DOCKETED	
Docket Number:	15-BSTD-02
Project Title:	Residential Compliance Manual and Documents
TN #:	232819-3
Document Title:	2016-CF2R-MCH-01b-SpaceConditioningSystem-PrescriptiveAlterationspdf
Description:	N/A
Filer:	Corrine Fishman
Organization:	California Energy Commission
Submitter Role:	Public Agency
Submission Date:	4/22/2020 9:12:33 AM
Docketed Date:	4/22/2020

STATE OF CALIFORNIA

SPACE CONDITIONING SYSTEMS DUCTS AND FANS

CEC-CF2R-MCH-01-H (Revised 09/18)

CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF INSTALLATION		CF2R-MCH-01-E
Space Conditioning Systems, Ducts, and Fans		(Page 1 of 6)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City:	Zip Code:

A. General Information

01	Dwelling Unit Name		02	Climate Zone	
03	Dwelling Unit Total Conditioned Floor Area (ft^2)		04	Number of Space Conditioning Systems in this Dwelling Unit	
05	Certificate of Compliance Type		06	Method Used to Calculate HVAC Loads	
07	Calculated Dwelling Unit Sensible Cooling Load (Btu/h)		08	Calculated Dwelling Unit Heating Load (Btu/h)	
09	Dwelling Unit Number of Bedrooms				

MCH-01b - Space Conditioning Systems Ducts and Fans - Prescriptive Alterations

B. Space Conditioning (SC) System Information

01	02	03	04	05	06	07	08	09	10
SC System Identification or Name	SC System Location or Area Served	CFA served by this SC System (ft^2)	Is the SC system a ducted system?	Installing a refrigerant containing component?	Installing new SC System components?	Installing more than 40 feet of ducts?	Installing entirely new duct system?	Installing entirely new SC system?	Alteration Type

C. Space Conditioning (SC) System Alterations Compliance Information

01	02	03	04	05	06	07	08	09	10	11	12	13
SC Identification or Name	Heating System Type	Altered Heating Component	Heating Efficiency Type	Heating Minimum Efficiency Value	Cooling System Type	Altered Cooling Components	Cooling Efficiency Type	Cooling Minimum Efficiency Value	Required Thermostat Type	New or Replaced Duct Length	New Duct R-Value	Central Fan Integrated (CFI) Ventilation System Status

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Project Name:	Enforcement Agency:	Permit Number:
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D. Installed Heating Equipment Information

01	02	03	04	05	06	07
SC Identification or Name	Heating Efficiency Type	Heating Efficiency Value	Heating Unit Manufacturer	Heating Unit Model Number	Heating Unit Serial Number	Rated Heating Capacity, Output (Btu/h)

Notes:

E. Installed Cooling Equipment Information

01	02	03	04	05	06	07	08
SC Identification or Name	Cooling Efficiency Type	Cooling Efficiency Value	Condenser or Package Unit Manufacturer	Condenser or Package Unit Model Number	Condenser or Package Unit Serial Number	System Rated Cooling Capacity at Design Conditions (Btu/h)	Condenser Rated Nominal Capacity (ton)

Notes:

F. Extension of Existing Duct System, Greater Than 40 Feet

01	02
SC Identification or Name	New Duct R-Value

CERTIFICATE OF INSTALLATION		CF2R-MCH-01-E
Space Conditioning Systems, Ducts, and Fans		(Page 3 of 6)
Project Name:	Enforcement Agency:	Permit Number:
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G. Installed Duct System Information

01	02	03	04	05	06	07	08	09
SC System Identification or Name	SC System Location or Area Served	Supply Duct Location	Supply Duct R-Value	Return Duct Location	Return Duct R-Value	Method of Compliance with Duct and Filter Grille Sizing Req's in 150.0(m)13	Number of Air Filter Devices on System	Can RA3.3 Airflow Protocols be used to test this System?
Notes:								

H. Installed Air Filter Device Information

01	02	03	04	05	06	07
SC System Identification or Name	SC System Location or Area Served	Air Filter Identification or Name	Air Filter Device Type	Air Filter Device Location	Determined Design Airflow Rate for Air Filter Device (cfm)	Determined Design Allowable Pressure Drop for Air Filter Device (inch W.C.)
Notes:						

