DOCKETED	
Docket Number:	24-BSTD-03
Project Title:	2025 Energy Code Compliance Software, Manuals and Forms
TN #:	263565
Document Title:	2025 Single-Family Certificates of Verification (CF3R)
Description:	This draft Single-Family Certificates of Verification (CF3R) 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:	5/30/2025 1:36:13 PM
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BUILDING AIR LEAKAGE DIAGNOSTIC TEST
BUILDING ENCLOSURES AND DWELLING UNIT ENCLOSURES

CALIFORNIA ENERGY COMMISSION

CEC-CF3R-ENV-20-H

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. Enclosure Air Leakage – General Information

01	Test Procedure used	
02	Date of the Diagnostic Test for this Dwelling	
03	Is ECC verification of building enclosure air leakage to outside required by CF1R?	
04	Target Enclosure Air Leakage from CF1R (CFM50)	
05	Indoor temperature during test (degrees Fahrenheit (°F))	
06	Outdoor temperature during test (degrees Fahrenheit (°F))	
07	Blower Door Location	
08	Building Elevation Above Sea Level (feet (ft))	

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)

C1. Enclosure Air Leakage Diagnostic Test for a 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	

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CALIFORNIA ENERGY COMMISSION

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SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

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 Difference (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 CFM50 (from software)	

D1. Altitude and Temperature Correction for Single-Point Test Data

01	Altitude and Temperature Correction Factor	
02	Corrected CFM50	

D2. Altitude and Temperature Correction for Multi-Point Test Data

Performed by blower door software.

01	

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. Compliance Statement

01	

G. Additional Requirements for Compliance

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

01	The procedure for preparing the enclosure for testing is detailed in RESNET 380-2019 Section 4.2.	
02	The procedure for installation of the test apparatus, and preparations for measurement shall conform to RESNET 380-2019 Section 4.3	
03	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.	
04	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 4.4.2.	
05	Verification Status:	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or All N/A - This entire table is not applicable
06	Correction Notes:	

H. 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	

BUILDING AIR LEAKAGE DIAGNOSTIC TEST
BUILDING ENCLOSURES AND DWELLING UNIT ENCLOSURES

CALIFORNIA ENERGY COMMISSION

CEC-CF3R-ENV-20-H

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

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

Documentation Author Name:	Documentation Author Signature:
Documentation Author Company Name:	Date Signed:
Address:	CEA/AEA/ECC Certification Identification (If applicable):
City/State/Zip:	Phone:

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of 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 Appendices RA2, RA3, 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 (CF2R) signed and submitted by the person(s) responsible for the construction or installation conforms to the requirements specified on the Certificate(s) of Compliance (CF1R) 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

CF3R-ENV-20-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. 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 CF1R which determines if a CFM50 compliance target value is required.
4. This field determines the CFM50 target enclosure air leakage from the CF1R if ECC verification of enclosure air leakage is required.
5. Enter the indoor temperature measured at the time that the enclosure air leakage test was performed.
6. Enter the outdoor temperature measured at the time that the enclosure air leakage test was performed.
7. 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”.
8. Enter the building elevation above sea level. Use the value for the closest city found in Reference Appendices, Joint Appendix JA2.2.

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.
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 for a Single-Point Test with Manual Meter

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 for a Single-Point Test with Automatic Meter

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.

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

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 60 ± 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 version of the ENV-20 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 for Single-Point Test Data

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 for Multi-Point Test Data

Section E1. Accuracy Adjustment for Single-Point Test Data

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

Section E2. Accuracy Adjustment for Multi-Point Test Data

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

Section F. Compliance Statement

1. This field is automatically calculated. A check is performed to make sure that the meter has been properly calibrated and that the measured enclosure air leakage is less than the target enclosure air leakage.

Section G. Additional Requirements for 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. Verification Status: If this Section does not apply, then select “All N/A”. If the system meets the criteria of the Additional Requirements then select “Pass”, otherwise select “Fail”. The latter selection means that the system does not meet the requirements and the CF1R will have to be revised, or the system will need to be modified to meet the requirements.

Correction Notes: If one or more applicable requirements are not met “Fail” will appear in the row above. When this occurs the rater is required to enter detailed notes here that describe what failed and why.

Documentation Declaration Statements

1. The person who prepared the CF3R 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. Air Barrier Materials

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 Correction Notes.

Note:

SPF insulation is an acceptable air barrier and sealant when installed to a minimum thickness of 2 inches for closed cell and 5.5 inches for open cell, except where not allowed by manufacturer (e.g., flues, vents, can lights, etc.).

01	A continuous sealed exterior air barrier is required in all thermal envelope assemblies to limit air movement between unconditioned/outside spaces and conditioned/inside spaces, and must comply using one of the following methods: 1. Using individual materials that have an air permeance not exceeding 0.004 cfm/ft^2 under a pressure differential of 0.3 in. w.g. (1.57 pcf) (0.02 L/s.m^2 at 75 pa) when tested in accordance with ASTM E2178; or 2. Using assemblies of materials and components that have an average air leakage not to exceed 0.04 cfm/ft^2 under a pressure differential of 0.3 in. w.g. (1.57 pcf) (0.2 L/s.m^2 at 75 pa) when tested in accordance with ASTM E2357, ASTM E1677, ASTM E1680, or ASTM E283; or 3. Testing the complete building and demonstrating that the air leakage rate of the building envelope does not exceed 0.40 cfm/ft^2 at a pressure differential of 0.3 in. w.g. (1.57 pcf) (2.0 L/s.m^2 at 75 pa) in accordance with ASTM E779 or an equivalent approved method.	
02	Method of Compliance	
03	Verification Status	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or ☐ All N/A - This entire table is not applicable.
04	Correction Notes	

B. Raised Floor Adjacent to Unconditioned Space or Separate Dwelling Units

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 Correction Notes.

01	All gaps in the raised floor are sealed.	
02	All chases are sealed at floor level using a sealed hard cover.	
03	All holes (e.g., for plumbing and electrical wires) that penetrate the floor or bottom plates of walls are sealed.	
04	Subfloor sheathing is glued or sealed at all panel edges to create a continuous airtight subfloor air barrier.	
05	Verification Status	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or ☐ All N/A - This entire table is not applicable.
06	Correction Notes	

C. Walls Adjacent to Unconditioned Space

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 Correction Notes.

01	All penetrations through the exterior wall air barrier are sealed to provide an airtight envelope to unconditioned spaces such as the outdoors, attic, garage, and crawlspace.	
02	Exterior wall air barrier is sealed to the top plate and bottom plate in each stud bay.	
03	All electrical boxes, including knockouts, that penetrate the air barrier to unconditioned space are sealed.	
04	All openings in the top and bottom plate, including all interior and exterior walls, to unconditioned space are sealed; such as holes drilled for electrical and plumbing.	
05	Exterior bottom plates (all stories) are sealed to the floor.	
06	All gaps around windows and doors are sealed. The sealant used follows manufacturer specifications.	
07	Rim joist gaps and openings are fully sealed.	
08	Fan exhaust duct outlet/damper at the exterior wall are sealed.	
09	Knee walls have solid and sealed blocking at the bottom, top, left, and right sides to prevent air movement into insulation.	
10	Verification Status	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or ☐ All N/A - This entire table is not applicable.
11	Correction Notes	

D. Ceiling Air Barrier Adjacent to Unconditioned Space

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 Correction Notes.

01	There is a continuous air barrier at the ceiling level. All openings into walls, drops, chases or double walls are sealed.	
02	All penetrations through the top plate of interior and exterior walls are sealed.	
03	Fire sprinklers penetrating a ceiling air barrier shall be sealed to prevent air movement according to the manufacturer's instructions.	
04	All fixtures cut into ceiling air barrier (e.g., HVAC registers, electrical boxes, fire alarm boxes, exhaust fan housing, and recessed lighting fixtures) are sealed to the surrounding dry wall. If it is not possible to seal the fixture directly, a secondary air barrier shall be created around the fixture.	
05	All installed recessed lighting fixtures that penetrate the ceiling to unconditioned space are rated to be Insulation Contact and Airtight (IC and AT) which allow direct contact with insulation.	
06	All dropped ceiling areas are covered with hard covers that are sealed to the framing, or else the bottom and sides of dropped ceiling areas are all insulated and sealed as ceilings and walls as required on the Certificate of Compliance.	
07	All vertical chases (e.g., HVAC ducts and plumbing) and soffits are sealed at the ceiling level.	
08	Chimneys and flues require sheet metal flashing at the ceiling level. The flashing shall be sealed to the chimney/flue with fire rated caulk. The flashing shall be sealed to the surrounding framing.	
09	Framing locations where air may move down into the walls from the attic (e.g., double walls, pocket doors, architectural bump-outs, etc.) have a sealed hard cover to prevent air movement.	
10	Attic access forms an airtight seal between the conditioned space and unconditioned space. Vertical attic access requires mechanical compression using screws or latches.	
11	Verification Status	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or ☐ All N/A - This entire table is not applicable.
12	Correction Notes	

E. Roof Air Barrier – Unvented Attics Adjacent to Unconditioned Space

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 Correction Notes.

01	There is a continuous air barrier at the roof deck and gable ends.	
02	Chimneys and flues require sheet metal flashing at the roof deck. The flashing is sealed to the chimney/flue with fire rated caulk. The flashing is sealed to the surrounding framing.	
03	All penetrations in the roof deck and gable ends for plumbing, electrical, etc. are sealed.	
04	Verification Status	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or ☐ All N/A - This entire table is not applicable.
05	Correction Notes	

F. Conditioned Space Above or Adjacent to Garage Air Barrier

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 Correction Notes.

01	All penetrations in the subfloor above the garage into conditioned space must follow the raised floor air barrier requirements.	
02	Infiltration between the space above the garage and the subfloor is prevented by one of the following methods: • Seal all edges of the garage ceiling (typically drywall) at the perimeter of the garage to create a continuous airtight surface between the garage and adjacent conditioned envelope. Seal all plumbing, electrical, and mechanical penetrations between the garage and adjacent conditioned space. For an open-web truss, airtight blocking is added on all four sides of the garage perimeter. Insulation can be placed on the garage ceiling. • Seal the band joist above the wall at the garage to conditioned space transition. Seal all subfloor seams and penetrations between the garage and adjacent conditioned space. Insulation must be placed in contact with the subfloor below the conditioned space.	
03	Verification Status	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or ☐ All N/A - This entire table is not applicable.
04	Correction Notes	

G. Cantilevered Floor Air Barrier

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 Correction Notes.

01	Airtight blocking is installed between joists where the wall rim joist would have been located in the absence of a cantilever.	
02	Exterior sheathing is installed to the bottom of the cantilever so that there is a continuous air and weather barrier for the cantilever. The cantilevered joist must be insulated to the same R-value as would be required for the subfloor prior to closing.	
03	Any gaps, cracks or penetrations in the air barrier of the cantilever are sealed. Recessed can lights in the cantilever are rated to be Insulation Contact and Airtight (IC and AT) and properly sealed to the sheathing.	
04	Verification Status	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or ☐ All N/A - This entire table is not applicable.
05	Correction Notes	

H. Walls for Attached Porch, Attic, Double Wall Air Barrier

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 Correction Notes.

01	An exterior wall air barrier is required at the intersection of the porch and exterior wall when there is conditioned space on the other side. The exterior wall includes an air barrier where the attic attaches to the conditioned space.	
02	Truss framing blocking is used at the top and bottom of each wall/roof section.	
03	Verification Status	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or ☐ All N/A - This entire table is not applicable.
04	Correction Notes	

I. Special Requirements for SIPs

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 Correction Notes.

01	SIPs are considered an air barrier when properly sealed at top, bottom, sides, and all penetrations.	
02	Air barrier is continuous across all surfaces, including between SIPs and non-SIP sections.	
03	Verification Status	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or ☐ All N/A - This entire table is not applicable.
04	Correction Notes	

J. Special Requirements for ICF

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 Correction Notes.

01	ICF sections are considered an air barrier when properly sealed at top, bottom, sides and all penetrations.	
02	Air barrier is continuous across all surfaces, including between ICF and non-ICF sections.	
03	Verification Status	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or ☐ All N/A - This entire table is not applicable.
04	Correction Notes	

K. 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	

QII - AIR INFILTRATION SEALING – FRAMING STAGE

CALIFORNIA ENERGY COMMISSION

CEC-CF3R-ENV-21-H

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

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

Documentation Author Name:	Documentation Author Signature:
Documentation Author Company Name:	Date Signed:
Address:	CEA/AEA/ECC Certification Identification (If applicable):
City/State/Zip:	Phone:

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of 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 Field verification identified on this Certificate of Verification comply with the applicable requirements in Reference Appendices RA2, RA3, 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 (CF2R) signed and submitted by the person(s) responsible for the construction or installation conforms to the requirements specified on the Certificate(s) of Compliance (CF1R) 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

CF3R-ENV-21 User Instructions

Quality Insulation Installation (QII) applies to the entire building (roof/ceiling, walls, and floor) for new construction and requires field verification by a third-party ECC Rater. For Alterations to existing buildings, compliance credit can only be taken when the "existing, plus addition, plus alteration" approach is used, but credit will only apply to the new surfaces in the new zone.

A. Air Barrier Materials

2. Method of Compliance: Using the drop down menu, indicate which method is being used to comply with the continuous air barrier requirements [e.g., Method 1 (Individual Materials), Method 2 (Assemblies of Materials), Method 3 (Complete Building)].
3. Verification Status: ECC Rater to select from list:
    a. Pass – all applicable requirements are met.
    b. Fail – one or more applicable requirements are not met. Rater must enter reason for failure in correction notes field below.
    c. All N/A – This entire table is not applicable.
4. Correction Notes: Rater must enter the reason for failure.

B. Raised Floor Adjacent to Unconditioned Space or Separate Dwelling Unit

5. Verification Status: ECC Rater to select from list:
    a. Pass – all applicable requirements are met.
    b. Fail – one or more applicable requirements are not met. Rater must enter reason for failure in correction notes field below.
    c. All N/A – This entire table is not applicable.
6. Correction Notes: Rater must enter the reason for failure.

C. Walls Adjacent to Unconditioned Space

10. Verification Status: ECC Rater to select from list:
    a. Pass – all applicable requirements are met.
    b. Fail – one or more applicable requirements are not met. Rater must enter reason for failure in correction notes field below.
    c. All N/A – This entire table is not applicable.
11. Correction Notes: Rater must enter the reason for failure.

D. Ceiling Air Barrier Adjacent to Unconditioned Space

11. Verification Status: ECC Rater to select from list:
    a. Pass – all applicable requirements are met.
    b. Fail – one or more applicable requirements are not met. Rater must enter reason for failure in correction notes field below.
    c. All N/A – This entire table is not applicable.
12. Correction Notes: Rater must enter the reason for failure.

E. Roof Air Barrier – Unvented Attics Adjacent to Unconditioned Space

4. Verification Status: ECC Rater to select from list:
    a. Pass – all applicable requirements are met.
    b. Fail – one or more applicable requirements are not met. Rater must enter reason for failure in correction notes field below.

c. All N/A – This entire table is not applicable.

5. Correction Notes: Rater must enter the reason for failure.

F. Conditioned Space Above or Adjacent to Garage Air Barrier

3. Verification Status: ECC Rater to select from list:
   a. Pass – all applicable requirements are met.
   b. Fail – one or more applicable requirements are not met. Rater must enter reason for failure in correction notes field below.
   c. All N/A – This entire table is not applicable.
4. Correction Notes: Rater must enter the reason for failure.

G. Cantilevered Floor Air Barrier

4. Verification Status: ECC Rater to select from list:
   a. Pass – all applicable requirements are met.
   b. Fail – one or more applicable requirements are not met. Rater must enter reason for failure in correction notes field below.
   c. All N/A – This entire table is not applicable.
5. Correction Notes: Rater must enter the reason for failure.

H. Walls for Attached Porch, Attic, Double Wall Air Barrier

3. Verification Status: ECC Rater to select from list:
   a. Pass – all applicable requirements are met.
   b. Fail – one or more applicable requirements are not met. Rater must enter reason for failure in correction notes field below.
   c. All N/A – This entire table is not applicable.
4. Correction Notes: Rater must enter the reason for failure.

I. Special Requirements for SIPs

3. Verification Status: ECC Rater to select from list:
   a. Pass – all applicable requirements are met.
   b. Fail – one or more applicable requirements are not met. Rater must enter reason for failure in correction notes field below.
   c. All N/A – This entire table is not applicable.
4. Correction Notes: Rater must enter the reason for failure.

J. Special Requirements for ICF

3. Verification Status: ECC Rater to select from list:
   a. Pass – all applicable requirements are met.
   b. Fail – one or more applicable requirements are not met. Rater must enter reason for failure in correction notes field below.
   c. All N/A – This entire table is not applicable.
4. Correction Notes: Rater must enter the reason for failure.

Documentation Declaration Statements

1. The person who prepared the CF3R 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.

QII – INSULATION INSTALLATION

CALIFORNIA ENERGY COMMISSION

CEC-CF3R-ENV-22-H

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. Insulation Materials Installed

01	Roof Deck Insulation Material Installed	
02	Ceiling Insulation Material Installed	
03	Exterior Wall Insulation Material Installed	
04	Raised Floor Insulation Material Installed	
05	Slab Edge Insulation Material Installed	
06	Verification Status	
07	Correction Notes	

B. All Surfaces

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 Correction Notes.

01	Air barrier installation and preparation for insulation was done and verified prior to insulation being installed.	
02	All surfaces between conditioned and unconditioned space are sealed and insulated to meet or exceed the levels specified on the Certificate of Compliance.	
03	All structural framing areas shall be insulated in a manner that resists thermal bridging through the assembly separating conditioned from unconditioned space. Structural bracing, tie-downs, and framing of steel, or specialized framing used to meet structural requirements of the California Building Code (CBC) are allowed and must be insulated. These areas shall be called out on the building plans with diagrams and/or specified design drawings indicating the R-value of insulation and fastening method to be used.	
04	All insulation was installed according to the manufacturer's installation instructions.	
05	Labels or specification/data sheets for each insulation material shall be provided to the ECC rater. Loose-fill material includes insulation material bag labels or coverage charts.	
06	Loose-fill insulation – The installed depth and density of insulation is verified in at least 6 random locations to ensure that the minimum thickness and installed density meet the R-value specified on the Certificate of Compliance and are consistent with the manufacturer's coverage chart.	
07	If kraft paper faced insulation is used, paper is installed on the conditioned (warm in winter) side of surface. Paper must be in contact with air barrier to within 2-inches of the framing (stud, joists, etc.).	
08	Verification Status	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or ☐ All N/A - This entire table is not applicable.
09	Correction Notes	

C. Raised Floor Adjacent to Unconditioned Space

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 Correction Notes.

01	Air barrier installation and preparation for insulation was done and verified prior to insulation being installed.	
02	All surfaces between conditioned and unconditioned space are sealed and insulated to meet or exceed the levels specified on the Certificate of Compliance.	
03	All structural framing areas shall be insulated in a manner that resists thermal bridging through the assembly separating conditioned from unconditioned space. Structural bracing, tie-downs, and framing of steel, or specialized framing used to meet structural requirements of the California Building Code (CBC) are allowed and must be insulated. These areas shall be called out on the building plans with diagrams and/or specified design drawings indicating the R-value of insulation and fastening method to be used.	
04	All insulation was installed according to the manufacturer's installation instructions.	
05	Labels or specification/data sheets for each insulation material shall be provided to the ECC rater. Loose-fill material includes insulation material bag labels or coverage charts.	
06	Loose-fill insulation – The installed depth and density of insulation is verified in at least 6 random locations to ensure that the minimum thickness and installed density meet the R-value specified on the Certificate of Compliance and are consistent with the manufacturer's coverage chart.	
07	If kraft paper faced insulation is used, paper is installed on the conditioned (warm in winter) side of surface. Paper must be in contact with air barrier to within 2-inches of the framing (stud, joists, etc.).	
08	Verification Status	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or ☐ All N/A - This entire table is not applicable.
09	Correction Notes	

D. Wall Adjacent to Unconditioned Space

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 Correction Notes.

01	Insulation quality was verified prior to the installation of the interior air barrier (typically gypsum board).	
02	Loose-fill and batt insulation is in contact with all six sides of wall cavities (top, bottom, back, left, right, front [to be installed later]) with no gaps, voids, or compression. Special Situation: Where framing depth is greater than required insulation thickness (e.g., double walls or framed bump-outs) a secondary air barrier shall be installed and in contact with the insulation, so that the insulation fills the cavity formed by the additional air barrier.	
03	Insulation fits snuggly around obstructions (e.g., electrical boxes, plumbing and wiring) with no gaps, voids or compression.	
04	Structural metal tie-downs and shear panels are insulated between exterior air barrier and metal.	
05	Hard to access wall stud cavities, such as corner channels or wall intersections, are insulated to the proper R-value prior to the installation of exterior sheathing or exterior stucco lathe.	
06	Insulation and interior air barrier are installed behind tub, shower, fireplace enclosures and stairwells to the R-value listed on the Certificate of Compliance when located against exterior walls.	
07	All single-member window and door headers shall be insulated to a minimum of R-3 for a 2x4 framing, or equivalent width, and a minimum of R-5 for all other assemblies. No header insulation is required for single-member headers that are the same width as the wall, provided that the entire wall has at least R-2 insulation.	
08	After insulation is installed: All insulated walls have interior and exterior air barriers, including kneewalls and walls of skylight wells. Exception: Rim joists. Interior air barrier (typically gypsum board) is sealed to top plate.	
09	Verification Status	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or ☐ All N/A - This entire table is not applicable.
10	Correction Notes	

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

E. Ceiling Adjacent to Unconditioned Space

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 Correction Notes.

01	Insulation extends to the outside surface of the exterior wall.	
02	Insulation is in direct contact with the ceiling air barrier so there are no gaps, voids or compression.	
03	Chimneys and flues (except zero clearance) have a sheet metal collar at the ceiling level to prevent contact with the insulation. The collar is at least as tall as the depth of the insulation. There is a minimum 1-inch clearance between the collar and the chimney/flue for double wall vent, and 6-inches for single wall vent, unless manufacturer's instructions require otherwise. The collar is sealed to the ceiling with high temperature sealant to prevent air leakage. The insulation is in contact with the sheet metal collar.	
04	Recessed can lights penetrating the ceiling air barrier are covered with insulation to the depth needed to meet the ceiling R-value specified on the Certificate of Compliance.	
05	External surfaces of steel studs, steel-framed kneewalls, skylight shafts, and gable ends are covered with insulation.	
06	Verification Status	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or ☐ All N/A - This entire table is not applicable.
07	Correction Notes	

F. Ceiling Insulation in Vented Attics

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 Correction Notes.

01	Required eave ventilation shall not be obstructed. The net-free ventilation area of the eave vent is maintained.	
02	Eave vent baffles and dams are installed to prevent air movement under or into the ceiling insulation.	
03	Attic access is insulated to the same R-value required by the Certificate of Compliance for ceiling insulation and the insulation is permanently attached using adhesive or mechanical fasteners.	
04	Attic access must have a dam around the access to at least the same depth as the insulation.	
05	Attic rulers specified to the installed loose-fill material (brand and type) are installed and evenly distributed throughout the attic to verify depth (one ruler for every 250 square feet (ft^2)). The rulers are clearly readable and scaled to read inches of insulation and the R-value installed.	
06	Verification Status	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or ☐ All N/A - This entire table is not applicable.
07	Correction Notes	

G. Insulation in Unvented Attics

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 Correction Notes.

01	The roof sheathing is the air barrier and is sealed to prevent air movement to the outside.	
02	Insulation is in full contact with the air barrier (roof sheathing).	
03	If insulated using air permeable insulation, gable end walls are sealed and insulated the same as exterior walls, including interior air barrier.	
04	Verification Status	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or ☐ All N/A - This entire table is not applicable.
05	Correction Notes	

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

H. Insulation in Vented Attics (High Performance Vented Attics)

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 Correction Notes.

01	Insulation is in full contact with roof sheathing and firmly supported to prevent sagging.	
02	Batt insulation between roof trusses is acceptable with minimal gaps and voids caused by roof truss members.	
03	Insulation is not required on gable end walls.	
04	Required roof deck insulation over any conditioned space, or HVAC ducts, is installed on the entire attic roof deck; even over unconditioned spaces (e.g., garage, covered porch). Roof deck of attic over unconditioned space without HVAC ducts and separated from other attics by a sealed air barrier do not need to be insulated.	
05	Verification Status	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or ☐ All N/A - This entire table is not applicable.
06	Correction Notes	

I. Special Requirements for Skylight Shafts and Attic Knee Walls

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 Correction Notes.

01	Insulation must meet all the requirements for walls and insulation is in contact with the air barrier on all six sides unless SPF is used.	
02	Insulation shall be in full contact with the interior wall finish. Batt insulation must be cut to fit around 2x4's that are laid flat.	
03	Skylight shafts and attic knee walls shall be completely enclosed by vertical and horizontal framing, including horizontal plates at the top and bottom of the insulation.	
04	Verification Status	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or ☐ All N/A - This entire table is not applicable.
05	Correction Notes	

J. Special Requirements for Floors Above Garages

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 Correction Notes.

01	If the air barrier is at the perimeter of the garage below the conditioned subfloor, then the insulation may be placed on the garage ceiling. The perimeter of the subfloor must also be insulated.	
02	Verification Status	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or ☐ All N/A - This entire table is not applicable.
03	Correction Notes	

K. Special Requirements for Cantilevered Floors

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 Correction Notes.

