



2016 Energy Standards – Residential Envelope

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QUESTIONS...

- **Please feel free to ask at anytime:**
 - During class
 - During break
 - @ the end of/after class





Goals for this Training

- Review over and clarify the residential envelope requirements in the 2016 Energy Standards for:
 - Low-rise residential buildings (*in sequential order of §*)
 - Newly constructed buildings, additions, and alterations
- Simplify compliance and enforcement of the Energy Standards during the:
 - Plan review process
 - Field inspection process



A Little CEC History

- Section 25402 of the Public Resources Code (known as the **Warren Alquist Act**)
- The act created the Energy Commission in 1974 and gave it authority to develop and maintain Building Energy Efficiency Standards
- Requires the Standards and new requirements to be cost effective over the economic life of the structure
- Requires the Energy Commission to update the Standards periodically (about every 3 years)



*Let's start with some Energy
Standards Basics - 101*



2016 Building Energy Efficiency Standards

- **Effective on Jan. 1, 2017**
 - Building permit applications submitted on or after this date
- **Master plans for tract homes affected:**
 - Need to resubmit if permits pulled on or after effective date





2016 Documents



- Building Energy Efficiency Standards
- Residential Compliance Manual
- Reference Appendices
- ALL available online



Navigating The Energy Standards

TITLE 24 - THE CALIFORNIA BUILDING STANDARDS CODE

- **Part 1 (Administrative Code)**

- Chapter 10: the administrative requirements

- **Part 6 (Energy Code)**

- Subchapters 1 through 9
- Mostly referred to by Section #'s
- These are the technical requirements





Part 1 Section #s

- 10-101 – Scope
- 10-102 – Definitions
- 10-103 – Requirements for Designers, Enforcement...
- 10-103.1 – Lighting ATTCP
- 10-103.2 – Mech. ATTCP
- 10-104 – Exceptional Designs
- 10-105 – CEC Enforcement
- 10-106 – Local Standards
- 10-107 – Interpretations
- 10-108 – Exemption
- 10-109 – Software & Registries
- 10-110 – Application Procedures
- 10-111 – Fenestration
- 10-112 – Default Tables
- 10-113 – Roofing Products
- 10-114 – Out. Lighting Zones



Part 6 Section #s for Res

TABLE 100.0-A APPLICATION OF STANDARDS					
Occupancies	Application	Mandatory	Prescriptive	Performance	Additions/Alterations
General Provisions for All Buildings 100.0, 100.1, 100.2, 110.0					
Nonresidential, High-Rise Residential, And Hotels/Motels	General	120.0	140.0, 140.2	140.0, 140.1	141.0
	Envelope (conditioned)	110.6, 110.7, 110.8, 120.7	140.3		
	Envelope (unconditioned process spaces)	N.A.	140.3(c)		
	HVAC (conditioned)	110.2, 110.5, 120.1, 120.2, 120.3, 120.4, 120.5, 120.8	140.4		
	Water Heating	110.3, 120.3, 120.8, 120.9	140.5		
	Indoor Lighting (conditioned, process spaces)	110.9, 120.8, 130.0, 130.1, 130.4	140.3(c), 140.6	N.A.	141.0
	Indoor Lighting (unconditioned and parking garages)	110.9, 120.8, 130.0, 130.1, 130.4	140.3(c), 140.6		
	Outdoor Lighting	110.9, 130.0, 130.2, 130.4	140.7		
	Electrical Power Distribution	110.11, 130.5	N.A.		
	Pool and Spa Systems	110.4, 110.5, 150.0(p)	N.A.		
Solar Ready Buildings	110.10	N.A.		141.0(a)	
Covered Processes ¹	Envelope, Ventilation, Process Loads	110.2, 120.6	140.9	140.1	120.6, 140.9
Signs	Indoor and Outdoor	130.0, 130.3	140.8	N.A.	141.0, 141.0(b)2H
Low-Rise Residential	General	150.0	150.1(a, c)	150.1(a), 150.1(b)	150.2(a), 150.2(b)
	Envelope (conditioned)	110.6, 110.7, 110.8, 150(a), 150.0(b), 150.0(c), 150.0(d), 150.0(e), 150.0(g)			
	HVAC (conditioned)	110.2, 110.5, 150.0(h), 150.0(i), 150.0(j), 150.0(m), 150.0(e)			
	Water Heating	110.3, 150.0(j, n)			
	Indoor Lighting (conditioned, unconditioned and parking garages)	110.9, 130.0, 150.0(k)			
	Outdoor Lighting	110.9, 130.0, 150.0(k)			
	Pool and Spa Systems	110.4, 150.0(p)	N.A.	N.A.	150.2(a), 150.2(b)
	Solar Ready Buildings	110.10	N.A.	N.A.	N.A.

