DEPARTMENT OF LABOR AND INDUSTRY

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: Mike Moore

Model Code: 2024 IRC

Date: January 7, 2025

Code or Rule Section: 2024 IRC Section 325

Email address: mmoore@statorllc.com

Telephone number: 303.408.7015

Firm/Association affiliation, if any: Stator LLC, Representing the Home Ventilating Institute (HVI)

Code or rule section to be changed: 2024 IRC Section 325

Intended for Technical Advisory Group ("TAG"): Residential Building 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 in the model code book? If so, list section(s).
2024 IRC Section 325

☐ 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).
Various places. See proposed code change.

☐ delete language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).
This proposed code change does not propose to carry forward any Minnesota amendments except as otherwise covered in the proposed revisions to the 2024 IRC.

☒ add new language that is not found in the model code book or in Minnesota Rule.
Most of the proposed language is either in the model code book or in the Minnesota Rules, but some of the language is new.

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 model codes and Minnesota's Rules, is supported (but not required) by Sec. 29. Minnesota Statutes 2023, section 326B.106, subdivision 1 which states, "(c) Beginning with the 2018 edition of the model building codes and every six years thereafter, the commissioner shall review the new model building codes and adopt the model codes as amended for use in Minnesota, within two years of the published edition date. The commissioner may adopt amendments to the building codes prior to the adoption of the new building codes 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 the 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 proposed code change appended to the end of this document.

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 proposed code change should be coordinated with the companion proposed code change submitted to the Mechanical and Fuel Gas Code TAG, covering Chapters 2, 15, 16, and 44.

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 Rules chapter 1322 currently requires a balanced ventilation system for IRC buildings. Local exhaust (i.e., for bathrooms, toilet rooms, and kitchens) can be used to comply with the chapter 1322 intermittent ventilation rate but is not required. This proposed code change and its companion proposed code change (submitted to the Mechanical and Fuel Gas Code TAG) would merge the ventilation requirements of the 2024 IRC and chapter 1322 to maintain the requirement for a whole-house balanced ventilation system and establish requirements for local exhaust, while simplifying the code. Further, this proposed code change is coordinated with the Minnesota Residential Energy Code TAG's recent recommendation to approve proposals RE-7 and RE-19.1, which would modify the IECC-Residential code to require that the balanced ventilation system be a heat or energy recovery ventilator (HERV) for single-family, two-family, townhome, and low-rise multifamily dwelling units across all of Minnesota's climate zones.

If approved, accomplishments of this proposed code change and its companion proposed code change would include the following:

1. Relocate ventilation requirements from MN Rules chapter 1322 to the IRC for buildings complying with the IRC.
2. Modify the model code to retain Minnesota requirements for the whole-house mechanical ventilation system to be a balanced ventilation system.
3. Establish local exhaust requirements in bathrooms, toilet rooms (i.e., water closet compartments), and kitchens, in accordance with the 2024 IRC.
4. Align with the Minnesota Residential Energy Code TAG's recent recommendation to require an HERV for single-family, two-family, and townhomes.
5. Clarify the 2024 IRC provisions by reorganizing and using consistent terminology.

Minnesota has long required balanced ventilation for IRC dwelling units. By specifying a balanced ventilation system for whole-house ventilation, Minnesota's code prohibits exhaust-only whole-house ventilation systems that can draw air from below slabs, crawlspaces, garages, and attics. Minnesota's code also prohibits supply-only ventilation systems that can lead to formation of condensation within the building envelope.

Balanced ventilation systems are also able to provide filtered air directly from the outdoors and to temper the outdoor air (if provided with a heat or energy recovery core – as proposed by the Minnesota Residential Energy Code TAG to be required within Minnesota Rules chapter 1322 for all IRC dwelling units), increasing the likelihood of energy-efficient system operation by occupants.

Following is a comparison between the chapter 1322 ventilation requirements and those promulgated by this proposed code change and its companion proposed code change.

