



STATE OF NORTH CAROLINA
OFFICE OF ADMINISTRATIVE HEARINGS

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February 15, 2018

Barry Gupton, Rulemaking Coordinator
Building Code Council
Sent via email only: Barry.Gupton@ncdoi.gov

Re: 2018 Residential Code Tables N1102.1.2 and N1102.1.4
2018 Energy Conservation Code Tables R402.12 and R402.1.4

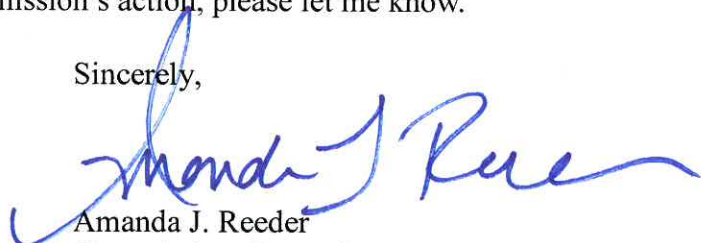
Dear Mr. Gupton:

At its meeting this morning, the Rules Review Commission objected to the above-captioned rules in accordance with G.S. 150B-21.10.

The Commission objected to the 2018 Residential Code Table N1102.1.4 and the 2018 Energy Conservation Code Table R402.1.4 for failure to comply with the APA, as the agency did not publish these Rules in the NC Register as required by G.S. 150B-21.2. The Commission objected to the 2018 Residential Code Table N1102.1.2 and the 2018 Energy Conservation Code Table R402.1.2 based upon ambiguity, as it agreed with the agency's contention that these Rules are interconnected to Tables N1102.1.4 and R402.1.4. Therefore, without approving the corresponding changes to Tables N1102.1.4 and R402.1.4, these Rules are unclear as written.

Please respond to this letter in accordance with the provisions of G.S. 150B-21.12. If you have any questions regarding the Commission's action, please let me know.

Sincerely,


Amanda J. Reeder
Commission Counsel

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RRC STAFF OPINION

PLEASE NOTE: THIS COMMUNICATION IS EITHER 1) ONLY THE RECOMMENDATION OF AN RRC STAFF ATTORNEY AS TO ACTION THAT THE ATTORNEY BELIEVES THE COMMISSION SHOULD TAKE ON THE CITED RULE AT ITS NEXT MEETING, OR 2) AN OPINION OF THAT ATTORNEY AS TO SOME MATTER CONCERNING THAT RULE. THE AGENCY AND MEMBERS OF THE PUBLIC ARE INVITED TO SUBMIT THEIR OWN COMMENTS AND RECOMMENDATIONS (ACCORDING TO RRC RULES) TO THE COMMISSION.

AGENCY: North Carolina Building Code Council

RULE CITATION: 2018 NC Residential Building Code, Table N1102.1.4

RECOMMENDED ACTION:

- ☐ Approve, but note staff's comment
- ☒ Object, based on:
 - ☐ Lack of statutory authority
 - ☐ Unclear or ambiguous
 - ☐ Unnecessary
- ☒ Failure to comply with the APA
- ☐ Extend the period of review

COMMENT:

Staff recommends objection to this Rule for failure to comply with the APA. This is because it appears that the Council did not publish this Table in the NC Register, in violation of the public notice and opportunity to comment requirements of G.S. 150B-21.2, which requires public notice and opportunity to comment.

G.S. 143-138(a) states that the Council is required to follow the APA in promulgating the rules of the Building Codes.

§ 143-138. North Carolina State Building Code.

(a) Preparation and Adoption. – The Building Code Council may prepare and adopt, in accordance with the provisions of this Article, a North Carolina State Building Code. Before the adoption of the Code, or any part of the Code, the Council shall hold at least one public hearing. A notice of the public hearing shall be published in the North Carolina Register at least 15 days before the date of the hearing. Notwithstanding G.S. 150B-2(8a)h., the North Carolina State Building Code as adopted by the Building Code Council is a rule within the meaning of G.S. 150B-2(8a) and shall be adopted in accordance with the procedural requirements of Article 2A of Chapter 150B of the General Statutes.

The agency is subject to the APA, and the APA requires agencies to publish notice of rulemaking. The agency did not comply and staff recommends objection to this proposed Rule change.

Amanda J. Reeder
Commission Counsel

Staff notes that the agency did publish changes to Table N1102.1.2 in the August 1, 2017 NC Register. (Text of the publication is attached). The Rule as published in August 2017 included proposed changes that were not made within the Table itself. It is not unusual for an agency to decide to not make proposed changes following public comment, so staff is not recommending objection based on the changes the agency did not make following publication.

After publication in the August 1, 2017 Register, the RRC approved the 2018 Residential Code at its September 21, 2017 meeting to become effective January 1, 2018. (Attached) It appears that the footnotes that were approved at that meeting were not included in the August 1, 2017 publication, which predated approval by nearly two months. The agency added the footnotes into the Rule when it was submitted to the RRC for review. Staff does not believe that adding in the footnotes that are part of the Code constitutes a substantial change pursuant to G.S. 150B-21.2.

Therefore, staff recommends objection to Table N1102.1.4 as written for failure to comply with the APA.

§ 150B-21.2. Procedure for adopting a permanent rule.

(a) Steps. – Before an agency adopts a permanent rule, the agency must comply with the requirements of G.S. 150B-19.1, and it must take the following actions:

- (1) Publish a notice of text in the North Carolina Register.
- (2) When required by G.S. 150B-21.4, prepare or obtain a fiscal note for the proposed rule.
- (3) Repealed by Session Laws 2003-229, s. 4, effective July 1, 2003.
- (4) When required by subsection (e) of this section, hold a public hearing on the proposed rule after publication of the proposed text of the rule.
- (5) Accept oral or written comments on the proposed rule as required by subsection (f) of this section.

(b) Repealed by Session Laws 2003-229, s. 4, effective July 1, 2003.

(c) Notice of Text. – A notice of the proposed text of a rule must include all of the following:

- (1) The text of the proposed rule, unless the rule is a readoption without substantive changes to the existing rule proposed in accordance with G.S. 150B-21.3A.
- (2) A short explanation of the reason for the proposed rule.
- (2a) A link to the agency's Web site containing the information required by G.S. 150B-19.1(c).
- (3) A citation to the law that gives the agency the authority to adopt the rule.
- (4) The proposed effective date of the rule.
- (5) The date, time, and place of any public hearing scheduled on the rule.
- (6) Instructions on how a person may demand a public hearing on a proposed rule if the notice does not schedule a public hearing on the proposed rule and subsection (e) of this section requires the agency to hold a public hearing on the proposed rule when requested to do so.
- (7) The period of time during which and the person within the agency to whom written comments may be submitted on the proposed rule.
- (8) If a fiscal note has been prepared for the rule, a statement that a copy of the fiscal note can be obtained from the agency.
- (9) Repealed by Session Laws 2013-143, s. 1, effective June 19, 2013.

(d) Mailing List. – An agency must maintain a mailing list of persons who have requested notice of rule making. When an agency publishes in the North Carolina Register a notice of text of a proposed rule, it must mail a copy of the notice or text to each person on the mailing list who has requested notice on the subject matter described in the notice or the rule affected. An agency may charge an annual fee to each person on the agency's mailing list to cover copying and mailing costs.

(e) Hearing. – An agency must hold a public hearing on a rule it proposes to adopt if the agency publishes the text of the proposed rule in the North Carolina Register and the agency receives a written request for a public hearing on the proposed rule within 15 days after the notice of text is published. The agency must accept comments at the public hearing on both the proposed rule and any fiscal note that has been prepared in connection with the proposed rule.

