CERTIFICATE OF COMPLIANCE	CF1R-NCB-01-E
Newly Constructed Buildings	(Page 1 of 6)
Project Name:	Date Prepared:

A. GENERAL INFORMATION

01	**Project Name:**		**02**	**Date:**	
03	**Project Location:**		**04**	**Compliance Method:**	
05	**CA City:**		**06**	**Building Front Orientation (deg or cardinal):**	
07	**Zip Code:**		**08**	**Number of Dwelling Units:**	
09	**Climate Zone:**		**10**	**Fuel Type:**	
11	**Building Type:**	☐ Single Family ☐ Multi Family	**12**	**Total Conditioned Floor Area:**	
13	**Project Type:**	☐ Newly Constructed Building ☐ New Addition greater than 1,000 ft^2	**14**	**Slab Area:**	

B. OPAQUE SURFACE DETAILS – Framed (Section 150.1(c)1)

01	02	03	04	05	06		07	08	09	10	11
					Proposed					**Required**	
Tag/ID	Assembly Type	Frame Type	Frame Depth (inches)	Frame Spacing (inches)	Cavity R-value	Continuous Insulation R-value	U-Factor	Appendix JA4 Reference		U-Factor from Package A	Comments
								Table	Cell		

C. OPAQUE SURFACE DETAILS – Non-framed (Section 150.1(c)1)

01	02	03	04	05	06	07	08	09	10	11
				Proposed					**Required**	
Tag/ID	Assembly Type	Assembly Materials	Thickness (inches)	Core Insulation R-value	Continuous Insulation R-value	U-Factor	Appendix JA4 Reference		U-Factor from Package A	Comments
							Table	Cell		

CERTIFICATE OF COMPLIANCE	CF1R-NCB-01-E
Newly Constructed Buildings	(Page 2 of 6)
Project Name:	Date Prepared:

D. OPAQUE SURFACE DETAILS – Mass Walls (Section 150.1(c)1)

01	02	03	04	05	06		07		08	09	10		11	
					Proposed						**Required**			
					Interior Insulation		Exterior Insulation		Appendix JA4 Reference		Interior Insulation		Exterior Insulation	
Tag/ID	Walls Above Grade	Mass Type	Mass Thickness (inches)	Furring Strip Thickness (inches)	R-value	U-factor	R-value	U-factor	Table	Cell	R-value	U-factor	R-value	U-factor

E. SLAB INSULATION (Table 150.1-A)

01	02		03		04
	Proposed		**Required**		
Floor Type	R-value	U-factor	Insulation R-value	Insulation U-factor	Comments

- **Heated slab floors require mandatory slab insulation (see Table 110.8-A).**

F. RADIANT BARRIER (Section 150.1(c)2

01	02
Radiant Barrier installed below the roof deck and on all gable end walls	Comment

A radiant barrier is required (for Climate Zones 2-15)

- *To meet the prescriptive requirement, a minimum free ventilation area of not less than one square foot of vent area for each 300 ft^2 of attic floor area with 30 percent upper vent.*
- *A minimum air space between the top surface of the radiant barrier and roof decking of not less than 1.5 inches at the center of the truss/rafter span.*
- *Radiant Barrier shall be installed to cover all gable end walls and other vertical surfaces in the attic.*

CERTIFICATE OF COMPLIANCE	CF1R-NCB-01-E
Newly Constructed Buildings	(Page 3 of 6)
Project Name:	Date Prepared:

G. ROOFING PRODUCTS (COOL ROOF) (Section 150.1(c)11)

01	02	03	04	05	06	07	08	09	10	11
				Proposed			**Required**			
Mass Roof 25 lb ft^2 or greater	Roof Pitch	CRRC Product ID Number	Product Type	Aged Solar Reflectance	Thermal Emittance	SRI	Aged Solar Reflectance	Thermal Emittance	SRI	Comments

NOTES:

- Any roof area covered by building integrated photovoltaic panels and solar thermal panels are exempt from the above Cool Roof requirements.
- Liquid field applied coatings must comply with installation criteria from section 110.8(i)4.

H. FENESTRATION/GLAZING AREAS ALLOWED

01	02	03	04	05	06
Tag/ID	Orientation	Maximum Allowed	U-factor	SHGC	Comments

I. FENESTRATION PROPOSED AREAS AND EFFICIENCIES

01	02	03	04	05	06	07	08	09	10	11	12
Tag/ID	Fenestration Type	Surface Area	Orientation N, S, W, E or Roof	# of Panes	Total Proposed Area	U-factor	Source	SHGC	Source	Exterior Shading Device	Comments
a.	Total Proposed Fenestration Area										
b.	Maximum Allowed Fenestration Area										
c.	Row a. ≤ Row b.)										
d.	If exterior shading devices are used, what is the new calculated SHGC value from CF1R-ENV-03?										

CERTIFICATE OF COMPLIANCE	CF1R-NCB-01-E
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Project Name:	Date Prepared:

J. SPACE CONDITIONING (SC) SYSTEMS – HEATING/COOLING/DUCTS

01	02	03	04	05	06	07	08	09
Heating Equipment Type	Heating Efficiency	Cooling Equipment Type	Cooling Efficiency	Distribution System Type	Duct Location	Duct R-value	Thermostat Type	Comments

- Central gas furnaces have a minimum efficiency of 78% AFUE, heat pumps 7.7 HSPF. Any gas heating appliance sold in California will meet the minimum appliance efficiency standard and is allowed. Heat pumps and mini-split heat pumps are the only type of electric heating system allowed.
- Central cooling systems and heat pumps have a minimum efficiency of 13 SEER. Any cooling appliance sold in California will meet the minimum appliance efficiency standard and is allowed.
- The prescriptive requirements preclude the use of bypass ducts in association with zonally controlled systems. A HERS Rater shall verify that zonally controlled systems have no bypass ducts.

K. VENTILATION COOLING in Climate Zones 8-14 Section 150.1(c)12

01	02
Required 2 CFM per ft^2 of Conditioned Floor Area	Minimum Attic Vent Free Area (column 1 / 375 CFM)

- Homeowners shall be provided a one-page fact sheet on the efficient operation of a whole house fan.

L. WATER HEATING (Section 150.1(c)8)

List water heaters and boilers for both domestic hot water (DHW) heaters and hydronic space heating.

01	02	03	0	05	06	07	08	09	10	11
Water Heater Type	Water Heating System Type	Fuel Type	Central Domestic Hot Water Heating Distribution System	Dwelling Unit Distribution Type	Number of Water Heaters In System	Water Heater Volume (gal)	Energy Factor, AFUE or Thermal Efficiency	Rated Input (Btuh or kW)	Standby Loss (% or Btu)	Back-Up Solar Savings Fraction

CERTIFICATE OF COMPLIANCE	CF1R-NCB-01-E
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M. HERS VERIFICATION SUMMARY The enforcement agency shall pay special attention to the HERS Measures specified in this checklist below. A registered Certificate of Verification for all the measures specified shall be submitted to the building inspector before final inspection.

Ducts

- Duct leakage testing required (Residential Appendix RA3.1)
- Heating and cooling systems are ductless, no HERS verification required
- System is zonally controlled. No bypass ducts are allowed, as confirmed by HERS verification

Refrigerant Charge

- Refrigerant Charge Testing is required (Residential Appendix RA3.2) in climate zones 2 and 8-15
- No cooling system installed

Central System Air Handlers

- Airflow and Fan Efficacy (Residential Appendix RA3.3) or System Design
- No cooling system installed
- Non-ducted cooling system

CERTIFICATE OF COMPLIANCE	CF1R-NCB-01-E
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Project Name:	Date Prepared:

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT	
1. I certify that this Certificate of Compliance documentation is accurate and complete.	
Documentation Author Name:	Documentation Author Signature:
Company:	Signature Date:
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 Compliance is true and correct.
2. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer).
3. That the energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
4. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.
5. I will ensure that a registered copy of this Certificate of Compliance shall be 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 Compliance is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Designer Name:	Responsible Designer Signature:
Company :	Date Signed:
Address:	License:
City/State/Zip:	Phone:

For assistance or questions regarding the Energy Standards, contact the Energy Hotline at: 1-800-772-3300.

Registration Number: Registration Date/Time: HERS Provider:

Minimum requirements for prescriptive compliance can be found in Building Energy Efficiency Standards Section 150.1(c), and Table 150.1-A (Package A). Completing these forms will require that you have the Reference Appendices for the 2013 Building Energy Efficiency Standards, which contains the Joint Appendices used to determine climate zone and to complete the table for opaque surfaces. When the term CF-1R is used it means the CF-1R-PRSC-NCB-01. Worksheets are identified by their entire name and subsequently by only the worksheet number, such as CF1R-ENV-02.

Instructions for tables with column numbers and row letters are given separately.

A. GENERAL INFORMATION

Project Name: Identifying information, such as owner's name.

Date: Date of document preparation.

Project Location: Legal street address of property or other applicable location identifying information.

Compliance Method: Prescriptive.

CA City: Legal city/town of property.

Building Front Orientation: Building front expressed in degrees, where North = 0, East = 90, South = 180, and West = 270. Indicate cardinal if it is a subdivision or multi-family project that will be built in multiple orientations. The standards (section 100.1) include the following additional details for determining orientation:

- Cardinal covers all orientations (for buildings that will be built in multiple orientations);
- North is oriented to within 45 degrees of true north, including 45 degrees east of north;
- East is oriented to within 45 degrees of true east, including 45 degrees south of east;
- South is oriented to within 45 degrees of true south, including 45 degrees west of south;
- West is oriented to within 45 degrees of true west, including 45 degrees south of west.

Zip Code: 5-digit zip code for the project location (used to determine climate zone).

Number of Dwelling Units: 1 for single-family, 1 or more for multifamily.

Climate zone: From Joint Appendix JA2.1.1.

Fuel Type: Natural Gas, Liquefied Propane Gas, or Electricity. NOTE: prescriptive compliance only allows electricity if existing appliances are electric and natural gas is not available in the building.

Building Type: Single Family (includes duplex), or Multi Family (a building that shares common walls and common floors or ceilings).

Total Conditioned Floor Area: Enter the new conditioned floor area in ft^2, as measured from the outside of exterior walls. If the project is an addition, this form is used for additions that are greater than 1,000 ft^2.

Project Type: Newly constructed building or new addition greater than 1,000 ft^2.

Slab Area: Area of the first floor slab (if any) in ft^2.

B. OPAQUE SURFACE DETAILS – Framed

1. Tag/ID: A label (if any) from the plans, such as A1.4 or wall.
2. Assembly Type: Roof, Ceiling, Wall, Floor over crawlspace or floor over exterior.
3. Frame type: Wood or Metal.
4. Frame Depth: Nominal dimensions (in inches) of framing material such as 2x4 or 2x6.
5. Frame Spacing: 16 or 24 (inches on center).
6. Cavity R-value: Cavity R-value: insulation installed between framing members. NOTE: Wall U-factor required for all climate zones is 0.065. This U-factors can be met by wood framed 2x4 walls with R-13 cavity + R5 continuous insulation (not interrupted by framing), R-15 cavity plus R-4 continuous insulation, or any combination of cavity and/or continuous insulation that results in a U-factor equal to or less than 0.065. Continuous Insulation: R-value of rigid or continuous insulation (not interrupted by framing).
7. U-factor: The U-factor for the proposed assembly. Must be less than or equal to column 10 or have an attached CF1R-ENV-02-E to show that a weighted U-factor for multiple assemblies will meet the maximum value in column 11.
8. Appendix JA4 Table: Table number used to determine the R-value or U-factor (e.g., an ICF wall is 4.3.13).
9. Appendix JA4 Cell: Cell number used to determine the R-value or U-factor (e.g., an 8-inch thick ICF wall with 2 inches of EPS (R-15.4) is A6).
10. Required U-factor: from Package A: Value required based on climate zone and assembly type.

11. Comments: Any notes regarding location, unique conditions, or attachments.

C. OPAQUE SURFACE DETAILS – Non-framed

1. Tag/ID: A label (if any) from the plans, for example, A1.4 or wall.
2. Assembly Type: Roof, Wall.
3. Assembly materials: SIP OSB, SIP I-Joist, see JA4 for guidance.
4. Thickness: Thickness in inches.
5. Proposed Interior or Core Insulation R-value: Insulation installed within the materials or on the inside. See Joint Appendix JA4 for guidance.
6. Proposed Continuous Insulation R-value: Insulation installed on the exterior. See Joint Appendix JA4 for guidance.
7. U-factor: Proposed assembly U-factor from JA4 or WS-01. Must be less than or equal to column 10.
8. Appendix JA4 Table: Table number used to determine the R-value or U-factor (e.g., an ICF wall is 4.3.13).
9. Appendix JA4 Cell: Cell number used to determine the R-value or U-factor (e.g., an 8-inch thick ICF wall with 2 inches of EPS (R-15.4) is A6).
10. Required Assembly U-factor from Package A: Based on assembly type and climate zone.
11. Comments: Any notes regarding location, unique conditions, or attachments.

D. OPAQUE SURFACE DETAILS – Mass Walls

1. Tag/ID: A label (if any) from the plans, for example, A1.4 or wall.
2. Walls Above Grade: Yes or No.
3. Mass Type: ICF, Masonry. See JA4 for guidance.
4. Mass Thickness: Thickness (in inches) of mass.
5. Furring Strips Thickness: If furring strips are required to meet the required wall R-value or U-factor shown in columns 12 through 15, indicate the thickness of the furring strip (in inches). See Table 4.3.14 of Joint Appendix 4.
6. Interior Insulation R-value or U-factor: Enter either the R-value or U-factor of proposed insulation on the inside surface of the mass wall. See column 10 for the required insulation value for the wall type selected. See JA4 for guidance. Use the same descriptor (R-value or U-factor) throughout Table D.
7. Exterior Insulation R-value or U-factor: Enter either the R-value or U-factor of proposed insulation on the outside surface of the mass wall. See column 11 for the required insulation value for the wall type selected. See JA4 for guidance.
8. Appendix JA4 Table: Table number used to determine the R-value or U-factor (e.g., an ICF wall is 4.3.13).
9. Appendix JA4 Cell: Cell number used to determine the R-value or U-factor (e.g., an 8-inch thick ICF wall with 2 inches of EPS (R-15.4) is A6).

10. Interior Insulation: The required R-value or U-factor (whichever descriptor was selected in column 6) for interior insulation will be completed based on the Table 150.1-A requirements for the wall type.
11. Exterior Insulation: The required R-value or U-factor (whichever descriptor was selected in column 7) for exterior insulation will be completed based on the Table 150.1-A requirements for the wall type.

E. SLAB INSULATION

Slab edge performance specifications and installation criteria are found in Sections 150.0(l) and 150.1(c)1D (Table 150.1-A). Requirements vary by climate zone and slab conditions.

1. Floor type: Types include slab-on-grade or raised slab.
    - Slab-on-grade floors require slab edge insulation in climate zone 16 only.
    - Raised slab must be insulated to R8 in climate zones 1, 2, 11, 13, 14 and 16, R-4 in climate zones 12 and 15, and no insulation is required in climate zones 3-10.
2. Proposed R-value: When required, insulation can be specified by either R-value or U-factor. If specifying an R-value complete column 2.
3. Proposed U-Factor: When required, specify the U-factor of proposed insulation in column 3.
4. Required Insulation R-value: Whichever descriptor was used (R-value or U-factor) in column 2 or 3 will be used to specify the value required, which will vary by climate zone and type of slab. Values are from Table 150.1-A.
5. Required Insulation U-factor: Whichever descriptor was used (R-value or U-factor) in column 2 or 3 will be used to specify the value required, which will vary by climate zone and type of slab. Values are from Table 150.1-A.
6. Comments: Any notes regarding location, unique conditions, or attachments.

NOTE: A suggestion is provided to highlight that there is a mandatory slab edge insulation requirement for heated slab floors. Since mandatory requirements are not listed on the Certificate of Compliance, this is provided for information purposes only. The specific requirements are in Sections 110.8(g) and Table 110.8-A.

F. RADIANT BARRIER

1. Radiant Barrier installed below the roof deck and on all gable end walls: Yes or No
2. Comments: Any notes regarding location, unique conditions, or attachments.

Radiant barrier performance specifications and installation criteria are found in Sections 110.8(j) and 150.1(c)2, and in Residential Appendix RA4.2.1.

Radiant barriers are required by Package A in climate zones 2-15.

G. ROOFING PRODUCTS - COOL ROOF

Roofing requirements are found in Sections 110.8(i) and 150.1(c)11. Depending on the climate zone and roof slope, a cool roof (defined as a minimum aged solar reflectance and thermal emittance, or a minimum SRI) may be required by Package A.

Exceptions include (1) low-slope roofs (pitch 2:12 or less) in climate zones 1-12, 14 and 16; (2) steep slope roof (pitch greater than 2:12) in climate zones 1-9 and 16; (3) roof constructions that have thermal mass over the roof membrane with at least 25 lb/ft^2; and (4) any roof area covered by building integrated photovoltaic panels and solar thermal panels (the area of roof not covered by photovoltaic panels would still need to meet any applicable cool roof requirements).

1. Mass roof 25 lb ft^2 or greater: Mass roofs are not required to have a cool roof even if the climate zone specifies minimum performance requirements.
2. Roof Pitch: Expressed as 4:12, for example, which means the roof rises 4 foot within a span of 12 feet. When roofs have multiple pitches the requirements are based on the pitch of 50% or more of the roof.
3. The CRRC Product ID Number is obtained from the Cool Roof Rating Council's Rated Product Directory at www.coolroofs.org/products/search.php. Products are listed by manufacturer, brand, type of installation, roofing material, and color, as well as product performance.
4. Product type: See Cool Roof Rating Council's directory. Generally product types include single-ply roof, wood shingles, asphalt roof, metal roof, tile roof.
5. Proposed Aged Solar Reflectance: Value is from the Cool Roof Rating Council's Rated Product Directory. If the aged value is not available, calculate the SRI using the initial solar reflectance on CF-1R-PRSC-WS-04 (Cool Roof and SRI Worksheet).
6. Proposed Thermal Emittance: From the product specifications. Skip this value if using a calculated SRI.
7. Proposed SRI: It is optional to meet either the SRI or the solar reflectance/thermal emittance. To calculate the SRI value use calculation from http://www.energy.ca.gov/title24/. Enter the resulting value in the SRI Column above and attach a copy of the CF-1R-PRSC-WS-04.
8. Minimum Required Aged Solar Reflectance: Based on climate zone and roof slope.
9. Minimum Required Thermal Emittance: Based on climate zone and roof slope.
10. Minimum SRI: Based on climate zone and roof slope.
11. Comments: Any notes regarding location, unique conditions, or attachments, such as an SRI worksheet.

If the cool roofing requirements will be met by a liquid field applied coating, Section 110.8(i)4 requires the coating be applied across the entire roof surface and meet the dry mil thickness or coverage recommended by the manufacturer.

H. FENESTRATION/GLAZING AREAS ALLOWED

1. Tag/ID – Provide a name or designator for each unique type of fenestration surface. This designator should be used consistently throughout the plan set (elevations, finish schedules, etc.) such as, Window-1, Skylight-1 and etc…to identify each surface. It should also be consistently used on the other forms in the compliance documentation.
2. Orientation: This will be the sum for each window area for each orientation or when the west-facing area is limited to a maximum of 5 percent.
3. Maximum Allowed: Calculated value based on conditioned floor area times 5 percent for west-facing fenestration (if limited by climate zone) and 0.20 for all orientations. The maximum total glazing area is 20 percent, of which a maximum of 5 percent can face west in climate zones 2, 4, and 6-16.
4. U-factor: Maximum U-factor from Package A or Table 150.1-A. This field will always be 0.32 unless the U-factor will be the area weighted averaged, CF1R-ENV-02, with other higher fenestration windows.
5. SHGC: Maximum SHGC from Package A or Table 150.1-A. This field will either be 0.25 or N/A, depending on the climate zone. N/A means there is no maximum SHGC required in this climate zone. The SHGC will be the area weighted averaged, CF1R-ENV-02, with other higher fenestration windows.
6. Comments: Any notes regarding location, unique conditions, or attachments.

I. FENESTRATION PROPOSED AREAS AND EFFICIENCIES

1. Tag/ID – Provide a name or designator for each unique type of fenestration surface. This designator should be used consistently throughout the plan set (elevations, finish schedules, etc.) such as, Window-1, Skylight-1 and etc…to identify each surface. It should also be consistently used on the other forms in the compliance documentation.
2. Fenestration Type: Indicate the type of fenestration construction such as: Fixed Window, Operable Window, Curtainwall or Storefront, Glazed Doors. For Skylights use: Glass Curb Mounted, Glass Deck Mounted or Plastic curb Mounted.
3. Surface area indicates the in square feet (sf.) of each exterior fenestration type. Add all the same like/type area of windows on the same orientation.

4. Orientation can be North, East, South, West, or in degrees. If documentation is for a building that may be built in any direction (cardinal) in a climate zone that limits west-facing fenestration, complete this section assuming the side of the building with the most fenestration faces west.
5. Indicate the number of panes for each Tag/ID; is it a single, double, triple pane window? Can enter either 1, 2 or 3 to represent the panes. Indicate for each Tag/ID.

   NOTE: Doors with glazing are counted in one of two ways. A door with 50% or more glazing is counted as the entire door area. A door with less than 50% glazing can be counted as the entire door area or can be calculated as the actual glass area with a 2-inch (0.17 ft^2) frame all around.

6. Total Proposed All Orientations: Add column 6 values and enter in row a.. Compare Total Proposed Fenestration with Maximum Allowed Fenestration in Row b.. Note: the proposed area needs to be ≤ to Row a.. If not, reduction of proposed fenestration will be required. The total allowed fenestration area is 20% for all climate zones. If the climate zone has a 5% west-facing limit, then both limits are applied to the building's total fenestration area.
7. U-factor: Enter (a) the NFRC U-factor based on the proposed brand and type of fenestration using National Fenestration Rating Council (www.nfrc.org) certified values, (b) the default value from Table 110.6-A, or (c) the weighted average U-factor calculated on form CF1R-ENV-02, Area Weighted Average Calculation Worksheet. For the exceptions, up to 3 ft^2 of tubular skylights and up to 3 ft^2 of glazing in a door enter N/A, and for up to 16 ft^2 of skylight, enter 0.55. If any products (other than the exceptions) have a higher U-factor than 0.32, first complete a CF1R-ENV-02,to calculate the area weighted average U-factor and attach it to the CF-1R-PRSC-NCB-01.

   NOTE: Dynamic glazing is a glazing system that changes its performance U-factor and SHGC based on the physical environment. Dynamic glazing includes chromogenic glazing or integrated shading systems (this does not include internally or externally mounted shading devices). If using dynamic glazing, use the lowest tested U-factor and SHGC in Columns 8 and 10.

8. Source: NFRC, Default or CF1R-ENV-02,. The source of the U-factor data for the fenestration product.
9. SHGC: In climate zones 2, 4 and 6-16, enter the SHGC from (a) NFRC-rated certification information, (b) default table 110.6-B, or (c) the weighted average SHGC calculated on form CF1R-ENV-02,. For the exceptions, up to 3 ft^2 of tubular skylights and up to 3 ft^2 of glazing in a door enter N/A, and for up to 16 ft^2 of skylight, enter 0.30. If any products (other than the exceptions) have a higher SHGC than required by Package A, first complete a form CF1R-ENV-02,to calculate a weighted average SHGC and attach it to the CF-1R.
10. Source: NFRC, Default or CF1R-ENV-02,. The source of the SHGC data for the fenestration product.
11. Exterior Shading Device: If exterior shading devices are used to meet the SHGC requirement, indicate the type of device (from Table S-1 of CF-1R-PRSC-WS-03 Solar Heat Gain Coefficient Worksheet) and attach a CF-1R-ENV-03.

Note: If using an overhang for south-facing glazing, the glazing must be fully shaded at solar noon on August 21 and substantially exposed to direct sunlight at solar noon on December 21 (see Residential Manual, Chapter 3)

12. Comments: Any notes regarding location, unique conditions, or attachments.

a. Total Proposed Fenestration Area: Is the total sum of column 6 of all fenestration area listed in both this form and building plans.
b. Maximum Allowed Fenestration Area: Row b. Auto-complete from Table H.03.; CFA x 0.20, 0.05 (for west facing orientation) in specific zones.
c. Compliance requires that Total Proposed Fenestration Area, Row a., must be less than or equal to row b., otherwise the proposed fenestration areas must be reduce to meet the Maximum Allowed Fenestration Row b..
d. If exterior shading devices are used to meet the prescriptive SHGC requirements (as indicated by a value in column I.11), indicate the SHGC calculated on form CF-1R-ENV-03 and attach the form for each window with an exterior shading device.

J: SPACE CONDITIONING SYSTEMS – HEATING/COOLING/DUCTS

1. Heating system type: Indicate heating system type as furnace, central heat pump, boiler, hydronic, wood heat, wall furnace, room heat pump, or electric resistance if it meets the exception. An exception to Section 150.1(c)6 allows electric resistance heating only when it is supplemental to another system, as indicated by a capacity of < 2 KW or 7,000 Btu/hr, and a time-limiting control device that allows it to be operated for 30-minutes at a time.
2. Heating efficiency: For central gas heating systems, the minimum efficiency required by the appliance efficiency standards is 78% AFUE. Heat pumps have an HSPF of 7.7 or higher. Other appliance types will have different efficiency levels (e.g., a gas wall furnace may have a minimum requirement of 73% AFUE or lower, depending on the size and type). Any gas heating appliance (or heat pump) sold in California is acceptable. The only electric heating appliance allowed is a heat pump.
3. Cooling System Type: Indicate cooling system type or specify “no cooling system installed.” Categories include central air split system, central air package system, heat pump, room air or room heat pump, mini-split heat pump, or no cooling.
4. Cooling efficiency: For central cooling systems, the minimum efficiency required by the appliance efficiency standards is13 SEER. Other appliance types will have different efficiency levels (e.g., a room air conditioner may have a minimum requirement of 9 EER (when an appliance standard is an EER this is considered equivalent to an SEER). Any cooling appliance sold in California is acceptable.
5. Distribution system type: This could be ducted, radiant floor, piping, or ductless.
6. Duct location: If the system has ducts, indicate where they will be installed. Locations include attic, garage, conditioned space, radiant floor.
7. Duct R-value: This value is from Package A. Ducted systems in Climate Zones 1-10 and 12-13 require R-6 duct insulation, and in climate zones 11 and 14-16 ducted systems require R-8 duct insulation. If ducts are installed in conditioned space (which must be field verified), this field will be N/A. If system is ductless this field will be N/A.

8. Thermostat type: Select a setback thermostat or an Energy Management System (EMS) for most systems, or N/A if exempt. Controls for most systems can be by a device that allows a person to program up to 4 temperature setpoints within 24 hours. See Section P.1 for more information and for a list of systems that do not have to meet the setback thermostat requirements.
9. Comments: Include any comments here.

K. VENTILATION COOLING

In climate zones 8-14, a whole house fan is required to provide ventilation. The requirement is found in Section 150.1(c)12.

1. Required 2 CFM per ft^2 of conditioned floor area: auto complete.
2. Minimum attic free vent area: Calculate the attic vent free area: auto complete column 1 divided by 375 CFM.

L. WATER HEATING SYSTEMS

1. Water heater type. Prescriptive Standards allow four options under Section 150.1(c)8 (see Section P.2 for more detailed information on these requirements.
    A. One gas or propane storage water heater for each dwelling unit, with an input of up to 75,000 Btu/hour and a storage capacity no greater than 60 gallons. Distribution system type for individual dwelling units shall be either trunk and branch (standard) with no recirculating system or a demand recirculation system with manual controls
    B. One gas or propane instantaneous (tankless) water heater for each dwelling unit. With an input no greater than 200,000 Btu/hour. Distribution system type is limited to either trunk and branch system (standard) with no recirculating system or a demand recirculation system with manual controls.
    C. All water heaters installed must comply with Section 110.1 and 110.3. The distribution system shall be equipped with a demand recirculation control allowing pump operation to be based on measurement of hot water demand and hot water return temperature. The system shall have at least two loops. Buildings with 8 or less units do not have to comply with the demand recirculation requirement.
    D. If natural gas is not available, an electric-resistance storage or instantaneous water heater with additional criteria that it be located inside the conditioned space, has no recirculation pumps, and has a solar water-heating system with a solar fraction of at least 50 percent.

2. Water heating system type: Domestic Hot Water (DHW), Hydronic, Combined Hydronic, or Central. DHW is for domestic hot water, hydronic is a water heating system used for space heating only; combined hydronic are when the water heater will provide both space conditioning and domestic hot water. A central water heater serves multiple dwelling units in a multi-family building..
3. Fuel Type: Gas, LP (propane), electric (special conditions apply, see M.1.D and Q.4.D).
4. Central Recirculation Distribution System: For multi-family buildings with using a central distribution system a demand recirculation system with at least two distribution loops must be installed. This requirement applies to any building with eight or more units. If the system is non-central or project is individual units enter n/a.
5. Dwelling Unit Distribution Type: This shall be either trunk and branch (standard), or a manual controlled demand recirculating system.
6. Number of water heaters in system: In single-family and multi-family with water heaters in each dwelling units the value is 1. For multi-family central systems serving multiple dwelling units enter the total number of water heaters.
7. Water heater volume (gal): tank capacity in gallons. For individual water heaters for a dwelling unit this will be 60 gallons or less. If instantaneous, enter n/a. For multi-family central systems enter the total storage volume.
8. Energy Factor, AFUE or thermal efficiency: From product literature or a California Energy Commission directory.
9. Rated input (Btuh or kWh): Enter the equipment input rating, for gas or propane fired units are Btuh, for electric fired system the units are Kwh.
10. Standby Loss (percent or Btuh): Applies only to large storage water heaters and boilers, Enter n/a for small storage or instantaneous water heaters.
11. Back-up solar savings fraction: If compliance requires a back-up solar system, indicate the solar contribution (e.g., 0.30). The system size requirements are shown below in Q.4. External calculations are required.

M. HERS MEASURES

1. Duct Leakage Testing: All duct systems must meet maximum duct leakage requirements. Typically the maximum leakage is 6% but varies for when the duct leakage test is performed and the type of building (single family, townhouse, multifamily). The only exception is if the heating and cooling systems are ductless.
2. Bypass Ducts: The prescriptive requirements preclude the use of bypass ducts in association with zonally controlled systems. A HERS Rater will verify that zonally controlled systems have no bypass ducts.
3. Refrigerant Charge: Some type of refrigerant charge verification or Charge Indicator Display is required in climate zones 2 and 8-15 for most common systems such as ducted split and packaged systems, and mini-split systems. See Section 150.1(c)7A. or Reference Residential Appendix RA3.2. If a building is built in climate zones 1, 3-17 or 16, or has no cooling system, no refrigerant charge verification is required.

4. Central System Air Handlers: Unless a building has no cooling system or has a non-ducted cooling system, the system must meet mandatory and prescriptive requirements for an airflow greater than 350 CFM per ton of nominal cooling capacity, and a fan efficacy less than or equal to 0.58 W/CFM. See 150.0(m)13, 150.1(c)10, and Reference Residential Appendix RA3.

DOCUMENTATION DECLARATION STATEMENTS

1. The person who prepared the CF-1R will sign and complete the fields for their name, company (if applicable), address, phone number, certification information (if applicable), date and signature (may be electronic).
2. The person who is assuming responsibility for the project being built to comply with Title 24, Part 6, will complete the fields for their name, company (if applicable), address, phone number, license number (if applicable), date and signature (may be electronic).

REGISTRATION

The CF-1R must be registered with a HERS provider prior to submitting for a building permit. See _____.

STANDARDS REFERENCES

1. Thermostats

    a. Thermostat requirements are found in Section 110.2(c) with special requirements for heat pumps in Section 110.2(b). Controls for most systems can be by a central energy management control system ("EMS") or a setback thermostat with a mechanism allowing a person to program up to 4 temperature setpoints within 24 hours ("setback").

        EXCEPTIONS: If the heating system type is a gravity gas wall, floor or room heater, non-central electric heater, fireplace or decorative gas appliance, or wood stove, a setback thermostat or energy management control system is not required.

        If the cooling system type is a room air conditioner or room air conditioner heat pump setback thermostat or energy management control system is not required.

2. Water Heaters:

Section 150.1(c) allows a limited number of conditions for water heating. If conditions other than these are proposed, the prescriptive compliance approach cannot be used:

A. 150.1(c)8A one gas or propane storage water heater, up to 75,000 Btu/hour input (typically 50 gallons or less), with either no recirculating system or a demand recirculation system with manual controls. If the Energy Factor is less than or equal to the federal minimum, it must have an R-12 external wrap. See D. below.
B. 150.1(c)8B one gas or propane instantaneous (tankless) water heater with an input of 200,000 Btu per hour or less, no storage tank, and either no recirculating system or a demand recirculation system with manual controls. .
C. 150.1(c)8C a central water-heating system that has includes the following components (1) gas or propane water heaters, boilers or other water heating equipment, (2) a water heating recirculation loop that meets the requirements of Section 110.3(c)2 and Section 110.3(c)5 equipped with automatic controls for the recirculation pump based on measurement of hot water demand and hot water return temperature, and if more than 8 dwelling units, two recirculation loops each serving half of the building; (3) a solar water-heating system with a minimum solar savings fraction of 0.20 in climate zones 1 through 9 or a minimum solar savings fraction of 0.35 in climate zones 10 through 16 (installation criteria is in Reference Residential Appendix RA4).
D. 150.1(c)8D if natural gas is not available, an electric-resistance storage or instantaneous water heater with addition criteria that it be located inside the conditioned space, it has no recirculation pumps, and has a solar water-heating system with a minimum solar savings fraction of 0.50 (installation criteria is in Reference Residential Appendix RA4).

CERTIFICATE OF COMPLIANCE	CF1R-ADD-01-E
Additions 1,000 ft^2 or less	(Page 1 of 7)
Project Name:	Date Prepared:

A. GENERAL INFORMATION

Project Name:		**Date:**	
Project Location:		**Compliance Method:**	
CA City:		**Building Front Orientation (deg):**	
Zip Code:		**Number of Dwelling Units:**	
Climate Zone:		**Fuel Type:**	
Building Type	☐ Single Family ☐ Multi Family	**Total Conditioned Floor Area (Addition):**	
Project Type:	Addition ☐ ≤ 300 ☐ > 300 to ≤ 400 ☐ > 400 to ≤ 700 ☐ > 700 to ≤ 1000	**Slab Area:**	

B. OPAQUE SURFACE DETAILS – Framed (Section 150.2(a))

01	02	03	04	05	06		07	08	09	10	11
					Proposed					**Required**	
								Appendix JA4 Reference			
Tag/ID	Assembly Type	Frame Type	Frame Depth (inches)	Frame Spacing (inches)	Cavity R-value	Continuous Insulation R-value	U-Factor	Table	Cell	U-Factor	Comments

C. OPAQUE SURFACE DETAILS – Non-framed (Section 150.1(c)1)

01	02	03	04	05	06	07	08	09	10	11
				Proposed					**Required**	
							Appendix JA4 Reference			
Tag/ID	Assembly Type	Assembly Materials	Thickness (inches)	Core Insulation R-value	Continuous Insulation R-value	U-Factor	Table	Cell	U-Factor from Package A	Comments

D. OPAQUE SURFACE DETAILS – Mass Walls (Section 150.1(c)1)

01	02	03	04	05	06		07		08	09	10		11	
					Proposed						**Required**			
					Interior Insulation		Exterior Insulation		Appendix JA4 Reference		Interior Insulation		Exterior Insulation	
Tag/ID	Walls Above Grade	Mass Type	Mass Thickness (inches)	Furring Strip Thickness (inches)	R-value	U-factor	R-value	U-factor	Table	Cell	R-value	U-factor	R-value	U-factor

E. SLAB INSULATION (Table 150.1-A)

01	02	03	04	05	06
	Proposed		**Required**		
Floor Type	R-value	U-factor	Insulation R-value	Insulation U-factor	Comments

- Heated slab floors require mandatory slab insulation (see Table 110.8-A).

F. RADIANT BARRIER (Section 150.1(c)2

01	02
Radiant Barrier installed below the roof deck and on all gable end walls	Comment

A radiant barrier is required (for Climate Zones 2-15)

- *To meet the prescriptive requirement, a minimum free ventilation area of not less than one square foot of vent area for each 300 ft2 of attic floor area with 30 percent upper vent.*
- *A minimum air space between the top surface of the radiant barrier and roof decking of not less than 1.5 inches at the center of the truss/rafter span.*
- *Radiant Barrier shall be installed to cover all gable end walls and other vertical surfaces in the attic.*

G. ROOFING PRODUCTS (COOL ROOF) (Section 150.1(c)11)

01	02	03	04	05	06	07	08	09	10	11
				Proposed			**Minimum Required**			
Mass Roof 25 lb ft2 or greater	Roof Pitch	CRRC Product ID Number	Product Type	Aged Solar Reflectance	Thermal Emittance	SRI	Aged Solar Reflectance	Thermal Emittance	SRI	Comments

NOTES:

- Any roof area covered by building integrated photovoltaic panels and solar thermal panels are exempt from the above Cool Roof requirements.
- Liquid field applied coatings must comply with installation criteria from section 110.8(i)4.

H. FENESTRATION/GLAZING AREAS ALLOWED (Section 150.2(a)1)

01	02	03	04	05
		The Greater		
Addition Type ft^2	Orientation	Maximum Allowed %	Maximum Calculated Allowed ft^2	Comments

I. FENESTRATION PROPOSED AREAS AND EFFICIENCIES (Section 150.2(a)1)

01	02	03	04	05	06	07	08	09	10	11	12
Fenestration Type	Frame Type	Orientation	Proposed West Facing Area ft^2	Proposed Non West Facing Area ft^2	Total Proposed Area All Orientations	U-factor	Source	SHGC	Source	Exterior Shading Device	Comments

a	Added West-facing Fenestration Area	
b	Maximum Allowed West-facing Fenestration Area	
c	Is West-facing Fenestration Area ≤ Allowed	
d	Added Fenestration Area (all orientations)	
e	Maximum Allowed Fenestration Area (all orientations)	
F	Is Total Proposed Fenestration Area ≤ Allowed	
g	If exterior shading devices are used, what is the calculated value from CF1R-ENV-03	

J. HVAC SYSTEMS – NEW HEATING/COOLING (Section 150.1(c)7)

01	**02**	03	04	05	06	07	08
Alteration Type	Area to be heated/cooled (ft2)	Heating System Type	Heating Efficiency	Cooling System Type	Cooling Efficiency	Thermostat Type	Comments

- The Appliance Efficiency Standards regulate the minimum efficiency requirement of regulated appliances sold in California. Any new appliance legally offered for sale will meet the minimum efficiency required for prescriptive compliance.
- Central gas furnaces have a minimum efficiency of 78% AFUE, heat pumps 7.7 HSPF. While any gas heating appliance sold in California is acceptable for prescriptive compliance, the only types of electric systems allowed are heat pumps and mini-split heat pumps.
- Central cooling systems and heat pumps have a minimum efficiency of 13 SEER.

K. DUCT SYSTEMS (Section 150.2(b)1D)

01	02	03	04	05	06
Duct Alteration Type	Distribution System Type	Duct Location	Added Duct Length	Duct R-Value	Comments

- The prescriptive requirements preclude the use of bypass ducts in association with zonally controlled systems. A HERS Rater shall verify that zonally controlled systems have no bypass ducts.

L. WATER HEATING SYSTEMS (Section 150.2(a)1D for Additions)

01	02	03	04	05	06	07	08	09	10
Existing Water Heater Fuel Type	Proposed Water Heater Fuel Type	Proposed DHW Water Heater Type	Number of Added Water Heaters	Central Distribution Type	Dwelling Unit Distribution Type	Water Heater Efficiency (EF, AFUE))	Rated Input (Btuh or kWh)	Water Heater Volume (gallons)	Comments

M. WATER HEATING (Section 150.1(c)8 for New Construction)

01	02	03	04	05	06	07	08	09	10	11
Water Heater Type	Water Heating System Type	Fuel Type	Central Domestic Hot Water Distribution System	Dwelling Unit Distribution Type	Number of Water Heaters In System	Water Heater Volume (gal)	Energy Factor, AFUE, or Thermal Efficiency	Rated Input (Btuh or kW)	Standby Loss (percent of value (btuh))Rated	Back-Up Solar Savings Fraction

CERTIFICATE OF COMPLIANCE	CF1R-ADD-01-E
Additions 1,000 ft^2 or less	(Page 6 of 7)
Project Name:	Date Prepared:

N. HERS VERIFICATION SUMMARY The enforcement agency should pay special attention to the HERS Measures specified in this checklist below. A registered Certificate of Verification for all the measures specified shall be submitted to the building inspector before final inspection.

Ducts

- Duct leakage testing required (Residential Appendix RA3.1)
- Heating and cooling systems are ductless, no HERS verification required

Refrigerant Charge

- Refrigerant Charge Testing is required (Residential Appendix RA3.2) in climate zones 2 and 8-15
- No cooling system installed

Central System Air Handlers

- Airflow and Fan Efficacy (Residential Appendix RA3.3) or System Design
- No cooling system installed
- Non-ducted cooling system

CERTIFICATE OF COMPLIANCE	CF1R-ADD-01-E
Additions 1,000 ft^2 or less	(Page 7 of 7)
Project Name:	Date Prepared:

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT	
1. I certify that this Certificate of Compliance documentation is accurate and complete.	
Documentation Author Name:	Documentation Author Signature:
Company:	Signature Date:
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 Compliance is true and correct.
2. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer).
3. That the energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
4. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.
5. I will ensure that a registered copy of this Certificate of Compliance shall be 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 Compliance is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Designer Name:	Responsible Designer Signature:
Company :	Date Signed:
Address:	License:
City/State/Zip:	Phone:

For assistance or questions regarding the Energy Standards, contact the Energy Hotline at: 1-800-772-3300.

CF1R-ADD User Instructions

Minimum requirements for prescriptive addition compliance can be found in Building Energy Efficiency Standards Section 150.2(a), and Table 150.1-A (Package A). Completing these forms will require that you have the Reference Appendices for the 2013 Building Energy Efficiency Standards, which contains the Joint Appendices used to determine climate zone and to complete the section for opaque surfaces. When the term CF-1R is used it means the CF-1R-PRSC-ADD-01. Worksheets are identified by their entire name and subsequently by only the worksheet number, such as WS-02.

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

If any part of the addition does not comply, prescriptive compliance fails and the performance (or computer) compliance approach must be used. Only the new construction is required to meet the requirements specified in this documentation. If any alterations to the existing building are occurring, those are documented on one or more of the CF-1R-ALT forms.

A. GENERAL INFORMATION

Project Name: Identifying information, such as owner's name.

Date: Date of document preparation.

Project Location: Legal street address of property or other applicable identifying information.

Compliance Method: Prescriptive.

CA City: Legal city/town of property.

Building Front Orientation: Building front expressed in degrees, where North = 0, East = 90, South = 180, and West = 270. The standards (section 100.1) include the following additional details for determining orientation:

- North is oriented to within 45 degrees of true north, including 45 degrees east of north;
- East is oriented to within 45 degrees of true east, including 45 degrees south of east;
- South is oriented to within 45 degrees of true south, including 45 degrees west of south;

- West is oriented to within 45 degrees of true west, including 45 degrees south of west.

Zip Code: 5-digit zip code for the project location (used to determine climate zone).

Number of Dwelling Units: 1 for single-family, 1 or more for multifamily.

Climate zone: From Joint Appendix JA2.1.1.

Fuel Type: Natural Gas, Liquefied Propane Gas, or Electricity. NOTE: prescriptive compliance only allows electricity if existing appliances are electric and natural gas is not available in the building.

Building Type: Single Family (includes duplex), or Multi Family (a building that shares common walls and common floors or ceilings).

Total Conditioned Floor Area: Enter the new conditioned floor area in ft2, as measured from the outside of exterior walls of the addition.

Project Type: Check the size of the addition as being 300 ft2 or less, greater than 300 up to 400 ft2, greater than 400 up to 700 ft2, or greater than 700 up to 1000 ft2.

Slab Area: Area of the first floor slab of the addition (if any) in ft2.

B. BUILDING INSULATION DETAILS (Section 150.2(b)1)

Additions of 700 ft2 or less require only R-13 wall insulation. Unless otherwise noted, all other requirements of Package A are required when using prescriptive compliance.

1. Tag/ID: A label (if any) from the plans, such as A1.4 or wall.
2. Assembly Type: Roof, Ceiling, Wall, Floor over crawlspace or floor over exterior.
3. Frame type: Wood or Metal.
4. Frame Depth: Nominal dimensions (in inches) of framing material such as 2x4 or 2x6.
5. Frame Spacing: 16 or 24 (inches on center).
6. Cavity R-value: insulation installed between framing members. NOTE: Wall U-factor required for all climate zones is 0.065. This U-factors can be met by wood framed 2x4 walls with R-13 cavity + R5 continuous insulation (not interrupted by framing), R-15 cavity plus R-4

continuous insulation, or any combination of cavity and/or continuous insulation that results in a U-factor equal to or less than 0.065. Continuous Insulation: R-value of rigid or continuous insulation (not interrupted by framing).

7. U-factor: The U-factor for the proposed assembly must be less than or equal to column 10 or have an attached CF-1R-ENV-02-E to show that a weighted U-factor for multiple assemblies will meet the maximum value in column 10.
    - NOTE: If using a weighted average of multiple assemblies to meet the required U-factor, attach form CF-1R-ENV-02-E, Area Weighted Average Calculation Worksheet.
8. Appendix JA4 Table: Table number used to determine the R-value or U-factor (e.g., an ICF wall is 4.3.13).
9. Appendix JA4 Cell: Cell number used to determine the R-value or U-factor (e.g., an 8-inch thick ICF wall with 2 inches of EPS (R-15.4) is A6).
10. Required U-factor: From Package A or from Section 150.2. Value required based on climate zone and assembly type.
11. Comments: Any notes regarding location, unique conditions, or attachments.

C. OPAQUE SURFACE DETAILS – Non-Framed

1. Tag/ID: A label (if any) from the plans, for example, A1.4 or wall.
2. Assembly Type: Roof, Wall.
3. Assembly materials: SIP OSB, SIP I-Joist, see JA4 for guidance.
4. Thickness: Thickness in inches.
5. Core Insulation R-value: Insulation installed within the materials or on the inside. See Joint Appendix JA4 for guidance.
6. Continuous Insulation R-value: Insulation installed on the exterior. See Joint Appendix JA4 for guidance.
7. U-factor: Proposed assembly U-factor from JA4 or CF1R-ENV-01-E. Must be less than or equal to column 10.
8. Appendix JA4 Table: Table number used to determine the R-value or U-factor (e.g., an ICF wall is 4.3.13).
9. Appendix JA4 Cell: Cell number used to determine the R-value or U-factor (e.g., an 8-inch thick ICF wall with 2 inches of EPS (R-15.4) is A6)
10. Required Assembly U-factor from Package A: Based on assembly type and climate zone.
11. Comments: Any notes regarding location, unique conditions, or attachments.

D. OPAQUE SURFACE DETAILS – Mass Walls

1. Tag/ID: A label (if any) from the plans, for example, A1.4 or wall.
2. Walls Above Grade: Yes or No.
3. Mass Type: ICF, Masonry. See JA4 for guidance.
4. Mass Thickness: Thickness (in inches) of mass.
5. Furring Strips Thickness: If furring strips are required to meet the required wall R-value or U-factor shown in columns 12 through 15, indicate the thickness of the furring strip (in inches). See Table 4.3.14 of Joint Appendix 4.

6. Interior Insulation R-value or U-factor: Enter either the R-value or U-factor of proposed insulation on the inside surface of the mass wall. See column 10 for the required insulation value for the wall type selected. See JA4 for guidance. Use the same descriptor (R-value or U-factor) throughout Table D.
7. Exterior Insulation R-value or U-factor: Enter either the R-value or U-factor of proposed insulation on the outside surface of the mass wall. See column 11 for the required insulation value for the wall type selected. See JA4 for guidance.
8. Appendix JA4 Table: Table number used to determine the R-value or U-factor (e.g., an ICF wall is 4.3.13).
9. Appendix JA4 Cell: Cell number used to determine the R-value or U-factor (e.g., an 8-inch thick ICF wall with 2 inches of EPS (R-15.4) is A6).
10. Interior Insulation: The required R-value or U-factor (whichever descriptor was selected in column 6) for interior insulation will be completed based on the Table 150.1-A requirements for the wall type.
11. Exterior Insulation: The required R-value or U-factor (whichever descriptor was selected in column 7) for exterior insulation will be completed based on the Table 150.1-A requirements for the wall type.

E. SLAB INSULATION

Slab edge performance specifications and installation criteria are found in Sections 150.0(l) and 150.1(c)1D (Table 150.1-A). Requirements vary by climate zone and slab conditions.

1. Floor type: Types include slab-on-grade or raised slab.
   - Slab-on-grade floors require slab edge insulation in climate zone 16 only.
   - Raised slab must be insulated to R8 in climate zones 1, 2, 11, 13, 14 and 16, R-4 in climate zones 12 and 15, and no insulation is required in climate zones 3-10.
2. Proposed R-value: When required, insulation can be specified by either R-value or U-factor. When specifying an R-value complete column 2.
3. Proposed U-Factor: When required, specify the U-factor of proposed insulation in column 3.
4. Required Insulation R-value: Whichever descriptor was used (R-value or U-factor) in column 2 or 3 will be used to specify the value required, which will vary by climate zone and type of slab. Values are from Table 150.1-A.
5. Required Insulation U-factor: Whichever descriptor was used (R-value or U-factor) in column 2 or 3 will be used to specify the value required, which will vary by climate zone and type of slab. Values are from Table 150.1-A.
6. Comments: Any notes regarding location, unique conditions, or attachments.

NOTE: A suggestion is provided to highlight that there is a mandatory slab edge insulation requirement for heated slab floors. Since mandatory requirements are not listed on the Certificate of Compliance, this is provided for information purposes only. The specific requirements are in Sections 110.8(g) and Table 110.8-A.

F. RADIANT BARRIER

1. Radiant Barrier installed below the roof deck and on all gable end walls: Yes or No
2. Comments: Any notes regarding location, unique conditions, or attachments.

Radiant barrier performance specifications and installation criteria are found in Sections 110.8(j) and 150.1(c)2, and in Residential Appendix RA4.2.1.

Radiant barriers are required by Package A in climate zones 2-15.

G. ROOFING PRODUCTS - COOL ROOF

Roofing requirements are found in Section 110.8(i) and 150.1(c)11. Depending on the climate zone and roof slope, a cool roof (defined as a minimum aged solar reflectance and thermal emittance, or a minimum SRI) may be required by Package A.

