Residential Compliance Forms for Occupancy

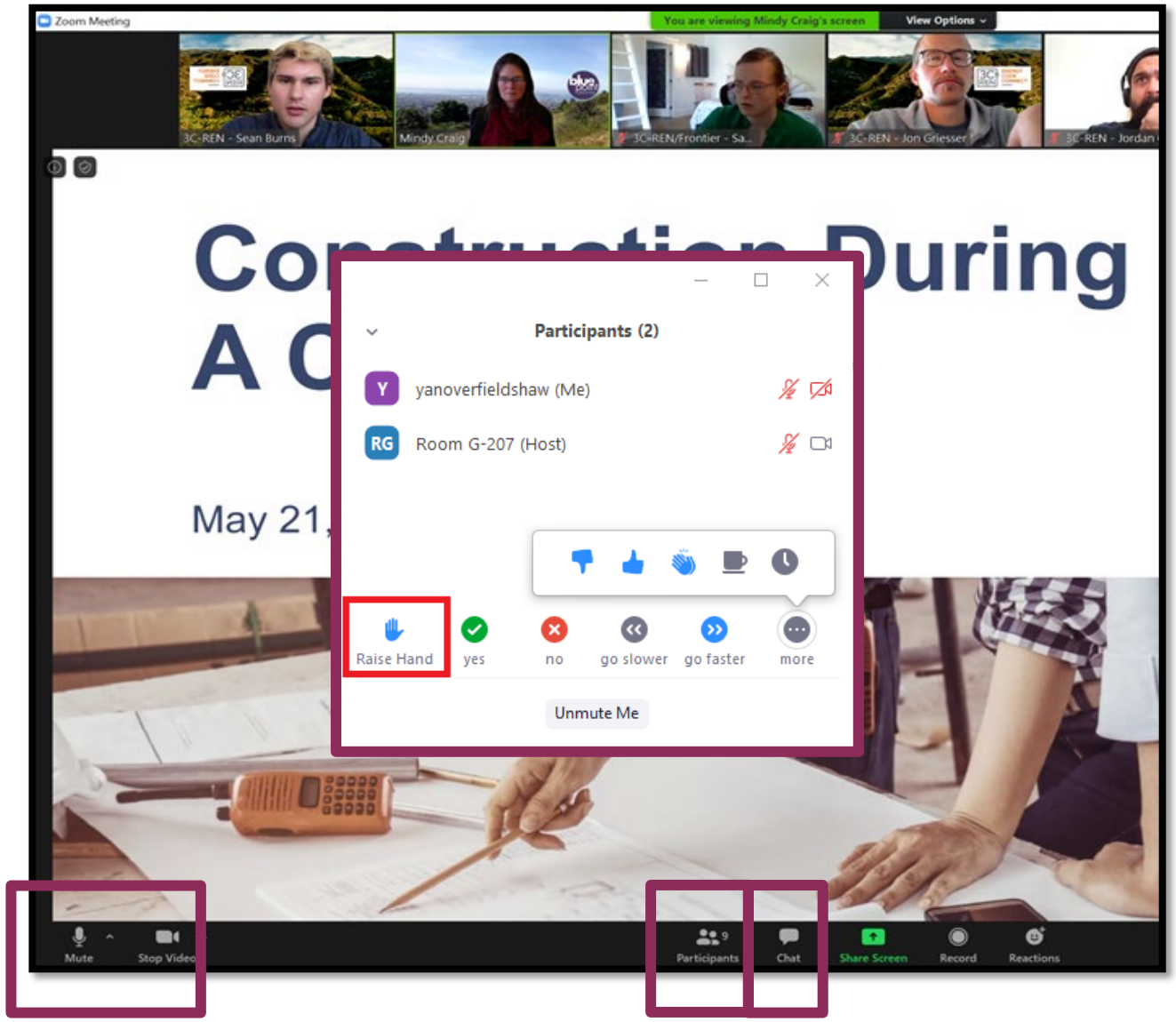
Jennifer Rennick, AIA, CEA – In Balance Green Consulting

Paul Dunn, HERS I & II – Central Coast Energy Compliance

November 29, 2023

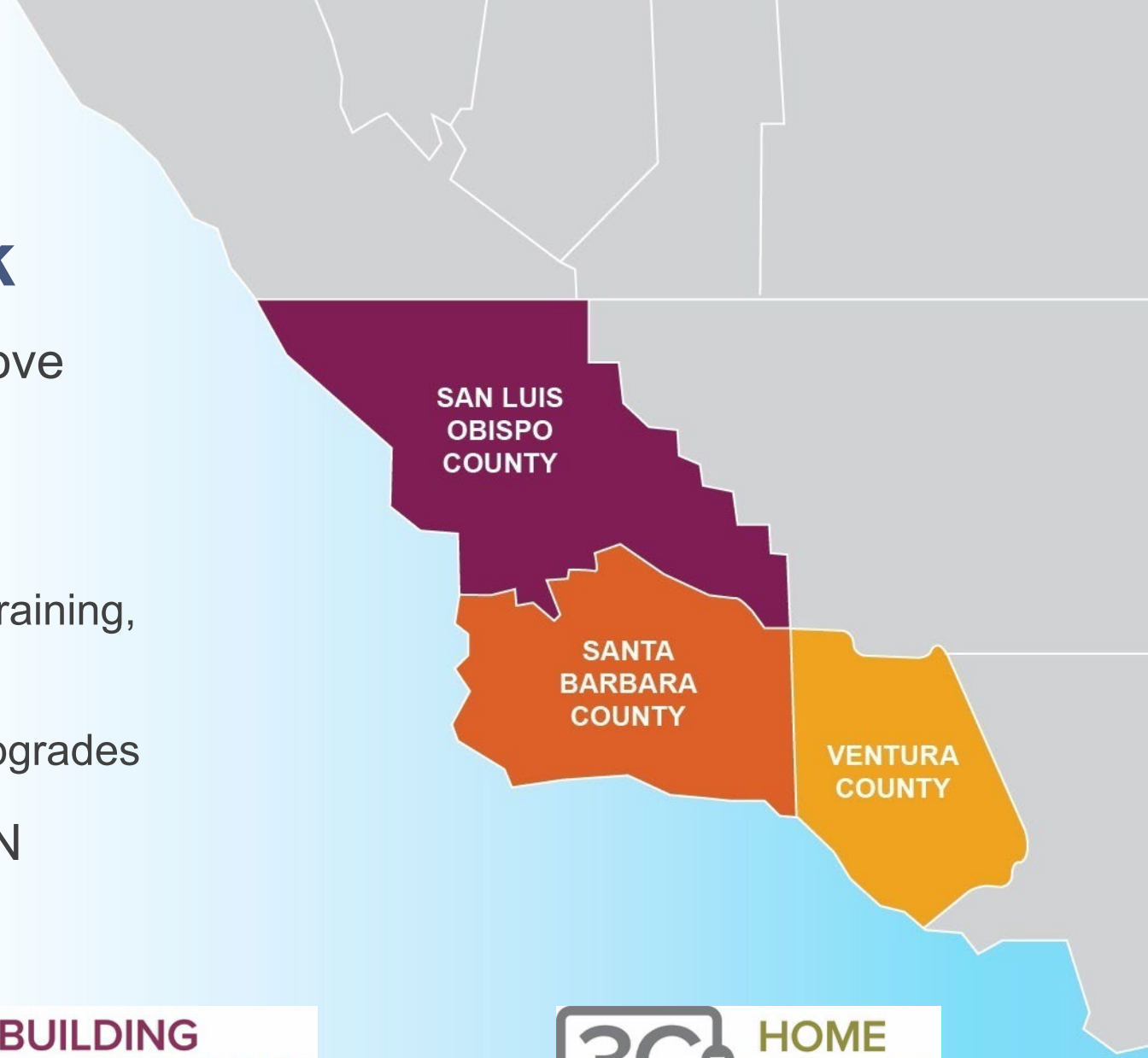
Zoom Orientation

- Please be sure your full name is displayed
- Please mute upon joining
- Use "Chat“ box to share questions or comments
- Under "Participant" select "Raise Hand" to share a question or comment verbally
- The session may be recorded and posted to 3C-REN's on-demand page. Feel free to ask questions via the chat and keep video off if you want to remain anonymous in the recording.



3C-REN: Tri-County Regional Energy Network

- Three counties working together to improve energy efficiency in the region
- Services for –
  - **Building Professionals:** industry events, training, and energy code compliance support
  - **Households:** free and discounted home upgrades
- Funded by ratepayer dollars that 3C-REN returns to the region



3C REN ENERGY CODE CONNECT

3C REN BUILDING PERFORMANCE TRAINING

3C REN HOME ENERGY SAVINGS

3C REN ENERGY CODE CONNECT

- Serves all building professionals
- Three services –
  - **Energy Code Coach**
  - **Training and Support**
  - **Regional Forums**
- Makes the Energy Code easy to follow

Energy Code Coach:
3c-ren.org/codes
805.781.1201

Event Registration:
3c-ren.org/events

BUILDING PERFORMANCE TRAINING

- Serves current and prospective building professionals
- Expert instruction:
  - **Technical skills**
  - **Soft skills**
- Helps workers to thrive in an evolving industry

Event Registration:
3c-ren.org/events

3C REN HOME ENERGY SAVINGS

Multifamily (5+ units)

- No cost technical assistance
- Rebates up to $750/apartment plus additional rebates for specialty measures like heat pumps

Single Family (up to 4 units)

- Sign up to participate!
- Get paid for the metered energy savings of your customers

Enrollment:
3C-REN.org/contractor-participation

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Today's Learning Objectives

As a follow-up to "Residential Compliance Forms for Permitting," we will build on the initial compliance forms used for the building permit to understand what measures are required during construction and how to demonstrate compliance.

- Understand how to read the CF-1R for required construction measures
- Review common HERS measures and how the tests are conducted and verified
- Identify common snags that may hold up final occupancy, and how to avoid them
- Discuss major differences between new construction and alterations + additions

Learning Units:

- 0.10 ICC CEU pending for this course
- 1.0 AIA HSW pending for this course

Overview of Forms for Residential Single Family Construction

- CF-1R – Forms used to show ***Compliance*** with the energy code at initial plan submittal
- CF-2R – Forms used during construction to demonstrate that the energy code features met ***Installation*** requirements
- CF-3R – Forms used after installation to confirm that the energy code features met the ***Verification*** requirements

Process for Residential Permitting

CF-1R Compliance created and uploaded to HERS Registry

CF-2R Installation completed and uploaded to HERS Registry

CF-3R Verification completed and uploaded to HERS Registry

Building Official Confirms CF-2R's and CF-3R's are uploaded and signed (PSR)

HERS – Home Energy Rating System

We have two HERS Providers, CalCERTS and CHEERS, in California. These organization are responsible for training and certifying HERS Raters, and supporting the California Energy Code HERS Registry.