¹ Nonresidential, high-rise and hotel/motel buildings that contain covered processes may conform to the applicable requirements of both occupancy types listed in this table.

- **§110.0 – 110.10 as applicable**
 - Cover both res and nonres
- **§150.0 for res mandatory measures**
- **§150.1 for ALL prescriptive requirements**
 - Newly constructed buildings
- **§150.2 for additions and alterations**



Low-Rise Residential

- Single family dwellings (any # of stories)
- Duplexes (any # of stories)
- Multi-family occupancies in any building 3 habitable stories or less





Requirements

- **Mandatory measures**
 - Minimum efficiency levels and requirements that must always be met
 - Can never trade off
- **Prescriptive Measures**
 - Set of predefined efficiency levels and requirements that comprise the Prescriptive Approach
 - Usually supersede mandatory measures
 - Different requirements for newly constructed buildings, additions, and alterations



Compliance Approaches

- **Prescriptive Approach**

- Simplest approach, but less flexible (by-hand forms)
- Establishes baseline for Standard home/budget under Performance Approach
- Mostly used for alterations

- **Performance Approach**

- Most flexible approach, allows for trade-offs
- Requires the use of Energy Commission approved software
- Mostly used for newly constructed homes and additions



Compliance Documents (Forms)

	Residential	Nonresidential
Certificate of Compliance	CF1R	NRCC
Certificate of Installation	CF2R	NRCI
Certificate of Verification	CF3R	NRCV
Certificate of Acceptance	-	NRCA



Where can I find the forms?

Appendix A of the 2016 Residential Compliance Manual

A screenshot of a web browser window displaying the California Energy Commission's website. The browser's address bar shows the URL: <http://www.energy.ca.gov/2015publications/CEC-400-2015-032/appendices/forms/>. The page features a header image of wind turbines on a hill. Below the image, the breadcrumb trail reads: Home → 2015publications → CEC-400-2015-032 → appendices → forms. The main heading is "2016 Residential Compliance Manual - Appendix A, Single Forms" with a link to "Parent Directory". A table lists the forms available for download.

Name	last modified <small>Color dates added today</small>	Size
Alterations and Additions Non HERS Verified Forms	Apr 14, 2016	4 kb
CF1R	Apr 14, 2016	4 kb
CF2R	Apr 14, 2016	4 kb
CF3R	Dec 01, 2015	4 kb

<http://www.energy.ca.gov/2015publications/CEC-400-2015-032/appendices/forms/>



Project Status Report (PSR)

Project Status Report		CalCERTS, Inc	
		1 of 2	
GENERAL INFORMATION			
Code Year Standards:	2013	 <p>Easy to Verify @ calcerts.com</p>	
Project Name:	Shewmaker Performance Demo		
Project Type:	New Construction SFR		
Address:	1516 9th Street		
City / State / Zip:	Sacramento / CA / 95814		
Enforcement Agency:	City of Sacramento		
Permit Number:	123456789		
HERS VERIFIABLE MEASURES:	NOT COMPLETE		
OVERALL STATUS:	NOT COMPLETE		
CF1R INFORMATION - Certificate of Compliance			
Certificate Type:	Compliance		
Registered Form:	CF1R-PRF-01-E		
Registered Date:	04/05/2016 08:30		
Registration Number:	216-N0125429A-00000000-0000		
ADDITIONAL CF1Rs			
System	Form	Registered Date	Registration Number
	CF1R-SRA-01		216-N0125443A-00000000-0000
CF2R INFORMATION - Certificate of Installation			
System	Form	Registered Date	Registration Number
	CF2R-ENV-01 (Fenestration Installation)		216-N0125429A-E010001A-0000
	CF2R-ENV-02 (Envelope Air Sealing)		216-N0125429A-E0200001A-0000
	CF2R-ENV-03 (Insulation Installation)		216-N0125429A-E0300001A-0000
	CF2R-ENV-04 (Roofing-Radiant Barrier)		216-N0125429A-E0400001A-0000
	CF2R-MCH-01 (Space Conditioning Systems, Ducts and Fans)	04/05/2016 09:40	216-N0125429A-M0100001A-0000
System 1	CF2R-MCH-20 (Duct Leakage)	04/05/2016 09:40	216-N0125429A-M2000002A-0000
System 1	CF2R-MCH-23 (Airflow)	04/05/2016 09:40	216-N0125429A-M2300002A-0000
System 1	CF2R-MCH-22 (Fan Efficacy)	04/05/2016 09:40	216-N0125429A-M2200002A-0000
System 1	CF2R-MCH-25 (Refrigerant Charge)	04/05/2016 09:40	216-N0125429A-M2500002A-0000
	CF2R-MCH-27 (IAQ and MV)	04/05/2016 09:40	216-N0125429A-M2700001A-0000
	CF2R-PLB-02 (SD HWS Distribution)	04/05/2016 09:40	216-N0125429A-P0200003A-0000
CF3R INFORMATION - Certificate of Verification			
System	Form	Registered Date	Registration Number
	CF3R-MCH-27 (IAQ and MV)		216-N0125429A-M2700001A-M27A
System 1	CF3R-MCH-20 (Duct Leakage)	04/11/2016 12:52	216-N0125429A-M2000002A-M20A

- Summarizes status of ALL forms
- Available for any project in HERS registry
- “Overall” and “HERS” should be marked Complete
 - Can access directly in registry
 - Can request as a hard copy in lieu of a stack of forms



*Let's talk about the Envelope
Mandatory Measures*



Envelope Big Picture





Fenestration Definitions

Fenestration – a transparent or translucent material plus any sash, frame, mullions and dividers

U-factor – a measure of the heat transmission through the fenestration

Solar Heat Gain Coefficient (SHGC) – the fraction of solar radiation entering the space through the fenestration which is released as heat into the space



Fenestration Definitions *cont.*



Manufactured – preassembled glazing and frame

- Typical window or skylight

Site-Built – plant-fabricated and field-assembled

- Storefront or curtain wall system
- Referred to as knock-down

Field-Fabricated – field-made

- Custom made at site for a specific application



§110.6: Fenestration Labels

- Temporary labels are required for all fenestration
 - NFRC label (manufactured)
 - NFRC certificate (site-built)
 - Default values label (manufactured, site-built, field fabricated)
- Labels specify U-Factor, SHGC, and air leakage values
 - Used to determine/verify efficiency
- Most residential fenestration is manufactured, and must have NFRC label



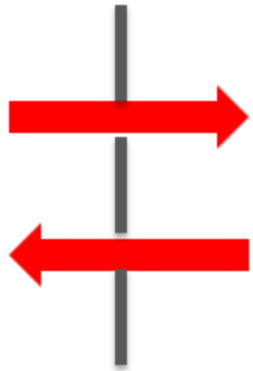
Temporary Labels

 National Fenestration Rating Council® CERTIFIED		World's Best Window Co. Millennium 2000+ Vinyl-Clad Wood Frame Double Glazing • Argon Fill • Low E Product Type: Vertical Slider	
ENERGY PERFORMANCE RATINGS			
U-Factor (U.S./I-P)		Solar Heat Gain Coefficient	
0.30		0.30	
ADDITIONAL PERFORMANCE RATINGS			
Visible Transmittance		Air Leakage (U.S./I-P)	
0.51		0.2	
<small>Manufacturer stipulates that these ratings conform to applicable NFRC procedures for determining whole product performance. NFRC ratings are determined for a fixed set of environmental conditions and a specific product size. NFRC does not recommend any product and does not warrant the suitability of any product for any specific use. Consult manufacturer's literature for other product performance information. www.nfrc.org</small>			

2016 California Energy Commission Default Label XYZ Manufacturing Co.		
Key Features:	<input type="checkbox"/> Doors	<input type="checkbox"/> Double-Pane
	<input type="checkbox"/> Skylight	<input type="checkbox"/> Glass Block
Frame Type	Product Type:	Product Glazing Type:
<input type="checkbox"/> Metal	<input type="checkbox"/> Operable	<input type="checkbox"/> Clear
<input type="checkbox"/> Non-Metal	<input type="checkbox"/> Fixed	<input type="checkbox"/> Tinted
<input type="checkbox"/> Metal, Thermal Break	<input type="checkbox"/> Greenhouse/Garden Window	<input type="checkbox"/> Single-Pane
<input type="checkbox"/> Air space 7/16 in. or greater <input type="checkbox"/> With built-in curb <input type="checkbox"/> Meets Thermal-Break Default Criteria	-----	To calculate VT see NA6
California Energy Commission Default U-factor =	California Energy Commission Default SHGC =	California Energy Commission Calculated VT =
Product meets the air infiltration requirements of §110.6(a)1, U-factor criteria of §110.6(a)2, SHGC criteria of §110.6(a)3 and VT criteria of §110.6(a)4 of the 2016 Building Energy Efficiency Standards for Residential and Nonresidential Buildings.		



Air Leakage Definitions



Infiltration - uncontrolled air leakage from outside to inside, through cracks, joints, windows, doors, partitions or penetrations

Exfiltration - uncontrolled air leakage from inside to outside, through cracks, joints, windows, doors, partitions or penetrations



§110.7: Air leakage

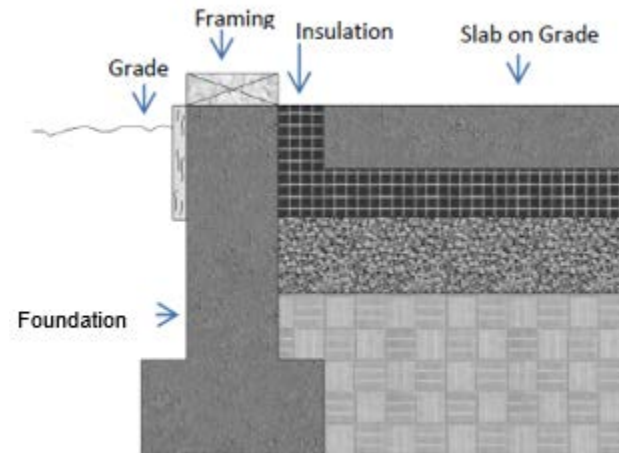
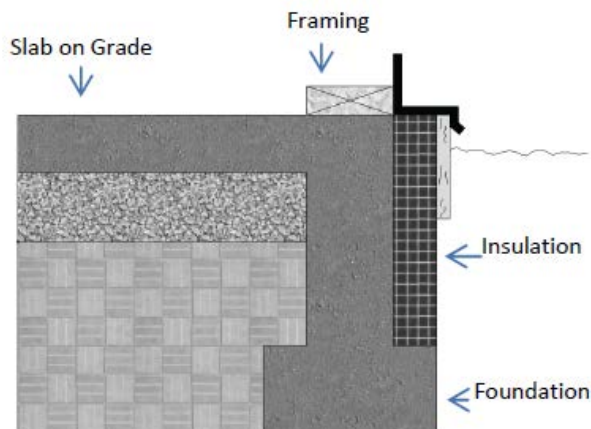
- Must seal building envelope to limit infiltration and exfiltration
 - Where: Joints, penetrations, openings
 - Prefabricated items (like windows) need to be sealed into the envelope
 - Includes things like pipes penetrating a ceiling/attic or garage wall (unconditioned space)
 - How: Sealant/caulking, weather-stripping, or gasket





§110.8(g): Heated Slab Insulation

- Heated slab edge insulation requirements:
 - Install insulation per TABLE 110.8-A
 - Protect exposed material to wind, equipment, moisture, & UV
 - Terminate insulation to block insects from access to structure above foundation





§110.8(i): Roofing (Cool Roof)

- When a cool roof is required:
 - Product must be certified and labeled by the CRRC
 - Label specifies solar reflectance (SR) and thermal emittance (TE) efficiency values
 - Solar reflectance index (SRI) may be used as alternative which trades off between rated SR and TE values
 - Default values can be used for non-certified products
 - Liquid-applied roof coatings must meet TABLE 110.8-C



§110.8(j): Radiant barrier

- When a radiant barrier is required, the product must:
 - Have an emittance of 0.05 or less; and
 - Be tested per ASTM; and
 - Be certified to CA Department of Consumer Affairs



Insulation Definitions

R-value – capacity of an insulating material to resist heat flow

U-factor – a measure of the heat transmission through a wall, roof, floor, or a given thickness of a material





§150.0(a),(c): Ceiling/Roof & Wall Insulation

- Ceilings/Roof assemblies
 - Minimum R-22 insulation between wood frame; or maximum average assembly U-factor of 0.043
- Wall assemblies
 - Minimum R-13 insulation in 2x4 wood frame; or maximum average assembly U-factor of 0.102
 - Minimum R-19 insulation in 2x6 & greater wood frame; or maximum average assembly U-factor of 0.074



