


SUBMISSION FOR PERMANENT RULE

1. Rule-Making Agency: NC Building Code Council	
2. Rule citation & name (name not required for repeal): 2018 NC Residential Code N1106.2 Mandatory requirements. (200901 Item B-21)	
3. Action: <input type="checkbox"/> ADOPTION <input checked="" type="checkbox"/> AMENDMENT <input type="checkbox"/> REPEAL <input type="checkbox"/> READOPTION <input type="checkbox"/> REPEAL through READOPTION	
4. Rule exempt from RRC review? <input type="checkbox"/> Yes. Cite authority: <input checked="" type="checkbox"/> No	5. Rule automatically subject to legislative review? <input type="checkbox"/> Yes. Cite authority: <input checked="" type="checkbox"/> No
6. Notice for Proposed Rule: <input checked="" type="checkbox"/> Notice Required Notice of Text published on: November 16, 2020 Link to Agency notice: https://www.ncosfm.gov/codes/building-code-council-bcc/bcc-hearing-notice Hearing on: December 8, 2020 Adoption by Agency on: June 8, 2021 <input type="checkbox"/> Notice not required under G.S.: Adoption by Agency on:	
7. Rule establishes or increases a fee? (See G.S. 12-3.1) <input type="checkbox"/> Yes Agency submitted request for consultation on: Consultation not required. Cite authority: <input checked="" type="checkbox"/> No	8. Fiscal impact. Check all that apply. <input type="checkbox"/> This Rule was part of a combined analysis. <input type="checkbox"/> State funds affected <input type="checkbox"/> Local funds affected <input checked="" type="checkbox"/> Substantial economic impact (≥\$1,000,000) <input checked="" type="checkbox"/> Approved by OSBM <input type="checkbox"/> No fiscal note required
<p style="text-align: center;">9. REASON FOR ACTION</p> 9A. What prompted this action? Check all that apply: <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <input checked="" type="checkbox"/> Agency <input type="checkbox"/> Court order / cite: <input type="checkbox"/> Federal statute / cite: <input type="checkbox"/> Federal regulation / cite: </div> <div style="width: 45%;"> <input type="checkbox"/> Legislation enacted by the General Assembly Cite Session Law: <input checked="" type="checkbox"/> Petition for rule-making <input type="checkbox"/> Other: </div> </div> 9B. Explain: The purpose of this amendment is to relocate referenced tables of the 2012 NCECC into the current NCRC and to add information regarding insulation of unvented attics. The delayed effective date of this Rule is January 1, 2022. The Statutory authority for Rule-making is G. S. 143-136; 143-138.	
10. Rulemaking Coordinator: Carl Martin Carl Martin Phone: 1(919)647-0009 E-Mail: carl.martin@ncdoi.gov Additional agency contact, if any: Phone: E-Mail:	11. Signature of Agency Head* or Rule-making Coordinator: <div style="text-align: center; margin-bottom: 10px;">  </div> *If this function has been delegated (reassigned) pursuant to G.S. 143B-10(a), submit a copy of the delegation with this form. Typed Name: Carl Martin Title: Chief Code Consultant
RRC AND OAH USE ONLY	
Action taken: <input type="checkbox"/> RRC extended period of review: <input type="checkbox"/> RRC determined substantial changes: <input type="checkbox"/> Withdrawn by agency <input type="checkbox"/> Subject to Legislative Review <input type="checkbox"/> Other:	

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2018 NC Residential Code
N1106.2 Mandatory requirements. (200901 Item B-21)

N1106.2 Mandatory requirements. Compliance with this section requires that the provisions identified in Sections N1101 through N1104 labeled as “mandatory” be met. The building thermal envelope shall be greater than or equal to levels of efficiency and Solar Heat Gain Coefficient in Table N1106.2.1 or Table N1106.2.2, Table 402.2.3 or 402.1.3 of the 2012 North Carolina Energy Conservation Code. Minimum standards associated with compliance shall be the ANSI RESNET ICC Standard 301-2014: “Standard for the Calculation and Labeling of the Energy Performance of Low-Rise Residential Buildings using an

Energy Rating Index.” A North Carolina *registered design professional* or certified *HERS rater* is required to perform the analysis if required by North Carolina licensure laws.

Exception: Supply and return ducts in unconditioned space and outdoors shall be insulated to a minimum R-8. Supply ducts inside semi-conditioned space shall be insulated to a minimum R-4; return ducts inside conditioned and semi-conditioned space are not required to be insulated. Ducts located inside conditioned space are not required to be insulated other than as may be necessary for preventing the formation of condensation on the exterior of cooling ducts.

TABLE N1106.2.1
MINIMUM INSULATION AND FENESTRATION REQUIREMENTS FOR ENERGY RATING INDEX COMPLIANCE^a

CLIMATE ZONE	FENESTRATION VALUES			R-VALUES FOR								
	FENESTRATION U-FACTOR ^{b,j}	SKYLIGHT ^b U-FACTOR	GLAZED FENESTRATION SHGC ^{b,k}	CEILING ^m	UNVENTED ^p RAFTER ASSEMBLIES IN ATTICS CONTAINING DUCTWORK, AIR-IMPERMEABLE	UNVENTED ^p RAFTER ASSEMBLIES IN ATTICS CONTAINING DUCTWORK, AIR-PERMIABLE/IMPERMEABLE	WOOD FRAME WALL	MASS WALL ⁱ	FLOOR	BASEMENT ^{c,o} WALL	SLAB ^d	CRAWL SPACE ^c WALL
3	<u>0.35</u>	<u>0.65</u>	<u>0.3</u>	<u>30</u>	<u>20</u>	<u>15-10^a</u>	<u>13</u>	<u>5/10</u>	<u>19</u>	<u>10/13^f</u>	<u>0</u>	<u>5/13</u>
4	<u>0.35</u>	<u>0.6</u>	<u>0.3</u>	<u>38 or 30ci^l</u>	<u>20</u>	<u>15-10^a</u>	<u>15, 13+2.5^h</u>	<u>5/10</u>	<u>19</u>	<u>10/13</u>	<u>10</u>	<u>10/13</u>
5	<u>0.35</u>	<u>0.6</u>	<u>NR</u>	<u>38 or 30ci^l</u>	<u>25</u>	<u>15-20^a</u>	<u>19ⁿ, 13+5^h, or 15+3^h</u>	<u>13/17</u>	<u>30^g</u>	<u>10/13</u>	<u>10</u>	<u>10/13</u>

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.- Deleted.

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

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 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.

SUBMISSION FOR PERMANENT RULE

k. In addition to the exemption in 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 either to 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 are 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.

p. The air-impermeable insulation shall meet the requirements of the definition in Section R202. Air-impermeable insulation shall be installed in direct contact with the underside of the structural roof sheathing. For one- and two-family dwellings and townhouses, the insulation installation shall meet the requirements of R806.5 of the North Carolina Residential Code. For Residential Buildings other than one- and two-family dwellings and townhouses, the insulation installation shall meet the installation requirements of 1203.3 of the North Carolina Building Code. Exposed rafters shall be covered with R-7 insulation.

q. The value for air-permeable insulation is shown first and that for air-impermeable insulation second. Thus, R-15 + R-10 indicates that the minimum value for air-permeable insulation is R-15, and the minimum value for air-impermeable insulation is R-10. Air-impermeable insulation shall be installed in direct contact with the underside of the structural roof sheathing. The air-permeable insulation shall be installed directly under the air-impermeable insulation. Exposed rafters shall be covered with R-7 insulation.