An agency may hold a public hearing on a proposed rule and fiscal note in other circumstances. When an agency is required to hold a public hearing on a proposed rule or decides to hold a public hearing on a proposed rule when it is not required to do so, the agency must publish in the North Carolina Register a notice of the date, time, and place of the public hearing. The hearing date of a public hearing held after the agency publishes notice of the hearing in the North Carolina Register must be at least 15 days after the date the notice is published. If notice of a public hearing has been

published in the North Carolina Register and that public hearing has been cancelled, the agency shall publish notice in the North Carolina Register at least 15 days prior to the date of any rescheduled hearing.

(f) **Comments.** – An agency must accept comments on the text of a proposed rule that is published in the North Carolina Register and any fiscal note that has been prepared in connection with the proposed rule for at least 60 days after the text is published or until the date of any public hearing held on the proposed rule, whichever is longer. An agency must consider fully all written and oral comments received.

(g) **Adoption.** – An agency shall not adopt a rule until the time for commenting on the proposed text of the rule has elapsed and shall not adopt a rule if more than 12 months have elapsed since the end of the time for commenting on the proposed text of the rule. Prior to adoption, an agency shall review any fiscal note that has been prepared for the proposed rule and consider any public comments received in connection with the proposed rule or the fiscal note. An agency shall not adopt a rule that differs substantially from the text of a proposed rule published in the North Carolina Register unless the agency publishes the text of the proposed different rule in the North Carolina Register and accepts comments on the proposed different rule for the time set in subsection (f) of this section.

An adopted rule differs substantially from a proposed rule if it does one or more of the following:

- (1) Affects the interests of persons who, based on the proposed text of the rule published in the North Carolina Register, could not reasonably have determined that the rule would affect their interests.
- (2) Addresses a subject matter or an issue that is not addressed in the proposed text of the rule.
- (3) Produces an effect that could not reasonably have been expected based on the proposed text of the rule.

When an agency adopts a rule, it shall not take subsequent action on the rule without following the procedures in this Part. An agency must submit an adopted rule to the Rules Review Commission within 30 days of the agency's adoption of the rule.

(h) **Explanation.** – An agency must issue a concise written statement explaining why the agency adopted a rule if, within 15 days after the agency adopts the rule, a person asks the agency to do so. The explanation must state the principal reasons for and against adopting the rule and must discuss why the agency rejected any arguments made or considerations urged against the adoption of the rule. The agency must issue the explanation within 15 days after receipt of the request for an explanation.

(i) **Record.** – An agency must keep a record of a rule-making proceeding. The record must include all written comments received, a transcript or recording of any public hearing held on the rule, any fiscal note that has been prepared for the rule, and any written explanation made by the agency for adopting the rule. (1973, c. 1331, s. 1; 1975, 2nd Sess., c. 983, s. 63; 1977, c. 915, s. 2; 1983, c. 927, ss. 3, 7; 1985, c. 746, s. 1; 1985 (Reg. Sess., 1986), c. 1022, s. 1(1), (7); 1987, c. 285, ss. 7-9; 1989, c. 5, s. 1; 1991, c. 418, s. 1; 1995, c. 507, s. 27.8(d); 1996, 2nd Ex. Sess., c. 18, s. 7.10(e); 2003-229, s. 4; 2011-398, s. 5; 2013-143, s. 1; 2013-413, s. 3(a).)

1. Surface burning characteristics. The flame-spread index and smoke developed index of forming material, other than foam plastic, left exposed on the interior shall comply with Section R302. The surface burning characteristics of foam plastic used in insulating concrete forms shall comply with Section R316.3.

2. Interior covering. Stay-in-place forms constructed of rigid foam plastic shall be protected on the interior of the building as required by Section R316. Where gypsum board is used to protect the foam plastic, it shall be installed with a mechanical fastening system. Use of adhesives in addition to mechanical fasteners is permitted.

3. Exterior wall covering. Stay-in-place forms constructed of rigid foam plastics shall be protected from sunlight and physical damage by the application of an approved exterior wall covering complying with this code. Exterior surfaces of other stay-in-place forming systems shall be protected in accordance with this code.

~~4. Termite protection. In areas where the probability of termite infestation is "very heavy" as indicated by Table R301.2(1) or Figure R301.2(6), foam plastic insulation shall be permitted below grade on foundation walls in accordance with Section R318.4.~~

4. Termite hazards. In areas where hazard of termite damage is moderate - heavy in accordance with Figure R301.2(6), foam plastic insulation shall be permitted below grade on foundation walls in accordance with one of the following conditions:

4.1. Where in addition to the requirements in Section R318.1, a method of protecting the foam plastic and structure from subterranean termite damage is provided.

4.2. The structural members of walls, floors, ceilings and roofs are entirely of noncombustible materials or pressure-preservative-treated wood

4.3. On the interior side of basement walls.

5. Flat ICF wall system forms shall conform to ASTM E 2634.

Motion/Second/Approved – The request was granted. The proposed effective date of this rule is March 1, 2018 (earliest through RRC), unless the BCC assigns a delayed effective date (January 1, 2019).

Reason Given – This purpose of this amendment is to coordinate the termite inspection and treatment gaps with the infestation probability that exists in North Carolina.

Fiscal Statement – This rule is anticipated to provide equivalent compliance with no net decrease/increase in cost. This rule is not expected to either have a substantial economic impact or increase local and state funds. A fiscal note has not been prepared.

B-13. Request by Robert Privott, NCHBA to amend the 2018 NC Residential Code, Table N1102.1.2 (and the 2018 NC Energy Conservation Code, Table R402.1.2) as follows:

TABLES N1102.1.2 and R402.1.2 INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT^a

CLIMATE ZONE	FENESTRATION U-FACTOR ^{b, j}	SKYLIGHT U-FACTOR ^b	GLAZED FENESTRATION SHGC ^{b, e, k}	CEILING R-VALUE ^m	WOOD FRAME WALL R-VALUE	MASS WALL R-VALUE ⁱ	FLOOR R-VALUE	BASEMENT WALL R-VALUE ^{c, o}	SLAB ^d R-VALUE & DEPTH	CRAWL SPACE WALL R-VALUE ^c
3	0.35	0.55 0.65	0.30	38 or 30ci 30	15 or 13+2.5 13 ^h	5/13 or 5/10ci 5/10	19	5/13 ^f 10/13 ^f	0	5/13
4	0.35	0.55 0.60	0.30	38 or 30cont. ^j	15 or 13+2.5 ^h	5/13 or 5/10ci 5/10	19	10/15 13	10 ^d	10/15 13
5	0.35	0.55 0.60	NR	38 or 30cont. ^j	19 ⁿ or 15, 13+5 ^h or 15+3 ^{e, h}	13/17 or 13/2.5 ci	30 ^g	10/15 13	10 ^d	10/19 13

For SI: 1 foot = 304.8 mm.

a. R-values are minimums. U-factors and SHGC are maximums.

b. The fenestration U-factor column excludes skylights. The SHGC column applies to all glazed fenestration.

c. "10/13" means R-10 continuous insulated sheathing on the interior or exterior of the home or R-13 cavity insulation at the interior of the basement wall or crawl space wall.

d. For monolithic slabs, insulation shall be applied from the inspection gap downward to the bottom of the footing or a maximum of 18 inches below grade whichever is less. For floating slabs, insulation shall extend to the bottom of the foundation wall or 24 inches, whichever is less. (See Appendix O) R-5 shall be added to the required slab edge R-values for heated slabs.

e. R-19 fiberglass batts compressed and installed in a nominal 2 × 6 framing cavity is deemed to comply. Fiberglass batts rated R-19 or higher compressed and installed in a 2 × 4 wall is not deemed to comply.

f. Basement wall insulation is not required in warm-humid locations as defined by Figure ~~N1101.2(1) and (2)~~ N1101.7 and Table ~~N1101.2~~ N1101.7.

g. Or insulation sufficient to fill the framing cavity, R-19 minimum.

h. "13+5" means R-13 cavity insulation plus R-5 insulated sheathing. 15+3 means R-15 cavity insulation plus R-3 insulated sheathing. If structural sheathing covers 25 percent or less of the exterior, insulating sheathing is not required where structural sheathing is used. If structural sheathing covers more than 25 percent of exterior, structural sheathing shall be supplemented with insulated sheathing of at least R-2. 13+2.5 means R-13 cavity insulation plus R-2.5 sheathing.

i. For Mass Walls, the second R-value applies when more than half the insulation is on the interior of the mass wall.

j. R-30 shall be deemed to satisfy the ceiling insulation requirement wherever the full height of uncompressed R-30 insulation extends over the wall top plate at the eaves. Otherwise R-38 insulation is required where adequate clearance exists or insulation must extend to either the insulation baffle or within 1" of the attic roof deck.

k. Table value required except for roof edge where the space is limited by the pitch of the roof, there the insulation must fill the space up to the air baffle.

