MN Department of Labor and Industry, Construction Codes and Licensing Division

2024 Residential Energy Code Technical Advisory Group

Code Change Proposal Compilation for the Review of the 2021 IECC-R

DEPARTMENT OF LABOR AND INDUSTRY

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: Amanda Spuckler

Email address: amanda.spuckler@state.mn.us

Telephone number: 651-284-5361

Firm/Association affiliation, if any: DLI

Date: 6-27-2023

Model Code: IECC-R

Code or Rule Section: 1322.0100

Code or rule section to be changed: 1322.0100 subp. 2

Intended for Technical Advisory Group ("TAG"):

General Information	**Yes**	**No**
A. Is the proposed change unique to the State of Minnesota?	☐	☒
B. Is the proposed change required due to climatic conditions of Minnesota?	☐	☒
C. Will the proposed change encourage more uniform enforcement?	☒	☐
D. Will the proposed change remedy a problem?	☒	☐
E. Does the proposal delete a current Minnesota Rule, chapter amendment?	☐	☒
F. Would this proposed change be appropriate through the ICC code development process?	☐	☒

Proposed Language

1. The proposed code change is meant to:

   ☐ change language contained the model code book? If so, list section(s).

   ☒ change language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s). Part 1322.0100, subp. 2

   ☐ delete language contained in the model code book? If so, list section(s).

   ☐ delete language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

   ☒ add new language that is not found in the model code book or in Minnesota Rule.

2. Is this proposed code change required by Minnesota Statute? If so, please provide the citation.

3. Provide *specific* language you would like to see changed. Indicate proposed new words with underlining and ~~strikethrough~~ words proposed for deletion. Include the entire code (sub) section or rule subpart that contains your proposed changes.

Subp. 2. Scope. This code applies to the following residential buildings and associated systems and equipment:

a. IRC-1 single-family dwellings, IRC-2 Two-family dwellings, IRC-3 townhouses, and IRC-4 accessory structures; and

b. Buildings or portions of buildings containing Group I-1, R-2, R-3, or R-4 occupancies where the entire composite building is three stories or less in height above grade plane ~~as defined in the Residential Provisions of the 2012 IECC~~.

4. Will this proposed code change impact other sections of a model code book or an amendment in Minnesota Rule? If so, please list the affected sections or rule parts.
No

Need and Reason

1. Why is the proposed code change needed? Please provide a general explanation as well as a specific explanation for any changes to numerical values (heights, area, etc.)
The change provides users with the scope of the code in the scoping section. Currently, code users must refer to the definition of "residential" in the IECC to determine which structures are considered residential for the purposes of the code. The proposal changes how scoping information is presented but not the scope of the code.

2. Why is the proposed code change a reasonable solution?
The code change is reasonable because it provides a code user with scoping information without requiring them to refer to the definitions in chapter 2. It is simply more convenient.

3. What other factors should the TAG consider?
None.

Cost/Benefit Analysis

1. Will the proposed code change increase or decrease costs? Please explain and provide estimates if possible.
N/A

2. If there is an increased cost, will this cost be offset by a safety or other benefit? Please explain. If the benefit is quantifiable (for example energy savings), provide an estimate if possible.
N/A

3. If there is a cost increase, who will bear the costs? This can include government units, businesses, and individuals.
N/A

4. Are there any enforcement or compliance cost increases or decreases with the proposed code change? Please explain.
N/A

5. Will the cost of complying with the proposed code change in the first year after the rule takes effect exceed $25,000 for any one small business or small city (Minn. Stat. § 14.127)? A small business is any business that has less than 50 full-time employees. A small city is any statutory or home rule charter city that has less than ten full-time employees. Please explain.
   N/A

Regulatory Analysis

1. What parties or segments of industry are affected by this proposed code change?
   Building contractors, mechanical contractors, architects, engineers, municipal building officials, building inspectors, building managers and homeowner

2. Can you think of other means or methods to achieve the purpose of the proposed code change? What might someone opposed to this code change suggest instead? Please explain what the alternatives are and why your proposed change is the preferred method or means to achieve the desired result.
   An alternative would be to leave the existing scoping language and require code users to refer to definitions chapter to determine scoping. The proposed change eliminates the need to refer to the definitions and ensures code users are aware of the scoping based on information given in the scoping section.

3. What are the probable costs or consequences of not adopting the code change, including those costs or consequences borne by identifiable categories of affected parties, such as separate classes of government units, businesses, or individuals?
   None

4. Are you aware of any federal or state regulation or requirement related to this proposed code change? If so, please list the federal or state regulation or requirement and your assessment of any differences between the proposed code change and the federal regulation or requirement.
   N/A

***Note: Incomplete forms may be returned to the submitter with instruction to complete the form. Only completed forms can considered by the TAG.

DEPARTMENT OF LABOR AND INDUSTRY

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: Amanda Spuckler

Email address: amanda.spuckler@state.mn.us

Telephone number: 651-284-5361

Firm/Association affiliation, if any: DLI

Date: 6/27/2023

Model Code: IECC-R

Code or Rule Section: R301

Code or rule section to be changed: R301, Figure 301.1, and Table 301.1

Intended for Technical Advisory Group ("TAG"):

General Information	**Yes**	**No**
A. Is the proposed change unique to the State of Minnesota?	☒	☐
B. Is the proposed change required due to climatic conditions of Minnesota?	☒	☐
C. Will the proposed change encourage more uniform enforcement?	☐	☒
D. Will the proposed change remedy a problem?	☒	☐
E. Does the proposal delete a current Minnesota Rule, chapter amendment?	☐	☒
F. Would this proposed change be appropriate through the ICC code development process?	☐	☒

Proposed Language

1. The proposed code change is meant to:

☐ change language contained the model code book? If so, list section(s).

☐ change language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

☒ delete language contained in the model code book? If so, list section(s).
Delete R301.1 and replace with list of MN counties and climate zones
Delete section R301.2 warm humid climates
Delete section R301.3 describing how to determine climate zone for locations not assigned to one
Delete Figure R301.1 US Map Depicting Climate Zones
Delete Table R301.1 Climate zones, moisture regimes, and warm humid designations by state, county, and territory

☐ delete language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

☒ add new language that is not found in the model code book or in Minnesota Rule.

2. Is this proposed code change required by Minnesota Statute? If so, please provide the citation.
   No

3. Provide *specific* language you would like to see changed. Indicate proposed new words with underlining and ~~strikethrough~~ words proposed for deletion. Include the entire code (sub) section or rule subpart that contains your proposed changes.
   IECC Section R301 and all subsections are deleted in their entirety and replaced with the following:
   Section R301 Climate Zones.
   The following counties are located in climate zone 7: Aitkin, Beltrami, Carlton, Cass, Clearwater, Cook, Crow Wing, Hubbard, Itasca, Kittson, Koochiching, Lake, Lake of the Woods, Mahnomen, Marshall, Norman, Pennington, Pine, Polk, Red Lake, Roseau, St. Louis, Wadena. All other counties are located in climate zone 6A.

   Figure 301.1 is deleted.
   Table 301.1 is deleted.

4. Will this proposed code change impact other sections of a model code book or an amendment in Minnesota Rule? If so, please list the affected sections or rule parts.
   The proposed change is necessary to coordinate with changes to climate zones in adopted part 1323.0514 which modifies ASHRAE 90.1-2019 section 5.1.4 Climate.

Need and Reason

1. Why is the proposed code change needed? Please provide a general explanation as well as a specific explanation for any changes to numerical values (heights, area, etc.)
   The change is needed to coordinate with changes and updates to climate zones in adopted chapter 1323, the Minnesota Commercial Energy Code. The 2021 IECC and ASHRAE 90.1-2019 use the climate zone data from ASHRAE Standard 169, which assigns Fillmore, Houston, and Winona counites to climate zone 5A. The adopted chapter 1323 assigned those 3 counties to climate zone 6A to maintain two climate zones in Minnesota.

   The proposed change also eliminates a lengthy table that provides climate zone information for each U.S. county as well as section 301.3 which describes how to determine the climate zone for a location that is not assigned to one. The table and section are unnecessary because all MN counties are assigned to a climate zone by the proposed code change.

2. Why is the proposed code change a reasonable solution?
   The code change is a reasonable solution so both the commercial and residential energy codes assign counites to the same climate zones. The change will also eliminate a lengthy table and sections with climate zone information that is not applicable to Minnesota.

3. What other factors should the TAG consider?
   ASHRAE Standard 169 assigns the following counties that were previously in climate zone 7 to 6A: Becker, Clay, Grant, Kanabec, Mille Lacs, Otter Tail, and Wilkin. The updated chapter 1323 and the unamended 2021 IECC also assign those counties to climate zone 6A. The proposed code change also assigns those counties to climate zone 6A.

Cost/Benefit Analysis

1. Will the proposed code change increase or decrease costs? Please explain and provide estimates if possible.

No changes to costs, or minimal, because the 2021 IECC applies similar requires to climate zones 6A and 5A. Furthermore, Fillmore, Houston, and Winona counties currently comply with climate zone 6A requirements.

2. If there is an increased cost, will this cost be offset by a safety or other benefit? Please explain. If the benefit is quantifiable (for example energy savings), provide an estimate if possible.
   The benefits of the proposed code change are uniformity and consistency with the commercial energy code. The addition of a third climate zone in Minnesota could result in confusion without the benefit of improved energy efficiency or cost savings.

3. If there is a cost increase, who will bear the costs? This can include government units, businesses, and individuals.
   Homeowners

4. Are there any enforcement or compliance cost increases or decreases with the proposed code change? Please explain.
   N/A

5. Will the cost of complying with the proposed code change in the first year after the rule takes effect exceed $25,000 for any one small business or small city (Minn. Stat. § 14.127)? A small business is any business that has less than 50 full-time employees. A small city is any statutory or home rule charter city that has less than ten full-time employees. Please explain.
   N/A

Regulatory Analysis

1. What parties or segments of industry are affected by this proposed code change?

   Building contractors, mechanical contractors, architects, engineers, municipal building officials, building inspectors, building managers and homeowners

2. Can you think of other means or methods to achieve the purpose of the proposed code change? What might someone opposed to this code change suggest instead? Please explain what the alternatives are and why your proposed change is the preferred method or means to achieve the desired result.
   None. Not adopting the proposed code change will result in unnecessary confusion with the commercial energy code.

3. What are the probable costs or consequences of not adopting the code change, including those costs or consequences borne by identifiable categories of affected parties, such as separate classes of government units, businesses, or individuals?
   The probable consequence is inconsistent application and enforcement of the code.

4. Are you aware of any federal or state regulation or requirement related to this proposed code change? If so, please list the federal or state regulation or requirement and your assessment of any differences between the proposed code change and the federal regulation or requirement.
   No.

***Note: Incomplete forms may be returned to the submitter with instruction to complete the form. Only completed forms can considered by the TAG.

DEPARTMENT OF LABOR AND INDUSTRY

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: John G.Smith, P.E. *Date:* August 26, 2023

Rev September 20, 2023

Email address: *Model Code:* Residential

Telephone number: *Code or Rule Section:* R302

Design Conditions

Firm/Association affiliation, if any:

Code or rule section to be changed: 1322

Intended for Technical Advisory Group ("TAG"):

General Information	**Yes**	**No**
A. Is the proposed change unique to the State of Minnesota?	☒	☐
B. Is the proposed change required due to climatic conditions of Minnesota?	☒	☐
C. Will the proposed change encourage more uniform enforcement?	☒	☐
D. Will the proposed change remedy a problem?	☒	☐
E. Does the proposal delete a current Minnesota Rule, chapter amendment?	☒	☐
F. Would this proposed change be appropriate through the ICC code development process?	☐	☒

Proposed Language

1. The proposed code change is meant to:

   X☐ change language contained the model code book? If so, list section(s).
   Section R302

   ☐ change language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

   ☐ delete language contained in the model code book? If so, list section(s).

   ☐ delete language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

   ☐ add new language that is not found in the model code book or in Minnesota Rule.

2. Is this proposed code change required by Minnesota Statute? If so, please provide the citation.

No

3. Provide *specific* language you would like to see changed. Indicate proposed new words with underlining and ~~strikethrough~~ words proposed for deletion. Include the entire code (sub) section or rule subpart that contains your proposed changes.

   Add the following new subsection:

   R302.2 Climatic Data Design Conditions

   Climatic data design conditions to be used for the calculation of heating and cooling loads shall be determined by either of the following methods:
   Method 1: Use weather conditions identified in Table R302.1. Where the building city location is not listed, use the listed city that is the nearest.
   Method 2: Use weather data published as a part of ASHRAE Standard 169 for the nearest city. This data is available at www.ASHRAE-meteo.info. Design temperatures shall be the 2021 data and shall be rounded to the nearest whole number. Winter design conditions shall be 99.6% heating dry bulb value. Summer conditions shall be the 1% annual cooling dry bulb design conditions.

Table R302.1
CLIMATIC DATA DESIGN CONDITIONS

City	Winter Design db ºF ASHRAE 99.6%	Summer db ºF/coinc wb ºF ASHRAE 1%
Aitkin	-20	82/72
Albert Lea	-11	86/72
Alexandria AP	-18	85/70
Bemidji AP	-23	82/67
Brainerd	-19	85/69
Cloquet	-18	82/68
Crookston	-24	84/70
Duluth AP	-17	81/67
Ely	-27	82/67
Eveleth	-23	82/67
Faribault	-14	88/73
Fergus Falls	-20	85/70
Grand Marais	-18	73/62
Grand Rapids	-20	82/67
Hibbing/Chisholm	-24	82/68
International Falls AP	-26	82/67
Litchfield	-15	86/72
Little Falls	-18	86/70
Mankato	-12	86/72
Mpls/St. Paul AP	-11	88/72

Montivedeo	-15	88/73
Mora	-18	86/70
Morris	-17	86/72
New Ulm	-14	88/73
Owatonna	-15	86/72
Pequot Lakes	-23	85/68
Pipestone	-12	86/73
Redwood Falls	-13	88/73
Rochester AP	-13	85/72
Roseau	-24	84/72
St. Cloud AP	-17	86/71
Silver Bay	-19	82/66
Thief River Falls	-22	82/68
Tofte		75/61
Virginia	-22	82/67
Warroad	-24	82/70
Wheaton	-17	86/72
Willmar	-11	86/72
Winona	-9	88/73
Worthington	-11	86/71

4. Will this proposed code change impact other sections of a model code book or an amendment in Minnesota Rule? If so, please list the affected sections or rule parts.
   No

Need and Reason

1. Why is the proposed code change needed? Please provide a general explanation as well as a specific explanation for any changes to numerical values (heights, area, etc.)
   The above table is the very similar to what is currently in the 2024 Commercial Energy Code which will go into effect in January of 2024. The difference is the Residential winter design is the 99.6% ASHRAE valuie, while the Commercial value is the extreme mean condition. It is important to have the outdoor design conditions for uniformity in design and to help assure that HVAC systems will perform as expected. Option 2 clearly identifies which weather data conditions to use for the heating and cooling conditions as the data includes many different statistical data points.

2. Why is the proposed code change a reasonable solution?
   Maintains design conditions which are similar to what have used for many years in Minnesota. Provides a standard method of determining the design conditions.

   The 1% summer conditions track to our current Commercial Energy Code, and that is why I propose using those values for the summer conditions.

   The winter design condition proposal of 99.6% was discussed and felt to be a more appropriate value for Residential design than the Commercial mean extreme condition

I would also note that years ago winter design conditions were based on weather data from December, January and February. The new ASHRAE winter tabulated data is based on the full year – 8,760 hours. This can skew the winter design conditions.

3. What other factors should the TAG consider?
   None

Cost/Benefit Analysis

1. Will the proposed code change increase or decrease costs? Please explain and provide estimates if possible.
   No cost change

2. If there is an increased cost, will this cost be offset by a safety or other benefit? Please explain. If the benefit is quantifiable (for example energy savings), provide an estimate if possible.

3. If there is a cost increase, who will bear the costs? This can include government units, businesses, and individuals.

4. Are there any enforcement or compliance cost increases or decreases with the proposed code change? Please explain.
   No

5. Will the cost of complying with the proposed code change in the first year after the rule takes effect exceed $25,000 for any one small business or small city (Minn. Stat. § 14.127)? A small business is any business that has less than 50 full-time employees. A small city is any statutory or home rule charter city that has less than ten full-time employees. Please explain.
   No

Regulatory Analysis

1. What parties or segments of industry are affected by this proposed code change?
   Architects, Engineers, Construction Contractors, Building Officials, Owners and Inspectors.

2. Can you think of other means or methods to achieve the purpose of the proposed code change? What might someone opposed to this code change suggest instead? Please explain what the alternatives are and why your proposed change is the preferred method or means to achieve the desired result.
   None

3. What are the probable costs or consequences of not adopting the code change, including those costs or consequences borne by identifiable categories of affected parties, such as separate classes of government units, businesses, or individuals?
   There would be no uniformity of how heating and cooling loads are calculated.

4. Are you aware of any federal or state regulation or requirement related to this proposed code change? If so, please list the federal or state regulation or requirement and your assessment of any differences between the proposed code change and the federal regulation or requirement.
   None

***Note: Incomplete forms may be returned to the submitter with instruction to complete the form. Only completed forms can considered by the TAG.

DEPARTMENT OF LABOR AND INDUSTRY

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: **Jared Johnson, Phius Alliance Minnesota**
Marcy Conrad Nutt, Passive House Minnesota

Email address: **jared.t.johnson11@gmail.com**
marcy@phmn.org

Telephone number: **507-923-5415**
612-202-2791

Date: **August 29, 2023**
November 7, 2023
January 10, 2024

Model Code: **2021 IECC**

Code or Rule Section: **R402.4.1**

Firm/Association affiliation, if any: **Phius Alliance Minnesota, Passive House Minnesota**

Code or rule section to be changed: **R402.4.1.2 Testing; R402.4.1.3 Leakage Rate**

Intended for Technical Advisory Group ("TAG"):

General Information	**Yes**	**No**
A. Is the proposed change unique to the State of Minnesota?	☒	☐
B. Is the proposed change required due to climatic conditions of Minnesota?	☒	☐
C. Will the proposed change encourage more uniform enforcement?	☒	☐
D. Will the proposed change remedy a problem?	☒	☐
E. Does the proposal delete a current Minnesota Rule, chapter amendment?	☐	☒
F. Would this proposed change be appropriate through the ICC code development process?	☐	☒

Proposed Language

1. The proposed code change is meant to:

   ☒ change language contained the model code book? If so, list section(s).

   R402.4.1.3 Leakage Rate

   ☐ change language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

   ☐ delete language contained in the model code book? If so, list section(s).

   ☐ delete language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

☐ add new language that is not found in the model code book or in Minnesota Rule.

2. Is this proposed code change required by Minnesota Statute? If so, please provide the citation.

   No

3. Provide *specific* language you would like to see changed. Indicate proposed new words with underlining and ~~strikethrough~~ words proposed for deletion. Include the entire code (sub) section or rule subpart that contains your proposed changes.

   R402.4.1.3 Leakage Rate
   "When complying with Section R401.2.1, the building or dwelling unit shall have an air leakage rate not exceeding 5.0 air changes per hour in Climate Zones 0, 1 and 2, and ~~3.0~~ 2.0 air changes per hour in Climate Zones 3 through 8, when tested in accordance with Section R402.4.1.2."

4. Will this proposed code change impact other sections of a model code book or an amendment in Minnesota Rule? If so, please list the affected sections or rule parts.

   Yes – if the leakage rate specified by R402.4.1.3 is improved, the leakage rates within Section "R402.4.1.2 Testing" should be updated to reflect this – the exception should be modified as follows:

   R402.4.1.2 Testing

   The building or dwelling unit shall be tested for air leakage. The maximum air leakage rate for any building or dwelling unit under any compliance path shall not exceed 5.0 air changes per hour or 0.28 cubic feet per minute (CFM) per square foot [0.0079 m3/(s × m2)] of dwelling unit enclosure area. Testing shall be conducted in accordance with ANSI/RESNET/ICC 380, ASTM E779 or ASTM E1827 and reported at a pressure of 0.2 inch w.g. (50 Pascals). Where required by the code official, testing shall be conducted by an approved third party. A written report of the results of the test shall be signed by the party conducting the test and provided to the code official. Testing shall be performed at any time after creation of all penetrations of the building thermal envelope have been sealed.

   Exception: For heated, attached private garages and heated, detached private garages accessory to one- and two-family dwellings and townhouses not more than three stories above grade plane in height, building envelope tightness and insulation installation shall be considered acceptable where the items in Table R402.4.1.1, applicable to the method of construction, are field verified. Where required by the code official, an approved third party independent from the installer shall inspect both air barrier and insulation installation criteria. Heated, attached private garage space and heated, detached private garage space shall be thermally isolated from all other habitable, conditioned spaces in accordance with Sections R402.2.12 and R402.3.5, as applicable.

   During testing:
   1. **Exterior windows and doors, fireplace and stove doors shall be closed, but not sealed, beyond the intended weatherstripping or other infiltration control measures.**
   2. **Dampers including exhaust, intake, makeup air, backdraft and flue dampers shall be closed, but not sealed beyond intended infiltration control measures.**
   3. **Interior doors, where installed at the time of the test, shall be open.**
   4. **Exterior or interior terminations for continuous ventilation systems shall be sealed.**
   5. **Heating and cooling systems, where installed at the time of the test, shall be turned off.**

6. Supply and return registers, where installed at the time of the test, shall be fully open.

Exception: When testing individual dwelling units, an air leakage rate not exceeding 0.23 ~~0.30~~ cubic feet per minute per square foot [0.0065] ~~0.008~~ m3/(s × m2)] of the dwelling unit enclosure area, tested in accordance with ANSI/RESNET/ICC 380, ASTM E779 or ASTM E1827 and reported at a pressure of 0.2 inch w.g. (50 Pa), shall be permitted in all climate zones for:

1. **Attached single and multiple-family building dwelling units.**
2. **Buildings or dwelling units that are 1,500 square feet (139.4 m2) or smaller.**

Mechanical ventilation shall be provided in accordance with Section M1505 of the International Residential Code or Section 403.3.2 of the International Mechanical Code, as applicable, or with other approved means of ventilation.

*** NOTE: Previous references to the Total Building Performance Path (R405.4.2) have been moved to a separate proposal**

Need and Reason

1. Why is the proposed code change needed? Please provide a general explanation as well as a specific explanation for any changes to numerical values (heights, area, etc.)

   Tighter air sealing:
   Air leakage in cold climates creates unnecessary costs for property owners, as well as health and durability challenges in our Minnesota climate:

   - **In winter, leaks carry warm, moist air through building walls, causing condensation within the wall cavity. This, in turn, creates rot and mold, which lead to unnecessary health risks and maintenance costs. In addition, heating dollars and humidity are lost through the leaks.**

   - **In summer, air leakage results in lost cooling dollars. Leaks also let in allergens, increasingly common pollutants such as wildfire smoke, and humidity. Keeping humidity levels at a safe and healthy level is easier and cheaper in buildings that are well air-sealed.**

   Lowering the requirement from 3.0 ACH50 to 2.0 would provide better protection against the issues listed above and improve overall energy performance, while still remaining achievable with current construction materials and practices.

2. Why is the proposed code change a reasonable solution?

   Air-sealing uses materials and methods already common and affordable within the building industry. We believe the proposed change can be achieved with little more than education and attention to detail. According to RESNET: Of the 6,143 completed HERS-rated projects in Minnesota over the last 12 months, 75% of those projects have achieved an ACH level of 2.0 or lower.

   Concerns raised by homebuilders for air sealing within 1) attached dwelling units (i.e. townhomes) and detached dwellings under 1500 sf are already addressed by an exception within the testing criteria, as noted above. This revision still intends to provide leniency in

such conditions as needed, while tailoring the requirements to the specific demands of Minnesota's climate zones.

3. What other factors should the TAG consider?

   Tighter air sealing has definite benefits, but requires balanced ventilation to maintain a healthy interior environment – the two must be considered together.

Cost/Benefit Analysis

1. Will the proposed code change increase or decrease costs? Please explain and provide estimates if possible.

   As stated above, we anticipate any cost increase would be minimal. Air sealing is already standard practice, and the majority of new builds in Minnesota are already hitting these ACH levels.

2. If there is an increased cost, will this cost be offset by a safety or other benefit? Please explain. If the benefit is quantifiable (for example energy savings), provide an estimate if possible.

   The energy savings alone would quickly make up for the minimal extra cost. Extra insurance against moisture intrusion into walls is also a potential offset.

3. If there is a cost increase, who will bear the costs? This can include government units, businesses, and individuals.

   Builders, who will pass it along to individual homeowners.

4. Are there any enforcement or compliance cost increases or decreases with the proposed code change? Please explain.

   No, there should not be extra compliance costs.

5. Will the cost of complying with the proposed code change in the first year after the rule takes effect exceed $25,000 for any one small business or small city (Minn. Stat. § 14.127)? A small business is any business that has less than 50 full-time employees. A small city is any statutory or home rule charter city that has less than ten full-time employees. Please explain.

   Not that we are aware of.

Regulatory Analysis

1. What parties or segments of industry are affected by this proposed code change?

   Trade workers (siders, framers, specialized subcontractors)

2. Can you think of other means or methods to achieve the purpose of the proposed code change? What might someone opposed to this code change suggest instead? Please explain what the alternatives are and why your proposed change is the preferred method or means to achieve the desired result.

People might argue against the idea of making air-tight walls, instead choosing to "let the walls breathe". There is an argument to be had in letting walls breathe, as it prevents moisture from sticking around for too long in any cavity. The problem with this approach in our Minnesota climate is that it prevents insulation from ever being used effectively. If we

are going to try to cut down energy usage in cold climates, insulation will have to be part of that solution, and protecting these insulated walls with tight air-sealing is a must.

3. What are the probable costs or consequences of not adopting the code change, including those costs or consequences borne by identifiable categories of affected parties, such as separate classes of government units, businesses, or individuals?

   Over the long term, the amount of energy savings that will not be realized will be tremendous. Small incremental gains can create huge progress when multiplied over thousands and thousands of new homes. More homes will have wall moisture issues as well, which are expensive remediations in comparison to a little extra front-end air sealing work.

4. Are you aware of any federal or state regulation or requirement related to this proposed code change? If so, please list the federal or state regulation or requirement and your assessment of any differences between the proposed code change and the federal regulation or requirement.

   We are unaware of any federal or state regulation or requirement related to this proposed change.

***Note: Incomplete forms may be returned to the submitter with instruction to complete the form. Only completed forms can considered by the TAG.

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Email address: **jared.t.johnson11@gmail.com**
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Telephone number: **507-923-5415**
612-202-2791

Firm/Association affiliation, if any: **Phius Alliance Minnesota, Passive House Minnesota**

Date: **January 10, 2024**

Model Code: **2021 IECC**

Code or Rule Section: **R405.4.2**

Code or rule section to be changed: **R405.4.2 Residence Specifications**

Intended for Technical Advisory Group ("TAG"):

General Information	**Yes**	**No**
A. Is the proposed change unique to the State of Minnesota?	☒	☐
B. Is the proposed change required due to climatic conditions of Minnesota?	☒	☐
C. Will the proposed change encourage more uniform enforcement?	☒	☐
D. Will the proposed change remedy a problem?	☒	☐
E. Does the proposal delete a current Minnesota Rule, chapter amendment?	☐	☒
F. Would this proposed change be appropriate through the ICC code development process?	☐	☒

Proposed Language

1. The proposed code change is meant to:

   ☒ change language contained the model code book? If so, list section(s).

   R405.4.2 Residence Specifications [TABLE R405.2(1)]

   ☐ change language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

   ☐ delete language contained in the model code book? If so, list section(s).

   ☐ delete language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

☐ add new language that is not found in the model code book or in Minnesota Rule.

2. Is this proposed code change required by Minnesota Statute? If so, please provide the citation.

   No

3. Provide *specific* language you would like to see changed. Indicate proposed new words with underlining and ~~strikethrough~~ words proposed for deletion. Include the entire code (sub) section or rule subpart that contains your proposed changes.

TABLE R405.4.2(1)
SPECIFICATIONS FOR THE STANDARD REFERENCE AND PROPOSED DESIGNS

BUILDING COMPONENT	STANDARD REFERENCE DESIGN	PROPOSED DESIGN
Air exchange rate	The air leakage rate at a pressure of 0.2 inch w.g. (50 Pa) shall be Climate Zones 0 through 2: 5.0 air changes per hour. Climate Zones 3 through 8: **2**.0 ~~**3.0** air changes per hour.~~	The mechanical ventilation rate$_b$ shall be in addition to the air leakage rate and shall be as proposed.
	The mechanical ventilation rate shall be in addition to the air leakage rate and shall be the same as in the proposed design, but not greater than 0.01 × *CFA* + 7.5 × (N_{br} + 1) where: *CFA* = conditioned floor area, ft$_2$. N_{br} = number of bedrooms. The mechanical ventilation system type shall be the same as in the proposed design. Energy recovery shall not be assumed for mechanical ventilation.	

4. Will this proposed code change impact other sections of a model code book or an amendment in Minnesota Rule? If so, please list the affected sections or rule parts.

   No

Need and Reason

1. Why is the proposed code change needed? Please provide a general explanation as well as a specific explanation for any changes to numerical values (heights, area, etc.)

   See CCP RE-4 (RE-4.2 Part A) (regarding R402.4.1.3 Leakage Rate). The primary intent of this proposed change is to maintain consistency between the prescriptive and Total Building Performance compliance pathways. The following information is repeated from Proposal RE-4.

Tighter air sealing:
Air leakage in cold climates creates unnecessary costs for property owners, as well as health and durability challenges in our Minnesota climate:

- **In winter, leaks carry warm, moist air through building walls, causing condensation within the wall cavity. This, in turn, creates rot and mold, which lead to unnecessary health risks and maintenance costs. In addition, heating dollars and humidity are lost through the leaks.**

- **In summer, air leakage results in lost cooling dollars. Leaks also let in allergens, increasingly common pollutants such as wildfire smoke, and humidity. Keeping humidity levels at a safe and healthy level is easier and cheaper in buildings that are well air-sealed.**

Lowering the requirement from 3.0 ACH50 to 2.0 would provide better protection against the issues listed above and improve overall energy performance, while still remaining achievable with current construction materials and practices.

2. Why is the proposed code change a reasonable solution?

   Air-sealing uses materials and methods already common and affordable within the building industry. We believe the proposed change can be achieved with little more than education and attention to detail. According to RESNET: Of the 6,143 completed HERS-rated projects in Minnesota over the last 12 months, 75% of those projects have achieved an ACH level of 2.0 or lower.

3. What other factors should the TAG consider?

   Tighter air sealing has definite benefits, but requires balanced ventilation to maintain a healthy interior environment – the two must be considered together.

Cost/Benefit Analysis

1. Will the proposed code change increase or decrease costs? Please explain and provide estimates if possible.

   As stated above, we anticipate any cost increase would be minimal. Air sealing is already standard practice, and the majority of new builds in Minnesota are already hitting these ACH levels.

2. If there is an increased cost, will this cost be offset by a safety or other benefit? Please explain. If the benefit is quantifiable (for example energy savings), provide an estimate if possible.

   The energy savings alone would quickly make up for the minimal extra cost. Extra insurance against moisture intrusion into walls is also a potential offset.

3. If there is a cost increase, who will bear the costs? This can include government units, businesses, and individuals.

   Builders, who will pass it along to individual homeowners.

4. Are there any enforcement or compliance cost increases or decreases with the proposed code change? Please explain.

   No, there should not be extra compliance costs.

5. Will the cost of complying with the proposed code change in the first year after the rule takes effect exceed $25,000 for any one small business or small city (Minn. Stat. § 14.127)? A small business is any business that has less than 50 full-time employees. A small city is any statutory or home rule charter city that has less than ten full-time employees. Please explain.

   Not that we are aware of.

Regulatory Analysis

1. What parties or segments of industry are affected by this proposed code change?

   Trade workers (siders, framers, specialized subcontractors)

2. Can you think of other means or methods to achieve the purpose of the proposed code change? What might someone opposed to this code change suggest instead? Please explain what the alternatives are and why your proposed change is the preferred method or means to achieve the desired result.

   People might argue against the idea of making air-tight walls, instead choosing to "let the walls breathe". There is an argument to be had in letting walls breathe, as it prevents moisture from sticking around for too long in any cavity. The problem with this approach in our Minnesota climate is that it prevents insulation from ever being used effectively. If we are going to try to cut down energy usage in cold climates, insulation will have to be part of that solution, and protecting these insulated walls with tight air-sealing is a must.

3. What are the probable costs or consequences of not adopting the code change, including those costs or consequences borne by identifiable categories of affected parties, such as separate classes of government units, businesses, or individuals?

   Over the long term, the amount of energy savings that will not be realized will be tremendous. Small incremental gains can create huge progress when multiplied over thousands and thousands of new homes. More homes will have wall moisture issues as well, which are expensive remediations in comparison to a little extra front-end air sealing work.

4. Are you aware of any federal or state regulation or requirement related to this proposed code change? If so, please list the federal or state regulation or requirement and your assessment of any differences between the proposed code change and the federal regulation or requirement.

   We are unaware of any federal or state regulation or requirement related to this proposed change.

***Note: Incomplete forms may be returned to the submitter with instruction to complete the form. Only completed forms can considered by the TAG.

DEPARTMENT OF LABOR AND INDUSTRY

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: **Marcy Conrad Nutt, Passive House Minnesota**
Jared Johnson, Phius Alliance Minnesota

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Firm/Association affiliation, if any: **Phius Alliance Minnesota, Passive House Minnesota**

Date: **October 16, 2023 (REVISED)**

Model Code: **2021 IECC**

Code or Rule Section: **R401 / R409 / R410**

Code or rule section to be changed: **R401.2**, **Added sections: R401.2.5, R401.2.6, R409 & R410**

Intended for Technical Advisory Group ("TAG"):

General Information

		Yes	No
A.	Is the proposed change unique to the State of Minnesota?	☐	☒
B.	Is the proposed change required due to climatic conditions of Minnesota?	☒	☐
C.	Will the proposed change encourage more uniform enforcement?	☐	☒
D.	Will the proposed change remedy a problem?	☒	☐
E.	Does the proposal delete a current Minnesota Rule, chapter amendment?	☐	☒
F.	Would this proposed change be appropriate through the ICC code development process?	☐	☒

Proposed Language

1. The proposed code change is meant to:

☐ change language contained the model code book? If so, list section(s).

☐ change language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

☐ delete language contained in the model code book? If so, list section(s).

☐ delete language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

☒ add new language that is not found in the model code book or in Minnesota Rule.

2. Is this proposed code change required by Minnesota Statute? If so, please provide the citation.

No

3. Provide *specific* language you would like to see changed. Indicate proposed new words with underlining and ~~strikethrough~~ words proposed for deletion. Include the entire code (sub) section or rule subpart that contains your proposed changes. **PINK = language added following the previous submission**

R401.2 Application
Residential buildings shall comply with Section R401.2.~~5~~6 and either Sections R401.2.1, R401.2.2, R401.2.3 ~~or~~ R401.2.4~~.~~, or R401.2.5.

R401.2.5 Passive House Building Certification Option.
The Passive House Building Certification Option requires compliance with Section R409.

Section R409 Passive House Building Certification Option

R409.1 General. Projects shall comply with Section R409.2 or R409.3.

R409.2 Passive House Institute U.S. (Phius)
This section establishes criteria for compliance via Passive House Institute U.S. (Phius) standards.

R409.2.1 Projects shall comply with Phius CORE or Phius ZERO, including its United States Department of Energy (USDOE) Energy Star and Zero Energy Ready Home co-requisites, and performance calculations by Phius-approved software.

R409.2.1.1 Phius documentation.

1. **Prior to the issuance of a building permit, the following items must be provided to the code official:**
   - i. **Phius 2021 (or newer) Verification Report which demonstrates project compliance with Phius 2021 (or newer) performance requirements.**
   - ii. **A statement from the CPHC that the verification report results accurately reflect the submitted plans.**
   - iii. **Evidence of project registration from Phius**

   OR

   - i. **A Design Certification Letter from Phius.**

2. **Prior to the issuance of a certificate of occupancy, the following item must be provided to the code official:**
   - i. **A Design Certification Letter from Phius.**
   - ii. **An updated Verification Report by the CPHC which reflects "as-built" conditions and test results that demonstrate project compliance with Phius (blower door and ventilation results).**

iii. A statement from the CPHC that the envelope meets the Phius hygrothermal requirements found in Appendix B of the Phius 2021 Certification Guidebook
iv. A statement from the Phius Certified Verifier or Rater that confirms the project test results and other Phius verification requirements are met.
v. A copy of the Phius workbook listing all testing results and as-built conditions.

OR

i. **A Project Certificate demonstrating final certification awarded by Phius.**

R409.3 Passive House Institute (PHI)
This section establishes criteria for compliance via the PHI standards.

(a) **R409.3.1 Projects shall comply with the PHI Passive House Low Energy Building standard or better, which include performance calculations by PHI-approved software PHPP version 9 or later.**

R409.3.1.1 Passive House International (PHI) documentation.

1. If using PHI Passive House software, prior to the issuance of a building permit, the following item(s) must be provided to the code official:
   i. A PHPP compliance report which demonstrates project compliance with current PHI performance requirements;
   ii. A statement from the Certified Passive House Consultant/Designer (CPHC/D) that the PHPP results and compliance report accurately reflects the plans submitted;
   iii. Evidence of project registration from a Certified Passive House Certifier.

