STATE OF CALIFORNIA

BUILDING LEAKAGE DIAGNOSTIC TEST

CEC-CF3R-ENV-20-H (Revised 06/13) CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF VERIFICATION		CF3R-ENV-20-H
Building Leakage Diagnostic Test		(Page 1 of 2)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City	Zip Code

A. Building Air Leakage – General Information		
01	Test Procedure Used:	
02	Building Air Leakage Target from CF1R	
03	Indoor Temperature During Test (degreeF)	
04	Outdoor Temperature During Test (degreeF)	
05	Blower Door Location	
06	Building Elevation (ft)	
07	Building Volume (ft3)	
08	Date of the Diagnostic Test for this Dwelling	

B. Diagnostic Equipment Information		
01	Number of Fans Used to Pressurize Home	
02	Fan #1	
03	Manometer Make	
04	Manometer Model	
05	Manometer Serial Number	
06	Manometer Calibration Date	
07	Manometer Calibration Status	
08	Fan Make	
09	Fan Model	
10	Fan Serial Number	

C. Envelope Leakage Diagnostic Test - ENV20a - Single Point Air Tightness Test With Manual Meter		
01	Time average period of meter	
02	Average Baseline Building Pressure Reading #1	
03	Average Baseline Building Pressure Reading #2	
04	Average Baseline Building Pressure Reading #3	
05	Average Baseline Building Pressure Reading #4	
06	Average Baseline Building Pressure Reading #5	
07	Baseline Range	
08	Accuracy Level	
09	Average Baseline Building Pressure Reading	
10	Pre-test baseline building pressure	
11	Unadjusted Building Pressure Target	
12	Unadjusted Building Pressure Measured	
13	Induced building pressure	
14	Nominal Fan flow at above fan pressure	
15	Fan configuration (rings)	
16	Nominal CFM50	

D. Altitude and Temperature Correction		
01	Altitude correction factor	
02	Temperature correction factor	
03	Corrected CFM50	

E. Accuracy Adjustment		
01	Extending factor	
02	Adjusted CFM50 (measured air leakage rate)	

CERTIFICATE OF VERIFICATION	CF3R-ENV-20-H
Building Leakage Diagnostic Test	(Page 2 of 2)

Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City	Zip Code

F. Compliance Statement

G. Additional Requirements For Compliance

The responsible persons signature on this document indicates that the following was completed before a blower-door test began:

01	Open all interior doors and access including those to closets and those between a conditioned basement and attic.
02	HVAC Supply and return register dampers shall be fully open.
03	Temporarily sealing of combustion flues and intermittent exhaust fans are not allowed. Some examples are: combustion flues, fresh air intakes, dryer vents, bathroom and kitchen exhaust vents and fire place.
04	Continuously operated ventilation devices like energy recovery ventilators may be sealed.
05	Multifamily – Each dwelling unit must be tested individually and shown to meet the leakage requirements. Pressurization of the adjacent dwelling units while conducting this test is not allowed.

The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.

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:

Instructions for ENV20

Section A. Building Air Leakage – General Information

1. Select the appropriate test procedure. This selection will determine which version of this document will be used (a, b, c, d, or e) and therefore which data must be collected. Note that single-point tests can only be used under certain conditions. Note that newer manometers have automatic functions for compensating for baseline (automatic baseline) and compensating for house pressures other than the target (@50 Pa). It is preferable to use these, when available, however if these automatic functions are to be used, they must be used for BOTH automatic baseline and pressure compensation.
2. This number is automatically pulled from the performance approach Certificate of Compliance and is the target maximum that was entered by the documentation author. If this number cannot be achieved, the performance compliance calculations can be redone with a higher number or without the requirement for building air leakage.
3. Enter the indoor temperature measured at the time that the building air leakage test was performed.
4. Enter the outdoor temperature measured at the time that the building air leakage test was performed.
5. 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".
6. Enter the building elevation use the value for the closest city found in Joint Appendix JA2.2. Only elevations higher than 5000 feet require an adjustment to the calculations.
7. This number is automatically pulled from the performance approach Certificate of Compliance. It is used to calculate air changes.
8. Enter the date that the building leakage test data was collected.

Section B. Diagnostic Equipment Information

1. Enter the number of blower door fan systems required to run simultaneously to pressurize the home for the building 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.
2. Enter the appropriate information for each fan system used in the following rows.
3. Enter the make (brand) of the manometer used to collect the building air leakage data. Examples: Retrotec, Energy Conservatory.
4. Enter the model of the manometer used to collect the building air leakage data. Examples: DM-2 Mark II, DG700.
5. Enter the serial number of the manometer used to collect the building air leakage data.
6. Enter the most recent date that the manometer was calibrated by following manufacturer's calibration specifications.
7. This field is automatically filled. If the calibration date was more than 12 months prior to the test date entered in Row A.8, above, an error will appear.
8. Enter the make (brand) of the fan used to collect the building air leakage data. Examples: Retrotec, Energy Conservatory.
9. Enter the model of the fan used to collect the building air leakage data. Examples: US1000, Q46, BD3, BD4.

Section C. Envelope Leakage Test (ENV20a)

1. Enter the time average period used on the manometer during the test. Must be at least 10 seconds.
2. Enter the first of five baseline building pressure readings.
3. Enter the second of five baseline building pressure readings.
4. Enter the third of five baseline building pressure readings.
5. Enter the fourth of five baseline building pressure readings.
6. Enter the fifth of five baseline building pressure readings.
7. This field is automatically calculated when using the online form. The equation used to calculate this value in the field equals [Largest value of (C. 2 through C. 6)] –[smallest value of (C. 2 through C. 6)] = Baseline Range
8. This field is automatically calculated when using the online form. The values entered the field C. 8 equals a. if row C. 7 > 5.0, enter "Standard"; b. if row C. 7 ≥ 5 and ≤ 10, enter "Reduced"; c. if row C. 7 > 10, "**cannot use single-point test", do not proceed**.
9. This field is automatically calculated when using the online form. The equation used to calculate this value in the field equals (C.2+ C.3+ C.4+ C.5+ C.6)/5 = Average Baseline Building Pressure Reading
10. Enter the pre-test baseline building pressure. The protocols allow the average from Row C.9 or a newly measured number to be used.
11. This field is automatically calculated when using the online form. The equation used to calculate this value in the field equals -50pa – C.9 = Pre-test building pressure
12. Enter the measured unadjusted building pressure straight from the manometer. It should be as close to the target from Row C.11 as possible. Note that the protocols require depressurization of the envelope. All blower door induced pressures are to be negative relative to outside.
13. This field is automatically calculated when using the online form. The equation used to calculate this value in the field equals Row C.12 – C.9 = Induced Building pressure.
14. Enter the fan flow from the manometer that corresponds to the measured unadjusted building pressure from Row C.12.
15. Enter the fan configuration (rings) that was used during the data acquisition. Examples: Ring A, Ring A1
16. This field is automatically calculated when using the online form. The equation used to calculate this value in the field equals (50/Row C.13) ^0.65 x row C. 14 = Nominal CFM50

Section D. Altitude and Temperature Correction

1. This field is automatically calculated when using the online form. The equation used to calculate this value in the field equals:
   a. If the elevation entered in Row A.6 ≤ 5,000 ft, then enter 1 as altitude correction in box D. 1
   b. If the elevation entered in Row A.6 > 5,000 ft, altitude correction equation equals 1 + (0.000006 * A.6)
2. Enter the temperature correction factor from Table RA3.8-2 or RA3.8-3 using the indoor and outdoor temperatures entered in Rows A.3 and A.4.

Table RA3.8-2 ***Temperature Correction Factors for Depressurization Testing****- Calculated according to ASTM E779-10*

		Inside Temperature (F)								
		50	**55**	**60**	**65**	**70**	**75**	**80**	**85**	**90**
Outside Temp (F)	**-20**	1.062	1.072	1.081	1.090	1.099	1.108	1.117	1.127	1.136
	-15	1.056	1.066	1.075	1.084	1.093	1.102	1.111	1.120	1.129
	-10	1.051	1.060	1.069	1.078	1.087	1.096	1.105	1.114	1.123
	-5	1.045	1.054	1.063	1.072	1.081	1.090	1.099	1.108	1.117
	0	1.039	1.048	1.057	1.066	1.075	1.084	1.093	1.102	1.111
	5	1.033	1.042	1.051	1.060	1.069	1.078	1.087	1.096	1.105
	10	1.028	1.037	1.046	1.055	1.064	1.072	1.081	1.090	1.099
	15	1.023	1.031	1.040	1.049	1.058	1.067	1.076	1.084	1.093
	20	1.017	1.026	1.035	1.044	1.052	1.061	1.070	1.079	1.087
	25	1.012	1.021	1.029	1.038	1.047	1.056	1.064	1.073	1.082
	30	1.007	1.015	1.024	1.033	1.041	1.050	1.059	1.067	1.076
	35	1.002	1.010	1.019	1.028	1.036	1.045	1.054	1.062	1.071
	40	0.997	1.005	1.014	1.023	1.031	1.040	1.048	1.057	1.065
	45	0.992	1.000	1.009	1.017	1.026	1.035	1.043	1.051	1.060
	50	0.987	0.995	1.004	1.012	1.021	1.029	1.038	1.046	1.055
	55	0.982	0.990	0.999	1.008	1.016	1.024	1.033	1.041	1.050
	60	0.997	0.986	0.994	1.003	1.011	1.019	1.028	1.036	1.045
	65	0.973	0.981	0.989	0.998	1.006	1.015	1.023	1.031	1.040
	70	0.968	0.976	0.985	0.993	1.001	1.010	1.018	1.026	1.035
	75	0.963	0.972	0.980	0.988	0.997	1.005	1.013	1.022	1.030
	80	0.959	0.967	0.976	0.984	0.992	1.000	1.009	1.017	1.025
	85	0.955	0.963	0.971	0.979	0.988	0.996	1.004	1.012	1.020
	90	0.950	0.958	0.967	0.975	0.983	0.991	0.999	1.008	1.016
	95	0.946	0.954	0.962	0.970	0.979	0.987	0.995	1.003	1.011
	100	0.942	0.950	0.958	0.966	0.970	0.982	0.990	0.998	1.007
	105	0.938	0.946	0.954	0.962	0.970	0.978	0.986	0.994	1.002
	110	0.933	0.942	0.950	0.952	0.966	0.974	0.982	0.990	0.998

Table RA3.8-3 ***Temperature Correction Factors for Pressurization Testing****- Calculated according to ASTM E779-10*

		Inside Temperature (F)								
		50	**55**	**60**	**65**	**70**	**75**	**80**	**85**	**90**
Outside Temp (F)	**-20**	0.865	0.861	0.857	0.853	0.849	0.845	0.841	0.837	0.833
	-15	0.874	0.870	0.866	0.862	0.858	0.854	0.850	0.846	0.842
	-10	0.883	0.879	0.874	0.870	0.866	0.862	0.858	0.854	0.850
	-5	0.892	0.887	0.883	0.879	0.875	0.871	0.867	0.863	0.859
	0	0.900	0.896	0.892	0.887	0.883	0.879	0.875	0.871	0.867
	5	0.909	0.905	0.900	0.896	0.892	0.888	0.883	0.879	0.875
	10	0.918	0.913	0.909	0.905	0.900	0.896	0.892	0.888	0.884
	15	0.927	0.922	0.918	0.913	0.909	0.905	0.900	0.896	0.892
	20	0.935	0.931	0.926	0.922	09.17	0.913	0.909	0.905	0.900
	25	0.944	0.939	0.935	0.930	0.926	0.922	0.917	0.913	0.909
	30	0.952	0.948	0.943	0.939	0.934	0.930	0.926	0.921	0.917
	35	0.961	0.956	0.952	0.947	0.943	0.938	0.934	0.930	0.926
	40	0.970	0.965	0.960	0.956	0.951	0.947	0.942	0.938	0.934
	45	0.978	0.974	0.961	0.964	0.960	0.955	0.951	0.946	0.942
	50	0.987	0.982	0.977	0.973	0.968	0.963	0.959	0.955	0.950
	55	0.995	0.990	0.986	0.981	0.976	0.972	0.967	0.963	0.958
	60	1.004	0.999	0.994	0.998	0.985	0.980	0.976	0.971	0.967
	65	1.012	1.008	1.003	0.998	0.993	0.988	0.984	0.979	0.975
	70	1.021	1.016	1.011	1.006	1.001	0.997	0.992	0.988	0.983
	75	1.029	1.024	1.019	1.015	1.010	1.005	1.000	0.996	0.991
	80	1.038	1.033	1.028	1.023	1.018	1.013	1.009	1.004	0.999
	85	1.046	1.041	1.036	1.031	1.026	1.022	1.017	1.012	1.008
	90	1.055	1.050	1.045	1.040	1.035	1.030	1.025	1.020	1.016
	95	1.063	1.058	1.053	1.048	1.043	1.038	1.033	1.028	1.024
	100	1.072	1.066	1.061	1.056	1.051	1.046	1.041	1.037	1.032
	105	1.080	1.075	1.070	1.064	1.059	1.054	1.050	1.045	1.040
	110	1.088	1.083	1.078	1.073	1.068	1.063	1.058	1.053	1.048

3. This field is automatically calculated when using the online form. The equation used to calculate this value in the field equals the product of D.1 * D.2 * C.16.

Section E. Accuracy Adjustment

1. This field is automatically calculated when using the online form. The equation used to calculate this value in the field equals:
    c. If the accuracy level C.8 = Standard, then enter 1 as accuracy adjustment in box E. 1
    d. If the accuracy level C.8 = Reduced, accuracy adjustment equation equals 1+[0.1+(50/C. 14)]
2. This field is automatically calculated when using the online form. The equation used to calculate this value in the field equals the D.3 * E.1. = Adjusted CFM50 **Note -** This is the number that must be less than or equal to the target building air leakage from the CF-1R, shown in Row A.2.

STATE OF CALIFORNIA

BUILDING LEAKAGE DIAGNOSTIC TEST

CEC-CF3R-ENV-20-H (Revised 06/13) CALIFORNIA ENERGY COMMISSION

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

A. Building Air Leakage – General Information		
01	Test Procedure Used:	
02	Building Air Leakage Target from CF1R	
03	Indoor temperature during test (degreeF)	
04	Outdoor temperature during test (degreeF)	
05	Blower door location	
06	Building Elevation (ft)	
07	Building Volume (ft3)	
08	Date of the diagnostic test for this dwelling	

B. Diagnostic Equipment Information		
01	Number of Fans Used to Pressurize Home	
02	Fan #1	
03	Manometer Make	
04	Manometer Model	
05	Manometer Serial Number	
06	Manometer Calibration Date	
07	Manometer Calibration Status	
08	Fan Make	
09	Fan Model	
10	Fan Serial Number	

C. Envelope Leakage Diagnostic Test - ENV20b - Single Point Air Tightness Test With Automatic Meter		
01	Time average period of meter	
02	Baseline Building Pressure Reading #1	
03	Baseline Building Pressure Reading #2	
04	Baseline Building Pressure Reading #3	
05	Baseline Building Pressure Reading #4	
06	Baseline Building Pressure Reading #5	
07	Baseline Range	
08	Accuracy Level	
09	Average Baseline Building Pressure Reading	
10	Pre-test baseline building pressure	
11	Induced building pressure, Target=-50 Pa	
12	Nominal CFM50	

D. Altitude and Temperature Correction		
01	Altitude correction factor	
02	Temperature correction factor	
03	Corrected CFM50	

E. Accuracy Adjustment		
01	Extending factor	
02	Adjusted CFM50 (measured air leakage rate)	

CERTIFICATE OF VERIFICATION		CF3R-ENV-20-H
Building Leakage Diagnostic Test		(Page 2 of 3)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City	Zip Code

F. Compliance Statement
<< if manometer Calibration Date in B. 6 is within 12 months of the date of the diagnostic test A. 8 and if Adjusted CFM50 Leakage in E. 2 is less than or equal to the Building Air Leakage Rate Target in A. 2 then display text: "Building Passes Envelope Leakage Test"; if manometer Calibration Date in B. 6 is more than 12 months from the date of the diagnostic test A. 8 or if Adjusted CFM50 Leakage in E. 2 is more than the Building Air Leakage Rate Target in A. 2 then display text: "Building Fails Envelope Leakage Test">>

G. Additional Requirements For Compliance	
The responsible persons signature on this document indicates that the following was completed before a blower-door test began:	
01	Open all interior doors and access including those to closets and those between a conditioned basement and attic.
02	HVAC Supply and return register dampers shall be fully open.
03	Temporarily sealing of combustion flues and intermittent exhaust fans are not allowed. Some examples are: combustion flues, fresh air intakes, dryer vents, bathroom and kitchen exhaust vents and fire place.
04	Continuously operated ventilation devices like energy recovery ventilators may be sealed.
05	Multifamily – Each dwelling unit must be tested individually and shown to meet the leakage requirements. Pressurization of the adjacent dwelling units while conducting this test is not allowed.
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.	

BUILDING LEAKAGE DIAGNOSTIC TEST

CERTIFICATE OF VERIFICATION	CF3R-ENV-20-H
Building 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 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:

Instructions for ENV20b

Section A. Building Air Leakage – General Information

1. Select the appropriate test procedure. This selection will determine which version of this document will be used (a, b, c, d, or e) and therefore which data must be collected. Note that single-point tests can only be used under certain conditions. Note that newer manometers have automatic functions for compensating for baseline (automatic baseline) and compensating for house pressures other than the target (@50 Pa). It is preferable to use these, when available, however if these automatic functions are to be used, they must BOTH be used.
2. This number is automatically pulled from the performance approach Certificate of Compliance and is the target maximum that was entered by the documentation author. If this number cannot be achieved, the performance compliance calculations can be redone with a higher number or without the requirement for building air leakage.
3. Enter the indoor temperature measured at the time that the building air leakage test was performed.
4. Enter the outdoor temperature measured at the time that the building air leakage test was performed.
5. 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".
6. Enter the building elevation use the value for the closest city found in Joint Appendix JA2.2. Only elevations higher than 5000 feet require an adjustment to the calculations.
7. This number is automatically pulled from the performance approach Certificate of Compliance. It is used to calculate air changes.
8. Enter the date that the building leakage test data was collected.

Section B. Diagnostic Equipment Information

1. Enter the number of blower door fan systems required to run simultaneously to pressurize the home for the building 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.
2. Enter the appropriate information for each fan system used in the following rows.
3. Enter the make (brand) of the manometer used to collect the building air leakage data. Examples: Retrotec, Energy Conservatory.
4. Enter the model of the manometer used to collect the building air leakage data. Examples: DM-2 Mark II, DG700.
5. Enter the serial number of the manometer used to collect the building air leakage data.
6. Enter the most recent date that the manometer was calibrated by following manufacturer's calibration specifications.
7. This field is automatically filled. If the calibration date was more than 12 months prior to the test date entered in Row A.8, above, an error will appear.
8. Enter the make (brand) of the fan used to collect the building air leakage data. Examples: Retrotec, Energy Conservatory.
9. Enter the model of the fan used to collect the building air leakage data. Examples: US1000, Q46, BD3, BD4.
10. Enter the serial number of the fan used to collect the building air leakage data.

Section C. Envelope Leakage Test (ENV20b)

1. Enter the time average period used on the manometer during the test. Must be at least 10 seconds.
2. Enter the first of five baseline building pressure readings.
3. Enter the second of five baseline building pressure readings.
4. Enter the third of five baseline building pressure readings.
5. Enter the fourth of five baseline building pressure readings.
6. Enter the fifth of five baseline building pressure readings.
7. This field is automatically calculated when using the online form. The equation used to calculate this value in the field equals [Largest value of (C. 2 through C. 6)] –[smallest value of (C. 2 through C. 6)] = Baseline Range
8. This field is automatically calculated when using the online form. The values entered the field C. 8 equals a. if row C. 7 > 5.0, enter "Standard"; b. if row C. 7 ≥ 5 and ≤ 10, enter "Reduced"; c. if row C. 7 > 10, "**cannot use single-point test", do not proceed**.
9. This field is automatically calculated when using the online form. The equation used to calculate this value in the field equals (C.2+ C.3+ C.4+ C.5+ C.6)/5 = Average Baseline Building Pressure Reading
10. Enter the pre-test baseline building pressure. The protocols allow the average from Row C.9 or a newly measured number to be used. Note that the automatic baseline and @50 Pa functions must both be turned ON for this test.
11. Enter the induced building pressure from the manometer. It should be as close to -50 Pa as possible but no smaller (absolute) than minus 15 Pa. Note that the protocols require depressurization of the envelope. All blower door induced pressures are to be negative relative to outside. Note that the automatic baseline and @50 Pa functions must both be turned ON for this test.
12. Enter the fan flow from the manometer that corresponds to the measured unadjusted building pressure from Row C.11. Note that the automatic baseline and @50 Pa functions must both be turned ON for this test.

Section D. Altitude and Temperature Correction

1. This field is automatically calculated when using the online form. The equation used to calculate this value in the field equals:
    a. If the elevation entered in Row A.6 ≤ 5,000 ft, then enter 1 as altitude correction in box D. 1

b. If the elevation entered in Row A.6 > 5,000 ft, altitude correction equals 1 + (0.000006 * A.6)

2. Enter the temperature correction factor from Table RA3.8-2 or RA3.8-3 using the indoor and outdoor temperatures entered in Rows A.3 and A.4.

Table RA3.8-2 ***Temperature Correction Factors for Depressurization Testing****- Calculated according to ASTM E779-10*

		Inside Temperature (F)								
		50	**55**	**60**	**65**	**70**	**75**	**80**	**85**	**90**
Outside Temp (F)	**-20**	1.062	1.072	1.081	1.090	1.099	1.108	1.117	1.127	1.136
	-15	1.056	1.066	1.075	1.084	1.093	1.102	1.111	1.120	1.129
	-10	1.051	1.060	1.069	1.078	1.087	1.096	1.105	1.114	1.123
	-5	1.045	1.054	1.063	1.072	1.081	1.090	1.099	1.108	1.117
	0	1.039	1.048	1.057	1.066	1.075	1.084	1.093	1.102	1.111
	5	1.033	1.042	1.051	1.060	1.069	1.078	1.087	1.096	1.105
	10	1.028	1.037	1.046	1.055	1.064	1.072	1.081	1.090	1.099
	15	1.023	1.031	1.040	1.049	1.058	1.067	1.076	1.084	1.093
	20	1.017	1.026	1.035	1.044	1.052	1.061	1.070	1.079	1.087
	25	1.012	1.021	1.029	1.038	1.047	1.056	1.064	1.073	1.082
	30	1.007	1.015	1.024	1.033	1.041	1.050	1.059	1.067	1.076
	35	1.002	1.010	1.019	1.028	1.036	1.045	1.054	1.062	1.071
	40	0.997	1.005	1.014	1.023	1.031	1.040	1.048	1.057	1.065
	45	0.992	1.000	1.009	1.017	1.026	1.035	1.043	1.051	1.060
	50	0.987	0.995	1.004	1.012	1.021	1.029	1.038	1.046	1.055
	55	0.982	0.990	0.999	1.008	1.016	1.024	1.033	1.041	1.050
	60	0.997	0.986	0.994	1.003	1.011	1.019	1.028	1.036	1.045
	65	0.973	0.981	0.989	0.998	1.006	1.015	1.023	1.031	1.040
	70	0.968	0.976	0.985	0.993	1.001	1.010	1.018	1.026	1.035
	75	0.963	0.972	0.980	0.988	0.997	1.005	1.013	1.022	1.030
	80	0.959	0.967	0.976	0.984	0.992	1.000	1.009	1.017	1.025
	85	0.955	0.963	0.971	0.979	0.988	0.996	1.004	1.012	1.020
	90	0.950	0.958	0.967	0.975	0.983	0.991	0.999	1.008	1.016
	95	0.946	0.954	0.962	0.970	0.979	0.987	0.995	1.003	1.011
	100	0.942	0.950	0.958	0.966	0.970	0.982	0.990	0.998	1.007
	105	0.938	0.946	0.954	0.962	0.970	0.978	0.986	0.994	1.002
	110	0.933	0.942	0.950	0.952	0.966	0.974	0.982	0.990	0.998

Table RA3.8-3 ***Temperature Correction Factors for Pressurization Testing****- Calculated according to ASTM E779-10*

		Inside Temperature (F)								
		50	**55**	**60**	**65**	**70**	**75**	**80**	**85**	**90**
	-20	0.865	0.861	0.857	0.853	0.849	0.845	0.841	0.837	0.833
	-15	0.874	0.870	0.866	0.862	0.858	0.854	0.850	0.846	0.842
	-10	0.883	0.879	0.874	0.870	0.866	0.862	0.858	0.854	0.850
	-5	0.892	0.887	0.883	0.879	0.875	0.871	0.867	0.863	0.859
	0	0.900	0.896	0.892	0.887	0.883	0.879	0.875	0.871	0.867
	5	0.909	0.905	0.900	0.896	0.892	0.888	0.883	0.879	0.875
	10	0.918	0.913	0.909	0.905	0.900	0.896	0.892	0.888	0.884
	15	0.927	0.922	0.918	0.913	0.909	0.905	0.900	0.896	0.892
	20	0.935	0.931	0.926	0.922	09.17	0.913	0.909	0.905	0.900
	25	0.944	0.939	0.935	0.930	0.926	0.922	0.917	0.913	0.909
	30	0.952	0.948	0.943	0.939	0.934	0.930	0.926	0.921	0.917
	35	0.961	0.956	0.952	0.947	0.943	0.938	0.934	0.930	0.926
	40	0.970	0.965	0.960	0.956	0.951	0.947	0.942	0.938	0.934
Outside Temp (F)	**45**	0.978	0.974	0.961	0.964	0.960	0.955	0.951	0.946	0.942
	50	0.987	0.982	0.977	0.973	0.968	0.963	0.959	0.955	0.950
	55	0.995	0.990	0.986	0.981	0.976	0.972	0.967	0.963	0.958
	60	1.004	0.999	0.994	0.998	0.985	0.980	0.976	0.971	0.967
	65	1.012	1.008	1.003	0.998	0.993	0.988	0.984	0.979	0.975
	70	1.021	1.016	1.011	1.006	1.001	0.997	0.992	0.988	0.983
	75	1.029	1.024	1.019	1.015	1.010	1.005	1.000	0.996	0.991
	80	1.038	1.033	1.028	1.023	1.018	1.013	1.009	1.004	0.999
	85	1.046	1.041	1.036	1.031	1.026	1.022	1.017	1.012	1.008
	90	1.055	1.050	1.045	1.040	1.035	1.030	1.025	1.020	1.016
	95	1.063	1.058	1.053	1.048	1.043	1.038	1.033	1.028	1.024
	100	1.072	1.066	1.061	1.056	1.051	1.046	1.041	1.037	1.032
	105	1.080	1.075	1.070	1.064	1.059	1.054	1.050	1.045	1.040
	110	1.088	1.083	1.078	1.073	1.068	1.063	1.058	1.053	1.048

3. This field is automatically calculated when using the online form. The equation used to calculate this value in the field equals the product of D.1 * D.2 * C.16.

Section E. Accuracy Adjustment

1. This field is automatically calculated when using the online form. The equation used to calculate this value in the field equals:
    c. If the accuracy level C.8 = Standard, then enter 1 as accuracy adjustment in box E. 1
    d. If the accuracy level C.8 = Reduced, accuracy adjustment equation equals 1+[0.1+(50/C. 14)]
2. This field is automatically calculated when using the online form. The equation used to calculate this value in the field equals the D.3 * E.1. = Adjusted CFM50 **Note -** This is the number that must be less than or equal to the target building air leakage from the CF-1R, shown in Row A.2.

STATE OF CALIFORNIA

BUILDING LEAKAGE DIAGNOSTIC TEST

CEC-CF3R-ENV-20-H (Revised 06/13) CALIFORNIA ENERGY COMMISSION

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

A. Building Air Leakage – General Information		
01	Test Procedure Used:	
02	Building Air Leakage Target from CF1R	
03	Indoor temperature during test (degreeF)	
04	Outdoor temperature during test (degreeF)	
05	Blower door location	
06	Building Elevation (ft)	
07	Building Volume (ft3)	
08	Date of the diagnostic test for this dwelling	

B. Diagnostic Equipment Information		
01	Number of Fans Used to Pressurize Home	
02	Fan #1	
03	Manometer Make	
04	Manometer Model	
05	Manometer Serial Number	
06	Manometer Calibration Date	
07	Manometer Calibration Status	
08	Fan Make	
09	Fan Model	
10	Fan Serial Number	

C. Envelope Leakage Diagnostic Test - ENV20c – Multi-Point Air Tightness Test		
01	Name and version of ASTM E779-10 compliant software used for multi-point test.	
02	Pre-test baseline building pressure	
03	Time average period of meter	
04	Unadjusted Building Pressure Target	
05	Unadjusted Building Pressure Measured	
06	Induced building pressure	
07	A minimum of eight readings were taken spaced evenly between 15 Pa and 60 Pa (or highest attainable pressure).	
08	Post-test baseline building pressure	
09	Corrected CFM50 (from software)	

D. Altitude and Temperature Correction (not used, performed by blower door software)

E. Accuracy Adjustment		
01	Percent uncertainty @ 95% confidence level (from software)	
02	Accuracy level	
03	Extending factor	
04	Adjusted CFM50 (measured air leakage rate)	

CERTIFICATE OF VERIFICATION		CF3R-ENV-20-H
Building Leakage Diagnostic Test		(Page 2 of 3)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City	Zip Code

F. Compliance Statement
<< if manometer Calibration Date in B. 6 is within 12 months of the date of the diagnostic test A. 8 and if Adjusted CFM50 Leakage in E. 4 is less than or equal to the Building Air Leakage Rate Target in A. 2 then display text: "Building Passes Envelope Leakage Test"; if manometer Calibration Date in B. 6 is more than 12 months from the date of the diagnostic test A. 8 or if Adjusted CFM50 Leakage in E. 4 is more than the Building Air Leakage Rate Target in A. 2 then display text: "Building Fails Envelope Leakage Test">>

G. Additional Requirements For Compliance	
The responsible persons signature on this document indicates that the following was completed before a blower-door test began:	
01	Open all interior doors and access including those to closets and those between a conditioned basement and attic.
02	HVAC Supply and return register dampers shall be fully open.
03	Temporarily sealing of combustion flues and intermittent exhaust fans are not allowed. Some examples are: combustion flues, fresh air intakes, dryer vents, bathroom and kitchen exhaust vents and fire place.
04	Continuously operated ventilation devices like energy recovery ventilators may be sealed.
05	Multifamily – Each dwelling unit must be tested individually and shown to meet the leakage requirements. Pressurization of the adjacent dwelling units while conducting this test is not allowed.
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.	

CERTIFICATE OF VERIFICATION	CF3R-ENV-20-H
Building 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 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:

Instructions for ENV20c

Section A. Building Air Leakage – General Information

1. Select the appropriate test procedure. This selection will determine which version of this document will be used (a, b, c, d, or e) and therefore which data must be collected. Note that single-point tests can only be used under certain conditions. Note that newer manometers have automatic functions for compensating for baseline (automatic baseline) and compensating for house pressures other than the target (@50 Pa). It is preferable to use these, when available, however if these automatic functions are to be used, they must BOTH be used.
2. This number is automatically pulled from the performance approach Certificate of Compliance and is the target maximum that was entered by the documentation author. If this number cannot be achieved, the performance compliance calculations can be redone with a higher number or without the requirement for building air leakage.
3. Enter the indoor temperature measured at the time that the building air leakage test was performed.
4. Enter the outdoor temperature measured at the time that the building air leakage test was performed.
5. 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".
6. Enter the building elevation use the value for the closest city found in Joint Appendix JA2.2. Only elevations higher than 5000 feet require an adjustment to the calculations.
7. This number is automatically pulled from the performance approach Certificate of Compliance. It is used to calculate air changes.
8. Enter the date that the building leakage test data was collected.

Section B. Diagnostic Equipment Information

1. Enter the number of blower door fan systems required to run simultaneously to pressurize the home for the building 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.
2. Enter the appropriate information for each fan system used in the following rows.
3. Enter the make (brand) of the manometer used to collect the building air leakage data. Examples: Retrotec, Energy Conservatory.
4. Enter the model of the manometer used to collect the building air leakage data. Examples: DM-2 Mark II, DG700.
5. Enter the serial number of the manometer used to collect the building air leakage data.
6. Enter the most recent date that the manometer was calibrated by following manufacturer's calibration specifications.
7. This field is automatically filled. If the calibration date was more than 12 months prior to the test date entered in Row A.8, above, an error will appear.
8. Enter the make (brand) of the fan used to collect the building air leakage data. Examples: Retrotec, Energy Conservatory.
9. Enter the model of the fan used to collect the building air leakage data. Examples: US1000, Q46, BD3, BD4.
10. Enter the serial number of the fan used to collect the building air leakage data.

Section C. Envelope Leakage Test (ENV20c)

1. This test requires the use of an ASTM E779-10 compliant software. Enter the name and version of the software used to perform the calculations for the multi-point test. Note that the automatic baseline and @50 Pa functions should NOT be used for this test. Note that for QA purposes the inputs and test reports from the software may be requested by a HERS provider and should be kept for at least 5 years from date of test. Examples: FanTestic Pro v.5.0, TECTITE v.4.0
2. Enter the pre-test baseline building pressure reading. Note that the automatic baseline and @50 Pa functions should NOT be used for this test.
3. Enter the time average period used on the manometer during the test. Must be at least 10 seconds.
4. This field is automatically calculated when using the online form. The equation used to calculate this value in the field equals -60 + C.2 = Unadjusted Building Pressure Target. This number is for reference only to assist the user.
5. Enter the measured unadjusted building pressure straight from the manometer. It should be as close to the target from Row C.4 as possible. Note that the protocols require depressurization of the envelope. All blower door induced pressures are to be negative relative to outside. Note that the automatic baseline and @50 Pa functions should NOT be used for this test.
6. This field is automatically calculated when using the online form. The equation used to calculate this value in the field equals C.5 – C.2 = Induced Building Pressure.
7. The protocols in RA3.8.7.5 require that a minimum of eight total readings, equally spaced, be entered into the software. The lowest reading can be no smaller (absolute) than minus 4 Pa plus the baseline pressure reading.
8. Enter the pre-test baseline building pressure reading. Note that the automatic baseline and @50 Pa functions should NOT be used for this test.
9. Enter the CFM50 value reported back from the software based on the eight data points entered. Make sure that it is adjusted for temperature, altitude and accuracy by the software.