List of CF2R and CF3R Forms
–Example Project on CalCERTS

Installation and Verification Certificates that MAY be Required from the CF1R You may add tested measures if the Yes/No option is available.		Installation Certificate (CF2R)	Certificate of Verification (CF3R)
CF2R-ELC-01	Electric Ready Requirements:	YES	N/A
CF2R-ENV-01	Fenestration Installation:	YES	N/A
CF2R-ENV-03	Insulation Installation:	YES	N/A
CF2R-ENV-04	Roofing-Radiant Barrier:	No	N/A
CF2R-ENV-20	Building Leakage Diagnostic Test:	No	No
CF2R-ENV-21	QII-Framing Stage:	No	No
CF2R-ENV-22	QII-Insulation Installation:	No	No
CF2R-LTG-01	Lighting:	YES	N/A
CF2R-MCH-01	Space Conditioning Systems, Ducts and Fans:	YES	N/A
CF2R-MCH-02	Whole House Fan:	No	N/A
CF2R-MCH-25	Refrigerant Charge:	YES	YES
CF2R-MCH-27	IAQ and MV:	YES	YES
CF2R-MCH-31	HERS Whole House Fan:	No	No
CF2R-MCH-32	Local Mechanical Exhaust:	YES	YES
CF2R-PLB-02	SD HWS Distribution:	No	N/A
CF2R-PLB-03	Pool and Spa:	No	N/A
CF2R-PLB-22	HERS SD HWS Distribution:	YES	YES
CF2R-PVB-01	Photovoltaic Systems:	YES	N/A
CF2R-PVB-02	Battery Storage Systems:	No	N/A
CF2R-SRA-02	Minimum Solar Zone Area Worksheet:	No	N/A

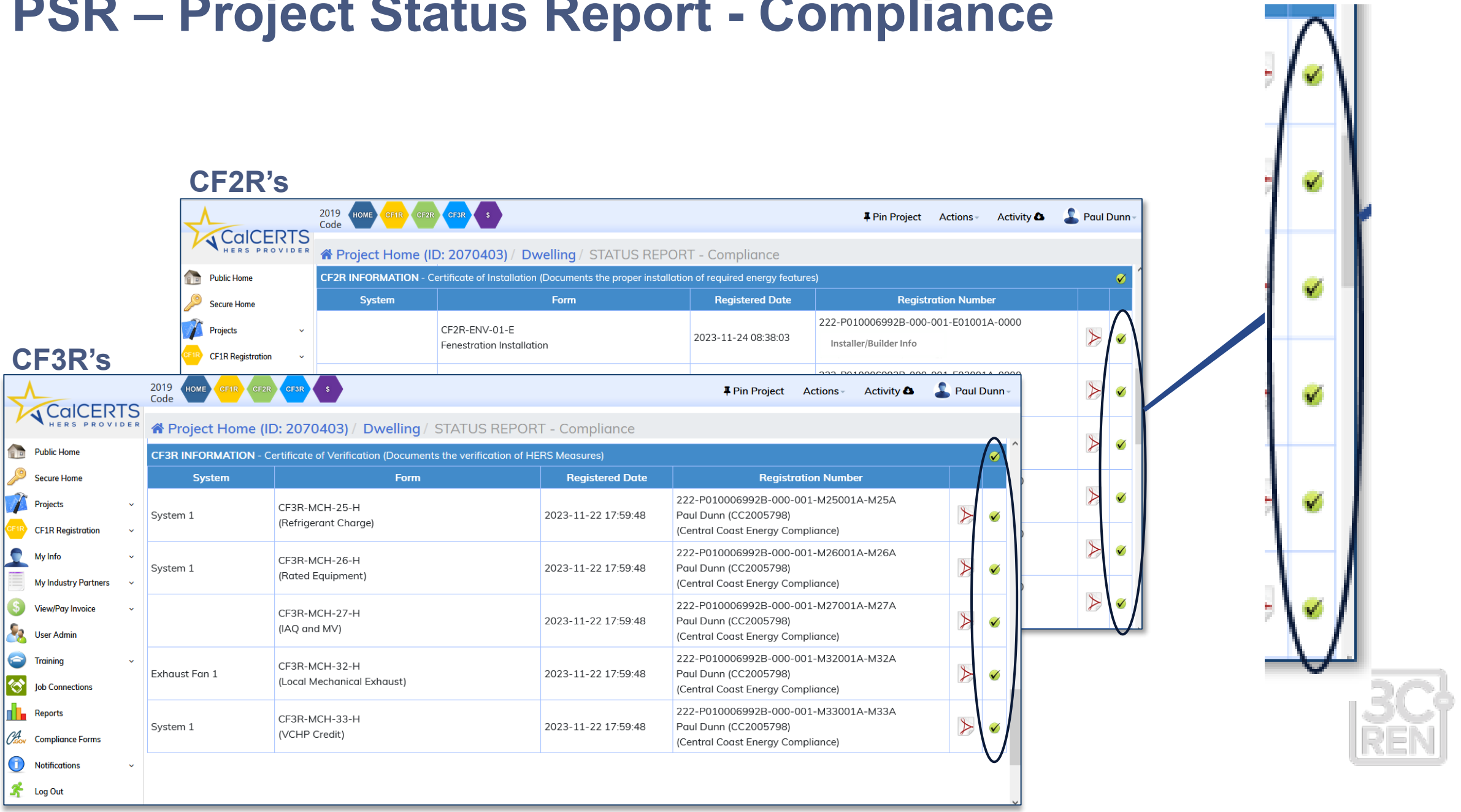
*** Fan Efficacy Airflow is required and can be satisfied by EITHER the MCH-23 and MCH-22 OR the MCH-28. The exact measure is determined by the CF2R-MCH-01.**

**** The MCH-26 is determined on the CF2R-MCH-01.**

PSR – Project Status Report - Compliance

CF2R's

CF3R's



CEC – 2022 Supporting Documents - Forms - Residential

CALIFORNIA ENERGY COMMISSION

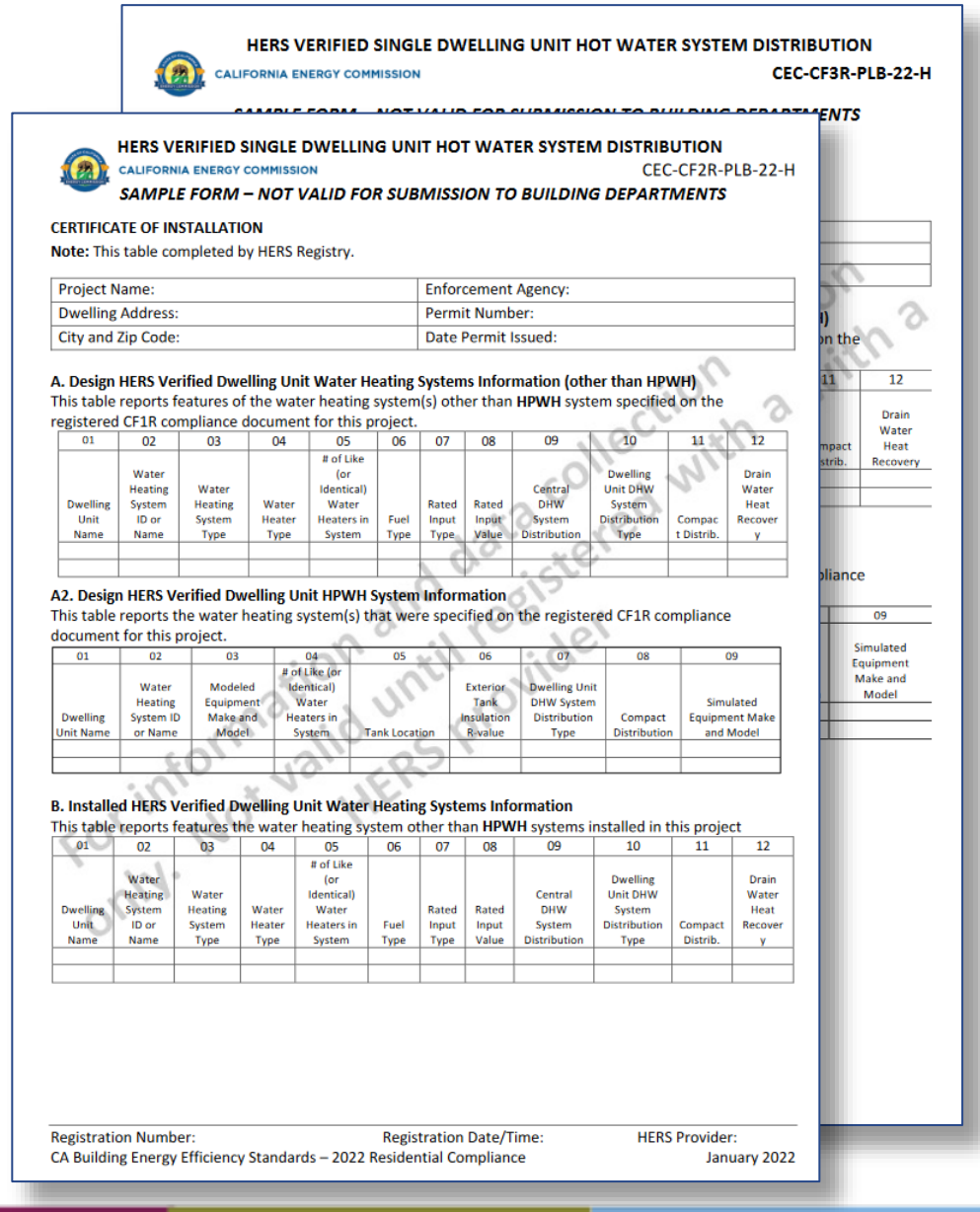
Enter keywords, e.g. Tracking Progress

HOME | PROCEEDINGS | RULES AND REGULATIONS | PROGRAMS AND TOPICS | FUNDING | DATA AND REPORTS | SHOWCASE

California Energy Commission > Programs and Topics > All Programs > Building Energy Efficiency Standards > 2022 Building Energy Efficiency Standards > **2022 Supporting Documents - Forms - Residential**

- **Electric – Including Solar and Battery** +
- **Envelope** +
- **Existing Conditions** +
- **Lighting** +
- **Mechanical** +
- **Plumbing** +
- **Pool and Spa**

California Energy Commission
www.energy.ca.gov



HERS VERIFIED SINGLE DWELLING UNIT HOT WATER SYSTEM DISTRIBUTION
CALIFORNIA ENERGY COMMISSION
CEC-CF3R-PLB-22-H

HERS VERIFIED SINGLE DWELLING UNIT HOT WATER SYSTEM DISTRIBUTION
CALIFORNIA ENERGY COMMISSION
CEC-CF2R-PLB-22-H
SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

CERTIFICATE OF INSTALLATION

Note: This table completed by HERS Registry.

