DOCKETED	
Docket Number:	15-BSTD-02
Project Title:	Residential Compliance Manual and Documents
TN #:	232818-21
Document Title:	2016-CF2R-MCH-23c-AirflowRate-BestThatIcanDopdf
Description:	N/A
Filer:	Corrine Fishman
Organization:	California Energy Commission
Submitter Role:	Public Agency
Submission Date:	4/22/2020 9:24:16 AM
Docketed Date:	4/22/2020

STATE OF CALIFORNIA

SPACE CONDITIONING SYSTEM AIRFLOW RATE

CEC-CF2R-MCH-23-H (Revised 09/18) CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF INSTALLATION		CF2R-MCH-23-H
Space Conditioning System Airflow Rate		(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. Hole for the Placement of a Static Pressure Probe (HSPP), and Permanently Installed Static Pressure Probe (PSPP) in the Supply Plenum Procedures for installing HSPP or PSPP are specified in RA3.3.1.1.		
01	Method Used to Demonstrate Compliance with the HSPP/PSPP Requirement	

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	
02	Manufacturer of Airflow Measurement Apparatus	
03	Model Number of Airflow Measurement Apparatus	
04	Certification Status of the Airflow Measurement Apparatus Accuracy	

MCH-23c Forced Air System Airflow Rate Measurement – Alternative to Compliance with Minimum System Airflow Requirements for Altered Systems

D. Alternative to Compliance with Minimum System Airflow Requirements for Altered Systems The installer shall attempt to correct non-compliant system airflow rates by performing the following remedial actions as specified in RA3.3.3.1.5		
01	Determine that the air filter media is clean. If the air filter media is dirty, then replace it with clean filter media.	
02	Open all registers and dampers and remove any obstructions.	
03	Replace/Repair all accessible crushed, blocked, restricted, remove excess length, and sharp bends in ducts. Supported every 4 ft max. with a max. 2 in sag.	
04	Clean the evaporator coil according to the manufacturer and ensure the coil is not obstructed.	
05	Air handler fan speed set to high and blower wheel and motor are operating properly.	
06	If determined to be too small, replace the return duct with a larger one and/or add a second return duct.	
07	If determined to be too small, replace the return grille with a larger area grille.	
08	If any of the above were not completed list the Action Required and a description of why the action could not be completed:	
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.		

CERTIFICATE OF INSTALLATION		CF2R-MCH-23-H
Space Conditioning System Airflow Rate		(Page 2 of 3)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City:	Zip Code:

E. Forced Air System Airflow Rate Measurement - Best Airflow Rate Attainable The procedures for System Airflow Rate Verification are specified in Reference Residential Appendix RA3.3.		
01	Required Minimum System Airflow Rate (cfm/ton)	
02	Required Minimum System Airflow Target (cfm)	
03	Actual System Airflow Rate Measurement (cfm)	
04	Compliance Statement:	
05	HERS Sample Group Eligibility	

F. 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 airflow rate measurement identified on this Certificate of Installation.
02	The airflow rate measurement apparatus used to perform the airflow rate measurement identified on this Certificate of Installation was calibrated in accordance with the apparatus manufacturer's specifications and conforms to the instrumentation specifications given in RA3.3.1.
03	A visual inspection shall confirm that bypass ducts that deliver conditioned supply air directly to the space conditioning system return duct airflow are not used on newly constructed zonally controlled systems unless the Performance Certificate of Compliance indicates an allowance for use of a bypass duct. When a bypass duct is accounted for on the Performance Certificate of Compliance, the airflow rate shall conform to the specifications listed on the Certificate of Compliance.
04	All registers were fully open during the diagnostic test.
05	System fan was set at maximum speed during the diagnostic test.
06	If fresh air duct is part of the HVAC system it was not closed during the diagnostic test.
07	Airflow rate and fan watt draw shall be simultaneous measurements when used to calculate the Fan Efficacy tested value.
08	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.
09	For altered systems that do not comply with the minimum 300 cfm per ton airflow rate requirement but opt to comply using the remedial actions on this MCH-23 compliance document according to Section RA3.3.3.1.5, the system's thermostat shall conform to the specifications in Reference Joint Appendix JA5 and shall be capable of receiving and responding to Demand Response Signals prior to final approval of the building permit by the enforcing agency (Section 150.2(b)1Fia).
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.	

SPACE CONDITIONING SYSTEM AIRFLOW RATE

CERTIFICATE OF INSTALLATION	CF2R-MCH-23-H
Space Conditioning System Airflow Rate	(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 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 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):	

CF2R-MCH-23c-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-01, 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-01, which must be completed prior to this document.

3 System Installation Type: Select the appropriate System Installation Type from the following choices:
   a. New: Use this choice for newly constructed buildings, additions with all-new systems dedicated to the addition, or new systems installed in existing homes where the equipment and ducts are all newly installed (aka, "Cut-in").
   b. Replacement: Use this choice if the system is a complete replacement space-conditioning system installed as part of an alteration, and includes all the system heating or cooling equipment plus a replacement duct system (150.2(b)1Diia) where the ducts are at least 75% or more newly installed duct material (up to 25% of the finished system may consist of reused parts from the dwelling unit's previously existing duct system, such as registers, grilles, boots, air handler, coil, plenums, duct material); plus a replacement air handler.
   c. Alteration: Use this choice for existing buildings where any of the following are newly installed or replaced as part of the project and the system does not meet one of the other compliance categories above:
      i. 40 feet or more of space-conditioning system ducts are installed in unconditioned space or indirectly conditioned space.
      ii. Air conditioning or heat pump condenser
      iii. Heating or cooling coil
      iv. Air handler (e.g., furnace, fan coil, package unit)

4 Nominal Cooling Capacity (tons) of Condenser: This field is filled out automatically. It is referenced from the CF2R-MCH-01, 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-01, 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-01, which must be completed prior to this document.

