

# Substantiating Documents for Public Comments Received on 2024 NGBS Draft 3

November 22, 2024

## Contents

PC303 - NGBS Draft 3 Comments

PC304 - 2021 IECC Table



**Home Innovation**  
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## *2024 UPDATE*

PC303- NGBS Draft 3 Comments

**703.2 Building envelope**

**703.2.1 UA improvement.** The total building thermal envelope UA is less than or equal to the baseline total UA resulting from the U-factors provided in Table 703.2.1(a) or IECC Tables C402.1.4 R402.1.2 and C402.4, as applicable. Where insulation is used to achieve the UA improvement, the insulation installation is in accordance with Grade 1 complying with § 701.4.3.2.1 as verified by a third-party. Total UA is documented using a REScheck, COMcheck, or equivalent report to verify the baseline and the UA improvement.

*(Unstrike table shown below)*

**Table 703.2.1(a)  
Baseline U-Factors<sup>a</sup>**

Climate Zone	Fenestration U-Factor	Skylight U-Factor	Ceiling U-Factor	Frame Wall U-Factor	Mass Wall U-Factor <sup>b</sup>	Floor U-Factor	Basement Wall U-Factor	Crawlspace Wall U-Factor <sup>c</sup>
1	0.50	0.75	0.035	0.084	0.197	0.064	0.360	0.477
2	0.40	0.65	0.026	0.084	0.165	0.064	0.360	0.477
3	0.30	0.55	0.026	0.060	0.098	0.047	0.091 <sup>c</sup>	0.136
4 except Marine	0.30	0.55	0.024	0.045	0.098	0.047	0.059	0.065
5 and Marine 4	0.30	0.55	0.024	0.045	0.082	0.033	0.050	0.055
6	0.30	0.55	0.024	0.045	0.060	0.033	0.050	0.055
7 and 8	0.30	0.55	0.024	0.045	0.057	0.028	0.050	0.055

a. Non-fenestration U-factors shall be obtained from measurement, calculation, or an approved source.  
 b. Where more the half the insulation is on the interior, the mass wall U-factors is not greater than 0.17 in Zone 1, 0.14 in Zone 2, 0.12 in Zone 3, 0.10 in Zone 4 except in Marine, and the same as the frame wall U-factor in Marine Zone 4 and Zones 5 through 8.  
 — Basement wall U-factor of 0.360 in warm-humid locations.  
 c. — Note: See Appendix E for SI units.

(Strike table below)

**Table 703.2.1(a)**  
Baseline U-Factors<sup>a</sup>

CLIMATE ZONE	FENESTRATION U-FACTOR <sup>b</sup>	SKYLIGHT <sup>b</sup> U-FACTOR	GLAZED FENESTRATION SHGC <sup>b, e</sup>	CEILING R-VALUE	WOOD FRAME WALL R-VALUE	MASS WALL R-VALUE <sup>f</sup>	FLOOR R-VALUE	BASEMENT <sup>c</sup> WALL R-VALUE	SLAB <sup>d</sup> R-VALUE & DEPTH	CRAWLSPACE <sup>c</sup> WALL R-VALUE
1	NR	0.75	0.25	30	13	3/4	13	0	0	0
2	0.40	0.65	0.25	38	13	4/6	13	0	0	0
3	0.35	0.55	0.25	38	20 or 13+5 <sup>h</sup>	8/13	19	5/13 <sup>i</sup>	0	5/13
4 except Marine	0.35	0.55	0.40	49	20 or 13+5 <sup>h</sup>	8/13	19	10/13	10, 2 ft	10/13
5 and Marine 4	0.32	0.55	NR	49	20 or 13+5 <sup>h</sup>	13/17	30 <sup>e</sup>	15/19	10, 2 ft	15/19
6	0.32	0.55	NR	49	20+5 or 13+10 <sup>h</sup>	15/20	30 <sup>e</sup>	15/19	10, 4 ft	15/19
7 and 8	0.32	0.55	NR	49	20+5 or 13+10 <sup>h</sup>	19/21	38 <sup>e</sup>	15/19	10, 4 ft	15/19

- a. R-values are minimums. U-factors and SHGC are maximums. When insulation is installed in a cavity which is less than the label or design thickness of the insulation, the installed R-value of the insulation shall not be less than the R-value specified in the table.
- b. The fenestration U-factor column excludes skylights. The SHGC column applies to all glazed fenestration. Exception: Skylights may be excluded from glazed fenestration SHGC requirements in climate zones 1 through 3 where the SHGC for such skylights does not exceed 0.30.
- c. "15/19" means R-15 continuous insulation on the interior or exterior of the home or R-19 cavity insulation at the interior of the basement wall. "15/19" shall be permitted to be met with R-13 cavity insulation on the interior of the basement wall plus R-5 continuous insulation on the interior or exterior of the home. "10/13" means R-10 continuous insulation on the interior or exterior of the home or R-13 cavity insulation at the interior of the basement wall.
- d. R-5 shall be added to the required slab edge R-values for heated slabs. Insulation depth shall be the depth of the footing or 2 feet, whichever is less in Climate Zones 1 through 3 for heated slabs.
- e. There are no SHGC requirements in the Marine Zone.
- f. Basement wall insulation is not required in warm-humid locations as defined by IECC Figure R301.1 and Table R301.1.
- g. Or insulation sufficient to fill the framing cavity, R-19 minimum.
- h. The first value is cavity insulation, the second value is continuous insulation, so "13+5" means R-13 cavity insulation plus R-5 continuous insulation.
- i. The second R-value applies when more than half the insulation is on the interior of the mass wall.