01	Sealed blocking shall be installed between joists where the wall rim joist would have been located in the absence of a cantilever. Insulation shall be placed on both sides of the block.	
02	Verification Status	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or ☐ All N/A - This entire table is not applicable.
03	Correction Notes	

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

L. Special Requirements for Attached Porches

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 Correction Notes.

01	Exterior wall at the intersection of the porch roof is fully insulated above, below and behind the roof line.	
02	Where truss framing is used, airtight blocking is used at the top and bottom of each wall/roof section and is insulated.	
03	Verification Status	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or ☐ All N/A - This entire table is not applicable.
04	Correction Notes	

M. Special Requirements for SPF Insulation

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 Correction Notes.

01	Installed product meets the claimed R-value per inch. The total R-value may be calculated based on the thickness of insulation multiplied by the "tested R-value per inch" as certified by the Department of Consumer Affairs, Bureau of Household Goods and Services.	
02	Installed thickness meets the required R-value from the Certificate of Compliance. Verified in at least 6 random places for each surface type: floors, walls, and ceilings.	
03	Insulation is spray applied to fully adhere to structural assembly framing, floor and ceiling joists, and other framing surfaces within the construction cavity.	
04	If multiple layers are applied, each foam lift (e.g., spray application) adheres to the substrate and foam interfaces.	
05	Closed cell SPF: In areas where an air barrier is required the foam is at least 2-inches thick.	
06	Open cell SPF: In areas where an air barrier is required the foam is at least 5.5-inches thick.	
07	Open cell SPF: Depressions in the foam insulation surface are not greater than 1/2-inch of the required thickness provided these depressions do not exceed 10% of the surface area being insulated.	
08	Open cell SPF: Insulation completely fills cavities of 2x4 framing.	
09	SPF insulation is not applied directly to recessed lighting fixtures unless specifically allowed by manufacturer's instructions. When not allowed, can lights are: A. Covered with a minimum of 1.5-inches of mineral fiber insulation; or B. Enclosed in a manufacturer's approved box fabricated from an approved material, such as 18 gauge sheet metal or ½-inch gypsum board.	
10	Verification Status	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or ☐ All N/A - This entire table is not applicable.
11	Notes	

N. 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	

QII – INSULATION INSTALLATION

CALIFORNIA ENERGY COMMISSION

CEC-CF3R-ENV-22-H

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

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

Documentation Author Name:	Documentation Author Signature:
Documentation Author Company Name:	Date Signed:
Address:	CEA/AEA/ECC Certification Identification (If applicable):
City/State/Zip:	Phone:

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of 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 Field verification identified on this Certificate of Verification comply with the applicable requirements in Reference Appendices RA2, RA3, 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 (CF2R) signed and submitted by the person(s) responsible for the construction or installation conforms to the requirements specified on the Certificate(s) of Compliance (CF1R) 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

CF3R-ENV-22 User Instructions

Quality Insulation Installation (QII) applies to the entire building (roof/ceiling, walls, and floor) for new construction and requires field verification by a third-party ECC Rater. For alterations to existing buildings, compliance credit can only be taken when the "existing, plus addition, plus alteration" approach is used, but credit will only apply the new surfaces in the new zone.

A. Insulation Materials Installed

1. Roof Deck Insulation Material Installed: Using the drop down menu, indicate what type of insulation material is being installed (e.g., Batt and Blanket, Rigid Board, SPF, etc.).
2. Ceiling Insulation Material Installed: Using the drop down menu, indicate what type of insulation material is being installed (e.g., Batt and Blanket, Rigid Board, SPF, etc.).
3. Exterior Wall Insulation Material Installed: Using the drop down menu, indicate what type of insulation material is being installed (e.g., Batt and Blanket, Rigid Board, SPF, etc.).
4. Raised Floor Insulation Material Installed: Using the drop down menu, indicate what type of insulation material is being installed (e.g., Batt and Blanket, Rigid Board, SPF, etc.).
5. Slab Edge Insulation Material Installed: Using the drop down menu, indicate what type of insulation material is being installed (e.g., Batt and Blanket, Rigid Board, SPF, etc.).
6. Verification Status: ECC Rater to select from list:
    a. Pass – all applicable requirements are met.
    b. Fail – one or more applicable requirements are not met. Rater must enter reason for failure in correction notes field below.
    c. All N/A – This entire table is not applicable.
7. Correction Notes: Rater must enter the reason for failure.

B. All Surfaces

8. Verification Status: ECC Rater to select from list:
    a. Pass – all applicable requirements are met.
    b. Fail – one or more applicable requirements are not met. Rater must enter reason for failure in correction notes field below.
    c. All N/A – This entire table is not applicable.
9. Correction Notes: Rater must enter the reason for failure.

C. Raised Floor Adjacent to Unconditioned Space

6. Verification Status: ECC Rater to select from list:
    a. Pass – all applicable requirements are met.
    b. Fail – one or more applicable requirements are not met. Rater must enter reason for failure in correction notes field below.
    c. All N/A – This entire table is not applicable.
7. Correction Notes: Rater must enter the reason for failure.

D. Wall Adjacent to Unconditioned Space

9. Verification Status: ECC Rater to select from list:
    a. Pass – all applicable requirements are met.
    b. Fail – one or more applicable requirements are not met. Rater must enter reason for failure in correction notes field below.
    c. All N/A – This entire table is not applicable.
10. Correction Notes: Rater must enter the reason for failure.

E. Ceiling Adjacent to Unconditioned Space

6. Verification Status: ECC Rater to select from list:
    a. Pass – all applicable requirements are met.
    b. Fail – one or more applicable requirements are not met. Rater must enter reason for failure in correction notes field below.
    c. All N/A – This entire table is not applicable.
7. Correction Notes: Rater must enter the reason for failure.

F. Ceiling Insulation in Vented Attics

6. Verification Status: ECC Rater to select from list:
    a. Pass – all applicable requirements are met.
    b. Fail – one or more applicable requirements are not met. Rater must enter reason for failure in correction notes field below.
    c. All N/A – This entire table is not applicable.
7. Correction Notes: Rater must enter the reason for failure.

G. Insulation in Unvented Attics

5. Verification Status: ECC Rater to select from list:
    a. Pass – all applicable requirements are met.
    b. Fail – one or more applicable requirements are not met. Rater must enter reason for failure in correction notes field below.
    c. All N/A – This entire table is not applicable.
6. Correction Notes: Rater must enter the reason for failure.

H. Insulation in Vented Attics (High Performance Vented Attics)

5. Verification Status: ECC Rater to select from list:
    a. Pass – all applicable requirements are met.
    b. Fail – one or more applicable requirements are not met. Rater must enter reason for failure in correction notes field below.
    c. All N/A – This entire table is not applicable.
6. Correction Notes: Rater must enter the reason for failure.

I. Special Requirements for Skylight Shafts and Attic Knee Walls

4. Verification Status: ECC Rater to select from list:
    a. Pass – all applicable requirements are met.
    b. Fail – one or more applicable requirements are not met. Rater must enter reason for failure in correction notes field below.
    c. All N/A – This entire table is not applicable.
5. Correction Notes: Rater must enter the reason for failure.

J. Special Requirements for Floors Above Garage

2. Verification Status: ECC Rater to select from list:
    a. Pass – all applicable requirements are met.
    b. Fail – one or more applicable requirements are not met. Rater must enter reason for failure in correction notes field below.
    c. All N/A – This entire table is not applicable.
3. Correction Notes: Rater must enter the reason for failure.

K. Special Requirements for Cantilevered Floors

2. Verification Status: ECC Rater to select from list:
    a. Pass – all applicable requirements are met.
    b. Fail – one or more applicable requirements are not met. Rater must enter reason for failure in correction notes field below.
    c. All N/A – This entire table is not applicable.
3. Correction Notes: Rater must enter the reason for failure.

L. Special Requirements for Attached Porches

3. Verification Status: ECC Rater to select from list:
    a. Pass – all applicable requirements are met.
    b. Fail – one or more applicable requirements are not met. Rater must enter reason for failure in correction notes field below.
    c. All N/A – This entire table is not applicable.
4. Correction Notes: Rater must enter the reason for failure.

M. Special requirements for SPF Insulation

10. Verification Status: ECC Rater to select from list:
    a. Pass – all applicable requirements are met.
    b. Fail – one or more applicable requirements are not met. Rater must enter reason for failure in correction notes field below.
    c. All N/A – This entire table is not applicable.
11. Correction Notes: Rater must enter the reason for failure.

N. 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 CF3R 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.

EXISTING CONDITIONS FOR RESIDENTIAL ALTERATIONS

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

CERTIFICATE OF VERIFICATION

Note: This table completed by ECC Registry.

Project Name:	CF1R-PRF Calculation Date/Time:
CF1R-PRF Calculation Description:	CF1R-PRF Input File Name:

A. General Information

01	Project Name				
02	Calculation Description				
03	Project Location				
04	CA City		05	Standard Version	
06	Zip Code		07	Software Version	
08	Climate Zone		09	Front Orientation (deg/Cardinal)	
10	Total Building Volume (ft^3)		11	Number of Dwelling Units	
12	Project Scope		13	Number of Bedrooms	
14	New Conditioned Floor Area(ft^2)		15	Number of Stories	
16	Existing Conditioned Floor Area (ft^2)		17	Fenestration Average U-factor	
18	Total Conditioned Floor Area (ft^2)		19	Glazing Percentage (%)	

B1. Building Envelope Leakage

01	Date of Diagnostic Test for this Dwelling	
02	Test Procedure Used	
03	Manometer Make	
04	Manometer Model	
05	Manometer Serial Number	
06	Manometer Calibration Date	
07	Manometer Calibration Status	
08	Test Methodology	
09	Target Enclosure Air Leakage from CF1R (ACH50)	
09	Tested Pre-Retrofit CFM50	
10	Tested Pre-Retrofit ACH50	
11	Verification	
12	Verification Status	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below
13	Correction Notes:	

EXISTING CONDITIONS FOR RESIDENTIAL ALTERATIONS

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

B. Opaque Surfaces

01	02	03	04	05	06	07	08
Name	Zone	Existing Conditions	Surface Type	Azimuth	Orientation	Total Cavity R-value	Verification

09	Verification Status:	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below
10	Correction Notes:	

C. Roofs

01	02	03	04	05	06	07	08
Name	Construction	Roof Rise	Roof Reflectance	Roof Emittance	Radiant Barrier	Cool Roof	Verification

09	Verification Status:	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below
10	Correction Notes:	

D. Windows

01	02	03	04	05	06	07	08
Name	Azimuth	Multiplier	Area (ft^2)	U-factor	SHGC	Exterior Shading	Verification

09	Verification Status:	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below
10	Correction Notes:	

E. Doors

01	02	03	04	05
Name	Parent Surface	Area (ft^2)	U-factor	Verification

06	Verification Status:	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below
07	Correction Notes:	

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

EXISTING CONDITIONS FOR RESIDENTIAL ALTERATIONS

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

F. Overhangs & Fins

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
	Overhang					Left Fin				Right Fin				
Window	Overhang Depth	Dist. Up	Left Ext.	Right Ext.	Flap Ht	Depth	Top Up	Dist (Left)	Bottom Up	Depth	Top Up	Dist (Right)	Bottom Up	Verification

16	Verification Status:	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below
17	Correction Notes:	

G. Water Heaters

01	02	03	04	05	06	07	08	09
Name	Heater Element Type	Tank Type	Tank Volume (gal)	Energy Factor or Efficiency	Input Rating	Tank Exterior Insulation R-value	Standby Loss (Fraction)	Verification

10	Verification Status:	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below
11	Correction Notes:	

H. Water Heating

01	02	03	04	05
Name	Distribution Type	Number of Heaters	Solar Savings Fraction	Verification

06	Verification Status:	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below
07	Correction Notes:	

I. HVAC – Heating Systems

01	02	03	04
Name	Type	Efficiency	Verification

05	Verification Status:	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below
06	Correction Notes:	

EXISTING CONDITIONS FOR RESIDENTIAL ALTERATIONS

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

J. HVAC – Cooling Systems

01	02	03	04	05
Name	System Type	EER/EER2/CEER	SEER/SEER2	Verification

06	Verification Status:	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below
07	Correction Notes:	

K. HVAC Distribution

01	02	03	04	05
Name	Duct R-Value	Supply Duct Location	Return Duct Location	Verification

06	Verification Status:	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below
07	Correction Notes:	

L. Indoor Air Quality (IAQ) Fans

01	02	03	04	05
Name	IAQ Fan Type	Airflow (CFM)	Fan Efficacy (W/CFM)	Verification

06	Verification Status	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below
07	Correction Notes:	

M. 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	

EXISTING CONDITIONS FOR RESIDENTIAL ALTERATIONS

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

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

Documentation Author Name:	Documentation Author Signature:
Documentation Author Company Name:	Date Signed:
Address:	CEA/AEA/ECC Certification Identification (If applicable):
City/State/Zip:	Phone:

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of 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. I field inspected the existing building features, materials, components, manufactured devices, or system performance characteristics proposed for compliance credit for energy efficiency improvement identified on this Certificate of Verification and determined these existing building features, materials, components, manufactured devices, or system performance characteristics qualify for the proposed existing conditions compliance credit unless reported as not qualified in verification status and correction notes fields on this Certificate of Verification.
4. 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.
5. 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.

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

CF3R-EXC-20-H User Instructions

A. General Information
Rater should verify this information to the best of their ability. Any questions or deviations should be indicated in the Verification Status row.

B1. Building Envelope Leakage
Existing (pre-retrofit) building envelope leakage should be verified in accordance with the procedures outlined in the Reference Appendices, Residential Appendix, RA3.8.

B. Opaque Surfaces
Existing roof type, R-value above deck, and R-value below deck should all be verified.

C. Roofs
Existing dwelling unit, frame type, area, U-factor, and R-values should all be verified.

D. Windows
Existing dwelling unit, surface type, frame type, area, u-factor, and R-values should all be verified.

E. Doors
Existing wall type, frame type, area, U-factor, and R-values should all be verified.

F. Overhangs & Fins
All columns of this section should be verified.

G. Water Heaters
All columns of this section should be verified.

H. Water Heating
All columns of this section should be verified.

I. HVAC – Heating Systems
All columns of this section should be verified.

J. HVAC – Cooling Systems
All columns of this section should be verified.

K. HVAC Distribution
All columns of this section should be verified

L. Indoor Air Quality (IAQ) Fans
All columns of this section should be verified.

M. Determination of ECC Verification Compliance
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 CF3R 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.

DUCT LEAKAGE DIAGNOSTIC TEST

CALIFORNIA ENERGY COMMISSION

CEC-CF3R-MCH-20-H

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. System Information

01	Space Conditioning System Identification or Name	
02	Space Conditioning System Location or Area Served	
03	Indoor Unit Name or Description of Area Served	
04	Building Type from CF1R	
05	Verified Low Leakage Ducts in Conditioned Space (VLLDCS) Credit from CF1R?	
06	Verified Low Leakage Air-Handling Unit Credit from CF1R?	
07	Duct System Compliance Category	
08	Any portions of Duct Located in Garage?	
09	Is the system type Small Duct High Velocity (SDHV)?	

B1. Duct Leakage Diagnostic Test for Completely New Duct System

01	Air-Handling Unit Airflow (AHU Airflow) Determination Method	
02	Condenser Nominal Cooling Capacity (ton)	
03	Indoor Unit Nominal Cooling Capacity	
04	Heating Capacity (kBtu/h)	
05	Conditioned Floor Area Served by this HVAC System (ft^2)	
06	Measured AHU Airflow (cfm)	
07	Duct Leakage Test Conditions	
08	Duct Leakage Test Method	
09	Leakage Factor	
10	Calculated Target Allowable Duct Leakage Rate (cfm)	
11	Actual Duct Leakage Rate from Leakage Test Measurement (cfm)	
12	Compliance Statement:	
13	Notes:	

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

B2. Duct Leakage Diagnostic Test for Low Leakage Ducts in Conditioned Space

01	System compliance with visual inspection per RA3.1.4.1.3?	
02	Duct Leakage Test Conditions	
03	Duct Leakage Test Method	
04	Target Allowable Duct Leakage Rate (cfm)	
05	Actual Duct Leakage Rate from Leakage Test Measurement (cfm)	
06	Compliance Statement:	

B3. Duct Leakage Diagnostic Test for Low Leakage Air-Handling Unit (LLAHU)

01	Air-Handling Unit Airflow (AHU Airflow) Determination Method	
02	Condenser Nominal Cooling Capacity (ton)	
03	Indoor Unit Nominal Cooling Capacity	
04	Heating Capacity (kBtu/h)	
05	Conditioned Floor Area Served by this HVAC System (ft^2)	
06	Measured AHU Airflow (cfm)	
07	Duct Leakage Test Conditions	
08	Duct Leakage Test Method	
09	Leakage Factor	
10	Calculated Target Allowable Duct Leakage Rate (cfm)	
11	Actual Duct Leakage Rate from Leakage Test Measurement (cfm)	
12	Air-Handling Unit Manufacturer Name	
13	Air-Handling Unit Model Number	
14	Compliance Statement:	
15	Notes:	

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

B4. Duct Leakage Diagnostic Test for Complete Replacement or Altered Duct System

01	Air-Handling Unit Airflow (AHU Airflow) Determination Method	
02	Condenser Nominal Cooling Capacity (ton)	
03	Indoor Unit Nominal Cooling Capacity	
04	Heating Capacity (kBtu/h)	
05	Conditioned Floor Area Served by this HVAC System (ft^2)	
06	Measured AHU Airflow (cfm)	
07	Duct Leakage Test Conditions	
08	Duct Leakage Test Method	
09	Leakage Factor	
10	Calculated Target Allowable Duct Leakage Rate (cfm)	
11	Actual Duct Leakage Rate from Leakage Test Measurement (cfm)	
12	Compliance Statement:	
13	Notes:	

B5. Duct Leakage Diagnostic Test for Smoke Test or Alteration Using Smoke Test

01	Air-Handling Unit Airflow (AHU Airflow) Determination Method	
02	Condenser Nominal Cooling Capacity (ton)	
03	Indoor Unit Nominal Cooling Capacity	
04	Heating Capacity (kBtu/h)	
05	Conditioned Floor Area Served by this HVAC System (ft^2)	
06	Measured AHU Airflow (cfm)	
07	Duct Leakage Test Conditions	
08	Duct Leakage Test Method	
09	Leakage Factor	
10	Calculated Target Allowable Duct Leakage Rate (cfm)	
11	Actual Duct Leakage Rate from Leakage Test Measurement (cfm)	
12	Compliance Statement:	
13	Notes:	

C. Ducts Located in Garage Spaces

01	Duct Leakage Test Method	
02	Leakage Factor	
03	Air-Handling Unit Airflow (AHU Airflow) Determination Method	
04	Measured AHU Airflow (cfm)	
05	Calculated Target Allowable Duct Leakage Rate (cfm)	
06	Actual Duct Leakage Rate from Leakage Test Measurement (cfm)	
07	Compliance Statement:	

D. Additional Requirements for Compliance

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

01	System was tested in its normal operation condition. No temporary taping allowed.	
02	Outside air (OA) duct connections to the central forced air duct system shall not be sealed/taped off during duct leakage testing. OA ducts used for Central Fan Integrated (CFI) Indoor Air Quality ventilation systems, or Central Fan Ventilation Cooling Systems, that utilize dampers that open only when OA is required and automatically close when OA is not required, may configure the OA damper to the closed position during duct leakage testing.	
03	All supply and return register boots were sealed to the drywall.	
04	Building cavities were not used as plenums, or platform returns, in lieu of ducts.	
05	If cloth backed tape was used it was covered with Mastic and draw bands.	
06	All connection points between the air handler and the supply and return plenums are completely sealed.	
07	For completely new systems visual inspection at final construction stage: For all supply and return registers, verify that the spaces between the register boot and the interior finishing wall are properly sealed.	
08	For completely new systems visual inspection at final construction stage: If the house rough-in duct leakage test was conducted without an air handler installed, inspect the connection points between the air handler and the supply and return plenums to verify that the connection points are properly sealed.	
09	For completely new systems visual inspection at final construction stage: Inspect all joints to ensure that no cloth backed rubber adhesive duct tape is used.	
10	For Duct Systems with Low Leakage Air-Handling Unit (LLAHU): The Low Leakage Air-handling Unit Model identified on this compliance document is included in the list of certified Low Leakage Air-Handling Units published on the Energy Commission Website at: https://www.energy.ca.gov/rules-and-regulations/building-energy-efficiency/manufacturer-certification-building-equipment/low	
11	For Replacement or Alteration Duct Systems: If the system complies using the Smoke Test method, the smoke test was conducted in accordance with the requirements of Reference Residential Appendix RA3.1.4.3.6. Systems that comply using the smoke test shall not be included in sample groups for ECC verification compliance.	
12	Verification Status:	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or ☐ All N/A - This entire table is not applicable
13	Correction Notes:	

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	

DUCT LEAKAGE DIAGNOSTIC TEST

CALIFORNIA ENERGY COMMISSION

CEC-CF3R-MCH-20-H

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

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

Documentation Author Name:	Documentation Author Signature:
Documentation Author Company Name:	Date Signed:
Address:	CEA/AEA/ECC Certification Identification (If applicable):
City/State/Zip:	Phone:

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of 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 Appendices RA2, RA3, 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 (CF2R) signed and submitted by the person(s) responsible for the construction or installation conforms to the requirements specified on the Certificate(s) of Compliance (CF1R) 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

CF3R-MCH-20-H User Instructions

A. System Information

1 *HVAC System Identification or Name*: This field is filled out automatically. It is referenced from the CF2R-MCH-20, which must be completed prior to this document.
2. *HVAC System Location or Area Served*: This field is filled out automatically. It is referenced from the CF2R-MCH-20, which must be completed prior to this document.
3. *Indoor Unit Name:* This field is filled out automatically. It is referenced from the CF2R-MCH-20, which must be completed prior to this document.
4. *Building Type*: This field is filled out automatically. It is referenced from the CF2R-MCH-20
5. *Verified Low Leakage Ducts in Conditioned Space (VLLDCS)*: This field is filled out automatically. It is referenced from the CF2R-MCH-20.
6. *Verified Low Leakage Air-Handling Unit (VLLAHU) Credit* This field is filled out automatically. It is referenced from the CF2R-MCH-20.
7. *Duct System Compliance Category*: This field is filled out automatically. It is referenced from the CF2R-MCH-20.
8. *Any portions of Duct Located in Garage*: User select from Yes or No.

B1. Duct Leakage Diagnostic Test for Completely New Duct System

1. *Air-Handling Unit Airflow (AHU Airflow) Determination Method*: User will select from the following options:
   a. Default Airflow Method: The Default Airflow Method may only be used for homes where the duct system is being tested before the conditioning and heating system is installed and the equipment specification is not known (See Section RA3.1.4.2.1 of the 2025 Reference Appendices).
   b. Cooling System Method: For systems with air conditioning, this selection must be made, and the nominal air handler airflow shall be 400 CFM per nominal ton of condensing unit cooling capacity as specified by the manufacturer
   c. Heating System Method: For heating only systems the nominal air-handler airflow shall be 21.7 CFM per kBtu/h of rated heating output capacity.
   d. Measured Airflow Method: The measured system airflow can be used as the air-handler airflow for the purpose of establishing duct leakage percentage (See Section RA3.1.4.2.3 of the 2025 Reference Appendices).
   e. Indoor Unit Method
2. *Condenser Nominal Cooling Capacity (ton)*: Same data given on MCH-01.
3. *Indoor Unit Nominal Cooling Capacity:* Same data given on MCH-01.
4. *Heating Capacity (kBtu/h)*: Same data given on MCH-01;
5. *Conditioned Floor Area Served by this HVAC System (ft^2)*: User must input CFA for the space. Should be consistent with the CF1R input value.
6. *Measured AHU Airflow (CFM)*: If “Measured Airflow Method” is selected, user must input measured airflow.
7. *Duct Leakage Test Conditions*: Select from the following options:
   a. Test Rough-in AHU: Installers may determine duct leakage in new construction by using diagnostic measurements at rough-in building construction stage prior to installation of interior finishing (See

Section RA3.1.4.3.2 of the 2025 Reference Appendices). In this case the air-handling unit (AHU) is installed at the time of test.

b. Test Rough-in No AHU: Same as "Test Rough-in" except air handling unit is not yet installed (See Section RA3.1.4.3.2 of the 2025 Reference Appendices).

c. Test Final: Test conducted at "final", i.e. all equipment, ducts, and registers are installed and the system is essentially in its final operating condition. (rough-in no longer an option. See Section RA3.1.4.3.1 of the 2025 Reference Appendices).

8. *Duct Leakage Test Method*: Select from the following options: Leakage to the Outside (house is pressurized simultaneously with the ducts such that only leakage going outside of the pressurized conditioned shell is measured, see RA3.1.4.3.4), or Total Leakage.
9. *Leakage Factor*: This field is automatically filled out based on choices in previous fields.
10. *Calculated Target Allowable Duct Leakage Rate (cfm)*: This value will be automatically calculated based on values entered in previous fields.
11. *Actual Duct Leakage Rate from Leakage Test Measurement (cfm)*: Input the duct leakage rater taken from actual test measurements.
12. *Compliance Statement*: If Actual Duct Leakage Rate from leakage test is less than or equal to Calculated Target Allowable Duct Leakage Rate, "System passes leakage test" will automatically populate. If not, "System fails leakage test" will automatically populate.
13. *Notes*: This field is automatically filled out. The values in B02, B03, B04 and B05 are checked against the values in the same rows of the CF2R-MCH-20 for this system. If they do not match, an error message will appear here.