TABLE N1106.2.2

EQUIVALENT U-FACTORS FOR TABLE N1106.2.1^a

CLIMATE ZONE	FENESTRATION ^d	SKYLIGHT U-FACTOR	CEILING	UNVENTED ^e RAFTER ASSEMBLIES IN ATTICS CONTAINING DUCTWORK, AIR-IMPERMEABLE	UNVENTED ^e RAFTER ASSEMBLIES IN ATTICS CONTAINING DUCTWORK, AIR-PERMIABLE/IMPERMEABLE	FRAME WALL	MASS WALL ^b	FLOOR	BASE-MENT ^d WALL	CRAWL SPACE ^c WALL
3	<u>0.35</u>	<u>0.65</u>	<u>0.0350</u>	<u>0.05</u>	<u>0.043^f</u>	<u>0.082</u>	<u>0.141</u>	<u>0.047</u>	<u>0.059</u>	<u>0.136</u>
4	<u>0.35</u>	<u>0.60</u>	<u>0.0300</u>	<u>0.05</u>	<u>0.043^f</u>	<u>0.077</u>	<u>0.141</u>	<u>0.047</u>	<u>0.059</u>	<u>0.065</u>
5	<u>0.35</u>	<u>0.60</u>	<u>0.0300</u>	<u>0.037</u>	<u>0.034^f</u>	<u>0.061</u>	<u>0.082</u>	<u>0.033</u>	<u>0.059</u>	<u>0.065</u>

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.

e. The air-impermeable insulation shall meet the requirements of the definition in section R202. Air-impermeable insulation shall be installed in direct contact with the underside of the structural roof sheathing. For one- and two-family dwellings and townhouses, the insulation installation shall meet the requirements of R806.5 of the North Carolina Residential Code. Exposed rafters shall be covered with R-7 insulation.

f. For air-permeable/ impermeable applications, Table N1106.2.1 shall be followed for minimum insulation values.

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2. Rule citation & name (name not required for repeal): 2018 NC Residential Code M1402.1 General. (200901 Item B-9)	
3. Action: <input type="checkbox"/> ADOPTION <input checked="" type="checkbox"/> AMENDMENT <input type="checkbox"/> REPEAL <input type="checkbox"/> READOPTION <input type="checkbox"/> REPEAL through READOPTION	
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7. Rule establishes or increases a fee? (See G.S. 12-3.1) <input type="checkbox"/> Yes Agency submitted request for consultation on: Consultation not required. Cite authority: <input checked="" type="checkbox"/> No	8. Fiscal impact. Check all that apply. <input type="checkbox"/> This Rule was part of a combined analysis. <input type="checkbox"/> State funds affected <input type="checkbox"/> Local funds affected <input type="checkbox"/> Substantial economic impact (≥\$1,000,000) <input type="checkbox"/> Approved by OSBM <input checked="" type="checkbox"/> No fiscal note required
<p style="text-align: center;">9. REASON FOR ACTION</p> 9A. What prompted this action? Check all that apply: <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <input checked="" type="checkbox"/> Agency <input type="checkbox"/> Court order / cite: <input type="checkbox"/> Federal statute / cite: <input type="checkbox"/> Federal regulation / cite: </div> <div style="width: 45%;"> <input type="checkbox"/> Legislation enacted by the General Assembly Cite Session Law: <input checked="" type="checkbox"/> Petition for rule-making <input type="checkbox"/> Other: </div> </div> 9B. Explain: The purpose of this amendment is to update the code because manufacturers will be transitioning away from UL 1995 to UL 60335-2-40 for most new products over the next few years, because UL 1995 will be obsoleted effective 1/1/2024. The delayed effective date of this Rule is January 1, 2022. The Statutory authority for Rule-making is G. S. 143-136; 143-138.	
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2018 NC Residential Code
M1402.1 General. (200901 Item B-9)

M1402.1 (918.1) General. Oil-fired central furnaces shall conform to ANSI/UL 727. Electric furnaces shall conform to UL 1995 or UL/CSA 60335-2-40. Solid fuel furnaces shall be tested in accordance with UL 391.

SUBMISSION FOR PERMANENT RULE

1. Rule-Making Agency: NC Building Code Council	
2. Rule citation & name (name not required for repeal): 2018 NC Residential Code M1403.1 Heat pumps. (200901 Item B-10)	
3. Action: <input type="checkbox"/> ADOPTION <input checked="" type="checkbox"/> AMENDMENT <input type="checkbox"/> REPEAL <input type="checkbox"/> READOPTION <input type="checkbox"/> REPEAL through READOPTION	
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SUBMISSION FOR PERMANENT RULE

2018 NC Residential Code

M1403.1 Heat pumps. (200901 Item B-10)

M1403.1 (918.2) Heat pumps. Electric heat pumps shall be listed and labeled in accordance with UL 1995 or UL/CSA/ANCE 60335-2-40.

SUBMISSION FOR PERMANENT RULE

1. Rule-Making Agency: NC Building Code Council	
2. Rule citation & name (name not required for repeal): 2018 NC Residential Code Chapter 44 References UL/CSA/ANCE 60335-2-40 & ASHRAE 34. (200901 Item B-8)	
3. Action: <input type="checkbox"/> ADOPTION <input checked="" type="checkbox"/> AMENDMENT <input type="checkbox"/> REPEAL <input type="checkbox"/> READOPTION <input type="checkbox"/> REPEAL through READOPTION	
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2018 NC Residential Code

Chapter 44 References UL/CSA/ANCE 60335-2-40 & ASHRAE 34. (200901 Item B-8)

ANCE

~~UL/CSA/ANCE 60335-2-40 — 2012~~ ~~Standard for Household and Similar Electrical Appliances, Part 2: Particular Requirements for Motor compressors~~
~~M1403.1~~

ASHRAE

~~34 — 2013~~2019 Designation and Safety Classification of Refrigerants
M1411.1


CSA

CSA C22.2 No. 60335-2-40-2019
~~UL/CSA/ANCE 60335-2-40 — 2012~~ Standard for Household and Similar Electrical Appliances, Part 2-40:
Particular Requirements for ~~Motor compressors~~ Electrical Heat Pumps,
Air-Conditioners and Dehumidifiers - 3rd Edition
M1402.1, M1403.1

UL

1995 — ~~2014~~2015 Heating and Cooling Equipment
M1402.1, M1403.1, M1407.1
~~UL/CSA/ANCE 60335-2-40-2012~~2019 Standard for Household and Similar Electrical Appliances, Part 2-40:
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M1402.1, M1403.1

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2. Rule citation & name (name not required for repeal): 2018 NC Building Code 403.4.5 and 916. (201208 Item B-6)	
3. Action: <input type="checkbox"/> ADOPTION <input checked="" type="checkbox"/> AMENDMENT <input type="checkbox"/> REPEAL <input type="checkbox"/> READOPTION <input type="checkbox"/> REPEAL through READOPTION	
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2018 NC Building Code
403.4.5 and 916. (201208 Item B-6)

403.4.5 Emergency Responder ~~Radio~~ Communication Coverage. Emergency responder ~~radio~~ communication coverage shall be provided in accordance with Section 510 of the *International Fire Code*.

916 Emergency Responder ~~Radio~~ Communication Coverage

916.1 General. Emergency responder ~~radio~~ communication coverage shall be provided in all new buildings in accordance with Section 510 of the *International Fire Code*.