Note: See Appendix E for SI units.

(Table below remains unchanged)

**Table 703.2.1(b)**  
Points for Improvement in Total Building Thermal Envelope UA Compared to Baseline UA

Minimum UA Improvement	Climate Zone							
	1 <sup>a</sup>	2	3	4	5	6	7	8
	<b>POINTS</b>							
0 to <5%	00	00	00	00	00	00	00	00
5% to <10%	02	13	13	13	03	03	03	03
10% to <15%	13	56	55	46	36	36	35	67
15% to <20%	45	89	98	79	69	69	78	1210
20% to <25%	76	1212	1310	1112	912	1012	1111	1913
25% to <30%	108	1515	1613	1516	1314	1415	1514	2617
30% to <35%	1310	1918	2016	1919	1717	1818	2016	3220
≥35%	1611	2321	2318	2222	2020	2121	2519	3823

a. Tropical Climate Zone: Points are Climate Zone 1 points divided by 2 and rounded down

Exception: For the Tropical Climate Zone, crawl space, basement, and floor u-factors are excluded from the total building thermal envelope UA improvement calculation.

**Reasoning Statement:**

The draft language creates unequal options and is deleting the table with the correct equivalent values.

Mandatory compliance options in 703.1 are based on the 2021 IECC. The table 703.2.1(a) that is struck in this draft correctly shows the 2021 IECC U-factors for which points are awarded for going above and beyond the base requirements in 703.1.

The draft adds a table that is mostly R-value based. This alone makes it incompatible with this section as it is U-factor based. Additionally, the added table is not appropriate since it has values that are less efficient than the base requirements in 703.1. It would make no sense to award points based on an envelope that is less efficient.

The original (struck) table should be reinstated and then added (underlined) table should be deleted.

No comment on or changes to table 703.2.1(b).

PC304- 2021 IECC Table

**TABLE R402.1.2  
MAXIMUM ASSEMBLY U-FACTORS<sup>a</sup> AND FENESTRATION REQUIREMENTS**

CLIMATE ZONE	FENESTRATION U-FACTOR <sup>f</sup>	SKYLIGHT U-FACTOR	GLAZED FENESTRATION SHGC <sup>d,e</sup>	CEILING U-FACTOR	WOOD FRAME WALL U-FACTOR	MASS WALL U-FACTOR <sup>b</sup>	FLOOR U-FACTOR	BASEMENT WALL U-FACTOR	CRAWL SPACE WALL U-FACTOR
0	0.50	0.75	0.25	0.035	0.084	0.197	0.064	0.360	0.477
1	0.50	0.75	0.25	0.035	0.084	0.197	0.064	0.360	0.477
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3	0.30	0.55	0.25	0.026	0.060	0.098	0.047	0.091 <sup>c</sup>	0.136
4 except Marine	0.30	0.55	0.40	0.024	0.045	0.098	0.047	0.059	0.065
5 and Marine 4	0.30	0.55	NR	0.024	0.045	0.082	0.033	0.050	0.055
6	0.30	0.55	NR	0.024	0.045	0.060	0.033	0.050	0.055
7 and 8	0.30	0.55	NR	0.024	0.045	0.057	0.028	0.050	0.055

For SI: 1 foot = 304.8 mm.

- a. Nonfenestration *U*-factors shall be obtained from measurement, calculation or an approved source.
- b. Mass walls shall be in accordance with Section R402.2.5. Where more than half the insulation is on the interior, the mass wall *U*-factors shall not exceed 0.17 in Climate Zones 0 and 1, 0.14 in Climate Zone 2, 0.12 in Climate Zone 3, 0.087 in Climate Zone 4 except Marine, 0.065 in Climate Zone 5 and Marine 4, and 0.057 in Climate Zones 6 through 8.
- c. In Warm Humid locations as defined by Figure R301.1 and Table R301.1, the basement wall *U*-factor shall not exceed 0.360.
- d. The SHGC column applies to all glazed fenestration.  
**Exception:** In Climate Zones 0 through 3, skylights shall be permitted to be excluded from glazed fenestration SHGC requirements provided that the SHGC for such skylights does not exceed 0.30.
- e. There are no SHGC requirements in the Marine Zone.
- f. A maximum *U*-factor of 0.32 shall apply in Marine Climate Zone 4 and Climate Zones 5 through 8 to vertical fenestration products installed in buildings located either:
  1. Above 4,000 feet in elevation above sea level, or
  2. In windborne debris regions where protection of openings is required by Section R301.2.1.2 of the *International Residential Code*.