SPACE CONDITIONING SYSTEM FAN EFFICACY

CALIFORNIA ENERGY COMMISSION

CEC-CF2R-MCH-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:	Permit Application Date:

A. Ducted Cooling System Information

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

B. Fan Watt Measurement Apparatus and Procedure Information

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

01	Fan Watt Verification Device Used	

MCH-22d Forced Air System Fan Efficacy Measurement – Newly Installed Zoned Single-Speed Compressor Systems with Central Fan Ventilation Cooling

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

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

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

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

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

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

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

09	Compliance Statement:	

E. Central Fan Ventilation Cooling System Fan Efficacy Measurement

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

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

F. Additional Requirements

01	All registers were fully open during the diagnostic test.
02	System fan was set at maximum speed during the diagnostic test.
03	If fresh air duct is part of the HVAC system it was not closed during the diagnostic test.
04	Airflow rate and fan watt draw shall be simultaneous measurements when used to calculate the fan efficacy tested value.
05	Multi-speed compressor space cooling systems or variable speed compressor systems shall verify airflow (cfm/ton) and fan efficacy (watt/cfm) with system operating in cooling mode at the maximum compressor speed and the maximum air handler fan speed.
06	Zoned cooling air distribution systems with single speed compressors shall meet both the airflow (cfm/ton) and fan efficacy (watt/cfm) criteria in every zonal control mode.
07	Portable watt meters used for measurements of air-handler watt draws shall be true power measurement systems (i.e., sensor plus data acquisition system) having an accuracy of ± 2% of reading or ± 10 watts whichever is greater.

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

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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/HERS Certification Identification (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 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 a HERS 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 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 installation 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.

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

CF2R-MCH-22d-H User Instructions

Section A. Ducted Cooling System Information

1. *System Identification or Name:* This field is filled out automatically. It is referenced from the CF2R-MCH-23, which must be completed prior to this document.
2. *System Location or Area Served:* This field is filled out automatically. It is referenced from the CF2R-MCH-23, which must be completed prior to this document.
3. *Indoor Unit Name:* This field is filled out automatically. It is referenced from the CF2R-MCH-23, which must be completed prior to this document.
4. *System Installation Type:* This field is filled out automatically. It is referenced from the CF2R-MCH-23, which must be completed prior to this document.
5. *Nominal Cooling Capacity (tons) of Condenser:* This field is filled out automatically. It is referenced from the CF2R-MCH-23, which must be completed prior to this document.
6. *Condenser Speed Type:* This field is filled out automatically. It is referenced from the CF2R-MCH-23, which must be completed prior to this document.
7. *Cooling System Zonal Control Type:* This field is filled out automatically. It is referenced from the CF2R-MCH-23, which must be completed prior to this document.
8. *Central Fan Integrated (CFI) Ventilation System Status:* This field is filled out automatically. It is referenced from the CF2R-MCH-23, which must be completed prior to this document.
9. *System Bypass Duct Status:* This field is filled out automatically. It is referenced from the CF2R-MCH-23, which must be completed prior to this document.
10. *Date of System Airflow Rate Measurement:* This field is filled out automatically. It is referenced from the CF2R-MCH-23, which must be completed prior to this document.
11. *Airflow Rate Protocol utilized:* This field is filled out automatically. It is referenced from the CF2R-MCH-23, which must be completed prior to this document.
12. *Central Fan Ventilation Cooling System Status:* This field is filled out automatically. It is referenced from the CF2R-MCH-23, which must be completed prior to this document.

Section B. Fan Watt Measurement Apparatus and Procedure Information

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

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

1. *Actual Tested Watts:* Enter the number of watts tested using the device specified in Section B and tested with all zones calling for cooling simultaneously.
2. *Actual Tested Airflow from MCH-23 (cfm):* This field is filled out automatically. It is referenced from the CF2R-MCH-23, which must be completed prior to this document.
3. *Required Fan Efficacy (watts/cfm):* This field is filled out automatically and referenced from MCH-01. Values below are used unless higher efficacy values are listed on the CF1R for performance compliance.
    a. 0.62 watts/cfm for small duct high velocity HP or AC systems
    b. 0.45 watts/cfm for central gas furnace or packaged gas furnace systems
    c. 0.58 watts/cfm for all other systems

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

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

1. *Number of Independently Controlled Zones: Enter the number of independently controlled zones.*
2. *Required Fan Efficacy (Watts/cfm):* This field is filled out automatically and referenced from MCH-01. Values below are used unless higher efficacy values are listed on the CF1R for performance compliance.
    a. 0.62 watt/cfm for small duct high velocity HP or AC systems
    b. 0.45 watt/cfm for central gas furnace or packaged gas furnace systems
    c. 0.58 watt/cfm for all other systems
3. *Zone Name*: Enter a unique name for each independent zone.
4. *Zone Description*: Enter a description of the zone (e.g. upstairs, downstairs).
5. *Measured Watt Draw with All Other Zones Off*: Enter the number of watts tested using the device specified in Section B and tested with all other zones off.
6. *Measured Airflow with All Other Zones Off*: This field is filled out automatically. It is referenced from the CF2R-MCH-23, which must be completed prior to this document.
7. *Calculated Fan Efficacy*: This field is filled out automatically. It is calculated by dividing the measured watt draw by the measured airflow.
8. *Zone Compliance Status*: This field is filled out automatically. The result is based on whether or not the actual fan efficacy meets the required fan efficacy for this zone.
9. *Compliance Statement*: This field is filled out automatically. The result is based on whether or not the actual fan efficacy meets the required fan efficacy for all zones tested.

Section E. Central Fan Ventilation Cooling System Fan Efficacy Measurement

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

Section F. Additional Requirements

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

Documentation Declaration Statements

1. The person who prepared the CF2R 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.