CERTIFICATE OF COMPLIANCE	CF1R-NCB-01-E
Prescriptive Newly Constructed Buildings	(Page 1 of 7)
Project Name:	Date Prepared:

A. General Information

01	Project Name:		02	Date Prepared:	
03	Project Location:		04	Building Front Orientation (deg or cardinal):	
05	CA City:		06	Number of Dwelling Units:	
07	Zip Code:		08	Fuel Type:	
09	Climate Zone:		10	Total Conditioned Floor Area (ft^2):	
11	Building Type:		12	Slab Area (ft^2):	
13	Project Scope:		14	Exceptions to Fenestration U-factor & SHGC 150.1(c)3A	

B. Opaque Surface Details – 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	Frame Type	Frame Depth (inches)	Frame Spacing (inches)	Cavity R-value	Continuous Insulation R-value	U-Factor	Table	Cell	U-Factor from Package A	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

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CERTIFICATE OF COMPLIANCE	CF1R-NCB-01-E
Prescriptive Newly Constructed Buildings	(Page 2 of 7)
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

Note:

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

F. Ceiling/Roof Insulation (Section 150.1(c)1A)

01	02	03	04	05	06	07
Option	Air Space (Yes/No)	Above Roof Deck R-value	Below Roof Deck R-value	Ceiling Insul. R-value	Radiant Barrier Required?	Vented Attic? (Yes/No)

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CERTIFICATE OF COMPLIANCE	CF1R-NCB-01-E
Prescriptive Newly Constructed Buildings	(Page 3 of 7)
Project Name:	Date Prepared:

Note:

- Where insulation is installed above the roofing membrane or above the layer used to seal the roof from water penetration the insulation shall have a maximum water absorption of 0.3 percent by volume when tested according to ASTM Standard C272.

~~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)~~

- ~~Radiant barriers shall meet specific eligibility and installation criteria to receive energy credit for compliance with the Building Energy Efficiency Standards for low-rise residential buildings. Refer to RA4.2.1~~
- ~~The emittance of the radiant barrier shall be less than or equal to 0.05 as tested in accordance with ASTM C1371 or ASTM E408.~~
- ~~For Prescriptive Compliance the attic shall be ventilated to provide 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 no less than 30 percent upper vents. Ridge vents or gable end vents are recommended to achieve the best performance. The material should be cut to allow for full airflow to the venting.~~

G. Roofing Products (Cool Roof) (Section 150.1(c)11)

01	02	03	04	05	06	07	08	09	10	11	12	13
						Proposed				**Minimum Required**		
Tag/ID	Mass Roof 25 lb/ft^2 or greater	Roof Pitch	Method of compliance	Product Type	CRRC Product ID Number	Initial Solar Reflectance	Aged Solar Reflectance	Thermal Emittance	SRI (Optional)	Aged Solar Reflectance	Thermal Emittance	SRI (Optional)

~~NOTES~~Notes:

- Any roof area covered by building integrated photovoltaic panels and solar thermal panels is 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 Allowed Areas and Efficiencies (Section 150.1(c)3)

01	02	03	04	05	06	07
Maximum Allowed Fenestration Area for All Orientation (ft^2)	Maximum Allowed West-Facing Fenestration Area Only (ft^2)	Maximum Allowed U-factor (Windows)	Maximum Allowed U-factor (Skylights)	Maximum Allowed SHGC (Windows)	Maximum Allowed SHGC (Skylights)	Comments

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CERTIFICATE OF COMPLIANCE	CF1R-NCB-01-E
Prescriptive Newly Constructed Buildings	(Page 4 of 7)
Project Name:	Date Prepared:

I. Fenestration Proposed Areas and Efficiencies

Note: If meeting Exception 1 to 150.1(c)3A, Installing ≤ 3ft^2 glass in door, it is assumed to meet the minimum required U-factor (0.32) & SHGC (0.25).
If meeting Exception 1 to 150.1(c)3A, Installing ≤ 3ft^2 tubular skylight, it is assumed to meet the minimum required U-factor (0.55) & SHGC (0.30).

01	02	03	04	05	06	07	08	09	10	11	12	13	14
Tag/ID	Fenestration Type	Frame Type	Dynamic Glazing	Orientation N, S, W, E or Roof	Number of Panes	Proposed Fenestration Area (ft^2)	Proposed West Facing Fenestration Area (ft^2)	Proposed U-factor	Source	Proposed SHGC	Source	Exterior Shading Device	Combined SHGC from CF1R-ENV-03

15	Total Proposed Fenestration Area	
16	Maximum Allowed Fenestration Area	
17	Compliance Statement	
18	Total Proposed West-Facing Fenestration Area	
19	Maximum Allowed West-Facing Fenestration Area	
20	Compliance Statement	
21	Proposed Fenestration U-factor (Windows)	
22	Required Fenestration U-factor (Windows)	
23	Compliance Statement	
24	Proposed Fenestration SHGC (Windows)	
25	Required Fenestration SHGC (Windows)	
26	Compliance Statement	
27	Proposed Fenestration U-factor (Skylights)	
28	Required Fenestration U-factor (Skylights)	
29	Compliance Statement	
30	Proposed Fenestration SHGC (Skylights)	
31	Required Fenestration SHGC (Skylights)	
32	Compliance Statement	

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CERTIFICATE OF COMPLIANCE	CF1R-NCB-01-E
Prescriptive Newly Constructed Buildings	(Page 5 of 7)
Project Name:	Date Prepared:

J. Space Conditioning (SC) Systems – Heating/Cooling/Ducts (Section 150.1(c)7)

01	02	03	04	05	06	07	08	09	10	11	12
Space Conditioning System Identification or Name	Heating System Type	Heating Efficiency Type	Heating Efficiency Value	Cooling System Type	Cooling Efficiency SEER	Cooling Efficiency EER	Distribution System Type	Duct Location	Duct R-value	Thermostat Type	Comments

Notes:

- Central gas furnaces have a minimum efficiency of ~~78~~81% AFUE, heat pumps 8.0~~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 14~~3~~ 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 Airflow Rate (CFM) (~~2~~ 1.5 CFM per ft^2 of Conditioned Floor Area)	Minimum Attic Vent Free Area (in^2) (column 1 x 0.~~384~~192)

L. Water Heating Systems (Section 150.1(c)8)
List water heaters and boilers for both domestic hot water (DHW) heaters and hydronic space heating.

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
Water Heating System ID or Name	Water Heating System Type	Water Heater Type	# of Water Heaters in system	Water Heater Storage Volume (gal)	Fuel Type	Rated Input Type	Rated Input Value	Heating Efficiency Type	Heating Efficiency Value	Standby Loss (%)	Exterior Insul. R-Value	Back-Up Solar Savings Fraction	Central DHW System Distribution Type	Dwelling Unit DHW System Distribution Type

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CERTIFICATE OF COMPLIANCE	CF1R-NCB-01-E
Prescriptive Newly Constructed Buildings	(Page 6 of 7)
Project Name:	Date Prepared:

M. Space Conditioning Systems and Water Heating Systems in Multifamily Dwelling Units

01	02	03	04	05	06
Dwelling Unit Name	Dwelling Unit Total CFA (ft^2)	Central Water Heating System Identification or Name	Dwelling Unit Water Heating System Identification or Name	Dwelling Unit Space Conditioning System Identification or Name	Comments

N. 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.

Duct Leakage Verification- Section 150.0(m)11

- Duct leakage testing is required (Residential Appendix RA3.1) in all climate zones for ducted heating and cooling systems.
- System is zonally controlled. No bypass ducts are allowed, as confirmed by HERS verification

Zonally Controlled Systems – Bypass Dampers - Section 150.1(c)13

- If system is zonally controlled, no bypass ducts are allowed, as confirmed by HERS verification (See RCM Appendix F)

Refrigerant Charge Verification – Section 150.1(c)7a

- Refrigerant Charge Testing is required (Residential Appendix RA3.2) in climate zones 2 and 8-15 for all air source A/C and heat pumps.
- Some exceptions apply to factory charged package systems

Central System Air Handlers – Air Flow and Fan Efficacy Verification - Section 150.0(m)13

- Airflow (min 350 cfm/ton) and Fan Efficacy (max 0.58 watts/cfm) on systems with ducted air conditioning will be field verified by a HERS rater or Return Duct and Filter System Design according to tables 150.0-B~~C~~/~~D~~C will be HERS verified
- Heat-only systems with Central Fan Integrated (CFI) ventilation are required to have less than 0.58 watts per cfm as verified by a HERS rater.

Indoor Air Quality Mechanical Ventilation

- Mechanical ventilation airflow rate according to ASHRAE 62.2 is required to be verified by a HERS rater (RA3.7)

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CERTIFICATE OF COMPLIANCE	CF1R-NCB-01-E
Prescriptive Newly Constructed Buildings	(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:

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

CF1R-NCB-01-E User Instructions

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 2016~~3~~ 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 CF1R is used it means the CF1R-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

1. Project Name: Identifying information, such as owner's name.
2. Date: Date of document preparation.
3. Project Location: Legal street address of property or other applicable location identifying information.
4. 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 ~~s~~Standards (~~s~~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.
5. CA City: Legal city/town of property.
6. Number of Dwelling Units: 1 for single-family, 2 or more for multifamily.
7. Zip Code: 5-digit zip code for the project location (used to determine climate zone).
8. 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.

9. Climate zone: From Joint Appendix JA2.1.1.
10. 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.
11. Building Type: Single Family (includes duplex), or Multi Family (a building that shares common walls and common floors or ceilings).
12. Slab Area: Area of the first floor slab (if any) in ft^2.
13. Project Scope: Newly constructed building or new addition greater than 1,000 ft^2.
14. Exceptions to Fenestration U-factor and SHGC: Installing less than or equal to 3 ft^2 glass in door, Installing less than or equal to 3 ft^2 tubular skylight, or Installing less than or equal to 16 ft^2 skylight, or Not Applicable.

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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.
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, 24, or 48 (inches on center).
6. Proposed Cavity R-value: Cavity R-value of insulation installed between framing members.

   NOTE: Wall U-factor required for all climate zones is ~~0.065~~0.05. 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~~0.05.

   Proposed Continuous Insulation R-value: R-value of rigid or continuous insulation (not interrupted by framing).
7. Proposed 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 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 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, SIP single 2x, SIP double 2x, see JA4 for guidance.
4. Thickness: Thickness in inches.
5. Proposed 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. Proposed U-factor: 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 U-factor from Package A: Based on assembly type and climate zone.
11. Comments: Any notes regarding location, unique conditions, or attachments.

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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: Clay Brick, Clay Hollow Unit, CMU Light Weight, CMU Medium Weight, CMU Normal Weight, concrete, ICF. 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 10 and 11, indicate the thickness of the furring strip (in inches). See Table 4.3.14 of Joint Appendix 4.
6. Proposed 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 interior insulation value for the wall type selected. See JA4 for guidance. Use the same descriptor (R-value or U-factor) throughout Table D.
7. Proposed 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 exterior 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. Required Interior Insulation R-value or U-factor: 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. Required Exterior Insulation R-value or U-factor: 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.
   Proposed U-Factor: When required, specify the U-factor of proposed insulation in column 3.
3. 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.
   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.
4. 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.

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F. Roof/Ceiling Insulation

1. Option: Option A (Continuous Insulation), Option B (Below Roof Deck Insulation), or Option C.
2. Air Space: Yes or No.
3. Above Roof Deck R-value: This field will be auto populated. The required above roof deck R-value will vary depending on climate zone and whether or not there is an air space.
4. Below Roof Deck R-value: This field will be auto populated. The required below roof deck R-value will vary depending on climate zone and whether or not there is an air space.
5. Insulation R-value: This field will be auto populated. The required insulation R-value will vary depending on climate zone.
6. Radiant Barrier Required?: This field will be auto populated. The radiant barrier requirement will vary depending on compliance option used and climate zone.
7. Vented Attic?: Yes or No.

Note: If attic is unvented, prescriptive compliance cannot be used. Compliance may be attempted using the performance approach.

~~**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. Tag/ID: A label (if any) from the plans, such as R1.
2. Mass roof 25 lb/ft^2 or greater: Yes or No. Mass roofs are not required to have a cool roof even if the climate zone specifies minimum performance requirements.
3. 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.
4. Method of Compliance: Indicate if the method of compliance is going to be based on Aged Solar Reflectance and Thermal Emittance or is it going to be based on the Solar Reflectance Index (SRI).
5. Product Type: See Cool Roof Rating Council's directory. Generally product types include single-ply roof, wood shingles, asphalt roof, metal roof, tile roof.
6. The CRRC Product ID Number is obtained from the Cool Roof Rating Council's Rated Product Directory at www.coolroofs.org/products/results. Products are listed by manufacturer, brand, type of installation, roofing material, and color, as well as product performance.
7. Proposed Initial Solar reflectance: Based on the product chosen from the Cool Roof Rating Council's Rated Product Directory. If using default assumption indicate NA since the Aged Solar Reflectance is available.

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8. 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 calculated Aged Solar Reflectance using the Solar Reflectance Index (SRI) Calculation worksheet located on the California Energy Commission website or the aging equation $\rho_{aged}=[0.2+\beta[\rho_{initial}-0.2]$, where $\rho_{initial}$ = the initial solar reflectance and soiling resistance β is listed by product type below.

VALUES OF SOILING RESISTANCE β BY PRODUCT TYPE

Product Type	CRRC Product Category	β
Field-Applied Coating	Field-Applied Coating	0.65
Other	Not A Field-Applied Coating	0.70

9. Proposed Thermal Emittance: From the product specification default value. If using a calculated SRI place the Thermal Emittance used to calculate SRI.
10. Proposed SRI: It is optional to meet the SRI but if chosen to do so, use the Solar Reflectance Index (SRI) Calculation Worksheet found on the California Energy Commission website http://energy.ca.gov/title24/2013standards/documents/solar_reflectance/.
11. Minimum Required Aged Solar Reflectance: Based on climate zone and roof slope.
12. Minimum Required Thermal Emittance: Based on climate zone and roof slope.
13. Minimum Required SRI: 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.

H. Fenestration/Glazing Allowed Areas and Efficiencies

1. Maximum Allowed Fenestration Area for All Orientation: Calculated value based on conditioned floor area times 20 percent for all orientations.
2. Maximum Allowed West-Facing Fenestration Area Only: Calculated value based on conditioned floor area times 5 percent (Used in climate zones 2, 4, and 6-16 for west-facing fenestration).
3. Maximum Allowed U-factor (Windows): 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.
4. Maximum Allowed U-factor (Skylights): Maximum U-factor from Package A or Table 150.1-A. This field will almost always be 0.32 unless meeting one of the Exceptions to 150.1(c)3A. If meeting one of the Exceptions, this field will be 0.55.
5. Maximum Allowed SHGC (Windows): 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. Maximum Allowed SHGC (Skylights): Maximum SHGC from Package A or Table 150.1-A. This field will almost always be 0.25 unless meeting one of the Exceptions to 150.1(c)3A. If meeting one of the Exceptions, this field will be 0.30.
7. 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, 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 e.g., Fixed Window, Operable Window, Skylight, Tubular Skylight, or Glass in Door.

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

3. Frame Type: Indicate the frame type as either metal, metal thermal break, or nonmetal.
4. Dynamic Glazing: Indicate whether the fenestration has an integrated shading device, chromogenic glazing, or none for no dynamic glazing. Chromogenic glazing shall be considered separately from other fenestration types.
5. Orientation: Orientation can be North, East, South, West. If documentation is for a building that may be built in any direction, in a climate zone that limits west-facing fenestration, complete this section assuming the side of the building with the most fenestration faces west.

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

6. Number of Panes: Indicate the number of panes for each Tag/ID; is it a single, double, or triple pane window?
7. Proposed Fenestration Area (ft^2): Indicate the area (in square feet) of each exterior fenestration type, excluding west-facing fenestration.
8. Proposed West Facing Fenestration Area (ft^2): In climate zones 2, 4, and 6-16, indicate the area (in square feet) of each exterior west-facing fenestration type separately.

NOTE: Skylights installed in a roof with a pitch less than 1:12 are considered to face west.

9. Proposed 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, or
   (b) the default value from Table 110.6-A, or
   (c) the NA6.2 alternate default U-factor (for non-rated site-built fenestration only), or
   (d) the Area-weighted Average from CF1R-ENV-02.

If any products (other than the exceptions) have a higher U-factor than 0.32, first complete a form CF1R-ENV-02 to calculate the area-weighted average U-factor, which must be 0.32 or less, and attach it to the CF1R-NCB-01.

NOTE: (1) For the exceptions – up to 3 ft^2 of tubular skylights and up to 16 ft^2 of skylight area, enter 0.55.
(2) For the exception – up to 3 ft^2 of glass in door, enter 0.32.
(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 9 and 10.

10. Source: NFRC, Tables 110.6-A and 110.6-B, Equations NA6-1 and NA6-2, or Area-weighted Average Worksheet (ENV-02). The source of the U-factor data for the fenestration product.
11. Proposed SHGC: In climate zones 2, 4, and 6-16, enter the SHGC from
    (a) NFRC-rated certification information, or
    (b) default table 110.6-B, or
    (c) the NA6.3 alternate default SHGC (for non-rated site-built fenestration only), or
    (d) the Area-weighted Average from CF1R-ENV-02.

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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 the area-weighted average SHGC and attach it to the CF1R-NCB-01.

NOTE: (1) For the exceptions – up to 3 ft^2 of tubular skylights and up to 16 ft^2 of skylight area, enter 0.30.
(2) For the exception – up to 3 ft^2 of glass in door, enter 0.25.

12. Source: NFRC, Tables 110.6-A and 110.6-B, Equations NA6-1 and NA6-2, or Area-weighted Average Worksheet (ENV-02). The source of the SHGC data for the fenestration product.
13. 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 the CF1R-ENV-03-E.

    NOTE: An exterior shading device is not used for products with an NFRC rated U-factor and SHGC based on a factory integrated shading device. Chromogenic glazing shall be considered separately from other fenestration.

14. Combined SHGC from CF1R-ENV-03: If exterior shading devices are combined with the SHGC value of the fenestration to meet the prescriptive SHGC requirements (as indicated in column ~~I~~J. 13), indicate the SHGC calculated on form CF1R-ENV-03 and attach the form for each window with an exterior shading device.

15.–32. Automatically completed entries; no user input required.

J. Space Conditioning (SC) Systems – Heating/Cooling/Ducts

1. Space Conditioning System Identification or Name: Provide a unique name for each unique space conditioning system type in the building. If the same space conditioning system type is used in more than one location in the building, it is sufficient to list the unique space conditioning system type only once. In order for one space conditioning system type to be considered the same as another, it must have the same description in fields 2 through 9.
2. 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.
3. Heating Efficiency Type: AFUE, HSPF, COP
4. Heating Efficiency Value: For central gas heating systems, the minimum efficiency required by the appliance efficiency standards is 81~~78~~% AFUE. Heat pumps have an HSPF of 8.0~~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 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.
6. Cooling Efficiency SEER: For central cooling systems, the minimum efficiency required by the appliance efficiency standards is 14~~3~~ SEER.
7. Cooling Efficiency EER: 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.
8. Distribution System Type: This could be ducted, radiant floor, piping, or ductless.
9. Duct Location: If the system has ducts, indicate where they will be installed. Locations include attic, garage, conditioned space, radiant floor.
10. 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.

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11. 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.
12. 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 Whole House Fan Airflow Rate (CFM): ~~2~~1.5 CFM per ft^2 of conditioned floor area (auto complete).
2. Minimum Attic Free Vent Area (in^2): Minimum attic vent free area = column 1 multiplied by 144 and divided by ~~375~~750, which is equivalent to multiplying by 0.192~~384~~ (auto complete).

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L. Water Heating Systems

1. Water Heating System Identification or Name: Provide a unique name for each unique water heating system type in the building. If the same water heating system type is used in more than one location in the building, it is sufficient to list the unique water heating system type only once. In order for one water heating system type to be considered the same as another, it must have the same description in fields 2 through 12.
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. 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).

Single Dwelling Unit

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~~A single gas or propane instantaneous water heater with an input of 200,000 Btu per hour or less and no storage tank, and that meets the requirements of Sections 110.1 and 110.3.

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.~~A single gas or propane storage type water heater with an input of 105,000 Btu per hour or less, rated volume less than or equal to 55 gallons and that meets the requirements of Sections 110.1 and 110.3. The dwelling unit shall meet all of the requirements for Quality Insulation Installation (QII) as specified in the Reference Appendix RA3.5.

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.~~A single gas or propane storage type water heater with an input of 105,000 Btu per hour or less, rate volume of more than 55 gallons, and that meets the requirements of Sections 110.1 and 110.3.

Central System

~~C.~~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.~~All water heaters installed must comply with Sections 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.

~~3.~~4. 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.

~~4.~~5. Water Heater Storage 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.

~~5.~~6. Fuel Type: Gas, Propane, Electric (special conditions apply, see M.1.D and Q.4.D).

~~6.~~7. Rated Input Type: Enter the equipment input rating type, for gas or propane fired system the units are Btuh, for electric fired system the units are kW.

~~7.~~8. Rated Input Value: Enter the numeric value of rated input.

~~8.~~9. Heating Efficiency Type: Energy Factor, AFUE, or Thermal Efficiency. From product literature or a California Energy Commission directory.

~~9.~~10. Heating Efficiency Value: Enter the value from product literature or a California Energy Commission directory

~~10.~~11. Standby Loss (percent): Applies only to large storage water heaters, Enter n/a for small storage or instantaneous water heaters.

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~~11.~~12. Exterior Insulation R-Value: Enter the R-value if exterior insulation on the storage tank is installed
~~12.~~13. Back-Up Solar Savings Fraction: If compliance requires a back-up solar system, indicate the solar contribution (e.g., 0.30). External calculations are required.
~~13.~~14. Central DHW System Distribution Type: 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.
~~14.~~15. Dwelling Unit DHW System Distribution Type: For a Central DHW this field shall be Standard. If non-central then pick from Standard, Demand Recirculation – Manual Control, Demand Recirculation – Sensor Control.

M. Space Conditioning Systems and Water Heating Systems in Multifamily Dwelling Units

1. Dwelling Unit Name: Enter one unique name for each of the number of dwelling units identified in Section A field 06.
2. Dwelling Unit Total CFA: Enter the conditioned floor area for the dwelling unit.
3. Central Water Heating System Identification or Name: Select one of the central DHW system names
4. Dwelling Unit Water Heating System Identification or Name: Select one of the Dwelling Unit water heating system names entered in Section M~~L~~. If more than one water heating system type is needed in the dwelling unit, enter another row of data for the dwelling unit and select the additional water heating system name.
5. Dwelling Unit Space Conditioning System Identification or Name: Select one of the Space conditioning system names that were entered in Section K~~J~~. If more than one space conditioning system type is needed in the dwelling unit, enter another row of data for the dwelling unit and select the additional space conditioning system name
6. Comments: Include any comments here.

N. HERS Verification Summary

1. Duct Leakage verification: All duct systems must meet maximum duct leakage requirements. Typically the maximum leakage is ~~6~~5% 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. Zonally Controlled Systems - Bypass Dampers: 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 Verification: 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 - Airflow Rate and Fan Efficacy Verification: 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.
5. Indoor Air Quality Mechanical Ventilation: All new dwellings are required to meet the whole-building mechanical ventilation airflow rate according to ASHRAE 62.2 is required (RA3.7).

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 CF1R must be registered with a HERS provider prior to submitting for a building permit.

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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:

Single Dwelling Unit

A. A single gas or propane instantaneous water heater with an input of 200,000 Btu per hour or less and no storage tank, and that meets the requirements of Sections 110.1 and 110.3.
B. A single gas or propane storage type water heater with an input of 105,000 Btu per hour or less, rated volume less than or equal to 55 gallons and that meets the requirements of Sections 110.1 and 110.3. The dwelling unit shall meet all of the requirements for Quality Insulation Installation (QII) as specified in the Reference Appendix RA3.5.
C. A single gas or propane storage type water heater with an input of 105,000 Btu per hour or less, rate volume of more than 55 gallons, and that meets the requirements of Sections 110.1 and 110.3.

Central System

D. All water heaters installed must comply with Sections 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.

~~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).~~

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~~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).~~

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