MULTIFAMILY CENTRAL HOT WATER SYSTEM DISTRIBUTION
CALIFORNIA ENERGY COMMISSION
CEC-LMCI-PLB-01-E

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

## CERTIFICATE OF INSTALLATION

**Note:** This table completed by HERS Registry.

Project Name:	Enforcement Agency:
Dwelling Address:	Permit Number:
City and Zip Code:	Permit Application Date:

#### A. General Information

	01	Building Name	· O`
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## B. Design Central Water Heating Systems Information (other than CHPWH)

This table reports features of the water heating system other than **CHPWH** system that were specified on the registered LMCC compliance document for this project.

0											
01	02	03	04	05	06	07	08	09	10	11	12
			# of	Water				~	0	1.570	
Water	Water		Water	Heater			- 40		2		
Heating	Heating	Water	Heaters	Storage		8	2.0	Heating	Heating	Standby	Exterior
System ID or	System	Heater	in	Volume		Rated	Rated	Efficiency	Efficiency	Loss	Insul.
Name	Туре	Туре	System	(gal)	Fuel Type	Input Type	Input Value	Туре	Value	(%)	R-Value
						1	5.	2			
						0		5			
						and the second second		The second secon			

## **B2. Design CHPWH System Information**

This table reports the water heating systems specified on the registered LMCC compliance document for this project.

01	02	03	04	05	06	07	08	09	10	11	12
	Modeled		2		11.	- 3	0		Loop		Simulate
Water	Equipme	# of	20	. 2	Primary	-		Loop	Pipe		d
Heating	nt	Water	1	Vil	Tank	- V		Tank	Insulatio		Equipme
System	Make	Heaters/	Primary	Primary	Total	Loop	Loop	Total	n	Loop	nt Make
ID	and	Compres	Tank	Tank	Insulatio	Tank	Tank	Insulatio	Thicknes	Tank	and
or Name	Model	sors	Location	Volume	n	Location	Volume	n	S	Туре	Model
	1 10	. 1	40	Y	1						
- 0	1	20	1								

# C. Installed Central Water Heating Systems Information

This table reports features of the water heating system other than **CHPWH** system that were specified on the registered LMCC compliance document for this project.

0											
01	02	03	04	05	06	07	08	09	10	11	12
			# of	Water							
Water	Water		Water	Heater							
Heating	Heating	Water	Heaters	Storage				Heating	Heating	Standby	Exterior
System ID or	System	Heater	in	Volume		Rated	Rated	Efficiency	Efficiency	Loss	Insul.
Name	Туре	Туре	System	(gal)	Fuel Type	Input Type	Input Value	Туре	Value	(%)	R-Value

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CEC-LMCI-PLB-01-E

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#### C2. Installed CHPWH System Information

This table reports the water heating system features that were specified on the registered LMCC compliance document for this project.

01	02	03	04	05	06	07	08	09	10	11
	Modeled	# of								
Water	Equipmen	Water								
Heating	t	Heaters/	Primary	Primary	Primary				Loop Pipe	
System ID	Make and	Compress	Tank	Tank	Tank	Loop Tank	Loop Tank	Loop Tank	Insulation	Loop Tank
or Name	Model	ors	Location	Volume	Insulation	Location	Volume	Insulation	Thickness	Туре
								21	5	0
								0	5	0

#### D. Design Central Water Heating Distribution Systems Information

This table reports the water heating distribution types specified on the registered LMCC compliance document for this project.

01	02	03
	Central DHW System	Dwelling Unit DHW System
Water Heating System ID or Name	Distribution Type	Distribution Type
	. 0.	20

#### E. Installed Central Water Heating Distribution Systems Information

This table reports the water heating distribution types specified on the registered LMCC compliance document for this project.