   OR

   i. A Design Certification Letter from a Certified Passive House Certifier.

2. **Prior to the issuance of a certificate of occupancy, the following items must be provided to the code official:**
   i. A Design Certification Letter from a Certified Passive House Certifier.
   ii. An updated PHPP compliance report which reflects "as-built" conditions and test results (blower door and ventilation results) that demonstrates project compliance with PHI performance requirements;
   iii. A copy of the Passive House Verifier's or Rater's test results;
   iv. A statement from the CPHD that the project test results meet the model performance requirements, all the mandatory limits and any other mandatory requirements.

   OR

   i. A Final Certification Letter from a Certified Passive House Certifier

2. Will this proposed code change impact other sections of a model code book or an amendment in Minnesota Rule? If so, please list the affected sections or rule parts.

No

Need and Reason

1. Why is the proposed code change needed? Please provide a general explanation as well as a specific explanation for any changes to numerical values (heights, area, etc.)

BACKGROUND. Buildings built to the Passive House standard result in significant energy savings over a typically code-built home. Moreover, Passive House projects are more resilient, quieter, have better air quality and undergo a rigorous QA/QC process ensuring high quality construction. Passive House design is built on the following five principles:

- Using continuous insulation throughout the building envelope to minimize or eliminate thermal bridging.
- Building a well-detailed and extremely airtight building envelope, preventing infiltration of outside air and loss of conditioned air while increasing envelope durability and longevity.
- Using high-performance windows (double or triple-paned windows depending on climate and building type) and doors - solar gain is managed to exploit the sun's energy for heating purposes in the heating season and to minimize overheating during the cooling season.
- Using balanced heat- and moisture-recovery ventilation to significantly enhance indoor air quality.
- Minimizing the space conditioning system due to lower space conditioning loads.

Including Passive House (either the Phius or PHI passive house certification path) as an alternative compliance path:

-Provides an option in the energy code for homes that is significantly more energy efficient than those meeting the 2021 IECC. Passive house projects will reduce energy use between 40 and 60% compared with a code built home.

-Does not add any administrative cost to the code enforcement process. Passive House provides a third party design review and enforcement to ensure the single family or multi-family project meets the standard. This amendment simplifies the path for homebuilders/homebuyers who would like a home that is more energy efficient than a similar home built to the 2021 IECC.

-Will help Minnesota meet its goals set out in the Climate Action Framework[1] by:

- **Specifically: "…improving building codes and standards so that all new commercial and large multi-family buildings produce net-zero greenhouse has emissions by 2036."[2]**
- **Lowering demand on Minnesota's power grid, making a transition toward clean energy easier**
- **Protecting Minnesotans from extreme weather[3]**

[1] https://climate.state.mn.us/minnesotas-climate-action-framework
[2] https://climate.state.mn.us/next-step-our-clean-energy-transition
[3] https://climate.state.mn.us/protecting-minnesotans-extreme-weather

2. Why is the proposed code change a reasonable solution?

As an alternate compliance path, it gives the people of Minnesota an additional option. It is NOT mandatory. As Passive House uses third-party review and construction inspection, homeowners are assured of getting a high-quality, energy efficient home without adding new burdens to inspectors.

3. What other factors should the TAG consider?

Besides energy savings, the TAG should consider the co-benefits of a home meeting the Passive House standard. A house built under the standard will be (1) resilient in the face of extreme weather conditions, (2) have excellent indoor air quality, (3) reduce the intensity of noise from the outside, (4) have little or no thermal bridges reducing interior cold spots and reduce the risk of excessive moisture.

Cost/Benefit Analysis

1. Will the proposed code change increase or decrease costs? Please explain and provide estimates if possible.

While a home built to the Passive House standard costs more to build than a home meeting the 2021 IECC, a number of mitigating factors should be taken into consideration:

1. As it is an alternate compliance path, a builder is not subject to the additional cost if they choose not to pursue Passive House.

2. Experience from other jurisdictions indicates that first costs drop rapidly as architects, engineers, builders and raters become more familiar with the standard. As the Passive House standard does not require any unknown technologies, materials or building techniques, the main cost driver is unfamiliarity with the requirements of the standard and what it takes to achieve it. Therefore, as more construction professionals gain experience with Passive House projects, the initial cost premium will invariably decrease.

Following are some examples:

1.As a result of a well-designed incentive structure, affordable housing in Pennsylvania has seen an increase in projects starting in 2015. Because these projects are funded by the Pennsylvania Housing Finance Authority, costs are tracked very closely. Following is a chart outlining the decrease in cost over a three year period; See Figure 1.

Figure 1: **Figure 1: COST COMPARISON BETWEEN PASSIVE HOUSE AND NON-PASSIVE HOUSE PROJECTS [1]**

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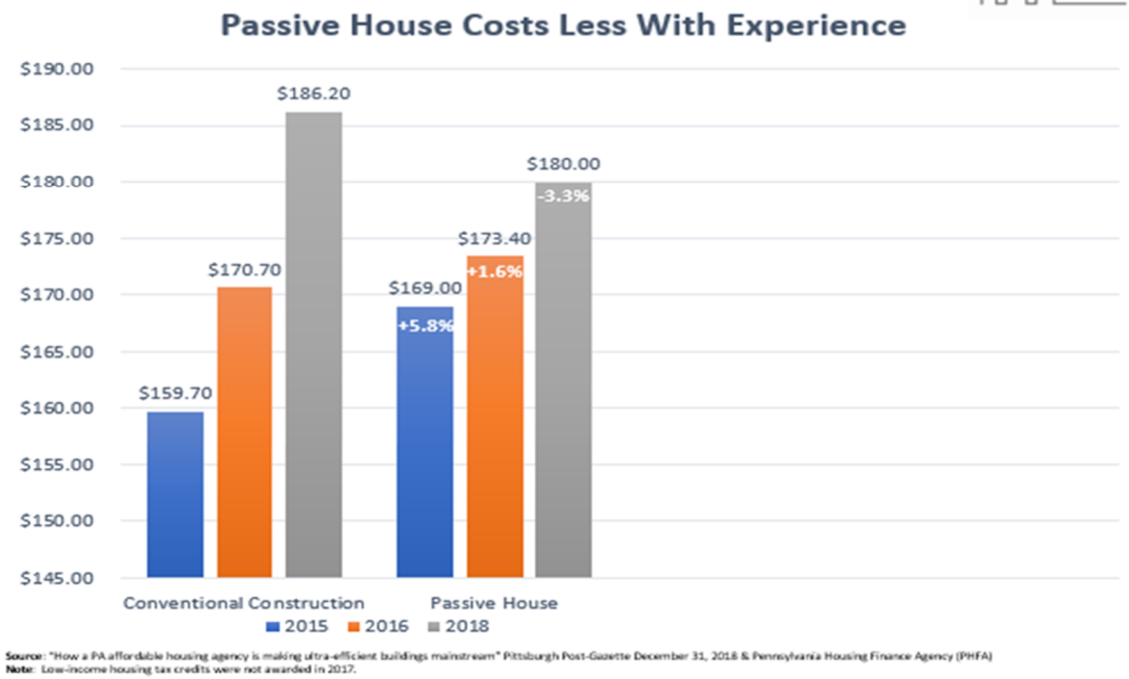
[1] "How a PA Affordable Housing Agency is Making Ultra-Efficient Buildings Mainstream" Pittsburgh Post-Gazette, December 31, 2016 & Pennsylvania Housing Finance Agency



Source: "How a PA affordable housing agency is making ultra-efficient buildings mainstream" Pittsburgh Post-Gazette December 31, 2018 & Pennsylvania Housing Finance Agency (PHFA)
Note: Low-income housing tax credits were not awarded in 2017.

2. The Massachusetts Clean Energy Center provided incentive funding for several Passive House multi-family projects to assess the incremental costs associated with Passive house. The study found that incremental costs ranged from 1.0% to 4.3%. These costs are expected to decrease with future projects:

Figure 2: Incremental Costs Associated with Passive House Projects Funded by the Massachusetts Clean Energy Center

Project	Number of Units	Incremental Cost
Old Colony; Phase 3C	55	2.8%
North Commons	53	4.3%
Depot Village/Hanson Village	48	4.1%
Finch Cambridge	98	1.4%
Harbor Village	30	1.8%
Mattapan Station	135	2.0%
Bartlett Station/Kinzie	52	1.0%

3. It is important to note that along with the minimal incremental costs, projects result in long-term energy cost savings.

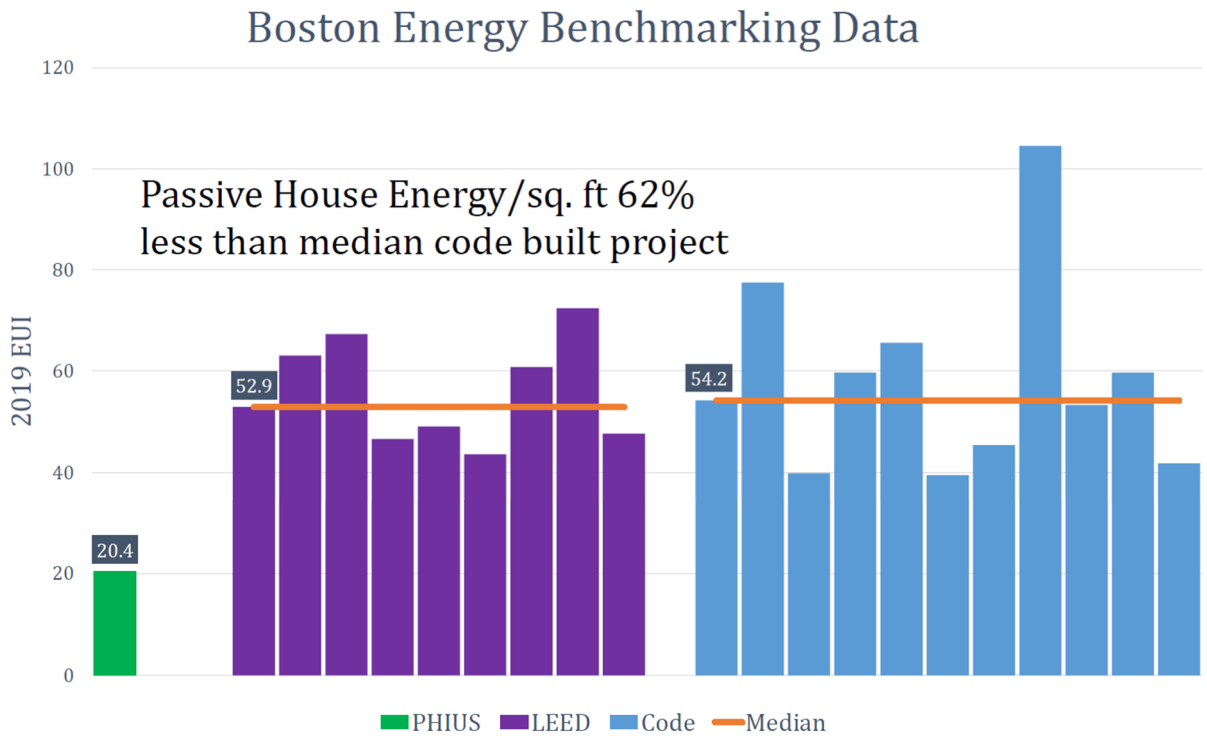
- **One study showed that the average multifamily Passive House building used 20.8 kBtu/sf/yr; as compared to 55.9 for multifamily building built to code (https://www.masscec.com/sites/default/files/documents/Scaling%20Up%20Passive%20House%20Multifamily_The%20 Massachusetts%20Story_20220824.pdf)**

2. If there is an increased cost, will this cost be offset by a safety or other benefit? Please explain. If the benefit is quantifiable (for example energy savings), provide an estimate if possible.

There are several studies that highlight the energy savings that can be expected from buildings receiving the Passive House standard. One such study:

- **At the 2022 NESEA BuildBoston conference, the Massachusetts Department of Energy Resources presented the results of an analysis of the energy use of multi-family buildings. DOER found that Phius buildings had an Energy Use Intensity 60% below the code level energy use. Similar data from the Philadelphia benchmarking data analysis shows energy savings of around 50%. (Apigian, Michele et al. At the Finish Line: How Two Affordable passive Projects Crossed the Hardest Hurdles; BuildingEnergy Boston, February 28, 2022)**

Figure 3: Boston Energy Benchmarking Data (NESEA BuildBoston Conference 5/7/2021)



3. If there is a cost increase, who will bear the costs? This can include government units, businesses, and individuals.

The building owner/builder will bear the costs. However, it should be emphasized that even if the costs are passed on to the home buyer, the reduced utility costs will over time, mitigate or eliminate the increased cost.

4. Are there any enforcement or compliance cost increases or decreases with the proposed code change? Please explain.

   As stated above, Passive House uses third-party review and construction inspection, so there is assurance of a high-quality, energy efficient home without adding new burdens to Inspectors. In fact, the cost of enforcement will decrease for those projects that choose the Passive House alternative compliance path.

5. Will the cost of complying with the proposed code change in the first year after the rule takes effect exceed $25,000 for any one small business or small city (Minn. Stat. § 14.127)? A small business is any business that has less than 50 full-time employees. A small city is any statutory or home rule charter city that has less than ten full-time employees. Please explain.

   No- this is an optional compliance path.

Regulatory Analysis

1. What parties or segments of industry are affected by this proposed code change?

   Architects, building owners, builders, trades people

2. Can you think of other means or methods to achieve the purpose of the proposed code change? What might someone opposed to this code change suggest instead? Please explain what the alternatives are and why your proposed change is the preferred method or means to achieve the desired result.

   - **No; this is an alternative (optional) compliance path.**
   - **While this alternative compliance path may result in first-cost increases—which will be opposed to by anyone not wanting to increase first-costs, the fact that this is entirely optional means those who do not want to have potentially have increased costs (and the resulting energy savings), do not need to pursue this option.**

3. What are the probable costs or consequences of not adopting the code change, including those costs or consequences borne by identifiable categories of affected parties, such as separate classes of government units, businesses, or individuals?

   By not allowing this alternative compliance path, Minnesota is placing barriers and slowing change towards building methods that will lower energy use.

4. Are you aware of any federal or state regulation or requirement related to this proposed code change? If so, please list the federal or state regulation or requirement and your assessment of any differences between the proposed code change and the federal regulation or requirement.

   No

***Note: Incomplete forms may be returned to the submitter with instruction to complete the form. Only completed forms can considered by the TAG.

DEPARTMENT OF LABOR AND INDUSTRY

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: **Jared Johnson, Phius Alliance Minnesota**
Marcy Conrad Nutt, Passive House Minnesota

Email address:

Telephone number:

Firm/Association affiliation, if any: **Phius Alliance Minnesota, Passive House Minnesota**

Date: **October 9, 2023**

Model Code: **2021 IECC**

Code or Rule Section: **Table R402.1.3**

Code or rule section to be changed: **Table R402.1.3**

Intended for Technical Advisory Group ("TAG"):

General Information	**Yes**	**No**
A. Is the proposed change unique to the State of Minnesota?	☒	☐
B. Is the proposed change required due to climatic conditions of Minnesota?	☒	☐
C. Will the proposed change encourage more uniform enforcement?	☐	☒
D. Will the proposed change remedy a problem?	☒	☐
E. Does the proposal delete a current Minnesota Rule, chapter amendment?	☐	☒
F. Would this proposed change be appropriate through the ICC code development process?	☐	☒

Proposed Language

1. The proposed code change is meant to:

☒ change language contained the model code book? If so, list section(s).

Table R402.1.3 Insulation Minimum R-Values and Fenestration Requirements by Component
(Dec. 2020 version)

☐ change language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

☐ delete language contained in the model code book? If so, list section(s).

☐ delete language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

☐ add new language that is not found in the model code book or in Minnesota Rule.

2. Is this proposed code change required by Minnesota Statute? If so, please provide the citation.

   No

3. Provide *specific* language you would like to see changed. Indicate proposed new words with underlining and ~~strikethrough~~ words proposed for deletion. Include the entire code (sub) section or rule subpart that contains your proposed changes.

   Table R402.1.3 INSULATION MINIMUM R-VALUES AND FENESTRATION REQUIREMENTS BY COMPONENT (Dec. 2020 version)

CLIMATE ZONE	FENESTRATION U-FACTOR	SKYLIGHT U-FACTOR	GLAZED FENESTRATION SHGC	CEILING R-VALUE	WOOD FRAME WALL R-VALUE	MASS WALL R-VALUE	FLOOR R-VALUE
6	**0.30**	**0.55**	**NR**	**60**	***20+~~5ci~~ 10ci or 0+20ci***	**15/20**	**30**
7 and 8	**0.30**	**0.55**	**NR**	**60**	***20+~~5ci~~ 14ci or 0+20ci***	**19/21**	**38**

4. Will this proposed code change impact other sections of a model code book or an amendment in Minnesota Rule? If so, please list the affected sections or rule parts.

   No

Need and Reason

1. Why is the proposed code change needed? Please provide a general explanation as well as a specific explanation for any changes to numerical values (heights, area, etc.)

   Left unaltered, the code presents a significant risk of condensation forming within the wall cavity due to Minnesota's cold climate. In the Residential Chapter of the 2021 International Energy Conservation Code, the wall insulation requirement in Table R402.1.3 (for both Climate Zone 6 & 7) includes the option to use R20 + 5ci. R20 + 5ci is an insulation assembly that specifies R-20 for cavity insulation along with R-5 for exterior continuous insulation. This will likely pose moisture problems in Minnesota's climate zones. According to the study by the Building Science Corporation, "BSD-163: Controlling Cold-Weather Condensation Using Insulation" by John Straube: "[condensation] can accumulate as frost in cold weather, and subsequently cause 'leaks' when the frost thaws and liquid water drains down, or cause rot if the moisture does not dry quickly upon the return of warmer and sunnier weather."

2. Why is the proposed code change a reasonable solution?

   Again, according to Straube, the exterior insulation R-value should be roughly 50% of the cavity insulation in Climate Zone 6. In the case of R20 + 5ci, the ratio of continuous to exterior insulation is 0.25 (5:20 = 0.25:1). In this case, there would be insufficient exterior insulation to protect against cold-weather condensation in the walls. By utilizing continuous insulation with a minimum R-value of 10, the optimal 50% cavity-to-continuous insulation ratio is achieved (10:20 = 0.5:1).

In Climate Zone 7, the recommended ratio increases - the exterior insulation R-value should be approximately 70% of the cavity insulation due to colder winter temperatures. This results in a recommended continuous insulation R-value of 14 when utilizing R20 insulation within the cavity. (14/20 = 0.7)

3. What other factors should the TAG consider?

   The additional exterior insulation would also generate benefits to homeowners in added energy savings and thermal comfort.

Cost/Benefit Analysis **(PINK = Updates since the previous submission)**

1. Will the proposed code change increase or decrease costs? Please explain and provide estimates if possible.

   Adding additional exterior insulation will slightly raise the cost. The difference between 1" of exterior insulation (R-5) and 2" (R-10) is about $19 per board (which is equivalent to 32 square feet). For a typical home, with roughly 1,800 square feet of wall area and 1,800 square feet of floor area, the additional cost is about $1,050 per home. With the construction cost of an average mid-level Minnesota home ranging between $118/SF (Forbes, Houzeo) and $273/SF (Home Builder Digest) this cost increase totals to about a 0.2 - 0.5 percent increase in overall cost in Climate Zone 6.[1] [2] [3]

   ($118/SF x 1800 SF = $212,400; $1,050/$213,450 = 0.49%)
   ($273/SF x 1800 SF = $491,400; $1,050/$492,450 = 0.21%)

   The difference between 1" of exterior insulation (R-5) and 3" (R-14) is about $40 per board. Under the same assumption, the typical cost increase would equal approximately $2,250 per home. Again, approximating the construction cost of an average home to be about $120/SF, this cost increase totals to about a 0.5 – 1.1 percent increase in overall cost in Climate Zone 7.

   ($120/SF x 1800 SF = $212,400; $2,250/$213,450 = 1.05%)
   ($273/SF x 1800 SF = $491,400; $2,250/$492,450 = 0.45%)

2. If there is an increased cost, will this cost be offset by a safety or other benefit? Please explain. If the benefit is quantifiable (for example energy savings), provide an estimate if possible.

   The primary value of this code change would be the cost saving due to the avoided maintenance concerns that would be presented by condensation, as well as the subsequent rot and mold, within the wall cavity. Although they would be inherently variable, the repair costs due to moisture problems in walls alone would strongly outweigh the additional up-front cost as described above.

   Additionally, incremental cost savings from increased energy efficiency should be taken into account.

[1] Forbes Home. "How Much Does It Cost To Build A House In 2023?" September 2023. (https://www.forbes.com/home-improvement/contractor/cost-to-build-a-house/)
[2] Houzeo. ""How Much Does it Cost to Build A House in Minnesota (MN) in 2023?" September 2023. (https://www.houzeo.com/blog/how-much-does-it-cost-to-build-a-house-minnesota/)
[3] Home Builder Digest. "How Much Does it Cost to Build a House in Minneapolis?" (https://www.homebuilderdigest.com/cost-guide/minnesota-cost-guides/how-much-does-it-cost-to-build-a-house-in-minneapolis/)

3. If there is a cost increase, who will bear the costs? This can include government units, businesses, and individuals.

   Individuals would bear the cost increase.

4. Are there any enforcement or compliance cost increases or decreases with the proposed code change? Please explain.

   There is no direct change in enforcement nor compliance costs with this proposal. Aligning the code with current building science recommendations could result in reduced litigation costs.

5. Will the cost of complying with the proposed code change in the first year after the rule takes effect exceed $25,000 for any one small business or small city (Minn. Stat. § 14.127)? A small business is any business that has less than 50 full-time employees. A small city is any statutory or home rule charter city that has less than ten full-time employees. Please explain.

   Not that we are aware of.

Regulatory Analysis

1. What parties or segments of industry are affected by this proposed code change?

   Home buyers / renters, builders, trades, owners, manufacturers, architects

2. Can you think of other means or methods to achieve the purpose of the proposed code change? What might someone opposed to this code change suggest instead? Please explain what the alternatives are and why your proposed change is the preferred method or means to achieve the desired result.

   Hygrothermal modeling of wall assemblies to determine condensation risk could be an option, but that would come with enforcement/compliance costs.

3. What are the probable costs or consequences of not adopting the code change, including those costs or consequences borne by identifiable categories of affected parties, such as separate classes of government units, businesses, or individuals?

   Homeowners will have to deal with wall insulation condensation issues and the associated costs of remedying those issues. Government entities may have to deal with legal challenges.

   The added energy savings of having a higher R-value wall will also bolster the cost-benefit outlook for this change. For the trades that install the CI, this is not a big shift in the practice from the baseline IECC 2021 code- it is simply installing a thicker board.

4. Are you aware of any federal or state regulation or requirement related to this proposed code change? If so, please list the federal or state regulation or requirement and your assessment of any differences between the proposed code change and the federal regulation or requirement.

   We are unaware of any federal or state regulation or requirement related to this proposed change.

***Note: Incomplete forms may be returned to the submitter with instruction to complete the form. Only completed forms can considered by the TAG.

DEPARTMENT OF LABOR AND INDUSTRY

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: **Jared Johnson, Phius Alliance Minnesota**

Marcy Conrad Nutt, Passive House Minnesota

Email address:

Telephone number:

Date: **August 29, 2023**

Model Code: **2021 IECC**

Code or Rule Section: **R403.6.1**

Firm/Association affiliation, if any: **Phius Alliance Minnesota, Passive House Minnesota**

Code or rule section to be changed: **R403.6.1**

Intended for Technical Advisory Group ("TAG"):

General Information	**Yes**	**No**
A. Is the proposed change unique to the State of Minnesota?	☒	☐
B. Is the proposed change required due to climatic conditions of Minnesota?	☒	☐
C. Will the proposed change encourage more uniform enforcement?	☒	☐
D. Will the proposed change remedy a problem?	☒	☐
E. Does the proposal delete a current Minnesota Rule, chapter amendment?	☐	☒
F. Would this proposed change be appropriate through the ICC code development process?	☐	☒

Proposed Language

1. The proposed code change is meant to:

☒ change language contained the model code book? If so, list section(s).

R403.6.1 Heat or Energy Recovery Ventilation

☐ change language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

☐ delete language contained in the model code book? If so, list section(s).

☐ delete language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

☐ add new language that is not found in the model code book or in Minnesota Rule.

2. Is this proposed code change required by Minnesota Statute? If so, please provide the citation.

   No

3. Provide *specific* language you would like to see changed. Indicate proposed new words with underlining and ~~strikethrough~~ words proposed for deletion. Include the entire code (sub) section or rule subpart that contains your proposed changes.

   R403.6.1 Heat or energy recovery ventilation
   Dwelling units shall be provided with a heat recovery or energy recovery ventilation system in Climate Zones 6-8. The system shall be balanced with a minimum sensible heat recovery efficiency of 65 percent at 32°F (0°C) at a flow greater than or equal to the design airflow.

4. Will this proposed code change impact other sections of a model code book or an amendment in Minnesota Rule? If so, please list the affected sections or rule parts.

   This change would affect MN Amendment 1322.0403 Section R403, Systems. Subpart 2. R403.5.

   Our intent is to build off the 2021 IECC. We want to avoid addressing the current Minnesota amendments to the energy code.

Need and Reason

1. Why is the proposed code change needed? Please provide a general explanation as well as a specific explanation for any changes to numerical values (heights, area, etc.)

   Fresh air is a requirement and best practice in all climate zones and during all seasons in Minnesota. R402.4.1.2 requires building envelopes to become more airtight, so buildings must rely less on air leakage than in times past.

2. Why is the proposed code change a reasonable solution?

   The combination of air tightness requirements with balanced, efficient ventilation requirements go hand-in-hand, to avoid sick-building syndrome.

3. What other factors should the TAG consider?

   Energy or Heat recovery ventilation allows fresh, filtered air to be brought into homes at all times of the year, while reducing the costs of bringing that air to indoor room temperature.

Cost/Benefit Analysis

1. Will the proposed code change increase or decrease costs? Please explain and provide estimates if possible.

   It will increase costs, depending on the prices of the ERV and HRV units. This price will inevitably come down as adoption is more widespread. As of today's date, the RenewAire EV90 model is currently retailing at $920 per unit. Combined with installation, the total cost comes to somewhere in the $1500-$2000 range.

2. If there is an increased cost, will this cost be offset by a safety or other benefit? Please explain. If the benefit is quantifiable (for example energy savings), provide an estimate if possible.

   There will be an immediate offset cost in that purchase and installation of bathroom/kitchen exhaust fans will no longer be needed. The national average cost to install a bathroom fan is $383 with equipment and installation. The energy savings gained from not having to recondition outside air in the frigid Minnesota winters will also help to offset those initial costs.

3. If there is a cost increase, who will bear the costs? This can include government units, businesses, and individuals.

   Homeowners.

4. Are there any enforcement or compliance cost increases or decreases with the proposed code change? Please explain.

   There should not be extra compliance costs, as

5. Will the cost of complying with the proposed code change in the first year after the rule takes effect exceed $25,000 for any one small business or small city (Minn. Stat. § 14.127)? A small business is any business that has less than 50 full-time employees. A small city is any statutory or home rule charter city that has less than ten full-time employees. Please explain.

   Not that we are aware of.

Regulatory Analysis

1. What parties or segments of industry are affected by this proposed code change?

   Building owners, builders, mechanical contractors

2. Can you think of other means or methods to achieve the purpose of the proposed code change? What might someone opposed to this code change suggest instead? Please explain what the alternatives are and why your proposed change is the preferred method or means to achieve the desired result.

   We have heard the argument that folks can just open a window for fresh air. "Opening a window" is only a viable ventilation solution during the brief shoulder seasons in Minnesota, when desired indoor conditions and outdoor conditions are similar. Most of the year, opening a window comes with high costs for heating/cooling, comfort and/or air quality.

3. What are the probable costs or consequences of not adopting the code change, including those costs or consequences borne by identifiable categories of affected parties, such as separate classes of government units, businesses, or individuals?

   Buildings with air-tight envelopes will require proper balanced ventilation in order to prevent sick-building syndrome. Not maintaining balanced ventilation in the winter will also be a source of energy loss due to the constant reconditioning of outside air.

4. Are you aware of any federal or state regulation or requirement related to this proposed code change? If so, please list the federal or state regulation or requirement and your assessment of any differences between the proposed code change and the federal regulation or requirement.

We are not aware of any at this time.

***Note: Incomplete forms may be returned to the submitter with instruction to complete the form. Only completed forms can considered by the TAG.

DEPARTMENT OF LABOR AND INDUSTRY

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: Ben Rabe

Date: 8/22/23

Email address:

Model Code: 2021 IECC

Telephone number:

Code or Rule Section: Residential Energy Code

Firm/Association affiliation, if any: New Buildings Institute

Code or rule section to be changed: R404.4

Intended for Technical Advisory Group ("TAG"):

General Information	**Yes**	**No**
A. Is the proposed change unique to the State of Minnesota?	☐	☒
B. Is the proposed change required due to climatic conditions of Minnesota?	☐	☒
C. Will the proposed change encourage more uniform enforcement?	☒	☐
D. Will the proposed change remedy a problem?	☒	☐
E. Does the proposal delete a current Minnesota Rule, chapter amendment?	☐	☒
F. Would this proposed change be appropriate through the ICC code development process?	☒	☐

Proposed Language

1. The proposed code change is meant to:

   ☐ change language contained the model code book? If so, list section(s).

   ☐ change language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

   ☐ delete language contained in the model code book? If so, list section(s).

   ☐ delete language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

   ☒ add new language that is not found in the model code book or in Minnesota Rule.

2. Is this proposed code change required by Minnesota Statute? If so, please provide the citation.

   No, but it would aid the state in meeting our state and local climate goals.

3. Provide *specific* language you would like to see changed. Indicate proposed new words with underlining and ~~strikethrough~~ words proposed for deletion. Include the entire code (sub) section or rule subpart that contains your proposed changes.

Add new text as follows:

R103.2.4 Electrification system. The construction documents shall provide details for additional electric infrastructure, including branch circuits, conduit, or pre-wiring, and panel capacity in compliance with the provisions of this code.

Add new text as follows:

R105.2.5 Electrical rough-in inspection. Inspections at electrical rough-in shall verify compliance as required by the code and the approved plans and specifications as to the locations, distribution, and capacity of the electrical system.

Revise numbering as follows:

~~R105.2.5~~ R105.2.6 Final inspection.

Add new definitions as follows:

ALL-ELECTRIC BUILDING. A *building* that contains no *combustion equipment*, or plumbing for *combustion equipment*, installed within the *building*, or *building site*.

APPLIANCE. A device or apparatus that is manufactured and designed to utilize energy and for which this code provides specific requirements.

COMBUSTION EQUIPMENT. Any *equipment* or *appliance* used for space heating, *service water heating*, cooking, clothes drying, or lighting that uses *fuel gas* or *fuel oil*.

EQUIPMENT. Piping, ducts, vents, control devices and other components of systems other than appliances that are permanently installed and integrated to provide control of environmental conditions for buildings. This definition shall also include other systems specifically regulated in this code.

FUEL GAS. A natural gas, manufactured gas, liquified petroleum gas or a mixture of these.

FUEL OIL. Kerosene or any hydrocarbon oil having a flash point not less than 100°F (38°C).

MIXED-FUEL BUILDING. A *building* that contains *combustion equipment* or includes piping for *combustion equipment*.

Revise text as follows:

R401.2.5 Additional energy efficiency. This section establishes additional requirements applicable to all compliance approaches to achieve additional energy efficiency.

1. For *all-electric buildings* complying with Section R401.2.1, one of the additional efficiency package options shall be installed according to Section R408.2.

2. For *mixed-fuel buildings* complying with Section R401.2.1, the building shall be required to install either R408.2.1 or R408.2.5 of the additional efficiency package

options, and any two of R408.2.2, R408.2.3, or R408.2.4 of the additional efficiency package options.

~~2~~3. For buildings complying with Section R401.2.2, the building shall meet one of the following:

~~2~~3.1. *All-electric buildings* shall have ~~O~~one of the additional efficiency package options in Section R408.2 ~~shall be~~ installed without including such measures in the proposed design under Section R405; or

~~2~~3.2. The proposed design of the *all-electric building* ~~building~~ under Section R405.3 shall have an annual energy cost that is less than or equal to the 95 percent of the annual energy cost of the standard reference design~~.~~; or

3.3 Mixed-fuel buildings shall have either R408.2.1 or R408.2.5 of the additional efficiency package options, and any two of R408.2.2, R408.2.3, or R408.2.4 of the additional efficiency package options installed without including such measures in the proposed design under Section R405; or

3.4 The proposed design of the mixed-fuel building under Section R405.3 shall have an annual energy cost that is less than or equal to 85 percent of the annual energy cost of the standard reference design.

~~3~~4. For buildings complying with the Energy Rating Index alternative Section R401.2.3, the Energy Rating Index value shall be at least 5 percent less than the Energy Rating Index target specified in Table R406.5.

The option~~s~~ selected for compliance shall be identified in the certificate required by Section R401.3.

Revise text as follows:

R401.3 Certificate. A permanent certificate shall be completed by the builder or other approved party and posted on a wall in the space where the furnace is located, a utility room or an approved location inside the building. Where located on an electrical panel, the certificate shall not cover or obstruct the visibility of the circuit directory label, service disconnect label or other required labels. The certification shall indicate the following:

4. The types, sizes, fuel sources, and efficiencies of heating, cooling and service water heating equipment. Where a gas-fired unvented room heater, electric furnace or baseboard electric heater is installed in the residence, the certificate shall indicate “gas-fired unvented room heater,” “electric furnace” or “baseboard electric heater,” as appropriate. An efficiency shall not be indicated for gas-fired unvented room heaters, electric furnaces and electric baseboard heaters.
8. The fuel sources for cooking and clothes drying equipment.
9. Where combustion equipment is installed, the certificate shall indicate information on the installation of additional electric infrastructure including which *equipment* and/or *appliances* include additional electric infrastructure, capacity reserved on the electrical service panel for replacement of each piece of combustion *equipment* and/or *appliance*

R402.1 General. The building thermal envelope shall comply with the requirements of Sections R402.1.1 through R402.1.5.

Exceptions:

1. 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 containing no *combustion equipment* with a peak design rate of energy usage less than 3.4 Btu/h·ft2 (10.7 W/m2) or 1.0 watt/ft2 of floor area for space conditioning purposes.
    2. Those containing no *combustion equipment* that do not contain *conditioned space*.

Add new text as follows:

R404.6 Additional electric infrastructure. *Combustion equipment* shall be installed in accordance with this section.

R404.6.1 Equipment serving multiple units. *Combustion equipment* that serves multiple *dwelling units* shall comply with Section C405.16.

R404.6.2 Combustion water heating. Water heaters shall be installed in accordance with the following:

1. A dedicated 240-volt branch circuit with a minimum capacity of 30 amps shall terminate within 3 feet (914 mm) from the water heater and be accessible to the water heater with no obstructions. Both ends of the branch circuit shall be labeled with the words "For Future Heat Pump Water Heater" and be electrically isolated.
2. A condensate drain that is no more than 2 inches (51 mm) higher than the base of the installed water heater and allows natural draining without pump assistance shall be installed within 3 feet (914 mm) of the water heater.
3. The water heater shall be installed in a space with minimum dimensions of 3 feet (914 mm) by 3 feet (914 mm) by 7 feet (2134 mm) high.
4. The water heater shall be installed in a space with a minimum volume of 700 cubic feet (20,000 L) or the equivalent of one 16-inch (406 mm) by 24-inch (610 mm) grill to a heated space and one 8-inch (203 mm) duct of no more than 10 feet (3048 mm) in length for cool exhaust air.

R404.6.3 Combustion space heating. Where a building has combustion equipment for space heating, the building shall be provided with a designated exterior location(s) in accordance with the following:

1. Natural drainage for condensate from cooling equipment operation or a condensate drain located within 3 feet (914 mm), and
2. A dedicated branch circuit in compliance with IRC Section E3702.11 based on heat pump space heating equipment sized in accordance with R403.7 and terminating within 3 feet (914 mm) of the location with no obstructions. Both ends of the branch circuit shall be labeled “For Future Heat Pump Space Heater.”

Exception: Where an electrical circuit in compliance with IRC Section E3702.11 exists for space cooling equipment.

R404.6.4 Combustion clothes drying. A dedicated 240-volt branch circuit with a minimum capacity of 30 amps shall terminate within 6 feet (1829 mm) of natural gas clothes dryers and shall be accessible with no obstructions. Both ends of the branch circuit shall be labeled with the words “For Future Electric Clothes Drying” and be electrically isolated.

R404.6.5 Combustion cooking. A dedicated 240-Volt, 40A branch circuit shall terminate within 6 feet (1829 mm) of natural gas ranges, cooktops and ovens and be accessible with no obstructions. Both ends of the branch circuit shall be labeled with the words “For Future Electric Range” and be electrically isolated.

R404.6.6 Other combustion equipment. *Combustion equipment* and end-uses not covered by Sections R404.6.2-5 shall be provided with a branch circuit sized for an electric *appliance*, *equipment* or end use with an equivalent capacity that terminates within 6 feet (1829 mm) of the *appliance* or *equipment*.