Item	Chapter 1322 Ventilation Provision	Corollary Section of Proposed Code Change	Comment
1	R403.5 Mechanical ventilation	R325.1.2 (requirement), M1505.4.1 (balanced ventilation system), M1505.5 (local exhaust), dampers (N1103.6/R403.6)	Maintain MN's requirement for a balanced ventilation system. Maintain the IRC requirement for local exhaust. Base whole-house ventilation rate requirements on floor area of the house.
2	R403.5.1 Alterations	Exception to Sections M1505.1 and R325.1.2	Maintain MN's exception for alterations.
3	R403.5.2 Total Ventilation Rate	M1505.4.3 (whole-house mechanical ventilation), M1505.5 (local exhaust)	For whole-house mechanical ventilation, roughly align with the MN Rules chapter 1322 Section R403.5.3 continuous ventilation rate requirement. For intermittent ventilation, maintain 2024 IRC requirements for local exhaust of kitchens, bathrooms, and toilet rooms. The resulting rates are comparable to MN's current requirements.
4	R403.5.3 Continuous Ventilation Rate	M1505.4.3 (whole-house mechanical ventilation rate)	For whole-house mechanical ventilation, roughly align with the MN Rules chapter 1322 Section R403.5.3 continuous ventilation rate requirement.
5	R403.5.4 Intermittent Ventilation Rate	M1505.5 (local exhaust)	For intermittent ventilation, maintain 2024 IRC requirements for local exhaust of kitchens, bathrooms, and toilet rooms.
6	R403.5.5 Balanced and HRV/ERV systems	M1505.4.1 (balanced ventilation); M1505.4.1, N1103.6.1/R403.6.1 (HERV requirement)	Maintain MN's requirement for a balanced ventilation system. The residential energy code is expected to have requirements for HERVs.
7	R403.5.6 Installation requirements	M1505.4 and M1505.5 (manufacturer installation instructions); M1505.4.4 (distribution); M1505.4.1, N1103.6.1/R403.6.1 (HERV requirement to replace tempering requirement)	Simplify MN's distribution requirements by replacing with Section M1505.4.4. Maintain MN's requirement for installation in accordance with manufacturer's instructions. Replace MN's R403.5.6.1.2 tempering requirement with IRC R403.6.1 HERV requirement. Replace MN's R403.5.6.1.3 airflow verification requirement with IRC N1103.6.3 (R403.6.3).
8	R403.5.7 Fans	M1505.3, M1505.5.1 (airflow ratings); N1103.6.2/R403.6.2 [fan efficacy]	Generally maintain MN's requirements for airflow ratings and fan efficacy, aligning with ASHRAE 62.2 or the 2024 IRC where divergences occur. Delete references to sound ratings, based on MN DLI staff's request.
9	R403.5.8 Multifan systems	M1504.6	Maintain MN's requirement to have dampers for multiple exhaust fans using the same exhaust duct system. Replacement language is sourced from ASHRAE 62.2.
10	R403.5.9 Connection to forced air circulation systems	M1301.3 and M1307.1	Replace MN's specific installation requirements with a general requirement to comply with manufacturer's installation instructions.
11	R403.5.10 Dampers	N1103.6/R403.6	Replace MN's requirements for dampers with the 2024 IRC requirement. Note that the 2024 IRC does not have requirements for access, except in the case of makeup air dampers.
12	R403.5.11 Intake openings	M1504.4, M1504.5 (outdoor air intake opening location and protection)	Generally maintain MN requirements for outdoor air intake openings.
13	R403.5.12 Filtration	M1301.3 and M1307.1 (manufacturer installation instructions)	Replace the filtration requirement with a general requirement to comply with manufacturer's installation instructions. Such

			instructions are expected to require filtration to protect equipment, where required.
14	R403.5.13 Noise and vibration	M1301.3 and M1307.1 (manufacturer installation instructions)	Replace noise dampening requirements with a general requirement to comply with manufacturer's installation instructions.
15	R403.5.14 Controls	M1505.4.2	Replace MN's more detailed control requirements with the IRC's more generic control requirements.
16	R403.5.15 Labeling	None	Delete requirement to label outdoor air intake openings and exhaust terminations.
17	R403.5.16 Documentation	N1101.12/R303.3	IRC Section N1101.12/R303.3 requires that, "Maintenance instructions shall be furnished for equipment and systems that require preventive maintenance."

2. Why is the proposed code change a reasonable solution?
   See answer to #1.

3. What other factors should the TAG consider?
   See answer to #1.

Cost/Benefit Analysis

1. Will the proposed code change increase or decrease costs? Please explain and provide estimates if possible.
   Balanced ventilation systems are already required, so there is no increase in costs associated with their specification. Presumably, most bathrooms, kitchens, and toilet rooms are also provided with local exhaust, so no additional costs are assumed for these systems.

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.
   No.

Regulatory Analysis

1. What parties or segments of industry are affected by this proposed code change?
   None.

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.
One alternative would be to roll back MN's current requirements. See the response to #1 under the Need and Reason section above for the rationale as to why this proposed code change is the preferred method.

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 elects to maintain its current amendments, there is presumably minimal cost or consequence of not adopting this code change (since this code change is generally a simplified version of MN's current requirements). However, if MN adopts the IRC mechanical provisions without amendment (e.g., permitting exhaust-only whole-house ventilation systems or supply-only whole-house ventilation systems), air quality could be diminished, or the durability of the building envelope could be compromised. Poor air quality could lead to poor health outcomes and associated health costs that are borne by occupants, corporations, and institutions.

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 be considered by the TAG.

Revise the 2024 IRC as follows:

R325.1 Habitable rooms. *Habitable space* shall be provided with natural light and ~~natural~~ mechanical *ventilation* in accordance with Sections R325.1.1 through R325.~~1.~~3.

Commented [M1]: Mechanical ventilation is required, so the natural ventilation requirements of Section R325.1.2 do not apply, based on Exceptions 1 and 2. We can therefore delete the requirement for natural ventilation.

R325.1.1 Natural light. Habitable rooms shall have an aggregate area of glazed openings not less than 8 percent of the floor area of such rooms. Required glazed openings shall face directly onto a street, alley or *public way*, or a yard or *court* located on the same lot as the *building*.
Exceptions:
1. Required glazed openings shall be permitted to face into a roofed porch, deck or patio adjacent to a street, alley, public way, yard or court, where there the longer side of the roofed area is not less than 65 percent unobstructed and the ceiling height is not less than 7 feet (2134 mm).
2. Required glazed openings shall be permitted to face into a sunroom adjacent to a street, alley, public way, yard or court.
3. Glazed openings are not required where artificial light is provided that is capable of producing an average illumination of 6 footcandles (65 lux) over the area of the room at a height of 30 inches (762 mm) above the floor level.
4. Eave projections shall not be considered as obstructing the clear open space of a yard or court.

~~**R325.1.2 Natural ventilation.** Habitable rooms shall have an aggregate area openable to the outdoors not less than 4 percent of the floor area of such rooms. Openings shall be through windows, skylights, doors, louvers or other approved openings to the outdoor air. Such openings shall be provided with ready access or shall otherwise be readily controllable by the building occupants.~~
~~**Exceptions:**~~
~~1. Natural ventilation shall not be required in habitable rooms other than kitchens where a whole-house mechanical ventilation system or a mechanical ventilation system capable of producing 0.35 air changes per hour in the habitable rooms is installed in accordance with Section M1505.~~
~~2. Natural ventilation shall not be required in kitchens where a local exhaust system is installed in accordance with Section M1505.~~

Commented [M2]: Because mechanical ventilation is required, Exceptions 1 and 2 apply. Therefore, natural ventilation is not required and can be deleted.

~~3. Required ventilation openings shall be permitted to open into a thermally isolated sunroom or roofed porch, deck, or~~ patio ~~where not less than 40 percent of the roofed area perimeter is open to the outdoor air.~~
~~4. Required ventilation openings shall be permitted to open into a thermally isolated sunroom provided there is an openable area between the adjoining room and the sunroom of not less than one-tenth of the floor area of the interior room and not less than 20 square feet (1.9 m2). The minimum openable area of the sunroom to outdoor air shall be based on the total floor area of the adjoining room and the sunroom.~~

R325.1.2 Mechanical ventilation. Buildings and dwelling units complying with Section N1102.5.1 shall be provided with mechanical ventilation, including *local exhaust*, and with whole-house mechanical *ventilation* consisting of a heat recovery or energy recovery ventilation system, in accordance with Sections N1103.6 and M1505.
Exception: Whole-house mechanical *ventilation* consisting of a heat recovery or energy recovery ventilation system shall not be required for an *alteration.*

R325.1.3 Adjoining rooms. For the purpose of determining light and *whole-house mechanical* *ventilation* *system* requirements, rooms shall be considered to be a portion of an adjoining room where not less than one-half of the area of the common wall is open and unobstructed and provides an opening of not less than one-tenth of the floor area of the interior room and not less than 25 square feet (2.3 m2).

R325.2 Bathrooms. Bathrooms, water closet compartments and other similar rooms shall be provided with ~~aggregate glazing area in windows of not less than 3 square feet (0.3 m2), one-half of which shall be openable.~~
~~**Exception:** The glazed areas shall not be required where artificial light and~~ a *local exhaust* system, which is permitted to be a dedicated exhaust duct from a heat recovery or energy recovery *ventilation* system, ~~are provided. The minimum local exhaust rates shall be determined~~ in accordance with Section M1505. Exhaust air from the space shall be exhausted directly to the outdoors unless complying with the exception to Section M1505.2.

~~**R325.3 Mechanical ventilation.** Buildings and dwelling units complying with Section N1102.5.1 shall be provided with mechanical ventilation in accordance with Section M1505, or with other approved means of ventilation.~~

Informative note: Section R325.2 will be coordinated with Section M1505.2 as follows.

M1505.2 Recirculation of air. Exhaust air from bathrooms and toilet rooms shall not be recirculated within a residence or circulated to another *dwelling unit* and shall be exhausted directly to the outdoors. Exhaust air from bathrooms, toilet rooms and *kitchens* shall not discharge into an *attic*, *crawl space* or other areas inside the *building*. This section shall not prohibit the installation of ductless range hoods in accordance with the exception to Section M1503.3.
Exception: Recirculation of exhaust air within a single *dwelling unit* shall be permitted during temporary defrost operation of a heat recovery ventilator or energy recovery ventilator as required by the manufacturer's installation instructions.

R325.43 Opening location. Outdoor air intake openings and exhaust terminations ~~openings~~ shall be located in accordance with Chapters 12 through 24 ~~Sections R325.4.1 and R325.4.2~~.
~~**R325.4.1 Intake openings.** Mechanical and gravity outdoor air intake openings shall be located not less than 10 feet (3048 mm) from any hazardous or noxious contaminant, such as vents, chimneys, plumbing vents, streets, alleys, parking lots and loading docks.~~
~~For the purpose of this section, the exhaust from dwelling unit toilet rooms, bathrooms and kitchens shall not be considered as hazardous or noxious.~~
~~**Exceptions:**~~
~~1. The 10-foot (3048 mm) separation is not required where the intake opening is located 3 feet (914 mm) or greater below the contaminant source.~~
~~2. Vents and chimneys serving fuel-burning appliances shall be terminated in accordance with the applicable provisions of Chapters 18 and 24.~~
~~3. Clothes dryer exhaust ducts shall be terminated in accordance with Section M1502.3.~~
~~**R325.4.2 Exhaust openings.** Exhaust air shall not be directed onto walkways.~~
~~**R325.5 Outside opening protection.** Air exhaust and intake openings that terminate outdoors shall be protected with corrosion resistant screens, louvers or grilles having an opening size of not less than 1/4 inch (6 mm) and a maximum~~

Commented [M3]: This section is the result of combining the 2024 IRC Section 325.3, MN 1322, and the MN Residential Energy Code TAG recommended approval of a code change proposal to require an HERV.