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

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

A2. Design HERS 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	07	08	09
Dwelling Unit Name	Water Heating System ID or Name	Modeled Equipment Make and Model	# of Like (or Identical) Water Heaters in System	Tank Location	Exterior Tank Insulation R-value	Dwelling Unit DHW System Distribution Type	Compact Distribution	Simulated Equipment Make and Model

B. Installed HERS Verified Dwelling Unit Water Heating Systems Information
This table reports features the water heating system other than **HPWH** systems installed in this project

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

Registration Number: Registration Date/Time: HERS Provider:
CA Building Energy Efficiency Standards – 2022 Residential Compliance January 2022

2022 Supporting Docs CF2R & CF3R

Note: Most forms are for reference only

Envelope

CF2R

- CF2R-ENV-01-E Fenestration Installation
- CF2R-ENV-03-E Insulation Installation
- CF2R-ENV-04-E Roofing Ventilation and Radiant Barrier
- CF2R-ENV-20a-H Building Air Leakage Diagnostic Test - Building Enclosures and Dwelling Unit Enclosures
- CF2R-ENV-20b-H-EnclosureAirLeakage-SinglePointTest-Automatic Meter
- CF2R-ENV-21-H QII - Air Infiltration Sealing - Framing Stage
- CF2R-ENV-22-H QII - Insulation Installation

CF3R

- CF3R-ENV-20a Building Enclosure Air Leakage Diagnostic Test - Building Enclosures and Dwelling Unit Enclosures - Single Point Test - Manual Meter
- CF3R-ENV-20b Building Enclosure Air Leakage Diagnostic Test - Building Enclosures and Dwelling Unit Enclosures - Single Point Test - Automatic Meter
- CF3R-ENV-21-HERS QII - Air Infiltration Sealing - Framing Stage
- CF3R-ENV-22-HERS QII - Insulation Installation

Reminder:
E – Enforcement Agency
H – HERS

2022 Supporting Docs CF2R & CF3R

Note: Most forms are for reference only

Mechanical

CF2R

- 01
  - CF2R-MCH-01a-E Space Conditioning Systems Ducts and Fans
  - CF2R-MCH-01b-E Space Conditioning System Ducts and Fans - Prescriptive Alterations
  - CF2R-MCH-01c-E Space Conditioning System Ducts and Fans - Prescriptive New Construction
  - CF2R-MCH-01d-E Space Conditioning System Ducts and Fans - Performance E+A+A
- 02
  - CF2R-MCH-02-E Whole House Fan
- 04
  - CF2R-MCH-04-E Evaporative Coolers
- 20
  - CF2R-MCH-20a-H Duct Leakage Diagnostic Test - New Construction
  - CF2R-MCH-20b-H Duct Leakage Diagnostic Test - LLDCS
  - CF2R-MCH-20c-H Duct Leakage Diagnostic Test - LLAHU
  - CF2R-MCH-20d-H Duct Leakage Diagnostic Test - Existing Construction
  - CF2R-MCH-20e-H Duct leakage Diagnostic Test - Sealing Accessible Leaks
- 21
  - CF2R-MCH-21-H QII - Air Infiltration Sealing - Framing Stage
- 22
  - CF2R-MCH-22a-H Space Conditioning System Fan Efficacy - All Zones Calling Only
  - CF2R-MCH-22b-H Space Conditioning System Fan Efficacy - Zonal Control Mode
  - CF2R-MCH-22c-H Space Conditioning System Fan Efficacy - All Zones Calling Only - With CFVCS
  - CF2R-MCH-22d-H Space Conditioning System Fan Efficacy - Every Zonal Control Mode - With CFVCS
- 23
  - CF2R-MCH-23a-H Space Conditioning System Airflow Rate - All Zones Calling Only
  - CF2R-MCH-23b-H Space Conditioning System Airflow Rate - Every Zonal Control Mode
  - CF2R-MCH-23c-H Space Conditioning System Airflow Rate - Best That I Can Do
  - CF2R-MCH-23d-H Space Conditioning System Airflow Rate - Measurement Only - All Zones Calling Only
  - CF2R-MCH-23e-H Space Conditioning System Airflow Rate - All Zones Calling Only - With CFVCS
  - CF2R-MCH-23f-H Space Conditioning System Airflow Rate - Every Zonal Control Mode - With CFVCS
- 24
  - CF2R-MCH-24a-H-Enclosure Air Leakage Worksheet-Single Point Test-Manual Meter
  - CF2R-MCH-24a-H-Enclosure Air Leakage Worksheet-Single Point Test-Automatic Meter
- 25
  - CF2R-MCH-25a-H Refrigerant Charge Verification - Superheat
  - CF2R-MCH-25b-H Refrigerant Charge Verification - Supercooling
  - CF2R-MCH-25c-H Refrigerant Charge Verification - Weigh-in Observation
  - CF2R-MCH-25f-H Refrigerant Charge Verification - Packaged System Manufacturer Cert
- 26
  - CF2R-MCH-26-H Rated Space Conditioning System Equipment Verification
- 27
  - CF2R-MCH-27a-H Indoor Air Quality and Mechanical Ventilation - Single Family Attached
  - CF2R-MCH-27d-H Indoor Air Quality and Mechanical Ventilation - Non-Dwelling Unit
- 28
  - CF2R-MCH-28-H Return Duct Design and Air Filter Device Sizing According to Tables 150.0-B or C
- 29
  - CF2R-MCH-29-H Duct Surface Area Reduction; R-Value; Buried Ducts Compliance Credit
- 30
  - CF2R-MCH-30-H Ventilation Cooling - Whole House Fan
- 31
  - CF2R-MCH-31a-H Whole House Fan HERS - Airflow and Watts per WHF
  - CF2R-MCH-31b-H Whole House Fan HERS - Airflow per WHF and Total Watts
- 32
  - CF2R-MCH-32-H Local Mechanical Exhaust
- 33
  - CF2R-MCH-33-H Variable Capacity Heat Pump Compliance Credit
- 34
  - CF2R-MCH-34-E Pre-Cooling

2022 Supporting Docs CF2R & CF3R

Note: Most forms are for reference only

Mechanical

CF3R

20
- CF3R-MCH-20a Duct Leakage Diagnostic Test - New Construction
- CF3R-MCH-20b Duct Leakage Diagnostic Test - LLDCS
- CF3R-MCH-20c-H Duct Leakage Diagnostic Test - LLAHU
- CF3R-MCH-20d-H Duct Leakage Diagnostic Test - Existing Construction
- CF3R-MCH-20e-H Duct leakage Diagnostic Test - Sealing Accessible Leaks

21
- CF3R-MCH-21 Duct Location

22
- CF2R-MCH-22a-H Space Conditioning System Fan Efficacy - All Zones Calling Only
- CF3R-MCH-22b-H Space Conditioning System Fan Efficacy - Zonal Control Mode
- CF3R-MCH-22c-H Space Conditioning System Fan Efficacy - All Zones Calling Only - With CFVCS
- CF3R-MCH-22d-H Space Conditioning System Fan Efficacy - Every Zonal Control Mode - With CFVCS

Reminder:
E – Enforcement Agency
H – HERS

23
- CF3R-MCH-23a-H Space Conditioning System Airflow Rate - All Zones Calling Only
- CF3R-MCH-23b-H Space Conditioning System Airflow Rate - Every Zonal Control Mode
- CF3R-MCH-23c-H Space Conditioning System Airflow Rate - Best That I Can Do
- CF3R-MCH-23d-H Space Conditioning System Airflow Rate - Measurement Only - All Zones Calling Only
- CF3R-MCH-23e-H Space Conditioning System Airflow Rate - All Zones Calling Only - With CFVCS
- CF3R-MCH-23f-H Space Conditioning System Airflow Rate - Every Zonal Control Mode - With CFVCS

24
- CF3R-MCH-24a Building Air Leakage Diagnostic Test Worksheet - Building Enclosures and Dwelling Unit Enclosures - Single Point Test - Manual Meter
- CF3R-MCH-24b Building Air Leakage Diagnostic Test Worksheet - Building Enclosures and Dwelling Unit Enclosures - Single Point Test - Automatic Meter

25
- CF3R-MCH-25a-H Refrigerant Charge Verification - Superheat
- CF3R-MCH-25b-H Refrigerant Charge Verification - Supercooling
- CF3R-MCH-25c-H Refrigerant Charge Verification - Weigh-in Observation
- CF3R-MCH-25d Refrigerant Charge Verification - FID

26
- CF3R-MCH-26-H Rated Space Conditioning System Equipment Verification

27
- CF3R-MCH-27a-H Indoor Air Quality and Mechanical Ventilation - Single Family Attached

28
- CF3R-MCH-28-H Return Duct Design and Air Filter Device Sizing According to Tables 150.0-B or C

29
- CF3R-MCH-29-H Duct Surface Area Reduction; R-Value; Buried Ducts Compliance Credit

30
- CF3R-MCH-30-H Ventilation Cooling - Whole House Fan

31
- CF3R-MCH-31a-H Whole House Fan HERS - Airflow and Watts per WHF
- CF3R-MCH-31b-H Whole House Fan HERS - Airflow per WHF and Total Watts

32
- CF3R-MCH-32-H Local Mechanical Exhaust

33
- CF3R-MCH-33-H Variable Capacity Heat Pump Compliance Credit

Quality Insulation Installation (QII) ENV-21, 22 and MCH-21

CF1R-PRF-01-E

Calculation Description: Title 24 Analysis **Input File Name:** Sample Res Project.ribd22

HERS FEATURE SUMMARY

The following is a summary of the features that must be field-verified by a certified HERS Rater as a condition for meeting the modeled energy performance for this computer analysis. Additional detail is provided in the building tables below. Registered CF2Rs and CF3Rs are required to be completed in the HERS Registry

- Quality insulation installation (QII)
- Indoor air quality ventilation
- Kitchen range hood

HERS QII Work Flow:

- Triggered on CF1R
- Job Site Meeting "Review Requirements"
- HERS Inspection: Framing
  - Envelope Measures
  - HVAC/Duct Measures
- HERS Inspection: Insulation Install
  - Envelope Measures

CF2R and CF3R Forms

- CF2R-ENV-03-E Insulation Installation
- CF2R-ENV-21-H QII - Air Infiltration Sealing - Framing Stage
- CF2R-ENV-22-H QII - Insulation Installation
- CF2R-MCH-21-H QII - Air Infiltration Sealing - Framing Stage
- CF3R-ENV-21-HERS QII - Air Infiltration Sealing - Framing Stage
- CF3R-ENV-22-HERS QII - Insulation Installation

Insulation Installation CF2R-ENV-03-E (Non-HERS / Installer or GC)

The first half of this form is to document what insulation was installed, how much, and where…

…the second half of this form list reminders for the **Mandatory Measures and other insulation requirements**.

INSULATION INSTALLATION

CALIFORNIA ENERGY COMMISSION CEC-CF

CERTIFICATE OF INSTALLATION

Note: This table completed by HERS Registry.

Field Name	Data Entry	Field Name	Data Entry
Project Name		Enforcement Agency	
Dwelling Address		Permit Number	
City and Zip Code		Permit Application Date	

A. Roof/Ceiling Insulation

Field	Field Name	Entry 1	Entry 2	Entry 3
01	I.D.			
02	Manufacturer & Brand			
03	Assembly/ Framing Material			
04	Assembly Thickness (inches)			

INSULATION INSTALLATION

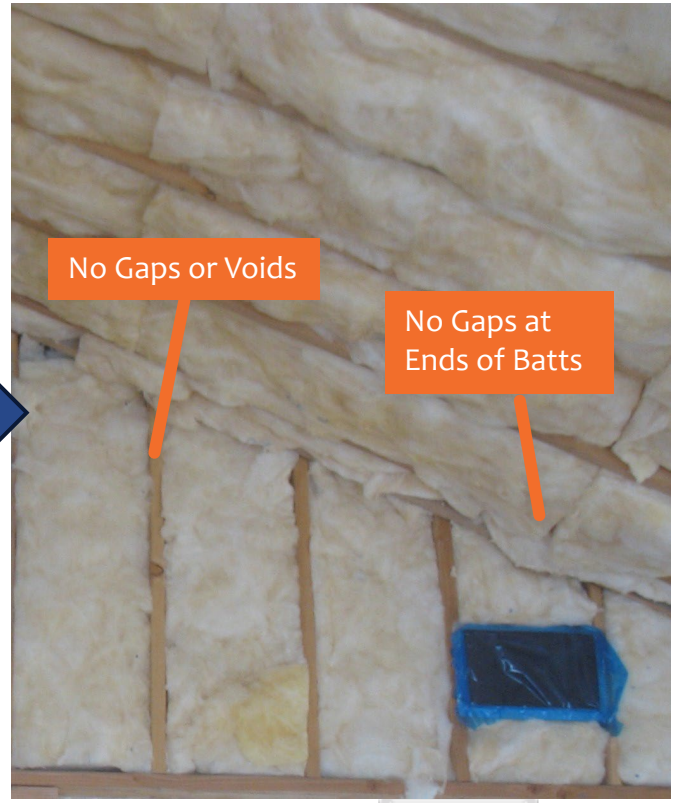
CALIFORNIA ENERGY COMMISSION CEC-CF2R-ENV-03-E

H. Installed Insulation

Field	Field Description
01	Installed insulation R-values are the same or greater than listed on the CF1R.
02	No gaps or voids between the insulation and framing.
03	No gaps between the sides or ends of batt insulation.
04	Loose-fill insulation must be installed to the minimum installed weight per square foot (density) of the manufacturer's cut sheet for the proposed R-value.
05	Batt insulation is not compressed (no stuffing of the insulation into the cavity) and is installed to its full thickness.
06	Insulation is cut around obstructions such as electrical boxes.
07	Batt insulation is delaminated around all plumbing and electrical lines in ceilings, walls, and floors.
08	Band joists are insulated to the same R-value as the wall.
09	In all narrow cavities the insulation shall be cut to fit or filled with expanding foam.
10	Insulation was installed per manufacturer instructions.

