

SECTION 143 – PRESCRIPTIVE REQUIREMENTS FOR BUILDING ENVELOPES

A building complies with this section by being designed with and having constructed and installed either (1) envelope components that comply with each of the requirements in Subsection (a) for each individual component and the requirements of Subsection (c) where they apply, or (2) an envelope that complies with the overall requirements in Subsection (b) and the requirements of Subsection (c) where they apply. When making calculations under Subsection (a) or (b), all of the rules listed in Section 141(c)1, 4, and 5 shall apply.

(a) Envelope Component Approach.

1. Exterior roofs and ceilings. Exterior roofs and ceilings shall:

- A. Roofs. All roofing products shall meet the requirements of 118 and the applicable requirements of Subsections i through iii:
 - i. Nonresidential buildings with low-sloped roofs in climate zones 2-15 shall have a minimum 3-year aged solar reflectance of 0.55 and a minimum thermal emittance of 0.75, or a minimum aged SRI of 64.
 - ~~1. EXCEPTION 1 TO SECTION 143(a)1Ai:~~ Wood-framed roofs in climate zones 3 and 5 are exempt from the minimum requirements for solar reflectance and thermal emittance or SRI if the roof assembly has a U-factor of 0.039 or lower.
 - ~~2. EXCEPTION 2 TO SECTION 143(a)1Ai:~~ Metal building roofs in climate zones 3 and 5 are exempt from the minimum requirements for solar reflectance and thermal emittance or SRI if the roof assembly has a U-factor of 0.048 or lower.
 - ~~3. EXCEPTION 3 TO SECTION 143(a)1Ai:~~ Roof area covered by ~~B~~building integrated photovoltaic panels and ~~building integrated solar thermal~~ [Payam B1]panels are ~~exempt not required to meet from~~ the minimum requirements for solar reflectance and thermal emittance or SRI.
 - ~~4. EXCEPTION 4 TO SECTION 143(a)1Ai:~~ Roof constructions that have thermal mass over the roof membrane with a weight of at least 25 lb/ft².
 - ii. Nonresidential steep-sloped roofs with roofing products that have a roof weight of less than five pounds per square foot in climate zones 2-16 shall have a minimum 3-year aged solar reflectance of 0.20 and a minimum thermal emittance of 0.75, or a minimum SRI of [CEC2]16. Steep-sloped roofing products that have a roof weight of five pounds per square foot or more in climate zones 1 through 16 shall have a minimum 3-year aged reflectance of 0.15 and a minimum emittance of 0.75, or a minimum SRI of 10
 - iii. High-rise residential buildings and hotels and motels with low-sloped roofs in climate zones 10, 11, 13, 14, and 15 shall have a minimum 3-year aged solar reflectance of 0.55 and a minimum thermal emittance of 0.75, or a minimum SRI of 64.
- B. Have insulation placed in direct contact with a continuous roof or drywall ceiling where required by Section 118(e); and
- C. Have an overall assembly U-factor no greater than the applicable value in TABLE 143-A, TABLE 143-B, or TABLE 143-C.²

2. **Exterior walls.** Exterior walls shall have ~~either an installed insulation R-value no less than, or~~ an overall assembly U-factor no greater than the applicable value in -TABLE 143-A, TABLE 143-B, or TABLE 143-C.
3. **Demising walls.** Demising walls shall meet the requirements of Section 118(f).
4. **External floors and soffits.** External floors and soffits shall have ~~either an installed insulation R-value no less than, or~~ an overall assembly U-factor no greater than, the applicable value in TABLE 143-A, TABLE 143-B, or TABLE 143-C.
5. **Windows.** Windows shall:

- A. Have (1) a west-facing area no greater than 40 percent of the gross west-facing exterior wall area, or six feet times the west-facing display perimeter, whichever is greater; and (2) a total area no greater than 40 percent of the gross exterior wall area, or six feet times the display perimeter, whichever is greater; and

EXCEPTION to Section 143(a)5A: Window area in demising walls is not counted as part of the window area for this requirement. Demising wall area is not counted as part of the gross exterior wall area or display perimeter.