Commented [M4]: Mechanical ventilation, including local exhaust of bathrooms, water closet compartments, and other similar rooms, is required by the 2024 IRC, so there is no need to reference window area or to retain the exception.

Commented [M5]: The exception in Section M1505.2 aligns with the common practice of specifying HERVs with recirculation defrost in cold climates to ensure that the whole-house mechanical ventilation system functions as a balanced mechanical ventilation system whenever it operates. Across MN's climate zones, the concurrent operation of recirculation and bathroom usage is estimated to account for less than 0.3% of the year.

Commented [M6]: This section is moved to R325.1.2.

Commented [M7]: This is a generic reference to the mechanical section of the IRC. Clothes dryer terminations are located in accordance with Section M1502.3. Local exhaust terminations are located in accordance with Section M1504.3. Outdoor air intake openings are located in accordance with Sections M1413 and M1504.4. Chapter 24 has requirements related to combustion air intakes.

~~opening size of 1/2 inch (13 mm), in any dimension. Openings shall be protected against local weather conditions. Outdoor air exhaust and intake openings shall meet the provisions for exterior wall opening protectives in accordance with this code.~~

Informative note: Section R325.3 will be coordinated with Section M1504 as follows.

M1504.3 Exhaust ~~openings~~ termination location. ~~Air exhaust openings shall terminate~~Exhaust air shall not be directed onto walkways. Exhaust terminations shall be located as follows:

1. Not less than 3 feet (914 mm) from property lines.
2. Not less than 3 feet (914 mm) from gravity outdoor air intake openings, operable windows, and doors.
3. Not less than 10 feet (3048 mm) from mechanical outdoor air intake openings except where either of the following apply:
   3.1. The exhaust termination ~~opening~~ is located not less than 3 feet (914 mm) above the outdoor air intake opening.
   3.2 The exhaust termination ~~opening~~ is part of a factory-built intake/exhaust combination termination fitting installed in accordance with the ~~fan~~ manufacturer's instructions, and the exhaust air is drawn from a *living space*.
4. ~~In accordance with Sections R303.5.2 and R303.6.~~

M1504.4 Outdoor air intake opening location. Mechanical and gravity outdoor air intake openings shall be located not less than 10 feet (3048 mm) from any hazardous or noxious contaminant, such as vents, chimneys, plumbing vents, streets, alleys, and parking lots. For the purpose of this section, the exhaust from *dwelling unit* toilet rooms, bathrooms, and *kitchens* shall not be considered as hazardous or noxious.

Exceptions:

1. The 10-foot (3048 mm) separation is not required where the outdoor air intake opening is located 3 feet (914 mm) or greater below the contaminant source.
2. Separation from vents and chimney terminations serving fuel-burning *appliances* or *fireplaces* shall comply with the applicable provisions of Chapters 18 and 24.
3. Separation from clothes dryer exhaust terminations shall comply with Section M1502.3.
4. Separation from other exhaust terminations shall be in accordance with Section M1504.3.
5. The outdoor air intake opening is part of a factory-built intake/exhaust combination termination fitting installed in accordance with the manufacturer's instructions, and the exhaust air is drawn from a *living space*.

M1504.5 Exhaust termination and outdoor air intake opening protection. Exhaust terminations and outdoor air intake openings shall be protected with corrosion-resistant screens, louvers or grilles having an opening size of not less than 1/4 inch (6 mm) and a maximum opening size of 1/2 inch (13 mm), in any dimension. Exhaust terminations and outdoor air intake openings shall be protected against local weather conditions and shall meet the provisions for exterior wall opening protectives in accordance with this code.

Renumber remaining sections as necessary.

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DEPARTMENT OF LABOR AND INDUSTRY

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: Mike Moore

Model Code: 2024 IRC

Date: January 17, 2025

Code or Rule Section: 2024 IRC R201, M1501-M1505, M1602, and Chapter 44's Referenced Standards

Email address: mmoore@statorllc.com

Telephone number: 303.408.7015

Firm/Association affiliation, if any: Stator LLC, Representing the Home Ventilating Institute (HVI)

Code or rule section to be changed: 2024 IRC R201, M1501-M1505, M1602, and Chapter 44's Referenced Standards

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

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General Information	**Yes**	**No**
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2024 IRC Sections R201, M1501-M1505, M1602, and Chapter 44's Referenced Standards.

☐ 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).
Various places. See proposal.

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   Yes. This proposed code change should be coordinated with the companion proposed code change submitted to the Mechanical and Fuel Gas Code TAG, covering Section R325.

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.)

