

Use this checklist when the project:

- Alters and/or adds fenestration (windows, skylights and/or glazing in doors) to the existing home — and nothing more.
**This checklist is not intended to support projects in which the enforcement agency requires building design plans and specifications to be submitted with the application for a building permit.*

ESSENTIALS

1. Does the project trigger California’s Building Energy Efficiency Standards (Title 24, Part 6)?

YES NO

The project triggers Title 24, Part 6 (the Energy Code) if it changes or adds new fenestration (windows, skylights and/or glazing in opaque doors) to the existing house. This includes replacing a single window, even if fenestration area does not increase.

Exceptions:

- Replacing ONLY window glazing, sash or both (framing remains). If you don’t change the frame it doesn’t trigger code.
- Replacing fenestration associated with unconditioned spaces. (For example, replacing a window between an unconditioned garage and the outside would not trigger the code; neither would replacing a window that is in a wall that separates two areas in an unconditioned garage.)

2. Does it meet the Energy Code’s Requirements under the Prescriptive Approach?

YES NO

Prescriptive requirements for fenestration alterations in Climate Zone 10 depend on type of project:

	U-Factor ^B	SHGC ^{B,C}
Replacing Fenestration (No Increase in Area)^D		
• Windows & Door Glazing — 75 ft ² or less	0.40 or lower	0.35 or lower
• Windows & Door Glazing — More than 75 ft ²	0.30 or lower	0.23 or lower
• Skylights – any amount	0.55 or lower	0.30 or lower

	U-Factor ^B	SHGC ^{B,C}	Total Fenestration ^E Area (% of CFA ^A)	West-facing ^F Area (% of CFA ^A)
Increasing Fenestration Area^E				
• Windows & Door Glazing — 75 ft ² or less	0.30 or lower	0.23 or lower	n/a	n/a
• Windows & Door Glazing — More than 75 ft ²	0.30 or lower	0.23 or lower	20% or less ^G	5% or less ^G
• Skylights – 16 ft ² or less	0.55 or lower	0.30 or lower	n/a	n/a
• Skylights – More than 16 ft ²	0.30 or lower	0.23 or lower	20% or less ^G	5% or less ^G

3. Are the necessary forms included with the permit application?

YES NO

If the project...	Include this form:
Adds or replaces fenestration only (in existing house)	CF1R-ALT-05-E: Certificate of Compliance for Prescriptive Residential Alterations (Non-HERS)
Also uses averaged U-factor and SHGC values ^H	CF1R-ENV-02-E: Area Weighted Average Calculation Worksheet
Also considers exterior shading devices to meet SHGC requirements ^I	CF1R-ENV-03-E: Solar Heat Gain Coefficient (SHGC) Worksheet

A – I See page 3 for notes.

Required Documentation & Building Inspection

Are CF1R forms really required for window and skylight alterations?

- Some enforcement agencies may, at their discretion, choose **not** to require compliance documents for Prescriptive Residential Alteration projects that do NOT require HERS verification. Even so, exemptions from submitting compliance documentation shall not be deemed to grant authorization for any work to be done in any manner in violation of this code or other provisions of law. See §10-103(a)1C for more information.

Does a basic window/skylight replacement require HERS verification? Must its CF1R be registered with a HERS Provider?

- No, if the project is submitting via the Prescriptive Approach for a low-rise single-family home (using the CF1R-ALT-05-E), it will **not** trigger HERS measures.
- If it is submitting via the Prescriptive Approach for an Addition (CF1R-ADD) or the Performance Approach (CF1R-PRF) **and** any HERS measures are required for the scope of work, **all** forms must then be registered with a HERS provider.

What forms will the building inspector require?

- In addition to the CF1R-ALT-05-E submitted with the permit application, the inspector will look for the CF2R-ENV-01-E: Certificate of Installation for Fenestration Installation, which is completed by the person who is responsible for installing the altered windows and skylights.
Also, for most projects, the inspector will check the NFRC labels on the fenestration and the CF2R to confirm they meet the required values specified on the CF1R. (See the next question below.)

Any tips for permit applicants as they approach final building inspection?

- Per Mandatory Measures, U-factor and SHGC values for **manufactured** windows & skylights must be listed on the CF1R using one of two approved sources:
 - Values listed directly on product label (only values from NFRC – National Fenestration Rating Council)
 - Default values listed in Energy Code [Table 110.6-A](#) (U-factor) and [Table 110.6-B](#) (SHGC)
- Field-fabricated window products have different certification requirements in which they must use the default values. See §110.6(b) for more information.
- If values from NFRC product labels are used on the CF1R for compliance, corresponding windows on-site **MUST** still have their labels on and visible to the building inspector during inspection. Do not remove labels from these products, as the building inspector will need to verify U-factor and SHGC specific to each altered window.

Single Window Replacement Projects

What if the Alteration project only involves replacing one existing window? Does this trigger Title 24?

- Yes. Even just one window replacement triggers an Alteration under Title 24, Part 6. However, if only the glazing or sash (or both) were replaced, it would be considered a Repair, and NOT trigger Title 24. (Changing the frame triggers the code.)

Prescriptive or Performance

What do you mean by “Performance Approach” to compliance?

- The Performance Approach provides another pathway to compliance that uses approved modeling software to “trade off” energy efficiency measures (so you can do “worse” than Prescriptive requirements for some things and “better” than Prescriptive for others, as long as all Mandatory requirements are met and the energy budget balances). Proof of energy budget balance is documented via the CF1R-PRF-01-E report. The Performance Approach may be considered if the project is unable to meet the Prescriptive requirements for window/skylight Alterations supported by this checklist.

Notes

- A** “CFA” is conditioned floor area, which is determined by using the floor area (in square feet) of enclosed conditioned space on all floors of a building, as measured at the floor level of the exterior surfaces of exterior walls enclosing the conditioned space.
- B** U-factor measures a window assembly’s rate of heat loss (how well it insulates). Solar Heat Gain Coefficient (SHGC) measures the ability to limit sunlight from warming the interior space. U-factor and SHGC values are “area-weighted average” values. Weighted averaging is a mathematical technique for combining different amounts of various window products into a single number.
- Note that alterations involving up to 3 ft² of new glazing area installed in doors and up to 3 ft² of new tubular skylights area with dual-pane diffusers are not required to meet the Prescriptive U-factor and SHGC requirements for those fenestration areas. However, they must meet the Mandatory requirement of maximum U-factor of 0.58 except for 10 ft., or 0.5% of the CFA (whichever is greater) of new fenestration/skylights.
- If the project uses fenestration with chromogenic glazing, which responds to automatic controls based on solar intensity, an exception applies. See Exception 3 to Section 150.1(c)3A for details.
- C** SHGC may be calculated taking qualifying exterior shading into consideration.
- D** “Replacement fenestration” may include fenestration that is located in the same existing wall or roof in which the same or larger area of existing fenestration is being removed. This is labeled as “altered.” Any new fenestration area that increases the total net area of fenestration in any existing wall or roof is labeled as “new.” Walls/roofs that are closed up due to removed windows/skylights will need to be insulated to Mandatory minimums of §150.0(a)(b)(c).
- E** Total Fenestration Area considers all the fenestration in the building. That is, the new fenestration plus existing fenestration that remains after the project. Fenestration includes windows, skylights and glazing in doors. (Opaque doors with 25 percent or greater glazing are treated as fenestration.)
- F** West-facing for a window is $\leq 45^\circ$ north of true west to $< 45^\circ$ south of true west. For a skylight, it is any direction if the pitch is less than 1:12 and the same as for a window if the pitch is 1:12 or greater.
- G** The following Prescriptive requirement applies when added fenestration area exceeds 75 ft² (or added skylight area exceeds 16 ft²):
- The entire building’s **total** fenestration area – including added fenestration – must be less than or equal to 20% of the building’s CFA.
 - The entire building’s total **west**-facing fenestration – including added west-facing fenestration – must be less than or equal to 5% of the building’s conditioned floor area.
 - If the fenestration area is greater than 20% of the CFA, or west-facing fenestration is greater than 5% of the CFA, the project cannot comply prescriptively, and must use the Performance Approach to demonstrate compliance. (See “Prescriptive or Performance” in the FAQs section of this checklist.)
- H** The CF1R-ENV-02-E worksheet is only necessary when the project involves differing window specs (more than one level of window U-factor or SHGC used in a building to meet Prescriptive compliance requirements). This worksheet helps to calculate area-weighted average U-factors for fenestration/glazing or Solar Heat Gain Coefficient (SHGC) values for Prescriptive compliance.
- Note that dynamic glazing is treated independently and cannot be combined with other fenestration types on the form. Submit the CF1R-ENV-02-E with the energy compliance documents.
- I** The CF1R-ENV-03-E worksheet is only necessary when determining the total Solar Heat Gain Coefficient (SHGC) value of fenestration in combination with an exterior shading device. Submit the CF1R-ENV-03-E with the energy compliance documents.

For More Information

The Energy Code

- Energy Code Section **150.2(b)1A, B** – Energy Efficiency Standards for Additions and Alterations to Existing Low-rise Residential Buildings – **Fenestration** and **Replacement Fenestration**
energycodeace.com/site/custom/public/reference-ace-2019/index.html#!Documents/section1502energyefficiencystandardsforadditionsandalterationsto.htm
- Energy Code Section **150.1(c)3, 4** – Performance and Prescriptive Approaches for Low-Rise Residential Buildings - **Fenestration** and **Shading**
energycodeace.com/site/custom/public/reference-ace-2019/index.html#!Documents/section1501performanceandprescriptivecomplianceapproachesforlowr.htm
- Energy Code Section **110.6** – **Mandatory Requirements** for Fenestration Products and Exterior Doors
energycodeace.com/site/custom/public/reference-ace-2019/index.html#!Documents/section1106mandatoryrequirementsforfenestrationproductsandexteri.htm
- Energy Code **Table 150.1-A** – **Component Package**: Single Family Standard Building Design
energycodeace.com/site/custom/public/reference-ace-2019/Documentssection1501performanceandprescriptivecomplianceapproachesforlowr.htm#table1501acomponentpackagesinglefamilystandardbuildingdesign.htm
- Energy Code **Table 110.6-A** – Default **Fenestration Product U-factors**
energycodeace.com/site/custom/public/reference-ace-2019/index.html#!Documents/section1106mandatoryrequirementsforfenestrationproductsandexteri.htm
- Energy Code **Table 110.6-B** – Default Solar Heat Gain Coefficient (**SHGC**)
energycodeace.com/site/custom/public/reference-ace-2019/index.html#!Documents/section1106mandatoryrequirementsforfenestrationproductsandexteri.htm

To Interpret the Energy Code

- **Fact Sheet**: **Residential Fenestration in Building Alterations**
energycodeace.com/download/35127/file_path/fieldList/FactSheet.Res-Fenestration.2019
- **Application Guide**: **Residential Envelope, Solar Ready and PV** (see Chapters 1 & 5)
energycodeace.com/download/40887/file_path/fieldList/AppGuide.Res.%20Envelope_SolarReady_PV.2019

Forms for Window and Skylight Alterations

- **CF1R-ALT-05-E**: **Certificate of Compliance** for Residential Alterations (Non-HERS)
energycodeace.com/download/39471/file_path/fieldList/2019-CF1R-ALT-05-E-PrescriptiveAlterations-SimpleNonHERS-PaperVersion.pdf
- **CF1R-ENV-02-E**: **Area Weighted Average Calculation Worksheet**
energycodeace.com/download/39472/file_path/fieldList/2019-CF1R-ENV-02-E-AreaWeightedAverageWorkSheet.pdf
- **CF1R-ENV-03-E**: **Solar Heat Gain Coefficient (SHGC) Worksheet**
energycodeace.com/download/39473/file_path/fieldList/2019-CF1R-ENV-03-E-ShgcWorkSheet.pdf
- **CF2R-ENV-01-E**: **Certificate of Installation** for Fenestration
energycodeace.com/download/39479/file_path/fieldList/2019-CF2R-ENV-01-FenestrationInstallation.pdf



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