B2. Duct Leakage Diagnostic Test - Low Leakage Ducts in Conditioned Space

1. *System compliance with visual inspection per RA3.1.4.1.3*: This field will be automatically filled. A visual inspection confirms the space conditioning system is located entirely in conditioned space in accordance with RA3.1.4.1.3. If any part of the duct system is outside of conditioned space, the system does not pass.
2. *Duct Leakage Test Conditions*: This field will be automatically filled. The entire duct system shall be included in the total leakage test. The air handler, supply and return plenums and all the connectors, transition pieces, duct boots and registers must be installed and tested to total system leakage. All supply registers shall be taped so that the tape goes over the grills and attaches to the surrounding drywall. All return grilles except for one large centrally located return grille or the air handler cabinet access panel shall be taped up.
3. *Duct Leakage Test Method*: This field will be automatically filled. Leakage to outside shall be verified by pressurizing the dwelling and the ducts to 25 Pa (0.1 inches of water) with respect to outside. A full description of these procedures can be found in RA3.1.4.3.4.
4. *Target Allowable Duct Leakage Rate (cfm)*: This field will be automatically filled. In order to pass this test duct leakage must be equal to or less than 25 cfm when the dwelling and ducts are pressurized to 25 Pa with respect to outside. NOTE: The 25 cfm leakage value will be difficult to reach unless the ducts are located in conditioned space.

5. *Actual Duct Leakage Rate from Leakage Test Measurement (cfm)*: Input the duct leakage rate taken from actual test measurements.

6. *Compliance statement:* This field will be automatically filled. The test passes if actual leakage rate is less than or equal to 25 cfm and a MCH-21 has been registered.

B3. Duct Leakage Diagnostic Test - Low Leakage Air-Handling Unit (LLAHU)

1. *Air-Handling Unit Airflow (AHU Airflow) Determination Method*: User will select from the following options:
   a. Cooling System Method: For systems with cooling, this selection must be made, and the nominal air handler airflow shall be 400 CFM per nominal ton of condensing unit cooling capacity as specified by the manufacturer or the heating only value, whichever is greater (See Section RA3.1.4.2.2 of the 2025 Reference Appendices).
   b. Heating System Method: For heating only systems the nominal air handler airflow shall be 21.7 CFM per kBtu/h of rated heating output capacity.
   c. Measured Airflow Method: The system airflow can be used as the air-handler airflow for the purpose of establishing duct leakage percentage (See Section RA3.1.4.2.3 of the 2025 Reference Appendices).
   d. Default Airflow Method: The Default Airflow Method may only be used for homes where the duct system is being tested before the conditioning and heating system is installed and the equipment specification is not known (See Section RA3.1.4.2.1 of the 2025 Reference Appendices).
   e. Indoor Unit Method
2. *Condenser Nominal Cooling Capacity (ton)*: Same data given on MCH-01.
3. *Indoor Unit Nominal Cooling Capacity:* Same data given on MCH-01.
4. *Heating Capacity (kBtu/h)*: Same data given on MCH-01;
5. *Conditioned Floor Area Served by this HVAC System (ft^2)*: User will input CFA for zone which should be consistent with the value from the CF1R. User will have the option to leave this field blank because the zone CFA is only required for the default airflow calculation.
6. *Measured AHU Airflow (cfm)*: If "Measured Airflow Method" is selected, user must input measured airflow.
7. *Duct Leakage Test Conditions*: User must select from the following options:
   a. Test Final: Test conducted at final inspection (testing at rough is not an option with this test. See Section RA3.1.4.3.1 of the 2025 Reference Appendices).
8. *Duct Leakage Test Method*: User will select from the following options: Total Leakage.
9. *Leakage Factor*: Value will be automatically populated from in CF2R-MCH-20.
10. *Calculated Target Allowable Duct Leakage Rate (cfm)*: This value will be automatically populated depending on values in B06, B07, and B08.
11. *Actual Duct Leakage Rate from Leakage Test Measurement (cfm)*: User will input this value from actual measurements from leakage test.
12. *Air-Handling Unit Manufacturer Name*: This will be automatically populated from information entered in the MCH-01.
13. *Air-Handling Unit Model Number*: This will be automatically populated from information entered in the MCH-01.
14. *Compliance Statement*: If Actual Duct Leakage Rate from leakage test is less than or equal to Calculated Target Allowable Duct Leakage Rate, "System passes leakage test" will automatically populate. If not, "System fails leakage test will automatically populate.

15. *Notes:* This field is automatically filled out. The values in B02, B03, B04, B05, B12 and B13 are checked against the values in the same rows of the CF2R-MCH-20 for this system. If they do not match an error message will appear here.

B4. Duct Leakage Diagnostic Test - Complete Replacement or Altered Duct System

1. *Air-Handling Unit Airflow (AHU Airflow) Determination Method*: User will select from the following options:
   a. Default Airflow Method: The Default Airflow Method may only be used for homes where the duct system is being tested before the conditioning and heating system is installed and the equipment specification is not known (See Section RA3.1.4.2.1 of the 2025 Reference Appendices).
   b. Cooling System Method: For systems with air conditioning, this selection must be made, and the nominal air handler airflow shall be 400 CFM per nominal ton of condensing unit cooling capacity as specified by the manufacturer (Note: the heating only value may be used, if higher, See Section RA3.1.4.2.2 of the 2025 Reference Appendices).
   c. Heating System Method: For heating only systems the nominal air handler airflow shall be 21.7 CFM per kBtu/h of rated heating output capacity.
   d. Measured Airflow Method: The measured system airflow can be used as the air handler airflow for the purpose of establishing duct leakage percentage (See Section RA3.1.4.2.3 of the 2025 Reference Appendices).
   e. Indoor Unit Method
2. *Condenser Nominal Cooling Capacity (ton)*: Same data given on MCH-01. Should be consistent with CF2R-MCH-20 for this system.
3. *Indoor Unit Nominal Cooling Capacity:* Same data given on MCH-01.
4. *Heating Capacity (kBtu/h)*: Same data given on MCH-01. Should be consistent with CF2R-MCH-20 for this system.
5. *Conditioned Floor Area Served by this HVAC System (ft^2)*: User must input CFA for the space. Should be consistent with the CF1R input value. Should be consistent with CF2R-MCH-20 for this system.
6. *Measured AHU Airflow (CFM)*: If "Measured Airflow Method" is selected, user must input measured airflow.
7. *Duct Leakage Test Conditions*: Select from the following options:
   a. Test Rough-in AHU: Installers may determine duct leakage in new construction by using diagnostic measurements at rough-in building construction stage prior to installation of interior finishing (See Section RA3.1.4.3.2 of the 2025 Reference Appendices). In this case the air handling unit (AHU) is installed at the time of test.
   b. Test Rough-in No AHU: Same as "Test Rough-in" except air handling unit is not yet installed (See Section RA3.1.4.3.2 of the 2025 Reference Appendices).
   c. Test Final: Test conducted at "final", i.e. all equipment, ducts, and registers are installed and the system is essentially in its final operating condition. (rough-in no longer an option. See Section RA3.1.4.3.1 of the 2025 Reference Appendices).

8. *Duct Leakage Test Method*: Select from the following options: Leakage to the Outside (house is pressurized simultaneously with the ducts such that only leakage going outside of the pressurized conditioned shell is measured, see RA3.1.4.3.4), or Total Leakage.
9. *Leakage Factor*: This field is automatically filled out based on choices in previous fields.
10. *Calculated Target Allowable Duct Leakage Rate (cfm)*: This value will be automatically calculated based on values entered in previous fields.
11. *Actual Duct Leakage Rate from Leakage Test Measurement (cfm)*: Input the duct leakage rater taken from actual test measurements.
12. *Compliance Statement*: If Actual Duct Leakage Rate from leakage test is less than or equal to Calculated Target Allowable Duct Leakage Rate, "System passes leakage test" will automatically populate. If not, "System fails leakage test" will automatically populate.
13. *Notes*: This field is automatically filled out. The values in B02, B03 and B04, B05 are checked against the values in the same rows of the CF2R-MCH-20 for this system. If they do not match an error message will appear here.

B5. Duct Leakage Diagnostic Test - Sealing All Accessible Leaks using Smoke Test

1. *Air-Handling Unit Airflow (AHU Airflow) Determination Method*: User will select from the following options:
   a. Default Airflow Method: The Default Airflow Method may only be used for homes where the duct system is being tested before the conditioning and heating system is installed and the equipment specification is not known (See Section RA3.1.4.2.1 of the 2025 Reference Appendices).
   b. Cooling System Method: For systems with air conditioning, this selection must be made, and the nominal air handler airflow shall be 400 CFM per nominal ton of condensing unit cooling capacity as specified by the manufacturer (Note: the heating only value may be used, if higher, See Section RA3.1.4.2.2 of the 2025 Reference Appendices).
   c. Heating System Method: For heating only systems the nominal air handler airflow shall be 21.7 CFM per kBtu/h of rated heating output capacity.
   d. Measured Airflow Method: The measured system airflow can be used as the air handler airflow for the purpose of establishing duct leakage percentage (See Section RA3.1.4.2.3 of the 2025 Reference Appendices).
   e. Indoor Unit Method
2. *Condenser Nominal Cooling Capacity (ton)*: Same data given on MCH-01.
3. *Indoor Unit Nominal Cooling Capacity:* Same data given on MCH-01.
4. *Heating Capacity (kBtu/h)*: Same data given on MCH-01.
5. *Conditioned Floor Area Served by this HVAC System (ft^2)*: User must input CFA for the space. Should be consistent with the CF1R input value.
6. *Measured AHU Airflow (CFM)*: If "Measured Airflow Method" is selected, user must input measured airflow.
7. *Duct Leakage Test Conditions*: Select from the following options:
   a. Test Rough-in AHU: Installers may determine duct leakage in new construction by using diagnostic measurements at rough-in building construction stage prior to installation of interior finishing (See

Section RA3.1.4.3.2 of the 2025 Reference Appendices). In this case the air-handling unit (AHU) is installed at the time of test.

b. Test Rough-in No AHU: Same as "Test Rough-in" except air handling unit is not yet installed (See Section RA3.1.4.3.2 of the 2025 Reference Appendices).
c. Test Final: Test conducted at "final", i.e. all equipment, ducts, and registers are installed and the system is essentially in its final operating condition. (rough-in no longer an option. See Section RA3.1.4.3.1 of the 2025 Reference Appendices).

8. *Duct Leakage Test Method*: Select from the following options: Leakage to the Outside (house is pressurized simultaneously with the ducts such that only leakage going outside of the pressurized conditioned shell is measured, see RA3.1.4.3.4), or Total Leakage.
9. *Leakage Factor*: This field is automatically filled out based on choices in previous fields.
10. *Calculated Target Allowable Duct Leakage Rate (cfm)*: This value will be automatically calculated based on values entered in previous fields.
11. *Actual Duct Leakage Rate from Leakage Test Measurement (cfm)*: Input the duct leakage rater taken from actual test measurements.
12. *Compliance Statement*: If *Actual Duct Leakage Rate* is less than or equal to *Calculated Target Allowable Duct Leakage Rate*, "system passes - system complies with Allowable Duct Leakage Rate Criterion" will automatically populate.

    If measured leakage is greater than allowable duct leakage rate, then the following will automatically populate:

    "System passes using smoke test of an altered HVAC system in an existing building

    - No visible smoke exits the accessible portions of the duct system.
    - Smoke is only emanating from air handler unit (AHU cabinet and non-accessible portions of the duct system.

    Note: Accessible is defined as having access thereto, but which first may require removal or opening of access panels, doors, or moving similar obstructions. If access to the ducts requires an object to be demolished or deconstructed, then sealing of those ducts is not required.
14. *Notes*: This field is automatically filled out. The values in B02, B03, B04 and B05 are checked against the values in the same rows of the CF2R-MCH-20 for this system. If they do not match, an error message will appear here.

C. Ducts Located in Garage Spaces

1. *Duct Leakage Test Method*: This field is automatically filled out based on choices in previous fields.
2. *Leakage Factor*: This field is automatically filled out based on choices in previous fields.
3. *Air-Handling Unit Airflow (AHU Airflow) Determination Method*: This field is automatically filled out based on choices in previous fields.
4. *Measured AHU Airflow (CFM)*: This field is automatically filled out based on choices in previous fields.
5. *Calculated Target Allowable Duct Leakage Rate (cfm)*: This value will be automatically calculated based on values entered in previous fields
6. *Actual Duct Leakage Rate from Leakage Test Measurement (cfm)*: This field is automatically filled out based on choices in previous fields

7. *Compliance Statement*: If Actual Duct Leakage Rate from leakage test is less than or equal to Calculated Target Allowable Duct Leakage Rate, passes message will automatically populate. If not, "System fails leakage test" will automatically populate.

D. Additional Requirements for Compliance

1. This field must be a true statement (or not applicable) for the system to comply.
2. This field must be a true statement (or not applicable) for the system to comply.
3. This field must be a true statement (or not applicable) for the system to comply.
4. This field must be a true statement (or not applicable) for the system to comply.
5. This field must be a true statement (or not applicable) for the system to comply.
6. This field must be a true statement (or not applicable) for the system to comply.
7. This field must be a true statement (or not applicable) for the system to comply.
8. This field must be a true statement (or not applicable) for the system to comply.
9. This field must be a true statement (or not applicable) for the system to comply.
10. This field must be a true statement (or not applicable) for the system to comply.
11. This field must be a true statement (or not applicable) for the system to comply.
12. *Verification Status:* If this Section does not apply, then select "All N/A". If the system meets all of the additional requirements for compliance that apply to the system, then select "Pass", otherwise select "Fail". The latter selection means that the system does not meet the applicable requirements and the system will need to be modified to meet the requirements or airflow and fan efficacy will have to be verified by diagnostic
13. *Correction Notes:* If one or more applicable requirements are not met "Fail" will appear in the row above. When this occurs the rater is required to enter detailed notes here that describe what failed and why.

Section E. Determination of ECC Verification Compliance

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

Documentation Declaration Statements

1. The person who prepared the CF3R 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.

DUCT LOCATION

CALIFORNIA ENERGY COMMISSION

CEC-CF3R-MCH-21-H

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

Note: Submit one Installation Certificate for each duct system that is taking credit for duct location.

01	SC System Identification or Name	
02	SC System Location or Area Served	
03	Indoor Unit Name or Description of Area Served	
04	Status – Less than 12 ft Ducts in Conditioned Space Performance Credit	
05	Status – Ducts Located In Conditioned Space Performance Credit	
06	Status – Duct System Located Entirely in Directly Conditioned Space, No Insulation Requirement	
07	Status – Portions of Ducts Located in Conditioned Space, R-6 Exception	

B. 12 Linear Feet or Less of Duct Located Outside of Conditioned Space - RA3.1.4.1.2

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.

01	A visual inspection shall confirm space conditioning systems with air handlers located outside the conditioned space have 12 linear feet or less of duct located outside the conditioned space including air handler and plenum.	
02	Verification Status:	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or ☐ All N/A - This entire table is not applicable
03	Correction Notes:	

C. Ducts Located In Conditioned Space - RA3.1.4.1.3

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	A visual inspection shall confirm the space conditioning duct system is located entirely in conditioned space.	
02	Verification Status:	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or ☐ All N/A - This entire table is not applicable
03	Correction Notes:	

D. Duct System Located Entirely in Directly Conditioned Space, No Insulation Requirement - RA3.1.4.3.8

01	A Visual Inspection Shall Confirm the Space Conditioning Distribution System Location as specified by Section RA3.1.4.1.3	
02	Actual System Duct Leakage Rate (cfm) Measured Using RA3.1.4.3.4 Duct Leakage to Outside from Fan Pressurization of Ducts	
03	Compliance Statement:	

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	

DUCT LOCATION

CALIFORNIA ENERGY COMMISSION

CEC-CF3R-MCH-21-H

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

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

Documentation Author Name:	Documentation Author Signature:
Documentation Author Company Name:	Date Signed:
Address:	CEA/AEA/ECC Certification Identification (If applicable):
City/State/Zip:	Phone:

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of 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 Field verification identified on this Certificate of Verification comply with the applicable requirements in Reference Appendices RA2, RA3, 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 (CF2R) signed and submitted by the person(s) responsible for the construction or installation conforms to the requirements specified on the Certificate(s) of Compliance (CF1R) 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

CF2R-MCH-21-H User Instructions

Section A. General Information

1. *HVAC System Identification or Name*: This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document.
2. *HVAC System Location or Area Served*: This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document.
3. *Indoor Unit Name:* This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document.
4. *Status – Less than 12 ft Ducts in Conditioned Space Performance Credit:* This field is automatically filled based on the information given on the CF1R. If "True" appears here, it means that this credit was taken in the performance calculations, is required for compliance and must be field verified.
5. *Status – Ducts Located in Conditioned Space Performance Credit:* This field is automatically filled based on the information given on the CF1R. If "True" appears here, it means that this credit was taken in the performance calculations, is required for compliance and must be field verified.
6. *Status – Duct Systems Located Entirely in Conditioned Space, No Insulation Requirement*– This field is automatically filled based on the information given on the CF1R. If "True" appears here, it means that the duct system is located entirely in conditioned space and is allowed to be installed with insulation less than the minimum R-Value or no insulation.
7. *Status – Portions of Ducts Located in Conditioned Space, R-6 Exception* – This field is automatically filled based on the information given on the CF1R. If "True" appears here, it means that portions of the duct system are located in conditioned space and are allowed to be installed with insulation less than the minimum R-Value or no insulation.

Section B. 12 Linear Feet or Less of Duct Located Outside of Conditioned Space

1. This field is informational and pertains to the following fields.
2. *Verification Status:* If this Section does not apply, then select "All N/A". If the system meets the criteria for *12 Linear Feet or Less of Supply Duct Located Outside of Conditioned Space* credit then select "Pass", otherwise select "Fail". The latter selection means that the system does not meet the requirements and the CF1R will have to be revised, or the system will need to be modified to meet the requirements.
3. This field is used by the Rater to notify the contractor what needs to be corrected if this verification status is marked as fail.

Section C. Ducts Located in Conditioned Space

1. This field is informational and pertains to the following fields.
2. *Verification Status:* If this Section does not apply, then select "All N/A". If the system meets the criteria for *Ducts Located in Conditioned Space* credit then select "Pass", otherwise select "Fail". The latter selection means that the system does not meet the requirements and the CF1R will have to be revised, or the system will need to be modified to meet the requirements.
3. This field is used by the Rater to notify the contractor what needs to be corrected if this verification status is marked as fail.

Section D. Duct System Located Entirely in Directly Conditioned, No Insulation Requirement

1. *A Visual Inspection Shall Confirm the Distribution System is in Conditioned Space:* If a visual inspection confirms that the ducts are entirely within directly conditioned space, then select "entirely in directly conditioned space", otherwise select "not entirely in directly conditioned space". The latter selection

means that the system does not meet the requirements and the CF1R will have to be revised or the system will need to be modified such that the ducts are located entirely within directly conditioned space.

2. *Actual System Duct Leakage Rate (cfm) Measured using RA3.1.4.3.4 Duct Leakage to Outside from Fan Pressurization of Ducts:* Enter the measured duct leakage rate (cfm) using the procedures found in RA3.1.4.3.4.
3. *Compliance Statement:* This field is automatically filled.

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 CF3R 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.

SPACE CONDITIONING SYSTEM FAN EFFICACY

CALIFORNIA ENERGY COMMISSION

CEC-CF3R-MCH-22-H

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. Ducted Cooling System Information

01	System Identification or Name	
02	System Location or Area Served	
03	Indoor Unit Name or Description of Area Served	
04	System Installation Type	
05	Nominal Cooling Capacity (tons) of Condenser	
06	Condenser Speed Type	
07	Cooling System Zonal Control Type	
08	Central Fan Integrated (CFI) Ventilation System Status	
09	System Bypass Duct Status	
10	Date of System Airflow Rate Measurement	
11	Airflow Rate Protocol Utilized	
12	Central Fan Ventilation Cooling System Status	

B. Fan Watt Measurement Apparatus and Procedure Information

Instrument Specifications are given in RA3.3.1, and system fan watt measurement apparatus information is given in RA3.3.2.2.

01	Fan Watt Verification Device Used	

C1. Forced Air System Fan Efficacy Measurement

Complete this section with Fan Efficacy Measurement Data for Newly Installed Non-Zoned Systems or Zoned Multi-Speed Compressor

The procedures for System Fan Watt Verification are specified in Reference Residential Appendix RA3.3.

01	Actual Tested Watts	
02	Actual Tested Airflow from MCH-23 (cfm)	
03	Required Fan Efficacy (watts/cfm)	
04	Actual Fan Efficacy (watts/cfm)	
05	Compliance Statement:	

C2. Forced Air System Fan Efficacy Measurement – All Zones Calling

Complete this section with Fan Efficacy Measurement Data for Newly Installed Zoned Single-Speed Compressor Systems

The procedures for System Fan Watt Verification are specified in Reference Residential Appendix RA3.3.

01	Actual Tested Watts	
02	Actual Tested Airflow from MCH-23 (cfm)	
03	Required Fan Efficacy (watts/cfm)	
04	Actual Fan Efficacy (watts/cfm)	
05	Compliance Statement:	

SPACE CONDITIONING SYSTEM FAN EFFICACY

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

D. Forced Air System Fan Efficacy Measurement – All Zonal Control Modes

The procedures for System Fan Efficacy Verification are specified in Reference Residential Appendix RA3.3.
Note: For compliance with verification in all zonal control modes, it is sufficient to verify fan efficacy for operation of each individual zone when the individual zone is the sole zone calling for conditioning. It is not necessary to verify fan efficacy for combinations of 2 or more zones that are less than all zones calling (e.g., 2 out of three zones calling).

01	Number of Independently Controlled Zones (i.e., number of thermostats or temperature sensors that independently control one or more dampers.)	
02	Required Fan Efficacy in All Zonal Control Modes(Watt/cfm)	

03	04	05	06	07	08
Zone Name	Zone Description	Measured Watt Draw with all Other Zones Off	Measured Airflow with all Other Zones Off (cfm)	Calculated Fan Efficacy (Watts/cfm)	Zone Compliance Status

09	Compliance Statement:	

E. Central Fan Ventilation Cooling System Fan Efficacy Measurement

The procedures for Central Fan Ventilation Cooling System Fan Watt Verification are specified in Reference Residential Appendix RA3.3.4.

01	Actual Tested Watts	
02	Actual Tested Ventilation Airflow from MCH-23 (cfm)	
03	Required Fan Efficacy (watts/cfm)	
04	Actual Fan Efficacy (watts/cfm)	
05	Compliance Statement:	

F. Additional 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.

01	All registers were fully open during the diagnostic test.	
02	System fan was set at maximum speed during the diagnostic test.	
03	If fresh air duct is part of the HVAC system it was not closed during the diagnostic test.	
04	Airflow rate and fan watt draw shall be simultaneous measurements when used to calculate the fan efficacy tested value.	
05	Multi-speed compressor space cooling systems or variable speed compressor systems with controls that vary fan speed subject to the number of zones, as certified by the installer may verify airflow (cfm/ton) and fan efficacy (watt/cfm) with system operating at maximum compressor capacity and system fan speed with all zones calling for conditioning.	
06	Zoned cooling air distribution systems with single speed compressors shall meet both the airflow (cfm/ton) and fan efficacy (watt/cfm) criteria in every zonal control mode.	
07	Portable Watt meters used for measurements of air-handler watt draws shall be true power measurement systems (i.e., sensor plus data acquisition system) having an accuracy of ± 2% of reading or ± 10 watts whichever is greater.	
	Verification Status:	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or ☐ All N/A - This entire table is not applicable
	Correction Notes:	

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

G. 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	

SPACE CONDITIONING SYSTEM FAN EFFICACY

CALIFORNIA ENERGY COMMISSION

CEC-CF3R-MCH-22-H

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

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

Documentation Author Name:	Documentation Author Signature:
Documentation Author Company Name:	Date Signed:
Address:	CEA/AEA/ECC Certification Identification (If applicable):
City/State/Zip:	Phone:

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of 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 Field verification identified on this Certificate of Verification comply with the applicable requirements in Reference Appendices RA2, RA3, 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 (CF2R) signed and submitted by the person(s) responsible for the construction or installation conforms to the requirements specified on the Certificate(s) of Compliance (CF1R) 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

CF3R-MCH-22-H User Instructions

Section A. Ducted Cooling System Information

1. System Identification or Name: This field is filled out automatically. It is referenced from the CF3R-MCH-23, which must be completed prior to this document.
2. System Location or Area Served: This field is filled out automatically. It is referenced from the CF3R-MCH-23, which must be completed prior to this document.
3. Indoor Unit Name: This field is filled out automatically. It is referenced from the CF3R-MCH-23, which must be completed prior to this document.
4. System Installation Type: This field is filled out automatically. It is referenced from the CF3R-MCH-23, which must be completed prior to this document.
5. Nominal Cooling Capacity (tons) of Condenser: This field is filled out automatically. It is referenced from the CF3R-MCH-23, which must be completed prior to this document.
6. Condenser Speed Type: This field is filled out automatically. It is referenced from the CF3R-MCH-23, which must be completed prior to this document.
7. Cooling System Zonal Control Type: This field is filled out automatically. It is referenced from the CF3R-MCH-23, which must be completed prior to this document.
8. Central Fan Integrated (CFI) Ventilation System Status: This field is filled out automatically. It is referenced from the CF3R-MCH-23, which must be completed prior to this document.
9. System Bypass Duct Status: This field is filled out automatically. It is referenced from the CF3R-MCH-23, which must be completed prior to this document.
10. Date of System Airflow Rate Measurement: This field is filled out automatically. It is referenced from the CF3R-MCH-23, which must be completed prior to this document.
11. Airflow Rate Protocol utilized: This field is filled out automatically. It is referenced from the CF3R-MCH-23, which must be completed prior to this document.
12. Central Fan Ventilation Cooling System Status: This field is filled out automatically. It is referenced from the CF3R-MCH-23, which must be completed prior to this document.