- B. Have a U-factor no greater than the applicable value in TABLE 143-A, TABLE 143-B, or TABLE 143-C; and
- C. Have a relative solar heat gain, excluding the effects of interior shading, no greater than the applicable value in TABLE 143-A, TABLE 143-B, or TABLE 143-C. The relative solar heat gain of windows is:
 - i. The solar heat gain coefficient of the windows; or
 - ii. Relative solar heat gain as calculated by EQUATION 143-A, if an overhang extends beyond both sides of the window jamb a distance equal to the overhang projection.

EXCEPTION to Section 143(a)5C: The applicable "north" value for relative solar heat gain in TABLE 143-A, TABLE 143-B, or TABLE 143-C or 0.56, whichever is greater, 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.

EQUATION 143-A RELATIVE SOLAR HEAT GAIN

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

WHERE:

RSHG = Relative solar heat gain.

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.

6. **Skylights.** Skylights shall:

- A. Have an area no greater than five percent of the gross exterior roof area; and

EXCEPTION to Section 143(a)6A: Atria over 55 feet high shall have a skylight area no greater than 10 percent of the gross exterior roof area.

- B. Have a U-factor no greater than the applicable value in TABLE 143-A, TABLE 143-B, or TABLE 143-C; and
- C. Have a solar heat gain coefficient no greater than the applicable value in TABLE 143-A, TABLE 143-B, or TABLE 143-C.

7. **Exterior doors.** All exterior doors for conditioned spaces shall have a U-factor not greater than the applicable value in TABLE 143-A, TABLE 143-B or TABLE 143-C.

8. **Relocatable Public School Buildings.** In complying with Sections 143(a)1 to 7, relocatable public school buildings shall comply either with TABLE 143-A, including the non-north window RSHG and skylight SHGC requirements, when the manufacturer/builder certifies that the relocatable building is manufactured only for use in a specific climate

zone(s) and that the relocatable building can not be lawfully used in other climate zones or with TABLE 143-C when the manufacturer/builder certifies that the relocatable building is manufactured for use in any climate zone. When the relocatable building complies with TABLE 143-C for use in more than one climate zone, the relocatable building shall meet the most stringent requirements for each building component in all of the climate zones for which the relocatable building is certified.

The manufacturer/builder shall place two metal identification labels on each relocatable building module, 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. In addition to information required by the Division of the State Architect (DSA), the labels shall state either "Complies with Title 24, Part 6 for all Climate Zones" or "Complies with Title 24, Part 6 for Climate Zones" and then list all of the climate zones for which the manufacturer has manufactured the relocatable building to comply. The location of the identification labels shall be shown on the building plans.

~~NOTE: Section 143(a)8 applies to all relocatable buildings for which an application for approval of original construction or for approval of alteration to the building envelope, space conditioning, lighting or water heating components of the relocatable building is submitted after the effective date of the 2004 California Energy Code.~~

TABLE 143-A – 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
Roofs/Ceilings	Metal Building ¹		0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065	
	Wood Framed and Other		0.049	0.039	0.039	0.039	0.049	0.075	0.067	0.067	0.039	0.039	0.039	0.039	0.039	0.039	0.039	
Roofing Products	Low-sloped	Aged Reflectance	NR	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	NR	
		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	NR	
	Steep Sloped (less than 5 lb/ft ²)	Aged 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	
		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	
Steep Sloped (5 lb/ft ² or more)	Aged Reflectance	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15		
		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		
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	0.057	0.061	
	Metal-framed		0.098	0.062	0.082	0.062	0.062	0.098	0.098	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	
	Mass Light		0.196	0.170	0.278	0.227	0.44	0.44	0.44	0.44	0.44	0.170	0.170	0.170	0.170	0.170	0.170	
	Mass Heavy		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	
	Wood-framed and Other		0.102	0.059	0.110	0.059	0.102	0.110	0.110	0.102	0.059	0.059	0.059	0.059	0.059	0.059	0.042	
Floors/Soffits	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	0.058	
	Other		0.048	0.039	0.071	0.071	0.071	0.071	0.071	0.071	0.071	0.071	0.039	0.071	0.071	0.039	0.039	
Windows	U-factor		0.47	0.47	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.47	0.47	0.47	0.47	0.47	0.47	
	RSHG North	0-10% WWR	0.72	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.72	
		10-20% WWR	0.49	0.51	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.51	0.51	0.51	0.51	0.51	0.49	
		20-30% WWR	0.47	0.47	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.47	0.47	0.47	0.47	0.47	0.47	
		30-40% WWR	0.47	0.47	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.47	0.47	0.47	0.47	0.40	0.40	
	RSHG Non-North	0-10% WWR	0.49	0.47	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.47	0.47	0.47	0.47	0.46	0.46	
		10-20% WWR	0.43	0.36	0.55	0.55	0.55	0.61	0.61	0.61	0.61	0.36	0.36	0.36	0.36	0.36	0.43	
		20-30% WWR	0.43	0.36	0.41	0.41	0.41	0.39	0.39	0.39	0.39	0.36	0.36	0.36	0.36	0.36	0.43	
30-40% WWR		0.43	0.31	0.41	0.41	0.41	0.34	0.34	0.34	0.34	0.31	0.31	0.31	0.31	0.31	0.43		
Doors, 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	
Skylight	U-factor	Glass, curb	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	
		Glass, no curb	0.68	0.68	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.68	0.68	0.68	0.68	0.68	0.68	
		Plastic	1.04	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.04	
	SHGC	Glass, 0-2%	NR	0.46	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.46	0.46	0.46	0.46	0.46	NR	
		Glass, 2.1-5%	NR	0.36	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.36	0.36	0.36	0.36	0.36	NR	
		Plastic, 0-2%	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	
		Plastic, 2.1-5%	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	