SUBMISSION FOR PERMANENT RULE


1. Rule-Making Agency: NC Building Code Council	
2. Rule citation & name (name not required for repeal): 2018 NC Mechanical Code 908.1 General. (200901 Item B-12)	
3. Action: <input type="checkbox"/> ADOPTION <input checked="" type="checkbox"/> AMENDMENT <input type="checkbox"/> REPEAL <input type="checkbox"/> READOPTION <input type="checkbox"/> REPEAL through READOPTION	
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7. Rule establishes or increases a fee? (See G.S. 12-3.1) <input type="checkbox"/> Yes Agency submitted request for consultation on: Consultation not required. Cite authority: <input checked="" type="checkbox"/> No	8. Fiscal impact. Check all that apply. <input type="checkbox"/> This Rule was part of a combined analysis. <input type="checkbox"/> State funds affected <input type="checkbox"/> Local funds affected <input type="checkbox"/> Substantial economic impact (≥\$1,000,000) <input type="checkbox"/> Approved by OSBM <input checked="" type="checkbox"/> No fiscal note required
<p style="text-align: center;">9. REASON FOR ACTION</p> 9A. What prompted this action? Check all that apply: <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <input checked="" type="checkbox"/> Agency <input type="checkbox"/> Court order / cite: <input type="checkbox"/> Federal statute / cite: <input type="checkbox"/> Federal regulation / cite: </div> <div style="width: 45%;"> <input type="checkbox"/> Legislation enacted by the General Assembly Cite Session Law: <input checked="" type="checkbox"/> Petition for rule-making <input type="checkbox"/> Other: </div> </div> 9B. Explain: The purpose of this amendment is to update the code because manufacturers will be transitioning away from UL 1995 to UL 60335-2-40 for most new products over the next few years, because UL 1995 will be obsoleted effective 1/1/2024. The delayed effective date of this Rule is January 1, 2022. The Statutory authority for Rule-making is G. S. 143-136; 143-138.	
10. Rulemaking Coordinator: Carl Martin Carl Martin Phone: 1(919)647-0009 E-Mail: carl.martin@ncdoi.gov Additional agency contact, if any: Phone: E-Mail:	11. Signature of Agency Head* or Rule-making Coordinator: <div style="text-align: center; margin-bottom: 10px;">  </div> <hr style="border: 0; border-top: 1px solid black; margin: 5px 0;"/> *If this function has been delegated (reassigned) pursuant to G.S. 143B-10(a), submit a copy of the delegation with this form. Typed Name: Carl Martin Title: Chief Code Consultant
RRC AND OAH USE ONLY	
Action taken: <input type="checkbox"/> RRC extended period of review: <input type="checkbox"/> RRC determined substantial changes: <input type="checkbox"/> Withdrawn by agency <input type="checkbox"/> Subject to Legislative Review <input type="checkbox"/> Other:	

SUBMISSION FOR PERMANENT RULE

2018 NC Mechanical Code
908.1 General. (200901 Item B-12)

908.1 General. A cooling tower used in conjunction with an air-conditioning appliance shall be installed in accordance with the manufacturer's instructions. Factory-built cooling towers shall be listed in accordance with UL 1995 or UL/CSA 60335-2-40.

SUBMISSION FOR PERMANENT RULE

1. Rule-Making Agency: NC Building Code Council	
2. Rule citation & name (name not required for repeal): 2018 NC Mechanical Code 918.1 Forced-Air Furnaces & 918.2 Heat Pumps. (200901 Item B-13)	
3. Action: <input type="checkbox"/> ADOPTION <input checked="" type="checkbox"/> AMENDMENT <input type="checkbox"/> REPEAL <input type="checkbox"/> READOPTION <input type="checkbox"/> REPEAL through READOPTION	
4. Rule exempt from RRC review? <input type="checkbox"/> Yes. Cite authority: <input checked="" type="checkbox"/> No	5. Rule automatically subject to legislative review? <input type="checkbox"/> Yes. Cite authority: <input checked="" type="checkbox"/> No
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10. Rulemaking Coordinator: Carl Martin Carl Martin Phone: 1(919)647-0009 E-Mail: carl.martin@ncdoi.gov Additional agency contact, if any: Phone: E-Mail:	11. Signature of Agency Head* or Rule-making Coordinator: <div style="text-align: center; margin-bottom: 10px;">  </div> <hr style="border: 0; border-top: 1px solid black; margin: 5px 0;"/> *If this function has been delegated (reassigned) pursuant to G.S. 143B-10(a), submit a copy of the delegation with this form. Typed Name: Carl Martin Title: Chief Code Consultant
RRC AND OAH USE ONLY	
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SUBMISSION FOR PERMANENT RULE


2018 NC Mechanical Code

918.1 Forced-Air Furnaces & 918.2 Heat Pumps. (200901 Item B-13)

918.1 Forced-air furnaces. Oil-fired furnaces shall be tested in accordance with UL 727. Electric furnaces shall be tested in accordance with UL 1995 or UL/CSA 60335-2-40. Solid fuel furnaces shall be tested in accordance with UL 391. Forced-air furnaces shall be installed in accordance with the listings and the manufacturer's instructions.

918.2 Heat pumps. Electric heat pumps shall be tested in accordance with UL 1995 or UL/CSA 60335-2-40.

SUBMISSION FOR PERMANENT RULE

1. Rule-Making Agency: NC Building Code Council	
2. Rule citation & name (name not required for repeal): 2018 NC Mechanical Code 1101.2 Factory-built equipment and appliances. (200901 Item B-14)	
3. Action: <input type="checkbox"/> ADOPTION <input checked="" type="checkbox"/> AMENDMENT <input type="checkbox"/> REPEAL <input type="checkbox"/> READOPTION <input type="checkbox"/> REPEAL through READOPTION	
4. Rule exempt from RRC review? <input type="checkbox"/> Yes. Cite authority: <input checked="" type="checkbox"/> No	5. Rule automatically subject to legislative review? <input type="checkbox"/> Yes. Cite authority: <input checked="" type="checkbox"/> No
6. Notice for Proposed Rule: <input checked="" type="checkbox"/> Notice Required Notice of Text published on: November 16, 2020 Link to Agency notice: https://www.ncosfm.gov/codes/building-code-council-bcc/bcc-hearing-notice Hearing on: December 8, 2020 Adoption by Agency on: June 8, 2021 <input type="checkbox"/> Notice not required under G.S.: Adoption by Agency on:	
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<p style="text-align: center;">9. REASON FOR ACTION</p> 9A. What prompted this action? Check all that apply: <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <input checked="" type="checkbox"/> Agency <input type="checkbox"/> Court order / cite: <input type="checkbox"/> Federal statute / cite: <input type="checkbox"/> Federal regulation / cite: </div> <div style="width: 45%;"> <input type="checkbox"/> Legislation enacted by the General Assembly Cite Session Law: <input checked="" type="checkbox"/> Petition for rule-making <input type="checkbox"/> Other: </div> </div> 9B. Explain: The purpose of this amendment is to update the code because manufacturers will be transitioning away from UL 1995 to UL 60335-2-40 for most new products over the next few years, because UL 1995 will be obsoleted effective 1/1/2024. The delayed effective date of this Rule is January 1, 2022. The Statutory authority for Rule-making is G. S. 143-136; 143-138.	
10. Rulemaking Coordinator: Carl Martin Carl Martin Phone: 1(919)647-0009 E-Mail: carl.martin@ncdoi.gov Additional agency contact, if any: Phone: E-Mail:	11. Signature of Agency Head* or Rule-making Coordinator: <div style="text-align: center; margin-bottom: 10px;">  </div> <hr style="border: 0; border-top: 1px solid black; margin: 5px 0;"/> *If this function has been delegated (reassigned) pursuant to G.S. 143B-10(a), submit a copy of the delegation with this form. Typed Name: Carl Martin Title: Chief Code Consultant
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SUBMISSION FOR PERMANENT RULE

2018 NC Mechanical Code

1101.2 Factory-built equipment and appliances. (200901 Item B-14)

1101.2 Factory-built equipment and appliances. Listed and labeled self-contained, factory-built equipment and appliances shall be tested in accordance with UL 207, 412, 471, ~~or 1995~~ or UL/CSA 60335-2-40. Such equipment and appliances are deemed to meet the design, manufacture and factory test requirements of this code if installed in accordance with their listing and the manufacturer's instructions.