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

I. Wall Insulation



Meeting the Code Mandatory Measures will make QII –HERS much easier!

QII - Air Infiltration Sealing CF2R-ENV-21-H

QII - AIR INFILTRATION SEALING – FRAMING STAGE

CALIFORNIA ENERGY COMMISSION

CEC-CF2R-ENV-21-H

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

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.

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.

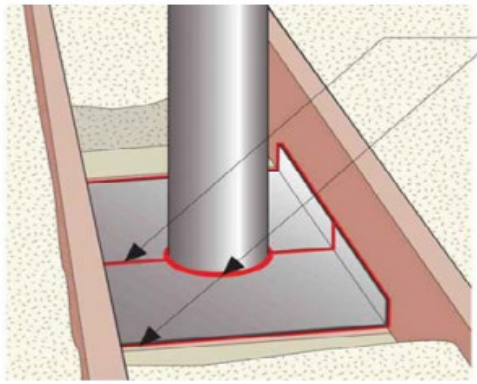
E. Roof Air Barrier – Unvented Attics Adjacent to Unconditioned Space

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

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.

Meeting QII – Air Infiltration Sealing at the Framing Stage will make –HERS Building /Enclosure Air Leakage Testing much easier!

Exterior Bottom (Sill) Plates Sealed to Floor



U.S. DEPARTMENT OF ENERGY
Energy Efficiency & Renewable Energy

Drawings and instructions in the guide show contractors the proper way to air seal around typical breaks in the ceiling. Here, sheet metal and fire-rated caulk provide air sealing around a flue pipe.

QII - Air Infiltration Sealing CF2R-ENV-21-H

QII - AIR INFILTRATION SEALING – FRAMING STAGE

CALIFORNIA ENERGY COMMISSION

CEC-CF2R-ENV-21-H

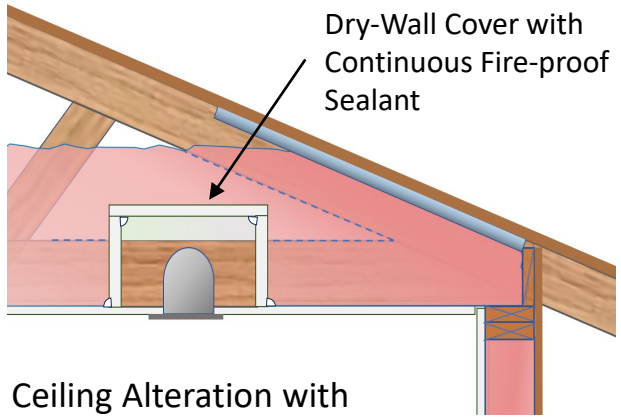
SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

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.

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 allows 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.

Continuous Bead of Sealant



Ceiling Alteration with
Existing Recessed Fixture

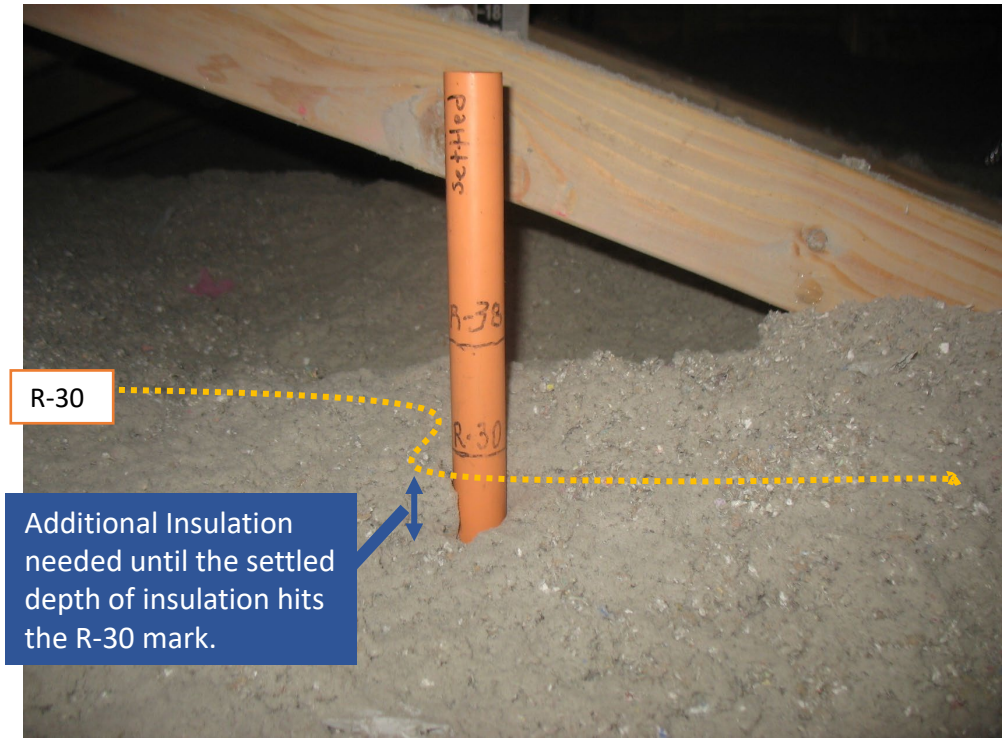
Meeting QII – Air Infiltration Sealing at the Framing Stage will make –HERS Building /Enclosure Air Leakage Testing much easier!

QII – Insulation Installation - CF3R-ENV-22-H

CERTIFICATE OF VERIFICATION	CF3R-ENV-22-H
QII - Insulation Installation	(Page 1 of 7)

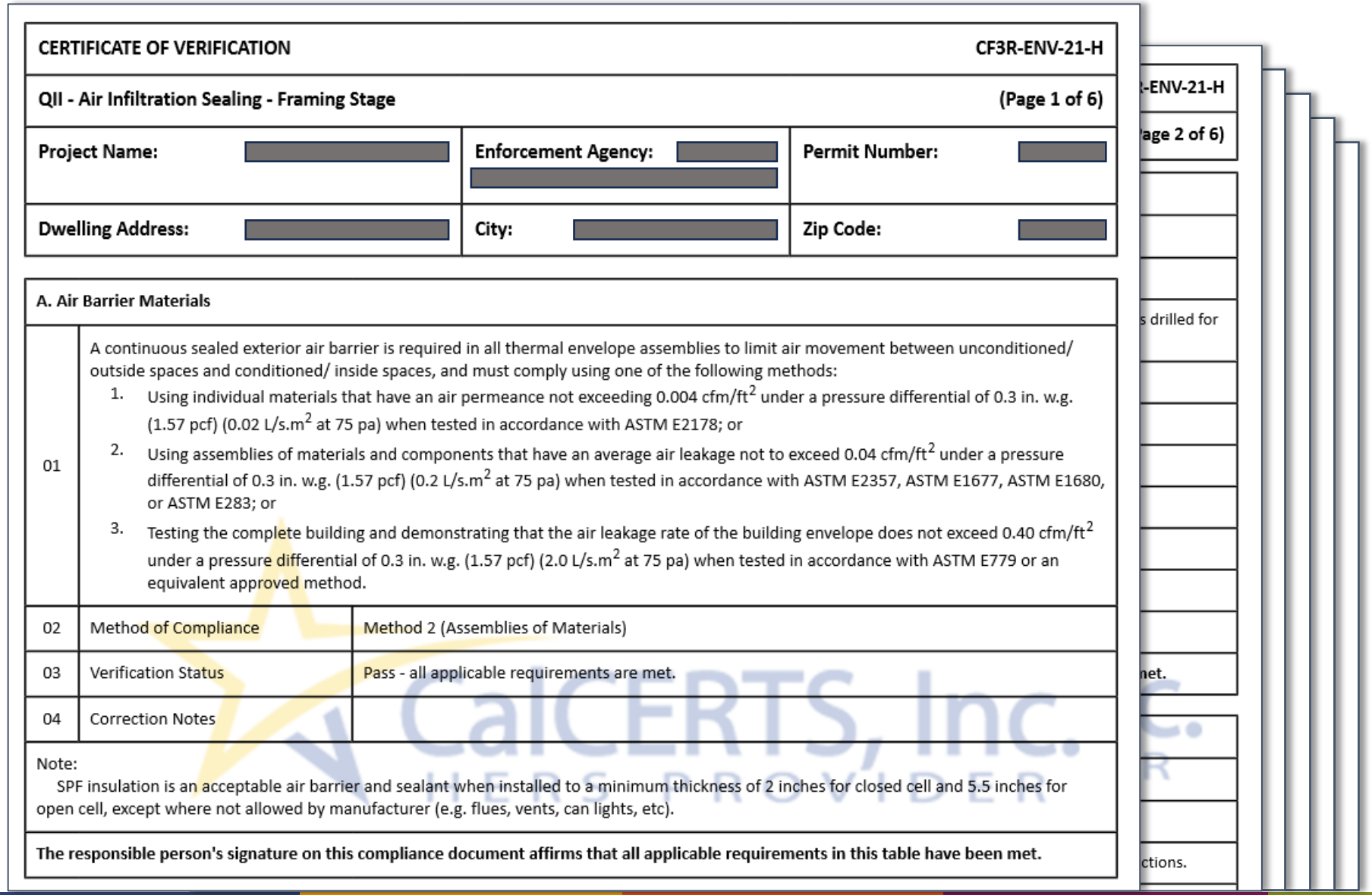
A. Insulation Materials Installed		
01	Roof Deck Insulation Material Installed	n/a
02	Ceiling Insulation Material Installed	Loose-fill
03	Exterior Wall Insulation Material Installed	Loose-fill
04	Raised Floor Insulation Material Installed	n/a
05	Slab Edge Insulation Material Installed	n/a
06	Verification Status	Pass - all applicable requirements are met.

B. All Surfaces	
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 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 HERS 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 R-value specified on the Certificate of Compliance, and are consistent with the manufacturer's coverage chart.



Loose-fill insulation depth and density is verified in at least 6 random locations to show the CF1R value has been met.

After CF2R/CF3R's are complete, the project can obtain final Occupancy approval.



CERTIFICATE OF VERIFICATION			CF3R-ENV-21-H
QII - Air Infiltration Sealing - Framing Stage			(Page 1 of 6)
Project Name:	**Enforcement Agency:**		**Permit Number:**
Dwelling Address:	**City:**		**Zip Code:**

A. Air Barrier Materials		
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 under a pressure differential of 0.3 in. w.g. (1.57 pcf) (2.0 L/s.m^2 at 75 pa) when tested in accordance with ASTM E779 or an equivalent approved method.	
02	Method of Compliance	Method 2 (Assemblies of Materials)
03	Verification Status	Pass - all applicable requirements are met.
04	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).