§150.0(d),(f): Raised Floor & Slab Edge Insulation

- Raised floor assemblies
 - Minimum R-19 insulation between wood frame; or maximum average assembly U-factor of 0.037
- Slab edge insulation
 - When required, material must meet minimum specifications:
 - Water absorption
 - Water vapor permeance
 - Protection from UV & physical damage



§150.0(g): Vapor Retarder

- Climate Zones 14 & 16 only, a Class I or II vapor retarder is required on conditioned side of insulation in:
 - Exterior wall
 - Vented attics
 - Unvented attics having air-permeable insulation
- All Climate Zones, a Class I or II vapor retarder is required on grade for unvented spaces (and controlled vent spaces)
- What's a *Class I, II, or III*?
 - I = perm \leq 0.1
 - II = perm $>$ 0.1 and \leq 1.0
 - III = perm $<$ 1.0 and \leq 10.0



§150.0(q): Fenestration U-Factor

- Fenestration (including skylights & glass doors) must:
 - Have a U-factor of 0.58 or less; **or**
 - The weighted average of all fenestration cannot exceed 0.58 U-factor (meaning some can be higher if some are lower)
 - Should not be an issue for most homes with manufactured NFRC rated windows/skylights
 - Keep an eye out for custom windows (especially stained glass/decorative windows)



QUESTIONS...

About the mandatory measures?





*Let's talk about the Envelope
Prescriptive Measures
(New construction)*



§150.1(c)1A: Ceiling/Roof Insulation Summary

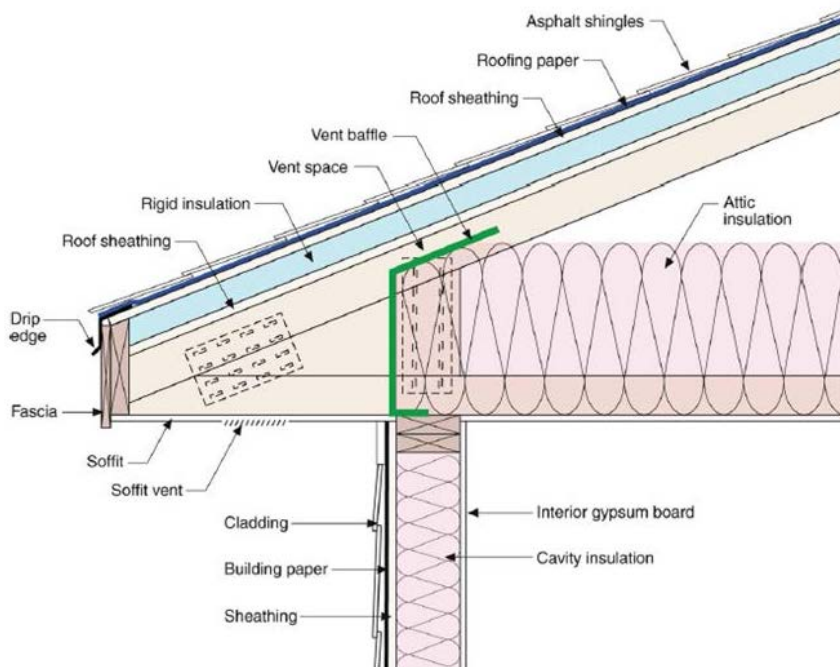
- Introduction of “high performance attics” requirements
- 3 options available
- Insulation required at ceiling and roof depending on option and Climate Zone
- Radiant barrier and duct location/insulation requirements also depend on option and Climate Zone



§150.1(c)1Ai: Ceiling/Roof Insulation *cont.*

- **Option A**

➤ Per TABLE 150.1-A



- Continuous insulation required above roof rafters in some Climate Zones
- Ceiling insulation required
- Radiant barrier required in Climate Zones 2 through 15
- Vented attic space



§150.1(c)1Aii: Ceiling/Roof Insulation *cont.*

• Option B

➤ Per TABLE 150.1-A

- Insulation required below roof deck in some Climate Zones
- Ceiling insulation required
- Radiant barrier required in Climate Zones 2, 3 and 5 through 7
- Vented attic space