Section D. Altitude and Temperature Correction (Done by software)

Section E. Accuracy Adjustment

1. Enter the "percent uncertainty @ 95% confidence level" reported back from the software based on the eight data points entered.

2. This field is automatically calculated when using the online form. The values entered the field E. 1 equals a. if row E. 1 ≥ 10.0, enter "Standard"; b. if row E. 1 > 10, enter "Reduced".
3. This field is automatically calculated when using the online form. The equation used to calculate this value in the field equals:
    a. If the accuracy level E.2 = Standard, then enter 1 as extending factor in box E. 3
    b. If the accuracy level E.2 = Reduced, extending factor equation equals 1+(% uncertainty/100)
4. This field is automatically calculated when using the online form. The equation used to calculate this value in the field equals the C.9 * E.3. = Adjusted CFM50 **Note -** This is the number that must be less than or equal to the target building air leakage from the CF-1R, shown in Row A.2.

STATE OF CALIFORNIA

BUILDING LEAKAGE DIAGNOSTIC TEST

CEC-CF2R-ENV-20-H (Revised 06/13) CALIFORNIA ENERGY COMMISSION

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

A. Building Air Leakage – General Information		
01	Test Procedure Used:	
02	Building Air Leakage Target from CF1R	
03	Indoor temperature during test (degreeF)	
04	Outdoor temperature during test (degreeF)	
05	Blower door location	
06	Building Elevation (ft)	
07	Building Volume (ft3)	
08	Date of the diagnostic test for this dwelling	

B. Diagnostic Equipment Information		
01	Number of Fans Used to Pressurize Home	
02	Fan #1	
03	Manometer Make	
04	Manometer Model	
05	Manometer Serial Number	
06	Manometer Calibration Date	
07	Manometer Calibration Status	
08	Fan Make	
09	Fan Model	
10	Fan Serial Number	

C. Envelope Leakage Diagnostic Test - ENV20d – Repeated Single Point Air Tightness Test With Manual Meter		
01	Time average period of meter	
02	Pre-test baseline building pressure	
03	Blower Door Software used for calculations?	
04	Fan configuration	

05	06	07	08	09
Baseline Building Pressure Reading	Unadjusted building pressure	Nominal fan flow	Induced Building Pressure	Nominal CFM50

10	Average nominal CFM50	

D. Altitude and Temperature Correction		
<<if row C. 3 = “no”, use this section>>		
01	Altitude correction factor	<<calculated value, if row A. 6 ≤ 5000 Ft = 1; row A. 6 > 5000 =, 1 + .000006 * row A. 6
02	Temperature correction factor	
03	Corrected CFM50	

CERTIFICATE OF VERIFICATION		CF3R-ENV-20-H
Building Leakage Diagnostic Test		(Page 2 of 3)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City	Zip Code

E. Accuracy Adjustment		
<<if row C. 3 = "no", use this section>>		
01	Standard deviation of nominal CFM 50 values above	
02	Percent uncertainty	
03	Accuracy level	
04	Extending factor	
05	Adjusted CFM50 (measured air leakage rate)	
<<if row C. 3 = "yes", use next two lines>>		
06	Corrected CFM50 (from software)	
07	Percent uncertainty @ 95% confidence level (from software)	

F. Compliance Statement
<< if manometer Calibration Date in B. 6 is within 12 months of the date of the diagnostic test A. 8 and if Adjusted CFM50 Leakage in E. 5 or E. 7 is less than or equal to the Building Air Leakage Rate Target in A. 2 then display text: "Building Passes Envelope Leakage Test"; if manometer Calibration Date in B. 6 is more than 12 months from the date of the diagnostic test A. 8 or if Adjusted CFM50 Leakage in E. 5 or E. 7 is more than the Building Air Leakage Rate Target in A. 2 then display text: "Building Fails Envelope Leakage Test">>

G. Additional Requirements For Compliance	
01	Open all interior doors and access including those to closets and those between a conditioned basement and attic.
02	HVAC Supply and return register dampers shall be fully open.
03	Temporarily sealing of combustion flues and intermittent exhaust fans are not allowed. Some examples are: combustion flues, fresh air intakes, dryer vents, bathroom and kitchen exhaust vents and fire place.
04	Continuously operated ventilation devices like energy recovery ventilators may be sealed.
05	Multifamily – Each dwelling unit must be tested individually and shown to meet the leakage requirements. Pressurization of the adjacent dwelling units while conducting this test is not allowed.
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.	

CERTIFICATE OF VERIFICATION		CF3R-ENV-20-H
Building 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 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:

Instructions for ENV20d

Section A. Building Air Leakage – General Information

1. Select the appropriate test procedure. This selection will determine which version of this document will be used (a, b, c, d, or e) and therefore which data must be collected. Note that single-point tests can only be used under certain conditions. Note that newer manometers have automatic functions for compensating for baseline (automatic baseline) and compensating for house pressures other than the target (@50 Pa). It is preferable to use these, when available, however if these automatic functions are to be used, they must BOTH be used.
2. This number is automatically pulled from the performance approach Certificate of Compliance and is the target maximum that was entered by the documentation author. If this number cannot be achieved, the performance compliance calculations can be redone with a higher number or without the requirement for building air leakage.
3. Enter the indoor temperature measured at the time that the building air leakage test was performed.
4. Enter the outdoor temperature measured at the time that the building air leakage test was performed.
5. 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".
6. Enter the building elevation use the value for the closest city found in Joint Appendix JA2.2. Only elevations higher than 5000 feet require an adjustment to the calculations.
7. This number is automatically pulled from the performance approach Certificate of Compliance. It is used to calculate air changes.
8. Enter the date that the building leakage test data was collected.

Section B. Diagnostic Equipment Information

1. Enter the number of blower door fan systems required to run simultaneously to pressurize the home for the building 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.
2. Enter the appropriate information for each fan system used in the following rows.
3. Enter the make (brand) of the manometer used to collect the building air leakage data. Examples: Retrotec, Energy Conservatory.
4. Enter the model of the manometer used to collect the building air leakage data. Examples: DM-2 Mark II, DG700.
5. Enter the serial number of the manometer used to collect the building air leakage data.
6. Enter the most recent date that the manometer was calibrated by following manufacturer's calibration specifications.
7. This field is automatically filled. If the calibration date was more than 12 months prior to the test date entered in Row A.8, above, an error will appear.
8. Enter the make (brand) of the fan used to collect the building air leakage data. Examples: Retrotec, Energy Conservatory.
9. Enter the model of the fan used to collect the building air leakage data. Examples: US1000, Q46, BD3, BD4.
10. Enter the serial number of the fan used to collect the building air leakage data.

Section C. Envelope Leakage Test (specific to the ENV20d)

1. Enter the time average period used on the manometer during the test. Must be at least 10 seconds.
2. Enter the pre-test baseline building pressure reading.
3. If ASTM E779-10 compliant software is being used for the calculations, enter the name and version here. Otherwise, choose "none".
4. Enter the fan configuration (rings) used during the data acquisition. Examples: Ring A, Ring A1, Ring B2. Note: fan configuration must be the same for all data points described below)

Note: A minimum of five and a maximum of nine data points are required for items C.5, C.6, C.7, C.8, and C.9 below for this test.

5. Enter baseline building pressure readings
6. Enter the measured unadjusted building pressure straight from the manometer. Note that the protocols require depressurization of the envelope. All blower door induced pressures are to be negative relative to outside.
7. Enter the fan flow from the manometer that corresponds to the measured unadjusted building pressure from Row C.6.
8. This field is automatically calculated when using the online form. The equation used to calculate this value to calculate this value in the field equals Row C.6 – C.5 = Induced Building pressure.
9. This field is automatically calculated when using the online form. The equation used to calculate this value in the field equals [50/(Row C.8)]^[0.65 x C.8 = Nominal CFM50.
10. This field is automatically calculated when using the online form. The equation used to calculate this value in the field equals $(C.9_1+C.9_2+ C.9_3+ C.9_4+ C.9_5+C.9_6+ C.9_7+ C.9_8+ C.9_9)/N$ or the number of tests = Average Nominal CFM50

Section D. Altitude and Temperature Correction

1. This field is automatically calculated when using the online form. The equation used to calculate this value in the field equals:
    a. If the elevation entered in Row A.6 ≤ 5,000 ft, then enter 1 as altitude correction in box D. 1
    b. If the elevation entered in Row A.6 > 5,000 ft, altitude correction equation equals 1 + (0.000006 * A.6)
2. Enter the temperature correction factor from Table RA3.8-2 or RA3.8-3 using the indoor and outdoor temperatures entered in Rows A.3 and A.4.

Table RA3.8-2 ***Temperature Correction Factors for Depressurization Testing****- Calculated according to ASTM E779-10*

		Inside Temperature (F)								
		50	**55**	**60**	**65**	**70**	**75**	**80**	**85**	**90**
Outside Temp (F)	**-20**	1.062	1.072	1.081	1.090	1.099	1.108	1.117	1.127	1.136
	-15	1.056	1.066	1.075	1.084	1.093	1.102	1.111	1.120	1.129
	-10	1.051	1.060	1.069	1.078	1.087	1.096	1.105	1.114	1.123
	-5	1.045	1.054	1.063	1.072	1.081	1.090	1.099	1.108	1.117
	0	1.039	1.048	1.057	1.066	1.075	1.084	1.093	1.102	1.111
	5	1.033	1.042	1.051	1.060	1.069	1.078	1.087	1.096	1.105
	10	1.028	1.037	1.046	1.055	1.064	1.072	1.081	1.090	1.099
	15	1.023	1.031	1.040	1.049	1.058	1.067	1.076	1.084	1.093
	20	1.017	1.026	1.035	1.044	1.052	1.061	1.070	1.079	1.087
	25	1.012	1.021	1.029	1.038	1.047	1.056	1.064	1.073	1.082
	30	1.007	1.015	1.024	1.033	1.041	1.050	1.059	1.067	1.076
	35	1.002	1.010	1.019	1.028	1.036	1.045	1.054	1.062	1.071
	40	0.997	1.005	1.014	1.023	1.031	1.040	1.048	1.057	1.065
	45	0.992	1.000	1.009	1.017	1.026	1.035	1.043	1.051	1.060
	50	0.987	0.995	1.004	1.012	1.021	1.029	1.038	1.046	1.055
	55	0.982	0.990	0.999	1.008	1.016	1.024	1.033	1.041	1.050
	60	0.997	0.986	0.994	1.003	1.011	1.019	1.028	1.036	1.045
	65	0.973	0.981	0.989	0.998	1.006	1.015	1.023	1.031	1.040
	70	0.968	0.976	0.985	0.993	1.001	1.010	1.018	1.026	1.035
	75	0.963	0.972	0.980	0.988	0.997	1.005	1.013	1.022	1.030
	80	0.959	0.967	0.976	0.984	0.992	1.000	1.009	1.017	1.025
	85	0.955	0.963	0.971	0.979	0.988	0.996	1.004	1.012	1.020
	90	0.950	0.958	0.967	0.975	0.983	0.991	0.999	1.008	1.016
	95	0.946	0.954	0.962	0.970	0.979	0.987	0.995	1.003	1.011
	100	0.942	0.950	0.958	0.966	0.970	0.982	0.990	0.998	1.007
	105	0.938	0.946	0.954	0.962	0.970	0.978	0.986	0.994	1.002
	110	0.933	0.942	0.950	0.952	0.966	0.974	0.982	0.990	0.998

Table RA3.8-3 ***Temperature Correction Factors for Pressurization Testing****- Calculated according to ASTM E779-10*

		Inside Temperature (F)								
		50	**55**	**60**	**65**	**70**	**75**	**80**	**85**	**90**
Outside Temp (F)	**-20**	0.865	0.861	0.857	0.853	0.849	0.845	0.841	0.837	0.833
	-15	0.874	0.870	0.866	0.862	0.858	0.854	0.850	0.846	0.842
	-10	0.883	0.879	0.874	0.870	0.866	0.862	0.858	0.854	0.850
	-5	0.892	0.887	0.883	0.879	0.875	0.871	0.867	0.863	0.859
	0	0.900	0.896	0.892	0.887	0.883	0.879	0.875	0.871	0.867
	5	0.909	0.905	0.900	0.896	0.892	0.888	0.883	0.879	0.875
	10	0.918	0.913	0.909	0.905	0.900	0.896	0.892	0.888	0.884
	15	0.927	0.922	0.918	0.913	0.909	0.905	0.900	0.896	0.892
	20	0.935	0.931	0.926	0.922	09.17	0.913	0.909	0.905	0.900
	25	0.944	0.939	0.935	0.930	0.926	0.922	0.917	0.913	0.909
	30	0.952	0.948	0.943	0.939	0.934	0.930	0.926	0.921	0.917
	35	0.961	0.956	0.952	0.947	0.943	0.938	0.934	0.930	0.926
	40	0.970	0.965	0.960	0.956	0.951	0.947	0.942	0.938	0.934
	45	0.978	0.974	0.961	0.964	0.960	0.955	0.951	0.946	0.942
	50	0.987	0.982	0.977	0.973	0.968	0.963	0.959	0.955	0.950
	55	0.995	0.990	0.986	0.981	0.976	0.972	0.967	0.963	0.958
	60	1.004	0.999	0.994	0.998	0.985	0.980	0.976	0.971	0.967
	65	1.012	1.008	1.003	0.998	0.993	0.988	0.984	0.979	0.975
	70	1.021	1.016	1.011	1.006	1.001	0.997	0.992	0.988	0.983
	75	1.029	1.024	1.019	1.015	1.010	1.005	1.000	0.996	0.991
	80	1.038	1.033	1.028	1.023	1.018	1.013	1.009	1.004	0.999
	85	1.046	1.041	1.036	1.031	1.026	1.022	1.017	1.012	1.008
	90	1.055	1.050	1.045	1.040	1.035	1.030	1.025	1.020	1.016
	95	1.063	1.058	1.053	1.048	1.043	1.038	1.033	1.028	1.024
	100	1.072	1.066	1.061	1.056	1.051	1.046	1.041	1.037	1.032
	105	1.080	1.075	1.070	1.064	1.059	1.054	1.050	1.045	1.040
	110	1.088	1.083	1.078	1.073	1.068	1.063	1.058	1.053	1.048

3. This field is automatically calculated when using the online form. The equation used to calculate this value in the field equals the product of D.1 * D.2 * C.10.

Section E. Accuracy Adjustment (If Row C.3 = No)

1. This field is automatically calculated when using the online form. It is the standard deviation of the nominal CFM50 values from Rows $C.9_1$ through $C.9_9$. The equation used to calculate this value in the field equals the square root of {[(C.10- $C.9_1$)^2+(C.10- $C.9_2$)^2+(C.10- $C.9_3$)^2+(C.10- $C.9_4$)^2+(C.10- $C.9_5$)^2+(C.10- $C.9_6$)^2+(C.10- $C.9_7$)^2+(C.10- $C.9_8$)^2+(C.10- $C.9_9$)^2]/N-1 or the number of tests minus one} = standard deviation of the nominal CFM50.
2. This field is automatically calculated when using the online form. It is the percent uncertainty and the equation used to calculate this value in the field equals {[(C.1/ square root N or the number of tests)x t-statistic look up from table RA 3.8-1]/D.3 corrected CFM50} = percent uncertainty

Table 3.8-1 Precision Uncertainty: *Values of t-statistic*

Number of Readings	t-statistic
5	2.78
6	2.57
7	2.45
8	2.37
9	2.31

3. This field is automatically calculated when using the online form. The equation used to calculate this value in the field equals:
    a. If the percent uncertainty in E.2 ≤ 10, then enter "standard" as accuracy level in box E. 3
    b. If the percent uncertainty in E.2 > 10, then enter "reduced" as accuracy level in box E. 3
4. This field is automatically calculated when using the online form. The equation used to calculate this value in the field equals:
    a. If the accuracy level E.3 = Standard, then enter 1 as extending factor in box E.4
    b. If the accuracy level E.3 = Reduced, extending factor equation equals 1+(E.2/100)
5. This field is automatically calculated when using the online form. The equation used to calculate this value in the field equals the D.3 * E.4 = Adjusted CFM50

Section E. Accuracy Adjustment (If Row C.3 = Yes)

6. Enter the corrected CFM50 from manometer software.
7. Enter the percent uncertainty from manometer software.

STATE OF CALIFORNIA

BUILDING LEAKAGE DIAGNOSTIC TEST

CEC-CF3R-ENV-20-H (Revised 06/13) CALIFORNIA ENERGY COMMISSION

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

A. Building Air Leakage – General Information		
01	Test Procedure Used:	
02	Building Air Leakage Target from CF1R	
03	Indoor temperature during test (degreeF)	
04	Outdoor temperature during test (degreeF)	
05	Blower door location	
06	Building Elevation (ft)	
07	Building Volume (ft3)	
08	Date of the diagnostic test for this dwelling	

B. Diagnostic Equipment Information		
01	Number of Fans Used to Pressurize Home	
02	Fan #1	
03	Manometer Make	
04	Manometer Model	
05	Manometer Serial Number	
06	Manometer Calibration Date	
07	Manometer Calibration Status	
08	Fan Make	
09	Fan Model	
10	Fan Serial Number	

C. Envelope Leakage Diagnostic Test - ENV20e – Repeated Single Point Air Tightness Test With Automatic Meter										
01	Time average period of meter									
02	Pre-test baseline building pressure									
03	Blower Door Software used for calculations?									
04	Data Points =>	#1	#2	#3	#4	#5	#6	#7	#8	#9
05	(Min 5, max 9 data pts)									
06	Fan configuration*									
07	Induced building pressure									
08	Nominal CFM50									
09	Average nominal CFM50	<<calculated, average of nominal CFM50 values, above>>								

D. Altitude and Temperature Correction		
<<if row C. 3 = "no", use this section>>		
01	Altitude correction factor	
02	Temperature correction factor	
03	Corrected CFM50	

E. Accuracy Adjustment		
<<if row C. 3 = "no", use this section**>>**		
01	Standard deviation of nominal CFM 50 values above	
02	Percent uncertainty	
03	Accuracy level	
04	Extending factor	
05	Adjusted CFM50 (measured air leakage rate)	

CERTIFICATE OF VERIFICATION		CF3R-ENV-20-H
Building Leakage Diagnostic Test		(Page 2 of 3)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City	Zip Code

<<if row C. 3 = "yes", use next two lines>>		
06	Corrected CFM50 (from software)	
07	Percent uncertainty @ 95% confidence level (from software)	

F. Compliance Statement

<< if manometer Calibration Date in B. 6 is within 12 months of the date of the diagnostic test A. 8 and if Adjusted CFM50 Leakage in E. 8 is less than or equal to the Building Air Leakage Rate Target in A. 2 then display text: "Building Passes Envelope Leakage Test"; if manometer Calibration Date in B. 6 is more than 12 months from the date of the diagnostic test A. 8 or if Adjusted CFM50 Leakage in E. 8 is more than the Building Air Leakage Rate Target in A. 2 then display text: "Building Fails Envelope Leakage Test">>

G. Additional Requirements For Compliance

The responsible persons signature on this document indicates that the following was completed before a blower-door test began:

01	Open all interior doors and access including those to closets and those between a conditioned basement and attic.
02	HVAC Supply and return register dampers shall be fully open.
03	Temporarily sealing of combustion flues and intermittent exhaust fans are not allowed. Some examples are: combustion flues, fresh air intakes, dryer vents, bathroom and kitchen exhaust vents and fire place.
04	Continuously operated ventilation devices like energy recovery ventilators may be sealed.
05	Multifamily – Each dwelling unit must be tested individually and shown to meet the leakage requirements. Pressurization of the adjacent dwelling units while conducting this test is not allowed.

The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.

CERTIFICATE OF VERIFICATION		CF3R-ENV-20-H
Building 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 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:

Instructions for ENV20e

Section A. Building Air Leakage – General Information

1. Select the appropriate test procedure. This selection will determine which version of this document will be used (a, b, c, d, or e) and therefore which data must be collected. Note that single-point tests can only be used under certain conditions. Note that newer manometers have automatic functions for compensating for baseline (automatic baseline) and compensating for house pressures other than the target (@50 Pa). It is preferable to use these, when available, however if these automatic functions are to be used, they must BOTH be used.
2. This number is automatically pulled from the performance approach Certificate of Compliance and is the target maximum that was entered by the documentation author. If this number cannot be achieved, the performance compliance calculations can be redone with a higher number or without the requirement for building air leakage.
3. Enter the indoor temperature measured at the time that the building air leakage test was performed.
4. Enter the outdoor temperature measured at the time that the building air leakage test was performed.
5. 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".
6. Enter the building elevation use the value for the closest city found in Joint Appendix JA2.2. Only elevations higher than 5000 feet require an adjustment to the calculations.
7. This number is automatically pulled from the performance approach Certificate of Compliance. It is used to calculate air changes.
8. Enter the date that the building leakage test data was collected.

Section B. Diagnostic Equipment Information

1. Enter the number of blower door fan systems required to run simultaneously to pressurize the home for the building 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.
2. Enter the appropriate information for each fan system used in the following rows.
3. Enter the make (brand) of the manometer used to collect the building air leakage data. Examples: Retrotec, Energy Conservatory.
4. Enter the model of the manometer used to collect the building air leakage data. Examples: DM-2 Mark II, DG700.
5. Enter the serial number of the manometer used to collect the building air leakage data.
6. Enter the most recent date that the manometer was calibrated by following manufacturer's calibration specifications.
7. This field is automatically filled. If the calibration date was more than 12 months prior to the test date entered in Row A.8, above, an error will appear.
8. Enter the make (brand) of the fan used to collect the building air leakage data. Examples: Retrotec, Energy Conservatory.
9. Enter the model of the fan used to collect the building air leakage data. Examples: US1000, Q46, BD3, BD4.
10. Enter the serial number of the fan used to collect the building air leakage data.

Section C. Envelope Leakage Test (specific to the ENV20e)

1. Enter the time average period used on the manometer during the test. Must be at least 10 seconds.
2. Enter the pre-test baseline building pressure reading.
3. If ASTM E779-10 compliant software is being used for the calculations, enter the name and version here. Otherwise, choose "none".
4. These are the numbered columns for the data points required for the test. There is a minimum of five and a maximum of nine data points required for this test.
5. This shows which data points are required or optional for this test. There is a minimum of five and a maximum of nine data points required for this test.
6. Enter the fan configuration (rings) that was used during the data acquisition. Examples: Ring A, Ring A1, Ring B2
7. Enter the induced building pressure from the manometer (automatic baseline feature turned on). It should be close to 50 Pa, but no less than 15 Pa.
8. Enter the Nominal CFM50 from the manometer (@50 Pa feature turned on).
9. This field is automatically calculated when using the online form. The equation used to calculate this value in the field equals $(C.8_1+C.8_2+ C.8_3+ C.8_4+ C.8_5+C.8_6+ C.8_7+ C.8_8+ C.8_9)/N$ or the number of tests = Average Nominal CFM50

Section D. Altitude and Temperature Correction

1. This field is automatically calculated when using the online form. The equation used to calculate this value in the field equals:
    a. If the elevation entered in Row A.6 ≤ 5,000 ft, then enter 1 as altitude correction in box D. 1
    b. If the elevation entered in Row A.6 > 5,000 ft, altitude correction equation equals 1 + (0.000006 * A.6)
2. Enter the temperature correction factor from Table RA3.8-2 or RA3.8-3 using the indoor and outdoor temperatures entered in Rows A.3 and A.4.

Table RA3.8-2 ***Temperature Correction Factors for Depressurization Testing****- Calculated according to ASTM E779-10*

		Inside Temperature (F)								
		50	**55**	**60**	**65**	**70**	**75**	**80**	**85**	**90**
Outside Temp (F)	**-20**	1.062	1.072	1.081	1.090	1.099	1.108	1.117	1.127	1.136
	-15	1.056	1.066	1.075	1.084	1.093	1.102	1.111	1.120	1.129
	-10	1.051	1.060	1.069	1.078	1.087	1.096	1.105	1.114	1.123
	-5	1.045	1.054	1.063	1.072	1.081	1.090	1.099	1.108	1.117
	0	1.039	1.048	1.057	1.066	1.075	1.084	1.093	1.102	1.111
	5	1.033	1.042	1.051	1.060	1.069	1.078	1.087	1.096	1.105
	10	1.028	1.037	1.046	1.055	1.064	1.072	1.081	1.090	1.099
	15	1.023	1.031	1.040	1.049	1.058	1.067	1.076	1.084	1.093
	20	1.017	1.026	1.035	1.044	1.052	1.061	1.070	1.079	1.087
	25	1.012	1.021	1.029	1.038	1.047	1.056	1.064	1.073	1.082
	30	1.007	1.015	1.024	1.033	1.041	1.050	1.059	1.067	1.076
	35	1.002	1.010	1.019	1.028	1.036	1.045	1.054	1.062	1.071
	40	0.997	1.005	1.014	1.023	1.031	1.040	1.048	1.057	1.065
	45	0.992	1.000	1.009	1.017	1.026	1.035	1.043	1.051	1.060
	50	0.987	0.995	1.004	1.012	1.021	1.029	1.038	1.046	1.055
	55	0.982	0.990	0.999	1.008	1.016	1.024	1.033	1.041	1.050
	60	0.997	0.986	0.994	1.003	1.011	1.019	1.028	1.036	1.045
	65	0.973	0.981	0.989	0.998	1.006	1.015	1.023	1.031	1.040
	70	0.968	0.976	0.985	0.993	1.001	1.010	1.018	1.026	1.035
	75	0.963	0.972	0.980	0.988	0.997	1.005	1.013	1.022	1.030
	80	0.959	0.967	0.976	0.984	0.992	1.000	1.009	1.017	1.025
	85	0.955	0.963	0.971	0.979	0.988	0.996	1.004	1.012	1.020
	90	0.950	0.958	0.967	0.975	0.983	0.991	0.999	1.008	1.016
	95	0.946	0.954	0.962	0.970	0.979	0.987	0.995	1.003	1.011
	100	0.942	0.950	0.958	0.966	0.970	0.982	0.990	0.998	1.007
	105	0.938	0.946	0.954	0.962	0.970	0.978	0.986	0.994	1.002
	110	0.933	0.942	0.950	0.952	0.966	0.974	0.982	0.990	0.998

Table RA3.8-3 ***Temperature Correction Factors for Pressurization Testing****- Calculated according to ASTM E779-10*

		Inside Temperature (F)								
		50	**55**	**60**	**65**	**70**	**75**	**80**	**85**	**90**
Outside Temp (F)	**-20**	0.865	0.861	0.857	0.853	0.849	0.845	0.841	0.837	0.833
	-15	0.874	0.870	0.866	0.862	0.858	0.854	0.850	0.846	0.842
	-10	0.883	0.879	0.874	0.870	0.866	0.862	0.858	0.854	0.850
	-5	0.892	0.887	0.883	0.879	0.875	0.871	0.867	0.863	0.859
	0	0.900	0.896	0.892	0.887	0.883	0.879	0.875	0.871	0.867
	5	0.909	0.905	0.900	0.896	0.892	0.888	0.883	0.879	0.875
	10	0.918	0.913	0.909	0.905	0.900	0.896	0.892	0.888	0.884
	15	0.927	0.922	0.918	0.913	0.909	0.905	0.900	0.896	0.892
	20	0.935	0.931	0.926	0.922	09.17	0.913	0.909	0.905	0.900
	25	0.944	0.939	0.935	0.930	0.926	0.922	0.917	0.913	0.909
	30	0.952	0.948	0.943	0.939	0.934	0.930	0.926	0.921	0.917
	35	0.961	0.956	0.952	0.947	0.943	0.938	0.934	0.930	0.926
	40	0.970	0.965	0.960	0.956	0.951	0.947	0.942	0.938	0.934
	45	0.978	0.974	0.961	0.964	0.960	0.955	0.951	0.946	0.942
	50	0.987	0.982	0.977	0.973	0.968	0.963	0.959	0.955	0.950
	55	0.995	0.990	0.986	0.981	0.976	0.972	0.967	0.963	0.958
	60	1.004	0.999	0.994	0.998	0.985	0.980	0.976	0.971	0.967
	65	1.012	1.008	1.003	0.998	0.993	0.988	0.984	0.979	0.975
	70	1.021	1.016	1.011	1.006	1.001	0.997	0.992	0.988	0.983
	75	1.029	1.024	1.019	1.015	1.010	1.005	1.000	0.996	0.991
	80	1.038	1.033	1.028	1.023	1.018	1.013	1.009	1.004	0.999
	85	1.046	1.041	1.036	1.031	1.026	1.022	1.017	1.012	1.008
	90	1.055	1.050	1.045	1.040	1.035	1.030	1.025	1.020	1.016
	95	1.063	1.058	1.053	1.048	1.043	1.038	1.033	1.028	1.024
	100	1.072	1.066	1.061	1.056	1.051	1.046	1.041	1.037	1.032
	105	1.080	1.075	1.070	1.064	1.059	1.054	1.050	1.045	1.040
	110	1.088	1.083	1.078	1.073	1.068	1.063	1.058	1.053	1.048

3. This field is automatically calculated when using the online form. The equation used to calculate this value in the field equals the product of D.1 * D.2 * C.9.

Section E. Accuracy Adjustment (If Row C.3 = No)

1. This field is automatically calculated when using the online form. It is the standard deviation of the nominal CFM50 values from Rows $C.9_1$ through $C.9_9$. The equation used to calculate this value in the field equals the square root of {[(C.10- $C.9_1$)^2+(C.10- $C.9_2$)^2+(C.10- $C.9_3$)^2+(C.10- $C.9_4$)^2+(C.10- $C.9_5$)^2+(C.10- $C.9_6$)^2+(C.10- $C.9_7$)^2+(C.10- $C.9_8$)^2+(C.10- $C.9_9$)^2]/N-1 or the number of tests minus one} = standard deviation of the nominal CFM50.

2. This field is automatically calculated when using the online form. It is the percent uncertainty and the equation used to calculate this value in the field equals {[(C.1/ square root N or the number of tests)x t-statistic look up from table RA 3.8-1]/D.3 corrected CFM50} = percent uncertainty

Table 3.8-1 Precision Uncertainty: *Values of t-statistic*

Number of Readings	t-statistic
5	2.78
6	2.57
7	2.45
8	2.37
9	2.31

3. This field is automatically calculated when using the online form. The equation used to calculate this value in the field equals:
    a. If the percent uncertainty in E.2 ≤ 10, then enter "standard" as accuracy level in box E. 3
    b. If the percent uncertainty in E.2 > 10, then enter "reduced" as accuracy level in box E. 3
4. This field is automatically calculated when using the online form. The equation used to calculate this value in the field equals:
    a. If the accuracy level E.3 = Standard, then enter 1 as extending factor in box E.4
    b. If the accuracy level E.3 = Reduced, extending factor equation equals 1+(E.2/100)
5. This field is automatically calculated when using the online form. The equation used to calculate this value in the field equals the D.3 * E.4 = Adjusted CFM50

Section E. Accuracy Adjustment (If Row C.3 = Yes)

6. Enter the corrected CFM50 from manometer software.
7. Enter the percent uncertainty from manometer software.

STATE OF CALIFORNIA

AIR INFILTRATION SEALING – FRAMING STAGE FOR BATT, LOOSE FILL, AND SPF

CEC-CF3R-ENV-21-H (Revised 06/13) CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF VERIFICATION		CF3R-ENV-21-H
Quality Insulation Installation (QII) –Air Infiltration Sealing - Framing Stage for Batt, Loose Fill, and SPF		(Page 1 of 3)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City	Zip Code

A. AIR INFILTRATION AND INSULATION INSTALLATION (QII) - FRAMING STAGE		
01	The requirements below cover the required air sealing and installation of insulation that must occur in the framing stage.	
02	Spray Foam Insulation (SPF) can be considered an air barrier when SPF covers the possible leakage area to a thickness of 5.5 inches for open cell SPF (ocSPF) and 2.0 inches for closed cell SPF (ccSPF).	
03	Verification Status:	
04	Correction Notes:	
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.		

B. RAISED FLOOR		
01	All gaps in the raised floor are sealed.	
02	All chases sealed at floor level using a hard cover and the hard covers are sealed.	
03	All Plumbing and electrical wires that penetrate the floor are sealed.	
04	Subfloor sheathing is glued or sealed at all exterior panel edges, to create a continuous air tight subfloor.	
05	Verification Status:	
06	Correction Notes:	
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.		

C. WALLS/KNEE WALLS		
01	All penetrations through the exterior wall air barrier are sealed to provide an air-tight envelope to unconditioned spaces such as the outdoors, attic, garage and crawl space.	
02	Exterior wall air barrier is sealed to the top plate and bottom plate in each stud bay.	
03	All electrical boxes including knockouts that penetrate the air barrier to unconditioned space are sealed.	
04	All openings in top and bottom plate, including all interior and exterior walls, to unconditioned space are sealed. Such as holes drilled for electrical and plumbing.	
05	Exterior bottom plates (all stories) are sealed to the floor using the appropriate sealing method.	
06	All gaps around windows and doors are sealed. Proper sealant used was specified by window manufacturer.	
07	Rim Joists all gaps/openings fully sealed.	
08	Fan exhaust ducts that run between conditioned floors to exterior walls have a damper at the exterior wall.	
09	Metal tie downs are insulated between exterior framing and tie down.	
10	Insulation is installed in hard to access wall stud cavities, such as corner channels, wall intersections are insulated to the proper R-value prior to exterior sheathing, or the exterior stucco lath.	
11	Insulation is installed behind tub, shower, fireplace enclosures, and exterior stairwells to the R-value listed on the CF1R when located against exterior walls. Insulation is required to be installed before tub, shower, and fireplace are installed.	
12	A solid air barrier is installed on the interior wall from floor to ceiling before tub, shower, and fireplace enclosures are installed in exterior walls. Insulation in contact on all six sides of air barrier on exterior walls.	
13	All window and door headers shall be insulated to a minimum of R-2 between the exterior face of the header and inside surface of the finish wall material.	
14	Knee walls have solid and sealed blocking at the bottom, top, left side and right side of the knee wall.	
15	Verification Status:	
16	Correction Notes:	
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.		

