

# Residential High Performance Windows and Doors

## Draft Code Language

Last Updated: March 6, 2017

## 1. INTRODUCTION

The California Statewide Utility Codes and Standards Team actively supports the California Energy Commission in developing revisions to the 2019 California Building Energy Efficiency Standards (Title 24, Part 6). Our joint intent is to achieve significant energy savings through the development of reasonable, responsible, and cost-effective code change proposals for the 2019 Title 24 code change cycle.

The Statewide Utility Team is proposing code change for residential windows and doors. This measure improves the performance of windows and doors in the low-rise residential standards by reducing the U-factors and for windows adjusting the solar heat gain coefficients (SHGC) by climate zone to reduce energy use.

For windows, the proposal reduces the U-factor in all climate zones from 0.32 to 0.30 Btu/hr-ft<sup>2</sup>-°F. In climate zones 2, 4, and 6 through 15 that have significant cooling, the proposal reduces the Solar Heat Gain Coefficient (SHGC) from 0.25 to 0.23. This level of performance is already in wide use and is typical of products with low conductance frame materials and dual pane glazing with an extra low solar heat gain low emissivity coating, argon gas fill, and an improved spacer. In climate zones 1, 3, 5 and 16, which have limited cooling and are dominated by heating, there is no SHGC requirement. Note that climate zone 16 is now in this category based on the analysis in the report completed for this code change proposal. For performance calculations, the no requirement continues to be modeled with a 0.50 SHGC that is representative of dual glazing with a high solar gain low emissivity coating.

For doors, such as those at the front entry and between the conditioned space and the garage, the proposal reduces the U-factor in all climate zones to 0.20 Btu/hr-ft<sup>2</sup>-°F. This level of performance is typical of an insulated door and is widely available. The definition of doors has been modified from 50 percent (½ lite) to 25 percent (¼ lite) of glass or less. This definition matches the National Fenestration Rating Council (NFRC) test standard used to rate doors. Doors with more than 25 percent (¼ lite) are called glazed doors and are treated as windows in Title 24, Part 6 under this proposal. It is anticipated that this will result in an increase in the use of rated and labeled doors.

**The Statewide Utility Team is requesting feedback on the draft code language presented in this document.** Input we receive will inform the code change proposal that the Statewide Utility Team will be proposing to the California Energy Commission in April 2017.

To provide feedback, please email us at [info@title24stakeholders.com](mailto:info@title24stakeholders.com) or contact the measure lead, whose contact information is provided below:

Ken Nittler  
Enercomp, Inc.

[ken@enercomp.net](mailto:ken@enercomp.net)

(530) 885-9891

For more information about the California Statewide Utility Codes and Standards Team's 2019 Title 24, Part 6 advocacy efforts, and the latest information on this code change proposal please visit:

[www.title24stakeholders.com](http://www.title24stakeholders.com).

## 2. DRAFT CODE LANGUAGE

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The proposed changes to the Standards, Reference Appendices, and the ACM Reference Manuals are provided below. Changes to the 2016 documents are marked with underlining (new language) and ~~strikethroughs~~ (deletions).

### 2.1 Standards

The proposed measure will require updating the definitions section 100.1(b), prescriptive section 150.1(c)5 and Table 150.1-A.

#### SECTION 100.1 – DEFINITIONS AND RULES OF CONSTRUCTION

##### (b) Definitions

**DOOR** is an operable opening in the building envelope, including swinging and roll-up doors, fire doors, pet doors and access hatches with less than ~~50~~ 25 percent glazed area. When that operable opening has ~~50~~ 25 percent or more glazed area it is a glazed door. See Fenestration: Glazed Door.

**DOOR AREA** for doors other than glazed doors is the total door rough opening area which includes the door fenestration, door fenestration frame components in the exterior walls and roofs.

**GLAZED DOOR** is an exterior door having a glazed area of ~~50~~ 25 percent or greater of the area of the door. Glazed doors shall meet fenestration product requirements. See: Door.

**FENESTRATION AREA** for windows in nonresidential buildings is the total window rough opening area which includes the fenestration, fenestration frame components in the exterior walls and roofs. Fenestration area in low rise residential buildings is the total window, skylight and glazed door rough opening area which includes the fenestration, fenestration frame components in the exterior walls and roofs.