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

Approval Process

- CF1R on HERS Registry
- CF2R on HERS Registry
- CF3R on HERS Registry
- Enforcement Agency (AHJ) can access the **Watermarked Forms**
- AHJ will see "PASS" on List of Required Forms

Building/Enclosure Air Leakage ENV-20-H and MCH-24-H

CF1R-PRF-01-E

HERS FEATURE SUMMARY

The following is a summary of the features that must be field-verified by a certified HERS Rater as a condition for meeting the modeled energy performance for this computer analysis. Additional detail is provided in the building tables below. Registered CF2Rs and CF3Rs are required to be completed in the HERS Registry

- Quality insulation installation (QII)
- Building air leakage/reduced infiltration
- Kitchen range hood
- Verified Existing Conditions
- Duct Sealing required if a duct system component, plenum, or air handling unit is altered

BUILDING ENVELOPE - HERS VERIFICATION

01	02	03	04	05
Quality Insulation Installation (QII)	High R-value Spray Foam Insulation	Building Envelope Air Leakage	CFM50	ACH @ CFM50
Required	Not Required	Required	400.0	2

ACH – Air Changes per Hour

HERS Work Flow:

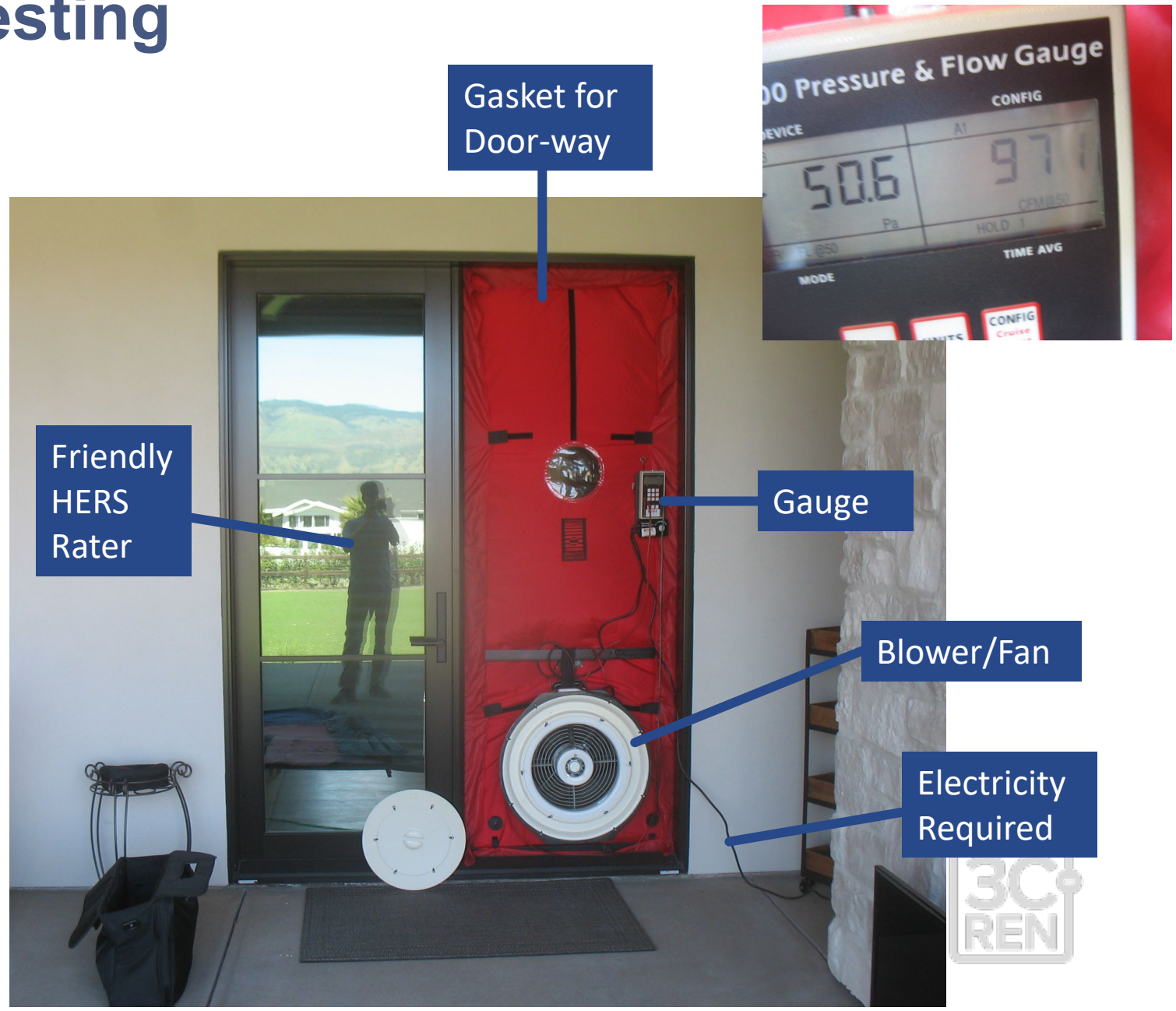
- Triggered on CF1R
- "Kick-off" Job Site "Review" Meeting
- "Pre-Test(s)" can be performed after:
  - Envelope Sealing
  - HVAC/Duct Sealing
- Final Blower Door Test

CF2R and CF3R Forms

- CF2R-ENV-20a-H Building Air Leakage Diagnostic Test - Building Enclosures and Dwelling Unit
- CF2R-ENV-20b-H-EnclosureAirLeakage-SinglePointTest-Automatic Meter
- CF2R-MCH-24a-H-Enclosure Air Leakage Worksheet-Single Point Test-Manual Meter
- CF2R-MCH-24a-H-Enclosure Air Leakage Worksheet-Single Point Test-Automatic Meter
- CF3R-ENV-20a Building Enclosure Air Leakage Diagnostic Test - Building Enclosures and Dwelling Unit Enclosures - Single Point Test - Manual Meter
- CF3R-ENV-20b Building Enclosure Air Leakage Diagnostic Test - Building Enclosures and Dwelling Unit Enclosures - Single Point Test - Automatic Meter
- CF3R-MCH-24a Building Air Leakage Diagnostic Test Worksheet - Building Enclosures and Dwelling Unit Enclosures - Single Point Test - Manual Meter
- CF3R-MCH-24b Building Air Leakage Diagnostic Test Worksheet - Building Enclosures and Dwelling Unit Enclosures - Single Point Test - Automatic Meter

Building Air Leakage Testing

- Measure Pressure (Pa) and Airflow Leakage (cfm)
- Equipment:
  - Blower Door Kit
  - Pressure & Flow Gauge
  - Shows a “Positive Pressurization” Test
- Envelope Leakage to/from:
  - Outdoors
  - Attic
  - Crawlspace



Duct and HVAC Leakage Testing –MCH-20 Series

CF1R-PRF-01-E

HERS FEATURE SUMMARY

The following is a summary of the features that must be field-verified by a certified HERS Rater as a condition for meeting the modeled energy performance for this computer analysis. Additional detail is provided in the building tables below. Registered CF2Rs and CF3Rs are required to be completed in the HERS Registry

- Quality insulation installation (QII)
- Indoor air quality ventilation
- Kitchen range hood
- Minimum Airflow
- Verified EER/EER2
- Verified SEER/SEER2
- Fan Efficacy Watts/CFM
- Duct leakage testing
- Low-leakage Air Handling Unit

Note: These other HERS items are also triggered (MCH-01, MCH-22 and MCH-23)

HVAC DISTRIBUTION - HERS VERIFICATION

01	02	03	04	05	06	07	08	09
Name	Duct Leakage Verification	Duct Leakage Target (%)	Verified Duct Location	Verified Duct Design	Buried Ducts	Deeply Buried Ducts	Low-leakage Air Handler	Low Leakage Ducts Entirely in Conditioned Space
Air Distribution System 1-hers-dist	Yes	5.0	Not Required	Not Required	Not Required	Credit not taken	Required	No

HERS Work Flow:

- Triggered on CF1R
- "Kick-off" Job Site "Review" Meeting
- "Pre-Test(s)" can be performed after:
  - HVAC/Duct Sealing
- Final Duct Leakage Test

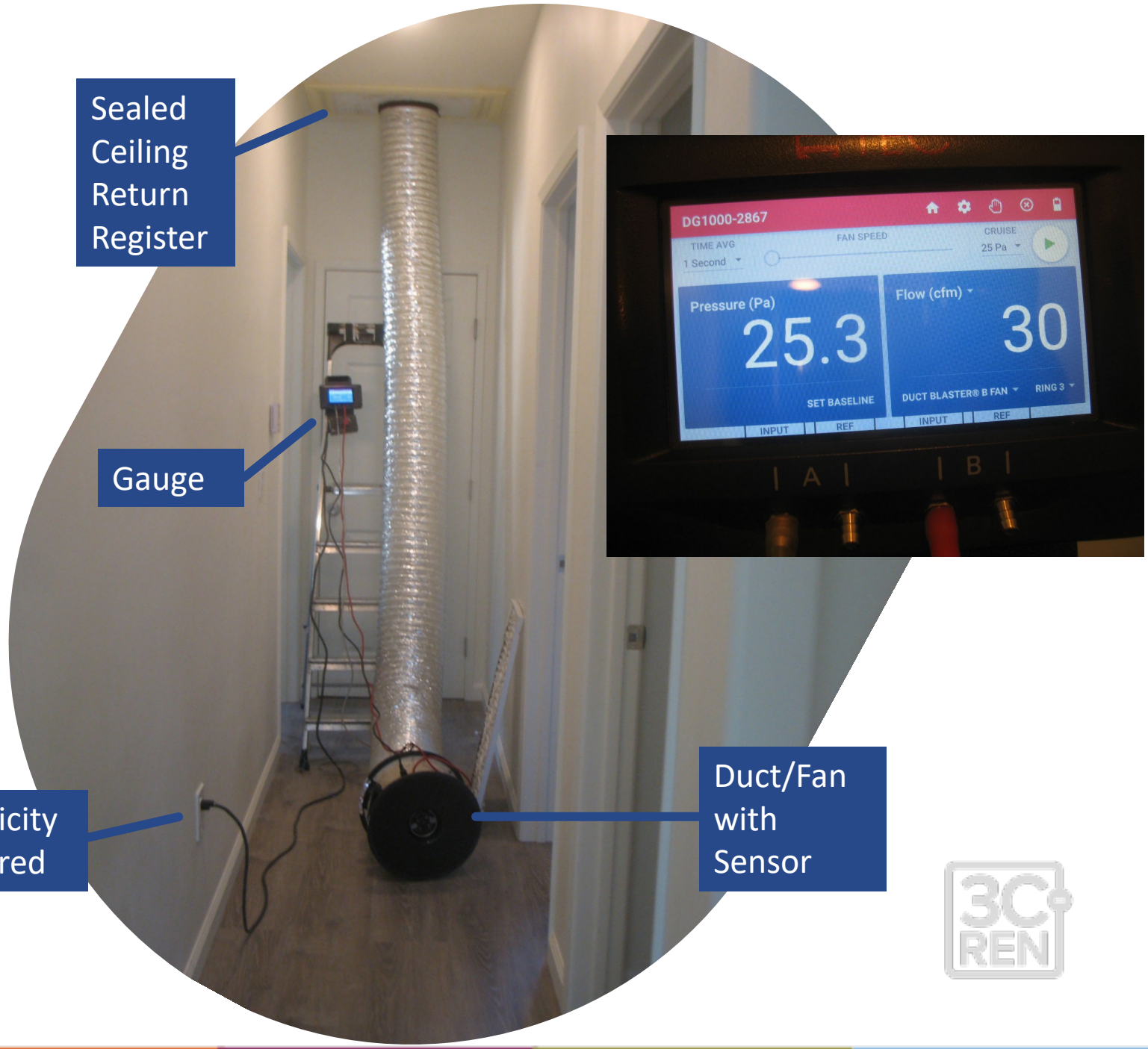
CF2R and CF3R Forms

- CF2R-MCH-20a-H Duct Leakage Diagnostic Test - New Construction
- CF2R-MCH-20b-H Duct Leakage Diagnostic Test - LLDCS (Low Leakage Ducts in Conditioned Space)
- CF2R-MCH-20c-H Duct Leakage Diagnostic Test - LLAHU (Low Leakage Air Handler Unit)

