

DOCKETED

Docket Number:	18-BSTD-02
Project Title:	2019 ENERGY CODE COMPLIANCE MANUALS
TN #:	232779-33
Document Title:	2019-CF3R-ENV-20a-EnclosureAirLeakage-SinglePointTest- Manual Meter (2)pdf
Description:	N/A
Filer:	Corrine Fishman
Organization:	California Energy Commission
Submitter Role:	Public Agency
Submission Date:	4/20/2020 9:09:36 AM
Docketed Date:	4/20/2020

BUILDING AIR LEAKAGE DIAGNOSTIC TEST – BUILDING ENCLOSURES AND DWELLING UNIT ENCLOSURES

CEC-CF3R-ENV-20-H (Revised 01/19)

CALIFORNIA ENERGY COMMISSION



CERTIFICATE OF VERIFICATION		CF3R-ENV-20-H
Building Air Leakage Diagnostic Test – Building Enclosures and Dwelling Unit Enclosures		(Page 1 of 3)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City:	Zip Code:

A. Enclosure Air Leakage – General Information

01	Is HERS verification of building enclosure air leakage to outside required by CF1R?	
02	Is HERS verification of dwelling compartmentalization leakage \leq 0.3 CFM ₅₀ /ft ² of enclosure area required by CF1R?	
03	Target Enclosure Air Leakage from CF1R (CFM50)	
04	Indoor temperature during test (°F)	
05	Outdoor temperature during test (°F)	
06	Blower Door Location	
07	Building Elevation Above Sea Level (ft)	
08	Total dwelling unit floor area (ft ²)	
09	Total dwelling unit ceiling area (ft ²)	
10	Total dwelling unit exterior wall area (ft ²)	
11	Total dwelling unit wall area shared with other dwelling units (ft ²)	
12	Total dwelling unit enclosure area (ft ²)	
13	Target dwelling unit compartmentalization leakage (CFM50)	
14	Date of the Diagnostic Test for this Dwelling	
15	Test Procedure used	

B. Diagnostic Equipment Information

01	Number of Manometers Used to Measure Home Pressurization			
02	03	04	05	06
Manometer Make	Manometer Model	Manometer Serial Number	Manometer Calibration Date	Manometer Calibration Status
07	Number of Fans Used to Pressurize Home			
08	09	10	11	
Fan Make	Fan Model	Fan Serial Number	Fan Configuration (rings)	

ENV20a - Single Point Air Tightness Test With Manual Meter

C. Enclosure Air Leakage Diagnostic Test

01	Time Average Period of Meter (seconds)	
02	Test Methodology	
03	Pre-Test Baseline Enclosure Pressure (Pa) (May be positive or negative)	
04	Unadjusted Enclosure Pressure Target (Pa)	
05	Unadjusted Enclosure Pressure Measured (Pa) (Pressurization is positive; Depressurization is negative)	
06	Induced Enclosure Pressure Difference (Pa) Goal = 50 ± 3 (Pressurization is positive; Depressurization is negative)	
07	Induced Enclosure Pressure Check	
08	Measured Nominal Fan Flow at Above Fan Pressure (cfm) at the Induced Enclosure Pressure Difference (in C06 above)	
09	Calculated Nominal CFM50	

Registration Number:

Registration Date/Time:

HERS Provider:

CA Building Energy Efficiency Standards - 2019 Residential Compliance

January 2019

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D. Altitude and Temperature Correction

01	Altitude and Temperature Correction Factor	
02	Corrected CFM50	

E. Accuracy Adjustment

01	Adjusted CFM50 (measured air leakage rate)	
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F. Compliance Statement

01	
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G. Additional Requirements for Compliance

01	The procedure for preparing the enclosure for testing is detailed in RESNET 380-2016 Section 3.2.	
02	When multifamily attached dwelling units must comply with the maximum dwelling unit enclosure air leakage specified in Standards Section 150.0(o)1Eii, the test shall be conducted with the dwelling unit as if it were exposed to the outdoor air on all sides, top and bottom by opening doors and windows of adjacent dwelling units as specified by RA3.8.3.1.	
03	The procedure for installation of the test apparatus, and preparations for measurement shall conform to RESNET 380-2016 Section 3.3	
04	The procedure for the conduct of the enclosure air leakage test shall conform to the One-Point Airtightness Test specified in RESNET 380-2016 Section 3.4.1	
05	Verification Status:	<input type="checkbox"/> Pass - all applicable requirements are met; or <input type="checkbox"/> Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or <input type="checkbox"/> All N/A - This entire table is not applicable
06	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.