NOTE: Exceptions include (1) additions of 300 ft2 or less, (2) low-slope roofs (pitch 2:12 or less) in climate zones 1-12, 14 and 16; (3) steep slope roof (pitch greater than 2:12) in climate zones 1-9 and 16; (4) roof constructions that have thermal mass over the roof membrane with at least 25 lb/ft2; and (5) any roof area covered by building integrated photovoltaic panels and solar thermal panels (the area of roof not covered by photovoltaic panels would still need to meet any applicable cool roof requirements).

1. Mass roof 25 lb ft2 or greater: Mass roofs are not required to have a cool roof even if the climate zone specifies minimum performance requirements.
2. Roof Pitch: Expressed as 4:12, for example, which means the roof rises 4 foot within a span of 12 feet. When roofs have multiple pitches the requirements are based on the pitch of 50% or more of the roof.
3. The CRRC Product ID Number is obtained from the Cool Roof Rating Council's Rated Product Directory at www.coolroofs.org/products/search.php. Products are listed by manufacturer, brand, type of installation, roofing material, and color, as well as product performance.
4. Product type: See Cool Roof Rating Council's directory. Generally product types include single-ply roof, wood shingles, asphalt roof, metal roof, tile roof.

5. Proposed Aged Solar Reflectance: Value is from the Cool Roof Rating Council's Rated Product Directory. If the aged value is not available, calculate the SRI using the initial solar reflectance on CF1R-ENV-04-E (Cool Roof and SRI Worksheet).
6. Proposed Thermal Emittance: From the product specifications. Skip this value if using a calculated SRI.
7. Proposed SRI: It is optional to meet either the SRI or the solar reflectance/thermal emittance. To calculate the SRI value use calculation from http://www.energy.ca.gov/title24/. Enter the resulting value in the SRI Column above and attach a copy of the CF1R-ENV-04-E.
8. Minimum Required Aged Solar Reflectance: Based on climate zone and roof slope.
9. Minimum Required Thermal Emittance: Based on climate zone and roof slope.
10. Minimum SRI: Based on climate zone and roof slope.
11. Comments: Any notes regarding location, unique conditions, or attachments, such as an SRI worksheet.

If the cool roofing requirements will be met by a liquid field applied coating, Section 110.8(i)4 requires the coating be applied across the entire roof surface and meet the dry mil thickness or coverage recommended by the manufacturer.

H. FENESTRATION/GLAZING AREAS ALLOWED

The climate zone and size of the addition will affect the amount of fenestration (also known as glazing) allowed. If limited to 20%, this is calculated as Conditioned Floor Area x 0.20 = total ft^2 of fenestration allowed (20%). Fenestration areas are expressed in feet, not inches. When west-facing fenestration is limited (in climate zones 2, 4, and 6-16), it is limited to a maximum of 5%. Additions of 1,000 ft^2 or less have alternate requirements. For example, the limit may be 120 ft^2 of fenestration or 25%. While west-facing fenestration may be limited, if there is no west fenestration the upper limit remains at 120 ft^2 or 25% (or the values shown in columns 2 and 3).

1. Addition Type: ≦ 400, ≦700, or > 700 to ≦ 1,000

Orientation: Orientation (North, East, South, West) Building Front Orientation: Building front expressed in degrees, where North = 0, East = 90, South = 180, and West = 270. The standards (section 100.1) include the following additional details for determining orientation:

- North is oriented to within 45 degrees of true north, including 45 degrees east of north;
- East is oriented to within 45 degrees of true east, including 45 degrees south of east;
- South is oriented to within 45 degrees of true south, including 45 degrees west of south;
- West is oriented to within 45 degrees of true west, including 45 degrees south of west.

In climate zones where the West-facing glazing is limited, list West-facing individually. This separation of fenestration by orientation is needed only for west-facing fenestration in climate zones 2, 4 and 6-16.

The remaining fields will be completed based on climate zone and conditioned floor area of the addition.

Maximum allowed is the greater of the value in column 3 or 4.

2. Maximum Allowed (based on percent of conditioned floor area): If West-facing fenestration is limited two rows will appear. West-facing fenestration area is limited to 5%, and the maximum total fenestration area is 30% for additions up to 400 ft^2, 25% for additions greater than 400 ft^2 but no greater than 700 ft^2, and 20% of greater than 700 ft^2.

3. Maximum Allowed ft^2: If West-facing fenestration is limited, it is limited to 60 ft^2 for additions of 700 ft^2 or less, or 70 ft^2 for greater than 700 ft^2. Other orientations (or the total in the addition) are limited to 75 ft^2 for additions up to 400 ft^2, 120 for additions greater than 400 ft^2 but no greater than 700 ft^2, and 175 ft^2 for additions of greater than 700 ft^2.

	≦ 400 ft^2		**≦700 ft^2**		**> 700 to ≦ 1,000 ft^2**	
Orientation	**Percentage**	**Area**	**Percentage**	**Area**	**Percentage**	**Area**
West	5%	30	5%	60	5%	70
All Orientations	30%	75	25%	120	20%	175

NOTE: West includes any vertical fenestration oriented to within 45 degrees of true west (in either direction), including 45 degrees south of west, any skylights oriented west, and skylights facing any direction with a pitch of less than 1:12.

The values in these fields will be entered into Section I.

4. Comments: Any notes regarding location, unique conditions, or attachments.

I. FENESTRATION/GLAZING PROPOSED AREAS AND EFFICIENCIES

1. Fenestration Type: Window, glass door, skylight, or glass block.
2. Fame type: Vinyl, wood, metal, metal thermal break, clad, fiberglass, or none.
3. Orientation (North, East, South, West) or in degrees. In climate zones where the West-facing glazing is limited, list West-facing individually.

4. Proposed West Facing Area ft^2: The size of any windows, doors with glass, or skylights within the floor area of the addition (combine windows with the same characteristics). West orientation includes any vertical fenestration oriented to within 45 degrees of true west, including 45 degrees south of west, any skylights oriented west, and skylights facing any direction with a pitch of less than 1:12.

   NOTE: Doors with glazing are counted in one of two ways. A door with 50% or more glazing is counted as the entire door area. A door with less than 50% glazing can be counted as the entire door area or can be calculated as the actual glass area with a 2-inch (0.17 ft) frame all around.

5. Proposed Non-West Facing Area ft^2: The size of any windows, doors with glass, or skylights within the floor area of the addition (combine windows with the same characteristics).
6. Total Proposed Area All Orientations: See row d below.
7. U-factor: Enter (a) the NFRC U-factor based on the proposed brand and type of fenestration using National Fenestration Rating Council (www.nfrc.org) certified values, (b) the default value from Table 110.6-A, or (c) the weighted average U-factor calculated on form CF1R-ENV-02-E, Area Weighted Average Calculation Worksheet. If any products (other than the exceptions) have a higher U-factor than 0.32, first complete a CF-1R-ENV-02-E to calculate a weighted average U-factor and attach it to the CF-1R-ADD-01-E.

   NOTES: (1) An exception allows up to 3 ft^2 of tubular skylights and up to 3 ft^2 of glazing in a door without having to meet a maximum U-factor. This field can be N/A. For up to 16 ft^2 of skylight, this value can be 0.55 or less.

   (2) If any fenestration has a U-factor greater than the maximum, with the exception of the 3 allowances for tubular skylights, glass in door, and skylights with 0.55 or less, complete a ENV-02-E and attach it to the CF-1R. If adding fenestration in climate zones with a maximum SHGC requirement, and any fenestration has an SHGC greater than required (with the exception of the 3 allowances for tubular skylights, glass in door, and skylights with 0.55 or less), complete a ENV-02-E and attach it to the CF-1R.

   (3) Dynamic glazing is a glazing system that changes its performance U-factor and SHGC based on the physical environment. Dynamic glazing includes chromogenic glazing or integrated shading systems (this does not include internally or externally mounted shading devices). If using dynamic glazing, use the lowest tested U-factor and SHGC in Columns 7 and 9.

8. Source: The source of the U-factor data for the fenestration product can be NFRC, Default, or ENV-02-E.
9. SHGC: Enter (a) the NFRC SHGC based on the proposed brand and type of fenestration using National Fenestration Rating Council (www.nfrc.org) certified values, (b) the default value from Table 110.6-B, or (c) the area weighted average SHGC calculated on form

CF1R-ENV-02-E, Area Weighted Average Calculation Worksheet. If any products (other than the exceptions) have a higher SHGC than 0.25, first complete a ENV-02-E to calculate a area weighted average SHGC and attach it to the CF-1R.

10. Source: The source of the SHGC data for the fenestration product can be NFRC, Default, or ENV-02-E
11. Exterior Shading Device: If exterior shading devices are used to meet the SHGC requirement, indicate the type of device (from Table S-1 of CF1R-ENV-03-E Solar Heat Gain Coefficient Worksheet) and attach an ENV-03-E.

    NOTE: South Overhang. If using an overhang for south-facing glazing, the glazing must be fully shaded at solar noon on August 21 and substantially exposed to direct sunlight at solar noon on December 21 (see Residential Manual, Section 3.5.5).

12. Comments: Note any special location or comment here.

To determine compliance with allowable fenestration areas, complete rows a-g.

a. Added West-facing Fenestration Area: If limited, enter the total amount of west-facing fenestration ONLY that will be in the addition's floor area.
b. Maximum Allowed West-facing Fenestration Area: From Section H (greater of column 2 or 3.
c. Is West-facing Fenestration Area $\leq$ Allowed: Indicate Yes if west-facing fenestration area is less than or equal to the maximum area allowed. If No another compliance approach must be used.
d. Added Fenestration Area (all orientations): This field is to show the area of fenestration for all orientations within the floor area of the addition.
e. Maximum Allowed Total Fenestration Area (all orientations): From Section H (greater of column 2 or 3.

J. HVAC SYSTEMS – HEATING/COOLING

If an existing space system will condition an addition, the prescriptive requirements do not apply to that system (Exception 4 to Section 150.2(a)). The enforcement agencies may require verification that the capacity of the existing heating system is adequate to meet the added load of the additional conditioned floor area. Since there is no health and safety code requirement to provide cooling, the enforcement agency will not ask for verification that the capacity of the existing system is adequate to meet the added load of the additional conditioned floor area.

If a new system is installed complete the following section.

1. Alteration type: Select "New" if a new system will serve the addition alone, or "Replace" if a new system is being installed to condition the existing and new space.
2. Area to be heated/cooled (ft^2): Indicate the conditioned floor area that the system will be heating and/or cooling.
3. Heating system type: Type includes furnace, central heat pump, boiler, hydronic, wood heat, wall furnace, room heater, room heat pump, or electric resistance (if it meets the exception). An exception to Section 150.1(c)6 allows electric resistance heating only when it is supplemental to another system, as indicated by a capacity of < 2 kW or 7,000 Btu/hr, and has a time-limiting control device that allows it to be operated for 30-minutes at a time.
4. Heating efficiency: For central gas heating systems, the minimum efficiency required by the appliance efficiency standards is 78% AFUE. Heat pumps have an HSPF of 7.7 or higher. Other appliance types will have different efficiency levels (e.g., a gas wall furnace may have a minimum requirement of 73% AFUE or lower, depending on the size and type). Any gas heating appliance (or heat pump) sold in California is acceptable. The only electric heating appliance allowed is a heat pump.
5. Cooling System Type: Indicate cooling system type or specify "no cooling." Categories include central air split system, central air package system, heat pump, room air or room heat pump, mini-split heat pump, or no cooling.
6. Cooling efficiency: For central cooling systems, the minimum efficiency required by the appliance efficiency standards is 13 SEER. Other appliance types will have different efficiency levels (e.g., a room air conditioner may have a minimum requirement of 9 EER (when an appliance standard is an EER this is considered equivalent to an SEER). Any cooling appliance sold in California is acceptable.
7. Thermostat type: Select a setback thermostat or an Energy Management System (EMS) for most systems, or N/A if exempt. Controls for most systems can be by a device that allows a person to program up to 4 temperature setpoints within 24 hours. See Section P.1 for more information and for a list of systems that do not have to meet the setback thermostat requirements.
8. Comments: Any notes regarding location or unique conditions.

NOTE: Ventilation Cooling or a whole house fan (a prescriptive requirement in climate zones 8-14) is not required for additions less than or equal to 1,000 ft^2. Other mandatory requirements still apply.

K. DUCT SYSTEMS

If an existing heating/cooling system is being extended to serve the addition, if less than 40 feet of new or replacement duct work is installed in either unconditioned or indirectly conditioned space (such as an attic or crawlspace) then no duct requirements are triggered. If that is the case only mandatory requirements apply. If prescriptive duct requirements are triggered, Exception 5 to Section 150.2(a) requires the existing duct

system and the extended ducts to meet applicable requirements of the alteration requirements. The HERS Rater will know what requirements apply for duct leakage testing.

1. Duct Alteration Type: Select Extend (if extending the ductwork from an existing system, New (if a new system is being installed for the addition only) or Replace (if a replacement system will serve an area larger than the addition alone).
2. Distribution System Type: Select ducted, radiant floor, piping, or ductless.
3. Duct location: If the system has ducts, indicate where they will be installed. Locations include attic, garage, conditioned space, radiant floor.
4. Added Duct Length: Indicate if Less than 40 feet of duct or more than 40 feet of duct is being added or replaced. Indicate only ducts in unconditioned space.
5. Duct R-value: From Package A. Ducted systems in Climate Zones 1-10 and 12-13 require R-6 duct insulation and in climate zones 11 and 14-16 ducted systems require R-8 duct insulation. If ducts are installed in conditioned space (which must be field verified), this field will be N/A. If system is ductless this field will be N/A.
9. Comments: Any notes regarding location or unique conditions.

NOTE: When duct sealing to an existing duct system is triggered by the changes being made, a narrow exception is provided only when the existing duct system is constructed, insulated or sealed with asbestos.

L. WATER HEATING SYSTEMS FOR ADDITIONS

Water heating compliance for an addition ranges from options found in Section 150.2(a) to using any of the prescriptive options found in Section 150.1(c)8. When a water heater is added as part of an addition, there is a very simple option of adding a gas or propane water heater, 60 gallons maximum (typically 50), or instantaneous. There is also a provision for adding an electric water heater but only if the existing fuel type is electric. Changing from gas to electric is not allowed, unless the new water heater is a heat pump water heater (which meets Section 150.2(b)1Giii).

1. Existing Fuel Type: Gas, Propane or Electricity.
2. Proposed Fuel Type: Gas, Propane or Electricity.

NOTE: Electricity is only allowed if (a) the existing water heater fuel type is electric, (b) if the proposed water heater type is a heat pump water heater, or (c) the electric storage or tankless water heater is located inside the conditioned space, has no recirculation pumps, and has a solar water-heating system sized to meet 50% of the water heating requirements (see Residential Manual). Otherwise, this compliance approach cannot be used and computer performance compliance is required.

3. Proposed DHW (domestic hot water) Water Heater Type: select storage, instantaneous, heat pump, or central (for multi-family).
4. Number of Added Water Heaters: Prescriptive compliance allows the addition of a single water heater.
5. Central Distribution System: Demand recirculation is required for all central distribution system in buildings with more than 8 dwelling units. If individual dwelling units are used enter n/a.
6. Dwelling Unit Distribution Type: Selections are both trunk and branch with no recirculation (standard) or recirculating with manual demand control.
7. Equipment Efficiency: For dwelling unit equipment enter the Energy Factor of the proposed water heater. The federal minimum Energy Factor for storage gas water heaters varies by tank volume. For a small water heater (75,000 Btu input or less for storage, 200,000 Btu input or less for instantaneous), the minimum energy factor is 0.58 for 50 gallons, 0.59 for 40 gallons, 0.61 for 30 gallons. Instantaneous water heaters will have an Energy Factor of 0.62 or higher, and heat pump water heaters have an energy factor of 2.0 or Rated Input (Btuh or Kwh): For Gas storage gas water heaters must be 75,000 Btuh or less, Instantaneous gas water heaters must be 200,000 Btuh or less. For multi-family buildings with central recirculation systems enter the AFUE or thermal efficiency of the equipment. For water heater heat pumps enter input in Kwh.
8. Rated Input: Enter the Btuh or Kwh rating for the water heater.
9. Water Heater Volume: For dwelling unit the capacity limit is no more than 60 gallons for storage water heaters. For tankless enter n/a. For central systems enter the total system storage.
10. Comments: Make any notations about conditions.

OPTIONAL – if the proposed water heating does not meet these requirements, it may be able to comply with the requirements applicable to new construction.

M. WATER HEATING SYSTEMS FOR NEW CONSTRUCTION

If the proposed added water heater does not meet the requirements of Table L, there are other options available in Section 150.1(c)8 that can be used for additions.

1. Water heater type. Prescriptive Standards allow four options under Section 150.1(c)8 (see Section P.2 for more detailed information on these requirements).
    A. One gas or propane storage water heater for each dwelling unit, with an input of up to 75,000 Btu/hour and a storage capacity no greater than 60 gallons. Distribution system type for individual dwelling units shall be either trunk and branch (standard) with no recirculating system or a demand recirculation system with manual controls.

B. One gas or propane instantaneous (tankless) water heater for each dwelling unit. With an input no greater than 200,000 Btu/hour. Distribution system type is limited to either trunk and branch system (standard) with no recirculating system or a demand recirculation system with manual controls.
C. All water heaters installed must comply with Section 110.1 and 110.3. The distribution system shall be equipped with a demand recirculation control allowing pump operation to be based on measurement of hot water demand and hot water return temperature. The system shall have at least two loops. Buildings with 8 or less units do not have to comply with the demand recirculation requirement.
D. If natural gas is not available, an electric-resistance storage or instantaneous water heater with additional criteria that it be located inside the conditioned space, has no recirculation pumps, and has a solar water-heating system with a solar fraction of at least 50 percent.

2. Water heating system type: Domestic Hot Water (DHW), Hydronic, Combined Hydronic, or Central. DHW is for domestic hot water, hydronic is a water heating system used for space heating only; combined hydronic are when the water heater will provide both space conditioning and domestic hot water. A central water heater serves multiple dwelling units in a multi-family building..
3. Fuel Type: Gas, LP (propane), electric (special conditions apply, see M.1.D and Q.4.D).
4. Central Recirculation Distribution System: For multi-family buildings with using a central distribution system a demand recirculation system with at least two distribution loops must be installed. This requirement applies to any building with eight or more units. If the system is non-central or project is individual units enter n/a.
5. Dwelling Unit Distribution Type: This shall be either trunk and branch (standard), or a manual controlled demand recirculating system.
6. Number of water heaters in system: In single-family and multi-family with water heaters in each dwelling units the value is 1. For multi-family central systems serving multiple dwelling units enter the total number of water heaters.
7. Water heater volume (gal): tank capacity in gallons. For individual water heaters for a dwelling unit this will be 60 gallons or less. If instantaneous, enter n/a. For multi-family central systems enter the total storage volume.
8. Energy Factor, AFUE or thermal efficiency: From product literature or a California Energy Commission directory.
9. Rated input (Btuh or Kwh): Enter the equipment input rating, for gas or propane fired units are Btuh, for electric fired system the units are Kwh.
10. Standby Loss (percent or Btuh): Applies only to large storage water heaters and boilers, Enter n/a for small storage or instantaneous water heaters.
11. Back-up solar savings fraction: If compliance requires a back-up solar system, indicate the solar contribution (e.g., 0.30). The system size requirements are shown below in Q.4. External calculations are required.

N. HERS MEASURES

HERS measures that are required will be listed in this section. A HERS rater will be required to complete inspections, verifications, or testing during construction of the addition. Possible verifications include:

1. Duct Leakage Testing: All duct systems must meet maximum duct leakage requirements. Typically the maximum leakage is 6% but varies for when the duct leakage test is performed and the type of building (single family, townhouse, multifamily). The only exception is if the heating and cooling systems are ductless.
2. Refrigerant Charge: Some type of refrigerant charge verification or Charge Indicator Display is required in climate zones 2 and 8-15 for most common systems such as ducted split and packaged systems, and mini-split systems. See Section 150(c)7.A. or Reference Residential Appendix RA3.2. If a building is built in climate zones 1, 3-17 or 16, or has no cooling system, no refrigerant charge verification is required.
3. Central System Air Handlers: Unless a building has no cooling system or has a non-ducted cooling system, the system must meet mandatory and prescriptive requirements for an airflow greater than 350 CFM per ton of nominal cooling capacity, and a fan efficacy less than or equal to 0.58 W/CFM. See 150.0(m)13, 150.1(c)10, and Reference Residential Appendix RA3.

DOCUMENTATION DECLARATION STATEMENTS

1. The person who prepared the CF-1R will sign and complete the fields for their name, company (if applicable), address, phone number, certification information (if applicable), date and signature (may be electronic).
2. The person who is assuming responsibility for the project being built to comply with Title 24, Part 6, will complete the fields for their name, company (if applicable), address, phone number, license number (if applicable), date and signature (may be electronic).

REGISTRATION

The CF-1R must be registered with a HERS provider prior to submitting for a building permit. See Residential Manual Section 2.1.1.

REFERENCES

1. Thermostats

Thermostat requirements are found in Section 110.2(c) with special requirements for heat pumps in Section 110.2(b). Controls for most systems can be by a central energy management control system ("EMS") or a setback thermostat with a mechanism allowing a person to program up to 4 temperature setpoints within 24 hours ("setback").

EXCEPTIONS: If the heating system type is a gravity gas wall, floor or room heater, non-central electric heater, fireplace or decorative gas appliance, or wood stove, a setback thermostat or energy management control system is not required.

If the cooling system type is a room air conditioner or room air conditioner heat pump setback thermostat or energy management control system is not required.

2. Water Heaters:

Section 150.1(c) allows a limited number of conditions for water heating. If conditions other than these are proposed, the prescriptive compliance approach cannot be used:

A. 150.1(c)8A one gas or propane storage water heater, up to 75,000 Btu/hour input (typically 50 gallons or less), with either no recirculating system or a demand recirculation system with manual controls. If the Energy Factor is less than or equal to the federal minimum, it must have an R-12 external wrap. See D. below.
B. 150.1(c)8B one gas or propane instantaneous (tankless) water heater with an input of 200,000 Btu per hour or less, no storage tank, and either no recirculating system or a demand recirculation system with manual controls. .
C. 150.1(c)8C a central water-heating system that has includes the following components (1) gas or propane water heaters, boilers or other water heating equipment, (2) a water heating recirculation loop that meets the requirements of Section 110.3(c)2 and Section 110.3(c)5 equipped with automatic controls for the recirculation pump based on measurement of hot water demand and hot water return temperature, and if more than 8 dwelling units, two recirculation loops each serving half of the building; (3) a solar water-heating system with a minimum solar savings fraction of 0.20 in climate zones 1 through 9 or a minimum solar savings fraction of 0.35 in climate zones 10 through 16 (installation criteria is in Reference Residential Appendix RA4).

D. 150.1(c)8D if natural gas is not available, an electric-resistance storage or instantaneous water heater with addition criteria that it be located inside the conditioned space, it has no recirculation pumps, and has a solar water-heating system with a minimum solar savings fraction of 0.50 (installation criteria is in Reference Residential Appendix RA4).

CERTIFICATE OF COMPLIANCE	CF1R-ALT-01-E
Residential Alterations	(Page 1 of 5)
Project Name:	Date Prepared:

A. GENERAL INFORMATION

01	**Project Name:**		**02**	**Date:**	
03	**Project Location:**		**04**	**Compliance Method:**	
05	**CA City:**		**06**	**Building Front Orientation (deg or cardinal):**	
07	**Zip Code:**		**08**	**Number of Dwelling Units:**	
09	**Climate Zone:**		**10**	**Fuel Type:**	
11	**Building Type**	☐ Single Family ☐ Multi Family	**12**	**Total Conditioned Floor Area:**	
13	**Project Type:**	☐ Insulation ☐ Roof Replacement ☐ Fenestration/Glazing ☐ Heating System ☐ Cooling System ☐ Duct System ☐ Water Heating	**14**	**Slab Area:**	

B. BUILDING INSULATION DETAILS (Section 150.2(b)1)

01	02	03	04	05	06		07	08	09	10	11
					Proposed					**Required**	
								Appendix JA4 Reference			
Tag/ID	Assembly Type	Frame Type	Frame Depth (inches)	Frame Spacing (inches)	Cavity R-value	Continuous Insulation R-value	U-factor	Table	Cell	U-Factor	Comments

C. ROOF REPLACEMENT (Prescriptive Alteration, Section 150.2(b)1H)

01	02	03	04	05	06	07	08	09	10	11	12
						Proposed			**Minimum Required**		
Altering > 50% of roof surface	Roof Pitch	Exception	CRRC Product ID Number	Product Type	R-value Deck Insulation	Aged Solar Reflectance	Thermal Emittance	SRI	Aged Solar Reflectance	Thermal Emittance	SRI

NOTES

- Mass roof with 25 lb/ft2 not required to comply with cool roof requirements
- Roof area covered by building integrated photovoltaic panels and solar thermal panels are exempt from the above Cool Roof requirements.
- Liquid field applied coatings must comply with installation criteria from section 110.8(i)4.