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If approved, accomplishments of this proposed code change and its companion proposed code change would include the following:

1. Relocate ventilation requirements from MN Rules chapter 1322 to the IRC for buildings complying with the IRC.
2. Modify the model code to retain Minnesota requirements for the whole-house mechanical ventilation system to be a balanced ventilation system.
3. Establish local exhaust requirements in bathrooms, toilet rooms (i.e., water closet compartments), and kitchens, in accordance with the 2024 IRC.
4. Align with the Minnesota Residential Energy Code TAG's recent recommendation to require an HERV for single-family, two-family, and townhomes.
5. Clarify the 2024 IRC provisions by reorganizing and using consistent terminology.

Minnesota has long required balanced ventilation for IRC dwelling units. By specifying a balanced ventilation system for whole-house ventilation, Minnesota's code prohibits exhaust-only whole-house ventilation systems that can draw air from below slabs, crawlspaces, garages, and attics. Minnesota's code

also prohibits supply-only ventilation systems that can lead to formation of condensation within the building envelope.

Balanced ventilation systems are also able to provide filtered air directly from the outdoors and to temper the outdoor air (if provided with a heat or energy recovery core – as proposed by the Minnesota Residential Energy Code TAG to be required within Minnesota Rules chapter 1322 for all IRC dwelling units), increasing the likelihood of energy-efficient system operation by occupants.

Following is a comparison between the chapter 1322 ventilation requirements and those promulgated by this proposed code change and its companion proposed code change.

Item	Chapter 1322 Ventilation Provision	Corollary Section of Proposed Code Change	Comment
1	R403.5 Mechanical ventilation	R325.1.2 (requirement), M1505.4.1 (balanced ventilation system), M1505.5 (local exhaust), dampers (N1103.6/R403.6)	Maintain MN's requirement for a balanced ventilation system. Maintain the IRC requirement for local exhaust. Base whole-house ventilation rate requirements on floor area of the house.
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4	R403.5.3 Continuous Ventilation Rate	M1505.4.3 (whole-house mechanical ventilation rate)	For whole-house mechanical ventilation, roughly align with the MN Rules chapter 1322 Section R403.5.3 continuous ventilation rate requirement.
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8	R403.5.7 Fans	M1505.3, M1505.5.1 (airflow ratings); N1103.6.2/R403.6.2 [fan efficacy]	Generally maintain MN's requirements for airflow ratings and fan efficacy, aligning with ASHRAE 62.2 or the 2024 IRC where divergences occur. Delete references to sound ratings, based on MN DLI staff's request.
9	R403.5.8 Multifan systems	M1504.6	Maintain MN's requirement to have dampers for multiple exhaust fans using the same exhaust duct system. Replacement language is sourced from ASHRAE 62.2.
10	R403.5.9 Connection to forced air circulation systems	M1301.3 and M1307.1	Replace MN's specific installation requirements with a general requirement to comply with manufacturer's installation instructions.
11	R403.5.10 Dampers	N1103.6/R403.6	Replace MN's requirements for dampers with the 2024 IRC requirement. Note that the 2024 IRC does not have requirements for access, except in the case of makeup air dampers.
12	R403.5.11 Intake openings	M1504.4, M1504.5 (outdoor air intake opening location and protection)	Generally maintain MN requirements for outdoor air intake openings.

13	R403.5.12 Filtration	M1301.3 and M1307.1 (manufacturer installation instructions)	Replace the filtration requirement with a general requirement to comply with manufacturer's installation instructions. Such instructions are expected to require filtration to protect equipment, where required.
14	R403.5.13 Noise and vibration	M1301.3 and M1307.1 (manufacturer installation instructions)	Replace noise dampening requirements with a general requirement to comply with manufacturer's installation instructions.
15	R403.5.14 Controls	M1505.4.2	Replace MN's more detailed control requirements with the IRC's more generic control requirements.
16	R403.5.15 Labeling	None	Delete requirement to label outdoor air intake openings and exhaust terminations.
17	R403.5.16 Documentation	N1101.12/R303.3	IRC Section N1101.12/R303.3 requires that, "Maintenance instructions shall be furnished for equipment and systems that require preventive maintenance."

2. Why is the proposed code change a reasonable solution?
   See answer to #1.

3. What other factors should the TAG consider?
   See answer to #1.

Cost/Benefit Analysis

1. Will the proposed code change increase or decrease costs? Please explain and provide estimates if possible.
   Balanced ventilation systems are already required, so there is no increase in costs associated with their specification. Presumably, most bathrooms, kitchens, and toilet rooms are also provided with local exhaust, so no additional costs are assumed for these systems.

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.
   No.

Regulatory Analysis

1. What parties or segments of industry are affected by this proposed code change?
   None.

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.
   One alternative would be to roll back MN's current requirements. See the response to #1 under the Need and Reason section above for the rationale as to why this proposed code change is the preferred method.

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 elects to maintain its current amendments, there is presumably minimal cost or consequence of not adopting this code change (since this code change is generally a simplified version of MN's current requirements). However, if MN adopts the IRC mechanical provisions without amendment (e.g., permitting exhaust-only whole-house ventilation systems or supply-only whole-house ventilation systems), air quality could be diminished, or the durability of the building envelope could be compromised. Poor air quality could lead to poor health outcomes and associated health costs that are borne by occupants, corporations, and institutions.