SUBMISSION FOR PERMANENT RULE

1. Rule-Making Agency: NC Building Code Council	
2. Rule citation & name (name not required for repeal): 2018 NC Mechanical Code Chapter 15 References UL/CSA 60335-2-40 & ASHRAE 15 & 34. (200901 Item B-11)	
3. Action: <input type="checkbox"/> ADOPTION <input checked="" type="checkbox"/> AMENDMENT <input type="checkbox"/> REPEAL <input type="checkbox"/> READOPTION <input type="checkbox"/> REPEAL through READOPTION	
4. Rule exempt from RRC review? <input type="checkbox"/> Yes. Cite authority: <input checked="" type="checkbox"/> No	5. Rule automatically subject to legislative review? <input type="checkbox"/> Yes. Cite authority: <input checked="" type="checkbox"/> No
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<p style="text-align: center;">9. REASON FOR ACTION</p> 9A. What prompted this action? Check all that apply: <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <input checked="" type="checkbox"/> Agency <input type="checkbox"/> Court order / cite: <input type="checkbox"/> Federal statute / cite: <input type="checkbox"/> Federal regulation / cite: </div> <div style="width: 45%;"> <input type="checkbox"/> Legislation enacted by the General Assembly Cite Session Law: <input checked="" type="checkbox"/> Petition for rule-making <input type="checkbox"/> Other: </div> </div> 9B. Explain: The purpose of this amendment is to update the code because manufacturers will be transitioning away from UL 1995 to UL 60335-2-40 for most new products over the next few years, because UL 1995 will be obsoleted effective 1/1/2024. The delayed effective date of this Rule is January 1, 2022. The Statutory authority for Rule-making is G. S. 143-136; 143-138.	
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SUBMISSION FOR PERMANENT RULE

2018 NC Mechanical Code

Chapter 15 References UL/CSA 60335-2-40 & ASHRAE 15 & 34. (200901 Item B-11)

ASHRAE

ASHRAE
1791 Tullie Circle, NE
Atlanta, GA 30329

15—~~2013~~2019

Safety Standard for Refrigeration Systems

1101.6, 1105.8, 1108.1

34—~~2013~~2019

Designation and Safety Classification of Refrigerants

202, 1102.2.1, 1103.1

CSA

CSA Group
8501 East Pleasant Valley Road
Cleveland, OH 44131-5516

CSA-C22.2 No. 60335-2-40-2019

Household And Similar Electrical Appliances - Safety – Part
2-40: Particular Requirements for Electrical Heat Pumps, Air-
Conditioners and Dehumidifiers – 3rd Edition
908.1, 918.1, 918.2, 1101.2

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062-2096

1995—~~2011~~2015


Heating and Cooling Equipment

908.1, 911.1, 918.1, 918.2, 1101.2

UL 60335-2-40-2019

Household And Similar Electrical Appliances - Safety – Part
2-40: Particular Requirements for Electrical Heat Pumps, Air-
Conditioners and Dehumidifiers – 3rd Edition
908.1, 918.1, 918.2, 1101.2

SUBMISSION FOR PERMANENT RULE


1. Rule-Making Agency: NC Building Code Council	
2. Rule citation & name (name not required for repeal): 2018 NC Energy Code Chapter 2 Definitions. (200901 Item B-20)	
3. Action: <input type="checkbox"/> ADOPTION <input checked="" type="checkbox"/> AMENDMENT <input type="checkbox"/> REPEAL <input type="checkbox"/> READOPTION <input type="checkbox"/> REPEAL through READOPTION	
4. Rule exempt from RRC review? <input type="checkbox"/> Yes. Cite authority: <input checked="" type="checkbox"/> No	5. Rule automatically subject to legislative review? <input type="checkbox"/> Yes. Cite authority: <input checked="" type="checkbox"/> No
6. Notice for Proposed Rule: <input checked="" type="checkbox"/> Notice Required Notice of Text published on: November 16, 2020 Link to Agency notice: https://www.ncosfm.gov/codes/building-code-council-bcc/bcc-hearing-notices Hearing on: March 9, 2021 Adoption by Agency on: June 8, 2021 <input type="checkbox"/> Notice not required under G.S.: Adoption by Agency on:	
7. Rule establishes or increases a fee? (See G.S. 12-3.1) <input type="checkbox"/> Yes Agency submitted request for consultation on: Consultation not required. Cite authority: <input checked="" type="checkbox"/> No	8. Fiscal impact. Check all that apply. <input type="checkbox"/> This Rule was part of a combined analysis. <input type="checkbox"/> State funds affected <input type="checkbox"/> Local funds affected <input type="checkbox"/> Substantial economic impact (≥\$1,000,000) <input type="checkbox"/> Approved by OSBM <input checked="" type="checkbox"/> No fiscal note required
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10. Rulemaking Coordinator: Carl Martin Carl Martin Phone: 1(919)647-0009 E-Mail: carl.martin@ncdoi.gov Additional agency contact, if any: Phone: E-Mail:	11. Signature of Agency Head* or Rule-making Coordinator: <div style="text-align: center; margin-bottom: 10px;">  </div> <p>*If this function has been delegated (reassigned) pursuant to G.S. 143B-10(a), submit a copy of the delegation with this form.</p> Typed Name: Carl Martin Title: Chief Code Consultant
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SUBMISSION FOR PERMANENT RULE

2018 NC Energy Code
Chapter 2 Definitions. (200901 Item B-20)

AIR-IMPERMEABLE INSULATION. An insulation having an air permanence equal to or less than 0.02 L/s-m² at 75 Pa pressure differential tested according to ASTM E2178 or E283 at the thickness applied.

SUBMISSION FOR PERMANENT RULE

1. Rule-Making Agency: NC Building Code Council	
2. Rule citation & name (name not required for repeal): 2018 NC Energy Code R406.2 Mandatory requirements. (200901 Item B-15)	
3. Action: <input type="checkbox"/> ADOPTION <input checked="" type="checkbox"/> AMENDMENT <input type="checkbox"/> REPEAL <input type="checkbox"/> READOPTION <input type="checkbox"/> REPEAL through READOPTION	
4. Rule exempt from RRC review? <input type="checkbox"/> Yes. Cite authority: <input checked="" type="checkbox"/> No	5. Rule automatically subject to legislative review? <input type="checkbox"/> Yes. Cite authority: <input checked="" type="checkbox"/> No
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10. Rulemaking Coordinator: Carl Martin Carl Martin Phone: 1(919)647-0009 E-Mail: carl.martin@ncdoi.gov Additional agency contact, if any: Phone: E-Mail:	11. Signature of Agency Head* or Rule-making Coordinator: <div style="text-align: center; margin-top: 10px;">  <hr style="width: 80%; margin: 0 auto;"/> </div> <p>*If this function has been delegated (reassigned) pursuant to G.S. 143B-10(a), submit a copy of the delegation with this form.</p> <p>Typed Name: Carl Martin Title: Chief Code Consultant</p>
RRC AND OAH USE ONLY	
Action taken: <input type="checkbox"/> RRC extended period of review: <input type="checkbox"/> RRC determined substantial changes: <input type="checkbox"/> Withdrawn by agency <input type="checkbox"/> Subject to Legislative Review <input type="checkbox"/> Other:	

SUBMISSION FOR PERMANENT RULE

2018 NC Energy Code
R406.2 Mandatory requirements. (200901 Item B-15)

R406.2 Mandatory requirements. Compliance with this section requires that the provisions identified in Sections R401 through R404 labeled as “mandatory” be met. The building thermal envelope shall be greater than or equal to levels of efficiency and Solar Heat Gain Coefficient in Table R406.2.1 or Table R406.2.2, Table 402.1.1 or 402.1.3 of the 2012 North Carolina Energy Conservation Code. Minimum standards associated with compliance shall be the ANSI RESNET ICC Standard 301-2014: “Standard for the Calculation and Labeling of the Energy Performance of Low-Rise Residential Buildings using an Energy Rating Index.” A North Carolina *registered design professional* or certified *HERS rater* is required to perform the analysis if required by North Carolina licensure laws.