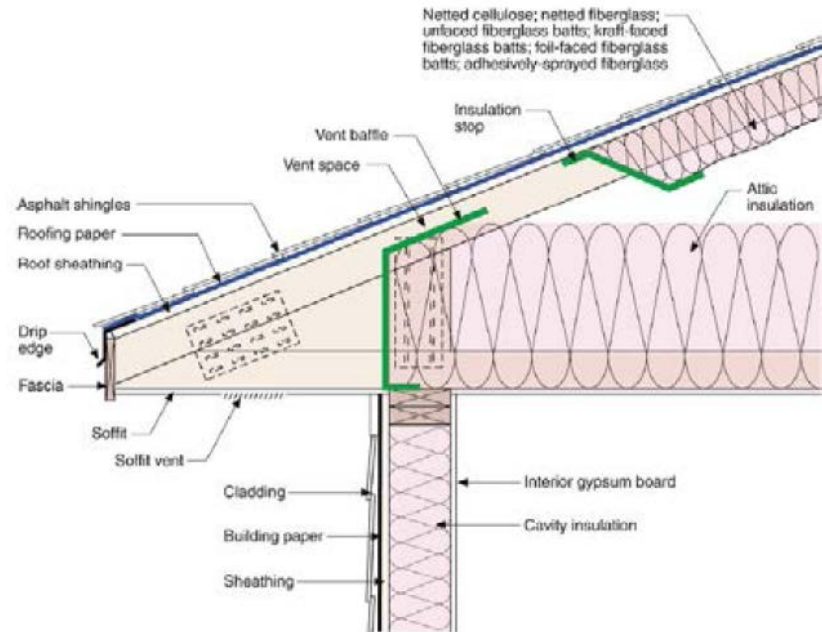


Figure 1: Venting Details for Modified Conventional Vented Attic



§150.1(c)1Aiii: Ceiling/Roof Insulation *cont.*

- **Option C**

- Per TABLE 150.1-A

- Ceiling insulation required
- Radiant barrier required in Climate Zones 2 through 15
- Ducts must be located in conditioned space (HERS verified)
- Vented attic space





§150.1(c)1B: Wall Insulation



- “High performance walls” requirements introduced
- Per TABLE 150.1-A:
 - Maximum U-factor specified
 - Required value lowered (more stringent)
 - Provides for greater design flexibility
 - Requirements for below grade walls



§150.1(c)1C,D: Raised Floors & Slab Perimeter Insulation

- Raised floors
 - Minimum R-19 insulation between wood frame; or maximum average assembly U-factor of 0.037 (same as mandatory)
 - Requirements for raised concrete slab in TABLE 150.1-A
- Slab perimeter
 - Climate Zone 16 only
 - Minimum R-7 continuous insulation; or maximum average assembly U-factor of 0.58



§150.1(c)2: Radiant Barrier

- Radiant barrier required per HPA Options A, B, or C:
 - Must be installed according to Reference Residential Appendix RA4.2.1
 - Including on gable ends
 - Usually installed laminated (which is perforated) to OSB board for new construction
 - Attic space must meet free ventilation area requirements



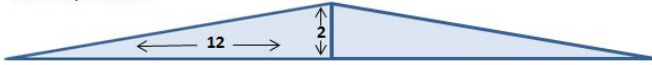
§150.1(c)3,4: Fenestration

- Fenestration must meet requirements per TABLE 150.1-A:
 - Maximum U-factor of 0.32
 - Maximum SHGC of 0.25
 - Climate Zones 2, 4, 6–16
 - Maximum total fenestration area of 20%
 - Maximum total west-facing area of 5%
 - Climate Zones 2, 4, 6–16



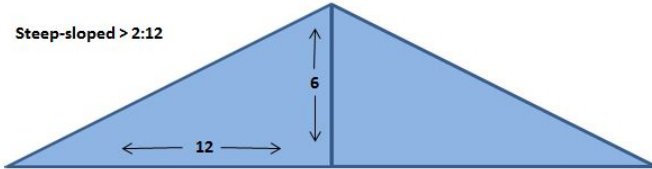
Roofing Definitions

Low-sloped $\leq 2:12$



Low-sloped – rise to run 2:12 or lower

Steep-sloped $> 2:12$



Steep-sloped – rise to run higher than 2:12

Solar Reflectance (SR) - ability to reflect solar energy from the sun back into the atmosphere

Thermal Emittance (TE) - the ability to release heat that has been absorbed

Solar Reflectance Index (SRI) - combines SR three year *aged* value and TE in an equation



§150.1(c)11: Cool Roofs

- Roofing product must meet requirements per TABLE 150.1-A:
 - Steep-sloped roofs:
 - Climate Zones 10 – 15
 - ✓ Minimum aged solar reflectance of 0.20; and
 - ✓ Minimum thermal emittance 0.75
 - ✓ **OR**, minimum solar reflectance index (SRI) of 16
 - Low-sloped roofs:
 - Climate Zones 13 and 15
 - ✓ Minimum aged solar reflectance of 0.63; and
 - ✓ Minimum thermal emittance of 0.75
 - ✓ **OR**, minimum SRI of 75



QUESTIONS...

