INDOOR AIR QUALITY AND MECHANICAL VENTILATION

CALIFORNIA ENERGY COMMISSION

CEC-LMCI-MCH-27-H

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

CERTIFICATE OF INSTALLATION

Note: This table completed by ECC Registry.

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

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

A. Whole-Dwelling Mechanical Ventilation - General Information

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

B. Ventilation - Total Ventilation Rate

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

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

C. Installed Ventilation - Total Ventilation Rate

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

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

D. HRV or ERV serving Individual Dwelling Unit

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

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

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E. Additional Envelope Requirements

01	Envelope Leakage	

F. Additional Central Ventilation System Balancing Requirements

01	Maximum Ventilation Flow (CFM)	

G. Requirements for balanced and supply only ventilation systems (160.0(b)2Axi)

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

Balanced and supply ventilation component accessibility. Balanced and supply ventilation systems shall meet the following requirements for accessibility:

01	IAQ filter and HRV/ERV accessibility. System air filters and HRV/ERV heat/energy recovery cores shall be located such that they are accessible for service from within occupiable spaces, basements, garages, balconies, mechanical closets or accessible rooftops. Filters and heat/energy recovery cores behind access panels, access doors, or grilles located no more than 10 feet above a walking surface inside a space specified above comply with this requirement. **Exception to Section 160.2(b)2Axia:** Systems that require servicing from inside the attic shall have the following: 1. A Fault Indicator Display (FID) meeting the requirements of Reference Appendix JA17; and 2. An attic access door located in a wall or, where attic access is provided through a ceiling, an attic access hatch that includes an integrated ladder; and 3. A walkway from the attic access door to the HRV/ERV.
02	IAQ system component accessibility. Fans, motors, heat exchangers, filters and recovery cores shall meet all applicable requirements of California Mechanical Code 304.0 accessibility of service.

H. Fault Indicator Display

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.	

I. Fault Indicator Display – Additional Requirements

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

01	Fault Indicator Display devices shall either be factory installed by the space-conditioning system manufacturer, or field installed according to the space-conditioning system manufacturer's requirements and the FID manufacturer's specifications.
02	The installer shall ensure that a copy of the FID manufacturer's user instructions documentation has been made available to the building owner.

J. Compliance Statement

01	

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K. Other Requirements

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

The items listed below (6.1 through 6.6 and 6.8) correspond to the information given in ASHRAE 62.2 Section 6 "Other Requirements". Refer also to Chapter 4.6 of the Residential Compliance Manual (Section 4.6.8) for information describing these "Other Requirements". The signature of the Responsible Person in the declaration statement below certifies that the building complies with these requirements specified in ASHRAE 62.2 Section 6.1 through 6.6 and 6.8 if applicable.