7 Central Fan Integrated (CFI) Ventilation System Status: If the system has Central Fan Integrated System, then select "CFI System", otherwise select "Not a CFI system".

8 System Bypass Duct Status: This field is filled out automatically. It is referenced from the CF2R-MCH-01, which must be completed prior to this document.

9 Date of System Airflow Rate Measurement: Enter the date that the airflow test was performed.

10 Airflow Rate Protocol Utilized: If the system installation type is "New" or "Replacement" then only the RA3.3 airflow methods may be used. If the system installation type is "Alteration", the RA3.3 airflow methods may be used, but the Alternative to Compliance with Minimum System Airflow Requirements ("Best I Can Do" Airflow) is an option for existing systems that may require substantial modification to improve the airflow.

Section B. Hole for the Placement of a Static Pressure Probe (HSPP), and Permanently Installed Static Pressure Probe (PSPP) in the Supply Plenum

1 A hole for a static pressure probe (HSPP) or a permanent static pressure probe (PSPP) is required when system airflow verification is required, whether the airflow test method used requires one or not. Select the appropriate choice from the following options using a dropdown box, the Static Pressure Measurement Method:
   a. If an Hole Static Pressure Probe is installed then select "HSPP Installed"
   b. If a Permanent Static Pressure Probe is installed then select "PSPP Installed"
   c. If the system is configured such that an HSPP nor PSPP can be installed, an alternate location that provides access for making supply plenum pressure measurement may be used. Select "An alternative location has been provided and clearly labeled."
   d. If the system is such that an HSPP or PSPP is not applicable, select "HSPP/PSPP are not applicable to this system".

Section C. Airflow Rate Measurement Apparatus and Procedure Information

1. Airflow Rate Measurement Type used for this airflow rate verification: Select the appropriate airflow test procedure from the following options for the method used to determine actual fan air flow:
    a. Diagnostic Fan Flow Using Fan Flow Meter (aka Plenum Pressure Matching) according to the procedures in RA3.3.3.1.1
    b. Diagnostic Fan Flow Using Flow Grid Measurement according to the procedures in RA3.3.3.1.2
    c. Diagnostic Fan Flow Using Powered Flow Capture Hood according to the procedures in RA3.3.3.1.3
    d. Diagnostic Fan Flow Using Traditional Flow Capture Hood according to the procedures in RA3.3.3.1.4
2. Manufacturer of Airflow Measurement Apparatus: Enter the name of the manufacturer of the airflow measurement tool used to measure the airflow for this test.
3. Model number of Airflow Measurement Apparatus: Enter the model number of the airflow measurement tool used to measure the airflow for this test.
4. Certification Status of the Airflow Measurement Apparatus Accuracy: The measurement apparatus used to perform airflow verification measurements must appear on the CEC list of approved devices found at http://www.energy.ca.gov/title24/equipment_cert/ama_fas/index.html, if this is true, select "Certified", otherwise select "Not Certified". The latter choice will not allow the system to pass until a certified device is used.

Section D. Alternative to Compliance with Minimum System Airflow Requirements for Altered Systems

1. Refer to section RA3.3.3. for details on this item. Indicate whether completed or not.
2. Refer to section RA3.3.3. for details on this item. Indicate whether completed or not.
3. Refer to section RA3.3.3. for details on this item. Indicate whether completed or not.
4. Refer to section RA3.3.3. for details on this item. Indicate whether completed or not.
5. Refer to section RA3.3.3. for details on this item. Indicate whether completed or not.
6. Refer to section RA3.3.3. for details on this item. Indicate whether completed or not.
7. Refer to section RA3.3.3. for details on this item. Indicate whether completed or not.
8. If any of the above items could not be completed due to inaccessibility or significant cost, provide an explanation here.

Section E. Forced Air System Airflow Rate Measurement - Best Airflow Rate Attainable

1. Required Minimum System Airflow Rate (cfm/ton): This field is filled automatically. The target is always 300 cfm/ton for this option.
2. Required Minimum System Airflow Target (cfm): This field is calculated automatically. It is the product of the minimum airflow rate per ton and the tonnage of the system condenser.
3. Actual System Airflow Rate Measurement (cfm): Enter the actual tested value of the airflow measured using the apparatus specified above.
4. Compliance Statement: This field is filled automatically. Compliance requires that the measured airflow meets the minimum airflow target, however if the criteria of RA3.3.3 is met the best attainable airflow rate will suffice.
5. HERS Sample Group Eligibility: This field is filled out automatically. If the minimum airflow rate cannot be met and the criteria of RA3.3.3 is used, the system cannot be included in a HERS sample group.

Section F. Additional Requirements

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