

**ENVELOPE – DAYLIT ZONE WORKSHEET**

CEC-NRCC-ENV-04-E (Revised 01/16)

CALIFORNIA ENERGY COMMISSION



CERTIFICATE OF COMPLIANCE		NRCC-ENV-04-E
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Project Name:	Date Prepared:	

*NOTE: This worksheet applies only to buildings with three or fewer stories, climate zones 2 through 15, having an enclosed conditioned or unconditioned space > 5,000 ft<sup>2</sup> that is directly under a roof with a ceiling height > 15 ft and ≥ 0.5 W/ft<sup>2</sup>, unless exempted by the **EXCEPTIONS** in §140.3(c).*

A. MINIMUM SKYLIGHT AREA FOR LARGE ENCLOSED SPACES (requirements in §140.3(c))	
01	Enter building plan reference page(s) for large enclosed space _____; and
02	Enter building plan reference page(s) for daylit zone plans for enclosed space _____ or attach a separate daylit zone design plan with this form; then <b>Go to Step 1 below.</b>

B. SKYLIGHT INFORMATION						
01	02	03	04	05	06	07
Tag/ID	Skylight Type	Number of Skylights	U-factor	SHGC	VT <sub>avg</sub>	Haze Material Value > 90% (Yes / No)
						<input type="checkbox"/> / <input type="checkbox"/>
						<input type="checkbox"/> / <input type="checkbox"/>
						<input type="checkbox"/> / <input type="checkbox"/>

C. CALCULATE DAYLIT AREA (§140.3(c)1)			
<i>The minimum Skylit Zone requirements can be met by using either Skylit Daylit Zones or Primary Sidelit Daylit Zones or Combinations.</i>			
<b>Step 1</b> Calculate the minimum prescriptively required Total Daylit Zone Area, per §140.3(c)1			
01	Floor area of enclosed space	<b>A</b>	ft <sup>2</sup> Floor area
02	Minimum Prescriptively Required Total Daylit Area is (0.75 x floor area (A) – the area of any permanent obstructions), see §140.3(c)1 & §130.1(d)1A for additional details.	<b>B</b>	ft <sup>2</sup> Minimum prescriptively required Total Daylit Zone Area
<b>Step 2</b> Calculate Total Daylit Zone Area			
03.	Skylit Daylit Zone Area ignoring obstructions, determined in accordance with §130.1(d)1A and as shown on the building plans (0.7 x average ceiling height from edge of rough opening of skylight)..	<b>C</b>	ft <sup>2</sup> Skylit Daylit Zone Area
04	Primary Sidelit Daylit Zone Area determined in accordance with §130.1(d)1B and as shown on the building plans ((window head height x (window width + window head height)) – areas beyond obstructions).	<b>D</b>	ft <sup>2</sup> Primary Sidelit Daylit Zone Area
05	Areas of Primary Sidelit Daylit Zone Area that overlap with the Skylit Daylit Zone Area	<b>E</b>	ft <sup>2</sup> Overlapping Zone Area
06	Total Daylit Zone Area ( <b>F = C+D-E</b> )	<b>F</b>	ft <sup>2</sup> Total Daylit Zone Area

D. COMPARE TOTAL DAYLIT ZONE AREA TO PRESCRIPTIVE MINIMUM	
<b>Step 1</b> Compare	
01	Check if Total Daylit Zone Area (F) is equal to or greater than Minimum Prescriptively Required Daylit Zone Area (B). <b>Space PASSES</b> if F ≥ B.

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<b>E. CALCULATE TOTAL SKYLIGHT AREA (§140.3(c)4)</b>				
The Total Skylight Area can be met by using either Equation 1 or Equation 2 below.				
<input type="checkbox"/> <b>Equation 1: Total Skylight Area = (Skylight Area)/(Daylit Zone under Skylights) ≥ 3%</b>				
<b>Step 1</b> Calculate the Daylit Zone under Skylights				
01	Average Ceiling Height	A	ft	Average Ceiling Height
02	Total floor area in the space within a horizontal distance of 0.7 times the average ceiling height from the edge of the rough opening	B	ft <sup>2</sup>	Daylit Zone under Skylight
<b>Step 2</b> Calculate the Total Skylight Area				
03	Area of Skylight	C	ft <sup>2</sup>	Skylight Area
04	Total Skylight Area ( <b>D = C/B</b> )	D	%	Total Skylight Area
<input type="checkbox"/> <b>Equation 2: Total Skylight Area = (Skylight Area) * (VT<sub>avg</sub>) ≥ 1.5%</b>				
<b>Step 1</b> Calculate the Daylit Zone under Skylights				
05	Average Ceiling Height	E		Average Ceiling Height
06	Total floor area in the space within a horizontal distance of 0.7 times the average ceiling height from the edge of the rough opening	F		Daylit Zone under Skylight
<b>Step 2</b> Calculate the Total Skylight Area				
07	Area of Skylight	G	ft <sup>2</sup>	Skylight Area
08	Average Visible Transmittance (VT <sub>avg</sub> )	H		Visible Transmittance
09	Total Skylight Area ( <b>H = G/F</b> )	I	%	Total Skylight Area

<b>F. COMPARE</b>	
<b>Step 1</b> Compare	
01	Check if Total Skylight Area (D or H) is equal to or greater than 3% of the total floor area (Equation 1); or 1.5% of the total floor area (Equation 2) <b>Space Passes if D ≥ 0.03 using Equation 1; or H ≥ 0.015 using Equation 2.</b>

<b>DOCUMENTATION AUTHOR'S DECLARATION STATEMENT</b>	
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:
<b>RESPONSIBLE PERSON'S DECLARATION STATEMENT</b>	

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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. 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 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-04-E User Instructions

*This worksheet applies only to buildings with three or fewer stories, in climate zones 2 through 15, having an enclosed conditioned or unconditioned space > 5,000 ft<sup>2</sup> that is directly under a roof with a ceiling height > 15 ft and  $\geq 0.5$  W/ft<sup>2</sup>, unless exempted by the **EXCEPTIONS** in §140.3(c).*

#### A. Minimum Skylight Area for Large Enclosed Spaces

1. Enter the reference page number from the building plans which reference the information for large enclosed spaces.
2. Enter the reference page number from the building plans which references the daylit zone designs on the plans attach a separate daylit zone design plan with this compliance document, NRCC-ENV-04-E.

#### B. Skylight Information

1. Provide a name or designator for each skylight. This designator should be consistently used throughout the plan set (elevations, finish schedules, etc.) such as, Skylight-1, or S-1, etc... to identify each surface. It should also be consistently used on other compliance documents in the same compliance documentation.
2. Indicate the skylight type: Glass curb mounted, Glass deck mounted, or Plastic curb mounted.
3. Indicate the number of skylights for each skylight type.
4. Indicate the proposed U-factor from NRCC-ENV-06-E Area-Weighted Average, Tables 140.3-B, C or D, NFRC Label Certificate or the Energy Commission's Default Table U-factors 110.6-A.
5. Indicate the proposed SHGC from NRCC-ENV-06 Area-Weighted Average, Tables 140.3-B, C or D, NFRC Label Certificate or the Energy Commission's Default Table SHGCs 110.6-B.
6. Indicate the proposed VT
7. Skylights have a glazing material or diffuser that has a measured haze material value greater than 90%, determined according to ASTM D1003, or other test method approved by the Energy Commission. Indicate Yes or No.

#### C. Calculating Daylit Zone

*The minimum Skylit Zone requirements can be met by using either Skylit Daylit Zones or Primary Sidelit Daylit Zones or Combinations.*

##### Step 1

1. Enter the floor area of the conditioned, or unconditioned, enclosed space next to A.
2. First calculate the minimum prescriptively required total daylit area. Additional information can be found on the Nonresidential Compliance Manual examples or see §140.3(c)1. Use Equation  $0.75 \times \text{Floor Area (A)}$  – area of any permanent obstructions. Enter value in B.

##### Step 2

3. Calculate the Skylit Daylit Zone Area (C) in accordance with §130.1(d)1A and shown on the building plans, ignoring the effects of obstructions. Enter the Skylit Daylit Zone Area value in (C).
  - **SKYLIT DAYLIT ZONE Area** is the rough area in plain view under each skylight, plus 0.7 times the average ceiling height in each direction from the edge of the rough opening of the skylight, minus any area on a plan beyond a permanent obstruction that is taller than the following: A permanent obstruction that is taller than one-half the distance from the floor to the bottom of the skylight. The bottom of the skylight is measured from the bottom of the skylight well for skylights having wells, or the bottom of the skylight if no skylight well exists. For the purpose of determining the skylit daylit zone, the geometric shape of the skylit daylit zone shall be identical to the plan view geometric shape of the rough opening of the skylight; for example, for a rectangular skylight the skylit daylit zone plan area shall be rectangular, and for a circular skylight the skylit daylit zone plan area shall be circular.
4. Calculate the Primary Sidelit Daylit Zone area (D) in accordance with §130.1(d)1B. Enter the Skylit Daylit Zone Area value in (D).
  - **PRIMARY SIDELIT DAYLIT ZONE** is the area on a plan directly adjacent to each vertical glazing, one window head height deep into the area, and window width plus 0.5 times window head height wide on each side of the rough opening of the window, minus any area on a plan beyond a permanent obstruction that is 6 ft or taller as measured from the floor.
5. Calculate or measure the overlap area of the Primary Sidelit Daylit Zone Area with the Skylit Daylit Zone Area and enter the Overlap Zone Area in (E)
6. Calculate the Daylit Zone Area by using equation  $F = C + D - E$  and enter the Total Daylit Zone Area.

#### D. Compare Daylit Area Zone

##### Step 1

1. Compare if the Total Daylit Zone Area (F) is  $\geq$  than Minimum Prescriptively Required Daylit Zone Area (B). If  $F \geq B$  then compliance is met with the Total Daylit Zone Area.

**E. Calculate Total Skylight Area**

*The Total Skylight Area requirement can be met by using either Equation 1 or Equation 2 below.*

**Equation 1****Step 1**

1. Enter the average ceiling height in feet.
2. Calculate the total Daylit Zone under Skylight. Total floor area in the space within a horizontal distance of 0.7 times the average ceiling height from the edge of the rough opening.

**Step 2**

3. Enter the area of the skylight in square feet (ft<sup>2</sup>).
4. Calculate the Total Skylight Area. Skylight Area divided by the Daylit Zone under Skylight must be greater than or equal to 3%.

**Equation 2****Step 1**

5. Enter the average ceiling height in feet.
6. Calculate the total Daylit Zone under Skylight. Total floor area within a horizontal distance of 0.7 times the average ceiling height from the edge of the rough opening.

**Step 2**

7. Enter the area of the skylight in square feet.
8. Enter the Average Visible Transmittance.
9. Calculate the Total Skylight Area. Skylight Area multiplied by the average visible transmittance must be greater than or equal to 1.5 percent.

**F. Compare**

1. Compare if the Total Skylight Area is  $\geq 3\%$  of the total floor area (Equation 1); or  $\geq 1.5\%$  of the total floor area (Equation 2). If  $D \geq 0.03$ ; or  $H \geq 0.015$  then compliance is met with the Total Skylight Area.