Motion/Second/Approved – The request was granted. The proposed effective date of this rule is March 1, 2018 (earliest through RRC), unless the BCC assigns a delayed effective date (January 1, 2019).

Reason Given – This purpose of this proposal is to retain the 2012 NC insulation requirements.

Fiscal Statement – This rule is anticipated to provide equivalent compliance with no net decrease/increase in cost. This rule is not expected to either have a substantial economic impact or increase local and state funds. A fiscal note has not been prepared.

14. Request by Leon Skinner, Raleigh to amend the 2018 NC Plumbing Code, Chapter 2 as follows:

Water service pipe. The pipe from the water main or other source of potable water supply, or from the meter when the meter is at the public right of way, to the water distribution system of the building served. ~~Water service pipe shall terminate 5 feet (1524 mm) outside the foundation wall.~~

Motion/Second/Approved – The request was granted. The proposed effective date of this rule is March 1, 2018 (earliest through RRC), unless the BCC assigns a delayed effective date (January 1, 2019).

Reason Given – This purpose of this amendment is for consistency with the International Plumbing Code and to allow more flexibility as to where the full-open main water valve can be located.

Fiscal Statement – This rule is anticipated to provide equivalent compliance with no net decrease/increase in cost. This rule is not expected to either have a substantial economic impact or increase local and state funds. A fiscal note has not been prepared.

15. Request by Leon Skinner, Raleigh to amend the 2018 NC Plumbing Code, Section 605.3 as follows:

605.3 Water service pipe. Water service pipe shall conform to NSF 61 and shall conform to one of the standards listed in Table 605.3. ~~All~~ Water service pipe or tubing, installed underground and outside of the structure, shall have a minimum working pressure rating of 160 psi (1100 kPa) at 73.4°F (23°C). Where the water pressure exceeds 160 psi (1100 kPa), piping material shall have a minimum rated working pressure equal to the highest available pressure. Water service piping materials not third-party certified for water distribution shall terminate 5 feet (1524 mm) outside the building at or before the full-open valve located at the entrance to the structure. ~~All~~ Ductile iron water service piping shall be cement mortar lined in accordance with AWWA C104.

Motion/Second/Approved – The request was granted. The proposed effective date of this rule is March 1, 2018 (earliest through RRC), unless the BCC assigns a delayed effective date (January 1, 2019).

Reason Given – This purpose of this amendment is for consistency with the International Plumbing Code and to allow more flexibility as to where the full-open main water valve can be located.

Fiscal Statement – This rule is anticipated to provide equivalent compliance with no net decrease/increase in cost. This rule is not expected to either have a substantial economic impact or increase local and state funds. A fiscal note has not been prepared.

16. Request by Wade White, PE, Brite Engineering to amend the 2014/2017 NC Electrical Code, Article 680.21(C) as follows:

BUILDING THERMAL ENVELOPE

N1102.1 (R402.1) General (Prescriptive).

The *building thermal envelope* shall meet the requirements of Sections N1102.1.1 through N1102.1.4~~5~~.

Exception: The following low energy buildings, or portions thereof, separated from the remainder of the building by *building thermal envelope* assemblies complying with this section shall be exempt from the *building thermal envelope* provisions of Section N1102.

- Those with a peak design rate of energy usage less than $3.4 \text{ Btu/h} \cdot \text{ft}^2$ (10.7 W/m^2) or 1.0 watt/ft^2 of floor area for space conditioning purposes.
- Those that do not contain *conditioned space*.

N1102.1.1 (R402.1.1) Vapor retarder. Deleted.

~~Wall assemblies in the building thermal envelope shall comply with the vapor retarder requirements of Section R702.7.~~

TABLE N1102.1.2 (R402.1.2)
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT^a

CLIMATE ZONE	FENESTRATION U-FACTOR ^{b,j}	SKYLIGHT U-FACTOR ^b	GLAZED FENESTRATION SHGC ^{b, e, k}	CEILING R-VALUE ^m	WOOD FRAME WALL R-VALUE	MASS WALL R-VALUE ⁱ	FLOOR R-VALUE	BASEMENT ^c WALL R-VALUE	SLAB ^d R-VALUE & DEPTH	CRAWL SPACE ^c 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	0.25-0.30	38 or 30ci ^l	20 15 or 13 + 2.5 ^h	85/13 or 5/10ci	19	5/13 ^f	0	5/13
4 except Marine	0.35	0.55	0.40-0.30	49 38 or 30ci ^l	20 15 or 13 + 2.5 ^h	85/13 or 5/10ci	19	10 / 13 15	10, 2 ft	10/13 15
5 and Marine 4	0.32-0.35	0.55	NR	49 38 or 30ci ^l	20 19 ⁿ or 13 + 5 ^h or 15+3 ^h	13/17 or 13/12.5 ci	30 ^g	15/19 10/15	10, 2 ft	15 10/19
6	0.32	0.55	NR	49	20 + 5 or 13 + 40 ^h	15/20	30 ^g	15/19	10, 4 ft	15/19

7 and 8	0.32	0.55	NR	49	20+5 or 13+ h 10	19/24	38 ^g	15/19	10, 4 ft	15/19
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For SI: 1 foot = 304.8 mm.

- 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.
- 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.
- ~~“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. “10/15” means R-10 continuous insulated sheathing on the interior or exterior of the home or R-15 cavity insulation at the interior of the basement wall or crawl space wall.~~
- 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 Zones 1 through 3 for heated slabs.~~ For monolithic slabs, insulation shall be applied from the inspection gap downward to the bottom of the footing or a maximum of 24 inches below grade whichever is less. For floating slabs, insulation shall extend to the bottom of the foundation wall or 24 inches, whichever is less. (See Appendix O.)
- ~~There are no SHGC requirements in the Marine Zone. Deleted.~~
- Basement wall insulation is not required in warm-humid locations as defined by Figure N1101.10 and Table N1101.10.
- Or insulation sufficient to fill the framing cavity, R-19 minimum.
- 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. If structural sheathing covers 25 percent or less of the exterior, insulating sheathing is not required where structural sheathing is used. If structural sheathing covers more than 25 percent of exterior, structural sheathing shall be supplemented with insulated sheathing of at least R-2.
- The second *R*-value applies when more than half the insulation is on the interior of the mass wall.
- In addition to the exemption in Section N1102.3.3, a maximum of two glazed fenestration product assemblies having a *U*-factor no greater than 0.55 shall be permitted to be substituted for minimum code compliant fenestration product assemblies without penalty.
- In addition to the exemption in Section N1102.3.3, a maximum of two glazed fenestration product assemblies having a SHGC no greater than 0.70 shall be permitted to be substituted for minimum code compliant fenestration product assemblies without penalty.
- R-30 shall be deemed to satisfy the ceiling insulation requirement wherever the full height of uncompressed R-30 insulation extends over the wall top plate at the eaves. Otherwise R-38 insulation is required where adequate clearance exists or insulation must extend to either the insulation baffle or within 1” of the attic roof deck.
- Table value required except for roof edge where the space is limited by the pitch of the roof, there the insulation must fill the space up to the air baffle.
- R-19 fiberglass batts compressed and installed in a nominal 2 x 6 framing cavity is deemed to comply. Fiberglass batts rated R-19 or higher compressed and installed in a 2x4 wall is not deemed to comply.
- Basement wall meeting the minimum mass wall specific heat content requirement may use the mass wall *R*-value as the minimum requirement.

