

**CERTIFICATE OF INSTALLATION**

This Certificate of Installation documents the installation of service water heating features, materials, components, and manufactured devices required to demonstrate compliance with Title 24, Part 6 per §10-103(a)3 for nonresidential spaces with water heating systems in low-rise mixed-use buildings. Low-rise multifamily buildings which are not mixed-use should document water heating systems on the LMCI-PLB-01-E for Central Water Heating systems in Dwelling Units and the LMCI-PLB-02-E for Single Dwelling Unit Water Heating Systems through ECC Providers Registries.

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

A. GENERAL INFORMATION

01	Project Location (city):		05	Authority Having Jurisdiction:	
02	Zip Code:		06	Building Permit #:	
03	Date of Permit Set used for construction:		07	Date of As-built Set:	
04	Name of Permit Set used for construction:		08	Name of As-built Set:	

B. INSTALLER SCOPE

This table indicates construction systems and materials documented on this Certificate of Installation.

01	02	03	04
☐ Water Heating Equipment	☐ Distribution (piping, valves, insulation, etc.)	☐ Controls	☐ Pool/Spa

**C. COMPLIANCE RESULTS**

This table indicates whether the as-built conditions documented in this form are equal or better than what was documented on the permitted Certificate of Compliance. If the installation is not equal or better, Section 10-103(a)2B requires the Certificate of Compliance to be revised accordingly to demonstrate compliance.

01	INSTALLED FEATURES EXACTLY MATCH DESIGN ON PERMITTED CERTIFICATE OF COMPLIANCE
Documented as-built conditions should be verified by inspector from Authority Having Jurisdiction to comply.	
The Certificate of Compliance should be revised to confirm as-built conditions comply and this Certificate of Installation updated accordingly.	

D. EXCEPTIONAL CONDITIONS

This table is auto-filled with uneditable comments because of field conditions noted by the installer that may impact mechanical controls requirements documented on the Certificate of Compliance.

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E. INSTALLER NOTES

This table includes remarks made by the installer to the Authority Having Jurisdiction.

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**F. INSTALLATION DETAILS**

The following tables indicate performance requirements as documented on the permitted Certificate of Compliance for all systems and components included in Table B. Installer Scope. Also indicated are the as-built conditions documented by the installer/ documentation author.

Domestic Hot Water Equipment Efficiency

01	02	03	04	05	06	07	08	11
Name or Item Tag	Model #	Space Type	Equipment Type	Volume (gal)	Rated Input Capacity (Btu/h)	Capacity Unit	Rated Efficiency	DHW Equipment Compliance
Per C of C								
As-built Conditions								

Domestic Hot Water Equipment Additional Requirements

The following requirements have been included on the permitted Certificate of Compliance (NRCC) to comply with Title 24, Part 6. Installed equipment shall meet these requirements or the Certificate of Compliance shall be modified to demonstrate compliance.

System Name:	
Unfired storage tank insulation shall have Internal + External $\geq$ R-16 OR External $\geq$ R-12. Label required per Title 24, Part 6 §110.3(c)3	
Isolation valves installed for instantaneous water heater with input rating > 6.8 kBTUH or 2 kW per Title 24, Part 6 §110.3(c)6.	
Backup heat is required when inlet air is unconditioned unless the compressor cut-off temperature is below the Heating Winter Median of Extremes for the closest location listed in Table 2-3 from Reference Joint Appendix JA2.	
Consumer integrated HPWHs shall meet the following requirement:	
The primary storage tank temperature setpoint shall be at least 135°F - §170.2(d)2Aiv	
The minimum heat pump water heater compressor cut-off temperature shall be equal to or lower than 40°F ambient air temperature	