D. CEILING/ATTIC	
01	For vented attics much of the ceiling air barrier is verified after the ceiling drywall is installed using the ENV-22.
02	For non-vented attics ensure all penetrations through the roof deck and gable ends are sealed and air tight.
03	All eave vents are covered with a rigid ventilation baffle that maintains the Net free-ventilation area.
04	All dropped ceilings/soffits are covered with hard covers and sealed to framing.
05	All chases are covered with hard covers and sealed to framing.
06	HVAC ducts that travel down a chase the chase is sealed at the ceiling level.
07	Chimney's and Flue's require sheet metal flashing. The flashing shall be sealed to the chimney/flue with fire rated caulk. The flashing shall be sealed to the surrounding framing.
08	All Eave/soffit baffles are installed to stop air movement around the baffle and into insulation. Net free-ventilation of the eave/soffit shall be maintained.
09	Double walls that open to attic are covered with an air barrier and cover has an air tight seal to the framing.

CERTIFICATE OF VERIFICATION		CF3R-ENV-21-H
Quality Insulation Installation (QII) –Air Infiltration Sealing - Framing Stage for Batt, Loose Fill, and SPF		(Page 2 of 3)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City	Zip Code

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.		

E. CONDITIONED SPACE ABOVE OR ADJACENT TO GARAGE AIR BARRIER		
01	All penetration in the subfloor above the garage into conditioned space must follow the raised floor air barrier requirements above.	
02	The builder to ensure infiltration does not enter the house between the space above the garage and subfloor. Select the option used below:	
03	[Yes or No]	(a) Edges are Sealed at the garage ceiling (typical drywall) at the perimeter of the garage to create a continuous air tight surface between the garage and adjacent conditioned envelope. Seal all plumbing, electric and mechanical penetrations between the garage and the adjacent conditioned space. For an open-web truss, airtight blocking is added on four sides of the garage perimeter. Insulation can be placed on the garage ceiling.
04	[Yes or No]	(b) Seal band joist above the wall at the garage to conditioned space transition. Seal all subfloor seams and penetrations between the conditioned space and the garage. Insulation must be placed in contact of subfloor below conditioned space.
05	Verification Status:	
06	Correction Notes:	
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.		

F. WALLS FOR ATTACHED PORCH, ATTIC, DOUBLE WALL	
01	All walls that separate conditioned and unconditioned space includes a continuous air barrier on the interior and exterior wall.
02	Exterior wall, air barrier required at the intersection of the porch and exterior wall when there is conditioned space on the other side. The exterior wall where the attic attaches to the conditioned space does includes an air barrier.
03	Truss framing blocking is used at the top and bottom of each wall/roof section.
04	Verification Status:
05	Correction Notes:
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.	

G. CANTILEVERED FLOOR AIR BARRIER	
01	Airtight blocking is installed between joists where the wall rim joist would have been located in the absence of a cantilever.
02	Exterior sheathing is installed to the bottom of the cantilever so that there is a continuous air and weather barrier for the cantilever. The cantilevered joist must be insulated to the same R value as would be required for the subfloor prior to closing.
03	Any gaps, cracks or penetrations in the air barrier of the cantilever are sealed. Can lights in the cantilever are IC and AT rated and properly sealed to sheathing.
04	Verification Status:
05	Correction Notes:
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.	

H. MULTIFAMILY AIR BARRIER	
01	Multifamily buildings must meet all air sealing requirements for single family buildings listed above.
02	Each dwelling unit must be air sealed to stop air movement from one unit to another.
03	Floor AND Ceiling of each Dwelling Unit: All penetrations through the floor and ceiling of each unit are sealed including, electric and gas utilities, water pipes, drain pipes, fire protection service pipes, communication wiring.
04	Elevator penthouse, mechanical penthouse, stairwell doors, roof access hatch, plumbing stacks sealed to reduce air transfer from attached spaces.
05	Common Walls: Bottom plate between units is sealed to the subfloor. All penetrations in the common walls are sealed including electrical boxes, wiring and plumbing penetrations. Perpendicular Interior walls that open into the common walls are sealed.
06	Vertical Chases for garbage chutes, elevator shafts, and HVAC ducting plumbing must be sealed to the floor and ceiling of each unit to stop air movement up and around the chase due to stack effect.
07	Vertical Chases for garbage chutes, elevator shafts, and HVAC ducting plumbing, wiring etc. must be sealed to stop air movement through the chase to the surrounding spaces.
08	Common Hallways must be sealed to stop air movement into dwelling units.
09	Verification Status:
10	Correction Notes:
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.	

AIR INFILTRATION SEALING – FRAMING STAGE FOR BATT, LOOSE FILL, AND SPF

CERTIFICATE OF VERIFICATION		CF3R-ENV-21-H
Quality Insulation Installation (QII) –Air Infiltration Sealing - Framing Stage for Batt, Loose Fill, and SPF		(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:

Instructions for ENV21a

A. AIR INFILTRATION AND INSULATION INSTALLATION (QII) - FRAMING STAGE

3. HERS Rater to select from list:
   a. Pass - all applicable requirements are met.
   b. Fail - one or more applicable requirements are not met. Rater must enter reason for failure in corrections notes field below.
4. Correction Notes, Rater must enter reason for failure.

B. RAISED FLOOR

5. HERS Rater to select from list:
   a. Pass - all applicable requirements are met.
   b. Fail - one or more applicable requirements are not met. Rater must enter reason for failure in corrections notes field below.
   c. All n/a - This entire table is not applicable.
6. Correction Notes, Rater must enter reason for failure.

C. WALLS/KNEE WALLS

15. HERS Rater to select from list:
   a. Pass - all applicable requirements are met.
   b. Fail - one or more applicable requirements are not met. Rater must enter reason for failure in corrections notes field below.
16. Correction Notes, Rater must enter reason for failure.

D. CEILING/ATTIC

10. HERS Rater to select from list:
   a. Pass - all applicable requirements are met.
   b. Fail - one or more applicable requirements are not met. Rater must enter reason for failure in corrections notes field below.
11. Correction Notes, Rater must enter reason for failure.

E. CONDITIONED SPACE ABOVE OR ADJACENT TO GARAGE AIR BARRIER

5. HERS Rater to select from list:
   a. Pass - all applicable requirements are met.
   b. Fail - one or more applicable requirements are not met. Rater must enter reason for failure in corrections notes field below.
   c. All n/a - This entire table is not applicable.
6. Correction Notes, Rater must enter reason for failure.

F. WALLS FOR ATTACHED PORCH, ATTIC, DOUBLE WALL

4. HERS Rater to select from list:
   a. Pass - all applicable requirements are met.
   b. Fail - one or more applicable requirements are not met. Rater must enter reason for failure in corrections notes field below.
   c. All n/a - This entire table is not applicable.
5. Correction Notes, Rater must enter reason for failure.

G. CANTILEVERED FLOOR AIR BARRIER

4. HERS Rater to select from list:
   a. Pass - all applicable requirements are met.
   b. Fail - one or more applicable requirements are not met. Rater must enter reason for failure in corrections notes field below.
   c. All n/a - This entire table is not applicable.
5. Correction Notes, Rater must enter reason for failure.

H. MULTIFAMILY AIR BARRIER

9. HERS Rater to select from list:
   a. Pass - all applicable requirements are met.
   b. Fail - one or more applicable requirements are not met. Rater must enter reason for failure in corrections notes field below.
   c. All n/a - This entire table is not applicable.
10. Correction Notes, Rater must enter reason for failure.

STATE OF CALIFORNIA

AIR INFILTRATION SEALING – FRAMING STAGE FOR SIP and ICF

CEC-CF3R-ENV-21-H (Revised 06/13) LIFORNIA ENERGY COMMISSION

CERTIFICATE OF VERIFICATION		CF3R-ENV-21-H
Quality Insulation Installation (QII) – Air Infiltration Sealing - Framing Stage for SIP and ICF		(Page 1 of 3)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City	Zip Code

If there are any traditional stick built exterior walls use the CF3R-ENV-21. For traditional stick built roof/ceiling use the CF3R-ENV-22 and 23.

A. INSTALLATION		
01	The R-value of all SIP/ICF products is the same or better than listed on the CF1R.	
02	If modeled on the CF-1R the density of the installed product is the same as installed.	
03	SIP/ICF products have been installed per manufacturer installation instructions.	
04	Verification Status:	
05	Correction Notes:	
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.		

B. RAISED FLOOR		
01	All gaps in the raised floor are sealed.	
02	All chases sealed at floor level using a hard cover and the hard covers are sealed.	
03	All Plumbing and electrical wires that penetrate the floor must be sealed.	
04	Subfloor sheathing is glued or sealed at all exterior panel edges, to create a continuous air tight subfloor.	
05	Verification Status:	
06	Correction Notes:	
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.		

C. WALLS		
01	Exterior walls are sealed to every floor on every story.	
02	All gaps around windows and doors are sealed. Proper sealant used was as specified by window manufacturer.	
03	All gaps around windows and doors are filled with insulation. Batt insulation is not allowed to be stuffed into gap.	
04	All plumbing and wiring penetrations through the top and bottom of panels, and electrical boxes that penetrate the wall are sealed.	
05	All SIP panel joints sealed at the interior of the wall and the exterior of each panel.	
06	Fan exhaust ducts that run between conditioned floors to exterior walls must include a damper at the exterior wall.	
07	Header sealed to wall with continues foam or caulk per manufacturer directions.	
08	Verification Status:	
09	Correction Notes:	
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.		

D. SIP CEILING		
01	For vented attics use the CF3R-ENV-22.	
02	For non-vented attics ensure all penetrations through the roof deck and gable ends are sealed and air tight.	
03	Verification Status:	
04	Correction Notes:	
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.		

E. CONDITIONED SPACE ABOVE OR ADJACENT TO GARAGE AIR BARRIER		
All penetration in the subfloor above the garage into conditioned space must follow the raised floor air barrier requirements above.		
01	The builder needs to ensure infiltration does not enter the house between the space above the garage and subfloor. Select the option used:	
02	[Yes or No]	(a) Sealed all edges of garage ceiling (typical drywall) at the perimeter of the garage to create a continuous air tight surface between the garage and adjacent conditioned envelope. Seal all plumbing, electric and mechanical penetrations between the garage and the adjacent conditioned space on. For an open-web truss, airtight blocking must be added on four sides of the garage perimeter. Insulation can be placed on the garage ceiling.
03	[Yes or No]	(b) Seal band joist above the wall at the garage to conditioned space transition. Seal all subfloor seams and penetrations between the conditioned space and the garage. Insulation must be placed in contact of subfloor below conditioned space.
04	Verification Status:	
05	Correction Notes:	
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.		

CERTIFICATE OF VERIFICATION		CF3R-ENV-21-H
Quality Insulation Installation (QII) – Air Infiltration Sealing - Framing Stage for SIP and ICF		(Page 2 of 3)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City	Zip Code

F. CANTILEVERED FLOOR AIR BARRIER		
01	Airtight blocking shall be installed between joists where the wall rim joist would have been located in the absence of a cantilever.	
02	Exterior sheathing shall be installed to the bottom of the cantilever so that there is a continuous air and weather barrier for the cantilever. The cantilevered joist must be insulated to the same R-value as for the subfloor.	
03	Any gaps, cracks or penetrations in the air barrier of the cantilever shall be sealed. Recessed down lights in the cantilever is IC and AT rated and properly sealed to sheathing.	
04	Verification Status:	
05	Correction Notes:	
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.		

G. MULTIFAMILY AIR BARRIER		
01	Multifamily buildings require all the above plus each unit must control air movement across envelope components separating each dwelling.	
02	Floor AND Ceiling of each Dwelling Unit – All penetrations through the floor and ceiling of each unit must be sealed including, electric and gas utilities, water pipes, drain pipes, fire protection service pipes, communication wiring etc.	
03	Elevator penthouse, mechanical penthouse, stairwell doors, roof access hatch, plumbing stacks etc. sealed to reduce air transfer from attached spaces.	
04	Common Walls – Bottom plate between units must be sealed to the subfloor. All penetration in the common walls is sealed. Interior walls that open into the common walls must be sealed.	
05	Vertical Chases – All vertical chases are sealed at the floor and ceiling of each unit so air cannot transfer from first floor to second floor around chase.	
06	Vertical Chases –The chases such as garbage chutes, elevator shafts, and HVAC ducting are sealed to stop air movement through the chase to surrounding spaces.	
07	Common Hallways – Penetrations between dwelling unit and common hallways are sealed including doors to the dwelling unit are gasketed or made substantially airtight.	
08	Verification Status:	
09	Correction Notes:	
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.		

CERTIFICATE OF VERIFICATION	CF3R-ENV-21-H
Quality Insulation Installation (QII) – Air Infiltration Sealing - Framing Stage for SIP and ICF	(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:

Instructions for ENV23

A. INSTALLATION

4. HERS Rater to select from list:
   a. Pass - all applicable requirements are met.
   b. Fail - one or more applicable requirements are not met. Rater must enter reason for failure in corrections notes field below.
5. Correction Notes, Rater must enter reason for failure.

B. RAISED FLOOR

5. HERS Rater to select from list:
   a. Pass - all applicable requirements are met.
   b. Fail - one or more applicable requirements are not met. Rater must enter reason for failure in corrections notes field below.
   c. All n/a - This entire table is not applicable.
6. Correction Notes, Rater must enter reason for failure.

C. WALLS

8. HERS Rater to select from list:
   a. Pass - all applicable requirements are met.
   b. Fail - one or more applicable requirements are not met. Rater must enter reason for failure in corrections notes field below.
9. Correction Notes, Rater must enter reason for failure.

D. SIP CEILING

3. HERS Rater to select from list:
   a. Pass - all applicable requirements are met.
   b. Fail - one or more applicable requirements are not met. Rater must enter reason for failure in corrections notes field below.
   c. All n/a - This entire table is not applicable.
4. Correction Notes, Rater must enter reason for failure.

E. CONDITIONED SPACE ABOVE OR ADJACENT TO GARAGE AIR BARRIER

4. HERS Rater to select from list:
   a. Pass - all applicable requirements are met.
   b. Fail - one or more applicable requirements are not met. Rater must enter reason for failure in corrections notes field below.
   c. All n/a - This entire table is not applicable.
5. Correction Notes, Rater must enter reason for failure.

F. CANTILEVERED FLOOR AIR BARRIER

4. HERS Rater to select from list:
   a. Pass - all applicable requirements are met.
   b. Fail - one or more applicable requirements are not met. Rater must enter reason for failure in corrections notes field below.
   c. All n/a - This entire table is not applicable.
5. Correction Notes, Rater must enter reason for failure.

G. MULTIFAMILY AIR BARRIER

6. HERS Rater to select from list:
   a. Pass - all applicable requirements are met.
   b. Fail - one or more applicable requirements are not met. Rater must enter reason for failure in corrections notes field below.
   c. All n/a - This entire table is not applicable.

Correction Notes, Rater must enter reason for failure.

AIR INFILTRATION SEALING – CEILING/ROOF DECK

CERTIFICATE OF VERIFICATION		**CF3R-ENV-22-H**
Quality Insulation Installation (QII) - Air Infiltration Sealing - Ceiling/Roof Deck		(Page 1 of 2)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City	Zip Code

For typical vented attics where the insulation is at the roof deck ceiling air barrier must be verified after the ceiling drywall is installed and before attic insulation is installed. If SPF will be used in the attic this can be considered the air barrier. Soffit and chase's must still be covered and chimneys and flues require metal flashing. Buildings with a Non vented attic all air sealing requirements appropriate for the roof must be verified.

A. CEILING INSPECTION – Vented Attics	
01	There is a continuous air barrier at the ceiling level. All opening into walls, drops, chasses, double walls are sealed. Examples are below.
02	Chimney's and Flue's require sheet metal flashing. The flashing shall be sealed to the chimney/flue with fire rated caulk. The flashing shall be sealed to the surrounding framing.
03	All penetration through the top plate of interior and exterior walls are sealed.
04	Electrical boxes, fire alarm boxes, fire sprinklers, cut into ceiling are sealed to the surrounding drywall. If not possible to seal fixture directly a secondary air barrier was created around the fixture.
05	All installed recessed light fixtures that penetrate the ceiling to unconditioned space are rated to be Insulation Contact and Air Tight (IC and AT) which allows direct contact with insulation. Housing is sealed to the drywall.
06	Exhaust fan housing is sealed to surrounding drywall and all holes and seams in the housing sealed.
07	All soffits and chases are covered with a hard cover that is sealed to the framing with caulk or foam.
08	Double walls that open to attic are covered and the cover sealed to the framing.
09	Attic Access forms airtight seal from conditioned space to unconditioned space. Vertical attic access requires mechanical compression using screws, or latches.
10	Knee walls require solid and sealed blocking at the bottom, top left side and right side of the knee wall. When the knee wall is placed on top of a subfloor the open cavity below the subfloor and the ceiling below are sealed.
11	HVAC ducts that travel down a chase the chase are sealed at the ceiling level.
12	HVAC boots that penetrate the ceiling are sealed to the surrounding drywall.
13	All top plates of interior and exterior walls sealed to drywall.
14	Attic access must be surrounded with a dam at least the same depth as the insulation to prevent loss of ceiling insulation.
15	There must be a dam placed at the exterior edge of all kneewalls and all edges of insulation to stop air movement through insulation.
16	Verification Status:
17	Correction Notes:
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.	

B. ROOF INSPECTION – Non vented attics	
01	There is a continuous air barrier at the roof deck and gable ends.
02	Chimney's and Flue's require sheet metal flashing at the roof deck. The flashing is sealed to the chimney/flue with fire rated caulk. The flashing is sealed to the surrounding framing.
03	All penetrations for plumbing, electrical etc in the roof deck and gable ends are sealed.
04	Verification Status:
05	Correction Notes:
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.	

CERTIFICATE OF VERIFICATION		**CF3R-ENV-22-H**
Quality Insulation Installation (QII) - Air Infiltration Sealing - Ceiling/Roof Deck		(Page 2 of 2)
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:

Instructions for ENV22

A. CEILING INSPECTION – Vented Attics

16. HERS Rater to select from list:
    a. Pass - all applicable requirements are met.
    b. Fail - one or more applicable requirements are not met. Rater must enter reason for failure in corrections notes field below.
    c. All n/a - This entire table is not applicable.
17. Correction Notes, Rater must enter reason for failure.

B. ROOF INSPECTION – Non vented attics

4. HERS Rater to select from list:
    a. Pass - all applicable requirements are met.
    b. Fail - one or more applicable requirements are not met. Rater must enter reason for failure in corrections notes field below.
    c. All n/a - This entire table is not applicable.
5. Correction Notes, Rater must enter reason for failure.

CERTIFICATE OF VERIFICATION		CF3R-ENV-23-H
Quality Insulation Installation (QII) - Insulation Stage		(Page 1 of 4)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City	Zip Code

A. QUALITY INSULATION INSTALLATION (QII) INSULATION STAGE		
01	Insulation shall be installed to the requirements of Reference Residential Appendices, RA 3.5.	
02	Air barrier installation and preparation for insulation was done at framing stage prior to insulation being installed	
03	All structural framing areas shall be insulated in a manner that resists thermal bridging of the assembly separating conditioned from unconditioned space. Structural bracing, tie-downs, and framing of steel, or specialized framing used to meet structural requirements of the CBC are allowed and must be insulated. These areas shall be called out on the building plans with diagrams and/or specific design drawings indicating the R-value of insulation and fastening method to be used. It is recommended that spray foam be use.	
04	Medium and light density Spray Foam (SPF) manufacturers claim various R-values per inch. In California the maximum R-value that can be claimed for close cell SPF (ccSPF) is an R-value of 5.8 per inch and for open cell SPF (ocSPF) is an R-value of 3.6 per inch, unless documentation is provided showing that the product and/or manufacturer has a current ICC Evaluation Service Report (ESR) that shows compliance with *Acceptance Criteria for Spray-Applied Foam Plastic Insulation--AC377*.	
05	All insulation was installed to the manufactures insulation installation instructions.	
06	Verification Status:	
07	Correction Notes:	
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.		

B. QUALITY OF ALL INSTALLED INSULATION		
01	Installed insulation R-values is the same or greater than specified on the CF1R.	
02	No gaps or voids between the insulation and framing.	
03	Gaps between studs shall be filled with insulation.	
04	Batt - ensure the ends are cut so there are no gaps.	
05	Batt - Insulation is cut around obstructions like electrical boxes and no gaps exist.	
06	Batt - insulation is not compressed (no stuffing of the insulation into the cavity).	
07	Batt insulation is delaminated around all plumbing and electrical lines in ceilings, walls and floors.	
08	An air barrier is installed at all exposed edge of insulation.	
09	Loose-fill insulation installed to the minimum installed weight per square foot per the manufacturer's labeled R-value specification.	
10	Rigid board insulation shall be installed according to the manufacturer's installation instructions.	
11	SPF insulation shall be spray-applied to fully adhere to structural assembly framing, floor and ceiling joists, and other framing surfaces within the construction cavity.	
12	SPF - with multiple layers applied, each foam lift (i.e. spray application) adheres to the substrate and foam interfaces.	
13	SPF - if values other than R-5.8 per inch for ccSPF and R-3.6 per inch for ocSPF are used, then an ICC Evaluation Service Report (ESR) is attached and uploaded to the HERS provider's web site.	
14	ccSPF - in areas where an air barrier is required the foam is at least two inches thick.	
15	ocSPF depressions in the foam insulation surface are not greater than 1-inch of the required thickness provided these depressions do not exceed 10% of the surface area being insulated.	
16	ocSPF insulation does completely fill cavities of 2x4 inch framing or less.	
17	ocSPF cavities greater than 2x4 inch framing are filled to the thickness that meets the required R-value used for compliance.	
18	SPF installed as an air barrier is sprayed at a minimum of 5.5 inches in thickness for open cell and 2.0 inches for closed cell.	
19	The insulation installer provided a CF2R-ENV-03 and CF2R-ENV-23. Labels or specification/data sheets are attached to the CF2R-ENV-03 for each insulating material. The material datasheet for the installed material meets the performance specifications of the required R-Values. Blown in material also includes insulation material bag labels or coverage charts.	
20	Verification Status:	
21	Correction Notes:	
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.		

C. CEILING/ROOF INSULATION	
01	Insulation extends to the outside edge of the exterior top plates and is flush against any ventilation dams/baffles.
02	Insulation is in direct contact with ceiling so there are no gaps between the ceiling and the insulation.
03	Chimneys and flues (except for zero clearance) require sheet metal collar around the stack. The collar must be at least as tall as the depth of the insulation. The collar shall be 1" from the chimney/flue for double wall vent, and 6" from the chimney/flue for single wall vent" unless manufacturer requires otherwise. The collar must be sealed to the ceiling with high temperature sealant to prevent air leakage. The insulation is in contact with the sheet metal collar.
04	Required eave ventilation shall not be obstructed - the net free-ventilation area of the eave vent is maintained

CERTIFICATE OF VERIFICATION		CF3R-ENV-23-H
Quality Insulation Installation (QII) - Insulation Stage		(Page 2 of 4)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City	Zip Code

05	Eave vent baffles are installed to prevent air movement under or into the ceiling insulation
06	Recessed downlights are covered with insulation. If they are not covered to the same depth as required by the CF1R for ceiling insulation then an area weighted calculation is required. Recessed downlights are AT and IC rated.
07	Recessed downlights where SPF insulation is installed shall: (Note: SPF insulation shall not be applied directly to recessed lighting fixtures) (a) be covered with a minimum of 1.5 inches of mineral fiber insulation, or (b) be enclosed in a box fabricated from 1/4 inch plywood, 18 gauge metal, 3/8 inch hard board or gypboard. Hard board or gypboard do not cause a recessed downlights to meet the zero clearance insulation contact requirements.
08	Walkways and mechanical platforms are insulated to the same R-value as required by the CF1R for ceiling insulation. If not an area weighted calculation is completed and turned in with this form.
09	Soffits, chasses, drops have a sealed hard cover and the insulation is in direct contact with the hard cover.
10	Knee walls – an air dam the full depth of the ceiling insulation is added to the exterior edge of the knee wall so the ceiling insulation overlaps the knee wall to the full depth of the ceiling insulation.
11	Attic access doors are insulated to the same R-value required by the CF1R for roof insulation and the insulation is permanently attached using adhesive or mechanical fasteners. Preferred method is rigid insulation.
12	Attic Access forms airtight seal from conditioned space to unconditioned space. Vertical attic access requires mechanical compression using screws, or latches.
13	Attic access must have a dam around the access to at least the same depth as the insulation.
14	Insulation batts must be cut to fit around cross bracings and truss webs.
15	Attic rulers appropriate to the material are installed and evenly distributed throughout the attic to verify Depth (one ruler for every 250 square feet) The rulers are clearly readable from the attic access and scaled to read inches of insulation and the R-value installed.
16	Loose fill and SPF insulation a HERS rater shall measure the installed thickness (include low and high areas) and density of insulation in at least 6 random locations on walls, roof/ceilings and floors to ensure minimum thickness levels and the installed density meets the R-value specified on the Certificate of Compliance, and are consistent with the manufacturer's coverage chart.
17	Steel-framed kneewalls, skylight shafts, and gable ends, external surfaces of steel studs are covered with insulation
18	Verification Status:
19	Correction Notes:
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.	

D. WALL INSULATION	
01	**Batts, loose fill mineral fiber, mineral and natural wool, and cellulose:** fills cavity and is in contact with air barrier on six sides.
02	**ocSPF:** completely fill cavities of 2x4 inch framing or less. Not required to fill cavities greater than 2x4 inch framing unless required to meet R-value.
03	**ccSPF:** insulation is not required to fill the cavities of framed assemblies unless required to meet R-value.
04	**Double walls and bump-outs** - insulation fills the cavity, or additional air barrier is installed so the insulation fills the cavity and is in contact with the insulation on all six sides unless SPF is used. Insulation shall be installed on the exterior of the double walls/bump-outs.
05	Low expanding foam used around windows and doors, if allowed by the manufacturer. If not allowed fill cavity with insulation. Batts are not allowed to be stuffed into space.
06	Electrical panel in exterior insulated wall the panel is air tight and insulation is installed behind the panel.
07	Skylight shafts and attic knee wall insulation must meet all the requirements for walls and is in contact with the air barrier on six sides unless SPF is used.
08	Skylight shafts and attic kneewalls insulation shall be in full contact with the drywall or other interior wall finish. Batt insulation must be cut to fit around 2x4's that are laid flat.
09	Skylight shafts and attic kneewalls shall be completely enclosed by vertical and horizontal framing, including horizontal plates at top and bottom of the insulation.
10	Band/Rim joists are insulated to the same R-value as the wall.
11	Verification Status:
12	Correction Notes:
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.	

E. RAISED FLOOR INSULATION QUALITY	
01	Insulation is in full contact with subfloor.
02	Insulation hangers are spaced at 18 inches or less, insulation hangers do not compress insulation.
03	Netting or mesh can be used if the cavity under the floor is filled and in contact with the subfloor.
04	When daylight basements are adjacent to crawlspaces, if the basement is conditioned the walls adjacent to the crawlspace are insulated to the R-value listed on the CF-1R. This includes framed stem walls, and vertical concrete retaining walls.

CERTIFICATE OF VERIFICATION		CF3R-ENV-23-H
Quality Insulation Installation (QII) - Insulation Stage		(Page 3 of 4)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City	Zip Code

05	If access to the crawlspace is from the conditioned area the raised floor includes an airtight insulated access hatch. Where possible locate crawl space access from the exterior.	
06	Verification Status:	
07	Correction Notes:	
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.		

F. FLOOR ABOVE GARAGE INSULATION QUALITY		
01	Insulation must be in full contact with subfloor if the air barrier is at the band joist at the garage house wall.	
02	Insulation hangers spaced at 18 inches or less, insulation hangers must not compress insulation.	
03	Netting or mesh can be used if the cavity under the floor is filled and in contact with the subfloor.	
04	If air barrier is at the perimeter of the garage below the conditioned subfloor then the insulation may be placed on the garage ceiling. Perimeter of subfloor must also be insulated.	
05	Verification Status:	
06	Correction Notes:	
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.		

G. CANTILEVERED FLOOR INSULATION QUALITY		
01	Insulation is in full contact with cantilevered subfloor. Insulation hangers are spaced at 18 inches or less, insulation hangers do not compress insulation. Netting or mesh can be used if the cavity under the floor is filled and in contact with the subfloor.	
02	Sealed Blocking shall be installed between joists where the wall rim joist would have been located in the absence of a cantilever. Insulation shall be placed on both sides of this block.	
03	Verification Status:	
04	Correction Notes:	
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.		

H. ATTACHED PORCH ROOF INSULATION QUALITY		
01	Exterior wall at the intersection of the porch roof is fully insulated above, below and behind the roof line.	
02	Where truss framing is used, airtight blocking is used at the top and bottom of each wall/roof section and insulated.	
03	Verification Status:	
04	Correction Notes:	
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.		

CERTIFICATE OF VERIFICATION		CF3R-ENV-23-H
Quality Insulation Installation (QII) - Insulation Stage		(Page 4 of 4)
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:

Instructions for ENV23

A. QUALITY INSULATION INSTALLATION (QII) INSULATION STAGE

6. HERS Rater to select from list:
   a. Pass - all applicable requirements are met.
   b. Fail - one or more applicable requirements are not met. Rater must enter reason for failure in corrections notes field below.
7. Correction Notes, Rater must enter reason for failure.

B. QUALITY OF ALL INSTALLED INSULATION

20. HERS Rater to select from list:
   a. Pass - all applicable requirements are met.
   b. Fail - one or more applicable requirements are not met. Rater must enter reason for failure in corrections notes field below.
21. Correction Notes, Rater must enter reason for failure.

C. CEILING/ROOF INSULATION

18. HERS Rater to select from list:
   a. Pass - all applicable requirements are met.
   b. Fail - one or more applicable requirements are not met. Rater must enter reason for failure in corrections notes field below.
19. Correction Notes, Rater must enter reason for failure.

D. WALLS INSULATION

11. HERS Rater to select from list:
   a. Pass - all applicable requirements are met.
   b. Fail - one or more applicable requirements are not met. Rater must enter reason for failure in corrections notes field below.
12. Correction Notes, Rater must enter reason for failure.

E. RAISED FLOOR INSULATION QUALITY

6. HERS Rater to select from list:
   a. Pass - all applicable requirements are met.
   b. Fail - one or more applicable requirements are not met. Rater must enter reason for failure in corrections notes field below.
   c. All n/a - This entire table is not applicable.
7. Correction Notes, Rater must enter reason for failure.

F. FLOOR ABOVE GARAGE INSULATION QUALITY

5. HERS Rater to select from list:
   a. Pass - all applicable requirements are met.
   b. Fail - one or more applicable requirements are not met. Rater must enter reason for failure in corrections notes field below.
   c. All n/a - This entire table is not applicable.
6. Correction Notes, Rater must enter reason for failure.

G. CANTILEVERED FLOOR INSULATION QUALITY

3. HERS Rater to select from list:
   a. Pass - all applicable requirements are met.
   b. Fail - one or more applicable requirements are not met. Rater must enter reason for failure in corrections notes field below.
   c. All n/a - This entire table is not applicable.
4. Correction Notes, Rater must enter reason for failure.

H. ATTACHED PORCH ROOF INSULATION QUALITY

3. HERS Rater to select from list:
   a. Pass - all applicable requirements are met.
   b. Fail - one or more applicable requirements are not met. Rater must enter reason for failure in corrections notes field below.
   c. All n/a - This entire table is not applicable.
4. Correction Notes, Rater must enter reason for failure.

STATE OF CALIFORNIA

DUCT LEAKAGE DIAGNOSTIC TEST

CEC-CF3R-MCH-20-H (Revised 06/13) CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF VERIFICATION		CF3R-MCH-20-H
Duct Leakage Diagnostic Test		(Page 1 of 2)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City	Zip Code

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

B. Duct Leakage Diagnostic Test - MCH-20a - Completely New Duct System		
01	Condenser Nominal Cooling Capacity (ton)	
02	Heating Capacity (kBtu/h)	
03	Conditioned Floor Area Served by this HVAC System (ft2)	
04	Duct Leakage Test Conditions	
05	Duct Leakage Test Method?	
06	LeakageFactor ( )	
07	Air-Handling Unit Airflow (AHUAirflow) Determination Method	
08	Measured AHUAirflow (cfm)	
09	Calculated Target Allowable Duct Leakage Rate (cfm)	
10	Actual duct leakage rate from leakage test measurement (cfm)	
Compliance statement:		

C. ADDITIONAL REQUIREMENTS FOR COMPLIANCE	
The responsible persons signature on this document indicates the installation complies with the following requirements:	
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.
Visual Inspection at Final Construction Stage (applicable if system was tested at rough-in) After installing the interior finishing wall and verifying that the above rough-in tests was completed, the following procedure must be performed	
07	For all supply and return registers, verify that the spaces between the register boot and the interior finishing wall are properly sealed.
08	If the house rough-in duct leakage test was conducted without an air handler installed, inspect the connection points between the air handler and the supply and return plenums to verify that the connection points are properly sealed.
09	Inspect all joints to ensure that no cloth backed rubber adhesive duct tape is used.
10	Verification Status
If Verification Status for this table indicates "Fail", the reason shall be described in the correction notes for this table.	
Correction Notes for this table:	
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.	

