

HERS VERIFIED SINGLE DWELLING UNIT HOT WATER SYSTEM DISTRIBUTION



CERTIFICATE OF VERIFICATION		NRCV-PLB-22-H
HERS Verified High Rise Residential/Hotel/Motel Single Dwelling Unit Hot Water System Distribution (Page 1 of 6)		
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City:	Zip Code:

A. General Information

This table reports the dwelling unit name that were specified on the NRCC-PRF-01 compliance document for this project.

01	Dwelling Unit Name
----	--------------------

B. Design Dwelling Unit Water Heating Systems Information

This table reports the water heating system(s) features specified on the registered NRCC-PRF-01 compliance document for this project.

01	02	03	04	05	06	07	08	09	10
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	Dwelling Unit DHW System Distribution Type	Compact Distrib.

C. Installed Dwelling Unit Water Heating Systems Information

This table reports the water heating system features installed in this project.

01	02	03	04	05	06	07	08	09	10
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	Dwelling Unit DHW System Distribution Type	Compact Distrib.

D. Design Dwelling Unit Water Heating Efficiency Information

This table reports the water heater(s) efficiency features specified on the registered NRCC-PRF-01 compliance document for this project.

01	02	03	04	05	06
Water Heating System ID or Name	Heating Efficiency Type	Heating Efficiency Value	Standby Loss (%)	Exterior Insulation R-Value	Tank location

E. Installed Dwelling Unit Water Heating Efficiency Information

This table reports the water heater(s) system efficiency features that were installed in this project.

01	02	03	04	05	06
Water Heating System ID or Name	Heating Efficiency Type	Heating Efficiency Value	Standby Loss (%)	Exterior Insulation R-Value	Tank location

HERS VERIFIED SINGLE DWELLING UNIT HOT WATER SYSTEM DISTRIBUTION



CERTIFICATE OF VERIFICATION		NRCV-PLB-22-H
HERS Verified High Rise Residential/Hotel/Motel Single Dwelling Unit Hot Water System Distribution (Page 2 of 6)		
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City:	Zip Code:

F. Installed Water Heater Manufacturer Information		
01	02	03
Water Heating System ID or Name	Manufacturer	Model Number

G. HERS-Verified Compact Hot Water Distribution Expanded Credit (CHWDS-H-EX) (RA3.6.5)						
For dwelling units with multiple systems, only allow one value to be entered for both master bath distance and kitchen distance.						
01	02	03	04	05	06	07
System Name	Number of Stories	Master Bath distance of furthest fixture to Water Heater in feet	Kitchen distance from furthest fixture to Water Heater in feet	Furthest Third furthest fixture to Water Heater in feet	Weighted Distance	Qualification Distance
08	No hot water piping >1 inch diameter is allowed.					
09	Length of 1 inch diameter piping is limited to 8 feet or less.					
10	Two and three story buildings cannot have hot water distribution piping in the attic, unless the water heater is also located in the attic.					
11	Eligible recirculating systems must be HERS-Verified Demand Recirculation: Manual Control conforming to RA4.4.17.					
12	Verification Status:				<input type="checkbox"/> <u>Pass</u> - all applicable requirements are met; or <input type="checkbox"/> <u>Fail</u> - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or <input type="checkbox"/> <u>All N/A</u> - This entire table is not applicable	
13	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.						

H. HERS-Verified Drain Water Heat Recovery System (DWHR-H)					
01	02	03	04	05	06
Manufacturer	Model #	Rated effectiveness	Installation Configuration (Equal flow, unequal to shower, unequal to water heater)	Percent of shower served by the DWHR device	DWHR System Certified by CEC
					<input type="checkbox"/> Yes <input type="checkbox"/> No
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.					

HERS VERIFIED SINGLE DWELLING UNIT HOT WATER SYSTEM DISTRIBUTION



CERTIFICATE OF VERIFICATION		NRCV-PLB-22-H
HERS Verified High Rise Residential/Hotel/Motel Single Dwelling Unit Hot Water System Distribution		(Page 3 of 6)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City:	Zip Code:

I. Mandatory Measures for Insulation for Piping, and Tanks.	
01	Equipment shall meet the applicable requirements of the Appliance Efficiency Regulations (Section 110.3(b)1).
02	Unfired Storage Tanks are insulated with an external R-12 or combination of R-16 internal and external insulation. (Section 110.3(c)4).
03	<p>The following pipes are insulated, to the thicknesses required by Table 120.3A, except for those sections of pipe that are subject to one of the exceptions below: All domestic hot water piping shall be insulated as specified in Section 609.11 of the California Plumbing Code. In addition, the following piping conditions shall have a minimum insulation wall thickness of 1 inch or a minimum insulation R-value of 7.7: (RA4.4.1)</p> <ul style="list-style-type: none"> • The first 5 feet (1.5 meters) of cold water pipes from the storage tank. • All piping with a nominal diameter of 3/4 inch (19 millimeter) and less than 1 inch. • All hot water piping from the heating source to the kitchen fixtures. • All underground piping. <ul style="list-style-type: none"> ▪ insulation buried below grade must be installed in a water proof and non-crushable casing or sleeve • Piping from the heating source to storage tank or between tanks ○ Piping that penetrates framing members shall not be required to have pipe insulation for the distance of the framing penetration. 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. ○ Piping installed in interior or exterior walls that is surrounded on all sides by at least 1 inch (2.5 cm) of insulation. ○ Piping installed in crawlspace with a minimum of 1 inches (2.5 cm) of crawlspace insulation above and below. ○ Piping installed in attics with a minimum of 4 inches (10 cm) of attic insulation on top ○ Pipe insulation shall fit tightly and all elbows and tees shall be fully insulated.
04	<p>For Gas or Propane Water Heaters: Ensure the following are installed (Section 150.0(n))</p> <ul style="list-style-type: none"> • A dedicated 125V, 20A electrical receptacle connected to the electric panel with a 120/240V 3 conductor, 10 AWG copper branch circuit, within 3 feet from the water heater and accessible with no obstructions; <ul style="list-style-type: none"> ▪ The conductor shall be labeled with the work "Spare" on both ends; and ▪ A reserved single pole circuit breaker space next to the circuit breaker next to the branch circuit labeled "Future" 240V shall be provided. • A Category III or IV vent, or a Type B vent with straight pipe between outside and water heater • A condensate drain no more than 2 inches higher than the base on water heater for natural draining • A gas supply line with capacity of at least 200,000 Btu/hr
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.	

J. HERS-Verified Pipe Insulation Credit Requirements RA 3.6.3	
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.
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.	

K. HERS-Verified Parallel Piping Requirements (RA 3.6.4)	
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.
02	For manifolds that include valves, the manifold must be readily accessible in accordance with the plumbing code.
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.
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.
05	Verification Status:
06	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.	

HERS VERIFIED SINGLE DWELLING UNIT HOT WATER SYSTEM DISTRIBUTION



CERTIFICATE OF VERIFICATION		NRCV-PLB-22-H
HERS Verified High Rise Residential/Hotel/Motel Single Dwelling Unit Hot Water System Distribution		(Page 4 of 6)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City:	Zip Code:

L. HERS-Verified Demand Recirculation Manual Control Requirements(R-DRmc-H) (RA3.6.6)	
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. (RA4.4.9/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: (RA4.4.9(f)/RA4.4.13(d)) <ul style="list-style-type: none"> • 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 5 minutes for single dwellings, and 10 minutes for multiple dwellings following any activation. This is provided in the event that the normal means of shutting off the pump have failed. (RA4.4.9(f)3/RA4.4.13(d)3)
04	Pump and control placement shall meet one of the following criteria: (RA4.4.9(d)/RA4.4.13(b)) <ul style="list-style-type: none"> • 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 thermo-sensor 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. (RA4.4.9(e)/RA4.4.13(c))
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. (RA4.4.9(c)/RA4.4.13(a))
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, or similar device, 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 line per Section 110.3(c)5F.
14	Verification Status:
15	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.	

HERS VERIFIED SINGLE DWELLING UNIT HOT WATER SYSTEM DISTRIBUTION



CERTIFICATE OF VERIFICATION		NRCV-PLB-22-H
HERS Verified High Rise Residential/Hotel/Motel Single Dwelling Unit Hot Water System Distribution		(Page 6 of 6)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City:	Zip Code:

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:	
<ol style="list-style-type: none"> 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:

For information only. Not valid until registration only. HERS provider

A. Dwelling Unit Name

01 This identifies the dwelling unit on this compliance document and is referenced from the CF1R. One form is required for each dwelling unit in the building.

B. Design Central Water Heating Systems Information

This table reports the water heating system features that were specified on the registered CF1R compliance document for this project. For information only and requires no user input.

C. Installed Dwelling Unit Water Heating Systems Information

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

01 Water Heating System ID or Name – Reference information from CF1R.

02 Water Heating System Type – Reference information from CF1R. The different kinds of water heating system type are DHW, or Combined Hydronic.

03 Water Heater Type – Information from CF1R. The different kinds of water heaters are Large/Commercial Storage, Small/Consumer Storage, Residential-Duty Commercial Storage, Heat Pump, Boiler, Large/Commercial Instantaneous, Small/Consumer Instantaneous, Residential-Duty Commercial Instantaneous or Indirect.