Section B. Fan Watt Measurement Apparatus and Procedure Information

1. Fan Watt Verification Device Used: If the device used to measure fan watts was a portable watt meter then select "Portable Watt Meter". This can include plug-in devices such as a "Watts-Up" meter, or a "Kill-a-Watt" meter, or a clamp-on type meter that reads true power watts directly (must account for power factor – multiplying amps x volts is not adequate).

Section C1. Forced Air System Fan Efficacy Measurement

(This section title is for systems that are Non-Zoned or have Zoned Multi-Speed Compressor) **and;**

Section C2. Forced Air System Fan Efficacy Measurement – All Zones Calling

(This section title is for zonally controlled systems) Both C1 and C2 have the same fields and instructions:

1. Actual Tested Watts: Enter the number of watts tested using the device specified in Section B and tested with all zones calling for cooling simultaneously.
2. Actual Tested Airflow from MCH-23 (cfm): This field is filled out automatically. It is referenced from the CF3R-MCH-23, which must be completed prior to this document.
3. Required Fan Efficacy (watts/cfm): This field is filled out automatically and referenced from MCH-01. Values below are used unless higher efficacy values are listed on the CF1R for performance compliance.
    a. 0.62 watts/cfm for small duct high velocity HP or AC systems
    b. 0.45 watts/cfm for central gas furnace or packaged gas furnace systems

   c. 0.58 watts/cfm for all other systems
4. Actual Fan Efficacy (watts/cfm): This field is filled out automatically. It is calculated by dividing the actual tested watts by the actual tested airflow.
5. Compliance Statement: This field is filled out automatically. The result is based on whether or not the actual fan efficacy meets the required fan efficacy.

Section D. Forced Air System Fan Efficacy Measurement – All Zonal Control Modes

(This section is required for zonally controlled systems)

1. *Number of Independently Controlled Zones: Enter the number of independently controlled zones.*
2. *Required Fan Efficacy (Watts/cfm):* This field is filled out automatically and referenced from MCH-01. Values below are used unless higher efficacy values are listed on the CF1R for performance compliance.
   a. 0.62 watt/cfm for small duct high velocity HP or AC systems
   b. 0.45 watt/cfm for central gas furnace or packaged gas furnace systems
   c. 0.58 watt/cfm for all other systems
3. *Zone Name*: Enter a unique name for each independent zone.
4. *Zone Description*: Enter a description of the zone (e.g. upstairs, downstairs).
5. *Measured Watt Draw with All Other Zones Off*: Enter the number of watts tested using the device specified in Section B and tested with all other zones off.
6. *Measured Airflow with All Other Zones Off*: This field is filled out automatically. It is referenced from the CF3R-MCH-23, which must be completed prior to this document.
7. *Calculated Fan Efficacy*: This field is filled out automatically. It is calculated by dividing the measured watt draw by the measured airflow.
8. *Zone Compliance Status*: This field is filled out automatically. The result is based on whether or not the actual fan efficacy meets the required fan efficacy for this zone.
9. *Compliance Statement*: This field is filled out automatically. The result is based on whether or not the actual fan efficacy meets the required fan efficacy for all zones tested.

Section E. Central Fan Ventilation Cooling System Fan Efficacy Measurement

(This section is required if project includes a CFVCS system)

1. Actual Tested Watts: Enter the number of watts tested using the device specified in Section B and tested at ventilation cooling airflow rate.
2. Actual Tested Ventilation Airflow from MCH-23: This field is filled out automatically. It is referenced from the CF2R-MCH-23, which must be completed prior to this document.
3. Required Fan Efficacy: This field is filled out automatically and referenced from MCH-01. Values below are used unless higher efficacy values are listed on the CF1R for performance compliance.
   a. 0.62 watt/cfm for small duct high velocity HP or AC systems
   b. 0.45 watt/cfm for central gas furnace or packaged gas furnace systems
   c. 0.58 watt/cfm for all other systems
4. Actual Fan Efficacy: This field is filled out automatically. This is calculated by dividing the measured watt draw by the measured airflow.
5. Compliance Statement: This field is filled out automatically. The result is based on whether or not the actual fan efficacy meets the required fan efficacy for all zones tested.

Section F. Additional Requirements

1. This field must be a true statement (or not applicable) for the system to comply.
2. This field must be a true statement (or not applicable) for the system to comply.
3. This field must be a true statement (or not applicable) for the system to comply.

4. This field must be a true statement (or not applicable) for the system to comply.
5. This field must be a true statement (or not applicable) for the system to comply.
6. This field must be a true statement (or not applicable) for the system to comply.
7. This field must be a true statement (or not applicable) for the system to comply.
8. Verification Status: If this Section does not apply, then select "All N/A". If the system meets the criteria for fan efficacy Additional Requirements, then select "Pass", otherwise select "Fail". The latter selection means that the system does not meet the requirements and the CF1R will have to be revised, or the system will need to be modified to meet the requirements.
9. Correction Notes: If one or more applicable requirements are not met "Fail" will appear in the row above. When this occurs the rater is required to enter detailed notes here that describe what failed and why.

Section G. 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 CF3R 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.

SPACE CONDITIONING SYSTEM AIRFLOW RATE

CALIFORNIA ENERGY COMMISSION

CEC-CF3R-MCH-23-H

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. Ducted Cooling System Information

01	Space Conditioning System Identification or Name	
02	Space Conditioning System Description of Area Served	
03	Indoor Unit Name	
04	System Installation Type	
05	Nominal Cooling Capacity (tons)	
06	Condenser Speed Type	
07	Cooling System Zonal Control Type	
08	Central Fan Integrated (CFI) Ventilation System Status	
09	System Bypass Duct Status	
10	Date of System Airflow Rate Measurement	
11	Airflow Rate Protocol Utilized	
12	Central Fan Ventilation Cooling System Status	

B. Hole for the Placement of a Static Pressure Probe (HSPP), and Permanently Installed Static Pressure Probe (PSPP) in the Supply Plenum

Procedures for installing HSPP or PSPP are specified in RA3.3.1.1.

01	Method Used to Demonstrate Compliance with the HSPP/PSPP Requirement	

C. Airflow Rate Measurement Apparatus and Procedure Information

Instrument Specifications are given in RA3.3.1.1, and system airflow rate measurement apparatus information is given in RA3.3.2.

01	Airflow Rate Measurement Type Used for this Airflow Rate Verification	
02	Manufacturer of Airflow Measurement Apparatus	
03	Model number of Airflow Measurement Apparatus	
04	Certification Status of the Airflow Measurement Apparatus Accuracy	

D. Alternative to Compliance with Minimum System Airflow Requirements for Altered Systems

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

The installer shall attempt to correct non-compliant system airflow rates by performing the following remedial actions as specified in RA3.3.3.1.5

01	Determine that the air filter media is clean. If the air filter media is dirty, then replace it with clean filter media.	
02	Open all registers and dampers and remove any obstructions.	
03	Replace/Repair all accessible crushed, blocked, restricted, remove excess length, and sharp bends in ducts. Supported every 4 ft max. with a max. 2 in sag.	
08	Clean the evaporator coil according to the manufacturer and ensure the coil is not obstructed.	
05	Air handler fan speed set to high and blower wheel and motor are operating properly.	
06	If determined to be too small, replace the return duct with a larger one and/or add a second return duct.	
07	If determined to be too small, replace the return grille with a larger area grille.	
08	If any of the above were not completed list the Action Required and a description of why the action could not be completed:	
09	Verification Status:	
10	Correction Notes:	
11	Optional Notes:	

E1. Forced Air System Airflow Rate Measurement

Complete this section with Airflow Rate Measurement Data for Newly Installed Non-Zoned Systems or Zoned Multi-Speed Compressor

01	Actual System Airflow Rate Measurement (cfm)	
02	Required Minimum System Airflow Rate (cfm/ton)	
03	Required Minimum System Airflow Target (cfm)	
04	Compliance Statement:	

E2. Forced Air System Airflow Rate Measurement - All Zones Calling

Complete this section with Airflow Rate Measurement Data for Newly Installed Zoned Single-Speed Compressor Systems

The procedures for System Airflow Rate Verification are specified in Reference Residential Appendix RA3.3

01	Actual System Airflow Rate Measurement (cfm)	
02	Required All Zones Calling Minimum System Airflow Rate (cfm/ton)	
03	Required All Zones Calling Minimum System Airflow Target (cfm)	
04	Compliance Statement:	

SPACE CONDITIONING SYSTEM AIRFLOW RATE

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

E3. Forced Air System Airflow Rate Measurement - Best Airflow Rate Attainable

Complete this section with Airflow Rate Measurement Data for Alternative to Compliance with Minimum System Airflow Requirements for Altered Systems

The procedures for System Airflow Rate Verification are specified in Reference Residential Appendix RA3.3

01	Actual System Airflow Rate Measurement (cfm)	
02	Required Minimum System Airflow Rate (cfm/ton)	
03	Required Minimum System Airflow Target (cfm)	
04	Compliance Statement:	
05	ECC Sample Group Eligibility	

E4. Forced Air System Airflow Rate Measurement – Heating Only

Complete this section with Airflow Rate Measurement Data for Newly Installed Heating Only Non-Zoned Systems or Zoned Multi-Speed Compressor Measurement Only – No Minimum Target Requirement

The procedures for System Airflow Rate Verification are specified in Reference Residential Appendix RA3.3

01	Actual System Airflow Rate Measurement (cfm)	

F. Forced Air System Airflow Rate Measurement – All Other Zonal Control Modes

The procedures for System Airflow Rate Verification are specified in Reference Residential Appendix RA3.3. For compliance with verification in all zonal control modes, it is sufficient to verify airflow rate for operation of each individual zone when the individual zone is the sole zone calling for conditioning. It is not necessary to verify airflow rate for combinations of 2 or more zones that are less than all zones calling (e.g., 2 out of three zones calling).

01	Number of Independently Controlled Zones (i.e., number of thermostats or temperature sensors that independently control one or more dampers.)			
02	Required Minimum Cooling System Airflow Rate (cfm/ton)			
03	Required Minimum Airflow in all Zonal Control Modes (cfm)			
04		05	06	07
Zone Name		Zone Description	Measured Airflow with All Other Zones Off (CFM)	Zone Compliance Status
08	Compliance Statement:			

G. Central Fan Ventilation Cooling System Airflow Rate Measurement

The procedures for central fan ventilation cooling system airflow rate verification are specified in Reference Residential Appendix RA3.3.4

01	Required Ventilation System Airflow Rate (cfm)	
02	Actual System Ventilation Airflow Rate Measurement (cfm)	
03	Compliance Statement:	

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

H. Additional Requirements

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

01	Air filters that meet the applicable requirements of Standards Section 150.0(m)12 or 150.0(m)13 were properly installed in the system during system airflow rate measurement identified on this Certificate of Installation.	
02	The airflow rate measurement apparatus used to perform the airflow rate measurement identified on this Certificate of Installation was calibrated in accordance with the apparatus manufacturer's specifications and conforms to the instrumentation specifications given in RA3.3.1.	
03	All registers were fully open during the diagnostic test.	
04	System fan was set at maximum speed during the diagnostic test.	
05	If fresh air duct is part of the HVAC system it was not closed during the diagnostic test.	
06	Airflow rate and fan watt draw shall be simultaneous measurements when used to calculate the Fan Efficacy tested value.	
07	Airflow rate and fan watt draw shall be simultaneous measurements when used to calculate the Fan Efficacy tested value.	
08	Multi-speed compressor space cooling systems or variable speed compressor systems with controls that vary fan speed subject to the number of zones, as certified by the installer may verify airflow (cfm/ton) and fan efficacy (Watt/cfm) with system operating at maximum compressor capacity and system fan speed with all zones calling for conditioning,	
09	For altered systems that do not comply with the minimum 300 cfm per ton airflow rate requirement but opt to comply using the remedial actions on this MCH-23 compliance document according to Section RA3.3.3.1.5, the system's thermostat shall conform to the specifications in Reference Joint Appendix JA5 and shall be capable of receiving and responding to Demand Response Signals prior to final approval of the building permit by the enforcing agency (Section 150.2(b)1Fiia).	
10	Verification Status:	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or ☐ All N/A - This entire table is not applicable
11	Correction Notes:	

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	

SPACE CONDITIONING SYSTEM AIRFLOW RATE

CALIFORNIA ENERGY COMMISSION

CEC-CF3R-MCH-23-H

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

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

Documentation Author Name:	Documentation Author Signature:
Documentation Author Company Name:	Date Signed:
Address:	CEA/AEA/ECC Certification Identification (If applicable):
City/State/Zip:	Phone:

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of 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 Field verification identified on this Certificate of Verification comply with the applicable requirements in Reference Appendices RA2, RA3, 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 (CF2R) signed and submitted by the person(s) responsible for the construction or installation conforms to the requirements specified on the Certificate(s) of Compliance (CF1R) 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

CF2R-MCH-23-H User Instructions

Section A. Ducted Cooling System Information

1. System Identification or Name: This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document.
2. System Location or Area Served: This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document.
3. Indoor Unit Name: This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document.
4. System Installation Type: Select the appropriate System Installation Type from the following choices:
   a. New: Use this choice for newly constructed buildings, additions with all-new systems dedicated to the addition, or new systems installed in existing homes where the equipment and ducts are all newly installed (aka, "Cut-in").
   b. Replacement: Use this choice if the system is a complete replacement space-conditioning system installed as part of an alteration, and includes all the system heating or cooling equipment plus a replacement duct system (150.2(b)1Diia) where the ducts are at least 75% or more newly installed duct material (up to 25% of the finished system may consist of reused parts from the dwelling unit's previously existing duct system, such as registers, grilles, boots, air handler, coil, plenums, duct material); plus a replacement air handler.
   c. Alteration: Use this choice for existing buildings where any of the following are newly installed or replaced as part of the project and the system does not meet one of the other compliance categories above.:
      i. 40 feet or more of space-conditioning system ducts are installed in unconditioned space or indirectly conditioned space.
      ii. Air conditioning or heat pump condenser
      iii. Heating or cooling coil
      iv. Air handler (e.g., furnace, fan coil, package unit)
5. Nominal Cooling Capacity (tons): This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document. If the number of indoor units connected to the outdoor unit is equal to one or the system is a packaged system then this field is equal to the nominal cooling capacity of the condenser. If the number of indoor units connected to the outdoor unit is greater than one this field is equal to the indoor unit nominal cooling capacity.
6. Condenser Speed Type: This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document.
7. Cooling System Zonal Control Type: This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document.
8. Central Fan Integrated (CFI) Ventilation System Status: If the system has Central Fan Integrated System, then select "CFI System", otherwise select "Not a CFI system".
9. System Bypass Duct Status: This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document.
10. Date of System Airflow Rate Measurement: Enter the date that the airflow test was performed.
11. Airflow Rate Protocol Utilized: If the system installation type is "New" or "Replacement" then only the RA3.3 airflow methods may be used. If the system installation type is "Alteration", the RA3.3 airflow methods may be used, but the Alternative to Compliance with Minimum System Airflow Requirements ("Best I Can Do" Airflow) is an option for existing systems that may require substantial modification to improve the airflow.

12. Central Fan Ventilation Cooling System (CFVCS) Status: This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document.

Section B. Hole for the Placement of a Static Pressure Probe (HSPP), and Permanently Installed Static Pressure Probe (PSPP) in the Supply Plenum

1. A hole for a static pressure probe (HSPP) or a permanent static pressure probe (PSPP) is required when system airflow verification is required, whether the airflow test method used requires one or not. Select the appropriate choice from the following options using a dropdown box, the Static Pressure Measurement Method:
   - If an Hole Static Pressure Probe is installed then select "HSPP Installed"
   - If a Permanent Static Pressure Probe is installed then select "PSPP Installed"
   - If the system is configured such that an HSPP nor PSPP can be installed, an alternate location that provides access for making supply plenum pressure measurement may be used. Select "An alternative location has been provided and clearly labeled."
   - If the system is such that an HSPP or PSPP is not applicable, select "HSPP/PSPP are not applicable to this system".

Section C. Airflow Rate Measurement Apparatus and Procedure Information

1. Airflow Rate Measurement Type Used for this Airflow Rate Verification: Select the appropriate airflow test procedure from the following options for the method used to determine actual fan airflow:
   - Diagnostic Fan Flow Using Fan Flow Meter (aka Plenum Pressure Matching) according to the procedures in RA3.3.3.1.1
   - Diagnostic Fan Flow Using Flow Grid Measurement according to the procedures in RA3.3.3.1.2
   - Diagnostic Fan Flow Using Powered Flow Capture Hood according to the procedures in RA3.3.3.1.3
   - Diagnostic Fan Flow Using Traditional Flow Capture Hood according to the procedures in RA3.3.3.1.4
   2. Manufacturer of Airflow Measurement Apparatus: Enter the name of the manufacturer of the airflow measurement tool used to measure the airflow for this test.
3. Model number of Airflow Measurement Apparatus: Enter the model number of the airflow measurement tool used to measure the airflow for this test.
4. Certification Status of the Airflow Measurement Apparatus Accuracy: The measurement apparatus used to perform an airflow verification measurements must appear on the CEC list of approved devices found at http://www.energy.ca.gov/title24/equipment_cert/ama_fas/index.html, if this is true, select "Certified", otherwise select "Not Certified". The latter choice will not allow the system to pass until a certified device is used.

D. Alternative to Compliance with Minimum System Airflow Requirements for Altered Systems

(This section is required for altered systems using alternative compliance)

These fields are required for alteration project compliance

1. Refer to section RA3.3.3. for details on this item. Indicate whether completed or not.
2. Refer to section RA3.3.3. for details on this item. Indicate whether completed or not.
3. Refer to section RA3.3.3. for details on this item. Indicate whether completed or not.
4. Refer to section RA3.3.3. for details on this item. Indicate whether completed or not.
5. Refer to section RA3.3.3. for details on this item. Indicate whether completed or not.
6. Refer to section RA3.3.3. for details on this item. Indicate whether completed or not.
7. Refer to section RA3.3.3. for details on this item. Indicate whether completed or not.

8. User Input
9. *Verification Status:* If this Section does not apply, then select "All N/A". If the system meets the airflow criteria, then select "Pass", otherwise select "Fail". The latter selection means that the system does not meet the requirements and the CF1R will have to be revised, or the system will need to be modified to meet the requirements.
10. *Correction Notes:* If one or more applicable requirements are not met "Fail" will appear in the row above. When this occurs, the rater is required to enter detailed notes here that describe what failed and why.
11. If any of the above items could not be completed due to inaccessibility or significant cost, provide additional explanation here.

Section E1. Forced Air System Airflow Rate Measurement

(This section is required for non-zoned systems or zoned systems with multi-speed systems)

1. Required Minimum System Airflow Rate (cfm/ton): This field is filled automatically. The target is based on whether the system is new or altered and whether a value was specified on the CF2R-MCH-01.
2. Required Minimum System Airflow Target (cfm): This field is calculated automatically. It is the product of the minimum airflow rate per ton and the tonnage of the system condenser.
3. Actual System Airflow Rate Measurement (cfm): Enter the actual tested value of the airflow measured using the apparatus specified above.
4. Compliance Statement: This field is filled automatically. Compliance requires that the measured airflow meets the minimum airflow target.

Section E2. Forced Air System Airflow Rate Measurement – All Zones Calling

(This section is required if system is zonally controlled)

1. Required All Zones Calling Minimum System Airflow Rate (cfm/ton): This field is filled automatically. The target is based on whether the system is new or altered and whether a value was specified on the CF2R-MCH-01.
2. Required All Zones Calling Minimum System Airflow target (cfm): This field is calculated automatically. It is the product of the minimum airflow rate per ton and the tonnage of the system condenser.
3. Actual System Airflow Rate Measurement (cfm): Enter the actual tested value of the airflow measured using the apparatus specified above.
4. Compliance Statement: This field is filled automatically. Compliance requires that the measured airflow meets the minimum airflow target.

Section E3. Forced Air System Airflow Rate Measurement - Best Airflow Rate Attainable

(This section is required for altered systems using alternative compliance)

1. Required Minimum System Airflow Rate (cfm/ton): This field is filled automatically. The target is always 300 cfm/ton for this option.
2. Required Minimum System Airflow Target (cfm): This field is calculated automatically. It is the product of the minimum airflow rate per ton and the tonnage of the system condenser.
3. Actual System Airflow Rate Measurement (cfm): Enter the actual tested value of the airflow measured using the apparatus specified above.
4. Compliance Statement: This field is filled automatically. Compliance requires that the measured airflow meets the minimum airflow target, however if the criteria of RA3.3.3 is met the best attainable airflow rate will suffice.
5. ECC Sample Group Eligibility: This field is filled out automatically. If the minimum airflow rate cannot be met and the criteria of RA3.3.3 is used, the system cannot be included in a ECC sample group.

Section E4. Forced Air System Airflow Rate Measurement

(This section is required if system is heating only)

- Actual System Airflow Rate Measurement (cfm): Enter the actual tested value of the airflow measured using the apparatus specified above.

Section F. Forced Air System Airflow Rate Measurement – All Other Zonal Control Modes

(This section is required for systems with single speed compressor and zonally controlled).

1. Number of Independently Controlled Zones: Enter the number of zones in this system that are independently controlled, i.e., that can call for cooling while other zones can be fully or mostly shut off from system airflow. This usually corresponds to the number of thermostats or zone sensors.
2. Required Minimum Cooling System Airflow Rate (cfm/ton): This field is filled automatically. The target is based on whether the system is new or altered and whether a value was specified on the CF2R-MCH-01.
3. Required Minimum Airflow in all Zonal Control Modes (cfm): This field is filled out automatically. If a value other than 350 cfm was claimed in the performance calculations, it will be referenced from the CF1R, otherwise the target is 350 cfm.
4. Zone Name: Enter a unique name for each zone on this system. Examples: Zone 1, Z1, Zone A, etc.
5. Zone Description: Enter a brief description of each zone that is detailed enough allow someone to distinguish it from the others in the field. Examples: upstairs, first floor, east wing, bedrooms only, (list rooms served), etc.
6. Measured Airflow with All Other Zones Off: This test must be performed with only one independently controlled zone calling for cooling (Note: if fan watt verification is required, it must be performed simultaneously to the corresponding airflow from this test). All other zones must not be calling during this test. The zone dampers for the other zones must be in their normal closed position. Enter the airflow value measured for the zone that is calling. This test must be performed for each and every independently controlled zone.
7. Zone Compliance Status: This field is filled out automatically. The result is based on whether or not the actual airflow meets the required airflow for this zone.
8. Compliance Statement: This field is filled out automatically. The result is based on whether or not the actual airflow meets the required airflow for all zones

Section G. Central Fan Ventilation Cooling System Airflow Rate Measurement

(This section is required if project has a fixed or variable CFVCS.)

1. Required Ventilation System Airflow Rate (cfm): This field is filled automatically. The target is based on the airflow rate specified on the CF2R-MCH-01.
2. Actual System Ventilation Airflow Rate Measurement (cfm): Enter the actual tested value of the airflow measured using the apparatus specified above.
3. Compliance Statement: This field is filled automatically. Compliance requires that the measured airflow meets the airflow target.

Section H. Additional Requirements

1. This field must be a true statement (or not applicable) for the system to comply.
2. This field must be a true statement (or not applicable) for the system to comply.
3. This field must be a true statement (or not applicable) for the system to comply.
4. This field must be a true statement (or not applicable) for the system to comply.
5. This field must be a true statement (or not applicable) for the system to comply.
6. This field must be a true statement (or not applicable) for the system to comply.
7. This field must be a true statement (or not applicable) for the system to comply
8. This field must be a true statement (or not applicable) for the system to comply
9. This field must be a true statement (or not applicable) for the system to comply
10. Verification Status: If this Section does not apply, then select “All N/A”. If the system meets the airflow criteria then select “Pass”, otherwise select “Fail”. The latter selection means that the system does not meet the requirements and the CF1R will have to be revised, or the system will need to be modified to meet the requirements.
11. Correction Notes: If one or more applicable requirements are not met “Fail” will appear in the row above. When this occurs the rater is required to enter detailed notes here that describe what failed and why.

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 CF3R 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.