01	**6.1 Adjacent Spaces and Transfer Air.** Measures shall be taken to minimize air movement across envelope components to dwelling units from adjacent spaces such as garages, unconditioned crawlspaces, unconditioned attics, and other dwelling. Supply and balanced mechanical ventilation systems shall be designed and constructed to provide ventilation air directly from the outdoors. 6.1.1 **Attached Dwelling Units**. Attached dwelling units, except existing units as described in Normative Appendix A, Section A5, shall demonstrate compliance with Section 6.1 by verifying a leakage rate less than or equal to 0.2 cfm per ft2 (100 L/s per 100 m2) of the dwelling-unit boundary area by means of a blower door test at a test pressure of 50 Pa. Testing shall be conducted in accordance with ANSI/RESNET/ICC Standard 380. For horizontally attached dwelling units that are being evaluated for the infiltration credit in Section 4.1.2, the procedure specified in Section 4.1.2 shall be an alternative to the procedure of this section. 6.1.2 **Garages.** When an occupiable space adjoins a garage, the design must prevent migration of contaminants to the adjoining occupiable space. Air seal the walls, ceilings, and floors that separate garages from occupiable space. To be considered air-sealed, all joints, seams, penetrations, openings between door assemblies and their respective jambs and framing, and other sources of air leakage through wall and ceiling assemblies separating the garage from the residence and its attic area shall be caulked, gasketed, weather stripped, wrapped, or otherwise sealed to limit air movement. Doors between garages and occupiable spaces shall be gasketed or made substantially airtight with weather stripping. 6.1.3 **Space-Conditioning System Ducts.** All air distribution joints located outside the dwelling-unit boundary shall be sealed. HVAC systems that serve spaces within the dwelling-unit boundary shall not be designed to supply air to or return air from the garage. HVAC systems that include air handlers or ducts located outside the dwelling-unit boundary shall have total air leakage of no more than 6% of total fan airflow when measured at 0.1 in. of water (25 Pa) using California Building Energy Efficiency Standards, Residential Appendix RA3.1 or equivalent. Method D of ASTM E1554 may be used to meet this requirement. If the air handler, ducts, or both are located in the garage, the garage door shall be open to the outside when the duct leakage is tested.
02	**6.2 Labeling** Controls shall be labeled as to their function (unless that function is obvious, such as toilet exhaust fan switches)**.**
03	**6.3 Clothes Dryers.** Clothes dryers shall be exhausted directly to the outdoors. **Exception to 6.3**: Condensing dryers plumbed to a drain.
04	**6.4 Combustion and Solid-Fuel Burning Appliances.** 6.4.1 Combustion and solid-fuel-burning appliances must be provided with adequate combustion and ventilation air and installed in accordance with manufacturers' installation instructions, NFPA 31, NFPA 54/ANSI Z223.1, NFPA 211, or other equivalent code acceptable to the building official. 6.4.2 Where atmospherically vented combustion appliances or solid-fuel burning appliances are located inside the dwelling unit boundary, the total net exhaust flow of the two largest exhaust fans (not including a summer cooling fan intended to be operated in conjunction with windows or other openings) shall not exceed 15 cfm per 100 ft^2 (75 L/s per 100 m^2) of floor area when in operation at full capacity. If the designed total net airflow exceeds this limit, the net exhaust air flow must be reduced by reducing the exhaust air flow or providing compensating outdoor air. Gravity or barometric dampers in nonpowered exhaust makeup air systems shall not be used to provide compensating outdoor air. Atmospherically vented combustion appliances do not include direct-vent appliances. Combustion appliances that pass safety testing performed according to ANSI/BPI-1200 shall be deemed as complying with Section 6.4.2.
05	**6.5 Ventilation Opening Area.** Spaces shall have ventilation openings as listed in the following subsections. Such openings shall meet the requirements of Section 6.6. **Exception to 6.5**: Attached dwelling units and spaces that meet the local ventilation requirements set for bathrooms in Section 5 [of ASHRAE 62.2]. 6.5.1 **Habitable Spaces.** Each habitable space shall be provided with ventilation openings with an openable area not less than 4% of the floor area or less than 5 ft^2 (0.5 m^2). 6.5.2 **Toilets and Utility Rooms**. Toilets and utility rooms shall be provided with natural ventilation openings with an openable area not less than 4% of the room floor area or less than1.5 ft^2 (0.15 m^2). **Exceptions to 6.5.2**: 1. Utility rooms with a dryer exhaust duct. 2. Toilet compartments in bathrooms.

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L. Air Moving Equipment

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

The items listed below (7.1 through 7.5) correspond to the information given in ASHRAE 62.2 Section 7 "Air-Moving Equipment". Refer also to Chapter 11 of the Non-Residential Compliance Manual (Section 11.4) for information describing these requirements in more detail. The signature of the Responsible Person in the declaration statement below certifies that the building complies with these requirements specified in ASHRAE 62.2 Section 7.1 through 7.5 if applicable.

01	**7.1 Ratings.** Airflow and sound ratings shall be provided for ventilation devices and equipment serving individual dwelling units. Airflow and sound ratings shall be provided in accordance with HVI 920, or equivalent, by an administration and certification body that is accredited in accordance with ISO/IEC 17065 with respect to application of the standards and test procedures referenced in Section 7.1 and accredited by an accreditation body operating in accordance with ISO/IEC 17011. Laboratory tests of representative units shall be conducted for airflow in accordance with ANSI/ASHRAE Standard 51/AMCA 210, as prescribed by HVI 916, or equivalent, and conducted for sound in accordance with ANSI/AMCA Standard 300, as prescribed by HVI 915, or equivalent. This section does not require certification to HVI 917
02	**7.2 Installation.** Installations of systems or equipment shall be carried out in accordance with manufacturer's design requirements and installation instructions.
03	**7.3 Sound Ratings for Fans.** Ventilation fans shall be rated for sound at no less than the minimum airflow rate required by this standard as noted below. These sound ratings shall be at a minimum of 0.1 in. of water (25 Pa) static pressure in accordance with the HVI procedures referenced in Section 7.1. **Exception to 7.3:** HVAC air handlers and remote mounted fans need not meet sound requirements. To be considered for this exception, a remote mounted fan must be mounted outside the habitable spaces, bathrooms, toilets, and hallways, and there must be at least 4 ft (1 m) of ductwork between the fan and the intake grille. 7.3.1 **Dwelling-Unit Ventilation or Continuous Local Exhaust Fans.** These fans shall be rated for sound at a maximum of 1.0 sone. 7.3.2 **Demand-Controlled Local Exhaust Fans.** Bathroom exhaust fans used to comply with Section 5.2 shall be rated for sound at a maximum of 3 sones. Kitchen exhaust fans used to comply with Section 5.2 shall be rated for sound at a maximum of 3 sones at one or more airflow settings greater than or equal to 100 cfm (47 L/s). **Exception to 7.3.2:** Fans with a minimum airflow setting exceeding 400 cfm (189 L/s) need not comply.
04	**7.4 Exhaust Ducts.** 7.4.1 **Multiple Exhaust Fans Using One Duct.** Exhaust fans in separate dwelling units shall not share a common exhaust duct. If more than one of the exhaust fans in a single dwelling unit shares a common exhaust duct, each fan shall be equipped with a backdraft damper to prevent the recirculation of exhaust air from one room to another through the exhaust ducting system. 7.4.2 **Single Exhaust Fan Ducted to Multiple Exhaust Inlets.** Where exhaust inlets are commonly ducted across multiple dwelling units, one or more exhaust fans located downstream of the exhaust inlets shall be designed and intended to run continuously, or a system of one or more backdraft dampers shall be installed to isolate each dwelling unit from the common duct when the fan is not running.
05	**7.5 Supply Ducts.** Where supply outlets are commonly ducted across multiple dwelling units, one or more supply fans located upstream of all the supply outlets shall be designed and intended to run continuously, or a system of one or more backdraft dampers shall be installed to isolate each dwelling unit from the common duct when the fan is not running.

