

DOCKETED

Docket Number:	24-BSTD-03
Project Title:	2025 Energy Code Compliance Software, Manuals and Forms
TN #:	263790
Document Title:	2025 Nonresidential Certificates of Verification (NRCV)
Description:	This draft Nonresidential Certificates of Verification (NRCV) will be subject for vote during an Energy Commission Business Meeting. 2025 Energy Code compliance documents to record compliance with the 2025 Energy Code.
Filer:	Haile Bucaneg
Organization:	California Energy Commission
Submitter Role:	Commission Staff
Submission Date:	6/3/2025 11:42:34 AM
Docketed Date:	6/3/2025

**BUILDING AIR LEAKAGE DIAGNOSTIC TEST –
BUILDING ENCLOSURES AND DWELLING UNIT ENCLOSURES****SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS****CERTIFICATE OF VERIFICATION****Note:** This table completed by ECC Registry.

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

A. Enclosure Air Leakage – General Information

01	Test Procedure used	
02	Date of the Diagnostic Test for this Dwelling	
03	Is ECC verification of dwelling compartmentalization leakage ≤ 0.3 CFM ₅₀ /ft ² of enclosure area required by NRCV-MCH-27?	
04	Indoor temperature during test (°F)	
05	Outdoor temperature during test (°F)	
06	Blower Door Location	
07	Building Elevation Above Sea Level (ft)	
08	Total dwelling unit floor area (ft ²)	
09	Total dwelling unit ceiling area (ft ²)	
10	Total dwelling unit exterior wall area (ft ²)	
11	Total dwelling unit wall area shared with other dwelling units (ft ²)	
12	Total dwelling unit enclosure area (ft ²)	
13	Target dwelling unit compartmentalization leakage (CFM50)	

B. Diagnostic Equipment Information

01	Number of Manometers Used to Measure Home Pressurization									
02		03		04		05		06		
Manometer Make		Manometer Model		Manometer Serial Number		Manometer Calibration Date		Manometer Calibration Status		
07	Number of Fans Used to Pressurize Home									
08		09		10				11		
Fan Make		Fan Model		Fan Serial Number				Fan Configuration (rings)		

**BUILDING AIR LEAKAGE DIAGNOSTIC TEST –
BUILDING ENCLOSURES AND DWELLING UNIT ENCLOSURES****SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS****C1. Enclosure Air Leakage Diagnostic Test for Single Point Test with Manual Meter**

01	Time Average Period of Meter (seconds)	
02	Test Methodology	
03	Pre-Test Baseline Enclosure Pressure (Pa) (May be positive or negative)	
04	Unadjusted Enclosure Pressure Target (Pa)	
05	Unadjusted Enclosure Pressure Measured (Pa) (Pressurization is positive; Depressurization is negative)	
06	Induced Enclosure Pressure Difference (Pa) Goal = 50 ± 3 or -50 ± 3 (Pressurization is positive; Depressurization is negative)	
07	Induced Enclosure Pressure Check	
08	Measured Nominal Fan Flow at Above Fan Pressure (cfm) at the Induced Enclosure Pressure Difference (in C06 above)	
09	Calculated Nominal CFM50	

C2. Enclosure Air Leakage Diagnostic Test for a Single-Point Test with Automatic Meter

01	Time Average Period of Meter (seconds)	
02	Test Methodology	
03	Pre-Test Baseline Enclosure Pressure (Pa) (May be positive or negative)	
04	Induced Enclosure Pressure from Manometer (Pa) Goal = 50 ± 3 or -50 ± 3 (Pressurization is positive; Depressurization is negative)	
05	Induced Enclosure Pressure Check	
06	Nominal CFM50	

C3. Enclosure Air Leakage Diagnostic Test for a Multi-Point Test

01	Time Average Period of Meter (seconds)	
02	Test Methodology	
03	Pre-Test Baseline Enclosure Pressure (Pa) (May be positive or negative)	
04	Unadjusted Enclosure Pressure Target (Pa)	
05	Unadjusted Enclosure Pressure Measured (Pa) (Pressurization is positive; Depressurization is negative)	
06	Induced Enclosure Pressure from Manometer (Pa) Goal = 60 ± 3 or -60 ± 3 (Pressurization is positive; Depressurization is negative)	
07	A minimum of five readings were taken spaced evenly between 10 Pa and 60 Pa (or highest attainable pressure)	
08	Post-Test Baseline Enclosure Pressure (Pa)	
09	Name and Version of ASTM E779 Compliant Software used for Multi-Point Test	
10	Corrected Nominal CFM50 (from software)	

D1. Altitude and Temperature Correction for a Single-Point Test Date

01	Altitude and Temperature Correction Factor	
02	Corrected CFM50	

**BUILDING AIR LEAKAGE DIAGNOSTIC TEST –
BUILDING ENCLOSURES AND DWELLING UNIT ENCLOSURES****SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS****D2. Altitude and Temperature Correction for Multi-Point Test Data**

Performed by blower door software For Multi-Point Test

--

E1. Accuracy Adjustment for Single-Point Test Data

01	Adjusted CFM50 (measured air leakage rate)	
----	--	--

E2. Accuracy Adjustment for Multi-Point Test Data

01	Percent Uncertainty @ 95% Confidence Level (from software)	
02	Accuracy Level	
03	Accuracy Adjustment Factor	
04	Adjusted CFM50 (measured air leakage rate)	

F. Measured Enclosure Air Leakage Rate

01	
----	--

G. Additional Requirements for Test Compliance

01	The procedure for preparing the enclosure for testing is detailed in RESNET 380-2019 Section 4.2.
02	When multifamily attached dwelling units must comply with the maximum dwelling unit enclosure air leakage specified in Standards Section 160.2(b)2Aivb2, the test shall be conducted with the dwelling unit as if it were exposed to the outdoor air on all sides, top and bottom by opening doors and windows of adjacent dwelling units as specified by RA3.8.3.
03	The procedure for installation of the test apparatus, and preparations for measurement shall conform to RESNET 380-2019 Section 4.3
04	The procedure for the conduct of the enclosure air leakage test shall conform to the One-Point Airtightness Test specified in RESNET 380-2019 Section 4.4.1.
05	The procedure for the conduct of the enclosure air leakage test shall conform to the Multi-Point Airtightness Test specified in RESNET 380-2019 Section 4.4.1.

**BUILDING AIR LEAKAGE DIAGNOSTIC TEST –
BUILDING ENCLOSURES AND DWELLING UNIT ENCLOSURES****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.

Documentation Author Name:	Documentation Author Signature:
Company:	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 Verification is true and correct.
2. I am the certified ECC 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 ECC verification identified on this Certificate of Verification comply with the applicable requirements in Reference Nonresidential Appendices NA1, NA2, NA7 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 understand 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, and I will take the necessary steps to accomplish this requirement.
6. 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, and I will take the necessary steps to accomplish this requirement.

BUILDER OR INSTALLER INFORMATION AS SHOWN ON THE CERTIFICATE OF INSTALLATION

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

ECC PROVIDER DATA REGISTRY INFORMATION

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

ECC RATER INFORMATION

ECC Rater Company Name:	
Responsible Rater Name:	Responsible Rater Signature:
Responsible Rater Certification Number w/ this ECC Provider:	Date Signed:

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

**BUILDING AIR LEAKAGE DIAGNOSTIC TEST –
BUILDING ENCLOSURES AND DWELLING UNIT ENCLOSURES****SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS****NRCV-MCH-24a-H User Instructions****Section A. Enclosure Air Leakage – General Information**

1. Select the appropriate test procedure. This selection will determine which sections of this document are required. Not that newer manometers have automatic functions for compensating baseline (automatic baseline) and compensating for house pressures other than the target (50 Pa). It is preferable to use these when available.
2. Enter the date that the enclosure air leakage test data was collected.
3. This field is automatically filled from the NRCV-MCH-27 which determines if a 0.3CFM/ft² value is required.
4. Enter the indoor temperature measured at the time that the enclosure air leakage test was performed.
5. Enter the outdoor temperature measured at the time that the enclosure air leakage test was performed.
6. Provide a brief description of the location where the blower door was installed for the test. Examples: “front entry door on west side of house”, “door between house and garage”, “large window in family room”.
7. Enter the building elevation above sea level. Use the value for the closest city found in Joint Appendix JA2.2.
8. Enter the total dwelling unit floor area if ECC verification of dwelling compartmentalization leakage is required.
9. Enter the total dwelling unit ceiling area if ECC verification of dwelling compartmentalization leakage is required.
10. Enter the total dwelling unit exterior wall area if ECC verification of dwelling compartmentalization leakage is required.
11. Enter the total dwelling unit wall area shared with other dwelling units if ECC verification of dwelling compartmentalization leakage is required.
12. This field is automatically calculated as the sum of the total dwelling unit surface area if ECC verification of dwelling compartmentalization leakage is required.
13. This field is automatically calculated as the target dwelling unit compartmentalization leakage value if ECC verification of dwelling compartmentalization leakage is required.