CERTIFICATE OF VERIFICATION		CF3R-MCH-20-H
Duct Leakage Diagnostic Test		(Page 2 of 2)
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:

A. System Information

01. *HVAC System Identification or Name*: Same data given on CF2R-MCH-20; provides an identification name or tag name that uniquely identifies the duct system. If there is a mechanical plan for the system, the tag name may be given on the plans.
02. *HVAC System Location or Area Served*: Same data given on CF2R-MCH-20; provides a brief description of the area served by the duct system (e.g. upstairs; downstairs).
03. *Building Type*: Same data given on CF2R-MCH-20.
04. *Verified Low Leakage Ducts in Conditioned Space (VLLDCS)*: Same data given on CF2R-MCH-20; Details whether or not VLLDCS is required per CF1R.
05. *Verified Low Leakage Air-handling Unit (VLLAHU)*: Same data given on CF2R-MCH-20; Details whether or not VLLAHU is required per CF1R.
06. *Duct System Compliance Category*: Same data given on CF2R-MCH-20

B. Duct Leakage Diagnostic Test - MCH-20a - Completely New Duct System

01. *Condenser Nominal Cooling Capacity (ton)*: Enter the installed condenser nominal cooling capacity in tons.
02. *Heating Capacity (kBtu/h)*: Enter the installed heating capacity in kBtu/h.
03. *Conditioned Floor Area Served by this HVAC System(ft^2)*: User must input CFA for the space. Should be consistent with the data given on CF2R-MCH-20.
04. *Duct Leakage Test Conditions*: Same data given on CF2R-MCH-20.
05. *Duct Leakage Test Method*: Same data given on CF2R-MCH-20.
06. *Leakage Factor*: Same data given on CF2R-MCH-20.
07. *Air-Handling Unit Airflow (AHUAirflow) Determination Method*: Same data given on CF2R-MCH-20.
08. *Measured AHU Airflow (CFM)*: If "Measured Airflow Method" is selected in row B07, user must input measured airflow.
09. *Calculated Target Allowable Duct Leakage Rate (cfm)*: This value will be automatically populated depending on values in B6, B7, and B8.
10. *Actual Duct Leakage Rate from Leakage Test Measurement (cfm)*: User will input this value from actual measurements from leakage test.
11. *Compliance Statement*: If Actual Duct Leakage Rate from leakage test (B10) is less than or equal to Calculated Target Allowable Duct Leakage Rate, "System passes leakage test" will automatically populate. If not, "System fails leakage test" will automatically populate.
12. *Notes*: If the installed cooling or heating capacities or CFA of the area served by the HVAC system does not match the Installation Certificate, then a note indicating the discrepancy will be displayed.

C. Additional Requirements for Compliance

10. HERS Rater to select from list:
    a. Pass - all applicable requirements are met.
    b. Fail - one or more applicable requirements are not met. Rater must enter reason for failure in corrections notes field below.

Correction Notes, Rater must enter reason for failure.

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DUCT LEAKAGE DIAGNOSTIC TEST

CERTIFICATE OF VERIFICATION	CF3R-MCH-20-H
Duct Leakage Diagnostic Test	(Page 1 of 2)

Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City	Zip Code

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

B. 20b. Duct Leakage Diagnostic Test - Low Leakage Ducts in Conditioned Space		
01	System compliance with visual inspection per RA3.1.4.1.3? (registered MCH-21 is required)	
02	Duct Leakage Test Conditions	
03	Duct Leakage Test Method	
04	Target Allowable Duct Leakage Rate (cfm)	
05	Actual duct leakage rate from leakage test measurement (cfm)	
Compliance statement:		

C. ADDITIONAL REQUIREMENTS FOR COMPLIANCE		
The responsible persons signature on this document indicates the installation complies with the following requirements:		
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	Verification Status	
If Verification Status for this table indicates “Fail”, the reason shall be described in the correction notes for this table.		
Correction Notes for this table:		
The responsible person’s signature on this compliance document affirms that all applicable requirements in this table have been met.		

CERTIFICATE OF VERIFICATION	CF3R-MCH-20-H
Duct Leakage Diagnostic Test	(Page 2 of 2)

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:

A. System Information

01. *HVAC System Identification or Name*: Same data given on CF2R-MCH-20; provides an identification name or tag name that uniquely identifies the duct system. If there is a mechanical plan for the system, the tag name may be given on the plans.
02. *HVAC System Location or Area Served*: Same data given on CF2R-MCH-20; provides a brief description of the area served by the duct system (e.g. upstairs; downstairs).
03. *Building Type*: Same data given on CF2R-MCH-20.
04. *Verified Low Leakage Ducts in Conditioned Space (VLLDCS)*: Same data given on CF2R-MCH-20; Details whether or not VLLDCS is required per CF1R.
05. *Verified Low Leakage Air-handling Unit (VLLAHU)*: Same data given on CF2R-MCH-20; Details whether or not VLLAHU is required per CF1R.
06. *Duct System Compliance Category*: Same data given on CF2R-MCH-20

B. 20b. Duct Leakage Diagnostic Test - Low Leakage Ducts in Conditioned Space

01. *System compliance with visual inspection per RA3.1.4.1.2? (registered CF3R-MCH-21 is required)*: This field will be automatically filled. A *CF3R-MCH-21* must be registered to certify a visual inspection confirms the space conditioning system is located entirely in conditioned space in accordance with RA3.1.4.1.3. If any part of the duct system is outside of conditioned space, the system does not pass.
02. *Duct Leakage Test Conditions*: Same data given on CF2R-MCH-20.
03. *Duct Leakage Test Method*: Same data given on CF2R-MCH-20.
04. *Target Allowable Duct Leakage Rate (cfm)*: Same data given on CF2R-MCH-20.
05. *Actual Leakage Rate (cfm):* Enter the actual leakage from the test.
06. *Compliance statement:* This field will be automatically filled. The test passes if actual leakage rate is less than or equal to 25 cfm and a *CF3R-MCH-21* has been registered.

C. Additional Requirements for Compliance

07. HERS Rater to select from list:

a. Pass - all applicable requirements are met.
b. Fail - one or more applicable requirements are not met. Rater must enter reason for failure in corrections notes field below.

Correction Notes, Rater must enter reason for failure.

STATE OF CALIFORNIA

DUCT LEAKAGE DIAGNOSTIC TEST

CEC-CF3R-MCH-20-H (Revised 06/13)

CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF VERIFICATION		CF3R-MCH-20-H
Duct Leakage Diagnostic Test		(Page 1 of 2)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City	Zip Code

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

B. Duct Leakage Diagnostic Test - MCH-20c - Low Leakage Air-Handling Unit (LLAHU)		
01	Condenser Nominal Cooling Capacity (ton)	
02	Heating Capacity (kBtu/h)	
03	Conditioned Floor Area Served by this HVAC System (ft2)	
04	Duct Leakage Test Conditions	
05	Duct Leakage Test Method?	
06	LeakageFactor ( )	
07	Air-Handling Unit Airflow (AHUAirflow) Determination Method	
08	Measured AHUAirflow (cfm)	
09	Calculated Target Allowable Duct Leakage Rate (cfm)	
10	Actual duct leakage rate from leakage test measurement (cfm)	
11	Air-Handling Unit Manufacturer Name	
12	Air-Handling Unit Model Number	
Compliance statement:		

C. ADDITIONAL REQUIREMENTS FOR COMPLIANCE		
The responsible persons signature on this document indicates the installation complies with the following requirements:		
01	**The Low Leakage Air-handling Unit Model identified on this compliance document is included in the list of certified Low Leakage Air-Handling Units published on the Energy Commission Website at:** http://www.energy.ca.gov/title24/2008standards/special_case_appliance/supplemental_listings/Low_Leakage_Air-Handling_Unit_Listing_2012-10-30.pdf (provide updated link).	
02	System was tested in its normal operation condition. No temporary taping allowed.	
03	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.	
04	All supply and return register boots were sealed to the drywall.	
05	Building cavities were not used as plenums or platform returns in lieu of ducts.	
06	If cloth backed tape was used it was covered with Mastic and draw bands.	
07	All connection points between the air handler and the supply and return plenums are completely sealed.	
08	Verification Status	
If Verification Status for this table indicates "Fail", the reason shall be described in the correction notes for this table.		
Correction Notes for this table:		
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.		

CERTIFICATE OF VERIFICATION		CF3R-MCH-20-H
Duct Leakage Diagnostic Test		(Page 2 of 2)
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:

A. System Information

01. *HVAC System Identification or Name*: Same data given on CF2R-MCH-20; provides an identification name or tag name that uniquely identifies the duct system. If there is a mechanical plan for the system, the tag name may be given on the plans.
02. *HVAC System Location or Area Served*: Same data given on CF2R-MCH-20; provides a brief description of the area served by the duct system (e.g. upstairs; downstairs).
03. *Building Type*: Same data given on CF2R-MCH-20.
04. *Verified Low Leakage Ducts in Conditioned Space (VLLDCS)*: Same data given on CF2R-MCH-20; Details whether or not VLLDCS is required per CF1R.
05. *Verified Low Leakage Air-handling Unit (VLLAHU)*: Same data given on CF2R-MCH-20; Details whether or not VLLAHU is required per CF1R.
06. *Duct System Compliance Category*: Same data given on CF2R-MCH-20

B. Duct Leakage Diagnostic Test - MCH-20c - Low Leakage Air-Handling Unit (LLAHU)

01. *Condenser Nominal Cooling Capacity (ton)*: Enter the condenser nominal cooling capacity in tons, data may be found on the manufacturer documentation.
02. *Heating Capacity (kBtu/h)*: Enter the heating capacity in kBtu/h, data may be found on the manufacturer documentation.
03. *Conditioned Floor Area Served by this HVAC System (ft2)*: User will input CFA for zone which should be consistent with the value from the CF2R-MCH-20. User will have the option to leave this field blank because the zone CFA is only required for the default airflow calculation.
04. *Duct Leakage Test Conditions*: Same data given on CF2R-MCH-20.
05. *Duct Leakage Test Method*: Same data given on CF2R-MCH-20.
06. *Leakage Factor*: Same data given on CF2R-MCH-20.
07. *Air-Handling Unit Airflow (AHUAirflow) Determination Method*: Same data given on CF2R-MCH-20.
08. *Measured AHUAirflow (cfm)*: If "Measured Airflow Method" is selected in row B07, user must input measured airflow.
09. *Calculated Target Allowable Duct Leakage Rate (cfm)*: This value will be automatically populated depending on values in B06, B07, and B08.
10. *Actual Duct Leakage Rate from Leakage Test Measurement (cfm)*: User will input this value from actual measurements from leakage test.
11. *Air-Handling Unit Manufacturer Name*: Enter the manufacturer name of the air handling unit installed.
12. *Air-Handling Unit Model Number*: Enter the model number of the air handling unit installed.
13. *Compliance Statement*: If Actual Duct Leakage Rate from leakage test (B10) is less than or equal to Calculated Target Allowable Duct Leakage Rate (B09), "System passes leakage test" will automatically populate. If not, "System fails leakage test will automatically populate.
14. *Notes:* If the installed cooling or heating capacities or CFA of the area served by the HVAC system does not match the Installation Certificate, then a note indicating the discrepancy will be displayed. Also, if the manufacturer name or model number of the air handling unit does not match the Installation Certificate, then a note indicating the discrepancy will be displayed.

C. Additional Requirements for Compliance

08. HERS Rater to select from list:
    a. Pass - all applicable requirements are met.
    b. Fail - one or more applicable requirements are not met. Rater must enter reason for failure in corrections notes field below.

Correction Notes, Rater must enter reason for failure.

STATE OF CALIFORNIA

DUCT LEAKAGE DIAGNOSTIC TEST

CEC-CF3R-MCH-20-H (Revised 06/13) CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF VERIFICATION		CF3R-MCH-20-H
Duct Leakage Diagnostic Test		(Page 1 of 2)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City	Zip Code

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

B. Duct Leakage Diagnostic Test - MCH-20d - Complete Replacement or Altered Duct System		
01	Condenser Nominal Cooling Capacity (ton)	
02	Heating Capacity (kBtu/h)	
03	Conditioned Floor Area Served by this HVAC System (ft2)	
04	Duct Leakage Test Conditions	
05	Duct Leakage Test Method?	
06	LeakageFactor ( )	
07	Air-Handler Unit Airflow (AHUAirflow) Determination Method	
08	Measured AHUAirflow (cfm)	
09	Calculated Target Allowable Duct Leakage Rate (cfm)	
10	Actual duct leakage rate from leakage test measurement (cfm)	
Compliance statement:		

C. ADDITIONAL REQUIREMENTS FOR COMPLIANCE	
The responsible persons signature on this document indicates the installation complies with the following requirements:	
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 smoke test shall not be included in sample groups for HERS verification.
08	Verification Status
If Verification Status for this table indicates "Fail", the reason shall be described in the correction notes for this table.	
Correction Notes for this table:	
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.	

CERTIFICATE OF VERIFICATION		CF3R-MCH-20-H
Duct Leakage Diagnostic Test		(Page 2 of 2)
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:

CF-3R-MCH-20-HERS Instructions

A. System Information

01. *HVAC System Identification or Name*: Same data given on CF2R-MCH-20; provides an identification name or tag name that uniquely identifies the duct system. If there is a mechanical plan for the system, the tag name may be given on the plans.
02. *HVAC System Location or Area Served*: Same data given on CF2R-MCH-20; provides a brief description of the area served by the duct system (e.g. upstairs; downstairs).
03. *Building Type*: Same data given on CF2R-MCH-20.
04. *Verified Low Leakage Ducts in Conditioned Space (VLLDCS)*: Same data given on CF2R-MCH-20; Details whether or not VLLDCS is required per CF1R.
05. *Verified Low Leakage Air-handling Unit (VLLAHU)*: Same data given on CF2R-MCH-20; Details whether or not VLLAHU is required per CF1R.
06. *Duct System Compliance Category*: Same data given on CF2R-MCH-20

B. Duct Leakage Diagnostic Test - MCH-20d - Complete Replacement or Altered Duct System

01. *Condenser Nominal Cooling Capacity (ton)*: Enter the installed condenser nominal cooling capacity in tons.
02. *Heating Capacity (kBtu/h)*: Enter the installed heating capacity in kBtu/h.
03. *Conditioned Floor Area Served by this HVAC System(ft^2)*: User must input CFA for the space. Should be consistent with the data given on CF2R-MCH-20.
04. *Duct Leakage Test Conditions*: Same data given on CF2R-MCH-20.
05. *Duct Leakage Test Method*: Same data given on CF2R-MCH-20.
06. *Leakage Factor*: Same data given on CF2R-MCH-20.
07. *Air-Handling Unit Airflow (AHUAirflow) Determination Method*: Same data given on CF2R-MCH-20.
08. *Measured AHU Airflow (CFM)*: If "Measured Airflow Method" is selected in row B07, user must input measured airflow.
09. *Calculated Target Allowable Duct Leakage Rate (cfm)*: This value will be automatically populated depending on values in B6, B7, and B8.
10. *Actual Duct Leakage Rate from Leakage Test Measurement (cfm)*: User will input this value from actual measurements from leakage test.
11. *Compliance Statement*: If Actual Duct Leakage Rate from leakage test (B10) is less than or equal to Calculated Target Allowable Duct Leakage Rate, "System passes leakage test" will automatically populate. If not, "System fails leakage test" will automatically populate.
12. *Notes*: If the installed cooling or heating capacities or CFA of the area served by the HVAC system does not match the Installation Certificate, then a note indicating the discrepancy will be displayed.

C. Additional Requirements for Compliance

08. HERS Rater to select from list:

a. Pass - all applicable requirements are met.
b. Fail - one or more applicable requirements are not met. Rater must enter reason for failure in corrections notes field below.

Correction Notes, Rater must enter reason for failure.

STATE OF CALIFORNIA

DUCT LEAKAGE DIAGNOSTIC TEST

CEC-CF3R-MCH-20-H (Revised 06/13) CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF VERIFICATION		CF3R-MCH-20-H
Duct Leakage Diagnostic Test		(Page 1 of 2)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City	Zip Code

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

B. Duct Leakage Diagnostic Test - MCH-20e - Sealing All Accessible Leaks using Smoke Test		
01	Condenser Nominal Cooling Capacity (ton)	
02	Heating Capacity (kBtu/h)	
03	Conditioned Floor Area Served by this HVAC System (ft2)	
04	Duct Leakage Test Conditions	
05	Duct Leakage Test Method	
06	LeakageFactor ( )	
07	Air-Handling Unit Airflow (AHUAirflow) Determination Method	
08	Measured AHUAirflow (cfm)	
09	Calculated Target Allowable Duct Leakage Rate (cfm)	
10	Actual duct leakage rate from leakage test measurement (cfm)	
Compliance statement:		

C. ADDITIONAL REQUIREMENTS FOR COMPLIANCE	
The responsible persons signature on this document indicates the installation complies with the following requirements:	
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 smoke test shall not be included in sample groups for HERS verification.
08	Verification Status
If Verification Status for this table indicates "Fail", the reason shall be described in the correction notes for this table.	
Correction Notes for this table:	
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met..	

CERTIFICATE OF VERIFICATION		CF3R-MCH-20-H
Duct Leakage Diagnostic Test		(Page 2 of 2)
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:

CF3R-MCH-20-HERS Instructions

A. System Information

01. *HVAC System Identification or Name*: Same data given on CF2R-MCH-20; provides an identification name or tag name that uniquely identifies the duct system. If there is a mechanical plan for the system, the tag name may be given on the plans.
02. *HVAC System Location or Area Served*: Same data given on CF2R-MCH-20; provides a brief description of the area served by the duct system (e.g. upstairs; downstairs).
03. *Building Type*: Same data given on CF2R-MCH-20.
04. *Verified Low Leakage Ducts in Conditioned Space (VLLDCS)*: Same data given on CF2R-MCH-20; Details whether or not VLLDCS is required per CF1R.
05. *Verified Low Leakage Air-handling Unit (VLLAHU)*: Same data given on CF2R-MCH-20; Details whether or not VLLAHU is required per CF1R.
06. *Duct System Compliance Category*: Same data given on CF2R-MCH-20

B. Duct Leakage Diagnostic Test - MCH-20e - Sealing All Accessible Leaks using Smoke Test

01. *Condenser Nominal Cooling Capacity (ton)*: Enter the installed condenser nominal cooling capacity in tons.
02. *Heating Capacity (kBtu/h)*: Enter the installed heating capacity in kBtu/h.
03. *Conditioned Floor Area Served by this HVAC System(ft^2)*: User must input CFA for the space. Should be consistent with the data given on CF2R-MCH-20.
04. *Duct Leakage Test Conditions*: Same data given on CF2R-MCH-20.
05. *Duct Leakage Test Method*: Same data given on CF2R-MCH-20.
06. *Leakage Factor*: Same data given on CF2R-MCH-20.
07. *Air-Handling Unit Airflow (AHUAirflow) Determination Method*: Same data given on CF2R-MCH-20.
08. *Measured AHU Airflow (CFM)*: If "Measured Airflow Method" is selected in row B07, user must input measured airflow.
09. *Calculated Target Allowable Duct Leakage Rate (cfm)*: This value will be automatically populated depending on values in B6, B7, and B8.
10. *Actual Duct Leakage Rate from Leakage Test Measurement (cfm)*: User will input this value from actual measurements from leakage test.
11. *Compliance Statement*: If Actual Duct Leakage Rate from leakage test (B10) is less than or equal to Calculated Target Allowable Duct Leakage Rate, "System passes leakage test" will automatically populate. If not, "System fails leakage test" will automatically populate.
12. *Notes*: If the installed cooling or heating capacities or CFA of the area served by the HVAC system does not match the Installation Certificate, then a note indicating the discrepancy will be displayed.

C. Additional Requirements for Compliance

08. HERS Rater to select from list:

a. Pass - all applicable requirements are met.
b. Fail - one or more applicable requirements are not met. Rater must enter reason for failure in corrections notes field below.

Correction Notes, Rater must enter reason for failure.

CERTIFICATE OF INSTALLATION		CF3R-MCH-21-H
Duct Location		(Page 1 of 2)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City	Zip Code

A. General Information

Note: Submit one Installation Certificate for each duct system that is taking credit for duct location.

01	SC System Identification or Name	
02	SC System Location or Area Served	
03	Status - Less than 12 ft Ducts in Conditioned Space Performance Credit:	
04	Status - Ducts Located In Conditioned Space Performance Credit:	
05	Status – All Ducts Entirely in Directly Conditioned Space R-value Exception	

B. 12 Linear Feet or Less of Supply Duct Located Outside of Conditioned Space - RA3.1.4.1.2		
01	A visual inspection shall confirm space conditioning systems with air handlers located outside the conditioned space have 12 linear feet or less of duct located outside the conditioned space including air handler and plenum.	
02	Verification Status:	
03	Correction Notes:	
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.		

C. Ducts Located In Conditioned Space - RA3.1.4.1.3		
01	A visual inspection shall confirm the space conditioning system is located entirely in conditioned space.	
02	Verification Status:	
03	Correction Notes:	
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.		

D. All Ducts Located Entirely in Directly Conditioned Space R-Value Exception - RA3.1.4.3.8		
01	A visual inspection shall confirm the space conditioning system location:	
02	Actual system duct leakage rate (cfm) measured using RA3.1.4.3.4 Duct Leakage to Outside from Fan Pressurization of Ducts	
03	Compliance Statement:	
04	Verification Status:	
05	Correction Notes:	
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.		

CERTIFICATE OF INSTALLATION	CF3R-MCH-21-H
Duct Location	(Page 2 of 2)

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:

Section A. General Information

01. *SC System Identification or Name:* Same date given on MCH-01, provides an identification name or tag name that uniquely identifies the duct system. If there is a mechanical plan for the system, the tag name may be given on the plans.
02. *SC System Location or Area Served:* Same data given on MCH-01, provides a brief description of the area served by the duct system (e.g. upstairs, downstairs).
03. *Status – Less than 12 ft Ducts in Conditioned Space Performance Credit:* This field is automatically filled based on the information given on the CF1R.
04. *Status – Ducts Located in Conditioned Space Performance Credit:* This field is automatically filled based on the information given on the CF1R.
05. *Status – All Ducts Located Entirely in Directly Conditioned Space R-Value Exception:* This field is automatically filled based on the information given on the CF1R.

<<This table is only shown if 12 Linear Feet or Less is selected in A.03>>

Section B. 12 Linear Feet or Less of Supply Duct Located Outside of Conditioned Space

01. This field is automatically filled.
02. *Verification Status:* Select one of the following from the list provided, "Pass", "Fail" or "All n/a".
03. This field is automatically filled.

<<This table is only shown if Ducts in Conditioned Space is selected in A.03>>

Section C. Ducts Located in Conditioned Space

01. This field is automatically filled.
02. *Verification Status:* Select one of the following from the list provided, "Pass", "Fail" or "All n/a".
03. This field is automatically filled.

<<This table is only shown if Duct Entirely in Directly Conditioned Space is selected in A.03>>

Section D. All Ducts Located Entirely in Directly Conditioned Space R-Value Exception

01. *A Visual Inspection Shall Confirm the Space Conditioning System Location:* Select from the list one of the following "entirely in conditioned space" or "Not entirely in conditioned space".
02. *Actual System Duct Leakage Rate (cfm) Measured using RA3.1.4.3.4 Duct Leakage to Outside from Fan Pressurization of Ducts:* Enter the measured duct leakage rate (cfm) using the procedures found in RA3.1.4.3.4.
03. *Compliance Statement:* This field is automatically filled.
04. *Verification Status:* Select one of the following from the list provided, "Pass", "Fail".
05. This field is automatically filled.

STATE OF CALIFORNIA

FAN EFFICACY (FAN WATT DRAW)

CEC-CF3R-MCH-22-H (Revised 06/13) CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF INSTALLATION		CF3R-MCH-22-H
Fan Efficacy (Fan Watt Draw)		(Page 1 of 2)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City	Zip Code

A. System Information

Each system requiring verification must use a separate form.

01	System Name or Identification/Tag	
02	System Location or Area Served	

B. Fan Watt Draw Measurement

When the Certificate of Compliance indicates Fan Watt Draw verification is required, the procedures must be performed as specified in RA3.3. This measure requires verification by a HERS rater.

01	Fan Watt Draw Verification Method		
02	Actual Tested Watt	**Watts**	
03	Actual Tested Airflow from MECH-23	**CFM**	
04	Required Fan Efficiency	**Watts/CFM**	
05	Actual Fan Efficiency	**Watts/CFM**	
Compliance Statement:			

C. ADDITIONAL REQUIREMENTS FOR COMPLIANCE

01	All registers were fully open.	
02	System fan was set at maximum speed.	
03	If fresh air duct is part of the HVAC system it was not closed.	
04	Airflow and fan watt draw requires simultaneous measurements to calculate tested values.	
05	Multi-speed compressor systems or variable speed compressor systems verified air flow (cfm/ton) and fan efficacy (Watt/cfm) for system operation in cooling mode at the maximum compressor speed and the maximum air handler fan speed.	
06	Zoned air distribution systems met both the airflow (cfm/ton) and fan efficacy (Watt/cfm) criteria in every zonal control mode.	
07	Zoned air distribution systems that have multi-speed compressor systems or variable speed compressor systems shall only be required to verify air flow (cfm/ton) and fan efficacy (Watt/cfm) for system operation in cooling mode at maximum compressor capacity and maximum system fan speed and with all zones calling for conditioning.	
08	Verification Status:	
09	Correction Notes:	
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.		

CERTIFICATE OF INSTALLATION		CF3R-MCH-22-H
Fan Efficacy (Fan Watt Draw)		(Page 2 of 2)
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):	

User Instructions for Completing the MECH 22:

System Information

1. System Name or Identification/Tag – Imported from the MECH-01 or entered manually; provide an identification name or tag name that uniquely identifies the duct system. If there is a mechanical plan for the system, the tag name may be given on the plans.
2. System Location or Area Served - Imported from the MECH-01 or entered manually; provide a brief description of the area served by the duct system (e.g. upstairs; downstairs).

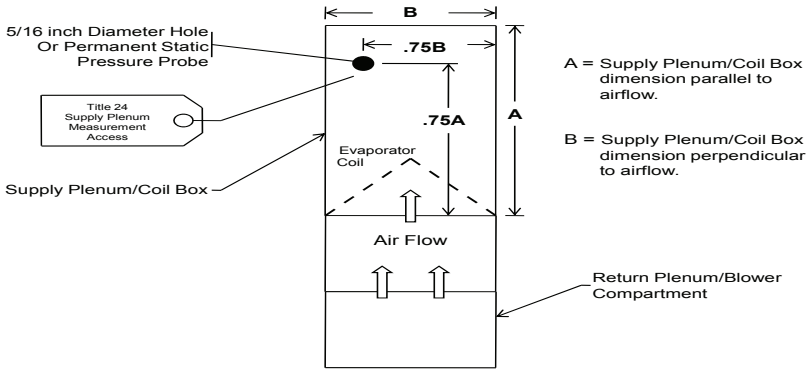
Fan Watt Draw Measurement

3. Select or Enter Fan Watt verification method from the following:
   A. Portable Watt Meter Measurement according to the procedures in RA3.3.3.2.1
   B. Utility Revenue Meter Measurement according to the procedures in RA3.3.3.2.2
   C. Digital Utility Revenue Meter Measurement according to the procedures in RA3.3.3.3.
4. Enter the Actual Tested Watts using the method picked in #6.
5. Actual Tested Airflow (CFM) from the MECH 23(Auto filled from MECH 23).
6. Required Fan Efficiency – Imported from the CF1R or manually entered (0.58 Watts/CFM or lower)
7. Actual Fan Efficiency = Actual Tested Watts (from #7 above) / Actual Tested Airflow (from #8 above) – Calculated value auto filled into form.
8. Compliance Statement auto filled:
   A. If #10 is less than or equal to #9 = **Pass –** The system's fan watt draw meets the requirements of the design
   B. If #10 is greater than #9 = **Fail –** The system's fan watt draw does not meets the requirements of the design

Installer Certifies the Following for Fan Watt Draw

9. Compliance Statement auto filled based on the yes/no answer:
   A. If the yes box is checked = **Passes –** By checking the yes box the installer certifies that the requirements in the above box have been met.
   B. If the no box is checked = **Fails –** By checking the no box the installer certifies that the requirements in the above box have not been met.

Figure RA3.3-1.



Additional Requirements

HERS Rater to select from list:

a. Pass - all applicable requirements are met.
b. Fail - one or more applicable requirements are not met. Rater must enter reason for failure in corrections notes field below.

Correction Notes, Rater must enter reason for failure.

STATE OF CALIFORNIA

SPACE CONDITIONING SYSTEM AIRFLOW RATE

CEC-CF3R-MCH-23-H (Revised 06/13) ALIFORNIA ENERGY COMMISSION

CERTIFICATE OF INSTALLATION		CF3R-MCH-23-H
Space Conditioning System Airflow Rate		(Page 1 of 2)
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	Nominal Cooling Capacity (tons) of Condenser	
04	System Installation Type	
05	Cooling System Zonal Control Type	
06	Bypass Duct Status	
07	Required Minimum System Airflow Rate (cfm)	
08	Allowable Minimum Zonal Airflow Rate (cfm)	
09	Date of System Airflow Rate Measurement	
10	Type of System Airflow Rate Compliance	

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 ae 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.	
03	Manufacturer of Airflow Measurement Apparatus	
04	Model number of Airflow Measurement Apparatus	
05	Certification Status of the Airflow Measurement Apparatus Accuracy	
06	determine compliance method for this document; display applicable tables below	

MCH-23a Forced Air System Airflow Rate Measurement - Single Zone Systems or Zonally Controlled Systems with All Zones Calling

D. Forced Air System Airflow Rate Measurement The procedures for System Airflow Rate Verification are specified in Reference Residential Appendix RA3.3.		
01	Target System Airflow Rate (cfm)	
02	Actual System Airflow Rate Measurement (cfm)	
Compliance Statement:		

E. 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 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	Verification Status:	
04	Correction Notes:	
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.		

CERTIFICATE OF INSTALLATION	CF3R-MCH-23-H
Space Conditioning System Airflow Rate	(Page 2 of 2)

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):	

User Instructions for Completing the MECH 23:

System Information

1. System Name or Identification/Tag – Imported from the MECH-01 or entered manually; provide an identification name or tag name that uniquely identifies the duct system. If there is a mechanical plan for the system, the tag name may be given on the plans.
2. System Location or Area Served - Imported from the MECH-01 or entered manually; provide a brief description of the area served by the duct system (e.g. upstairs; downstairs).

HSPP or PSPP Verification

3. Select from the following options using a dropdown box, the Static Pressure Measurement Method:
   A. HSPP – Hole Static Pressure Probe
   B. PSPP – Permanente Static Pressure Probe
   C. Alternate Location – alternate location that provides access for making supply plenum pressure measurement
4. Requirements auto filled based on the user selection from #3:
   A. If A picked in #3 then:
      a. For HSPP a 5/16 inch (8 mm) hole was drilled and placed per Figure RA3.3-1.
      b. The hole has been labeled stating “Title 24 Supply Plenum Measurement Access" in at least 12-point font.
   B. If B picked in #3 then:
      a. For PSPP a permanently installed pressure probe was installed per Figure RA3.3-1.
      b. The probe has been labeled stating “Title 24 Supply Plenum Measurement Access" in at least 12-point font.
   C. If C picked in #3 then:
      a. For Alternate Locations the system must be in an existing building.
      b. Certify that the hole cannot conform to the specifications per Figure RA3.3-1
      c. A 5/16 inch (8 mm) hole was drilled in an alternate location that provides access for making an accurate supply plenum pressure measurement.
      d. Confirm that the hole has been labeled stating “Title 24 Supply Plenum Measurement Access" in at least 12-point font.
5. Compliance Statement auto filled based on the yes/no answer to #5:
   A. If the yes box is checked = **Passes –** The installer certifies that the installation meets the requirements outlined in #4 above
   B. If the no box is checked = **Fails –** The installer certifies that the installation doesn’t meet the requirements outlined in #4 above

Verified System Airflow

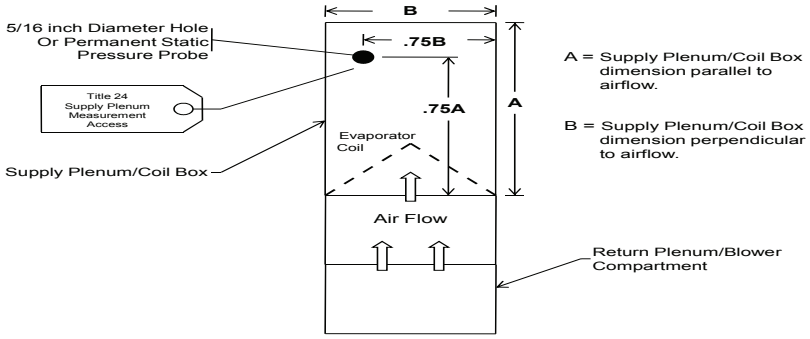
6. Select from the following options for the method used to determine actual fan air flow:
   A. Diagnostic Fan Flow Using Plenum Pressure Matching according to the procedures in RA3.3.3.1.1
   B. Diagnostic Fan Flow Using Flow Grid Measurement according to the procedures in RA3.3.3.1.2
   C. Diagnostic 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
7. Installed Outdoor Condenser Capacity (Tons) – Imported from the MECH-01 or manually entered.
8. Required Airflow per Ton (CFM/Ton) – For new construction look at the CF1R and determine if a required airflow is listed. Use this value. If nothing is listed then enter (350 CFM/Ton).
9. Required Minimum System Airflow = Tons (from #7 above) X CFM/Ton (from #8 above) – Calculated value auto filled into form.
10. Actual Tested Airflow (User input number from field test) = CFM.
11. Compliance Statement auto filled based comparison between #10 (Tested CFM) and #9 (Requited CFM):
    A. If #10 is equal to or greater than #9 = **Pass –** The system’s airflow meets the requirements of the design**.**
    B. If #10 is less than #9 = **Fail –** The system’s airflow does not meet the requirements of the design.

