DUCT LEAKAGE DIAGNOSTIC TEST

CERTIFICATE OF INSTALLATION		CF2R-MCH-20-H
Duct Leakage Diagnostic Test		(Page 1 of 3)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City:	Zip Code:

A. System Information		
01	Space Conditioning System Identification or Name	
02	Space Conditioning System Location or Area Served	
03	Building Type from CF1R	
04	Verified Low Leakage Ducts in Conditioned Space (VLLDCS) Credit from CF1R?	
05	Verified Low Leakage Air-Handling Unit Credit from CF1R?	
06	Duct System Compliance Category	

MCH-20e - Sealing All Accessible Leaks using Smoke Test

B. Duct Leakage Diagnostic Test		
01	Condenser Nominal Cooling Capacity (ton)	
02	Heating Capacity (kBtu/h)	
03	Conditioned Floor Area Served by this HVAC System (ft^2)	
04	Duct Leakage Test Conditions	
05	Duct Leakage Test Method	
06	Leakage Factor	
07	Air-Handling Unit Airflow (AHU Airflow) Determination Method	
08	Measured AHU Airflow (cfm)	
09	Calculated Target Allowable Duct Leakage Rate (cfm)	
10	Actual Duct Leakage Rate from Leakage Test Measurement (cfm)	
11	Compliance Statement:	

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C. Additional Requirements for Compliance	
01	System was tested in its normal operation condition. No temporary taping allowed.
02	Outside air (OA) ducts for Central Fan Integrated (CFI) ventilation systems, shall not be sealed/taped off during duct leakage testing. CFI OA ducts that utilize controlled motorized dampers, that open only when OA ventilation is required to meet ASHRAE Standard 62.2, and close when OA ventilation is not required, may be configured to the closed position during duct leakage testing.
03	All supply and return register boots were sealed to the drywall.
04	Building cavities were not used as plenums, or platform returns, in lieu of ducts.
05	If cloth backed tape was used it was covered with Mastic and draw bands.
06	All connection points between the air handler and the supply and return plenums are completely sealed.
07	If the system complies using the Smoke Test method, the smoke test was conducted in accordance with the requirements of Reference Residential Appendix RA3.1.4.3.6. Systems that comply using the smoke test shall not be included in sample groups for HERS verification compliance.
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.	

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Duct Leakage Diagnostic Test		(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-20e-H User Instructions

A. System Information

1 *HVAC 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. *HVAC 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. *Building Type*: This field is filled out automatically. It is referenced from the Certificate of Compliance (CF1R), which must be completed prior to this document.
4. *Verified Low Leakage Ducts in Conditioned Space (VLLDCS)*: This field is filled out automatically. It is referenced from the Certificate of Compliance (CF1R), which must be completed prior to this document.
5. *Verified Low Leakage Air-Handling Unit (VLLAHU) Credit* This field is filled out automatically. It is referenced from the Certificate of Compliance (CF1R), which must be completed prior to this document.
6. *Duct System Compliance Category*: Choose from New, Replacement, Alteration, Replacement Using Smoke Test, Alteration Using Smoke Test.
   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 is newly installed and 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).
   b. Replacement: For existing buildings where the equipment is not newly installed but 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). Sometimes referred to as a "re-ducted" system.
   c. Alteration: 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:
      1. 40 feet of space-conditioning system ducts are installed in unconditioned space or indirectly conditioned space.
      2. Air conditioning or heat pump condenser
      3. Heating or cooling coil
      4. Air handler (e.g., furnace, fan coil, package unit)
   d. Replacement using Smoke Test: Similar to "Replacement" but the target leakage could not be met due to the equipment not being new. Smoke is used to show that leaks are only coming from the previously existing equipment. All accessible leaks visible by smoke must be sealed.
   e. Alteration using Smoke Test: Similar to "Alteration" but the target leakage could not be met due to the equipment not being new or due to inaccessible leaks. Smoke is used to show that leaks are only coming from the previously existing equipment or are inaccessible. All accessible leaks visible by smoke must be sealed.

B. Duct Leakage Diagnostic Test - Sealing All Accessible Leaks using Smoke Test

1. *Condenser Nominal Cooling Capacity (ton)*: Same data given on MCH-01.
2. *Heating Capacity (kBtu/h)*: Same data given on MCH-01.
3. *Conditioned Floor Area Served by this HVAC System (ft^2)*: User must input CFA for the space. Should be consistent with the CF1R input value.
4. *Duct Leakage Test Conditions*: Select from the following options:
   a. Test Rough-in AHU: Installers may determine duct leakage in new construction by using diagnostic measurements at rough-in building construction stage prior to installation of interior finishing (See Section RA3.1.4.3.2 of the 2016 Reference Appendices). In this case the air-handling unit (AHU) is installed at the time of test.
   b. Test Rough-in No AHU: Same as "Test Rough-in" except air handling unit is not yet installed (See Section RA3.1.4.3.2 of the 2016 Reference Appendices).
   c. Test Final: Test conducted at "final", i.e. all equipment, ducts, and registers are installed and the system is essentially in its final operating condition. (rough-in no longer an option. See Section RA3.1.4.3.1 of the 2016 Reference Appendices).

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5. *Duct Leakage Test Method*: Select from the following options: Leakage to the Outside (house is pressurized simultaneously with the ducts such that only leakage going outside of the pressurized conditioned shell is measured, see RA3.2.4.3.4), or Total Leakage.
6. *Leakage Factor*: This field is automatically filled out based on choices in previous fields.
7. *Air-Handling Unit Airflow (AHU Airflow) Determination Method*: User will select from the following options:
   a. Default Airflow Method: The Default Airflow Method may only be used for homes where the duct system is being tested before the conditioning and heating system is installed and the equipment specification is not known (See Section RA3.1.4.2.1 of the 2016 Reference Appendices).
   b. Cooling System Method: For systems with air conditioning, this selection must be made, and the nominal air handler airflow shall be 400 CFM per nominal ton of condensing unit cooling capacity as specified by the manufacturer (Note: the heating only value may be used, if higher, See Section RA3.1.4.2.2 of the 2016 Reference Appendices).
   c. Heating System Method: For heating only systems the nominal air handler airflow shall be 21.7 CFM per kBtu/h of rated heating output capacity.
   d. Measured Airflow Method: The measured system airflow can be used as the air handler airflow for the purpose of establishing duct leakage percentage (See Section RA3.1.4.2.3 of the 2016 Reference Appendices).
8. *Measured AHU Airflow (CFM)*: If "Measured Airflow Method" is selected as the *Air-Handling Unit Airflow (AHU Airflow) Determination Method*, user must input measured airflow.
9. *Calculated Target Allowable Duct Leakage Rate (cfm)*: This value will be automatically calculated based on values entered in previous fields.
10. *Actual Duct Leakage Rate from Leakage Test Measurement (cfm)*: Input the duct leakage rater taken from actual test measurements.
11. *Compliance Statement*: If measured leakage (B10) is less than or equal to allowable duct leakage rate (B09), "system passes - system complies with Allowable Duct Leakage Rate Criterion" will automatically populate.
    If measured leakage is greater than allowable duct leakage rate, then the following will automatically populate:
    "System passes using smoke test of an altered HVAC system in an existing building
    - No visible smoke exits the accessible portions of the duct system.
    - Smoke is only emanating from air handler unit (AHU cabinet and non-accessible portions of the duct system.

    Note: Accessible is defined as having access thereto, but which first may require removal or opening of access panels, doors, or moving similar obstructions. If access to the ducts requires an object to be demolished or deconstructed, then sealing of those ducts is not required.

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