Section B. Diagnostic Equipment Information

1. Enter the number of manometers used to measure the enclosure pressurization. If more than one system is used, the fan flow numbers need to be manually added together, unless blower door software is used that will accommodate multiple fan systems running simultaneously.
2. Enter the make (brand) of the manometer used to collect the enclosure air leakage data. Examples: Retrotec, Energy Conservatory.
3. Enter the model of the manometer used to collect the enclosure air leakage data. Examples: DM-2 Mark II, DG700.
4. Enter the serial number of the manometer used to collect the enclosure air leakage data.
5. Enter the most recent date that the manometer was calibrated by following manufacturer’s calibration specifications.
6. This field is automatically filled. If the calibration date was more than 12 months prior to the test date entered in Row A02 above, an error will appear.

**BUILDING AIR LEAKAGE DIAGNOSTIC TEST –
BUILDING ENCLOSURES AND DWELLING UNIT ENCLOSURES*****SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS***

7. Enter the number of blower door fan systems required to run simultaneously to pressurize the enclosure for the enclosure air leakage test. If more than one system is used, the fan flow numbers need to be manually added together, unless blower door software is used that will accommodate multiple fan systems running simultaneously.
8. Enter the make (brand) of the fan used to collect the enclosure air leakage data. Examples: Retrotec, Energy Conservatory.
9. Enter the model of the fan used to collect the enclosure air leakage data. Examples: US1000, Q46, BD3, BD4.
10. Enter the serial number of the fan used to collect the enclosure air leakage data.
11. Enter the fan configuration shown on the meter. This is sometimes referred to as “range configuration”, “CONFIG” or “rings”. Examples: Open, A, B, C8.

Section C1. Enclosure Air Leakage Test (This section is required if A01 test procedure is single point manual)

1. Enter the Time Average Period used on the manometer during the test. Must be at least 10 seconds.
2. Select the type of test being performed: Pressurization (air blowing into house) or depressurization (air blowing out of house).
3. Enter the pre-test baseline enclosure pressure. This is the reading on the manual manometer with no fans turned on.
4. This field is automatically calculated. This is the enclosure pressure target value the enclosure needs to achieve during the test.
5. Enter the unadjusted enclosure pressure measured. This value is read from the manual manometer during the test.
6. This field is automatically calculated. This value is the difference of the unadjusted enclosure pressure measured and the pre-test baseline enclosure pressure. The goal is to achieve 50 ± 3 Pa.
7. This field is automatically calculated. This field determines if the pressure achieved is acceptable to proceed with the enclosure air leakage test.
8. Enter the measured nominal fan flow at above fan pressure from the manometer that corresponds to the induced enclosure pressure difference.
9. This field is automatically calculated. The induced enclosure pressure difference is converted to a nominal airflow at 50 Pa.

Section C2. Enclosure Air Leakage Test (This section is required if A01 test procedure is single point automatic)

1. Enter the time average period used on the manometer during the test. Must be at least 10 seconds.
2. Select the type of test being performed: Pressurization (air blowing into house) or depressurization (air blowing out of house).
3. Enter the pre-test baseline enclosure pressure. This is the reading on the automatic manometer with no fans turned on.
4. Enter the induced enclosure pressure from the automatic manometer. The goal is to achieve 50 ± 3 Pa.
5. This field is automatically calculated. This field determines if the pressure achieved is acceptable to proceed with the enclosure air leakage test.
6. Enter the measured nominal CFM50 from the automatic manometer.

**BUILDING AIR LEAKAGE DIAGNOSTIC TEST –
BUILDING ENCLOSURES AND DWELLING UNIT ENCLOSURES****SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS****Section C3. Enclosure Air Leakage Test** (This section is required if A01 test procedure is multi- point)

1. Enter the time average period used on the manometer during the test. Must be at least 10 seconds.
2. Select the type of test being performed: Pressurization (air blowing into house) or depressurization (air blowing out of house).
3. Enter the pre-test baseline enclosure pressure. This is the reading on the automatic manometer with no fans turned on.
4. This field is automatically calculated. This is the enclosure pressure target value the enclosure needs to achieve during the test.
5. Enter the unadjusted enclosure pressure measured. This value is read from the manual manometer during the test.
6. Enter the induced enclosure pressure from the automatic manometer. The goal is to achieve 50 ± 3 Pa.
7. When using the software for a multi-point test, a minimum of five measures must be taken over a range of pressures. This is where the user acknowledges that this was done.
8. Enter the Post Test Baseline Enclosure Pressure from the manometer.
9. This section requires use of an ASTM E779-19 compliant software, typically provided by the blower door manufacturer. Confirm with the software vendor that it is compliant. Enter the name and version here.
10. Enter the final Corrected CFM50 reading from the software.

Section D1. Altitude and Temperature Correction (This section is required if A01 test procedure is single point manual or automatic)

1. This field is automatically calculated. This factor is determined based on the altitude and temperature of the building location using equation 4 in Section 9 of ASTM E779-19.
2. This field is automatically calculated. The corrected CFM50 is the nominal CFM50 from Section C multiplied by the altitude and temperature correction factor.

Section D2. Altitude and Temperature Correction (This section is required if A01 test procedure is multi-point) Performed by blower door software.**Section E1. Accuracy Adjustment** (This section is required if A01 test procedure is single point manual or automatic)

1. This field is automatically calculated. This value is determined from equation 5a from ANSI/RESNET/ICC 380-2019.

Section E2. Accuracy Adjustment

(This section is required if A01 test procedure is multi-point)

1. The software will provide a “Percent Uncertainty” value based on the readings taken. Enter that value here
2. This field is automatically calculated. If the Percent Uncertainty level is 10% or less, the Accuracy Level is “Standard”. If the Percent Uncertainty level is greater than 10%, the Accuracy Level is “Reduced”.
3. This field is automatically calculated:
 - a. If the Accuracy Level is “Standard”, the Accuracy Adjustment Factor will be 1 (no adjustment)
 - b. If the Accuracy Level is “Reduced”, the Accuracy Adjustment Factor will be adjusted by the Percent Uncertainty.



**BUILDING AIR LEAKAGE DIAGNOSTIC TEST –
BUILDING ENCLOSURES AND DWELLING UNIT ENCLOSURES**

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

4. This field is automatically calculated. The Adjusted CFM50 is the Corrected CFM50 multiplied by the Accuracy Adjustment Factor.

Section F. Measured Enclosure Air Leakage Rate

1. This field is automatically calculated. A check is performed to make sure that the meter has been properly calibrated.

Section G Additional Requirements for Test Compliance

1. This statement must be true (or not applicable) for the test to conform to the protocols.
2. This statement must be true (or not applicable) for the test to conform to the protocols.
3. This statement must be true (or not applicable) for the test to conform to the protocols.
4. This statement must be true (or not applicable) for the test to conform to the protocols.
5. This statement must be true (or not applicable) for the test to conform to the protocols.

Documentation Declaration Statements

1. The person who prepared the NRCV 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 (if applicable) for their company, responsible builder or installer name, CSLB license number, sample group number, dwelling test status in sample group, ECC Rater company name, ECC Rater name, ECC Rater signature, ECC Rater certification number and date signed.

**SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS****CERTIFICATE OF VERIFICATION****Note:** This table completed by ECC Registry.

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

*Title 24, Part 6, Section 160.2(b)2 **Ventilation and Indoor Air Quality for Attached Dwelling Units.** All dwelling units shall meet the requirements of ANSI/ASHRAE Standard 62.2-2022 Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings subject to the amendments specified by Title 24, Part 6, Section 160.2(b)2*

A. Whole-Dwelling Mechanical Ventilation - General Information

Note: Non-dwelling units do not meet the definition for a dwelling unit as defined in Section 100.1(b). Non-dwelling units are not designed to provide independent living facilities and do not provide permanent provisions for living, sleeping, eating, cooking and sanitation.

01	Dwelling Unit Name	
02	Building Type	
03	Project Scope	
04	Total Conditioned Floor Area of Dwelling Unit (For addition projects the conditioned floor area equals existing area plus addition area)	
05	Number of Bedrooms in Dwelling Unit (For addition projects the number of bedrooms equals the existing bedrooms plus addition bedrooms)	
06	Ventilation System Type	
07	Ventilation Operation Schedule	
08	Fault Indicator Display (FID) Status	

B. Ventilation - Total Ventilation Rate

A mechanical supply system, exhaust system, or combination thereof shall provide whole-dwelling ventilation with outdoor air each hour at no less than the rate in 160.2(b)2Aiv

01	Total Required Ventilation rate, (Q_{tot})	
----	--	--

C. Installed Ventilation - Total Ventilation Rate

A mechanical supply system, exhaust system, or combination thereof shall provide whole-dwelling ventilation with outdoor air each hour at no less than the rate in 160.2(b)2Aiv

01	02	03	04	05
Fan Name	Fan Location	Runtime (Min/Hr)	Installed Mechanical Ventilation Rate (CFM)	Equivalent Continuous Ventilation (CFM)
06	Total Installed Equivalent Continuous Ventilation (CFM)			

**SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS****D. HRV or ERV serving Individual Dwelling Unit**

- Heat or Energy Recovery Systems must have a fan efficacy of ≤ 1.0 W/cfm in all climate zones (Section 160.2(b)2Biii).
- Heat or Energy Recovery Systems must prescriptively have a fan efficacy of ≤ 0.6 W/cfm and a minimum sensible heat recovery of 67% in climate zones 1, 2, 4 11-14 and 16 (Section 170.2(c)3Biva).