Exception: Supply and return ducts in unconditioned space and outdoors shall be insulated to a minimum R-8. Supply ducts inside semi-conditioned space shall be insulated to a minimum R-4; return ducts inside conditioned and semi-conditioned space are not required to be insulated. Ducts located inside conditioned space are not required to be insulated other than as may be necessary for preventing the formation of condensation on the exterior of cooling ducts.

TABLE R406.2.1
MINIMUM INSULATION AND FENESTRATION REQUIREMENTS FOR ENERGY RATING INDEX COMPLIANCE^a

CLIMATE ZONE	FENESTRATION VALUES			R-VALUES FOR								
	FENESTRATION U-FACTOR ^{b,j}	SKYLIGHT ^b U-FACTOR	GLAZED FENESTRATION SHGC ^{b,k}	CEILING ^m	UNVENTED ^p RAFTER ASSEMBLIES IN ATTICS CONTAINING DUCTWORK, AIR-IMPERMEABLE	UNVENTED ^p RAFTER ASSEMBLIES IN ATTICS CONTAINING DUCTWORK, AIR-PERMIABLE/IMPERMEABLE	WOOD FRAME WALL	MASS WALL ⁱ	FLOOR	BASEMENT ^{c,o} WALL	SLAB ^d	CRAWL SPACE ^c WALL
3	<u>0.35</u>	<u>0.65</u>	<u>0.3</u>	<u>30</u>	<u>20</u>	<u>15-10^q</u>	<u>13</u>	<u>5/10</u>	<u>19</u>	<u>10/13^f</u>	<u>0</u>	<u>5/13</u>
4	<u>0.35</u>	<u>0.6</u>	<u>0.3</u>	<u>38 or 30ci^l</u>	<u>20</u>	<u>15-10^q</u>	<u>15, 13+2.5^h</u>	<u>5/10</u>	<u>19</u>	<u>10/13</u>	<u>10</u>	<u>10/13</u>
5	<u>0.35</u>	<u>0.6</u>	<u>NR</u>	<u>38 or 30ci^l</u>	<u>25</u>	<u>15-20^q</u>	<u>19ⁿ, 13+5^h, or 15+3^h</u>	<u>13/17</u>	<u>30^g</u>	<u>10/13</u>	<u>10</u>	<u>10/13</u>

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 R2) R-5 shall be added to the required slab edge R-values for heated slabs.

e.- Deleted.

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 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 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.

SUBMISSION FOR PERMANENT RULE


- 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 either to 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 are 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.
- p. The air-impermeable insulation shall meet the requirements of the definition in Section R202. Air-impermeable insulation shall be installed in direct contact with the underside of the structural roof sheathing. For one- and two-family dwellings and townhouses, the insulation installation shall meet the requirements of R806.5 of the North Carolina Residential Code. For Residential Buildings other than one- and two-family dwellings and townhouses, the insulation installation shall meet the installation requirements of 1203.3 of the North Carolina Building Code. Exposed rafters shall be covered with R-7 insulation.
- q. The value for air-permeable insulation is shown first and that for air-impermeable insulation second. Thus, R-15 + R-10 indicates that the minimum value for air-permeable insulation is R-15, and the minimum value for air-impermeable insulation is R-10. Air-impermeable insulation shall be installed in direct contact with the underside of the structural roof sheathing. The air-permeable insulation shall be installed directly under the air-impermeable insulation. Exposed rafters shall be covered with R-7 insulation.

TABLE R406.2.2
EQUIVALENT U-FACTORS FOR TABLE R406.2.1^a

CLIMATE ZONE	FENESTRATION ^d	SKYLIGHT U-FACTOR	CEILING	UNVENTED ^e RAFTER ASSEMBLIES IN ATTICS CONTAINING DUCTWORK, AIR-IMPERMEABLE	UNVENTED ^e RAFTER ASSEMBLIES IN ATTICS CONTAINING DUCTWORK, AIR-PERMEABLE/IMPERMEABLE	FRAME WALL	MASS WALL ^b	FLOOR	BASE-MENT ^d WALL	CRAWL SPACE ^c WALL
3	0.35	0.65	0.0350	0.05	0.043^f	0.082	0.141	0.047	0.059	0.136
4	0.35	0.60	0.0300	0.05	0.043^f	0.077	0.141	0.047	0.059	0.065
5	0.35	0.60	0.0300	0.037	0.034^f	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.
- e. The air-impermeable insulation shall meet the requirements of the definition in section R202. Air-impermeable insulation shall be installed in direct contact with the underside of the structural roof sheathing. For one- and two-family dwellings and townhouses, the insulation installation shall meet the requirements of R806.5 of the North Carolina Residential Code. Exposed rafters shall be covered with R-7 insulation.
- f. For air-permeable/ impermeable applications, Table R406.2.1 shall be followed for minimum insulation values.

SUBMISSION FOR PERMANENT RULE

1. Rule-Making Agency: NC Building Code Council	
2. Rule citation & name (name not required for repeal): 2018 NC Fire Code 304.4.4 Revocation. (201208 Item B-1)	
3. Action: <input type="checkbox"/> ADOPTION <input type="checkbox"/> AMENDMENT <input checked="" type="checkbox"/> REPEAL <input type="checkbox"/> READOPTION <input type="checkbox"/> REPEAL through READOPTION	
4. Rule exempt from RRC review? <input type="checkbox"/> Yes. Cite authority: <input checked="" type="checkbox"/> No	5. Rule automatically subject to legislative review? <input type="checkbox"/> Yes. Cite authority: <input checked="" type="checkbox"/> No
6. Notice for Proposed Rule: <input checked="" type="checkbox"/> Notice Required Notice of Text published on: February 15, 2021 Link to Agency notice: https://www.ncosfm.gov/codes/building-code-council-bcc/bcc-hearing-notice Hearing on: March 9, 2021 Adoption by Agency on: June 8, 2021 <input type="checkbox"/> Notice not required under G.S.: Adoption by Agency on:	
7. Rule establishes or increases a fee? (See G.S. 12-3.1) <input type="checkbox"/> Yes Agency submitted request for consultation on: Consultation not required. Cite authority: <input checked="" type="checkbox"/> No	8. Fiscal impact. Check all that apply. <input type="checkbox"/> This Rule was part of a combined analysis. <input type="checkbox"/> State funds affected <input type="checkbox"/> Local funds affected <input type="checkbox"/> Substantial economic impact (≥\$1,000,000) <input type="checkbox"/> Approved by OSBM <input checked="" type="checkbox"/> No fiscal note required
<p style="text-align: center;">9. REASON FOR ACTION</p> 9A. What prompted this action? Check all that apply: <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <input checked="" type="checkbox"/> Agency <input type="checkbox"/> Court order / cite: <input type="checkbox"/> Federal statute / cite: <input type="checkbox"/> Federal regulation / cite: </div> <div style="width: 45%;"> <input type="checkbox"/> Legislation enacted by the General Assembly Cite Session Law: <input checked="" type="checkbox"/> Petition for rule-making <input type="checkbox"/> Other: </div> </div> 9B. Explain: The purpose of this amendment is to delete section 304.4.4 because enforcement methods already exist in section 109. The delayed effective date of this Rule is January 1, 2022. The Statutory authority for Rule-making is G. S. 143-136; 143-138.	
10. Rulemaking Coordinator: Carl Martin Carl Martin Phone: 1(919)647-0009 E-Mail: carl.martin@ncdoi.gov Additional agency contact, if any: Phone: E-Mail:	11. Signature of Agency Head* or Rule-making Coordinator: <div style="text-align: center; margin-top: 10px;">  </div> <hr style="border: 0; border-top: 1px solid black; margin: 5px 0;"/> *If this function has been delegated (reassigned) pursuant to G.S. 143B-10(a), submit a copy of the delegation with this form. Typed Name: Carl Martin Title: Chief Code Consultant
RRC AND OAH USE ONLY	
Action taken: <input type="checkbox"/> RRC extended period of review: <input type="checkbox"/> RRC determined substantial changes: <input type="checkbox"/> Withdrawn by agency <input type="checkbox"/> Subject to Legislative Review <input type="checkbox"/> Other:	


SUBMISSION FOR PERMANENT RULE

2018 NC Fire Code

304.4.4 Revocation. (201208 Item B-1)

~~**304.4.4 Revocation.** The use of doorstep refuse and recycling collection containers in apartment occupancies is revocable by the fire code official for violations of this section.~~

SUBMISSION FOR PERMANENT RULE

1. Rule-Making Agency: NC Building Code Council	
2. Rule citation & name (name not required for repeal): 2018 NC Fire Code 510 Emergency Responder communications Coverage and Chapter 80 Referenced Standards. (201208 Item B-5)	
3. Action: <input type="checkbox"/> ADOPTION <input checked="" type="checkbox"/> AMENDMENT <input type="checkbox"/> REPEAL <input type="checkbox"/> READOPTION <input type="checkbox"/> REPEAL through READOPTION	
4. Rule exempt from RRC review? <input type="checkbox"/> Yes. Cite authority: <input checked="" type="checkbox"/> No	5. Rule automatically subject to legislative review? <input type="checkbox"/> Yes. Cite authority: <input checked="" type="checkbox"/> No
6. Notice for Proposed Rule: <input checked="" type="checkbox"/> Notice Required Notice of Text published on: February 15, 2021 Link to Agency notice: https://www.ncosfm.gov/codes/building-code-council-bcc/bcc-hearing-notice Hearing on: March 9, 2021 Adoption by Agency on: June 8, 2021 <input type="checkbox"/> Notice not required under G.S.: Adoption by Agency on:	
7. Rule establishes or increases a fee? (See G.S. 12-3.1) <input type="checkbox"/> Yes Agency submitted request for consultation on: Consultation not required. Cite authority: <input checked="" type="checkbox"/> No	8. Fiscal impact. Check all that apply. <input type="checkbox"/> This Rule was part of a combined analysis. <input type="checkbox"/> State funds affected <input type="checkbox"/> Local funds affected <input type="checkbox"/> Substantial economic impact (≥\$1,000,000) <input type="checkbox"/> Approved by OSBM <input checked="" type="checkbox"/> No fiscal note required
9. REASON FOR ACTION 9A. What prompted this action? Check all that apply: <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <input checked="" type="checkbox"/> Agency <input type="checkbox"/> Court order / cite: <input type="checkbox"/> Federal statute / cite: <input type="checkbox"/> Federal regulation / cite: </div> <div style="width: 45%;"> <input type="checkbox"/> Legislation enacted by the General Assembly Cite Session Law: <input checked="" type="checkbox"/> Petition for rule-making <input type="checkbox"/> Other: </div> </div> 9B. Explain: The purpose of this amendment is to update the code to the more current International Code Language and related standards. The delayed effective date of this Rule is January 1, 2022. The Statutory authority for Rule-making is G. S. 143-136; 143-138.	
10. Rulemaking Coordinator: Carl Martin Carl Martin Phone: 1(919)647-0009 E-Mail: carl.martin@ncdoi.gov Additional agency contact, if any: Phone: E-Mail:	11. Signature of Agency Head* or Rule-making Coordinator: <div style="text-align: center; margin-top: 10px;">  </div> <hr style="border: 0; border-top: 1px solid black; margin: 5px 0;"/> *If this function has been delegated (reassigned) pursuant to G.S. 143B-10(a), submit a copy of the delegation with this form. Typed Name: Carl Martin Title: Chief Code Consultant
RRC AND OAH USE ONLY	
Action taken: <input type="checkbox"/> RRC extended period of review: <input type="checkbox"/> RRC determined substantial changes: <input type="checkbox"/> Withdrawn by agency <input type="checkbox"/> Subject to Legislative Review <input type="checkbox"/> Other:	

SUBMISSION FOR PERMANENT RULE

2018 NC Fire Code

510 Emergency Responder communications Coverage and Chapter 80 Referenced Standards. (201208 Item B-5)

SECTION 510 EMERGENCY RESPONDER ~~RADIO~~ COMMUNICATION COVERAGE

510.1 Emergency responder radio communication coverage in new buildings. ~~All new buildings shall have approved radio coverage for emergency responders within the building based upon the existing coverage level of the public safety communications system of the jurisdiction at the exterior of the building. Approved in-building 2-way emergency responder communication coverage shall be provided in all new buildings. In-building 2-way emergency responder communication coverage shall be based on the existing coverage levels of the public safety communication systems utilized by the jurisdiction, measured at the exterior of the building.~~ This section shall not require improvement of the existing public safety communication systems.

Exceptions:

1. Where *approved* by the building official and the *fire code official*, a wired communication system in accordance with Section 907.2.13.2 shall be permitted to be installed or maintained instead of an *approved radio communications* coverage system.
2. Where it is determined by the *fire code official* that the ~~radio~~ communications coverage system is not needed.
3. In facilities where emergency responder ~~radio~~ communication coverage is required and such systems, components or equipment required could have a negative impact on the normal operations of that facility, the *fire code official* shall have the authority to accept an automatically activated emergency responder ~~radio~~ communication coverage system.
4. New buildings 7,500 square feet or less and not more than 1 story above grade plane.
 - 4.1. This exception does not apply to windowless buildings, underground buildings or buildings with a basement.

510.2 Emergency Responder ~~Radio-Communications~~ Coverage in Existing Buildings. Deleted

510.3 Permit required. A construction permit for the installation of or modification to ~~emergency responder radio coverage systems and related equipment is required as specified in Section 105.7.5. in-building 2-way emergency responder communication coverage systems and related equipment is required as specified in Section 105.7.6.~~ Maintenance performed in accordance with this code is not considered a modification and does not require a permit.

510.4 Technical requirements. Equipment required to provide emergency responder communication coverage shall be listed in accordance with UL 2524. Systems, components and equipment required to provide the ~~emergency responder radio coverage~~ in-building 2-way emergency responder communication coverage system shall comply with Sections 510.4.1 through ~~510.4.2.5~~ 510.4.2.8.