Installer Certifies the Following for Verified System Airflow

12. Compliance Statement auto filled based on the yes/no answer to #12:

A. If the yes box is checked = **Passes –** By checking the yes box the installer certifies that the requirements in the above box have been met.
B. If the no box is checked = **Fails –** By checking the no box the installer certifies that the requirements in the above box have not been met.

Figure RA3.3-1.



Additional Requirements

3. HERS Rater to select from list:
   a. Pass - all applicable requirements are met.
   b. Fail - one or more applicable requirements are not met. Rater must enter reason for failure in corrections notes field below.
   c. All n/a - This entire table is not applicable.
4. Correction Notes, Rater must enter reason for failure.

STATE OF CALIFORNIA

REFRIGERANT CHARGE VERIFICATION

CEC-CF3R-MCH-25-H (Revised 06/13) CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF VERIFICATION		CF3R-MCH-25
Refrigerant Charge Verification		(Page 1 of 3)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City	Zip Code

A. System Information **HERS Rater to field-verify all system information, discrepancies to be noted by overwriting entry.**		
01	System Identification or Name	
02	System Location or Area Served	
03	Condenser (or package unit) make or brand	
04	Condenser (or package unit) model number	
05	Nominal Cooling Capacity (tons) of Condenser	
06	Condenser (or package unit) serial number	
07	Refrigerant Type	
08	Other Refrigerant Type (if applicable)	
09	Project Type	
10	Charge Indicator Display (CID) Status (Note: Even systems with a CID must have refrigerant charge verified by installer)	
11	Is the system of a type that the minimum airflow can be verified using an approved measurement procedure (RA3.3 or RA3.2.2.7)?	
12	Is the system of a type that approved refrigerant charge verification procedures can be used to verify compliance with the refrigerant charge verification requirements when temperatures are ≥ 55°F (RA3.2.2, or RA1)?	
13	Date of HERS Rater Refrigerant Charge Verification for this system	
14	Refrigerant charge verification method used by installer.	
15	Person who performed the Refrigerant Charge Verification reported on the Certificate of Installation:	
16	HERS Verification Compliance Requirement Status	
17	Refrigerant charge verification method used by HERS Rater.	

Standard Charge Verification Procedure – CF3R-MCH-25a - Superheat Method

B. Metering Device Verification – HERS Rater is required to visually field verify all information from CF2R Superheat Method can only be used on systems that do not have a variable metering device.		
01	Refrigerant metering device	
02	Superheat Method applicability status	

C. Instrument Calibration – HERS Raters are required to calibrate their diagnostic tools. Procedures for instrument calibration are given in Reference Residential Appendix RA3.2.2 and RA3.2.2.2		
01	Date of Digital Refrigerant Gauge Calibration	
02	Date of Digital Thermocouple Calibration	
03	Digital Refrigerant Gauge Calibration Status	
04	Digital Thermocouple Calibration Status	

D. Measurement Access Hole (MAH) Verification – HERS Raters are required to visually field verify MAH *Procedures for installing MAH are specified in Reference Residential Appendix RA3.2.2.3*		
01	Method used to demonstrate compliance with the Measurement Access Hole (MAH) requirement	

CERTIFICATE OF VERIFICATION		CF3R-MCH-25
Refrigerant Charge Verification		(Page 2 of 3)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City	Zip Code

E. Minimum System Airflow Rate Verification
Procedures for verifying minimum system airflow are specified in Reference Residential Appendix RA3.2.2.7.

01	Minimum Required System Airflow Rate (cfm)	
02	System Airflow Rate Verification Status	

F. Data Collection – HERS Rater must independently collect all data in this section.
Procedures for determining Refrigerant Charge using the Standard Charge Verification Procedure are given in Reference Residential Appendix RA3.2.2 and RA3.2.2.2

01	Lowest return air dry bulb temperature that occurred during the refrigerant charge verification procedure (degreeF)	
02	Measured Condenser air entering dry-bulb temperature ($T_{condenser, db}$) (degreeF)	
03	Outdoor Temperature Qualification Status	
04	Measured Return (evaporator entering) air dry-bulb temperature ($T_{return, db}$) (degreeF)	
05	Measured Return (evaporator entering) air wet-bulb temperature ($T_{return, wb}$) (degreeF)	
06	Measured Suction line temperature ($T_{suction}$) (degreeF)	
07	Measured Suction line pressure ($P_{suction}$ - psig)	
08	Evaporator saturation temperature ($T_{evaporator, sat}$) from digital gauge or P-T Table using Line F07 (degreeF)	
09	Measured Superheat (Line F06 – Line F08) (degreeF)	
10	Target Superheat (from Table RA3.2-2, using F02 and F05) (degreeF)	
11	Compliance Statement:	

REFRIGERANT CHARGE VERIFICATION

CERTIFICATE OF VERIFICATION		CF3R-MCH-25
Refrigerant Charge Verification		(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:

Instructions MCH-25a:

Section A. System Information

1. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
2. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25) If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
3. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
4. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25) If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
5. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
6. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25) If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
7. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25) If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
8. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). If "Other" is chosen in Row A07, then installer will indicate the type of refrigerant being used. If R-22 or R-410A is being used (regardless of trade name, Puron, Genetron, etc.) it should be indicated in Row A07, not here. This row is only for refrigerants other than R-22 and R-410a. Documentation of other refrigerants should be requested. If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
9. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). These are defined in detail the Residential Compliance Manual. If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
10. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). Installer is to select the appropriate choice regarding whether this system has a Charge Indicator Display (CID). Qualifying CID's may exempt a system from HERS refrigerant charge verification. CID's are described in Joint Appendix JA6.1. Qualfying CID's must appear on a list of approved devices kept by the Commission. If installed system does not match the description here, it fails.
11. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). Most ducted split systems and package systems are of the type that minimum airflow can be verified using an approved measurement procedure. Examples of systems that do not meet this description are ductless systems. Selecting "No" here may subject the project to additional scrutiny by enforcement personnel.
12. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25) Most ducted split systems and package systems are of the type that approved refrigerant charge verification procedures detailed in Residential Appendix RA3.2.2 or RA1 can be used (i.e., Standard Charge Verification or Winter Setup Verification procedures). Examples of systems that may not meet this description are "mini splits" or variable refrigerant flow systems that may only be charged using weigh-in procedures. Selecting "No" here may subject the project to additional scrutiny.
13. HERS rater to input date of refrigerant charge verification.
14. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). The installer is to have select the refrigerant charge verification method used from the choices provided:
    - Superheat (outdoor temperature must be ≥ 55 degF); This verification method can only be used when the outdoor temperature is at or above 55 degF. It is only used on systems with fixed orifice refrigerant metering devices (non-variable metering devices). This method is detailed in Reference Appendix RA3.2.2.6.1. Systems verified using this method may be eligible for HERS verification compliance using sampling. Choosing this option will generate a CF2R-MCH-25a.
    - Subcooling (outdoor temperature must be ≥ 55 degF); This verification method can only be used when the outdoor temperature is at or above 55 degF. It is only used on systems with variable metering devices (TXV or EXV). This method is detailed in Reference Appendix RA3.2.2.6.2. Systems verified using this method may be eligible for HERS verification compliance using sampling. Choosing this option will generate a CF2R-MCH-25b.
    - Weigh-in; This verification method can be used at any outdoor temperature allowed by the equipment manufacturer. This method is detailed in Reference Appendix RA3.2.3. Systems verified using this method are NOT eligible for HERS verification compliance using Group Sampling. Choosing this option will generate a CF2R-MCH-25c.
    - Winter Setup (applicable when outdoor temperature is < 55 degF); The Winter Setup verification method is a special version of the Subcooling method. It can be used when the outdoor temperature is between 37 and 55 degF. It can only be used on equipment where the manufacturer has specifically approved it for the equipment being tested. The Winter Setup procedure is details in Residential Appendix RA1.2. Choosing this option will generate a CF2R-MCH-25e.
    - New Package Unit Factory Charge; Choose this option when a new package unit is being installed that has an AHRI rating. This helps ensure that the unit was properly charged at the factory. HERS verification of refrigerant charge may not be required in this case. Choosing this option will generate a CF2R-MCH-25f.

15. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). The installer (or rater) is to have identified who performed the verification that is documented on the Certificate of Installation. Note that HERS verification compliance by Group Sampling requires that the installer perform their own refrigerant charge verification as part of the installation of the equipment prior to the system being put into a sample group for possible selection by a HERS rater for verification. If Group Sampling is not intended, the HERS Rater may perform the refrigerant charge verification on behalf of the Installing Contractor (applies to any method but Weigh-In) and the Rater will enter same results on both the CF2R and CF3R.
16. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). The Group Sampling status is automatically displayed based on the input results of Row A14 and Row A15 on the CF2R. Group Sampling procedures are detailed Residential Appendix RA2.3.
17. Specify the refrigerant charge verification used by the rater. Choices vary depending on what method was specified in Row A14.

Section B. Metering Device Verification

1. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). Installer is to have selected the correct metering device used on the system being verified. This will check against the refrigerant charge verification method selected in Row A14. An error message will appear in Row B02 if the wrong verification method may has been selected. Superheat verification can only be used on systems with fixed orifice and Subcool verification can only be used on systems with variable metering devices (TXV or EXV). This entry must match installed system to pass.
2. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). Superheat verification can only be used on systems with fixed orifice and Subcool verification can only be used on systems with variable metering devices (TXV or EXV).

Section C. Instrument Calibration

1. Enter the date of most recent Digital Refrigerant Gauge Calibration Field Check by rater. Analog gauges are not allowed for verification purposes under the 2013 Standards. Specification for pressure gauges is found in Residential Appendix RA3.2.2.2.3. Procedures for the field check procedure are detailed in RA3.2.2.4.2. Calibration field check must happen at least once every 30 days.
2. Enter the date of the most recent Digital Thermocouple Calibration by rater. Specifications for thermocouples and temperature sensors can be found in Residential Appendix RA3.2.2.2.2. Procedures for calibration are detailed in RA3.2.2.4.1. Calibration must happen at least once every 30 days.
3. Digital Refrigerant Gauge Calibration status will appear automatically. If the date entered in Row C01 is more than 30 days prior to date of verification this row will indicate that calibration is required and you will not be allowed to continue filling out this document.
4. Digital Thermocouple Calibration status will appear automatically. If the date entered in Row C02 is more than 30 days prior to date of verification this row will indicate that calibration is required and you will not be allowed to continue filling out this document.

Section D. Measurement Access Hole (MAH) Verification

1. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). Installer is to have indicated the method used to demonstrate compliance with the MAH requirement by selecting the appropriate method from the drop down list. Procedures for installing MAH's are detailed in RA3.2.2.3. Selecting that the MAH cannot be installed consistent with Figure 3.2-1 may result in additional scrutiny by enforcement personnel.) If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.

Section E. Minimum System Airflow Rate Verification

1. This information is automatically calculated based on the information given in line A09. This is the target minimum system airflow required for the system being verified.
2. This information is automatically calculated based on either the CF3R-MCH-23, or CF3R-MCH-24, which documents the rater's measured airflow of the system being verified. If the measured airflow is not adequate it will not comply with the airflow requirements and refrigerant charge verification cannot be performed.

Section F. Superheat Charge Verification Method – Data Collection

1. The Rater must independently collect this data. Measure and record the lowest return air dry-bulb temperature that occurred during the refrigerant charge procedure in degrees F. This temperature must remain above 70 degF during the verification procedure. This requirement is detailed in Residential Appendix RA3.2.2.5.
2. The Rater must independently collect this data. Measure and record the condenser air dry-bulb temperature ($T_{condenser}$) in degrees F. This value is used to determine the target superheat from table RA3.2-2. This value must be at least 55 degF and no more than 115 degF to use the Superheat Charge Verification Method.
3. If a value less than 55 degF or greater than 115 degF is entered in Row F02 the Superheat Method cannot be used.

4. The Rater must independently collect this data. Measure and record the return air dry-bulb temperature ($T_{return,db}$) in degrees F. This measurement is taken at the MAH (or alternate location specified in Row F01. This procedure is detailed in RA3.2.2.5.
5. The Rater must independently collect this data. Measure and record the return air wet-bulb temperature ($T_{return,wb}$) in degrees F. This measurement is taken at the MAH (or alternate location specified in Row F01. This procedure is detailed in RA3.2.2.5. This value is used to determine the target superheat from table RA3.2-2.
6. The Rater must independently collect this data. Measure and record the suction line temperature ($T_{suction}$) in degrees F. This procedure is detailed in RA3.2.2.5. This value is used to calculate the measured superheat.
7. The Rater must independently report this data. This procedure is detailed in RA3.2.2.5. This value is used to determine the evaporator saturation temperature ($T_{evaporator,sat}$) from a pressure temperature chart for the appropriate refrigerant (can be internal to a digital gauge), which is entered into Row F08.
8. The Rater must independently collect this data. Enter the evaporator saturation temperature ($T_{evaporator,sat}$) from the digital gauge or a separate pressure-temperature chart that corresponds to the suction line pressure entered in Row F07, in degrees F.
9. Measured superheat is automatically calculated as the difference between the suction line temperature (Row F06) and the evaporator saturation temperature (Row F08)
10. The Rater must independently report this data. Enter target superheat from Table RA3.2-2. This table requires values for the condenser air dry bulb temperature (Row F02) and the return air wet bulb temperature (Row F05)
11. System passes superheat method when Row F10 is within plus or minus 8 degrees of Row F09.

STATE OF CALIFORNIA

REFRIGERANT CHARGE VERIFICATION

CEC-CF3R-MCH-25-H (Revised 06/13) CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF VERIFICATION		CF3R-MCH-25-H
Refrigerant Charge Verification		(Page 1 of 3)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City	Zip Code

A. System Information **HERS Rater to field-verify all system information, discrepancies to be noted by overwriting entry.**		
01	System Identification or Name	
02	System Location or Area Served	
03	Condenser (or package unit) make or brand	
04	Condenser (or package unit) model number	
05	Nominal Cooling Capacity (tons) of Condenser	
06	Condenser (or package unit) serial number	
07	Refrigerant Type	
08	Other Refrigerant Type (if applicable)	
09	Project Type	
10	Charge Indicator Display (CID) Status (Note: Even systems with a CID must have refrigerant charge verified by installer)	
11	Is the system of a type that the minimum airflow can be verified using an approved measurement procedure (RA3.3 or RA3.2.2.7)?	
12	Is the system of a type that approved refrigerant charge verification procedures can be used to verify compliance with the refrigerant charge verification requirements when temperatures are ≥ 55°F (RA3.2.2, or RA1)?	
13	Date of HERS Rater Refrigerant Charge Verification for this system	
14	Refrigerant charge verification method used by installer.	
15	Person who performed the Refrigerant Charge Verification reported on the Certificate of Installation:	
16	HERS Verification Compliance Requirement Status	
17	Refrigerant charge verification method used by HERS Rater.	

Standard Charge Verification Procedure - MCH25b - Subcooling Method

B. Metering Device Verification – HERS Rater is required to visually field verify all information from C2R **Subcooling Method can only be used on systems that have a variable metering device.**		
01	Refrigerant metering device	
02	Subcooling Method applicability status	

C. Instrument Calibration – HERS Raters are required to calibrate their diagnostic tools. Procedures for instrument calibration are given in Reference Residential Appendix RA3.2.2 and RA3.2.2.2		
01	Date of Digital Refrigerant Gauge Calibration	
02	Date of Digital Thermocouple Calibration	
03	Digital Refrigerant Gauge Calibration Status	
04	Digital Thermocouple Calibration Status	

D. Measurement Access Hole (MAH) Verification – HERS Raters are required to visually field verify MAH *Procedures for installing MAH are specified in Reference Residential Appendix RA3.2.2.3*		
01	Method used to demonstrate compliance with the Measurement Access Hole (MAH) requirement	

E. Minimum System Airflow Rate Verification **Procedures for verifying minimum system airflow are specified in Reference Residential Appendix RA3.2.2.7.**		
01	Minimum Required System Airflow Rate (cfm)	
02	System Airflow Rate Verification Status	

CERTIFICATE OF VERIFICATION		CF3R-MCH-25-H
Refrigerant Charge Verification		(Page 2 of 3)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City	Zip Code

F. Data Collection and Calculations – HERS Rater must independently collect all data in this section. Procedures for Refrigerant Charge using the Standard Charge Verification Procedure are given in Reference Residential Appendix RA3.2.2.		
01	Lowest return air dry bulb temperature that occurred during the refrigerant charge verification procedure (degreeF)	
02	Measured Condenser air entering dry-bulb temperature ($T_{condenser, db}$)	
03	Outdoor Temperature Qualification Status	
04	Measured Liquid Line Temperature (T_{liquid}) (degreeF)	
05	Measured Liquid Line Pressure (P_{liquid}) (psig)	
06	Condenser saturation temperature ($T_{condensor, sat}$) from digital gauge or P-T Table using Line F05 (degreeF)	
07	Measured Subcooling (Line F06 – Line F04) (degreeF)	
08	Target Subcooling from Manufacturer (degreeF)	
09	Compliance Statement:	

G. Metering Device Verification– HERS Rater must independently collect all data in this section. Procedures for the verification of proper metering device operation are specified in RA3.2.2.6.2		
01	Measured Suction line temperature ($T_{suction}$) (degreeF)	
02	Measured Suction line pressure ($P_{suction}$) (psig)	
03	Evaporator saturation temperature ($T_{evaporator, sat}$) from digital gauge or P-T Table using line G02 (degreeF)	
04	Measured Superheat (Line G01 – Line G03) (degreeF)	
05	Measured Superheat (Line G04) is between 3 and 26 deg F (inclusive)	
06	Measured Superheat (Line G04) is within manufacturer's specifications, if known.	
07	Compliance Statement:	

CERTIFICATE OF VERIFICATION		CF3R-MCH-25-H
Refrigerant Charge Verification		(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:

Instructions MCH-25b:

Section A. System Information

1. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
2. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25) If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
3. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
4. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25) If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
5. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
6. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25) If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
7. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25) If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
8. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). If "Other" is chosen in Row A07, then installer will indicate the type of refrigerant being used. If R-22 or R-410A is being used (regardless of trade name, Puron, Genetron, etc.) it should be indicated in Row A07, not here. This row is only for refrigerants other than R-22 and R-410a. Documentation of other refrigerants should be requested. If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
9. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). These are defined in detail the Residential Compliance Manual. If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
10. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). Installer is to select the appropriate choice regarding whether this system has a Charge Indicator Display (CID). Qualifying CID's may exempt a system from HERS refrigerant charge verification. CID's are described in Joint Appendix JA6.1. Qualfying CID's must appear on a list of approved devices kept by the Commission. If installed system does not match the description here, it fails.
11. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). Most ducted split systems and package systems are of the type that minimum airflow can be verified using an approved measurement procedure. Examples of systems that do not meet this description are ductless systems. Selecting "No" here may subject the project to additional scrutiny by enforcement personnel.
12. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25) Most ducted split systems and package systems are of the type that approved refrigerant charge verification procedures detailed in Residential Appendix RA3.2.2 or RA1 can be used (i.e., Standard Charge Verification or Winter Setup Verification procedures). Examples of systems that may not meet this description are "mini splits" or variable refrigerant flow systems that may only be charged using weigh-in procedures. Selecting "No" here may subject the project to additional scrutiny.
13. HERS rater to input date of refrigerant charge verification.
14. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). The installer is to have select the refrigerant charge verification method used from the choices provided:
    - Superheat (outdoor temperature must be ≥ 55 degF); This verification method can only be used when the outdoor temperature is at or above 55 degF. It is only used on systems with fixed orifice refrigerant metering devices (non-variable metering devices). This method is detailed in Reference Appendix RA3.2.2.6.1. Systems verified using this method may be eligible for HERS verification compliance using sampling. Choosing this option will generate a CF2R-MCH-25a.
    - Subcooling (outdoor temperature must be ≥ 55 degF); This verification method can only be used when the outdoor temperature is at or above 55 degF. It is only used on systems with variable metering devices (TXV or EXV). This method is detailed in Reference Appendix RA3.2.2.6.2. Systems verified using this method may be eligible for HERS verification compliance using sampling. Choosing this option will generate a CF2R-MCH-25b.
    - Weigh-in; This verification method can be used at any outdoor temperature allowed by the equipment manufacturer. This method is detailed in Reference Appendix RA3.2.3. Systems verified using this method are NOT eligible for HERS verification compliance using Group Sampling. Choosing this option will generate a CF2R-MCH-25c.
    - Winter Setup (applicable when outdoor temperature is < 55 degF); The Winter Setup verification method is a special version of the Subcooling method. It can be used when the outdoor temperature is between 37 and 55 degF. It can only be used on equipment where the manufacturer has specifically approved it for the equipment being tested. The Winter Setup procedure is details in Residential Appendix RA1.2. Choosing this option will generate a CF2R-MCH-25e.
    - New Package Unit Factory Charge; Choose this option when a new package unit is being installed that has an AHRI rating. This helps ensure that the unit was properly charged at the factory. HERS verification of refrigerant charge may not be required in this case. Choosing this option will generate a CF2R-MCH-25f.

15. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). The installer (or rater) is to have identified who performed the verification that is documented on the Certificate of Installation. Note that HERS verification compliance by Group Sampling requires that the installer perform their own refrigerant charge verification as part of the installation of the equipment prior to the system being put into a sample group for possible selection by a HERS rater for verification. If Group Sampling is not intended, the HERS Rater may perform the refrigerant charge verification on behalf of the Installing Contractor (applies to any method but Weigh-In) and the Rater will enter same results on both the CF2R and CF3R.
16. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). The Group Sampling status is automatically displayed based on the input results of Row A14 and Row A15 on the CF2R. Group Sampling procedures are detailed Residential Appendix RA2.3.
17. Specify the refrigerant charge verification used by the rater. Choices vary depending on what method was specified in Row A14.

Section B. Metering Device Verification

1. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). Installer is to have selected the correct metering device used on the system being verified. This will check against the refrigerant charge verification method selected in Row A14. An error message will appear in Row B02 if the wrong verification method may has been selected. Superheat verification can only be used on systems with fixed orifice and Subcool verification can only be used on systems with variable metering devices (TXV or EXV). This entry must match installed system to pass.
2. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). Superheat verification can only be used on systems with fixed orifice and Subcool verification can only be used on systems with variable metering devices (TXV or EXV).

Section C. Instrument Calibration

1. Enter the date of most recent Digital Refrigerant Gauge Calibration Field Check by rater. Analog gauges are not allowed for verification purposes under the 2013 Standards. Specification for pressure gauges is found in Residential Appendix RA3.2.2.2.3. Procedures for the field check procedure are detailed in RA3.2.2.4.2. Calibration field check must happen at least once every 30 days.
2. Enter the date of the most recent Digital Thermocouple Calibration by rater. Specifications for thermocouples and temperature sensors can be found in Residential Appendix RA3.2.2.2.2. Procedures for calibration are detailed in RA3.2.2.4.1. Calibration must happen at least once every 30 days.
3. Digital Refrigerant Gauge Calibration status will appear automatically. If the date entered in Row C01 is more than 30 days prior to date of verification this row will indicate that calibration is required and you will not be allowed to continue filling out this document.
4. Digital Thermocouple Calibration status will appear automatically. If the date entered in Row C02 is more than 30 days prior to date of verification this row will indicate that calibration is required and you will not be allowed to continue filling out this document.

Section D. Measurement Access Hole (MAH) Verification

1. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). Installer is to have indicated the method used to demonstrate compliance with the MAH requirement by selecting the appropriate method from the drop down list. Procedures for installing MAH's are detailed in RA3.2.2.3. Selecting that the MAH cannot be installed consistent with Figure 3.2-1 may result in additional scrutiny by enforcement personnel.) If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.

Section E. Minimum System Airflow Rate Verification

1. This information is automatically calculated based on the information given in line A09. This is the target minimum system airflow required for the system being verified.
2. This information is automatically calculated based on either the CF3R-MCH-23, or CF3R-MCH-24, which documents the rater's measured airflow of the system being verified. If the measured airflow is not adequate it will not comply with the airflow requirements and refrigerant charge verification cannot be performed.

Section F. Subcooling Charge Verification Method – Data Collection

1. The Rater must independently collect this data. Measure and record the lowest return air dry-bulb temperature that occurred during the refrigerant charge procedure in degrees F. This temperature must remain above 70 degF during the verification procedure. This requirement is detailed in Residential Appendix RA3.2.2.5.
2. The Rater must independently collect this data. Measure and record the condenser air dry-bulb temperature ($T_{condenser}$) in degrees F. This value must be at least 55 degF and no more than 115 degF to use the Subcooling Charge Verification Method.
3. If a value less than 55 degF or greater than 115 degF is entered in Row F02 the Subcooling Method cannot be used.
4. The Rater must independently collect this data. Measure and record the liquid line temperature (T_{liquid}) in degrees F. This procedure is detailed in RA3.2.2.5. This value is used to calculate the measured subcool temperature.

5. The Rater must independently collect this data. Measure and record the liquid line pressure (P_{liquid}) in psig. This procedure is detailed in RA3.2.2.5. This value is used to determine the condenser saturation temperature ($T_{condenser,sat}$) from a pressure temperature chart for the appropriate refrigerant (can be internal to a digital gauge), which is entered into Row F06.
6. Enter the condenser saturation temperature ($T_{condenser,sat}$) from the digital gauge or a separate pressure-temperature chart that corresponds to the liquid line pressure entered in Row F05, in degrees F.
7. Measured Subcooling is automatically calculated as the difference between the liquid line temperature (Row F04) and the condenser saturation temperature (Row F06)
8. The Rater must independently collect this data. Enter target subcooling from manufacturer. This may be a challenge to find for older equipment. Internet searches can sometimes result in archived equipment specifications for the equipment in question, or sometimes a very similar model. If the manufacturer's target cannot be found the Commission's Executive Director may provide additional guidance for compliance.
9. System passes Subcooling method when Row F08 is within plus or minus 5 degrees of Row F07.

Section G. Metering Device Verification

1. The Rater must independently collect this data. Measure and record the suction line temperature ($T_{suction}$) in degrees F. This procedure is detailed in RA3.2.2.5. This value is used to calculate the measured superheat.
2. The Rater must independently collect this data. Measure and record the suction line pressure ($P_{suction}$) in psig. This procedure is detailed in RA3.2.2.5. This value is used to determine the evaporator saturation temperature ($T_{evaporator,sat}$) from a pressure temperature chart for the appropriate refrigerant (can be internal to a digital gauge), which is entered into Row G03.
3. Enter the evaporator saturation temperature ($T_{evaporator,sat}$) from the digital gauge or a separate pressure-temperature chart that corresponds to the suction line pressure entered in Row G02, in degrees F.
4. Measured superheat is automatically calculated as the difference between the suction line temperature (Row G01) and the evaporator saturation temperature (Row G03)
5. There are two possible criteria for passing. If the manufacturer's specification is known it should be used, otherwise the CEC requirement is that the superheat be between 4 and 25 degF, inclusive. This row checks the CEC requirement.
6. If the manufacturer's target superheat for ensuring proper metering device operation is known, it supersedes the CEC requirement of being between 4 and 25 degF. If "Yes, documentation to be provided upon request." is selected, the installer should be prepared to provide documentation for the target values used.
7. There are two possible criteria for passing. If the manufacturer's specification is known it should be used, otherwise the CEC requirement is that the superheat be between 4 and 25 degF, inclusive. If "Yes, documentation to be provided upon request." is selected in Row G06, the installer should be prepared to provide documentation for the target values used.

CERTIFICATE OF VERIFICATION		CF3R-MCH-25-H
Refrigerant Charge Verification		(Page 1 of 2)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City	Zip Code

A. System Information **HERS Rater to field-verify all system information, discrepancies to be noted by overwriting entry.**		
01	System Identification or Name	
02	System Location or Area Served	
03	Condenser (or package unit) make or brand	
04	Condenser (or package unit) model number	
05	Nominal Cooling Capacity (tons) of Condenser	
06	Condenser (or package unit) serial number	
07	Refrigerant Type	
08	Other Refrigerant Type (if applicable)	
09	Project Type	
10	Charge Indicator Display (CID) Status (Note: systems with a CID must have refrigerant charge verified by installer)	
11	Is the system of a type that the minimum airflow can be verified using an approved measurement procedure (RA3.3 or RA3.2.2.7)?	
12	Is the system of a type that approved refrigerant charge verification procedures can be used to verify compliance with the refrigerant charge verification requirements when temperatures are ≥ 55°F (RA3.2.2, or RA1)?	
13	Date of HERS Rater Refrigerant Charge Verification for this system	
14	Refrigerant charge verification method used by installer.	
15	Person who performed the Refrigerant Charge Verification reported on the Certificate of Installation:	
16	HERS Verification Compliance Requirement Status	
17	Refrigerant charge verification method used by HERS Rater.	

Weigh In Charging Procedure HERS Rater Observation- MCH25c

B. Measurement Access Hole (MAH) Verification – HERS Raters are required to visually field verify MAH *Procedures for installing MAH are specified in Reference Residential Appendix RA3.2.2.3*		
01	Method used to demonstrate compliance with the Measurement Access Hole (MAH) requirement	

C. Minimum System Airflow Rate Verification **Procedures for verifying minimum system airflow are specified in Reference Residential Appendix RA3.2.2.7.**		
01	Minimum Required System Airflow Rate (cfm)	
02	System Airflow Rate Verification Status	

D. Weigh In Charge Procedure – HERS Rater Must Observe and Confirm All Data Collected Procedures for Refrigerant Charge using the Weigh-in Charging Procedure are given in Reference Residential Appendix RA3.2.2.2 and RA3.2.2.3		
01	Measured Condenser air entering dry-bulb temperature ($T_{condenser, db}$)	
02	Specify the method of weigh-in	
03	Manufacturer's Standard charge for condenser (lbs)	
04	Manufacturer's Standard liquid line length (ft)	
05	Manufacturer's Standard liquid line diameter (in)	
06	Manufacturer's Standard indoor coil size (tons)	

CERTIFICATE OF VERIFICATION		CF3R-MCH-25-H
Refrigerant Charge Verification		(Page 2 of 2)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City	Zip Code

07	Installed liquid line length (ft)	
08	Installed liquid line diameter (in)	
09	Installed indoor coil size (tons)	
10	Charge adjustment from manufacturer's specifications (ounces, positive = add, negative = remove)	
11	All brazing of refrigerant lines done with dry nitrogen in lines and evaporator coil	
12	Prior to introducing refrigerant, system is evacuated to 500 microns or less and, when isolated, has risen no more than 300 microns after 5 minutes.	
13	Weigh-in Charge Adjustment: If condenser is new with a factory pre-charge, the proper amount of refrigerant has been added or removed (line D10).	
14	Weigh-in Total Charge: If the condenser is not new or is new but does not have a factory pre-charge, the correct total charge has been introduced into the system (line D03 + Line D10)	

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:

Instructions MCH-25c:

Section A. System Information

1. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
2. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25) If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
3. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
4. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25) If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
5. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
6. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25) If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
7. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25) If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
8. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). If "Other" is chosen in Row A07, then installer will indicate the type of refrigerant being used. If R-22 or R-410A is being used (regardless of trade name, Puron, Genetron, etc.) it should be indicated in Row A07, not here. This row is only for refrigerants other than R-22 and R-410a. Documentation of other refrigerants should be requested. If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
9. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). These are defined in detail the Residential Compliance Manual. If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
10. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). Installer is to select the appropriate choice regarding whether this system has a Charge Indicator Display (CID). Qualifying CID's may exempt a system from HERS refrigerant charge verification. CID's are described in Joint Appendix JA6.1. Qualfying CID's must appear on a list of approved devices kept by the Commission. If installed system does not match the description here, it fails.
11. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). Most ducted split systems and package systems are of the type that minimum airflow can be verified using an approved measurement procedure. Examples of systems that do not meet this description are ductless systems. Selecting "No" here may subject the project to additional scrutiny by enforcement personnel.
12. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25) Most ducted split systems and package systems are of the type that approved refrigerant charge verification procedures detailed in Residential Appendix RA3.2.2 or RA1 can be used (i.e., Standard Charge Verification or Winter Setup Verification procedures). Examples of systems that may not meet this description are "mini splits" or variable refrigerant flow systems that may only be charged using weigh-in procedures. Selecting "No" here may subject the project to additional scrutiny.
13. HERS rater to input date of refrigerant charge verification.

14. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). The installer is to have select the refrigerant charge verification method used from the choices provided:
    - Superheat (outdoor temperature must be ≥ 55 degF); This verification method can only be used when the outdoor temperature is at or above 55 degF. It is only used on systems with fixed orifice refrigerant metering devices (non-variable metering devices). This method is detailed in Reference Appendix RA3.2.2.6.1. Systems verified using this method may be eligible for HERS verification compliance using sampling. Choosing this option will generate a CF2R-MCH-25a.
    - Subcooling (outdoor temperature must be ≥ 55 degF); This verification method can only be used when the outdoor temperature is at or above 55 degF. It is only used on systems with variable metering devices (TXV or EXV). This method is detailed in Reference Appendix RA3.2.2.6.2. Systems verified using this method may be eligible for HERS verification compliance using sampling. Choosing this option will generate a CF2R-MCH-25b.
    - Weigh-in; This verification method can be used at any outdoor temperature allowed by the equipment manufacturer. This method is detailed in Reference Appendix RA3.2.3. Systems verified using this method are NOT eligible for HERS verification compliance using Group Sampling. Choosing this option will generate a CF2R-MCH-25c.
    - Winter Setup (applicable when outdoor temperature is < 55 degF); The Winter Setup verification method is a special version of the Subcooling method. It can be used when the outdoor temperature is between 37 and 55 degF. It can only be used on equipment where the manufacturer has specifically approved it for the equipment being tested. The Winter Setup procedure is details in Residential Appendix RA1.2. Choosing this option will generate a CF2R-MCH-25e.
    - New Package Unit Factory Charge; Choose this option when a new package unit is being installed that has an AHRI rating. This helps ensure that the unit was properly charged at the factory. HERS verification of refrigerant charge may not be required in this case. Choosing this option will generate a CF2R-MCH-25f.
15. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). The installer (or rater) is to have identified who performed the verification that is documented on the Certificate of Installation. Note that HERS verification compliance by Group Sampling requires that the installer perform their own refrigerant charge verification as part of the installation of the equipment prior to the system being put into a sample group for possible selection by a HERS rater for verification. If Group Sampling is not intended, the HERS Rater may perform the refrigerant charge verification on behalf of the Installing Contractor (applies to any method but Weigh-In) and the Rater will enter same results on both the CF2R and CF3R.
16. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). The Group Sampling status is automatically displayed based on the input results of Row A14 and Row A15 on the CF2R. Group Sampling procedures are detailed Residential Appendix RA2.3.
17. Specify the refrigerant charge verification used by the rater. Choices vary depending on what method was specified in Row A14.