01	02	03	04
Manufacturer Make	Manufacturer Model Number	Fan Efficacy Performance Rating (W/CFM)	Sensible Recovery Efficiency (%)

E. Additional Envelope Requirements

01	Envelope Leakage	
----	------------------	--

F. Additional Central Ventilation System Balancing Requirements

01	Maximum Ventilation Flow (CFM)	
----	--------------------------------	--

G. Fault Indicator Display Installation Verification

Qualification Requirements for Ventilation System Fault Indicator Displays are detailed in in Appendix JA17.

01	FID Manufacturer Name/Make	
02	FID Model Number	
03	The display module is mounted adjacent to the system thermostat.	
04	The manufacturer has certified to the Energy Commission that the FID model meets the requirements of Reference Joint Appendix JA17 (make and model found on CEC list of approved FID devices).	
05	The system has operated for at least 15 minutes and the FID reports that the system is operating within acceptable parameters.	
06	Compliance Statement:	

H. Compliance Statement

01	
----	--

I. Determination of ECC 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	
----	--

**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.

Documentation Author Name:	Documentation Author Signature:
Company:	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 Verification is true and correct.
2. I am the certified ECC 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 ECC verification identified on this Certificate of Verification comply with the applicable requirements in Reference Nonresidential Appendices NA1, NA2, NA7 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 understand 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 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 registered copy of this Certificate of Verification 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.

BUILDER OR INSTALLER INFORMATION AS SHOWN ON THE CERTIFICATE OF INSTALLATION

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

ECC PROVIDER DATA REGISTRY INFORMATION

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

ECC RATER INFORMATION

ECC Rater Company Name:	
Responsible Rater Name:	Responsible Rater Signature:
Responsible Rater Certification Number w/ this ECC Provider:	Date Signed:

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

NRCV-MCH-27-H User Instructions**Section A. General Information**

1. Dwelling Unit Name: User input text from the NRCC-PRF-01 (Performance) or NRCC-MCH-E (Prescriptive). This is the unique identifier for this dwelling unit. Needed for high-rise residential dwelling units. Ventilation is calculated and provided for each dwelling unit individually.
2. Building Type: Fixed value equal to high-rise residential.
3. Project Scope: User select from following new, addition, or alteration. Based on project scope from the NRCC-PRF-01 (Performance) or NRCC-MCH-E (Prescriptive).
4. Total Conditioned Floor Area of Dwelling Unit: User input number based on the information from NRCC-PRF-01 (Performance) or NRCC-MCH-E (Prescriptive).
5. Number of Bedrooms in Dwelling Unit: User input number based on the information from NRCC-PRF-01 (Performance) or NRCC-MCH-E (Prescriptive).
6. Ventilation system Type: This is a user selected value from list of ventilation types Supply, Exhaust, Balanced, Balanced – ERV, Balanced – HRV, Central Fan Integrated (CFI), Central Ventilation System – Supply and Central Ventilation System – Exhaust and Central Ventilation System Balanced.
7. Ventilation operation schedule: This is a user selected value from list of Continuous, Short-Term Average, Scheduled and Real-time Control.
 - Note if “Ventilation System Type” (A06) = Central Fan Integrated & “Ventilation Operation Schedule” (A07) = Continuous; then user will not be allowed to proceed.

Section B. Ventilation - Total Ventilation Rate This value is automatically calculated using equation 160.2-B from the Energy Standards.

Section C. Installed Ventilation – Total Ventilation Rate Method

1. User input text identifying the fan name for each installed ventilation fan.
2. User input text identifying the fan location for each installed ventilation fan.
3. Runtime (Min/Hr): This value may be filled out automatically or be user input.
 - If ventilation operation schedule from section A = “continuous”, then value of 60 will be automatically entered.
 - If ventilation operation schedule from section A = “short term average”, then user enter value of less than or equal to 60 for each installed ventilation fan.
4. User to enter CFM value from test procedures described in NA7.18.1 for each installed ventilation fan.
5. Equivalent continuous ventilation CFM is automatically calculated for each ventilation fan.
6. Total installed equivalent continuous ventilation CFM is automatically calculated based on the installed ventilation fans.

Section D. HRV or ERV serving Individual Dwelling Unit

1. User input manufacturer make of the installed equipment from the manufacturer nameplate.
2. User input model number of the installed equipment from the manufacturer nameplate.
3. User input the fan efficacy performance rating (W/CFM) for the installed equipment as determined by RA3.7.4.4.

4. User input the sensible recovery efficiency performance rating (%) for the installed equipment as determined by RA3.7.4.4.

Section E. Additional Central Ventilation System Balancing Requirements

1. Maximum Ventilation Flow (CFM): This field is filled out automatically calculated.

Section F. Additional Central Ventilation System Balancing Requirements

1. Maximum Ventilation Flow (CFM): This field is filled out automatically calculated.

Section G. Fault Indicator Display Installation Verification

1. Enter the manufacturer name or make of the approved Fault Indicator Display. Must match name shown on the list of approved devices kept by the Commission.
2. Enter the manufacturer model number of the approved Fault Indicator Display. Must match name shown on the list of approved devices kept by the Commission.
3. The installer must confirm that the FID display module is mounted adjacent to thermostat that controls the system being verified. This requirement is detailed in Residential Appendix JA17.
4. The installer must confirm that the installed FID is approved and appears the list of approved devices kept by the Commission. This requirement is detailed in Residential Appendix JA17.
5. The installer must confirm that the system has operated for at least 15 minutes and that they system is operating within acceptable parameters as specified by the FID and equipment manufacturers. This requirement is detailed in Residential Appendix JA17.

Section H. Compliance Statement

1. This field is filled out automatically.

Section I. Determination of ECC Verification Compliance

1. This field is filled out automatically based on all verification protocol requirements in this document showing compliance.

Documentation Declaration Statements

1. The person who prepared the NRCV 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 (if applicable) for their company, responsible builder or installer name, CSLB license number, sample group number, dwelling test status in sample group, ECC Rater company name, ECC Rater name, ECC Rater signature, ECC Rater certification number and date signed.

**SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS****CERTIFICATE OF VERIFICATION****Note:** This table completed by ECC Registry.

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

Title 24, Part 6, Section 160.2(b)2 Ventilation and Indoor Air Quality for Attached Dwelling Units. All dwelling units shall meet the requirements of ANSI/ASHRAE Standard 62.2. Ventilation and Acceptable Indoor Air Quality in Residential Buildings, subject to the amendments specified in Section 160.2(b)2A. Equation and table numbering on this form corresponds to the numbering for that information in the published ANSI/ASHRAE Standard 62.2-2022

A. Local Mechanical Exhaust - General Information

01	Dwelling Unit Name	
02	Building Type	
03	Total Kitchen Floor Area	
04	Kitchen Average Ceiling Height	
05	Kitchen Total Conditioned Volume	
06	Kitchen Type	
07	Dwelling Unit Total Floor Area	
08	Kitchen Range (Cooking Stove) Fuel Type	

B. Kitchen Exhaust Systems

01	02	03	04	05	06	07	08	09a	09	10a	10	11	12
System Name	Manufacturer Name	System Type	HVI or AHAM Directory Listed Model Number	HVI or AHAM Directory Listed Rated Airflow	HVI or AHAM Directory Listed Sound Rating	Minimum Airflow (defaults to rated airflow)	Operation Schedule	Method of Compliance	Required Minimum Ventilation Rate	Exception to Maximum Sound Rating	Maximum Sound Rating	Compliance Statement for Airflow	Compliance Statement for Sound

C. Continuous Kitchen Exhaust

01	Total Continuous Ventilation Airflow	
02	Required Minimum Continuous Ventilation Airflow	
03	Compliance Statement	

D. Kitchen Range Hood Capture Efficiency Option

01	Manufacturer Name	
02	CEC-Approved Directory Listed Model Number	
03	CEC-Approved Directory Listed Rated Capture Efficiency	
04	Required Minimum Capture Efficiency (Table 160.2-G)	
05	Compliance Statement	

**SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS****E. Determination of ECC 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

FOR INFORMATION AND DATA COLLECTION
ONLY. NOT VALID UNTIL REGISTERED
WITH AN ECC PROVIDER.

