SPACE CONDITIONING SYSTEM FAN EFFICACY

CERTIFICATE OF INSTALLATION		CF2R-MCH-22-H
Space Conditioning System Fan Efficacy		(Page 1 of 3)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City:	Zip Code:

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

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-22b Forced Air System Fan Efficacy Measurement – Newly Installed Zoned Single-Speed Compressor Systems

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:	

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:				

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CERTIFICATE OF INSTALLATION		CF2R-MCH-22-H
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E. 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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CERTIFICATE OF INSTALLATION		CF2R-MCH-22-H
Space Conditioning System Fan Efficacy		(Page 3 of 3)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City:	Zip Code:

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

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 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 (responsible builder/installer), otherwise I am an authorized representative of the responsible builder/installer.
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 plans and specifications approved by the enforcement agency.
4. I understand that a HERS rater will check the installation to verify compliance, and that if such checking identifies defects; I am required to take corrective action at my expense. I understand that Energy Commission and HERS Provider representatives will also perform quality assurance checking of installations, including those approved as part of a sample group but not checked by a HERS rater, and if those installations fail to meet the requirements of such quality assurance checking, the required corrective action and additional checking/testing of other installations in that HERS sample group will be performed at my expense.
5. I reviewed a copy of the Certificate of Compliance approved by the enforcement agency that identifies the specific requirements for the scope of construction or installation identified on this Certificate of Installation, and I have ensured that the requirements that apply to the construction or installation have been met.
6. I will ensure 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. 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.

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):	

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CF2R-MCH-22b-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 *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.
4 *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.
5 *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.
6 *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.
7 *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.
8 *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.
9 *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.
10 *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.

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. If a value other than 0.58 Watts/cfm was claimed in the performance calculations, it will be referenced from the CF1R, otherwise the target is 0.58 Watts/cfm.
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.

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