510.4.1 ~~Radio Signal Strength~~ Emergency communication coverage system signal strength. The building shall be considered to have acceptable ~~emergency responder radio coverage in-building 2-way emergency responder communication system coverage~~ when signal strength measurements in 95 percent of all areas on each floor of the building and critical areas shall be provided with 99 percent floor area radio coverage. Critical areas are fire command centers, fire pump rooms, exit stairs, exit passageways, elevator lobbies, sprinkler rooms, riser rooms, standpipe cabinets, sprinkler sectional valve locations, and other areas deemed critical by the AHJ. The signal strength shall meet requirements in Sections 510.4.1.1 ~~and 510.4.1.2 through 510.4.1.3.~~

510.4.1.1 Minimum signal strength into the building. ~~A minimum signal strength of -95 dBm shall be received within the building. The minimum inbound signal strength shall be sufficient to provide usable voice communications throughout the coverage area as specified by the fire code official. The inbound signal level shall be a minimum of -95dBm throughout the coverage area and sufficient to provide not less than a Delivered Audio Quality (DAQ) of 3.0 or an equivalent Signal-to-Interference-Plus-Noise Ratio (SINR) applicable to the technology for either analog or digital signals.~~

510.4.1.2 Minimum signal strength out of the building. ~~A minimum signal strength of -95 dBm shall be received by the agency's radio when transmitted within the building. The minimum outbound signal strength shall be~~

SUBMISSION FOR PERMANENT RULE

sufficient to provide usable voice communications throughout the coverage area as specified by the *fire code official*. The outbound signal level shall be sufficient to provide not less than a DAQ of 3.0 or an equivalent SINR applicable to the technology for either analog or digital signals.

510.4.1.3 System performance. Signal strength shall be sufficient to meet the requirements of the applications being utilized by public safety for emergency operations through the coverage area as specified by the *fire code official* in Section 510.4.2.2.

510.4.2 System design. The ~~emergency responder radio coverage in-building 2- way emergency responder communication~~ coverage system shall be designed in accordance with Sections 510.4.2.1 through ~~510.4.2.5~~ 510.4.2.8 and NFPA 1221.

510.4.2.1 Amplification systems ~~allowed and components.~~ Buildings and structures that cannot support the required level of ~~radio coverage shall be equipped with a radiating cable system, a distributed antenna system with Federal Communications Commission (FCC) certified signal boosters, or other system approved by the fire code official in order to achieve the required adequate radio coverage.~~ in-building 2- way emergency responder communication coverage shall be equipped with systems and components to enhance the radio signals and achieve the required level of emergency communication coverage specified in Sections 510.4.1 through 510.4.1.3. Emergency communication systems utilizing radio-frequency-emitting devices and cabling shall be approved by the fire code official. Prior to installation, all RF-emitting devices shall have the certification of the radio licensing authority and be suitable for public safety use.

510.4.2.2 Technical criteria. The *fire code official* shall maintain a document providing the specific technical information and requirements for the ~~emergency responder radio coverage system.~~ in-building 2- way emergency responder communication coverage system. This document shall contain, but not be limited to, the various frequencies required, the location of radio sites, the effective radiated power of radio sites, ~~and other supporting technical information.~~ the maximum propagation delay in microseconds, the applications being used and other supporting technical information necessary for system design.

510.4.2.3 Standby power. ~~Emergency responder radio In-building 2- way emergency responder communication coverage systems shall be provided with standby power in accordance with section 604.~~ dedicated standby power or provided with 2-hour standby batteries and connected to the facility generator power system in accordance with Section 604. The standby power supply shall be capable of operating the ~~emergency responder radio in-building 2- way emergency responder communication coverage system for a duration of not less than 24 hours.~~ at 100-percent system capacity for a duration of not less than 12 hours.

510.4.2.4 Signal booster requirements. If used, signal boosters shall meet the following requirements:

1. All signal booster components shall be contained in a National Electrical Manufacturer's Association (NEMA) 4-type waterproof cabinet.
2. Battery systems used for the emergency power source shall be contained in a NEMA ~~4-type water proof cabinet~~ 3R or higher-rated cabinet.
3. ~~The signal booster system and battery system shall be electrically supervised and monitored by a supervisor service, or when approved by the fire code official, shall sound an audible signal at a constantly attended location.~~ Equipment shall have FCC or other radio licensing authority certification and be suitable for public safety use prior to installation.
4. ~~Equipment shall have FCC certification prior to installation.~~ Where a donor antenna exists, isolation shall be maintained between the donor antenna and all inside antennas to not less than 20dB greater than the system gain under all operating conditions.
5. Active RF emitting devices used in in-building 2- way emergency responder communication coverage systems shall have built-in oscillation detection and control circuitry.
6. The installation of amplification systems or systems that operate on or provide the means to cause interference on any in-building 2- way emergency responder communication coverage network shall be coordinated and approved by the *fire code official*.

SUBMISSION FOR PERMANENT RULE

510.4.2.5 ~~Additional frequencies and change of frequencies. System monitoring.~~ ~~The emergency responder radio coverage system shall be capable of modification or expansion in the event frequency changes are required by the FCC or additional frequencies are made available by the FCC. The in-building 2-way emergency responder communication coverage system shall be monitored by a listed *fire alarm control unit*, or where approved by the *fire code official*, shall sound an audible signal at a constantly attended on-site location. Automatic supervisory signal shall include the following:~~

1. Loss of normal AC power supply.
2. System battery charger(s) failure.
3. Malfunction of the donor antenna(s).
4. Failure of active RF-emitting device(s).
5. Low-battery capacity at 70-percent reduction of operating capacity.
6. Failure of critical system components.
7. The communications link between the *fire alarm system* and the in-building 2- way emergency responder communication coverage system.
8. Oscillation of active RF-emitting device(s)

510.4.2.6 Additional frequencies and change of frequencies. The in-building 2- way emergency responder communication coverage system shall be capable of modification or expansion in the event frequency changes are required by the FCC or other radio licensing authority, or additional frequencies are made available by the FCC or other radio licensing authority.

510.4.2.7 Design documents. The *fire code official* shall have the authority to require “as-built” design documents and specifications for in-building 2- way emergency responder communication coverage systems. The documents shall be in a format acceptable to the *fire code official*.

510.4.2.8 Radio communication antenna density. Systems shall be engineered to minimize the near-far effect. In-building 2- way emergency responder communication coverage system designs shall include sufficient antenna density to address reduced gain conditions.

Exception:

1. Systems where all portable devices within the same band use active power control features.

510.5 Installation requirements. The installation of the ~~public safety radio in-building 2- way emergency responder communication~~ coverage system shall be in accordance with NFPA 1221 and Sections 510.5.1 through 510.5.4-510.5.5.

510.5.1 ~~Approval prior to installation. Mounting of the donor antenna(s).~~ Amplification systems capable of operating on frequencies licensed to any public safety agency by the FCC shall not be installed without prior coordination and approval of the *fire code official*. To maintain proper alignment with the system designed donor site, donor antennas shall be permanently affixed on the building or where approved, mounted on a movable sled with a clearly visible sign stating "Movement or repositioning of this antenna is prohibited without approval from the *fire code official*". The antenna installation shall be in accordance with the applicable requirements in the *International Building Code* for weather protection of the building envelope.

510.5.2 ~~Minimum qualifications of personnel. Approval prior to installation.~~ The minimum qualifications of the system designer and

lead installation personnel shall include both of the following:

1. A valid FCC issued general radio operator's license.
2. Certification of in-building system training issued by a national recognized organization, school, or a certificate issued by the manufacturer of the equipment being installed.