Revise table as follows:

TABLE R405.2 REQUIREMENTS FOR TOTAL BUILDING PERFORMANCE

SECTION [a]	TITLE
Electrical Power and Lighting Systems	
R404.1	Lighting equipment
R404.2	Interior lighting controls
R404.6	Additional electric infrastructure

Revise table as follows:

TABLE R406.2 REQUIREMENTS FOR ENERGY RATING INDEX

SECTION [a]	TITLE
Electrical Power and Lighting Systems	
R404.1	Lighting equipment
R404.2	Interior lighting controls
R404.6	Additional electric infrastructure
R406.3	Building thermal envelope

Revise text as follows:

R406.5 ERI-based compliance. Compliance based on an ERI analysis requires that the rated *proposed* design and confirmed built dwelling be shown to have an ERI less than or equal to the appropriate value for the proposed *mixed-fuel building* or the proposed *all-electric building* as indicated in Table R406.4 when compared to the *ERI reference design*.

TABLE R406.4 MAXIMUM ENERGY RATING INDEX

Climate Zone	~~Energy Rating Index~~ All-Electric Building	Mixed Fuel Building
5	55	47
6	54	46
7	53	46

Add new text as follows:

R408.2.3 Reduced energy use in service water-heating option. The hot water system shall meet one of the following efficiencies:

4. Greater than or equal to 82 EF instantaneous fossil fuel service water-heating system and drain water heat recovery unit meeting the requirements of Section R403.5.3 installed on at least one shower.

4. Will this proposed code change impact other sections of a model code book or an amendment in Minnesota Rule? If so, please list the affected sections or rule parts.

No, it will not.

Need and Reason

1. Why is the proposed code change needed? Please provide a general explanation as well as a specific explanation for any changes to numerical values (heights, area, etc.)

In order to meet the state's aggressive climate goals, Minnesota must not only reduce energy use through energy efficiency and move to utility scale and on-site renewable energy, but also begin to transition away from using combustion equipment in buildings to electric equipment. Therefore, it is crucial that new buildings built today can be cost-effectively retrofitted in the future with electric

equipment so that emissions are not “locked-in” by gas-dependent building infrastructure. Fortunately, heat pump technology has dramatically improved over the last few decades, giving contractors and building owners access to highly efficient electric heating and cooling, and water heating technologies.

One of the biggest expenses of electrification retrofits – and therefore barriers to electrification in existing buildings - is running electrical infrastructure through a completed and enclosed building that has combustion equipment. This significant future cost can be greatly reduced through making simple, low-cost modifications to buildings during construction that enable easier electrification in the future. The requirements in this proposed amendment ensure that the electrical infrastructure is in place so that building owners can convert -electric equipment in the future and ensures that unitized gas water heaters can be replaced with high-performance heat pump water heaters (HPWHs).

2. Why is the proposed code change a reasonable solution?

   This proposed code change future proofs homes so that it will be technically and economically feasible for owners with natural gas water heaters to install efficient electric appliances in the future if they wish.

3. What other factors should the TAG consider?

   None

Cost/Benefit Analysis

1. Will the proposed code change increase or decrease costs? Please explain and provide estimates if possible.

   This code will only nominally increase costs.

2. If there is an increased cost, will this cost be offset by a safety or other benefit? Please explain. If the benefit is quantifiable (for example energy savings), provide an estimate if possible.

   Yes. If not enacted, costs to install an electric heat pump water heater in the future maybe too costly for buildings designed only for natural gas water heaters.

3. If there is a cost increase, who will bear the costs? This can include government units, businesses, and individuals.

   Cost will be passed to homeowner and will save cost over retrofit.

4. Are there any enforcement or compliance cost increases or decreases with the proposed code change? Please explain.

   No.

5. Will the cost of complying with the proposed code change in the first year after the rule takes effect exceed $25,000 for any one small business or small city (Minn. Stat. § 14.127)? A small business is any business that has less than 50 full-time employees. A small city is any statutory or home rule charter city that has less than ten full-time employees. Please explain.

   No.

Regulatory Analysis

1. What parties or segments of industry are affected by this proposed code change?

   This proposed code change would require additional electrical work.

2. Can you think of other means or methods to achieve the purpose of the proposed code change? What might someone opposed to this code change suggest instead? Please explain what the alternatives are and why your proposed change is the preferred method or means to achieve the desired result.

   I cannot think of another way to achieve the goals of this proposal.

3. What are the probable costs or consequences of not adopting the code change, including those costs or consequences borne by identifiable categories of affected parties, such as separate classes of government units, businesses, or individuals?

   This proposal will save homeowners the burden of upgrading electrical capacity and installing conduit before when electrifying appliances.

4. Are you aware of any federal or state regulation or requirement related to this proposed code change? If so, please list the federal or state regulation or requirement and your assessment of any differences between the proposed code change and the federal regulation or requirement.

   No.

***Note: Incomplete forms may be returned to the submitter with instruction to complete the form. Only completed forms can considered by the TAG.

DEPARTMENT OF LABOR AND INDUSTRY

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: Ben Rabe

Date: August 18, 2023

Email address:

Model Code: 2021 IECC

Telephone number:

Code or Rule Section: Residential Energy Code

Firm/Association affiliation, if any: New Buildings Institute

Code or rule section to be changed: R404.4

Intended for Technical Advisory Group ("TAG"):

General Information	**Yes**	**No**
A. Is the proposed change unique to the State of Minnesota?	☐	☒
B. Is the proposed change required due to climatic conditions of Minnesota?	☐	☒
C. Will the proposed change encourage more uniform enforcement?	☒	☐
D. Will the proposed change remedy a problem?	☒	☐
E. Does the proposal delete a current Minnesota Rule, chapter amendment?	☐	☒
F. Would this proposed change be appropriate through the ICC code development process?	☒	☐

Proposed Language

1. The proposed code change is meant to:

   ☐ change language contained the model code book? If so, list section(s).

   ☐ change language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

   ☐ delete language contained in the model code book? If so, list section(s).

   ☐ delete language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

   ☒ add new language that is not found in the model code book or in Minnesota Rule.

2. Is this proposed code change required by Minnesota Statute? If so, please provide the citation.
   No

3. Provide *specific* language you would like to see changed. Indicate proposed new words with underlining and ~~strikethrough~~ words proposed for deletion. Include the entire code (sub) section or rule subpart that contains your proposed changes.

Add definition as follows:

ENERGY STORAGE SYSTEM (ESS) . One or more devices, assembled together, capable of storing energy in order to supply electrical energy at a future time.

Add new text as follows:

R103.2.4 Energy storage-ready system. The construction documents shall provide the location of pathways for routing of raceways or cable from the energy storage system to the electrical service panel, from the panelboard to dedicated branch circuits, the location and layout of a designated area for electrical energy storage system and system isolation equipment.

R105.2.5 Electrical rough-in inspection. Inspections at electrical rough-in shall verify compliance as required by the code and the approved plans and specifications as to the locations, distribution, and capacity of the electrical system. Where the energy storage system area is not in the same space as the electrical panel, inspections shall verify conduit or pre-wiring from the energy storage ready zone to the electrical panel.

R404.4 Electrical energy storage system. One- and two-family dwellings, townhouse units, and Group R-3 occupancies shall either comply with R404.4.1 or R404.4.2. Buildings with Group R-2 and R-4 occupancies shall comply with C405.15.

R404.4.1 Electrical energy storage energy capacity. Each building shall have an *ESS* with a minimum rated energy capacity of 5 kWh with a minimum of four *ESS* supplied branch circuits.

R404.4.2 Electrical energy storage system ready. Each building shall be energy storage ready area in accordance with Sections R404.4.2.1 through R404.2.2.4.

R404.4.2.1 Energy storage system space. Interior or exterior space with dimensions and locations in accordance with Section R328 of the International Residential Code and Section 110.26 of NFPA 70 shall be reserved to allow for the future installation of an energy storage system.

R404.4.2.2 System Isolation Equipment Space. Space shall be reserved to allow for the future installation of a transfer switch within 3 feet (305 mm) of the main panelboard. Raceways shall be installed between the panelboard and the transfer switch location to allow the connection of an *ESS*.

R404.4.2.3 Panelboard with backed-up load circuits. A dedicated raceway from the main service to a panelboard that supplies the branch circuits served by the *ESS*. All branch circuits are permitted to be supplied by the main service panel prior to the installation of an *ESS*. The track size of the raceway shall be not less than one inch. The panelboard that supplies the branch circuits shall be labeled "Subpanel reserved for future battery energy storage system to supply essential loads."

R404.4.2.4 Branch circuits served by ESS. A minimum of four branch circuits shall be identified and have their source of supply collocated at a single panelboard supplied by the *ESS*. The following end uses shall be served by the branch circuits:

1. A refrigerator.
2. One lighting circuit serving the primary path of egress the primary egress.
3. A sleeping room receptacle outlet.

Revise table as follows:

TABLE R405.2 REQUIREMENTS FOR TOTAL BUILDING PERFORMANCE

SECTION	TITLE
Electrical Power and Lighting Systems	
R404.1	Lighting equipment
R404.2	Interior lighting controls
R404.6	Energy storage infrastructure

SECTION R406
ENERGRY RATING INDEX COMPLIANCE ALTERNATIVE

Revise table as follows:

TABLE R406.2 REQUIREMENTS FOR ENERGY RATING INDEX

SECTION	TITLE
Electrical Power and Lighting Systems	
R404.1	Lighting equipment
R404.2	Interior lighting controls
R404.6	Energy storage infrastructure
R406.3	Building thermal envelope

4. Will this proposed code change impact other sections of a model code book or an amendment in Minnesota Rule? If so, please list the affected sections or rule parts.

   No.

Need and Reason

1. Why is the proposed code change needed? Please provide a general explanation as well as a specific explanation for any changes to numerical values (heights, area, etc.)

   Energy storage is critical to achieving Minnesota's goal of a carbon-free power sector by 2040. These systems also bolster the economy, present a cost savings opportunity for homeowners and increase resiliency to power outages. In 2020, 21% of the United State's electricity is sourced from renewable energy, primarily wind, an intermittent source of energy. As the U.S. increases the amount of electricity generated from renewables, buildings must be prepared to aid in this transition by storing energy to match grid demands.

   Policies to encourage energy storage will improve the U.S. economy. Energy storage is expected to grow by over 40% each year until 2025 and the U.S., because of its manufacturing background and experience in battery-storage technology for cars is becoming a clear leader in this market.

   Energy storage will also present a cost-saving opportunity for homeowners. Battery prices have and will likely continue to fall in the United States, meaning that behind-the-meter storage will likely become more accessible and affordable in the short-term. More and more utilities are moving beyond voluntary programs and are expanding use of time-of-use rates for electricity as a tool for shaping demand. Ensuring homes are energy-storage ready now will allow them to cost effectively install storage systems in the future and take advantage of these voluntary programs.

   Finally, energy storage will improve resilience to power outages. In 2020, DOE found that an average household in the United States goes without power for 8 hours in a year. Because of extreme weather events caused by climate change, those outages are increasing. These outages are estimated to cost the U.S. economy between $25 billion to $70 billion annually. Requiring

homes to be storage-ready will ensure communities are more resilient by allowing buildings to cost effectively install storage which can operate for a short-period of time without relying on the electricity grid.

2. Why is the proposed code change a reasonable solution?

   Installing the infrastructure for a future energy storge is a more cost-effective way to future-proof homes.

3. What other factors should the TAG consider?

   This proposal will help future proof homes for the clean energy transition.

Cost/Benefit Analysis

1. Will the proposed code change increase or decrease costs? Please explain and provide estimates if possible.

   This code will only nominally increase costs.

2. If there is an increased cost, will this cost be offset by a safety or other benefit? Please explain. If the benefit is quantifiable (for example energy savings), provide an estimate if possible.

   Commercial analysis for a similar measure showed no incremental costs. Some costs are expected on residential. Overall savings potential impacts are outlined in reason statement - costs of outages and other grid infrastructure are passed on to consumers, it just isn't as recognizable on an energy bill. Measure will also allow consumers the ability to install energy storage in the future, removing retrofit costs, and allowing homeowners to have resiliency onsite, which have quantifiable health, wellness, and comfort co-benefits.

3. If there is a cost increase, who will bear the costs? This can include government units, businesses, and individuals.

   Cost will be passed to homeowner and will save cost over retrofit.

4. Are there any enforcement or compliance cost increases or decreases with the proposed code change? Please explain.

   This system can be inspected during normal electrical inspection and will increase the cost of compliance.

5. Will the cost of complying with the proposed code change in the first year after the rule takes effect exceed $25,000 for any one small business or small city (Minn. Stat. § 14.127)? A small business is any business that has less than 50 full-time employees. A small city is any statutory or home rule charter city that has less than ten full-time employees. Please explain.

   No.

Regulatory Analysis

1. What parties or segments of industry are affected by this proposed code change?

   This proposed code change would require additional electrical work.

2. Can you think of other means or methods to achieve the purpose of the proposed code change? What might someone opposed to this code change suggest instead? Please explain what the alternatives are and why your proposed change is the preferred method or means to achieve the desired result.

   I cannot think of another way to achieve the goals of this proposal.

3. What are the probable costs or consequences of not adopting the code change, including those costs or consequences borne by identifiable categories of affected parties, such as separate classes of government units, businesses, or individuals?

   This proposal will save homeowners the burden of upgrading their homes have energy storage systems.

4. Are you aware of any federal or state regulation or requirement related to this proposed code change? If so, please list the federal or state regulation or requirement and your assessment of any differences between the proposed code change and the federal regulation or requirement.

   No.

***Note: Incomplete forms may be returned to the submitter with instruction to complete the form. Only completed forms can considered by the TAG.

DEPARTMENT OF LABOR AND INDUSTRY

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: Eric Fowler

Date: 2/15/24

Email address:

Model Code: 2021 IECC

Telephone number:

Code or Rule Section: Residential Energy Code

Firm/Association affiliation, if any: Fresh Energy

Code or rule section to be changed: R404

Intended for Technical Advisory Group ("TAG"):

General Information	**Yes**	**No**
A. Is the proposed change unique to the State of Minnesota?	☐	☒
B. Is the proposed change required due to climatic conditions of Minnesota?	☐	☒
C. Will the proposed change encourage more uniform enforcement?	☒	☐
D. Will the proposed change remedy a problem?	☒	☐
E. Does the proposal delete a current Minnesota Rule, chapter amendment?	☐	☒
F. Would this proposed change be appropriate through the ICC code development process?	☒	☐

Proposed Language

1. The proposed code change is meant to:

   ☐ change language contained the model code book? If so, list section(s).

   ☐ change language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

   ☐ delete language contained in the model code book? If so, list section(s).

   ☐ delete language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

   ☒ add new language that is not found in the model code book or in Minnesota Rule.

2. Is this proposed code change required by Minnesota Statute? If so, please provide the citation.

No, it is not, however, minimum requirements for in commercial and multifamily buildings passed during the 2023 legislative session.

3. Provide *specific* language you would like to see changed. Indicate proposed new words with underlining and ~~strikethrough~~ words proposed for deletion. Include the entire code (sub) section or rule subpart that contains your proposed changes.

Add new definitions as follows:

AUTOMOBILE PARKING SPACE. A space within a building or private or public parking lot, exclusive of driveways, ramps, columns, office and work areas, for the parking of an automobile.

ELECTRIC VEHICLE (EV). An automotive-type vehicle for on-road use, such as passenger automobiles, buses, trucks, vans, neighborhood electric vehicles, and electric motorcycles, primarily powered by an electric motor that draws current from a building electrical service, EVSE, a rechargeable storage battery, a fuel cell, a photovoltaic array, or another source of electric current.

Electric Vehicle Supply Equipment (EVSE). The conductors, including the ungrounded, grounded, and equipment grounding conductors, and the Electric Vehicle connectors, attachment plugs, and all other fittings, devices, power outlets, or apparatus installed specifically for the purpose of transferring energy between the premises wiring and the Electric Vehicle.

EV Ready Space. A designated parking space which is provided with one 40-ampere, 208/240-volt dedicated branch circuit for EVSE servicing Electric Vehicles. The circuit shall terminate in a suitable termination point such as a receptacle, junction box, or an EVSE, and be located in close proximity to the proposed location of the EV parking spaces.

EV Capable Space. Electrical panel capacity and space to support a minimum 40-ampere, 208/240-volt branch circuit for a designated parking space, and the installation of raceways, both underground and surface mounted, to support an EVSE.

Add new text as follows:

R404.4 Electric Vehicle Power Transfer Infrastructure. New one- and two-family dwellings and townhouses with automobile parking spaces shall be provided in accordance with this section. All other new residential parking facilities shall be provided with electric vehicle power transfer infrastructure in accordance with Minnesota Rules Chapters 1323.

R404.4.1 Quantity. Each dwelling unit with a designated attached or detached garage or other onsite private parking provided adjacent to the dwelling unit shall be provided with one EV ready space or EV capable space.

R404.4.2 EV Ready Spaces. Each EV ready space used to comply with Section R404.4 shall comply with all of the following:

1. A circuit shall terminate in the same room, or if outdoors within 10 feet of the EV ready space it serves.
2. Reserved circuit breaker space in panelboard and, if provided, the circuit shall have a minimum capacity of 9.6 kVA (or 40A at 240V).
3. The panelboard or other electrical distribution equipment directory shall designate the circuit as “For electric vehicle supply equipment (EVSE)” and the junction box or enclosure shall be marked “For electric vehicle supply equipment (EVSE).”

R404.4.3 EV Capable Spaces. Each EV capable space used to comply with Section R404.4 shall comply with all of the following:

1. A conduit with a minimum of ¾ inch internal diameter shall terminate at a junction box in the same room, or if outdoors within 10 feet of the EV capable space it serves.
2. Reserved circuit breaker space in panelboard and, if provided, the circuit shall have a minimum capacity of 9.6 kVA (or 40A at 240V).
3. The panelboard or other electrical distribution equipment directory shall designate the circuit as "For electric vehicle supply equipment (EVSE)" and the junction box or enclosure shall be marked "For electric vehicle supply equipment (EVSE)."

4. Will this proposed code change impact other sections of a model code book or an amendment in Minnesota Rule? If so, please list the affected sections or rule parts.

   No.

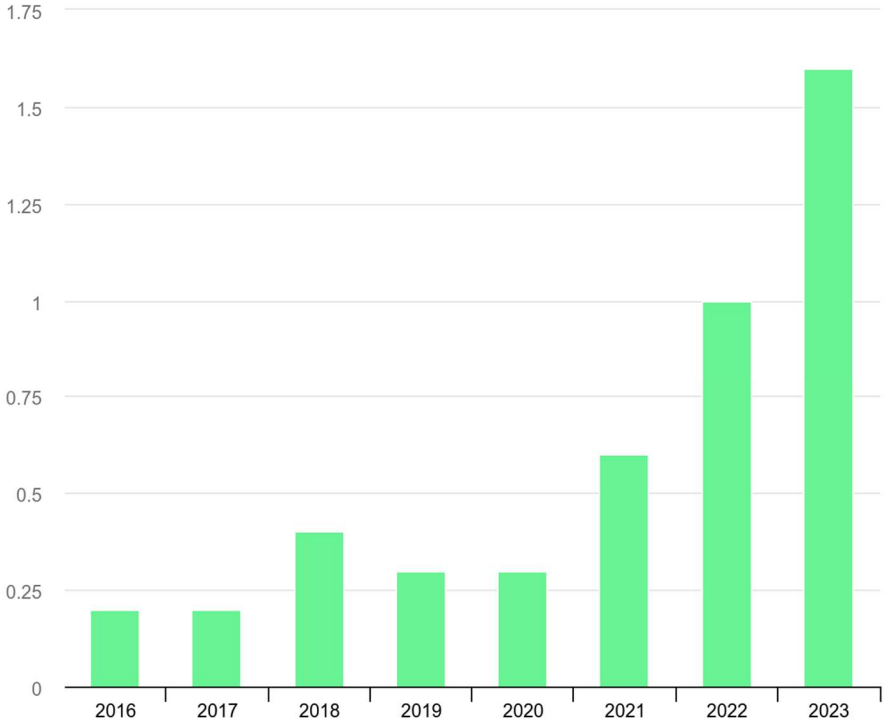
Need and Reason

1. Why is the proposed code change needed? Please provide a general explanation as well as a specific explanation for any changes to numerical values (heights, area, etc.)

   Electric vehicle adoption is on the rise in Minnesota, and across the country, as options expand, battery technology improves, and upfront prices come closer to gasoline-powered vehicles. This growth is exponential, not linear. By preparing new homes with consumer options in mind, the Department will reduce the burden of costly retrofits post-construction, and maintain a code that provides for the "use of modern methods, devices, materials and techniques," as required by statute. Minnesota would also be following the lead of numerous other jurisdictions who have included EV ready spaces as part of new residential construction, including California and cities in Colorado, Missouri, Arizona, as well as Vancouver.[1]

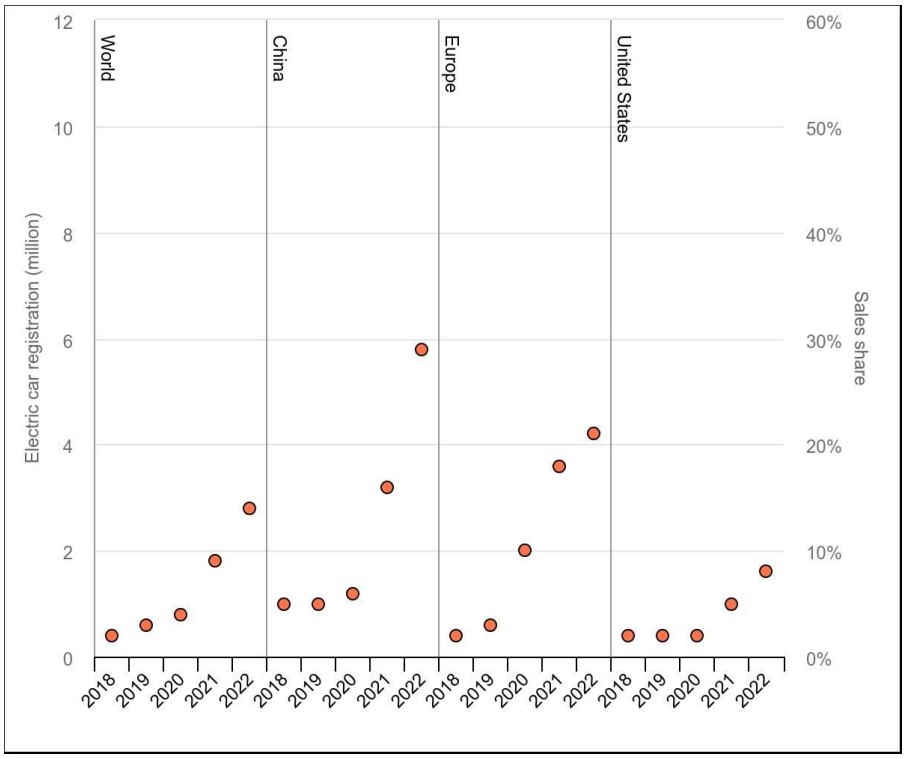
[1] ICC, "2021 Electric Vehicles and Building Codes: A Strategy for Greenhouse Gas Reduction," published October 2021; see Table 1: Sample EV-Integrated Code Provisions, which lists the jurisdictions that require EV Ready Space(s) for new single-family construction. (https://codes.iccsafe.org/content/ICCEVBCSGGR2021P1/current-approaches-to-ev-integrated-codes)

New EV sales in the United States hovered around a quarter million each year from 2016 to 2020, and has since grown to over 1.5 million new vehicles in 2023.[2]



EVs are on track to pass 10% of new vehicle sales soon in the United States, while globally they were almost 15% of sales in 2022.[3]

This trend holds true in Minnesota as well, where 34,474 light-duty EVs were registered as of January 2023, up from 13,015 in



[2] IEA, Electric car sales, 2016-2023, IEA, Paris https://www.iea.org/data-and-statistics/charts/electric-car-sales-2016-2023, IEA. Licence: CC BY 4.0

[3] IEA, Electric car registrations and sales share in China, United States and Europe, 2018-2022, IEA, Paris https://www.iea.org/data-and-statistics/charts/electric-car-registrations-and-sales-share-in-china-united-states-and-europe-2018-2022, IEA. Licence: CC BY 4.0

February 2020.[4] Additionally, 6.6 percent of all new light-duty vehicle sales in Minnesota were electric in 2023 (through September), compared to 1.7% of light-duty vehicle sales in 2020.[5] This trend is expected to continue as EV familiarity increases and purchase incentives from both the federal and state level continue over the next several years.[6]

Globally, sales projections range from 40% market share by 2030 to over 60% market share by 2030, according to analysis by IEA and RMI.[7]

This market share has been driven in part by lower prices and expanded options for EVs. Last year, the average price for an EV cost only $2,800 more than the average price for a new gasoline-powered passenger vehicle.[8] Additionally, as more EVs have entered the new vehicle marketplace, a robust used EV market will continue to grow that offers access to EVs at a more affordable price for more consumers. Affordability will be further spurred by the availability of a used EV tax credit for up to $4,000 for vehicles costing $25,000 or less.[9]

Minnesota residents seeking to charge their electric vehicle at home may face a number of costs, including an electric service upgrade, wiring a 240 volt circuit to the charging location, and installing Electric Vehicle Suply Equipment (EVSE), commonly known as an EV charger. This proposal does not require installation of EVSE, or even wiring the circuit, but preserves consumer choice by requiring space in the electric panel for the circuit, and at minimum, conduit for easy installation of the circuit without digging or other costly, invasive work.

This cost is often unexpected for new EV owners, and spurred Xcel Energy to offer a "home wiring rebate" to help defray the cost and support EV adoption in its service territory, while also supporting EVs in its service territories getting onto a time-varying electricity rate that optimizes use of the electric grid, to the benefit of both the EV owner and general grid customers. Level 2 charging enables EV owners to participate in utility pricing programs that offer lower electricity prices at times of the day when load is lowest on the electric grid (typically overnight, when wind power is also most prevalent), thereby optimizing use of the electric grid and renewable energy, while also saving the EV owner money. A Level 2 Charger is typically required to participate in these beneficial utility programs.

2. Why is the proposed code change a reasonable solution?

   This proposal will prepare residents for charging at home as a growing number of Minnesotans opt for electric vehicles. The proposal allows flexibility for builders to provide conduit or to pre-wire for a charger, without requiring the installation of Electric Vehicle Supply Equipment.

3. What other factors should the TAG consider?

[4] Minnesota Public Utilities Commission, https://mn.gov/puc/activities/economic-analysis/electric-vehicles/
[5] Jukka Kukkonen, "10 EV market trends to watch in 2024," posted January 23, 2024. Sales numbers retrieved from the Electric Vehicle Dashboard hosted by the Alliance for Automotive Innovation.: https://www.autosinnovate.org/EVDashboard
[6] Ibid. EV purchases incentives for new vehicles at the federal level range up to $7,500 in tax credits, while used EVs can quality for up to $4,000 of tax credits for their purchaser. Income limits apply to these purchase incentives, and not all models are eligible, but notably these incentives have added pressure to the broader EV market to bring down prices. *See:* https://money.com/ev-vs-gas-cars-price-difference-decreasing/
[7] "EVs to surpass two-thirds of global car sales by 2030, putting at risk nearly half of oil demand, new research finds," RMI, https://rmi.org/press-release/evs-to-surpass-two-thirds-of-global-car-sales-by-2030-putting-at-risk-nearly-half-of-oil-demand-new-research-finds/
[8] Natural Resources Defense Council, "Electric vs. Gas Cars: Is it Cheaper to Drive an EV?", posted November 17, 2023. Data originally from Cox Automotive (https://www.coxautoinc.com/market-insights/kbb-atp-september-2023/)
[9] U.S. Department of Energy, "Federal Tax Credits for Pre-owned Plug-in Electric and Fuel Cell Vehicles" (webpage),last updated 1/16/2024. (https://www.fueleconomy.gov/feg/taxused.shtml)

Economy wide, EVs advance efficiency significantly, wasting only about 11% of energy compared to the roughly 80% wasted by gasoline powered cars.[10] EVs eliminate a major source of air pollution, with health impacts both local and global. Finally, they give consumers the option to use local sources of energy, including utility scale renewable electricity or even power from a resident's own rooftop or community solar.

Cost/Benefit Analysis

1. Will the proposed code change increase or decrease costs? Please explain and provide estimates if possible.

   This code will only nominally increase costs.

2. If there is an increased cost, will this cost be offset by a safety or other benefit? Please explain. If the benefit is quantifiable (for example energy savings), provide an estimate if possible.

   Providing an EV Ready Space at a Level 2 capacity of 40A, 240V in new construction adds minimal cost. The Southwest Energy Efficiency Project (SWEEP) estimates the incremental cost at about $50 per space, depending on the distance between the electric panel and the parking space.[11] Research by NBI and NRDC estimates the cost at $115.[12]

   New construction with 200 amp service is typically more than enough to allow for Level 2 charging.[13] Many homeowners are even able to charge an EV with a 100 amp panel, making the need for more than the standard 200 amp service extremely unlikely, especially in small and modest sized homes.[14]

   Alternatively, retrofitting homes for Level 2 Charging is much costlier. Estimates vary widely from $300-$5,000.[15] In Xcel Energy's 2023 Transportation Electrification Plan, they estimated that installing a dedicated 240 V circuit in their Minnesota service territory cost $880 on average, with costs varying by site but reaching a maximum of $5,000 for a single project.[16]

   Assuming incremental EV ready costs of $115 compared to retrofit costs of $880, only 14% of residents would need to install EVSE in their EV ready parking space to realize overall cost savings of $820 per 100 homes.[17] If the (conservative) IEA estimates of 40% EV market share by 2030 are

[10] "Electrifying transportation reduces emissions AND saves massive amounts of energy," Yale Climate Connections, 2022, https://yaleclimateconnections.org/2022/08/electrifying-transportation-reduces-emissions-and-saves-massive-amounts-of-energy/
[11] SWEEP, "SWEEP guide to EV infrastructure building codes,"(webpage), under section "Cost implications: EV building codes save people money." (https://www.swenergy.org/ev-infrastructure-building-codes/)
[12] Page 22, "Cost Study of the Building Decarbonization Code," NBI, 2022, https://newbuildings.org/resource/cost-study-of-the-building-decarbonization-code/
[13] Energy Star, https://www.energystar.gov/products/energy_star_home_upgrade/make_your_home_electric_ready
[14] "Yes, it's possible to electrify a home on just 100 amps," Canary Media, December 2023, https://www.canarymedia.com/articles/electrification/yes-its-possible-to-electrify-a-home-on-just-100-amps
[15] "An electric car charging station installation costs $750 to $2,600 for a Level 2 charger, 240-volt outlet, wiring, and wall mounting. Some EV charger installations cost $2,000 to $5,000 for extensive wiring or if the electrical panel needs upgrading." 2023 EV Charging Station Cost | Install Level 2 or Tesla (homeguide.com) updated September 2023
New 240v outlet: "totaling $300 or so" Cost To Install An Electrical Outlet: GFCI, 220v, 240v – Forbes Home
"if you need to mount the system from zero: do the wiring, and install a new service panel and 240 V outlet - add about $1000 - $1500 to your estimate" How Much Does It Cost To Install An EV Charger? (jdpower.com) December 2022
[16] Pg. 52, Xcel Energy, 2023 Integrated Distribution Plan - Appendix H: Transportation Electrification Plan (filed Nov 1, 2023) (link)
[17] In a 100 home universe: 100 x $115 = $11,500 for all EV ready compared to 14 x $880 = $12,320 for retrofit costs. Total saved: 12,320 - 11,500 = $820.

correct, then 20% of residents or more might install EVSE in their EV ready parking space, realizing cost savings of $6,100 per 100 homes.[18]

None of these estimates include savings from the lower operation costs of EVs compared to an internal combustion engine. According to AAA, an electric vehicle (EV) will save roughly $1,039 per year in total fuel and maintenance costs compared to a comparable gasoline vehicle.[19]

The estimates above also leave out the impact on human health and healthcare costs that EVs reduce by lowering fossil fuel combustion. Research lead by the Harvard Chan School of Public Health found that "more than 8 million people died in 2018 from fossil fuel pollution," equating to about 1 in 5 deaths worldwide.[20] Across the United States, research published in the journal *Environmental Research: Health* estimated that US oil and gas causes roughly $77 billion in health impacts every year. The health harms are also local and measurable. Researchers in Rochester, Minnesota studied almost 20,000 people over 11 years and found "significant relationships between asthma exacerbations and residential proximity to traffic."[21] By simply making it easier for residents to eliminate nearby sources of fossil fuel pollution, we can continue protecting the health and welfare of Minnesotans inside of buildings and out.

A small investment during new construction will save homeowners substantial future costs and give them more options. Given the market trends identified in the reason statement, it is not a question of whether homes will need EV charging infrastructure, but when. Failing to adopt this proposal will be saddling future homeowners with substantially higher costs.

3. If there is a cost increase, who will bear the costs? This can include government units, businesses, and individuals.

   Cost will be passed to homeowner and will save cost over retrofit.

4. Are there any enforcement or compliance cost increases or decreases with the proposed code change? Please explain.

   This system can be inspected during normal electrical inspection and will increase the cost of compliance.

5. Will the cost of complying with the proposed code change in the first year after the rule takes effect exceed $25,000 for any one small business or small city (Minn. Stat. § 14.127)? A small business is any business that has less than 50 full-time employees. A small city is any statutory or home rule charter city that has less than ten full-time employees. Please explain.

   No, see cost estimates above.

Regulatory Analysis

[18] In a 100 home universe: 100 x $115 = $11,500 for all EV ready compared to 20 x $880 = $17,600 for retrofit costs. Total saved: 17,600 – 11,500 = $ 6,100.

[19] "$709 in fuel savings assuming 15,000 miles, and $330 saved in maintenance, repair, and tires" according to "True Cost of Electric Vehicles," AAA, https://www.aaa.com/autorepair/articles/true-cost-of-ev

[20] "Fossil fuel air pollution responsible for 1 in 5 deaths worldwide," Harvard Chan School of Public Health, 2021, https://www.hsph.harvard.edu/c-change/news/fossil-fuel-air-pollution-responsible-for-1-in-5-deaths-worldwide/

[21] Lindgren P, Johnson J, Williams A, Yawn B, Pratt GC. Asthma exacerbations and traffic: examining relationships using link-based traffic metrics and a comprehensive patient database. Environ Health. 2016 Nov 3;15(1):102. doi: 10.1186/s12940-016-0184-2. PMID: 27809853; PMCID: PMC5094142.

1. What parties or segments of industry are affected by this proposed code change?

   This proposed code change would require additional electrical and/or laborer work.

2. Can you think of other means or methods to achieve the purpose of the proposed code change? What might someone opposed to this code change suggest instead? Please explain what the alternatives are and why your proposed change is the preferred method or means to achieve the desired result.

   There is no other clear policy tool to prepare Minnesota homes for EV charging and avoid steep retrofit costs.

3. What are the probable costs or consequences of not adopting the code change, including those costs or consequences borne by identifiable categories of affected parties, such as separate classes of government units, businesses, or individuals?

   This proposal will save homeowners the burden of upgrading their homes to provide electrical vehicle charging.

4. Are you aware of any federal or state regulation or requirement related to this proposed code change? If so, please list the federal or state regulation or requirement and your assessment of any differences between the proposed code change and the federal regulation or requirement.

   No, although a legislation passed in the 2023 Minnesota legislative session requiring adding electric vehicle charging to the commercial budling code.

***Note: Incomplete forms may be returned to the submitter with instruction to complete the form. Only completed forms can considered by the TAG.

DEPARTMENT OF LABOR AND INDUSTRY

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: Ben Rabe

Date: August 23, 2023

Email address:

Telephone number:

Model Code: 2021 IECC

Code or Rule Section: Residential Energy Code

Firm/Association affiliation, if any: New Buildings Institute

Code or rule section to be changed: R404.4

Intended for Technical Advisory Group ("TAG"):

General Information	**Yes**	**No**
A. Is the proposed change unique to the State of Minnesota?	☐	☒
B. Is the proposed change required due to climatic conditions of Minnesota?	☐	☒
C. Will the proposed change encourage more uniform enforcement?	☒	☐
D. Will the proposed change remedy a problem?	☒	☐
E. Does the proposal delete a current Minnesota Rule, chapter amendment?	☐	☒
F. Would this proposed change be appropriate through the ICC code development process?	☒	☐

Proposed Language

1. The proposed code change is meant to:

   ☐ change language contained the model code book? If so, list section(s).

   ☐ change language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

   ☐ delete language contained in the model code book? If so, list section(s).

   ☐ delete language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

   ☒ add new language that is not found in the model code book or in Minnesota Rule.

2. Is this proposed code change required by Minnesota Statute? If so, please provide the citation.

   No, however solar ready homes will help the state meet the statutory goal of 100 percent clean energy by 2040.

3. Provide *specific* language you would like to see changed. Indicate proposed new words with underlining and ~~strikethrough~~ words proposed for deletion. Include the entire code (sub) section or rule subpart that contains your proposed changes.

SECTION R103
CONSTRUCTION DOCUMENTS

Add new text as follows:

R103.2.3 Solar-ready system. The construction documents shall provide details for dedicated roof area, structural design for roof dead and live load, and routing of conduit or pre-wiring from *solar-ready zone* to electrical service panel or plumbing from *solar-ready zone* to *service water heating* system for the *solar-ready zone* shall be represented on the construction documents.