04 # of Water Heaters in system – Reference information from CF1R.

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 CF1R. The different kinds of fuel types are natural gas, propane, oil, or electricity.

07 Rated Input Type – Reference information from CF1R. 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 CF1R.

09 Dwelling Unit DHW System Distribution Type - Reference information from CF1R.

D. Design Dwelling Unit Water Heating Efficiency Information

This table reports the water heating system features that were specified on the registered CF1R compliance document for this project. For information only and requires no user input.

E. Installed Dwelling Unit Water Heating Efficiency 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 CF1R

02 Heating Efficiency Type – Reference information from CF1R. Different efficiency types are Energy Factor, AFUE, UEF and Thermal Efficiency.

03 Heating Efficiency Value – User input. Numerical value of the Heating Efficiency. Must be equal to or higher efficiency than **value indicated on the CF1R**.

04 Standby Loss – User input. Must be equal to or less than value indicated on the CF1R. Value may be N/A if CF1R value is N/A.

05 Exterior Insulation R-Value – User input. Must be equal to or higher than value indicated on the CF1R. Value may be N/A if CF1R value is N/A.

06 Tank location – User input. Must be equal to system type indicated on the CF1R.

F. 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 CF1R.

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.

G. HERS Verified Compact Design Distribution System

This table lists the user inputs and calculations, which must match values on CF-1R.

- 01 Master Bath distance of furthest fixture to Water Heater in feet.
- 02 Kitchen distance from furthest fixture to Water Heater in feet
- 03 Furthest Third fixtures from fixture to Water Heater in feet
- 04 Weighted Distance
- 05 Qualified Distance

$$\text{Weighted Distance} = x * d_{\text{MasterBath}} + y * d_{\text{Kitchen}} + z * d_{\text{FurthestThird}}$$

Where:

x, y, and z = Weighted Distance coefficients (unitless), see Table 4.4.6-1.

d_{MasterBath} = The plan view, straight line distance from the water heater to the furthest fixture served by that water heater in the master bathroom (feet).

d_{Kitchen} = The plan view, straight line distance from the water heater to the furthest fixture served by that water heater in the kitchen (feet).

d_{FurthestThird} = The plan view, straight line distance from the water heater to the furthest fixture served by that water heater in the furthest room¹ in the dwelling unit (feet).

Table 4.4.6-1: Weighted Distance Coefficients

Distribution System	x	y	z
Non-Recirculating	0.4	0.4	0.2
Recirculating	0.0	0.0	1.0

¹ Because the Master Bath and Kitchen have unique separate terms, the Furthest Third fixture must be located in neither of these rooms. The laundry room is excluded, and shall not be used as the furthest third fixture. In multifamily cases where there is not another qualifying use point, the Furthest Third term equals zero.

$$\text{Qualification Distance} = (a + b * CFA) / n$$

Where:

a, b = Qualification distance coefficients (unitless), see Table 4.4.6-2.

CFA = Conditioned floor area of the dwelling unit (ft²), and

n = Number of water heaters in the dwelling unit (unitless).

Table 4.4.6-2: Coefficients for the Qualification Distance Calculation

Building Type	Coefficient a		Coefficient b	
	Non-Recirculating	Recirculating	Non-Recirculating	Recirculating
Single Family				
One story	10	22.7	0.0095	0.0099
Two story	15	11.5	0.0045	0.0095
Three story	10	0.5	0.0030	0.014
Multifamily				
One story	7.5	n/a	0.0080	n/a

H. HERS-Verified Drain Water Heat Recovery System

This table lists the requirements for all central recirculation systems. HERS rater must ensure all the requirements in this table are met.

01 Drain Water Heat Recovery Manufacturer’s name- Enter the name of the Manufacturer

02 Drain Water Heat Recovery Manufacturer’s model number – Enter the Model number

03 Rated Effectiveness’ – Enter the rated effectiveness of the Water Heat Recovery Unit.

04 Installation Configuration (Equal flow, unequal to shower, unequal to water heater) – Enter type of configuration.

05 Percent of shower served by the DWHR device – By percent enter the ratio of showers that the heat recovery is receiving water from
06 DWHR System Certified by CEC – Enter “Yes” if certified or else enter “No”.

I. Mandatory Measures for All Domestic Hot Water Distribution Systems

This table lists the requirements for all recirculation systems. HERS rater must ensure all the requirements in this table are met.

J. HERS-Verified Pipe Insulation Credit Requirements

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

K. HERS-Verified Parallel Piping Requirements

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

L. HERS-Verified Demand Recirculation Manual Control Requirements

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

M. HERS-Verified Demand Recirculation Sensor Control Requirements

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

For information and data collection only. Not valid until registered with a HERS provider