About the prescriptive requirements?





Performance Approach

- Can trade off between prescriptive requirements
 - Including with other envelope measures and/or HVAC, water heating, HERS testing/verification, etc.
- Envelope HERS compliance credits
 - Quality Insulation Installation (QII)
 - Envelope leakage (blower door test)



Envelope Plan Review

- Verify efficiencies on CF1R form match plans (schedules, architectural/structural, etc.):
 - Assembly R-Values and insulation type
 - Fenestration U-Factor, SHGC, and areas
 - Radiant barrier
 - Cool roof solar reflectance and thermal emittance (or SRI)
 - HERS testing/verification
- Can require mandatory measures summary



Envelope Field Inspection

- Verify efficiencies and installation during respective stage of construction:
 - **Foundation Inspection**
 - Slab edge insulation R-value and installation
 - **Rough Frame Inspection**
 - NFRC labels on fenestration
 - CRRC label for cool roof
 - Radiant barrier in attic, including on gable ends
 - **Insulation Inspection**
 - Walls, ceiling/attic, and raised floor insulation R-values (and sealing)
 - **Final Inspection**
 - All ENV CF2R and CF3R forms are completed and registered when required (use PSR)



Let's talk about
Additions & Alterations
(Prescriptive Approach)



§150.2(a): Additions

- Additions $\leq 700 \text{ ft}^2$ have less stringent requirements:
 - Meet mandatory ceiling insulation R-22
 - Extension of wood frame walls allowed to be same dimensions
 - Cool roof not required for additions $\leq 300 \text{ ft}^2$
 - Climate Zones 2, 4, and 6–16
 - Allowed 60 ft^2 of west facing fenestration
 - For additions $\leq 700 \text{ ft}^2$ and $> 400 \text{ ft}^2$, total allowed fenestration is greater of: 120 ft^2 or 25% of CFA
 - For additions $\leq 400 \text{ ft}^2$, total allowed fenestration is greater of: 75 ft^2 or 30% of CFA



§150.2(b)1A: Fenestration Alterations

- When **adding** fenestration, must meet same efficiency and area requirements as new construction
 - Exempt from area requirements when:
 - Add fenestration area $\leq 75 \text{ ft}^2$
 - Add skylight area $\leq 16 \text{ ft}^2$, with 0.55 U-factor & 0.30 SHGC
- When **replacing** fenestration, must meet same efficiency requirements as new construction
 - Exemptions to efficiency requirements:
 - Replacement fenestration area $\leq 75 \text{ ft}^2$ with 0.40 U-factor & 0.35 SHGC
 - Skylights with 0.55 U-factor & 0.30 SHGC



§150.2(b)1H: Re-Roofs

- When **replacing** $> 50\%$ of the roof:
 - Product must meet same cool roof requirements for new construction
 - Only the altered roofing area need comply
 - There are several exceptions for both steep-sloped roofs and low-sloped roofs

** See new Cool Roof Brochures!*



Alterations and Additions Forms

- Available online
- Interactive instructions
- Dynamic
 - Scope specific
 - Add and delete table rows
 - Simple logic

STATE OF CALIFORNIA
Prescriptive Residential Alterations That Do Not Require HERS Field Verification
 CEC-CFIR-ALT-05-E (Revised 04/18) CALIFORNIA ENERGY COMMISSION
CERTIFICATE OF COMPLIANCE CFIR-ALT-05-E
 Prescriptive Residential Alterations That Do Not Require HERS Field Verification Page 1 of 2

This compliance document is only applicable to simple alterations that do not require HERS verification for compliance. When HERS verification is required, a CFIR-ALT-01 shall first be registered with a HERS Provider Data Registry.

Alterations to Space Conditioning Systems that are exempt from HERS verification requirements may use the CFIR-ALT-05 and CFIR-ALT-05 Compliance Documents. Possible exemptions from duct leakage testing include: less than 40 ft of ducts were added or replaced; or the existing duct system was insulated with asbestos; or the existing duct system was previously tested and passed by a HERS Rater. If space conditioning systems are altered and are not exempt from HERS verification, then a CFIR-ALT-02 must be completed and registered with a HERS Provider Data Registry.