EXCEPTION:

CERTIFICATE OF COMPLIANCE	CF1R-ALT-01-E
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Project Name:	Date Prepared:

D. FENESTRATION/GLAZING AREAS ALLOWED (Section 150.2(b)1)

01	02	03	04	05
Alteration Type	Fenestration Type	Orientation	Maximum Allowed ft2	Comments

E. FENESTRATION/GLAZING PROPOSED AREAS AND EFFICIENCIES (Section 150.2(b)1)

01	02	03	04	05	06	07	08	09	10	11	12	13
Fenestration Type	Frame Type	Orientation	Area Removed ft2	Area Added ft2	Net Added Area ft2	Maximum Allowed U-factor	U-factor	Source	SHGC	Source	Exterior Shading Device	Comments

a	Net Added West-facing Fenestration Area	
b	Existing + Added West-facing Fenestration Area	
c	Maximum Allowed West-facing Fenestration Area	
d	Is West-facing Fenestration Area ≤ Allowed	
e	Net Added Fenestration Area (all orientations)	
f	Existing + Added Fenestration Area (all orientations)	
g	Maximum Allowed Fenestration Area (all orientations)	
h	Is Existing + Added Fenestration Area ≤ Allowed	
i	If exterior shading devices are used, what is the calculated value from CF1R-ENV-03	

CERTIFICATE OF COMPLIANCE	CF1R-ALT-01-E
Residential Alterations	(Page 3 of 5)
Project Name:	Date Prepared:

F. SPACE CONDITIONING(SC) SYSTEMS – HEATING/COOLING (Prescriptive section 150.2(b))

01	**02**	03	04	05	06	07	08
Alteration Type	Floor Area Served (ft2)	Heating System Type	Heating Component Altered	Cooling System Type	Cooling Component Altered	Thermostat Type	Comments

- The Appliance Efficiency Standards regulate the minimum efficiency requirement of regulated appliances sold in California. Any new appliance legally offered for sale will meet the minimum efficiency required for prescriptive compliance.

G. DUCT SYSTEMS (Section 150.2(b)1D)

01	02	03	04	05	06
Duct Alteration Type	Distribution System Type	Duct Location	Added Duct Length	Duct R-Value	Comments
New/Replacement, Extension					

- The prescriptive requirements preclude the use of bypass ducts in association with zonally controlled systems. A HERS Rater shall verify that zonally controlled systems have no bypass ducts.

H. WATER HEATING SYSTEMS (Section 150.2(b)1G)

01	02	03	04	05	06	07	08	09
Existing Water Heater Fuel Type	Proposed DHW Water Heater Type	Proposed Water Heater Fuel Type	Proposed Water Heater Efficiency (EF, AFUE)	Water Heater Volume (gal)	Central Distribution Type	Dwelling Unit Distribution Type	Solar Water Heater Solar Fraction	Comments

CERTIFICATE OF COMPLIANCE	CF1R-ALT-01-E
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Project Name:	Date Prepared:

I. HERS VERIFICATION SUMMARY The enforcement agency should pay special attention to the HERS Measures specified in this checklist below. A registered Certificate of Verification for all the measures specified shall be submitted to the building inspector before final inspection.

Ducts

- Duct Leakage Testing in accordance with Section 150.2(b)1C,D, and E is required (Residential Appendix RA3.1)

Refrigerant Charge

- Refrigerant Charge Verification in accordance with Section 150.2(b)1F is required in climate zones 2 and 8-15 (Residential Appendix RA3.2).

Central System Air Handlers

- Airflow or Fan Efficacy Verification is required for ducted air cooled air conditioners and air source heat pumps in accordance with Section 150.2(b)1C, and F (Residential Appendix RA3.2. and RA3.3).

CERTIFICATE OF COMPLIANCE	CF1R-ALT-01-E
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Project Name:	Date Prepared:

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT	
1. I certify that this Certificate of Compliance documentation is accurate and complete.	
Documentation Author Name:	Documentation Author Signature:
Company:	Signature Date:
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 Compliance is true and correct.
2. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer).
3. That the energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
4. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.
5. I will ensure that a registered copy of this Certificate of Compliance shall be 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 Compliance is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Designer Name:	Responsible Designer Signature:
Company :	Date Signed:
Address:	License:
City/State/Zip:	Phone:

For assistance or questions regarding the Energy Standards, contact the Energy Hotline at: 1-800-772-3300.

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

Completing these forms will require that you have the Reference Appendices for the 2013 Building Energy Efficiency Standards. This document contains the Joint Appendices which are used to determine climate zone and to complete the section for opaque surfaces. When the term CF-1R is used it means the CF-1R-PRSC-ALT-01. Worksheets are identified by their entire name and subsequently by only the worksheet number, such as WS-02.

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

If any part of the alteration does not comply, prescriptive compliance fails and the performance compliance approach must be used.

A. GENERAL INFORMATION

Project Name: Identifying information, such as owner's name.

Date: Date of document preparation.

Project Location: Legal street address of property or other applicable identifying information.

Compliance Method: Prescriptive.

CA City: Legal city/town of property.

Building Front Orientation: Building front expressed in degrees, where North = 0, East = 90, South = 180, and West = 270. Indicate cardinal if it is a subdivision or multi-family project that will be built in multiple orientations. The standards (section 100.1) include the following additional details for determining orientation:

- Cardinal covers all orientations (for buildings that will be built in multiple orientations);
- North is oriented to within 45 degrees of true north, including 45 degrees east of north;
- East is oriented to within 45 degrees of true east, including 45 degrees south of east;
- South is oriented to within 45 degrees of true south, including 45 degrees west of south;
- West is oriented to within 45 degrees of true west, including 45 degrees south of west.

Zip Code: 5-digit zip code for the project location (used to determine climate zone).

Number of Dwelling Units: 1 for single-family, 1 or more for multifamily.

Climate zone: From Joint Appendix JA2.1.1.

Fuel Type: Natural Gas, Liquefied Propane Gas, or Electricity. NOTE: prescriptive compliance only allows electricity if existing appliances are electric and natural gas is not available in the building.

Building Type: Single Family (includes duplex), or Multi Family (a building that shares common walls and common floors or ceilings).

Total Conditioned Floor Area: Enter the new conditioned floor area in ft2, as measured from the outside of exterior walls of the dwelling unit or building being altered.

Project Type: Check all that apply – insulation, roof replacement, fenestration/glazing, heating system, cooling system, duct system, and/or water heating alteration.

Slab Area: Area of the first floor slab (if any) in ft2.

B. BUILDING INSULATION DETAILS (Section 150.2(b)1)

1. Tag/ID: A label (if any) from the plans, such as A1.4 or wall.
2. Assembly Type: Roof, Ceiling, Wall, Floor over crawlspace or floor over exterior.
3. Frame Type: Wood or Metal.
4. Frame Depth: Nominal dimensions of framing material such as 4 (if 2x4) or 6 (if 2x6).
5. Frame Spacing: 16 or 24 inches on center.
6. Cavity R-value. Insulation installed between framing.

   NOTE: Section 110.8(d) specifies that if adding insulation to an existing attic, the resulting attic insulation must total R-30. However, the amount of insulation required is limited to the amount of room available for insulation without conflicting with Building Code Section 1203.2.

7. U-factor: The U-factor for the entire wall, roof or floor assembly.

8. Appendix JA4 Table: Table number used to determine the R-value or U-factor (e.g., an ICF wall is 4.3.13).
9. Appendix JA4 Cell: Cell number used to determine the R-value or U-factor (e.g., an 8-inch thick ICF wall with 2 inches of EPS (R-15.4) is A6).
10. Required U-factor: from mandatory requirements in Sections 110.0 and 150.0.
11. Comments or notes regarding location or unique condition.

C. ROOF REPLACEMENT (Prescriptive Alteration, Section 150.2(b)1H)

When 50% or more of the roof is being replaced the roofing requirements are triggered. Any areas of roof covered by building integrated photovoltaic panels and solar thermal panels (the area of roof not covered by photovoltaic panels would still need to meet any applicable cool roof requirements). Additionally, there are many alternatives/exceptions when a cool roof is required.

When the roof is steep slope (pitch greater than 2:12) the roof requirements include a cool roof in climate zones 10-15. The minimum requirement is 0.20 aged solar reflectance, 0.75 thermal emittance, or an SRI of 16.

EXCEPTIONS AND ALTERNATIVES FOR STEEP SLOPE ROOFS:

(a) Mass roof 25 lbs/ft2 or greater (uncommon situation such as sod roof);
(b) Air space 1" from top of roof deck to bottom of roofing;
(c) Roofing product has a profile ratio of rise to width of 1 to 5 for 50 percent or greater of the width of the roofing product;
(d) Ducts already meet Section 150.1(c) insulation and duct leakage requirements;
(e) Roof has R-38 insulation;
(f) Roof has a radiant barrier;
(g) No ducts are installed in the attic; or
(h) R-4 insulation above the roof deck.

In climate zones 13-15, when there is a low slope roof (pitch 2:12 or less) the cool roof requirements are for a minimum aged solar reflectance of 0.63, a minimum 0.75 thermal emittance, or a minimum SRI of 75.

EXCEPTIONS AND ALTERNATIVES FOR LOW SLOPE ROOFS:

(a) Mass roof 25 lbs/ft2 or greater (uncommon situation such as sod roof);
(b) No ducts are installed in the attic; or

(c) Roof deck installation—by installing roof deck insulation, a lower aged solar reflectance is required: R-2 (0.62-0.60), R-4 (0.59-0.55), R-6 (0.54-0.50), R-8 (0.49-0.45), R-12 (0.44-0.40), R-16 (0.39-0.35), R-20 (0.34-0.30), R-24 (0.29-0.25).

Complete the fields for this section as follows:

1. Altering > 50% of roof surface: Indicate Yes or No. A yes triggers the prescriptive requirements for meeting a cool roof requirement.
2. Roof Pitch: When roofs have multiple pitches the requirements are based on the pitch of 50% or more of the roof.
3. Exception: If meeting one of the exceptions. Indicate which exception is, or will be, met.
4. The CRRC Product ID Number: obtained from the Cool Roof Rating Council's Rated Product Directory at www.coolroofs.org/products/search.php. Products are listed by manufacturer, brand, type of installation, roofing material, and color, as well as product performance.
5. Product Type: See Cool Roof Rating Council's directory. Generally product types include single-ply, wood shingles, asphalt, metal, and tile.
6. R-value Deck Insulation: If one of the exceptions selected includes adding roof deck insulation, indicate the R-value of insulation.
7. Proposed Aged Solar Reflectance: Value is from the Cool Roof Rating Council's Rated Product Directory. If the aged value is not available, calculate the SRI using the initial solar reflectance (see column 9).
8. Proposed Thermal Emittance: From the product specifications.
9. Proposed SRI: It is optional to meet either the SRI or the solar reflectance/thermal emittance. To calculate the SRI value use the Worksheet at http://www.energy.ca.gov/title24/ and enter the resulting value in the SRI Column above and attach a copy of the SRI Worksheet to the CF-1R.
10. Minimum Required Aged Solar Reflectance: auto-complete based on climate zone and roof slope.
11. Minimum Required Thermal Emittance: auto-complete based on climate zone and roof slope.
12. Minimum SRI: auto-complete based on climate zone and roof slope.

If the cool roofing requirements will be met by a liquid field applied coating, Section 110.8(i)4 requires the coating be applied across the entire roof surface and meet the dry mil thickness or coverage recommended by the manufacturer.

D. FENESTRATION/GLAZING AREAS ALLOWED

The climate zone and size of the addition will affect the amount of fenestration (also known as glazing) allowed. If limited to 20%, this is calculated as Conditioned Floor Area x 0.20 = total ft^2 of fenestration allowed (20%). Fenestration areas are expressed in feet, not inches. When west-facing fenestration is limited (in climate zones 2, 4, and 6-16), it is limited to a maximum of 5%. Additions of 1,000 ft^2 or less have alternate requirements. For example, the limit may be 120 ft^2 of fenestration or 25%. While west-facing fenestration may be limited, if there is no west fenestration the upper limit remains at 120 ft^2 or 25% (or the values shown in columns 2 and 3).

The Alteration Type and Fenestration Type will affect how the standards apply and whether the fenestration area is limited. Percentages are determined as Conditioned Floor Area x 0.20 = total ft^2 of fenestration allowed (20%). Depending on the climate zone, If west-facing fenestration is limited, it is limited to a maximum of 5%. The overall total fenestration area is limited to 20%, not 25%. Fenestration areas are expressed in feet, not inches.

1. Alteration Type. Enter **Repair**, **Replace75, ReplaceALL**, **Add75**, **Add76, ReplaceSky, Add16Sky, or AddSky** as describe below:

   Repair: A repair is when glass in an existing sash and frame is replaced or replacement of sashes in an existing frame. Repairs are not required to meet any requirements of the energy efficiency standards.

   Replace75: When up to 75 ft^2 of fenestration is replaced, the replacement vertical fenestration must meet a maximum 0.40 U-factor and in climate zones 2, 4, 6-16 a maximum 0.35 SHGC.

   ReplaceAll: When all fenestration (with an area of greater than 75 ft^2) is replaced, the new fenestration product must have a maximum U-factor of 0.32 and in climate zones 2, 4, 6-16 a maximum SHGC of 0.25. This alteration does not trigger the area limits of Package A.

   Add75: When adding fenestration up to 75 ft^2, the selected fenestration product must have a maximum U-factor of 0.32 and in climate zones 2, 4, 6-16 a maximum SHGC of 0.25. This alteration does not trigger the area limits of Package A.

   Add76: When more than 75 ft^2 is added to the existing fenestration, in addition to the above requirements, the maximum fenestration area of the dwelling unit cannot exceed 20% and the maximum West-facing fenestration area (in climate zones 2, 4, 6-16) cannot exceed 5%.

   ReplaceSky: When an equal area of existing skylights is replaced, the replacement skylights must meet a maximum 0.55 U-factor and in climate zones 2, 4, 6-16 a maximum 0.30 SHGC.

   Add16Sky: When up to 16 ft^2 of skylight area is added, the product selected must meet a maximum U-factor of 0.55 and in climate zones 2, 4, 6-16 a maximum 0.30 SHGC.

   AddSky: When greater than 16 ft^2 of skylight area is added, the product selected must meet a maximum U-factor and SHGC of Table 150.1-A, which is a maximum 0.32 U-factor and in climate zones 2, 4, 6-16 a maximum 0.25 SHGC.

The remaining fields are auto completed based on alteration type, conditioned floor area, and climate zone.

2. Fenestration Type:
3. Orientation: In climate zones with a west-facing limit (2, 4, 6-16), two values will be displayed, one for west and one for the other orientations (E, S, and W).
4. Maximum Allowed ft^2: If West-facing fenestration is limited two rows will appear. West-facing fenestration area is limited to 5%, and the maximum total fenestration area is 20%. Depending on the type of fenestration and the alteration type, this field may show values such as 75 ft^2 or 16 ft^2.

   The values in these fields will be entered into the lower Section E, rows c and g.

   NOTE: West includes any vertical fenestration oriented to within 45 degrees of true west, including 45 degrees south of west. For skylights, west also includes any skylight area facing any direction with a pitch of less than 1:12

5. Comments: Note any special location or comment here.

E. FENESTRATION/GLAZING PROPOSED AREAS AND EFFICIENCIES

1. Fenestration Type: Window, glass door, skylight, or glass block.
2. Fame type: Vinyl, wood, metal, metal thermal break, clad, fiberglass, or none.
3. Orientation (North, East, South, West) or in degrees. In climate zones where the West-facing glazing is limited, list west-facing individually. The definitions in the Energy Efficiency Standards include these specific details:
   - North is oriented to within 45 degrees of true north, including 45 degrees east of north;
   - East is oriented to within 45 degrees of true east, including 45 degrees south of east;
   - South is oriented to within 45 degrees of true south, including 45 degrees west of south;
   - West is oriented to within 45 degrees of true west, including 45 degrees south of west.

   Skylights in a roof pitch greater than 1:12 can be included as facing the same orientation as that portion of the roof angle. If the skylight is in a roof with a pitch less than 1:12, the skylight is assumed to face west.

4. Area Removed ft^2: The size of window(s) being replaced or removed (combine windows with the same characteristics).

   NOTE: Doors with glazing are counted in one of two ways. A door with 50% or more glazing is counted as the entire door area. A door with less than 50% glazing can be counted as the entire door area or can be calculated as the actual glass area with a 2-inch (0.17 ft^2) frame all around.

5. Area Added ft^2: The size of new or replacement window(s), doors, skylights.
6. Net Added Area ft^2: The difference between columns 4 and 5 (can be a negative number if reducing the area).
7. Maximum Allowed U-factor: This field will be vary depending on the type of alteration specified in Section D.

   NOTE: For up to 3 ft^2 of tubular skylights and up to 3 ft^2 of glazing in a door, this field and column 8 can be n/a. For up to 16 ft^2 of skylight, enter 0.55.

8. U-factor: Enter (a) the NFRC U-factor based on the proposed brand and type of fenestration using National Fenestration Rating Council (www.nfrc.org) certified values, (b) the default value from Table 110.6-A, or (c) the weighted average U-factor calculated on form CF-1R-PRSC-WS-02, Area Weighted Average Calculation Worksheet. For the exceptions, up to 3 ft^2 of tubular skylights and up to 3 ft^2 of glazing in a door enter N/A, and for up to 16 ft^2 of skylight, enter 0.55. If any products (other than the exceptions) have a higher U-factor than 0.32, first complete a WS-02 to calculate a weighted average U-factor and attach it to the CF-1R.

   NOTE: Dynamic glazing is a glazing system that changes its performance U-factor and SHGC based on the physical environment. Dynamic glazing includes chromogenic glazing or integrated shading systems (this does not include internally or externally mounted shading devices). If using dynamic glazing, use the lowest tested U-factor and SHGC in Columns 8 and 11.

9. Source: NFRC, Default or WS-02. The source of the U-factor data for the fenestration product.
10. Maximum Allowed SHGC: This field will be vary depending on the type of alteration specified in Section D for climate zones 2, 4 and 6-16. In climate zones 1, 3 and 5, where there is no maximum SHGC requirement, this value is n/a.
11. Source: NFRC, Default (from Table 110.6-B) or WS-02. The source of the SHGC data for the fenestration product.
12. Exterior Shading Device: If exterior shading devices are used to meet the SHGC requirement, indicate the type of device (from Table S-1 of CF-1R-PRSC-WS-03 Solar Heat Gain Coefficient Worksheet) and attach a WS-03.

    If using an overhang for south-facing glazing, the glazing must be fully shaded at solar noon on August 21 and substantially exposed to direct sunlight at solar noon on December 21 (see Residential Manual, Section 3.___).

13. Comments: Note any special location or comment here.

To determine compliance with allowable fenestration areas, complete rows a-h.

a. Net Added West-facing Fenestration Area: If limited, enter the total amount of west-facing fenestration ONLY that will be added to the dwelling unit when alterations are complete.

b. Existing + Added West-facing Fenestration Area: If more than 75 ft of fenestration is added, the dwelling unit cannot exceed 5% west-facing fenestration in climate zones 2, 4, and 6-16. Enter the area of West-facing fenestration ONLY that will be in the dwelling unit when alterations are complete.
c. Maximum Allowed West-facing Fenestration Area: Conditioned Floor Area x 0.05 (for climate zones affected).
d. Is West-facing Fenestration Area ≤ Allowed: Indicate Yes if west-facing fenestration area is less than or equal to the maximum area allowed, West-facing fenestration area is in compliance.
e. Net Added Fenestration Area (all orientations): This field is to show the net area of added fenestration for all orientations. When limited, the maximum is either up to 75 ft of added fenestration or a 20% limit is placed on the dwelling unit when alterations are complete. The total includes all existing and new fenestration, including the area of fenestration with exceptions for U-factor and SHGC.
f. Existing + Added Fenestration Area (all orientations): If more than 75 ft of fenestration is added, the dwelling unit cannot exceed 20% fenestration. Enter the area of all fenestration existing and new in the dwelling unit when alterations are complete (including West facing).
g. Maximum Allowed Total Fenestration Area (all orientations). Conditioned Floor Area x 0.20.
h. Is Existing + Added Fenestration Area ≤ Allowed: Indicate Yes if the total fenestration area is less than or equal to the maximum area allowed, the fenestration area is in compliance.
i. If exterior shading devices are used to meet the SHGC requirements, enter the value calculated on the WS-03 and attach it to the CF-1R.

NOTE: If any fenestration has a U-factor greater than the maximum, with the exception of the 3 allowances for tubular skylights, glass in door, and skylights with 0.55 or less, complete a WS-02 and attach it to the CF-1R. If adding fenestration in climate zones with a maximum SHGC requirement, and any fenestration has an SHGC greater than required (with the exception of the 3 allowances for tubular skylights, glass in door, and skylights with 0.55 or less), complete a WS-02 and attach it to the CF-1R.

F. HVAC SYSTEMS – HEATING/COOLING

Requirements of the standards apply to a heating and cooling system alteration based on the type of alteration and the system type (Section 150.2(b)1). A completely new system will meet all mandatory and prescriptive requirements, which vary by climate zone (based on Section 150.2(b)1C). [NOTE: Computer performance compliance can be used to trade-off any requirements that are not mandatory.] When parts of a system are replaced, it may trigger some of the same requirements that apply to new systems and duct alterations.

Cooling System Alterations

If a new system is installed, this triggers all of the cooling system requirements of a new dwelling, as well as duct sealing requirements that apply to duct alterations, even if duct alterations are not proposed. Similar requirements are triggered if the cooling system alteration includes adding or replacing: including air handler, outdoor condensing unit or cooling coil.

In addition to requirements of some form of refrigerant charge verification, if the alteration is to a refrigerant-containing system such as compressor, condensing coil, evaporative coil, refrigerant metering device or refrigerant piping, the setback thermostat requirements of Section 110.2(c) apply.

Heating System Alterations

If a new system is installed, this triggers all system requirements for a new dwelling, as well as duct sealing requirements that apply to duct alterations, even if duct alterations are not proposed. Similar requirements are triggered if the heating system alteration includes replacing an air handler or heating coil.

Your HERS rater will know the more specific requirements that apply when the project details are known.

If altering or installing a space conditioning system, complete the following section.

1. Alteration type: Select "New" if a completely new system is being installed. Select "Alter" if parts of an existing system are being replaced. Select "Repair" if unsure of what specific changes to the system are to be made.
2. Floor Area Served (ft2): Indicate the conditioned floor area that the system will be heating and/or cooling.
3. Heating System Type: Type includes furnace, central heat pump, boiler, hydronic, wood heat, wall furnace, room heater, room heat pump, mini-split heat pump or electric resistance (if it meets the exception). An exception to Section 150.1(c)6 allows electric resistance heating only when it is supplemental to another system, as indicated by a capacity of < 2 kW or 7,000 Btu/hr, and has a time-limiting control device that allows it to be operated for 30-minutes at a time.
4. Heating Component Altered: Select all that apply from (a) condensing coil, (b) evaporator coil, (c) compressor, or (d) air handler/furnace.
5. Cooling System Type: Indicate cooling system type or specify "no cooling." Categories include central air split system, central air package system, heat pump, room air or room heat pump, mini-split heat pump, or no cooling.
6. Cooling Component Altered: Select all that apply from (a) condensing coil, (b) evaporator coil, (c) compressor, (d) refrigerant metering device, (e) refrigerant piping, or (f) air handler/furnace.
7. Thermostat type: Typically setback or EMS. Non-central systems that are exempt (see below) are N/A.

Requirements are found in Section 110.2(c) with special requirements for heat pumps in Section 110.2(b). Controls for most systems can be by a central energy management control system ("EMS") or a setback thermostat with a mechanism allowing a person to program up to 4 temperature setpoints within 24 hours ("setback").

EXEMPTIONS: If the system type is a gravity gas wall, floor or room heater, non-central electric heater, fireplace, decorative gas appliance, wood stove, room air conditioner or room heat pump, a setback thermostat or energy management control system is not required ("N/A").

NOTE: Ventilation Cooling or a whole house fan (a prescriptive requirement in climate zones 8-14) is not required for additions less than or equal to 1,000 ft2. Other mandatory requirements still apply.

6. Comments: Any notes regarding location or unique conditions.

G. DUCT SYSTEMS

If a duct system is being added or completely replaced, the duct insulation and duct sealing requirements apply as if it was a new dwelling unit. If a duct system is altered or extended (by more than 40 feet of added duct), and in some cases when the heating and/or cooling system is completely replaced or altered, duct sealing requirements are triggered. (See Section 150.2(b)1.)

The HERS Rater will know what requirements apply for duct leakage testing and the varying levels of leakage allowed based on the specifics of the building alteration.

1. Duct Alteration Type: Select Extend (if extending the ductwork from an existing system, New (if a new system is being installed for the addition only) or Replacement (if a replacement system will serve an area larger than the addition alone).
2. Distribution System Type: Select ducted, radiant floor, piping, or ductless.
3. Duct location: If the system has ducts, indicate where they will be installed. Locations include attic, garage, conditioned space, radiant floor.
4. Added Duct Length: If the alteration type is Extend, indicate the length of duct being added in unconditioned space.
5. Duct R-value: If system is New or Replacement, a ducted system in Climate Zones 1-10 and 12-13 require R-6 duct insulation, and in climate zones 11 and 14-16 ducted systems require R-8 duct insulation. If ducts are installed in conditioned space (which must be field verified), this field will be N/A. If system is ductless this field will be N/A.
6. Comments: Any notes regarding location or unique conditions.

NOTE: When duct sealing to an existing duct system is triggered by the changes being made, a narrow exception is provided only when the existing duct system is constructed, insulated or sealed with asbestos.

NOTE: Some alterations to the heating and/or cooling system will trigger duct sealing requirements as shown in Section I.