- Notes:
- Mass, Light walls are defined as having a heat capacity greater than or equal to 7.0 Btu/h-ft² and less than 15.0 Btu/h-ft². Heavy mass walls are defined as having a heat capacity greater than or equal to 15.0 Btu/h-ft².
 - No skylight SHGC requirements are defined for climate zones 1 and 16. A climate zone without a requirement is designated as “NR”.

TABLE 143-B – 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	
Roofs/Ceilings	Metal Building ²		0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065	
	Wood Framed and Other		0.034	0.028	0.039	0.028	0.039	0.039	0.039	0.039	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.028	
Roofing Products	Low-sloped	Aged Reflectance	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.55	0.55	NR	0.55	0.55	0.55	NR
		Emittance	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.75	0.75	NR	0.75	0.75	0.75
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 ³		0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	
	Mass Light		0.170	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		0.160	0.160	0.160	0.184	0.211	0.690	0.690	0.690	0.690	0.690	0.690	0.184	0.253	0.211	0.184	0.184	
		Wood-framed and Other[CE3]	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	Mass		0.045	0.045	0.058	0.058	0.058	0.069	0.092	0.092	0.092	0.069	0.058	0.058	0.058	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	0.039	0.034	0.039	0.034	
Windows	U-factor		0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	
	RSHG North	0-10% WWR	0.68	0.49	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.49	0.49	0.49	0.49	0.47	0.47	0.68
		10-20% WWR	0.68	0.49	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.49	0.49	0.49	0.49	0.43	0.43	0.68
		20-30% WWR	0.47	0.40	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.40	0.40	0.40	0.40	0.43	0.43	0.47
		30-40% WWR	0.47	0.40	0.55	0.55	0.55	0.61	0.61	0.61	0.61	0.61	0.40	0.40	0.40	0.40	0.41	0.41	0.47
	RSHG Non-North	0-10% WWR	0.46	0.46	0.41	0.41	0.41	0.47	0.47	0.47	0.47	0.47	0.46	0.46	0.46	0.46	0.36	0.36	0.46
		10-20% WWR	0.46	0.46	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.46	0.46	0.46	0.46	0.31	0.31	0.46
		20-30% WWR	0.36	0.36	0.31	0.31	0.31	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.26	0.26	0.36
30-40% WWR		0.30	0.30	0.26	0.26	0.26	0.31	0.31	0.31	0.31	0.31	0.30	0.30	0.30	0.30	0.26	0.26	0.30	
Doors, 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	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	
Skylight	U-factor	Glass, curb	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	
		Glass, no curb	0.68	0.68	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.68	0.68	0.68	0.68	0.68	0.68	
		Plastic	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	
	SHGC	Glass, 0-2%	0.46	0.46	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.46	0.46	0.46	0.46	0.46	0.46	
		Glass, 2.1-5%	0.36	0.32	0.32	0.32	0.32	0.40	0.40	0.40	0.40	0.40	0.32	0.32	0.32	0.32	0.31	0.31	
		Plastic, 0-2%	0.69	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	
		Plastic, 2.1-5%	0.55	0.34	0.39	0.39	0.39	0.39	0.57	0.57	0.57	0.57	0.34	0.34	0.34	0.34	0.27	0.27	