Section B. Measurement Access Hole (MAH) Verification

1. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). Installer is to have indicated the method used to demonstrate compliance with the MAH requirement by selecting the appropriate method from the drop down list. Procedures for installing MAH's are

detailed in RA3.2.2.3. Selecting that the MAH cannot be installed consistent with Figure 3.2-1 may result in additional scrutiny by enforcement personnel.) If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.

Section C. Minimum System Airflow Rate Verification

1. This information is automatically calculated based on the information given in line A09. This is the target minimum system airflow required for the system being verified.
2. This information is automatically calculated based on either the CF3R-MCH-23, or CF3R-MCH-24, which documents the rater's measured airflow of the system being verified. If the measured airflow is not adequate it will not comply with the airflow requirements and refrigerant charge verification cannot be performed.

Section D. Weigh In Charge Procedure

1. HERS rater must visually observe the installer taking this measurement and confirm that correct values are entered into the CF2R. Measure and record the outside air dry-bulb temperature in degrees F. This will affect the procedures that may be used for HERS verification.
2. HERS rater must confirm that correct values are entered into the CF2R. Specify the method of weigh-in. There are two options that may be used. One is to add or remove a small, weighed portion of refrigerant from a factory charged unit (Charge Adjustment). The other is to weigh the entire charge of refrigerant before introducing it into the system (Total Charge). Select either one. Note: The amount of refrigerant in systems that are not newly installed cannot be assumed to be the factory charge. Systems using existing refrigerant must use the Total Charge method. Only new, factory installed equipment can utilize the Charge Adjustment method.
3. HERS rater must confirm that correct values are entered into the CF2R. Enter the Manufacturer's Standard Charge for condenser in pounds and ounces. This is the amount of refrigerant that the manufacturer specifies for a "standard" installation (typical coil match, typical line set size and length). For the Charge Adjustment method, this is the amount of refrigerant that factory charges the system to. Rater should request to see manufacturer's documentation to support this value.
4. HERS rater must confirm that correct values are entered into the CF2R. The Manufacturer's Standard Charge, specified in E03 is based on a standard liquid line length, typically 25 feet. Enter the value here, in feet. Be prepared to provide manufacturer's documentation to support this value.
5. HERS rater must confirm that correct values are entered into the CF2R. The Manufacturer's Standard Charge, specified in E03 is based on a standard liquid line diameter. Enter the value here, in inches (for example: 1/4", 3/8", etc.). Rater should request to see manufacturer's documentation to support this value.
6. HERS rater must confirm that correct values are entered into the CF2R. The Manufacturer's Standard Charge, specified in E03 is based on a standard indoor (evaporator) coil size. Enter the value here, in tons. Rater should request to see manufacturer's documentation to support this value.
7. HERS rater must confirm that correct values are entered into the CF2R. Enter the length of the liquid line installed on the system being verified, in feet. This value must be compared to the standard liquid line length entered in E04 and used to determine if the Manufacturer's Standard Charge entered in E03 is appropriate.

8. HERS rater must confirm that correct values are entered into the CF2R. Enter the diameter of the liquid line installed on the system being verified, in inches (for example: 1/4", 3/8", etc.). This value must be compared to the standard liquid line diameter entered in E05 and used to determine if the Manufacturer's Standard Charge entered in E03 is appropriate.
9. HERS rater must confirm that correct values are entered into the CF2R. Enter the size of the indoor (evaporator) coil installed on the system being verified, in tons. This value must be compared to the standard coil size entered in E06 and used to determine if the Manufacturer's Standard Charge entered in E03 is appropriate.
10. HERS rater must confirm that correct values are entered into the CF2R. Enter the Charge Adjustment to Standard Charge, in ounces. This is the amount of refrigerant that the manufacturer specifies to add to, or remove from, the Manufacturer's Standard Charge entered in E03. This value must come from manufacturer's specifications using the standard values entered in Rows E04 through E06 to the installed values entered in Rows E07 through E09. If refrigerant is to be added, this value should be a positive number. If refrigerant is to be removed, this value should be a negative number. Rater should request to see manufacturer's documentation to support this value.
11. HERS rater must confirm that brazing of refrigerant lines was done with dry nitrogen in lines and evaporator coil. This ensures that there are no contaminants in the refrigerant lines prior to charging.
12. HERS rater must confirm that system was evacuated to 500 microns or leas and, when isolated, has risen no more than 300 microns after 5 minutes. This ensures that the system will not leak refrigerant after charging.
13. HERS rater must confirm that correct values are entered into the CF2R. This value is calculated automatically. If "Charge Adjustment" was specified in Row E02, then the value shown here will be the same as the value shown in Row E10. This is the amount of weighed refrigerant that will be added or removed from the factory charged unit. If refrigerant is to be added, this value should be a positive number. If refrigerant is to be removed, this value should be a negative number. If "Total Charge" was specified in Row E02, then the value shown here will be the value in row E03 added to the value in row E10. This is the total amount of refrigerant that will be in the system, all of which must be weighed before introducing into the system.
14. HERS rater must confirm that correct values are entered into the CF2R. Enter the amount of refrigerant weighed and added to, or removed from, system. If refrigerant is to be added, this value should be a positive number. If refrigerant is to be removed from a factory charged system, this value should be a negative number. This value must match the value in E11 for the system to pass.

STATE OF CALIFORNIA

REFRIGERANT CHARGE VERIFICATION

CEC-CF3R-MCH-25-H (Revised 06/13) CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF VERIFICATION		CF3R-MCH-25
Refrigerant Charge Verification		(Page 1 of 2)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City	Zip Code

A. System Information **HERS Rater to field-verify all system information, discrepancies to be noted by overwriting entry.**		
01	System Identification or Name	
02	System Location or Area Served	
03	Condenser (or package unit) make or brand	
04	Condenser (or package unit) model number	
05	Nominal Cooling Capacity (tons) of Condenser	
06	Condenser (or package unit) serial number	
07	Refrigerant Type	
08	Other Refrigerant Type (if applicable)	
09	Project Type	
10	Charge Indicator Display (CID) Status (Note: Even systems with a CID must have refrigerant charge verified by installer)	
11	Is the system of a type that the minimum airflow can be verified using an approved measurement procedure (RA3.3 or RA3.2.2.7)?	
12	Is the system of a type that approved refrigerant charge verification procedures can be used to verify compliance with the refrigerant charge verification requirements when temperatures are ≥ 55°F (RA3.2.2, or RA1)?	
13	Date of HERS Rater Refrigerant Charge Verification for this system	
14	Refrigerant charge verification method used by installer.	
15	Person who performed the Refrigerant Charge Verification reported on the Certificate of Installation:	
16	HERS Verification Compliance Requirement Status	
17	Refrigerant charge verification method used by HERS Rater.	

Verification of Charge Indicator Display – CF2R-MCH-25d – CID

B. Charge Indicator Display Verification Applicability		
01	Measured Condenser air entering dry-bulb temperature ($T_{condenser, db}$) (degreeF)	
02	Outdoor Temperature Qualification Status	
03	Self Diagnostic Reporting (SDR)	
04	Charge Indicator Display Verification Applicability	

C. Measurement Access Hole (MAH) Verification – HERS Raters are required to visually field verify MAH *Procedures for installing MAH are specified in Reference Residential Appendix RA3.2.2.3*		
01	Method used to demonstrate compliance with the Measurement Access Hole (MAH) requirement	

D. Minimum System Airflow Rate Verification *Procedures for verifying minimum system airflow are specified in Reference Residential Appendix RA3.2.2.7.*		
01	Minimum Required System Airflow Rate (cfm)	
02	System Airflow Rate Verification Status	

E. Charge Indicator Display
Procedures for the Charge Indicator Display Verification are detailed in RA3.4.2

STATE OF CALIFORNIA

REFRIGERANT CHARGE VERIFICATION

CEC-CF3R-MCH-25-H (Revised 06/13)

CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF VERIFICATION		CF3R-MCH-25
Refrigerant Charge Verification		(Page 2 of 2)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City	Zip Code

01	CID Manufacturer Name/Make	
02	CID Model Number	
03	The display module is mounted adjacent to the system thermostat	
04	The manufacturer has certified to the Energy Commission that the CID model meets the requirements of Reference Joint Appendix JA6 (Make and model found on CEC list of approved CID devices)	
05	The system has operated for at least 15 minutes and the CID reports that the system is operating within acceptable parameters.	
06	Compliance Statement:	

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:

Instructions MCH-25d:

Section A. System Information

1. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
2. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25) If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
3. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
4. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25) If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
5. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
6. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25) If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
7. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25) If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
8. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). If "Other" is chosen in Row A07, then installer will indicate the type of refrigerant being used. If R-22 or R-410A is being used (regardless of trade name, Puron, Genetron, etc.) it should be indicated in Row A07, not here. This row is only for refrigerants other than R-22 and R-410a. Documentation of other refrigerants should be requested. If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
9. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). These are defined in detail the Residential Compliance Manual. If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
10. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). Installer is to select the appropriate choice regarding whether this system has a Charge Indicator Display (CID). Qualifying CID's may exempt a system from HERS refrigerant charge verification. CID's are described in Joint Appendix JA6.1. Qualfying CID's must appear on a list of approved devices kept by the Commission. If installed system does not match the description here, it fails.
11. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). Most ducted split systems and package systems are of the type that minimum airflow can be verified using an approved measurement procedure. Examples of systems that do not meet this description are ductless systems. Selecting "No" here may subject the project to additional scrutiny by enforcement personnel.
12. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25) Most ducted split systems and package systems are of the type that approved refrigerant charge verification procedures detailed in Residential Appendix RA3.2.2 or RA1 can be used (i.e., Standard Charge Verification or Winter Setup Verification procedures). Examples of systems that may not meet this description are "mini splits" or variable refrigerant flow systems that may only be charged using weigh-in procedures. Selecting "No" here may subject the project to additional scrutiny.
13. HERS rater to input date of refrigerant charge verification.
14. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). The installer is to have select the refrigerant charge verification method used from the choices provided:
    - Superheat (outdoor temperature must be ≥ 55 degF); This verification method can only be used when the outdoor temperature is at or above 55 degF. It is only used on systems with fixed orifice refrigerant metering devices (non-variable metering devices). This method is detailed in Reference Appendix RA3.2.2.6.1. Systems verified using this method may be eligible for HERS verification compliance using sampling. Choosing this option will generate a CF2R-MCH-25a.
    - Subcooling (outdoor temperature must be ≥ 55 degF); This verification method can only be used when the outdoor temperature is at or above 55 degF. It is only used on systems with variable metering devices (TXV or EXV). This method is detailed in Reference Appendix RA3.2.2.6.2. Systems verified using this method may be eligible for HERS verification compliance using sampling. Choosing this option will generate a CF2R-MCH-25b.
    - Weigh-in; This verification method can be used at any outdoor temperature allowed by the equipment manufacturer. This method is detailed in Reference Appendix RA3.2.3. Systems verified using this method are NOT eligible for HERS verification compliance using Group Sampling. Choosing this option will generate a CF2R-MCH-25c.
    - Winter Setup (applicable when outdoor temperature is < 55 degF); The Winter Setup verification method is a special version of the Subcooling method. It can be used when the outdoor temperature is between 37 and 55 degF. It can only be used on equipment where the manufacturer has specifically approved it for the equipment being tested. The Winter Setup procedure is details in Residential Appendix RA1.2. Choosing this option will generate a CF2R-MCH-25e.
    - New Package Unit Factory Charge; Choose this option when a new package unit is being installed that has an AHRI rating. This helps ensure that the unit was properly charged at the factory. HERS verification of refrigerant charge may not be required in this case. Choosing this option will generate a CF2R-MCH-25f.

15. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). The installer (or rater) is to have identified who performed the verification that is documented on the Certificate of Installation. Note that HERS verification compliance by Group Sampling requires that the installer perform their own refrigerant charge verification as part of the installation of the equipment prior to the system being put into a sample group for possible selection by a HERS rater for verification. If Group Sampling is not intended, the HERS Rater may perform the refrigerant charge verification on behalf of the Installing Contractor (applies to any method but Weigh-In) and the Rater will enter same results on both the CF2R and CF3R.
16. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). The Group Sampling status is automatically displayed based on the input results of Row A14 and Row A15 on the CF2R. Group Sampling procedures are detailed Residential Appendix RA2.3.
17. Specify the refrigerant charge verification used by the rater. Choices vary depending on what method was specified in Row A14.

Section B. Charge Indicator Display Verification Applicability

1. Measure and record the condenser entering dry bulb air temperature (outdoor air at condenser).
2. This box is filled automatically. If the outdoor temperature is less than 55 degF, the CID must be equipped with self diagnostic reporting capabilities for it to operate correctly when it is below 55 degF.
3. Rater to verify whether or not CID is equipped with SDR capability. This can be determined by checking model number against CEC list of approved CIDs.
4. This box is filled automatically. The outdoor temperature must be above 55 degF or the CID must be equipped with SDR capability for CID verification to proceed.

Section C. Measurement Access Hole (MAH) Verification

1. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). Installer is to have indicated the method used to demonstrate compliance with the MAH requirement by selecting the appropriate method from the drop down list. Procedures for installing MAH's are detailed in RA3.2.2.3. Selecting that the MAH cannot be installed consistent with Figure 3.2-1 may result in additional scrutiny by enforcement personnel.) If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.

Section D. Minimum System Airflow Rate Verification

1. This information is automatically calculated based on the information given in line A09. This is the target minimum system airflow required for the system being verified.
2. This information is automatically calculated based on either the CF3R-MCH-23, or CF3R-MCH-24, which documents the rater's measured airflow of the system being verified. If the measured airflow is not adequate it will not comply with the airflow requirements and refrigerant charge verification cannot be performed.

Section E. Verification of Charge Indicator Display

1. Information retrieved from CF2R-MCH-25. Rater to confirm that entry matches name shown on the list of approved devices kept by the Commission. If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
2. Information retrieved from CF2R-MCH-25. Rater to confirm that entry matches model number shown on the list of approved devices kept by the Commission. If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
3. The rater must confirm that the CID display module is mounted adjacent to thermostat that controls the system being verified. This requirement is detailed in Residential Appendix RA3.4.2.
4. The rater must confirm that the installed CID is approved and appears the list of approved devices kept by the Commission. This requirement is detailed in Residential Appendix RA3.4.2.
5. The rater must confirm that the system has operated for at least 15 minutes and that they system is operating within acceptable parameters as specified by the CID and equipment manufacturers. This requirement is detailed in Residential Appendix RA3.4.2.

STATE OF CALIFORNIA

REFRIGERANT CHARGE VERIFICATION

CEC-CF3R-MCH-25-H (Revised 06/13) CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF VERIFICATION		CF3R-MCH-25-H
Refrigerant Charge Verification		(Page 1 of 3)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City	Zip Code

A. System Information **HERS Rater to field-verify all system information, discrepancies to be noted by overwriting entry.**		
01	System Identification or Name	
02	System Location or Area Served	
03	Condenser (or package unit) make or brand	
04	Condenser (or package unit) model number	
05	Nominal Cooling Capacity (tons) of Condenser	
06	Condenser (or package unit) serial number	
07	Refrigerant Type	
08	Other Refrigerant Type (if applicable)	
09	Project Type	
10	Charge Indicator Display (CID) Status (Note: Even systems with a CID must have refrigerant charge verified by installer)	
11	Is the system of a type that the minimum airflow can be verified using an approved measurement procedure (RA3.3 or RA3.2.2.7)?	
12	Is the system of a type that approved refrigerant charge verification procedures can be used to verify compliance with the refrigerant charge verification requirements when temperatures are ≥ 55°F (RA3.2.2, or RA1)?	
13	Date of HERS Rater Refrigerant Charge Verification for this system	
14	Refrigerant charge verification method used by installer.	
15	Person who performed the Refrigerant Charge Verification reported on the Certificate of Installation:	
16	HERS Verification Compliance Requirement Status	
17	Refrigerant charge verification method used by HERS Rater.	

Winter Setup Charge Verification Procedure - MCH25e

Winter Setup for the Standard Charge Verification Procedure is specified in Reference Residential Appendix RA1.2.Procedures for determining Refrigerant Charge using the Standard Charge Verification Procedure are given in Reference Residential Appendix RA3.2.2.

B. System Model Applicability for Winter Setup Method – HERS Rater must verify applicability of Winter Setup Method		
01	Refrigerant metering device	
02	Winter Setup Method applicability status	
03	**The responsible person's signature on this document indicates confirmation that the installed model number is currently listed as approved for Winter Setup Method on the Energy Commission website:** http://www.energy.ca.gov/title24/2008standards/special_case_appliance/	

C. Instrument Calibration – HERS Raters are required to calibrate their diagnostic tools. Procedures for instrument calibration are given in Reference Residential Appendix RA3.2.2 and RA3.2.2.2		
01	Date of Digital Refrigerant Gauge Calibration	
02	Date of Digital Thermocouple Calibration	
03	Digital Refrigerant Gauge Calibration Status	
04	Digital Thermocouple Calibration Status	

D. Measurement Access Hole (MAH) Verification – HERS Raters are required to visually field verify MAH *Procedures for installing MAH are specified in Reference Residential Appendix RA3.2.2.3*		
01	Method used to demonstrate compliance with the Measurement Access Hole (MAH) requirement	

CERTIFICATE OF VERIFICATION		CF3R-MCH-25-H
Refrigerant Charge Verification		(Page 2 of 3)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City	Zip Code

E. Minimum System Airflow Rate Verification **Procedures for verifying minimum system airflow are specified in Reference Residential Appendix RA3.2.2.7.**		
01	Minimum Required System Airflow Rate (cfm)	
02	System Airflow Rate Verification Status	

F. Data Collection and Calculations – HERS Rater must independently collect all data in this section. **Procedures for determining Refrigerant Charge using the Standard Charge Verification Procedure are given in RA3.2.2.**		
The responsible person's signature on this document indicates confirmation that, with a Condenser Outlet Air Restrictor installed, and after system operation was stabilized for at least 15 minutes, throughout the data collection for this verification, the difference between the liquid line pressure and suction line pressure was maintained between 160 and 220 psi for R-410A systems, or between 100 and 145 psi for R-22 systems.		
01	Lowest return air dry bulb temperature that occurred during the refrigerant charge verification procedure (degreeF)	
02	Measured Condenser air entering dry-bulb temperature ($T_{condenser, db}$)	
03	Outdoor Temperature Qualification Status	
04	Measured Liquid Line Temperature (T_{liquid}) (degreeF)	
05	Measured Liquid Line Pressure (P_{liquid}) (psig)	
06	Condenser saturation temperature ($T_{condensor, sat}$) from digital gauge or P-T Table using Line F05 (degreeF)	
07	Measured Subcooling (Line F06 – Line F04) (degreeF)	
08	Target Subcooling from Manufacturer (degreeF)	
09	Compliance Statement:	

G. Metering Device Verification– HERS Rater must independently collect all data in this section. **Procedures for the verification of proper metering device operation are specified in RA3.2.2.6.2**		
01	Measured Suction line temperature ($T_{suction}$) (degreeF)	
02	Measured Suction line pressure ($P_{suction}$) (psig)	
03	Evaporator saturation temperature ($T_{evaporator, sat}$) from digital gauge or P-T Table using line G02 (degreeF)	
04	Measured Superheat (Line G01 – Line G03) (degreeF)	
05	Measured Superheat (Line G04) is between 3 and 26 deg F (inclusive)	
06	Measured Superheat (Line G04) is within manufacturer's specifications, if known.	
07	Compliance Statement:	

H. Confirmation of Refrigerant Pressure Differential – HERS Rater must independently collect all data in this section **Procedures for the Winter Setup are detailed in RA1.2.22**		
01	Phigh, – Plow (psi) from F06 and G02	
02	Compliance Statement:	

CERTIFICATE OF VERIFICATION		CF3R-MCH-25-H
Refrigerant Charge Verification		(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:

Instructions MCH-25e:

Section A. System Information

1. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
2. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25) If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
3. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
4. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25) If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
5. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
6. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25) If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
7. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25) If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
8. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). If "Other" is chosen in Row A07, then installer will indicate the type of refrigerant being used. If R-22 or R-410A is being used (regardless of trade name, Puron, Genetron, etc.) it should be indicated in Row A07, not here. This row is only for refrigerants other than R-22 and R-410a. Documentation of other refrigerants should be requested. If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
9. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). These are defined in detail the Residential Compliance Manual. If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
10. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). Installer is to select the appropriate choice regarding whether this system has a Charge Indicator Display (CID). Qualifying CID's may exempt a system from HERS refrigerant charge verification. CID's are described in Joint Appendix JA6.1. Qualfying CID's must appear on a list of approved devices kept by the Commission. If installed system does not match the description here, it fails.
11. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). Most ducted split systems and package systems are of the type that minimum airflow can be verified using an approved measurement procedure. Examples of systems that do not meet this description are ductless systems. Selecting "No" here may subject the project to additional scrutiny by enforcement personnel.
12. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25) Most ducted split systems and package systems are of the type that approved refrigerant charge verification procedures detailed in Residential Appendix RA3.2.2 or RA1 can be used (i.e., Standard Charge Verification or Winter Setup Verification procedures). Examples of systems that may not meet this description are "mini splits" or variable refrigerant flow systems that may only be charged using weigh-in procedures. Selecting "No" here may subject the project to additional scrutiny.
13. HERS rater to input date of refrigerant charge verification.
14. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). The installer is to have select the refrigerant charge verification method used from the choices provided:
    - Superheat (outdoor temperature must be ≥ 55 degF); This verification method can only be used when the outdoor temperature is at or above 55 degF. It is only used on systems with fixed orifice refrigerant metering devices (non-variable metering devices). This method is detailed in Reference Appendix RA3.2.2.6.1. Systems verified using this method may be eligible for HERS verification compliance using sampling. Choosing this option will generate a CF2R-MCH-25a.
    - Subcooling (outdoor temperature must be ≥ 55 degF); This verification method can only be used when the outdoor temperature is at or above 55 degF. It is only used on systems with variable metering devices (TXV or EXV). This method is detailed in Reference Appendix RA3.2.2.6.2. Systems verified using this method may be eligible for HERS verification compliance using sampling. Choosing this option will generate a CF2R-MCH-25b.
    - Weigh-in; This verification method can be used at any outdoor temperature allowed by the equipment manufacturer. This method is detailed in Reference Appendix RA3.2.3. Systems verified using this method are NOT eligible for HERS verification compliance using Group Sampling. Choosing this option will generate a CF2R-MCH-25c.
    - Winter Setup (applicable when outdoor temperature is < 55 degF); The Winter Setup verification method is a special version of the Subcooling method. It can be used when the outdoor temperature is between 37 and 55 degF. It can only be used on equipment where the manufacturer has specifically approved it for the equipment being tested. The Winter Setup procedure is details in Residential Appendix RA1.2. Choosing this option will generate a CF2R-MCH-25e.
    - New Package Unit Factory Charge; Choose this option when a new package unit is being installed that has an AHRI rating. This helps ensure that the unit was properly charged at the factory. HERS verification of refrigerant charge may not be required in this case. Choosing this option will generate a CF2R-MCH-25f.

15. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). The installer (or rater) is to have identified who performed the verification that is documented on the Certificate of Installation. Note that HERS verification compliance by Group Sampling requires that the installer perform their own refrigerant charge verification as part of the installation of the equipment prior to the system being put into a sample group for possible selection by a HERS rater for verification. If Group Sampling is not intended, the HERS Rater may perform the refrigerant charge verification on behalf of the Installing Contractor (applies to any method but Weigh-In) and the Rater will enter same results on both the CF2R and CF3R.
16. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). The Group Sampling status is automatically displayed based on the input results of Row A14 and Row A15 on the CF2R. Group Sampling procedures are detailed Residential Appendix RA2.3.
17. Specify the refrigerant charge verification used by the rater. Choices vary depending on what method was specified in Row A14.

Section B. System Model Applicability for Winter Setup Method

1. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). Installer is to have selected the correct metering device used on the system being verified. This will check against the refrigerant charge verification method selected in Row A14. An error message will appear in Row B02 if the wrong verification method may has been selected. Winter Setup verification can only be used on systems with variable metering devices (TXV or EXV). If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.
2. This box is automatically filled out. Winter Setup verification can only be used on systems with variable metering devices (TXV or EXV).
3. Rater must verify that the system being tested appears on the list of approved equipment for Winter Setup Method.

Section C. Instrument Calibration

1. Enter the date of most recent Digital Refrigerant Gauge Calibration Field Check by rater. Analog gauges are not allowed for verification purposes under the 2013 Standards. Specification for pressure gauges is found in Residential Appendix RA3.2.2.2.3. Procedures for the field check procedure are detailed in RA3.2.2.4.2. Calibration field check must happen at least once every 30 days.
2. Enter the date of the most recent Digital Thermocouple Calibration by rater. Specifications for thermocouples and temperature sensors can be found in Residential Appendix RA3.2.2.2.2. Procedures for calibration are detailed in RA3.2.2.4.1. Calibration must happen at least once every 30 days.
3. Digital Refrigerant Gauge Calibration status will appear automatically. If the date entered in Row C01 is more than 30 days prior to date of verification this row will indicate that calibration is required and you will not be allowed to continue filling out this document.
4. Digital Thermocouple Calibration status will appear automatically. If the date entered in Row C02 is more than 30 days prior to date of verification this row will indicate that calibration is required and you will not be allowed to continue filling out this document.

Section D. Measurement Access Hole (MAH) Verification

1. This information is automatically pulled from the Certificate of Installation (CF2R-MCH-25). Installer is to have indicated the method used to demonstrate compliance with the MAH requirement by selecting the appropriate method from the drop down list. Procedures for installing MAH's are detailed in RA3.2.2.3. Selecting that the MAH cannot be installed consistent with Figure 3.2-1 may result in additional scrutiny by enforcement personnel.) If installed system does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail.

Section E. Minimum System Airflow Rate Verification

1. This information is automatically calculated based on the information given in line A09. This is the target minimum system airflow required for the system being verified.
2. This information is automatically calculated based on either the CF3R-MCH-23, or CF3R-MCH-24, which documents the rater's measured airflow of the system being verified. If the measured airflow is not adequate it will not comply with the airflow requirements and refrigerant charge verification cannot be performed.

Section F. Subcooling Charge Verification Method – Data Collection

1. The Rater must independently collect this data. Measure and record the lowest return air dry-bulb temperature that occurred during the refrigerant charge procedure in degrees F. This temperature must remain above 70 degF during the verification procedure. This requirement is detailed in Residential Appendix RA3.2.2.5.
2. The Rater must independently collect this data. Measure and record the condenser air dry-bulb temperature ($T_{condenser}$) in degrees F. This value must be at least 55 degF and no more than 115 degF to use the Subcooling Charge Verification Method.
3. If a value less than 55 degF or greater than 115 degF is entered in Row F02 the Subcooling Method cannot be used.
4. The Rater must independently collect this data. Measure and record the liquid line temperature (T_{liquid}) in degrees F. This procedure is detailed in RA3.2.2.5. This value is used to calculate the measured subcool temperature.

5. The Rater must independently collect this data. Measure and record the liquid line pressure (P_{liquid}) in psig. This procedure is detailed in RA3.2.2.5. This value is used to determine the condenser saturation temperature ($T_{condenser,sat}$) from a pressure temperature chart for the appropriate refrigerant (can be internal to a digital gauge), which is entered into Row F06.
6. Enter the condenser saturation temperature ($T_{condenser,sat}$) from the digital gauge or a separate pressure-temperature chart that corresponds to the liquid line pressure entered in Row F05, in degrees F.
7. Measured Subcooling is automatically calculated as the difference between the liquid line temperature (Row F04) and the condenser saturation temperature (Row F06)
8. The Rater must independently collect this data. Enter target subcooling from manufacturer. This may be a challenge to find for older equipment. Internet searches can sometimes result in archived equipment specifications for the equipment in question, or sometimes a very similar model. If the manufacturer's target cannot be found the Commission's Executive Director may provide additional guidance for compliance.
9. System passes Subcooling method when Row F08 is within plus or minus 5 degrees of Row F07.

Section G. Metering Device Verification

1. The Rater must independently collect this data. Measure and record the suction line temperature ($T_{suction}$) in degrees F. This procedure is detailed in RA3.2.2.5. This value is used to calculate the measured superheat.
2. The Rater must independently collect this data. Measure and record the suction line pressure ($P_{suction}$) in psig. This procedure is detailed in RA3.2.2.5. This value is used to determine the evaporator saturation temperature ($T_{evaporator,sat}$) from a pressure temperature chart for the appropriate refrigerant (can be internal to a digital gauge), which is entered into Row G03.
3. Enter the evaporator saturation temperature ($T_{evaporator,sat}$) from the digital gauge or a separate pressure-temperature chart that corresponds to the suction line pressure entered in Row G02, in degrees F.
4. Measured superheat is automatically calculated as the difference between the suction line temperature (Row G01) and the evaporator saturation temperature (Row G03)
5. There are two possible criteria for passing. If the manufacturer's specification is known it should be used, otherwise the CEC requirement is that the superheat be between 4 and 25 degF, inclusive. This row checks the CEC requirement.
6. If the manufacturer's target superheat for ensuring proper metering device operation is known, it supersedes the CEC requirement of being between 4 and 25 degF. If "Yes, documentation to be provided upon request." is selected, the installer should be prepared to provide documentation for the target values used.
7. There are two possible criteria for passing. If the manufacturer's specification is known it should be used, otherwise the CEC requirement is that the superheat be between 4 and 25 degF, inclusive. If "Yes, documentation to be provided upon request." is selected in Row G06, the installer should be prepared to provide documentation for the target values used.

Section H. Confirmati0n of Refrigerant Pressure Differential.

1. This box is automatically filled out. It verifies that the correct refrigerant pressure was maintained.
2. This box is automatically filled out. It verifies that the correct refrigerant pressure was maintained. With a Condenser Outlet Air Restrictor installed, and after system operation was stabilized for at least 15 minutes, throughout the data collection for this verification, the difference between the liquid line pressure and suction line pressure must be maintained between 160 and 220 psi for R-410A systems, or between 100 and 145 psi for R-22 systems. If not an error message will appear here.

STATE OF CALIFORNIA

VERIFICATION OF HIGH SEER & EER EQUIPMENT

CEC-CF3R-MCH-26-H (Revised 06/13) CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF VERIFICATION		CF3R-MCH-26-H
Verification of High SEER &EER Equipment		(Page 1 of 2)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City	Zip Code

Procedures for verification of High SEER and EER Equipment are described in Reference Appendix RA3.4. Each HVAC system requiring verification must use a separate form.