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 be considered by the TAG.

Revise the 2024 IRC as follows:

CHAPTER 2
DEFINITIONS

SECTION R201
GENERAL

[MP] WHOLE-HOUSE MECHANICAL VENTILATION SYSTEM. ~~An exhaust system, supply system, or combination thereof~~ A *balanced ventilation system* that is designed to mechanically exchange indoor air for outdoor air ~~where~~ when operating continuously or through a programmed intermittent schedule to satisfy the whole-house *ventilation* rate. For the definition applicable in Chapter 11, see Section N1101.6.

Commented [M1]: Coordinate with MN 1322's requirement for balanced ventilation.

CHAPTER 14
HEATING AND COOLING EQUIPMENT AND APPLIANCES

SECTION M1413 EVAPORATIVE COOLING EQUIPMENT

M1413.1 General. Evaporative cooling *equipment* and *appliances* shall comply with UL 1995 or UL/CSA/ANCE 60335-2-40 and shall be installed:
1. In accordance with the manufacturer's instructions.
2. On level platforms in accordance with Section M1305.1.3.1.
3. So that openings in exterior walls are flashed in accordance with Section R703.4.
4. So as to protect the potable water supply in accordance with Section P2902.
5. So that outdoor air intake opening locations are in accordance with Section M1504.4~~R325.4.1~~.

Commented [M2]: Use "outdoor air intake opening" for consistency and update reference based on moving outdoor air intake opening location requirements to Section M1504.4.

CHAPTER 15
EXHAUST AND WHOLE-HOUSE MECHANICAL VENTILATION SYSTEMS

SECTION M1501
GENERAL

M1501.1 Outdoor discharge. The air removed by every mechanical exhaust system shall be discharged to the outdoors in accordance with Section M1504.3. Air shall not be exhausted into an attic, soffit, ridge vent or crawl space.

M1501.2 Outdoor air intake opening. Outdoor air intake opening requirements shall meet M1504.4.

SECTION M1503
DOMESTIC COOKING EXHAUST EQUIPMENT

M1503.3 Exhaust discharge. Domestic cooking exhaust equipment shall discharge to the outdoors through a duct. The duct shall have a smooth interior surface, shall be airtight, shall be equipped with a backdraft damper and shall be independent of all other exhaust systems. Ducts serving domestic cooking exhaust equipment shall not terminate in an attic or crawl space or areas inside the *building*.
Exception: Where installed in accordance with the manufacturer's instructions, and where ~~mechanical or natural ventilation~~ *local exhaust* is otherwise provided for the *kitchen* in accordance with Table M1505.5, listed and labeled ductless range hoods shall not be required to discharge to the outdoors.

Commented [M3]: This modification clarifies that some form of mechanical exhaust is required for kitchens, even when a ductless range hood is installed.

SECTION M1504
~~EXHAUST~~ VENTILATION DUCTS, ~~AND~~ EXHAUST TERMINATIONS, AND OUTDOOR AIR INTAKE OPENINGS

Commented [M4]: Use consistent terminology and clarify the scope of the section.

M1504.1 Duct construction. Where ~~exhaust~~ *ventilation* duct construction is not specified in this chapter, construction shall comply with Chapter 16.

M1504.2 Duct length. The length of exhaust and supply ducts used with ventilating *equipment* shall not exceed the lengths determined in accordance with Table M1504.2.
Exception: Duct length shall not be limited where the *duct system* complies with the manufacturer's design criteria or where the airflow rate of the installed ventilating *equipment* is verified by the installer or *approved* third party using integrated diagnostic equipment, a flow hood, flow grid or other airflow measuring device.

Commented [M5]: Use of integrated diagnostic equipment for airflow testing is permitted by 2024 IRC Section N1103.6.3/R403.6.3.

M1504.3 Exhaust ~~openings~~ termination location. ~~Air exhaust openings shall terminate~~Exhaust air shall not be directed onto walkways. Exhaust terminations shall be located as follows:

Commented [M6]: Relocated from 2024 IRC Section R325.4.2.

1. Not less than 3 feet (914 mm) from property lines.
2. Not less than 3 feet (914 mm) from gravity outdoor air intake openings, operable windows, and doors.
3. Not less than 10 feet (3048 mm) from mechanical outdoor air intake openings except where either of the following apply:
   3.1. The exhaust termination ~~opening~~ is located not less than 3 feet (914 mm) above the outdoor air intake opening.
   3.2 The exhaust termination ~~opening~~ is part of a factory-built intake/exhaust combination termination fitting installed in accordance with the ~~fan~~ manufacturer's instructions, and the exhaust air is drawn from a *living space*.
4. ~~In accordance with Sections R303.5.2 and R303.6.~~

Commented [M7]: Use consistent terminology, "exhaust terminations," throughout.

Commented [M8]: The requirements in these sections are relocated to Section M1504.3 and M1504.5 and are still applicable.