**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.

Documentation Author Name:	Documentation Author Signature:
Company:	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 Verification is true and correct.
2. I am the certified ECC 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 ECC verification identified on this Certificate of Verification comply with the applicable requirements in Reference Nonresidential Appendices NA1,,NA2,NA7 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 understand 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 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 registered copy of this Certificate of Verification 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.

BUILDER OR INSTALLER INFORMATION AS SHOWN ON THE CERTIFICATE OF INSTALLATION

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

ECC PROVIDER DATA REGISTRY INFORMATION

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

ECC RATER INFORMATION

ECC Rater Company Name:	
Responsible Rater Name:	Responsible Rater Signature:
Responsible Rater Certification Number w/ this ECC Provider:	Date Signed:

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

LMCV-MCH-32-H User Instructions

Section A. Local Mechanical Exhaust - General Information

1. Dwelling Unit Name: This field is filled out automatically and referenced from the MCH-01
2. Building Type: This field is filled out automatically and referenced from the LMCC.
3. Total Kitchen Floor Area: Enter the total floor area for an enclosed kitchen or N/A for a non-enclosed kitchen.
4. Kitchen Average Ceiling Height: Enter the kitchen ceiling height for an enclosed kitchen or N/A for a non-enclosed kitchen.
5. Kitchen Total Conditioned Volume: This field is filled out automatically and calculated based on the kitchen area and ceiling height.
6. Kitchen Type: Enter the type of kitchen (enclosed or non-enclosed).
7. Dwelling Unit Total Floor Area: This field is filled out automatically and referenced from the MCH-01.
8. Kitchen Range Fuel Type: Select the fuel type of the kitchen range: natural gas or electric.

Section B. Kitchen Exhaust System

1. System Name: Enter a unique name for the kitchen exhaust system
2. Manufacturer Name: Enter manufacturer name for the kitchen exhaust system.
3. System Type: Select the type of kitchen exhaust system. Options are vented range hood, downdraft, and other.
4. HVI or AHAM Directory Listed Model Number: Enter the kitchen exhaust system model number matching the installed equipment and HVI or AHAM directory.
5. HVI or AHAM Directory Listed Rated Airflow: Enter the rated airflow listed in the HVI or AHAM directory for the above model number.
6. HVI or AHAM Directory Listed Sound Rating: Enter the sound rating listed in the HVI or AHAM directory for the above model number.
7. Minimum Airflow (defaults to rated airflow): Defaults to rated airflow from HVI directory, but editable if exhaust system minimum airflow rate is less than HVI listed value.
8. Operation Schedule: Select the kitchen exhaust system operation schedule. Options are demand control and continuous.
- 9a. Method of Compliance: Select the method of compliance. Options are airflow and capture efficiency.
9. Required Minimum Ventilation Rate (if demand controlled): This field is filled out automatically and is calculated based on the system operation schedule and type, and kitchen type and volume, and Table 150.0-E and Table 150.0-G. This field is only used for demand control exhaust systems. Continuous exhaust required minimum ventilation rate is determined in Section D.
- 10a. Exception to Maximum Sound Rating: User select: No Exception or Remote mounted fan with min. 4-ft of duct between fan and intake grille.
10. Maximum Sound Rating: This field is filled out automatically and is calculated based the system operation schedule and minimum airflow.
11. Compliance Statement for Airflow: This field is filled out automatically based on the installed system listed airflow rate and minimum required ventilation rate. This field only determines compliance using airflow ratings for demand-controlled kitchen exhaust systems. Continuous system ventilation rate compliance is determined in Section D. Vented range hoods utilizing the capture efficiency rating for compliance is determined in Section E.
12. Compliance Statement for Sound. This field is filled out automatically based on the installed system listed sound rating and maximum sound rating allowed.

Section C. Continuous Kitchen Exhaust

1. Total Continuous Ventilation Airflow: This field is filled out automatically and is equal to the sum of the HVI listed airflow for all continuously operated kitchen exhaust systems.
2. Required Minimum Continuous Ventilation Airflow: This field is filled out automatically and is equal to five times the enclosed kitchen volume.
3. Compliance Statement: This field is filled out automatically and is based on the total installed continuous ventilation airflow and the required minimum continuous ventilation airflow.

Section D. Kitchen Range Hood Capture Efficiency Option

Note: This table is used only when complying with local exhaust requirements by utilizing the capture efficiency rating instead of the airflow rating.

1. Manufacturer Name: Enter manufacturer name for the kitchen range hood.
2. CEC-Approved Directory Listed Model Number: Enter the kitchen range hood model number matching the installed equipment and a CEC-approved directory listing.
3. CEC-Approved Directory Listed Rated Capture Efficiency: Enter the rated capture efficiency in the CEC-approved directory for the above model number.
4. Required Minimum Capture Efficiency: This field is filled out automatically and is determined by the dwelling unit square footage, kitchen range fuel type, and Table 150.0-G.
5. Compliance Statement. This field is filled out automatically based on the installed system listed capture efficiency rating and required minimum capture efficiency.

Section E. Determination of ECC Verification Compliance

1. This field is filled out automatically based on all verification protocol requirements in this document showing compliance.

Documentation Declaration Statements

1. The person who prepared the NRCV 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 (if applicable) for their company, responsible builder or installer name, CSLB license number, sample group number, dwelling test status in sample group, ECC Rater company name, ECC Rater name, ECC Rater signature, ECC Rater certification number and date signed.



SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

CERTIFICATE OF VERIFICATION

Note: This table completed by ECC Registry.

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

A. General Information

01	Building Name	
----	---------------	--

B. Design Verified 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.

01	02	03	04	05	06	07	08	09	10	11	12
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

B2. Design Verified 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
Water Heating System ID or Name	Modeled Equipment Make and Model	# of Water Heaters/ Compressors	Primary Tank Location	Primary Tank Volume	Primary Tank Total Insulation	Loop Tank Location	Loop Tank Volume	Loop Tank Total Insulation	Loop Pipe Insulation Thickness	Loop Tank Type	Simulated Equipment Make and Model

C. Installed Verified Central Water Heating Systems Information

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

01	02	03	04	05	06	07	08	09	10	11	12
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
13	Compliance Statement										



SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

C2. Installed Verified 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
Water Heating System ID or Name	Modeled Equipment Make and Model	# of Water Heaters/ Compressors	Primary Tank Location	Primary Tank Volume	Primary Tank Insulation	Loop Tank Location	Loop Tank Volume	Loop Tank Insulation	Loop Pipe Insulation Thickness	Loop Tank Type

D. Design Verified 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	04	05	06
Water Heating System ID or Name	Central DHW System Distribution Type	Dwelling Unit DHW System Distribution Type	California Plumbing Code Appendix M	Master Mixing Valve	Insulation Verification

E. Installed Verified 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	04	05	06
Water Heating System ID or Name	Central DHW System Distribution Type	Dwelling Unit DHW System Distribution Type	California Plumbing Code Appendix M	Master Mixing Valve	Insulation Verification

F. Installed Verified Water Heater Manufacturer Information

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



SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

G. Mandatory Requirements for All Central Domestic Hot Water Systems

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.

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: <ul style="list-style-type: none"> • External insulation of R-3.5, or • Internal insulation of R-16, or • The heat loss of the tank surface based on an 80°F water-air temperature difference shall be less than 6.5 Btuh/ft². (Section 110.3(c)4).
04	Recirculation loops shall meet the following requirements: <ul style="list-style-type: none"> • 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). • A check valve or similar device shall be located between the recirculation pump and the water heating equipment to prevent water from flowing backwards through the recirculation loop. (Section 110.3(c) 4B). • 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). • 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). • 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). • 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).
05	Instantaneous water heaters with an input greater than 6.8 kBtu/hr. (2kW) shall have isolation valves on both the cold water supply and the hot water line. (110.3 (c) 6).
06	Domestic hot water piping insulation requirements (Section 150(J)): <ul style="list-style-type: none"> • All domestic hot water piping shall be insulated as specified in Section 609.12 of the California Plumbing Code. Insulation buried below grade must be installed in a waterproof and non-crushable casing or sleeve. • Pipe insulation shall fit tightly and all elbows and tees shall be fully insulated. • 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 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. • Insulation is not required on the cold water line when it is used as the return.
07	<p>Domestic hot water piping insulation requirements: See the exceptions to Section 160.4(e)</p> <p>All piping for multifamily domestic hot water systems shall be insulated and meet the applicable requirements below:</p> <p>1. General Requirements:</p> <ol style="list-style-type: none"> The first 8 feet of inlet cold water piping from the storage tanks, including piping between a storage tank and a heat trap shall be insulated. Insulation on the piping and domestic hot water system appurtenances shall be continuous. Pipe supports, hangers, and pipe clamps shall be attached on the outside of rigid pipe insulation to prevent thermal bridges. All pipe insulation seams shall be sealed. Insulation for pipe elbows shall be mitered, preformed, or site fabricated with PVC covers. Insulation for tees shall be notched, preformed, or site fabricated with PVC covers. Extended stem isolation valves shall be installed. All plumbing appurtenances on hot water piping from a heating source to heating plant, at the heating plant, and distribution supply and return piping shall be insulated to meet the following requirements: <ol style="list-style-type: none"> Where the outer diameter of the appurtenance is less than the outer diameter of the insulated pipe that it is attached to, the appurtenance shall be insulated flush with the insulation surrounding the pipe. Where the outer diameter of the appurtenance is greater than the outer diameter of the insulated pipe that it is attached to, the appurtenance shall be insulated with a minimum thickness of 1 inch. The insulation shall be removable and re-installable to ensure maintenance or replacement services can be completed. Valves shall be fully functional without impediment from the insulation.



SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

07	<p>2. Insulation Thickness: All piping for multifamily domestic hot water systems shall meet the insulation thickness requirements specified in of Table 160.4-A.</p> <ul style="list-style-type: none"> a. For insulation conductivity in the range shown in Table 160.4-A for the applicable fluid temperature range, the insulation shall have the applicable minimum thickness or R-value shown in Table 160.4-A. b. if the insulation conductivity falls outside the range provided in Table 160.4-A applicable fluid temperature range, the insulation shall meet a minimum R-value as indicated in Table 160.4-A. Or, it can have a thickness determined using Equation 160.4-A. c. Insulation conductivity shall be determined in accordance with ASTM C335 at the mean temperature listed in Table 160.4-A, and shall be rounded to the nearest 1/100 Btu-inch per hour per square foot per °F. <p>3. Insulation Protection: Pipe Insulation shall be protected from damage due to sunlight, moisture, equipment maintenance and wind. Protection shall, at minimum, include the following:</p> <ul style="list-style-type: none"> a. Pipe and appurtenance insulation exposed to weather shall be protected by a cover suitable for outdoor service. The cover shall be water retardant and provide shielding from solar radiation that can cause degradation of the material. Appurtenance insulation covers shall be removable and able to be reinstalled. Adhesive tape shall not be used to provide this protection. b. Pipe insulation covering chilled water piping and refrigerant suction piping located outside the conditioned space shall include, or be protected by, a Class I or Class II vapor retarder. All penetrations and joints shall be sealed. c. Pipe insulation buried below grade must be installed in a waterproof and noncrushable casing or sleeve. 	
08	Verification Status:	<input type="checkbox"/> Pass - all applicable requirements are met; or <input type="checkbox"/> Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or <input type="checkbox"/> All N/A - This entire table is not applicable
09	Correction Notes:	

H. California Plumbing Code Appendix M

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

01	All distribution piping shall be sized according to the methodology specified in the California Plumbing Code Appendix M.
----	---

I. Verified Multiple Dwelling Units Master Mixing Valves Installation Requirements

For central systems with hot water piping serving multiple dwelling units master mixing valves (MMV) shall meet the following minimum specification, installation, and startup requirements specified in RA4.4.19.

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.

01	<p>Plumbing Plans: The plumbing plans shall include the following MMV specification at a minimum:</p> <ul style="list-style-type: none"> a. Manufacturer's installation and commissioning instructions and plumbing drawings. b. MMV conforms to the American Society of Sanitation Engineers (ASSE) 1017-2009 standard, Performance Requirements for Temperature Actuated Mixing Valves for Hot Water Distribution Systems. c. Water mixing parameters and associated values: <ul style="list-style-type: none"> 1. Input parameters A. Recirculation pump flow rate <ul style="list-style-type: none"> A. Recirculation pump flow rate B. Mixing valve outlet water temperature C. Recirculation return water temperature D. Mixing valve hot inlet water temperature 2. Calculated parameters A. Percentage of water flow returning to cold side of MMV <ul style="list-style-type: none"> A. Percentage of water flow returning to hot side of MMV B. Percentage of water flow returning to hot side of MMV 3. Manufacturer's operating parameter <ul style="list-style-type: none"> A. Maximum water mixing ratio
----	---



SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

02	Installation: Installation of MMV shall meet manufacturer's instruction and the following requirements at a minimum: <ul style="list-style-type: none">a. The MMV shall be installed on the central heating plant hot water supply outlet header leading to the recirculation loop.b. Check valves installed on the recirculation return line and cold-water line to inlet cold connection of MMV and on recirculation return piping leading back to storage tank or water heater.c. Isolation valves installed on the inlet cold water, inlet recirculation return, inlet hot and outlet connections to MMV and on recirculation return piping connection to storage tank or water heater.d. Balancing valve installed on the recirculation return piping to the water heater for MMVs that cannot 100% close the hot inlet port during operation.e. Thermometers installed on the outlet of the MMV and on the recirculation return line next the water pump.	
03	Startup: <ul style="list-style-type: none">a. Startup testing of MMV during recirculation only operation.<ul style="list-style-type: none">1. Close all hot fixtures in the domestic water system.2. Ensure that the water heater is operational and idling with storage tank plumbed to the mixing valve and meeting the hot inlet temperature specified in the plumbing plans.3. Start the recirculation pump and set mixed outlet temperature or setpoint temperature on the MMV. Start the circulation pump at the specified water flow rate and adjust as needed to meet recirculation return temperature specified in the plumbing plans.4. Let distribution system warm up and stabilize for 30 minutes and adjust mixing parameters as needed to realign with values in plumbing plans.5. Let the recirculation pump operate for three hours without any water draws to ensure there is no temperature creep.6. If during or after the three-hour period the MMV outlet and return temperature stays elevated by greater than 2°F and doesn't return back to the specified temperature, then make necessary adjustments to the MMV. If temperature creep persists with mechanical MMV, adjust the balancing valve as necessary on the recirculation return line leading back to the water heater to ensure average MMV outlet temperature meets the specified temperature.7. If adjustments are made to MMV or balancing valve in Step 6, then repeat Step 5.b. Startup testing of MMV for a combination of recirculation and hot water draws.<ul style="list-style-type: none">1. Once the MMV is operational in a closed loop, make a water draw for 10 minutes using one of the following options:<ul style="list-style-type: none">A. With a shower operating at full flow at every: three dwelling units in a building with 15 or fewer dwelling units, five dwelling units in a building with 16 to 30 dwelling units, eight dwelling units in a building with 31 to 60 dwelling units, ten dwelling.B. The hot water valve on a hose bib, mop sink, or other fixture on the branch line or location on the hot water distribution line is opened to a draw volume of 1 gpm for every: three dwelling units in a building with 15 or fewer dwelling units, five dwelling units in a building with 16 to 30 dwelling units, eight dwelling units in a building with 31 to 60 dwelling units, ten dwelling units in a building than 60 to 200 dwelling units, twenty dwelling units in a building with more than 200 dwelling units.2. Monitor recirculation return temperature on the thermometer during the 10-minute draw period and ensure design return water temperature is maintained at the specified temperature documented in the plumbing plans.3. If the recirculation return temperature falls more than 5°F below the specified temperature during the draw period, then adjust MMV setup to ensure compliance.	
04	Verification Status:	<input type="checkbox"/> Pass - all applicable requirements are met; or <input type="checkbox"/> Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or <input type="checkbox"/> All N/A - This entire table is not applicable
05	Correction Notes:	



SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

J. Verified Pipe Insulation for Central System

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

01	<p>The heating plant and recirculation system piping insulation installation quality shall be field verified by a ECC-rater. The ECC-rater shall inspect the heating plant and horizontal supply header and return piping in accordance with mandatory requirements in Title 24 Part 6 section 160.4. The rater shall use a sampling approach that one in seven DHW recirculation pipe risers and associated branches be inspected to verify the pipe insulation meet with the following requirements:</p> <ul style="list-style-type: none">a. All piping for multifamily domestic hot water systems shall be insulated to the thickness specified in Table 160.4-A, including the first 8 feet of inlet cold water piping to the heating plant. Insulation on the piping and appurtenances shall be continuous.b. All appurtenances at the heating plant, from a heating source to storage tank(s), or in between storage tanks and storage water heaters, and recirculation supply and return loop shall meet the following:<ul style="list-style-type: none">1. Insulation to be flush with pipe insulation or have minimum of one inch if appurtenance is bulkier.2. Removable and re-installable for maintenance or replacement.3. Pipe supports, hangers, and clamps shall be attached on the outside of rigid pipe insulation.c. All pipe insulation seams shall be sealed along the length of the pipe and between adjacent sections of insulation material.d. Insulation for pipe elbows shall be mitered, and insulation for tees shall be notched. Alternatively, tees and elbows may be pre-formed, or site fabricated with PVC covers.e. Isolation valves shall be fully functional. Extended stem isolation valves shall be installed on hot water piping or where pipe insulation is required.
----	--

K. Determination of 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	
----	--



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.