BUILDING AIR LEAKAGE DIAGNOSTIC TEST WORKSHEET
BUILDING ENCLOSURES AND DWELLING UNIT ENCLOSURES

CALIFORNIA ENERGY COMMISSION

CEC-CF3R-MCH-24-H

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. Enclosure Air Leakage – General Information

01	Test Procedure used	
02	Date of the Diagnostic Test for this Dwelling	
03	Is ECC verification of building enclosure air leakage to outside required by MCH-27?	
04	Default Enclosure Air Leakage	
05	Indoor temperature during test (°F)	
06	Outdoor temperature during test (°F)	
07	Blower Door Location	
08	Building Elevation Above Sea Level (ft)	
09	Dwelling Unit Volume	

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)

C1. Enclosure Air Leakage Diagnostic Test for a 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	

BUILDING AIR LEAKAGE DIAGNOSTIC TEST WORKSHEET
BUILDING ENCLOSURES AND DWELLING UNIT ENCLOSURES

CALIFORNIA ENERGY COMMISSION

CEC-CF3R-MCH-24-H

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

C2. Enclosure Air Leakage Diagnostic Test for Single Point Air Tightness 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 Data

01	Altitude and Temperature Correction Factor	
02	Corrected CFM50	
03	ACH50	

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 Worksheet Compliance

01	The procedure for preparing the enclosure for testing is detailed in RESNET 380-2019 Section 4.2.
02	The procedure for installation of the test apparatus, and preparations for measurement shall conform to RESNET 380-2019 Section 4.3
03	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
04	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 4.4.2

BUILDING AIR LEAKAGE DIAGNOSTIC TEST WORKSHEET
BUILDING ENCLOSURES AND DWELLING UNIT ENCLOSURES

CALIFORNIA ENERGY COMMISSION

CEC-CF3R-MCH-24-H

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

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

Documentation Author Name:	Documentation Author Signature:
Documentation Author Company Name:	Date Signed:
Address:	CEA/AEA/ECC Certification Identification (If applicable):
City/State/Zip:	Phone:

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of 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 Field verification identified on this Certificate of Verification comply with the applicable requirements in Reference Appendices RA2, RA3, 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 (CF2R) signed and submitted by the person(s) responsible for the construction or installation conforms to the requirements specified on the Certificate(s) of Compliance (CF1R) 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

CF3R-MCH-24-H User Instructions

Section A. Enclosure Air Leakage – General Information

1. Select the appropriate test procedure. This selection will determine what sections are required in this report. 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 MCH-27 which determines if a $2ACH_{50}$ value is required.
4. This field displays the $2ACH_{50}$ default enclosure air leakage.
5. Enter the indoor temperature measured at the time that the enclosure air leakage test was performed.
6. Enter the outdoor temperature measured at the time that the enclosure air leakage test was performed.
7. 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”.
8. Enter the building elevation above sea level. Use the value for the closest city found in Joint Appendix JA2.2.
9. This field is automatically calculated unless the CF1R is an NCB or ADD.

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.
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
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 manual 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.

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 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. 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. Multi-Point procedure 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 E779-10.

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

(If A01 test procedure is multi-point corrections are performed by the 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 380-2016.

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.
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 Worksheet 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.

Documentation Declaration Statements

1. The person who prepared the CF3R 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.

REFRIGERANT CHARGE VERIFICATION

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. System Information

ECC Rater to field-verify all system information, discrepancies to be noted by overwriting entry.

01	Space Conditioning System Identification or Name	
02	Space Conditioning System Location or Area Served	
03	Condenser (or package unit) Make or Brand	
04	Condenser (or package unit) Model Number	
05	Nominal Cooling Capacity (tons) of Condenser	
06	Condenser (or package unit) Serial Number	
07	Refrigerant Type	
08	Other Refrigerant Type (if applicable)	
09	Liquid Line Filter Drier Installed According to Manufacturer's Specifications (if applicable)	
10	System Installation Type	
11	Fault Indicator Display (FID) Status (Note: Even systems with a FID must have refrigerant charge verified by installer)	
12	Is the system of a type that the minimum airflow can be verified for all indoor units using an approved measurement procedure (RA3.3 or RA3.3.3)?	
13	Is the system of a type that approved refrigerant charge verification procedures can be used to verify compliance with the refrigerant charge verification requirements when temperatures are ≥ 55°F (RA3.2.2, or RA1)?	
14	Date of Refrigerant Charge Verification for this System	
15	Refrigerant Charge Verification Method Used	
16	Person Who Performed the Refrigerant Charge Verification Reported on this Certificate of Installation	
17	ECC Verification Compliance Requirement Status	
18	Refrigerant Charge Verification Method Used by ECC Rater	

B1. Metering Device Verification

ECC Rater is required to visually field verify all information from CF2R. Superheat Method can only be used on systems that do not have a variable metering device.

01	Refrigerant Metering Device	
02	Superheat Method Applicability Status	

B2. Metering Device Verification

ECC Rater is required to visually field verify all information from CF2R. Subcooling Method can only be used on systems that have a variable metering device.

01	Refrigerant Metering Device	
02	Subcooling Method Applicability Status	

C. Instrument Calibration

ECC Raters are required to calibrate their diagnostic tools. Procedures for instrument calibration are given in Reference Residential Appendix RA3.2.2 and RA3.2.2.2

01	Date of Digital Refrigerant Gauge Calibration	
02	Date of Digital Thermocouple Calibration	
03	Digital Refrigerant Gauge Calibration Status	
04	Digital Thermocouple Calibration Status	

D. Measurement Access Hole (MAH) Verification

ECC Raters are required to visually field verify MAH. Procedures for installing MAH are specified in Reference Residential Appendix RA3.2.2.3.

01	Method Used to Demonstrate Compliance with the Measurement Access Hole (MAH) Requirement	

E. Minimum System Airflow Rate Verification

Procedures for verifying minimum system airflow are specified in Reference Residential Appendix RA3.3.3.

01	02	03
Indoor Unit Name or Description of Area Served	Minimum Required System Airflow Rate (cfm)	System Airflow Rate Verification Status
04	Compliance Statement:	
Notes:		

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

F1. Data Collection for Superheat Method

ECC Rater must independently collect all data in this section. Procedures for determining Refrigerant Charge using the Standard Charge Verification Procedure are given in Reference Residential Appendix RA3.2.2 and RA3.2.2.2.

01	Lowest Return Air Dry-bulb Temperature that Occurred During the Refrigerant Charge Verification Procedure (°F)	
02	Measured Condenser Air Entering Dry-bulb Temperature ($T_{condenser, db}$) (°F)	
03	Outdoor Temperature Qualification Status	
04	Measured Return (evaporator entering) Air Dry-bulb Temperature ($T_{return, db}$) (°F)	
05	Measured Return (evaporator entering) Air Wet-bulb Temperature ($T_{return, wb}$) (°F)	
06	Measured Suction Line Temperature ($T_{suction}$) (°F)	
07	Measured Suction Line Pressure ($P_{suction}$ - psig)	
08	Evaporator Saturation Temperature ($T_{evaporator, sat}$) from Digital Gauge or P-T Table using Line F07 (°F)	
09	Measured Superheat (Line F06 – Line F08) (°F)	
10	Target Superheat (from Table RA3.2-2, using F02 and F05) (°F)	
11	Compliance Statement:	

F2. Data Collection and Calculations for Subcooling Method

ECC Rater must independently collect all data in this section. Procedures for Refrigerant Charge using the Standard Charge Verification Procedure are given in Reference Residential Appendix RA3.2.2.

01	Lowest Return Air Dry-bulb Temperature that Occurred During the Refrigerant Charge Verification Procedure (°F)	
02	Measured Condenser Air Entering Dry-bulb Temperature ($T_{condenser, db}$)	
03	Outdoor Temperature Qualification Status	
04	Measured Liquid Line Temperature (T_{liquid}) (°F)	
05	Measured Liquid Line Pressure (P_{liquid}) (psig)	
06	Condenser Saturation Temperature ($T_{condensor, sat}$) from Digital Gauge or P-T Table using Line F05 (°F)	
07	Measured Subcooling (Line F06 – Line F04) (°F)	
08	Target Subcooling from Manufacturer (°F)	
09	Compliance Statement:	

G. Metering Device Verification for Subcooling Method

ECC Rater must independently collect all data in this section. Procedures for the verification of proper metering device operation are specified in RA3.2.2.6.2.

01	Measured Suction Line Temperature ($T_{suction}$) (°F)	
02	Measured Suction Line Pressure ($P_{suction}$) (psig)	
03	Evaporator Saturation Temperature ($T_{evaporator, sat}$) from Digital Gauge or P-T Table using line G02 (°F)	
04	Measured Superheat (Line G01 – Line G03) (°F)	
05	Measured Superheat (Line G04) is between 4°F and 25°F (inclusive)	
06	Measured Superheat (Line G04) is within Manufacturer's Specifications (if known)	
07	Compliance Statement:	

H. Weigh In Charge Procedure

ECC Rater Must Observe and Confirm All Data Collected. Procedures for Refrigerant Charge using the Weigh-in Charging Procedure are given in Reference Residential Appendix RA3.2.2.2 and RA3.2.3.

01	Measured Condenser Air Entering Dry-bulb Temperature ($T_{condenser, db}$) (°F)	
02	Specify the Method of Weigh-in	
03	Manufacturer's Standard Charge for Condenser (lbs, oz.)	
04	Manufacturer's Standard Liquid Line Length (ft)	
05	Manufacturer's Standard Liquid Line Diameter (in)	
06	Manufacturer's Standard Indoor Coil Size (tons)	
07	Installed Liquid Line Length (ft)	
08	Installed Liquid Line Diameter (in)	
09	Installed Indoor Coil Size (tons)	
10	Charge Adjustment to Standard Charge from Manufacturer's Specifications (ounces, positive = add, negative = remove)	
11	Refrigerant Required to be Weighed in by the Installer (lbs, oz)	
12	Refrigerant Weighed in by Installer (lbs, oz)	
13	Verification Status: (Note: If Verification Status for this table indicates "Fail", the reason shall be described in the correction notes for this table.)	
Correction Notes:		

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

I. Weigh In Charge Procedure – Additional Requirements

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

01	If refrigerant line connections require welding, the system is braised with dry nitrogen in the lines and indoor coil.	
02	i. In all cases where the OEM instructions call for checking for gas leaks with vacuum, prior to introducing refrigerant, system is evacuated to 500 microns or less and, when isolated, has risen no more than 300 microns after 5 minutes. ii. In all cases where the OEM instructions call for checking for gas leaks with nitrogen gas, the system was pressurized to the manufacturer's specified pressure and if the pressure could not be maintained, leaks were located and fixed.	
03	Observation and documentation of the vacuum and pressurization tests are not required if no fittings (other than the fitting to the compressor) are compression or flare fittings.	
04	The calculated weight adjustment for lineset length is based on the length and diameter of the lineset.	
05	The calculated weight adjustment for coil size is based on manufacturer instructions.	
06	The actual total weight adjustment is equal to the sum of the calculated weight adjustments for lineset and coil size.	
07	The calculated and actual total weights of refrigerant in the system are recorded on or near the nameplate label, in indelible ink or other permanent means.	
08	Verification Status: (Note: If Verification Status for this table indicates "Fail", the reason shall be described in the correction notes for this table.)	
Correction Notes:		

J. 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	

REFRIGERANT CHARGE VERIFICATION

CALIFORNIA ENERGY COMMISSION

CEC-CF3R-MCH-25-H

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

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

Documentation Author Name:	Documentation Author Signature:
Documentation Author Company Name:	Date Signed:
Address:	CEA/AEA/ECC Certification Identification (If applicable):
City/State/Zip:	Phone:

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of 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 Field verification identified on this Certificate of Verification comply with the applicable requirements in Reference Appendices RA2, RA3, 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 (CF2R) signed and submitted by the person(s) responsible for the construction or installation conforms to the requirements specified on the Certificate(s) of Compliance (CF1R) 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

CF2R-MCH-25-H User Instructions

Section A. System Information

1. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
2. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25) If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
3. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
4. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25) If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
5. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
6. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25) If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
7. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25) If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail. Choose the type of refrigerant used by the system being verified. R-454, R-22 and R-410A are the most common, but other types may occasionally be encountered.
8. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). If "Other" is chosen in A07, then installer will indicate the type of refrigerant being used. If R-454, R-22 or R-410A is being used (regardless of trade name, Puron, Genetron, etc.) it should be indicated in A07, not here. This row is only for refrigerants other than R-22 and R-410a. Documentation of other refrigerants should be requested. If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
9. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). If applicable, a liquid line filter drier shall be installed according to the manufacturer's specifications.
10. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). These are defined in detail the Residential Compliance Manual. If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail. Indicate whether the HVAC system is Completely New, Replacement or an Alteration.
11. N/A.
12. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). Most ducted split systems and package systems are of the type that minimum airflow can be verified using an approved measurement procedure. Examples of systems that do not meet this description are ductless systems. Selecting "No" here may subject the project to additional scrutiny by enforcement personnel.
13. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25) Most ducted split systems and package systems are of the type that approved refrigerant charge verification procedures detailed in Residential Appendix RA3.2.2 or RA1 can be used (i.e., Standard Charge Verification procedures). Examples of systems that may not meet this description are "mini splits" or variable refrigerant flow systems that may only be charged using weigh-in procedures. Selecting "No" here may subject the project to additional scrutiny.
14. ECC rater to input date of their refrigerant charge verification.
15. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). The installer is to have selected the refrigerant charge verification method used from the choices provided:

- Superheat (outdoor temperature must be ≥ 55°F); this verification method can only be used when the outdoor temperature is at or above 55°F. It is only used on systems with fixed orifice refrigerant metering devices (non-variable metering devices). This method is detailed in Reference Appendix RA3.2.2.6.1. Systems verified using this method may be eligible for ECC verification compliance using Group Sampling
- Subcooling (outdoor temperature must be ≥ 55°F); this verification method can only be used when the outdoor temperature is at or above 55°F. It is only used on systems with variable metering devices (TXV or EXV). This method is detailed in Reference Appendix RA3.2.2.6.2. Systems verified using this method may be eligible for ECC verification compliance using Group Sampling.
- Weigh-in; this verification method can be used by the installer at any outdoor temperature allowed by the equipment manufacturer. This method is detailed in Reference Appendix RA3.2.3. Systems verified using this method are NOT eligible for ECC verification compliance using Group Sampling.
- New Package Unit Factory Charge; the installer should choose this option when a new package unit is being installed that has an AHRI rating. This helps ensure that the unit was properly charged at the factory. ECC verification of refrigerant charge may not be required in this case.

16. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). The installer (or rater) is to have identified who performed the verification that is documented on the Certificate of Installation. Note that ECC verification compliance by Group Sampling requires that the installer perform their own refrigerant charge verification as part of the installation of the equipment prior to the system being put into a sample group for possible selection by a ECC rater for verification. If Group Sampling is not intended, the ECC Rater may perform the refrigerant charge verification on behalf of the Installing Contractor (applies to any method but Weigh-In) and the Rater will enter same results on both the CF2R and CF3R.
17. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). The Group Sampling status is automatically displayed based on the input results of A15 and A16 on the CF2R. Group Sampling procedures are detailed in Residential Appendix RA2.6.3.
18. Specify the refrigerant charge verification used by the ECC rater. Choices vary depending on what method was specified in Row A11, A12, and A15.

Section B1 and B2. Metering Device Verification

1. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). Installer is to have selected the correct metering device used on the system being verified. This will check against the refrigerant charge verification method selected in A15. An error message will appear in B02 if the wrong verification method may have been selected. Superheat verification can only be used on systems with fixed orifice and Subcool verification can only be used on systems with variable metering devices (TXV or EXV). This entry must match installed system to pass.
2. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). Superheat verification can only be used on systems with fixed orifice and Subcool verification can only be used on systems with variable metering devices (TXV or EXV).

Section C. Instrument Calibration

1. Enter the date of most recent Digital Refrigerant Gauge Calibration Field Check. Analog gauges are not allowed for verification purposes under the 2025 Standards. Specification for pressure gauges is found in Residential Appendix RA3.2.2.2.3. Procedures for the field check procedure are detailed in RA3.2.2.4.2. Calibration field check must happen at least once every 30 days.
2. Enter the date of the most recent Digital Thermocouple Calibration. Specifications for thermocouples and temperature sensors can be found in Residential Appendix RA3.2.2.2.2. Procedures for calibration are detailed in RA3.2.2.4.1. Calibration must happen at least once every 30 days.
3. Digital Refrigerant Gauge Calibration status will appear automatically. If the date entered in C01 is more than 30 days prior to date of verification this row will indicate that calibration is required and you will not be allowed to continue filling out this document until calibration is performed.
4. Digital Thermocouple Calibration status will appear automatically. If the date entered in C02 is more than 30 days prior to date of verification this row will indicate that calibration is required and you will not be allowed to continue filling out this document until calibration is performed.

Section D. Measurement Access Hole (MAH) Verification

1. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). Installer is to have indicated the method used to demonstrate compliance with the MAH requirement by selecting the appropriate method from the drop down list. Procedures for installing MAH's are detailed in RA3.2.2.3. Selecting that the MAH cannot be installed consistent with Figure 3.2-1 may result in additional scrutiny by enforcement personnel.) If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail. For Weigh-in verification methods only If A12 = NO, then system is exempt from the MAH requirement and a special message will show up here.

Section E. Minimum System Airflow Rate Verification

1. This information is automatically calculated based on the information given in A10. This is the target minimum system airflow required for the system being verified.
2. This information is automatically calculated based on the MCH-23 or MCH-28, which documents the measured airflow (or alternative method) of the system being verified. If the measured airflow is not adequate it will not comply with the airflow requirements and refrigerant charge verification cannot be performed. For Weigh-in verification methods only If A12 = NO, then system is exempt from the airflow rate requirement and a special message will show up here.

Section F1. Superheat Charge Verification Method – Data Collection

1. The Rater must independently collect this data. Measure and record the lowest return air dry-bulb temperature that occurred during the refrigerant charge procedure in °F. This temperature must remain above 70°F during the verification procedure. This requirement is detailed in Residential Appendix RA3.2.2.5.
2. The Rater must independently collect this data. Measure and record the condenser air dry-bulb temperature ($T_{condenser}$) in °F. This value is used to determine the target superheat from table RA3.2-2. This value must be at least 55°F and no more than 115°F to use the Superheat Charge Verification Method.
3. If a value less than 55°F or greater than 115°F is entered in F02 the Superheat Method cannot be used.
4. The Rater must independently collect this data. Measure and record the return air dry-bulb temperature ($T_{return,db}$) in °F. This measurement is taken at the MAH (or alternate location specified in F01. This procedure is detailed in RA3.2.2.5.

5. The Rater must independently collect this data. Measure and record the return air wet-bulb temperature ($T_{return,wb}$) in ° F. This measurement is taken at the MAH (or alternate location specified in F01. This procedure is detailed in RA3.2.2.5. This value is used to determine the target superheat from table RA3.2-2.
6. The Rater must independently collect this data. Measure and record the suction line temperature ($T_{suction}$) in °F. This procedure is detailed in RA3.2.2.5. This value is used to calculate the measured superheat.
7. The Rater must independently report this data. This procedure is detailed in RA3.2.2.5. This value is used to determine the evaporator saturation temperature ($T_{evaporator,sat}$) from a pressure temperature chart for the appropriate refrigerant (can be internal to a digital gauge), which is entered into F08.
8. The Rater must independently collect this data. Enter the evaporator saturation temperature ($T_{evaporator,sat}$) from the digital gauge or a separate pressure-temperature chart that corresponds to the suction line pressure entered in F07, in °F.
9. Measured superheat is automatically calculated as the difference between the suction line temperature (F06) and the evaporator saturation temperature (F08)
10. The Rater must independently report this data. Enter target superheat from Table RA3.2-2. This table requires values for the condenser air dry bulb temperature (F02) and the return air wet bulb temperature (F05)
11. System passes superheat method when F10 is within plus or minus 8°F of F09. Note that the target for the installer, on the CF2R-MCH-25 is plus or minus 5°F.

Section F2. Subcooling Charge Verification Method – Data Collection

1. The Rater must independently collect this data. Measure and record the lowest return air dry-bulb temperature that occurred during the refrigerant charge procedure in °F. This temperature must remain above 70°F during the verification procedure. This requirement is detailed in Residential Appendix RA3.2.2.5.
2. The Rater must independently collect this data. Measure and record the condenser air dry-bulb temperature ($T_{condenser}$) in °F. This value must be at least 55°gF and no more than 115°F to use the Subcooling Charge Verification Method.
3. If a value less than 55°F or greater than 115°F is entered in F02 the Subcooling Method cannot be used.
4. The Rater must independently collect this data. Measure and record the liquid line temperature (T_{liquid}) in °F. This procedure is detailed in RA3.2.2.5. This value is used to calculate the measured subcool temperature.
5. The Rater must independently collect this data. Measure and record the liquid line pressure (P_{liquid}) in psig. This procedure is detailed in RA3.2.2.5. This value is used to determine the condenser saturation temperature ($T_{condenser,sat}$) from a pressure temperature chart for the appropriate refrigerant (can be internal to a digital gauge), which is entered into F06.
6. Enter the condenser saturation temperature ($T_{condenser,sat}$) from the digital gauge or a separate pressure-temperature chart that corresponds to the liquid line pressure entered in F05, in °F.
7. Measured Subcooling is automatically calculated as the difference between the liquid line temperature (F04) and the condenser saturation temperature (F06)
8. The Rater must independently collect this data. Enter target subcooling from manufacturer. This may be a challenge to find for older equipment. Internet searches can sometimes result in archived equipment specifications for the equipment in question, or sometimes a very similar model. If the manufacturer's target cannot be found the Commission's Executive Director may provide additional guidance for compliance.

9. System passes Subcooling method when F08 is within plus or minus 6°F of F07. Note that the target for the installer, on the CF2R, is plus or minus 3°F.

Section G. Metering Device Verification for Subcooling Method

1. The Rater must independently collect this data. Measure and record the suction line temperature ($T_{suction}$) in °F. This procedure is detailed in RA3.2.2.5. This value is used to calculate the measured superheat.
2. The Rater must independently collect this data. Measure and record the suction line pressure ($P_{suction}$) in psig. This procedure is detailed in RA3.2.2.5. This value is used to determine the evaporator saturation temperature ($T_{evaporator,sat}$) from a pressure temperature chart for the appropriate refrigerant (can be internal to a digital gauge), which is entered into G03.
3. Enter the evaporator saturation temperature ($T_{evaporator,sat}$) from the digital gauge or a separate pressure-temperature chart that corresponds to the suction line pressure entered in G02, in °F.
4. Measured superheat is automatically calculated as the difference between the suction line temperature (G01) and the evaporator saturation temperature (G03).
5. There are two possible criteria for passing. If the manufacturer's specification is known it should be used, otherwise the CEC requirement is that the superheat be between 3°F and 26°F, inclusive. This row checks the CEC requirement.
6. If the manufacturer's target superheat for ensuring proper metering device operation is known, it supersedes the CEC requirement of being between 3°F and 26°F. If "Yes, documentation to be provided upon request." is selected, the installer should be prepared to provide documentation for the target values used.
7. There are two possible criteria for passing. If the manufacturer's specification is known it should be used, otherwise the CEC requirement is that the superheat be between 3°F and 26°F, inclusive. If "Yes, documentation to be provided upon request." is selected in G06, the installer should be prepared to provide documentation for the target values used.

Section H. Weigh In Charge Procedure

1. ECC rater must visually observe the installer taking this measurement and confirm that correct values are entered into the CF2R. Measure and record the outside air dry-bulb temperature in °F. This will affect the procedures that may be used for ECC verification.
2. ECC rater must confirm that correct values are entered into the CF2R. Specify the method of weigh-in. There are two options that may be used. One is to add or remove a small, weighed portion of refrigerant from a factory charged unit (Charge Adjustment). The other is to weigh the entire charge of refrigerant before introducing it into the system (Total Charge). Select either one. Note: The amount of refrigerant in systems that are not newly installed cannot be assumed to be the factory charge. Altered systems using existing refrigerant must use the Total Charge method. Only new, factory installed equipment can utilize the Charge Adjustment method.
3. ECC rater must confirm that correct values are entered into the CF2R. Enter the Manufacturer's Standard Charge for condenser in pounds and ounces. This is the amount of refrigerant that the manufacturer specifies for a "standard" installation (typical coil match, typical line set size and length). For the Charge Adjustment method, this is the amount of refrigerant that factory charges the system to. Rater should request to see manufacturer's documentation to support this value.
4. ECC rater must confirm that correct values are entered into the CF2R. The Manufacturer's Standard Charge, specified in H03 is based on a standard liquid line length, typically 25 feet. Enter the value here, in feet. Be prepared to provide manufacturer's documentation to support this value.

5. ECC rater must confirm that correct values are entered into the CF2R. The Manufacturer's Standard Charge, specified in H03 is based on a standard liquid line diameter. Enter the value here, in inches (for example: 1/4", 3/8", etc.). Rater should request to see manufacturer's documentation to support this value.
6. ECC rater must confirm that correct values are entered into the CF2R. The Manufacturer's Standard Charge, specified in H03 is based on a standard indoor (evaporator) coil size. Enter the value here, in tons. Rater should request to see manufacturer's documentation to support this value.
7. ECC rater must confirm that correct values are entered into the CF2R. Enter the length of the liquid line installed on the system being verified, in feet. This value must be compared to the standard liquid line length entered in H04 and used to determine if the Manufacturer's Standard Charge entered in E03 is appropriate.
8. ECC rater must confirm that correct values are entered into the CF2R. Enter the diameter of the liquid line installed on the system being verified, in inches (for example: 1/4", 3/8", etc.). This value must be compared to the standard liquid line diameter entered in H05 and used to determine if the Manufacturer's Standard Charge entered in H03 is appropriate.
9. ECC rater must confirm that correct values are entered into the CF2R. Enter the size of the indoor (evaporator) coil installed on the system being verified, in tons. This value must be compared to the standard coil size entered in H06 and used to determine if the Manufacturer's Standard Charge entered in H03 is appropriate.
10. ECC rater must confirm that correct values are entered into the CF2R. Enter the Charge Adjustment to Standard Charge, in ounces. This is the amount of refrigerant that the manufacturer specifies to add to, or remove from, the Manufacturer's Standard Charge entered in H03. This value must come from manufacturer's specifications using the standard values entered in H04 through H06 to the installed values entered in H07 through H09. If refrigerant is to be added, this value should be a positive number. If refrigerant is to be removed, this value should be a negative number. Rater should request to see manufacturer's documentation to support this value.
11. ECC rater must confirm that correct values are entered into the CF2R. This value is calculated automatically. If "Charge Adjustment" was specified in H02, then the value shown here will be the same as the value shown in H10. This is the amount of weighed refrigerant that will be added or removed from the factory charged unit. If refrigerant is to be added, this value should be a positive number. If refrigerant is to be removed, this value should be a negative number. If "Total Charge" was specified in H02, then the value shown here will be the value in H03 added to the value in H10. This is the total amount of refrigerant that will be in the system, all of which must be weighed before introducing into the system.
12. ECC rater must confirm that correct values are entered into the CF2R. Enter the amount of refrigerant weighed and added to, or removed from, system. If refrigerant is to be added, this value should be a positive number. If refrigerant is to be removed from a factory charged system, this value should be a negative number. This value must match the value in H11 for the system to pass.
13. ECC rater to indicate whether system passes or not. If not, use the next line to provide notes as to why system did not pass.