01	02	03
81	Central DHW System	Dwelling Unit DHW System
Water Heating System ID or Name	Distribution Type	Distribution Type
- C	a v. alv	
10.	0.0	

## F. Installed Water Heater Manufacturer Information

01	02	03
Water Heating System ID or Name	Manufacturer	Model Number
	1.	
10, 01		



CALIFORNIA ENERGY COMMISSION

CEC-LMCI-PLB-01-E

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#### G. Mandatory Requirements for All Central Domestic Hot Water Systems

01	On systems that have a total capacity greater than 167,000 Btu/hr, outlets that require higher than service water temperatures as listed in the ASHRAE Handbook have separate remote heaters, heat exchangers, or boosters to supply the outlet with the higher temperature. (Section 110.3 (c)1)
02	Systems with circulating pumps or with electrical heat trace systems shall be capable of automatically turning off the system. (Section 110.3(c)2).
03	Unfired storage tanks are insulated with an external R-3.5 or combination of R-16 internal and external Insulation. (Section 110.3(c)4).
04	<ul> <li>Recirculation loops shall meet the following requirements:</li> <li>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)4A).</li> <li>A check valve is located between the recirculation pump and the water heater. (Section 110.3(c)4B).</li> <li>A hose bib is installed between the pump and the water heating equipment with an isolation valve between the hose bib and the water heating equipment. (Section 110.3(c)4C).</li> <li>Isolation valves shall be installed on both sides of the pump, of which the valve required in 110.3(c)4C can be one. (Section 110.3(c)4D).</li> <li>The cold water piping and the recirculation loop piping shall not be connected to the hot water storage tank drain port. (Section 110.3(c)4E).</li> <li>A check valve shall be installed on the cold water supply line between the hot water system and the next closest tee on the cold water supply line. (Section 110.3(c)4F).</li> </ul>

# **H. Multiple Dwelling Units – Recirculation Temperature Modulation Control Requirements (RA4.4.11)** 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 on measurements of hot water demand.
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°F.

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

## **I. Multiple Dwelling Units – Recirculation Continuous Monitoring Systems Requirements (RA4.4.12)** 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.
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.
03	A current contract must be available that demonstrates the system will be monitored.

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CALIFORNIA ENERGY COMMISSION

CEC-LMCI-PLB-01-E

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

## J. Multiple Dwelling Units – Demand Recirculation Requirements (RA4.4.13)

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.
	After the pump has been activated, the controls shall allow the pump to operate until the water temperature at the thermo-sensor rise
02	to one of the following values:
	<ul> <li>Not more than 10°F (5.6°C) above the initial temperature of the water in the pipe; or</li> </ul>
	<ul> <li>Not more than 102°F (38.9°C).</li> </ul>
	The controls shall limit pump operation to a maximum of 10 minutes following any activation. This is provided in the event that the
03	normal means of shutting off the pump have failed.
	Pump and control placement shall meet one of the following criteria:
	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
04	• The pump and controls are installed on the dedicated return line near the water heater and the thermo-sensor is installed in ar
	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.
	Manual or sensor controls shall be installed and, if powered, each control has standby power of 1 Watt or less. Controls may be locate
06	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.
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CEC-LMCI-PLB-01-E

# SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

#### DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

1. I	certify that	this Certificate	of Installation	documentation	is accurate and	complete.
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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:
   The information provided on this Certificate of Installation is true and correct.
  - 2. I am either: a) a responsible person 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, or b) I am an authorized representative of the responsible person and attest to the declarations in this statement on the responsible person's behalf.
  - 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 Certificate of Compliance, plans, and specifications approved by the enforcement agency.
  - 4. I understand 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, and I will take the necessary steps to ensure this requirement is accomplished.
  - 5. 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, and I will take the necessary steps to ensure this requirement is accomplished.

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:	

For assistance or questions regarding the Energy Standards, contact the Energy Hotline at: 1-800-772-3300

## LMCI-PLB-01-E User Instructions

#### A. General Information

This table reports the building location as specified on the Registered LMCC.

#### **B. Design Central Water Heating Systems Information**

This table reports features of the water heating system other than **CHPWH** system that were specified on the registered LMCC compliance document for this project. This section is for information/verification purposes only and requires no user input.

#### **B2. Design CHPWH System Information**

This table reports the water heating systems specified on the registered LMCC compliance document for this project. This section is for information/verification purposes only and requires no user input.