TABLE N1102.1.4 (R402.1.4)
EQUIVALENT *U*-FACTORS^a

CLIMATE ZONE	FENESTRATION <i>U</i> -FACTOR ^d	SKYLIGHT <i>U</i> -FACTOR	CEILING <i>U</i> -FACTOR	FRAME WALL <i>U</i> -FACTOR	MASS WALL <i>U</i> -FACTOR ^b	FLOOR <i>U</i> -FACTOR	BASEMENT WALL <i>U</i> -FACTOR	CRAWL SPACE WALL <i>U</i> -FACTOR
4	0.50	0.75	0.035	0.084	0.197	0.064	0.360	0.477
2	0.40	0.65	0.030	0.084	0.165	0.064	0.360	0.477

3	0.35	0.55	0.030	0.060 0.077	0.098 0.141	0.047	0.091 ^c	0.136
4 except Marine	0.35	0.55	0.026 0.030	0.060 0.077	0.098 0.141	0.047	0.059	0.065
5 and Marine-4	0.32 0.35	0.55	0.026 0.030	0.060 0.061	0.082	0.033	0.050 0.059	0.055 0.065
6	0.32	0.55	0.026	0.045	0.060	0.033	0.050	0.055
7 and 8	0.32	0.55	0.026	0.045	0.057	0.028	0.050	0.055

- Nonfenestration *U*-factors shall be obtained from measurement, calculation or an approved source.
- When more than half the insulation is on the interior, the mass wall *U*-factors shall be a maximum of ~~0.17 in Zone 1, 0.14 in Zone 2, 0.12~~ 0.07 in Zone 3, ~~0.087~~ 0.07 in Zone 4 ~~except Marine~~, and ~~0.065~~ 0.054 in Zone 5 ~~and Marine~~ 4, and 0.057 in Zones 6 through 8.
- Basement wall *U*-factor of 0.360 in warm-humid locations as defined by Figure N1101.10 (R301.1) and Table N1101.10 (R301.1).
- A maximum of two glazed fenestration product assemblies having a *U*-factor no greater than 0.55 and a SHGC no greater than 0.70 shall be permitted to be substituted for minimum code compliant fenestration product assemblies without penalty. When applying this note and using the REScheck "UA Trade-off" compliance method to allow continued use of the software, the applicable fenestration products shall be modeled as meeting the *U*-factor of 0.35 and the SHGC of 0.30, as applicable, but the fenestration products actual *U*-factor and actual SHGC shall be noted in the comments section of the software for documentation of application of this note to the applicable products. Compliance for these substitute products shall be verified compared to the allowed substituted maximum *U*-value requirement and maximum SHGC requirement, as applicable.

N1102.2 (R402.2) Specific insulation requirements (Prescriptive).

In addition to the requirements of Section N1102.1, insulation shall meet the specific requirements of Sections N1102.2.1 through ~~N1102.2.13~~ N1102.2.15.

N1102.2.1 (R402.2.1) Ceilings with attic spaces.

Where Section R1102.1.2 would require R-38 insulation in the ceiling, installing R-30 over 100 percent of the ceiling area requiring insulation shall be deemed to satisfy the requirement for R-38 wherever the full height of uncompressed R-30 insulation extends over the wall top plate at the eaves. ~~Similarly, where Section R1102.1.2 would require R-49 insulation in the ceiling, installing R-38 over 100 percent of the ceiling area requiring insulation shall be deemed to satisfy the requirement for R-49 insulation wherever the full height of uncompressed R-38 insulation extends over the wall top plate at the eaves.~~ This reduction shall not apply to the *U*-factor alternative approach in Section R1102.1.4 and the total UA alternative in Section R1102.1.5.

Exceptions:

- When insulation is installed in a fully enclosed attic floor system, as described in Appendix E-2.1, R-30 shall be deemed compliant.
- In roof edge and other details such as bay windows, dormers, and similar areas where the space is limited, the insulation must fill the space up to the air baffle.

N1102.2.2 (R402.2.2) Ceilings without attic spaces.

Where Section N1102.1.2 would require R-38 insulation ~~levels above R-30~~ and the design of the roof/ceiling assembly, including cathedral ceilings, bay windows and other similar areas, does not allow sufficient space for the required insulation, the minimum required insulation for such roof/ceiling assemblies shall be R-30. This reduction of insulation from the requirements of Section N1102.1.2 shall be limited to 500 square feet (46 m²) ~~or 20~~

REQUEST FOR TECHNICAL CHANGE

AGENCY: NC Building Code Council

RULE CITATION: 2018 NC Residential Code, Tables N1102.1.2 and N1102.1.4

DEADLINE FOR RECEIPT: Friday, February 9, 2018

The Rules Review Commission staff has completed its review of this rule prior to the Commission's next meeting. The Commission has not yet reviewed this rule and therefore there has not been a determination as to whether the rule will be approved. You may call this office to inquire concerning the staff recommendation.

In reviewing these rules, the staff determined that the following technical changes need to be made:

On the Submission for Permanent Filing Form and Rule, please change the Code to the Residential Code.

Table N1102.1.2: You did not make the changes proposed to the Ceiling R-Value in Climate Zones 4 and 5, nor the one in Wood Frame Wall R-Value. Was this in response to public comment?

You are changing the existing language and adding entirely new language in the Footnotes. Please show all changes made after publication. Was this due to the approval of the Code by the RRC in September while this was still pending publication?

Table N1102.1.4: I do not see that you published this table in the August 1, 2017 Register. Did you publish it on a different date?

Please retype the rule accordingly and resubmit it to our office at 1711 New Hope Church Road, Raleigh, North Carolina 27609.

Amanda J. Reeder
Commission Counsel
Date submitted to agency: January 31, 2018

N1102.1.2 Insulation and fenestration criteria.

The *building thermal envelope* shall meet the requirements of Table N1102.1.2, based on the climate zone specified in N1101.7.

**TABLE N1102.1.2
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT^a**

CLIMATE ZONE	FENESTRATION ^N U-FACTOR ^{b, j}	SKYLIGHT ^b U-FACTOR	GLAZED FENESTRATION ^N SHGC ^{b, k}	CEILING ^G R-VALUE ^m	WOOD FRAME WALL R-VALUE	MASS WALL R-VALUE ⁱ	FLOOR R-VALUE	BASEMENT ^{c, o} WALL R-VALUE	SLAB ^d R-VALUE & DEPTH	CRAWL SPACE ^c WALL R-VALUE
3	0.35	0.55 0.65	0.30	30 38 or 30ci ^l	13 45 or 13+2.5 h	5 13 or 5/40ci 5/10	19	10 5/13 ^f	0	5/13
4	0.35	0.55 0.60	0.30	38 or 30ci ^l	15 or 13+2.5 h	5 13 or 5/40ci 5/10	19	10 13 45	10 ^d	10 13 45
5	0.35	0.55 0.60	NR	38 or 30ci ^l	19 ⁿ or 13+5 Or h 15+3	13/17 or 13/12.5ci	30 ^g	10 13 45	10 ^d	10 13 49

For SI: 1 foot = 304.8 mm.

