

Proposal Summary

Multifamily Envelope

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Introduction

The document summarizes proposed revisions to the California Energy Code (Title 24, Part 6) that will be discussed during a utility-sponsored stakeholder meeting on February 14, 2023. The Statewide Utility Codes and Standards Enhancement (CASE) Team is seeking input and feedback. To provide your comments, email info@title24stakeholders.com by February 28, 2023.

Measure Description

This CASE Report will focus on three measures that are grouped into the 'Envelope' category of building systems.

Cool Roof Improvements

This measure would increase aged solar reflectance (ASR), thermal emittance (TE) and solar reflectance index (SRI) value requirements and expand cool roof requirements to more climate zones. Cool roofs reduce the heat absorption into the roof materials, reducing the cooling loads in the building. This measure will be coordinated with changes to the residential roof requirements.

Improved Wall Performance

This measure would increase the mandatory R-value of wall insulation to R-15 in 2x4 construction and R-21 in 2x6 construction, establishing a new backstop for buildings using the performance compliance pathway. Higher wall insulation R-values reduce heat transfer in the solid portions of the walls in a building. Because wall insulation also has a prescriptive aspect that exceeds this minimum level (but is tradeable with other building systems in the performance compliance pathway), there will be no energy savings associated with this change to the mandatory portion of the code. This measure will be coordinated with changes to the residential wall insulation requirements.

High Performance Windows

This measure would improve prescriptive U-factor and solar heat gain coefficient (SHGC) for all categories of multifamily fenestration, including curtainwall, architectural windows, and skylights. This will save energy by reducing the amount of heating or cooling needed to keep the indoor air temperature in the desired comfort range. However, because of complex interactions

associated with thermal lag between the building and the outside air, improving (lowering) the U-Factor value will not necessarily reduce the annual building energy consumption. There are conditions where the lower U-Factor might improve annual heating energy but worsen the annual cooling energy to the point where the total energy consumption will increase. The Statewide CASE Team will evaluate this as part of the measure development process. This measure will also be coordinated with changes to the residential and nonresidential fenestration requirements.

These three measures work in conjunction to reduce the total amount of heat transfer that occurs in a building from the conditioned inside air to the outside ambient air.

Data Needs/Stakeholder Information Requests

The data needs for each measure are provided below.

Cool Roof Improvements

- **Technical Feasibility** – Information from manufacturers and specifiers on the following topics.
 1. Specifiers – Does available (stocked) product selection drive specifications? Are higher SRI and emissivity products available through special order and is that path chosen as a tradeoff in the performance method?
 2. Manufacturers – Are there limitations to the range of SRI than can be introduced while still maintaining the range of esthetic options desired for architectural purposes? What are the most specified roof colors and are there higher SRI versions that may be considered visually equivalent for architectural purposes?
- **Market Readiness** – Information from manufacturers on product availability and any barriers to increasing the SRI requirements for cool roofs.
 1. Manufacturers – Availability of cool roof products in the California market that exceed the current code for SRI and thermal emissivity. Are there any barriers to introducing higher performance cool roof products into the CA market? Do municipalities limit the SRI to address glare in a manner that will cause conflict between the Code and local ordinance?
- **Costs** – Information from manufacturers on the cost of cool roof products.
 1. Manufacturers – What are the cost implications of increasing the SRI of roofing products? Is there a premium to specifying a cool roof with asphalt shingles compared to a non-CR rated product? Does this cost difference increase as the SRI increases?

Improved Wall Performance

- **Technical Feasibility** – Information from manufacturers and specifiers on the following topics.
 1. Specifiers – Are higher (above code minimum of R-13 and R-20) R-value insulation products used in wall cross-sections as a tradeoff in the performance method? What do most projects have for insulation in typical wall cross-sections.