Documentation Author Name:	Documentation Author Signature:
Company:	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 Verification is true and correct.
2. I am the certified ECC 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 ECC verification identified on this Certificate of Verification comply with the applicable requirements in Reference Nonresidential Appendices NA1, NA2, NA7 and the requirements specified on the Certificate of Compliance for the building approved by the enforcement agency.



SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

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 understand 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 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 registered copy of this Certificate of Verification 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.

BUILDER OR INSTALLER INFORMATION AS SHOWN ON THE CERTIFICATE OF INSTALLATION

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

ECC PROVIDER DATA REGISTRY INFORMATION

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

ECC RATER INFORMATION

ECC Rater Company Name:	
Responsible Rater Name:	Responsible Rater Signature:
Responsible Rater Certification Number w/ this ECC Provider:	Date Signed:

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

NRCV-PLB-21-H User Instructions

A. General Information

This table reports the building name - user input.

B. Design Verified Central Water Heating Systems Information

This table reports features of the water heating system other than HPWH system – user input.

B2. Design Verified CHPWH System Information

This table reports the water heating systems – user input.

C. Installed HERS Verified Central Water Heating Systems Information

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

1. Water Heating System ID or Name – Reference information from Table B.
2. Water Heating System Type – Reference information from Table B. The different kinds of water heating system type are DHW or Combined Hydronic.
3. Water Heater Type – Information from Table B. 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 Table B.
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 Table B. The different kinds of fuel types are natural gas, propane, oil, or electricity.
7. Rated Input Type – Reference information from Table B. 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 Table B.
9. Heating Efficiency Type – Reference information from NRCC. 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 Table B
11. Standby Loss – User input. Must be equal to or less than value indicated on the Table B. Value may be N/A if NRCC value is N/A.
12. Exterior Insul. R-Value – User input. Must be equal to or higher than value indicated on the NRCC. Value may be N/A if NRCC value is N/A.

C2. Installed Verified 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 Verified Central Water Heating Distribution Systems Information

1. Water heating distribution types specified on the Table B or Table B2.
2. User input
3. User input

E. Installed Verified Central Water Heating Distribution Systems Information

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

F. Installed Verified 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 Table C.
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. California Plumbing Code Appendix M

This table lists the requirements for California Plumbing Code Appendix M. ECC rater must ensure all the requirements in this table are met.

I. Verified Multiple Dwelling Units Master Mixing Valves Installation Requirements

Dwelling Units Master Mixing Valves. ECC rater must ensure all the requirements in this table are met.

J. Verified Pipe Insulation for Central System

This table lists the requirements for Verified Pipe Insulation for Central System. ECC rater must ensure all the requirements in this table are met.

K. Determination of Verification Compliance

This field is filled out automatically. Compliance requires that all individual criteria pass.

Documentation Declaration Statements

1. The person who prepared the NRCV 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 (if applicable) for their company, responsible builder or installer name, CSLB license number, sample group number, dwelling test status in sample group, ECC Rater company name, ECC Rater name, ECC Rater signature, ECC Rater certification number and date signed.

**SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS****CERTIFICATE OF VERIFICATION****Note:** This table completed by ECC Registry.

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

A. Design Verified Dwelling Unit Water Heating Systems Information (other than HPWH)

This table reports features of the water heating system(s) other than HPWH system specified on the registered LMCC compliance document for this project.

01	02	03	04	05	06	07	08	09	10	11	12
Dwelling Unit Name	Water Heating System ID or Name	Water Heating System Type	Water Heater Type	# of Like (or Identical) Water Heaters in System	Fuel Type	Rated Input Type	Rated Input Value	Central DHW System Distribution	Dwelling Unit DHW System Distribution Type	Compact Distrib.	Drain Water Heat Recovery

A2. Design Verified Dwelling Unit HPWH System Information

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

01	02	03	04	05	06	07	08	09	10
Dwelling Unit Name	Water Heating System ID or Name	Modeled Equipment Make and Model	# of Like (or Identical) Water Heaters in System	Tank Location	Exterior Tank Insulation R-value	Dwelling Unit DHW System Distribution Type	Compact Distribution	Drain Water Heat Recovery	Simulated Equipment Make and Model

B. Installed Verified 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	11	12
Dwelling Unit Name	Water Heating System ID or Name	Water Heating System Type	Water Heater Type	# of Like (or Identical) Water Heaters in System	Fuel Type	Rated Input Type	Rated Input Value	Central DHW System Distribution	Dwelling Unit DHW System Distribution Type	Compact Distrib.	Drain Water Heat Recovery

**SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS****B2. Installed Verified Dwelling Unit HPWH System Information**

This table reports the water heating system(s) installed in this project.

01	02	03	04	05	06	07	08	09
Dwelling Unit Name	Water Heating System ID or Name	Modeled Equipment Make and Model	# of Like (or Identical) Water Heaters in System	Tank Location	Exterior Tank Insulation R-value	Dwelling Unit DHW System Distribution Type	Compact Distribution	Drain Water Heat Recovery

C. Design Verified Dwelling Unit Water Heating Efficiency Information

This table reports the water heater(s) efficiency features specified on the registered LMCC compliance document for this project. (Not needed for central systems)

01	02	03	04	05	06	07
Water Heating System ID or Name	Heating Efficiency Type	Heating Efficiency Value	Standby Loss (%)	Exterior Insulation R-Value	Water Heater Storage Volume (gal)	Tank location

D. Installed Verified Dwelling Unit Water Heating Efficiency Information

This table reports the water heater(s) efficiency features installed in this project. (Not needed for central systems)

01	02	03	04	05	06	07
Water Heating System ID or Name	Heating Efficiency Type	Heating Efficiency Value	Standby Loss (%)	Exterior Insulation R-Value	Water Heater Storage Volume (gal)	Tank location
08	Compliance Statement					

E. Installed Water Heater Manufacturer Information

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

**SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS****F. Mandatory Measures for all Domestic Hot Water Distribution Systems**

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.

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-3.5 or combination of R-16 internal and external Insulation. (Section 110.3(c)3).
03	<p>Domestic hot water piping insulation requirements (Section 150(I)):</p> <ul style="list-style-type: none"> All domestic hot water piping shall be insulated as specified in Section 609.12 of the California Plumbing Code. Insulation buried below grade must be installed in a waterproof and non-crushable casing or sleeve. Pipe insulation shall fit tightly and all elbows and tees shall be fully insulated. 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 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. Insulation is not required on the cold water line when it is used as the return.
04	<p>a. A designated space at least 2.5 feet by 2.5 feet and 7 feet tall within 3 feet from the water heater</p> <ul style="list-style-type: none"> A dedicated 125V, 20A electrical receptacle connected to the electric panel with a 120/240V 3 conductor, branch circuit rated at 30 amps minimum, within 3 feet from the water heater and is accessible with no obstructions. The conductor shall be labeled with the word "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 use" shall be provided. A condensate drain no more than 2 inches higher than the base of the water heater, and allows for natural draining without pump assistance. <p>b. A designated space at least 2.5 feet by 2.5 feet and 7 feet tall more than 3 feet from the water heater</p> <ul style="list-style-type: none"> A dedicated 240 volt branch circuit shall be installed within 3 feet from the designated space. The branch circuit shall be rated at 30 amps minimum. The blank cover shall be identified as "240V ready"; and The main electrical service panel shall have a reserved space to allow for the installation of a double pole circuit breaker for a future HPWH installation. The reserved space shall be permanently marked as "For Future 240V use"; and Either a dedicated cold water supply, or the cold water supply shall pass through the designated HPWH location just before reaching the gas or propane water heater; and The hot water supply pipe coming out of the gas or propane water heater shall be routed first through the designated HPWH location before serving any fixtures; and The hot and cold water piping at the designated HPWH location shall be exposed and readily accessible for future installation of a HPWH; and A condensate drain no more than 2 inches higher than the base of the installed water heater, and allows natural draining without pump assistance.
05	<p>Domestic hot water piping insulation requirements: See the exceptions to Section 160.4(e)</p> <p>All piping for multifamily domestic hot water systems shall be insulated and meet the applicable requirements below:</p> <p>1. General Requirements:</p> <ol style="list-style-type: none"> The first 8 feet of inlet cold water piping from the storage tanks, including piping between a storage tank and a heat trap shall be insulated. Insulation on the piping and domestic hot water system appurtenances shall be continuous. Pipe supports, hangers, and pipe clamps shall be attached on the outside of rigid pipe insulation to prevent thermal bridges. All pipe insulation seams shall be sealed. Insulation for pipe elbows shall be mitered, preformed, or site fabricated with PVC covers. Insulation for tees shall be notched, preformed, or site fabricated with PVC covers. Extended stem isolation valves shall be installed. All plumbing appurtenances on hot water piping from a heating source to heating plant, at the heating plant, and distribution supply and return piping shall be insulated to meet the following requirements: <ol style="list-style-type: none"> Where the outer diameter of the appurtenance is less than the outer diameter of the insulated pipe that it is attached to, the appurtenance shall be insulated flush with the insulation surrounding the pipe. Where the outer diameter of the appurtenance is greater than the outer diameter of the insulated pipe that it is attached to, the appurtenance shall be insulated with a minimum thickness of 1 inch. The insulation shall be removable and re-installable to ensure maintenance or replacement services can be completed. Valves shall be fully functional without impediment from the insulation.

**SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS**

05	<p>1. Insulation Thickness: All piping for multifamily domestic hot water systems shall meet the insulation thickness requirements specified in of Table 160.4-A.</p> <p>a. For insulation conductivity in the range shown in Table 160.4-A for the applicable fluid temperature range, the insulation shall have the applicable minimum thickness or R-value shown in Table 160.4-A.</p> <p>b. if the insulation conductivity falls outside the range provided in Table 160.4-A applicable fluid temperature range, the insulation shall meet a minimum R-value as indicated in Table 160.4-A. Or, it can have a thickness determined using Equation 160.4-A.</p> <p>c. Insulation conductivity shall be determined in accordance with ASTM C335 at the mean temperature listed in Table 160.4-A, and shall be rounded to the nearest 1/100 Btu-inch per hour per square foot per °F.</p> <p>2. Insulation Protection: Pipe Insulation shall be protected from damage due to sunlight, moisture, equipment maintenance and wind. Protection shall, at minimum, include the following:</p> <p>a. Pipe and appurtenance insulation exposed to weather shall be protected by a cover suitable for outdoor service. The cover shall be water retardant and provide shielding from solar radiation that can cause degradation of the material. Appurtenance insulation covers shall be removable and able to be reinstalled. Adhesive tape shall not be used to provide this protection.</p> <p>b. Pipe insulation covering chilled water piping and refrigerant suction piping located outside the conditioned space shall include, or be protected by, a Class I or Class II vapor retarder. All penetrations and joints shall be sealed.</p> <p>c. Pipe insulation buried below grade must be installed in a waterproof and noncrushable casing or sleeve.</p>	
06	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
07	Correction Notes:	

G. Verified Compact Hot Water Distribution System Expanded Credit (CHWDS-H-EX) (RA3.6.5)

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.

For dwelling units with multiple systems, enter the master bath distance and kitchen distance to the closest water heater, and enter the average of the furthest fixture to each water heater.

01	02	03	04	05	06	07	08	09
Dwelling 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 (Avg for multiple water heaters)	Weighted Distance	Qualification Distance	Design Compactness Factor	Calculated Compactness Factor
10	No hot water piping >1 inch diameter is allowed.							
11	Length of 1 inch diameter piping is limited to 8 feet or less.							
12	Two and three story buildings cannot have hot water distribution piping in the attic, unless the water heater is also located in the attic.							
13	Eligible recirculating systems must be Verified Demand Recirculation: Manual Control conforming to RA4.4.17.							
14	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						
15	Correction Notes:							

**SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS****H. Compact Hot Water Distribution System (RA4.4.6)**

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

For dwelling units with multiple systems, enter the master bath distance and kitchen distance to the closest water heater, and enter the average of the furthest fixture to each water heater.

01	02	03	04	05	06	07	08	09
Dwelling 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 (Avg for multiple water heaters)	Weighted Distance	Qualification Distance	Design Compactness Factor	Calculated Compactness Factor

I. Verified Drain Water Heat Recovery System (DWHR-H) (RA3.6.9)

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.

DWHR devices shall comply with these requirements.

Design DWHR System Information

01	02	03	04
System ID/Name	Rated Effectiveness	Installation Configuration	Percent of shower served by the DWHR device

Installed DWHR System Information

05	06	07	08	09	10	11
System Name/ID	Manufacturer	Model #	Rated effectiveness	Installation Configuration	Percent of shower served by the DWHR device	DWHR System Certified by CEC (Yes/No)
12	For water heating system serving a single dwelling, the DWHR system shall, at the minimum, recover heat from the master bathroom shower and must at least transfer that heat either back to the respective shower(s) or the water heater.					
13	For central water heating system serving multiple dwellings, the DWHR system shall, at the minimum, recover heat from half the showers located above the first floor and must at least transfer that heat either back to all the respective showers or the water heater.					
14	The DWHR unit(s) shall be installed within 1 degrees of the rated slope. Sloped DWHR shall have a minimum lengthwise slope of 1 degree. The lateral level tolerance shall be within plus or minus 1 degree.					
15	Verification Status:		<div><input type="checkbox"/> Pass - all applicable requirements are met; or</div> <div><input type="checkbox"/> Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or</div> <div><input type="checkbox"/> All N/A - This entire table is not applicable</div>			
16	Correction Notes:					

**SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS****J. Verified Pipe Insulation for Central Systems Requirements (RA3.6.2)**

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.

Systems that utilize this distribution type shall comply with these requirements.

01	ECC rater shall inspect the heating plant and horizontal supply header and return piping in accordance with the requirements in Title 24 Part 6 section 170.2(d).	
02	<p>The rater shall use a sampling approach that one in seven DHW recirculation pipe risers and associated branches be inspected to verify the pipe insulation meet with the following requirements:</p> <ul style="list-style-type: none">a. All piping for multifamily domestic hot water systems shall be insulated to the thickness specified in Table 160.4-A, including the first 8 feet of inlet cold water piping to the heating plant. Insulation on the piping and appurtenances shall be continuous.b. All appurtenances at the heating plant, from a heating source to storage tank(s), or in between storage tanks and storage water heaters, and recirculation supply and return loop shall meet the following:<ul style="list-style-type: none">1. Insulation to be flush with pipe insulation or have minimum of one inch if appurtenance is bulkier.2. Removable and re-installable for maintenance or replacement.3. Pipe supports, hangers, and clamps shall be attached on the outside of rigid pipe insulation.c. All pipe insulation seams shall be sealed along the length of the pipe and between adjacent sections of insulation material.d. Insulation for pipe elbows shall be mitered, and insulation for tees shall be notched. Alternatively, tees and elbows may be pre-formed, or site fabricated with PVC covers. <p>Isolation valves shall be fully functional. Extended stem isolation valves shall be installed on hot water piping or where pipe insulation is required.</p>	
03	Verification Status:	<input type="checkbox"/> Pass - all applicable requirements are met; or <input type="checkbox"/> Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or <input type="checkbox"/> All N/A - This entire table is not applicable
04	Correction Notes:	

K. Verified Central Parallel Piping Requirements (PP-H) (RA3.6.4)

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.

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-1.	
05	Verification Status:	<input type="checkbox"/> Pass - all applicable requirements are met; or <input type="checkbox"/> Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or <input type="checkbox"/> All N/A - This entire table is not applicable
06	Correction Notes:	

**SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS****L. Central Parallel Piping Requirements (RA4.4.4)**

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

Systems that utilize this distribution type shall comply with these requirements.

01	Each central manifold has 15 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 instance, 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-1.

M. Point of Use Requirements (POU) (RA4.4.5)

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

Systems that utilize this distribution type shall comply with these requirements.

01	<p>All hot water supply pipe run lengths are equal to or less than the maximum values shown below, based on the pipe diameter. If a combination of piping is used in a single run, then one half the allowed length of each size is the maximum installed length. The maximum allowed length of piping for the longest run terminating in:</p> <p>3/8 inch - For only one pipe size - max length allowed is 15 feet For combination pipe sizes the max allowed length of 3/8-inch piping is 7.5 feet, of 1/2 inch piping is 5 feet, and 3/4 inch piping is 2.5 feet.</p> <p>1/2 inch - For only one pipe size – max length allowed is 10 feet For combination pipe sizes the allowed length of 1/2-inch piping is 5 feet, and 3/4 inch piping is 2.5 feet.</p> <p>3/4 inch - For only one pipe size = 5 feet</p>
----	--

N. Mandatory Requirements for all Recirculation Systems (RA4.4.7)

Systems that utilize this distribution type shall comply with these requirements.

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

01	A check valve located between the recirculation pump and the water heater to prevent unintentional recirculation.
02	Piping must take most direct path between water heater and fixtures.
03	Insulation is not required on the cold water line when it is used as the return.

O. Recirculation Non-Demand Controls Requirements (RA4.4.8)

Systems that utilize this distribution type shall comply with these requirements.

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

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.
----	---

**SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS****P. Demand Recirculation Manual Control (RA4.4.9)/Sensor Control (RA4.4.10) Requirements**

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

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. For Demand Recirculation Manual Control, the pump shall be turned on using a manual switch system. For Demand Recirculation Sensor Control, the pump shall be turned on using a sensor system.
02	The controls shall be located in the kitchen, bathroom, and any hot water fixture location that is at least 20 feet from the water heater.
03	Manual controls may be activated by wired or wireless mechanisms. Each control shall have standby power of 1 Watt or less.
04	Sensor Controls may be activated by wired or wireless mechanisms, including buttons, motion sensors, door switches and flow switches. Each control shall have standby power of 1 Watt or less.
05	Pump and control placement shall meet one of the following criteria: <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).
06	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: <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).
07	Controls shall limit operation to no more than 5 minutes following activation.