Notes:

1. Mass, Light walls are defined as having a heat capacity greater than or equal to 7.0 Btu/h-ft² and less than 15.0 Btu/h-ft². Heavy mass walls are defined as having a heat capacity greater than or equal to 15.0 Btu/h-ft².
2. No skylight SHGC requirements are defined for climate zones 1 and 16. A climate zone without a requirement is designated as “NR”.

TABLE 143-C PRESCRIPTIVE ENVELOPE CRITERIA FOR RELOCATABLE PUBLIC SCHOOL BUILDINGS WHERE MANUFACTURER CERTIFIES USE IN ALL CLIMATE ZONES

		ALL CLIMATE ZONES
Roof/Ceiling U-factor		
Metal Building		0.048
Wood-framed and other		0.039
Roofing Products – Aged Reflectance/Emittance		
Low-Sloped		0.55/0.75
Steep-Sloped – Less than 5 lb/ft ²		0.20/0.75
5 lb/ft ² or more		0.15/0.75
Wall U-factor		
Wood frame		0.059
Metal frame		0.062
Metal building		0.057
Mass/7.0 ≤ HC		0.170
Other		0.059
Floor/Soffit U-factor		
Wood-Framed and Other		0.048
Windows		
U-factor		0.47
Relative solar heat gain		
0-10% WWR		0.36
11-20% WWR		0.31
21-30% WWR		0.26
31-40% WWR		0.26
Skylights		
Doors, U-factor	Non-Swinging	0.50
	Swinging	0.70
U-factor	Glass w/Curb	0.99
	Glass wo/Curb	0.57
	Plastic w/Curb	0.87
SHGC Glass	0-2%	0.46
	2.1-5%	0.36
SHGC Plastic	0-2%	0.69
	2.1-5%	0.57

Note: Construction assembly U-factors shall be calculated in accordance with Reference Joint Appendix JA4.

[†] R-value cannot be used for compliance when roof has metal framing members or a metal deck unless additional rigid insulation is installed. See Section 143(a)1C.

- (b) **Overall Envelope TDV Energy Approach.** ~~Overall TDV Energy.~~ The total TDV Energy of the overall envelope of the proposed building, TDV_{prop} , shall be no greater than the total TDV Energy of the overall envelope of a standard building, TDV_{std} , as calculated in Reference Nonresidential Appendix NA5 “Envelope Tradeoff Procedure”. In making the calculations, it shall be assumed that the orientation and area of each envelope component of the standard building are the same as in the proposed building. If the proposed building has Window-Wall-Ratio greater than 40% or Skylight-Roof-Ratio greater than 5%, the area of walls and windows or roofs and skylights will be adjusted accordingly in the standard building to cap the WWR at 40% and SRR at 5%.

WHERE:

$$\begin{aligned}
 HG_{std} &= \sum_{i=1}^{nW} (A_{Wi} \times U_{Wi_{std}} \times TF_i) + \sum_{i=1}^{nF} (A_{Fi} \times U_{Fi_{std}} \times TF_i) + \sum_{i=1}^{nR} (A_{Ri} \times U_{Ri_{std}} \times TF_i) \\
 &+ \sum_{i=1}^{nG} (A_{Gi} \times U_{Gi_{std}} \times TF_i) + \sum_{i=1}^{nS} (A_{Si} \times U_{Si_{std}} \times TF_i) + \sum_{i=1}^{nG} (WF_{Gi} \times A_{Gi} \times RSHG_{Gi_{std}}) \times SF \\
 &+ \sum_{i=1}^{nS} (WF_{Si} \times A_{Si} \times SHGC_{Si_{std}}) \times SF + \sum_{i=1}^{nR} (WF_{Ri} \times A_{Ri} \times U_{Ri_{std}} \times [1 - (0.2 + 0.7[\rho_{Ri_{std}} - 0.2])]) \times SF
 \end{aligned}$$