H. WATER HEATING SYSTEMS

Dwelling unit water heating compliance for an alteration ranges from options found in Section 150.2(b) to using any of the prescriptive options found in Section 150.1(c)8. Water allowed includes gas or propane water heater, 60 gallons maximum or instantaneous (tankless). Dwelling Unit distribution systems are limited to trunk and branch or manual controlled demand recirculation. If there is no natural gas connected to the building, an electric water heater may be replaced with another electric water heater. However, changing from gas to electric is not allowed, unless the new water heater is a heat pump water heater (which meets section 150.2(b)1Giii). Multi-family central systems must use certified equipment as defined under Section 110.1 and 110.3.

NOTE: If the proposed installation does not meet the requirements allowed specifically for alterations, use form CF-1R-PRSC-NCB-01 to document the water heater alteration.

1. Existing Fuel Type: Gas, Propane or Electricity.
2. Proposed Water Heater Type: proposed water heater type is small storage (equipment with 75,000 Btu or less input), instantaneous (input of 200,000 Btu or less) , heat pump, or central (for multi-family).

   NOTE: Electricity is only allowed if (a) the existing water heater fuel type is electric, (b) if the proposed water heater type is a heat pump water heater, or (c) the electric storage or instantaneous water heater is located inside the conditioned space, has no recirculation pumps, and has a solar water-heating system sized to meet 50% of the water heating requirements (see Residential Manual). Otherwise, this compliance approach cannot be used and computer performance compliance is required.

3. Proposed Fuel Type: Gas, Propane or Electricity.
4. Proposed Water Heater Efficiency (EF, AFUE) for small storage, instantaneous, and heat pumps enter Energy Factor. For Central Systems enter AFUE or Thermal Efficiency for Boilers or Large Storage Gas Water Heaters.
5. Water Heater Volume: Enter volume of storage up to 60 gallons allowed for storage water heaters. For instantaneous water heaters or boilers enter n/a. For multi-family systems enter total storage.
6. Central Recirculation Distribution System: For multi-family buildings with using a central distribution system either the existing distribution system must be used or a demand recirculation system with at least two distribution loops must be installed. The two loop requirement applies to any building with eight or more units. If the system is non-central with water heaters in each unit enter n/a.

7. Dwelling Unit Distribution Type: This shall be the existing system or either trunk and branch (standard), or a manual controlled demand recirculating system.
8. Solar Water Heating Solar Fraction: For installations of electric water heaters a solar water heating system must be installed with a fraction of at least 50 percent.
9. Comments: Note any special location or comment here.

I. HERS MEASURES

HERS measures that are required will be listed in this section. A HERS rater will be required to complete inspections, verifications, or testing during construction of the addition. Possible verifications include:

1. Duct Leakage Testing: All duct systems must meet maximum duct leakage requirements. Typically the maximum leakage is 6% but varies for when the duct leakage test is performed and the type of building (single family, townhouse, multifamily). The only exception is if the heating and cooling systems are ductless.
2. Refrigerant Charge: Some type of refrigerant charge verification or Charge Indicator Display is required in climate zones 2 and 8-15 for most common systems such as ducted split and packaged systems, and mini-split systems. See Section 150(c)7.A. or Reference Residential Appendix RA3.2. If a building is built in climate zones 1, 3-17 or 16, or has no cooling system, no refrigerant charge verification is required.
3. Central System Air Handlers: Unless a building has no cooling system or has a non-ducted cooling system, the system must meet mandatory and prescriptive requirements for an airflow greater than 350 CFM per ton of nominal cooling capacity, and a fan efficacy less than or equal to 0.58 W/CFM. See 150.0(m)13, 150.1(c)10, and Reference Residential Appendix RA3.

SIGNATURES

1. The person who prepared the CF-1R will sign and complete the fields for their name, company (if applicable), address, phone number, certification information (if applicable), date and signature (may be electronic).
2. The person who is assuming responsibility for the project being built to comply with Title 24, Part 6, will complete the fields for their name, company (if applicable), address, phone number, license number (if applicable), date and signature (may be electronic).

REGISTRATION

1. The CF-1R must be registered with a HERS provider prior to submitting for a building permit. See Residential Manual Section 2.1.1.

STATE OF CALIFORNIA

ALTERATION TO AN HVAC SYSTEM

CEC-CF1R-ALT-02-E (Revised 06/13)

CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	CF1R-ALT-02-E
Alteration to an HVAC System	(Page 1 of 2)
Project Name:	Date Prepared:

A. GENERAL INFORMATION

01	Project Name:		02	Date Prepared:	
03	Project Location:		04	Building Type:	
05	CA City:		06	Dwelling Unit Name:	
07	Zip Code:		08	HVAC System Identification or Name:	
09	Climate Zone:		10	CFA served by HVAC System (ft2):	
11	Alteration Type:		12	HVAC System Location or Area Served	

B. ALT-02a – Extension of Existing Duct System, Greater Than 40 Feet (Section150.2(b)1Diib)

01	02	03		04	05	06		07	08	09
Heating System Type	Altered Heating Component	Required Min Heating Efficiency AFUE	or HSPF	Cooling System Type	Altered Cooling Components	Required Min Condenser Efficiency SEER	or EER	Required Thermostat Type	New or Replaced Duct Length (ft)	Req'd Min New Duct R-Value

C. Certificate of Installation Documents Required

CF2R-MECH-01-E

CF2R MECH-20-H – Duct Leakage

D. Certificate of Verification Documents Required

CF3R MECH-20-H – Duct Leakage

CERTIFICATE OF COMPLIANCE	CF1R-ALT-02-E
Alteration to an HVAC System	(Page 2 of 2)

Project Name:	Date Prepared:

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT	
1. I certify that this Certificate of Compliance documentation is accurate and complete.	
Documentation Author Name:	Documentation Author Signature:
Company:	Signature Date:
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 Compliance is true and correct.
2. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer).
3. That the energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
4. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.
5. I will ensure that a registered copy of this Certificate of Compliance shall be 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 Compliance is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Designer Name:	Responsible Designer Signature:
Company :	Date Signed:
Address:	License:
City/State/Zip:	Phone:

For assistance or questions regarding the Energy Standards, contact the Energy Hotline at: 1-800-772-3300.

A. GENERAL INFORMATION

1. Enter the Name of the project ex. Smith Changeout. Use a name that is unique and identifiable.
2. Enter the date this CF1R was prepared.
3. Enter the Project Location. Ex. Black Oak Subdivision, Hillcrest Apts. This allows more specification than just the city.
4. Enter the building type (Single Family or Multi Family). Multi family projects applies only to low-rise multifamily projects of three or fewer stories. High-rise multifamily projects fall under the non-residential standards.
5. Enter the name of the CA city that the project is in. Utilize the legal description as my be found on the deed or title.
6. Enter Dwelling Unit Name. Used for apartments with the same address but includes a unit number.
7. Enter Zip code of project.
8. Enter HVAC Identification or Name. Used to distinguish systems from each other in homes with more than one system. Ex. Upstairs system, living area system, zone 4, etc.
9. Enter Climate Zone where project is located. It is very important to enter the correct climate zone. Climate zone descriptions can be found in Joint Appendix JA2. Interactive and downloadable maps can be found at http://www.energy.ca.gov/maps/renewable/building_climate_zones.html
10. Enter the conditioned floor area served by the unit. For HVAC-only alterations, this can be an approximate number.
11. Alteration Type:
    Determine the work being done and match with one of four options below.
    a. **"Extension of Existing System"** – refer to section 150.2(b)1Diib of the Standards for the exact definition.
        - 40 feet of new ducts added or replaced and
        - After work is completed less than 75% of the duct system including, boots, air handler, plenums, duct material is new, or parts of the duct system are not accessible.
        - Air handler, condenser, coil or other refrigerant containing equipment is not being added or replaced.

    REQUIRED:
        - CF2R-MECH-01-E - Space Conditioning System Information
            - Duct insulation: new plenums R6, new duct ducting R-6 in CZ 2, 8, 9, 10, 12, and 13. R-8 in CZ 14, and 15.

    MAY BE REQUIRED: (Some exceptions apply. To be determined.)
        - CF2R & CF3R-MECH-20-H – Duct Leakage
            - 15% duct leakage testing.

    b. **"Altered Space-Conditioning System"** – refer to section 150.2(b)1E and F of the Standards for the exact definition.
        - aka "HVAC Changeout"
        - addition or replacement of package unit or air handler, outdoor condensing unit or indoor coil of a split system or air conditioner or heat pump.
        - Replacement of any refrigerant containing device in ducted central AC system.

- May also include new ducts or duct replacement.
- Does not meet the definition of an "Entirely New or Complete Replacement Duct System" or "Entirely New or Complete Replacement Space Conditioning System", below.

REQUIRED:

- CF2R-MECH-01-E - Space Conditioning System Information
  - Duct insulation: new plenums R6, new duct ducting R-6 in CZ 2, 8, 9, 10, 12, and 13. R-8 in CZ 14, and 15.
  - Upgrade to setback thermostat

MAY BE REQUIRED: (Some exceptions apply. To be determined.)

- CF2R & CF3R-MECH-20-H – Duct Leakage
  - 15% duct leakage testing.
- CF2R & CF3R-MECH-25-H – Refrigerant Charge Verification
  - In **Climate Zones 8 to 15** for HVAC Changeout (packaged, split, and mini-split) or a space-conditioning system of either a air conditioner or heat pump is altered by the installation or replacement of refrigerant-containing system components such as the compressor, condensing coil, evaporator coil, refrigerant metering device, or lineset.

c. **"Entirely New or Complete Replacement Duct System with or without Equipment Changeout"** – refer to section 150.2(b)1Diia and 150.2(b)1E and F of the Standards for the exact definition.

- New Duct System - At least 75 percent new duct material (up to 25 percent may consist of reused parts from the dwelling unit's existing duct system, e.g. boots, plenums, duct material), all ducts are accessible at some point during work
- Does not meet the definition of an "Entirely New or Complete Replacement Space Conditioning System", below.

REQUIRED:

- CF2R-MECH-01-E – Space Conditioning System Information
  - Duct insulation: new plenums R6, new duct ducting R-6 in CZ 2, 8, 9, 10, 12, and 13. R-8 in CZ 14, and 15.
  - Upgrade to setback thermostat
  - MERV 6 air filter

MAY BE REQUIRED: (Some exceptions apply. To be determined.)

- CF2R & CF3R-MECH-20-H – Duct Leakage
  - 6% duct leakage testing.
- CF2R & CF3R-MECH-25-H – Refrigerant Charge Verification
  - In **Climate Zones 8 to 15** for HVAC Changeout (packaged, split, and mini-split) or a space-conditioning system of either a air conditioner or heat pump is altered by the installation or replacement of refrigerant-containing system components such as the compressor, condensing coil, evaporator coil, refrigerant metering device, or lineset.

- CF2R MECH-22-H – Fan Efficacy
  - fan watt draw .58 W/CFM
- CF2R MECH-23-H - Airflow
  - airflow at 350 CFM/ton

d. **"Entirely New or Complete Replacement Space Conditioning System"** – refer to section 150.2(b)1C of the Standards for the exact definition.

- New Duct System - At least 75 percent new duct material (up to 25 percent may consist of reused parts from the dwelling unit's existing duct system, e.g. boots, plenums, duct material), all ducts are accessible at some point during work.
- New or newly replaced package unit or complete split system. All equipment is new.

REQUIRED:

- CF2R-MECH-01-E – Space Conditioning System Information
  - Duct insulation: new plenums R6, new duct ducting R-6 in CZ 2, 8, 9, 10, 12, and 13. R-8 in CZ 14, and 15.
  - Upgrade to setback thermostat
  - MERV 6 air filter

MAY BE REQUIRED: (Some exceptions apply. To be determined.)

- CF2R & CF3R-MECH-20-H – Duct Leakage
  - 6% duct leakage testing.
- CF2R & CF3R-MECH-25-H – Refrigerant Charge Verification
  - In **Climate Zones 8 to 15** for HVAC Changeout (packaged, split, and mini-split) or a space-conditioning system of either a air conditioner or heat pump is altered by the installation or replacement of refrigerant-containing system components such as the compressor, condensing coil, evaporator coil, refrigerant metering device, or lineset.
- CF2R MECH-22-H – Fan Efficacy
  - fan watt draw .58 W/CFM
- CF2R MECH-23-H - Airflow
  - airflow at 350 CFM/ton

12. Specify area (zone) system will be conditioning (whole house, upstairs, downstairs, etc.) Used to distinguish systems from each other in homes with more than one system.

B. ALT-02a - New Ducts Greater than 40 Ft Length

1. This box does not apply because HVAC equipment is not being altered.
2. This box does not apply because HVAC equipment is not being altered.
3. This box does not apply because HVAC equipment is not being altered.

4. This box does not apply because HVAC equipment is not being altered
5. This box does not apply because HVAC equipment is not being altered
6. This box does not apply because HVAC equipment is not being altered
7. This box does not apply because only changing ducts does not trigger the thermostat requirement.
8. Input the approximate length of new duct expected to be installed, either to replace or add to existing ducts. The important break point is at 40 feet.
9. This value is auto-filled based on the climate zone. Possible entries are R-6 in CZ 1-10, 12, 13; or R8 in CZ 11, 14-16.

A. GENERAL INFORMATION

01	Project Name:	<<text>>	02	Date Prepared:	<<date format; pick from enumerated list>>
03	Project Location:	<<text>>	04	Building Type:	< Single Family; Multi Family>>
05	CA City:	<<text: a city name>>	06	Dwelling Unit Name:	<<text>>
07	Zip Code:	<<text: pick from enumerated list>>	08	HVAC System Identification or Name:	<<text>>
09	Climate Zone:	<<text: pick from enumerated list>>	10	CFA served by HVAC System (ft2):	<<numeric; xxxx>>
11	Alteration Type:	<< user pick from list: • Extension of Existing Duct System; • Altered Space Conditioning System; • Entirely New or Complete Replacement Duct System with or without Equipment Changeout • Entirely New or Complete Replacement Space Conditioning System	12	HVAC System Location or Area Served	<<text>>

B. ALT-02a – Extension of Existing Duct System, Greater Than 40 Feet (Section150.2(b)1Diib)

01	02	03		04	05	06		07	08	09
Heating System Type	Altered Heating Component	Required Min Heating Efficiency AFUE	or HSPF	Cooling System Type	Altered Cooling Components	Required Min Condenser Efficiency SEER	or EER	Required Thermostat Type	New or Replaced Duct Length (ft)	Req'd Min New Duct R-Value
"N/A"	"None"	"N/A"	"N/A"	"N/A"	"None"	"N/A"	"N/A"	"N/A"	<<user input: number, ft, check to make sure it is greater than 40'>>	<<autofilled cell: R6 in CZ 1-10, 12, 13; or R8 in CZ 11, 14-16

C. Certificate of Installation Documents Required <<actual list will be determined based on scope of changes>>

CF2R-MECH-01-E

CF2R MECH-20-H – Duct Leakage

D. Certificate of Verification Documents Required (SOME EXCEPTIONS MAY APPLY – TO BE DETERMINED) <<actual list will be determined based on scope of changes>>

CF3R MECH-20-H – Duct Leakage

STATE OF CALIFORNIA

ALTERATION TO AN HVAC SYSTEM

CEC-CF1R-ALT-02-E (Revised 06/13)

CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	CF1R-ALT-02-E
Alteration to an HVAC System	(Page 1 of 2)
Project Name:	Date Prepared:

A. GENERAL INFORMATION

01	Project Name:		02	Date Prepared:	
03	Project Location:		04	Building Type:	
05	CA City:		06	Dwelling Unit Name:	
07	Zip Code:		08	HVAC System Identification or Name:	
09	Climate Zone:		10	CFA served by HVAC System (ft2):	
11	Alteration Type:		12	HVAC System Location or Area Served	

B. ALT-02b – Altered Space Conditioning System (Sections 150.2(b)1E and F)

01	02	03		04	05	06		07	08	09
Heating System Type	Altered Heating Component	Required Min Heating Efficiency AFUE	or HSPF	Cooling System Type	Altered Cooling Components	Required Min Condenser Efficiency SEER	or EER	Required Thermostat Type	New or Replaced Duct Length (ft)	Req'd Min New Duct R-Value

C. Certificate of Installation Documents Required

- CF2R-MECH-01-E
- CF2R MECH-20-H – Duct Leakage
- CF2R MECH-25-H – Refrigerant Charge
- CF2R MECH-23-H - Airflow

D. Certificate of Verification Documents Required

- CF3R MECH-20-H – Duct Leakage
- CF3R MECH-25-H – Refrigerant Charge
- CF3R MECH-23-H - Airflow

CERTIFICATE OF COMPLIANCE	CF1R-ALT-02-E
Alteration to an HVAC System	(Page 2 of 2)

Project Name:	Date Prepared:

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT	
1. I certify that this Certificate of Compliance documentation is accurate and complete.	
Documentation Author Name:	Documentation Author Signature:
Company:	Signature Date:
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 Compliance is true and correct.
2. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer).
3. That the energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
4. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.
5. I will ensure that a registered copy of this Certificate of Compliance shall be 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 Compliance is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Designer Name:	Responsible Designer Signature:
Company :	Date Signed:
Address:	License:
City/State/Zip:	Phone:

For assistance or questions regarding the Energy Standards, contact the Energy Hotline at: 1-800-772-3300

A. GENERAL INFORMATION

1. Enter the Name of the project ex. Smith Changeout. Use a name that is unique and identifiable.
2. Enter the date this CF1R was prepared.
3. Enter the Project Location. Ex. Black Oak Subdivision, Hillcrest Apts. This allows more specification than just the city.
4. Enter the building type (Single Family or Multi Family). Multi family projects applies only to low-rise multifamily projects of three or fewer stories. High-rise multifamily projects fall under the non-residential standards.
5. Enter the name of the CA city that the project is in. Utilize the legal description as my be found on the deed or title.
6. Enter Dwelling Unit Name. Used for apartments with the same address but includes a unit number.
7. Enter Zip code of project.
8. Enter HVAC Identification or Name. Used to distinguish systems from each other in homes with more than one system. Ex. Upstairs system, living area system, zone 4, etc.
9. Enter Climate Zone where project is located. It is very important to enter the correct climate zone. Climate zone descriptions can be found in Joint Appendix JA2. Interactive and downloadable maps can be found at http://www.energy.ca.gov/maps/renewable/building_climate_zones.html
10. Enter the conditioned floor area served by the unit. For HVAC-only alterations, this can be an approximate number.
11. Alteration Type:
    Determine the work being done and match with one of four options below.
    a. **"Extension of Existing System"** – refer to section 150.2(b)1Diib of the Standards for the exact definition.
        - 40 feet of new ducts added or replaced and
        - After work is completed less than 75% of the duct system including, boots, air handler, plenums, duct material is new, or parts of the duct system are not accessible.
        - Air handler, condenser, coil or other refrigerant containing equipment is not being added or replaced.

    REQUIRED:
        - CF2R-MECH-01-E - Space Conditioning System Information
            - Duct insulation: new plenums R6, new duct ducting R-6 in CZ 2, 8, 9, 10, 12, and 13. R-8 in CZ 14, and 15.

    MAY BE REQUIRED: (Some exceptions apply. To be determined.)
        - CF2R & CF3R-MECH-20-H – Duct Leakage
            - 15% duct leakage testing.

    b. **"Altered Space-Conditioning System"** – refer to section 150.2(b)1E and F of the Standards for the exact definition.
        - aka "HVAC Changeout"

- addition or replacement of package unit or air handler, outdoor condensing unit or indoor coil of a split system or air conditioner or heat pump.
- Replacement of any refrigerant containing device in ducted central AC system.
- May also include new ducts or duct replacement.
- Does not meet the definition of an "Entirely New or Complete Replacement Duct System" or "Entirely New or Complete Replacement Space Conditioning System", below.

REQUIRED:

- CF2R-MECH-01-E - Space Conditioning System Information
  - Duct insulation: new plenums R6, new duct ducting R-6 in CZ 2, 8, 9, 10, 12, and 13. R-8 in CZ 14, and 15.
  - Upgrade to setback thermostat

MAY BE REQUIRED: (Some exceptions apply. To be determined.)

- CF2R & CF3R-MECH-20-H – Duct Leakage
  - 15% duct leakage testing.
- CF2R & CF3R-MECH-25-H – Refrigerant Charge Verification
  - In **Climate Zones 8 to 15** for HVAC Changeout (packaged, split, and mini-split) or a space-conditioning system of either a air conditioner or heat pump is altered by the installation or replacement of refrigerant-containing system components such as the compressor, condensing coil, evaporator coil, refrigerant metering device, or lineset.

c. **"Entirely New or Complete Replacement Duct System with or without Equipment Changeout"** – refer to section 150.2(b)1Diia and 150.2(b)1E and F of the Standards for the exact definition.

- New Duct System - At least 75 percent new duct material (up to 25 percent may consist of reused parts from the dwelling unit's existing duct system, e.g. boots, plenums, duct material), all ducts are accessible at some point during work
- Does not meet the definition of an "Entirely New or Complete Replacement Space Conditioning System", below.

REQUIRED:

- CF2R-MECH-01-E – Space Conditioning System Information
  - Duct insulation: new plenums R6, new duct ducting R-6 in CZ 2, 8, 9, 10, 12, and 13. R-8 in CZ 14, and 15.
  - Upgrade to setback thermostat
  - MERV 6 air filter

MAY BE REQUIRED: (Some exceptions apply. To be determined.)

- CF2R & CF3R-MECH-20-H – Duct Leakage
  - 6% duct leakage testing.
- CF2R & CF3R-MECH-25-H – Refrigerant Charge Verification

- In **Climate Zones 8 to 15** for HVAC Changeout (packaged, split, and mini-split) or a space-conditioning system of either a air conditioner or heat pump is altered by the installation or replacement of refrigerant-containing system components such as the compressor, condensing coil, evaporator coil, refrigerant metering device, or lineset.

- CF2R MECH-22-H – Fan Efficacy
  - fan watt draw .58 W/CFM
- CF2R MECH-23-H - Airflow
  - airflow at 350 CFM/ton

d. **"Entirely New or Complete Replacement Space Conditioning System"** – refer to section 150.2(b)1C of the Standards for the exact definition.

- New Duct System - At least 75 percent new duct material (up to 25 percent may consist of reused parts from the dwelling unit's existing duct system, e.g. boots, plenums, duct material), all ducts are accessible at some point during work.
- New or newly replaced package unit or complete split system. All equipment is new.

REQUIRED:

- CF2R-MECH-01-E – Space Conditioning System Information
  - Duct insulation: new plenums R6, new duct ducting R-6 in CZ 2, 8, 9, 10, 12, and 13. R-8 in CZ 14, and 15.
  - Upgrade to setback thermostat
  - MERV 6 air filter

MAY BE REQUIRED: (Some exceptions apply. To be determined.)

- CF2R & CF3R-MECH-20-H – Duct Leakage
  - 6% duct leakage testing.
- CF2R & CF3R-MECH-25-H – Refrigerant Charge Verification
  - In **Climate Zones 8 to 15** for HVAC Changeout (packaged, split, and mini-split) or a space-conditioning system of either a air conditioner or heat pump is altered by the installation or replacement of refrigerant-containing system components such as the compressor, condensing coil, evaporator coil, refrigerant metering device, or lineset.
- CF2R MECH-22-H – Fan Efficacy
  - fan watt draw .58 W/CFM
- CF2R MECH-23-H - Airflow
  - airflow at 350 CFM/ton

12. Specify area (zone) system will be conditioning (whole house, upstairs, downstairs, etc.) Used to distinguish systems from each other in homes with more than one system.

B. ALT-02b – Altered Space Conditioning System (Sections 150.2(b)1E and F)

1. Select the appropriate heating system type from the pull down list.
2. Select the appropriate choice for heating system component being altered from the pull down list.
3. This box is auto-filled. It shows the minimum required heating system efficiency. Installed equipment may be equal to or greater than this value.
4. Select the appropriate cooling system type from the pull down list.
5. Select the appropriate choice for cooling system component being altered from the pull down list.
6. This box is auto-filled. It shows the minimum required cooling system efficiency. Installed equipment may be equal to or greater than this value.
7. This box is auto-filled. Replacing system equipment components triggers the requirement to upgrade the system thermostat to a programmable setback type thermostat.
8. Input the approximate length of new duct expected to be installed, either to replace or add to existing ducts. The important break point is at 40 feet.
9. This value is auto-filled based on the climate zone. Possible entries are R-6 in CZ 1-10, 12, 13; or R8 in CZ 11, 14-16.