H. 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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CALIFORNIA ENERGY COMMISSION



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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:

- The information provided on this Certificate of Verification is true and correct.
- I am the certified HERS Rater who performed the verification identified and reported on this Certificate of Verification (responsible rater).
- 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.
- 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.
- 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)
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HERS RATER INFORMATION

HERS Rater Company Name:	
Responsible Rater Name:	Responsible Rater Signature:
Responsible Rater Certification Number w/ this HERS Provider:	Date Signed:

Registration Number:

Registration Date/Time:

HERS Provider:

CA Building Energy Efficiency Standards - 2019 Residential Compliance

January 2019

CF3R-ENV-20a-H User Instructions**Section A. Enclosure Air Leakage – General Information**

1. This field is automatically filled from the CF1R which determines if a CFM50 compliance target value is required.
2. This field is automatically filled from the CF1R which determines if a 0.3CFM/ft² compliance target value is required.
3. This field determines the CFM50 target enclosure air leakage from the CF1R if HERS verification of enclosure air leakage is required.
4. Enter the indoor temperature measured at the time that the enclosure air leakage test was performed.
5. Enter the outdoor temperature measured at the time that the enclosure air leakage test was performed.
6. Provide a brief description of the location where the blower door was installed for the test. Examples: “front entry door on west side of house”, “door between house and garage”, “large window in family room”.
7. Enter the building elevation above sea level. Use the value for the closest city found in Joint Appendix JA2.2.
8. Enter the total dwelling unit floor area if HERS verification of dwelling compartmentalization leakage is required.
9. Enter the total dwelling unit ceiling area if HERS verification of dwelling compartmentalization leakage is required.
10. Enter the total dwelling unit exterior wall area if HERS verification of dwelling compartmentalization leakage is required.
11. Enter the total dwelling unit wall area shared with other dwelling units if HERS verification of dwelling compartmentalization leakage is required.
12. This field is automatically calculated as the sum of the total dwelling unit surface area if HERS verification of dwelling compartmentalization leakage is required.
13. This field is automatically calculated as the target dwelling unit compartmentalization leakage value if HERS verification of dwelling compartmentalization leakage is required.
14. Enter the date that the enclosure air leakage test data was collected.
15. Select the appropriate test procedure. This selection will determine which version of this document will be used (a or b). Not that newer manometers have automatic functions for compensating baseline (automatic baseline) and compensating for house pressures other than the target (50 Pa). It is preferable to use these when available.

Section B. Diagnostic Equipment Information

1. Enter the number of manometers used to measure the enclosure pressurization. If more than one system is used, the fan flow numbers need to be manually added together, unless blower door software is used that will accommodate multiple fan systems running simultaneously.
2. Enter the make (brand) of the manometer used to collect the enclosure air leakage data. Examples: Retrotec, Energy Conservatory.
3. Enter the model of the manometer used to collect the enclosure air leakage data. Examples: DM-2 Mark II, DG700.
4. Enter the serial number of the manometer used to collect the enclosure air leakage data.
5. Enter the most recent date that the manometer was calibrated by following manufacturer’s calibration specifications.
6. This field is automatically filled. If the calibration date was more than 12 months prior to the test date entered in Row A08 above, an error will appear.
7. Enter the number of blower door fan systems required to run simultaneously to pressurize the enclosure for the enclosure air leakage test. If more than one system is used, the fan flow numbers need to be manually added together, unless blower door software is used that will accommodate multiple fan systems running simultaneously.
8. Enter the make (brand) of the fan used to collect the enclosure air leakage data. Examples: Retrotec, Energy Conservatory.
9. Enter the model of the fan used to collect the enclosure air leakage data. Examples: US1000, Q46, BD3, BD4.
10. Enter the serial number of the fan used to collect the enclosure air leakage data.
11. Enter the fan configuration shown on the meter. This is sometimes referred to as “range configuration”, “CONFIG” or “rings”. Examples: Open, A, B, C8.

Section C. Enclosure Air Leakage Test (ENV20a)

1. Enter the Time Average Period used on the manometer during the test. Must be at least 10 seconds.
2. Select the type of test being performed: Pressurization (air blowing into house) or depressurization (air blowing out of house).
3. Enter the pre-test baseline enclosure pressure. This is the reading on the manual manometer with no fans turned on.
4. This field is automatically calculated. This is the enclosure pressure target value the enclosure needs to achieve during the test.
5. Enter the unadjusted enclosure pressure measured. This value is read from the manual manometer during the test.
6. This field is automatically calculated. This value is the difference of the unadjusted enclosure pressure measured and the pre-test baseline enclosure pressure. The goal is to achieve 50 ± 3 Pa.
7. This field is automatically calculated. This field determines if the pressure achieved is acceptable to proceed with the enclosure air leakage test.
8. Enter the measured nominal fan flow at above fan pressure from the manometer that corresponds to the induced enclosure pressure difference.
9. This field is automatically calculated. The induced enclosure pressure difference is converted to a nominal airflow at 50 Pa.

Section D. Altitude and Temperature Correction

1. This field is automatically calculated. This factor is determined based on the altitude and temperature of the building location using equation 4 in Section 9 of ASTM E779-10.

2. This field is automatically calculated. The corrected CFM50 is the nominal CFM50 from Section C multiplied by the altitude and temperature correction factor.

Section E. Accuracy Adjustment

1. This field is automatically calculated. This value is determined from equation 5a from ANSI/RESNET/ICC 380-2016.

Section F. Compliance Statement

1. This field is automatically calculated. A check is performed to make sure that the meter has been properly calibrated and that the measured enclosure air leakage is less than the target enclosure air leakage.

Section G. Additional Requirements for Compliance

1. This statement must be true (or not applicable) for the test to conform to the protocols.
2. This statement must be true (or not applicable) for the test to conform to the protocols.
3. This statement must be true (or not applicable) for the test to conform to the protocols.
4. This statement must be true (or not applicable) for the test to conform to the protocols.

For information and data collection only. Not valid until registered with a HERS provider