

Windows, Skylights, and other Fenestration: Guide to 2019 Energy Code Requirements

What is the energy code and why does it matter?

California's energy code, the **Building Energy Efficiency Standards** (Title 24, Part 6; the Standards), outlines the energy efficiency requirements for newly constructed buildings and additions and alterations to existing buildings. Energy efficiency reduces energy costs and wasteful consumption, improves building comfort, and reduces environmental impacts of energy use. The Standards ensure that builders use technologies and practices that are energy efficient and cost effective for building owners.

What are the window requirements?

The Standards require all new and replacement **windows, skylights, and doors with $\geq 50\%$ glass** (collectively termed "**fenestration**") to meet the certain energy specifications. The

U-factor (the rate of heat loss) and the **Solar Heat Gain Coefficient (SHGC)** values are performance ratings from the manufacturer and are shown on an NFRC label (Figure 1) attached to new windows by the manufacturer. (See Table 1 on page 2 for the maximum allowed U-Factor and SHGC values.) The building inspector will need to see these labels to ensure that the windows meet state requirements.

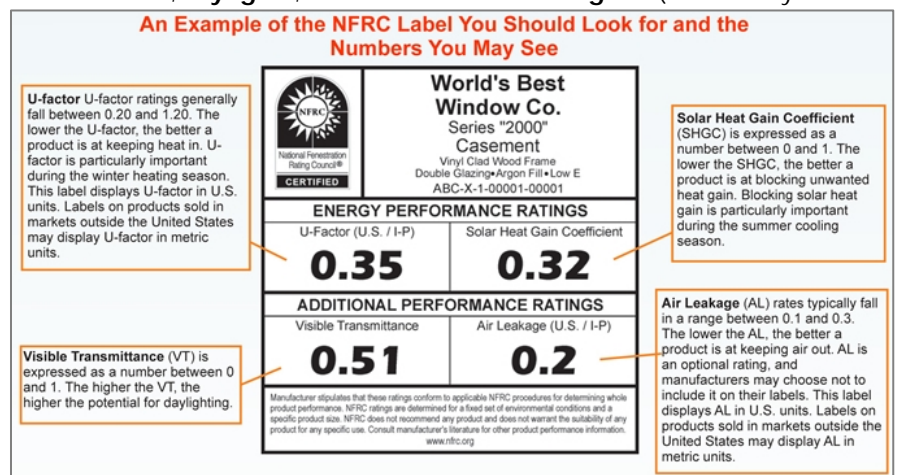


Figure 1: NFRC Label Example

If there is a **substantial increase** in total fenestration area (see page 2 for more information on what qualifies as a "substantial increase"), you will need to use a computer model to demonstrate that the energy use of the building is not increasing too much. This is called a **Performance Compliance Approach**.¹

(Step-by-step permit requirement guide on page 2)

Required 2019 compliance documents can be found at:

https://www2.energy.ca.gov/title24/2019standards/2019_compliance_documents/Residential_Documents/

For more information on 2019 Title 24 Part 6 requirements:

- Visit the California Energy Commission website: www.energy.ca.gov/title24/2019standards/
- Contact the CEC energy code hotline at (800) 772-3300 or email: title24@energy.state.ca.us
- Contact the BayREN Codes & Standards Program by email: codes@bayren.org

¹ Please note: If you are planning on substantially increasing the total fenestration area in your home, you must demonstrate that the energy use of the building has not been increased using the Performance Approach with the California Energy Commission certified compliance software. This approach allows more efficient energy features in a home to compensate for less efficient features. If you need help finding someone who can create a model for you, the California Association of Building Energy Consultants maintains a list of qualified professionals here www.cabec.org/find



Windows, Skylights, and other Fenestration: Guide to 2019 Energy Code Requirements

REPLACEMENT ONLY or MINOR INCREASE IN TOTAL AREA:

Are you **adding more than 75 ft² of fenestration area** (this includes any windows, sliding glass doors and any doors with $\geq 50\%$ glass) **and/or more than 16 ft² of skylight area**?

- Yes. Go to "SUBSTANTIAL INCREASE OF TOTAL AREA" section below.
- No. Install only fenestration that meet the applicable requirements in Table 1 (lower values are better).

SUBSTANTIAL INCREASE IN TOTAL AREA:

Step 1: Calculate fenestration area as a percentage of conditioned floor area

- 1) Total conditioned floor area: _____ ft²
- 2) _____ ft² = _____ ft² + _____ ft²
Total fenestration area = Existing fenestration area + New fenestration area
- 3) _____ % = _____ ft² / _____ ft² X 100
Percent of fenestration to conditioned floor area = Total fenestration area / Total conditioned floor area X 100

Step 2: Calculate west-facing fenestration area as a percent of conditioned floor area

- 1) Is the project located in climate zone 1 & 3 (San Francisco or San Mateo County, or coastal portions of Alameda, Contra Costa, and Solano Counties)? If yes, skip this step and move to Step 3.
- 2) _____ ft² = _____ ft² + _____ ft²
Total west-facing fenestration area = Existing west-facing fenestration area + New west-facing fenestration area
- 3) _____ % = _____ ft² / _____ ft² X 100
Percent of west-facing to conditioned floor area = Total west-facing fenestration area / Total conditioned floor area X 100

Step 3: Determine whether a **Performance Compliance Approach** is required

1. Is the **percent of fenestration to conditioned floor area** greater than 20%?
 Yes No
 2. Is the existing or added **percent of west-facing fenestration to conditioned floor area** greater than 5%? (Does not apply to climate zone 1 & 3.)
 Yes No
- If **Yes** for either question: The *Performance Compliance Approach* must be employed.
- If **No** for either question: Install only windows less than or equal to the applicable values in Table 1.

² Link to a map of California climate zones: https://ww2.energy.ca.gov/maps/renewable/building_climate_zones.html



Windows, Skylights, and other Fenestration: Guide to 2019 Energy Code Requirements

Table 1: Maximum allowed U-Factor and SHGC values for replacement

	Replacement Windows (and added windows) up to 75 sq ft.	Replacement Windows (and added windows) greater than 75 sq ft.	Replacement Skylights (and added skylights) up to 16 sq ft.
Maximum U-Factor	0.40	0.30	0.55
Maximum SHGC (not required for CZ 1 & 3)	0.35	0.23	0.30