

**ENVELOPE COMPONENT APPROACH**

CEC-NRCC-ENV-01-E (Revised 01/16)



CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	NRCC-ENV-01-E
Envelope Component Approach <span style="float: right;">(Page 1 of 4)</span>	
Project Name:	Date Prepared:

A. GENERAL INFORMATION					
01	Project Location:		06	Compliance Method:	<input type="checkbox"/> Component <input type="checkbox"/> Unconditioned (file Affidavit)
02	CA City and Zip Code:		07	Building Front Orientation (deg or cardinal):	
03	Climate Zone:		08	Phase of Construction:	<input type="checkbox"/> New Construction <input type="checkbox"/> Addition <input type="checkbox"/> Alteration
04	Total Conditioned Floor Area:		09	Building Occupancy:	<input type="checkbox"/> Nonresidential <input type="checkbox"/> High-Rise Residential <input type="checkbox"/> Hotel/Motel Guest Room
05	Building Type:	<input type="checkbox"/> Schools (Public School) <input type="checkbox"/> Relocatable Public School Bldg. <input type="checkbox"/> Conditioned Spaces <input type="checkbox"/> Unconditioned Spaces <input type="checkbox"/> Skylight Area for Large Enclosed Space > 5000 ft <sup>2</sup> (If checked include the NRCC-ENV-04-E with submittal)			

B. ENVELOPE DETAILS – FRAMED											
01	02	03	04	05	06	07	08		09	10	11
Tag/ID	Assembly Type	Frame Material	Frame Depth	Frame Spacing	Cavity R-value	Continuous Insulation R-value	Appendix JA 4 Reference		Proposed	Required	Field Inspection Comments
							Table	Cell	U-Factor	U-Factor from Tables 140.3-B, C or D	

C. ENVELOPE DETAILS – NON-FRAMED										
01	02	03	04	05	06	07		08	09	10
Tag/ID	Assembly Type	Assembly Materials	Thickness (inches)	Interior or Core Insulation R-value	Continuous Insulation R-value	Appendix JA4 Reference		Proposed	Required	Field Inspection Comments
						Table	Cell	U-Factor	U-Factor from Tables 140.3-B, C or D	



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<b>D. ENVELOPE DETAILS – MASS</b>											
01	02	03	04	05	06	07	08		09	10	11
Tag/ID	Mass Type	Density (lb/ft <sup>3</sup> )	Mass Thickness (inches)	Furring Strip Thickness (inches)	Interior Insulation R-value	Exterior Insulation R-value	Appendix JA4 Reference		Proposed	Required	Field Inspection Comments
							Table	Cell	U-factor	U-Factor from Tables 140.3-B, C or D	

<b>E. ROOFING PRODUCTS (COOL ROOF)</b>														
01	02	03	04	05			06			07	08	09	10	11
Mass Roof 25 lb/ft <sup>2</sup> or Greater	Roof Pitch	CRRCC Product ID Number	Product Type	Proposed			Minimum Required			SRI <sup>2</sup> (Optional)	Aged Solar Reflectance	Thermal Emittance	SRI (optional)	Comments
				Aged Solar Reflectance	Thermal Emittance	SRI <sup>2</sup> (Optional)	Aged Solar Reflectance	Thermal Emittance	SRI (optional)					
<input type="checkbox"/>				<input type="checkbox"/>										
<input type="checkbox"/>				<input type="checkbox"/>										
<input type="checkbox"/>				<input type="checkbox"/>										
<input type="checkbox"/> An aged solar reflectance less than 0.63 is allowed provided the maximum roof / ceiling U-factor in TABLE 140.3 is not exceeded														
<input type="checkbox"/> High-rise residential buildings and Hotels and Motels with low-sloped roofs in Climate Zones 1 through 8, 12 and 16 are exempted from aged Solar Reflectance and thermal emittance requirements.														
<input type="checkbox"/> High-rise residential buildings and Hotels/Motels with steep-sloped roofs in Climate Zones 1 and 16 are exempt from aged Solar Reflectance and thermal emittance requirements.														
<input type="checkbox"/> The roof area covered by building integrated photovoltaic panels and building integrated solar thermal panels are exempt from aged Solar Reflectance and thermal emittance requirements														
To apply Liquid Field Applied Coatings, the coating must be applied across the entire roof surface and meet the dry mil thickness or coverage recommended by the coatings manufacturer and meet minimum performance requirements listed in §110.8(i)4. Select the applicable coating:														
<input type="checkbox"/> Aluminum-Pigmented Asphalt Roof Coating <input type="checkbox"/> Cement-Based Roof Coating <input type="checkbox"/> Other _____														
<b>NOTES:</b>														
1. Check the box if the aged Solar reflectance was not available in the Cool Roof Rating Council's Rated Product Directory, Then use the equation in Section 110.8(i)2 where the Initial Reflectance value from the same directory and use the equation $(0.2+B(\rho_{initial} - 0.2))$ to obtain a calculated aged solar reflectance value. Where $\rho$ is the Initial Solar Reflectance and $B$ is either set to 0.65 for Field-Applied Coatings or it is set to 0.70 for all other roofing products other than Field-Applied Coating.														
2. Calculate the SRI Value by using the SRI Calculator Worksheet at ( <a href="http://energy.ca.gov/title24/2016standards/documents/solar_reflectance/">http://energy.ca.gov/title24/2016standards/documents/solar_reflectance/</a> ) and enter the resulting value in the SRI column above and attach a copy of the SRI-Worksheet (NRCC-ENV-03-E) to the to this compliance document.														

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<b>F. AIR BARRIER</b>				
01	02	03	04	05
Name	Air Barrier Material Type	Air Barrier Assembly Type	Whole Building Air Leakage Testing	Comments

<b>G. FENESTRATION PROPOSED AREAS AND EFFICIENCIES</b>											
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	Proposed				Overhang	Condition Status	Comments
					Max U-Factor	Max (R) SHGC	Min VT	Label			

<b>H. ENVELOPE MANDATORY MEASURES</b>	
Indicate location on building plans of Mandatory Envelope Measures Note Block: _____	
<b>INSTRUCTIONS TO APPLICANT ENVELOPE COMPLIANCE &amp; WORKSHEETS</b> (check box if worksheet are included)	
<i>For detailed instructions on the use of this and all Energy Efficiency Standards compliance documents, please refer to the Energy Commission website.</i>	
<input type="checkbox"/>	NRCC-ENV-01-E Certificate of Compliance. Required on plans for all submittals.
<input type="checkbox"/>	NRCC-ENV-04-E Use when minimum skylight requirements for large enclosed spaces are required in climate zones 2 through 15. Optional on plans.

**ENVELOPE COMPONENT APPROACH**

CEC-NRCC-ENV-01-E (Revised MM/YY)



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**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:

- The information provided on this Certificate of Compliance is true and correct.
- 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).
- 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.
- 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.
- I will ensure that a completed signed 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 completed signed 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:

## NRCC-ENV-01 User Instructions

Minimum requirements for prescriptive compliance can be found in Building Energy Efficiency Standards Section 140.3(a), and Tables 140.3-B, C and D. Completing these compliance documents will require that you have the Reference Appendices for the 2016 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 ENV-01 is used it means the NRCC-ENV-01-E. Worksheets are identified by their entire name and subsequently by only the worksheet number, such as ENV-01.

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

### A. GENERAL INFORMATION

1. Project Location: Enter legal street address of property or other applicable location identifying information.
2. CA City and Zip Code: Legal city/town of property and Zip Code
3. Climate Zone: From Joint Appendix JA2.1.1.
4. Total Conditioned Floor Area: Indicate the total conditioned floor area.
5. Building Type: Indicate Nonresidential, High-Rise Residential or Hotel/motel Guest Room.
6. Compliance Method: Component, unconditioned (file Affidavit).
7. 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° of true north, including 45° east of north;
  - East is oriented to within 45° of true east, including 45° south of east;
  - South is oriented to within 45° of true south, including 45° west of south;
  - West is oriented to within 45° of true west, including 45° south of west.
8. Phase of Construction: Newly constructed building, new Addition to an existing building or Alteration to an existing building.
9. Building Occupancy: Indicate if the building is a Nonresidential, High-Rise Residential or Hotel/Motel Guest Room.

### B. ENVELOPE 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 Material: 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. Cavity R-value: Cavity R-value: R-value of insulation installed between framing members.
7. Continuous Insulation: R-value of rigid or continuous insulation (not interrupted by framing).
8. Appendix JA4 Reference: Enter the JA4 Table and cell (column/row) (e.g., 4.3.13 D6) used to determine the assembly U-factor. If an assembly is not available on JA4, attach a Worksheet for EZ Frame. If multiple assemblies are needed to achieve a weighted average U-factor, attach a NRCC-ENV-06-E (Area Weighted Average Calculation Worksheet) compliance document.
9. Proposed U-factor: The U-factor for the proposed assembly. Must be less than or equal to column 10 or have an attached NRCC-ENV-06-E to show that a weighted U-factor for multiple assemblies will meet the maximum value in column 10.
10. Required U-factor from Tables 140.3 B, C or D: Value required based on climate zone and assembly type.
11. Field Inspection Comments: A field inspector verifies if the requirement has been met.

### C. ENVELOPE 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. Interior or 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. Appendix JA4 Reference: Enter the JA4 Table and cell (column/row) (e.g., 4.3.2 A13) used to determine the assembly U-factor. If an assembly is not available on JA4, attach a Worksheet for EZ Frame. If multiple assemblies are needed to achieve

a weighted average U-factor, attach a NRCC-ENV-06-E (Area Weighted Average Calculation Worksheet) compliance document.

8. Proposed U-factor: The U-factor for the proposed assembly. Must be less than or equal to column 9 or have an attached NRCC-ENV-06-E to show that a weighted U-factor for multiple assemblies will meet the maximum value in column 9.
9. Required U-factor from Tables 140.3 B, C or D: Based on assembly type and climate zone.
10. Field Inspection Comments: A field inspector verifies if the requirement has been met.

#### D. ENVELOPE DETAILS – MASS

1. Tag/ID: A label (if any) from the plans, for example, A1.4 or wall.
2. Mass Type: ICF, Masonry. See JA4 for guidance.
3. Density: indicate the density of the product being used in lb/ft<sup>3</sup>.
4. Mass Thickness: Thickness (in inches) of mass.
5. Furring Strips Thickness: If furring strips are required to meet the required wall U-factor shown in column 10, indicate the thickness of the furring strip (in inches). See Table 4.3.14 of Joint Appendix 4.
6. Interior Insulation R-value: Enter the R-value 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).
7. Exterior Insulation R-value: Enter the R-value of proposed insulation on the outside surface of the mass wall. See column 10 for the required insulation value for the wall type selected. See JA4 for guidance.
8. Appendix JA4 Table & Cell: Table and cell number used to determine the U-factor (e.g., an ICF wall is 4.3.13).
9. Proposed U-factor: The U-factor for the proposed assembly. Must be less than or equal to column 9 or have an attached NRCC-ENV-06-E to show that a weighted U-factor for multiple assemblies will meet the maximum value in column 9.
10. Required U-factor from Tables 140.3 B, C or D: Value required based on climate zone and assembly type.
11. Field Inspection Comments: A field inspector verifies if the requirement has been met.

#### E. ROOFING PRODUCTS - COOL ROOF

Roofing requirements are found in Sections 110.8(i) and 140.3(i). 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 Tables 140.3 B, C or D.

1. Mass roof 25 lb/ft<sup>2</sup> 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 ft within a span of 12 ft. 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](http://www.coolroofs.org/products/search.php). Products are listed by manufacturer, brand, and 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, and 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 NRCC-ENV-03-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://energy.ca.gov/title24/2016standards/documents/solar\\_reflectance/](http://energy.ca.gov/title24/2016standards/documents/solar_reflectance/). Enter the resulting value in the SRI column above and attach a copy of the NRCC-ENV-03-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.

**F. AIR BARRIER**

1. Name: Indicate the identifying name of the opaque surface (i.e., West Wall #1, Roof #1 or Floor #1)
2. Air Barrier Material Type: Identify the material type being used as the air barrier. Include product data/specification sheet showing conformance to leakage testing to meet an air permeance not exceeding 0.004 cfm/ft<sup>2</sup>, under a pressure differential of 0.3 in. w.g. (1.57 psf) (0.02 L/m<sup>2</sup> at 75 pa), when tested in accordance with ASTM E2178.
3. Air Barrier Assembly Type: Identify the assembly type being used as the air barrier. Include product data/specification sheet showing conformance to leakage testing to meet an air permeance not exceeding 0.04 cfm/ft<sup>2</sup>, under a pressure differential of 0.3 in. w.g. (1.57 psf) (0.2 L/m<sup>2</sup> at 75 pa), when tested in accordance with ASTM E2357, ASTM E1677, ASTM E1680, or ASTM E283.
4. Whole Building Air Leakage Testing: Indicate whether air leakage testing of the entire building has been conducted and the results of the test. The entire building shall have an air leakage rate not exceeding 0.40 cfm/ft<sup>2</sup> at a pressure differential of 0.3 in w.g. (1.57 psf) (2.0 L/ m<sup>2</sup> at 75 pa), when the entire building is tested, after completion of construction, in accordance with ASTM E779 or another test method approved by the Commission.
5. Comments: Provide any comments necessary to explain the details of measures used for compliance.

**G. 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 compliance documents 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: Indicate, in square feet (ft<sup>2</sup>) the surface area of each fenestration type.
4. Orientation: Indicate the orientation of each fenestration type (N, S, W, E or Roof for skylights).
5. Number of Panes: Indicate the number of panes for each fenestration type.
6. Proposed Max U-factor: Indicate each fenestration type. Values listed in column 6 are determined from NRCC-ENV-02-E worksheet column 4 and must be equal or better than value or listed in Table 140.3-B or C or D.
7. Proposed Max (R) SHGC: Indicate the shading provided for each fenestration type based on the fenestration's [relative] solar heat gain coefficient ((R) SHGC). Values listed in column 8 are determined from NRCC-ENV-02-E worksheet column 6 and must be equal or better than the values listed in Table 140.3-B or C or D. Use ENV-02 Window Details to calculate the Relative Solar Heat Gain effect of the overhang.
8. Proposed Min VT: Indicate the visible transmittance (VT) of the fenestration type. Values listed in Column 9 are determined from NRCC-ENV-02-E worksheet column 8 and must be equal or better than the values listed in Table 140.3-B or C or D.
9. Proposed Label: Indicate where the label was derived for each fenestration type. Indicate if the efficiency values from NFRC Label Certificate or from the CEC Default Values. Enter NFRC or NRCC-ENV-05-E (formally FC-1).
10. Overhang: Indicate whether overhangs are part of the fenestration control scheme. Calculations for overhangs must be completed if column 7 indicates, Yes. Use ENV-02 Window Details to calculate the Relative Solar Heat Gain effect of the overhang.
11. Condition Status: Indicate the condition or status of each fenestration type (i.e., New, Existing or Upgrade).
12. Comments: Provide any comments that help provide details of fenestration performance elements used for compliance.