$$\begin{aligned}
 HG_{prop} &= \sum_{j=1}^{nW} (A_{Wj} \times U_{Wj_{prop}} \times TF_j) + \sum_{j=1}^{nF} (A_{Fj} \times U_{Fj_{prop}} \times TF_j) + \sum_{j=1}^{nR} (A_{Rj} \times U_{Rj_{prop}} \times TF_j) \\
 &+ \sum_{j=1}^{nG} (A_{Gj} \times U_{Gj_{prop}} \times TF_j) + \sum_{j=1}^{nS} (A_{Sj} \times U_{Sj_{prop}} \times TF_j) + \sum_{j=1}^{nG} (WF_{Gj} \times A_{Gj} \times SHGC_{Gj_{prop}} \times OHE_j) \times SF \\
 &+ \sum_{j=1}^{nS} (WF_{Sj} \times A_{Sj} \times SHGC_{Sj_{prop}}) \times SF + \sum_{j=1}^{nR} (WF_{Rj} \times A_{Rj} \times U_{Rj_{prop}} \times [1 - (0.2 + 0.7[\rho_{Ri_{prop}} - 0.2])]) \times SF
 \end{aligned}$$

(c) **Minimum Skylight Area for Large Enclosed Spaces in Buildings with Three or Fewer Stories.** In climate zones 2 through 15, low rise conditioned or unconditioned enclosed spaces that are greater than 8,000 ft² directly under a roof with ceiling heights greater than 15 feet, ~~and have a lighting power density for general lighting equal to or greater than 0.5 W/ft²~~ shall meet sections 143(c)1-4 below. ~~For all S-1 and S-2 (storage) occupancies and all F-1 and F-2 (factory) occupancies: (a) a ceiling height of greater than 15 feet shall be assumed when the roof height is greater than 15 feet, and (b) the general lighting power density shall be assumed to be greater than 0.5 W/ft² when a completed general lighting plan for the entire space is not provided.~~

1. **Daylit Area.** At least one half of the floor area shall be in the skylit area under skylights and the skylit area shall be shown on the building plans. Skylit area is defined in Section 101.
2. **Minimum Skylight Area or Effective Aperture.** Areas that are skylit shall have a minimum skylight area to skylit area ratio of at least 3.3% or minimum skylight effective aperture of at least 1.1% . Skylight effective aperture shall be determined as specified in Equation 146-C.
3. **Skylight Characteristics.** Skylights shall:
 - A. Have a glazing material or diffuser that has a measured haze value greater than 90%, tested according to ASTM D1003 (notwithstanding its scope) or other test method approved by the Commission; and
 - B. If the space is conditioned, meet the requirements in Section 143(a)6 or 143(b).
4. **Controls.** Electric lighting in the daylit area shall be controlled as described in Section 131(c)2.

EXCEPTION 1 to Section 143(c): Auditoriums, churches, movie theaters, museums, and refrigerated warehouses.

EXCEPTION 2 to Section 143(c): In buildings with unfinished interiors, future enclosed spaces where it is planned to have less than or equal to 8,000 square feet of floor area, or ceiling heights less than or equal to 15 feet, based on proposed future interior wall and ceiling locations as delineated in the plans. This exception shall not apply to these future enclosed spaces when interior walls and ceilings are installed for the first time, the enclosed space floor area is greater than 8,000 square feet, and the ceiling height is greater than 15 feet (see Section 149(b)1M). This exception shall not be used for S-1 or S-2 (storage), or for F-1 or F-2 (factory) occupancies.

EXCEPTION 3 to Section 143(c): Enclosed spaces having a designed general lighting system with a lighting power density less than 0.5 watts per square foot.

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- ¹ The metal building U-factors have been made consistent with ASHRAE 90.1-2004 and 2007. The proposed U-factors are justified by life-cycle cost cost analysis.
 - ² The metal building U-factors have been made consistent with ASHRAE 90.1-2004 and 2007. The proposed U-factors are justified by life-cycle cost cost analysis.
 - ³ The metal framed U-factors for high rise residential and hotels are based on R-13 in the cavity, 16 in. stud spacing and R-5 continuous insulation. The life-cycle cost analysis supports a more stringent standard.