A. System Information			
01	Required SEER from the CF1R Report	**SEER**	
02	Required EER from the CF1R Report	**EER**	
03	System Name or Identification/Tag		
04	System Location or Area Served		
05	List AHRI certification number for the installed air conditioning equipment from http://www.ahridirectory.org		
06	Is Air Handler/Furnace make and model Included in the AHRI certification from row A05?		
07	Is time delay relay installed (Verify using manufactures data)?		
08	Is a TXV included in the AHRI certification from row A05 or manufactures data?		
09	Outdoor Condenser - Installed Manufacturer Name		
10	Outdoor Condenser - Installed Model Number		
11	Outdoor Condenser - Installed Serial Number		
12	Inside Coil - Installed Manufacture Name		
13	Inside Coil - Installed Model Number		
14	Inside Coil - Installed Serial Number		
15	Air Handler/Furnace - Installed Manufacture Name		
16	Air Handler/Furnace - Installed Model Number		
17	Air Handler/Furnace - Installed Serial Number		

B. Verified Cooling System Efficiency - SEER				
01	SEER listed on AHRI Certification row A05		**SEER**	
02	☐Yes	☐No	Is the AHRI certified SEER row B01 the same or better than required by the CF-1R row A01	
03	☐Yes	☐No	Are the Manufacturer Names and Model Numbers listed on the AHRI certification from row A05 the same as what was installed?	
04	☐Yes	☐No	Are the Manufacturer Names and Model Numbers listed on the AHRI certification from row A05 the same as what is listed on rows A09, A10, A12 and A13?	
05	Compliance Statement:			

C. Verified Cooling System Efficiency - EER				
01	EER listed on AHRI Certification row A05		**EER**	
02	☐Yes	☐No	Is the AHRI certified EER C01 the same or better than required by the CF1R row A02	
03	☐Yes	☐No	Are the Manufacturer Names and Model Numbers listed on the AHRI certification from row A05 the same as what was installed?	
04	☐Yes	☐No	Are the Manufacturer Names and Model Numbers listed on the AHRI certification from row A05 the same as what is listed on rows A09, A10, A12 and A13?	
05	Compliance Statement:			

D. Verified Cooling System Efficiency - Air Handler/Furnace			
01	☐Yes	☐No	Are the Manufacturer Names and Model Numbers listed on the AHRI certification from row A05 the same as what was installed?
02	☐Yes	☐No	Are the Manufacturer Names and Model Numbers listed on the AHRI certification from row A05 the same as what is listed on rows A15 and A16?
03	Compliance Statement:		

CERTIFICATE OF VERIFICATION			CF3R-MCH-26-H
Verification of High SEER &EER Equipment			(Page 2 of 2)
Project Name:		Enforcement Agency:	Permit Number:
Dwelling Address:		City	Zip Code

E. Verified Cooling System Efficiency - Time Delay			
01	☐Yes	☐No	If Yes is has the time delay been tested in the field and is functioning correctly?
02	☐Yes	☐No	If Yes is has the time delay been tested in the field and is functioning correctly?
03	Compliance Statement:		

F. Verified Cooling System Efficiency – TXV			
01	☐Yes	☐No	If Yes has the TXV been installed per manufacturer instructions and the expansion valve is in full contact with suction line, is tightly installed with a metal clamp, is placed in the proper orientation and is fully covered with insulation?
02	Compliance Statement:		

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:

User Instructions – MCH-26:

A. System Information

1. This field is automatically calculated when using the online form. If SEER is required on the CF-1R the required efficiency value will be automatically imported. To use this form manually in the field Rater must review the project CF-1R form for the SEER requirement.
2. This field is automatically calculated when using the online form. If EER is required on the CF-1R the required efficiency value will be automatically imported. To use this form manually in the field Rater must review the project CF-1R form for the EER requirement.
3. This field is automatically calculated when using the online form. System Name or Identification/Tag – Imported from the MECH-01; provide an identification name or tag name that uniquely identifies the duct system. If there is a mechanical plan for the system, the tag name may be given on the plans.
4. This field is automatically calculated when using the online form. System Location or Area Served - Imported from the MECH-01; provide a brief description of the area served by the duct system (e.g. upstairs; downstairs).
5. List AHRI certification number for the installed cooling system from http://www.ahridirectory.org. The installer must use equipment listed with AHRI. Equipment listed under this AHRI number must be used in the installation.
6. Some AHRI certifications require the air handler/furnace to be included in the certification number. If an air handler/furnace is listed with the AHRI certification number then select "yes" from the dropdown list. If not select "no" from the dropdown list
7. Some AHRI certifications require that a time delay be installed. If the certification from row A05 requires time delay then select "yes" from the dropdown list. If not select "no" from the dropdown list.
8. Some AHRI certifications require that a TXV be installed. If the certification from row A05 requires TXV then select "yes" from the dropdown list. If not select "no" from the dropdown list.
9. This field is automatically calculated when using the online form, Condenser Manufacture Name – Imported from the MECH-01; provide the installed outdoor Condenser Manufacture Name.
10. This field is automatically calculated when using the online form, Condenser Model Number – Imported from the MECH-01; provide the installed outdoor Condenser Model Number.
11. This field is automatically calculated when using the online form, Condenser Serial Number – Imported from the MECH-01; provide the installed outdoor Condenser Serial Number.
12. This field is automatically calculated when using the online form, Coil Manufacture Name – Imported from the MECH-01; provide the installed indoor Coil Manufacture Name.
13. This field is automatically calculated when using the online form, Coil Model Number – Imported from the MECH-01; provide the installed indoor Coil Model Number.
14. This field is automatically calculated when using the online form, Coil Serial Number – Imported from the MECH-01; provide the installed indoor Coil Serial Number.
15. This field is automatically calculated when using the online form, Air Handler/Furnace Manufacture Name – Imported from the MECH-01; provide the installed Air Handler/Furnace Manufacture Name.
16. This field is automatically calculated when using the online form, Air Handler/Furnace Model Number – Imported from the MECH-01; provide the installed Air Handler/Furnace Model Number.
17. This field is automatically calculated when using the online form, Air Handler/Furnace Serial Number – Imported from the MECH-01; provide the installed Air Handler/Furnace Serial Number.

B. Verified Cooling System Efficiency - SEER

1. Enter the SEER rating from the AHRI certificate from row A05.
2. The AHRI certified SEER row A05 must be the same or better than required by the CF1R row A01. If this is correct then mark Yes. Online form will auto fill.
3. The Manufacturer Names and Model Numbers listed on the AHRI certification from row A05 must be the same as what was installed. Mark Yes if this statement is correct.
4. The Manufacturer Names and Model Numbers listed on the AHRI certification from row A05 must be the same as what is listed on rows A09, A10, A12 and A13. Mark Yes if this statement is correct.
5. Compliance Statement: (If row A01 is NA then SEER VERIFICATION NOT REQUIRED)
   Pass if rows B02, B03 and B04 equal to Yes, or
   Fail if rows any of rows B02, B03 and B04 equal to No

C. Verified Cooling System Efficiency - EER

1. Enter the EER rating from the AHRI certificate from row A05
2. The AHRI certified EER row C01 must be the same or better than required by the CF1R row A02. If this is correct then mark Yes. Online form will auto fill.
3. The Manufacturer Names and Model Numbers listed on the AHRI certification from row A05 must be the same as what was installed. Mark Yes if this statement is correct.
4. The Manufacturer Names and Model Numbers listed on the AHRI certification from row A05 must be the same as what is listed on rows A09, A10, A12 and A13. Mark Yes if this statement is correct.

5. Compliance Statement: (If row A02 is NA then EER VERIFICATION NOT REQUIRED)
   Pass if rows C02, C03 and C04 equal to Yes, or
   Fail if rows any of rows C02, C03 and C04 equal to No

D. Verified Cooling System Efficiency – Air Handler/Furnace

1. The Manufacturer Names and Model Numbers listed on the AHRI certification from row A05 the same as what was installed. Mark Yes if this statement is correct.
2. The Manufacturer Names and Model Numbers listed on the AHRI certification from row A05 must be the same as what is listed on rows A15 and A16. Mark Yes if this statement is correct.
3. Compliance Statement: (If row A06 is No then Air Handler/Furnace VERIFICATION NOT REQUIRED)
   Pass if rows D01 and D02 equal to Yes, or
   Fail if either rows D01 or D02 equal to No (must fix system to proceed).

E. Verified Cooling System Efficiency - Time Delay

1. If time delay has been tested in the field and is functioning correctly? To verify the time delay is function properly the following is required.
   a. Turn the thermostat down until the compressor and indoor fan are both running.
   b. Turn the thermostat up so the compressor stops running.
   c. Verify that the indoor fan continues to run for at least 30 seconds.

   Mark Yes if all of these statements are correct.
2. Compliance Statement: (If row A07 is No then TIME DELAY VERIFICATION NOT REQUIRED)
   Pass if row E01 is Yes, or
   Fail if row E01 is No then installer must fix system to proceed.

F. Verified Cooling System Efficiency - TXV

1. If the TXV has been installed per manufacturer instructions and the expansion valve is in full contact with suction line, is tightly installed with a metal clamp, is placed in the proper orientation and is fully covered with insulation. Mark Yes if this statement is correct.
2. Compliance Statement: (If row A08 is No then TXV VERIFICATION NOT REQUIRED)
   PASS if row F01 is Yes, or
   Fail if row F01 is No then installer must fix system to proceed.

User Instructions – MCH-27a:

Section A. General Information

1 This information is automatically pulled from the CF-2R-MCH-27a. If building type does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail. Choices are "single family" and "low-rise multifamily"

2 This information is automatically pulled from the CF-2R-MCH-27a. If conditioned floor area does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail. Value to be entered in the field equals the conditioned floor area of the space, in square feet.

3 This information is automatically pulled from the CF-2R-MCH-27a. If number of bedrooms not match this entry, it can be overwritten by rater but it will be flagged as a possible fail. Value to be entered in the field equals the number of bedrooms in the home.

4 This information is automatically pulled from the CF-2R-MCH-27a. If ventilation operation schedule does not match this entry, it can be overwritten by rater from list but it will be flagged as a possible fail. Select the Ventilation Operation Schedule method used from the choices provided:

- Continuous
- Intermittent

5 This information is automatically pulled from the CF-2R-MCH-27a. If whole-building ventilation rate calculation method does not match this entry, it can be overwritten by rater from list but it will be flagged as a possible fail. Select the Whole Building Ventilation Rate Calculation Method from the choices provided:

- Fan Ventilation Rate Method
- Total Ventilation Rate Method

6 This information is automatically pulled from the CF-2R-MCH-27a. If whole-building ventilation system type does not match this entry, it can be overwritten by rater from list but it will be flagged as a possible fail. Select the Whole Building Ventilation System Type from the choices provided:

- Standalone - Exhaust
- Standalone - Supply
- Standalone - Balanced

Section B. Whole Building Continuous Ventilation – Fan Ventilation Rate Method

1 This value is automatically calculated using equation 4.1a. The equation used to calculate this value in the field equals:

   a. If A01= Single Family then [(0.01 x conditioned floor area A02) + 7.5(Number of bedrooms A03 + 1)] = Continuous Whole-Building Ventilation Rate

   b. If A01= Multifamily then [(0.03 x conditioned floor area A02) + 7.5(Number of bedrooms A03 + 1)] = Continuous Whole-Building Ventilation Rate

2 User entered value equals the total mechanical ventilation in CFM

C. Compliance Statement
<< if the whole-building ventilation rate B02 is equal to or greater than the required continuous whole-building ventilation rate B01 then display text: "Building Passes Continuous Whole-Building Ventilation Rate Test"; if the whole-building ventilation rate B02 is less than the required continuous whole-building ventilation rate B01 then display text: "Building Fails Continuous Whole-Building Ventilation Rate Test">>

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:

CERTIFICATE OF VERIFICATION		CF3R-MCH-27b-H
Indoor Air Quality and Mechanical Ventilation		(Page 1 of 2)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City	Zip Code

Title 24, Part 6, Section 150.0(o) **Ventilation for Indoor Air Quality.** All dwelling units shall meet the requirements of ANSI/ASHRAE Standard62.2. Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings. ***Equation and table numbering on this form corresponds to the numbering for that information in the published ANSI/ASHRAE Standard 62.2-2010.***

A. Dwelling Mechanical Ventilation - General Information		
01	Building Type	
02	Conditioned floor area of dwelling unit	
03	Number of bedrooms in dwelling unit	
04	Ventilation Operation Schedule	
05	Whole-Building Ventilation Rate Calculation Method.	
06	Whole Building Ventilation System Type	

27b - Continuous Ventilation Airflow – Total Ventilation Rate Method

B. Whole-Building Continuous Ventilation - Total Ventilation Rate Method - A mechanical supply system, exhaust system, or combination thereof shall provide whole-building ventilation with outdoor air each hour at no less than the rate in 62.2 equation 4.7.		
01	Total Required Ventilation rate (fan + infiltration), (Qtot)	
02	CFM50 from a registered ENV-20a-d	
03	Equivalent Leakage Area used for ventilation	
04	What is the vertical distance from the lowest above-grade floor to the highest ceiling in feet?	
05	What is the weather and shielding factor (wsf) for the city listed in 62.2 Appendix X Table X1?	
06	Normalized Leakage (NL)	
07	Ventilation provided by infiltration in (Qinf)	
08	Required Continuous Whole-Building Ventilation Rate (Q_{fan})	
09	Installed Continuous Whole-Building Ventilation Rate	

C. Compliance Statement

CERTIFICATE OF VERIFICATION		CF3R-MCH-27b-H
Indoor Air Quality and Mechanical Ventilation		(Page 2 of 2)
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:

User Instructions – MCH-27b:

Section A. General Information

1 This information is automatically pulled from the CF-2R-MCH-27b. If building type does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail. Choices are "single family" and "low-rise multifamily"

2 This information is automatically pulled from the CF-2R-MCH-27b. If conditioned floor area does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail. Value to be entered in the field equals the conditioned floor area of the space, in square feet.

3 This information is automatically pulled from the CF-2R-MCH-27b. If number of bedrooms not match this entry, it can be overwritten by rater but it will be flagged as a possible fail. Value to be entered in the field equals the number of bedrooms in the home.

4 This information is automatically pulled from the CF-2R-MCH-27b. If ventilation operation schedule does not match this entry, it can be overwritten by rater from list but it will be flagged as a possible fail. Select the Ventilation Operation Schedule method used from the choices provided:

- Continuous
- Intermittent

5 This information is automatically pulled from the CF-2R-MCH-27b. If whole-building ventilation rate calculation method does not match this entry, it can be overwritten by rater from list but it will be flagged as a possible fail. Select the Whole Building Ventilation Rate Calculation Method from the choices provided:

- Fan Ventilation Rate Method
- Total Ventilation Rate Method

6 This information is automatically pulled from the CF-2R-MCH-27b. If whole-building ventilation system type does not match this entry, it can be overwritten by rater from list but it will be flagged as a possible fail. Select the Whole Building Ventilation System Type from the choices provided:

- Standalone - Exhaust
- Standalone - Supply
- Standalone - Balanced

Section B. Whole Building Continuous Ventilation – Total Ventilation Rate Method

1 This value is automatically calculated using 62.2 equation 4.2a. The equation used to calculate this value in the field equals:

   a. If A01= Single Family then [(0.03 x conditioned floor area A02) + 7.5(Number of bedrooms A03 + 1)] = Required Continuous Whole-Building Ventilation Rate

   b. If A01= Multifamily then [(0.05 x conditioned floor area A02) + 7.5(Number of bedrooms A03 + 1)] = Required Continuous Whole-Building Ventilation Rate

2 This information is automatically pulled from the registered ENV-20a-d row A.2

3 This value is automatically calculated. The equation used to calculate this value in the field equals: (CFM50 B02 x 0.055= Equivalent Leakage Area (ELA)

4 User entered value equals the vertical distance from the lowest above-grade floor to the highest ceiling in feet

5 User entered value equals the Weather Shielding Factor (wsf) from 62.2 Appendix X Table X1.

6 This value is automatically calculated using 62.2 equation 4.5. The equation used to calculate this value in the field equals: [1000 x (Equivalent Leakage Area (ELA) row B02/ conditioned floor area A02) x (Vertical Distance B04/8.2)^0.4]= Normalized Leakage (NL)

7 This value is automatically calculated using 62.2 equation 4.6a. The equation used to calculate this value in the field equals: (Normalized Leakage (NL) row B06 x conditioned floor area A02)/7.3= Ventilation Provided by Ventilation

8 This value is automatically calculated using 62.2 equation 4.6a. The equation used to calculate this value in the field equals: (Normalized Leakage (NL) row B06 x conditioned floor area A02)/7.3= Ventilation Provided by Infiltration in (CFM)

9 This value is automatically calculated using 62.2 equation 4.7. The equation used to calculate this value in the field equals: (Required Continuous Whole-Building Ventilation Rate row B01 - Ventilation Provided by Infiltration row B08 = Required Continuous Whole-Building Ventilation Rate in (CFM)

10 User entered value equals the installed ventilation rate in (CFM)

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:

INDOOR AIR QUALITY AND MECHANICAL VENTILATION

CERTIFICATE OF VERIFICATION		CF3R-MCH-27c-H
Indoor Air Quality and Mechanical Ventilation		(Page 1 of 2)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City	Zip Code

Title 24, Part 6, Section 150.0(o) **Ventilation for Indoor Air Quality.** All dwelling units shall meet the requirements of ANSI/ASHRAE Standard62.2. Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings. ***Equation and table numbering on this form corresponds to the numbering for that information in the published ANSI/ASHRAE Standard 62.2-2010.***

A. Dwelling Mechanical Ventilation - General Information		
01	Building Type	
02	Conditioned floor area of dwelling unit	
03	Number of bedrooms in dwelling unit	
04	Ventilation Operation Schedule	
05	Whole-Building Ventilation Rate Calculation Method.	
06	Whole Building Ventilation System Type	

27c - Intermittent Ventilation Airflow - Fan Vent Rate Method

B. Intermittent Ventilation: The effective ventilation rate of an **intermittent** system is the combination of its delivered capacity, its fractional on-time, cycle time, and the ventilation effectiveness from Table 4.2. <<This section is only printed if an intermittent strategy is chosen in row 1>>		
01	In a single on off cycle, what is the ON time in hours?	
02	In a single on off cycle, what is the OFF time in hours?	
03	System must operate at least once every 24 hours. (Row 6 + Row 7 must be less than or equal to 24 hours)	
04	Daily fractional on time (*f* used in Table 4.2).	
05	System must operate at least 10% of the time.	
06	Turnover (N used in Table 4.2)	
07	Ventilation effectiveness (e, from Table 4.2)	
08	Intermittent ventilation rate	
09	Installed Intermittent ventilation Rate	
10	<<this line only visible if CFI System selected in A06>> System Fan Efficacy Compliance Status	
11	<<this line only visible if CFI System selected in A06>> System Fan Efficacy Compliance	

C. Compliance Statement

CERTIFICATE OF VERIFICATION		CF3R-MCH-27c-H
Indoor Air Quality and Mechanical Ventilation		(Page 2 of 2)
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:

User Instructions – MCH-27c:

Section A. General Information

1 This information is automatically pulled from the CF-2R-MCH-27c. If building type does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail. Choices are "single family" and "low-rise multifamily"

2 This information is automatically pulled from the CF-2R-MCH-27c. If conditioned floor area does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail. Value to be entered in the field equals the conditioned floor area of the space, in square feet.

3 This information is automatically pulled from the CF-2R-MCH-27c. If number of bedrooms not match this entry, it can be overwritten by rater but it will be flagged as a possible fail. Value to be entered in the field equals the number of bedrooms in the home.

4 This information is automatically pulled from the CF-2R-MCH-27c. If ventilation operation schedule does not match this entry, it can be overwritten by rater from list but it will be flagged as a possible fail. Select the Ventilation Operation Schedule method used from the choices provided:

- Continuous
- Intermittent

5 This information is automatically pulled from the CF-2R-MCH-27c. If whole-building ventilation rate calculation method does not match this entry, it can be overwritten by rater from list but it will be flagged as a possible fail. Select the Whole Building Ventilation Rate Calculation Method from the choices provided:

- Fan Ventilation Rate Method
- Total Ventilation Rate Method

6 This information is automatically pulled from the CF-2R-MCH-27c. If whole-building ventilation system type does not match this entry, it can be overwritten by rater from list but it will be flagged as a possible fail. Select the Whole Building Ventilation System Type from the choices provided:

- Standalone - Exhaust
- Standalone - Supply
- Standalone - Balanced
- Central Fan Integrated (CFI)

Section B. Intermittent Ventilation

1 Intermittent ventilation requires controls that ensure a regular operating schedule every 24 hours. Within a 24 hour period there will be one or more regular on off cycles. For a single on off cycle, enter the on time in hours. This value will be verified by a HERS rater.

2 Intermittent ventilation requires controls that ensure a regular operating schedule every 24 hours. Within a 24 hour period there will be one or more regular on off cycles. For a single on off cycle, enter the off time in hours. This value will be verified by a HERS rater.

3 This row performs an automatic check. The intermittent ventilation system must operate at least once every 24 hours. For this to occur, the on time plus the off time in a single on off cycle must be less than 24 hours. If this is true, "OK" will appear. If this is not true, an error will appear here and correct values will need to be entered into Rows C01 and C02. The equation used to calculate this value in the field equals: Time on in hours row C01 + Time off in hours row C02.

4 This value is automatically calculated. It is the daily fractional on time (*f*) used in 62.2 Table 4.2. A value of 0.60 means that in a 24 hour period the fan will run 60% of the time. The equation used to calculate this value in the field equals: On time in Hours row C01/(On time in Hours row C01 + Off time in Hours row C02)= Daily fractional on time

5 This row performs an automatic check. The ventilation system must operate at least 10% of the time. Row C04 must be greater than or equal to 0.10. If this is true, "OK" will appear. If this is not true, an error message will appear here and correct values will need to be entered into Rows C01 and C02.

6 This value is automatically calculated. It is the turnover (N) used in 62.2 Table 4.2. The equation used to calculate this value in the field equals: [12.8 x Continuous Whole-Building Ventilation Rate row B01 x (On time in Hours row C01 + Off time in Hours row C02)]/ Conditioned floor area of dwelling unit row A02= Turnover N

7 User entered value use the daily fractional time (*f*) from Row C04 and the turnover (N) from Row C06 to determine the ventilation effectiveness value (e) from 62.2 table 4.2.

8 This value is automatically calculated using 62.2 equation 4.8. It represents the required airflow in cfm that must be delivered during the ventilation system on times. This value will be verified by a HERS rater. The equation used to calculate this value in the field equals: Continuous Whole-Building Ventilation Rate row B01/(Daily fractional on time row C04 x ventilation effectiveness value row C07= required Intermittent ventilation rate

9 User entered value equals the installed intermittent ventilation rate in (CFM)

10 This information is automatically pulled from the registered MCH-22 row B07 Note: this line only visible if CFI System selected in A06

11 This information is automatically calculated based on C10 Note: this line only visible if CFI System selected in A06

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:

CERTIFICATE OF VERIFICATION		CF3R-MCH-27-H
Indoor Air Quality and Mechanical Ventilation		(Page 1 of 2)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City	Zip Code

Title 24, Part 6, Section 150.0(o) **Ventilation for Indoor Air Quality.** All dwelling units shall meet the requirements of ANSI/ASHRAE Standard62.2. Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings. ***Equation and table numbering on this form corresponds to the numbering for that information in the published ANSI/ASHRAE Standard 62.2-2010.***

A. Dwelling Mechanical Ventilation - General Information		
01	Building Type	
02	Conditioned floor area of dwelling unit	
03	Number of bedrooms in dwelling unit	
04	Ventilation Operation Schedule	
05	Whole-Building Ventilation Rate Calculation Method.	
06	Whole Building Ventilation System Type	

27d - Intermittent Ventilation Airflow – Total Vent Rate Method

B. Intermittent Ventilation: The effective ventilation rate of an **intermittent** system is the combination of its delivered capacity, its fractional on-time, cycle time, and the ventilation effectiveness from Table 4.2. <<This section is only printed if an intermittent strategy is chosen in row 1>>		
01	In a single on off cycle, what is the ON time in hours?	
02	In a single on off cycle, what is the OFF time in hours?	
03	System must operate at least once every 24 hours. (Row 6 + Row 7 must be less than or equal to 24 hours)	
04	Daily fractional on time (*f* used in Table 4.2).	
05	System must operate at least 10% of the time.	
06	Turnover (N used in Table 4.2)	
07	Ventilation effectiveness (e, from Table 4.2)	
08	Intermittent ventilation rate	
09	Installed Intermittent ventilation Rate	
10	<<this line only visible if CFI System selected in A06>> System Fan Efficacy Compliance Status	
11	<<this line only visible if CFI System selected in A06>> System Fan Efficacy Compliance	

C. Compliance Statement

CERTIFICATE OF VERIFICATION		CF3R-MCH-27-H
Indoor Air Quality and Mechanical Ventilation		(Page 2 of 2)
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:

Instructions for MCH-27d:

Section A. General Information

1. This information is automatically pulled from the CF-2R-MCH-27d. If building type does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail. Choices are "single family" and "low-rise multifamily"
2. This information is automatically pulled from the CF-2R-MCH-27d. If conditioned floor area does not match this entry, it can be overwritten by rater but it will be flagged as a possible fail. Value to be entered in the field equals the conditioned floor area of the space, in square feet.
3. This information is automatically pulled from the CF-2R-MCH-27d. If number of bedrooms not match this entry, it can be overwritten by rater but it will be flagged as a possible fail. Value to be entered in the field equals the number of bedrooms in the home.
4. This information is automatically pulled from the CF-2R-MCH-27d. If ventilation operation schedule does not match this entry, it can be overwritten by rater from list but it will be flagged as a possible fail. Select the Ventilation Operation Schedule method used from the choices provided:
   - Continuous
   - Intermittent
5. This information is automatically pulled from the CF-2R-MCH-27d. If whole-building ventilation rate calculation method does not match this entry, it can be overwritten by rater from list but it will be flagged as a possible fail. Select the Whole Building Ventilation Rate Calculation Method from the choices provided:
   - Fan Ventilation Rate Method
   - Total Ventilation Rate Method
6. This information is automatically pulled from the CF-2R-MCH-27d. If whole-building ventilation system type does not match this entry, it can be overwritten by rater from list but it will be flagged as a possible fail. Select the Whole Building Ventilation System Type from the choices provided:
   - Standalone - Exhaust
   - Standalone - Supply
   - Standalone - Balanced
   - Central Fan Integrated (CFI)

B. Intermittent Ventilation

1. Intermittent ventilation requires controls that ensure a regular operating schedule every 24 hours. Within a 24 hour period there will be one or more regular on off cycles. For a single on off cycle, enter the on time in hours. This value will be verified by a HERS rater.
2. Intermittent ventilation requires controls that ensure a regular operating schedule every 24 hours. Within a 24 hour period there will be one or more regular on off cycles. For a single on off cycle, enter the off time in hours. This value will be verified by a HERS rater.
3. This row performs an automatic check. The intermittent ventilation system must operate at least once every 24 hours. For this to occur, the on time plus the off time in a single on off cycle must be less than 24 hours. If this is true, "OK" will appear. If this is not true, an error will appear here and correct values will need to be entered into Rows C01 and C02. The equation used to calculate this value in the field equals: Time on in hours row C01 + Time off in hours row C02.
4. This value is automatically calculated. It is the daily fractional on time (*f*) used in 62.2 Table 4.2. A value of 0.60 means that in a 24 hour period the fan will run 60% of the time. The equation used to calculate this value in the field equals: On time in Hours row C01/(On time in Hours row C01 + Off time in Hours row C02)= Daily fractional on time
5. This row performs an automatic check. The ventilation system must operate at least 10% of the time. Row C04 must be greater than or equal to 0.10. If this is true, "OK" will appear. If this is not true, an error message will appear here and correct values will need to be entered into Rows C01 and C02.
6. This value is automatically calculated. It is the turnover (N) used in 62.2 Table 4.2. The equation used to calculate this value in the field equals: [12.8 x Continuous Whole-Building Ventilation Rate row B01 x (On time in Hours row C01 + Off time in Hours row C02)]/ Conditioned floor area of dwelling unit row A02= Turnover N
7. User entered value use the daily fractional time (*f*) from Row C04 and the turnover (N) from Row C06 to determine the ventilation effectiveness value (e) from 62.2 table 4.2.
8. This value is automatically calculated using 62.2 equation 4.8. It represents the required airflow in cfm that must be delivered during the ventilation system on times. This value will be verified by a HERS rater. The equation used to calculate this value in the field equals: Continuous Whole-Building Ventilation Rate row B01/(Daily fractional on time row C04 x ventilation effectiveness value row C07= required Intermittent ventilation rate
9. User entered value equals the installed intermittent ventilation rate in (CFM)
10. This information is automatically pulled from the registered CF-3R-MCH-22 row B07 Note: this line only visible if CFI System selected in A06
11. This information is automatically calculated based on C10 Note: this line only visible if CFI System selected in A06

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:

STATE OF CALIFORNIA

RETURN DUCT DESIGN AND AIR FILTER DEVICE SIZING ACCORDING TO TABLES 150.0-C OR D

CEC-CF3R-MCH-28-H (Revised 06/13)

CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF VERIFICATION		CF3R-MCH-28-H
Return Duct Design and Air Filter Device Sizing According to Tables 150.0-C or D		(Page 1 of 2)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City	Zip Code

A. System Information		
01	System Identification or Name	
02	System Location or Area Served	
03	Nominal Cooling Capacity (tons) of Condenser	
04	Number of Return Ducts	
05	Notes	

B. One Return Duct		
01	Minimum Return Duct Diameter (inches)	
02	Installed Return Duct Diameter (inches)	
03	Minimum Total Return Filter Grille Gross Area (inch$^{2)}$	
04	Installed Total Return Filter Grille Gross Area (inch^2)	
05	Compliance Statement:	

C. Two Return Ducts		
01	Minimum Return Duct1 Diameter (inches)	
02	Installed Return Duct1 Diameter (inches)	
03	Minimum Return Duct2 Diameter (inches)	
04	Installed Return Duct2 Diameter (inches)	
05	Minimum Total Return Filter Grille Gross Area (inch^2)	
06	Installed Total Return Filter Grille Gross Area (inch^2)	
07	Compliance Statement:	

D Additional Requirements For Compliance		
01	Qualification for the Alternative to Section 150.0(m)13B requires that the ducted space conditioning system shall not use zoning dampers. Systems that use zoning dampers shall comply with the requirements of Section 150.0(m)15.	
02	The return duct length for each return air filter grille shall not exceed 30 linear feet.	
03	The return duct(s) shall not contain more than a total of 180 degrees of bend.	
04	If the return duct contains more than 90 degrees of bend, one of the bends shall be a metal elbow.	
05	Return grille devices shall be labeled in accordance with the requirements in section 150.0(m)12A to disclose the grille's design airflow rate and a maximum allowable clean-filter pressure drop of 12.5 Pa (0.05 inches water) for the air filter media as rated in accordance with AHRI Standard 680 for the design airflow rate for the return grille.	
06	Verification Status:	
07	Correction Notes:	
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.		

RETURN DUCT DESIGN AND AIR FILTER DEVICE SIZING ACCORDING TO TABLES 150.0-C OR D

CERTIFICATE OF VERIFICATION		CF3R-MCH-28-H
Return Duct Design and Air Filter Device Sizing According to Tables 150.0-C or D		(Page 2 of 2)
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:

Instructions for MCH-28

Section A. System Information

1. *System Identification or Name:* the system identification/name is automatically pulled from the CF2R-MCH-28.
2. *System Location or Area Served:* the location/area served is automatically pulled from the CF2R-MCH-28.
3. *Nominal Cooling Capacity (tons) of Condenser:* Enter the installed condenser nominal cooling capacity in tons, data may be found on the manufacturer documentation.
4. *Number of Return Ducts:* Select the number of return ducts from the options given in the pull down list, either one or two return ducts.
5. *Notes:* If the installed condenser nominal cooling capacity does not match the Installation Certificate, a note indicating the discrepancy will be shown.

Section B. One Return Duct

1. *Minimum Return Duct Diameter:* This field is automatically calculated based on row A03.
2. *Installed Return Duct Diameter:* Enter the installed return duct diameter (inches).
3. *Minimum Total Return Filter Grille Gross Area:* This field is automatically calculated based on row A03.
4. *Installed Total Return Filter Grille Gross Area:* Enter the installed return filter grille gross area ($inch^2$). The area is equal to the length (inches) multiplied by the width (inches).
5. *Compliance Statement:* This field is automatically populated based on the inputs to rows B02 and B04.

Section C. Two Return Ducts

1. *Minimum Return Duct1 Diameter:* This field is automatically calculated based on row A03.
2. *Installed Return Duct1 Diameter:* Enter the diameter (inches) for the first return duct run.
3. *Minimum Return Duct2 Diameter:* This field is automatically calculated based on row A03.
4. *Installed Return Duct2 Diameter:* Enter the diameter (inches) for the second return duct run.
5. *Minimum Total Return Filter Grille Gross Area:* This field is automatically calculated based on row A03.
6. *Installed Total Return Filter Grille Gross Area:* Enter the total return filter grille gross area by summing up the two grille areas. The area of each grill is equal to the length (inches) multiplied by the width (inches).
7. *Compliance Statement:* This field is automatically populated based on the inputs to row C02, C04 and C06.

Section D Additional Requirements for Compliance

6. HERS Rater to select from list:
   a. Pass - all applicable requirements are met.
   b. Fail - one or more applicable requirements are not met. Rater must enter reason for failure in corrections notes field below.
7. Correction Notes, Rater must enter reason for failure.

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:

STATE OF CALIFORNIA

DUCT SURFACE AREA REDUCTION; R-VALUE; BURIED DUCTS COMPLIANCE CREDIT

CEC-CF3R-MCH-29-H (Revised 06/13) CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF VERIFICATION		CF3R-MCH-29-H
Duct Surface Area Reduction; R-Value; Buried Ducts Compliance Credit		(Page 1 of 3)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City	Zip Code

Note: Submit one Certificate of installation for each duct system that must demonstrate compliance in the dwelling.

A. DUCT SYSTEM INFORMATION		
01.	Duct System Name or Identification/Tag:	
02.	Duct System Location or Area Served:	
03	Status - Duct Surface Area Reduction And R-Value Compliance Credit	
04	Status - Buried Ducts Compliance Credit	
05	Status - Deeply Buried Ducts Compliance Credit	

B. DUCT SURFACE AREA REDUCTION AND R-VALUE COMPLIANCE CREDIT

Credit is available for supply duct systems with reduced surface area in unconditioned space with varying combinations of higher performance insulation if the system complies with the following requirements:

01	The duct system design shall be detailed in the special features section of the CF1R-PRF-01-E approved by the enforcement agency.	
02	A duct design layout that conforms to the duct system design details in the special features section of the CF1R-PRF-01-E shall be documented on the building design plans approved by the enforcement agency.	
03	The duct system installation, including duct sizes and locations of supply & return registers shall conform to the duct system design layout approved by the enforcement agency.	
04	The duct system installation shall be verified by a HERS rater according to the requirements in RA3.1.4.1.4.	
05	The duct system installation shall not have severely twisted or compressed sections that would restrict required operating airflow.	
06	Verification Status:	
07	Correction Notes:	

The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.

C. BURIED DUCTS COMPLIANCE CREDIT

Ducts partly or completely buried in blown attic insulation in dwelling units meeting the requirements for verified quality insulation installation may take credit for increased effective duct insulation if the system complies with the following requirements:

01	The duct system design shall be detailed in the special features section of the CF1R-PRF-01-E approved by the enforcement agency.	
02	A duct design layout that conforms to the duct system design details in the special features section of the CF1R-PRF-01-E shall be documented on the building design plans approved by the enforcement agency.	
03	The duct system installation, including duct sizes and locations of supply & return registers shall conform to the duct system design layout approved by the enforcement agency.	
04	The duct system installation shall be verified by a HERS rater according to the requirements in RA3.1.4.1.5.	
05	The duct system installation shall not have severely twisted or compressed sections that would restrict required operating airflow.	
06	The dwelling shall comply with all Quality Insulation Installation requirements as documented on the applicable CF2R and CF3R.	
07	Verification Status:	
08	Correction Notes:	

The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.