SECTION R105
INSPECTIONS

Revise text as follows:

R105.2.3 Plumbing rough-in inspection. Inspections at plumbing rough-in shall verify compliance as required by the code and approved plans and specifications as to types of insulation and corresponding R-values and protection and required controls. Where the *solar-ready zone* is installed for solar water heating, inspections shall verify pathways for routing of plumbing from *solar-ready zone* to service water heating system.

Add new text as follows:

R105.2.5 Electrical rough-in inspection. Inspections at electrical rough-in shall verify compliance as required by the code and the approved plans and specifications as to the locations, distribution, and capacity of the electrical system. Where the *solar-ready zone* is installed for electricity generation, inspections shall verify conduit or pre-wiring from *solar-ready zone* to electrical panel.

Revise numbering as follows:

~~**R105.2.5**~~ **R105.2.6 Final inspection.**

SECTION R202
GENERAL DEFINITIONS

Add new definition as follows:

SOLAR-READY ZONE. A section or sections of the roof or building overhang designated and reserved for the future installation of a solar photovoltaic or solar thermal system.

SECTION R401
GENERAL

Revise text as follows:

R401.3 Certificate. A permanent certificate shall be completed by the builder or other approved party and posted on a wall in the space where the furnace is located, a utility room or an approved location inside the building. Where located on an electrical panel, the certificate shall not cover or obstruct the visibility of the circuit directory label, service disconnect label or other required labels. The certification shall indicate the following:

8. Where a *solar-ready zone* is provided, the certificate shall indicate the location, dimensions, and capacity reserved on the electrical service panel.

SECTION R404
ELECTRICAL POWER AND LIGHTING SYSTEMS

Add new text as follows:

R404.4 Renewable energy infrastructure. The building shall comply with the requirements of R404.4.1 or R404.4.2

R404.4.1 One- and two- family dwellings and townhouses. One- and two-family dwellings and townhouses shall comply with Sections R404.4.1.1 through R404.4.1.4.

Exceptions:

1. A *building* with a permanently installed on-site renewable energy system.
2. A *building* with a solar-ready zone area that is less than 600 square feet (55 m^2) of roof area oriented between 110 degrees and 270 degrees of true north.
3. A *building* with a *solar-ready zone* area that is shaded for more than 70 percent of daylight hours annually.

R404.4.1.1 Solar-ready zone area. The total area of the *solar-ready zone* shall not be less than 300 square feet (28 m^2) and shall be composed of areas not less than 5.5 feet (1676 mm) in width and not less than 80 square feet (7.4 m^2) exclusive of access or set back areas as required by the International Fire Code.

Exception: Townhouses three stories or less in height above grade plane and with a total floor area less than or equal to 2,000 square feet (186 m^2) per dwelling shall be permitted to have a solar-ready zone area of not less than 150 square feet (14 m^2).

R404.4.1.2 Obstructions. *Solar-ready zones* shall be free from obstructions, including but not limited to vents, chimneys, and roof-mounted equipment.

R404.4.1.3 Electrical service reserved space. The main electrical service panel shall have a reserved space to allow installation of a dual pole circuit breaker for future solar electric installation and shall be labeled "For Future Solar Electric." The reserved space shall be positioned at the opposite (load) end from the input feeder location or main circuit location.

R404.4.1.4 Electrical interconnection. An electrical junction box shall be installed within 24 inches (610 mm) of the main electrical service panel and shall be connected to a capped roof penetration sleeve or a location in the attic that is within 3 feet (914 mm) of the *solar ready zone* by one of the following:

1. Minimum ¾-inch nonflexible conduit
2. Minimum #10 Metal copper 3-wire

Where the interconnection terminates in the attic, location shall be no less than 12" (35 mm) above ceiling insulation. Both ends of the interconnection shall be labeled "For Future Solar Electric".

R404.4.2 Group R occupancies. Buildings in Group R-2, R-3 and R-4 shall comply with Section C405.13.

SECTION R405
TOTAL BUILDING PERFORMANCE

Revise table as follows:

TABLE R405.2 REQUIREMENTS FOR TOTAL BUILDING PERFORMANCE

SECTION	TITLE
Electrical Power and Lighting Systems	
R404.1	Lighting equipment
R404.2	Interior lighting controls

R404.4	Renewable energy infrastructure

The mandatory requirements table has been modified to include the new requirements for renewable energy as mandatory elements of the code amendments.

SECTION R406
ENERGRY RATING INDEX COMPLIANCE ALTERNATIVE

Revise table as follows:

TABLE R406.2 REQUIREMENTS FOR ENERGY RATING INDEX

SECTION	TITLE
Electrical Power and Lighting Systems	
R404.1	Lighting equipment
R404.2	Interior lighting controls
R404.4	Renewable energy infrastructure
R406.3	Building thermal envelope

4. Will this proposed code change impact other sections of a model code book or an amendment in Minnesota Rule? If so, please list the affected sections or rule parts.

   No.

Need and Reason

1. Why is the proposed code change needed? Please provide a general explanation as well as a specific explanation for any changes to numerical values (heights, area, etc.)

   Minnesota's new 2023 climate legislation plans out a goal for a 100% carbon-free electricity standard by 2040. In order to meet this goal, there will need to be a huge increase in renewable energy installation. Having solar ready homes vastly decreases the cost of adding solar to residential buildings. According to a recent study entitled “A New Roadmap for the Lowest Cost Grid”, the least expensive grid involves a large amount of centralized renewables and a large amount of distributed renewables located on the building site. More renewables placed on site enables more clean utility-scale renewables to be deployed efficiently. It is therefore crucial for new residential buildings to be solar-ready so that the U.S. can reach its 100% carbon-free electricity goal by 2035 in the most cost-effective manner. Installing renewables on-site will also allow homeowners to economically benefit from the transition towards a low-carbon economy and benefit from additional resiliency during disruptions in centrally supplied power.

2. Why is the proposed code change a reasonable solution?

   Installing the infrastructure for a future solar installation is a cost-effective way to provide a glidepath to carbon neutrality for homeowners.

3. What other factors should the TAG consider?

   None.

Cost/Benefit Analysis

1. Will the proposed code change increase or decrease costs? Please explain and provide estimates if possible.

Recent analysis by NBI and partners using cost data from RSMeans indicates that adding the infrastructure to make a home solar ready would cost $216 or $0.09 per square foot for a typical home at the time of construction

2. If there is an increased cost, will this cost be offset by a safety or other benefit? Please explain. If the benefit is quantifiable (for example energy savings), provide an estimate if possible.

   Installing solar ready infrastructure during construction will vastly decrease the cost of solar installation later.

3. If there is a cost increase, who will bear the costs? This can include government units, businesses, and individuals.

   Cost will be passed to homeowner and will save cost over retrofit.

4. Are there any enforcement or compliance cost increases or decreases with the proposed code change? Please explain.

   Solar ready infrastructure can be inspected during the regular inspection schedule.

5. Will the cost of complying with the proposed code change in the first year after the rule takes effect exceed $25,000 for any one small business or small city (Minn. Stat. § 14.127)? A small business is any business that has less than 50 full-time employees. A small city is any statutory or home rule charter city that has less than ten full-time employees. Please explain.

   No.

Regulatory Analysis

1. What parties or segments of industry are affected by this proposed code change?

   This proposed code change would require additional electrical work.

2. Can you think of other means or methods to achieve the purpose of the proposed code change? What might someone opposed to this code change suggest instead? Please explain what the alternatives are and why your proposed change is the preferred method or means to achieve the desired result.

   I cannot think of another way to achieve the goals of this proposal.

3. What are the probable costs or consequences of not adopting the code change, including those costs or consequences borne by identifiable categories of affected parties, such as separate classes of government units, businesses, or individuals?

   This proposal will save homeowners the burden of upgrading electrical capcity and installing conduit before adding a photovoltaic solar system.

4. Are you aware of any federal or state regulation or requirement related to this proposed code change? If so, please list the federal or state regulation or requirement and your assessment of any differences between the proposed code change and the federal regulation or requirement.

   No

***Note: Incomplete forms may be returned to the submitter with instruction to complete the form. Only completed forms can considered by the TAG.

DEPARTMENT OF LABOR AND INDUSTRY

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: Ben Rabe

Date:

Email address:

Telephone number:

Model Code: 2012 IECC

Code or Rule Section: Residential Energy Code

Firm/Association affiliation, if any: New Buildings Institute

Code or rule section to be changed: R402.1

Intended for Technical Advisory Group ("TAG"):

General Information	**Yes**	**No**
A. Is the proposed change unique to the State of Minnesota?	☐	☒
B. Is the proposed change required due to climatic conditions of Minnesota?	☐	☒
C. Will the proposed change encourage more uniform enforcement?	☒	☐
D. Will the proposed change remedy a problem?	☐	☐
E. Does the proposal delete a current Minnesota Rule, chapter amendment?	☒	☒
F. Would this proposed change be appropriate through the ICC code development process?	☒	☐

Proposed Language

1. The proposed code change is meant to:

   ☐ change language contained the model code book? If so, list section(s).

   ☐ change language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

   ☐ delete language contained in the model code book? If so, list section(s).

   ☐ delete language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

   ☒ add new language that is not found in the model code book or in Minnesota Rule.

2. Is this proposed code change required by Minnesota Statute? If so, please provide the citation.

   No.

3. Provide *specific* language you would like to see changed. Indicate proposed new words with underlining and ~~strikethrough~~ words proposed for deletion. Include the entire code (sub) section or rule subpart that contains your proposed changes.

Revise as follows: (Portions of table not shown remain unchanged.)

TABLE R402.1.2 (TABLE N1102.1.2) MAXIMUM ASSEMBLY U-FACTORS AND FENESTRATION REQUIREMENTS

CLIMATE ZONE	FENESTRATION *U*-FACTOR[f]	SKYLIGHT*U*-FACTOR	GLAZED FENESTRATION SHGC[d, e]
~~1~~	~~NR~~	~~0.75~~	~~0.25~~
~~2~~	~~0.40~~	~~0.65~~	~~0.25~~
~~3~~	~~0.32~~	~~0.55~~	~~0.25~~
~~4 except Marine~~	~~0.32~~	~~0.55~~	~~0.40~~
~~5 and Marine 4~~	~~0.30~~	~~0.55~~	~~NR~~
6	~~0.30~~ 0.28	~~0.55~~ 0.50	NR
7 ~~and 8~~	~~0.30~~ 0.27	~~0.55~~ 0.50	NR

For SI: 1 foot = 304.8 mm.

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

Revise as follows: (Portions of table not shown remain unchanged.)

TABLE R402.1.3 (TABLE N1102.1.3) INSULATION MINIMUM R-VALUES AND FENESTRATION REQUIREMENTS BYCOMPONENT[a]

CLIMATE ZONE	FENESTRATION *U*-FACTOR[b]	SKYLIGHT*U*-FACTOR[b]	GLAZED FENESTRATION SHGC[b, ~~c~~]
~~1~~	~~NR~~	~~0.75~~	~~0.25~~
~~2~~	~~NR~~	~~0.75~~	~~0.25~~
~~3~~	~~0.40~~	~~0.65~~	~~0.25~~

~~4 except Marine~~	~~0.30~~	~~0.55~~	~~0.40~~
~~5 and Marine 4~~	~~0.30~~[i]	~~0.55~~	~~0.40~~
6	~~0.30~~ 0.28[i]	~~0.55~~ 0.50	NR
7 ~~and 8~~	~~0.30~~ 0.27 [i]	~~0.55~~ 0.50	NR

For SI: 1 foot = 304.8 mm.
NR = Not Required.
ci = continuous insulation.

a.*R*-values are minimums. *U*-factors and SHGC are maximums. Where insulation is installed in a cavity that is less than the label or design thickness of the insulation, the installed *R*-value of the insulation shall be not 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: In Climate Zones 0 through 3, skylights shall be permitted to be excluded from glazed fenestration SHGC requirements provided that the SHGC for such skylights does not exceed ~~0.30~~ 0.28.
c."5ci or 13" means R-5 continuous insulation (ci) on the interior or exterior surface of the wall or R-13 cavity insulation on the interior side of the wall. "10ci or 13" means R-10 continuous insulation (ci) on the interior or exterior surface of the wall or R-13 cavity insulation on the interior side of the wall. "15ci or 19 or 13&5ci" means R-15 continuous insulation (ci) on the interior or exterior surface of the wall; or R-19 cavity insulation on the interior side of the wall; or R-13 cavity insulation on the interior of the wall in addition to R-5 continuous insulation on the interior or exterior surface of the wall.
d.R-5 insulation shall be provided under the full slab area of a heated slab in addition to the required slab edge insulation *R*-value for slabs. as indicated in the table. The slab-edge insulation for heated slabs shall not be required to extend below the slab.
e.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.The first value is cavity insulation; the second value is continuous insulation. Therefore, as an example, "13&5" means R-13 cavity insulation plus R-5 continuous insulation.
h.Mass walls shall be in accordance with Section R402.2.5. The second *R*-value applies where more than half of the insulation is on the interior of the mass wall.
i.A maximum *U*-factor of ~~0.32~~ 0.30 shall apply in Climate Zones 3 through 8 to vertical fenestration products installed in buildings located either:

1. 1.Above 4,000 feet in elevation, or
2. 2.In windborne debris regions where protection of openings is required by Section R301.2.1.2 of the *International Residential Code*.

4. Will this proposed code change impact other sections of a model code book or an amendment in Minnesota Rule? If so, please list the affected sections or rule parts.

   No.

Need and Reason

1. Why is the proposed code change needed? Please provide a general explanation as well as a specific explanation for any changes to numerical values (heights, area, etc.)

   This proposed change to the fenestration U-factor aligns the IECC with the ENERGY STAR Version 6.0 specification. The ENERGY STAR specification for windows in climate zones 5-8 has been in place since January 1, 2016. Products that meet the ENERGY STAR standard are widely available and have been for some time. In 2016 – the first year the ENERGY STAR Version 6.0 specification was in effect for all climate zones – ENERGY STAR windows already had an 83% market share.

   Replacing old windows with ENERGY STAR certified windows lowers household energy bills by an average of 12 percent nationwide. The Environmental Protection Agency performed a cost-effectiveness analysis of Version 6.0 and found it to be cost-effective. That analysis can be found here: http://www.energystar.gov/sites/default/files/ESWDS-ReviewOfCost_EffectivenessAnalysis.pdf EPA notes that manufacturers can meet the proposed specification for climate zones 5-8 using either double- or triple-pane windows. In general, EPA's data show that double-pane windows that meet the northern climate zone specification are cost effective for consumers. Feedback that EPA has received from stakeholders confirms that new glass technologies, improvements in frame performance, and/or better spacer performance can help many product lines meet the proposed Northern Zone criteria with double-pane windows.

2. Why is the proposed code change a reasonable solution?

   The cost of high efficiency window is negligible and saves homeowners in utility costs.

3. What other factors should the TAG consider?

   None

Cost/Benefit Analysis

1. Will the proposed code change increase or decrease costs? Please explain and provide estimates if possible.

   EPA estimates that the current market share of Energy Star version 6 products is very high: 86% for windows, 80% for hinged entry doors, 84% for patio doors, and 72% for skylights. This demonstrates that fenestration meeting the proposed requirements are ubiquitous and will not increase the cost of construction for the vast majority of homeowners. Nonetheless, for the minority of products that do not meet the Energy Star version 6 criteria, there will be a marginal increase in cost. EPA's analysis in 2012-14 of the change to the version 6 criteria "shows that average-cost products offer payback periods of less than 10 years in all but five cities and payback periods of less than seven years in half of the cities for which EPA performed energy savings analysis", and less for lower cost products. As the industry transitions to the Energy Star version 7 requirements, the cost and payback for these version 6 criteria will be even less. Additionally, there would be no increase in construction cost for locations meeting the altitude or windborne debris provisions in footnote f.

2. If there is an increased cost, will this cost be offset by a safety or other benefit? Please explain. If the benefit is quantifiable (for example energy savings), provide an estimate if possible.

   If there is any cost increase it will be recouped quickly in energy savings.

3. If there is a cost increase, who will bear the costs? This can include government units, businesses, and individuals.

   Homeowner will be passed additional cost of high efficiency windows (if any additional cost).

4. Are there any enforcement or compliance cost increases or decreases with the proposed code change? Please explain.

   None, windows will be inspected as usual.

5. Will the cost of complying with the proposed code change in the first year after the rule takes effect exceed $25,000 for any one small business or small city (Minn. Stat. § 14.127)? A small business is any business that has less than 50 full-time employees. A small city is any statutory or home rule charter city that has less than ten full-time employees. Please explain.

   No.

Regulatory Analysis

1. What parties or segments of industry are affected by this proposed code change?

Window manufacturers and installers.

2. Can you think of other means or methods to achieve the purpose of the proposed code change? What might someone opposed to this code change suggest instead? Please explain what the alternatives are and why your proposed change is the preferred method or means to achieve the desired result.

   No.

3. What are the probable costs or consequences of not adopting the code change, including those costs or consequences borne by identifiable categories of affected parties, such as separate classes of government units, businesses, or individuals?

   This proposal will save homeowner in energy costs for a negligible cost increase.

4. Are you aware of any federal or state regulation or requirement related to this proposed code change? If so, please list the federal or state regulation or requirement and your assessment of any differences between the proposed code change and the federal regulation or requirement.

   No.

***Note: Incomplete forms may be returned to the submitter with instruction to complete the form. Only completed forms can considered by the TAG.

DEPARTMENT OF LABOR AND INDUSTRY

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: Jonny Kocher

Email address: jkocher@rmi.org

Telephone number: 510-761-5060

Firm/Association affiliation, if any: RMI

Date: 1/29/24

Model Code: IECC 2021

Code or Rule Section: Res Energy Code

Code or rule section to be changed: R404.4

Intended for Technical Advisory Group ("TAG"): *Residential Energy*

General Information	**Yes**	**No**
A. Is the proposed change unique to the State of Minnesota?	☐	☒
B. Is the proposed change required due to climatic conditions of Minnesota?	☐	☒
C. Will the proposed change encourage more uniform enforcement?	☐	☒
D. Will the proposed change remedy a problem?	☒	☐
E. Does the proposal delete a current Minnesota Rule, chapter amendment?	☐	☒
F. Would this proposed change be appropriate through the ICC code development process?	☒	☐

Proposed Language

1. The proposed code change is meant to:
   ☐ change language contained the model code book? If so, list section(s).
   ☐ change language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).
   ☐ delete language contained in the model code book? If so, list section(s).
   ☐ delete language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).
   ☒ add new language that is not found in the model code book or in Minnesota Rule.

2. Is this proposed code change required by Minnesota Statute? If so, please provide the citation.
   In order to reach Minnesota's climate goals, the State developed the Minnesota Climate Action Framework. Under the Smarter Buildings and Construction initiative, one of the suggested state action steps included: "Develop clear options for building owners and families to make informed environmentally preferable selections for their building materials and products, including appliances such as furnaces, water heaters, and cooktops/ovens."[1] Creating readiness requirements will enable building owners to make these informed selections in the future without it being prohibitively expensive.

[1] https://climate.state.mn.us/sites/climate-action/files/Climate%20Action%20Framework.pdf, page 19

3. Provide *specific* language you would like to see changed. Indicate proposed new words with underlining and ~~strikethrough~~ words proposed for deletion. Include the entire code (sub) section or rule subpart that contains your proposed changes.

R404.4 Electrification-ready circuits. Water heaters, space heating equipment, household clothes dryers, and cooking appliances that use fuel gas or liquid fuel shall comply with Sections R404.5.1 through R404.5.4. Electrical panel shall have spare circuits and be sized to meet the future load required by this section. Each spare circuit shall be labeled with the word "spare." Space shall be reserved in the electrical panel for each reserved circuit for the installation of an overcurrent device. Capacity for the future circuits required in this section shall be included in the load calculations of the original installation. ~~**Electric readiness.** Water heaters, space heaters, household clothes dryers, and cooking appliances that use fuel gas or liquid fuel shall comply with Sections R404.4.1 through R404.4.5.~~

R404.4.1 Cooking appliances. A circuit capable of feeding a future 240-volts, 40-amperes load ~~A dedicated branch circuit outlet with a rating not less than 240-volts, 40-amperes shall be installed and terminate within three feet of conventional cooking tops, conventional ovens or cooking appliances combining both.~~

Exception: Cooking appliances not installed in an individual dwelling unit .

R404.4.2 Household Clothes Dryers. A circuit capable of feeding a future 240-volts, 30-amperes load ~~A dedicated branch circuit with a rating not less than 240-volts, 30-amperes shall be installed and terminate within three feet (304 mm) of each household clothes dryer.~~

Exception: Clothes dryers not installed in an individual dwelling unit.

R404.4.3 Space ~~heaters~~ Heating Equipment. A circuit capable of feeding a future 240-volts, 40-amperes load ~~A dedicated branch circuit with a rating not less than either 240-volts, 30-amperes or 120V, 20-amperes shall be installed and terminate within three feet (304 mm) of each space heater.~~

Exception: Space heaters serving multiple dwelling units in a R-2 occupancy

R404.4.4 Water heaters. A circuit feeding a future 240-volts, 30-amperes load. ~~A dedicated branch circuit with a rating not less than either 240-volts, 30-amperes or 120V, 20-amperes shall be installed and terminate within three feet (304 mm) of each water heater.~~

Exception: Water heaters serving multiple dwelling units in a R-2 occupancy

~~**R404.4.4.1 Water heater space.** An indoor space that is at least three feet by three feet by seven feet high shall be available surrounding or within 3 feet of the installed water heater.~~

~~**Exception:** The water heater space requirement does not need to be met where a heat pump water heater or tankless water heater is installed.~~

~~**R404.4.5 Electrification-ready circuits.** The unused conductors required by Sections R404.4.1 through R404.4.4 shall be labeled with the word "spare." Space shall be reserved in the electrical panel in which the branch circuit originates for the installation of an overcurrent device. Capacity for the circuits required by Sections R404.4.1 through R404.4.4 shall be included in the load calculations of the original installation.~~

TABLE R405.2
REQUIREMENTS FOR SIMULATED BUILDING PERFORMANCE

SECTION	TITLE
R404.4	~~Electric readiness~~Electrification-ready circuits

TABLE R406.2
REQUIREMENTS FOR ENERGY RATING INDEX

SECTION[a]	TITLE
R404.4	~~Electric readiness~~Electrification-ready circuits

4. Will this proposed code change impact other sections of a model code book or an amendment in Minnesota Rule? If so, please list the affected sections or rule parts.
   No

Need and Reason

1. Why is the proposed code change needed? Please provide a general explanation as well as a specific explanation for any changes to numerical values (heights, area, etc.)
   Currently it is very expensive for consumers to switch from furnaces, gas water heaters, gas stoves and gas dryers to their electric alternatives. The expensive cost is one of the primary barriers in the fuel switching needed to reach the state and countries climate goals.

2. Why is the proposed code change a reasonable solution?
   This proposal enhances customer choice by making it easy for homeowners to choose either electric or gas appliances and water heating equipment. By ensuring that a home built with gas or propane can easily accommodate future electric appliances and equipment, this proposal protects homeowners from future costs, should natural gas become less affordable or even unavailable over the life of the building. As the electric grid becomes cleaner, and high-efficiency electric heat pump technology increasingly offers utility bill and pollution reduction benefits over gas, more customers may want to transition from natural gas to electric space and water heating. Federal, state, and local environmental and public health policies may also encourage, or even require the transition in some areas over the life of the building. Electric-ready requirements will protect customers from potential high retrofit costs.

3. What other factors should the TAG consider?
   According to RMI's State Climate Policy scorecard, Minnesota's building sector is not on track to reach a 27% reduction in GHG emissions by 2030 from a 2005 baseline, the emissions target benchmark set during the Paris Climate Agreement.[2] To reach this goal, Minnesota will need to reduce its natural gas usage by 32% from today's levels and move towards selling only all electric appliances by 2030. This policy is fully aligned with reaching that goal.

Cost/Benefit Analysis

1. Will the proposed code change increase or decrease costs? Please explain and provide estimates if possible.
   The cost will increase upfront costs. Sources from the New Buildings Institute, Group14 Engineering and the California Energy Commission estimate that the upfront costs of electric readiness ranges between $500 to $1,010.[3,4,5] Because this proposal only requires electrification of the panel, the esimtated cost is around $0 to $440.

[2] RMI State Score Card, 2022, https://statescorecard.rmi.org/mn
[3] NBI, Cost of Decarbonization Code, 2022, page 26
https://newbuildings.org/wp-content/uploads/2022/04/BuildingDecarbCostStudy.pdf
[4] California Energy Commission, 2022, page 2-3
https://efiling.energy.ca.gov/GetDocument.aspx?tn=238049&DocumentContentId=71300
[5] Group 14, 2020, page 12
https://www.communityenergyinc.com/wp-content/uploads/Building-Electrification-Study-Group14-2020-11.09.pdf

2. If there is an increased cost, will this cost be offset by a safety or other benefit? Please explain. If the benefit is quantifiable (for example energy savings), provide an estimate if possible.
   The cost of meeting these electric-ready requirements when the house is being built, walls are open, and the trades are already on-site, is marginal. In comparison, the cost of retrofitting a building for these requirements can be an order of magnitude higher and act as a barrier for the homeowner to choose electric appliances.

   An electrification engineering study by Group 14 reports that the electrical modifications needed to install a HP heating system and a HPWH is $2,100 as a retrofit compared to $500 as an original install for a 3,000 sq ft single family home. The California Energy Commission cost study found that the retrofit cost to add electrical infrastructure for water heating, space heating, dryers and cooking appliances after construction is at least $2,560 (likely higher), compared to the upfront cost of around $1,010 to do it during construction. These studies indicate that it is about 3-4 times less expensive to do this work during construction. Not making new buildings electric-ready would leave homeowners exposed to potentially high retrofit costs in the future and will greatly inhibit customer choice.

3. If there is a cost increase, who will bear the costs? This can include government units, businesses, and individuals.
   Construction contractors and developers will bear most of the costs. The substantial cost savings for reduced costs of future retrofits will benefit homeowners.

4. Are there any enforcement or compliance cost increases or decreases with the proposed code change? Please explain.
   There will be a negligible impact in inspection and enforcement cost when code inspectors ensure this portion of the code is complied with.

5. Will the cost of complying with the proposed code change in the first year after the rule takes effect exceed $25,000 for any one small business or small city (Minn. Stat. § 14.127)? A small business is any business that has less than 50 full-time employees. A small city is any statutory or home rule charter city that has less than ten full-time employees. Please explain.
   No. This will not impact businesses or cities. This is a residential code proposal.

Regulatory Analysis

1. What parties or segments of industry are affected by this proposed code change?
   Electrical contractors will have slightly more work because of this proposal

2. Can you think of other means or methods to achieve the purpose of the proposed code change? What might someone opposed to this code change suggest instead? Please explain what the alternatives are and why your proposed change is the preferred method or means to achieve the desired result.
   This is the only feasible option to cost effectively prepare homes for future electrification required to reach the state's climate action goals. The main argument will be around the upfront cost, which I have already addressed by showing that this will save thousands of dollars of future retrofit costs.

3. What are the probable costs or consequences of not adopting the code change, including those costs or consequences borne by identifiable categories of affected parties, such as separate classes of government units, businesses, or individuals?
   If we continue to build with fossil fuels in new buildings without preparing for the future energy transition, we will simply not meet our climate goals, which is unthinkable.

4. Are you aware of any federal or state regulation or requirement related to this proposed code change? If so, please list the federal or state regulation or requirement and your assessment of any differences between the proposed code change and the federal regulation or requirement.

The Inflation Reduction Act currently has many incentives and tax credits for installing new clean energy technologies. By preparing for electric ready homes, consumers whose appliances break between now and 2031 will be able to easily take advantage of these tax credits. Ideally, future administrations will continue to extend these incentives and tax credits.

***Note: Incomplete forms may be returned to the submitter with instruction to complete the form. Only completed forms can considered by the TAG.

DEPARTMENT OF LABOR AND INDUSTRY

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: Jonny Kocher

Date: 8/29/23

Email address:

Model Code: IECC 2021

Telephone number:

Code or Rule Section: Res Energy Code

Firm/Association affiliation, if any: RMI

Code or rule section to be changed: R408

Intended for Technical Advisory Group ("TAG"): *Residential Energy*

General Information	**Yes**	**No**
A. Is the proposed change unique to the State of Minnesota?	☐	☒
B. Is the proposed change required due to climatic conditions of Minnesota?	☐	☒
C. Will the proposed change encourage more uniform enforcement?	☐	☒
D. Will the proposed change remedy a problem?	☒	☐
E. Does the proposal delete a current Minnesota Rule, chapter amendment?	☐	☒
F. Would this proposed change be appropriate through the ICC code development process?	☒	☐

Proposed Language

1. The proposed code change is meant to:
   ☐ change language contained the model code book? If so, list section(s).
   ☐ change language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).
   ☐ delete language contained in the model code book? If so, list section(s).
   ☐ delete language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).
   ☒ add new language that is not found in the model code book or in Minnesota Rule.

2. Is this proposed code change required by Minnesota Statute? If so, please provide the citation.
   In order to reach Minnesota's climate goals, the State developed the Minnesota Climate Action Framework. Under the Smarter Buildings and Construction initiative, one of the suggested state action steps included: "Continue the uniform statewide energy code adoption process, evaluating and adopting national model energy codes to ensure aggressive energy savings and address energy code enforcement."[1] Adopting this proposal will help achieve this.

[1] https://climate.state.mn.us/sites/climate-action/files/Climate%20Action%20Framework.pdf, page 19

3. Provide *specific* language you would like to see changed. Indicate proposed new words with underlining and ~~strikethrough~~ words proposed for deletion. Include the entire code (sub) section or rule subpart that contains your proposed changes.

SECTION R408

ADDITIONAL EFFICIENCY REQUIREMENTS ~~PACKAGE OPTIONS~~

R408.1 Scope. This section establishes additional efficiency requirements ~~package options~~ to achieve additional energy efficiency in accordance with Section R401.2.~~5~~1. *Buildings* shall comply with either Section R408.2 or Section R408.3

R408.2. Heat pump equipment. Buildings shall comply with the following:

1. Heating and cooling equipment shall be electric heat pump equipment that meet the following requirements for cold climate heat pumps:
    1.1. COP at 5°F (-15°C) ≥ 1.75
    1.2 Percent of heating capacity at 5°F (-15°C) ≥ 70% of that at 47°F (8.34°C)

R408.3~~2~~ Additional energy efficiency credit requirements ~~package options~~. Additional efficiency ~~package options for compliance with Section R401.2.1 are set forth in Sections R408.2.1 through R408.2.5.~~ measures shall be selected from Table R408.3 that meet or exceed a total of 15 credits. Five additional credits shall be selected for dwelling units with greater than 5,000 square feet (465 m2) of living space floor area located above grade plane. Each measure selected shall meet the relevant subsections of Section R408 and receive credit as specified in Table R408.3 for the specific Climate Zone. Interpolation of credits between measures shall not be permitted.

Add new text as follows:

TABLE R408.3
CREDITS FOR ADDITIONAL ENERGY EFFICIENCY

Measure Number	Measure Description	Credit Value	
		CZ 6	CZ 7
R408.3.1.1 (1)	≥ 2.5% reduction in total UA	1	1
R408.2.1.1 (2)	≥ 5% reduction in total UA	3	3
R408.3.1.1 (3)	> 7.5% reduction in total UA	3	4
R408.3.1.2	0.22 U-factor windows	4	4
R408.3.2 (1)	High performance cooling system option 1	1	1
R408.3.2 (2)	High performance cooling system option 2	1	1
R408.3.2 (3)	High performance gas furnace option 1	8	8
R408.3.2(4)	High performance gas furnace option 2	7	7
R408.3.2(5)	High performance heat pump system option 1	29	25
R408.3.2 (6)	High performance heat pump	30	26

	system option 2		
R408.3.2 (7)	Ground source heat pump	30	26
R408.3.3 (1)	Fossil fuel service water heating system	2	2
R408.3.3 (2)	High performance heat pump water heating system option 1	5	5
R408.3.3 (3)	High performance heat pump water heating system option 2	5	5
R408.3.3 (~~3~~)4	Solar hot water heating system	5	5
R408.3.3 (5)	Compact hot water distribution	2	2
R408.3.4 (1)	More efficient distribution system	13	15
R408.3.4 (2)	Reduced total duct leakage	2	2
R408.3.5 (1)	2 ACH50 air leakage rate with ERV or HRV installed	15	8
R408.3.5 (2)	2 ACH50 air leakage rate with balanced ventilation	6	6
R408.3.5 (3)	1.5 ACH50 air leakage rate with ERV or HRV installed	18	11
R408.3.5 (4)	1 ACH50 air leakage rate with ERV or HRV installed	21	14
R408.3.6	Energy Efficient Appliances	4	5

Revise as follows:

R408.3~~2~~.1 Enhanced envelope ~~performance~~ options. ~~The total building thermal envelope UA, the sum of U-factor times assembly area, shall be less than or equal to 95 percent of the total UA resulting from multiplying the U-factors in Table R402.1.2 by the same assembly area as in the proposed building. The UA calculation shall be performed in accordance with Section R402.1.5. The area-weighted average SHGC of all glazed fenestration shall be less than or equal to 95 percent of the maximum glazed fenestration SHGC in Table R402.1.2.~~ The building thermal envelope shall meet the requirements of Section R408.3.1.1 or R408.3.1.2.

Add new text as follows:

R408.3.1.1 Enhanced envelope performance UA. The proposed total building thermal envelope UA shall be calculated in accordance with Section R402.1.5 and shall meet one of the following:

1. Not less than 2.5 percent of the total UA of the building thermal envelope.

2. Not less than 5 percent of the total UA of the building thermal envelope.

3. Not less than 7.5 percent of the total UA of the building thermal envelope.

R408.3.1.2 Improved fenestration. Vertical fenestration shall meet a U-factor equal to or less than 0.22.

Revise as follows:

R408.3~~2~~.2 More efficient HVAC equipment performance options. Heating and cooling *equipment* shall meet one of the following efficiencies:

Options:

1. Greater than or equal to ~~95 AFUE natural gas furnace and 16 SEER~~ 16.9 SEER2 and 13.4 EER2 air conditioner.

2. Greater than or equal to 15.2 SEER2 and 10 EER2 air conditioner.

3. Greater than or equal to 96 AFUE natural gas furnace.

4. Greater than or equal to 92 AFUE natural gas furnace.

~~2.~~ 5. Greater than or equal to ~~10 HSPF~~ 8.5 HSPF2/~~16 SEER~~ 16.9 SEER2 air source heat pump.

6. Greater than or equal to 8.1 HSPF2/16 SEER2 air source heat pump.

~~3.~~ 7. Greater than or equal to 3.5 COP ground source heat pump

For multiple cooling systems, all systems shall meet or exceed the minimum efficiency requirements in this section and shall be sized to serve 100 percent of the cooling design load. For multiple heating systems, all systems shall meet or exceed the minimum efficiency requirements in this section and shall be sized to serve 100 percent of the heating design load. In Climate Zone 5A, air-source heat pumps shall meet the following requirements for cold climate heat pumps:

1. COP at 5°F (-15°C) ≥ 1.75
2. Percent of heating capacity at 5°F (-15°C) ≥ 70% of that at 47°F (8.34°C)

R408.3~~2~~.3 Reduced energy use in service water-heating options. The hot water system shall meet one of the following efficiencies:

1. Greater than or equal to 0.82 EF fossil fuel service water-heating system.

2. Greater than or equal to 2.~~0~~9 UEF electric service water-heating system.

3. Greater than or equal to 3.2 UEF electric service water-heating system.

~~3.~~ 4. Greater than or equal to 0.4 solar fraction solar water-heating system.

5. Compact hot water distribution. For Compact Hot Water Distribution system credit, the volume shall store not more than 16 ounces of water in the nearest source of heated water and the termination of the fixture supply pipe when calculated using section R408.3.3.1 and documented in compliance with Section R408.3.3.2.

R408.3.3.1 Water volume determination. The water volume in the piping shall be calculated in accordance with this section. Water heaters, circulating water systems and heat trace temperature maintenance systems shall be considered to be sources of heated water. The volume shall be the sum of the internal volumes of pipe, fittings, valves, meters and manifolds between the nearest source of heated water and the termination of the fixture supply pipe. The volume in the piping shall be determined from Table R408.3.3.1. The volume contained within fixture shutoff valves, within flexible water supply connectors to a fixture fitting and within a fixture fitting shall not be included in the water volume determination. Where heated water is supplied by a recirculating system or heat-traced piping, the volume shall include the portion of the fitting on the branch pipe that supplies water to the fixture.

TABLE R408.3.3.1
INTERNAL VOLUME OF VARIOUS WATER DISTRIBUTION TUBING

OUNCES OF WATER PER FOOT OF TUBE

NOMINAL SIZE (inches)	COPPER TYPE M	COPPER TYPE L	COPPER TYPE K	CPVC CTS SDR 11	CPVC SCH 40	CPVC SCH 80	PE- RT SDR 9	COMPOSITE ASTM F1281	PEX CTS SDR 9
3/8	1.06	0.97	0.84	N/A	1.17	-	0.64	0.63	0.64
1/2	1.69	1.55	1.45	1.25	1.89	1.46	1.18	1.31	1.18
3/4	3.43	3.22	2.90	2.67	3.38	2.74	2.35	3.39	2.35
1	5.81	5.49	5.19	4.43	5.53	4.57	3.91	5.56	3.91
1 1/4	8.70	8.36	8.09	6.61	9.66	8.24	5.81	8.49	5.81
1 1/2	12.18	11.83	11.45	9.22	13.20	11.38	8.09	13.88	8.09
2	21.08	20.58	20.04	15.79	21.88	19.11	13.86	21.48	13.86

For SI: 1 foot = 304.8 mm, 1 inch = 25.4 mm, 1 liquid ounce = 0.030L, 1 oz/ft^2 = 305.15 g/m^2.