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DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

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

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

RESPONSIBLE PERSON'S DECLARATION STATEMENT

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

1. The information provided on this certificate of installation is true and correct.
2. I am either: a) a responsible person eligible under division 3 of the business and professions code in the applicable classification to accept responsibility for the system design, construction, or installation of features, materials, components, or manufactured devices for the scope of work identified on this certificate of installation, and attest to the declarations in this statement, or b) I am an authorized representative of the responsible person and attest to the declarations in this statement on the responsible person's behalf.
3. The constructed or installed features, materials, components or manufactured devices (the installation) identified on this certificate of installation conforms to all applicable codes and regulations and the installation conforms to the requirements given on the certificate of compliance, plans, and specifications approved by the enforcement agency.
4. I understand that an ECC-Rater will check the installation to verify compliance and if such checking determines the installation fails to comply, I am required to offer any necessary corrective action at no charge to the building owner.
5. I understand that a registered copy of this certificate of installation 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 installation is required to be included with the documentation the builder provides to the building owner at occupancy. I will take the necessary steps to fulfill this requirement.

Responsible Builder/Installer Name:	Responsible Builder/Installer Signature:	
Company Name: (Installing Subcontractor or General Contractor or Builder/Owner)	Position With Company (Title):	
Address:	CSLB License:	
City/State/Zip:	Phone:	Date Signed:
Third Party Quality Control Program (TPQCP) Status:	Name of TPQCP (if applicable):	

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

LMCI-MCH-27-H User Instructions

Section A. General Information

1. Building Unit Name: This field is filled out automatically. It is referenced from the LMCI-MCH-01, which must be completed prior to this document. This is the unique identifier for this dwelling unit. Needed mostly for multifamily dwelling units. Ventilation is calculated and provided for each dwelling unit individually.
2. Building Type: This field is filled out automatically. It is referenced from the LMCC. Values are "Multifamily".
3. Project Scope: This field is filled out automatically. It is referenced from the LMCC.
    - If parent document is the LMCC-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 ft^2"," ADU Addition > 300 to < 400 ft^2"," ADU Addition > 400 to < 700 ft^2" and "ADU Addition > 700 to < 1000 ft^2".
4. Total Conditioned Floor Area of Dwelling Unit: This field is filled out automatically. It is referenced from the LMCI-MCH-01.
5. Number of Bedrooms in Dwelling Unit: This field is filled out automatically. It is referenced from the LMCI-MCH-01.
6. Ventilation system Type: This may be filled out automatically or be user input.
    - If parent document is the LMCC-PRF-01, the 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.
    - 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" (A12) = Continuous; then user will not be allowed to proceed.

Section B. Whole Building Continuous Ventilation – Total Ventilation Rate Method

1. This value is automatically calculated using equation 160.2-Bfrom the Energy Standards.

Section C. Installed Ventilation – Total Ventilation Rate Method

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

Section D. HRV or ERV serving Individual Dwelling Unit

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

Section E. Additional Envelope Requirements

1. Envelope Leakage: This field is filled out automatically. It is referenced from the LMCI-MCH-24, which must be completed prior to this document.

Section F. Additional Central Ventilation System Balancing Requirements

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

Section G. Requirements for balanced and supply only ventilation systems

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.

Section H. Fault Indicator Display

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

Section I. Fault Indicator Display – Additional Requirements

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.

Section J. Compliance Statement

1. Compliance Statement: This field is filled out automatically

Section K 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
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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

Section L 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.

Documentation Declaration Statements

1. The person who prepared the LMCI will sign and complete the fields for their name, company (if applicable), address, phone number, certification information (if applicable), date and signature.
2. The person who is assuming responsibility for the project being built to comply with Title 24, Part 6, will complete the fields for their name, company (if applicable), address, phone number, license number (if applicable), date and signature.