## C. Installed Central Water Heating Systems Information

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

- 1. Water Heating System ID or Name Reference information from LMCC.
- 2. Water Heating System Type Reference information from LMCC. The different kinds of water heating system type are DHW or Combined Hydronic.
- Water Heater Type Information from LMCC. 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.
- 4. # of Water Heaters in System Reference information from LMCC.
- 5. Water Heater Storage Volume (gal) User input. Value may be N/A if water heater type is instantaneous with zero storage.
- 6. Fuel Type Reference information from LMCC. The different kinds of fuel types are natural gas, propane, oil, or electricity.
- 7. Rated Input Type Reference information from LMCC. For natural gas, propane and oil fuel type the input type is Btu/hr. For electric the input type is kW.
- 8. Rated Input Value User input. Numerical value of the rated input. Must be equal to or less than value indicated on the LMCC.
- 9. Heating Efficiency Type Reference information from LMCC. Different efficiency types are Energy Factor, AFUE, UEF 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 LMCC.
- 11. Standby Loss User input. Must be equal to or less than value indicated on the LMCC. Value may be N/A if LMCC value is N/A.
- 12. Exterior Insulation. R-Value User input. Must be equal to or higher than value indicated on the LMCC. Value may be N/A if LMCC value is N/A.

CERTIFICATE OF INSTALLATION – USER INSTRUCTIONS	LMCI-PLB-01-E
Multifamily Central Hot Water System Distribution	(Page 2 of 3)

## **C2.** Installed CHPWH System Information

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

- 1. Water Heating System ID or Name Reference information from Table B2.
- 2. Modeled Equipment Make and Model User input must be equal to the value indicated on Table B2 as default and allow user to override with an equivalent system based on the simulated equipment in Table B2.
- 3. Number of Water Heaters/ Compressors User input, must be equal to the value indicated on table B2.
- 4. Primary Tank Location Reference information from Table B2.
- 5. Primary Tank Volume User input, must be equal to or higher than the value indicated on table B2.
- 6. Primary Tank Insulation User input, must be equal to or higher than value indicated on table B2.
- 7. Loop Tank Location Reference information from Table B2.
- 8. Loop Tank Volume User input, must be equal to or higher than the value indicated on table B2.
- 9. Loop Tank Insulation User input, must be equal to or higher than value indicated on table B2.
- 10. Loop Pipe Insulation Thickness User input, must be equal to or higher than the value indicated on table B2.
- 11. Loop Tank Reference information from Table B2.

## D. Design Central Water Heating Distribution Systems Information

This table reports the water heating distribution types specified on the registered LMCC compliance document for this project.

## E. Installed Central Water Heating Distribution Systems Information

- 1. Water Heating System ID or Name Reference information from LMCC.
- 2. Central DHW System Distribution Type = Reference information from LMCC.
- 3. Dwelling Unit DHW System Distribution Type = Reference information from LMCC.

# 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

- 1. Water Heating System ID or Name Reference information from LMCC.
- 2. Manufacturer User input. Enter the name of the water heater manufacturer.
- 3. Model Number User input. Enter the model number of the water heater.

# G. Mandatory Requirements for All Central Domestic Hot Water Recirculation Systems

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

## H. Multiple Dwelling Units – Recirculation Temperature Modulation Control Requirements

This table only applies to systems indicated as **Recirculation Temperature Modulation Control.** In addition to the mandatory requirements in Table G, the installer must ensure the requirements on this table are met.

CERTIFICATE OF INSTALLATION – USER INSTRUCTIONS	LMCI-PLB-01-E
Multifamily Central Hot Water System Distribution	(Page 3 of 3)

## I. Multiple Dwelling Units – Recirculation Continuous Monitoring Systems Requirements

This table only applies to systems indicated as **Recirculation Continuous Monitoring Systems.** In addition to the mandatory requirements in Table G, the installer must ensure the requirements on this table are met.

#### J. Multiple Dwelling Units – Demand Recirculation Requirements

This table only applies to systems indicated as **Demand Recirculation.** In addition to the mandatory requirements in Table G, the installer must ensure the requirements on this table are met.

#### **Documentation Declaration Statements**

- 1. The person who prepared the LMCI will sign and complete the fields for their name, company (if applicable), address, phone number, certification information (if applicable), date and signature.
- ss, phone ss, phone cs, ph 2. The person who is assuming responsibility for the project being built to comply with Title 24, Part 6, will complete the fields for their name, company (if applicable), address, phone number, license