Section I. Weigh In Charge Verification – Additional Requirements

1. The Rater must confirm refrigerant line connections were checked for welding as required by the requirement for brazing lines charged with dry nitrogen is specified in Residential Appendix RA3.2.3.1.5.

2. The Rater must confirm refrigerant lines for leaks with nitrogen gas by pressurized to the manufacturer's specified pressure and if the pressure cannot be maintained, leaks shall be located and fixed.
3. The Rater must confirm refrigerant lines were checked for leaks by evacuating to 500 microns or less and rising by no more than 300 microns after 5 minutes as required by Residential Appendix RA3.2.3.1.5.
4. The Rater must confirm that Observation and documentation of the vacuum and pressurization tests are not required if no fittings (other than the fitting to the compressor) are compression or flare fittings is specified in Residential Appendix RA3.2.3.1.5.
5. The Rater must confirm that the calculated weight adjustment for lineset length is based on the length and diameter of the lineset is specified in Residential Appendix RA3.2.3.1.5.
6. The Rater must confirm that the calculated weight adjustment for coil size is based on manufacturer instructions is specified in Residential Appendix RA3.2.3.1.5.
7. The Rater must confirm that the actual total weight adjustment is equal to the sum of the calculated weight adjustments for lineset and coil size is specified in Residential Appendix RA3.2.3.1.5.
8. The Rater must confirm that the calculated and actual total weights of refrigerant in the system are recorded on or near the nameplate label, in indelible ink or other permanent means is specified in Residential Appendix RA3.2.3.1.5.

Documentation Declaration Statements

1. The person who prepared the CF3R 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.

Rated Space Conditioning System Equipment Verification

CALIFORNIA ENERGY COMMISSION

CEC-CF3R-MCH-26-H

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. System Information

Procedures for verification of High SEER/SEER2 and EER/EER2 Equipment are described in Reference Appendix RA3.4. Each HVAC system requiring verification must use a separate form.

01	Space Conditioning System Identification or Name	
02	Space Conditioning System Description of Area Served	
03a	Efficiency Metric	
03	Status: SEER/SEER2 Performance Compliance Credit Check	
04	Status: EER/EER2 Performance Compliance Credit Check	
05	Status: Heat Pump Heating Output Performance Compliance Check	
06	Status: HSPF/HSPF2 Performance Compliance Credit Check	
07	Directory Used to Certify Product Performance	
08	AHRI Certification Number for the Installed Space Conditioning System from http://www.ahridirectory.org	
09	Does the directory used to certify product performance require a specific air handler, furnace or fan coil make and model?	
10	Does the directory used to certify product performance require a time delay relay (+TDR)?	
11	Does the directory used to certify product performance require a TXV (+TXV)?	

B. Rated Space Conditioning System Equipment Information from Nameplate of the Installed System

The data on the nameplate of the installed component shall conform to the data for the component as shown in the Directory used to certify product performance in order to demonstrate compliance.

01	02	03	04	Data from nameplate of the installed system component					
				05	06	07	08	09	10
SC System ID/Name from CF1R	SC System Description of Area Served	Indoor Unit Name or Description of Area Served	Installed Indoor Unit Type	Outdoor Condenser or Package Unit – Installed Manufacturer Name	Outdoor Condenser or Package Unit - Installed Model Number	Indoor Unit – Installed Manufacturer Name	Indoor Unit - Installed Model Number	Installed Furnace Manufacturer Name	Installed Furnace Model Number

Rated Space Conditioning System Equipment Verification

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

C. Rated Space Conditioning System Equipment Information from Directory of Certified Product Performance

The data on the nameplate of the installed component shall conform to the data for the component as shown in the Directory used to certify product performance in order to demonstrate compliance.

01	02	03	04	Data from the directory used to certify product performance for the rated system component					
				05	06	07	08	09	10
SC System ID/Name from CF1R	SC System Description of Area Served	Indoor Unit Name or Description of Area Served	Installed Indoor Unit Type	Outdoor Condenser or Package Unit – Installed Manufacturer Name	Outdoor Condenser or Package Unit - Installed Model Number	Indoor Unit – Installed Manufacturer Name	Indoor Unit - Installed Model Number	Installed Furnace Manufacturer Name	Installed Furnace Model Number

D. Verified Cooling System SEER/SEER2

Signature by responsible person on this compliance document certifies that the installed cooling equipment meets or exceeds the required value listed on the CF2R.

01	Required Minimum SEER/SEER2	
02	Installed SEER/SEER2	
03	Compliance Statement:	

E. Verified Cooling System EER/EER2

Signature by responsible person on this compliance document certifies that the installed heat pump equipment meets or exceeds the required value listed on the CF2R.

01	Required Minimum EER/EER2	
02	Installed EER/EER2	
03	Compliance Statement:	

F. Verified Heat Pump Heating Output

Signature by responsible person on this compliance document certifies that the installed heat pump equipment meets or exceeds the required value listed on the CF2R.

01	Required Heating BTU Output at 47 Degrees F	
02	Installed Heating BTU Output at 47 Degrees F	
03	Required Heating Output at 17 Degrees F	
04	Installed Heating Output at 17 Degrees F	
05	Compliance Statement:	

G. Verified Heat Pump HSPF/HSPF2

Signature by responsible person on this compliance document certifies that the installed heat pump equipment meets or exceeds the required value listed on the CF2R.

01	Required Minimum HSPF/HSPF2	
02	Installed HSPF/HSPF2	
03	Compliance Statement:	

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

H. Verified Space Conditioning System Air Handler, Furnace or Fan Coil

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	If a specific air handler, furnace or fan coil is required by the directory used to certify product performance, the responsible person certifies by signing this compliance document that the installed air handler/furnace matches the equipment specified by the Directory of Certified Performance.	
02	Verification Status:	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or ☐ All N/A - This entire table is not applicable
03	Correction Notes:	

I. Verified Space Conditioning System Time Delay Relay

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	If a Time Delay Relay is specified by the Directory of Certified Product Performance, the responsible person certifies by signing this compliance document that the Time Delay Relay is installed and has been tested to operate correctly according to the protocols of RA3.4.3.	
02	Verification Status:	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or ☐ All N/A - This entire table is not applicable
03	Correction Notes:	

J. Verified Space Conditioning System TXV

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	If a TXV is specified by the Directory of Certified Product Performance, the responsible person certifies by signing this compliance document that the TXV is properly installed and has been visually verified, including proper placement of the sensing bulb.	
02	Verification Status:	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or ☐ All n/a - This entire table is not applicable
03	Correction Notes:	

K. Determination of Field 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	

Rated Space Conditioning System Equipment Verification

CALIFORNIA ENERGY COMMISSION

CEC-CF3R-MCH-26-H

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

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

Documentation Author Name:	Documentation Author Signature:
Documentation Author Company Name:	Date Signed:
Address:	CEA/AEA/ECC Certification Identification (If applicable):
City/State/Zip:	Phone:

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of 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 Field verification identified on this Certificate of Verification comply with the applicable requirements in Reference Appendices RA2, RA3, 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 (CF2R) signed and submitted by the person(s) responsible for the construction or installation conforms to the requirements specified on the Certificate(s) of Compliance (CF1R) 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

CF3R-MCH-26-H User Instructions

Section A. System Information

1. System Name or Identification/Tag: This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document.
2. System Location or Area Served: This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document.

3a. Efficiency Metric: This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document.

3. Status: SEER/SEER2 performance compliance credit check: This field is filled out automatically. It is referenced from the CF2R.
4. Status: EER/EER2 performance compliance credit check: This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document.
5. Status: Heat Pump Heating Output Performance Compliance Check: This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document.
6. Status: HSPF/HSPF2 performance compliance credit check: This field is filled out automatically. It is referenced from the CF2R.
7. Directory Used to Certify Product Performance: User to select from dropdown list the certification data base used to document equipment efficiency. Choices are AHRI, CEC and DOE.
8. AHRI Certification Number for the Installed Space Conditioning System: If the directory used is not AHRI, "N/A" will automatically be entered. Otherwise, enter the complete AHRI Certification Number for the Installed Space Conditioning System. This number represents a specific piece of equipment (e.g., package units) or combination of equipment (e.g., split systems) that must match the installed equipment.
9. Does the directory used to certify product performance require a specific air handler, furnace or fan coil make and model?: If not using AHRI, user has the option to select "N/A." Note that when using AHRI, this does not apply to package units. Sometimes, for split systems, a specific model air handler/furnace will be called out in addition to the condenser and coil. When it is, it must be installed and verified for the AHRI certificate to be valid for the installed system. Sometimes, the AHRI certificate only calls out the condenser and coil model numbers. In this case the furnace make/model need not be verified. If not, select "No".
10. Does the directory used to certify product performance require a time delay relay (+TDR)?: If not using AHRI, user has the option to select "N/A." If the AHRI certificate specifies that a TDR was on the system when it was tested, then the TDR is required for the system to achieve its certified efficiency and it must be verified. If not, select "No". The indication for a TDR usually consists of a "+TDR" at the end of the model number. Sometimes it may just be a "+D" (delay).
11. Does the directory used to certify product performance require a TXV (+TXV)?: If not using AHRI, user has the option to select "N/A." If the AHRI certificate specifies that a TXV was on the system when it was tested, then the TXV is required for the system to achieve its certified efficiency and it must be verified. If not, select "No". The indication for a TXV usually consists of a "+TXV" at the end of the model number. Sometimes it may just be a "+V" (valve).

Section B. Rated Space Conditioning System Equipment Verification from Nameplate

1. System Name or Identification/Tag: This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document.
2. System Location or Area Served: This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document.
3. Indoor unit Name: This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document.

4. Installed Indoor unit type is automatically filled out.
5. Outdoor Condenser or Package Unit - Installed Manufacturer Name, Data from Nameplate of Installed system component: This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document.
6. Outdoor Condenser or Package Unit - Installed Model Number, Data from Nameplate of Installed system component: This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document.
7. Indoor Coil - Installed Manufacturer Name, Data from Nameplate of Installed system component: This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document.
8. Indoor Coil - Installed Model Number, Data from Nameplate of Installed system component: This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document. For systems where there is no separate inside coil "N/A" will be automatically entered.
9. Installed Furnace Installed Manufacturer Name, Data from Nameplate of Installed system component: This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document.
10. Installed Furnace Installed Model Number, Data from Nameplate of Installed system component: This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document

Section C. Rated Space Conditioning System Equipment Verification from Directory

1. System Name or Identification/Tag: This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document.
2. System Location or Area Served: This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document.
3. Indoor unit Name: This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document.
4. Installed Indoor unit type is automatically filled out.
5. Outdoor Condenser or Package Unit - Installed Manufacturer Name, Data from the Directory used to certify product performance for the rated system component: Enter the Manufacturer's name for the condenser as it appears in the Directory. For Package units, this will be the only Manufacturer's name.
6. Outdoor Condenser or Package Unit - Installed Model Number, Data from the Directory used to certify product performance for the rated system component: Enter the Manufacturer's model number for the condenser as it appears in the Directory. For Package units, this will be the only model number required.
7. Indoor Coil - Installed Manufacturer Name, Data from the Directory used to certify product performance for the rated system component: Enter the Manufacturer's name for the inside coil (aka, indoor coil, evaporator coil) as it appears in the Directory. For system types that don't have separate inside coils or if the directory rating does not include this information, like package units, fan coil units and multi-split variable capacity heat pumps, user may enter "N/A".
8. Indoor Coil - Installed Model Number, Data from the Directory used to certify the rated system component: Enter the Manufacturer's model number for the inside coil (aka, indoor coil, evaporator coil) as it appears in the Directory. For system types that don't have separate inside coils or if the directory rating does not include this information (package units, fan coil units, multi-split variable capacity heat pumps), user may enter "N/A".
9. Installed Furnace Manufacturer Name, Data from the directory used to certify product performance for the rated system component: If not using AHRI, user has the option to select "N/A." Enter the Manufacturer's name for the air handler/furnace as it appears in the directory. For package units there is

no separate air handler, so enter "N/A". Also enter "N/A" if a specific furnace or air handler is not called out in the directory, as indicated in Section A, above.

10. Installed Furnace Installed Model Number, Data from the directory used to certify product performance for the rated system component: If not using AHRI, user has the option to select "N/A". Enter the Manufacturer's model number for the air handler/furnace as it appears in the directory. For package units there is no separate air handler, so enter "N/A". Also enter "N/A" if a specific furnace or air handler is not called out in the directory, as indicated in Section A, above.

Section D. Verified Cooling System SEER2

1. Required Minimum SEER/SEER2: This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document.
2. Installed SEER/SEER2: Enter the exact SEER value shown in the Directory used to certify the equipment shown in Section A, above.
3. Compliance Statement: This field is filled out automatically. Compliance requires that the installed SEER meet the required minimum SEER.

Section E. Verified Cooling System EER/EER2

1. Required Minimum EER2: This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document.
2. Installed EER/EER2: Enter the exact EER value shown in the Directory used to certify for the equipment shown in Section A, above.
3. Compliance Statement: This field is filled out automatically. Compliance requires that the installed EER meet the required minimum EER

Section F. Verified Heat Pump Heating Output

1. Required Heating BTU Output at 47 Degrees F: This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document.
2. Installed Heating BTU Output at 47 Degrees F: Enter the exact Heating BTU Output at 47 Degrees F value shown on in the Directory used to certify the equipment shown in Section A, above.
3. Required Heating BTU Output at 17 Degrees F: This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document.
4. Installed Heating BTU Output at 17 Degrees F: Enter the exact Heating BTU Output at 17 Degrees F value shown on in the Directory used to certify the equipment shown in Section A, above. N/A entry is allowed if heat pump system output is not rated at 17 degrees F in any directory
5. Compliance Statement: This field is filled out automatically. If both rating points are available compliance requires that the installed Heating BTU Output at 47 Degrees and Heating BTU Output at 17 Degrees meet the required minimum from CF2R-MCH-01 or if the high temperature is available compliance requires that the installed Heating BTU Output at 47 Degrees meet the required minimum from CF2R-MCH-01.

Section G. Verified Heat Pump System HSPF2

1. Required Minimum HSPF2: This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document.
2. Installed HSPF/HSPF2: Enter the exact HSPF2 value shown in the Directory used to certify for the equipment shown in Section A, above.
3. Compliance Statement: This field is filled out automatically. Compliance requires that the installed EER meet the required minimum EER.

Section H. Verified Cooling System Air Handler/Furnace

1. This statement must be true for the system to comply.
2. Verification Status: Select the appropriate choice from the following list:
    a. Select “Pass” if the installed air handler/furnace matches the air handler/furnace on the AHRI certificate.
    b. Select “Fail” if the installed air handler/furnace does not match the air handler/furnace on the AHRI certificate. You will be required to enter an explanation in the notes section below.
    c. Select “N/A” if this section does not apply.
3. Correction Notes: If “Fail” is selected in the previous row, indicate specifically why in this section

Section I. Verified Cooling System Time Delay Relay

1. This statement must be true for the system to comply.
2. Verification Status: Select the appropriate choice from the following list:
    a. Select “Pass” if the installed has a time delay relay that meets the verification requirements of RA3.4.3.
    b. Select “Fail” if the installed system does not meet the verification requirements of RA3.4.3.
    c. Select “N/A” if this section does not apply.
3. Correction Notes: If “Fail” is selected in the previous row, indicate specifically why in this section.

Section J. Verified Cooling System TXV

1. This statement must be true for the system to comply.
2. Verification Status: Select the appropriate choice from the following list:
    a. Select “Pass” if a TXV is specified by the Directory of Certified Product Performance and a TXV has been installed.
    b. Select “Fail” if a TXV is specified by the Directory of Certified Product Performance but has not been installed.
    c. Select “N/A” if this section does not apply.
3. Correction Notes: If “Fail” is selected in the previous row, indicate specifically why in this section.

Section K. Determination of Field Verification Compliance

1. Compliance Statement: This field is filled out automatically.

Documentation Declaration Statements

1. The person who prepared the CF3R 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.

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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 150.0(o) **Ventilation for Indoor Air Quality.** All dwelling units shall meet the requirements of ANSI/ASHRAE Standard 62.2-2022 Ventilation and Acceptable Indoor Air Quality in Single-Family Buildings subject to the amendments specified by Title 24, Part 6, Section 150.0(o)1

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. Single Family Attached/Detached General Information

01	Average Ceiling Height	
02	Total Conditioned Volume	
03	Vertical distance between the lowest and highest above-grade points within the pressure boundary in feet	
04	Air Changes Per Hour at 50 Pa	
05	Name of ANSI/ASHRAE Standard 62.2-2022 weather station for climate zone	
06	Weather and shielding factor (wsf) (Based on the city identified above)	

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

C. 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 150.0(o)1Ci

01	Total Required Ventilation rate, (Q_{tot})	
02	Enclosure Leakage Rate (Q_{50})	
03	Effective Annual Average Infiltration Rate (Q_{inf})	
04	Total Exterior Envelope Surface Area	
05	Unshared Exterior Envelope Surface Area (exclude surface areas attached to garages or other dwelling units)	
06	Required Mechanical Ventilation Rate (Q_{fan})	

D. 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 150.0(o)1Ci

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)			

E. HRV or ERV Serving Individual Dwelling Unit Information

Balanced ventilation systems shall comply with appropriate requirements in 150.0(o)2C.

01	02	03
Manufacturer Make	Manufacturer Model Number	Fan Efficacy Performance Rating (W/CFM)

F. 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:	

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

G. Compliance Statement

01	

H. 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 Verification documentation is accurate and complete.

Documentation Author Name:	Documentation Author Signature:
Documentation Author Company Name:	Date Signed:
Address:	CEA/AEA/ECC Certification Identification (If applicable):
City/State/Zip:	Phone:

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of 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 Field verification identified on this Certificate of Verification comply with the applicable requirements in Reference Appendices RA2, RA3, 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 (CF2R) signed and submitted by the person(s) responsible for the construction or installation conforms to the requirements specified on the Certificate(s) of Compliance (CF1R) 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

CF3R-MCH-27-H User Instructions

Section A. General Information

1. Building Unit Name: This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document. This is the unique identifier for this dwelling unit. Ventilation is calculated and provided for each dwelling unit individually.
2. Building Type: This field is filled out automatically. It is referenced from the CF1R. Values are "Single Family Attached"and "Single Family Detached".. User is allowed to overwrite imported value with "Non-dwelling unit" selection.
3. Project Scope: This field is filled out automatically. It is referenced from the CF1R.
    - If parent document is the CF1R-PRF-01, values are "Newly Constructed", "Newly Constructed (Addition Alone)" and "Addition and /or Alteration"
    - If parent document is CF1R-NCB-01, values are "Newly Constructed" and "Newly Constructed (Addition Alone)"
    - If parent document is CF1R-ADD-01, values are "ADU Addition < 300 ft2"," ADU Addition > 300 to < 400 ft2"," ADU Addition > 400 to < 700 ft2" and "ADU Addition > 700 to < 1000 ft2".
4. Total Conditioned Floor Area of Dwelling Unit: This field is filled out automatically. It is referenced from the CF2R-MCH-01.
5. Number of Bedrooms in Dwelling Unit: This field is filled out automatically. It is referenced from the CF2R-MCH-01.
6. Ventilation system Type: This may be filled out automatically or be user input.
    - If parent document is the CF1R-PRF-01, the value will be filled out automatically.
    - If building type is equal to Non-dwelling unit, an N/A value will be filled out automatically.
    - If parent document is the CF1R-NCB or CF1R-ADD, user selects from list of 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 may be filled out automatically or be user input.
    - Building type is equal to Non-dwelling unit; an N/A value will be filled out automatically.
    - User selects from list of Continuous, Short-Term Average, Scheduled and Real-time Control.
    - Note if "Ventilation System Type" (A11) = Central Fan Integrated & "Ventilation Operation Schedule" (A06) = Continuous; then user will not be allowed to proceed.
8. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-27). Installer is to select the appropriate choice regarding whether this system has a Fault Indicator Display (FID). FID's are described in Joint Appendix JA17. Qualifying FID's must appear on a list of approved devices kept by the Commission. If installed system does not match the description here, it fails.

Section B. Single Family Attached/Detached General Information

1. Average Ceiling Height: This may be filled out automatically or be user input.
    - If parent document is the CF1R-PRF-01, the value will be filled out automatically.
    - If parent document is the CF1R-NCB or CF1R-ADD, user enter value in feet.
2. Total Conditioned Volume: This field is calculated and filled out automatically.
3. Vertical distance between the lowest and highest above-grade points within the pressure boundary in feet: This may be filled out automatically or be user input.
    - If parent document is the CF1R-PRF-01, the value will be filled out automatically.
    - If parent document is the CF1R-NCB or CF1R-ADD, user enters value in feet.
4. Air Changes Per Hour at 50 Pa: This may be filled out automatically or be user selected

- If Building type is equal to Non-dwelling unit, an N/A value will be filled out automatically.
- If Building type does not equal Non-dwelling unit, then user may select from Default (ACH50=2.0) or Measured (ACH50<2.0)

5. Name of ANSI/ASHRAE Standard 62.2-2022 weather station for climate zone: This may be filled out automatically or be user input.
    - If parent document is the CF1R-PRF-01, the value will be filled out automatically.
    - If Building type is equal to Non-dwelling unit, an N/A value will be filled out automatically.
    - If parent document is the CF1R-NCB or CF1R-ADD, user select value from Weather Stations from the Table X1 US Climates, Normative Appendix X.
6. Weather and shielding factor (wsf): This value is automatically entered based on the selection in #6.

Section C. Whole -Dwelling Continuous Ventilation – Total Ventilation Rate Method

1. This value is automatically calculated using equation 150.0-B from the Energy Standards.
2. This value automatically calculates using either equation 150.0-C or 150.0-D from the Energy Standards.
    - If air changes per hour from section B is equal to “Default” then equation, 150.0-C will be used.
    - If air changes per hour from section B is equal to “Measured” and the leakage value from the CF2R-MCH-24 is < 2.0 then equation 150.0-D will be used.
    - If air changes per hour from section B is equal to “Measured” and the leakage value from the CF2R-MCH-24 is ≥ 2.0 then equation 150.0-C will be used.
3. This value is automatically calculated using equation 150.0-E from the Energy Standards.
4. Total Exterior Envelope Surface Area: This value may be filled out automatically or be user input.
    - If dwelling type from section A equals “Single Family Detached”, an N/A value will be filled out automatically.
    - If dwelling type from section A equals “Single Family Attached” and the parent document is the CF1R-PRF-01 then value will be automatically entered.
    - If dwelling type from section A equals “Single Family Attached or” and the parent document is the CF1R-NCB-01 or CF1R-ADD-01 then user enter value (ft^2).
5. Unshared Exterior Surface Area: This value may be filled out automatically or be user input.
    - If dwelling type from section A equals “single family detached”, an N/A value will be filled out automatically.
    - If dwelling type from section A equals “single family attached” and the parent document is the CF1R-PRF-01 then value will be automatically entered.
    - If dwelling type from section A equals “single family attached” and the parent document is the CF1R-NCB-01 or CF1R-ADD-01 then user enter value (ft^2).
6. This value is automatically calculated using equation 150.0-F from the Energy Standards.

Section D. 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 B = “continuous”, then value of 60 will be automatically entered.
    - If ventilation operation schedule from section B = “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 RA3.7.4 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.