- 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.
- The fenestration U-factor column excludes skylights. The SHGC column applies to all glazed fenestration.
- "10/45 13" means R-10 continuous insulated sheathing on the interior or exterior of the home or R-45 13 cavity insulation at the interior of the basement wall or crawl space wall. "
- For monolithic slabs, insulation shall be applied from the inspection gap downward to the bottom of the footing or a maximum of 24 inches below grade whichever is less. For floating slabs, insulation shall extend to the bottom of the foundation wall or 24 inches, whichever is less. (See Appendix O) R-5 shall be added to the required slab edge R-values for heated slabs
- Deleted.
- Basement wall insulation is not required in warm-humid locations as defined by Figure N1101.7 and Table N1101.7.
- Or insulation sufficient to fill the framing cavity, R-19 minimum.
- 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. If structural sheathing covers 25 percent or less of the exterior, insulating sheathing is not required where structural sheathing is used. If structural sheathing covers more than 25 percent of exterior, structural sheathing shall be supplemented with insulated sheathing of at least R-2.
- The second R-value applies when more than half the insulation is on the interior of the mass wall.
- In addition to the exemption in Section N1102.3.3, a maximum of two glazed fenestration product assemblies having a U-factor no greater than 0.55 shall be permitted to be substituted for minimum code compliant fenestration product assemblies without penalty.

- k. In addition to the exemption in Section N1102.3.3, a maximum of two glazed fenestration product assemblies having a SHGC no greater than 0.70 shall be permitted to be substituted for minimum code compliant fenestration product assemblies without penalty.
- l. R-30 shall be deemed to satisfy the ceiling insulation requirement wherever the full height of uncompressed R-30 insulation extends over the wall top plate at the eaves. Otherwise R-38 insulation is required where adequate clearance exists or insulation must extend to either the insulation baffle or within 1" of the attic roof deck.
- m. Table value required except for roof edge where the space is limited by the pitch of the roof, there the insulation must fill the space up to the air baffle.
- n. R-19 fiberglass batts compressed and installed in a nominal 2 × 6 framing cavity is deemed to comply. Fiberglass batts rated R-19 or higher compressed and installed in a 2x4 wall is not deemed to comply.
- o. Basement wall meeting the minimum mass wall specific heat content requirement may use the mass wall R-value as the minimum requirement.

N1102.1.4 U-factor alternative.

An assembly with a *U*-factor equal to or less than that specified in Table N1102.1.4 shall be permitted as an alternative to the *R*-value in Table N1102.1.2.

**TABLE N1102.1.4
EQUIVALENT U-FACTORS^a**

CLIMATE ZONE	FENESTRATION U-FACTOR ^d	SKYLIGHT U-FACTOR	CEILING U-FACTOR	FRAME WALL U-FACTOR	MASS WALL U-FACTOR ^b	FLOOR U-FACTOR	BASEMENT WALL U-FACTOR	CRAWL SPACE WALL U-FACTOR
3	0.35	0.55 0.65	0.030 0.035	0.077 0.082	0.141	0.047	0.059 ^c 0.094 ^e	0.136
4	0.35	0.55 0.60	0.030	0.077	0.141	0.047	0.059	0.065
5	0.35	0.55 0.60	0.030	0.061	0.082	0.033	0.059	0.065

- a. Nonfenestration *U*-factors shall be obtained from measurement, calculation or an approved source.
- b. When more than half the insulation is on the interior, the mass wall *U*-factors shall be a maximum of 0.07 in Climate Zone 3, 0.07 in Climate Zone 4, and 0.054 in Climate Zone 5.
- c. Basement wall *U*-factor of 0.360 in warm-humid locations as defined by Figure N1101.7 and Table N1101.7.
- d. A maximum of two glazed fenestration product assemblies having a *U*-factor no greater than 0.55 and a SHGC no greater than 0.70 shall be permitted to be substituted for minimum code compliant fenestration product assemblies without penalty. When applying this note and using the REScheck "UA Trade-off" compliance method to allow continued use of the software, the applicable fenestration products shall be modeled as meeting the *U*-factor of 0.35 and the SHGC of 0.30, as applicable, but the fenestration products actual *U*-factor and actual SHGC shall be noted in the comments section of the software for documentation of application of this note to the applicable products. Compliance for these substitute products shall be verified compared to the allowed substituted maximum *U*-value requirement and maximum SHGC requirement, as applicable.

The delayed effective date of this Rule is January 1, 2019.

The Statutory authority for Rule-making is G. S. 143-136; 143-138.

RRC STAFF OPINION

PLEASE NOTE: THIS COMMUNICATION IS EITHER 1) ONLY THE RECOMMENDATION OF AN RRC STAFF ATTORNEY AS TO ACTION THAT THE ATTORNEY BELIEVES THE COMMISSION SHOULD TAKE ON THE CITED RULE AT ITS NEXT MEETING, OR 2) AN OPINION OF THAT ATTORNEY AS TO SOME MATTER CONCERNING THAT RULE. THE AGENCY AND MEMBERS OF THE PUBLIC ARE INVITED TO SUBMIT THEIR OWN COMMENTS AND RECOMMENDATIONS (ACCORDING TO RRC RULES) TO THE COMMISSION.

AGENCY: North Carolina Building Code Council

RULE CITATION: 2018 NC Energy Conservation Code, Table R402.1.4

RECOMMENDED ACTION:

- ☐ Approve, but note staff's comment
- ☒ Object, based on:
 - ☐ Lack of statutory authority
 - ☐ Unclear or ambiguous
 - ☐ Unnecessary
- ☒ Failure to comply with the APA
- ☐ Extend the period of review

COMMENT:

Staff recommends objection to this Rule for failure to comply with the APA. This is because it appears that the Council did not publish this Table in the NC Register, in violation of the public notice and opportunity to comment requirements of G.S. 150B-21.2, which requires public notice and opportunity to comment.

G.S. 143-138(a) states that the Council is required to follow the APA in promulgating the rules of the Building Codes.

§ 143-138. North Carolina State Building Code.

(a) Preparation and Adoption. – The Building Code Council may prepare and adopt, in accordance with the provisions of this Article, a North Carolina State Building Code. Before the adoption of the Code, or any part of the Code, the Council shall hold at least one public hearing. A notice of the public hearing shall be published in the North Carolina Register at least 15 days before the date of the hearing. Notwithstanding G.S. 150B-2(8a)h., the North Carolina State Building Code as adopted by the Building Code Council is a rule within the meaning of G.S. 150B-2(8a) and shall be adopted in accordance with the procedural requirements of Article 2A of Chapter 150B of the General Statutes.

The agency is subject to the APA, and the APA requires agencies to publish notice of rulemaking. The agency did not comply and staff recommends objection to this proposed Rule change.

Amanda J. Reeder
Commission Counsel

Staff notes that the agency did publish changes to Table R402.1.2 in the August 1, 2017 NC Register. (Text of the publication is attached). The Rule as published in August 2017 included proposed changes that were not made within the Table itself. It is not unusual for an agency to decide to not make proposed changes following public comment, so staff is not recommending objection based on the proposed changes that the agency did not make following publication.

After publication in the August 1, 2017 Register, the RRC approved the 2018 Energy Conservation Code at its September 21, 2017 meeting to become effective January 1, 2018. (Attached) It appears that the footnotes that were approved at that meeting were not included in the August 1, 2017 publication, which predated approval by nearly two months. The agency added the footnotes into the Rule when it was submitted to the RRC for review. Staff does not believe that adding in the footnotes that are part of the Code constitutes a substantial change pursuant to G.S. 150B-21.2.

Therefore, staff recommends objection to Table R402.1.4 as written for failure to comply with the APA.

Amanda J. Reeder
Commission Counsel

1. Surface burning characteristics. The flame-spread index and smoke developed index of forming material, other than foam plastic, left exposed on the interior shall comply with Section R302. The surface burning characteristics of foam plastic used in insulating concrete forms shall comply with Section R316.3.

2. Interior covering. Stay-in-place forms constructed of rigid foam plastic shall be protected on the interior of the building as required by Section R316. Where gypsum board is used to protect the foam plastic, it shall be installed with a mechanical fastening system. Use of adhesives in addition to mechanical fasteners is permitted.

3. Exterior wall covering. Stay-in-place forms constructed of rigid foam plastics shall be protected from sunlight and physical damage by the application of an approved exterior wall covering complying with this code. Exterior surfaces of other stay-in-place forming systems shall be protected in accordance with this code.