A. GENERAL INFORMATION

01	Project Name:	<<text>>	02	Date Prepared:	<<date format; pick from enumerated list>>
03	Project Location:	<<text>>	04	Building Type:	< Single Family; Multi Family>>
05	CA City:	<<text: a city name>>	06	Dwelling Unit Name:	<<text>>
07	Zip Code:	<<text: pick from enumerated list>>	08	HVAC System Identification or Name:	<<text>>
09	Climate Zone:	<<text: pick from enumerated list>>	10	CFA served by HVAC System (ft2):	<<numeric; xxxx>>
11	Alteration Type:	<< user pick from list: • Extension of Existing Duct System; • Altered Space Conditioning System; • Entirely New or Complete Replacement Duct System with or without Equipment Changeout • Entirely New or Complete Replacement Space Conditioning System	12	HVAC System Location or Area Served	<<text>>

B. ALT-02b – Altered Space Conditioning System (Sections 150.2(b)1E and F)

1	2	3		4	5	6		7	8	9
Heating System Type	Altered Heating Component	Required Min Heating Efficiency AFUE	or HSPF	Cooling System Type	Altered Cooling Components	Required Min Condenser Efficiency SEER	or EER	Required Thermostat Type	New or Replaced Duct Length (ft)	Req'd Min New Duct R-Value
<<user pick from list: Furnace; or HeatPump (use ACM types)>>	<<user pick from list: Furnace; or HeatPump (use ACM types)>>	<<78>>	<<7.7>>	<<user pick from list: packagedAC; or splitSysAC, or SplitSysHp (useACM types)>>	<<user pick from list: Pick all that apply: condenser, coil, TXV/EXV, compressor, refrigerant line set >>	<<13>>	"N/A"	<<required: setback>>	<<user input: number, ft,>>	<<autofilled cell: R6 in CZ 1-10, 12, 13; or R8 in CZ 11, 14-16

C. Certificate of Installation Documents Required <<actual list will be determined based on scope of changes>>

- CF2R-MECH-01-E
- CF2R MECH-20-H – Duct Leakage
- CF2R MECH-25-H – Refrigerant Charge
- CF2R MECH-23-H - Airflow

D. Certificate of Verification Documents Required (SOME EXCEPTIONS MAY APPLY – TO BE DETERMINED) <<actual list will be determined based on scope of changes>>
CF3R MECH-20-H – Duct Leakage
CF3R MECH-25-H – Refrigerant Charge
CF3R MECH-23-H - Airflow

STATE OF CALIFORNIA

ALTERATION TO HVAC SYSTEM

CEC-CF1R-ALT--02-E (Revised 06/13)

CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	CF1R-ALT-02-E
Alteration to an HVAC System	(Page 1 of 2)
Project Name:	Date Prepared:

A. GENERAL INFORMATION

01	Project Name:		02	Date Prepared:	
03	Project Location:		04	Building Type:	
05	CA City:		06	Dwelling Unit Name:	
07	Zip Code:		08	HVAC System Identification or Name:	
09	Climate Zone:		10	CFA served by HVAC System (ft2):	
11	Alteration Type:		12	HVAC System Location or Area Served	

B. ALT-02c – Entirely New or Complete Replacement Duct System, with or without Equipment Changeout (Sections 150.2(b)1Diia and 150.2(b)1E, F)

1	2	3		4	5	6		7	8	9
Heating System Type	Altered Heating Component	Required Min Heating Efficiency AFUE	or HSPF	Cooling System Type	Altered Cooling Components	Required Min Condenser Efficiency SEER	or EER	Required Thermostat Type	New or Replaced Duct Length (ft)	Req'd Min New Duct R-Value

C. Certificate of Installation Documents Required

- CF2R-MECH-01-E
- CF2R MECH-20-H – Duct Leakage
- CF2R MECH-22-H – Fan Efficacy
- CF2R MECH-23-H - Airflow
- CF2R MECH-25-H – Refrigerant Charge

D. Certificate of Verification Documents Required

- CF3R MECH-20-H – Duct Leakage
- CF3R MECH-22-H – Fan Efficacy
- CF3R MECH-23-H - Airflow
- CF3R MECH-25-H – Refrigerant Charge

CERTIFICATE OF COMPLIANCE	CF1R-ALT-02-E
Alteration to an HVAC System	(Page 2 of 2)

Project Name:	Date Prepared:

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT	
1. I certify that this Certificate of Compliance documentation is accurate and complete.	
Documentation Author Name:	Documentation Author Signature:
Company:	Signature Date:
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 Compliance is true and correct.
2. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer).
3. That the energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
4. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.
5. I will ensure that a registered copy of this Certificate of Compliance shall be 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 Compliance is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Designer Name:	Responsible Designer Signature:
Company :	Date Signed:
Address:	License:
City/State/Zip:	Phone:

For assistance or questions regarding the Energy Standards, contact the Energy Hotline at: 1-800-772-3300.

A. GENERAL INFORMATION

1. Enter the Name of the project ex. Smith Changeout. Use a name that is unique and identifiable.
2. Enter the date this CF1R was prepared.
3. Enter the Project Location. Ex. Black Oak Subdivision, Hillcrest Apts. This allows more specification than just the city.
4. Enter the building type (Single Family or Multi Family). Multi family projects applies only to low-rise multifamily projects of three or fewer stories. High-rise multifamily projects fall under the non-residential standards.
5. Enter the name of the CA city that the project is in. Utilize the legal description as my be found on the deed or title.
6. Enter Dwelling Unit Name. Used for apartments with the same address but includes a unit number.
7. Enter Zip code of project.
8. Enter HVAC Identification or Name. Used to distinguish systems from each other in homes with more than one system. Ex. Upstairs system, living area system, zone 4, etc.
9. Enter Climate Zone where project is located. It is very important to enter the correct climate zone. Climate zone descriptions can be found in Joint Appendix JA2. Interactive and downloadable maps can be found at http://www.energy.ca.gov/maps/renewable/building_climate_zones.html
10. Enter the conditioned floor area served by the unit. For HVAC-only alterations, this can be an approximate number.
11. Alteration Type:

    Determine the work being done and match with one of four options below.

    a. **"Extension of Existing System"** – refer to section 150.2(b)1Diib of the Standards for the exact definition.
        - 40 feet of new ducts added or replaced and
        - After work is completed less than 75% of the duct system including, boots, air handler, plenums, duct material is new, or parts of the duct system are not accessible.
        - Air handler, condenser, coil or other refrigerant containing equipment is not being added or replaced.

    REQUIRED:
        - CF2R-MECH-01-E - Space Conditioning System Information
            - Duct insulation: new plenums R6, new duct ducting R-6 in CZ 2, 8, 9, 10, 12, and 13. R-8 in CZ 14, and 15.

    MAY BE REQUIRED: (Some exceptions apply. To be determined.)
        - CF2R & CF3R-MECH-20-H – Duct Leakage
            - 15% duct leakage testing.

    b. **"Altered Space-Conditioning System"** – refer to section 150.2(b)1E and F of the Standards for the exact definition.
        - aka "HVAC Changeout"
        - addition or replacement of package unit or air handler, outdoor condensing unit or indoor coil of a split system or air conditioner or heat pump.

- Replacement of any refrigerant containing device in ducted central AC system.
- May also include new ducts or duct replacement.
- Does not meet the definition of an "Entirely New or Complete Replacement Duct System" or "Entirely New or Complete Replacement Space Conditioning System", below.

REQUIRED:

- CF2R-MECH-01-E - Space Conditioning System Information
  - Duct insulation: new plenums R6, new duct ducting R-6 in CZ 2, 8, 9, 10, 12, and 13. R-8 in CZ 14, and 15.
  - Upgrade to setback thermostat

MAY BE REQUIRED: (Some exceptions apply. To be determined.)

- CF2R & CF3R-MECH-20-H – Duct Leakage
  - 15% duct leakage testing.
- CF2R & CF3R-MECH-25-H – Refrigerant Charge Verification
  - In **Climate Zones 8 to 15** for HVAC Changeout (packaged, split, and mini-split) or a space-conditioning system of either a air conditioner or heat pump is altered by the installation or replacement of refrigerant-containing system components such as the compressor, condensing coil, evaporator coil, refrigerant metering device, or lineset.

c. **"Entirely New or Complete Replacement Duct System with or without Equipment Changeout"** – refer to section 150.2(b)1Diia and 150.2(b)1E and F of the Standards for the exact definition.

- New Duct System - At least 75 percent new duct material (up to 25 percent may consist of reused parts from the dwelling unit's existing duct system, e.g. boots, plenums, duct material), all ducts are accessible at some point during work
- Does not meet the definition of an "Entirely New or Complete Replacement Space Conditioning System", below.

REQUIRED:

- CF2R-MECH-01-E – Space Conditioning System Information
  - Duct insulation: new plenums R6, new duct ducting R-6 in CZ 2, 8, 9, 10, 12, and 13. R-8 in CZ 14, and 15.
  - Upgrade to setback thermostat
  - MERV 6 air filter

MAY BE REQUIRED: (Some exceptions apply. To be determined.)

- CF2R & CF3R-MECH-20-H – Duct Leakage
  - 6% duct leakage testing.
- CF2R & CF3R-MECH-25-H – Refrigerant Charge Verification
  - In **Climate Zones 8 to 15** for HVAC Changeout (packaged, split, and mini-split) or a space-conditioning system of either a air conditioner or heat pump is altered by the installation or replacement of refrigerant-containing system components such as the compressor, condensing coil, evaporator coil, refrigerant metering device, or lineset.

- CF2R MECH-22-H – Fan Efficacy
  - fan watt draw .58 W/CFM
- CF2R MECH-23-H - Airflow
  - airflow at 350 CFM/ton

d. **"Entirely New or Complete Replacement Space Conditioning System"** – refer to section 150.2(b)1C of the Standards for the exact definition.
   - New Duct System - At least 75 percent new duct material (up to 25 percent may consist of reused parts from the dwelling unit's existing duct system, e.g. boots, plenums, duct material), all ducts are accessible at some point during work.
   - New or newly replaced package unit or complete split system. All equipment is new.

   REQUIRED:
   - CF2R-MECH-01-E – Space Conditioning System Information
     - Duct insulation: new plenums R6, new duct ducting R-6 in CZ 2, 8, 9, 10, 12, and 13. R-8 in CZ 14, and 15.
     - Upgrade to setback thermostat
     - MERV 6 air filter

   MAY BE REQUIRED: (Some exceptions apply. To be determined.)
   - CF2R & CF3R-MECH-20-H – Duct Leakage
     - 6% duct leakage testing.
   - CF2R & CF3R-MECH-25-H – Refrigerant Charge Verification
     - In **Climate Zones 8 to 15** for HVAC Changeout (packaged, split, and mini-split) or a space-conditioning system of either a air conditioner or heat pump is altered by the installation or replacement of refrigerant-containing system components such as the compressor, condensing coil, evaporator coil, refrigerant metering device, or lineset.
   - CF2R MECH-22-H – Fan Efficacy
     - fan watt draw .58 W/CFM
   - CF2R MECH-23-H - Airflow
     - airflow at 350 CFM/ton

12. Specify area (zone) system will be conditioning (whole house, upstairs, downstairs, etc.) Used to distinguish systems from each other in homes with more than one system.

B. ALT-02c – Entirely New or Complete Replacement Duct System, with or without Equipment Changeout

1. Select the appropriate heating system type from the pull down list.
2. Select the appropriate choice for heating system component being altered from the pull down list.

3. This box is auto-filled. It shows the minimum required heating system efficiency. Installed equipment may be equal to or greater than this value.
4. Select the appropriate cooling system type from the pull down list.
5. Select the appropriate choice for cooling system component being altered from the pull down list.
6. This box is auto-filled. It shows the minimum required cooling system efficiency. Installed equipment may be equal to or greater than this value.
7. This box is auto-filled. Replacing system equipment components triggers the requirement to upgrade the system thermostat to a programmable setback type thermostat.
8. Input the approximate length of new duct expected to be installed, either to replace or add to existing ducts. The important break point is at 40 feet.
9. This value is auto-filled based on the climate zone. Possible entries are R-6 in CZ 1-10, 12, 13; or R8 in CZ 11, 14-16.

A. GENERAL INFORMATION

1	Project Name:	<<text>>	2	Date Prepared:	<<date format; pick from enumerated list>>
3	Project Location:	<<text>>	4	Building Type:	< Single Family; Multi Family>>
5	CA City:	<<text: a city name>>	6	Dwelling Unit Name:	<<text>>
7	Zip Code:	<<text: pick from enumerated list>>	8	HVAC System Identification or Name:	<<text>>
9	Climate Zone:	<<text: pick from enumerated list>>	10	CFA served by HVAC System (ft2):	<<numeric; xxxx>>
11	Alteration Type:	<< user pick from list: • Extension of Existing Duct System; • Altered Space Conditioning System; • Entirely New or Complete Replacement Duct System with or without Equipment Changeout • Entirely New or Complete Replacement Space Conditioning System>>	12	HVAC System Location or Area Served	<<text>>

B. ALT-02c – Entirely New or Complete Replacement Duct System, with or without Equipment Changeout (Sections 150.2(b)1Diia and 150.2(b)1E, F)

1	2	3		4	5	6		7	8	9
Heating System Type	Altered Heating Component	Required Min Heating Efficiency AFUE	or HSPF	Cooling System Type	Altered Cooling Components	Required Min Condenser Efficiency SEER	or EER	Required Thermostat Type	New or Replaced Duct Length (ft)	Req'd Min New Duct R-Value
<<user pick from list: Furnace; or HeatPump (use ACM types)>>	<<user pick from list: Furnace; or HeatPump (use ACM types)>>	<<78>>	<<7.7>>	<<user pick from list: packagedAC; or splitSysAC, or SplitSysHp (useACM types)>>	<<user pick from list: Pick all that apply: condenser, coil, TXV/EXV, compressor, refrigerant line set >>	<<13>>	"N/A"	<<required: setback>>	<<user input: number, ft,>>	<<autofilled cell: R6 in CZ 1-10, 12, 13; or R8 in CZ 11, 14-16

C. Certificate of Installation Documents Required

- CF2R-MECH-01-E
- CF2R MECH-20-H – Duct Leakage
- CF2R MECH-22-H – Fan Efficacy
- CF2R MECH-23-H - Airflow
- CF2R MECH-25-H – Refrigerant Charge

D. Certificate of Verification Documents Required

- CF3R MECH-20-H – Duct Leakage
- CF3R MECH-22-H – Fan Efficacy
- CF3R MECH-23-H - Airflow
- CF3R MECH-25-H – Refrigerant Charge

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT	
1. I certify that this Certificate of Compliance documentation is accurate and complete.	
Documentation Author Name:	Documentation Author Signature:
Company:	Signature Date:
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 Compliance is true and correct.
2. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer).
3. That the energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
4. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.
5. I will ensure that a registered copy of this Certificate of Compliance shall be 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 Compliance is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Designer Name:	Responsible Designer Signature:
Company :	Date Signed:
Address:	License:
City/State/Zip:	Phone:

STATE OF CALIFORNIA

ALTERATION TO HVAC SYSTEM

CEC-CF1R-ALT--02-E (Revised 06/13)

CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	CF1R-ALT-02-E
Alteration to an HVAC System	(Page 1 of 2)
Project Name:	Date Prepared:

A. GENERAL INFORMATION

1	Project Name:		2	Date Prepared:	
3	Project Location:		4	Building Type:	
5	CA City:		6	Dwelling Unit Name:	
7	Zip Code:		8	HVAC System Identification or Name:	
9	Climate Zone:		10	CFA served by HVAC System (ft2):	
11	Alteration Type:		12	HVAC System Location or Area Served	

B. - ALT-02d - Entirely New or Complete Replacement Space Conditioning System (Section 150.2(b)1C)

1	2	3		4	5	6		7	8	9
Heating System Type	Altered Heating Component	Required Min Heating Efficiency AFUE	or HSPF	Cooling System Type	Altered Cooling Components	Required Min Condenser Efficiency SEER	or EER	Required Thermostat Type	New or Replaced Duct Length (ft)	Req'd Min New Duct R-Value

C. Certificate of Installation Documents Required

- CF2R-MECH-01-E
- CF2R MECH-20-H – Duct Leakage
- CF2R MECH-22-H – Fan Efficacy
- CF2R MECH-23-H - Airflow
- CF2R MECH-25-H – Refrigerant Charge

D. Certificate of Verification Documents Required

- CF3R MECH-20-H – Duct Leakage
- CF3R MECH-22-H – Fan Efficacy
- CF3R MECH-23-H - Airflow
- CF3R MECH-25-H – Refrigerant Charge

CERTIFICATE OF COMPLIANCE	CF1R-ALT-02-E
Alteration to an HVAC System	(Page 2 of 2)

Project Name:	Date Prepared:

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT	
1. I certify that this Certificate of Compliance documentation is accurate and complete.	
Documentation Author Name:	Documentation Author Signature:
Company:	Signature Date:
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 Compliance is true and correct.
2. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer).
3. That the energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
4. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.
5. I will ensure that a registered copy of this Certificate of Compliance shall be 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 Compliance is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Designer Name:	Responsible Designer Signature:
Company :	Date Signed:
Address:	License:
City/State/Zip:	Phone:

For assistance or questions regarding the Energy Standards, contact the Energy Hotline at: 1-800-772-3300.

A. GENERAL INFORMATION

1. Enter the Name of the project ex. Smith Changeout. Use a name that is unique and identifiable.
2. Enter the date this CF1R was prepared.
3. Enter the Project Location. Ex. Black Oak Subdivision, Hillcrest Apts. This allows more specification than just the city.
4. Enter the building type (Single Family or Multi Family). Multi family projects applies only to low-rise multifamily projects of three or fewer stories. High-rise multifamily projects fall under the non-residential standards.
5. Enter the name of the CA city that the project is in. Utilize the legal description as my be found on the deed or title.
6. Enter Dwelling Unit Name. Used for apartments with the same address but includes a unit number.
7. Enter Zip code of project.
8. Enter HVAC Identification or Name. Used to distinguish systems from each other in homes with more than one system. Ex. Upstairs system, living area system, zone 4, etc.
9. Enter Climate Zone where project is located. It is very important to enter the correct climate zone. Climate zone descriptions can be found in Joint Appendix JA2. Interactive and downloadable maps can be found at http://www.energy.ca.gov/maps/renewable/building_climate_zones.html
10. Enter the conditioned floor area served by the unit. For HVAC-only alterations, this can be an approximate number.
11. Alteration Type:
    Determine the work being done and match with one of four options below.
    a. **"Extension of Existing System"** – refer to section 150.2(b)1Diib of the Standards for the exact definition.
        - 40 feet of new ducts added or replaced and
        - After work is completed less than 75% of the duct system including, boots, air handler, plenums, duct material is new, or parts of the duct system are not accessible.
        - Air handler, condenser, coil or other refrigerant containing equipment is not being added or replaced.

    REQUIRED:
        - CF2R-MECH-01-E - Space Conditioning System Information
            - Duct insulation: new plenums R6, new duct ducting R-6 in CZ 2, 8, 9, 10, 12, and 13. R-8 in CZ 14, and 15.

    MAY BE REQUIRED: (Some exceptions apply. To be determined.)
        - CF2R & CF3R-MECH-20-H – Duct Leakage
            - 15% duct leakage testing.

    b. **"Altered Space-Conditioning System"** – refer to section 150.2(b)1E and F of the Standards for the exact definition.
        - aka "HVAC Changeout"

- addition or replacement of package unit or air handler, outdoor condensing unit or indoor coil of a split system or air conditioner or heat pump.
- Replacement of any refrigerant containing device in ducted central AC system.
- May also include new ducts or duct replacement.
- Does not meet the definition of an "Entirely New or Complete Replacement Duct System" or "Entirely New or Complete Replacement Space Conditioning System", below.

REQUIRED:

- CF2R-MECH-01-E - Space Conditioning System Information
  - Duct insulation: new plenums R6, new duct ducting R-6 in CZ 2, 8, 9, 10, 12, and 13. R-8 in CZ 14, and 15.
  - Upgrade to setback thermostat

MAY BE REQUIRED: (Some exceptions apply. To be determined.)

- CF2R & CF3R-MECH-20-H – Duct Leakage
  - 15% duct leakage testing.
- CF2R & CF3R-MECH-25-H – Refrigerant Charge Verification
  - In **Climate Zones 8 to 15** for HVAC Changeout (packaged, split, and mini-split) or a space-conditioning system of either a air conditioner or heat pump is altered by the installation or replacement of refrigerant-containing system components such as the compressor, condensing coil, evaporator coil, refrigerant metering device, or lineset.

c. **"Entirely New or Complete Replacement Duct System with or without Equipment Changeout"** – refer to section 150.2(b)1Diia and 150.2(b)1E and F of the Standards for the exact definition.

- New Duct System - At least 75 percent new duct material (up to 25 percent may consist of reused parts from the dwelling unit's existing duct system, e.g. boots, plenums, duct material), all ducts are accessible at some point during work
- Does not meet the definition of an "Entirely New or Complete Replacement Space Conditioning System", below.

REQUIRED:

- CF2R-MECH-01-E – Space Conditioning System Information
  - Duct insulation: new plenums R6, new duct ducting R-6 in CZ 2, 8, 9, 10, 12, and 13. R-8 in CZ 14, and 15.
  - Upgrade to setback thermostat
  - MERV 6 air filter

MAY BE REQUIRED: (Some exceptions apply. To be determined.)

- CF2R & CF3R-MECH-20-H – Duct Leakage
  - 6% duct leakage testing.
- CF2R & CF3R-MECH-25-H – Refrigerant Charge Verification

- In **Climate Zones 8 to 15** for HVAC Changeout (packaged, split, and mini-split) or a space-conditioning system of either a air conditioner or heat pump is altered by the installation or replacement of refrigerant-containing system components such as the compressor, condensing coil, evaporator coil, refrigerant metering device, or lineset.

- CF2R MECH-22-H – Fan Efficacy
  - fan watt draw .58 W/CFM
- CF2R MECH-23-H - Airflow
  - airflow at 350 CFM/ton

d. **"Entirely New or Complete Replacement Space Conditioning System"** – refer to section 150.2(b)1C of the Standards for the exact definition.

- New Duct System - At least 75 percent new duct material (up to 25 percent may consist of reused parts from the dwelling unit's existing duct system, e.g. boots, plenums, duct material), all ducts are accessible at some point during work.
- New or newly replaced package unit or complete split system. All equipment is new.

REQUIRED:

- CF2R-MECH-01-E – Space Conditioning System Information
  - Duct insulation: new plenums R6, new duct ducting R-6 in CZ 2, 8, 9, 10, 12, and 13. R-8 in CZ 14, and 15.
  - Upgrade to setback thermostat
  - MERV 6 air filter

MAY BE REQUIRED: (Some exceptions apply. To be determined.)

- CF2R & CF3R-MECH-20-H – Duct Leakage
  - 6% duct leakage testing.
- CF2R & CF3R-MECH-25-H – Refrigerant Charge Verification
  - In **Climate Zones 8 to 15** for HVAC Changeout (packaged, split, and mini-split) or a space-conditioning system of either a air conditioner or heat pump is altered by the installation or replacement of refrigerant-containing system components such as the compressor, condensing coil, evaporator coil, refrigerant metering device, or lineset.
- CF2R MECH-22-H – Fan Efficacy
  - fan watt draw .58 W/CFM
- CF2R MECH-23-H - Airflow
  - airflow at 350 CFM/ton

12. Specify area (zone) system will be conditioning (whole house, upstairs, downstairs, etc.) Used to distinguish systems from each other in homes with more than one system.

B. ALT-02d - Entirely New or Complete Replacement Space Conditioning System

1. Select the appropriate heating system type from the pull down list.
2. Select the appropriate choice for heating system component being altered from the pull down list.
3. This box is auto-filled. It shows the minimum required heating system efficiency. Installed equipment may be equal to or greater than this value.
4. Select the appropriate cooling system type from the pull down list.
5. Select the appropriate choice for cooling system component being altered from the pull down list.
6. This box is auto-filled. It shows the minimum required cooling system efficiency. Installed equipment may be equal to or greater than this value.
7. This box is auto-filled. Replacing system equipment components triggers the requirement to upgrade the system thermostat to a programmable setback type thermostat.
8. Input the approximate length of new duct expected to be installed, either to replace or add to existing ducts. The important break point is at 40 feet.
9. This value is auto-filled based on the climate zone. Possible entries are R-6 in CZ 1-10, 12, 13; or R8 in CZ 11, 14-16.

A. GENERAL INFORMATION

1	Project Name:	<<text>>	2	Date Prepared:	<<date format; pick from enumerated list>>
3	Project Location:	<<text>>	4	Building Type:	< Single Family; Multi Family>>
5	CA City:	<<text: a city name>>	6	Dwelling Unit Name:	<<text>>
7	Zip Code:	<<text: pick from enumerated list>>	8	HVAC System Identification or Name:	<<text>>
9	Climate Zone:	<<text: pick from enumerated list>>	10	CFA served by HVAC System (ft2):	<<numeric; xxxx>>
11	Alteration Type:	<< user pick from list: • Extension of Existing Duct System; • Altered Space Conditioning System; • Entirely New or Complete Replacement Duct System with or without Equipment Changeout • Entirely New or Complete Replacement Space Conditioning System	12	HVAC System Location or Area Served	<<text>>

B. - ALT-02d - Entirely New or Complete Replacement Space Conditioning System (Section 150.2(b)1C)

1	2	3		4	5	6		7	8	9
Heating System Type	Altered Heating Component	Required Min Heating Efficiency AFUE	or HSPF	Cooling System Type	Altered Cooling Components	Required Min Condenser Efficiency SEER	or EER	Required Thermostat Type	New or Replaced Duct Length (ft)	Req'd Min New Duct R-Value
<<user pick from list: Furnace; or HeatPump (use ACM types)>>	<<user pick from list: Furnace; or HeatPump (use ACM types)>>	<<78>>	<<7.7>>	<<user pick from list: packagedAC; or splitSysAC, or SplitSysHp (useACM types)>>	<<user pick from list: Pick all that apply: condenser, coil, TXV/EXV, compressor, refrigerant line set >>	<<13>>	"N/A"	<<required: setback>>	<<user input: number, ft,>>	<<autofilled cell: R6 in CZ 1-10, 12, 13; or R8 in CZ 11, 14-16

C. Certificate of Installation Documents Required

- CF2R-MECH-01-E
- CF2R MECH-20-H – Duct Leakage
- CF2R MECH-22-H – Fan Efficacy
- CF2R MECH-23-H - Airflow
- CF2R MECH-25-H – Refrigerant Charge

D. Certificate of Verification Documents Required

- CF3R MECH-20-H – Duct Leakage
- CF3R MECH-22-H – Fan Efficacy
- CF3R MECH-23-H - Airflow
- CF3R MECH-25-H – Refrigerant Charge

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT	
1. I certify that this Certificate of Compliance documentation is accurate and complete.	
Documentation Author Name:	Documentation Author Signature:
Company:	Signature Date:
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 Compliance is true and correct.
2. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer).
3. That the energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
4. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.
5. I will ensure that a registered copy of this Certificate of Compliance shall be 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 Compliance is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Designer Name:	Responsible Designer Signature:
Company :	Date Signed:
Address:	License:
City/State/Zip:	Phone:

STATE OF CALIFORNIA

ALTERATIONS - HVAC

CEC-CF1R-ALT-03-E (Revised 06/13) CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	CF1R-ALT-03-E
Alterations - HVAC CZ 1, 3 to 7 and 16 (formerly CF-1R-ALT-HVAC)	(Page 1 of 1)

Site Address:				**Enforcement Agency:**	**Date Prepared:**	**Permit#:**
Equipment Type		Equipment Efficiency		New: Ducting, *Plenums, Lineset* Required R-value	Conditioned Floor Area (sq ft)	Thermostat
☐ Packaged System ☐ Split System ☐ Furnace	☐ Evaporator Coil ☐ Condensing Unit ☐ Lineset	_____AFUE _____SEER _____EER	_____COP _____HSPF	☐ R-6 *(CZ 1,3 -7),s* ☐ R-8[1] *(CZ 16) Ducts* ☐ R-6 (all CZ's) Plenums ☐ R-5 or R7.5 Lineset[3]	Served by system _____sq ft	☐ Setback *(If not already present, must be installed)*

HERS VERIFICATION SUMMARY Listed below are Four HVAC Alteration Options. The installer determines the work to be completed and matches it to one of the options below. All forms to be registered (no hand filled forms allowed). Copy of forms to be left on site for final inspection.

☐ **1. HVAC Changeout/Repair Can include new ducting**	**Required Compliance Documents to be left on site for Final**:
All Equipment, Condenser Unit, Evaporator Coil, Air Handler/Furnace	CF1R-ALT-02-E CF2R: MECH-01, MECH-20-HERS CF3R: MECH-20-HERS
Installer Requirement: Duct leakage (≤ 15% or, ≤ 10% to outside, or seal all accessible leaks) Exempted from duct leakage testing if: ☐ 1. Duct system registered with HERS provider as previously sealed, or ☐ 2. There is less than 40 linear feet of duct in unconditioned space, or ☐ 3. Existing duct systems are constructed, insulated or sealed with asbestos (list manufacture date of building _____)	

☐ 2. **New HVAC System**	**Required Compliance Documents to be left on site for Final**:
All new equipment and All New Ducts[2]	CF1R-ALT-02-E CF2R-MECH-01, MECH-20-HERS, MECH-22-HERS, MECH-(23 or 24)-HERS CF3R-MECH-20-HERS, MECH-22-HERS, MECH-(23 or 24)-HERS[2]
Installer Requirement: Duct leakage ≤ 6%, Fan Efficacy (.58W/CFM), Air Flow ≥ 350 CFM/ton (or Standards Table 150.0-C / D alternative)	

☐ 3. **All New Ducts with Replacement**	**Required Compliance Documents to be left on site for Final**:
Includes replacing or installing All New Ducts[2] and one or more of the following: Condenser Unit, Evaporator Coil, Furnace	CF1R-ALT-02-E CF2R-MECH-01, MECH-20-HERS, MECH-(23 or 24)-HERS CF3R-MECH-20-HERS, MECH-(23 or 24)-HERS
Installer Requirement: Duct leakage ≤ 6%, Air Flow ≥ 350 CFM/ton (or Standards Table 150.0-C / D alternative) ☐ Exempted from duct leakage testing I existing duct systems are constructed, insulated or sealed with asbestos.	

☐ 4. **New Ducting over 40 feet**	**Required Compliance Documents to be left on site for Final**:
Adding or replacing ducts in unconditioned space but less than All New Ducts[2]	CF1R-ALT-02-E CF2R: MECH-20-HERS CF3R: MECH-20-HERS
Installer Required to: Duct leakage (≤ 15% or, ≤ 10% to outside, or seal all accessible leaks) ☐ Exempted from duct leakage testing I existing duct systems are constructed, insulated or sealed with asbestos.	

[1] All **new** ducting R-8 required when more than 40 ft installed and R-6 when less than 40 ft installed. This includes in walls, between floors etc.
[2] A New Duct system is when the duct system is constructed of at least 75 percent new duct material, and up to 25 percent may consist of reused parts from the dwelling unit's existing duct system (e.g., registers, grilles, boots, air handler, plenums, duct material.
[3] R-5 (1" thick insulation) for linesets 1" and less. R-7.5 (1.5" thick insulation) for linesets over 1 inch. Most mfg will require Suction line Diameter with insulation as the following 1.5-2T-2⅝", 2.5-3T-2¾", 3.5 to 4T-2⅞", 5T-4⅛"

Contractor (Documentation Author's /Responsible Designer'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 Compliance is true and correct.
2. I am eligible under Division 3 of the California Business and Professions Code to accept responsibility for the information on this document.
3. That the energy features and performance specifications for the design identified on this Certificate of Compliance conform to the requirements of Title 24, Parts 1 and 6 of the California Code of Regulations (CCR).
4. That the energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the CCR.
5. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.

Responsible Designer Name:	Responsible Designer Signature:	Date Signed:	License:

Company :	Address:	City/State/Zip:	Phone:

STATE OF CALIFORNIA

ALTERATIONS - HVAC

CEC-CF1R-ALT-04-E (Revised 06/13) CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	CF1R-ALT-04-E
Alterations - HVAC CZ 2, and 8-15 (formerly CF-1R-ALT-HVAC)	(Page 1 of 1)

Site Address:				**Enforcement Agency:**	**Date Prepared:**	**Permit#:**
Equipment Type		Equipment Efficiency		New Ducting, *Plenums, Lineset:* Required R-value	Conditioned Floor Area (sq ft)	Thermostat
☐ Packaged System ☐ Split System ☐ Mini Split ☐ Furnace	☐ Evaporator Coil ☐ Condensing Unit ☐ Compressor ☐ Lineset ☐ TXV	_____AFUE _____SEER _____EER	_____COP _____HSPF	☐ R-6 *(CZ 2, 8-13) Ducting* ☐ R-8[1] *(CZ 14-15) Ducting* ☐ R-6 (all CZ's) Plenums ☐ R-5 or R7.5) Lineset[4]	Served by system _____sqft	☐ Setback *(If not already present, must be installed)*

HERS VERIFICATION SUMMARY Listed below are Four HVAC Alteration Options. The installer determines the work to be completed and matches it to one of the options below. All forms to be registered (no hand filled forms allowed). Copy of forms to be left on site for final inspection.

☐ **1. HVAC Changeout/Repair**	**Required Compliance Documents to be left on site for Final**:
All Equipment, Condenser Unit, Evaporator Coil, Compressor, TXV, Lineset, Air Handler/Furnace[2] **(Can include new ducting)**	CF1R-ALT-02-E CF2R: MECH-01, MECH-20-HERS, MECH-(23 or 24)[2]-HERS, MECH-25-HERS[2] CF3R: MECH-20-HERS, MECH-(23 or 24)-HERS[2], MECH-25-HERS[2]

Installer Requirement: Duct leakage (≤ 15%, or ≤ 10% to outside, or seal all accessible leaks), Air Flow ≥ 300 CFM/ton, Refrigerant Charge.
Exempted from duct leakage testing if:
☐ 1. Duct system registered with HERS provider as previously sealed, or ☐ 2. There is less than 40 linear feet of duct in unconditioned space, or
☐ 3. Existing duct systems are constructed, insulated or sealed with asbestos (list manufacture date of building _____)

☐ 2. **New HVAC System**	**Required Compliance Documents to be left on site for Final**:
All new equipment and All New Ducts[3] including Mini Split	CF1R-ALT-02-E CF2R: MECH-01, MECH-20-HERS, MECH-22-HERS, MECH-(23 or 24)-HERS[2], MECH-25-HERS[2] CF3R: MECH-20-HERS, MECH-22-HERS, MECH-(23 or 24)-HERS[2], MECH-25-HERS[2] Mini Splits require CF1R-ALT-02-E, CF2R-MECH-01, and (CF2R-CF3R) MECH-25-HERS

Installer Requirement: Duct leakage ≤ 6%, Fan Efficacy (.58W/CFM), Air Flow ≥ 350 CFM/ton (or alternative), Refrigerant Charge

☐ 3. **All New Ducts with Replacement**	**Required Compliance Documents to be left on site for Final**:
All New Ducts[3] and one or more of the following replaced: Condenser Unit, Evaporator Coil, Compressor, TXV, Lineset, Furnace[2]	CF1R-ALT-02-E CF2R: MECH-01, MECH-20-HERS, MECH-(23 or 24)-HERS, MECH-25-HERS CF3R: MECH-20-HERS, MECH-(23 or 24)-HERS, MECH-25-HERS

Installer Requirement: Duct leakage ≤ 6%, Air Flow ≥ 350 CFM/ton (or alternative), Refrigerant Charge
Exempted from duct leakage testing if: ☐ 1. Existing duct systems are constructed, insulated or sealed with asbestos

☐ 4. **New Ducting over 40 feet**	**Required Compliance Documents to be left on site for Final**:
New ducting but less than All New Ducts[3]	CF1R-ALT-02-E, CF2R: MECH-20-HERS, CF3R: MECH-20-HERS

Installer Required to: Duct leakage (≤ 15% or, ≤ 10% to outside or, or seal all accessible leaks)
☐ EXCEPTION: Existing duct systems constructed, insulated or sealed with asbestos.

[1] All **new** ducting R-8 required when more than 40 ft installed and R-6 when less than 40 ft installed. This includes in walls, between floors etc.
[2] Heating only systems and Air Handler/Furnace changes do not require Air Flow MECH-(23 or 24), or Refrigerant Charge verification MECH-25
[3] All New Ducts is when at least 75 percent of the duct system is new duct material, and up to 25 percent may consist of reused parts from the dwelling unit's existing duct system (e.g., registers, grilles, boots, air handler, coil, plenums, duct material)
[4] R-5 (1" thick insulation) for linesets 1" and less. R-7.5 (1.5" thick insulation) for linesets over 1 inch. Most mfg will require Suction line Diameter with insulation as the following 1.5-2T-2⅝", 2.5-3T-2¾", 3.5 to 4T-2⅞", 5T-4⅛"

Contractor (Documentation Author's /Responsible Designer'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 Compliance is true and correct.
2. I am eligible under Division 3 of the California Business and Professions Code to accept responsibility for the information on this document.
3. That the energy features and performance specifications for the design identified on this Certificate of Compliance conform to the requirements of Title 24, Parts 1 and 6 of the California Code of Regulations (CCR).
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Responsible Designer Name:	Responsible Designer Signature:	Date Signed:	License:
Company :	Address:	City/State/Zip:	Phone:

CERTIFICATE OF COMPLIANCE	CF1R-ENV-01-E
EZ Frame Worksheet	(Page 1 of 2)
Project Name:	Date Prepared:

A. Assembly Information

01	Frame Type	
02	Surface Type	
03	Inside layer #3	
04	Inside layer #2	
05	Inside layer #1	
06	Framing Width	
07	Framing Depth	
08	Cavity Insulation	
09	Frame Spacing	
10	Framing Thickness or Gauge	
11	Framing Knockout	
12	Outside layer #1	
13	Outside layer #2	
14	Outside layer #3	
15	Outside layer #4	
16	Outside layer #5	

B. Results

01	Framing Assembly U-factor	
02	Framing Assembly R-value	

CERTIFICATE OF COMPLIANCE	CF1R-ENV-01-E
EZ Frame Worksheet	(Page 2 of 2)
Project Name:	Date Prepared:

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT	
1. I certify that this Certificate of Compliance documentation is accurate and complete.	
Documentation Author Name:	Documentation Author Signature:
Company:	Signature Date:
Address:	CEA/ HERS Certification Identification (if applicable):
City/State/Zip:	Phone:

RESPONSIBLE PERSON'S DECLARATION STATEMENT

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5. I will ensure that a registered copy of this Certificate of Compliance shall be 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 Compliance is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Designer Name:	Responsible Designer Signature:
Company :	Date Signed:
Address:	License:
City/State/Zip:	Phone:

A. Assembly Information

1. Frame Type: This refers to the type of construction material being used for structural purposes.
2. Surface Type: This refers to the type demising partition that separates the conditioned and unconditioned spaces (Wall, Floor, Roof or Ceiling).
3. Inside Layer #3: The third layer is adjacent to the second layer and is the layer visible from inside the building. The material of the must be selected from the materials library.
4. Inside Layer #2: The second layer is adjacent to the first layer and the material must be selected from the materials library.
5. Inside Layer #1: The first layer is adjacent to the framing and the material must be selected from the materials library.
6. Framing Width: For wood framing, enter the width of the framing member (in inches).
7. Framing Depth: For wood framing, enter the depth of the framing member (in inches).
8. Cavity Insulation: This refers to the R-value of the cavity insulation.
9. Frame Spacing: This refers to the center to center distance between the framing members.
10. Framing Thickness or Gauge: For metal framing, enter the metal thickness (in inches) or the gauge of the metal.
11. Framing Knockout: This refers to the percentage of the length of the metal framing member that does not conduct heat because of the knock-out (typically 15%)
12. Outside Layer #1: The first outside layer is adjacent to the framing and the material must be selected from the materials library.
13. Outside Layer #2: The second outside layer is adjacent to the first and the material must be selected from the materials library.
14. Outside Layer #3: The third outside layer is adjacent to the second and the material must be selected from the materials library.
15. Outside Layer #4: The fourth outside layer is adjacent to the third and the material must be selected from the materials library.
16. Outside Layer #5: The fifth outside layer is the layer that can be seen from outside the space and the material must be selected from the materials library.

B. Results

1. Framing Assembly U-factor: This is the total assembly U-factor, taking into account all information that was inputted (Btu/h-ft^{2}F).
2. Framing Assembly R-value: This is the total assembly R-value, based on the assembly U-factor (h-ft^2-F/Btu).

AREA WEIGHTED AVERAGE CALCULATION WORKSHEET

CERTIFICATE OF COMPLIANCE	CF1R-ENV-02-E
Area Weighted Average Calculation Worksheet	(Page 1 of 1)
Project Name:	Date Prepared:

A. Area-Weighted Average Calculation															
1	2		3		4		5		6		7		8		9
Item/ Tag No.	Type 1 Value[1]		Type 1 Area[2]		Type 2 Value[1]		Type 2 Area[2]		Type 3 Value[1]		Type 3 Area[2]		Total Area		Area Weighted Average Value[3]
	[(______)	x	(______)	+	(______)	x	(______)	+	(______)	x	(______)]	÷		=	
	[(______)	x	(______)	+	(______)	x	(______)	+	(______)	x	(______)]	÷		=	
	[(______)	x	(______)	+	(______)	x	(______)	+	(______)	x	(______)]	÷		=	
	[(______)	x	(______)	+	(______)	x	(______)	+	(______)	x	(______)]	÷		=	
	[(______)	x	(______)	+	(______)	x	(______)	+	(______)	x	(______)]	÷		=	
	[(______)	x	(______)	+	(______)	x	(______)	+	(______)	x	(______)]	÷		=	

1. *"Value" can be replaced throughout the formula by "U-factor", "Solar Heat Gain Coefficient," or any other value that varies throughout a residence and is appropriate to weight average. Mixture of different units not allowed.*
2. *"Area" can be replaced throughout the formula by "Length" or any other unit of measure used for the value being averaged. Mixture of different units not allowed.*
3. *Enter the above Weighted Average Value on the CF-1R form and attach this sheet.*

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

1. I certify that this Certificate of Compliance documentation is accurate and complete.

Documentation Author Name:	Documentation Author Signature:
Company:	Signature Date:
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 Compliance is true and correct.
2. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer).
3. That the energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
4. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.
5. I will ensure that a registered copy of this Certificate of Compliance shall be 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 Compliance is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Designer Name:	Responsible Designer Signature:
Company :	Date Signed:
Address:	License:
City/State/Zip:	Phone:

This worksheet is used to calculate the area-weighted average values for building envelope features such as walls, roofs, floors, mass, and fenestration/glazing U-factors or Solar Heat Gain Coefficient (SHGC) values for prescriptive compliance. R-values are not used for area-weighing; only U-factors or SHGC values are allowed.

Weighted averaging is done when there is more than one level of insulation or more than one type of window and one or more does not meet prescriptive compliance requirements. Each fenestration type (e.g., vertical windows, skylights, dynamic glazing, and window films) are treated independently and cannot be combined. Submit the ENV-02 with the energy compliance forms.

If exterior shading devices are used to meet an SHGC requirement, first complete a CF1R-ENV-03 (Solar Heat Gain Coefficient (SHGC) Worksheet). If the SHGC exceeds 0.25 then the weighted-average of other like windows should be used to determine overall compliance with prescriptive SHGC requirements.

General Information:
Project Name: Identifying information, such as owner's name.
Date: Date of document preparation.

A. Area Weighted Average Calculation

1. Tag/ID: same data given on NRCC CF1R's; provides an identification Tag or Identification name that uniquely identifies the window system. If there is a wall/floors/mass/window plan or schedule for the system, the Tag/ID name may be given on the plans.
2. Column 2: Type 1 Value: U-factor or SHGC value of the first component from the manufacturers data or specification sheet
3. Column 3: Type 1 Area: Area value (wall surface area or window rough opening); plus
4. Column 4 Type 2 Value: U-factor or SHGC value of the second component from the manufacturers data or specification sheet
5. Column 5: Type 2 Area: Area value (wall surface area or window rough opening); plus
6. Column 6: Type 3 Value: U-factor or SHGC value of the third component from the manufacturers data or specification sheet
7. Column 7: Type 3 Area: Area value (wall surface area or window rough opening); Sum all Types and divided by [Note: if more than three component s then use the next line and use the total area of both lines and divide into the summation of the other values.]
8. Column 8: Total Area: Is the sum of all the area of the walls or windows
9. Column 9: Area Weighted Average Value: The new calculated U-factor or SHGC value is entered on the respective prescriptive CF1R-NCB-01-E, CF1R-ALT-01series and CF1R-ADD-01.

STATE OF CALIFORNIA

SOLAR HEAT GAIN COEFFICIENT (SHGC) WORKSHEET

CEC-CF1F-ENV-03-E (Revised 06/13) CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	CF1R-ENV-03-E
Solar Heat Gain Coefficient (SHGC) Worksheet	(Page 1 of 1)
Project Name:	Date Prepared:

A. Product Information		
01	Window Item or Tag Name:	
02	Frame Type	
03	Product Type	
04	Glazing Coating	
05	Glazing Layer	
06	Fenestration Mounted	

B. Solar Heat Gain Coefficient Calculation Inputs		
01	Fenestration SHGC value from NFRC Label Certificate; ($SHGC_{fen)}$	
02	Fenestration SHGC value from Table 110.6-B; $SHGC_{fen}$	
03	Exterior Shade Device SHGC Type; $SHGC_{Exterior\ Shade}$	
04	The *larger* of Item (1, or 2, or 3) above; $SHGC_{max\ =}$	
05	The *smaller* of Item (1, or 2, or 3) above; $SHGC_{min\ =}$	
06	The total combined adjusted SHGC with exterior shading device; ($SHGC_{total}$)	

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

1. I certify that this Certificate of Compliance documentation is accurate and complete.

Documentation Author Name:	Documentation Author Signature:
Company:	Signature Date:
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 Compliance is true and correct.
2. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer).
3. That the energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
4. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.
5. I will ensure that a registered copy of this Certificate of Compliance shall be 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 Compliance is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Designer Name:	Responsible Designer Signature:
Company :	Date Signed:
Address:	License:
City/State/Zip:	Phone:

WKS-03 Instructions

This worksheet is to be used to determine the effective Solar Heat Gain Coefficients (SHGC) value of fenestration in combination with an exterior shading device. This worksheet is to be completed for each different fenestration and exterior shading combination. Total $SHGC_{total}$ values are determined by choosing the larger of B1, B2 or B3 for SHG_{max} and the smaller of B1, B2 or B3 for $SHGC_{min}$ and calculated in the total $SHGC_{total}$ equation in Item B6. The following rules apply when selecting exterior shading devices;

1. If using this worksheet, a standard bug screen must be assumed for all vertical fenestration unless replaced by another exterior shading device as listed in B3, only one exterior shade may be applied to a vertical window.
2. The listed SHGC for bug screen is an area-weighted value that assumes that the screens are only on operable windows. If no exterior shade is selected then assume to have a SHGC of 0.76 for standard bug screen for all windows.
3. This requirement does not apply to skylights where exterior shading SHGC is assumed to be 1.00.
4. When exterior shading devices are applied and do not meet the prescriptive efficiencies for windows or skylights then these windows and skylight must be area-weighted using the CF1R-WKS-02-E. Different shading conditions may also be modeled explicitly in the computer performance method.

The target value for Total $SHGC_{total}$ is 0.25 for Climate Zones 2, 4 and 6-16. However, if not able to meet the target value it may be required to calculate the area weighted average (CF1R-ENV-02-E form) with other more efficient like windows and skylights.
The resultant Total $SHGC_{total}$ value shall be documented prescriptively on the RCC-CF1R-NCB-01-E, RCC-CF1R-ADD-01-E and RCC-CF1R-ALT-01-E in the Fenestration section, attach a completed RCC-CF1R-ENV-03-E with submittal. On Performance Approach the program will generate its own CF1R and will include the Total $SHGC_{total}$ values.

A. GENERAL INFORMATION

1. Window Tag or ID Name; same data given on NCC CF1R's; provides an identification name or tag name that uniquely identifies the window system. If there is a window plan or schedule for the system, the tag name may be given on the plans.
2. Frame Type; Choose either: Metal or Non-metal or Metal w/Thermal Break
3. Product Type; Choose either Operable or fixed.
4. Glazing Coating; Clear (not visibly tinted) or Tinted (visibly tinted):
5. Glazing Layer; Choose either Single/Double Pane/Triple/Block Glass.
6. Fenestration Mounted; Choose either Vertical Glazing or Skylight

B. SOLAR HEAT GAIN COEFFICIENT CALCULATION

1. Fenestration SHGC value from NFRC Label Certificate: Enter in **B.1;** the SHGC value from the NFRC Label Certificate; or the Energy Commission's Default Label
2. Fenestration SHGC value from Table 110.6-B: Enter in **B.2;** If there is no labels available then choose the appropriate value from Table 110.6-B from the Standards. The value is based on the information provided in **A. General Information**.
3. Exterior Shade Device SHGC Type: Enter in **B.3;** select a value from Table S-1 below. If no exterior shading device is selected then default to the bug screen value of 0.76.
4. Enter in B.4; the larger of **B.**1, or **B.2**, or **B.3.**
5. Enter in B.5; select the smaller value from **B.**1, or **B.2**, or **B.3.**
6. Enter in B.6; the calculated total combined adjusted $SHGC_{total}$. Use the Target Equation to calculate the total $SHGC_{total}$.

REFERENCE TABLES:

Target Equation

$SHGC_{total}$ = [(_____ $SHGC_{max}$ × 0.2875) + 0.75] × _____$SHGC_{min}$

TABLE S-1

Exterior Shading Device		**$SHGC_{Exterior\ Shade}$**
1	Standard Bug Screens	0.76
2	Exterior Sunscreens with Weave 53 x 16/inch	0.30
3	Louvered Sunscreens w/Louvers as Wide as Openings	0.27
4	Low Sun Angle (LSA) Louvered Sunscreens	0.13
5	Vertical Roller or Shades or Retractable or Drop Arm/Marquisolette or Operable Awnings	0.13
6	Roll Down Blinds or Slats	0.13
7	None (for skylights only)	1.00

TABLE 110.6-B DEFAULT SOLAR HEAT GAIN COEFFICIENT (SHGC)

FRAME TYPE	PRODUCT	GLAZING	FENESTRATION PRODUCT SHGC		
			Single Pane SHGC	Double Pane SHGC	Glass Block SHGC
Metal	Operable	Clear	0.80	0.70	0.70
	Fixed	Clear	0.83	0.73	0.73
	Operable	Tinted	0.67	0.59	N.A.
	Fixed	Tinted	0.68	0.60	N.A.
Metal, Thermal Break	Operable	Clear	N.A.	0.63	N.A.
	Fixed	Clear	N.A.	0.69	N.A.
	Operable	Tinted	N.A.	0.53	N.A.
	Fixed	Tinted	N.A.	0.57	N.A.
Nonmetal	Operable	Clear	0.74	0.65	0.70
	Fixed	Clear	0.76	0.67	0.67
	Operable	Tinted	0.60	0.53	N.A.
	Fixed	Tinted	0.63	0.55	N.A.