NORMATIVE APPENDIX B:
INFILTRATION EFFECTIVENESS WEATHER AND SHIELDING FACTORS (WSF)
TABLE B1 U.S. Climates

TMY3	wsf	Weather Station	Latitude	Longitude	State
690150	0.50	Twentynine Palms	34.30	–116.17	California
722860	0.43	March AFB	33.90	–117.25	California
722868	0.45	Palm Springs Intl	33.83	–116.50	California
722869	0.42	Riverside Muni	33.95	–117.45	California
722880	0.39	Burbank–Glendale–Pasadena AP	34.20	–118.35	California
722885	0.39	Santa Monica Muni	34.02	–118.45	California
722886	0.39	Van Nuys Airport	34.22	–118.48	California
722895	0.55	Lompoc (AWOS)	34.67	–120.47	California
722897	0.51	San Luis Co Rgnl	35.23	–120.63	California
722899	0.45	Chino Airport	33.97	–117.63	California
722900	0.38	San Diego Lindbergh Field	32.73	–117.17	California
722903	0.39	San Diego/Montgomery	32.82	–117.13	California
722904	0.40	Chula Vista Brown Field NAAS	32.58	–116.98	California
722906	0.39	San Diego North Island NAS	32.70	–117.20	California
722926	0.40	Camp Pendleton MCAS	33.30	–117.35	California
722927	0.38	Carlsbad/Palomar	33.13	–117.28	California
722930	0.39	San Diego Miramar NAS	32.87	–117.13	California
722950	0.42	Los Angeles Intl Arpt	33.93	–118.40	California
722956	0.38	Jack Northrop Fld H	33.92	–118.33	California
722970	0.38	Long Beach Daugherty Fld	33.83	–118.17	California
722976	0.34	Fullerton Municipal	33.87	–117.98	California
722977	0.36	Santa Ana John Wayne AP	33.68	–117.87	California
723805	0.51	Needles Airport	34.77	–114.62	California
723810	0.59	Edwards AFB	34.90	–117.87	California
723815	0.58	Daggett Barstow–Daggett AP	34.85	–116.80	California
723816	0.62	Lancaster Gen Wm Fox Field	34.73	–118.22	California
723820	0.57	Palmdale Airport	34.63	–118.08	California
723830	0.68	Sandberg	34.75	–118.72	California
723840	0.43	Bakersfield Meadows Field	35.43	–119.05	California
723890	0.45	Fresno Yosemite Intl AP	36.78	–119.72	California
723895	0.42	Porterville (AWOS)	36.03	–119.07	California
723896	0.43	Visalia Muni (AWOS)	36.32	–119.40	California
723910	0.45	Point Mugu Nf	34.12	–119.12	California

NORMATIVE APPENDIX B:
INFILTRATION EFFECTIVENESS WEATHER AND SHIELDING FACTORS (WSF)
TABLE X1 U.S. Climates

TMY3	wsf	Weather Station	Latitude	Longitude	State
723925	0.44	Santa Barbara Municipal AP	34.43	–119.85	California
723926	0.43	Camarillo (AWOS)	34.22	–119.08	California
723927	0.45	Oxnard Airport	34.20	–119.20	California
723940	0.52	Santa Maria Public Arpt	34.92	–120.47	California
723965	0.53	Paso Robles Municipal Arpt	35.67	–120.63	California
724800	0.55	Bishop Airport	37.37	–118.35	California
724815	0.46	Merced/Macready Fld	37.28	–120.52	California
724830	0.51	Sacramento Executive Arpt	38.50	–121.50	California
724837	0.45	Beale AFB	39.13	–121.43	California
724838	0.50	Yuba Co	39.10	–121.57	California
724839	0.51	Sacramento Metropolitan AP	38.70	–121.58	California
724915	0.49	Monterey Naf	36.60	–121.87	California
724917	0.54	Salinas Municipal AP	36.67	-121.60	California
724920	0.50	Stockton Metropolitan Arpt	37.90	-112.23	California
724926	0.47	Modesto City – County AP	37.63	-120.95	California
724927	0.53	Livermore Municipal	37.70	-121.82	California
724930	0.54	Oakland Metropolitan Arpt	37.72	-122.22	California
724935	0.47	Hayward Air Term	37.67	-122.12	California
724936	0.53	Concord – Buchanan Field	38.00	-122.05	California
724940	0.60	San Francisco Intl AP	37.62	-122.40	California
724945	0.48	San Jose Intl AP	37.37	-121.93	California
724955	0.55	Napa Co. Airport	38.22	-122.28	California
724957	0.49	Santa Rosa (AWOS)	38.52	-122.82	California
725845	0.44	Blue Canyon AP	39.30	–120.72	California
725846	0.66	Truckee–Tahoe	39.32	–120.13	California
725847	0.64	South Lake Tahoe	38.90	–120.00	California
725905	0.47	Ukiah Municipal AP	39.13	–123.20	California
725910	0.50	Red Bluff Municipal Arpt	40.15	–122.25	California
725920	0.47	Redding Municipal Arpt	40.52	–122.32	California
725945	0.56	Arcata Airport	40.98	–124.10	California
725946	0.60	Crescent City Faa Ai	41.78	–124.23	California
725955	0.55	Montague Siskiyou County AP	41.78	–122.47	California
725958	0.59	Alturas	41.50	–120.53	California
745090	0.45	Mountain View Moffett Fld NAS	37.40	–122.05	California
745160	0.67	Travis Field AFB	38.27	–121.93	California
746120	0.52	China Lake Naf	35.68	–117.68	California
747020	0.50	Lemoore Reeves NAS	36.33	–119.95	California
747185	0.46	Imperial	32.83	–115.58	California
747187	0.46	Palm Springs Thermal AP	33.63	–116.17	California
747188	0.48	Blythe Riverside Co Arpt	33.62	–114.72	California

Section E. HRV or ERV Information

1. Manufacturer Make – User input text
2. Manufacturer Model Number – User input text
3. Fan Efficacy Performance Rating (W/CFM) – Reference information from CF1R or be user input.

Section F. 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 Joint 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 Joint 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 Joint Appendix JA17.

Section G. Compliance Statement

1. Compliance Statement: This field is filled out automatically

Section H. Determination of ECC Verification Compliance

1. Compliance Statement: This field is filled out automatically

Documentation Declaration Statements

1. The person who prepared the CF3R 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.

RETURN DUCT DESIGN AND AIR FILTER DEVICE SIZING ACCORDING TO TABLES 150.0-B OR C

CALIFORNIA ENERGY COMMISSION

CEC-CF3R-MCH-28-H

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. System Information

01	System Identification or Name	
02	System Location or Area Served	
03	Indoor Unit Name or Description of Area Served	
04	Nominal Cooling Capacity (tons) of Condenser	
05	Number of Return Ducts Used for Compliance	
06	Number of Additional Return Ducts (Not Used for Compliance)	

B. One Return Duct

01	Return Duct Minimum Nominal Diameter (inches)	
02	Installed Return Duct Nominal Diameter (inches)	
03	Minimum Total Return Filter Grille Nominal Area (inch^2)	
04	Installed Total Return Filter Grille Nominal Area (inch^2)	
05	Compliance Statement:	

C. Two Return Ducts

01	Minimum Return Duct1 Nominal Diameter (inches)	
02	Installed Return Duct1 Nominal Diameter (inches)	
03	Minimum Return Duct2 Nominal Diameter (inches)	
04	Installed Return Duct2 Nominal Diameter (inches)	
05	Minimum Total Return Filter Grille Nominal Area (inch^2)	
06	Installed Total Return Filter Grille Nominal Area (inch^2)	
07	Compliance Statement:	

D. Additional Requirements for Compliance

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	Qualification for the Alternative to Section 150.0(m)13B and D requires that the ducted space conditioning system shall not use zoning dampers. Systems that use zoning dampers shall comply with the requirements of Section 150.0(m)13.	
02	The return duct length for each return air filter grille shall not exceed 30 linear feet.	
03	The return duct(s) shall not contain more than a total of 180° of bend.	
04	If the return duct contains more than 90° of bend, one of the bends shall be a metal elbow.	
05	Return grille devices shall be labeled in accordance with the requirements in section 150.0(m)12Biv to disclose the grille's design airflow rate and a maximum allowable clean-filter pressure drop of 25 Pa (0.1 inches water) for the air filter when tested using ASHRAE Standard 52.2, or as rated in accordance with AHRI Standard 680 for the design airflow rate for the return grille.	
06	Verification Status:	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or ☐ All N/A - This entire table is not applicable
07	Correction Notes:	

E. Hole for the placement of a Static Pressure Probe (HSPP), and Permanently installed Static Pressure Probe (PSPP) in the Supply Plenum

Procedures for installing HSPP or PSPP are specified in RA3.3.1.1.

01	Method Used to Demonstrate Compliance with the HSPP/PSPP Requirement	

F. 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	

G. Additional Return Ducts (Not Used for Compliance)

01	02
Installed Return Duct Nominal Diameter (inches)	Installed Total Return Filter Grille Nominal Area ($inch^2$)

RETURN DUCT DESIGN AND AIR FILTER DEVICE SIZING ACCORDING TO TABLES 150.0-B OR C

CALIFORNIA ENERGY COMMISSION

CEC-CF3R-MCH-28-H

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

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

Documentation Author Name:	Documentation Author Signature:
Documentation Author Company Name:	Date Signed:
Address:	CEA/AEA/ECC Certification Identification (If applicable):
City/State/Zip:	Phone:

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of 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 Field verification identified on this Certificate of Verification comply with the applicable requirements in Reference Appendices RA2, RA3, 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 (CF2R) signed and submitted by the person(s) responsible for the construction or installation conforms to the requirements specified on the Certificate(s) of Compliance (CF1R) 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

CF3R-MCH-28-H User Instructions

Section A. System Information

1. System Identification or Name: This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document.
2. System Location or Area Served: This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document.
3. Indoor Unit Name: This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document.
4. Nominal Cooling Capacity (tons) of Condenser: This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document.
5. Number of Return Ducts: Select the number of return ducts from the options given in the pull down list, either one or two return ducts. Those are the only options for this compliance approach. Other configurations will require that airflow and fan watt draw be verified by diagnostic testing.

Section B. One Return Duct

1. Minimum Return Duct Nominal Diameter: This field is automatically calculated based on A03. Refer to Table 150.0-B.
2. Installed Return Duct Nominal Diameter: Enter the installed return duct nominal diameter (inches).
3. Minimum Total Return Filter Grille Nominal Area: This field is automatically calculated based on A03. Refer to Table 150.0-B.
4. Installed Total Return Filter Grille Nominal Area: Enter the installed return filter grille nominal area ($inch^2$). The nominal grille area is equal to the length (inches) multiplied by the width (inches) of the return grille.
5. Compliance Statement: This field is automatically populated based on the inputs to rows B02 and B04. Compliance requires that the installed duct nominal diameter meet or exceed the required duct nominal diameter AND the installed filter grille nominal area meet or exceed the required filter grille nominal area.

Section C. Two Return Ducts

1. Minimum Return Duct1 Nominal Diameter: This field is automatically calculated based on A03. Refer to Table 150.0-C.
2. Installed Return Duct1 Nominal Diameter: Enter the nominal diameter (inches) for the first return duct run.
3. Minimum Return Duct2 Nominal Diameter: This field is automatically calculated based on A03. Refer to Table 150.0-C.
4. Installed Return Duct2 Nominal Diameter: Enter the nominal diameter (inches) for the second return duct run.
5. Minimum Total Return Filter Grille Nominal Area: This field is automatically calculated based on A03. Refer to Table 150.0-C.
6. Installed Total Return Filter Grille Nominal Area: Enter the total return filter grille nominal area by summing up the two grille areas. The nominal area of each grille is equal to the length (inches) multiplied by the width (inches) of the return grille.
7. Compliance Statement: This field is automatically populated based on the inputs to C02, C04 and C06. Compliance requires that the installed duct nominal diameters meet or exceed the required duct nominal diameters AND the total installed filter grille nominal area meet or exceed the total required filter grille nominal area.

Section D Additional Requirements for Compliance

1. This field must be a true statement (or not applicable) for the system to comply.
2. This field must be a true statement (or not applicable) for the system to comply.
3. This field must be a true statement (or not applicable) for the system to comply.
4. This field must be a true statement (or not applicable) for the system to comply.
5. This field must be a true statement (or not applicable) for the system to comply

Section E. Hole for the Placement of a Static Pressure Probe (HSPP), and Permanently Installed Static Pressure Probe (PSPP) in the Supply Plenum

1. A hole for a static pressure probe (HSPP) or a permanent static pressure probe (PSPP) is required when system airflow verification is required, whether the airflow test method used requires one or not. Select the appropriate choice from the following options using a dropdown box, the Static Pressure Measurement Method:
    a. If an Hole Static Pressure Probe is installed then select “HSPP Installed”
    b. If a Permanent Static Pressure Probe is installed then select “PSPP Installed”
    c. If the system is configured such that an HSPP nor PSPP can be installed, an alternate location that provides access for making supply plenum pressure measurement may be used. Select “An alternative location has been provided and clearly labeled.”
    d. If the system is such that an HSPP or PSPP is not applicable, select “HSPP/PSPP are not applicable to this system”.

Section F. Determination of ECC Verification Compliance

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

Documentation Declaration Statements

1. The person who prepared the CF3R 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.

DUCT SURFACE AREA REDUCTION; R-VALUE; BURIED DUCTS COMPLIANCE CREDIT

CALIFORNIA ENERGY COMMISSION

CEC-CF3R-MCH-29-H

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:

Note: Submit one Certificate of installation for each duct system that must demonstrate compliance in the dwelling.

A. Duct System Information

01	Space Conditioning System Name or Identification/Tag	
02	Space Conditioning System Location or Area Served	
03	Indoor Unit Name or Description of Area Served	
04	Status - Duct Surface Area Reduction And R-Value Compliance Credit	
05	Status - Buried Ducts Compliance Credit	
06	Status - Deeply Buried Ducts Compliance Credit	

B. B. Duct Surface Area Reduction and R-value Compliance Credit

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

Credit is available for supply duct systems with reduced surface area in unconditioned space with varying combinations of higher performance insulation if the system complies with the following requirements.

01	The duct system design shall be detailed in the special features section of the CF1R-PRF-01-E approved by the enforcement agency.	
02	A duct design layout that conforms to the duct system design details in the special features section of the CF1R-PRF-01-E shall be documented on the building design plans approved by the enforcement agency.	
03	The duct system installation, including duct sizes, R-values, and lengths, and locations of supply & return registers shall conform to the duct system design layout approved by the enforcement agency.	
04	The duct system installation shall be verified by a ECC rater according to the requirements in RA3.1.4.1.4.	
05	The duct system installation shall not have severely twisted or compressed sections that would restrict required operating airflow.	
06	Verification Status:	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below
07	Correction Notes:	

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

C. Buried Ducts Compliance Credit

Ducts partly or completely buried in blown attic insulation in dwelling units meeting the requirements for verified quality insulation installation may take credit for increased effective duct insulation if the system complies with the following requirements.

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

01	The duct system design shall be detailed in the special features section of the CF1R-PRF-01-E approved by the enforcement agency.	
02	A duct design layout that conforms to the duct system design details in the special features section of the CF1R-PRF-01-E shall be documented on the building design plans approved by the enforcement agency.	
03	The installed duct system and attic insulation shall conform to the design details in the enforcement agency approved CF1R-PRF-01-E. These installation details include, duct nominal diameter, R-value, and length of each segment, ceiling insulation depth, type (i.e. fiberglass or cellulose), and R-value, and supply and return register locations.	
04	The duct system installation shall be verified by a ECC rater according to the requirements in RA3.1.4.1.5. Verification of duct system installation shall be completed prior to burial of ducts. Verification of insulation installation shall be completed by a second ECC inspection after ducts are buried.	
05	Ducts shall not have severely twisted or compressed sections that would restrict required operating airflow.	
06	Ducts shall be buried by a uniform level of insulation (i.e. no mounding attic insulation to achieve burial level), lay directly or within 3.5 inches of ceiling gypsum board, and have at least 6 inches of space between the duct outer jacket and the roof sheathing.	
07	The dwelling shall comply with all Quality Insulation Installation requirements as documented on the applicable CF2R and CF3R.	
08	Verification Status:	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below
09	Correction Notes:	

DUCT SURFACE AREA REDUCTION; R-VALUE; BURIED DUCTS COMPLIANCE CREDIT

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

D. Deeply Buried Ducts Compliance Credit

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

Duct segments meeting the requirements for buried ducts and covered by at least 3.5 inches of insulation can take credit for effective duct insulation levels greater than buried ducts. Deeply buried ducts have the option of using lowered portions of the ceiling or durable containment systems to achieve burial depth greater than the overall attic insulation level. Deeply buried duct systems must comply with the following requirements.

01	The duct system design shall be detailed in the special features section of the CF1R-PRF-01-E approved by the enforcement agency.	
02	A duct design layout that conforms to the duct system design details in the special features section of the CF1R-PRF-01-E shall be documented on the building design plans approved by the enforcement agency.	
03	The installed duct system and attic insulation shall conform to the design details in the enforcement agency approved CF1R-PRF-01-E. These installation details include, duct nominal diameter, R-value, and length of each segment, ceiling insulation depth, type (i.e. fiberglass or cellulose), and R-value, lowered chase or containment system locations, and supply and return register locations.	
04	The duct system installation shall be verified by a ECC rater according to the requirements in RA3.1.4.1.6. Verification of duct system installation shall be completed prior to burial of ducts. Verification of insulation installation shall be completed by a second ECC inspection after ducts are buried.	
05	Ducts shall not have severely twisted or compressed sections that would restrict required operating airflow.	
06	Ducts shall be buried by a uniform level of insulation (i.e. no mounding attic insulation to achieve burial level), lay directly or within 3.5 inches of ceiling gypsum board, and have at least 6 inches of space between the duct outer jacket and the roof sheathing.	
07	The dwelling shall comply with all Quality Insulation Installation requirements as documented on the applicable CF2R and CF3R.	
08	Containment systems shall have walls at least 7 inches wider than the duct outer diameter, extend at least 3.5 inches above the duct jacket, be filled completely with blown insulation, and have the duct centered between the containment walls.	
09	Verification Status:	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below
10	Correction Notes:	

E. Duct System Design Details

01	02	03	04	05	06	07	08	09
Duct Segment Identification	Nominal Diam. (in)	Duct R-value	Length (ft)	Attic Insulation R-value	Attic Insulation Depth (in)	Attic Insulation Type	Containment System or Lowered Chase	Duct Burial Level

F. 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	

DUCT SURFACE AREA REDUCTION; R-VALUE; BURIED DUCTS COMPLIANCE CREDIT

CALIFORNIA ENERGY COMMISSION

CEC-CF3R-MCH-29-H

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

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

Documentation Author Name:	Documentation Author Signature:
Documentation Author Company Name:	Date Signed:
Address:	CEA/AEA/ECC Certification Identification (If applicable):
City/State/Zip:	Phone:

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of 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 Field verification identified on this Certificate of Verification comply with the applicable requirements in Reference Appendices RA2, RA3, 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 (CF2R) signed and submitted by the person(s) responsible for the construction or installation conforms to the requirements specified on the Certificate(s) of Compliance (CF1R) 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

CF3R-MCH-29-H User Instructions

Section A. Duct System Information

1. *System Identification or Name:* This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document.
2. *System Location or Area Served:* This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document.
3. *Indoor Unit Name:* This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document.
4. Status – Duct Surface Area Reduction and R-Value Compliance Credit: This field is auto filled from the CF2R-MCH-29 indicating if the credit is being used. If not, then "N/A" will be displayed.
5. Status – Buried Ducts Compliance Credit: This filed is auto filled from the CF2R-MCH-29 indicating if the credit is being used. If not, then "N/A" will be displayed.
6. Status – Deeply Buried Ducts Compliance Credit: This field is auto filled from the CF2R-MCH-29 indicating if the credit is being used. If not, then "N/A" will be displayed.

Section B. Duct Surface Area Reduction and R-value Compliance Credit

1. This field must be a true statement (or not applicable) for the system to comply.
2. This field must be a true statement (or not applicable) for the system to comply.
3. This field must be a true statement (or not applicable) for the system to comply.
4. This field must be a true statement (or not applicable) for the system to comply.
5. This field must be a true statement (or not applicable) for the system to comply.
6. *Verification Status:* If the system meets the criteria for *Duct Surface Area Reduction and R-value Compliance Credit* then select "Pass", otherwise select "Fail". The latter selection means that the system does not meet the requirements and the CF1R will have to be revised, or the system will need to be modified to meet the requirements.
7. *Correction Notes:* If one or more applicable requirements are not met "Fail" will appear in the row above. When this occurs the rater is required to enter detailed notes here that describe what failed and why.

Section C. Buried Ducts Compliance Credit

1. This field must be a true statement (or not applicable) for the system to comply.
2. This field must be a true statement (or not applicable) for the system to comply.
3. This field must be a true statement (or not applicable) for the system to comply.
4. This field must be a true statement (or not applicable) for the system to comply.
5. This field must be a true statement (or not applicable) for the system to comply.
6. This field must be a true statement (or not applicable) for the system to comply.
7. This field must be a true statement (or not applicable) for the system to comply.
8. *Verification Status:* If the system meets the criteria for *Buried Ducts Compliance Credit* then select "Pass", otherwise select "Fail". The latter selection means that the system does not meet the requirements and the CF1R will have to be revised, or the system will need to be modified to meet the requirements.
9. *Correction Notes:* If one or more applicable requirements are not met "Fail" will appear in the row above. When this occurs the rater is required to enter detailed notes here that describe what failed and why.

Section D. Deeply Buried Ducts Compliance Credit

1. This field must be a true statement (or not applicable) for the system to comply.
2. This field must be a true statement (or not applicable) for the system to comply.
3. This field must be a true statement (or not applicable) for the system to comply.

4. This field must be a true statement (or not applicable) for the system to comply.
5. This field must be a true statement (or not applicable) for the system to comply.
6. This field must be a true statement (or not applicable) for the system to comply.
7. This field must be a true statement (or not applicable) for the system to comply.
8. This field must be a true statement (or not applicable) for the system to comply.
9. *Verification Status:* If the system meets the criteria for *Deeply Buried Ducts Compliance Credit* then select "Pass", otherwise select "Fail". The latter selection means that the system does not meet the requirements and the CF1R will have to be revised, or the system will need to be modified to meet the requirements.
10. *Correction Notes:* If one or more applicable requirements are not met "Fail" will appear in the row above. When this occurs the rater is required to enter detailed notes here that describe what failed and why.

Section E. Duct System Design Details

This table is a calculated field: table copied from CF1R-PRF-01

1. Reference information from CF1R-PRF-01, which must be completed prior to this document.
2. Reference information from CF1R-PRF-01, which must be completed prior to this document.
3. Reference information from CF1R-PRF-01, which must be completed prior to this document.
4. Reference information from CF1R-PRF-01, which must be completed prior to this document.
5. Reference information from CF1R-PRF-01, which must be completed prior to this document.
6. Reference information from CF1R-PRF-01, which must be completed prior to this document.
7. Reference information from CF1R-PRF-01, which must be completed prior to this document.
8. Reference information from CF1R-PRF-01, which must be completed prior to this document.
9. Reference information from CF1R-PRF-01, which must be completed prior to this document.

Documentation Declaration Statements

1. The person who prepared the CF3R 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.

Central Fan Ventilation Cooling Systems (CFVCS)

CALIFORNIA ENERGY COMMISSION

CEC-CF3R-MCH-30-H

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:

NOTE: When the Certificate of Compliance indicates a Central Fan Ventilation Cooling system is installed, the following items must be verified.

A. Central Fan Ventilation Cooling System (VCS) Equipment Information

01	Space Conditioning System Identification or Name	
02	Space Conditioning System Location or Area Served	
03	Indoor Unit Name or Description of Area Served	
04	Central FanVCS Equipment - Manufacturer Name	
05	Central Fan VCS Equipment - Manufacturer Model #	
06	Central FanVCS Equipment - Fan Type Required	
07	Central FanVCS Equipment - Fan Type Installed	
08	Central FanVCS Equipment - Manufacturer Documentation Status	
09	Duct Leakage Verification Status	
10	Airflow Rate Verification Status	
11	Fan Efficacy Verification Status	
12	Compliance Statement:	

B. 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	

Central Fan Ventilation Cooling Systems (CFVCS)

CALIFORNIA ENERGY COMMISSION

CEC-CF3R-MCH-30-H

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

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

Documentation Author Name:	Documentation Author Signature:
Documentation Author Company Name:	Date Signed:
Address:	CEA/AEA/ECC Certification Identification (If applicable):
City/State/Zip:	Phone:

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of 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 Appendices RA2, RA3, 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 (CF2R) signed and submitted by the person(s) responsible for the construction or installation conforms to the requirements specified on the Certificate(s) of Compliance (CF1R) 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

CF3R-MCH-30-E User Instructions

Section A. Central Fan Ventilation Cooling System (VCS) Equipment Information

1. Enter the Central Fan Ventilation Cooling System (VCS) Name or identification tag to help identify this system from other systems in the house. This field is automatically filled in as referenced from the MCH-01 description for this system.
2. Enter the Location or Area Served by the Central Fan VCS. This is a tag to distinguish this system from other systems in the house. This field is automatically filled in as referenced from the MCH-01 description for this system.
3. Indoor Unit Name: This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document.
4. Enter the Central Fan VCS Manufacturer Name.
5. Enter the Central Fan VCS Manufacturer Model Number.
6. The Central Fan VCS Fan Type Required is specified by the performance approach software. This field is filled in automatically as referenced from the CF1R.
7. Enter the Central Fan VCS Fan Type Installed. The choices are “Fixed Flow” or “Variable Flow”. Variable fans receive more compliance credit. The installed fan type should match the fan type specified on the CF1R.
8. Installer must verify/confirm that the Central Fan VCS Equipment is included in the Energy Commission listing of approved VCS devices and that the fan type, “Fixed” or “Variable”, matches what is shown on the list.
9. Compliance Credit for Central Fan VCS also requires that the system conforms to the maximum Duct Leakage verification requirements. This row automatically queries the project data to confirm that a MCH-20 has been registered indicating that the system passed the duct leakage criterion.
10. Compliance Credit for Central Fan VCS also requires that the system pass the Airflow Rate requirements. This row automatically queries the project data to confirm that the applicable MCH-23 Airflow Rate verification has been registered indicating that the system passed.
11. Compliance Credit for Central Fan VCS also requires that the system pass the Fan Efficacy requirements. This row automatically queries the project data to confirm that a MCH-22 Fan Efficacy verification has been registered indicating that the system passed.
12. Compliance Statement. The system must comply with all verification requirements in Section A in order to pass.

Section B. Additional Requirements

The System must comply with all of the additional requirements that are applicable in order to be in compliance with the Central Fan Ventilation Cooling System compliance credit requirements.

1. This field must be a true statement for the system to comply.
2. This field must be a true statement (or not applicable) for the system to comply.
3. This field must be a true statement for the system to comply.
4. This field must be a true statement (or not applicable) for the system to comply.
5. This field must be a true statement (or not applicable) for the system to comply.
6. This field must be a true statement for the system to comply.

