Indoor Air Quality and Mechanical Ventilation

CALIFORNIA ENERGY COMMISSION

CEC-CF3R-MCH-27-H

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

CERTIFICATE OF VERIFICATION

Note: This table completed by HERS 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 62.2-2019 Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential 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	

MCH-27a – Single Family Attached/Detached Ventilation

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 62.2-2016 weather station for climate zone	
06	Weather and shielding factor (wsf) (Based on the city identified above)	

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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)			

D2. HRV or ERV 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)

E. Compliance Statement

01	

F. Determination of HERS 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	

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DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

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

1. I certify that this Certificate of Verification documentation is accurate and complete.	
Documentation Author Name:	Documentation Author Signature:
Company:	Date Signed:
Address:	CEA/HERS Certification Information (if applicable):
City/State/Zip:	Phone:

RESPONSIBLE PERSON'S DECLARATION STATEMENT

2. 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 HERS 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 HERS 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 made available to the enforcement agency for all applicable inspections, and I will take the necessary steps to ensure this requirement is accomplished.
   6. I understand that a registered copy of this Certificate of Verification is required to be included with the documentation the builder provides to the building owner at occupancy, and I will take the necessary steps to ensure this requirement is accomplished.

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:

HERS PROVIDER DATA REGISTRY INFORMATION

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

HERS RATER INFORMATION

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

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

CF3R-MCH-27a-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.

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 62.2-2016 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 X1 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

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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	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

TMY3	wsf	Weather Station	Latitude	Longitude	State
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 D2. 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. Determination of HERS 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, HERS Rater company name, HERS Rater name, HERS Rater signature, HERS Rater certification number and date signed.