SUBMISSION FOR PERMANENT RULE

~~These qualifications shall not be required where demonstration of adequate skills and experience satisfactory to the fire code official is provided.~~

~~Amplification systems capable of operating on frequencies licensed to any public safety agency by the FCC or other radio licensing authority shall not be installed without prior coordination and approval of the fire code official and the frequency license holder(s).~~

510.5.3 Acceptance test procedure. Minimum qualifications of personnel. ~~Where an emergency responder radio coverage system is required, and upon completion of installation, the building owner shall have the radio system tested to verify that two way coverage on each floor of the building is not less than 90 percent. The test procedure shall be conducted as follows: The minimum qualifications of the system designer and lead installation personnel shall include both of the following:~~

~~1. Each floor of the building shall be divided into a grid of 20 approximately equal test areas.~~

~~1. A valid FCC-issued general radio operator's license.~~

~~2. The test shall be conducted using a calibrated portable radio of the latest brand and model used by the agency talking through the agency's radio communications system.~~

~~2. Certification of in-building system training issued by an approved organization or approved school, or a certificate issued by the manufacturer of the equipment being installed.~~

~~3. Failure of not more than two nonadjacent test areas shall not result in failure of the test.~~

~~4. In the event that three of the test areas fail the test, in order to be more statistically accurate, the floor shall be permitted to be divided into 40 equal areas. Failure of not more than four nonadjacent test areas shall not result in failure of the test. If the system fails the 40 area test, the system shall be altered to meet the 90 percent coverage requirement.~~

~~5. A test location approximately in the center of each test area shall be selected for the test, with the radio enabled to verify two way communications to and from the outside of the building through the public agency's radio communications system. Once the test location has been selected, that location shall represent the entire test area. Failure in the selected test location shall be considered failure of that test area. Additional test locations shall not be permitted.~~

~~6. The gain values of all amplifiers shall be measured and the test measurement results shall be kept on file with the building owner so that the measurements can be verified during annual tests. In the event that the measurement results become lost, the building owner shall be required to rerun the acceptance test to reestablish the gain values.~~

~~7. As part of the installation, a spectrum analyzer or other suitable test equipment shall be utilized to ensure spurious oscillations are not being generated by the subject signal booster. This test shall be conducted at the time of installation and at subsequent annual inspections.~~

~~These qualifications shall not be required where demonstration of adequate skills and experience satisfactory to the fire code official is provided.~~

510.5.4 FCC compliance. Acceptance test procedure. ~~The emergency responder radio coverage system installation and components shall comply with all applicable federal regulations including, but not limited to, FCC 47 CFR Part 90.219. Where an in-building 2- way emergency responder communication coverage system is required, and upon completion of installation, the building owner shall have the radio system tested to verify that two-way coverage on each floor of the building is not less than 95 percent. The test procedure shall be conducted as follows:~~

~~1. Each floor of the building shall be divided into a grid of 20 approximately equal test areas. Where a floor exceeds 128,000 ft² (11,900 m²), which is the floor area that can be covered by the maximum grid dimension of 80 ft. (24.4m), the floor shall be subdivided into sectors each having an area less than or equal to 128,000 ft² (11,900 m²), and each sector be tested individually with 20 grid cells in each sector. Signal strength measurements should be taken at the center of each grid and should be performed using standardized parameters as specified by NFPA 1221.~~

SUBMISSION FOR PERMANENT RULE

2. The test shall be conducted using a calibrated portable radio of the latest brand and model used by the agency talking through the agency's radio communications system or equipment approved by the fire code official.

3. Failure of more than one test area shall result in failure of the test.

4. In the event that two of the test areas fail the test, in order to be more statistically accurate, the floor shall be permitted to be divided into 40 equal test areas. Failure of not more than two nonadjacent test areas shall not result in failure of the test. If the system fails the 40-area test, the system shall be altered to meet the 95-percent coverage requirement.

5. A test location approximately in the center of each test area shall be selected for the test, with the radio enabled to verify two-way communications to and from the outside of the building through the public agency's radio communications system. Once the test location has been selected, that location shall represent the entire test area. Failure in the selected test location shall be considered to be a failure of that test area. Additional test locations shall not be permitted.

6. The gain values of all amplifiers shall be measured and the test measurement results shall be kept on file with the building owner so that the measurements can be verified during annual tests. In the event that the measurement results become lost, the building owner shall be required to rerun the acceptance test to reestablish the gain values.

7. As part of the installation, a spectrum analyzer or other suitable test equipment shall be utilized to ensure spurious oscillations are not being generated by the subject signal booster. This test shall be conducted at the time of installation and at subsequent annual inspections.

8. Systems shall be tested using two portable radios simultaneously conducting subjective voice quality checks. One portable radio shall be positioned not greater than 10 feet (3048 mm) from the indoor antenna. The second portable radio shall be positioned at a distance that represents the farthest distance from any indoor antenna. With both portable radios simultaneously keyed up on different frequencies within the same band, subjective audio testing shall be conducted and comply with DAQ levels as specified in Sections 510.4.1.1 and 510.4.1.2.

510.5.5 FCC compliance. The in-building 2- way emergency responder communication coverage system installation and components shall comply with all applicable federal regulations including, but not limited to, FCC 47 CFR Part 90.219.

510.6 Maintenance. The emergency responder radio in-building 2- way emergency responder communication coverage system shall be maintained operational at all times in accordance with Sections 510.6.1 through 510.6.3 510.6.4.

510.6.1 Testing and proof of compliance. The emergency responder radio coverage-The owner of the building or owner's authorized agent shall have the in-building 2- way emergency responder communication coverage system shall be inspected and tested annually or where structural changes occur including additions or remodels that could materially change the original field performance tests. Testing shall consist of the following:

1. In-building coverage test as described in Section 510.5.3.

2. Signal boosters shall be tested to verify that the gain is the same as it was upon initial installation and acceptance- or set to optimize the performance of the system.

3. Backup batteries and power supplies shall be tested under load of a period of 1 hour to verify that they will properly operate during an actual power outage. If within the 1-hour test period the battery exhibits symptoms of failure, the test shall be extended for additional 1-hour periods until the integrity of the battery can be determined.

4. ~~Other~~ All active components shall be checked to verify operation within the manufacturer's specifications.

5. At the conclusion of the testing, a report, which shall verify compliance with Section 510.5.3, shall be submitted to the fire code official.

510.6.2 Additional frequencies. The building owner shall modify or expand the emergency responder radio the in-building 2- way emergency responder communication coverage system at his or her expense in the event frequency changes are required by the FCC or other radio licensing authority, or additional frequencies are made available by

SUBMISSION FOR PERMANENT RULE

the FCC, or other radio licensing authority. Prior approval of a ~~public safety radio~~ an in-building 2- way emergency responder communication coverage system on previous frequencies does not exempt this section.

~~**510.6.3 Field Testing-Nonpublic safety system.** Agency personnel shall have the right to enter onto the property at any reasonable time to conduct field testing to verify the required level of radio coverage. Where other nonpublic safety amplification systems installed in buildings reduce the performance or cause interference with the in-building 2- way emergency responder communication coverage system, the nonpublic safety amplification system shall be corrected or removed.~~

510.6.4 Field testing. Agency personnel shall have the right to enter onto the property at any reasonable time to conduct field testing to verify the required level of radio coverage.

Chapter 80 Referenced Standards

NFPA

NFPA 1221-19 Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems.....510.4.2, 510.5, 510.5.4.

UL

UL2524 -19 Standard for In-building 2- Way Emergency Radio Communication Enhancement Systems510.4.

FCC

47 CFR Part 90.219-2007510.5.4, 510.5.5