Documentation Declaration Statements

1. The person who prepared the CF3R 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.

WHOLE HOUSE FAN

CALIFORNIA ENERGY COMMISSION

CEC-CF3R-MCH-31-H

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. Whole House Fan Measurement Procedures

01	Whole House Fan Airflow/Watts Measurement Procedure:	

B. Required Whole House Fan Specifications

01	02	03
Fan Name	WHF Modeled Airflow (CFM)	WHF Modeled Fan Power (Watts)

C1. Tested Whole House Fan Equipment Information – Airflow and watts measured per Whole House Fan

Requirements for Whole House Fans are given in Sections 150.1(b)2.B.vi and 150.1(c)12

01	02	03	04	05	06
Fan Name	Fan Location	WHF Manufacturer Name	WHF Model Number	WHF Tested Airflow (CFM) Per RA3.9.4.1	WHF Tested Watts Per RA3.9.4.2

C2. Tested Whole House Fan Equipment Information – Airflow measured per whole house fan and watts measured as a total value

Requirements for Whole House Fans are given in Sections 150.1(b)2.B.vi and 150.1(c)12

01	02	03	04	05	06
Fan Name	Fan Location	WHF Manufacturer Name	WHF Model Number	WHF Tested Airflow (CFM) Per RA3.9.4.1	WHF Tested Watts Per RA3.9.4.2

D. Whole House Fan Compliance Calculations

01	Required CFM	
02	Installed CFM	
03	Required Fan Efficacy (Watts/CFM)	
04	Installed Fan Efficacy (Watts/CFM)	

E. Compliance Statement

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

F. Additional Requirements

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

01	The installed fan shall be listed in the Home Ventilating Institute Certified Products Directory.	
02	The homeowner shall be provided with user instructions documentation that describes the proper use of the whole house fan necessary to obtain the full energy savings benefit.	
03	Verification Status:	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below
04	Correction Notes:	

G. 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	

Documentation Declaration Statements

1. The person who prepared the CF3R 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.

CALIFORNIA ENERGY COMMISSION

CEC-CF3R-MCH-31-H

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

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

Documentation Author Name:	Documentation Author Signature:
Documentation Author Company Name:	Date Signed:
Address:	CEA/AEA/ECC Certification Identification (If applicable):
City/State/Zip:	Phone:

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of 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 Field verification identified on this Certificate of Verification comply with the applicable requirements in Reference Appendices RA2, RA3, 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 (CF2R) signed and submitted by the person(s) responsible for the construction or installation conforms to the requirements specified on the Certificate(s) of Compliance (CF1R) 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

CF3R-MCH-31-H User Instructions

Section A. Whole House Fan Measurement Procedures

1. Select the procedure used to measure whole house fan Airflow.
2. Select the procedure used to measure whole house fan Watts.

Section B. Required Whole House Fan Specifications

1. Fan name will be auto populated from CF2R.
2. Whole House Fan (WHF) airflow in CFM will be auto populated from CF2R.
3. Whole House Fan (WHF) power in Watts will be auto populated from CF2R.

Section C1. Whole House Fan (WHF) Equipment Information

(This section is required if procedure in A01 uses a Portable Meter)

1. Fan name will be auto populated from CF2R.
2. Enter the location where each whole house fan is installed in the house.
3. Enter the name of the manufacturer for each whole house fan installed in the house.
4. Enter the model number for each whole house fan installed in the house.
5. Enter the tested airflow in CFM per RA3.9.4.1 for each whole house fan installed in the house.
6. Enter the tested the Watts per RA3.9.4.2 for each whole house fan installed in the house.

Section C2. Whole House Fan (WHF) Equipment Information

(This section is required if procedure in A01 uses a Revenue Meter)

1. Fan name will be auto populated from CF2R.
2. Enter the location where each whole house fan is installed in the house.
3. Enter the name of the manufacturer for each whole house fan installed in the house.
4. Enter the model number for each whole house fan installed in the house.
5. Enter the tested airflow in CFM per RA3.9.4.1 for each whole house fan installed in the house.
6. Enter the total tested Watts per RA3.9.4.2 for all whole house fans installed in the house.

Section D. Whole House Fan Compliance Calculations

1. This field is automatically populated from Section B.
2. This field is automatically populated from Section C.
3. This field is automatically populated from Section B.
4. This field is automatically calculated from section C.

E. Compliance Statement

To comply, the total installed whole house fan airflow must equal to or greater than the required airflow and the installed fan efficacy must be less than or equal to the required fan efficacy.

F. Additional Requirements

1. To qualify for the whole house fan credit, the installed whole house fans must be listed in the Home Ventilating Institute Certified Products Directory, https://www.hvi.org/hvi-certified-products-directory/
2. The homeowner shall be provided with user instructions documentation that describes the proper use of the whole house fan necessary to obtain the full energy savings benefit.

3. Verification Status: If the system meets the criteria for Whole House Fan Compliance Credit Compliance Credit then select "Pass", otherwise select "Fail". The latter selection means that the system does not meet the requirements and the CF1R will have to be revised, or the system will need to be modified to meet the requirements.
4. Correction Notes: If one or more applicable requirements are not met “Fail” will appear in the row above. When this occurs the rater is required to enter detailed notes here that describe what failed and why.

G. Determination of ECC Verification Compliance

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

Documentation Declaration Statements

1. The person who prepared the CF3R 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.

LOCAL MECHANICAL EXHAUST

CALIFORNIA ENERGY COMMISSION

CEC-CF2R-MCH-32-H

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 150.0(o) **Ventilation for Indoor Air Quality.** All dwelling units shall meet the requirements of ANSI/ASHRAE Standard 62.2. Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings, subject to the amendments specified in Section 150.0(o)1. ***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 150.0-G*)	
05	Compliance Statement	

E. Determination of Field 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	

LOCAL MECHANICAL EXHAUST

CALIFORNIA ENERGY COMMISSION

CEC-CF2R-MCH-32-H

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

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

Documentation Author Name:	Documentation Author Signature:
Documentation Author Company Name:	Date Signed:
Address:	CEA/AEA/ECC Certification Identification (If applicable):
City/State/Zip:	Phone:

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of 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 Field verification identified on this Certificate of Verification comply with the applicable requirements in Reference Appendices RA2, RA3, 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 (CF2R) signed and submitted by the person(s) responsible for the construction or installation conforms to the requirements specified on the Certificate(s) of Compliance (CF1R) 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

CF3R-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 CF1R.
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 CF3R 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.

VARIABLE CAPACITY HEAT PUMP COMPLIANCE CREDIT

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. VCHP System Information

Procedures for verification of VCHP compliance credit eligibility are described in the Energy Code Reference Appendices Section RA3.4.4.3.

01	SC System ID/Name from CF1R	
02	SC System Description of Area Served	
03	Conditioned Floor Area Served by the System (ft^2)	
04	Status: Refrigerant charge verification from MCH-25	
05	Verification: Is conditioned airflow supplied to all habitable rooms in accordance with the procedure in RA3.1.4.1.7?	
Notes:		

B. VCHP Indoor Unit Information

Ducted indoor units are required to be certified to the Energy Commission as low static systems, and included in the list of certified indoor units published on the Energy Commission website at the following URL:
https://www.energy.ca.gov/rules-and-regulations/building-energy-efficiency/manufacturer-certification-building-equipment.

01	02	03	04	05	06	07	08	09
Indoor Unit Name or Description of Area Served	Installed Indoor Unit Type	Indoor Unit Duct Status	Conditioned Floor Area Served By The Indoor Unit (ft^2)	Number of Air Filter Devices on Indoor Unit	Indoor Unit Required Minimum System Airflow Rate (cfm)	Status: Airflow Rate Verification from MCH-23	Is Field Verification of Default Non-Continuous Fan Operation Required?	Verification: Is Ducted Low Static Indoor Unit Certified to CEC?
Notes:								

VARIABLE CAPACITY HEAT PUMP COMPLIANCE CREDIT

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

C. Verification: Ducted Indoor Units Located Entirely in Directly Conditioned Space - RA3.1.4.3.8

Ducted indoor units shall be verified in accordance with the Verified Low Leakage Ducts in Conditioned Space procedure in Section RA3.1.4.3.8.

01	02	03	04
Indoor Unit Name or Description of Area Served	A Visual Inspection Shall Confirm the Space Conditioning Distribution System Location(RA3.1.4.1.3)	Measured Duct Leakage to Outside (cfm) Using RA3.1.4.3.4	Compliance Statement:
Notes:			

D. Verification: Ductless Indoor Units Located Entirely in Directly Conditioned Space - RA3.1.4.1.8

A visual inspection shall confirm that ductless indoor units are located entirely in conditioned space in accordance with the procedures of RA3.1.4.1.8.

01	02	03
Indoor Unit Name or Description of Area Served	Indoor Unit Installation Location Verification	Compliance Statement:
Notes:		

E. Verification: Wall Mounted Thermostats - RA3.4.5

Field verification according to the procedure in RA3.4.5 shall confirm that VCHP space conditioning zones that are greater than 150 ft^2, are controlled by a permanently installed wall-mounted thermostat.

01	02	03	04	05
Indoor Unit Name or Description of Area Served	Is a Wall-mounted Thermostat Installed in the Zone Served by the Indoor Unit?	Does the Thermostat Control the Zone's Indoor Unit?	Is the Thermostat Mounted Permanently to the Wall?	Compliance Statement:
Notes:				

VARIABLE CAPACITY HEAT PUMP COMPLIANCE CREDIT

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

F. Verification: Non-Continuous Fan Operation - RA3.4.6

If the certificate of compliance indicates non-continuous indoor unit fan operation was specified for compliance credit, then the system shall be field verified in accordance with the procedures in SC3.4.6 to confirm that the installed system's indoor unit + outdoor unit combination does not operate the fan continuously when the system thermostat is not calling for conditioning.

01	02	03	04	05
Indoor Unit Name or Description of Area Served	Is Non-Continuous Default Fan Operation Shown in CEC Certification Listings?	Does Indoor Unit Air Distribution Fan Operate When There Is No Call For Heating?	Does Indoor Unit Air Distribution Fan Operate When There Is No Call For Cooling?	Compliance Statement:
Notes:				

G. Verification: Installed Air Filter Sizing and Pressure Drop - RA3.1.4.7 and RA3.1.4.8

Nominal 2-inch or greater depth air filters shall be sized by the system designer to accommodate a maximum allowable clean-filter pressure drop of 0.1 inch w.c at the air filter's design airflow rate as verified according to the procedures in RA3.1.4.8. Nominal one-inch minimum depth air filters shall be allowed if the filter face area is sized based on a maximum face velocity of 150 ft per minute at the air filter design airflow rate according to the procedures in RA3.1.4.7. In order to inform the occupant of the airflow and clean filter pressure drop performance required for replacement air filters, the installer shall place a sticker in or near the filter grille displaying the air filter design airflow rate and the maximum allowed clean filter pressure drop at the design airflow rate as required by Standards Section 150.0(m)12Biv.

01	02	03	04	05	06	07	08	09	10	11	12
Indoor Unit Name or Description of Area Served	Air Filter Name or Description of Location	Air Filter Device Type	Design Airflow Rate for Air Filter Device (cfm)	Air Filter Nominal Depth (inch)	Air Filter Nominal Length (inch)	Air Filter Nominal Width (inch)	Air Filter Calculated Nominal Face Area ($inch^2$)	Air Filter Required Minimum Face Area ($inch^2$)	Face Area Compliance	Air Filter Rated Pressure Drop at Design Airflow Rate (inch W.C.)	Air Filter Pressure Drop Compliance
Notes:											

H. VCHP System Compliance Statement

01	

VARIABLE CAPACITY HEAT PUMP COMPLIANCE CREDIT

CALIFORNIA ENERGY COMMISSION

CEC-CF3R-MCH-33-H

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

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

Documentation Author Name:	Documentation Author Signature:
Documentation Author Company Name:	Date Signed:
Address:	CEA/AEA/ECC Certification Identification (If applicable):
City/State/Zip:	Phone:

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of 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 Appendices RA2, RA3, 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 (CF2R) signed and submitted by the person(s) responsible for the construction or installation conforms to the requirements specified on the Certificate(s) of Compliance (CF1R) 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:

CF3R-MCH-33-H User Instructions

Section A. VCHP System Information

1. This field is filled out automatically. It is referenced from the CF2R-MCH-01 which must be completed prior to this document.
2. This field is filled out automatically. It is referenced from the CF2R-MCH-01 which must be completed prior to this document.
3. This field is filled out automatically. It is referenced from the CF2R-MCH-01 which must be completed prior to this document.
4. This field is filled out automatically. It is referenced from the CF2R-MCH-25 which must be completed prior to this document.
5. Perform the verification specified by RSC3.1.4.1.7 and select the value that describes the result of the verification.

Section B. VCHP Indoor Unit Information

1. This field is filled out automatically. It is referenced from the CF2R-MCH-01 which must be completed prior to this document.
2. This field is filled out automatically. It is referenced from the CF2R-MCH-01 which must be completed prior to this document.
3. This field is filled out automatically. It is referenced from the CF2R-MCH-01 which must be completed prior to this document.
4. Accept the default value from theCF2R, otherwise enter the conditioned floor area served by the indoor unit - a value in ft^2.
5. Accept the default value from theCF2R, otherwise enter the number of air filter devices on this indoor unit.
6. This field is filled out automatically. It is referenced from the CF2R-MCH-23 which must be completed prior to this document.
7. This field is filled out automatically. It is referenced from the CF2R-MCH-23 which must be completed prior to this document.
8. This field is filled out automatically. It is referenced from the Certificate of Compliance which must be completed prior to this document.
9. Navigate to the URL for the Manufacturer certification listings and determine whether the installed system is included in the CEC listing, then select the value that describes the result of the verification.

Section C. Verification: Ducted Indoor Units Located Entirely in Directly Conditioned Space - RA3.1.4.3.8

1. This field is filled out automatically. It is referenced from a different section of this document.
2. Select the statement that best describes the location of the ducted distribution system.
3. Enter the leakage to outside airflow determined from the RA3.1.4.3.8
4. This field is filled out automatically

Section D. Verification: Ductless Indoor Units Located Entirely in Directly Conditioned Space - RA3.1.4.1.8

1. This field is filled out automatically. It is referenced from a different section of this document.
2. Select the statement that best describes the indoor unit installation location as determined according to RA3.1.4.1.8.
3. This field is filled out automatically

Section E. Verification: Wall Mounted Thermostats - RA3.4.5

1. This field is filled out automatically. It is referenced from a different section of this document.

2. Answer yes or no to the question: Is a wall-mounted thermostat installed in the zone served by the indoor unit?
3. Answer yes or no to the question: Does the thermostat control the zone's indoor unit?
4. Answer yes or no to the question: Is the thermostat mounted permanently to the wall?
5. This field is filled out automatically

Section F. Verification: Non-Continuous Fan Operation RA3.4.6

1. This field is filled out automatically. It is referenced from a different section of this document.
2. Select the best response to the question: Is non-continuous default fan operation shown in CEC certification listings?
3. Select the best response to the question: Does indoor unit air distribution fan operate when there is no call for heating?
4. Select the best response to the question: Does indoor unit air distribution fan operate when there is no call for cooling?
5. This field is filled out automatically

Section G. Verification: Installed Air Filter Sizing and Pressure Drop - RA3.1.4.7 and RA3.1.4.8

1. This field is filled out automatically. It is referenced from the CF2R-MCH-01 which must be completed prior to this document.
2. This field is filled out automatically. It is referenced from the CF2R-MCH-01 which must be completed prior to this document.
3. This field is filled out automatically. It is referenced from the CF2R-MCH-01 which must be completed prior to this document.
4. This field is filled out automatically. It is referenced from another section on this document, or from the CF2R-MCH-01 which must be completed prior to this document.
5. Enter the nominal depth of the air filter in inches.
6. Enter the nominal length of the air filter in inches.
7. Enter the nominal width of the air filter in inches.
8. This field is filled out automatically by calculating the product of air filter length and air filter width.
9. This field is filled out automatically based on the depth of the filter.
10. This field is filled out automatically
11. Input the pressure drop at the design airflow rate from the performance data information published on the air filter label.
12. This field is filled out automatically

Section H. VCHP System Compliance Statement

1. This field is filled out automatically

Documentation Declaration Statements

1. The person who prepared the CF3R 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.

VERIFIED SINGLE DWELLING UNIT HOT WATER SYSTEM DISTRIBUTION

CALIFORNIA ENERGY COMMISSION

CEC-CF3R-PLB-22-H

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 CF1R compliance document for this project.

01	02	03	04	05	06	07	08	09	10	11
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	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 CF1R compliance document for this project.

01	02	03	04	05	06	06a	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	Tank Volume	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
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	Dwelling Unit DHW System Distribution Type	Compact Distrib.	Drain Water Heat Recovery

VERIFIED SINGLE DWELLING UNIT HOT WATER SYSTEM DISTRIBUTION

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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	06a	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	Tank Volume	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 CF1R 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

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F. Mandatory Measures for Single Dwelling 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	Domestic hot water piping insulation requirements (Section 150(J)): • 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.
04	For Gas or Propane Water Heaters: Ensure either a **or** b are installed (Section 150.0(n)) a) designated space at least 2.5 feet by 2.5 feet and 7 feet tall within 3 feet from the water heater • 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 natural draining without pump assistance. 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 • 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	For Air-Source Heat Pump Water Heaters (HPWH), the following shall be met (Section 110.3(c)7) A. Backup heat is required when inlet air is unconditioned, unless the compressor cutout cut-off temperature is below the Heating Winter Median of Extreme. Backup heat may be internal or external to the HPWH B. Meet **one** of the ventilation requirements below. Minimum volume and opening size requirements shall be the sum of all HPWHs installed within the same space. Compressor capacity shall be determined using AHRI 540 Table 4 reference conditions for refrigeration with the "High" rating test point: a. Installed using a method provided by the manufacturer to meet or exceed the level of performance provided by the ventilation requirements of Section 110.3(c)7B2 through Section 110.3(c)B4. b. For HPWH installation without ducts, the installation space shall have a volume not less than the greater of 100 cubic feet per kBtu per hour of compressor capacity, or the minimum volume provided by the manufacturer for this method; or c. For HPWH installation without ducts, the installation space shall be vented to a communicating space via permanent openings, according to the following requirements: i. Communicating space shall meet the minimum volume of Section 110.3(c)7B12 above, minus the volume of the HPWH installation space; and ii. Permanent openings shall consist of a single layer of fixed flat slat louvers or grilles, with a total minimum Net Free Area (NFA) the larger of 125 square inches plus 25 square inches per kBtu per hour of compressor capacity, or the minimum provided by the manufacturer for this method. The permanent openings shall be fully louvered doors or two openings of equal area, one in the upper half of the enclosure and one in the bottom half of the enclosure. The top of the upper opening must be 12 inches or less from the enclosure top and the bottom of the lower vent must be 12 inches or less from the enclosure bottom; or

	the minimum provided by the manufacturer for this method. The permanent openings shall be fully louvered doors or two openings of equal area, one in the upper half of the enclosure and one in the bottom half of the enclosure. The top of the upper opening must be 12 inches or less from the enclosure top and the bottom of the lower vent must be 12 inches or less from the enclosure bottom; or b. For HPWH installations with ducts, the following requirements shall be met: i. The space joined to the installation space via ducts shall meet the minimum volume of Section 110.3(c)7B2 above, minus the volume of the HPWH installation space; and ii. All duct connections and building penetrations shall be sealed; and iii. Exhaust air ducts and all ducts which cross pressure boundaries shall be insulated to minimum of R-6; and iv. Where only the HPWH inlet or outlet is ducted, installation space shall include permanent openings which consist of a single layer of fixed flat slat louvers or grilles in the bottom half of the room, and/or a door undercut. With a ducted inlet, the minimum NFA shall be equal to the cross-sectional area of the duct. With a ducted exhaust, the minimum NFA shall be the larger of 20 square inches or the minimum NFA provided by the manufacturer for this method; and Where the inlet and outlet ducts both terminate within the same pressure boundary, airflow from the termination points shall be diverted away from each other	
06	Verification Status:	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or ☐ All N/A - This entire table is not applicable
07	Correction Notes:	

G. Verified Compact Hot Water Distribution 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

08	No hot water piping >1 inch diameter is allowed.	
09	Length of 1 inch diameter piping is limited to 8 feet or less.	
10	Two and three story buildings cannot have hot water distribution piping in the attic, unless the water heater is also located in the attic.	
11	Eligible recirculating systems must be Verified Demand Recirculation: Manual Control conforming to RA4.4.17.	
12	Verification Status:	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or ☐ All N/A - This entire table is not applicable
13	Correction Notes:	

VERIFIED SINGLE DWELLING UNIT HOT WATER SYSTEM DISTRIBUTION

CALIFORNIA ENERGY COMMISSION

CEC-CF3R-PLB-22-H

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H. Compact Hot Water Distribution (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:	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or ☐ All N/A - This entire table is not applicable
16	Correction Notes:	

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

J. Verified Pipe Insulation for Single Dwelling Systems Requirements (RA3.6.2)

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 unless otherwise noted in the Verification Status and the Corrections Notes in this table.

01	ECC rater shall perform a visual inspection that all hot water piping comply with the insulation requirements in 150.0(j).	
02	Verification Status:	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or ☐ All N/A - This entire table is not applicable
03	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:	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or ☐ All N/A - This entire table is not applicable
06	Correction Notes:	

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.

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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	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: 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 ½ inch piping is 5 feet, and ¾ inch piping is 2.5 feet. ½ inch - For only one pipe size – max length allowed is 10 feet For combination pipe sizes the allowed length of ½-inch piping is 5 feet, and ¾ inch piping is 2.5 feet. ¾ inch - For only one pipe size = 5 feet

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

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	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)

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 active control shall be either: timer, temperature, or time and temperature. Timers shall be set to less than 24 hours. The temperature sensor shall be connected to the piping and to the controls for the pump.
02	If more than one loop is installed each loop shall have its own pump and controls.

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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: • 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: • 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:	☐ Pass - all applicable requirements are met; or ☐ Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or ☐ All N/A - This entire table is not applicable
03	Correction Notes:	

R. Determination of Verification Compliance

VERIFIED SINGLE DWELLING UNIT HOT WATER SYSTEM DISTRIBUTION

CALIFORNIA ENERGY COMMISSION

CEC-CF3R-PLB-22-H

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

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

Documentation Author Name:	Documentation Author Signature:
Documentation Author Company Name:	Date Signed:
Address:	CEA/AEA/ECC Certification Identification (If applicable):
City/State/Zip:	Phone:

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of 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 Appendices RA2, RA3, 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 (CF2R) signed and submitted by the person(s) responsible for the construction or installation conforms to the requirements specified on the Certificate(s) of Compliance (CF1R) 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

CF3R-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 CF1R compliance document for this project. For information only and requires no user input.

A2. Design Verified Dwelling Unit HPWH System Information

This table reports the water heating system features that were specified on the registered CF1R 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 A.
2. Water Heating System ID or Name – Reference information from A.
3. Water Heating System Type – Reference information from A. The different kinds of water heating system type are DHW, or Combined Hydronic.
4. Water Heater Type – Information from 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 A.
6. Fuel Type – Reference information from A. The different kinds of fuel types are natural gas, propane, oil, or electricity.
7. Rated Input Type – Reference information from 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 CF1R.
10. Dwelling Unit DHW System Distribution Type - Reference information from A.
11. Compact Distribution - Reference information from A.
12. Drain Water Heat Recovery - Reference information from 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 C. AFUE, UEF and Thermal Efficiency.
3. Modeled Equipment Make and Model – User input must be equal to the value indicated on Table A2 as default and allow user to override with an equivalent system based on the simulated equipment in Table C.
4. # of Like (or Identical) Water Heaters in System – Reference information from Table A2.
5. Tank Location – User input. Must be equal to value indicated in Table A2.

6. Exterior Tank Insulation R-value – User input. Must be equal to or higher than value indicated in Table C.

6a. Tank Volume – User input must equal reference information on 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 CF1R 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 CF1R02 Heating Efficiency Type – Reference information from CF1R. Different efficiency types are Energy Factor, AFUE, UEF and Thermal Efficiency.
2. Heating Efficiency Value – User input. Numerical value of the Heating Efficiency. Must be equal to or higher efficiency than value indicated on the CF1R.
3. Standby Loss – User input. Must be equal to or less than value indicated on the CF1R. Value may be N/A if CF1R value is N/A.
4. Exterior Insulation R-Value – User input. Must be equal to or higher than value indicated on the CF1R. Value may be N/A if CF1R value is N/A.
5. Water Heater Storage Volume (gal) – User input. Value may be N/A if water heater type is instantaneous with zero storage.
6. Tank location – User input. Must be equal to system type indicated on the CF1R.

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 CF1R.
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 Single Dwelling Systems

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

G. Verified Compact Hot Water Distribution Expanded Credit and
H. Compact Hot Water Distribution 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 CF1R
2. 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.

3. Enter the Kitchen distance from furthest fixture to Water Heater in feet. For multiple water heaters, enter the distance to the closest water heater.
4. 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.
5. Calculated value – no user input required
6. 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 CF1R.
2. Reference information from CF1R.
3. Reference information from CF1R.
4. Reference information from CF1R.
5. Reference information from CF1R.
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 Credit.** 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.

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 Senor Control, -Verified Demand Recirculation Manual Control** or **-Verified Demand Recirculation Senor 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 **ECC-Verified Demand Recirculation Manual Control** or **ECC-Verified Demand Recirculation Senor Control.** In addition to the mandatory requirements in Table F and N, the installer must ensure the requirements in this table are met.

Documentation Declaration Statements

1. The person who prepared the CF3R 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.