- CF3R-MCH-20a Duct Leakage Diagnostic Test - New Construction
- CF3R-MCH-20b Duct Leakage Diagnostic Test - LLDCS (Low Leakage Ducts in Conditioned Space)
- CF3R-MCH-20c-H Duct Leakage Diagnostic Test - LLAHU (Low Leakage Air Handler Unit)

Duct Leakage Testing

- Measure Pressure (Pa) and Airflow (cfm)
- Equipment:
  - Duct Blaster Fan Kit
  - DG1000 Gauge
  - Shows a “Return Duct Pressurization” Test



Duct Sealing (Alterations) – MCH-20d & MCH-20e

CF1R-PRF-01-E

HERS FEATURE SUMMARY
The following is a summary of the features that must be field-verified by a certified HERS Rater as a condition for meeting the modeled energy performance for this computer analysis. Additional detail is provided in the building tables below. Registered CF2Rs and CF3Rs are required to be completed in the HERS Registry
• Quality insulation installation (QII) • Building air leakage/reduced infiltration • Kitchen range hood • Verified Existing Conditions • Duct Sealing required if a duct system component, plenum, or air handling unit is altered

HERS Work Flow:

- Triggered on CF1R
- "Kick-off" Job Site "Review" Meeting
- "Pre-Test(s)" can be performed after:
  - HVAC/Duct Sealing
- Final Duct Leakage Test

CF2R and CF3R Forms

- CF2R-MCH-20a-H Duct Leakage Diagnostic Test - New Construction
- CF2R-MCH-20b-H Duct Leakage Diagnostic Test - LLDCS
- CF2R-MCH-20c-H Duct Leakage Diagnostic Test - LLAHU
- CF2R-MCH-20d-H Duct Leakage Diagnostic Test - Existing Construction
- CF2R-MCH-20e-H Duct leakage Diagnostic Test - Sealing Accessible Leaks

- CF3R-MCH-20a Duct Leakage Diagnostic Test - New Construction
- CF3R-MCH-20b Duct Leakage Diagnostic Test - LLDCS
- CF3R-MCH-20c-H Duct Leakage Diagnostic Test - LLAHU
- CF3R-MCH-20d-H Duct Leakage Diagnostic Test - Existing Construction
- CF3R-MCH-20e-H Duct leakage Diagnostic Test - Sealing Accessible Leaks

MCH-20e-H Alteration Using Smoke Test

CALIFORNIA ENERGY COMMISSION

DUCT LEAKAGE DIAGNOSTIC TEST **CF3R-MCH-20-H**

(Page 1 of 4)

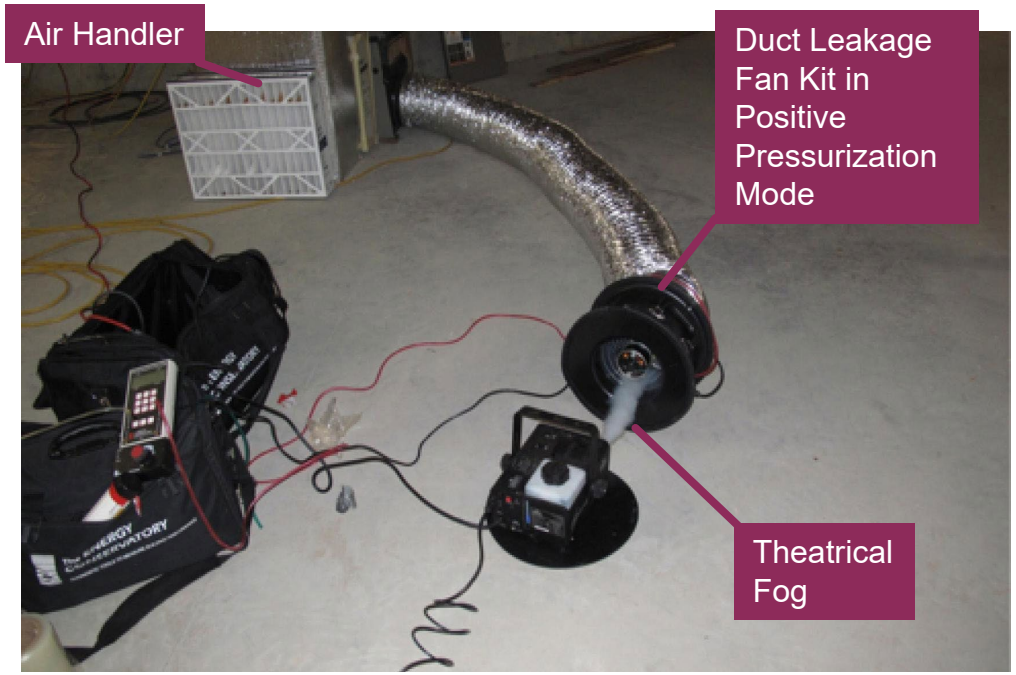
CERTIFICATE OF VERIFICATION

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	New Furnace
02	Space Conditioning System Location or Area Served	Whole House
03	Indoor Unit Name or Description of Area Served	N/A
04	Building Type from parent CC	Single family
05	Verified Low Leakage Ducts in Conditioned Space (VLLDCS) Credit from parent CC?	No, credit is not taken
06	Verified Low Leakage Air Handling Unit Credit from parent CC?	No, credit is not taken
07	Duct System Compliance Category	Alteration using smoke test
08	Portions of Duct Located in Garage?	
09	Is the system type Small Duct High Veloci	

Ducts in garage passes using smoke test of an altered HVAC system in an existing building

- No visible smoke exits the accessible portions of the ducts in the garage.



For existing altered ducts unable to meet the Total Duct Leakage or Leakage to Outside tests, a Smoke Test and Visual Inspection can be used:

- Initial Duct Leakage Test
- Seal all accessible areas
- Test Ducts again
- Perform Smoke Test and Visual Inspection

MCH-20a-H Duct Leakage Diagnostic Test

CALIFORNIA ENERGY COMMISSION

DUCT LEAKAGE DIAGNOSTIC TEST **CF3R-MCH-20-H**

(Page 3 of 4)

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.

Visual Inspection at Final Construction Stage (applicable if system was tested at rough-in).
After installing the interior finishing wall and verifying that the above rough-in tests was completed, the following procedure must be performed

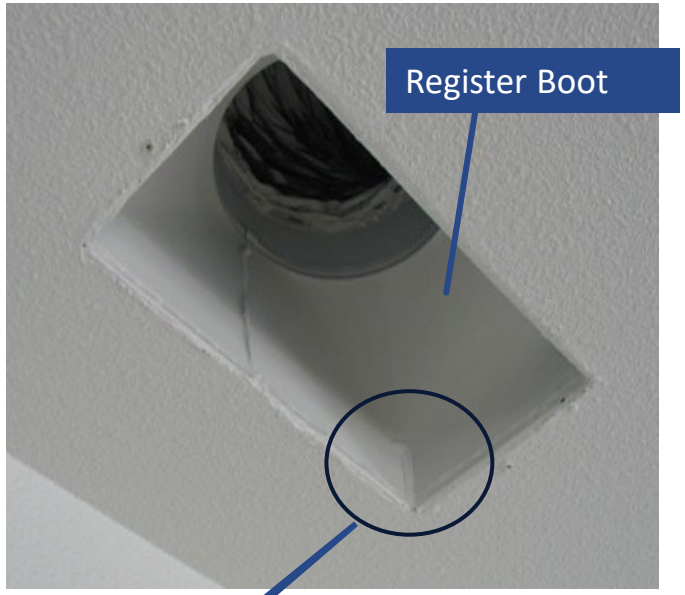
07	For all supply and return registers, verify that the spaces between the register boot and the interior finishing wall are properly sealed.	
08	If the house rough-in duct leakage test was conducted without an air handler installed, inspect the connection points between the air handler and the supply and return plenums to verify that the connection points are properly sealed.	
09	Inspect all joints to ensure that no cloth backed rubber adhesive duct tape is used.	
10	Verification Status:	Pass - all applicable requirements are met.
11	Correction Notes:	

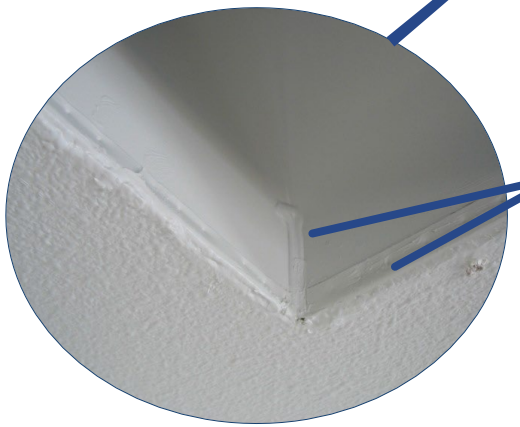
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met unless otherwise noted in the Verification Status and the Corrections Notes in this table.

Before

Common Problem Area – Connection to Drywall

After





Duct Leakage – Common Problem Areas

Flex Duct to Plenum or Rigid Duct or Register Boots

CALIFORNIA ENERGY COMMISSION

DUCT LEAKAGE DIAGNOSTIC TEST **CF3R-MCH-20-H**

(Page 3 of 4)

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.
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09	Inspect all joints to ensure that no cloth backed rubber adhesive duct tape is used.	
10	Verification Status:	Pass - all applicable requirements are met.
11	Correction Notes:	

The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met unless otherwise noted in the Verification Status and the Corrections Notes in this table.

Plenum Box, Rigid Duct, or Register Boots

Insulated Flex Duct

Well Sealed at Connection

Process / Good Practice

- Seal collar to plenum/sheet metal with mastic
- Seal inner liner of flex duct to collar with mastic and/or with draw-band
- Ensure duct insulation is in contact with plenum/sheet metal

CF2R-MCH-01-E Space Conditioning Systems, Ducts and Fans; followed by MCH-22-H Fan Efficacy and MCH-23-H System Air Flow Rate

CERTIFICATE OF INSTALLATION — **CF2R-MCH-01-E**

Space Conditioning Systems, Ducts, and Fans — **(Page 2 of 10)**

B. Design Space Conditioning (SC) System Component Specification
This table reports the space conditioning system features that

01	02	03	04
SC System ID/Name from CF1R	SC System Type	Heating System Type	Cooling System Type
furnace & AC	Heating and cooling system other	Central gas furnace	Central split AC
mini-split hp	Heat pump heating cooling	Ductless mini-split HP	Ductless mini-split HP

Notes:

C. Design Space Conditioning (SC) System Compliance Requirement
This table reports the space conditioning system features that

01	02	03	04
SC System ID/ Name from CF1R	Heating Efficiency Type	Minimum Heating Efficiency Value (%)	Heat Pump Heating Capacity at 47 °F
furnace & AC	AFUE	95	n/a
mini-split hp	HSPF	9	14000

Notes:

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SPACE CONDITIONING SYSTEM FAN EFFICACY — **CF3R-MCH-22-H**

(Page 2 of 3)

C. Forced Air System Fan Efficacy Measurement
The procedures for System Fan Watt Verification are sp

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:

D. Additional Requirements

01	All registers were fully open during the diagnos
02	System fan was set at maximum speed during t
03	If fresh air duct is part of the HVAC system it wa
04	Airflow rate and fan watt draw shall be simulta
05	Multi-speed compressor space cooling systems (Watt/cfm) with system operating in cooling m
06	Zoned cooling air distribution systems with sing criteria in every zonal control mode.
07	Portable watt meters used for measurements c acquisition system) having an accuracy of +- 2%
08	Verification Status — Pass - all a

CALIFORNIA ENERGY COMMISSION

SPACE CONDITIONING SYSTEM AIRFLOW RATE — **CF3R-MCH-23-H**

(Page 2 of 4)

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.	Traditional Flow Capture Hood according to procedure in RA3.3.3.1.4
02	Manufacturer of Airflow Measurement Apparatus	Kanomax
03	Model number of Airflow Measurement Apparatus	6710
04	Certification Status of the Airflow Measurement Apparatus Accuracy	Certified by Manufacturer and listed on CEC Website at http://www.energy.ca.gov/title24/equipment_cert/ama_fas/index.html

MCH-23a Forced Air System Airflow Rate Measurement - Newly Installed Non-Zoned Systems or Zoned Multi-Speed Compressor

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

01	Required Minimum System Airflow Rate (cfm/ton)	350
02	Required Minimum System Airflow Target (cfm)	700
03	Actual System Airflow Rate Measurement (cfm)	870
04	Compliance Statement:	System airflow rate complies

E. Additional Requirements

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 air flow rate measurement identified on this Certificate of Verification.