CERTIFICATE OF INSTALLATION		CF2R-MCH-01-E
Space Conditioning Systems, Ducts, and Fans		(Page 4 of 6)
Project Name:	Enforcement Agency:	Permit Number:
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I. Air Filter Device Requirements	
01	The system shall be designed to ensure that all recirculated air and all outdoor air supplied to the occupiable space is filtered before passing through the system's thermal conditioning components.
02	The system shall be designed to accommodate the clean-filter pressure drop imposed by the system air filter device(s). The design airflow rate and maximum allowable clean-filter pressure drop at the design airflow rate applicable to each air filter device shall be determined, and all system air filter device locations shall be labeled to disclose the applicable design airflow rate and the maximum allowable clean-filter pressure drop. The labels shall be permanently affixed to the air filter device, readily legible, and visible to a person replacing the air filter media, and the air filter devices shall be provided with air filter media that conforms to these determined/labeled maximum allowable clean-filter pressure drop values as rated using AHRI Standard 680.
03	All system air filter devices shall be located and installed in such a manner as to allow access and regular service by the system owner.
04	The system shall be provided with air filter media having a designated efficiency equal to or greater than MERV 6 when tested in accordance with ASHRAE Standard 52.2, or a particle size efficiency rating equal to or greater than 50% in the 3.0–10 micron range when tested in accordance with AHRI Standard 680.
05	The system shall be provided with air filter media that has been labeled by the manufacturer to disclose the efficiency and pressure drop ratings that conform to the required efficiency and pressure drop requirements for the air filter device.
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.	

J. HERS Verification Requirements

01	02	03	04	05	06	07	08	09	10
SC System Identification or Name	SC System Location or Area Served	Exemption From Duct Leakage Requirements	MCH-20 Duct Leakage Test	Exemption from Minimum R-Value for Ducts In Conditioned Space	MCH-21 Duct Location Verification	MCH-22 AHU Fan Efficacy (W/cfm)	MCH-23 AHU Airflow Rate (cfm/ton)	MCH-25 Refrigerant Charge	MCH-28 Return Duct Design - Table 150.0-B or C
Notes:									

CERTIFICATE OF INSTALLATION		CF2R-MCH-01-E
Space Conditioning Systems, Ducts, and Fans		(Page 5 of 6)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City:	Zip Code:

K. Space Conditioning Systems, Ducts and Fans – Mandatory Requirements and Additional Measures Note: Additional mandatory requirements from Section 150.0 that are not listed here may be applicable to some systems. These requirements may be applicable to only newly installed equipment or portions of the system that are altered. Existing equipment may be exempt from these requirements.	
Heating Equipment	
01	Equipment Efficiency: All heating equipment must meet the minimum efficiency requirements of Section 110.1 and Section 110.2(a) and the Appliance Efficiency Regulations.
02	Controls: All unitary heating systems, including heat pumps, must be controlled by a setback thermostat. These thermostats must be capable of allowing the occupant to program the temperature set points for at least four different periods in 24 hours. See Sections 150.0(i), 110.2(b).
03	Sizing: Heating load calculations must be done on portions of the building served by new heating systems to prevent inadvertent undersizing or oversizing. See sections 150.0(h)1 and 2).
04	Furnace Temperature Rise: Central forced-air heating furnace installations must be configured to operate at or below the furnace manufacturer's maximum inlet-to-outlet temperature rise specification. See Section 150.0(h)4.
05	Standby Losses and Pilot Lights: Fan-type central furnaces may not have a continuously burning pilot light. Section 110.5 and Section 110.2(d).
Cooling Equipment	
06	Equipment Efficiency: All cooling equipment must meet the minimum efficiency requirements of Section 110.1 and Section 110.2(a) and the Appliance Efficiency Regulations.
07	Refrigerant Line Insulation: All refrigerant line insulation in split system air conditioners and heat pumps must meet the R-value and protection requirements of Section 150.0(j)2 and 3, and Section 150.0(m)9.
08	Condensing Unit Location: Condensing units shall not be placed within 5 feet of a dryer vent outlet. See Section 150.0(h)3A.
09	Liquid Line Filter Drier: If applicable, a liquid line filter drier shall be installed according to the manufacturer's specifications. Section 150.0(h)3B
10	Sizing: Cooling load calculations must be done on portions of the building served by new cooling systems to prevent inadvertent undersizing or oversizing. See Section 150.0(h)1 and 2.
Air Distribution System Ducts, Plenums and Fans	
11	Insulation: In all cases, unless ducts are enclosed entirely in directly conditioned space, the minimum duct insulation value is R-6. Note that higher values may be required by the prescriptive or performance requirements. See Section 150.0(m)1.
12	Connections and Closures: All installed air-distribution system ducts and plenums must be, sealed and insulated to meet the requirements of CMC Sections 601.0, 602.0, 603.0, 604.0, 605.0 and ANSI/SMACNA-006-2006: Supply-air and return-air ducts and plenums must be insulated to a minimum installed level of R-6.0 or enclosed entirely in directly conditioned space as confirmed through field verification and diagnostic testing in accordance with the requirements of Reference Residential Appendix RA3.1.4.3.8.
Heat Pump Thermostat	
13	A thermostat shall be installed that meets the requirements of Section 110.2(b) and Section 110.2(c).
14	The thermostat shall be installed in accordance with the manufacturers published installation specifications.
15	First stage of heating shall be assigned to heat pump heating.
16	Second stage back up heating shall be set to come on only when the indoor set temperature cannot be met.
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-01-E
Space Conditioning Systems, Ducts, and Fans		(Page 6 of 6)
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 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:

CF2R-MCH-01b-E User Instructions

Minimum requirements for prescriptive HVAC installation compliance can be found in Building Energy Efficiency Standards Section 150.2(b)1C.

Completing these documents will require that you have the Reference Appendices for the 2016 Building Energy Efficiency Standards. This document contains the Joint Appendices which are used to determine climate zone and to complete the section for opaque surfaces.
When the term CF2R is used it means the CF2R-MCH-01-H.

Instructions for sections with column numbers and row numbers are given separately.

A. General Information

1 This field is filled out automatically. It is referenced from the Certificate of Compliance (CF1R), which must be completed prior to this document.
2 This field is filled out automatically. It is referenced from the Certificate of Compliance (CF1R), which must be completed prior to this document.
3 This field is filled out automatically. It is referenced from the Certificate of Compliance (CF1R), which must be completed prior to this document. When the project scope includes an addition to an existing building, the value is equal to the sum of the existing conditioned floor area plus the conditioned floor area of the addition. The default value from the CF1R may be overwritten in this document. Overwriting the default value will automatically flag this entry and subject it to additional scrutiny by QA and enforcement personnel.
4 This field is filled out automatically. It is referenced from the Certificate of Compliance (CF1R), which must be completed prior to this document. This value may be overwritten in this document but valid discrepancies with the CF1R are uncommon. Overwriting the default value will automatically flag this entry and subject it to additional scrutiny by QA and enforcement personnel.
5 This field is filled out automatically. It is referenced from the Certificate of Compliance (CF1R), which must be completed prior to this document.
6 Oversized equipment can result in reduced efficiency and capacity. Entirely new systems (see definition in Section 9.6.9 of the RCM) must be properly sized to match the heating and cooling load of the space that it serves. To do this, heating and cooling load calculations must be performed using an approved calculation methodology. These are listed here. Select the load calculation methodology used for this dwelling unit. If the project consists of a partial replacement of equipment or ducts (change-out) then load calculations are not required. Select N/A. Load calculations are always recommended, especially if the loads of the house have been changed since the original equipment has been installed (reduced via weatherization, other improvements).
7 Enter the total sensible cooling load for the dwelling unit described by this document. For projects involving dwelling units with more than one system, this will be a sum of the loads for the parts of the dwelling unit served by those systems. If the project consists of a partial replacement of equipment or ducts (change-out), then load calculations are not required. Select N/A.
8 Enter the total heating load for the dwelling unit described by this document. For projects involving dwelling units with more than one system, this will be a sum of the loads for the parts of the dwelling unit served by those systems. If the project consists of a partial replacement of equipment or ducts (change-out), then load calculations are not required. Select N/A.
9 Enter the number of bedrooms in the dwelling unit.

B. Space Conditioning (SC) System Information

1 This field is filled out automatically. It is referenced from the Certificate of Compliance (CF1R), which must be completed prior to this document. This value may be overwritten in this document but valid discrepancies with the CF1R are uncommon. Overwriting the default value will automatically flag this entry and subject it to additional scrutiny by QA and enforcement personnel. Revising the CF1R to match is recommended and may be required.

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10 This field is filled out automatically based on the entries in the previous columns.

C. Space Conditioning (SC) System Alterations Compliance Information

1 This field is filled out automatically. It is referenced from the Certificate of Compliance (CF1R), which must be completed prior to this document. This value may be overwritten in this document but valid discrepancies with the CF1R are uncommon. Overwriting the default value will automatically flag this entry and subject it to additional scrutiny by QA and enforcement personnel. Revising the CF1R to match is recommended and may be required.

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12 This field is filled out automatically. It is calculated based on entries in previous columns.

D. Installed Heating Equipment Information

1. This field is filled out automatically. It is referenced from the same row and column in the previous section.
2. This field is filled out automatically. It is referenced from the same row and column in Section C.
3. Enter the certified heating efficiency of the *installed* equipment. This value is verified against the minimum value shown in Section C. The installed efficiency must be greater than or equal to the required minimum efficiency.