CERTIFICATE OF VERIFICATION		CF3R-MCH-29-H
Duct Surface Area Reduction; R-Value; Buried Ducts Compliance Credit		(Page 2 of 3)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City	Zip Code

D. DEEPLY BURIED DUCTS COMPLIANCE CREDIT

Duct segments deeply buried in lowered areas of ceiling and covered by at least 3.5 inches of insulation above the top of the duct insulation jacket may claim effective insulation of R-25 for fiberglass insulation and R-31 for cellulose insulation if the system complies with the following requirements:

01	The duct system design shall be detailed in the special features section of the CF1R-PRF-01-E approved by the enforcement agency.	
02	A duct design layout that conforms to the duct system design details in the special features section of the CF1R-PRF-01-E shall be documented on the building design plans approved by the enforcement agency.	
03	The duct system installation, including duct sizes and locations of supply & return registers shall conform to the duct system design layout approved by the enforcement agency.	
04	The duct system installation shall be verified by a HERS rater according to the requirements in RA3.1.4.1.6.	
05	The duct system installation shall not have severely twisted or compressed sections that would restrict required operating airflow.	
06	The dwelling shall comply with all Quality Insulation Installation requirements as documented on the applicable CF2R and CF3R.	
07	Verification Status:	
08	Correction Notes:	

The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.

CERTIFICATE OF VERIFICATION		CF3R-MCH-29-H
Duct Surface Area Reduction; R-Value; Buried Ducts Compliance Credit		(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:

Instructions for MCH-29

Section A. Duct Information

1. System Name or Identification/Tag: This field is auto filled as referenced from the CF2R-MCH-29. This provides an identification name or tag name that uniquely identifies the duct system. If there is a mechanical plan for the system, the tag name may be given on the plans.
2. System Location or Area Served: This field is auto filled as referenced from the CF2R-MCH-29. This provides a brief description of the area served by the duct system (e.g. upstairs; downstairs).
3. Status – Duct Surface Area Reduction and R-Value Compliance Credit: This field is auto filled from the CF1R-PRF-01-E indicating if the credit is being used. If not, then N/A will be displayed.
4. Status – Buried Ducts Compliance Credit: This filed is auto filled from the CF1R-PRF-01-E indicating if the credit is being used. If not, then "N/A" will be displayed.
5. Status – Deeply Buried Ducts Compliance Credit: This field is auto filled from the CF1R-PRF-01-E indicating if the credit is being used. If not, then "N/A" will be displayed.

Section B. Supply Duct Surface Area Reduction and R-Value Compliance Credit

6. HERS Rater to select from list:
   a. Pass - all applicable requirements are met.
   b. Fail - one or more applicable requirements are not met. Rater must enter reason for failure in corrections notes field below.
7. Correction Notes, Rater must enter reason for failure.

Section C. Buried Ducts Compliance Credit

7. HERS Rater to select from list:
   a. Pass - all applicable requirements are met.
   b. Fail - one or more applicable requirements are not met.
8. Correction Notes, Rater must enter reason for failure.

Section D. Deeply Buried Ducts Compliance Credit

7. HERS Rater to select from list:
   a. Pass - all applicable requirements are met.
   b. Fail - one or more applicable requirements are not met. Rater must enter reason for failure in corrections notes field below.
8. Correction Notes, Rater must enter reason for failure.

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT	
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Company:	Date Signed:
Address:	CEA/HERS Certification Information (if applicable):
City/State/Zip:	Phone:

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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:

Central Fan Ventilation Cooling Systems (VCS)

CERTIFICATE OF VERIFICATION		CF3R-MCH-30-H
Central Fan Ventilation Cooling Systems (VCS)		(Page 1 of 2)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City	Zip Code

Central Fan Ventilation Cooling System (VCS)

When the Certificate of Compliance indicates a Central Fan Ventilation Cooling system is installed, the following items must be verified by the installer and also by a HERS Rater on a corresponding CF2R-MCH30.

A. Central Fan Ventilation Cooling System (VCS) Equipment Information		
01	System Name or Identification/Tag	
02	System Location or Area Served	
03	Central Fan VCS Equipment - Manufacturer Name	
04	Central Fan VCS Equipment - Manufacturer Model #	
05	Central Fan VCS Equipment - Fan Type	
06	Central Fan VCS Equipment - Certification Status	
07	Duct Leakage Verification Status	
08	Fan Efficacy Verification Status	
09	Central Fan Ventilation Cooling System controls: includes installation of an indoor thermostat	
10	Central Fan Ventilation Cooling System controls: includes installation of an outdoor temperature sensor to initiate and terminate ventilation cooling operation automatically.	
11	Central Fan Ventilation Cooling System controls: includes installation of an air handler temperature sensor to ensure correct outdoor air damper position.	

B. Compliance Statement

C. Additional Requirements		
01	Qualification for Central Fan Ventilation Cooling Compliance Credit requires use of approved models Certified to the Energy Commission for use for Ventilation Cooling, and listed in the Special Case Appliances Directory on the Energy Commission Website.	
02	Variable speed motor systems shall be capable of varying system airflow rate in a continuous range between full air flow rate (100%) and a minimum airflow rate of no more than 25% of the full airflow rate.	
03	The Central Fan Ventilation Cooling System manufacturer shall provide detailed system operation documentation to the building owner that describes how to configure the system controls and operate the system to obtain the maximum energy savings benefit. The manufacturer's system operation documentation shall also describe how the system's control strategy is implemented; how the fan speed is controlled during ventilation cooling mode; and how ventilation cooling rates are determined. System target ventilation cooling rate calculations (if applicable) shall occur at time intervals of 24 hours or less to ensure the system responds correctly to changes in weather patterns.	
04	Verification Status:	
05	Correction Notes:	
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.		

CERTIFICATE OF VERIFICATION		CF3R-MCH-30-H
Central Fan Ventilation Cooling Systems (VCS)		(Page 2 of 2)
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

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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.
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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:

Instructions for MCH-30

Section A. Whole House Fan Equipment Information

1. Enter the Central Fan Ventilation Cooling System (VCS) Name or identification tag to help identify this system from other systems in the house. This field is automatically filled in as referenced from the CF-2R-MCH-01 description for this system.
2. Enter the Location or Area Served by the Central Fan VCS. This is a tag to distinguish this system from other systems in the house. This field is automatically filled in as referenced from the CF-2R-MCH-01 description for this system.
3. Enter the Central Fan VCS Manufacturer Name.
4. Enter the Central Fan VCS Manufacturer Model Number.
5. The Central Fan VCS fan type is specified by the performance approach software. This field is filled in automatically as referenced from the CF-1R. The choices are "Fixed" or "Variable". Variable fans receive more compliance credit. The installed fan type should match the fan type specified on the CF1R.
6. HERS Rater must verify/confirm that the Central Fan VCS Equipment is included in the Energy Commission listing of approved VCS devices and that the fan type, "Fixed" or "Variable", indicated in Row A05 matches what is shown on the list.
7. Compliance credit for Central Fan VCS also requires that the system conforms to the maximum Duct Leakage verification requirements. This row automatically queries the project data to confirm that a CF-3R-MCH-20 has been registered indicating that the system passed the duct leakage criterion.
8. Compliance credit for Central Fan VCS also requires that the system pass the Fan Efficacy requirements. This row automatically queries the project data to confirm that a CF-3R-MCH-22 Fan Efficacy verification has been registered indicating that the system passed.
9. HERS Rater must confirm that the Central Fan VCS includes a properly installed indoor thermostat designed specifically for use with the installed VCS.
10. HERS Rater must confirm that the Central Fan VCS includes a properly installed outdoor temperature sensor to initiate and terminate ventilation cooling operation automatically.
11. HERS Rater must confirm that the Central Fan VCS includes a properly installed air handler temperature sensor to verify damper position.

Section C. Additional Requirements

4. HERS Rater to select from list:
   a. Pass - all applicable requirements are met.
   b. Fail - one or more applicable requirements are not met. Rater must enter reason for failure in corrections notes field below.
   c. All n/a - This entire table is not applicable.
5. Correction Notes, Rater must enter reason for failure.

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:

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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:

CERTIFICATE OF VERIFICATION		CF3R-PLB-20-H
Single Dwelling Unit Hot Water System Distribution		(Page 1 of 5)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City	Zip Code

A. General System Information		
01	Water Heating System Name:	
02	Dwelling Unit Distribution Type:	

B. MANDATORY MEASURES FOR ALL DOMESTIC HOT WATER DISTRIBUTION SYSTEMS		
01	Equipment shall meet the applicable requirements of the Appliance Efficiency Regulations (Section 110.3(b)1).	
02	Unfired Storage Tanks are insulated with an external R-12 or combination of R-16 internal and external Insulation. (Section 110.3(c)4).	
03	All piping with a nominal diameter of 3/4 inch (19 millimeter) or larger must be insulated with R3.6 or 1" of insulation. (Section 150.0(j))	
04	All hot water piping insulated from the water heater to the kitchen fixture or appliance with R3.6 or 1" of insulation (Section 150.0(j))	
05	The first 5 feet of hot and cold water pipes shall be insulated from the storage tank with R3.6 or 1" of insulation. (Section 150.0(j))	
06	Piping from the heating source to storage tank or between tanks must be insulated (Section 150.0(j))	
07	All piping associated with a domestic hot water recirculation system regardless of the pipe diameter must be insulated (Section 150.0(j))	
08	Piping from the heating source to storage tank or between tanks must be insulated (Section 150.0(j))	
09	Piping buried below grade must be installed in a water proof and non-crushable casing or sleeve that allows for installation, removal, and replacement of the enclosed pipe and insulation. (Section 150.0(j))	
10	All elbows and tees shall be fully insulated. (RA4.4.1)	
11	Where insulation is required, no piping shall be visible due to insulation voids. (RA4.4.1)	
12	All insulation shall fit tightly to the pipe (RA4.4.1)	
13	The maximum length per dwelling unit of 1 inch diameter piping in a non-recirculating system is less than 15 feet (Section 150.0(j))	
14	**For Gas or Propane Water Heaters:** Ensure the following are installed (Section 150.0(n)) 1. A 120V electrical receptacle is within 3 feet from the water heater and accessible with no obstructions 2. A Category III or IV vent, or a Type B vent with straight pipe between outside and water heater 3. A condensate drain no more than 2 inches higher than the base on water heater for natural draining 4. A gas supply line with capacity of at least 200,000 Btu/Hr	
15	Verification Status:	
16	Correction Notes:	

The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.

CERTIFICATE OF VERIFICATION		CF3R-PLB-20-H
Single Dwelling Unit Hot Water System Distribution		(Page 2 of 5)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City	Zip Code

C. (PIC-H) HERS-Verified Pipe Insulation Credit		
01	HERS verification of All hot water piping 1" and smaller shall be insulated to R-3.6 and be 1 inch thick. Piping with a diameter larger than 1 inch shall comply with the insulation requirements in Table 120.3-A.	
02	Verification Status:	
03	Correction Notes:	
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.		

D. (PP-H)-HERS-Verified Parallel Piping		
01	Central manifold have 8 feet or less of pipe between manifold and water heater	
02	Manifolds that include valves the manifold must be readily accessible in accordance with the plumbing code.	
03	Hot water distribution system piping from the manifold to the fixtures and appliances must take the most direct path. Ex Piping from a second story manifold cannot supply the first floor	
04	The hot water distribution piping must be separated by at least two inches from any other hot water supply piping	
05	Verification Status:	
06	Correction Notes:	
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.		

E. (CHWDS-H) HERS-Verified Compact Hot Water Distribution System		
01	Number of floors in the building	
02	Conditioned floor area	
03	Value for HERS verification –The maximum measured distance in feet of a straight line from the water heater to the furthest point of use For the floor area served.	
04	Verification Status:	
05	Correction Notes:	
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.		

CERTIFICATE OF VERIFICATION		CF3R-PLB-20-H
Single Dwelling Unit Hot Water System Distribution		(Page 3 of 5)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City	Zip Code

F. (POU-H)-HERS-Verified Point of Use		
01	Determine the allowed length of piping for the longest run terminating in: 3/8" - For only one pipe size = 15ft For multiple pipe sizes the allowed length of 3/8" piping is 7.5ft, of ½" piping is 5ft, and ¾" piping is 2.5ft. ½" - For only one pipe size = 10ft For multiple pipe sizes the allowed length of ½" piping is 5ft, and ¾" piping is 2.5ft. ¾" - For only one pipe size = 5ft	
02	Value for HERS verification –The maximum measured distance in feet of pipe from a water heater to the any point of use.	
03	Verification Status:	
04	Correction Notes:	
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.		

G. (RDRmc-H) - HERS-Verified Demand Recirculation Manual Control	
01	Verify the controlled recirculation systems operate "on-demand", meaning that pump operation shall be initiated shortly prior to the hot water draw. The controls shall operate on the principal of shutting off the pump with a sensed rise in pipe
02	If more than one loop installed each loop shall have its own pump and controls
03	Verify that the pump, demand controls and thermo-sensor are present
04	Manual switches are located in the kitchen, all bathrooms, and any hot water use location that is at least 20 feet (measured along the hot water piping) from the water heater
05	Manual controlled systems may be activated by wired or wireless button mechanisms
06	Automatic Air release valve is installed on the inlet side of the recirculation pump per Section 110.3(c)5A.
07	A check valve is located between the recirculation pump and the water heater per Section 110.3(c)5B.
08	Hose bibb is installed between the pump and the water heating equipment with an isolation valve between the hose bibb and the water heating equipment per Section 110.3(c)5C.
09	Isolation valves are installed on both sides of the pump. One of the isolation valves may be the same isolation valve as in item 8 above per Section 110.3(c)5D.
10	The cold water supply piping and the recirculation loop piping is not connected to the hot water storage tank drain port per Section 110.3(c)5E.
11	A check valve is installed on the cold water supply line between the hot water system and the next closest tee on the cold water supply per Section 110.3(c)5F.
12	Verification Status:
13	Correction Notes:
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.	

CERTIFICATE OF VERIFICATION		CF3R-PLB-20-H
Single Dwelling Unit Hot Water System Distribution		(Page 4 of 5)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City	Zip Code

H.(RDRsc-H) HERS-Verified Demand Recirculation Sensor Control<< Table H appears only if (RDRsc-H)- is selected in A2.>>		
01	Verify the controlled recirculation systems operate “on-demand”, meaning that pump operation shall be initiated shortly prior to the hot water draw. The controls shall operate on the principal of shutting off the pump with a sensed rise in pipe	
02	If more than one loop installed each loop shall have its own pump and controls	
03	Verify that the pump, demand controls and thermo-sensor are present	
04	Sensor controls are located in the kitchen, all bathrooms, and any hot water use location that is at least 20 feet (measured	
05	Sensor controlled systems may be activated by wired or wireless button mechanisms	
06	Automatic Air release valve is installed on the inlet side of the recirculation pump per Section 110.3(c)5A.	
07	A check valve is located between the recirculation pump and the water heater per Section 110.3(c)5B.	
08	Hose bibb is installed between the pump and the water heating equipment with an isolation valve between the hose bibb and the water heating equipment per Section 110.3(c)5C.	
09	Isolation valves are installed on both sides of the pump. One of the isolation valves may be the same isolation valve as in item 8 above per Section 110.3(c)5D.	
10	The cold water supply piping and the recirculation loop piping is not connected to the hot water storage tank drain port per Section 110.3(c)5E.	
11	A check valve is installed on the cold water supply line between the hot water system and the next closest tee on the cold water supply per Section 110.3(c)5F.	
12	Verification Status:	
13	Correction Notes:	
The responsible person’s signature on this compliance document affirms that all applicable requirements in this table have been met.		

CERTIFICATE OF VERIFICATION		CF3R-PLB-20-H
Single Dwelling Unit Hot Water System Distribution		(Page 5 of 5)
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:

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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:

CF2R-PLMB-20-H Instructions

TABLE E1 **Compact Hot Water Distribution System-(CHWDS)**	
Floor Area Served (ft2)	Maximum Measured Water Heater To Use Point Distance (ft)
< 1000	28’
1001 – 1600	43’
1601 – 2200	53’
2201 – 2800	62’
>2800	68’

TABLE F1 **HERS-Verified Point of Use (POU-H)**	
Size Nominal, Inch	Maximum Measured Water Heater To Use Point Distance Length of Pipe (feet)
3/8”	15
1/2”	10
3/4”	5

A. DHW DISTRIBUTION SYSTEM

1. Water Heating System Name: From CF-2R-PLB-20-H
2. Dwelling Unit Distribute type: Based on the system being installed, pick from one of the following - HERS-Verified Pipe Insulation Credit (PIC-H), HERS-Verified Parallel Piping (PP-H), HERS-Verified Compact Hot Water Distribution System (CHWDS-H), HERS-Verified Point of Use (POU-H), HERS-Verified Demand Recirculation Manual Control (RDRmc-H), or HERS-Verified Demand Recirculation Sensor Control (RDRsc-H).

B. MANDATORY MEASURES FOR ALL DOMESTIC HOT WATER DISTRIBUTION SYSTEMS

Ensure all mandatory requirements are met.

C. (PIC-H) HERS-Verified Pipe Insulation Credit

Inspection to verify that all hot water piping in non-recirculating systems is insulated and that corners and tees are fully insulated. No piping should be visible due to insulation voids with the exception of the last segment of piping that penetrate walls and delivers hot water to the sink, appliance, etc. Refer to RA3.6.3.

D. (PP-H)-HERS-Verified Parallel Piping

Inspection that requires that the measured length of piping between the water heater and single central manifold does not exceed five feet. Refer to RA3.6.4.

E. (CHWDS-H) HERS-Verified Compact Hot Water Distribution System

Field verification to insure that the longest pipe run from any use point to the water heater serving that use point does not exceed a maximum length in Table E1 above. Refer to RA3.6.5.

F. (POU-H)-HERS-Verified Point of Use

Inspection that all hot water fixtures in the dwelling unit, with the exception of the clothes washer, must be located within certain distance from a water heater based on pipe diameter. To meet this requirement, most houses will require multiple water heaters. Ensure the maximum pipe length does not exceed the length specified in Table F1 above. Refer to RA3.6.6.

G. (RDRmc-H) - HERS-Verified Demand Recirculation Manual Control

Inspection to verify that all recirculating hot water piping is insulated and that corners and tees are fully insulated. No piping should be visible due to insulation voids. Refer to RA3.6.7.

H.(RDRsc-H) HERS-Verified Demand Recirculation Sensor Control

Inspection to verify that all recirculating hot water piping is insulated and that corners and tees are fully insulated. No piping should be visible due to insulation voids. Refer to RA3.6.8.

MULTIFAMILY CENTRAL HOT WATER SYSTEM DISTRIBUTION

CERTIFICATE OF VERIFICATION		CF3R-PLB-21-H
Multifamily Central Hot Water System Distribution		(Page 1 of 2)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City	Zip Code

A. SYSTEM TYPE	
01	HERS-Verified Multiple Recirculation Loops for DHW Systems Serving Multiple Dwelling Units

B. HERS VERIFICATION REQUIREMENTS FOR ALL CENTRAL DOMESTIC HOT WATER RECIRCULATION SYSTEMS		
01	Outlet temperature controls: On systems that have a total capacity greater than 167,000 Btu/hr, outlets that require higher than service water temperatures as listed in the ASHRAE Handbook shall have separate remote heaters, heat exchangers, or boosters to supply the outlet with the higher temperature. (Section 110.3 (c)1)	
02	Controls for hot water distribution systems: Service hot water systems with circulating pumps or with electrical heat trace systems shall be capable of automatically turning off the system. (Section 110.3(c)2).	
03	Unfired Storage Tanks are insulated with an external R-12 or combination of R-16 internal and external Insulation. (Section 110.3(c)4).	
04	Automatic Air release valve is installed on the inlet side of the recirculation pump per Section 110.3(c)5A.	
05	A check valve is located between the recirculation pump and the water heater per Section 110.3(c)5B.	
06	Hose bibb is installed between the pump and the water heating equipment with an isolation valve between the hose bibb and the water heating equipment per Section 110.3(c)5C.	
07	Isolation valves are installed on both sides of the pump. One of the isolation valves may be the same isolation valve as in item 6 above per Section 110.3(c)5D.	
08	The cold water supply piping and the recirculation loop piping is not connected to the hot water storage tank drain port per Section 110.3(c)5E.	
09	A check valve is installed on the cold water supply line between the hot water system and the next closest tee on the cold water supply per Section 110.3(c)5F.	
10	System must have a dedicated return line which is insulated. (Section 120.3)	
11	All hot water pipes are insulated per the insulation requirements of Table 120.3A(Section 120.3)(1" insulation for 1" and smaller pipes. 1.5" insulation for 1 to 1.5 inch pipes)	
12	Where insulation is installed there is no piping visible due to insulation voids	
13	All elbows and tees fully insulated	
14	Verification Status:	
15	Correction Notes:	
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.		

C. HERS-VERIFIED MULTIPLE RECIRCULATION LOOPS FOR DHW SYSTEMS SERVING MULTIPLE DWELLING UNITS		
01	All buildings with 8 or more dwelling units have a **minimum** 2 recirculation loops.	
02	Each loop roughly serves the same number of dwellings.	
03	Each loop will have its own pump and controls	
04	Verification Status:	
05	Correction Notes:	
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.		

CERTIFICATE OF VERIFICATION	CF3R-PLB-21-H
Multifamily Central Hot Water System Distribution	(Page 2 of 2)

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:

A. SYSTEM TYPE

This form is used for HERS verification credit for Multiple Recirculation Loop Designs for DHW Systems Serving Multiple Dwelling Units defined in RA3.6.9.

B. MANDATORY MEASURES FOR ALL DOMESTIC HOT WATER DISTRIBUTION SYSTEMS

Ensure all mandatory requirements are met.

C. HERS-VERIFIED MULTIPLE RECIRCULATION LOOPS FOR DHW SYSTEMS SERVING MULTIPLE DWELLING UNITS

This measure requires on site HERS verification that at least two central recirculation loops are included in the system design. This credit is available to buildings with 8 or more units. The recirculation loops must be relatively equal in length and supply approximately the same number of dwelling units.

A. GENERAL INFORMATION

01	Project Name:				
02	Calculation Description				
03	Input File Name				
04	Multifamily/Subdivision Name				
05	Project Location:		06	Rule Set Filename:	
07	CA City :		08	Compliance Method:	
09	Zip code		10	Compliance Software:	
11	Climate Zone:		12	Bldg Front Orientation (deg or cardinal):	
13	Building Type:		14	Number of Dwelling Units:	
15	Construction Type:		16	Number of Zones:	
17	Total Cond. Floor Area (FT2):		18	Number of Stories:	
19	Slab Area (FT2):		20	Average Ceiling Height (FT):	
21	Addition Cond Floor Area (FT2):		22	Natural Gas on site?:	
23	Addition Slab Area (FT2):		24	Glazing Percentage (%):	
Verification Status:					

B. OPAQUE SURFACES - Roof Details (Gray columns are informational and need not be verified by Rater)*

Roof Type	Roof Pitch	Aged (or Initial?) Solar Reflectance	Thermal Emittance	Frame Type	Frame Depth (in)	Frame Spacing (in)	R-Value Above Deck	R-Value Below Deck	Status
Verification Status:									

C. OPAQUE SURFACES - Attic Details (Gray columns are informational and need not be verified by Rater)*

Dwelling Unit	Frame Type	Area (ft^2)	U-factor	Cavity R-value	Continuous Insulation R-value	Actual Azimuth (deg)	Tilt	Solar Gains	Appendix JA4 Reference	Attic Ventilation	Status

Verification Status:

D. OPAQUE SURFACES - Floor Details (Gray columns are informational and need not be verified by Rater)*

Dwelling Unit	Surface Type	Frame Type	Area (ft^2)	U-factor	Cavity R-value	Continuous Insulation R-value	Tilt	Solar Gains	Appendix JA4 Reference	Status

Verification Status:

E. OPAQUE SURFACES – Wall Details (Gray columns are informational and need not be verified by Rater)*

Surface Type	Frame Type	Area (ft^2)	U-factor	Cavity R-value	Continuous Insulation R-value	Actual Azimuth	Tilt	Solar Gains	Appendix JA4 Reference	Location/Comments	Status

Verification Status:

F. FENESTRATION SURFACES*

Orientation	Surface	Area (ft^2)	U-factor	SHGC	Source	Actual Azimuth	Tilt	Film SHGC	Location/Glazing Type	Status
Verification Status:										

G. EXTERIOR SHADING*

Window					Overhang				Side Fin				
Surface	Exterior Shade Type	Area (ft^2)	Width	Height	Depth	Height	Left Extension	Right Extension	Left Dist	Left Len	Right Dist	Right Len	Status
Verification Status:													

H. HVAC SYSTEMS*

HVAC System Name	Heating System Type	Heating Efficiency	Cooling System Type	Cooling Efficiency SEER	Cooling Efficiency EER	duct system Name	Fan Type	Status
Verification Status:								

I. HVAC DUCT SYSTEMS*

Duct System Name	Return Duct System Type	Return Duct R-Value	Return Duct Location	Supply Duct System Name	Supply Duct R-Value	Supply Duct Location	Status

Verification Status:

J. WATER HEATING SYSTEMS*

Water Heating System Name	Water Heating System Type	Central Distribution Type	Dwelling Unit Distribution Type	DHW Water Heater Type	Energy Factor or Recovery Efficiency or Thermal Efficiency	Rated Output (Btuh)	Standby Loss Total (Btuh)	Pilot Energy (Btuh)	Standby Loss (%)	Water Heater Volume (gal)	Number of water heaters in System	Water Heater Tank Exterior Insulation	Supplemental Tank Volume (gal)	Supplemental Tank External Insulation R-value	Supplemental Tank Interior Insulation R-Value	Status

Verification Status:

K. HYDRONIC HEATING SYSTEM PIPING*

System Name	Pipe Length (FT)	Nominal Pipe Diameter (inch)	Insulation R-Value	Status

Verification Status:

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. 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.

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

Instructions:
The vast majority of this form will be data transferred from the CF1R and software input file. This data is to be verified by the HERS rater, with the exception of columns that are "grayed out". These are provided for informational purposes only and the Rater does not need to verify this information. Each section above could have no rows to verify, or it could have many, depending on how the building was modeled. Each row needs to be verified. If the information in a particular row is not acceptable, the Rater will overwrite the incorrect information and a blank row will appear under the current row. The Rater will use this row to explain why it is an error. This may be for one or all of the columns for that row.
If any rows are overwritten "Fail" will appear in the last row of that section ("Verification Status"). The Rater must enter a general description of what failed and why.
If an item is missing from the list, (for example: five windows should have been modeled but only four appear on the list), the Rater can enter "Fail" in the last row and explain what is missing.
Generally Speaking, an item (row and column) should fail if what appears on this form is "worse" than what exists in the home (i.e., results in higher modeled energy use). For example, if R-0 appears on this form as the ceiling insulation but the existing home has some insulation, it should be marked as a fail Conversely, if this form shows R13 as the ceiling insulation, but only R-11 exists, this should not be marked as a fail. If the determination of "worse" is not readily apparent (e.g., wrong roof type specified), then it should be marked as a fail.

Sections:

A. General Information
Rater should verify this information to the best of their ability. Any questions or deviations should be indicated in the Verification Status row.

B. OPAQUE SURFACES - Roof Details (Gray columns are informational and need not be verified by Rater)
Existing roof type, R-value above deck and R-value below deck should all be verified.

C. OPAQUE SURFACES - Attic Details (Gray columns are informational and need not be verified by Rater)
Existing dwelling unit, frame type, area, u-factor, and R-values should all be verified.

D. OPAQUE SURFACES - Floor Details (Gray columns are informational and need not be verified by Rater)
Existing dwelling unit, surface type, frame type, area, u-factor, and R-values should all be verified.

E. OPAQUE SURFACES – Wall Details (Gray columns are informational and need not be verified by Rater)
Existing wall type, frame type, area, u-factor and R-values, should all be verified.

F. FENESTRATION SURFACES
All columns of this section should be verified.

G. EXTERIOR SHADING
All columns of this section should be verified.

H. HVAC SYSTEMS
All columns of this section should be verified.

I. HVAC DUCT SYSTEMS
All columns of this section should be verified.

J. WATER HEATING SYSTEMS
All columns of this section should be verified.

K. HYDRONIC HEATING SYSTEM PIPING
All columns of this section should be verified

A. GENERAL INFORMATION

01	**Project Name:**	<from input file>			
02	**Calculation Description**	<from input file>			
03	**Input File Name**	<from input file>			
04	**Multifamily/Subdivision Name**	<from input file>			
05	**Project Location:**	<from input file>	06	**Rule Set Filename:**	<from input file>
07	**CA City :**	<from input file>	08	**Compliance Method:**	<from input file>
09	**Zip code**	<from input file>	10	**Compliance Software:**	<from input file>
11	**Climate Zone:**	<from input file>	12	**Bldg Front Orientation (deg or cardinal):**	<from input file>
13	**Building Type:**	<from input file>	14	**Number of Dwelling Units:**	<from input file>
15	**Construction Type:**	<from input file>	16	**Number of Zones:**	<from input file>
17	**Total Cond. Floor Area (FT2):**	<from input file>	18	**Number of Stories:**	<from input file>
19	**Slab Area (FT2):**	<from input file>	20	**Average Ceiling Height (FT):**	<from input file>
21	**Addition Cond Floor Area (FT2):**	<from input file>	22	**Natural Gas on site?:**	<from input file>
23	**Addition Slab Area (FT2):**	<from input file>	24	**Glazing Percentage (%):**	<from input file>

Verification Status: <Text field to be filled out by rater if needed, see ** below. Any discrepancies in the above information relative to on site conditions determined by field verification can be overwritten by rater.>
<**>

B. OPAQUE SURFACES - Roof Details (Gray columns are informational and need not be verified by Rater)*

Roof Type	Roof Pitch	Aged (or Initial?) Solar Reflectance	Thermal Emittance	Frame Type	Frame Depth (in)	Frame Spacing (in)	R-Value Above Deck	R-Value Below Deck	Status
<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	E/A

Verification Status: <Text field to be filled out by rater if needed, see ** below.>
<*Any discrepancies in the above information relative to on site conditions determined by field verification can be overwritten by rater.>

<** Automatic input, choices are “Pass” or “Fail”. When no items in this section are overwritten by rater. If any one item above is overwritten by rater, “Fail” appears and user must enter a general description of what failed and why. User should also be able to manually enter “Fail” in the event that an item, such as a window, was not listed, but should have been.>

C. OPAQUE SURFACES - Attic Details (Gray columns are informational and need not be verified by Rater)*

Dwelling Unit	Frame Type	Area (ft^2)	U-factor	Cavity R-value	Continuous Insulation R-value	Actual Azimuth (deg)	Tilt	Solar Gains	Appendix JA4 Reference	Attic Ventilation	Status
<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	E/A
Verification Status: <Text field to be filled out by rater if needed, see ** below.>											

<* and **, same as section B, above>

D. OPAQUE SURFACES - Floor Details (Gray columns are informational and need not be verified by Rater)*

Dwelling Unit	Surface Type	Frame Type	Area (ft^2)	U-factor	Cavity R-value	Continuous Insulation R-value	Tilt	Solar Gains	Appendix JA4 Reference	Status
<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	E/A
Verification Status: <Text field to be filled out by rater if needed, see ** below.>										

<* and **, same as section B, above>

E. OPAQUE SURFACES – Wall Details (Gray columns are informational and need not be verified by Rater)*

Surface Type	Frame Type	Area (ft^2)	U-factor	Cavity R-value	Continuous Insulation R-value	Actual Azimuth	Tilt	Solar Gains	Appendix JA4 Reference	Location/Comments	Status
<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	E/A

Verification Status: <Text field to be filled out by rater if needed, see ** below.>

<* and **, same as section B, above>

F. FENESTRATION SURFACES*

Orientation	Surface	Area (ft^2)	U-factor	SHGC	Source	Actual Azimuth	Tilt	Film SHGC	Location/Glazing Type	Status
<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	E/A

Verification Status: <Text field to be filled out by rater if needed, see ** below.>

<* and **, same as section B, above>

G. EXTERIOR SHADING*

Window					Overhang				Side Fin				
Surface	Exterior Shade Type	Area (ft^2)	Width	Height	Depth	Height	Left Extension	Right Extension	Left Dist	Left Len	Right Dist	Right Len	Status
<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	E/A
Verification Status: <Text field to be filled out by rater if needed, see ** below.>													

<* and **, same as section B, above>

H. HVAC SYSTEMS*

HVAC System Name	Heating System Type	Heating Efficiency	Cooling System Type	Cooling Efficiency SEER	Cooling Efficiency EER	duct system Name	Fan Type	Status
<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	E/A
Verification Status: <Text field to be filled out by rater if needed, see ** below.>								

<* and **, same as section B, above>

I. HVAC DUCT SYSTEMS*

Duct System Name	Return Duct System Type	Return Duct R-Value	Return Duct Location	Supply Duct System Name	Supply Duct R-Value	Supply Duct Location	Status
<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	E/A
Verification Status: <Text field to be filled out by rater if needed, see ** below.>							

<* and **, same as section B, above>

J. WATER HEATING SYSTEMS*

Water Heating System Name	Water Heating System Type	Central Distribution Type	Dwelling Unit Distribution Type	DHW Water Heater Type	Energy Factor or Recovery Efficiency or Thermal Efficiency	Rated Output (Btuh)	Standby Loss Total (Btuh)	Pilot Energy (Btuh)	Standby Loss (%)	Water Heater Volume (gal)	Number of water heaters in System	Water Heater Tank Exterior Insulation	Supplemental Tank Volume (gal)	Supplemental Tank External Insulation R-value	Supplemental Tank Interior Insulation R-Value	Status
<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	<from input file>	E/A

Verification Status: <Text field to be filled out by rater if needed, see ** below.>

<* and **, same as section B, above>

K. HYDRONIC HEATING SYSTEM PIPING*

System Name	Pipe Length (FT)	Nominal Pipe Diameter (inch)	Insulation R-Value	Status
<from input file>	<from input file>	<from input file>	<from input file>	E/A

Verification Status: <Text field to be filled out by rater if needed, see ** below.>

<* and **, same as section B, above>

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT	
2. 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: 4. The information provided on this Certificate of Verification is true and correct. 5. I am the certified HERS Rater who performed the verification identified and reported on this Certificate of Verification (responsible rater). 6. 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.	
HERS RATER INFORMATION	
HERS Rater Company Name:	
Responsible Rater Name:	Responsible Rater Signature:
Responsible Rater Certification Number w/ this HERS Provider	Date Signed: