

ENVELOPE COMPONENT APPROACH		ENV-2C (Page 1 of 5)
Project Name:	Date:	Climate Zone:

EXTERIOR ROOFING PRODUCT (COOL ROOFS) - See Section 3.3 in the Nonresidential Manual and §118(i) and §143(a)1A in the Energy Standards for further description about exterior roofs and mandatory requirements for Cool Roofs.

(Note if the roofing product is not CRRC certified, this compliance approach cannot be used). Go to Overall Envelope Approach or Performance Approach.

CHECK APPLICABLE BOX BELOW IF EXEMPT FROM ONE OF THE ROOFING PRODUCT MINIMUM PRESCRIPTIVE REQUIREMENTS:

- Roofing compliance not required in Climate Zones 1 and 16 with a Low-Sloped. 2:12 pitch or less.
- Roofing compliance Not Required in Climate Zone 1 with a Steep-Sloped with less than 5 lb/ft². Greater than 2:12 pitch.
- High-rise residential buildings and hotels and motels with low-sloped roofs in Climate Zones 1 through 9, 12 and 16 are exempted from the low-sloped roofing criteria.
- Low-sloped Wood framed roofs in Climate Zones 3 and 5 are exempted solar reflectance and thermal emittance or SRI that have a U-factor of 0.039 or lower. See Opaque Surface Details roof assembly below, Column H.
- Low-sloped Metal framed roofs in Climate Zones 3 and 5 are exempted solar reflectance and thermal emittance or SRI that have a U-factor of 0.048 or lower. See Opaque Surface Details roof assembly below, Column H.
- The roof area covered by building integrated photovoltaic panels and building integrated solar thermal panels are exempted solar reflectance and thermal emittance or SRI.
- Roof constructions with thermal mass over the roof membrane with a weight of at least 25 lb/ft² is exempted from the Cool Roof criteria.

<i>CRRC Product ID Number¹</i>	Roof Slope		Product Weight		Product Type ²	Aged Solar Reflectance ^{3,4}	Thermal Emittance	SRI ⁵
	≤ 2:12	> 2:12	< 5lb/ft ²	≥ 5lb/ft ²				
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> ⁴		
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> ⁴		
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> ⁴		
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> ⁴		
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> ⁴		
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> ⁴		

ENVELOPE COMPONENT APPROACH		ENV-2C (Page 2 of 5)
Project Name:	Date:	Climate Zone:

1. The CRRC Product ID Number can be obtained from the Cool Roof Rating Council's Rated Product Directory at www.coolroofs.org/products/search.php
2. Indicate the type of product is being used for the roof top, i.e. single-ply roof, asphalt roof, metal roof, etc.
3. If the Aged Reflectance is not available in the Cool Roof Rating Council's Rated Product Directory then use the Initial Reflectance value from the same directory and use the equation $(0.2+0.7(\rho_{initial} - 0.2))$ to obtain a calculated aged value. Where ρ is the Initial Solar Reflectance.
4. Check box if the Aged Reflectance is a calculated value using the equation above.
5. Calculate the SRI value by using the SRI- Worksheet at <http://www.energy.ca.gov/title24/> and enter the resulting value in the SRI Column above and attach copy of the SRI- Worksheet to the ENV-1C.

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 §118(i)4. Select the applicable coating:

Aluminum-Pigmented Asphalt Roof Coating
 Cement-Based Roof Coating
 Other _____

Opaque Surface Details									
For the furred portioned of Mass Walls see Furring Strips Construction Table below.									
A	B	C	D	E	F	G	H	I	J
		Proposed <small>See Note</small>		Standard		Values From JA4 Table			
Tag/ ID ¹	Assembly Name or Type ²	Framing Material and Size ²	Thickness, Spacing, or Other ³	U- factor ⁴	JA4 Table Number ⁵	Framed Cavity R-value ⁶	Continuous Insulation R-Value ⁷	JA4 Assembly Row/Col ⁸	Proposed Assembly U-factor ⁹

- Note: For furred assemblies use the Mass and Furring Strips Construction Table below. See Page JA4-3 & Page JA4-5 for Equation 4-1 or 4-4.*
1. For Tag/ID indicate the identification name that matches the building plans.
 2. Indicate the Assembly Name or type: Roof/Ceiling, Walls, Floors, Slabs, Crawl Space, Doors and etc... Indicate the Frame type and Size: For Wood, Metal, Metal Buildings, Mass, enter 2x4, 2x6, or etc... see JA4 for other possible frame type assemblies.
 3. Enter the thickness for mass in inches or Spacing between framing members enter; 16" or 24" OC; or Other for all other assembly description such as Concrete Sandwich Panel, Spandrel Panel, Logs, Straw Bale Panel and etc....
 4. Based on the Climate Zone; enter the Standard U-factor from Table 143-A, B or C for each different assembly Name or type.
 5. Enter the Table number that closely resembles the proposed assembly.
 6. Enter the R-value that is being installed in the wall cavity or between the framing; otherwise, enter "0".
 7. Enter the Continuous Insulation R-value for the proposed assembly; otherwise, enter "0".
 8. Enter the row and column of the U-factor value based on Column F Table Number and enter the Assembly U-factor in Column J.
 9. The **Proposed** Assembly U-factor, Column J, must be equal to or less than the **Standard** U-factor in Column E to comply.

ENVELOPE COMPONENT APPROACH		ENV-2C (Page 3 of 5)
Project Name:	Date:	Climate Zone:

Furring Strips Construction Table for Mass Walls Only														
A	B	C	D	E	F	G	H	I	J	K	L	M		
Proposed Properties of Masonry and Concrete Walls From Reference Joint Appendix Table 4.3.5, 4.3.6, 4.3.7					Added Interior or Exterior Insulation in Furring Space from Reference Joint Appendix Table 4.3.13									
Mass Thickness ¹	Assembly Name or Type ²	JA4 Table Number ³	JA4-Mass Cell Value ⁴	Mass U-Factor ⁵	Insulation Layer Thickness	Frame Thickness	Frame Type Wood or Metal	Furring Cavity R-value ³	JA4 -Mass Cell Value ⁴	Effective R-value ⁵	Final Assembly U-factor ^{6,7}	Comment		

1. Indicate the Mass Thickness from Reference Joint Appendix JA.
 2. Indicate the Assembly Name or type: Roof/Ceiling, Walls, Floors, Slabs, Crawl Space, Doors and etc... Indicate the Frame type and Size: For Wood, Metal, Metal Buildings, Mass, enter 2x4, 2x6, or etc... see JA4 for other possible frame type assemblies.
 3. Enter the Table number that closely resembles the proposed assembly.
 4. Enter the row and column of the U-factor value.
 5. Enter the Effective R-value listed in the JA4 Table Number.
 6. The Final Assembly is calculated by using Equation 4-1 or Equation 4-4 of the Reference Joint Appendix JA4. Enter the value in Column L.
 7. Insert the Final Assembly U-factor value back on to the Opaque Surface Details table in Column J.

WEST WINDOW AREA CALCULATION See §143(a)5A in the Energy Standards or Section 3.2.2				
A. Gross West Exterior Wall Area		$ft^2 \times 0.40 =$	ft^2	40% Of Gross West Facing Exterior Wall Area; or
B. West Display Linear Perimeter		$FT \times 6 ft =$	ft^2	West Display Perimeter Area
C. Enter Larger Of A Or B			ft^2	Maximum Standard West Area
D. Enter Proposed West Window Area			ft^2	Proposed West Window Area
<i>Note: If the PROPOSED WEST WINDOW AREA is greater than the MAXIMUM STANDARD WEST AREA</i>				

WINDOW AREA CALCULATION for all other orientations other than West - See §143(a)5A in the Energy Standards or Section 3.2.2				
E. Gross Exterior Wall Area		$ft^2 \times 0.40 =$	ft^2	40% Of Gross Exterior Wall Area or
F. Linear Display Perimeter		$FT \times 6 ft =$	ft^2	Display Perimeter Area
G. Enter The Larger Of E or F			ft^2	Maximum Standard Area
H. Enter Proposed Window Area			ft^2	Proposed Window Area
<i>Note: If the PROPOSED WINDOW AREA is greater than the MAXIMUM STANDARD AREA then the</i>				

WINDOWS DETAILS §143(a)5B and C													
<i>NOTE: For all newly installed fenestration; must have either a certified NFRC Label Certificate or use the CEC default tables found in Table 116-A and Table 116B and documented by using CECs Fenestration Certificate (FC-1/ FC-2). For site-built fenestration and less than 10,000 ft² or more than or equal to 10,000 ft² see options for compliance in the Nonresidential Manual in Section 3.1.</i>													
A	B	C	D	E	F	G	H	I	J	K	L	M	N
Window Name (e.g., Window-1)	Area ¹	Type ²	Orientatio n	# of Pan es	Fenestration ⁴				Overhang				
					U-Factor	SHGC Propos	(R)SH GC	Dimensi ons	(R)SH GC	RSHG C ^{3,4}			

ENVELOPE COMPONENT APPROACH		ENV-2C (Page 5 of 5)
Project Name:	Date:	Climate Zone:

	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							

Total Skylight Area		<i>Enter above the Total Skylight Area in Window Details ENV-2C Page 3of 4.</i>
----------------------------	--	---

1. Enter the area of each different skylight product.
 2. Enter the type of skylight; M=Manufactured, SB=Site-built, and F=Fabricated.
 3. The Allowed U-factor and SHGC values are from table 143-A, B or C. Use Row D Skylight % (from above) to select the allowed SHGC.
 4. If the Proposed window does not use an overhang then fenestration SHGC is treated the same as RSHG.

RELOCATABLE PUBLIC SCHOOL BUILDINGS - See §143(a)8 in the Energy Standards

Option 1	
<input type="checkbox"/> For Specific Climate Zone, use Table 143-A - Prescriptive Envelope Criteria.	<input type="checkbox"/> Specific Climate Zone Metal Identification Label – Place two labels on each relocatable school building and indicate on the building plans. Indicate location on the building plans:
Option 2	
<input type="checkbox"/> For Any (All) Climate Zone, use Table 143-C - Prescriptive Envelope Criteria.	<input type="checkbox"/> Any (All) Climate Zone Metal Identification Label - Place two labels on each relocatable school building and indicate on the building plans. Indicate location on the building plans: