

Proposal Summary



2022 California Energy Code (Title 24, Part 6)

Nonresidential High Performance Envelope: Opaque 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 October 24, 2019. The Statewide Utility Codes and Standards Enhancement (CASE) Team is seeking input and feedback. To provide your comments, email info@title24stakeholders.com by October 10, 2019.

Measure Description

Opaque envelope will be a prescriptive measure that requires changes to compliance software but does not require new field verification tests. This proposal looks at modifying Table 140.3-B, 140.3-C of Title 24, Part 6. This measure requires that existing assembly U-factor requirements be re-evaluated for the 2022 cycle using the latest cost parameters. All components of the opaque envelope, including walls, roofs, floors, and opaque doors will be re-evaluated using nonresidential building prototypes to determine if cost-effective reductions in U-factor are justified in all climate zones.

Draft Code Language

The proposed changes to the Standards and Reference Appendices are provided below. Changes to the 2019 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.

We are not proposing to remove any multifamily Title 24, Part 6 requirements at this time. The Multifamily Team has not decided whether they will create a table in their section or refer our tables in their sections. One potential issue is that if the multifamily codes are scattered in multiple places, it is going to create confusion to the design community and the enforcement team.

SECTION 140.0 – PERFORMANCE AND PRESCRIPTIVE COMPLIANCE APPROACHES

Nonresidential, high-rise residential and hotel/motel buildings shall comply with all of the following:

- (a) The requirements of Sections 100.0 through 110.12 applicable to the building project (mandatory measures for all buildings).
- (b) The requirements of Sections 120.0 through 130.5 (mandatory measures for nonresidential, ~~high-rise residential and hotel/motel~~ buildings).

- (c) Either the performance compliance approach (energy budgets) specified in Section 140.1 or the prescriptive compliance approach specified in Section 140.2 for the Climate Zone in which the building will be located. Climate zones are shown in FIGURE 100.1-A.

NOTE to Section 140.0(c): The Commission periodically updates, publishes, and makes available to interested persons and local enforcement agencies precise descriptions of the Climate Zones, which is available by zip code boundaries depicted in the Reference Joint Appendices along with a list of the communities in each zone.

NOTE to Section 140.0: The requirements of Sections 140.1 through 140.9 apply to newly constructed buildings. Section 141.0 specifies which requirements of Sections 140.1 through 140.9 also apply to additions or alterations to existing buildings.

NOTE: Authority: Sections 25213, 25218, 25218.5, 25402 and 25402.1, Public Resources Code.
Reference: Sections 25007, 25008, 25218.5, 25310, 25402, 25402.1, 25402.4, 25402.5, 25402.8, and 25943, Public Resources Code.

SECTION 140.3 – PRESCRIPTIVE REQUIREMENTS FOR BUILDING ENVELOPES

A building complies with this section by being designed with and having constructed to meet all prescriptive requirements in Subsection (a) and the requirements of Subsection (c) and (d) where they apply.

(a) Envelope Component Requirements.

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

- A. **Roofing Products.** Shall meet the requirements of Section 110.8 and the applicable requirements of Subsections i through ii:

- i. Nonresidential buildings:

- a. Low-sloped roofs in Climate Zones 1 through 16 shall have:

1. A minimum aged solar reflectance of 0.63 and a minimum thermal emittance of 0.75; or
2. A minimum Solar Reflectance Index (SRI) of 75.

EXCEPTION 1 to Section 140.3(a)1Aia: Wood-framed roofs in Climate Zones 3 and 5 are exempt from the requirements of Section 140.3(a)1Aia if the roof assembly has a U-factor of 0.034 or lower.

EXCEPTION 2 to Section 140.3(a)1Aia: Roof constructions with a weight of at least 25 lb/ft² over the roof membrane are exempt from the requirements of Section 140.3(a)1Aia.

EXCEPTION 3 to SECTION 140.3(a)1Aia: An aged solar reflectance less than 0.63 is allowed provided the maximum roof/ceiling U-factor in TABLE 140.3 is not exceeded.

- b. Steep-sloped roofs in Climate Zones 1 through 16 shall have a minimum aged solar reflectance of 0.20 and a minimum thermal emittance of 0.75, or a minimum SRI of 16.

- ii. **High-rise residential buildings and hotels and motels:**

- a. Low-sloped roofs in Climate Zones 9, 10, 11, 13, 14 and 15 shall have a minimum aged solar reflectance of 0.55 and a minimum thermal emittance of 0.75, or a minimum SRI of 64.

EXCEPTION to Section 140.3(a)1Aii: Roof constructions with a weight of at least 25 lb/ft² over the roof membrane.

- b. Steep-sloped roofs in Climate Zones 2 through 15 shall have a minimum aged solar reflectance of 0.20 and a minimum thermal emittance of 0.75, or a minimum SRI of 16.

TABLE 140.3 ROOF/CEILING INSULATION TRADEOFF FOR AGED SOLAR REFLECTANCE

Nonresidential			
Aged Solar Reflectance	Metal Building Climate Zone 1-16 U-factor	Wood framed and Other Climate Zone 6 & 7 U-factor	Wood Framed and Other All Other Climate Zones U-factor
0.62-0.56	0.038	0.045	0.032
0.55-0.46	0.035	0.042	0.030
0.45-0.36	0.033	0.039	0.029
0.35-0.25	0.031	0.037	0.028

EXCEPTION to Section 140.3(a)1A: Roof area covered by building integrated photovoltaic panels and building integrated solar thermal panels are not required to meet the minimum requirements for solar reflectance, thermal emittance, or SRI.

- B. **Roof Insulation.** Roofs shall have an overall assembly U-factor no greater than the applicable value in Table 140.3- B, C or D, and where required by Section 110.8 and 120.7(a)3, insulation shall be placed in direct contact with a continuous roof or drywall ceiling.
2. **Exterior Walls.** Exterior walls shall have an overall assembly U-factor no greater than the applicable value in TABLE 140.3-B, C or D.
3. **Demising Walls.** Demising walls shall meet the requirements of Section 120.7(b)7. Vertical windows in demising walls between conditioned and unconditioned spaces shall have an area-weighted average U-factor no greater than the applicable value in TABLE 140.3-B, C or D.
4. **Exterior Floors and Soffits.** Exterior floors and soffits shall have an overall assembly U-factor no greater than the applicable value in TABLE 140.3-B, C or D.
5. **Exterior Windows.** Vertical windows in exterior walls shall:
- A. Percent window area shall be limited in accordance with the applicable requirements of i and ii below:
- a west-facing area no greater than 40 percent of the gross west-facing exterior wall area, or 6 feet times the west-facing display perimeter, whichever is greater; and
 - a total area no greater than 40 percent of the gross exterior wall area, or 6 feet times the display perimeter, whichever is greater; and
- NOTE:** Demising walls are not exterior walls, and therefore demising wall area is not part of the gross exterior wall area or display perimeter, and windows in demising walls are not part of the window area.
- B. Have an area-weighted average U-factor no greater than the applicable value in TABLE 140.3-B, C or D.
- EXCEPTION to Section 140.3(a)5B:** For vertical windows containing chromogenic type glazing:
- The lower-rated labeled U-factor shall be used with automatic controls to modulate the amount of heat flow into the space in multiple steps in response to daylight levels or solar intensity; and
 - Chromogenic glazing shall be considered separately from other glazing; and
 - Area-weighted averaging with other glazing that is not chromogenic shall not be permitted.

- C. Have an area-weighted average Relative Solar Heat Gain Coefficient, RSHGC, excluding the effects of interior shading, no greater than the applicable value in TABLE 140.3-B, C or D.

For purposes of this paragraph, the Relative Solar Heat Gain Coefficient, RSHGC, of a vertical window is:

- i. The Solar Heat Gain Coefficient of the window; or
- ii. Relative Solar Heat Gain Coefficient is calculated using EQUATION 140.3-A, if the window has an overhang that extends beyond each side of the window jamb by a distance equal to the overhang's horizontal projection.

EXCEPTION 1 to Section 140.3(a)5C: An area-weighted average Relative Solar Heat Gain Coefficient of 0.56 or less shall be used for windows:

- a. That are in the first story of exterior walls that form a display perimeter; and
- b. For which codes restrict the use of overhangs to shade the windows.

EXCEPTION 2 to Section 140.3(a)5C: For vertical windows containing chromogenic type glazing:

- i. the lower-rated labeled RSHGC shall be used with automatic controls to modulate the amount of heat flow into the space in multiple steps in response to daylight levels or solar intensity; and
- ii. chromogenic glazing shall be considered separately from other glazing; and
- iii. area-weighted averaging with other glazing that is not chromogenic shall not be permitted.

NOTE: Demising walls are not exterior walls, and therefore windows in demising walls are not subject to SHGC requirements.

- D. Have an area-weighted average Visible Transmittance (VT) no less than the applicable value in TABLE 140.3-B and C, or EQUATION 140.3-B, as applicable.

EXCEPTION 1 to Section 140.3(a)5D: When the window's primary and secondary sidelit daylight zones are completely overlapped by one or more skylit daylight zones, then the window need not comply with Section 140.3(a)5D.

EXCEPTION 2 to Section 140.3(a)5D: If the window's VT is not within the scope of NFRC 200, or ASTM E972, then the VT shall be calculated according to Reference Nonresidential Appendix NA6.

EXCEPTION 3 to Section 140.3(a)5D: For vertical windows containing chromogenic type glazing:

- i. The higher rated labeled VT shall be used with automatic controls to modulate the amount of light transmitted into the space in multiple steps in response to daylight levels or solar intensity; and
- ii. Chromogenic glazing shall be considered separately from other glazing; and
- iii. Area-weighted averaging with other glazing that is not chromogenic shall not be permitted.

NOTE: Demising walls are not exterior walls, and therefore windows in demising walls are not subject to VT requirements.

EQUATION 140.3-A RELATIVE SOLAR HEAT GAIN COEFFICIENT, RSHGC

$$RSHGC = SHGC_{win} \times \left[1 + \frac{aH}{V} + b \left(\frac{H}{V} \right)^2 \right]$$

WHERE:

RSHGC = Relative Solar Heat Gain Coefficient.

SHGC_{win} = Solar Heat Gain Coefficient of the window.

- H = Horizontal projection of the overhang from the surface of the window in feet, but no greater than V.
- V = Vertical distance from the window sill to the bottom of the overhang in feet.
- a = -0.41 for north-facing windows, -1.22 for south-facing windows, and -0.92 for east and west-facing windows.
- b = 0.20 for north-facing windows, 0.66 for south-facing windows, and 0.35 for east and west-facing windows.

EQUATION 140.3-B VERTICAL FENESTRATION MINIMUM VT

$$VT \geq 0.11 / WWR$$

WHERE:

WWR = Window Wall Ratio, the ratio of (i) the total window area of the entire building to (ii) the total gross exterior wall area of the entire building. If the WWR is greater than 0.40, then 0.40 shall be used as the value for WWR in EQUATION 140.3-B.

VT = Visible Transmittance of framed window.

6. **Skylights.** Skylights shall:

A. Have an area no greater than 5 percent of the gross exterior roof area Skylight Roof Ratio (SRR); and
EXCEPTION to Section 140.3(a)6A: Buildings with an atria over 55 feet high shall have a skylight area no greater than 10 percent of the gross exterior roof area.

B. Have an Area-Weighted Performance Rating U-factor no greater than the applicable value in TABLE 140.3-B, C or D.

EXCEPTION to Section 140.3(a)6B: For skylights containing chromogenic type glazing:

- i. the lower-rate labeled U-factor shall be used with automatic controls to modulate the amount of U-factor heat flow into the space in multiple steps in response to daylight levels or solar intensity; and
- ii. chromogenic glazing shall be considered separately from other glazing; and
- iii. area-weighted averaging with other glazing that is not chromogenic shall not be permitted.

C. Have an area-weighted performance rating Solar Heat Gain Coefficient no greater than the applicable value in TABLE 140.3-B, C or D.

EXCEPTION to Section 140.3(a)6C: For skylights containing chromogenic type glazing:

- i. the lower-rated labeled SHGC shall be used with automatic controls to modulate the amount of heat flow into the space in multiple steps in response to daylight levels or solar intensity; and
- ii. chromogenic glazing shall be considered separately from other glazing; and
- iii. area-weighted averaging with other glazing that is not chromogenic shall not be permitted.

D. Have an Area-Weighted Performance Rating VT no less than the applicable value in TABLE 140.3-B or C; and

EXCEPTION to Section 140.3(a)6D: For skylights containing chromogenic type glazing:

- i. the higher-rated labeled VT shall be used with automatic controls to modulate the amount of light transmitted into the space in multiple steps in response to daylight levels or solar intensity and;
 - ii. chromogenic glazing shall be considered separately from other glazing; and
 - iii. area-weighted averaging with other glazing that is not chromogenic shall not be permitted.
- E. Have a glazing material or diffuser that has a measured haze value greater than 90 percent, determined according to ASTM D1003, or other test method approved by the Energy Commission.

EXCEPTION to Section 140.3(a)6E: Skylights designed and installed to exclude direct sunlight entering the occupied space by the use of fixed or automated baffles or the geometry of the skylight and light well.

7. **Exterior doors.** All exterior doors that separate conditioned space from unconditioned space or from ambient air shall have a U-factor not greater than the applicable value in TABLE 140.3-B, C or D. Doors that are more than one-half glass in area are considered Glazed Doors.
8. **Relocatable Public School Buildings.** In complying with Sections 140.3(a)1 to 7 shall meet the following:
- A. Relocatable public school buildings shall comply with TABLE 140.3-B for a specific Climate Zone when the manufacturer or builder of the relocatable public school building certifies that the building is intended for use only in a specific Climate Zone; or
 - B. Relocatable public school buildings shall comply with TABLE 140.3-D for any Climate Zone when the manufacturer or builder of the relocatable public school building certifies that the building is intended for use in any Climate Zone; and
 - C. The manufacturer or builder of a relocatable public school building shall certify that components of the building comply with requirements of this section by:
 - i. The placement of two (2) metal identification labels on the building, one mechanically fastened and visible from the exterior and the other mechanically fastened to the interior frame above the ceiling at the end of the module, both labels stating (in addition to any other information by the Division of the State Architect or other law) "Complies with Title 24, Part 6 for all Climate Zones"; and
 - ii. Identification of the location of the 2 labels on the plans submitted to the enforcing agency.
9. **Air Barrier.** To meet the requirement of TABLE 140.3-B, all buildings shall have a continuous air barrier that is designed and constructed to control air leakage into, and out of, the building's conditioned space. The air barrier shall be sealed at all joints for its entire length and shall be composed of:
- A. Materials that have an air permeance not exceeding 0.004 cfm/ft², under a pressure differential of 0.3 in. of water (1.57 psf) (0.02 L/(sec-m²) at 75 pa), when tested in accordance with ASTM E2178; or
- EXCEPTION to Section 140.3(a)9A:** Materials in TABLE 140.3-A shall be deemed to comply with Section 140.3(a)9A provided if all joints are sealed and all of the materials are installed as air barriers in accordance with the manufacturer's instructions.

TABLE 140.3-A MATERIALS DEEMED TO COMPLY WITH SECTION 140.3(a)9A

	MATERIALS AND THICKNESS		MATERIALS AND THICKNESS
1	Plywood – min. 3/8 inches thickness	9	Built up roofing membrane
2	Oriented strand board – min. 3/8 inches thickness	10	Modified bituminous roof membrane
3	Extruded polystyrene insulation board – min. ½ inches thickness	11	Fully adhered single-ply roof membrane
4	Foil-back polyisocyanurate insulation board – min. ½ inches thickness	12	A Portland cement or Portland sand parge, or a gypsum plaster, each with min. 5/8 inches thickness
5	Closed cell spray foam with a minimum density of 2.0 pcf and a min. 2.0 inches thickness	13	Cast-in-place concrete, or precast concrete
6	Open cell spray foam with a density no less than 0.4 pcf and no greater than 1.5 pcf, and a min. 5½ inches thickness	14	Fully grouted concrete block masonry
7	Exterior or interior gypsum board min. 1/2 inches thickness	15	Sheet steel or sheet aluminum
8	Cement board – min. 1/2 inches thickness	---	-----

- B. Assemblies of materials and components that have an average air leakage not exceeding 0.04 cfm/ft², under a pressure differential of 0.3 in. of water (1.57 psf) (0.2 L/m² at 75 pa), when tested in accordance with ASTM E2357, ASTM E1677, ASTM E1680, or ASTM E283; or

EXCEPTION to Section 140.3(a)9B: The following materials shall be deemed to comply with Section 140.3(a)9B if all joints are sealed and all of the materials are installed as air barriers in accordance with the manufacturer's instructions:

- i. Concrete masonry walls that have at least two coatings of paint or at least two coatings of sealer coating.
 - ii. Concrete masonry walls with integral rigid board insulation.
 - iii. Structurally Insulated Panels.
 - iv. Portland cement or Portland sand parge, or stucco, or a gypsum plaster, each with min. 1/2 inches thickness
- C. The entire building has an air leakage rate not exceeding 0.40 cfm/ft² at a pressure differential of 0.3 in of water (1.57 psf) (2.0 L/ m² at 75 pa), when the entire building is tested, after completion of construction, in accordance with ASTM E779 or another test method approved by the Commission.

EXCEPTION to Section 140.3(a)9: Relocatable Public School Buildings.

TABLE 140.3-B – PRESCRIPTIVE ENVELOPE CRITERIA FOR NONRESIDENTIAL BUILDINGS (INCLUDING RELOCATABLE PUBLIC SCHOOL BUILDINGS WHERE MANUFACTURER CERTIFIES USE ONLY IN SPECIFIC CLIMATE ZONE; NOT INCLUDING HIGH-RISE RESIDENTIAL BUILDINGS AND GUEST ROOMS OF HOTEL/MOTEL BUILDINGS)

		Climate Zone																	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		
Envelope	Maximum U-factor	Roofs/ Ceilings	Metal Building	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	
			Wood Framed and Other	0.034	0.034	0.034	0.034	0.034	0.049	0.049	0.049	0.034	0.034	0.034	0.034	0.034	0.034	0.034	
		Walls	Metal Building	0.113	0.061	0.113	0.061	0.061	0.113	0.113	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.057	0.061
			Metal-framed	0.069	0.062	0.082	0.062	0.062	0.069	0.069	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062
			Mass Light ¹	0.196	0.170	0.278	0.227	0.440	0.440	0.440	0.440	0.440	0.170	0.170	0.170	0.170	0.170	0.170	0.170
			Mass Heavy ¹	0.253	0.650	0.650	0.650	0.650	0.690	0.690	0.690	0.690	0.650	0.184	0.253	0.211	0.184	0.184	0.160
			Wood-framed and Other	0.095	0.059	0.110	0.059	0.102	0.110	0.110	0.102	0.059	0.059	0.045	0.059	0.059	0.059	0.042	0.059
		Floors/ Soffits	Raised Mass	0.092	0.092	0.269	0.269	0.269	0.269	0.269	0.269	0.269	0.092	0.092	0.092	0.092	0.092	0.092	0.058
	Other		0.048	0.039	0.071	0.071	0.071	0.071	0.071	0.071	0.071	0.039	0.071	0.071	0.039	0.039	0.039	0.039	
	Roofing Products	Low-sloped	Aged Solar Reflectance	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	
			Thermal Emittance	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	
		Steep-Sloped	Aged Solar Reflectance	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	
			Thermal Emittance	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	
	Air Barrier		NR	NR	NR	NR	NR	NR	NR	NR	NR	REQ	REQ	REQ	REQ	REQ	REQ	REQ	
	Exterior Doors, Maximum U-factor		Non-Swinging	0.50	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	0.50	
			Swinging	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	

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CONTINUED: TABLE 140.3-B – PRESCRIPTIVE ENVELOPE CRITERIA FOR NONRESIDENTIAL BUILDINGS (INCLUDING RELOCATABLE PUBLIC SCHOOL BUILDINGS WHERE MANUFACTURER CERTIFIES USE ONLY IN SPECIFIC CLIMATE ZONE; NOT INCLUDING HIGH-RISE RESIDENTIAL BUILDINGS AND GUEST ROOMS OF HOTEL/MOTEL BUILDINGS)

		All Climate Zones				
			Fixed Window	Operable Window	Curtainwall or Storefront	Glazed Doors ²
Vertical	Area-Weighted Performance Rating	Max U-factor	0.36	0.46	0.41	0.45
		Max RSHGC	0.25	0.22	0.26	0.23
	Area-Weighted Performance Rating	Min VT	0.42	0.32	0.46	0.17
	Maximum WWR%	40%				
Skylights			Glass, Curb Mounted	Glass, Deck Mounted	Plastic, Curb Mounted	Tubular Daylighting Devices (TDDs)
	Area-Weighted Performance Rating	Max U-factor	0.58	0.46	0.88	0.88
		Max SHGC	0.25	0.25	NR	NR
	Area-Weighted Performance Rating	Min VT (Min VT _{annual} for TDDs)	0.49	0.49	0.64	0.38
	Maximum SRR%	5%				

TABLE 140.3-C – PRESCRIPTIVE ENVELOPE CRITERIA FOR HIGH-RISE RESIDENTIAL BUILDINGS AND GUEST ROOMS OF HOTEL/MOTEL BUILDINGS

			Climate Zone																	
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		
Envelope	Maximum U-factor	Roofs/Ceilings	Metal Building	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041		
			Wood Framed and Other	0.028	0.028	0.034	0.028	0.034	0.034	0.039	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.028		
		Walls	Metal Building	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.057	0.057	0.057	0.057	0.057	0.057	
				Metal-framed	0.069	0.069	0.069	0.069	0.069	0.069	0.105	0.069	0.069	0.069	0.069	0.069	0.069	0.048	0.069	
				Mass, Light ¹	0.170	0.170	0.170	0.170	0.170	0.227	0.227	0.227	0.196	0.170	0.170	0.170	0.170	0.170	0.170	
				Mass, Heavy ¹	0.160	0.160	0.160	0.184	0.211	0.690	0.690	0.690	0.690	0.690	0.184	0.253	0.211	0.184	0.184	0.160
		Wood-framed and Other	0.059	0.059	0.059	0.059	0.059	0.059	0.059	0.059	0.059	0.059	0.042	0.059	0.059	0.042	0.042	0.042		
		Floors/Soffits	Raised Mass ¹	0.045	0.045	0.058	0.058	0.058	0.069	0.092	0.092	0.092	0.069	0.058	0.058	0.045	0.058	0.037		
			Other	0.034	0.034	0.039	0.039	0.039	0.039	0.071	0.039	0.039	0.039	0.039	0.039	0.034	0.039	0.034		
	Roofing Products	Low-sloped	Aged Solar Reflectance	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.55	0.55	0.55	NR	0.55	0.55	0.55	NR
				Thermal Emittance	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.75	0.75	0.75	NR	0.75	0.75	0.75
		Steep-Sloped	Aged Solar Reflectance	NR	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	NR
				Thermal Emittance	NR	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
	Exterior Doors, Maximum U-factor	Non-Swinging	0.50	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	0.50	
Swinging		0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70		

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CONTINUED: TABLE 140.3-C – PRESCRIPTIVE ENVELOPE CRITERIA FOR HIGH-RISE RESIDENTIAL BUILDINGS AND GUEST ROOMS OF HOTEL/MOTEL BUILDINGS

Envelope	Fenestration	All Climate Zones				
			Fixed Window	Operable Window	Curtainwall/Storefront	Glazed Doors ²
Vertical	Area-Weighted Performance Rating	Max U-factor	0.36	0.46	0.41	0.45
		Max RSHGC	0.25	0.22	0.26	0.23
	Area-Weighted Performance Rating	Min VT	0.42	0.32	0.46	0.17
	Maximum WWR%	40%				
Skylights			Glass, Curb Mounted	Glass, Deck Mounted	Plastic, Curb Mounted	
	Area-Weighted Performance Rating	Max U-factor	0.58	0.46	0.88	
		Max SHGC	0.25	0.25	NR	
	Area-Weighted Performance Rating	Min VT	0.49	0.49	0.64	
	Maximum SRR%	5%				
Notes: 1. As defined in Section 100.0, light mass walls are walls with a heat capacity of at least 7.0 Btu/ft ² -oF and less than 15.0 Btu/ft ² -oF. Heavy mass walls are walls with a heat capacity of at least 15.0 Btu/ft ² -oF. 2. Glazed Doors applies to both site-built and to factory-assembled glazed doors.						