Q. Verified Demand Recirculation Manual Control (RDRmc-H) (RA3.6.6)/Sensor Control (RDRsc-H) (RA3.6.7) Requirements

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.

Systems that utilize this distribution type shall comply with these requirements.

01	ECC rater shall perform a visual inspection to verify that the demand pump, manual/sensor controls and thermo-sensor are present and operating properly consistent with the applicable requirements of RA4.4.9 and RA4.4.10	
02	Verification Status:	<input type="checkbox"/> Pass - all applicable requirements are met; or <input type="checkbox"/> Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or <input type="checkbox"/> All N/A - This entire table is not applicable
03	Correction Notes:	

R. Determination of ECC 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	
----	--

**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.

Documentation Author Name:	Documentation Author Signature:
Company:	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 Verification is true and correct.
2. I am the certified ECC 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 ECC verification identified on this Certificate of Verification comply with the applicable requirements in Reference Nonresidential Appendices NA1, NA2, NA7 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 understand 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 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 registered copy of this Certificate of Verification 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.

BUILDER OR INSTALLER INFORMATION AS SHOWN ON THE CERTIFICATE OF INSTALLATION

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

ECC PROVIDER DATA REGISTRY INFORMATION

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

ECC RATER INFORMATION

ECC Rater Company Name:	
Responsible Rater Name:	Responsible Rater Signature:
Responsible Rater Certification Number w/ this ECC Provider:	Date Signed:

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

CERTIFICATE OF INSTALLATION – USER INSTRUCTIONS	NRCV-PLB-22-H
Verified Individual Dwelling Unit Hot Water System Distribution	(Page 1 of 4)

NRCV-PLB-22-H User Instructions

A. Design Verified Central Water Heating Systems Information

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

A1. Design Verified Dwelling Unit HPWH System Information

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

B. Installed Verified Dwelling Unit Water Heating Systems Information

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

1. Dwelling Unit Name - Reference information from TABLE A.
2. Water Heating System ID or Name – Reference information from TABLE A.
3. Water Heating System Type – Reference information from TABLE A. The different kinds of water heating system type are DHW, or Combined Hydronic.
4. Water Heater Type – Information from TABLE A. 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.
5. # of Like (or Identical) Water Heaters in system – Reference information from TABLE A.
6. 06 Fuel Type – Reference information from TABLE A. The different kinds of fuel types are natural gas, propane, oil, or electricity.
7. Rated Input Type – Reference information from TABLE A. 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 TABLE A.
9. Central DHW System Distribution - Reference information from TABLE A.
10. Dwelling Unit DHW System Distribution Type - Reference information from TABLE A.
11. Compact Distribution - Reference information from TABLE A.
12. Drain Water Heat Recovery - Reference information from TABLE A.

B2. Installed Verified Dwelling Unit HPWH System Information

This table reports the water heating system information that is being installed. Require one line for each installed water heater. Not applicable for central systems.

1. Dwelling Unit Name – Reference information from Table A2.
2. Water Heating System ID or Name – Reference information from Table A2. AFUE, UEF and Thermal Efficiency.
3. Modeled Equipment Make and Model – User input must be equal to the value indicated on Table C as default and allow user to override with an equivalent system based on the simulated equipment in Table A2.
4. # of Like (or Identical) Water Heaters in System – Reference information from Table A2

CERTIFICATE OF INSTALLATION – USER INSTRUCTIONS	NRCV-PLB-22-H
Verified Individual Dwelling Unit Hot Water System Distribution	(Page 2 of 4)

5. Tank Location – User input. Must be equal to value indicated in Table B2.
6. Exterior Tank Insulation R-value – User input. Must be equal to or higher than value indicated in Table A2.
7. Dwelling Unit DHW System Distribution Type – Reference information from Table A2.
8. Compact Distribution – Reference information from Table A2.

C. Design Verified Dwelling Unit Water Heating Efficiency Information

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

D. Installed Verified 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.

1. Water Heating System ID or Name – Reference information from NRCC
2. Heating Efficiency Type – Reference information from NRCC. Different efficiency types are Energy Factor, AFUE, UEF and Thermal Efficiency.
3. Heating Efficiency Value – User input. Numerical value of the Heating Efficiency. Must be equal to or higher efficiency than value indicated on the NRCC.
4. Standby Loss – User input. Must be equal to or less than value indicated on the NRCC. Value may be N/A if NRCC value is N/A.
5. Exterior Insulation R-Value – User input. Must be equal to or higher than value indicated on the NRCC. Value may be N/A if NRCC value is N/A.
6. Water Heater Storage Volume (gal) – User input. Value may be N/A if water heater type is instantaneous with zero storage.
7. Tank location – User input. Must be equal to system type indicated on the NRCC.

E. 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 NRCC.
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.

F. Mandatory Measures for all Domestic Hot Water Distribution Systems

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

G. Verified Compact Hot Water Distribution Expanded System Credit and

H. Compact Hot Water Distribution System Basic

If performance compliance is used, this table lists the values used in the performance calculation and require no user input.

If prescriptive compliance is used, fill out this table

1. Reference information from NRCC
2. User select – user select from list
3. Enter the Master Bath distance of furthest fixture to Water Heater in feet. For multiple water heaters, enter the distance to the closest water heater.

CERTIFICATE OF INSTALLATION – USER INSTRUCTIONS	NRCV-PLB-22-H
Verified Individual Dwelling Unit Hot Water System Distribution	(Page 3 of 4)

4. Enter the Kitchen distance from furthest fixture to Water Heater in feet. For multiple water heaters, enter the distance to the closest water heater.
5. Enter Furthest Third fixtures from fixture to Water Heater in feet. For multiple water heaters, enter the average of the furthest distance of each water heater.
6. Calculated value – no user input required
7. Calculated value – no user input required

I. Verified Drain Water Heat Recovery System

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

1. Reference information from NRCC.
2. Reference information from NRCC.
3. Reference information from NRCC.
4. Reference information from NRCC.
5. Reference information from NRCC.
6. Drain Water Heat Recovery Manufacturer's name- Enter the name of the Manufacturer.
7. Drain Water Heat Recovery Manufacturer's model number – Enter the Model number.
8. Rated Effectiveness' – Enter the rated effectiveness of the DWHR device.
9. Installation Configuration – Enter type of configuration. Available options are Equal flow, unequal to shower, and unequal to water heater
10. Percent of shower served by the DWHR device – Enter the percent of showers served by this DWHR device.
11. DWHR System Certified by CEC – Enter "Yes" if certified or else enter "No".

J. Verified Pipe Insulation for Central Systems Requirements

This table only applies to systems indicated as **-Verified Pipe Insulation for Central Systems**. In addition to the mandatory requirements in Table F, the ECC rater must ensure the requirements in this table are met.

K. Verified Central Parallel Piping Requirements

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

L. Central Parallel Piping Requirements

This table only applies to systems indicated as Central **Parallel Piping**. In addition to the mandatory requirements in Table F, the installer must ensure the requirements in this table are met.

M. Point of Use Requirements

This table only applies to systems indicated as **Point of Use**. In addition to the mandatory requirements in Table F, the installer must ensure the requirements in this table are met.

N. Mandatory Requirements for all Recirculation Systems

The requirements of this table apply to all recirculation systems listed below.

CERTIFICATE OF INSTALLATION – USER INSTRUCTIONS	NRCV-PLB-22-H
Verified Individual Dwelling Unit Hot Water System Distribution	(Page 4 of 4)

O. Recirculation Non-Demand Controls Requirements

This table only applies to systems indicated as **Recirculation Non-demand controls**. In addition to the mandatory requirements in Table F and N, the installer must ensure the requirements in this table are met.

P. Demand Recirculation Manual Control/Sensor Control Requirements

This table only applies to systems indicated as **Demand Recirculation Manual Control, Demand Recirculation Sensor Control, -Verified Demand Recirculation Manual Control or -Verified Demand Recirculation Sensor Control**. In addition to the mandatory requirements in Table F and N, the installer must ensure the requirements in this table are met.

Q. Verified Demand Recirculation Manual Control (RDRmc-H) (RA3.6.6)/Sensor Control (RDRsc-H) (RA3.6.7)

This table only applies to systems indicated as **-Verified Demand Recirculation Manual Control or -Verified Demand Recirculation Sensor Control**. In addition to the mandatory requirements in Table F and N, the ECC rater must ensure the requirements in this table are met.

R. Determination of Verification Compliance

This field is filled out automatically. Compliance requires that all individual criteria pass.

Documentation Declaration Statements

1. The person who prepared the NRCV 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 (if applicable) for their company, responsible builder or installer name, CSLB license number, sample group number, dwelling test status in sample group, ECC Rater company name, ECC Rater name, ECC Rater signature, ECC Rater certification number and date signed.