Kanomax

Flow Capture Hood
Measures the air volume in cubic feet per minute (cfm) at the register.

Kitchen Range Hood - Local Mech Exhaust MCH-32-H

CF1R-PRF-01-E

HERS FEATURE SUMMARY
The following is a summary of the features that must be field-verified by a certified HERS Rater as a condition for meeting the modeled energy performance for this computer analysis. Additional detail is provided in the buildng tables below. Registered CF2Rs and CF3Rs are required to be completed in the HERS Registry
• Indoor air quality ventilation • Kitchen range hood • Verified Refrigerant Charge

Reminder:
The cfm on the installed kitchen exhaust range hood needs to match or exceed the values auto-populated in the CF2R.

CF2R and CF3R Forms

- CF2R-MCH-32-H Local Mechanical Exhaust
- CF3R-MCH-32-H Local Mechanical Exhaust

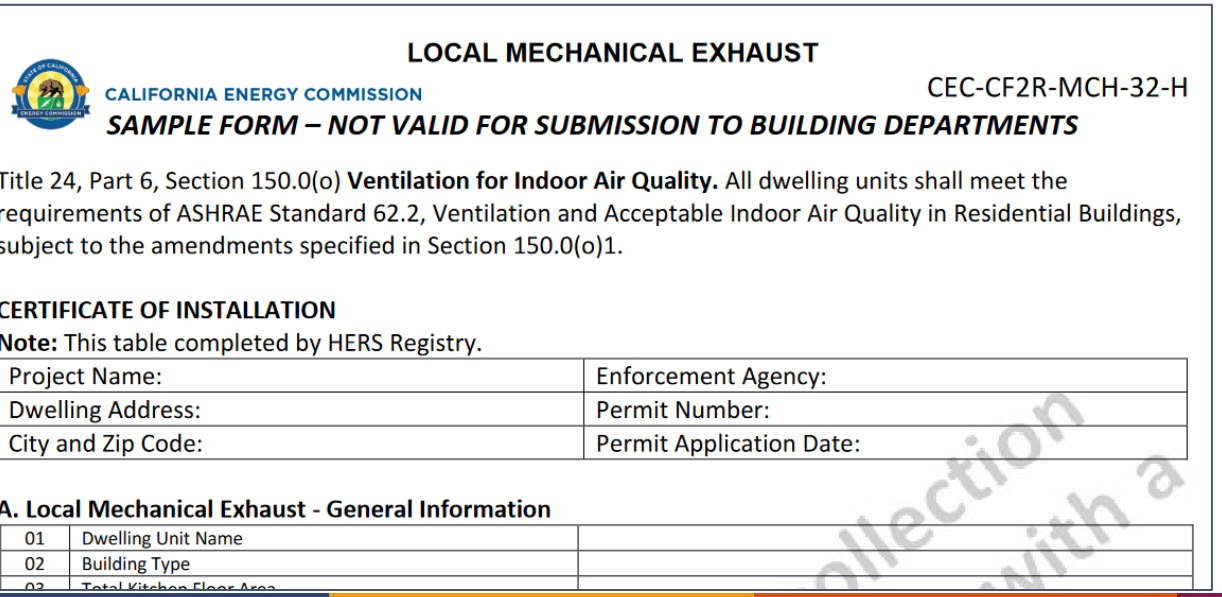
A. Local Mechanical Exhaust - General Information		
01	Dwelling unit name	
02	Building Type	Single family detached
03	Total Kitchen Floor Area	64
04	Kitchen Average Ceiling Height	9
05	Kitchen Total Conditioned Volume	576
06	Kitchen Type	Non-Enclosed
07	Dwelling Unit Total Floor Area	1000
08	Kitchen Range (Cooking Stove) Fuel Type	Electric

Range Hood – Use Table 150.0-G for Non-Enclosed Kitchens

Table 150.0-G Kitchen Range Hood Airflow Rates (cfm) and ASTM E3087 Capture Efficiency (CE) Ratings According to Dwelling Unit Floor Area and Kitchen Range Fuel Type

Dwelling Unit Floor Area (ft^2)	Hood Over Electric Range	Hood Over Natural Gas Range
>1500	50% CE or 110 cfm	70% CE or 180 cfm
>1000 - 1500	50% CE or 110 cfm	80% CE or 250 cfm
750 - 1000	55% CE or 130 cfm	85% CE or 280 cfm
<750	65% CE or 160 cfm	85% CE or 280 cfm

A Kitchen Range Hood with a HVI or AHAM rating CE of 55% or 130 cfm or greater would comply.



LOCAL MECHANICAL EXHAUST

CALIFORNIA ENERGY COMMISSION

CEC-CF2R-MCH-32-H

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

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

CERTIFICATE OF INSTALLATION

Note: This table completed by HERS Registry.

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

A. Local Mechanical Exhaust - General Information

01	Dwelling Unit Name	
02	Building Type	
03	Total Kitchen Floor Area	

collection with a

Note:
The CF2R-MCH-32 includes the above Table and other requirements, including a prescriptive duct design and hood performance testing method.

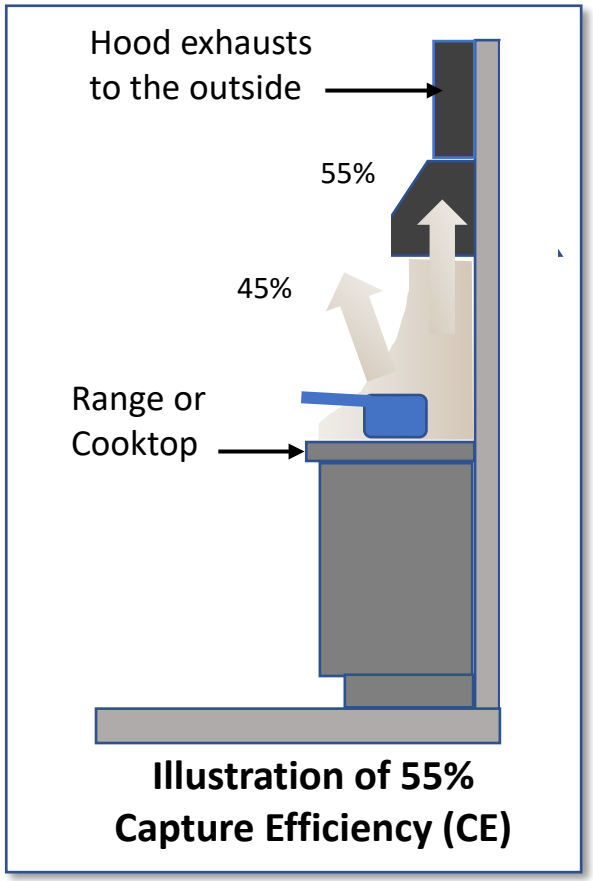


Illustration of 55% Capture Efficiency (CE)

Kitchen Exhaust System CF3R-MCH32-H

CALIFORNIA ENERGY COMMISSION

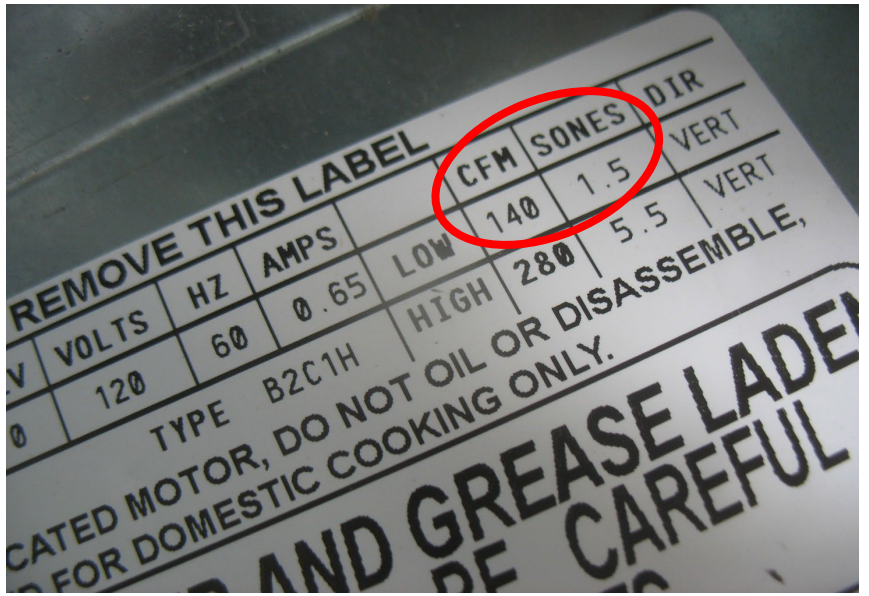
LOCAL MECHANICAL EXHAUST

CF3R-MCH-32-H

(Page 2 of 3)

B. Kitchen Exhaust System

01	02	03	04	05	06	07	08	09	10	11	12	13
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 (if demand controlled)	Exception to Maximum Sound Rating	Compliance Statement for Airflow	Compliance Statement for Sound
Kitchen Hood	Broan-Nutone	Vented Range Hood	DNR	140	1.5	140	Demand Control	Airflow	110	3 sone	Complies	Complies



Note:
CFM – Airflow
SONES – Sound Rating

3C REN

VCHP Compliance Option

CF1R-PRF-01-E

REQUIRED SPECIAL FEATURES

The following are features that must be installed as condition for meeting the modeled energy performance for this computer analysis.

- Variable capacity heat pump compliance option (verification details from VCHP Staff report, Appendix B, and RA3)
- Compact distribution system basic credit
- Northwest Energy Efficiency Alliance (NEEA) rated heat pump water heater; specific brand/model, or equivalent, must be installed

HERS FEATURE SUMMARY

The following is a summary of the features that must be field-verified by a certified HERS Rater as a condition for meeting the modeled energy performance for this computer analysis. Additional detail is provided in the building tables below. Registered CF2Rs and CF3Rs are required to be completed in the HERS Registry

- Quality insulation installation (QII)
- Indoor air quality ventilation
- Kitchen range hood
- Verified EER/EER2
- Verified SEER/SEER2
- Verified Refrigerant Charge
- Airflow in habitable rooms (SC3.1.4.1.7)
- Verified HSPF2
- Verified heat pump rated heating capacity
- Wall-mounted thermostat in zones greater than 150 ft2 (SC3.4.5)
- Ductless indoor units located entirely in conditioned space (SC3.1.4.1.8)

HERS QII Work Flow:

- Triggered on CF1R
- Job Site Meeting “Review Requirements”
- HERS Inspection: Pre-Insulation Re: units surface-mounted within conditioned envelope
- HERS Inspection: “Rater Observation for Weigh-in-Procedure” with the installing contractor on the day of charging the system and/or connecting a pre-charged refrigerant line system

CF2R and CF3R Forms

- CF2R-MCH-25c-H Refrigerant Charge Verification - Weigh-in Observation
- CF2R-MCH-26-H Rated Space Conditioning System Equipment Verification
- CF2R-MCH-33-H Variable Capacity Heat Pump Compliance Credit
- CF3R-MCH-25c-H Refrigerant Charge Verification - Weigh-in Observation
- CF3R-MCH-26-H Rated Space Conditioning System Equipment Verification
- CF3R-MCH-33-H Variable Capacity Heat Pump Compliance Credit

Refrigerant Charge – MCH-25-H Series

Paul says, "Please, coordinate the HERS Rater and Installing Contractor."