Alterations that utilize close Cell Spray Polyurethane Foam (cSPF) with a density of 1.5 to less than 2.5 pounds per cubic foot having an R-value other than 5.8 per inch, or Open Cell Spray Polyurethane Foam (ocSPF) with a density of 0.4 to less than 1.5 pounds per cubic foot having an R-value of 3.6 per inch, shall complete and register a CFIR-ALT-01 with a HERS Provider Data Registry.

If more than one person has responsibility for installation of the items on this certificate, each person shall prepare and sign a certificate applicable to the portion of construction for which they are responsible. Alternatively, the person with chief responsibility for construction shall prepare and sign this certificate for the entire construction. All applicable Mandatory Measures shall be met. Temporary labels shall not be removed before verification by the building inspector.

A. General Information

01	Project Name:	02	Date Prepared:
03	Project Location:	04	Building Front Orientation (deg or cardinal):
05	CA City:		
07	Zip Code:		
09	Climate Zone:		
11	Building Type:		

13 Project Scope (Select all that apply):

B. Insulation

C. Roof Replacement

CA Building Energy Efficiency Standards - 2016 Residential Compliance

STATE OF CALIFORNIA
Prescriptive Residential Additions 300 Ft² or Less, or Additions That Do Not Require HERS Field Verification
 CEC-CFIR-ADD-02-E (Revised 04/18) CALIFORNIA ENERGY COMMISSION
CERTIFICATE OF COMPLIANCE CFIR-ADD-02-E
 Prescriptive Residential Additions 300 Ft² or Less, or Additions That Do Not Require HERS Field Verification Page 1 of 2

This compliance document is only applicable to additions 300 Ft² or less, or additions that do not require HERS field verification for compliance. When HERS verification is required, a CFIR-ADD-01 shall first be registered with a HERS Provider Data Registry.

Alterations to Space Conditioning Systems that are exempt from HERS verification requirements may use the CFIR-ADD-02 and CFIR-ADD-02 Compliance Documents. Possible exemptions from duct leakage testing include: less than 40 ft of ducts were added or replaced; or the existing duct system was insulated with asbestos; or the existing duct system was previously tested and passed by a HERS Rater. If space conditioning systems are altered and are not exempt from HERS verification, then a CFIR-ADD-01 must be completed and registered with a HERS Provider Data Registry.

Additions or alterations that utilize close Cell Spray Polyurethane Foam (cSPF) with a density of 1.5 to less than 2.5 pounds per cubic foot having an R-value other than 5.8 per inch, or Open Cell Spray Polyurethane Foam (ocSPF) with a density of 0.4 to less than 1.5 pounds per cubic foot having an R-value of 3.6 per inch, shall complete and register a CFIR-ADD-01 with a HERS Provider Data Registry.

If more than one person has responsibility for installation of the items on this certificate, each person shall prepare and sign a certificate applicable to the portion of construction for which they are responsible. Alternatively, the person with chief responsibility for construction shall prepare and sign this certificate for the entire construction. All applicable Mandatory Measures shall be met. Temporary labels shall not be removed before verification by the building inspector.

A. General Information

01	Project Name:	02	Date Prepared:
03	Project Location:	04	Building Front Orientation (deg):
05	CA City:	06	Number of Dwelling Units with Additions:
07	Zip Code:	08	Fuel Type:
09	Climate Zone:	10	Total Conditioned Floor Area (ft ²) (Additions):
11	Building Type:	12	Slab Area (ft ²):
13	Project Scope:		
14	Addition Wall Type:	<input type="checkbox"/> Framed	<input type="checkbox"/> Non-framed
15	Roof Type:	<input type="checkbox"/> Mass Walls	<input type="checkbox"/> None
16	Roof/Ceiling insulation:	<input type="checkbox"/> Steep slope	<input type="checkbox"/> Low slope
17	Windows being installed?	<input type="checkbox"/> Option A - Above deck insulation	<input type="checkbox"/> Option B - Below deck insulation
18	New water heater being installed?	<input type="checkbox"/> Option C - Ducts & Air handler in conditioned space	<input type="checkbox"/> None

CA Building Energy Efficiency Standards - 2016 Residential Compliance

April 2018



Alterations and Additions Forms Exception §10-103

- For alterations, and additions $< 300 \text{ ft}^2$ that do not require HERS testing:
 - Building Department has the discretion to exempt CF1R and CF2R form requirements, or create simplified versions
- Does not exempt applicant from complying with code
- Can include requirements on permit application