N/A = Not available

R408.3.3.2 Water volume documentation. Where compliance with Section R408.3.3(5) is required, construction documentation or final field inspection shall verify that the compact hot water distribution system meets the prescribed limit in Section R408.3.3(5) with one of the following:

1. Referencing ounces of water per foot of tube on plans as per Table R408.3.3.1.

2. Referencing ounces of water per foot of tube installed as per Table R408.3.3.1.

3. In accordance with Department of Energy's Zero Energy Ready Home National Specification (Rev. 07 or higher) footnote on Hot water delivery systems.

R408.3~~2~~.4 More efficient duct thermal distribution system option. The thermal distribution system shall meet one of the following efficiencies:

~~1. 100 percent of ducts and air handlers located entirely within the building thermal envelope~~.

~~2.~~ 1. 100 percent of ductless thermal distribution system or hydronic thermal distribution system located completely inside the *building thermal envelope*.

~~3. 100 percent of duct thermal distribution system located in conditioned space as defined by Section R403.3.2.~~

2. When ducts are located outside conditioned space, the total leakage of the ducts, measured in accordance with R403.3.5, shall be in accordance with one of the following:

3.1. Where the air handler is installed at the time of testing, 2.0 cubic feet per minute (0.94 L/s) per 100 square feet (9.29 m) of *conditioned floor area*.

3.2 Where the air handler is not installed at the time of testing, 1.75 cubic feet per minute (0.83 L/s) per 100 square feet (9.29 m) of *conditioned floor area*.

R408.3~~2~~.5 Improved air sealing and efficient ventilation system option. ~~The measured air leakage rate shall be less than or equal to 3.0 ACH50, with either an Energy Recovery Ventilator (ERV) or Heat Recovery Ventilator (HRV) installed. Minimum HRV and ERV requirements, measured at the lowest tested net supply airflow, shall be greater than or equal to 75 percent Sensible Recovery Efficiency (SRE), less than or equal to 1.1 cubic feet per minute per watt (0.03 m /min/watt) and shall not use recirculation as a defrost strategy. In addition, the ERV shall be greater than or equal to 50 percent Latent Recovery/Moisture Transfer (LRMT).~~ The measured air leakage rate shall be one of the following:

1. Less than or equal to 2.0 ACH50, with either an Energy Recovery Ventilator (ERV) or Heat Recovery Ventilator (HRV) installed.

2. Less than or equal to 2.0 ACH50, with balanced ventilation as defined in Section 202 of the 2021 *International Mechanical Code*.

3. Less than or equal to 1.5 ACH50, with either an ERV or HRV installed.

4. Less than or equal to 1.0 ACH50, with either an ERV or HRV installed.

Minimum HRV and ERV requirements, measured at the lowest tested net supply airflow, shall be greater than or equal to 75 percent Sensible Recovery Efficiency (SRE), less than or equal to 1.1 cubic feet per minute per watt (0.03 m3/min/watt) and shall not use recirculation as a defrost strategy. In addition, the ERV shall be greater than or equal to 50 percent Latent Recovery/ Moisture Transfer (LRMT).

Add new text as follows:

R408.3.6 Energy efficient appliances. Appliances installed in a dwelling unit shall meet the product energy efficiency specifications listed in Table R408.3.6, or equivalent energy efficiency specifications. The three appliance types from Table R408.3.6 shall be installed for compliance with this section.

TABLE R408.3.6 MINIMUM EFFICIENCY REQUIREMENTS: APPLIANCES

Appliance	Efficiency Improvement	Test Procedure
Refrigerator	Maximum Annual Energy Consumption (AEC) No greater than 620 kWh/yr	10 CFR 430, Subpart B, Appendix A
Dishwasher	Maximum Annual Energy Consumption (AEC) No greater than 270 kWh/yr	10 CFR 430, Subpart B, Appendix C1
Clothes Washer and Clothes Dryer	Maximum Annual Energy Consumption (AEC) for Clothes Washer[a] No greater than 130 kWh/yr Integrated Modified	10 CFR 430 Subpart B, Appendix J2 and 10 CFR 430, Subpart B, Appendices D1 and D2

	Energy Factor (IMEF) > 1.84 cu.ft/kWh/cycle	

a. Credit for Clothes Washer and Clothes Dryer pair is based on Clothes Washer efficiency

4. Will this proposed code change impact other sections of a model code book or an amendment in Minnesota Rule? If so, please list the affected sections or rule parts.
   No

Need and Reason

1. Why is the proposed code change needed? Please provide a general explanation as well as a specific explanation for any changes to numerical values (heights, area, etc.)
   According to RMI's State Climate Policy scorecard, Minnesota's building sector is not on track to reach a 27% reduction in GHG emissions by 2030 from a 2005 baseline, the emissions target benchmark set during the Paris Climate Agreement.[2] To reach this goal, Minnesota will need to reduce its natural gas usage by 32% from today's levels and move towards selling only all electric appliances by 2030. This policy is fully aligned with reaching that goal.

2. Why is the proposed code change a reasonable solution?

   This proposal builds on the additional efficiency options in the 2021 IECC by converting those package options into a points-based system similar to the "Additional Efficiency Credits" system in C406 of the commercial section of the energy code.[3] The proposal requires projects to select additional efficiency "credits"equal to achieve a target of 15. There are several options provided, covering all aspects of building performance. The Northwest pioneered the use of the prescriptive residential options that are currently in place in Washington, and formerly were used in Oregon, and found them to be an effective method of increasing efficiency for residential construction using the prescriptive approach. Additionally Illinois is expected to adopt a similar proposal later this year, although with nearly double the required energy efficiency credits. This proposal does not require performance energy modeling or HERS verification which will increase its usefulness. This type of flex points option can also be easily implemented in the U.S. DOE REScheck software. The purpose of this code change proposal is to improve overall residential building efficiency (heating, cooling and water heating energy) by roughly 15% and to create a scalable, flexible means of improving residential building efficiency for future IECC updates. Instead of requiring efficiency improvements to specific building components that are not equal, the new "credit" approach in Section R408 provides a multitude of options for builders that are calibrated to achieve the efficiency requirements of the IECC. Points-based approaches have been used for several years in Washington and Oregon. This proposal is similar to the Flex Points proposal for the 2021 IECC in overall structure, but the points table has been updated based on the updates included in the 2021 IECC and feedback received. Like the previous version, this proposal also includes alternative compliance pathways for builders who select the simulated performance alternative or the Energy Rating Index (ERI) and will bring roughly equivalent improvements to all three compliance paths.

   This additional efficiency credit proposal is cost-effective, since it includes a number of options to achieve 15 points that are cost-effective and will provide three distinct benefits for jurisdictions adopting the 2021 IECC:

   1. This proposal meets a clear need for efficiency improvements in the model energy code now and in the future. Although the 2021 IECC was determined to be roughly 9% more efficient than the 2018 IECC (PNNL 2021), major gains have plateaued. Buildings still consume an estimated 42% of the nation's energy, 54% of its natural gas, and 71% of

[2] RMI State Score Card, 2022, https://statescorecard.rmi.org/mn
[3] Reasoning and Cost Analysis were used from original IECC code proposal, https://energy.cdpaccess.com/live/proposal/436/html/

its electricity. Governors, legislators, and mayors are increasingly turning to building energy codes to meet energy and climate goals, and those codes should continue to provide reasonable improvements going forward. The U.S. Conference of Mayors, in its fourth consecutive resolution on the subject, reiterated their "concerted support for putting future triennial IECC updates on a "glide path" of steady efficiency gains that will improve the efficiency performance of millions of U.S. residential, multi- family, and commercial buildings."[4] Several jurisdictions have already created or are in the process of creating package-based compliance paths or improved code provisions to meet their policy needs. The result is improved efficiency, but a lack of consistency in both format and requirements. Incorporating Flex Points into the Minnesota code will not only provide a 15% boost in energy conservation but will also provide a realistic map for additional improvements going forward. And, by providing more uniform targets for the efficiency of building components, this proposal will contribute to economies of scale, potentially lowering prices for builders and ultimately consumers.

2. This proposal will provide maximum flexibility for builders to achieve improved efficiency. Additional efficiency credits trusts that builders and design professionals will select the most cost-effective and sensible efficiency improvements for a given project. There are several alternatives for compliance in each climate zone, along with options to comply in a performance- or rating-based path. There are alternatives related to more insulation, more efficient windows, reduced air and duct leakage and improved equipment. This approach provides the right incentives for builders to make long-lasting improvements in residential buildings that are in the best interests of homeowners. The credit values were calculated based on the present value of energy cost savings over the 2018 IECC (including relevant federal equipment efficiency standards) and would need to be updated; these values are provided here for reference and reflect the estimated useful life of each measure over an assumed 30-year life of the building. While a 30-year period is consistent with the typical life of a mortgage, it is a very conservative period given the likelihood that some measures will provide efficiency benefits for decades beyond the initial 30-year period. The analysis behind the 2021 IECC proposal, used the methodology and assumptions included in the U.S. Department of Energy's Methodology for Evaluating Cost-Effectiveness of Residential Energy Code Changes, including the economic equations to obtain the present value of energy costs within the calculation methodology.[5] The energy consumption calculations take into consideration heating, cooling, and water heating energy, using DOE-2 energy simulation across 105 TMY3 weather locations and 12 building types to account for varying stories, foundations, and fuel types for each of the baseline and upgrade measures. The analysis compares the annual energy savings between a home with and without an efficiency measure over the useful life of the efficiency measure using useful life data from NAHB and other sources. Energy costs were calculated using the most recent national EIA projections for natural gas and electricity.

3. This proposal will encourage efficiency improvements in building components that are currently difficult to regulate. Additional efficiency credits addresses two issues that have complicated model energy codes for many years. First, innovative building practices or emerging technologies can benefit from being listed in codes, but states (and national code developing organizations) are reluctant to require new technologies or practices before they are market-tested. As a result, there are high barriers to entry for new technologies, even when they could transform the marketplace and provide energy- or cost-saving benefits for homeowners. As an example, Heat Recovery Ventilators (HRVs

[4] Salcido et al; *Energy Savings Analysis: 2021 IECC for Residential Buildings;* PNNL 2021; available at *Uniting Cities to Accelerate Focus on the Economic and Climate Benefits of Boosting America's Building Energy Efficiency*, 2019 U.S.C.M. Resolution 86 (June 11, 2018), *available at* https://www.usmayors.org/the-conference/resolutions/?category=c9211&meeting=86th%20Annual%20Meeting.

[5] https://www.energycodes.gov/sites/default/files/2021-07/2021IECC_CostEffectiveness_Final_Residential.pdf

) are cost-effective and reasonable for much of the country, but individual circumstances or climate conditions may favor another approach. Rather than require HRVs in every case, or most cases with exceptions, HRVs and Energy Recovery Ventilators are included as one of several options available to builders. Not only will credits create an opportunity for good technology to be used in more buildings, but it will open the door for market forces to make these technologies more widely available (and presumably less expensive). As new technologies or practices become available, these advances can be quickly and easily added into the credit table, fast-tracking technology that is good for consumers. Second, much of the heating, cooling, and water heating equipment installed in residential buildings is subject to federal preemption under the Energy Policy & Conservation Act. As has been debated at length in ICC Code Development hearings over the last 15 years, including equipment efficiencies in performance trade-offs tends to weaken the efficiency of the energy code, since the federal minimum efficiency for nearly every covered product is well below the efficiency levels of commonly installed products. When these efficiency levels are used in trade-off baselines, builders use the improved efficiency of common heating, cooling, and water heating products as a means of trading away efficiency of more permanent building components and features, even though the equipment would have been installed anyway. This "free ridership" may provide short-term cost savings for homebuilders, but it saddles homeowners with unexpected high energy costs over the entire useful life of the building. Moreover, this equipment often carries a much shorter useful life, which is not typically captured in code compliance simulations. This credit structure creates a new incentive to improve the efficiency of covered products without resulting in efficiency rollbacks elsewhere in the code. Heating, cooling, and water heating improvements (among others) are included among the Flex Points options with points calculated according to climate-specific energy cost savings and the longevity of the equipment. Each of these upgrades will build upon the current IECC efficiency, rather than trading it away.

In sum, this proposal will improve efficiency by roughly 15% while unlocking the competitive market for new technologies or building components that are difficult to regulate – all without rolling back the effectiveness or efficiency of the IECC.

3. What other factors should the TAG consider?
   Relevant factors were discussed above.

Cost/Benefit Analysis

1. Will the proposed code change increase or decrease costs? Please explain and provide estimates if possible.
   The code change proposal will increase the cost of construction. Very difficult to estimate the exact cost amount because of the highly flexible and integrative nature of the proposal.

2. If there is an increased cost, will this cost be offset by a safety or other benefit? Please explain. If the benefit is quantifiable (for example energy savings), provide an estimate if possible.
   Requiring additional efficiency measures, such as more insulation, more efficient windows, reduced air leakage and duct leakage, and/or more efficient equipment, to save 15% energy will increase the cost of construction, but the resulting energy and cost savings will recoup the initial costs and will continue to benefit consumers over the useful life of the home. Additionally, the flexibility of this approach allows for the most cost-effective means of meeting the stated ICC energy reduction goals.

3. If there is a cost increase, who will bear the costs? This can include government units, businesses, and individuals.

Construction contractors and developers will bear most of the costs. The cost savings for reduced utility bills will benefit homeowners.

4. Are there any enforcement or compliance cost increases or decreases with the proposed code change? Please explain.
   There will be a negligible impact in inspection and enforcement cost when code inspectors ensure this portion of the code is complied with.

5. Will the cost of complying with the proposed code change in the first year after the rule takes effect exceed $25,000 for any one small business or small city (Minn. Stat. § 14.127)? A small business is any business that has less than 50 full-time employees. A small city is any statutory or home rule charter city that has less than ten full-time employees. Please explain.
   No. This will not impact businesses or cities. This is a residential code proposal.

Regulatory Analysis

1. What parties or segments of industry are affected by this proposed code change?
   Contractors will have more work to do because of this proposal.

2. Can you think of other means or methods to achieve the purpose of the proposed code change? What might someone opposed to this code change suggest instead? Please explain what the alternatives are and why your proposed change is the preferred method or means to achieve the desired result.
   The other way to push for increased energy efficiency would be to move these requirements to the prescriptive portion of the code. This will reduce flexibility and increase cost further.

   The main argument will be around the upfront cost. This upfront cost should be recovered by homeowners who will see reduced utility bills and more resilient homes.

3. What are the probable costs or consequences of not adopting the code change, including those costs or consequences borne by identifiable categories of affected parties, such as separate classes of government units, businesses, or individuals?
   Increased utility bills, less resilient homes and more carbon and other air pollution.

4. Are you aware of any federal or state regulation or requirement related to this proposed code change? If so, please list the federal or state regulation or requirement and your assessment of any differences between the proposed code change and the federal regulation or requirement.
   None that I am aware of.

***Note: Incomplete forms may be returned to the submitter with instruction to complete the form. Only completed forms can considered by the TAG.

DEPARTMENT OF LABOR AND INDUSTRY

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: Gregory Metz

Email address: Greg.Metz@State.MN.US

Telephone number:

Firm/Association affiliation, if any: DLI/CCLD

Date: September 1, 2023

Model Code: 2021 IECC

Code or Rule Section: R202 Definitions

Code or rule section to be changed: R202 Definitions

Intended for Technical Advisory Group ("TAG"): MR 1322 Residential Energy Code

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General Information	**Yes**	**No**
A. Is the proposed change unique to the State of Minnesota?	☐	☒
B. Is the proposed change required due to climatic conditions of Minnesota?	☐	☒
C. Will the proposed change encourage more uniform enforcement?	☒	☐
D. Will the proposed change remedy a problem?	☒	☐
E. Does the proposal delete a current Minnesota Rule, chapter amendment?	☐	☒
F. Would this proposed change be appropriate through the ICC code development process?	☐	☒

Proposed Language

1. The proposed code change is meant to:

   ☒ change language contained the model code book? If so, list section(s).
   R202 Definitions

   ☐ change language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

   ☐ delete language contained in the model code book? If so, list section(s).

   ☐ delete language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

   ☐ add new language that is not found in the model code book or in Minnesota Rule.

2. Is this proposed code change required by Minnesota Statute? If so, please provide the citation.

3. Provide *specific* language you would like to see changed. Indicate proposed new words with underlining and ~~strikethrough~~ words proposed for deletion. Include the entire code (sub) section or rule subpart that contains your proposed changes.

R202 Definitions

Exhaust. The mechanical process of removing air from a space and discharging it to what is defined as outside.

Energy Recovery Ventilation System (ERV). Systems that employ air-to-air heat exchangers to recover energy from or reject energy to exhaust air for the purposes of preheating, precooling, humidifying or dehumidifying outdoor ventilation air prior to supplying the air to a space, either directly or as a part of the HVAC system. (from MR 1346)

Heat Recovery Ventilation System (HRV). Systems that employ air-to-air heat exchangers to recover energy from or reject energy to exhaust air for the purposes of preheating or precooling outdoor ventilation air without the transfer of latent moisture, prior to supplying the air to a space, either directly or as a part of the HVAC system.

Outside. Beyond the building atmospheric enclosure and completely open to the natural atmosphere.

Residential Building. For this code, includes ~~detached one- and two-family dwellings and multiple single family dwellings (townhouses)~~ IRC-1, IRC-2, IRC-3, IRC-4 and Group R-2, R-3, and R-4 buildings three stories or less in height above grade plane.

Service Water Heating. Heating water for domestic purposes other than space heating. (modified from ASHRAE 90.1)

Ventilation. The natural or mechanical process of supplying conditioned or unconditioned ventilation air to, or removing such air from, any space.

Ventilation Air. That portion of supply air that comes from what is defined as outside (outdoors) plus any recirculated air that has been treated to maintain the desired quality of air within a designated space.

4. Will this proposed code change impact other sections of a model code book or an amendment in Minnesota Rule? If so, please list the affected sections or rule parts.

Need and Reason

1. Why is the proposed code change needed? Please provide a general explanation as well as a specific explanation for any changes to numerical values (heights, area, etc.)

   Definitions need to be modified to clarify requirements specific to Minnesota rules.

2. Why is the proposed code change a reasonable solution?
   The revised definitions clarify commonly understood interpretations that have been problematic in the past but have been unclear and led to inconsistency among a variety of applications.

3. What other factors should the TAG consider?

Definition of Exhaust means that exhaust is no longer simply recirculating air into a room after passing through a filter.

ERV and HRV are added from other model code definitions to this location for clarification.

Outside clarifies that it means beyond the building atmospheric enclosure and not simply from one space to another within the building atmospheric enclosure.

Residential building is specific to Minnesota Rule 1300 definitions and will help to clarify that IRC-4 buildings are governed by this code.

Ventilation and ventilation air are defined to ensure that outdoor air is included where required to all spaces.

Cost/Benefit Analysis

1. Will the proposed code change increase or decrease costs? Please explain and provide estimates if possible.

   No change to cost. The definitions are clarifications of items already generally interpreted this way.

2. If there is an increased cost, will this cost be offset by a safety or other benefit? Please explain. If the benefit is quantifiable (for example energy savings), provide an estimate if possible.
   N/A

3. If there is a cost increase, who will bear the costs? This can include government units, businesses, and individuals.
   N/A

4. Are there any enforcement or compliance cost increases or decreases with the proposed code change? Please explain.
   No

5. Will the cost of complying with the proposed code change in the first year after the rule takes effect exceed $25,000 for any one small business or small city (Minn. Stat. § 14.127)? A small business is any business that has less than 50 full-time employees. A small city is any statutory or home rule charter city that has less than ten full-time employees. Please explain.
   N/A

Regulatory Analysis

1. What parties or segments of industry are affected by this proposed code change?

   Architects, engineers, developers, builders, construction contractors, building owners, building inspectors.

2. Can you think of other means or methods to achieve the purpose of the proposed code change? What might someone opposed to this code change suggest instead? Please explain what the alternatives are and why your proposed change is the preferred method or means to achieve the desired result.

There are not other means to achieve the purpose of the proposed change. An opponent to the change would argue preference for broader interpretation allowing for confusion of interpretations and potentially not meeting the intent and purpose of the code in order to save on construction costs.

3. What are the probable costs or consequences of not adopting the code change, including those costs or consequences borne by identifiable categories of affected parties, such as separate classes of government units, businesses, or individuals?

   Consequences will be non-uniform application of the code, confusion, and potential degradation of building durability.

4. Are you aware of any federal or state regulation or requirement related to this proposed code change? If so, please list the federal or state regulation or requirement and your assessment of any differences between the proposed code change and the federal regulation or requirement.

   No.

***Note: Incomplete forms may be returned to the submitter with instruction to complete the form. Only completed forms can considered by the TAG.

DEPARTMENT OF LABOR AND INDUSTRY

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: Steve Shold

Date: 9/8/2023

Email address: steve.shold@state.mn.us

Model Code: 2021 IECC-R

Telephone number:

Code or Rule Section: R402.2.4

Firm/Association affiliation, if any: Dept of Labor & Industry

Code or rule section to be changed: R402.2.4

Intended for Technical Advisory Group ("TAG"):

General Information	**Yes**	**No**
A. Is the proposed change unique to the State of Minnesota?	☐	☒
B. Is the proposed change required due to climatic conditions of Minnesota?	☐	☒
C. Will the proposed change encourage more uniform enforcement?	☒	☐
D. Will the proposed change remedy a problem?	☒	☐
E. Does the proposal delete a current Minnesota Rule, chapter amendment?	☐	☒
F. Would this proposed change be appropriate through the ICC code development process?	☒	☐

Proposed Language

1. The proposed code change is meant to:

☐ change language contained the model code book? If so, list section(s).

☐ change language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

☒ delete language contained in the model code book? If so, list section(s).
R402.2.4 Exception #2.

☐ delete language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

☐ add new language that is not found in the model code book or in Minnesota Rule.

2. Is this proposed code change required by Minnesota Statute? If so, please provide the citation.

3. Provide *specific* language you would like to see changed. Indicate proposed new words with underlining and ~~strikethrough~~ words proposed for deletion. Include the entire code (sub) section or rule subpart that contains your proposed changes.

R402.2.4 Access hatches and doors.
Access hatches and doors from conditioned to unconditioned spaces such as attics and crawl spaces shall be insulated to the same R-value required by Table R402.1.3 for the wall or ceiling in which they are installed.
Exceptions:

1. Vertical doors providing access from conditioned spaces to unconditioned spaces that comply with the fenestration requirements of Table R402.1.3 based on the applicable climate zone specified in Chapter 3.
2. ~~Horizontal pull-down, stair-type access hatches in ceiling assemblies that provide access from conditioned to unconditioned spaces in Climate Zones 0 through 4 shall not be required to comply with the insulation level of the surrounding surfaces provided the hatch meets all of the following:~~
    a. ~~2.1. The average U-factor of the hatch shall be less than or equal to U-0.10 or have an average insulation R-value of R-10 or greater.~~
    b. ~~2.2. Not less than 75 percent of the panel area shall have an insulation R-value of R-13 or greater.~~
    c. ~~2.3. The net area of the framed opening shall be less than or equal to 13.5 square feet (1.25 m2).~~
    d. ~~2.4. The perimeter of the hatch edge shall be weatherstripped.~~

The reduction shall not apply to the total UA alternative in Section R402.1.5.

4. Will this proposed code change impact other sections of a model code book or an amendment in Minnesota Rule? If so, please list the affected sections or rule parts.
    No.

Need and Reason

1. Why is the proposed code change needed? Please provide a general explanation as well as a specific explanation for any changes to numerical values (heights, area, etc.)
    The content in the second exception applies to climate zones 0 through 4 which are not located in Minnesota.

2. Why is the proposed code change a reasonable solution?
    As noted above, it does not have application to Minnesota.

3. What other factors should the TAG consider?
    1. An unlimited quantity of exterior doors and windows complying with the fenestration requirements in Table R402.1.3 can be installed within the thermal envelope.
    2. Section R402.3.4 allows one side-hinged opaque door assembly not greater than 24sf to be exempted from the U-factor requirement in in Section R402.1.2.
    3. Section R402.3.1 permits an area-weighted average of fenestration products to satisfy the U-factor requirements.

Cost/Benefit Analysis

1. Will the proposed code change increase or decrease costs? Please explain and provide estimates if possible.
   No.

2. If there is an increased cost, will this cost be offset by a safety or other benefit? Please explain. If the benefit is quantifiable (for example energy savings), provide an estimate if possible.
   No.

3. If there is a cost increase, who will bear the costs? This can include government units, businesses, and individuals.
   N/A

4. Are there any enforcement or compliance cost increases or decreases with the proposed code change? Please explain.
   No.

5. Will the cost of complying with the proposed code change in the first year after the rule takes effect exceed $25,000 for any one small business or small city (Minn. Stat. § 14.127)? A small business is any business that has less than 50 full-time employees. A small city is any statutory or home rule charter city that has less than ten full-time employees. Please explain.
   N/A

Regulatory Analysis

1. What parties or segments of industry are affected by this proposed code change?
   Building contractors, designers, municipal building inspectors, and homeowners.

2. Can you think of other means or methods to achieve the purpose of the proposed code change? What might someone opposed to this code change suggest instead? Please explain what the alternatives are and why your proposed change is the preferred method or means to achieve the desired result.
   Since the change removes content that would not have had an impact on Minnesota anyway, the only alternate would be to leave the language as written in model code. However, including items that have zero application leads to confusion and complication with application and enforcement.

3. What are the probable costs or consequences of not adopting the code change, including those costs or consequences borne by identifiable categories of affected parties, such as separate classes of government units, businesses, or individuals?
   None.

4. Are you aware of any federal or state regulation or requirement related to this proposed code change? If so, please list the federal or state regulation or requirement and your assessment of any differences between the proposed code change and the federal regulation or requirement.
   N/A.

***Note: Incomplete forms may be returned to the submitter with instruction to complete the form. Only completed forms can considered by the TAG.

DEPARTMENT OF LABOR AND INDUSTRY

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: Patrick Murray *Date:* 9/18/23

Email address: *Model Code:* 2021 IECC

Telephone number: *Code or Rule Section:* R403.6.1

Firm/Association affiliation, if any: J-Berd Mechanical Contractors Inc.

Code or rule section to be changed: R403.6.1

Intended for Technical Advisory Group ("TAG"): Residential Energy Code Technical Advisory Group (TAG)

General Information	**Yes**	**No**
A. Is the proposed change unique to the State of Minnesota?	☒	☐
B. Is the proposed change required due to climatic conditions of Minnesota?	☒	☐
C. Will the proposed change encourage more uniform enforcement?	☒	☐
D. Will the proposed change remedy a problem?	☐	☒
E. Does the proposal delete a current Minnesota Rule, chapter amendment?	☐	☒
F. Would this proposed change be appropriate through the ICC code development process?	☒	☐

Proposed Language

1. The proposed code change is meant to:

   ☐ change language contained the model code book? If so, list section(s).

   ☐ change language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

   ☒ delete language contained in the model code book? If so, list section(s).
   R403.6.1

   ☐ delete language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

   ☐ add new language that is not found in the model code book or in Minnesota Rule.

2. Is this proposed code change required by Minnesota Statute? If so, please provide the citation.
   No.

3. Provide *specific* language you would like to see changed. Indicate proposed new words with underlining and ~~strikethrough~~ words proposed for deletion. Include the entire code (sub) section or rule subpart that contains your proposed changes.
   ~~R403.6.1 Heat or energy recovery ventilation.~~ ~~*Dwelling units* shall be provided with a heat recovery or energy recovery ventilation system in Climate Zones 7 and 8. The system shall be balanced with a minimum sensible heat recovery efficiency of 65 percent at 32 °F (0°C) at a flow greater than or equal to the design airflow.~~

4. Will this proposed code change impact other sections of a model code book or an amendment in Minnesota Rule? If so, please list the affected sections or rule parts.
   No.

Need and Reason

1. Why is the proposed code change needed? Please provide a general explanation as well as a specific explanation for any changes to numerical values (heights, area, etc.)
   Undue burden of cost. For Zone 7, Duluth MN, a typical 1-bedroom apartment will have a 30-year payback period, a 2-bedroom apartment will have a 23-year payback period, and 3-bedroom apartment will have a 17-year payback period. The average life expectancy of a residential HRV is 15 years.

2. Why is the proposed code change a reasonable solution?
   In residential buildings, including multifamily, adequate ventilation is not an issue. Adding this type of equipment only adds cost with no increased benefit of ventilation.

3. What other factors should the TAG consider?
   ERV/HRVs are notorious for being neglected. Without proper maintenance the life expectancy of the unit significantly decreases. Filters and cores that are not cleaned regularly could cause more harm than good when it comes to providing fresh air.
   Additionally, lower income people generally live in apartments (multifamily residences). Even a small increase in housing costs is very significant for them.

Cost/Benefit Analysis

1. Will the proposed code change increase or decrease costs? Please explain and provide estimates if possible.
   Decrease cost. Adding an HRV to a single multifamily dwelling unit will cost about $2,500.

2. If there is an increased cost, will this cost be offset by a safety or other benefit? Please explain. If the benefit is quantifiable (for example energy savings), provide an estimate if possible.

3. If there is a cost increase, who will bear the costs? This can include government units, businesses, and individuals.

4. Are there any enforcement or compliance cost increases or decreases with the proposed code change? Please explain.
   Reduced cost in code enforcement. Fewer pieces of equipment to install, balance, and inspect for code compliance.

5. Will the cost of complying with the proposed code change in the first year after the rule takes effect exceed $25,000 for any one small business or small city (Minn. Stat. § 14.127)? A small business is any business that has less than 50 full-time employees. A small city is any statutory or home rule charter city that has less than ten full-time employees. Please explain.
   Yes, if a multifamily building is constructed in one of these locations the additional cost to construct will exceed $25,000. Many multifamily buildings that are 30-50 units are built, owned or operated by small businesses or individuals. Climate zone 7 in MN consists of mostly small towns with a few exceptions. Small towns get small apartments i.e. 30-50 unit buildings.

Regulatory Analysis

1. What parties or segments of industry are affected by this proposed code change?
   Architects, engineers, general contractors, mechanical contractors, electrical contractors, plan reviewers, inspectors, energy modelers, tenants, homeowners, developers, and equipment manufacturers.

2. Can you think of other means or methods to achieve the purpose of the proposed code change? What might someone opposed to this code change suggest instead? Please explain what the alternatives are and why your proposed change is the preferred method or means to achieve the desired result.
   Fuel and power prices can change payback period. If fuel costs increase HRV/ERV have a better pay back. Additionally, a higher flow rate of outside improves the payback of these systems.

   An alternative to complete removal could be exceptions based on payback periods, outdoor air requirements, number of bedrooms, or square footage of a dwelling unit. A generous analysis to an HRV shows that it could pay for itself with the right conditions when used in a dwelling that is 1500+ sqft and 3 bedrooms or more. For code uniformity and simplification of enforcement it seems best to remove the requirement all together.

3. What are the probable costs or consequences of not adopting the code change, including those costs or consequences borne by identifiable categories of affected parties, such as separate classes of government units, businesses, or individuals?
   Ultimately increased construction costs get passed on to the tenants. The tenants will bear the majority of the burden of these costs. Specific equipment manufacturers will sell less equipment.

4. Are you aware of any federal or state regulation or requirement related to this proposed code change? If so, please list the federal or state regulation or requirement and your assessment of any differences between the proposed code change and the federal regulation or requirement.
   No.

***Note: Incomplete forms may be returned to the submitter with instruction to complete the form. Only completed forms can considered by the TAG.

DEPARTMENT OF LABOR AND INDUSTRY

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: Patrick Murray *Date:* 9/18/23

Email address: *Model Code:* 2018 IECC

Telephone number: *Code or Rule Section:* N/A

Firm/Association affiliation, if any: J-Berd Mechanical Contractors Inc.

Code or rule section to be changed: MN R403.5.2, .3, .4

Intended for Technical Advisory Group ("TAG"): Minnesota Residential Energy Code

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General Information	**Yes**	**No**
A. Is the proposed change unique to the State of Minnesota?	☒	☐
B. Is the proposed change required due to climatic conditions of Minnesota?	☐	☒
C. Will the proposed change encourage more uniform enforcement?	☒	☐
D. Will the proposed change remedy a problem?	☒	☐
E. Does the proposal delete a current Minnesota Rule, chapter amendment?	☒	☐
F. Would this proposed change be appropriate through the ICC code development process?	☒	☐

Proposed Language

1. The proposed code change is meant to:

   ☐ change language contained the model code book? If so, list section(s).

   ☐ change language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

   ☐ delete language contained in the model code book? If so, list section(s).

   ☒ delete language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

   ☐ add new language that is not found in the model code book or in Minnesota Rule.

2. Is this proposed code change required by Minnesota Statute? If so, please provide the citation.
   No.

3. Provide *specific* language you would like to see changed. Indicate proposed new words with underlining and ~~strikethrough~~ words proposed for deletion. Include the entire code (sub) section or rule subpart that contains your proposed changes.
~~R403.5.2 Total ventilation rate.~~ ~~The mechanical ventilation system shall provide sufficient outdoor air to equal the total ventilation rate average for each 1-hour period in accordance with Table R403.5.2, or Equation R403.5.2, based on the number of bedrooms and square footage of conditioned space, including the basement and conditioned crawl spaces. For the purposes of Table R403.5.2 and Section R403.5.3, the following applies: a. Equation R403.5.2 Total ventilation rate: Total ventilation rate (cfm) = (0.02 × square feet of conditioned space) + (15 × (number of bedrooms + 1)) b. Equation R403.5.2.1 Continuous ventilation rate: Continuous ventilation rate (cfm) = Total ventilation rate/2~~
~~R403.5.3 Continuous ventilation rate.~~ ~~Continuous ventilation rate (CVR) is a minimum of 50 percent of the total ventilation rate (TVR). The CVR shall not be less than 40 cfm (1133 L/min) and shall provide a continuous average cfm rate according to Table R403.5.2 or according to Equation R403.5.2 for every 1-hour period. The portion of the ventilation system that is intended to be continuous may have automatic cycling controls to provide the average flow rate for each hour.~~
~~R403.5.4 Intermittent ventilation rate.~~ ~~Intermittent ventilation rate means the difference between the total ventilation rate and the continuous ventilation rate.~~

4. Will this proposed code change impact other sections of a model code book or an amendment in Minnesota Rule? If so, please list the affected sections or rule parts.
No.

Need and Reason

1. Why is the proposed code change needed? Please provide a general explanation as well as a specific explanation for any changes to numerical values (heights, area, etc.)
These sections of MN Residential Energy Code are in conflict with MN Mechanical Code section 403.3.1.1. MREC method for calculating ventilation is complicated and is misunderstood by many in the industry. It also provides inconsistent ventilation to dwelling units where as MMC provides much more consistent ventilation.

2. Why is the proposed code change a reasonable solution?
This would simplify code enforcement and design. It would also provide more consistent ventilation in residential spaces.

3. What other factors should the TAG consider?

Cost/Benefit Analysis

1. Will the proposed code change increase or decrease costs? Please explain and provide estimates if possible.
Decrease cost. Design and enforcement time would decrease. Equipment and install cost will likely not change.

2. If there is an increased cost, will this cost be offset by a safety or other benefit? Please explain. If the benefit is quantifiable (for example energy savings), provide an estimate if possible.

3. If there is a cost increase, who will bear the costs? This can include government units, businesses, and individuals.

4. Are there any enforcement or compliance cost increases or decreases with the proposed code change? Please explain.
   Enforcement and compliance cost decreases. The complexity of the ventilation calculation results in confusion for enforcement resulting in more time to enforce.

5. Will the cost of complying with the proposed code change in the first year after the rule takes effect exceed $25,000 for any one small business or small city (Minn. Stat. § 14.127)? A small business is any business that has less than 50 full-time employees. A small city is any statutory or home rule charter city that has less than ten full-time employees. Please explain.
   No.

Regulatory Analysis

1. What parties or segments of industry are affected by this proposed code change?
   Tenants, Designers, Air balancers, Building Officials, and Inspectors.

2. Can you think of other means or methods to achieve the purpose of the proposed code change? What might someone opposed to this code change suggest instead? Please explain what the alternatives are and why your proposed change is the preferred method or means to achieve the desired result.
   No, there seems to be no reason to have a ventilation requirement outside of the mechanical code.

3. What are the probable costs or consequences of not adopting the code change, including those costs or consequences borne by identifiable categories of affected parties, such as separate classes of government units, businesses, or individuals?
   Increase costs for building officials and inspectors due to confusion on ventilation requirements.

4. Are you aware of any federal or state regulation or requirement related to this proposed code change? If so, please list the federal or state regulation or requirement and your assessment of any differences between the proposed code change and the federal regulation or requirement.
   No.

***Note: Incomplete forms may be returned to the submitter with instruction to complete the form. Only completed forms can considered by the TAG.