2. Manufacturers – Are there limitations to the range of R-value than can be accommodated in 2x4 and 2x6 wall cross-sections? What is the practical limit for R-value in these walls based on space available or other limitations?
- **Market Readiness** – Information from manufacturers on product availability and any barriers to increasing the minimum R-value requirements for walls.
 1. Manufacturers – Are R-value 15 and 21 insulation products readily available in the market for specification?
 - **Costs** – Information from manufacturers on the cost of insulation products.
 1. Manufacturers – What are the cost implications of increasing the minimum R-value from 13 to 15 in 2x4 walls, and from 20 to 21 in 2x6 walls?

High Performance Windows

- **Technical Feasibility** – Information from manufacturers and specifiers on the following topics related to high performance windows.
 1. Specifiers – Preferences for window specifications; are higher performance windows used in performance metho compliance approaches? What product types are used when specifying higher performance? Do triple pane or thin triples get specified? Are there any practical reasons (other than cost) that higher performance windows aren't chosen at times?
 2. Manufacturers – are there any reliability or other limitations to window units that make high performance windows less reliable or have lower life expectations?
- **Market Readiness** – Information from manufacturers on product availability and any barriers to introduction for high performance windows.
 1. Manufacturers – Availability of window products in the California market that exceed the current code for U-factor. Are triple pane or thin triple window units available? Are there any barriers to introducing higher performance windows into the CA market? Are higher performing products available in traditional double pane configurations that can compete with triple or thin triples?
- **Costs** – Information from manufacturers and distributors on the cost of high performing windows.
 1. Manufacturers – Are better than code windows sold at a rate (currently) to support standard production lines and distribution? What are the cost implications of improving a window unit from the current code performance level up by a U-factor of 0.02? Does this increase extend linearly for each 0.02 beyond code?
 2. Distributors – Are specifiers driving the selection of window performance by requesting (specifying) improved performance, or do specifiers allow product availability and/or cost determine specifications?

Data may be provided anonymously. To participate or provide information, please email Avani Goyal, agoyal@trccompanies.com directly and cc info@title24stakeholders.com.

Draft Code Language

The proposed changes to the Standards and Reference Appendices are provided below. Changes to the 2022 documents are marked with **red underlining** (new language) and **strikethroughs** (deletions). Expected sections or tables of the proposed code (but not specific changes at this time) are highlighted in **yellow**.

Cool Roof Improvements Proposed Code Language

The following changes are proposed for Section 160.1(b):

Section 170.2 (a)

1. Exterior roofs and ceilings.

Exterior roofs and ceilings shall comply with each of the applicable requirements in this subsection:

- A. A. Roofing Products. All roofing products shall meet the requirements of Section 110.8 and the applicable minimum aged solar reflectance and thermal emittance requirements of TABLE 170.2-A.

EXCEPTION 1 to Section 170.2(a)1A: **Roof area covered with B**building integrated photovoltaic panels and building integrated solar thermal panels are exempt from the minimum requirements for solar reflectance and thermal emittance or SRI.