**Electric Ready Requirements**

System Name:	
A condensate drain that is no more than 2 inches higher than the base of the installed water heater, and allows natural draining without pump assistance	
A ventilation method meeting one of the following: - The designated space for the future heat pump water heater shall have a minimum volume of 700 cubic feet; or - The designated space for the future heat pump water heater shall vent to a communicating space in the same pressure boundary via permanent openings with a minimum total NFA of 250 square inches., so that the total combined volume connected via permanent openings is 700 cubic feet or larger. The permanent openings shall be: - Fully louvered doors with fixed louvers; or - Two permanent fixed openings located within 12 inches from the enclosure top and bottom; - The designated space for the future heat pump water heater shall include two 8 inches capped ducts, venting to the building exterior: - All ducts, connections, and building penetrations shall be sealed. - Exhaust air ducts and all ducts which cross pressure boundaries shall be insulated to a minimum insulation level of R-6. - Airflow from termination points shall be diverted away from each other.	
Space shall be reserved for a Heat Pump. The minimum space reserved shall include space for service clearances and air flow clearances and shall meet one of the following: - The space reserved shall be the space required for a heat pump water heater system that meets the total building hot water demand as calculated and documented by the responsible person associated with the project; or - The space reserved shall meet the requirements specified in Joint Appendix JA15.2.1.	
Space shall be reserved for Tanks. The minimum space reserved shall include space for service clearances and shall meet one of the following: - The space reserved shall be the space required for a heat pump water heater system that meets the total building hot water demand as calculated and documented by the responsible person associated with the project; or - The space reserved shall meet the requirements specified in Joint Appendix JA15.2.2.	
Ventilation shall be provided by meeting one of the following: - Physical space reserved for the heat pump shall be located outside; or - A pathway shall be reserved for future routing of supply and exhaust air via ductwork from the reserved heat pump location to a suitable outdoor location. Penetrations through the building envelope for louvers and ducts shall be planned and identified for future use. The reserved pathway and penetrations through the building envelope shall be sized to meet one of the following: - The reserved pathway and penetrations shall be sized to serve a heat pump water heater system that meets the total building hot water demand as calculated and documented by the responsible person associated with the project. - The reserved pathway and penetrations shall be sized to meet the requirements specified in Joint Appendix JA15.2.3.	
Condensate drainage piping. An approved receptacle that is sized per the California Plumbing Code for condensate drainage shall be installed within 3 feet of the reserved heat pump location, or piping shall be installed from within 3 feet of the reserved heat pump location to an approved discharge location that is sized in accordance with the California Plumbing Code, and meet one of the following: - Condensate drainage shall be sized to serve a heat pump water heater system that meets the total building hot water demand as calculated and documented by the responsible person associated with the project. - Condensate drainage piping shall be sized to meet the requirements specified in Joint Appendix JA15.2.4.	

**DOMESTIC HOT WATER DISTRIBUTION REQUIREMENTS**

The following requirements have been included on the permitted Certificate of Compliance to comply with Title 24, Part 6. Installed equipment shall meet these requirements or the Certificate of Compliance shall be modified to demonstrate compliance.

Recirculation Loops in Central Systems Serving Dwelling Units or Nonresidential Spaces

System Name:	
Automatic air release valve no more than 4 feet from pump or vertical pump installation	
Check valve or similar located between recirculation pump and water heating equipment to prevent backflow	
Hose bibb installed between pump and equipment and isolation valve between hose bibb and equipment	
Isolation valves on both sides of the pump	
Cold water and recirculation loop piping is not connected to the hot water storage tank drain port	
Check valve is installed on cold water supply between hot water system and next closest tee on cold water supply	
DWELLING UNITS ONLY: For heat pump water heating systems, the hot water return from the recirculation loop shall connect to a recirculation loop tank and shall not directly connect to the primary heat pump water heater inlet or the primary thermal storage tanks per §170.2(d)2Aii.	
DWELLING UNITS ONLY: For heat pump water heating systems, the fuel source for the recirculation loop tank shall be electricity per §170.2(d)2Aiii.	
DWELLING UNITS ONLY: The recirculation loop tank temperature setpoint shall be at least 10°F lower than the primary thermal storage tank temperature setpoint - §170.2(d)2Av	
DWELLING UNITS ONLY: All hot water distribution piping shall be sized in accordance with the California Plumbing Code Appendix M per §170.2(d)2C.	
DWELLING UNITS ONLY: A recirculation system with mechanical or digital thermostatic master mixing valve on each distribution supply and return loop and meet the requirements in Reference Appendix RA4.4, unless building has ≤ 8 dwelling units	

Distribution of Individual System(s) serving Dwelling Units

System Name:	
Single 240-volt heat pump water heaters serving dwelling units must also include systems with:	
	- Compact hot water distribution system as specified in Reference Appendix RA4.4.16 in climate zone 1 & 16; AND
	- A drain water heat recovery system that is field verified by an ECC Rater per Reference Appendix RA3.6.9 in climate zone 16.
A drain water heat recovery system that is field verified by an ECC Rater per Reference Appendix RA3.6.9 in climate zone 16.	
For recirculation distribution systems serving individual dwelling units, only Demand Recirculation Systems with manual on/off control as specified in the Reference Appendix RA4.4.9 shall be used.	

**Mandatory Pipe Insulation Requirements**

System Name:	
For systems serving dwelling units and common areas, pipe insulation must meet the minimum insulation requirements in Table 160.4-A (see below) except: - 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 abut securely against all framing members. - Piping installed in interior or exterior walls shall not be required to have pipe insulation if all of the requirements are met for compliance with Quality Insulation Installation (QII) as specified in the Reference Residential Appendix RA3.5. - Piping surrounded with a minimum of 1 inch of wall insulation, 2 inches of crawlspace insulation, or 4 inches of attic insulation, shall not be required to have pipe insulation.	
For systems serving nonresidential spaces, pipe insulation for the following applications must comply with the following: - Recirculating system piping, including supply and return piping of the water heater - The first 8 ft of hot and cold outlet piping, including between storage tank and heat trap, for a nonrecirculating storage system - Pipes that are externally heated	
Insulation shall be protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind. Insulation exposed to weather shall be installed with a cover suitable for outdoor service per §120.3(b)/ §160.4(f). Pipe insulation buried below grade must be installed in a waterproof and non-crushable casing or sleeve.	

**Domestic Hot Water System Controls**

The following requirements have been included on the permitted Certificate of Compliance to comply with Title 24, Part 6. Installed equipment shall meet these requirements or the Certificate of Compliance shall be modified to demonstrate compliance.

Manufacturers must certify that service water-heating systems shall be equipped with automatic temperature controls capable of adjustment from the lowest to the highest acceptable temperature settings for the intended use as listed in Table 3, Chapter 50 of the ASHRAE Handbook, HVAC Applications Volume or Table 613.1 of the California Plumbing Code for healthcare facilities.
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, Applications Volume, shall have separate remote heaters, heat exchangers, or boosters to supply the outlet with the higher temperature unless covered by California Plumbing Code Section 613.0.
Controls for circulating pumps or electrical heat trace systems are capable of automatically turning off the system unless system serves healthcare facility.
For recirculation systems serving multiple dwelling units, design includes a mechanical or digital thermostatic master mixing valve on each distribution supply and return loop per §170.2(d), or §180.1(b)3 for additions or alterations.
For recirculation systems serving individual dwelling units, design includes manual on/off controls as specified in Reference Appendix RA 4.4.9 per §150.1(c)8 §170.2(d).
Combustion air positive shut-off shall be provided per §160.4(e) on all newly installed commercial boilers as follows: - Boiler with input capacity $\geq$ 2.5 MMBtu/h, in which the boiler is designed to operate with a nonpositive vent static pressure - Boilers where one stack serves two or more boilers with a total combined input capacity per stack of 2.5 MMBtu/h.
Boiler combustion air fans with motors $\geq$ 10 hp shall meet one of the following for newly installed boilers: - The fan motor shall be driven by a variable speed drive OR - The fan motor shall include controls that limit the fan motor demand to $\leq$ 30% of the total design wattage at 50% of the design air volume.
Newly installed boilers with an input capacity $\geq$ 5 MMBtu/h and a steady state full-load combustion efficiency $<$ 90% shall maintain excess (stack-gas) oxygen concentrations $\leq$ 5% by volume on a dry basis over firing rates of 20-100%. Combustion air volume shall be controlled with respect to firing rate or flue gas oxygen concentration. Use of a common gas and combustion air control linkage or jack shaft is prohibited.

Pool & Spa

01	02	03	04	05	06	07	08	09	10
Pool/ Spa Description	Pool/Spa Service Type	On/Off Control	Instructions	Covers	Electric Resistance Heating Equipment	Heating Source Sizing	Piping	Pool Directional Inlets & Pump Control	Compliance
Per C of C									
As-built Conditions									

**Additional Requirements For Pool/ Spa Serving One Tenant §150.0(P)**

Pool/Spa Description:	
Dedicated-purpose pool pumps and replacement dedicated-purpose pump motors subject to State or Federal appliance standards shall be listed in the Commission's directory of certified equipment. - Dedicated-purpose pool pumps shall meet 20 CCR § 1605.1(g)(7) of the Appliance Efficiency Regulations. - Replacement dedicated-purpose pool pumpmotors shall meet 20 CCR § 1605.3 of the Appliance Efficiency Regulations.	
Filtration pumps shall be sized, or if programmable, shall be programmed, so that the filtration flow rate is not greater than the rate needed to turn over the pool water volume in 6 hours or 36 gpm, whichever is greater.	
Dedicated-purpose pool pumps with more than one speed shall have: - Controls that default to the filtration flow rate when no auxiliary pool loads are operating, and; - Controls that default to the filtration flow rate setting within 24 hours and shall have an override capability for servicing.	
System Piping must meet the following requirements: - A length of straight pipe that is greater than or equal to at least 4 pipe diameters shall be installed before the pump; and - Pool piping shall be sized so that the velocity of the water at maximum flow for auxiliary pool loads does not exceed 8 feet per second in the return line and 6 feet per second in the suction line; and - All elbows shall be sweep elbows or of an elbow-type that has a pressure drop of less than the pressure drop of straight pipe with a length of 30 pipe diameters.	
Filters shall be at least the size specified in NSF/ANSI 50 for public pool intended applications.	
Minimum diameter of backwash valves shall be 2 inches or the diameter of the return pipe, whichever is greater.	

G. ACCEPTANCE TESTS & FIELD VERIFICATION

The following Acceptance Tests and ECC Verifications related to the systems or materials documented on this Certificate of Installation have been indicated on the permitted Certificate of Compliance as being required to comply with Title 24, Part 6.

Certificates of Acceptance

There are no Certificates of Acceptance applicable to service water heating requirements.

Certificates of Verification

ECC verifications must be completed by an ECC Rater and LMCV forms completed through an approved ECC Provider database. The Certificate of Verification forms indicated below will be required by the Authority Having Jurisdiction to demonstrate compliance.

Form/Title	Systems to be Field Verified
LMCV-PLB-21-H Central Hot Water Distribution Verification	
LMCV-PLB-22-H Individual Dwelling Unit Hot Water Distribution Verification	
<i>There are no Acceptance Tests or ECC verifications indicated on the permitted LMCC related to the systems or materials documented on this LMCI.</i>	

A copy of this Certificate of Installation should be distributed to the Field Technician(s) who will perform the acceptance test(s). Title 24, Part 6 Section 10-103(a)3F also requires this Certificate of Installation be posted or made available to the Authority Having Jurisdiction for all applicable inspections.

**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/AEA/ECC 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 Certificate of Compliance, plans, and specifications approved by the enforcement agency.
4. 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.
5. I understand that a completed signed copy of this Certificate of Installation shall be made available with the building permit(s) issued for the building. shall be made available to the enforcement agency for all applicable inspections. I will take the necessary steps to fulfill this requirement.
6. I understand that a completed signed copy of this Certificate of Installation is required to be included with the documentation the builder provides to the building owner at occupancy. I will take the necessary steps to fulfill this requirement.

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:

CERTIFICATE OF COMPLIANCE – USER INSTRUCTIONS	LMCI-PLB-E
Domestic Water Heating System	(Page 1 of 3)

A. General Information

1. This field is filled out automatically with data from the NRCC.
2. This field is filled out automatically with data from the NRCC.
3. Enter the Date of Permit Set used for construction.
4. Enter the Name of Permit Set used for construction.
5. Enter the Authority Having Jurisdiction.
6. Enter the Building Permit #.
7. Enter the Date of As-Built Set.
8. Enter the Name of As-Built Set.

B. Project Scope

1. Select water heating equipment if applicable.
2. Select distribution (piping, valves, insulation, etc.) if applicable.
3. Select controls if applicable.

C. Compliance Results

This table is automatically filled with uneditable comments based on data entered in Section F.

D. Exceptional Conditions

This table is automatically filled with uneditable comments because of selections made or data entered in tables throughout the form.

E. Additional Remarks

Enter any notes or comments for the AHJ.

F. Installation Details

Domestic Hot Water Equipment Efficiency

1. This field is filled out automatically.
2. Enter the Model # of the equipment installed.
3. Individual or Central System: Select from dropdown.
4. Equipment Type: Select from dropdown.
5. Enter the Volume (gal) of the equipment installed.
6. Enter the Rated Input Capacity (Btu/h) of the equipment installed.

CERTIFICATE OF COMPLIANCE – USER INSTRUCTIONS	LMCI-PLB-E
Domestic Water Heating System	(Page 2 of 3)

7. Enter the Capacity Unit of the equipment installed.
8. Enter the Rated Efficiency of the equipment installed.
9. This field is filled out automatically.
10. This field is automatically calculated.
11. This field is filled out automatically.

Domestic Hot Water Equipment Requirements

1. This table covers the requirements for domestic hot water equipment.

Electric Ready Requirements

1. This table covers the requirements for Electric Ready.

Domestic Hot Water Distribution Additional Requirements

1. This table covers the additional requirements for domestic hot water distribution.

Distribution of Individual System(s) serving Dwelling Units

1. This table covers the requirements for Distribution of Individual System(s) serving Dwelling Units.

Mandatory Pipe Insulation Requirements

1. This table covers the requirements for Mandatory Pipe Insulation Requirements.

Domestic Hot Water System Controls

1. This table covers the requirements for domestic hot water system controls.

Pool & Spa

1. This table covers the requirements for Pool & Spa.

Additional Requirements For Pool/Spa Serving One Tenant §150.0(P)

1. This table covers the additional requirements for Pool/Spa Serving One Tenant.

CERTIFICATE OF COMPLIANCE – USER INSTRUCTIONS	LMCI-PLB-E
Domestic Water Heating System	(Page 3 of 3)

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.
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 number (if applicable), date and signature.