DEPARTMENT OF LABOR AND INDUSTRY

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: Mike Moore, Stator LLC, Representing the Home Ventilating Institute

Date: November 24, 2023

Email address:

Telephone number:

Firm/Association affiliation, if any: Stator LLC

Model Code: Residential Energy

Code or Rule Section: Chapter 2, R403.6

Code or rule section to be changed: Chapter 2, R403.6

Intended for Technical Advisory Group ("TAG"):

General Information	**Yes**	**No**
A. Is the proposed change unique to the State of Minnesota?	☒	☐
B. Is the proposed change required due to climatic conditions of Minnesota?	☒	☐
C. Will the proposed change encourage more uniform enforcement?	☒	☐
D. Will the proposed change remedy a problem?	☐	☒
E. Does the proposal delete a current Minnesota Rule, chapter amendment?	☐	☒
F. Would this proposed change be appropriate through the ICC code development process?	☒	☐

Proposed Language

1. The proposed code change is meant to:

   ☒ change language contained the model code book? If so, list section(s).
   Chapter 2, R403.6

   ☐ change language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

   ☐ delete language contained in the model code book? If so, list section(s).

   ☐ delete language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

   ☐ add new language that is not found in the model code book or in Minnesota Rule.

2. Is this proposed code change required by Minnesota Statute? If so, please provide the citation.

Adoption of this proposed code change, which is based on requirements in the 2021 IECC, is supported (but not required) by Sec. 29. Minnesota Statutes 2022, section 326B.106, subdivision 1 which states, "(d) Notwithstanding paragraph (c), the commissioner shall act on each new model residential energy code…The commissioner may adopt amendments prior to adoption of the new energy codes, as amended for use in Minnesota, to advance construction methods, technology, or materials, or, where necessary to protect the health, safety, and welfare of the public, or to improve the efficiency or use of a building."

3. Provide *specific* language you would like to see changed. Indicate proposed new words with underlining and ~~strikethrough~~ words proposed for deletion. Include the entire code (sub) section or rule subpart that contains your proposed changes.
   Please see the text at the end of this code change proposal form for proposed modifications.

4. Will this proposed code change impact other sections of a model code book or an amendment in Minnesota Rule? If so, please list the affected sections or rule parts.
   These proposed changes will only affect other sections of MN Rules where such sections reference MN 1322.0403.5.

Need and Reason

1. Why is the proposed code change needed? Please provide a general explanation as well as a specific explanation for any changes to numerical values (heights, area, etc.)
   The proposed code changes would update MN's energy code's ventilation provisions to better align with the 2021 IECC-R while improving energy savings versus current requirements.

2. Why is the proposed code change a reasonable solution?
   The proposed code changes have been vetted through the model code process, including the requirement to demonstrate cost effectiveness.

3. What other factors should the TAG consider?
   Minnesota's energy code has long required balanced mechanical ventilation. The latest version of the model energy code (the 2024 IECC) requires heat or energy recovery ventilators (HERVs) in climate zones 6, 7, and 8 based on cost-effectiveness that has been demonstrated versus a reference exhaust-only continuous dwelling unit ventilation system (i.e., the lowest first-cost ventilation system permitted by the model code). Cost effectiveness is even better when comparing an HERV to a reference balanced ventilation system (i.e., the case in MN). Because MN is currently considering updating its energy code to the 2021 edition, HVI's proposal is to align MN's code with the 2021 IECC-R requirement to provide an HERV for dwelling units in climate zones 7 and 8 (note that only climate zone 7 is referenced in the proposal because there are no climate zone 8 locations in MN). If the TAG is willing to consider the 2024 IECC-R as a precedent for MN's energy code, HVI would support MN's alignment with the 2024 IECC to expand the HERV requirement for MN beyond climate zone 7, to also include climate zone 6.

Cost/Benefit Analysis

1. Will the proposed code change increase or decrease costs? Please explain and provide estimates if possible.
   Where an HERV is not already being installed to meet MN's requirements for balanced ventilation, first-costs will increase. A rough estimate for the retail equipment price of a balanced system without heat or energy recovery is $500. A rough estimate for the retail equipment price of an HERV is $1000. Ducting and installation costs are expected to be approximately equal for the balanced system without heat recovery and the HERV.

2. If there is an increased cost, will this cost be offset by a safety or other benefit? Please explain. If the benefit is quantifiable (for example energy savings), provide an estimate if possible.
   The 2024 IECC-R is expanding the HERV requirements from climate zones 7 and 8 (as required by the 2021 IECC) to climate zones 6, 7, and 8, based on a cost-effectiveness analysis. The proposal that was submitted to the IECC resulting in expansion of HERV requirements to climate zone 6 showed ~$100 in natural gas savings in the first year of operation, based on building energy simulations for a typical home and a natural gas cost of $1.18/therm. These savings would support a simple payback of approximately 5 years or less in climate zone 6 (based on a $500 difference in first costs between a balanced ventilation system without heat recovery and an HERV). Monetized energy savings in Minnesota's climate zone 7 would be higher due to higher indoor to outdoor temperature differentials versus those in climate zone 6, resulting in an even shorter payback.

3. If there is a cost increase, who will bear the costs? This can include government units, businesses, and individuals.
   Homebuyers would bear the initial cost of the increase. However, financing the $500 incremental cost of the HERV equipment over a 30-year mortgage at 7.5% would result in an annual incremental difference in the mortgage of $41.95. This would be more than offset by the ~$100 in heating energy savings attributed to the HERV, making homebuyers cash-positive in year 1.

4. Are there any enforcement or compliance cost increases or decreases with the proposed code change? Please explain.
   None are anticipated.

5. Will the cost of complying with the proposed code change in the first year after the rule takes effect exceed $25,000 for any one small business or small city (Minn. Stat. § 14.127)? A small business is any business that has less than 50 full-time employees. A small city is any statutory or home rule charter city that has less than ten full-time employees. Please explain.
   The cost of complying is not expected to exceed the $25,000 threshold.

Regulatory Analysis

1. What parties or segments of industry are affected by this proposed code change?
   Homebuilders, contractors, and homebuyers could all be affected by this proposed code change.

2. Can you think of other means or methods to achieve the purpose of the proposed code change? What might someone opposed to this code change suggest instead? Please explain what the alternatives are and why your proposed change is the preferred method or means to achieve the desired result.
   An alternative to requiring HERVs in Minnesota's climate zone 7 (and potentially 6) would be to maintain the current requirement for balanced ventilation. The proposed change is preferable to the alternative because homebuyers should be cash positive in each year of HERV ownership.

3. What are the probable costs or consequences of not adopting the code change, including those costs or consequences borne by identifiable categories of affected parties, such as separate classes of government units, businesses, or individuals?
   If MN does not adopt this code change proposal, homebuyers may not realize the monetized energy savings associated with specifying an HERV versus a balanced ventilation system, potentially resulting in less available cash that could otherwise be invested or spent by homebuyers in their communities.

4. Are you aware of any federal or state regulation or requirement related to this proposed code change? If so, please list the federal or state regulation or requirement and your assessment of any differences between the proposed code change and the federal regulation or requirement.
   No.

***Note: Incomplete forms may be returned to the submitter with instruction to complete the form. Only completed forms can considered by the TAG.

HVI Proposal
November 27, 2023

Modify Chapter 4 of the 2021 IECC-R as follows:

R403.6 Mechanical ventilation. *Buildings* and *dwelling units* shall be provided with mechanical *ventilation* that complies with the requirements of the *International Residential Code* or *International Mechanical Code*, as applicable, or with other *approved* means of *ventilation*. Outdoor air intakes and exhausts shall have automatic or gravity dampers that close when the *ventilation* system is not operating.

R403.6.1 Heat or energy recovery ventilation. *Dwelling units* shall be provided with a heat recovery ventilation *system* (HRV) or energy recovery ventilation *system* (ERV) in Climate Zone~~s~~ 7 ~~and 8.~~ The *system* shall be balanced with a ~~minimum~~ sensible ~~heat~~ recovery efficiency ~~of~~ not less than 65 percent at 32°F (0°C) at an airflow greater than or equal to the continuous ventilation rate~~design airflow~~. The sensible recovery efficiency shall be determined from a listed value or from interpolation of listed values. An HRV or an ERV shall have either:

1. A sensible recovery efficiency rating developed in accordance with HVI Publication 920 at -13°F (25°C) cold weather test; or
2. Compliance documentation prepared by a registered professional engineer, stating that the unit is designed to provide outdoor air at an outdoor temperature of -13°F (-25°C).

R403.6.2 Whole-dwelling mechanical ventilation system fan efficacy. Fans used to provide whole-dwelling mechanical ventilation shall meet the efficacy requirements of Table R403.6.2 at one or more rating points. Fans shall be tested in accordance with ~~HVI 916~~ the test procedure referenced in Table R403.6.2 and listed. The airflow shall be reported in the product listing or on the label. Fan efficacy shall be reported in the product listing or shall be derived from the input power and airflow values reported in the product listing or on the label. Fan efficacy for fully ducted HRV, ERV, balanced, and in-line fans shall be determined at a static pressure of not less than 0.2 inch w.c. (49.85 Pa). Fan efficacy for ducted range hoods, bathroom and utility room fans shall be determined at a static pressure of not less than 0.1 inch w.c. (24.91 Pa).

TABLE R403.6.2 WHOLE-DWELLING MECHANICAL VENTILATION SYSTEM FAN EFFICACY[a]

~~For SI: 1 cubic foot per minute = 28.3 L/min.~~

~~a. Design outdoor airflow rate/watts of fan used.~~

FAN TYPE	AIRFLOW RATE (CFM)	MINIMUM EFFICACY (CFM/W)	TEST PROCEDURE
HRV or ERV	Any	1.2[a]	CAN/CSA C439
Balanced ventilation system without heat or energy recovery	Any	1.2[a]	ASHRAE 51 (ANSI/AMCA Standard 210)
Range hood	Any	2.8	
In-line supply or exhaust fan	Any	3.8	

Other exhaust fan	<90	2.8	
	≥ 90 and < 200	3.5	
	> 200	4.0	
Air-handling unit that is integrated to tested and listed HVAC equipment	Any	1.2	Outdoor airflow as specified. Air-handling unit fan power determined in accordance with the applicable US Department of Energy Code of Federal Regulations DOE10 CFR 430, or other approved test method.

For SI: 1 cubic foot per minute = 0.47 L/s.

a. For balanced ventilation systems, HRVs, and ERVs, determine the efficacy as the outdoor airflow divided by the total fan power.

DEPARTMENT OF LABOR AND INDUSTRY

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: John G. Smith, P.E.

Date: October 23, 2023
Revised Nov. 13, 2023

Email address:

*Model Code:*Residential

Telephone number:

Code or Rule Section: R402.2.3 Eave Baffle

Firm/Association affiliation, if any:

Code or rule section to be changed: 1322

Intended for Technical Advisory Group ("TAG"):

General Information	**Yes**	**No**
A. Is the proposed change unique to the State of Minnesota?	☒	☐
B. Is the proposed change required due to climatic conditions of Minnesota?	☐	☒
C. Will the proposed change encourage more uniform enforcement?	☒	☐
D. Will the proposed change remedy a problem?	☒	☐
E. Does the proposal delete a current Minnesota Rule, chapter amendment?	☐	☒
F. Would this proposed change be appropriate through the ICC code development process?	☒	☐

Proposed Language

1. The proposed code change is meant to:

   X☐ change language contained the model code book? If so, list section(s).
   R402.2.3 Eave Baffle

   ☐ change language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

   ☐ delete language contained in the model code book? If so, list section(s).

   ☐ delete language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

   ☐ add new language that is not found in the model code book or in Minnesota Rule.

2. Is this proposed code change required by Minnesota Statute? If so, please provide the citation.

3. Provide *specific* language you would like to see changed. Indicate proposed new words with underlining and ~~strikethrough~~ words proposed for deletion. Include the entire code (sub) section or rule subpart that contains your proposed changes.

   R402.2.3 **Eave baffle.** For air-permeable insulation in vented attics, a baffle shall be installed adjacent to soffit and eave vents. Baffles shall maintain a net free area opening equal to or greater than the size of the vent. The baffle shall extend over the top of the attic insulation. The baffle shall be permitted to be any solid material. The baffle shall be installed to the outer edge of the exterior wall top plate so as to provide maximum space for attic insulation coverage over the topplate. Where soffit venting is not continuous, baffles shall be installed continuously to prevent ventilation air in the eave soffit from bypassing the baffle.

   R402.2.3.1 **Wind Wash Prevention**: A wind wash baffle shall be provided to separate air permeable insulation from the ventilation intake space, extending vertically from the outside edge of the exterior wall top plate to the top of the insulation or the underside of the eave baffle and sealed on the bottom and sides.

4. Will this proposed code change impact other sections of a model code book or an amendment in Minnesota Rule? If so, please list the affected sections or rule parts.
   No

Need and Reason

1. Why is the proposed code change needed? Please provide a general explanation as well as a specific explanation for any changes to numerical values (heights, area, etc.)
   Preventing wind wash of the attic insulation along the perimeter wall edges is important to maintain the thermal performance of the insulation. Adding the wind wash baffle accomplishes this.

2. Why is the proposed code change a reasonable solution?
   It is a common solution to the issue.

3. What other factors should the TAG consider?

Cost/Benefit Analysis

1. Will the proposed code change increase or decrease costs? Please explain and provide estimates if possible.
   The proposed change clarifies a proper installation method which should be included in the project.

2. If there is an increased cost, will this cost be offset by a safety or other benefit? Please explain. If the benefit is quantifiable (for example energy savings), provide an estimate if possible.

3. If there is a cost increase, who will bear the costs? This can include government units, businesses, and individuals.

4. Are there any enforcement or compliance cost increases or decreases with the proposed code change? Please explain.
   No

5. Will the cost of complying with the proposed code change in the first year after the rule takes effect exceed $25,000 for any one small business or small city (Minn. Stat. § 14.127)? A small business is any business that has less than 50 full-time employees. A small city is any statutory or home rule charter city that has less than ten full-time employees. Please explain.

Regulatory Analysis

1. What parties or segments of industry are affected by this proposed code change?
   General contractor, insulation contractor, building officials.

2. Can you think of other means or methods to achieve the purpose of the proposed code change? What might someone opposed to this code change suggest instead? Please explain what the alternatives are and why your proposed change is the preferred method or means to achieve the desired result.
   No

3. What are the probable costs or consequences of not adopting the code change, including those costs or consequences borne by identifiable categories of affected parties, such as separate classes of government units, businesses, or individuals?
   Consequences of not adopting are reduction in thermal performance of attic insulation at perimeter.

4. Are you aware of any federal or state regulation or requirement related to this proposed code change? If so, please list the federal or state regulation or requirement and your assessment of any differences between the proposed code change and the federal regulation or requirement.
   No

***Note: Incomplete forms may be returned to the submitter with instruction to complete the form. Only completed forms can considered by the TAG.

DEPARTMENT OF LABOR AND INDUSTRY

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: John G. Smith, P.E.

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Telephone number: 612 867-3145

Firm/Association affiliation, if any:

Date: October 23, 2023
Rev. January 30, 2024

Model Code: Residential Energy Code

Code or Rule Section: 1322

Code or rule section to be changed: R402.1.5 Total UA alternative

Intended for Technical Advisory Group ("TAG"):

General Information	**Yes**	**No**
A. Is the proposed change unique to the State of Minnesota?	☒	☐
B. Is the proposed change required due to climatic conditions of Minnesota?	☒	☐
C. Will the proposed change encourage more uniform enforcement?	☒	☐
D. Will the proposed change remedy a problem?	☒	☐
E. Does the proposal delete a current Minnesota Rule, chapter amendment?	☐	☒
F. Would this proposed change be appropriate through the ICC code development process?	☒	☐

Proposed Language

1. The proposed code change is meant to:

   X change language contained the model code book? If so, list section(s).
   R402.1.5 Total UA alternative

   ☐ change language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

   ☐ delete language contained in the model code book? If so, list section(s).

   ☐ delete language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

   ☐ add new language that is not found in the model code book or in Minnesota Rule.

2. Is this proposed code change required by Minnesota Statute? If so, please provide the citation.
   No

3. Provide *specific* language you would like to see changed. Indicate proposed new words with underlining and ~~strikethrough~~ words proposed for deletion. Include the entire code (sub) section or rule subpart that contains your proposed changes.

R402.1.5 Total UA alternative: Where the total building thermal envelope UA, the sum of U-factor times assembly area, is less than or equal to the total UA resulting from multiplying the U-factors in Table R402.1.2 by the same assembly area as in the proposed building, the building shall be considered to be in compliance with Table R402.1.2. The UA calculation shall be performed using a method consistent with the ASHRAE Handbook of Fundamentals and shall include the thermal bridging effects of framing materials. In addition to UA compliance, ~~the SHGC requirements of Table R402.1.2 and~~ the maximum fenestration U-factors of Section R402.5 shall be met.

For walls complying with the maximum assembly U-factors in Table R402.1.2 or the insulation minimum R-values identified in Table R402.1.3, the building must not exceed the maximum window and door area as a percentage of the overall exposed wall area listed below. Other components must meet the requirements of Table R402.1.2 or R402.1.3.

Maximum Window and Door Area As a Percent of Overall Exposed Wall								
Window U:	**0.26**	**0.28**	**0.30**	**0.32**	**0.34**	**0.36**	**0.38**	**0.40**
% Window/Door:	30.2%	27.7%	25.5%	23.6%	22.0%	20.6%	19.4%	18.3%

R402.1.5.1 Performance criteria. The combined thermal transmittance (U_o) factors for walls, roof/ceilings, and floors over unheated spaces used for alternative calculation equivalency purposes must be less than or equal to:

1.1 0.110 Btu/h ft^2 °F for walls;

1.2 0.024 Btu/h ft^2 °F for roof/ceilings; and

1.3 0.033 Btu/h ft^2 °F (Zone 6) or 0.028 Btu/h ft^2 °F (Zone 7) for floors.

Where alternative construction assemblies are proposed, the combined total overall thermal transmittance (U_o) factors for walls, roof/ceilings, and floors over unheated spaces must be less than or equal to the calculated combined total thermal transmittance using the above maximum values.
That is:

Zone 6: $Uo_{walls}A_{walls} + Uo_{roof/ceiling}A_{roof/ceiling} + Uo_{floor}A_{floor} \leq 0.110A_{walls} + 0.024A_{roof/ceiling} + 0.033A_{floor}$

Zone 7: $Uo_{walls}A_{walls} + Uo_{roof/ceiling}A_{roof/ceiling} + Uo_{floor}A_{floor} \leq 0.110A_{walls} + 0.024A_{roof/ceiling} + 0.028A_{floor}$

4. Will this proposed code change impact other sections of a model code book or an amendment in Minnesota Rule? If so, please list the affected sections or rule parts.
No

Need and Reason

1. Why is the proposed code change needed? Please provide a general explanation as well as a specific explanation for any changes to numerical values (heights, area, etc.)

Using only UA equivalency with no limits on the baseline U values for the walls, roof/ceiling and floors over unheated spaces can have unintended consequences. For example, considering the walls only and performing U_o equivalent calculations, the effect of increasing glass area is shown below:

Prescriptive wall values:				
U_g:	**0.30**			
U_w:	**0.045**			
Framing to Cavity Ratio: 25%/75%				
For changing glass areas, what is resulting overall				
Uo which would satisfy UA alternative calculations?				
% Glass	**% Framing**	**% Cavity**	**U_o**	**U_o/0.110 wall limit**
15.00%	22.92%	68.76%	0.083	0.76
20.00%	22.60%	67.80%	0.096	0.87
25.00%	22.28%	66.84%	0.109	0.99
30.00%	21.96%	65.89%	0.122	1.10
35.00%	21.64%	64.93%	0.134	1.22
40.00%	21.33%	63.98%	0.147	1.34
45.00%	21.01%	63.02%	0.160	1.45
50.00%	20.69%	62.06%	0.173	1.57
Setting wall U at 0.110 would allow 25% glass area if Ug = 0.30				
Typical house is below 20% glass area				
Using higher performance glass would allow more than 25% glass				

The heat losses of a wall are calcuated using the formula U_oA (T_{inside}-$T_{outside}$). As can be noted, even 50% glass area will satisfy the equivalency calculation even though the overall wall has 57% greater heat losses than the limited 0.110 calculation, which limits the maximum glass area to about 25%. Summer heat gains would be similarly impacted, although more difficult to compare due to solar gains.

2. Why is the proposed code change a reasonable solution?
   This proposed change provides clarity to the calculation methods and eliminates the possibility of allowing buildings with much greater heat losses and gains than are intended by the code. This added wording is very similar to what was in the 1994 Minnesota Residential Energy Code. The deletion of the SHGC requirements was because they do not apply to Zones 6 and 7.

3. What other factors should the TAG consider?

Cost/Benefit Analysis

1. Will the proposed code change increase or decrease costs? Please explain and provide estimates if possible.
   No change. It provides clarification to how calculations are to be performed.

2. If there is an increased cost, will this cost be offset by a safety or other benefit? Please explain. If the benefit is quantifiable (for example energy savings), provide an estimate if possible.

3. If there is a cost increase, who will bear the costs? This can include government units, businesses, and individuals.

4. Are there any enforcement or compliance cost increases or decreases with the proposed code change? Please explain.
   No

5. Will the cost of complying with the proposed code change in the first year after the rule takes effect exceed $25,000 for any one small business or small city (Minn. Stat. § 14.127)? A small business is any business that has less than 50 full-time employees. A small city is any statutory or home rule charter city that has less than ten full-time employees. Please explain.
   No

Regulatory Analysis

1. What parties or segments of industry are affected by this proposed code change?
   General contractors,architects, engineers

2. Can you think of other means or methods to achieve the purpose of the proposed code change? What might someone opposed to this code change suggest instead? Please explain what the alternatives are and why your proposed change is the preferred method or means to achieve the desired result.
   No

   Proposed change is the correct method to assure consistency in how the UA alternative calculations are performed.

3. What are the probable costs or consequences of not adopting the code change, including those costs or consequences borne by identifiable categories of affected parties, such as separate classes of government units, businesses, or individuals?
   Increased energy consumption of residential buildings.

4. Are you aware of any federal or state regulation or requirement related to this proposed code change? If so, please list the federal or state regulation or requirement and your assessment of any differences between the proposed code change and the federal regulation or requirement.
   The goal of the energy code is to save energy, which is being promoted by the DOE.

***Note: Incomplete forms may be returned to the submitter with instruction to complete the form. Only completed forms can considered by the TAG.

DEPARTMENT OF LABOR AND INDUSTRY

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: Stephen Wieroniey
Randy Nicklas

Email address:

Telephone number:

Firm/Association affiliation, if any: Huntsman Corporation

Date: June XX, 2023

Model Code: IECC

Code or Rule Section: R402.2.1.1

Code or rule section to be changed:

Intended for Technical Advisory Group ("TAG"):

General Information	**Yes**	**No**
A. Is the proposed change unique to the State of Minnesota?	☐	☒
B. Is the proposed change required due to climatic conditions of Minnesota?	☐	☒
C. Will the proposed change encourage more uniform enforcement?	☐	☒
D. Will the proposed change remedy a problem?	☒	☐
E. Does the proposal delete a current Minnesota Rule, chapter amendment?	☐	☒
F. Would this proposed change be appropriate through the ICC code development process?	☒	☐

Proposed Language

1. The proposed code change is meant to:

   ☐ change language contained the model code book? If so, list section(s).
   R402.2.1.1

   ☐ change language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

   ☐ delete language contained in the model code book? If so, list section(s).

   ☐ delete language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

   X - add new language that is not found in the model code book or in Minnesota Rule.

2. Is this proposed code change required by Minnesota Statute? If so, please provide the citation.

3. Provide *specific* language you would like to see changed. Indicate proposed new words with underlining and ~~strikethrough~~ words proposed for deletion. Include the entire code (sub) section or rule subpart that contains your proposed changes.

Add new Section RXXXX (possibly 402.2.1.1) '**Unvented attic and unvented enclosed rafter assemblies** to read as follows:

RXXXX (NXXXX) Unvented attic and unvented enclosed rafter assemblies. Where IECC Table R402.1.2 or IRC Table N1102.1.2 requires R-60 an air impermeable insulation installed to the underside or directly above the roof deck with an R-value of R-30 (U-factor 0.038) shall be deemed equivalent to the provisions in IECC Table R402.1.2 or IRC Table N1102.1.2, with the following requirements:

1. The unvented attic assembly complies with the requirements of IRC R806.5.
2. The house shall attain a blower door test result < 2.5 ACH_{50}.
3. The house shall require a whole house mechanical ventilation system that does not solely rely on a negative pressure strategy (must be positive, balanced or hybrid)
4. Where insulation is installed below the roof deck and the exposed portion of roof rafters are not already covered by the R-30 depth of the air-impermeable insulation, the exposed portion of the roof rafters shall be wrapped (covered) by minimum R-3 unless directly covered by drywall / finished ceiling. Roof rafters are not required to be covered by minimum R-3 if a continuous insulation is installed above the roof deck.
5. Indoor heating, cooling and ventilation equipment (including ductwork) shall be inside the building thermal envelope.

4. Will this proposed code change impact other sections of a model code book or an amendment in Minnesota Rule? If so, please list the affected sections or rule parts.

Need and Reason

1. Why is the proposed code change needed? Please provide a general explanation as well as a specific explanation for any changes to numerical values (heights, area, etc.)

   The IECC model code does not contain a prescriptive R-value for roof deck insulation in unvented attics. When ductwork and mechanical systems are installed in an attic, unvented attic designs provide a unique path to energy savings because they are easier to air seal, and they keep the attic closer to the temperature of the occupied space while trapping any duct leakage, which will passively conditions the space.

2. Why is the proposed code change a reasonable solution?
   The air leakage and duct leakage eliminated by means of an unvented attic constructed with air impermeable insulation represent much larger energy savings versus the need for additional thermal insulation alone.

3. What other factors should the TAG consider?
   The provisions of the proposed section provide builders with a cost-effective energy improvement option without the need for a performance analysis. This allows more funds to be directed at energy improvements.

Cost/Benefit Analysis

1. Will the proposed code change increase or decrease costs? Please explain and provide estimates if possible.

   The proposed language is an option for builders. It will likely be used where it lowers their construction costs.

2. If there is an increased cost, will this cost be offset by a safety or other benefit? Please explain. If the benefit is quantifiable (for example energy savings), provide an estimate if possible.
   The use of air impermeable insulation helps prevent moisture accumulation at the roof deck which improves durability.

3. If there is a cost increase, who will bear the costs? This can include government units, businesses, and individuals.
   N/A

4. Are there any enforcement or compliance cost increases or decreases with the proposed code change? Please explain.
   An air tightness test is required by the 2021 IECC. This code change utilizes that data to require improved performance (2.5 ACH50) versus the requirements in R402.4.1.3.

5. Will the cost of complying with the proposed code change in the first year after the rule takes effect exceed $25,000 for any one small business or small city (Minn. Stat. § 14.127)? A small business is any business that has less than 50 full-time employees. A small city is any statutory or home rule charter city that has less than ten full-time employees. Please explain.
   N/A

Regulatory Analysis

1. What parties or segments of industry are affected by this proposed code change?

   The proposed language creates a new option for builders to comply with energy efficiency requirements. This option creates a cheaper pathway toward compliance. It is anticipated that this proposal will be positive for builders and homeowners, without negatively impacting energy efficiency.

2. Can you think of other means or methods to achieve the purpose of the proposed code change? What might someone opposed to this code change suggest instead? Please explain what the alternatives are and why your proposed change is the preferred method or means to achieve the desired result.

3. What are the probable costs or consequences of not adopting the code change, including those costs or consequences borne by identifiable categories of affected parties, such as separate classes of government units, businesses, or individuals?

   Unvented attics increase the energy efficiency of a home. Minnesota should promote the adoption of a new R-value for roof deck insulation to incentivize builders to construction homes with unvented attics where duct work is kept within conditioned space.

4. Are you aware of any federal or state regulation or requirement related to this proposed code change? If so, please list the federal or state regulation or requirement and your assessment of any differences between the proposed code change and the federal regulation or requirement.

   This proposal has been adopted by Alabama, Georgia, and Utah. It is anticipated to be adopted by North Carolina this year.

   Alabama – R402.2.2.1 (N1102.2.2.1) Semi-conditioned attics (Page 10)
   Georgia – R402.1.2.1 Indirectly Conditioned Attics (Page 4)
   North Carolina - HB 488 (Section 6) (Passed the House; Currently in Senate)
   Utah - HB 532 (page 58)

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DEPARTMENT OF LABOR AND INDUSTRY

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: Steve Shold

Email address: steve.shold@state.mn.us

Telephone number: 651-284-5312

Firm/Association affiliation, if any: Dept of Labor

Date: 12/21/23

Model Code: 2021 IECC-R

Code or Rule Section:

Code or rule section to be changed: Section R403.3 - Duct insulation

Intended for Technical Advisory Group ("TAG"):

General Information	**Yes**	**No**
A. Is the proposed change unique to the State of Minnesota?	☒	☐
B. Is the proposed change required due to climatic conditions of Minnesota?	☒	☐
C. Will the proposed change encourage more uniform enforcement?	☒	☐
D. Will the proposed change remedy a problem?	☒	☐
E. Does the proposal delete a current Minnesota Rule, chapter amendment?	☒	☐
F. Would this proposed change be appropriate through the ICC code development process?	☒	☐

Proposed Language

1. The proposed code change is meant to:

   ☐ change language contained the model code book? If so, list section(s).
   Yes, see language below.

   ☐ change language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).
   Yes, see language below.

   ☐ delete language contained in the model code book? If so, list section(s).
   Yes, see language below.

   ☐ delete language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).
   Yes, see language below.

   ☐ add new language that is not found in the model code book or in Minnesota Rule.
   Yes, see language below.

2. Is this proposed code change required by Minnesota Statute? If so, please provide the citation.
   In a manner of speaking, yes, due to durability requirements located in MS 326B.118.

3. Provide *specific* language you would like to see changed. Indicate proposed new words with underlining and ~~strikethrough~~ words proposed for deletion. Include the entire code (sub) section or rule subpart that contains your proposed changes.
   See language below.

4. Will this proposed code change impact other sections of a model code book or an amendment in Minnesota Rule? If so, please list the affected sections or rule parts.
   Yes, this is part of a 7-proposal series that will align the affected or related sections including: R403.3, R402, R402.2.1, R402.2.7, Table R402.4.1.1, R502.3.2, and R503.1.2.

Need and Reason

1. Why is the proposed code change needed? Please provide a general explanation as well as a specific explanation for any changes to numerical values (heights, area, etc.)
   The '21 model code language weakened requirements currently set in MN for duct insulation.

2. Why is the proposed code change a reasonable solution?
   This proposal carries forward requirements that have been in place in MN since 2015.

3. What other factors should the TAG consider?
   Proposals #25-30 which are related.

Cost/Benefit Analysis

1. Will the proposed code change increase or decrease costs? Please explain and provide estimates if possible.
   The code change should not impact costs compared to where MN is *now.* The insulation values are nearly identical to those currently specified, with the exception that Outdoor air intakes and Exhaust ducts within conditioned space will now need to meet R-4 as opposed to R-3.3 in the current 2015 MRE. However, a search indicates that R-3.3 is not something available to market with R-4 being widely available. The one difference is that the 2021 IECC would have allowed a weakening amendment from R-8 to R-6 for ducts less than 3" in diameter, so in some cases this could be perceived as a slight cost increase compared to the 2021 Model Code language.

2. If there is an increased cost, will this cost be offset by a safety or other benefit? Please explain. If the benefit is quantifiable (for example energy savings), provide an estimate if possible.
   Additional duct insulation can help prevent condensation within ducts and subsequent cosmetic damage.

3. If there is a cost increase, who will bear the costs? This can include government units, businesses, and individuals.
   There won't be an increase compared to current Energy Code requirements, but when compared to the '21 there may be a slight increase in cost for ducts less than 3" in diameter. Initially subcontractors would bear the cost for R-6 insulation, which will ultimately be passed on to the owner.

4. Are there any enforcement or compliance cost increases or decreases with the proposed code change? Please explain.
   No.

5. Will the cost of complying with the proposed code change in the first year after the rule takes effect exceed $25,000 for any one small business or small city (Minn. Stat. § 14.127)? A small business is any business that has less than 50 full-time employees. A small city is any statutory or home rule charter city that has less than ten full-time employees. Please explain.
   No.

Regulatory Analysis

1. What parties or segments of industry are affected by this proposed code change?
   Builders and remodelers, HVAC designers and contractors, material suppliers, and building inspectors.

2. Can you think of other means or methods to achieve the purpose of the proposed code change? What might someone opposed to this code change suggest instead? Please explain what the alternatives are and why your proposed change is the preferred method or means to achieve the desired result.
   Could stick with '21 Model Code.

3. What are the probable costs or consequences of not adopting the code change, including those costs or consequences borne by identifiable categories of affected parties, such as separate classes of government units, businesses, or individuals?
   More ductwork will be installed outside of the thermal boundary, and ducts 3" or less will be more susceptible to condensation. Cost consequences are unknown.

4. Are you aware of any federal or state regulation or requirement related to this proposed code change? If so, please list the federal or state regulation or requirement and your assessment of any differences between the proposed code change and the federal regulation or requirement.
   No.

See modified code language on next page

Summary

This proposal is #1 in a package of 7 related changes that seek to amend and clarify duct insulation, as well as provide guidance on how to address insulation in floors, walls, and ceilings where ducts are present, in both new and existing construction.

R403.3 Ducts. Ducts and air handlers shall be installed in accordance with Sections R403.3.1 through R403.3.7.
R403.3.1 Ducts **insulation.** ~~**located outside conditioned space.**~~ All ~~Supply and return~~ ducts ~~located outside *conditioned space*~~ shall be insulated according to Table R403.3.1. ~~an *R*-value of not less than R-8 for ducts 3 inches (76 mm) in diameter and larger and not less than R-6 for ducts smaller than 3 inches (76 mm) in diameter.~~ Ducts buried beneath a building shall be insulated as required per this section or have an equivalent thermal distribution efficiency. Underground ducts utilizing the thermal distribution efficiency method shall be listed and *labeled* to indicate the *R*-value equivalency.

TABLE R403.3.1
MINIMUM REQUIRED DUCT INSULATION

DUCT TYPE/LOCATION	REQUIREMENTS
Ducts outside conditioned space[a, b]	R-8, V and W
Outdoor air intakes within conditioned space[a, c]	R-4 and V
Exhaust ducts within conditioned space[a, c]	R-4 and V
Within concrete slab or within ground[a]	R-3.5
Ducts inside conditioned space	None Required

a. V means a vapor retarder in compliance with Section 604.11 of the *International Mechanical Code* or Section M1601.4.6 of the *International Residential Code*, as applicable.

b. W means an approved weatherproof barrier.

c. Insulation is only required in the conditioned space for a distance of 3 feet (914 mm) from the exterior or unconditioned space.

R403.3.2 Ducts located in conditioned space. For ductwork to be considered inside a *conditioned space,* ~~it~~ the duct system and air handler shall ~~comply with one of the following:~~ be located completely within the *continuous air barrier* and within the building thermal envelope where the required insulation value is not reduced on the unconditioned side of the duct. *(This section is NOT applicable to R405 Total Building Performance or R406 ERI paths – may need amendments to the tables in those chapters)*

~~1. The duct system shall be located completely within the *continuous air barrier* and within the building thermal envelope.~~
~~2. Ductwork in ventilated attic spaces shall be buried within ceiling insulation in accordance with Section R403.3.3 and all of the following conditions shall exist:~~

2.1. The air handler is located completely within the *continuous air barrier* and within the *building thermal envelope*.

2.2. The duct leakage, as measured either by a rough-in test of the ducts or a postconstruction total system leakage test to outside the *building thermal envelope* in accordance with Section R403.3.6, is less than or equal to 1.5 cubic feet per minute (42.5 L/min) per 100 square feet (9.29 m2) of *conditioned floor area* served by the duct system.

2.3. The ceiling insulation *R*-value installed against and above the insulated duct is greater than or equal to the proposed ceiling insulation *R*-value, less the *R*-value of the insulation on the duct.

3. Ductwork in floor cavities located over unconditioned space shall comply with all of the following:

3.1. A *continuous air barrier* installed between unconditioned space and the duct.

3.2. Insulation installed in accordance with Section R402.2.7.

3.3. A minimum R-19 insulation installed in the cavity width separating the duct from unconditioned space.

4. Ductwork located within *exterior walls* of the *building thermal envelope* shall comply with the following:

4.1. A *continuous air barrier* installed between unconditioned space and the duct.

4.2. Minimum R-10 insulation installed in the cavity width separating the duct from the outside sheathing.

4.3. The remainder of the cavity insulation shall be fully insulated to the drywall side.

R403.3.3 Ducts buried within ceiling insulation. Where supply and return air ducts are partially or completely buried in ceiling insulation, such ducts shall comply with all of the following:

1. The supply and return ducts shall have an insulation *R*-value not less than R-8.

2. At all points along each duct, the sum of the ceiling insulation *R*-value against and above the top of the duct, and against and below the bottom of the duct, shall be not less than R-19, excluding the *R*-value of the duct insulation.

3. In Climate Zones 0A, 1A, 2A and 3A, the supply ducts shall be completely buried within ceiling insulation, insulated to an *R*-value of not less than R-13 and in compliance with the vapor retarder requirements of Section 604.11 of the *International Mechanical Code* or Section M1601.4.6 of the *International Residential Code*, as applicable.

Exception: Sections of the supply duct that are less than 3 feet (914 mm) from the supply outlet shall not be required to comply with these requirements.

R403.3.3.1~~1~~3 Effective *R*-value of deeply buried ducts. Where using the Total Building Performance Compliance Option in accordance with Section R401.2.2, sections of ducts that are installed in accordance with Section R403.3.3, located directly on or within 5.5 inches (140 mm) of the ceiling, surrounded with blown-in attic insulation having an *R*-value of R-30 or greater and located such that the top of the duct is not less than 3.5 inches (89 mm) below the top of the insulation, shall be considered as having an effective duct insulation *R*-value of R-25.

DEPARTMENT OF LABOR AND INDUSTRY

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: Steve Shold

Email address: steve.shold@state.mn.us

Telephone number: 651-284-5312

Firm/Association affiliation, if any: Dept of Labor

Date: 12/21/23

Model Code: 2021 IECC-R

Code or Rule Section:

Code or rule section to be changed: Section R402.2.7 - Floor insulation

Intended for Technical Advisory Group ("TAG"):

General Information	**Yes**	**No**
A. Is the proposed change unique to the State of Minnesota?	☒	☐
B. Is the proposed change required due to climatic conditions of Minnesota?	☒	☐
C. Will the proposed change encourage more uniform enforcement?	☒	☐
D. Will the proposed change remedy a problem?	☒	☐
E. Does the proposal delete a current Minnesota Rule, chapter amendment?	☒	☐
F. Would this proposed change be appropriate through the ICC code development process?	☒	☐

Proposed Language

1. The proposed code change is meant to:

   ☐ change language contained the model code book? If so, list section(s).
   Yes, R402.2.7 Floors. See language below.

   ☐ change language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).
   No.

   ☐ delete language contained in the model code book? If so, list section(s).
   Yes, see language below.

   ☐ delete language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).
   No.

   ☐ add new language that is not found in the model code book or in Minnesota Rule.
   Yes, see language below.

2. Is this proposed code change required by Minnesota Statute? If so, please provide the citation.
   In a manner of speaking, yes, due to durability requirements located in MS 326B.118.

3. Provide *specific* language you would like to see changed. Indicate proposed new words with underlining and ~~strikethrough~~ words proposed for deletion. Include the entire code (sub) section or rule subpart that contains your proposed changes.
   See language below.

4. Will this proposed code change impact other sections of a model code book or an amendment in Minnesota Rule? If so, please list the affected sections or rule parts.
   Yes, this is part of a 7-proposal series that will align the affected or related sections including: R403.3, R402, R402.2.1, R402.2.7, Table R402.4.1.1, R502.3.2, and R503.1.2.

Need and Reason

1. Why is the proposed code change needed? Please provide a general explanation as well as a specific explanation for any changes to numerical values (heights, area, etc.)
   The code currently would allow ductwork to be installed in a floor cavity without requiring the minimum R-value of the cavity or assembly to be upheld.

2. Why is the proposed code change a reasonable solution?
   It is not necessary to have the floor insulation in contact with the underside of the subfloor, provided the perimeter of the floor assembly is insulated, so that item was removed. Language was added to clarify that when ductwork is installed within a floor cavity, the space between the duct and the unconditioned area must still meet a minimum R-value. This is important to prevent having floor cavities that lack insulation due to installing duct runs. This also helps the duct by keeping it to the conditioned side of the assembly. This helps to clarify and codify a long-standing interpretation for floor insulation that required minimum insulation between the duct and unconditioned space.

   Some may question why this is not located in the section regarding *Duct Insulation* (R403.3), that is because this content has to do with minimum ***floor*** insulation, whereas it had been in R403.3 "Duct insulation" not for the purpose of floor insulation, but only to indicate when ducts could be "considered" to be within conditioned space. With approval of RE-24, ducts would need to actually be *physically* located within conditioned space to be regarded as "within conditioned space". Therefore, any criteria regarding floor insulation belongs in Section R402 for the thermal envelope along with other requirements specific to floors.

3. What other factors should the TAG consider?
   Proposals #24-30 which are related.

Cost/Benefit Analysis

1. Will the proposed code change increase or decrease costs? Please explain and provide estimates if possible.
   This proposal will have a minimal impact on cost. It will only affect instances where ductwork is run in thermally bounding floors and where there is a physical space limitation to accommodate both the duct and the insulation. Where the space is not there, the insulation *can* be reduced via an exception whereby the floor must instead meet an overall U-factor that aligns with the U-factor requirements for floors based on climate zone.

2. If there is an increased cost, will this cost be offset by a safety or other benefit? Please explain. If the benefit is quantifiable (for example energy savings), provide an estimate if possible.
   The benefit will be maintaining minimum insulation levels in floor assemblies, lending to increased efficiency, and increasing the efficacy of air conveyed through the ductwork by keeping it on the interior side of the insulation. Moreover, the proposal gives clarity to insulation requirements for floors where ducts are present.

3. If there is a cost increase, who will bear the costs? This can include government units, businesses, and individuals.
   For the designs affected, initially subcontractors would bear the cost for insulation, which will ultimately be passed on to the owner. Owners will benefit from a more efficient thermal envelope.

4. Are there any enforcement or compliance cost increases or decreases with the proposed code change? Please explain.
   No.

5. Will the cost of complying with the proposed code change in the first year after the rule takes effect exceed $25,000 for any one small business or small city (Minn. Stat. § 14.127)? A small business is any business that has less than 50 full-time employees. A small city is any statutory or home rule charter city that has less than ten full-time employees. Please explain.
   No.

Regulatory Analysis

1. What parties or segments of industry are affected by this proposed code change?
   Designers, builders, and remodelers, HVAC and insulation contractors, and building inspectors.

2. Can you think of other means or methods to achieve the purpose of the proposed code change? What might someone opposed to this code change suggest instead? Please explain what the alternatives are and why your proposed change is the preferred method or means to achieve the desired result.
   No.

3. What are the probable costs or consequences of not adopting the code change, including those costs or consequences borne by identifiable categories of affected parties, such as separate classes of government units, businesses, or individuals?
   Cost consequences are unknown. Not adopting the change yields to continued confusion in design and enforcement, as well as a lack of insulation in floor assemblies containing ductwork.

4. Are you aware of any federal or state regulation or requirement related to this proposed code change? If so, please list the federal or state regulation or requirement and your assessment of any differences between the proposed code change and the federal regulation or requirement.
   No.

See proposed code modifications on next page…

Summary

This proposal is #2 in a package of 7 related changes that seek to amend and clarify duct insulation, as well as provide guidance on how to address insulation in floors, walls, and ceilings where ducts are present, in both new and existing construction. Additionally, this proposal removes one of the options that required floor insulation to be in constant contact with the subfloor. It also clarifies that a minimum amount of floor insulation must be maintained between the duct and unconditioned space where ducts are located within floor cavities.

R402.2.7 Floors. Floor *cavity insulation* shall be installed in accordance with manufacturer instructions to maintain required *R*-value and placement, and comply with ~~one of~~ the following:

~~1. Installation shall be installed to maintain permanent contact with the underside of the subfloor decking in accordance with manufacturer instructions to maintain required *R*-value or readily fill the available cavity space.~~

~~3.~~ 1. ~~A~~ Where a combination of cavity and continuous insulation ~~shall be~~ is installed, ~~so that~~ the cavity insulation ~~is~~ shall be in contact with the ~~top side of the~~ continuous insulation ~~that is installed on the underside of the floor framing separating the cavity and the unconditioned space below.~~ and ~~T~~the combined *R*-value ~~of the cavity and continuous insulation~~ shall not be less than ~~equal~~ the required *R*-value for floors. ~~Insulation shall extend from the bottom to the top of all perimeter floor framing members and the framing members shall be air sealed.~~

~~2.~~ 2. ~~Floor framing cavity insulation shall be permitted to be in contact with the top side of sheathing separating the cavity and the unconditioned space below. Insulation shall extend from the bottom to the top of all perimeter floor framing members and the framing members shall be air sealed.~~ Where floor insulation does not fill the framing cavity, the floor perimeter shall be insulated for the full height not less than the required R-value for walls.

R402.2.7.1 Floor cavities containing ducts. Where floor cavities over unconditioned space contain ducts, the floor insulation value in the space separating the duct from unconditioned space shall not be less than *R*-30, excluding the R-value of the duct.

Exceptions:

1. Floor cavities that contain ducts and are unable to meet the required *R*-value shall require the floor assembly to meet a *U*-factor of .033 in Climate Zone 6 and .028 in Climate Zone 7.
2. Portions of floor cavities containing ducts extended to an *addition* from an existing heating and cooling system shall not be required to comply with R402.2.7.1 provided the cavity is filled with insulation. Ducts shall be insulated in accordance with Section R403.3.

DEPARTMENT OF LABOR AND INDUSTRY

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: Steve Shold

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Telephone number: 651-284-5312

Firm/Association affiliation, if any: Dept of Labor

Date: 12/21/23

Model Code: 2021 IECC-R

Code or Rule Section:

Code or rule section to be changed: Table R402.4.1.1 - Floor insulation

Intended for Technical Advisory Group ("TAG"):

General Information	**Yes**	**No**
A. Is the proposed change unique to the State of Minnesota?	☒	☐
B. Is the proposed change required due to climatic conditions of Minnesota?	☒	☐
C. Will the proposed change encourage more uniform enforcement?	☒	☐
D. Will the proposed change remedy a problem?	☒	☐
E. Does the proposal delete a current Minnesota Rule, chapter amendment?	☒	☐
F. Would this proposed change be appropriate through the ICC code development process?	☒	☐

Proposed Language

1. The proposed code change is meant to:

   ☐ change language contained the model code book? If so, list section(s).
   Yes, Table R402.4.1.1.

   ☐ change language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).
   No.

   ☐ delete language contained in the model code book? If so, list section(s).
   No.

   ☐ delete language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).
   No.

   ☐ add new language that is not found in the model code book or in Minnesota Rule.
   Yes, see language below.

2. Is this proposed code change required by Minnesota Statute? If so, please provide the citation.
   No.

3. Provide *specific* language you would like to see changed. Indicate proposed new words with underlining and ~~strikethrough~~ words proposed for deletion. Include the entire code (sub) section or rule subpart that contains your proposed changes.
   See language below.

4. Will this proposed code change impact other sections of a model code book or an amendment in Minnesota Rule? If so, please list the affected sections or rule parts.
   Yes, this is part of a 7-proposal series that will align the affected sections including: R403.3, R402.2.1, R402.2.7, Table R402.4.1.1, R502.3.2, and R503.1.2.

Need and Reason

1. Why is the proposed code change needed? Please provide a general explanation as well as a specific explanation for any changes to numerical values (heights, area, etc.)
   It is not necessary for floor insulation to be in contact with the underside of the subfloor provided that the perimeter of the floor is insulated like an exterior wall. Removing this requirement allows flexibility for the designer and installer. This also provides clarification for the intent of the floor insulation requirements and aligns the table with proposed language for floor insulation in proposal RE-25.

2. Why is the proposed code change a reasonable solution?
   See explanation directly above.

3. What other factors should the TAG consider?
   Proposal RE-25.

Cost/Benefit Analysis

1. Will the proposed code change increase or decrease costs? Please explain and provide estimates if possible.
   Should have little to no effect on costs.

2. If there is an increased cost, will this cost be offset by a safety or other benefit? Please explain. If the benefit is quantifiable (for example energy savings), provide an estimate if possible.
   NA

3. If there is a cost increase, who will bear the costs? This can include government units, businesses, and individuals.
   NA

4. Are there any enforcement or compliance cost increases or decreases with the proposed code change? Please explain.
   No.

5. Will the cost of complying with the proposed code change in the first year after the rule takes effect exceed $25,000 for any one small business or small city (Minn. Stat. § 14.127)? A small business is any business that has less than 50 full-time employees. A small city is any statutory or home rule charter city that has less than ten full-time employees. Please explain.
   No.

Regulatory Analysis

1. What parties or segments of industry are affected by this proposed code change?
   Designers, builders, and remodelers, HVAC and insulation contractors, and building inspectors.

2. Can you think of other means or methods to achieve the purpose of the proposed code change? What might someone opposed to this code change suggest instead? Please explain what the alternatives are and why your proposed change is the preferred method or means to achieve the desired result.
   No.

3. What are the probable costs or consequences of not adopting the code change, including those costs or consequences borne by identifiable categories of affected parties, such as separate classes of government units, businesses, or individuals?
   Unknown cost implications, likely little to none.

4. Are you aware of any federal or state regulation or requirement related to this proposed code change? If so, please list the federal or state regulation or requirement and your assessment of any differences between the proposed code change and the federal regulation or requirement.
   No.

Summary

This proposal is #3 in a package of 7 related changes that seek to amend and clarify duct insulation, as well as provide guidance on how to address insulation in floors, walls, and ceilings where ducts are present, in both new and existing construction.

Table R402.4.1.1

COMPONENT	AIR BARRIER CRITERIA	INSULATION INSTALLATION CRITERIA
Floors, including cantilevered floors and floors above garages	The air barrier shall be installed at any exposed edge of insulation.	~~Floor framing cavity insulation shall be installed to maintain permanent contact with the underside of subfloor decking. Alternatively, floor framing cavity insulation shall be in contact with the top side of sheathing, or continuous insulation installed on the underside of floor framing and extending from the bottom to the top of all perimeter floor framing members.~~ Where a combination of cavity and continuous insulation is installed, the cavity insulation shall be in contact with the continuous insulation and the combined *R*-value shall be not less than the required *R*-value for floors. Where floor insulation does not fill the framing cavity, the floor perimeter shall be insulated for the full height not less than the required R-value for walls.

DEPARTMENT OF LABOR AND INDUSTRY

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: Steve Shold

Email address: steve.shold@state.mn.us

Telephone number: 651-284-5312

Firm/Association affiliation, if any: Dept of Labor

Date: 12/21/23

Model Code: 2021 IECC-R

Code or Rule Section:

Code or rule section to be changed: Section R402.XX - Wall insulation

Intended for Technical Advisory Group ("TAG"):

General Information	**Yes**	**No**
A. Is the proposed change unique to the State of Minnesota?	☒	☐
B. Is the proposed change required due to climatic conditions of Minnesota?	☒	☐
C. Will the proposed change encourage more uniform enforcement?	☒	☐
D. Will the proposed change remedy a problem?	☒	☐
E. Does the proposal delete a current Minnesota Rule, chapter amendment?	☒	☐
F. Would this proposed change be appropriate through the ICC code development process?	☒	☐

Proposed Language

1. The proposed code change is meant to:

   ☐ change language contained the model code book? If so, list section(s).
   No.

   ☐ change language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).
   No.

   ☐ delete language contained in the model code book? If so, list section(s).
   No.

   ☐ delete language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).
   No.

   ☐ add new language that is not found in the model code book or in Minnesota Rule.
   Yes, see language below.

2. Is this proposed code change required by Minnesota Statute? If so, please provide the citation.
   In a manner of speaking, yes, due to durability requirements located in MS 326B.118.

3. Provide *specific* language you would like to see changed. Indicate proposed new words with underlining and ~~strikethrough~~ words proposed for deletion. Include the entire code (sub) section or rule subpart that contains your proposed changes.
   See language below.

4. Will this proposed code change impact other sections of a model code book or an amendment in Minnesota Rule? If so, please list the affected sections or rule parts.
   Yes, this is part of a 7-proposal series that will align the affected sections including: R403.3, R402, R402.2.1, R402.2.7, Table R402.4.1.1, R502.3.2, and R503.1.2.

Need and Reason

1. Why is the proposed code change needed? Please provide a general explanation as well as a specific explanation for any changes to numerical values (heights, area, etc.)
   The code currently would allow ductwork to be installed in a wall cavity without requiring the minimum R-value of the cavity or assembly to be upheld.

2. Why is the proposed code change a reasonable solution?
   This is important to prevent having wall cavities that lack insulation due to installing duct runs inside them. This also keeps the duct to the conditioned side of the assembly, increasing the efficiency of the duct. This proposal parallels that which was written for ducts in floors by maintaining the insulation levels between duct and unconditioned space. Where the space is not there, the insulation *can* be reduced but requires the assembly or overall U-factor requirements to be met for walls based on climate zone. Without this statement, there is not language to ensure insulation is not reduced to accommodate ductwork.

   Some may question why this is not located in the section regarding *Duct Insulation* (R403.3), that is because this content has to do with minimum ***wall*** insulation, whereas it had been in R403.3 "Duct insulation" not for the purpose of wall insulation, but only to indicate when ducts could be "considered" to be within conditioned space. With approval of RE-24, ducts would need to actually be *physically* located within conditioned space to be regarded as "within conditioned space". Therefore, any criteria regarding wall insulation belongs in Section R402 for the thermal envelope.

3. What other factors should the TAG consider?
   Proposals #24-30 which are related.

Cost/Benefit Analysis

1. Will the proposed code change increase or decrease costs? Please explain and provide estimates if possible.
   This proposal will have a minimal impact on cost. It will only affect instances where ductwork is run in exterior walls and where there is a physical space limitation to accommodate both the duct and the insulation.

2. If there is an increased cost, will this cost be offset by a safety or other benefit? Please explain. If the benefit is quantifiable (for example energy savings), provide an estimate if possible.
   The benefit will be maintaining minimum insulation levels in wall assemblies, lending to increased efficiency, and increasing the efficacy of air conveyed through the ductwork by keeping it on the interior side of the insulation. Additionally, the proposal aligns insulation requirements for walls and floors, if RE-26 is accepted.

3. If there is a cost increase, who will bear the costs? This can include government units, businesses, and individuals.

For the designs affected, initially subcontractors would bear the cost for insulation, which will ultimately be passed on to the owner. Owners will benefit from a more efficient thermal envelope.

4. Are there any enforcement or compliance cost increases or decreases with the proposed code change? Please explain.
   No.

5. Will the cost of complying with the proposed code change in the first year after the rule takes effect exceed $25,000 for any one small business or small city (Minn. Stat. § 14.127)? A small business is any business that has less than 50 full-time employees. A small city is any statutory or home rule charter city that has less than ten full-time employees. Please explain.
   No.

Regulatory Analysis

1. What parties or segments of industry are affected by this proposed code change?
   Designers, builders, and remodelers, HVAC and insulation contractors, and building inspectors.

2. Can you think of other means or methods to achieve the purpose of the proposed code change? What might someone opposed to this code change suggest instead? Please explain what the alternatives are and why your proposed change is the preferred method or means to achieve the desired result.
   No.

3. What are the probable costs or consequences of not adopting the code change, including those costs or consequences borne by identifiable categories of affected parties, such as separate classes of government units, businesses, or individuals?
   Cost consequences are unknown. Not adopting the change yields to continued confusion in design and enforcement, as well as a lack of insulation in wall assemblies containing ductwork.

4. Are you aware of any federal or state regulation or requirement related to this proposed code change? If so, please list the federal or state regulation or requirement and your assessment of any differences between the proposed code change and the federal regulation or requirement.
   No.

Summary

This proposal is #4 in a package of 7 related changes that seek to amend and clarify duct insulation, as well as provide guidance on how to address insulation in floors, walls, and ceilings where ducts are present, in both new and existing construction.

NOTE: *The following section could be added in a couple places in R402 and moved around to suit since there is presently not a "wood wall insulation" section in R402. Depending on acceptance and placement, this could require renumbering other sections in R402 to accommodate.*

R402.XX Wall cavities containing ducts. Where wall cavities separating conditioned space from unconditioned space contain ducts, the wall insulation value in the space separating the duct from the unconditioned space shall not be less than the required R-value, excluding the R-value of the duct insulation.

DEPARTMENT OF LABOR AND INDUSTRY

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: Steve Shold

Email address: steve.shold@state.mn.us

Telephone number: 651-284-5312

Firm/Association affiliation, if any: Dept of Labor

Date: 12/21/23

Model Code: 2021 IECC-R

Code or Rule Section:

Code or rule section to be changed: Section R402.2.1 - Ceiling insulation

Intended for Technical Advisory Group ("TAG"):

General Information	**Yes**	**No**
A. Is the proposed change unique to the State of Minnesota?	☒	☐
B. Is the proposed change required due to climatic conditions of Minnesota?	☒	☐
C. Will the proposed change encourage more uniform enforcement?	☒	☐
D. Will the proposed change remedy a problem?	☒	☐
E. Does the proposal delete a current Minnesota Rule, chapter amendment?	☒	☐
F. Would this proposed change be appropriate through the ICC code development process?	☒	☐

Proposed Language

1. The proposed code change is meant to:

   ☐ change language contained the model code book? If so, list section(s).
   Yes, see language below.

   ☐ change language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).
   Yes, see language below.

   ☐ delete language contained in the model code book? If so, list section(s).
   Yes, see language below.

   ☐ delete language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).
   Yes, see language below.

   ☐ add new language that is not found in the model code book or in Minnesota Rule.
   Yes, see language below.

2. Is this proposed code change required by Minnesota Statute? If so, please provide the citation.
   In a manner of speaking, yes, due to durability requirements located in MS 326B.118.

3. Provide *specific* language you would like to see changed. Indicate proposed new words with underlining and ~~strikethrough~~ words proposed for deletion. Include the entire code (sub) section or rule subpart that contains your proposed changes.
   See language below.

4. Will this proposed code change impact other sections of a model code book or an amendment in Minnesota Rule? If so, please list the affected sections or rule parts.
   Yes, this is part of a 7 proposal series that will align the affected sections including: R403.3, R402, R402.2.1, R402.2.7, Table R402.4.1.1, R502.3.2, and R503.1.2.

Need and Reason

1. Why is the proposed code change needed? Please provide a general explanation as well as a specific explanation for any changes to numerical values (heights, area, etc.)
   The code currently would allow ductwork to be installed within attic insulation above a ceiling without requiring the minimum R-value to be upheld. The first sentence is stricken as it pertains to climate zones outside of MN.

2. Why is the proposed code change a reasonable solution?
   Adding insulation alongside and above ductwork in attic space is a relatively simple thing to do, as there is typically adequate space to accommodate the insulation, with minimal additional time or effort.

   Some may question why this is not located in the section regarding *Duct Insulation* (R403.3), that is because this content has to do with minimum ***attic*** insulation, whereas it had been in R403.3 "Duct insulation" not for the purpose of floor insulation, but only to indicate when ducts could be "considered" to be within conditioned space. With approval of RE-24, ducts would need to actually be *physically* located within conditioned space to be regarded as "within conditioned space". Therefore, any criteria regarding attic insulation belongs in Section R402 for the thermal envelope along with other requirements specific to attic insulation.

3. What other factors should the TAG consider?
   Proposals #24-30 which are related.

Cost/Benefit Analysis

1. Will the proposed code change increase or decrease costs? Please explain and provide estimates if possible.
   This proposal will have a minimal impact on cost. It will only affect instances where ductwork is run in attic space under or within the insulation – primarily in slab-on-grade homes.

2. If there is an increased cost, will this cost be offset by a safety or other benefit? Please explain. If the benefit is quantifiable (for example energy savings), provide an estimate if possible.
   The benefit will be maintaining minimum insulation levels in attic assemblies, lending to increased efficiency, and increasing the efficacy of air conveyed through the ductwork by keeping it on the interior side of the insulation. Additionally, the proposal gives clarity to insulation requirements for attics where ducts are present.

3. If there is a cost increase, who will bear the costs? This can include government units, businesses, and individuals.
   For the designs affected, initially subcontractors would bear the cost for insulation, which will ultimately be passed on to the owner. Owners will benefit from a more efficient thermal envelope.

4. Are there any enforcement or compliance cost increases or decreases with the proposed code change? Please explain.
   No.

5. Will the cost of complying with the proposed code change in the first year after the rule takes effect exceed $25,000 for any one small business or small city (Minn. Stat. § 14.127)? A small business is any business that has less than 50 full-time employees. A small city is any statutory or home rule charter city that has less than ten full-time employees. Please explain.
   No.

Regulatory Analysis

1. What parties or segments of industry are affected by this proposed code change?
   Designers, builders, and remodelers, HVAC and insulation contractors, and building inspectors.

2. Can you think of other means or methods to achieve the purpose of the proposed code change? What might someone opposed to this code change suggest instead? Please explain what the alternatives are and why your proposed change is the preferred method or means to achieve the desired result.
   No.

3. What are the probable costs or consequences of not adopting the code change, including those costs or consequences borne by identifiable categories of affected parties, such as separate classes of government units, businesses, or individuals?
   Cost consequences are unknown. Not adopting the change yields to continued confusion in design and enforcement, as well as a lack of insulation in attic assemblies containing ductwork.

4. Are you aware of any federal or state regulation or requirement related to this proposed code change? If so, please list the federal or state regulation or requirement and your assessment of any differences between the proposed code change and the federal regulation or requirement.
   No.

See proposed code modifications on next page…

Summary

This proposal is #5 in a package of 7 related changes that seek to amend and clarify duct insulation, as well as provide guidance on how to address insulation in floors, walls, and ceilings where ducts are present, in both new and existing construction.

Note: *The first sentence is removed as it does not pertain to MN climate zones. Section R402.2.1 is derived from R403.3.3 and relocated here since this has to do with maintaining ceiling R-value, and not the actual duct insulation. It was used in R403 to craft when ducts could be "considered to be located inside conditioned space", though they are not. I removed the provision to "consider" ducts in conditioned space in RE-24.*

R402.2.1 Ceilings with attics. ~~Where Section R402.1.3 requires R-49 insulation in the ceiling or attic, installing R-38 over 100 percent of the ceiling or attic area requiring insulation shall 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.~~ Where Section R402.1.3 requires R-60 insulation in the ceiling, installing R-49 over 100 percent of the ceiling area requiring insulation shall satisfy the requirement for R-60 insulation wherever the full height of uncompressed R-49 insulation extends over the wall top plate at the eaves. This reduction shall not apply to the insulation and fenestration criteria in Section R402.1.2 and the Total UA alternative in Section R402.1.5.

R402.2.2 Ceilings without attics. Where Section R402.1.3 requires insulation *R*-values greater than R-30 in the interstitial space above a ceiling and below the structural roof deck, and the design of the roof/ceiling assembly does not allow sufficient space for the required insulation, the minimum required insulation *R*-value for such roof/ceiling assemblies shall be R-30. Insulation shall extend over the top of the wall plate to the outer edge of such plate and shall not be compressed. This reduction of insulation from the requirements of Section R402.1.3 shall be limited to 500 square feet (46 m2) or 20 percent of the total insulated ceiling area, whichever is less. This reduction shall not apply to the Total UA alternative in Section R402.1.5.

R402.2.3 Ceiling insulation containing buried ducts. At all points along each duct, the sum of the ceiling insulation *R*-value against and above the top of the duct, and against and below the bottom of the duct, shall be not less than the required ceiling *R*-value, excluding the *R*-value of the duct insulation.

DEPARTMENT OF LABOR AND INDUSTRY

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: Steve Shold

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Telephone number: 651-284-5312

Firm/Association affiliation, if any: Dept of Labor

Date: 12/21/23

Model Code: 2021 IECC-R

Code or Rule Section:

Code or rule section to be changed: Section R502.3.2 – Heating and cooling systems (for **Additions**)

Intended for Technical Advisory Group ("TAG"):

General Information	**Yes**	**No**
A. Is the proposed change unique to the State of Minnesota?	☒	☐
B. Is the proposed change required due to climatic conditions of Minnesota?	☒	☐
C. Will the proposed change encourage more uniform enforcement?	☒	☐
D. Will the proposed change remedy a problem?	☒	☐
E. Does the proposal delete a current Minnesota Rule, chapter amendment?	☒	☐
F. Would this proposed change be appropriate through the ICC code development process?	☒	☐

Proposed Language

1. The proposed code change is meant to:

   ☐ change language contained the model code book? If so, list section(s).
   Yes, see language below.

   ☐ change language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).
   No.

   ☐ delete language contained in the model code book? If so, list section(s).
   No.

   ☐ delete language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).
   No.

   ☐ add new language that is not found in the model code book or in Minnesota Rule.
   Yes, see language below.

2. Is this proposed code change required by Minnesota Statute? If so, please provide the citation.
   In a manner of speaking, yes, due to durability requirements located in MS 326B.118.

3. Provide *specific* language you would like to see changed. Indicate proposed new words with underlining and ~~strikethrough~~ words proposed for deletion. Include the entire code (sub) section or rule subpart that contains your proposed changes.
   See language below.

4. Will this proposed code change impact other sections of a model code book or an amendment in Minnesota Rule? If so, please list the affected sections or rule parts.
   Yes, this is part of a 7-proposal series that will align the affected sections including: R403.3, R402, R402.2.1, R402.2.7, Table R402.4.1.1, R502.3.2, and R503.1.2.

Need and Reason

1. Why is the proposed code change needed? Please provide a general explanation as well as a specific explanation for any changes to numerical values (heights, area, etc.)
   The current exception listed in the '21 IECC-R Section R502.3.2 removes the requirement to insulate portions of *new* ductwork when existing ducts are extended to an addition (pertaining to portions of new duct that are outside the conditioned envelope). This would reduce the effectiveness of the added ductwork, and could allow condensation to form, lending to leaks and repair costs. The proposed change would mean that extended portions of ducts need to be insulated, but still allow them to be exempt from sealing and testing.

2. Why is the proposed code change a reasonable solution?
   MN required ducts outside conditioned space to be insulated in the current code cycle. The model code language would weaken current requirements.

3. What other factors should the TAG consider?
   Proposals #24-30 which are related.

Cost/Benefit Analysis

1. Will the proposed code change increase or decrease costs? Please explain and provide estimates if possible.
   This proposal will have a minimal impact on cost, as this is how the Energy code currently regulates ductwork (see MR 1322.0100 Subp. 3 A). It will only affect instances where ductwork is extended into a new addition from an existing run and cannot be located within the conditioned envelope.

2. If there is an increased cost, will this cost be offset by a safety or other benefit? Please explain. If the benefit is quantifiable (for example energy savings), provide an estimate if possible.
   It will not cost more than current regulations require.

3. If there is a cost increase, who will bear the costs? This can include government units, businesses, and individuals.
   It will not cost more than current regulations require.

4. Are there any enforcement or compliance cost increases or decreases with the proposed code change? Please explain.
   No.

5. Will the cost of complying with the proposed code change in the first year after the rule takes effect exceed $25,000 for any one small business or small city (Minn. Stat. § 14.127)? A small business is any business that has less than 50 full-time employees. A small city is any statutory or home rule charter city that has less than ten full-time employees. Please explain.
   No.

Regulatory Analysis

1. What parties or segments of industry are affected by this proposed code change?
   Designers, builders, and remodelers, HVAC and insulation contractors, and building inspectors.

2. Can you think of other means or methods to achieve the purpose of the proposed code change? What might someone opposed to this code change suggest instead? Please explain what the alternatives are and why your proposed change is the preferred method or means to achieve the desired result.
   No.

3. What are the probable costs or consequences of not adopting the code change, including those costs or consequences borne by identifiable categories of affected parties, such as separate classes of government units, businesses, or individuals?
   Specific numbers are unknown. Cost consequences could be repairs necessary from condensation leaking into floor/ceiling assemblies, as well as lost efficiency and lost ductwork efficacy.

4. Are you aware of any federal or state regulation or requirement related to this proposed code change? If so, please list the federal or state regulation or requirement and your assessment of any differences between the proposed code change and the federal regulation or requirement.
   No.

Summary

This proposal is #6 in a package of 7 related changes that seek to amend and clarify duct insulation, as well as provide guidance on how to address insulation in floors, walls, and ceilings where ducts are present, in both new and existing construction.

Note: *R403.3.5 – R403.3.7 are the adjusted section references based on code change RE-24 -- R403 for Sealing, Duct testing, and Duct leakage.*

R502.3.2 Heating and cooling systems. HVAC ducts newly installed as part of an *addition* shall comply with Section R403.

Exception: ~~Where d~~Ducts extended to an *addition* from an existing heating and cooling system ~~are extended to an *addition*~~shall not be required to comply with Sections R403.3.4 through R403.3.6.

DEPARTMENT OF LABOR AND INDUSTRY

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: Steve Shold

Email address: steve.shold@state.mn.us

Telephone number: 651-284-5312

Firm/Association affiliation, if any: Dept of Labor

Date: 12/21/23

Model Code: 2021 IECC-R

Code or Rule Section:

Code or rule section to be changed: Section R503.1.2 – Heating and cooling systems (for Alterations)

Intended for Technical Advisory Group ("TAG"):

General Information	**Yes**	**No**
A. Is the proposed change unique to the State of Minnesota?	☒	☐
B. Is the proposed change required due to climatic conditions of Minnesota?	☒	☐
C. Will the proposed change encourage more uniform enforcement?	☒	☐
D. Will the proposed change remedy a problem?	☒	☐
E. Does the proposal delete a current Minnesota Rule, chapter amendment?	☒	☐
F. Would this proposed change be appropriate through the ICC code development process?	☒	☐

Proposed Language

1. The proposed code change is meant to:

   ☐ change language contained the model code book? If so, list section(s).
   Yes, see language below.

   ☐ change language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).
   No.

   ☐ delete language contained in the model code book? If so, list section(s).
   No.

   ☐ delete language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).
   No.

   ☐ add new language that is not found in the model code book or in Minnesota Rule.
   Yes, see language below.

2. Is this proposed code change required by Minnesota Statute? If so, please provide the citation.
   In a manner of speaking, yes, due to durability requirements located in MS 326B.118.

3. Provide *specific* language you would like to see changed. Indicate proposed new words with underlining and ~~strikethrough~~ words proposed for deletion. Include the entire code (sub) section or rule subpart that contains your proposed changes.
   See language below.

4. Will this proposed code change impact other sections of a model code book or an amendment in Minnesota Rule? If so, please list the affected sections or rule parts.
   Yes, this is part of a 7-proposal series that will align the affected sections including: R403.3, R402, R402.2.1, R402.2.7, Table R402.4.1.1, R502.3.2, and R503.1.2.

Need and Reason

1. Why is the proposed code change needed? Please provide a general explanation as well as a specific explanation for any changes to numerical values (heights, area, etc.)
   The current exception listed in the '21 IECC-R Section R503.1.2 removes the requirement to insulate portions of *new* ductwork when existing ducts are extended to an addition (pertaining to portions of new duct that are outside the conditioned envelope). This would reduce the effectiveness of the added ductwork, and could allow condensation to form, lending to leaks and repair costs. The proposed change would mean that extended portions of ducts need to be insulated, but still allow them to be exempt from sealing and testing.

   This also serves to align language with requirements for Additions (proposal RE-29).

2. Why is the proposed code change a reasonable solution?
   MN required ducts outside conditioned space to be insulated in the current code cycle. The model code language would weaken current requirements.

3. What other factors should the TAG consider?
   Proposals #24-30 which are related.

Cost/Benefit Analysis

1. Will the proposed code change increase or decrease costs? Please explain and provide estimates if possible.
   This proposal will have a minimal impact on cost, as this is how the Energy code currently regulates ductwork (see MR 1322.0100 Subp. 3 A). It will only affect instances where ductwork is extended into a new addition from an existing run and cannot be located within the conditioned envelope.

2. If there is an increased cost, will this cost be offset by a safety or other benefit? Please explain. If the benefit is quantifiable (for example energy savings), provide an estimate if possible.
   It will not cost more than current regulations require.

3. If there is a cost increase, who will bear the costs? This can include government units, businesses, and individuals.
   It will not cost more than current regulations require.

4. Are there any enforcement or compliance cost increases or decreases with the proposed code change? Please explain.
   No.
5. Will the cost of complying with the proposed code change in the first year after the rule takes effect exceed $25,000 for any one small business or small city (Minn. Stat. § 14.127)? A small business is any business that has less than 50 full-time employees. A small city is any statutory or home rule charter city that has less than ten full-time employees. Please explain.
   No.

Regulatory Analysis

1. What parties or segments of industry are affected by this proposed code change?
   Designers, builders, and remodelers, HVAC and insulation contractors, and building inspectors.

2. Can you think of other means or methods to achieve the purpose of the proposed code change? What might someone opposed to this code change suggest instead? Please explain what the alternatives are and why your proposed change is the preferred method or means to achieve the desired result.
   No.

3. What are the probable costs or consequences of not adopting the code change, including those costs or consequences borne by identifiable categories of affected parties, such as separate classes of government units, businesses, or individuals?
   Specific numbers are unknown. Cost consequences could be repairs necessary from condensation leaking into floor/ceiling assemblies, as well as lost efficiency and lost ductwork efficacy.

4. Are you aware of any federal or state regulation or requirement related to this proposed code change? If so, please list the federal or state regulation or requirement and your assessment of any differences between the proposed code change and the federal regulation or requirement.
   No.

Summary

This proposal is #7 in a package of 7 related changes that seek to amend and clarify duct insulation, as well as provide guidance on how to address insulation in floors, walls, and ceilings where ducts are present, in both new and existing construction.

Note: *R403.3.5 – R403.3.7 are the adjusted section references based on code change RE-24 -- R403 for Sealing, Duct testing, and Duct leakage.*

R503.1.2 Heating and cooling systems. HVAC ducts newly installed as part of an *alteration* shall comply with Section R403.

> **Exception:** ~~Where d~~Ducts extended to an *addition* from an existing heating and cooling system ~~are extended to an *addition*~~shall not be required to comply with Sections R403.3.4 through R403.3.6.