~~4. Termite protection. In areas where the probability of termite infestation is "very heavy" as indicated by Table R301.2(1) or Figure R301.2(6), foam plastic insulation shall be permitted below grade on foundation walls in accordance with Section R318.4.~~

4. Termite hazards. In areas where hazard of termite damage is moderate - heavy in accordance with Figure R301.2(6), foam plastic insulation shall be permitted below grade on foundation walls in accordance with one of the following conditions:

4.1. Where in addition to the requirements in Section R318.1, a method of protecting the foam plastic and structure from subterranean termite damage is provided.

4.2. The structural members of walls, floors, ceilings and roofs are entirely of noncombustible materials or pressure-preservative-treated wood

4.3. On the interior side of basement walls.

5. Flat ICF wall system forms shall conform to ASTM E 2634.

Motion/Second/Approved – The request was granted. The proposed effective date of this rule is March 1, 2018 (earliest through RRC), unless the BCC assigns a delayed effective date (January 1, 2019).

Reason Given – This purpose of this amendment is to coordinate the termite inspection and treatment gaps with the infestation probability that exists in North Carolina.

Fiscal Statement – This rule is anticipated to provide equivalent compliance with no net decrease/increase in cost. This rule is not expected to either have a substantial economic impact or increase local and state funds. A fiscal note has not been prepared.

B-13. Request by Robert Privott, NCHBA to amend the 2018 NC Residential Code, Table N1102.1.2 (and the 2018 NC Energy Conservation Code, Table R402.1.2) as follows:

TABLES N1102.1.2 and R402.1.2 INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT^a

CLIMATE ZONE	FENESTRATION U-FACTOR ^{b, j}	SKYLIGHT U-FACTOR ^b	GLAZED FENESTRATION SHGC ^{b, e, k}	CEILING R-VALUE ^m	WOOD FRAME WALL R-VALUE	MASS WALL R-VALUE ⁱ	FLOOR R-VALUE	BASEMENT WALL R-VALUE ^{c, o}	SLAB ^d R-VALUE & DEPTH	CRAWL SPACE WALL R-VALUE ^c
3	0.35	0.55 0.65	0.30	38 or 30ci 30	15 or 13+2.5 13 ^h	5/13 or 5/10ci 5/10	19	5/13 ^f 10/13 ^f	0	5/13
4	0.35	0.55 0.60	0.30	38 or 30cont. ^j	15 or 13+2.5 ^h	5/13 or 5/10ci 5/10	19	10/15 13	10 ^d	10/15 13
5	0.35	0.55 0.60	NR	38 or 30cont. ^j	19 ⁿ or 15, 13+5 ^h or 15+3 ^{e, h}	13/17 or 13/2.5 ci	30 ^g	10/15 13	10 ^d	10/19 13

For SI: 1 foot = 304.8 mm.

a. R-values are minimums. U-factors and SHGC are maximums.

b. The fenestration U-factor column excludes skylights. The SHGC column applies to all glazed fenestration.

c. "10/13" means R-10 continuous insulated sheathing on the interior or exterior of the home or R-13 cavity insulation at the interior of the basement wall or crawl space wall.

d. For monolithic slabs, insulation shall be applied from the inspection gap downward to the bottom of the footing or a maximum of 18 inches below grade whichever is less. For floating slabs, insulation shall extend to the bottom of the foundation wall or 24 inches, whichever is less. (See Appendix O) R-5 shall be added to the required slab edge R-values for heated slabs.

e. R-19 fiberglass batts compressed and installed in a nominal 2 × 6 framing cavity is deemed to comply. Fiberglass batts rated R-19 or higher compressed and installed in a 2 × 4 wall is not deemed to comply.

f. Basement wall insulation is not required in warm-humid locations as defined by Figure ~~N1101.2(1) and (2)~~ N1101.7 and Table ~~N1101.2~~ N1101.7.

g. Or insulation sufficient to fill the framing cavity, R-19 minimum.

h. "13+5" means R-13 cavity insulation plus R-5 insulated sheathing. 15+3 means R-15 cavity insulation plus R-3 insulated sheathing. If structural sheathing covers 25 percent or less of the exterior, insulating sheathing is not required where structural sheathing is used. If structural sheathing covers more than 25 percent of exterior, structural sheathing shall be supplemented with insulated sheathing of at least R-2. 13+2.5 means R-13 cavity insulation plus R-2.5 sheathing.

i. For Mass Walls, the second R-value applies when more than half the insulation is on the interior of the mass wall.

j. R-30 shall be deemed to satisfy the ceiling insulation requirement wherever the full height of uncompressed R-30 insulation extends over the wall top plate at the eaves. Otherwise R-38 insulation is required where adequate clearance exists or insulation must extend to either the insulation baffle or within 1" of the attic roof deck.

k. Table value required except for roof edge where the space is limited by the pitch of the roof, there the insulation must fill the space up to the air baffle.

Motion/Second/Approved – The request was granted. The proposed effective date of this rule is March 1, 2018 (earliest through RRC), unless the BCC assigns a delayed effective date (January 1, 2019).

Reason Given – This purpose of this proposal is to retain the 2012 NC insulation requirements.

Fiscal Statement – This rule is anticipated to provide equivalent compliance with no net decrease/increase in cost. This rule is not expected to either have a substantial economic impact or increase local and state funds. A fiscal note has not been prepared.

14. Request by Leon Skinner, Raleigh to amend the 2018 NC Plumbing Code, Chapter 2 as follows:

Water service pipe. The pipe from the water main or other source of potable water supply, or from the meter when the meter is at the public right of way, to the water distribution system of the building served. ~~Water service pipe shall terminate 5 feet (1524 mm) outside the foundation wall.~~

Motion/Second/Approved – The request was granted. The proposed effective date of this rule is March 1, 2018 (earliest through RRC), unless the BCC assigns a delayed effective date (January 1, 2019).

Reason Given – This purpose of this amendment is for consistency with the International Plumbing Code and to allow more flexibility as to where the full-open main water valve can be located.

Fiscal Statement – This rule is anticipated to provide equivalent compliance with no net decrease/increase in cost. This rule is not expected to either have a substantial economic impact or increase local and state funds. A fiscal note has not been prepared.

15. Request by Leon Skinner, Raleigh to amend the 2018 NC Plumbing Code, Section 605.3 as follows:

605.3 Water service pipe. Water service pipe shall conform to NSF 61 and shall conform to one of the standards listed in Table 605.3. ~~All~~ Water service pipe or tubing, installed underground and outside of the structure, shall have a minimum working pressure rating of 160 psi (1100 kPa) at 73.4°F (23°C). Where the water pressure exceeds 160 psi (1100 kPa), piping material shall have a minimum rated working pressure equal to the highest available pressure. Water service piping materials not third-party certified for water distribution shall terminate 5 feet (1524 mm) outside the building at or before the full-open valve located at the entrance to the structure. ~~All~~ Ductile iron water service piping shall be cement mortar lined in accordance with AWWA C104.

Motion/Second/Approved – The request was granted. The proposed effective date of this rule is March 1, 2018 (earliest through RRC), unless the BCC assigns a delayed effective date (January 1, 2019).

Reason Given – This purpose of this amendment is for consistency with the International Plumbing Code and to allow more flexibility as to where the full-open main water valve can be located.

Fiscal Statement – This rule is anticipated to provide equivalent compliance with no net decrease/increase in cost. This rule is not expected to either have a substantial economic impact or increase local and state funds. A fiscal note has not been prepared.

16. Request by Wade White, PE, Brite Engineering to amend the 2014/2017 NC Electrical Code, Article 680.21(C) as follows:

SECTION R402 BUILDING THERMAL ENVELOPE

R402.1 General (Prescriptive).

The *building thermal envelope* shall meet the requirements of Sections R402.1.1 through R402.1.5.