#### SECTION 150.1 – PERFORMANCE AND PRESCRIPTIVE COMPLIANCE APPROACHES FOR LOW-RISE RESIDENTIAL BUILDINGS

##### (c) Prescriptive Standards/Component Package

##### 5. ~~RESERVED~~ Doors.

A. Installed door products not including glazed door products shall have an area weighted average U-factor no greater than the applicable value in TABLE 150.1-A and shall be determined in accordance with Sections 110.6(a)2. Glazed door products are treated as fenestration products in 150.1(c)3 and 150.1(c)4.

**TABLE 150.1-A COMPONENT PACKAGE-A STANDARD BUILDING DESIGN**

Building Envelope		Climate	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
		Fenestration	Maximum U-factor	0.302	0.302	0.302	0.302	0.302	0.302	0.302	0.302	0.302	0.302	0.302	0.302	0.302	0.302	0.302
Fenestration	Maximum SHGC	NR	0.235	NR	0.235	NR	0.235	0.235	0.235	0.235	0.235	0.235	0.235	0.235	0.235	0.235	0.235	0.25NR
	Maximum Total Area	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Door	Maximum West Facing Area	NR	5%	NR	5%	NR	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%NR
	Maximum U-factor	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20

## 2.2 Reference Appendices

There proposed measure will require changes to the glossary and Table 4.5.1 door U-factors.

### *Appendix JA1 – Glossary*

**DOOR** is an operable opening in the building envelope, including swinging and roll-up doors, fire doors, pet doors and access hatches with less than ~~50~~ 25 percent glazed area. When that operable opening has ~~50~~ 25 percent or more glazed area it is a glazed door. See Fenestration: Glazed Door.

**DOOR AREA** for doors other than glazed doors is the total door rough opening area which includes the door fenestration, door fenestration frame components in the exterior walls and roofs.

**GLAZED DOOR** is an exterior door having a glazed area of ~~50~~ 25 percent or greater of the area of the door. Glazed doors shall meet fenestration product requirements. See: Door.

**FENESTRATION AREA** for windows in nonresidential buildings is the total window rough opening area which includes the fenestration, fenestration frame components in the exterior walls and roofs.

Fenestration area in low rise residential buildings is the total window, skylight and glazed door rough opening area which includes the fenestration, fenestration frame components in the exterior walls and roofs.

### *JA4.5 Miscellaneous Construction*

#### *Table 4.5.1 – Doors:*

*Change #3 – Strike row 7 as NFRC ratings are required for any value lower than 0.5 Btu/hr-ft<sup>2</sup>-F.*

Description	U-factor (Btu/°F-ft²)	
		A
Uninsulated single-layer metal <i>swinging doors</i> or <i>non-swinging doors</i> , including single-layer uninsulated access hatches and uninsulated smoke vents:	1	1.45
Uninsulated double-layer metal <i>swinging doors</i> or <i>non-swinging doors</i> , including double-layer uninsulated access hatches and uninsulated smoke vents:	2	0.70
Insulated metal <i>swinging doors</i> , including fire-rated <i>doors</i> , insulated access hatches, and insulated smoke vents:	3	0.50
Wood <i>doors</i> , minimum nominal thickness of 1-3/4 in. (44 mm), including panel <i>doors</i> with minimum panel thickness of 1-1/8 in. (28 mm), and solid core flush <i>doors</i> , and hollow core flush <i>doors</i> :	4	0.50
Any other wood <i>door</i> .	5	0.60
Uninsulated single layer metal <i>roll up doors</i> including fire rated <i>door</i>	6	1.45
<del>Insulated single layer metal <i>sectional doors</i>, minimum insulation nominal thickness of 1 3/8 inch; expanded polystyrene (R-4 per inch).</del>	<del>7</del>	<del>0.179</del>

Source: ASHRAE 90.1-2007, Section A7.

~~Insulated single layer metal *sectional doors*, minimum insulation nominal thickness of 1 3/8 inch; expanded polystyrene (R-4 per inch).~~ 7  
 0.179