DEPARTMENT OF LABOR AND INDUSTRY

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: Steve Shold

Email address: steve.shold@state.mn.us

Telephone number: 651-284-5312

Firm/Association affiliation, if any: Dept of Labor

Date: 1/25/24

Model Code: 2021 IECC-R

Code or Rule Section:

Code or rule section to be changed: Section R202 – Definition of *Residential Building*

Intended for Technical Advisory Group ("TAG"):

General Information	**Yes**	**No**
A. Is the proposed change unique to the State of Minnesota?	☒	☐
B. Is the proposed change required due to climatic conditions of Minnesota?	☐	☒
C. Will the proposed change encourage more uniform enforcement?	☒	☐
D. Will the proposed change remedy a problem?	☒	☐
E. Does the proposal delete a current Minnesota Rule, chapter amendment?	☐	☒
F. Would this proposed change be appropriate through the ICC code development process?	☐	☒

Proposed Language

1. The proposed code change is meant to:

   ☐ change language contained the model code book? If so, list section(s).
   Yes, see language below.

   ☐ change language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).
   No.

   ☐ delete language contained in the model code book? If so, list section(s).
   No.

   ☐ delete language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).
   No.

   ☐ add new language that is not found in the model code book or in Minnesota Rule.
   Yes, see language below.

2. Is this proposed code change required by Minnesota Statute? If so, please provide the citation.
   No.

3. Provide *specific* language you would like to see changed. Indicate proposed new words with underlining and ~~strikethrough~~ words proposed for deletion. Include the entire code (sub) section or rule subpart that contains your proposed changes.
   See language below.

4. Will this proposed code change impact other sections of a model code book or an amendment in Minnesota Rule? If so, please list the affected sections or rule parts.
   Yes, this will have an impact on the application of the Scoping criteria.

Need and Reason

1. Why is the proposed code change needed? Please provide a general explanation as well as a specific explanation for any changes to numerical values (heights, area, etc.)
   Presently, due to the definitions and scoping, an accessory building is *technically* scoped to the Commercial Energy Code. In both the '15 MRE and the IECC-R, the definition for a "Residential Building" does *not* include "accessory structures". The definition for a "Commercial Building" states: "For this code, all buildings that are not included in the definition of "Residential buildings". It seems inappropriate to have an accessory building that is accessory to and supports a residential structure (IRC-1,2,3), and that is constructed as a residential building (IRC-4), to be scoped to the commercial energy code. Therefore, it seems fitting to include "accessory building" in the definition for Residential Buildings. The challenge, however, is drawing a distinction between accessory buildings that serve IRC-1,2,3 buildings, and those that serve *commercial* occupancies.

2. Why is the proposed code change a reasonable solution?
   For buildings that are designed constructed under the Residential Building code, scoping them to the Residential Energy code makes more sense and promotes simpler design, construction, and enforcement of requirements.

3. What other factors should the TAG consider?
   The definition and scoping language for the Residential Energy code need to work together. Additionally, the newly adopted MN Commercial Energy Code states the following below. Therefore, IRC-4 must be included in the scoping of the new Residential Energy code.

Subp. 3. **ASHRAE 90.1 section 2.** ASHRAE 90.1 section 2 is amended by adding two subsections to read as follows:

2.5 IRC-1 Single-family dwellings, IRC-2 Two-family dwellings, IRC-3 Townhomes, IRC-4 Utility buildings, and the portions of buildings containing occupancy groups I-1, R-1, R-2, R-3, and R-4 where the entire composite building structure is three or fewer stories above grade shall comply with Minnesota Rules, chapter 1322.

2.6 Where a building contains multiple occupancy groups and portions of the building are required to comply with Minnesota Rules, chapter 1322, those portions shall comply with Minnesota Rules, chapter 1322, and the remainder of the building shall comply with this rules chapter.

Statutory Authority: *MS s 326B.02; 326B.101; 326B.106*

History: *47 SR 983*

Cost/Benefit Analysis

1. Will the proposed code change increase or decrease costs? Please explain and provide estimates if possible.
   No.

2. If there is an increased cost, will this cost be offset by a safety or other benefit? Please explain. If the benefit is quantifiable (for example energy savings), provide an estimate if possible.
   NA

3. If there is a cost increase, who will bear the costs? This can include government units, businesses, and individuals.
   NA

4. Are there any enforcement or compliance cost increases or decreases with the proposed code change? Please explain.
   No.

5. Will the cost of complying with the proposed code change in the first year after the rule takes effect exceed $25,000 for any one small business or small city (Minn. Stat. § 14.127)? A small business is any business that has less than 50 full-time employees. A small city is any statutory or home rule charter city that has less than ten full-time employees. Please explain.
   NA

Regulatory Analysis

1. What parties or segments of industry are affected by this proposed code change?
   Designers, builders, and remodelers, HVAC and insulation contractors, and building inspectors.

2. Can you think of other means or methods to achieve the purpose of the proposed code change? What might someone opposed to this code change suggest instead? Please explain what the alternatives are and why your proposed change is the preferred method or means to achieve the desired result.
   No.

3. What are the probable costs or consequences of not adopting the code change, including those costs or consequences borne by identifiable categories of affected parties, such as separate classes of government units, businesses, or individuals?
   If the newest Residential Energy code does not include accessory structures in the definitions and scoping, enforcement will be confusing as the scoping will have to be reference from the new Commercial Energy code.

4. Are you aware of any federal or state regulation or requirement related to this proposed code change? If so, please list the federal or state regulation or requirement and your assessment of any differences between the proposed code change and the federal regulation or requirement.
   No.

RESIDENTIAL BUILDING. For this ~~code~~chapter, includes~~ detached one and two family dwellings and townhouses as well as Group~~ IRC-1 Single-family dwellings, IRC-2 Two-family dwellings, IRC-3 Townhomes, IRC-4 Accessory structures, and the portions of buildings containing groups I-1, R-2, R-3 and R-4 where the entire composite buildings~~ structure is~~ three or fewer stories ~~or less in height~~ above grade~~ plane~~.

DEPARTMENT OF LABOR AND INDUSTRY

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: Steve Shold

Email address: steve.shold@state.mn.us

Telephone number: 651-284-5312

Firm/Association affiliation, if any: Dept of Labor

Date: 2/15/24

Model Code: 2021 IECC-R

Code or Rule Section:

Code or rule section to be changed: Section R402.2.12 & .13 – Sunroom & Garage/Accessory structure insulation

Intended for Technical Advisory Group ("TAG"):

General Information	**Yes**	**No**
A. Is the proposed change unique to the State of Minnesota?	☒	☐
B. Is the proposed change required due to climatic conditions of Minnesota?	☒	☐
C. Will the proposed change encourage more uniform enforcement?	☒	☐
D. Will the proposed change remedy a problem?	☒	☐
E. Does the proposal delete a current Minnesota Rule, chapter amendment?	☐	☒
F. Would this proposed change be appropriate through the ICC code development process?	☒	☐

Proposed Language

1. The proposed code change is meant to:

   ☐ change language contained the model code book? If so, list section(s).
   Yes, see language below.

   ☐ change language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).
   No

   ☐ delete language contained in the model code book? If so, list section(s).
   No.

   ☐ delete language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).
   No.

   ☐ add new language that is not found in the model code book or in Minnesota Rule.
   Yes, see language below.

2. Is this proposed code change required by Minnesota Statute? If so, please provide the citation.

No.

3. Provide *specific* language you would like to see changed. Indicate proposed new words with underlining and ~~strikethrough~~ words proposed for deletion. Include the entire code (sub) section or rule subpart that contains your proposed changes.
   See language below.

4. Will this proposed code change impact other sections of a model code book or an amendment in Minnesota Rule? If so, please list the affected sections or rule parts.
   Yes, new section R402.2.13 will now be referenced in R502.2 (this change is located in a subsequent proposal).

Need and Reason

1. Why is the proposed code change needed? Please provide a general explanation as well as a specific explanation for any changes to numerical values (heights, area, etc.)
   Sunrooms and garages have different needs, so it makes sense to separate them out. The insulation requirements for garages and accessory structures have been severely lacking in past codes, so additional details and guidance will promote uniformity.

2. Why is the proposed code change a reasonable solution?
   Exceptions and breaks provided in the '21 IECC-R were maintained, but sections were made more specific.

3. What other factors should the TAG consider?
   NA

Cost/Benefit Analysis

1. Will the proposed code change increase or decrease costs? Please explain and provide estimates if possible.
   This proposal will have a minimal impact on cost. Most structures referenced are being insulated, it mainly promotes clarity and uniformity.

2. If there is an increased cost, will this cost be offset by a safety or other benefit? Please explain. If the benefit is quantifiable (for example energy savings), provide an estimate if possible.
   NA

3. If there is a cost increase, who will bear the costs? This can include government units, businesses, and individuals.
   If projects are affected, initially subcontractors would bear the cost for insulation, which will ultimately be passed on to the owner. Owners will benefit from a more efficient thermal envelope.

4. Are there any enforcement or compliance cost increases or decreases with the proposed code change? Please explain.
   No.

5. Will the cost of complying with the proposed code change in the first year after the rule takes effect exceed $25,000 for any one small business or small city (Minn. Stat. § 14.127)? A small business is any business that has less than 50 full-time employees. A small city is any statutory or home rule charter city that has less than ten full-time employees. Please explain.
   No.

Regulatory Analysis

1. What parties or segments of industry are affected by this proposed code change?
   Designers, builders, and remodelers, insulation contractors, and building inspectors.

2. Can you think of other means or methods to achieve the purpose of the proposed code change? What might someone opposed to this code change suggest instead? Please explain what the alternatives are and why your proposed change is the preferred method or means to achieve the desired result.
   No.

3. What are the probable costs or consequences of not adopting the code change, including those costs or consequences borne by identifiable categories of affected parties, such as separate classes of government units, businesses, or individuals?
   Not adopting the change yields to continued confusion in design and enforcement in these structures.

4. Are you aware of any federal or state regulation or requirement related to this proposed code change? If so, please list the federal or state regulation or requirement and your assessment of any differences between the proposed code change and the federal regulation or requirement.
   No.

Summary

This proposal separates out insulation requirements for sunrooms and garages/accessory structures, and provides exceptions for existing construction.

R402.2.12 Sunroom ~~and heated garage~~ insulation. *Sunrooms* enclosing *conditioned space* ~~and heated garages~~ shall meet the insulation requirements of this code.

> **Exception:** For *sunrooms* ~~and heated garages~~ provided *thermal isolation*, and enclosed *conditioned space*, the following exceptions to the insulation requirements of this code shall apply:
>
> 1. The minimum ceiling insulation *R*-values shall be ~~R-19 in *Climate Zones* 0 through 4 and~~ R-24 ~~in *Climate Zones* 5 through 8~~.
> 2. The minimum wall insulation *R*-value shall be R-13 ~~in all *climate zones*~~. Walls separating a *sunroom* ~~or heated garage~~ with *thermal isolation* from *conditioned space* shall comply with the *building thermal envelope* requirements of this code.

R402.2.13 Private garages and accessory structures. Garages and IRC-4 buildings enclosing *conditioned space* shall meet the insulation requirements of this code.

> **Exception:** For existing private garages and accessory structures that are altered to become *conditioned space*, the following exceptions to the insulation requirements of this code shall apply:
>
> 1. Slab-on-grade floor edges, foundations, and curbs shall be insulated to a minimum R-10 and comply with items a or b:
>   a. Insulation installed on the interior side shall be installed from top of foundation or curb to the top of the floor,
>   b. Insulation installed on the exterior shall be installed from the top of the concrete wall or curb to at least 6" below grade on the exterior, or to paved surfaces when present.
> 2. The minimum ceiling *R*-value shall be R-24.
> 3. The minimum wall insulation *R*-value shall be R-13.

DEPARTMENT OF LABOR AND INDUSTRY

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: Steve Shold

Email address: steve.shold@state.mn.us

Telephone number: 651-284-5312

Firm/Association affiliation, if any: Dept of Labor

Date: 2/15/24

Model Code: 2021 IECC-R

Code or Rule Section:

Code or rule section to be changed: Section R402.3.5 & .6 – Sunroom & Garage/Accessory Structure Fenestration

Intended for Technical Advisory Group ("TAG"):

General Information	**Yes**	**No**
A. Is the proposed change unique to the State of Minnesota?	☒	☐
B. Is the proposed change required due to climatic conditions of Minnesota?	☒	☐
C. Will the proposed change encourage more uniform enforcement?	☒	☐
D. Will the proposed change remedy a problem?	☒	☐
E. Does the proposal delete a current Minnesota Rule, chapter amendment?	☐	☒
F. Would this proposed change be appropriate through the ICC code development process?	☒	☐

Proposed Language

1. The proposed code change is meant to:

   ☐ change language contained the model code book? If so, list section(s).
   Yes, see language below.

   ☐ change language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).
   No

   ☐ delete language contained in the model code book? If so, list section(s).
   No.

   ☐ delete language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).
   No.

   ☐ add new language that is not found in the model code book or in Minnesota Rule.
   Yes, see language below.

2. Is this proposed code change required by Minnesota Statute? If so, please provide the citation.

No.

3. Provide *specific* language you would like to see changed. Indicate proposed new words with underlining and ~~strikethrough~~ words proposed for deletion. Include the entire code (sub) section or rule subpart that contains your proposed changes.
   See language below.

4. Will this proposed code change impact other sections of a model code book or an amendment in Minnesota Rule? If so, please list the affected sections or rule parts.
   Yes, new section R402.3.6 will now be referenced in R502.2 (this change is located in a subsequent proposal).

Need and Reason

1. Why is the proposed code change needed? Please provide a general explanation as well as a specific explanation for any changes to numerical values (heights, area, etc.)
   Sunrooms and garages have different needs, so it makes sense to separate them out. The fenestration requirements for garages and accessory structures have lacked clarity in past codes, so additional details and guidance will promote uniformity.

2. Why is the proposed code change a reasonable solution?
   Exceptions and breaks provided in the '21 IECC-R were maintained, but sections were made more specific. A new exception was added for clarity and uniformity.

3. What other factors should the TAG consider?
   NA

Cost/Benefit Analysis

1. Will the proposed code change increase or decrease costs? Please explain and provide estimates if possible.
   This proposal will have a minimal impact on cost. Most structures referenced are complying, it mainly promotes clarity and uniformity for these structures.

2. If there is an increased cost, will this cost be offset by a safety or other benefit? Please explain. If the benefit is quantifiable (for example energy savings), provide an estimate if possible.
   NA

3. If there is a cost increase, who will bear the costs? This can include government units, businesses, and individuals.
   If projects are affected, initially subcontractors would bear the cost for fenestration, which will ultimately be passed on to the owner. Owners will benefit from a more efficient thermal envelope.

4. Are there any enforcement or compliance cost increases or decreases with the proposed code change? Please explain.
   No.

5. Will the cost of complying with the proposed code change in the first year after the rule takes effect exceed $25,000 for any one small business or small city (Minn. Stat. § 14.127)? A small business is any business that has less than 50 full-time employees. A small city is any statutory or home rule charter city that has less than ten full-time employees. Please explain.
   No.

Regulatory Analysis

1. What parties or segments of industry are affected by this proposed code change?
   Designers, builders, and remodelers, insulation contractors, and building inspectors.

2. Can you think of other means or methods to achieve the purpose of the proposed code change? What might someone opposed to this code change suggest instead? Please explain what the alternatives are and why your proposed change is the preferred method or means to achieve the desired result.
   No.

3. What are the probable costs or consequences of not adopting the code change, including those costs or consequences borne by identifiable categories of affected parties, such as separate classes of government units, businesses, or individuals?
   Not adopting the change yields to continued confusion in design and enforcement in these structures.

4. Are you aware of any federal or state regulation or requirement related to this proposed code change? If so, please list the federal or state regulation or requirement and your assessment of any differences between the proposed code change and the federal regulation or requirement.
   No.

Summary

This proposal separates out fenestration requirements for sunrooms and garages/accessory structures, and provides exceptions for existing construction.

R402.3.5 Sunroom ~~and heated garage~~ fenestration.
Sunrooms ~~and heated garages~~ enclosing *conditioned space* shall comply with the fenestration requirements of this code.

> **Exception:** ~~In Climate Zones 2 through 8, f~~For *sunrooms* ~~and heated garages~~ with *thermal isolation* and enclosing *conditioned space*, the fenestration *U*-factor shall not exceed 0.45 and the skylight *U*-factor shall not exceed 0.70.

New fenestration separating a *sunroom* ~~or heated garage~~ with *thermal isolation* from *conditioned space* shall comply with the *building thermal envelope* requirements of this code.

R402.3.6 Private garage and accessory structure fenestration. Garages and IRC-4 buildings enclosing *conditioned space* shall meet the fenestration requirements of this code.

> **Exceptions:**
> 1. The fenestration *U*-factor shall not exceed 0.45 and the skylight *U*-factor shall not exceed 0.70.
> 2. Doors for vehicles shall be insulated to a minimum manufacturer stated *R*-value of R-15, and shall not be required to comply with Table R402.1.2, Table R402.1.3, or Section R402.4.

DEPARTMENT OF LABOR AND INDUSTRY

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: Steve Shold

Email address: steve.shold@state.mn.us

Telephone number: 651-284-5312

Firm/Association affiliation, if any: Dept of Labor

Date: 2/15/24

Model Code: 2021 IECC-R

Code or Rule Section:

Code or rule section to be changed: Section R402.1 – Low Energy Buildings

Intended for Technical Advisory Group ("TAG"):

General Information	**Yes**	**No**
A. Is the proposed change unique to the State of Minnesota?	☒	☐
B. Is the proposed change required due to climatic conditions of Minnesota?	☒	☐
C. Will the proposed change encourage more uniform enforcement?	☒	☐
D. Will the proposed change remedy a problem?	☒	☐
E. Does the proposal delete a current Minnesota Rule, chapter amendment?	☐	☒
F. Would this proposed change be appropriate through the ICC code development process?	☒	☐

Proposed Language

1. The proposed code change is meant to:

   ☐ change language contained the model code book? If so, list section(s).
   Yes, see language below.

   ☐ change language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).
   No

   ☐ delete language contained in the model code book? If so, list section(s).
   No.

   ☐ delete language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).
   No.

   ☐ add new language that is not found in the model code book or in Minnesota Rule.
   Yes, see language below.

2. Is this proposed code change required by Minnesota Statute? If so, please provide the citation.
   No.

3. Provide *specific* language you would like to see changed. Indicate proposed new words with underlining and ~~strikethrough~~ words proposed for deletion. Include the entire code (sub) section or rule subpart that contains your proposed changes.
   See language below.

4. Will this proposed code change impact other sections of a model code book or an amendment in Minnesota Rule? If so, please list the affected sections or rule parts.
   No.

Need and Reason

1. Why is the proposed code change needed? Please provide a general explanation as well as a specific explanation for any changes to numerical values (heights, area, etc.)
   Applying this content has been extremely confusing in the past for structures like sunrooms, garages, and accessory structures. Referencing the new definition for *"conditioned space"* located in the IECC-R will help provide clarity and uniformity.

2. Why is the proposed code change a reasonable solution?
   It removes the previously agonizing interpretation of "contain" and references the model code definition - *"conditioned space"*. It strikes the "3.4 Btu/h × ft2 (10.7 W/m2) or 1.0 watt/ft2 of floor area" threshold as it is a miniscule amount of conditioning that cannot provide any appreciable amount of conditioning in our cold climate.

3. What other factors should the TAG consider?
   NA

Cost/Benefit Analysis

1. Will the proposed code change increase or decrease costs? Please explain and provide estimates if possible.
   This proposal will have a minimal impact on cost. It mainly promotes clarity and uniformity for these structures.

2. If there is an increased cost, will this cost be offset by a safety or other benefit? Please explain. If the benefit is quantifiable (for example energy savings), provide an estimate if possible.
   NA

3. If there is a cost increase, who will bear the costs? This can include government units, businesses, and individuals.
   This will not provide **new** requirements.

4. Are there any enforcement or compliance cost increases or decreases with the proposed code change? Please explain.
   No.

5. Will the cost of complying with the proposed code change in the first year after the rule takes effect exceed $25,000 for any one small business or small city (Minn. Stat. § 14.127)? A small business is any business that has less than 50 full-time employees. A small city is any statutory or home rule charter city that has less than ten full-time employees. Please explain.
   No.

Regulatory Analysis

1. What parties or segments of industry are affected by this proposed code change?
   Designers, plan reviewers, and building inspectors.

2. Can you think of other means or methods to achieve the purpose of the proposed code change? What might someone opposed to this code change suggest instead? Please explain what the alternatives are and why your proposed change is the preferred method or means to achieve the desired result.
   No.

3. What are the probable costs or consequences of not adopting the code change, including those costs or consequences borne by identifiable categories of affected parties, such as separate classes of government units, businesses, or individuals?
   Not adopting the change yields to continued confusion in design and enforcement of buildings and portions thereof without conditioned space.

4. Are you aware of any federal or state regulation or requirement related to this proposed code change? If so, please list the federal or state regulation or requirement and your assessment of any differences between the proposed code change and the federal regulation or requirement.
   No.

R402.1 General. The *building thermal envelope* shall comply with the requirements of Sections R402.1.1 through R402.1.5.

Exceptions:

1. 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.
   ~~a. 1.1. Those with a peak design rate of energy usage less than 3.4 Btu/h × ft2 (10.7 W/m2) or 1.0 watt/ft2 of floor area for space conditioning purposes.~~
   b. 1.2. Those ~~that do not contain~~not meeting the definition of *conditioned space*.
2. Log homes designed in accordance with ICC 400.

For reference, "Conditioned Space" in 2021 IECC-R:

CONDITIONED SPACE. An area, room or space that is enclosed within the *building thermal envelope* and that is directly or indirectly heated or cooled. Spaces are indirectly heated or cooled where they communicate through openings with conditioned spaces, where they are separated from conditioned spaces by uninsulated walls, floors or ceilings, or where they contain uninsulated ducts, piping or other sources of heating or cooling.

DEPARTMENT OF LABOR AND INDUSTRY

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: Steve Shold

Email address: steve.shold@state.mn.us

Telephone number: 651-284-5312

Firm/Association affiliation, if any: Dept of Labor

Date: 2/15/24

Model Code: 2021 IECC-R

Code or Rule Section:

Code or rule section to be changed: Section R502.2 – Change in space conditioning

Intended for Technical Advisory Group ("TAG"):

General Information	**Yes**	**No**
A. Is the proposed change unique to the State of Minnesota?	☒	☐
B. Is the proposed change required due to climatic conditions of Minnesota?	☒	☐
C. Will the proposed change encourage more uniform enforcement?	☒	☐
D. Will the proposed change remedy a problem?	☒	☐
E. Does the proposal delete a current Minnesota Rule, chapter amendment?	☐	☒
F. Would this proposed change be appropriate through the ICC code development process?	☒	☐

Proposed Language

1. The proposed code change is meant to:

   ☐ change language contained the model code book? If so, list section(s).
   Yes, see language below.

   ☐ change language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).
   No

   ☐ delete language contained in the model code book? If so, list section(s).
   No.

   ☐ delete language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).
   No.

   ☐ add new language that is not found in the model code book or in Minnesota Rule.
   Yes, see language below.

2. Is this proposed code change required by Minnesota Statute? If so, please provide the citation.
   No.

3. Provide *specific* language you would like to see changed. Indicate proposed new words with underlining and ~~strikethrough~~ words proposed for deletion. Include the entire code (sub) section or rule subpart that contains your proposed changes.
   See language below.

4. Will this proposed code change impact other sections of a model code book or an amendment in Minnesota Rule? If so, please list the affected sections or rule parts.
   No.

Need and Reason

1. Why is the proposed code change needed? Please provide a general explanation as well as a specific explanation for any changes to numerical values (heights, area, etc.)
   Applying this content has been extremely confusing in the past for structures like sunrooms, garages, and accessory structures. With the addition of chapter 5 for existing buildings, the proposed exception helps point the user back to proposed content for insulation and fenestration requirements written into RE-32 & RE-33.

2. Why is the proposed code change a reasonable solution?
   As stated above, the proposed exception helps point the user back to proposed content for insulation and fenestration requirements written into RE-32 & RE-33. This will promote understanding, uniformity, and compliance.

3. What other factors should the TAG consider?
   NA

Cost/Benefit Analysis

1. Will the proposed code change increase or decrease costs? Please explain and provide estimates if possible.
   This proposal will have a minimal impact on cost. It mainly promotes clarity and uniformity for these structures.

2. If there is an increased cost, will this cost be offset by a safety or other benefit? Please explain. If the benefit is quantifiable (for example energy savings), provide an estimate if possible.
   NA

3. If there is a cost increase, who will bear the costs? This can include government units, businesses, and individuals.
   This will not provide **new** requirements.

4. Are there any enforcement or compliance cost increases or decreases with the proposed code change? Please explain.
   No.

5. Will the cost of complying with the proposed code change in the first year after the rule takes effect exceed $25,000 for any one small business or small city (Minn. Stat. § 14.127)? A small business is any business that has less than 50 full-time employees. A small city is any statutory or home rule charter city that has less than ten full-time employees. Please explain.
   No.

Regulatory Analysis

1. What parties or segments of industry are affected by this proposed code change?
   Designers, plan reviewers, and building inspectors.

2. Can you think of other means or methods to achieve the purpose of the proposed code change? What might someone opposed to this code change suggest instead? Please explain what the alternatives are and why your proposed change is the preferred method or means to achieve the desired result.
   Could leave it alone, but it serves as a helpful pointer back to the prescriptive thermal envelope provisions.

3. What are the probable costs or consequences of not adopting the code change, including those costs or consequences borne by identifiable categories of affected parties, such as separate classes of government units, businesses, or individuals?
   Not adopting the change yields to continued confusion in design and enforcement of buildings and portions thereof without conditioned space.

4. Are you aware of any federal or state regulation or requirement related to this proposed code change? If so, please list the federal or state regulation or requirement and your assessment of any differences between the proposed code change and the federal regulation or requirement.
   No.

R502.2 Change in space conditioning. Any unconditioned ~~or low-energy~~ space that is altered to become *conditioned space* shall be required to be brought into full compliance with this code.

Exceptions:

1. Garages and IRC-4 buildings shall comply with the insulation requirements of Section R402.2.13 and the fenestration requirements of Section R402.3.6.
2. ~~1.~~ Where the simulated performance option in Section R405 is used to comply with this section, the annual energy cost of the *proposed design* is permitted to be 110 percent of the annual energy cost otherwise allowed by Section R405.2.
3. ~~2.~~ Where the Total UA, as determined in Section R402.1.5, of the existing *building* and the *addition*, and any *alterations* that are part of the project, is less than or equal to the Total UA generated for the existing *building*.
4. ~~3.~~ Where complying in accordance with Section R405 and the annual energy cost or energy use of the *addition* and the existing *building*, and any *alterations* that are part of the project, is less than or equal to the annual energy cost of the existing *building*. The *addition* and any *alterations* that are part of the project shall comply with Section R405 in its entirety.

R502.3.1 Building envelope. New *building* envelope assemblies that are part of the *addition* shall comply with Sections R402.1, R402.2, R402.3.1 through R402.3.~~5~~6, and R402.4.

Exception: New envelope assemblies are exempt from the requirements of Section R402.4.1.2.

DEPARTMENT OF LABOR AND INDUSTRY

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: Steve Shold

Email address: steve.shold@state.mn.us

Telephone number: 651-284-5312

Firm/Association affiliation, if any: Dept of Labor

Date: 2/15/24

Model Code: 2021 IECC-R

Code or Rule Section:

Code or rule section to be changed: Section R503.1.1 – Building Envelope

Intended for Technical Advisory Group ("TAG"):

General Information	**Yes**	**No**
A. Is the proposed change unique to the State of Minnesota?	☒	☐
B. Is the proposed change required due to climatic conditions of Minnesota?	☒	☐
C. Will the proposed change encourage more uniform enforcement?	☒	☐
D. Will the proposed change remedy a problem?	☒	☐
E. Does the proposal delete a current Minnesota Rule, chapter amendment?	☐	☒
F. Would this proposed change be appropriate through the ICC code development process?	☒	☐

Proposed Language

1. The proposed code change is meant to:

   ☐ change language contained the model code book? If so, list section(s).
   Yes, see language below.

   ☐ change language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).
   No

   ☐ delete language contained in the model code book? If so, list section(s).
   No.

   ☐ delete language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).
   No.

   ☐ add new language that is not found in the model code book.
   Yes, see language below.

2. Is this proposed code change required by Minnesota Statute? If so, please provide the citation.
   No.

3. Provide *specific* language you would like to see changed. Indicate proposed new words with underlining and ~~strikethrough~~ words proposed for deletion. Include the entire code (sub) section or rule subpart that contains your proposed changes.
   See language below.

4. Will this proposed code change impact other sections of a model code book or an amendment in Minnesota Rule? If so, please list the affected sections or rule parts.
   No.

Need and Reason

1. Why is the proposed code change needed? Please provide a general explanation as well as a specific explanation for any changes to numerical values (heights, area, etc.)
   Most of the exceptions listed here currently reside in the administrative portion of the '15 MRE. However, two MN amended items were not included. This proposal carries them forward.

2. Why is the proposed code change a reasonable solution?
   These two items are important for durability and clarity in enforcement.

3. What other factors should the TAG consider?
   NA

Cost/Benefit Analysis

1. Will the proposed code change increase or decrease costs? Please explain and provide estimates if possible.
   This proposal will have no impact on cost.

2. If there is an increased cost, will this cost be offset by a safety or other benefit? Please explain. If the benefit is quantifiable (for example energy savings), provide an estimate if possible.
   NA

3. If there is a cost increase, who will bear the costs? This can include government units, businesses, and individuals.
   This will not provide **new** requirements.

4. Are there any enforcement or compliance cost increases or decreases with the proposed code change? Please explain.
   No.

5. Will the cost of complying with the proposed code change in the first year after the rule takes effect exceed $25,000 for any one small business or small city (Minn. Stat. § 14.127)? A small business is any business that has less than 50 full-time employees. A small city is any statutory or home rule charter city that has less than ten full-time employees. Please explain.
   No.

Regulatory Analysis

1. What parties or segments of industry are affected by this proposed code change?
   Builders, remodelers, designers, insulation contractors, and building inspectors.

2. Can you think of other means or methods to achieve the purpose of the proposed code change? What might someone opposed to this code change suggest instead? Please explain what the alternatives are and why your proposed change is the preferred method or means to achieve the desired result.
   No.

3. What are the probable costs or consequences of not adopting the code change, including those costs or consequences borne by identifiable categories of affected parties, such as separate classes of government units, businesses, or individuals?
   Not adopting the change could negatively affect homes in terms of moisture management and building science. This promotes durable resilient home remodeling.

4. Are you aware of any federal or state regulation or requirement related to this proposed code change? If so, please list the federal or state regulation or requirement and your assessment of any differences between the proposed code change and the federal regulation or requirement.
   No.

R503.1.1 Building envelope. Building envelope assemblies that are part of the *alteration* shall comply with Section R402.1.2 or R402.1.4, Sections R402.2.1 through R402.2.1~~2~~3, R402.3.1, R402.3.2, R402.4.3 and R402.4.5. Prior to installing attic insulation, accessible attic bypasses shall be sealed. An attic bypass is any air passageway between a conditioned space and an unconditioned attic.

Exception: The following alterations shall not be required to comply with the requirements for new construction provided that the energy use of the building is not increased:

1. Storm windows installed over existing fenestration.
2. Existing ceiling, wall or floor cavities exposed during construction provided that these cavities are filled with insulation.
3. Construction where the existing roof, wall or floor cavity is not exposed.
4. Roof recover.
5. Roofs without insulation in the cavity and where the sheathing or insulation is exposed during reroofing shall be insulated either above or below the sheathing.
6. Surface-applied window film installed on existing single pane fenestration assemblies to reduce solar heat gain provided that the code does not require the glazing or fenestration assembly to be replaced.
7. Insulation R-value, air barrier, and vapor retarder requirements are not applicable to existing foundations, crawl space walls, and basements in existing dwellings or dwelling units when the alteration or repair requires a permit if the original dwelling or dwelling unit permit was issued before June 1, 2009.

DEPARTMENT OF LABOR AND INDUSTRY

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: Patrick Murray *Date:* 2/21/24

Email address: Pmurray@j-berd.com *Model Code:* 2021 IECC

Telephone number: (320) 656-0847 *Code or Rule Section:* R401.2

Firm/Association affiliation, if any: J-Berd Mechanical Contractors Inc.

Code or rule section to be changed: R401.2

Intended for Technical Advisory Group ("TAG"): MN Residential Energy Code

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General Information	**Yes**	**No**
A. Is the proposed change unique to the State of Minnesota?	☐	☒
B. Is the proposed change required due to climatic conditions of Minnesota?	☐	☒
C. Will the proposed change encourage more uniform enforcement?	☒	☐
D. Will the proposed change remedy a problem?	☐	☒
E. Does the proposal delete a current Minnesota Rule, chapter amendment?	☐	☒
F. Would this proposed change be appropriate through the ICC code development process?	☒	☐

Proposed Language

1. The proposed code change is meant to:

   ☐ change language contained the model code book? If so, list section(s).

   ☐ change language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

   ☐ delete language contained in the model code book? If so, list section(s).

   ☐ delete language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

   ☒ add new language that is not found in the model code book or in Minnesota Rule.

2. Is this proposed code change required by Minnesota Statute? If so, please provide the citation.

   No.

3. Provide *specific* language you would like to see changed. Indicate proposed new words with underlining and ~~strikethrough~~ words proposed for deletion. Include the entire code (sub) section or rule subpart that contains your proposed changes.

   R401.2 Application. Residential buildings shall comply with Section R401.2.5 and either Sections R401.2.1, R401.2.2, R401.2.3 or R401.2.4.

   Exception:
   1. Additions, alterations, repairs and changes of occupancy to existing buildings complying with Chapter 5.
   2. Buildings may comply with the commercial energy code as an alternate compliance path to this code.

4. Will this proposed code change impact other sections of a model code book or an amendment in Minnesota Rule? If so, please list the affected sections or rule parts.

   No.

Need and Reason

1. Why is the proposed code change needed? Please provide a general explanation as well as a specific explanation for any changes to numerical values (heights, area, etc.)

   This code change would allow buildings to have more flexibility to comply energy standards.

2. Why is the proposed code change a reasonable solution?

   The focus of the residential energy code is single family homes and not Apartments or other similar facilities such as assisted living. Apartment buildings and others like them function more like commercial buildings than single family houses.
   The commercial energy code has higher standards than the residential energy code. A building will perform better following the commercial energy code compared to the residential energy code.

3. What other factors should the TAG consider?

   A 3 story independent living facility with a garage underneath is 3 stories above grade. This building would fall under the residential energy code. If you slide the building up so the garage is above grade it is now 4 stories above grade. Nothing is different about the size of the building or how it functions, but it would now fall under the commercial energy code. Allowing multifamily, assisted living, and independent living facilities to comply with the commercial energy code would permit shorter buildings to be built to the same standards as their taller counter parts.

Cost/Benefit Analysis

1. Will the proposed code change increase or decrease costs? Please explain and provide estimates if possible.

   It will not cause a cost change as it is an alternate compliance path that does not have to be selected.

2. If there is an increased cost, will this cost be offset by a safety or other benefit? Please explain. If the benefit is quantifiable (for example energy savings), provide an estimate if possible.

   If a builder chose to follow the commercial energy code, it would likely cost more due to the higher standards. A more energy efficient building will result in lower energy costs.

3. If there is a cost increase, who will bear the costs? This can include government units, businesses, and individuals.

   Initially the builder will bear the cost but it will be passed on to the tenant. However, savings on their energy bill will offset the improvements.

4. Are there any enforcement or compliance cost increases or decreases with the proposed code change? Please explain.

   There is likely no change to enforcement or compliance cost because the commercial energy code is already enforced and covers the same types of buildings that are similar in size, just one story taller.

5. Will the cost of complying with the proposed code change in the first year after the rule takes effect exceed $25,000 for any one small business or small city (Minn. Stat. § 14.127)? A small business is any business that has less than 50 full-time employees. A small city is any statutory or home rule charter city that has less than ten full-time employees. Please explain.

   No.

Regulatory Analysis

1. What parties or segments of industry are affected by this proposed code change?

   All parties or segments of the industry are affected in a positive manner.

2. Can you think of other means or methods to achieve the purpose of the proposed code change? What might someone opposed to this code change suggest instead? Please explain what the alternatives are and why your proposed change is the preferred method or means to achieve the desired result.

   The goal of this code change to is allow larger multiple story buildings to comply with standards that are applied to similar buildings. Being that the commercial energy code allows multiple compliance paths, presumably those paths could be added to the residential energy code, but that would be rather redundant.
   One may object to single family dwellings or townhomes being built to commercial standards. An alternative would be adding a square footage threshold to buildings falling under residential energy code. Hypothetically, if a building were over 10,000sqft it would fall under the commercial energy code regardless of height or occupancy.

3. What are the probable costs or consequences of not adopting the code change, including those costs or consequences borne by identifiable categories of affected parties, such as separate classes of government units, businesses, or individuals?

   Consequence of not adopting the code change is restricting compliance paths.

4. Are you aware of any federal or state regulation or requirement related to this proposed code change? If so, please list the federal or state regulation or requirement and your assessment of any differences between the proposed code change and the federal regulation or requirement.

   No.

***Note: Incomplete forms may be returned to the submitter with instruction to complete the form. Only completed forms can considered by the TAG.