Exception: The following low-energy buildings, or portions thereof, separated from the remainder of the building by *building thermal envelope* assemblies complying with this section shall be exempt from the *building thermal envelope* provisions of Section R402.

1. Those with a peak design rate of energy usage less than $3.4 \text{ Btu/h} \cdot \text{ft}^2$ (10.7 W/m^2) or 1.0 watt/ft^2 of floor area for space-conditioning purposes.
2. Those that do not contain *conditioned space*.

R402.1.1 Deleted. ~~Vapor retarder.~~

~~Wall assemblies in the building thermal envelope shall comply with the vapor retarder requirements of Section R702.7 of the International Residential Code or Section 1405.3 of the International Building Code, as applicable.~~

R402.1.2 Insulation and fenestration criteria.

The *building thermal envelope* shall meet the requirements of Table R402.1.2, based on the climate zone specified in Chapter 3.

**TABLE R402.1.2
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT^a**

CLIMATE ZONE	FENESTRATION ^{b, j} U-FACTOR	SKYLIGHT ^b U-FACTOR	GLAZED FENESTRATION ^{b, e, k} SHGC	CEILING ^l R-VALUE ^m	WOOD FRAME WALL ⁿ R-VALUE	MASS WALL ⁱ R-VALUE	FLOOR ^g R-VALUE	BASEMENT ^{c, o} WALL R-VALUE	SLAB ^d R-VALUE & DEPTH	CRAWL ^c SPACE 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 0.30	38 or 30ci ^l	20 15 or 13+2.5 ^h	5 8/13 or 5/10ci	19	5/13 ^f	0	5/13
4 except Marine	0.35	0.55	0.40 0.30	49 38 or 30ci ^l	20 15 or 13+2.5 ^h	5 8/13 or 5/10ci	19	10 15 13	10, 2 ft	10/15 13
5 and Marine 4	0.32 0.35	0.55	NR	49 38 or 30ci ^l	20 19 ⁿ or 13+5 ^h Or 15+3 ^h	13/17 or 13/12.5ci	30 ^g	10 15/15 19	10, 2 ft	10 15/19
6	0.32	0.55	NR	49	20+5 or 13+10 ^h	15/20	30 ^g	15/19	10, 4 ft	15/19

7-and-8	0.32	0.55	NR	49	20+5 or h 13+10	19/21	g 38	15/19	10, 4 ft	15/19
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For SI: 1 foot = 304.8 mm.

- 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. "10/15" means R-10 continuous insulated sheathing on the interior or exterior of the home or R-15 cavity insulation at the interior of the basement wall or crawl space wall. "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. For monolithic slabs, insulation shall be applied from the inspection gap downward to the bottom of the footing or a maximum of 24 inches below grade whichever is less. For floating slabs, insulation shall extend to the bottom of the foundation wall or 24 inches, whichever is less. (See Appendix 2) 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. ~~Deleted. There are no SHGC requirements in the Marine Zone.~~
- f. Basement wall insulation is not required in warm-humid locations as defined by 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. If structural sheathing covers 25 percent or less of the exterior, insulating sheathing is not required where structural sheathing is used. If structural sheathing covers more than 25 percent of exterior, structural sheathing shall be supplemented with insulated sheathing of at least R-2.
- i. The second R-value applies when more than half the insulation is on the interior of the mass wall.
- j. In addition to the exemption in Section R402.3.3, a maximum of two glazed fenestration product assemblies having a U-factor no greater than 0.55 shall be permitted to be substituted for minimum code compliant fenestration product assemblies without penalty.
- k. In addition to the exemption in Section R402.3.3, a maximum of two glazed fenestration product assemblies having a SHGC no greater than 0.70 shall be permitted to be substituted for minimum code compliant fenestration product assemblies without penalty.
- l. R-30 shall be deemed to satisfy the ceiling insulation requirement wherever the full height of uncompressed R-30 insulation extends over the wall top plate at the eaves. Otherwise R-38 insulation is required where adequate clearance exists or insulation must extend to either the insulation baffle or within 1" of the attic roof deck.
- m. Table value required except for roof edge where the space is limited by the pitch of the roof, there the insulation must fill the space up to the air baffle.
- n. R-19 fiberglass batts compressed and installed in a nominal 2 x 6 framing cavity is deemed to comply. Fiberglass batts rated R-19 or higher compressed and installed in a 2x4 wall is not deemed to comply.
- o. Basement wall meeting the minimum mass wall specific heat content requirement may use the mass wall R-value as the minimum requirement.

R402.1.3 R-value computation.

Insulation material used in layers, such as framing cavity insulation, or continuous insulation shall be summed to compute the corresponding component R-value. The manufacturer's settled R-value shall be used for blown insulation. Computed R-values shall not include an R-value for other building materials or air films. Where insulated siding is used for the purpose of complying with the continuous insulation requirements of Table R402.1.2, the manufacturer's labeled R-value for insulated siding shall be reduced by R-0.6.

R402.1.4 U-factor alternative.

An assembly with a *U*-factor equal to or less than that specified in Table R402.1.4 shall be permitted as an alternative to the *R*-value in Table R402.1.2.

**TABLE R402.1.4
EQUIVALENT U-FACTORS^a**

CLIMATE ZONE	FENESTRATION U-FACTOR ^d	SKYLIGHT U-FACTOR	CEILING U-FACTOR	FRAME WALL U-FACTOR	MASS WALL U-FACTOR ^b	FLOOR U-FACTOR	BASEMENT WALL U-FACTOR	CRAWL SPACE WALL U-FACTOR
1	0.50	0.75	0.035	0.084	0.197	0.064	0.360	0.477
2	0.40	0.65	0.030	0.084	0.165	0.064	0.360	0.477
3	0.35	0.55	0.030	0.060 0.077	0.098 0.141	0.047	0.091 ^c	0.136
4 except Marine	0.35	0.55	0.026 0.030	0.060 0.077	0.098 0.141	0.047	0.059	0.065
5 and Marine 4	0.32 0.35	0.55	0.026 0.030	0.060 0.061	0.082	0.033	0.050 0.059	0.055 0.065
6	0.32	0.55	0.026	0.045	0.060	0.033	0.050	0.055
7 and 8	0.32	0.55	0.026	0.045	0.057	0.028	0.050	0.055

- Nonfenestration *U*-factors shall be obtained from measurement, calculation or an approved source.
- When more than half the insulation is on the interior, the mass wall *U*-factors shall be a maximum of ~~0.17 in Climate Zone 1, 0.14 in Climate Zone 2, 0.12~~ 0.07 in Climate Zone 3, ~~0.087~~ 0.07 in Climate Zone 4 ~~except Marine~~, and ~~0.065~~ 0.054 in Climate Zone 5 ~~and Marine 4~~, and ~~0.057 in Climate Zones 6 through 8~~.
- Basement wall *U*-factor of 0.360 in warm-humid locations as defined by Figure R301.1 and Table R301.1.
- A maximum of two glazed fenestration product assemblies having a *U*-factor no greater than 0.55 and a SHGC no greater than 0.70 shall be permitted to be substituted for minimum code compliant fenestration product assemblies without penalty. When applying this note and using the REScheck "UA Trade-off" compliance method to allow continued use of the software, the applicable fenestration products shall be modeled as meeting the *U*-factor of 0.35 and the SHGC of 0.30, as applicable, but the fenestration products actual *U*-factor and actual SHGC shall be noted in the comments section of the software for documentation of application of this note to the applicable products. Compliance for these substitute products shall be verified compared to the allowed substituted maximum *U*-value requirement and maximum SHGC requirement, as applicable.

R402.1.5 Total UA alternative.

If the total *building thermal envelope* UA (sum of *U*-factor times assembly area) is less than or equal to the total UA resulting from using the *U*-factors in Table R402.1.4 (multiplied by the same assembly area as in the proposed building), the building shall be considered in compliance with Table R402.1.2. The UA calculation shall be done using a method consistent with the ASHRAE *Handbook of Fundamentals* and shall include the thermal bridging effects of framing materials. The SHGC requirements shall be met in addition to UA compliance.