TABLE S-1

Exterior Shading Device		$SHGC_{Exterior\ Shade}$
1	Standard Bug Screens	0.76
2	Exterior Sunscreens with Weave 53 x 16/inch	0.30
3	Louvered Sunscreens w/Louvers as Wide as Openings	0.27
4	Low Sun Angle (LSA) Louvered Sunscreens	0.13
5	Vertical Roller or Shades or Retractable or Drop Arm/Marquisolette or Operable Awnings	0.13
6	Roll Down Blinds or Slats	0.13
7	None (for skylights only)	1.00

STATE OF CALIFORNIA

SOLAR REFLECTANCE INDEX CALCULATION WORKSHEET

CEC-CF1R-ENV-04-E (Revised 06/13) CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	CF1R-ENV-04-E
Solar Reflectance Index Calculation Worksheet	(Page 1 of 2)

Project Name:	Date Prepared:

A. Product Information

1	CRRC Product ID Number	
2	Manufacturer	
3	Brand	
4	Model	
5	Product Type	
6	Roof Slope	

B. SRI Calculations

1	Aged Reflectance Listed with CRRC	
2	CRRC Listed Aged Solar Reflectance	
3	Initial Solar Reflectance	
4	Calculated Aged Solar Reflectance	
5	Thermal Emittance	

C. Results

1	Solar Reflective Index	

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

1. I certify that this Certificate of Compliance documentation is accurate and complete.

Documentation Author Name:	Documentation Author Signature:
Company:	Signature Date:
Address:	CEA/ HERS Certification Identification (if applicable):
City/State/Zip:	Phone:

RESPONSIBLE PERSON'S DECLARATION STATEMENT

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Responsible Designer Name:	Responsible Designer Signature:
Company :	Date Signed:
Address:	License:
City/State/Zip:	Phone:

Registration Number: Registration Date/Time: HERS Provider:

CERTIFICATE OF COMPLIANCE	CF1R-ENV-04-E
Solar Reflectance Index Calculation Worksheet	(Page 2 of 2)
Project Name:	Date Prepared:

CF1R-WKS-04-E Instructions

A. Product Information:

1. CRRC Product ID Number, Manufacturer, Brand, Model and Product Type should be based on product information from the Cool Roof Rating Council's website. The product directory is located at http://www.coolroofs.org/products/search.php and may be browsed either by viewing all products or by using the search function to find a specific product. Keep in mind that inclusion in the directory does not guarantee that a product will meet the energy requirements.
2. Roof Slope: Designate the roof slope as either "less than or equal to 2:12"(≤2:12) or "greater than 2:12"(>2:12). A ratio of 2:12 is approximately 9.5 degree slope. The SRI requirement is based partly on the slope of the roof.

B. SRI Calculations:

1. Aged Reflectance Listed with CRRC: Indicate whether or not your product's 3-year aged solar reflectance is listed on the CRRC website by selecting either "yes" or "no" from the drop-down list. Depending on your selection, the boxes that you will not need should become blacked out.
2. CRRC Listed Aged Solar Reflectance: If you selected "yes" to box 1, input the CRRC listed 3-year aged solar reflectance.
3. Initial Solar Reflectance: If you selected "no" to box 1, input the CRRC listed initial solar reflectance.
4. Calculated Aged Solar Reflectance: No input required. The calculator will calculate the aged reflectance using the initial reflectance once you hit enter or click outside the box. Note that the solar reflectance value will be a decimal between 0 and 1.
5. Thermal Emittance: Input the value for thermal emittance obtained from the CRRC. This value can be either the initial thermal emittance or the 3-year aged value. Note that it also must be a decimal between 0 and 1.

C. Results:

1. Solar Reflectance Index: If you have entered values for both solar reflectance and thermal emittance, once you press enter or click outside the box, the calculator will calculate the final SRI value. It may take a few moments to obtain a value for the SRI depending on the values you inputted for reflectance and emittance.

STATE OF CALIFORNIA

HYDRONIC HEATING SYSTEM WORKSHEET

CEC-CF1R-PLB-01-E (Revised 01/14)

CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE		CF1R-PLB-01-E
Hydronic Heating System Worksheet		(Page 1 of 1)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City	Zip Code

A. Pipe Heat Loss Worksheet

01	02	03	04
Pipe Diameter (inch)	Pipe Heat Loss Factor	Pipe Length	Pipe Heat Loss (Btu/hr)

05	sum of all pipe heat loss (Btu/hr)	
06	Average Hourly Pipe Heat Loss (Btu/hr)	

B. Hydronic System Calculations for Large Storage Gas

01	Recovery Efficiency/AFUE	
02	Average Hourly Pipe Heat Loss (Btu/hr)	
03	Rated Input (Btu/hr)	
04	Standby Percent (if applicable)	
05	Standby Energy (from appliance database) (Btu/hr)	
06	Standby Energy (calculated) (Btu/hr)	
07	Pump Watts (Watts) (if applicable)	
08	Pump Energy (Btu/hr)	
09	Effective AFUE	

A. Pipe Heat Loss Worksheet

01 Enter all the different pipe diameters of the system.
02 Using the table below, determine the pipe heat loss factor for the corresponding pipe diameter
03 Enter the pipe length
04 Multiply line B02 by B03, this is the pipe heat loss
05 Enter the sum of all pipe heat loss
06 Divide line B05 by 8760 times 1000

Pipe Heat Loss Factor Lookup Table

Pipe Nominal Diameter	Pipe Heat loss factor
.75	66.6
1.0	78.8
1.5	100.3

B. Hydronic System Calculations for Boiler or Large Storage Gas

01 Enter the Recovery Efficiency/AFUE from manufacturer's literature or the appliance database
02 Enter average hourly pipe heat loss sum A06 from section A above
03 Enter the rated input from manufacturer's literature or the appliance database
04 Enter the standby loss percent from manufacturer's literature or the appliance database. Can be skipped if unknown
05 Standby loss energy (from appliance database) is used if standby loss percent is not known. Enter the standby loss energy from manufacturer's literature or the appliance database.
06 Standby loss energy (calculated) is line A03 times line A04
07 Enter the pump watts
08 Pump energy is line A06 times 3.414 / 1000. If unknown then default value is 0.2
09 Effective AFUE is [line A01 – (line A02+ line A05 + (line A07 / line A03)]

CERTIFICATE OF COMPLIANCE	CF1R-SRA-01-E
Solar Ready Area– New Construction	(Page 1 of 3)
Project Name:	Date Prepared:

General Information

Building Type:

☐ Single Family Residence The single family residence shall comply with the requirements of Standards Section 110.10(b) through 110.10(e).

☐ Low-Rise Multifamily The low-rise multifamily building shall comply with the requirements of Standards Section 110.10(b) through 110.10(d).

Use form NRCC-SRA-01-E to show solar ready compliance for hotel/motel occupancies and high-rise multifamily buildings with ten stories or fewer and all other nonresidential buildings with three stories or fewer.

Solar-Ready **Choose one option from A, B, C, D or E or F below.**

☐ A. Allocated Solar Zone, Interconnection, Documentation and Electrical Service Requirements

CF1R-SRA-02-E Minimum Solar Zone Area Worksheet is required to be submitted.

Minimum Solar Zone Area (sqft) This is quantity [C] from SRA-02-E for single family and quantity [J] for low-rise multifamily buildings	
Proposed Solar Zone Area (sqft) This is quantity [S] from SRA-02-E for both single family and low-rise multifamily buildings	
The construction documents will indicate a location for inverters and metering equipment and a pathway for routing of conduit from the solar zone to the point of interconnection with the electrical service. The construction documents will indicate a pathway for routing of plumbing from the solar zone to the water heating system.	
A copy of the construction documents or a comparable document indicating information about the solar zone and interconnection pathways will be provided to the occupant.	
For Single Family Residences only: • The main electric service panel shall have a minimum busbar rating of 200 amps. The main electric service panel shall have reserved space to allow for the installation of a double pole circuit breaker. The reserved space shall be positioned at the opposite (load) end from the input feeder location or main circuit location. The reserved space shall be permanently marked as "For Future Solar Electric".	
If the installer certifies that all above requirements have been met and the Proposed Solar Zone Area meets or exceeds the Minimum Solar Zone Area, the building complies, otherwise it does not comply.	☐ **does not comply** ☐ **complies**

☐ B. Residence not in an Applicable Subdivision

Is this a single family residence located in subdivisions with ten or more single family residences and where the application for a tentative subdivision map for the residences has been deemed complete, by the enforcement agency, on or after January 1, 2014	☐ Yes ☐ No
Please check box to right if answered no to the above question in this section.	☐ **EXEMPT**

☐ C. Permanently Installed Solar Photovoltaic (PV) System

Will the proposed building have a permanently installed solar electric (PV) system? If yes, a *CF2R-SPV-01-E Certificate of Installation: Photovoltaic System Verification* will be required to be submitted as a condition of final approval.	☐ Yes ☐ No
Enter the Proposed Nameplate DC Power Rating for the PV System (watts)	
For Single Family Dwellings: Will the Proposed Nameplate DC Power Rating be equal to or greater than Minimum Nameplate DC Power Rating of 1000 Watts?	☐ Yes ☐ No
For Low Rise Multifamily: Calculate the Minimum Nameplate DC Power Rating (watts) = Total Roof Area (ft2) * (1 Watt/ ft2)	
For Low Rise Multifamily: Will the Proposed Nameplate DC Power Rating be equal to or greater than the Minimum Nameplate DC Power Rating?	☐ Yes ☐ No
If the proposed building will have a Permanently installed PV System that meets or exceeds the applicable Minimum Nameplate DC Power Rating the building is exempt from the Solar Ready Area requirements.	☐ **EXEMPT**

CERTIFICATE OF COMPLIANCE	CF1R-SRA-01-E
Solar Ready Area– New Construction	(Page 2 of 3)

Project Name:	Date Prepared:

☐ D. Permanently Installed Solar Water Heating System

Will the proposed building have a permanently installed solar water heating system? If yes, a *CF2R-STH-01-E Certificate of Installation: Solar Water Heating Systems* will be required to be submitted as a condition of final approval.		☐ Yes ☐ No
Will the annual solar savings fraction equal to or greater than the minimum requirements for exemption? For single family: equal to or greater than 0.5 For low-rise multi-family: equal to or great than 0.2 in climate zones 1 through 9, or 0.35 in climate zones 10 through 16		☐ Yes ☐ No
Please check box to right if answered yes to all questions in this section.		☐ **EXEMPT**

☐ E. Smart Thermostats and High Efficacy Lighting

Will all thermostats in each dwelling unit comply with Reference Joint Appendix 5 (JA5) and are they going to be capable of receiving and responding to Demand Response Signals prior to granting of an occupancy permit by the enforcing agency?		☐ Yes ☐ No
Will all installed luminaires be classified as high efficacy in accordance with the applicable requirements in Section 130.0(c), and in accordance with TABLE 150.0-A or TABLE 150.0-B?		☐ Yes ☐ No
Please check box to right if answered yes to all questions in this section.		☐ **EXEMPT**

☐ F. Roof is Designed for Vehicle Traffic or Parking or for Heliport (Applies to Low-rise Multifamily only)

Is the roof designed and approved to be used for vehicular traffic or parking or for a heliport.	☐ Yes ☐ No
Please provide building plan reference _____.	
Please check box to right if answered yes to the above question in this section.	☐ **EXEMPT**

Instructions to Applicant Solar-ready Compliance & Worksheets

(check box if worksheet are included)

- ☐ CF2R-SRA-01-E Certificate of Compliance Solar-ready. *Required on plans for all submittals.*
- ☐ CF2R-SRA-02-E Minimum Solar Zone Area Worksheet. *Required for compliance path A.*
- ☐ CF2R-SPV-01-E Certificate of Installation – Solar Photovoltaic Verification *Required for compliance path C.*
- ☐ CF2R-STH-01-E Certificate of Installation: Solar Water Heating Systems *Required for compliance path D.*

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT	
1. I certify that this Certificate of Compliance documentation is accurate and complete.	
Documentation Author Name:	Documentation Author Signature:
Company:	Signature Date:
Address:	CEA/ HERS Certification Identification (if applicable):
City/State/Zip:	Phone:
RESPONSIBLE PERSON'S DECLARATION STATEMENT	

CERTIFICATE OF COMPLIANCE	CF1R-SRA-01-E
Solar Ready Area– New Construction	(Page 3 of 3)

Project Name:	Date Prepared:

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of Compliance is true and correct.
2. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer).
3. That the energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
4. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.
5. I will ensure that a registered copy of this Certificate of Compliance shall be 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 Compliance is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Designer Name:	Responsible Designer Signature:
Company :	Date Signed:
Address:	License:
City/State/Zip:	Phone:

Solar Zone Area (requirements in §110.10 (b)1A Exception 3, 4, 5, or 6 and §110.10 (b)1B)

This worksheet applies to single family residences located in subdivisions with ten or more single family residences and where the application for a tentative subdivision map for the residences has been deemed complete, by the enforcement agency, on or after January 1, 2014, and which wish to show compliance with a reduced solar zone area per Exceptions 3, 4, 5 or 6 to the requirements of Section 110.10(b)1A. Note that Exceptions 1, 2, and 7 exempt a residence from the solar ready requirements and are documented on the Certificate of Compliance Form CF1R-SRA-01-E. Check the exception being used and fill in the relevant details.

This worksheet applies to low-rise multifamily projects that wish to show compliance with a reduced solar zone allowed under Exception 3 of Section 110.10(b)1B. Note that Exceptions 1, 2, 4, and 5 exempt a residence from the solar ready requirements and are documented on the Certificate of Compliance Form CF-1R-SRA-01-E. Check the exception being used and fill in the relevant details.

General Information

Building Type:

☐ Single Family The residence shall comply with the requirements of Standards Section 110.10(b) through 110.10(e).

☐ Low-rise Multifamily The low-rise multifamily building shall comply with the requirements of Standards Section 110.10(b) through 110.10(d)

Step 1: Determine Minimum Solar Zone Area

Single Family Residences

Calculate the minimum solar zone area using one of the four options provided below. Use method 3 if your roofs and overhangs are shaded.

☐ **Method 1. Reduced Solar Zone Area For Small, Tall Residences**

Does the single family residence have three stories or more? ☐ Yes ☐ No

Does the single family residences have a total floor area less than or equal to 2000 square feet ☐ Yes ☐ No

Please check box to right if answered yes to all questions in this section. ☐ **REDUCED SOLAR ZONE AREA OF 150 ft^2 APPLIES**

☐ **Method 2. Reduced Solar Zone Area for Homes With a Whole House Fan in a Wildland-Urban Interface in Climate Zones 8-14**

Is the residence located in climate zones 8-14? ☐ Yes ☐ No

Is the residence in a designated Wildland-Urban Interface Fire Area as defined in Title 24, Part 2? ☐ Yes ☐ No

Does the residence have a whole house fan? ☐ Yes ☐ No

Please check box to right if answered yes to all questions in this section. ☐ **REDUCED SOLAR ZONE AREA OF 150 ft^2 APPLIES**

☐ **Method 3. Reduced Solar Zone Area for Homes with Limited Solar Access** ***(requirements in 110.10(b)1A)***

The enforcement agency may require additional documentation that describes how the reduced solar zone area was determined.

List the Method/Tool(s) used to quantify annual solar access: (for example, "Software X," "CAD Tool Y"			
Area of low-sloped roof (ratio of rise to run of 2:12 or less) where the annual solar access is 70 percent or greater.	A		ft^2
Area of steep-sloped roof (ratio of rise to run is greater than 2:12) that is oriented between 110 and 270 degrees and annual solar access is 70 percent or greater.*	B		ft^2
Minimum solar zone area becomes	**C** = 0.5 x (A + B)		ft^2

Please check box to right if this section is completed. ☐ **REDUCED SOLAR ZONE AREA (calculated) APPLIES**

☐ **Method 4. Reduced Solar Zone Area for Homes with "Smart Thermostats"**

Are all thermostats "Smart Thermostats" complying with Reference Joint Appendix JA5 and are they capable of receiving and responding to Demand Response Signals? ☐ Yes ☐ No

Please check box to right if answered yes to all questions in this section. ☐ **REDUCED SOLAR ZONE AREA OF 150 ft^2 APPLIES**

Low-Rise Multifamily

Calculate the minimum solar zone area using one of the two options provided below. Use option 2 if your roofs and overhangs are shaded.

Method 1: Minimum Solar Zone Area Based on Total Roof Area (requirements in 110.10(b)1B)

New Construction: Total roof area Additions: Total roof area added to building	D		ft^2
New Construction: Area of roof covered with skylights Additions: Area of new roof area covered with skylights	E		ft^2
Minimum solar zone area	F = 0.15 x (D – E)		ft^2

Note: For additions, if A≤ 2,000 ft^2 then addition does not need to comply with solar zone requirements

Method 2: Minimum Solar Zone Area Based on Potential Solar Zone (requirements in Exception 3 to 110.10(b)1B)

The enforcement agency may require additional documentation that describes how the reduced solar zone area was determined.

List the Method/Tool(s) used to quantify annual solar access: (for example, "Software X," "CAD Tool Y"			
Area of low-sloped roof (ratio of rise to run of 2:12 or less) where the annual solar access is 70 percent or greater.*	G		ft^2
Area of steep-sloped roof (ratio of rise to run is greater than 2:12) that is oriented between 110 and 270 degrees and annual solar access is 70 percent or greater.*	H		ft^2
Minimum solar zone area	I = 0.5 x (G + H)		ft^2

* For new construction consider total roof area; for additions consider newly added roof area

Minimum solar zone area (either F or I)	**J**		ft^2

CERTIFICATE OF COMPLIANCE	CF1R-SRA-02-E
Minimum Solar Zone Area Worksheet – New Construction	(Page 3 of 4)
Project Name:	Date Prepared:

Step 2: Allocated Solar Zone Subareas (for both SF and low-rise MF)

Subarea ID	Building Plan Reference	Slope of Roof or Overhang	If Steep Slope, roof or overhang oriented between 110 and 270 degrees	Subarea complies with Part 9 of Title 24 [A]	Subarea is free of obstructions [B]	Subarea is located the appropriate distance from obstructions [C]	Smallest dimension is greater than 5 feet	Subarea meet minimum area requirement [D]	Subarea Qualifies [E]	Area
H	I	J	K	L	M	N	O	P	Q	R
		☐ Low ☐ Steep	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	ft^2
		☐ Low ☐ Steep	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	ft^2
		☐ Low ☐ Steep	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	ft^2
		☐ Low ☐ Steep	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	ft^2
		☐ Low ☐ Steep	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	ft^2
		☐ Low ☐ Steep	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	ft^2
		☐ Low ☐ Steep	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	ft^2
		☐ Low ☐ Steep	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	ft^2
									Proposed Solar Zone Area (sum of all qualifying subareas) [S]	**ft^2**

A. The solar zone shall comply with access, pathway, smoke ventilation, and spacing requirements as specified in Title 24, Part 9 or other Parts of Title 24 or in any requirements adopted by a local jurisdiction.
B. No obstructions, including but not limited to, vents, chimneys, architectural features, and roof mounted equipment, shall be located in the solar zone.
C. Solar zone must be located no closer than twice the distance, measured in the horizontal plane, of the height difference between the highest point of the obstruction and the horizontal projection of the nearest point of the solar zone, measured in the vertical plane.
D. If building roof area ≤ 10,000 ft^2 then minimum area is 80ft^2. If building roof area >10,000 ft^2 then minimum area is 160ft^2.
E. Check "yes" if answers to questions in columns K through P are "yes".

☐ **Building Complies with Minimum Solar Zone Area Requirement**	Check box if the sum of all subareas [S] is equal to or greater than the minimum solar zone area? ☐ (Minimum solar zone area is [C] for single family; [J] for low-rise multifamily)

CERTIFICATE OF COMPLIANCE	CF1R-SRA-02-E
Minimum Solar Zone Area Worksheet – New Construction	(Page 4 of 4)

Project Name:	Date Prepared:

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT	
1. I certify that this Certificate of Compliance documentation is accurate and complete.	
Documentation Author Name:	Documentation Author Signature:
Company:	Signature Date:
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 Compliance is true and correct.
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3. That the energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
4. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.
5. I will ensure that a registered copy of this Certificate of Compliance shall be 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 Compliance is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Designer Name:	Responsible Designer Signature:
Company :	Date Signed:
Address:	License:
City/State/Zip:	Phone:

OG 300 SOLAR WATER HEATING WORKSHEET

CERTIFICATE OF COMPLIANCE		CF1R-STH-01-E
OG 300 Solar Water Heating Worksheet		(Page 1 of 2)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City	Zip Code

A. General System Information		
01	Water Heating System Name:	
02	Conditioned Floor Area (ft^2)	
03	Climate Zone:	
04	Solar System Manufacturer	
05	Model Number	
06	SRCC Certification Number	

B. Inputs for Systems SRCC OG-300		
01	Solar Energy Factor of OG-300 solar water heating system, as listed in SRCC directory	
02	Type of back up water heater: gas or electric	
03	Calculated Solar Savings Fraction	

CERTIFICATE OF COMPLIANCE		CF1R-STH-01-E
OG 300 Solar Water Heating Worksheet		(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 Compliance documentation is accurate and complete.	
Documentation Author Name:	Documentation Author Signature:
Company:	Signature Date:
Address:	CEA/ HERS Certification Identification (if applicable):
City/State/Zip:	Phone:

RESPONSIBLE PERSON'S DECLARATION STATEMENT

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1. The information provided on this Certificate of Compliance is true and correct.
2. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer).
3. That the energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
4. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.
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Responsible Designer Name:	Responsible Designer Signature:
Company :	Date Signed:
Address:	License:
City/State/Zip:	Phone:

A. General System Information

01 Enter the water heating system name

02 Enter the conditioned floor area

03 Enter the climate zone of the system being installed

04 Enter the solar water heating system manufacturer

05 Enter the model number

06 Enter the SRCC Certification Number

B. Inputs for Systems SRCC OG-300

01 Enter the Solar Energy Factor of OG-300 solar water heating system, as listed in SRCC directory

02 Pick the type of back up water heater: gas or electric

21	Divide line 10 by line 11
22	Multiply line 20 by line 21
23	Subtract 1 by line 22
B03 = Line 23	

TABLE 1		
Climate Zone	Water Temperature	Solar Radiation
1	53.90	1220
2	57.52	1220
3	57.69	1533
4	59.12	1601
5	57.93	1602
6	61.55	1599
7	62.63	1586
8	62.97	1682
9	63.76	1685
10	63.76	1612
11	61.00	1580
12	59.65	1670
13	63.99	1726
14	61.48	1827
15	73.55	1884
16	50.54	1513

CERTIFICATE OF COMPLIANCE		CF1R-STH-02-E
OG 100 Solar Water Heating Worksheet		(Page 1 of 2)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City	Zip Code

A. General System Information		
01	Water Heating System Name	
02	Climate Zone	
03	Collector Manufacturer	
04	Collector Brand	
05	Collector Model Number	
06	SRCC Certification Number	
07	Name of Program Used to generate solar thermal performance	
08	Version of software used	
09	Collector Type	
10	Collector Area in ft^2	
11	Collector Rated Efficiency Curve Slope	
12	Collector Rated Efficiency Curve Intercept	
13	Number of Collectors	
14	Collector Fluid	
15	Water Heater Storage Volume in gallons	
16	Secondary Storage Tank Volume in gallons (If used)	
17	Collector angle from true north in degrees	
18	Collector slope form horizontal in degrees	
19	Floor area of building in ft^2	
20	Number of identical dwelling units	
21	Calculated Solar Fraction	

CERTIFICATE OF COMPLIANCE		CF1R-STH-02-E
OG 100 Solar Water Heating Worksheet		(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 Compliance documentation is accurate and complete.	
Documentation Author Name:	Documentation Author Signature:
Company:	Signature Date:
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 Compliance is true and correct.
2. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer).
3. That the energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
4. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.
5. I will ensure that a registered copy of this Certificate of Compliance shall be 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 Compliance is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Designer Name:	Responsible Designer Signature:
Company :	Date Signed:
Address:	License:
City/State/Zip:	Phone:

A. General System Information

01 Water Heating System Name: Enter the name of the water heating system.

02 California Climate Zone: Enter the climate zone the project was performed for.

03 Collector Manufacturer: Enter the name of the collector manufacturer

04 Collector Brand: Enter the Brand name of the collector if different than the Manufacturer.

05 Collector Model Number: Enter the collector model number as listed in the SRCC directory

06 SRCC Certification Number: Enter the SRCC Certification Number from the SRCC directory

07 Name of Program Used to generate solar thermal performance: Enter the name of the solar thermal simulation tool used. If other than California F-chart the program must be approved for use by the Commission

08 Version of software used: Enter if applicable the version of the simulation tool used.

09 Collector Type: Enter the collector type listed in the SRCC directory

10 Collector Area (sq ft): Enter the listed square footage of the collector as listed in the SRCC directory.

11 Collector Rated Efficiency Curve Slope: Enter the slope of the collector listed in the SRCC directory

12 Collector Rated Efficiency Curve intercept: Enter the intercept of the collector listed in the SRCC directory

13 Number of Collectors: Enter the number of collectors included in the simulation run.

14 Collector Fluid: Enter the type of fluid used in the collector (i.e. water, glycol, air).

15 Water Heater Storage Volume: Enter the number of gallons of fluid in the primary water heater storage tank.

16 Secondary Storage Tank Volume: IF applicable enter the volume of the secondary tank used for solar storage; this may include more than one tank.

17 Collector angle from true north in degrees: Enter the angle of the collectors from true north used in simulation. Note in calculating the angle be sure to include the regions magnetic declination.

18 Collector slope form horizontal in degrees: Enter the slope of the collectors from horizontal as used in the simulation.

19 Floor area of building: Enter the square footage of the building.

20 Number of identical dwelling units: Enter the number of units in the building

21 Calculated Solar Fraction: Enter the average annual solar fraction, or note that hourly data was used.