Table 170.2-A

MultiFamily				Climate Zone																
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
Roof/ Ceiling	Option B (meets §170.2(a) 1Bii)	Steep- sloped	Aged Solar Reflectance	NR	NR	NR	NR <u>0.25</u>	NR	NR	NR <u>0.25</u>	NR <u>0.25</u>	NR <u>0.25</u>	0.2 <u>0.25</u>	0.2 <u>0.25</u>	0.2 <u>0.25</u>	0.2 <u>0.25</u>	0.2 <u>0.25</u>	0.2 <u>0.25</u>	NR	
			Thermal Emittance	NR	NR	NR	NR <u>0.8</u>	NR	NR	NR <u>0.8</u>	NR <u>0.8</u>	NR <u>0.8</u>	0.75 <u>0.8</u>	0.75 <u>0.8</u>	0.75 <u>0.8</u>	0.75 <u>0.8</u>	0.75 <u>0.8</u>	0.75 <u>0.8</u>	0.75 <u>0.8</u>	NR
			Solar Reflectance Index (SRI)	NR	NR	NR	NR <u>23</u>	NR	NR	NR <u>23</u>	NR <u>23</u>	NR <u>23</u>	NR <u>23</u>	16 <u>23</u>	16 <u>23</u>	16 <u>23</u>	16 <u>23</u>	16 <u>23</u>	16 <u>23</u>	16 <u>23</u>
	Option D (Non Attic Roof)	Low- sloped	Aged Solar Reflectance	NR	NR <u>0.63</u>	NR	NR <u>0.63</u>	NR	NR <u>0.63</u>	NR <u>0.63</u>	NR <u>0.63</u>	0.63	0.63	0.63	0.63	NR <u>0.63</u>	0.63	0.63	0.63	NR
			Thermal Emittance	NR	NR <u>0.75</u>	NR	NR <u>0.75</u>	NR	NR <u>0.75</u>	NR <u>0.75</u>	NR <u>0.75</u>	0.75	0.75	0.75	0.75	NR <u>0.75</u>	0.75	0.75	0.75	NR
			Solar Reflectance Index (SRI)	NR	NR <u>75</u>	NR	NR <u>75</u>	NR	NR <u>75</u>	NR <u>75</u>	NR <u>75</u>	NR <u>75</u>	75	75	75	75	NR <u>75</u>	75	75	75

Improved Wall Performance Proposed Code Language

The following changes are proposed for Section 160.1(b):

Section 160.1(b) Wall Insulation.

1. Metal Building- The area-weighted average U-factor of the wall assembly shall not exceed 0.113.
2. Metal Framed- The area-weighted average U-factor of the wall assembly shall not exceed ~~0.154~~ 0.148.
3. Wood Framed and Others-
 - A. Nominal 2x4 inch framing shall have an area-weighted average U-factor of the wall assembly not exceeding ~~0.402~~ 0.95.
 - B. Nominal 2x6 inch framing shall have an area-weighted average U-factor of the wall assembly not exceeding ~~0.074~~ 0.69.
 - C. Other wall assemblies shall have an area-weighted average U-factor of the wall assembly not exceeding 0.102.

High Performance Windows Proposed Code Language

There are no proposed changes to the code text. For Table 170.2-A, the following changes are proposed:

Multifamily		Climate Zone															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Curtain Wall/ Storefront	Maximum U-factor	0.38	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.38
	Maximum RSHGC (Maximum unless otherwise indicated), three-or-less-habitable-stories	NR 0.35 min	0.26	NR 0.35 min	0.26	NR 0.35 min	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.25	0.26	NR 0.35 min
	Maximum RSHGC, four-or-more-habitable-stories	0.35	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.25	0.26	0.25
	Minimum VT, four or more habitable stories	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46
NAFS 2017 Performance Class AW ⁶	Maximum U-factor	0.38	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.38
	Maximum RSHGC (Maximum unless otherwise indicated), three-or-less-habitable-stories	NR 0.35 min	0.24	NR 0.35 min	0.24	NR 0.35 min	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	NR 0.35 min
	Maximum RSHGC, four-or-more-habitable-stories	0.35	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
	Minimum VT, four or more habitable stories	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37
All Other Fenestration	Maximum U-factor	0.3 0.28	0.3 0.28	0.3 0.28	0.3 0.28	0.3 0.28	0.34	0.34	0.3	0.3	0.3	0.3 0.28	0.3 0.28	0.3 0.28	0.3 0.28	0.3 0.28	0.3 0.28
	Maximum RSHGC (Maximum unless otherwise indicated), three-or-less-habitable-stories	NR 0.35 min	0.23	NR 0.35 min	0.23	NR 0.35 min	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	NR 0.35 min
	Maximum RSHGC, four-or-more-habitable-stories	0.35	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23
	Maximum Window to Floor Ratio	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Maximum Window to Wall Ratio	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	
Maximum Skylight Roof Ratio	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	