4. Enter the name of the *installed* Heating Unit Manufacturer as shown on the equipment nameplate.
5. Enter the name of the *installed* Heating Unit Model Number as shown on the equipment nameplate.
6. Enter the name of the *installed* Heating Unit Serial number as shown on the equipment nameplate.
7. Enter the rated heating capacity (output) of the *installed* Heating Unit in BTUs per hour.

E. Installed Cooling Equipment Information:

1. This field is filled out automatically. It is referenced from the same row and column in the previous sections.
2. This field is filled out automatically. It is referenced from Section C.
3. Enter the certified cooling efficiency of the *installed* equipment that corresponds to the type shown in the previous column. This value is verified against the minimum value shown in Section C. The installed efficiency must be greater than or equal to the required minimum efficiency.
4. Enter the name of the *installed* Condenser or Package Unit Manufacturer as shown on the equipment nameplate.
5. Enter the name of the *installed* Condenser or Package Unit Model Number as shown on the equipment nameplate.
6. Enter the name of the *installed* Condenser or Package Unit Serial Number as shown on the equipment nameplate.
7. Enter the rated sensible cooling capacity at design conditions of the *installed* cooling system in BTUs per hour.
8. Enter the *installed* Condenser Rated Nominal Cooling Capacity in tons. Note that this is based on the condenser, not the coil or air handler. This can usually be determined by the condenser model number.

F. Extension of Existing Duct System, Greater Than 40 Feet

1. This field is filled out automatically. It is referenced from the same row and column in the previous sections.
2. Enter the R-value of the *installed* supply ducts. This value is verified against the minimum value shown in Section C. The installed R-value must be greater than or equal to the required minimum R-value.

G. Installed Duct System information

1. This field is filled out automatically. It is referenced from the same row and column in the previous sections.
2. This field is filled out automatically. It is referenced from the same row and column in the previous sections.
3. Select the choice that best describes the predominant location of the supply ducts for this system.
4. Enter the R-value of the *installed* supply ducts. This value is verified against the minimum value shown in Section C. The installed R-value must be greater than or equal to the required minimum R-value.
5. Select the choice that best describes the predominant location of the return ducts for this system.
6. Enter the R-value of the *installed* return ducts. This value is verified against the minimum value shown in Section C. The installed R-value must be greater than or equal to the required minimum R-value.
7. Pick the appropriate choice. Refer to section 150.0(m)13 of the 2016 Building Energy Efficiency Standards, and Section 4.4 of Chapter 4 of the 2016 Residential Compliance Manual for more information.
8. Specify the number of air filter devices installed in this space conditioning system. Air filter devices installed in completely new systems must be properly sized, as documented in the next section. The value entered here will determine the number of rows needed in the following section.
9. If the system is of a type that can use one of the Reference Residential Appendix RA3.3 protocols for testing the airflow rate, then enter yes. Otherwise enter no.

H. Installed Air Filter Device Information

1. This field is filled out automatically. It is referenced from the same row and column in the previous sections.
2. This field is filled out automatically. It is referenced from the same row and column in the previous sections.
3. Enter a descriptive name of each air filter device so that it may be distinguished from others in the same system. Examples: FG1, filter2, etc.
4. Select the appropriate type of filter device from the list.
5. Enter a descriptive name of each air filter device so that it may be identified in the home. Examples: master suite, main hallway, at furnace, entry wall, etc.
6. Enter the design flow in CFM of the filter device. The total for all filter devices in a single system should be greater than or equal to the total system design CFM in cooling mode (or heating mode for heat-only systems).
7. Enter the design static pressure drop provided by the filter device manufacturer. This should be consistent with the duct design calculations. Not accounting for higher filter pressure drops will result in poor system airflow characteristics, reduced capacity and reduced efficiency. This may result in not passing field verification.

I. Air Filter Device Requirements

This table is a list of requirements for air filter devices.

J. HERS Verification Requirements

1. This field is filled out automatically. It references previous sections in this document.
2. This field is filled out automatically. It references previous sections in this document.
3. If applicable, select the any of the exemptions listed. Exemptions will be flagged and may subject the system to additional enforcement scrutiny.
4. This field is filled out automatically. It is calculated based on data from the CF1R and from previous sections in this document.
5. If applicable, select the any of the exemptions listed. Exemptions will be flagged and may subject the system to additional enforcement scrutiny.
6. This field is filled out automatically. It is calculated based on data from the CF1R and from previous sections in this document.
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K. Space Conditioning Systems, Ducts and Fans – Mandatory Requirements and Additional Measures

This table is a list of mandatory measures and additional requirements for space conditioning systems, ducts and fans.