution Type - Reference information from Table A

C. Installed Water Heater Manufacturer Information
This table reports the manufacturer information of the installed water heater(s). Require one line for each installed water heater
01 Water Heating System ID or Name – Reference information from NRCC-PRF-01.
02 Manufacturer – User input. Enter the name of the water heater manufacturer.
03 Model Number – User input. Enter the model number of the water heater.

D. HERS Verification Requirements for All Central Domestic Hot Water Recirculation Systems
This table lists the requirements for all central recirculation systems. HERS rater must ensure all the requirements on this table are met.

E Multiple Dwelling Units – Recirculation Temperature Modulation Control Requirements
This table only applies to systems indicated in A13 and B13 as **Recirculation Temperature Modulation Control.** In additional the mandatory requirements in Table D, the HERS rater must ensure the requirements on this table are met.

F. Multiple Dwelling Units – Recirculation Continuous Monitoring Systems Requirements
This table only applies to systems indicated in A13 and B13 as **Recirculation Continuous Monitoring Systems.** In additional the mandatory requirements in Table D, the HERS rater must ensure the requirements on this table are met.

G. Multiple Dwelling Units – Demand Recirculation Requirements
This table only applies to systems indicated in A13 and B13 as **Demand Recirculation.** In additional the mandatory requirements in Table D, the HERS rater must ensure the requirements on this table are met.

H. Multiple Dwelling Units – Non-Demand Control Recirculation Systems Requirements
This table only applies to systems indicated in A13 and B13 as **Non-Demand Control Recirculation Systems.** In additional the mandatory requirements in Table D, the HERS rater must ensure the requirements on this table are met.

I. HERS Verified Multiple Recirculation Loops for DHW Systems Serving Multiple Dwelling Units Requirements
This table applies to all systems identified on this form. This measure requires on site HERS verification that at least two central recirculation loops are included in the system design. This credit is available to buildings with 8 or more units. The recirculation loops must be relatively equal in length and supply approximately the same number of dwelling units.

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