REFRIGERANT CHARGE VERIFICATION

CALIFORNIA ENERGY COMMISSION

CEC-CF2R-MCH-25-H

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

CERTIFICATE OF INSTALLATION

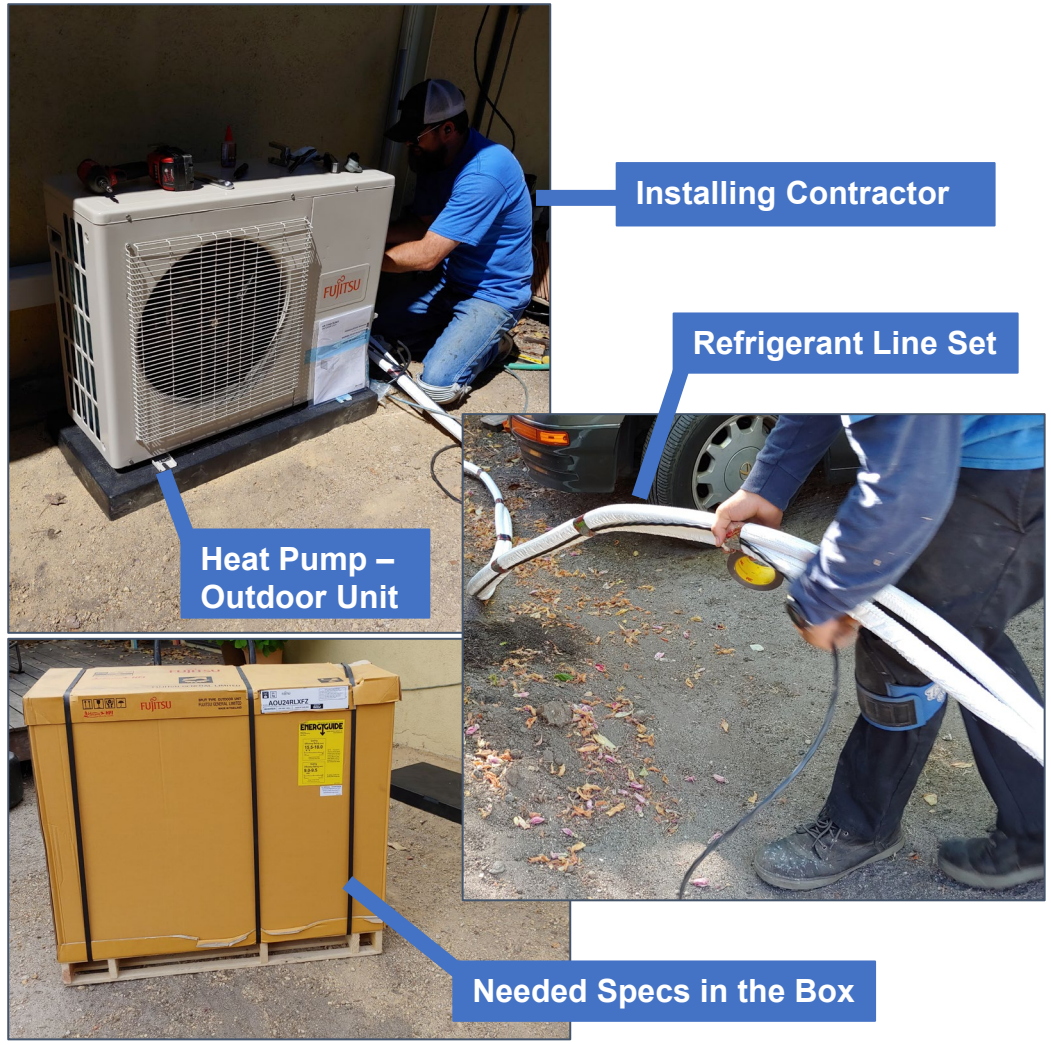
Note: This table completed by HERS Registry.

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

A. System Information

Each system requiring refrigerant charge verification will be documented on a separate certificate.

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)?	



VCHP Compliance Option MCH-33-H – Ductless Wall Mounted

Note:
Indoor units shall be installed within the air and thermal boundaries, with air flow to each habitable room, i.e. ea bedrm and living area; wall thermostats required.

CERTIFICATE OF VERIFICATION	CF3R-MCH-33-H
Variable Capacity Heat Pump Compliance Credit	(Page 2 of 4)

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

This section does not apply to this project.

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 SC3.1.4.1.8.

01	02	03
Indoor Unit Name or Description of Area Served	Indoor Unit Installation Location Verification	Compliance Statement
Living Unit	Indoor unit mounted entirely on the surface of walls, ceilings, or floors	Complies
Right Bed Unit	Indoor unit mounted entirely on the surface of walls, ceilings, or floors	Complies
Left Bed Unit	Indoor unit mounted entirely on the surface of walls, ceilings, or floors	Complies

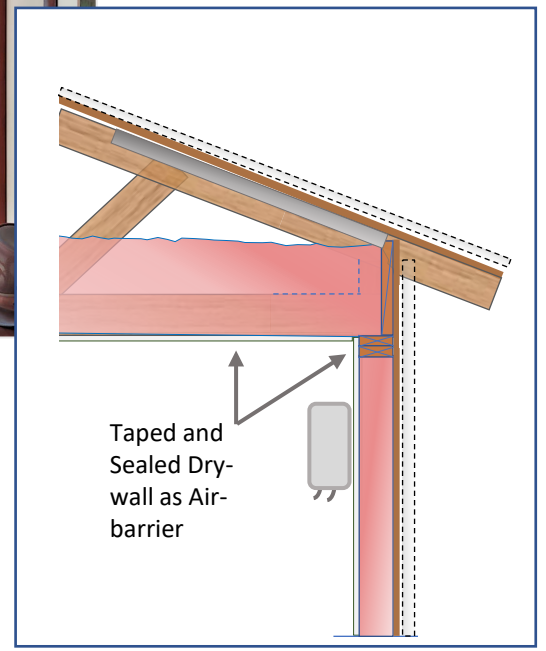
Notes:

E. Verification: Wall Mounted Thermostats - SC3.4.5

Field verification according to the procedure in SC3.4.5 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
Living Unit	Yes	Yes	Yes	Complies
Right Bed Unit	Yes	Yes	Yes	Complies
Left Bed Unit	Yes	Yes	Yes	Complies

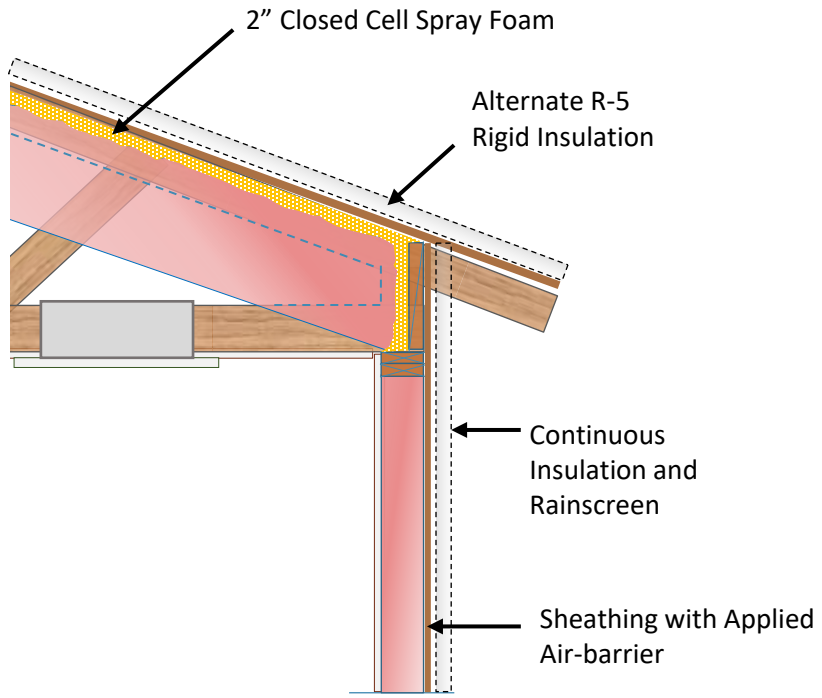
Notes:



Vented Attic with a Continuous Air and Thermal Boundary

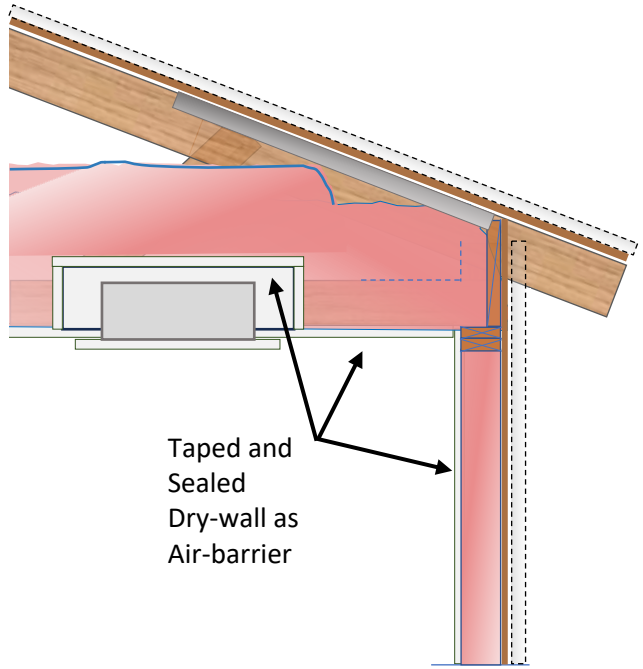
VCHP Compliance Option MCH-33-H –Ductless Recessed Units

Note:
Indoor units shall be installed within the air and thermal boundaries, with air flow to each habitable room, i.e. ea bedrm and living area; wall thermostats required.



Unvented Attic with a Continuous Air and Thermal Boundary

Ductless Recessed-Ceiling



Vented Attic with a Continuous Air and Thermal Boundary

Closing

- Continuing Education Units Available
  - Contact shuskey@co.slo.ca.us for AIA and ICC LUs
- Coming to Your Inbox Soon!
  - Slides, Recording, & Survey – Please Take It and Help Us Out!
- Upcoming Courses:
  - December 5 - What Energy Consultants Need To Know About HERS Measures
  - December 6 – All-Electric Water Heating (SLOCAOR)
  - December 7 - Using Life Cycle Assessment & Embodied Carbon Calculators to Make Design and Product Choices
  - December 15 – Getting Past Heat Pump Objections
- Visit www.3c-ren.org/events for our full catalog of trainings. 2024 courses coming soon!

Thank you!

For more info:
3c-ren.org

For questions:
info@3c-ren.org

3C REN

TRI-COUNTY REGIONAL ENERGY NETWORK

SAN LUIS OBISPO • SANTA BARBARA • VENTURA