R402.2 Specific insulation requirements (Prescriptive).

In addition to the requirements of Section R402.1, insulation shall meet the specific requirements of Sections R402.2.1 through R402.2.15 ~~R402.2.13~~.

R402.2.1 Ceilings with attic spaces.

Where Section R402.1.2 would require R-38 insulation in the ceiling, installing R-30 over 100 percent of the ceiling area requiring insulation shall be deemed to satisfy the requirement for R-38 wherever the full height of uncompressed R-30 insulation extends over

REQUEST FOR TECHNICAL CHANGE

AGENCY: NC Building Code Council

RULE CITATION: 2018 NC Energy Conservation Code, Tables R402.1.2 and R402.1.4

DEADLINE FOR RECEIPT: Friday, February 9, 2018

The Rules Review Commission staff has completed its review of this rule prior to the Commission's next meeting. The Commission has not yet reviewed this rule and therefore there has not been a determination as to whether the rule will be approved. You may call this office to inquire concerning the staff recommendation.

In reviewing these rules, the staff determined that the following technical changes need to be made:

On the Submission for Permanent Filing Form and Rule, please change the Code to the Energy Conservation Code.

Table R402.1.2: *You did not make the changes proposed to the Ceiling R-Value in Climate Zones 4 and 5, nor the one in Wood Frame Wall R-Value. Was this in response to public comment?*

You are changing the existing language and adding entirely new language in the Footnotes. Please show all changes made after publication. Was this due to the approval of the Code by the RRC in September while this was still pending publication?

Table R402.1.4: *I do not see that you published this table in the August 1, 2017 Register. Did you publish it on a different date?*

Please retype the rule accordingly and resubmit it to our office at 1711 New Hope Church Road, Raleigh, North Carolina 27609.

Amanda J. Reeder
Commission Counsel
Date submitted to agency: January 31, 2018

R402.1.2 Insulation and fenestration criteria.

The *building thermal envelope* shall meet the requirements of Table R402.1.2, based on the climate zone specified in Chapter 3.

TABLE R402.1.2
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT^a

CLIMATE ZONE	FENESTRATION ^N U-FACTOR ^{b, j}	SKYLIGHT ^b U-FACTOR	GLAZED FENESTRATION ^N SHGC ^{b, k}	CEILING ^G R-VALUE ^m	WOOD FRAME WALL ^R R-VALUE	MASS WALL ^R R-VALUE ⁱ	FLOOR ^R R-VALUE	BASEMENT ^{c, o} WALL R-VALUE	SLAB ^d R-VALUE & DEPTH	CRAWL SPACE ^c WALL R-VALUE
3	0.35	0.55 0.65	0.30	30 38 or 30ci ^l	13 45 or 38 or ^h 13+2.5	5/13 or 5/40ci 5/10	19	^f 10 5/13	0	5/13
4	0.35	0.55 0.60	0.30	38 or 30ci ^l	15 or ^h 13+2.5	5/13 or 5/40ci 5/10	19	10/13 45	10 ^d	10/13 45
5	0.35	0.55 0.60	NR	38 or 30ci ^l	19 ⁿ or ^h 13+5 Or ^h 15+3	13/17 or 13/12.5ci	^g 30	10/13 45	10 ^d	10/13 49

For SI: 1 foot = 304.8 mm.

- 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.
- The fenestration U-factor column excludes skylights. The SHGC column applies to all glazed fenestration.
- "10/45-13" means R-10 continuous insulated sheathing on the interior or exterior of the home or R-45 13 cavity insulation at the interior of the basement wall or crawl space wall. "
- For monolithic slabs, insulation shall be applied from the inspection gap downward to the bottom of the footing or a maximum of 24 inches below grade whichever is less. For floating slabs, insulation shall extend to the bottom of the foundation wall or 24 inches, whichever is less. (See Appendix 2) R-5 shall be added to the required slab edge R-values for heated slabs
- Deleted.
- Basement wall insulation is not required in warm-humid locations as defined by Figure R301.1 and Table R301.1.
- Or insulation sufficient to fill the framing cavity, R-19 minimum.
- 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. If structural sheathing covers 25 percent or less of the exterior, insulating sheathing is not required where structural sheathing is used. If structural sheathing covers more than 25 percent of exterior, structural sheathing shall be supplemented with insulated sheathing of at least R-2.
- The second R-value applies when more than half the insulation is on the interior of the mass wall.
- In addition to the exemption in Section R402.3.3, a maximum of two glazed fenestration product assemblies having a U-factor no greater than 0.55 shall be permitted to be substituted for minimum code compliant fenestration product assemblies without penalty.

- k. In addition to the exemption in Section R402.3.3, a maximum of two glazed fenestration product assemblies having a SHGC no greater than 0.70 shall be permitted to be substituted for minimum code compliant fenestration product assemblies without penalty.
- l. R-30 shall be deemed to satisfy the ceiling insulation requirement wherever the full height of uncompressed R-30 insulation extends over the wall top plate at the eaves. Otherwise R-38 insulation is required where adequate clearance exists or insulation must extend to either the insulation baffle or within 1" of the attic roof deck.
- m. Table value required except for roof edge where the space is limited by the pitch of the roof, there the insulation must fill the space up to the air baffle.
- n. R-19 fiberglass batts compressed and installed in a nominal 2 × 6 framing cavity is deemed to comply. Fiberglass batts rated R-19 or higher compressed and installed in a 2x4 wall is not deemed to comply.
- o. Basement wall meeting the minimum mass wall specific heat content requirement may use the mass wall R-value as the minimum requirement.

R402.1.4 U-factor alternative.

An assembly with a *U*-factor equal to or less than that specified in Table R402.1.4 shall be permitted as an alternative to the *R*-value in Table R402.1.2.

**TABLE R402.1.4
EQUIVALENT U-FACTORS^a**

CLIMATE ZONE	FENESTRATION U-FACTOR ^d	SKYLIGHT U-FACTOR	CEILING U-FACTOR	FRAME WALL U-FACTOR	MASS WALL U-FACTOR ^b	FLOOR U-FACTOR	BASEMENT WALL U-FACTOR	CRAWL SPACE WALL U-FACTOR
3	0.35	0.55 0.65	0.030 0.035	0.077 0.082	0.141	0.047	0.059 ^c 0.094 ^e	0.136
4	0.35	0.55 0.60	0.030	0.077	0.141	0.047	0.059	0.065
5	0.35	0.55 0.60	0.030	0.061	0.082	0.033	0.059	0.065

- a. Nonfenestration *U*-factors shall be obtained from measurement, calculation or an approved source.
- b. When more than half the insulation is on the interior, the mass wall *U*-factors shall be a maximum of 0.07 in Climate Zone 3, 0.07 in Climate Zone 4, and 0.054 in Climate Zone 5.
- c. Basement wall *U*-factor of 0.360 in warm-humid locations as defined by Figure R301.1 and Table R301.1.
- d. A maximum of two glazed fenestration product assemblies having a *U*-factor no greater than 0.55 and a SHGC no greater than 0.70 shall be permitted to be substituted for minimum code compliant fenestration product assemblies without penalty. When applying this note and using the REScheck "UA Trade-off" compliance method to allow continued use of the software, the applicable fenestration products shall be modeled as meeting the *U*-factor of 0.35 and the SHGC of 0.30, as applicable, but the fenestration products actual *U*-factor and actual SHGC shall be noted in the comments section of the software for documentation of application of this note to the applicable products. Compliance for these substitute products shall be verified compared to the allowed substituted maximum *U*-value requirement and maximum SHGC requirement, as applicable.

The delayed effective date of this Rule is January 1, 2019.

The Statutory authority for Rule-making is G. S. 143-136; 143-138.