SPACE CONDITIONING SYSTEM AIRFLOW RATE

CERTIFICATE OF VERIFICATION		CF3R-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 RA3.2.2.7.3		
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	Verification Status:	
09	Correction Notes:	
10	Optional Notes: additional information not relevant to correction for responses given in Rows 01 through 07 in this section	

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CERTIFICATE OF VERIFICATION		CF3R-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 air flow rate measurement identified on this Certificate of Verification.	
02	The airflow rate measurement apparatus used to perform the airflow rate measurement identified on this Certificate of Verification 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 air flow (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 RA3.2.2.7.3, 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).	
10	Verification Status:	
11	Correction Notes:	

The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met unless otherwise noted in the Verification Status and the Corrections Notes in this table.

G. 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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CERTIFICATE OF VERIFICATION		CF3R-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 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

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 will ensure 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. 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.

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:

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CF3R-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 percent or more newly installed duct material (up to 25 percent 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".

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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.
5. *(not visible to user)*

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

1. Refer to section *RA3.2.2.7.* for details on this item.- Indicate whether completed or not.
2. Refer to section *RA3.2.2.7.* for details on this item. -Indicate whether completed or not.
3. Refer to section *RA3.2.2.7.* for details on this item.- Indicate whether completed or not.
4. Refer to section *RA3.2.2.7.* for details on this item.- Indicate whether completed or not.
5. Refer to section *RA3.2.2.7.* for details on this item.- Indicate whether completed or not.
6. Refer to section *RA3.2.2.7.* for details on this item.- Indicate whether completed or not.
7. Refer to section *RA3.2.2.7.* for details on this item.- Indicate whether completed or not.
8. *Verification Status:* If this Section does not apply, then select "All n/a". If the system meets the airflow criteria then select "Pass", otherwise select "Fail". The latter selection means that the system does not meet the requirements and the CF1R will have to be revised, or the system will need to be modified to meet the requirements.
9. *Correction Notes:* If one or more applicable requirements are not met "Fail" will appear in the row above. When this occurs the rater is required to enter detailed notes here that describe what failed and why.
10. If any of the above items could not be completed due to inaccessibility or significant cost, provide additional 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 *RA3.2.2.7* 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 *RA3.2.2.7* 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.
9 *Verification Status:* If this Section does not apply, then select "All n/a". If the system meets the airflow criteria then select "Pass", otherwise select "Fail". The latter selection means that the system does not meet the requirements and the CF1R will have to be revised, or the system will need to be modified to meet the requirements.
10 *Correction Notes:* If one or more applicable requirements are not met "Fail" will appear in the row above. When this occurs the rater is required to enter detailed notes here that describe what failed and why.

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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 air flow rate measurement identified on this Certificate of Verification.	
02	The airflow rate measurement apparatus used to perform the airflow rate measurement identified on this Certificate of Verification 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 air flow (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 RA3.2.2.7.3, 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).	
10	Verification Status:	<<user pick from list: *** Pass - all applicable requirements are met; or *** Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or *** All n/a - This entire table is not applicable>>
11	Correction Notes:	<<if Verification Status= Fail, then text entry in this Corrections Notes field is required; user input text>>
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met unless otherwise noted in the Verification Status and the Corrections Notes in this table.		

G. 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	<<if B01≠ System does not comply; and C04 ≠ Not Certified; and D08=system complies; then display: Complies: All specified verification protocol requirements on this document are met; else display: Does not comply: One or more specified verification protocol requirements on this document are not met >

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