M1504.4 Outdoor air intake opening location. Mechanical and gravity outdoor air intake openings shall be located not less than 10 feet (3048 mm) from any hazardous or noxious contaminant, such as vents, chimneys, plumbing vents, streets, alleys, and parking lots. For the purpose of this section, the exhaust from *dwelling unit* toilet rooms, bathrooms, and *kitchens* shall not be considered as hazardous or noxious.

Commented [M9]: Relocated from Section R325.4.1.

Exceptions:
1. The 10-foot (3048 mm) separation is not required where the outdoor air intake opening is located 3 feet (914 mm) or greater below the contaminant source.
2. Separation from vents and chimney terminations serving fuel-burning *appliances* or *fireplaces* shall comply with the applicable provisions of Chapters 18 and 24.
3. Separation from clothes dryer exhaust terminations shall comply with Section M1502.3.

4. Separation from other exhaust terminations shall be in accordance with Section M1504.3.
5. The outdoor air intake opening is part of a factory-built intake/exhaust combination termination fitting installed in accordance with the manufacturer's instructions, and the exhaust air is drawn from a *living space*.

M1504.5 Exhaust termination and outdoor air intake opening protection. Exhaust terminations and outdoor air intake openings shall be protected with corrosion-resistant screens, louvers or grilles having an opening size of not less than 1/4 inch (6 mm) and a maximum opening size of 1/2 inch (13 mm), in any dimension. Exhaust terminations and outdoor air intake openings shall be protected against local weather conditions and shall meet the provisions for exterior wall opening protectives in accordance with this code.

Commented [M10]: Relocated from Section R325.5.

Informative note: Section M1504 will be coordinated with Section R325 as follows.

R325.43 Opening location. Outdoor air intake openings and exhaust terminations ~~openings~~ shall be located in accordance with Chapters 12 through 24 ~~Sections R325.4.1 and R325.4.2~~.
~~**R325.4.1 Intake openings.** Mechanical and gravity outdoor air intake openings shall be located not less than 10 feet (3048 mm) from any hazardous or noxious contaminant, such as vents, chimneys, plumbing vents, streets, alleys, parking lots and loading docks.~~
~~For the purpose of this section, the exhaust from dwelling unit toilet rooms, bathrooms and kitchens shall not be considered as hazardous or noxious.~~
~~**Exceptions:**~~
~~1. The 10-foot (3048 mm) separation is not required where the intake opening is located 3 feet (914 mm) or greater below the contaminant source.~~
~~2. Vents and chimneys serving fuel-burning appliances shall be terminated in accordance with the applicable provisions of Chapters 18 and 24.~~
~~3. Clothes dryer exhaust ducts shall be terminated in accordance with Section M1502.3.~~
~~**R325.4.2 Exhaust openings.** Exhaust air shall not be directed onto walkways.~~
~~**R325.5 Outside opening protection.** Air exhaust and intake openings that terminate outdoors shall be protected with corrosion-resistant screens, louvers or grilles having an opening size of not less than 1/4 inch (6 mm) and a maximum opening size of 1/2 inch (13 mm), in any dimension. Openings shall be protected against local weather conditions. Outdoor air exhaust and intake openings shall meet the provisions for exterior wall opening protectives in accordance with this code.~~

M1504.6 Duct system serving multiple exhaust fans. Exhaust fans in separate dwelling units shall not share a common exhaust duct. Where more than one exhaust fan in a single *dwelling unit* shares a common exhaust duct, each fan shall be equipped with a backdraft damper to prevent the recirculation of exhaust air from one room to another through the exhaust ducting system.

Commented [M11]: This section replaces MN Rules chapter 1322 Section R403.5.8 and is copied from ASHRAE 62.2.

SECTION M1505
MECHANICAL VENTILATION

M1505.1 General. ~~Where *L*~~*local exhaust*, ~~or~~ and whole-house mechanical *ventilation* ~~is provided, the ventilation system~~ shall be provided ~~designed~~ in accordance with this section. *Ventilation* ducts shall comply with Section M1504.

Commented [M12]: This cross reference points to existing requirements.

Exception: Whole-house mechanical *ventilation* shall not be required for an *alteration* where no such system exists prior to the *alteration*.

Commented [M13]: This aligns with the exception within MN Rules chapter 1322 Section R403.5.1.

M1505.2 Recirculation of air. Exhaust air from bathrooms and toilet rooms shall not be recirculated within a residence or circulated to another *dwelling unit* and shall be exhausted directly to the outdoors. Exhaust air from bathrooms, toilet rooms and *kitchens* shall not discharge into an *attic*, *crawl space* or other areas inside the *building*. This section shall not prohibit the installation of ductless range hoods in accordance with the exception to Section M1503.3.

Exception: Recirculation of exhaust air within a single *dwelling unit* shall be permitted during temporary defrost operation of a heat recovery ventilator or energy recovery ventilator as required by the manufacturer's installation instructions.

Informative note: Section M1505.2 will be coordinated with Section R325.2 as follows.

R325.2 Bathrooms. Bathrooms, water closet compartments and other similar rooms shall be provided with ~~aggregate glazing area in windows of not less than 3 square feet (0.3 m2), one-half of which shall be openable.~~
~~**Exception:** The glazed areas shall not be required where artificial light and~~ a *local exhaust* system, which is permitted to be a dedicated exhaust duct from a heat recovery or energy recovery *ventilation* system, ~~are provided. The minimum local exhaust rates shall be determined~~ in accordance with Section M1505. Exhaust air from the space shall be exhausted directly to the outdoors unless complying with the exception to Section M1505.2.

M1505.3 ~~Exhaust~~ Ventilating equipment ratings. *Local ~~E~~exhaust* fans and *whole-house mechanical ventilation system* fans shall be *listed* and *labeled* as providing the minimum required airflow in accordance with ANSI/AMCA 210-ANSI/ASHRAE 51, HVI 916 or HVI 920. The *listed* airflow shall meet or exceed the airflow required by Section M1505.4.3 and Section M1505.5, as applicable, at not less than one speed setting. Airflow shall be field tested and verified in accordance with Section N1103.6.3.

M1505.4 Whole-house mechanical ventilation system. *Whole-house mechanical ventilation systems* shall be designed in accordance with Sections M1505.4.1 through M1505.4.~~4~~3.

M1505.4.1 System design. The *whole-house mechanical ventilation system* shall be a *balanced ventilation system* consisting of a heat recovery or energy recovery ventilator as required in Section N1103.6.1. ~~consist of one or more supply or exhaust fans, or a combination of such, and associated ducts and controls. Local exhaust or supply fans are permitted to serve as such a system. Outdoor air ducts connected to the return side of an air handler shall be considered as providing supply ventilation.~~

M1505.4.2 System controls. The *whole-house mechanical ventilation system* shall be provided with controls that enable manual override. Controls shall include text or a symbol indicating their function.

M1505.4.3 Mechanical ventilation rate. The *whole-house mechanical ventilation system* shall provide outdoor air at a continuous rate not less than that determined in accordance with Table M1505.4.3(1) or not less than that determined by Equation 15-1.

Equation 15-1 *Ventilation* rate in cubic feet per minute = (0.01 × total square foot floor area of house) + 7.5 × (number of bedrooms + 1)

Exception~~s~~:
~~1. Ventilation rate credit. The minimum mechanical ventilation rate determined in accordance with Table M1505.4.3(1) or Equation 15-1 shall be reduced by 30 percent, provided that both of the following conditions apply:~~
~~1.1. A ducted system supplies ventilation air directly to each bedroom and to one or more of the following rooms:~~
~~1.1.1. Living room.~~
~~1.1.2. Dining room.~~
~~1.1.3. *Kitchen*.~~
~~1.2. The whole-house ventilation system is a balanced ventilation system.~~
~~2.~~ Programmed intermittent operation. The *whole-house mechanical ventilation system* is permitted to operate intermittently where the system has controls that enable operation for not less than 25 percent of each 4-hour segment, and the *ventilation* rate prescribed in Table M1505.4.3(1)~~,~~ or by Equation 15-1 ~~or by Exception 1~~ is multiplied by the factor determined in accordance with Table M1505.4.3(2).

Commented [M14]: The exception in Section M1505.2 aligns with the common practice of specifying HERVs with recirculation defrost in cold climates to ensure that the whole-house mechanical ventilation system functions as a balanced mechanical ventilation system whenever it operates. Across MN's climate zones, the concurrent operation of recirculation and bathroom usage is estimated to account for less than 0.3% of the year.

Commented [M15]: HERV airflow is generally determined in accordance with HVI 920, so it should be referenced here.

Commented [M16]: Provide a cross-reference to energy code requirements.

Commented [M17]: Align with MN 1322's requirement for a balanced ventilation system.

Commented [M18]: Provide a cross-reference to energy code requirements.

Commented [M19]: By deleting this exception, the continuous ventilation rate required by this section roughly aligns with the MN Rules chapter 1322 Section R403.5.3 continuous ventilation rate requirement.

TABLE M1505.4.3(1)
CONTINUOUS WHOLE-HOUSE MECHANICAL VENTILATION SYSTEM AIRFLOW RATE REQUIREMENTS

DWELLING UNIT FLOOR AREA (square feet)	NUMBER OF BEDROOMS				
	0–1	2–3	4–5	6–7	> 7
	Airflow in CFM				
< 1,500	30	45	60	75	90
1,501–3,000	45	60	75	90	105
3,001–4,500	60	75	90	105	120
4,501–6,000	75	90	105	120	135
6,001–7,500	90	105	120	135	150
> 7,500	105	120	135	150	165

For SI: 1 square foot = 0.0929 m^2, 1 cubic foot per minute = 0.0004719 m^3/s.

TABLE M1505.4.3(2)
INTERMITTENT WHOLE-HOUSE MECHANICAL VENTILATION RATE FACTORS[a, b]

RUN-TIME PERCENTAGE IN EACH 4-HOUR SEGMENT	25%	33%	50%	66%	75%	100%
Factor[a]	4	3	2	1.5	1.3	1.0

a. For ventilation system run-time values between those given, the factors are permitted to be determined by interpolation.
b. Extrapolation beyond the table is prohibited.

M1505.4.4 Distribution. A shared or dedicated ducted system shall supply *ventilation* air directly to each bedroom, to each floor level and to one or more of the following rooms:

1. Living room.
2. Dining room.
3. *Kitchen.*

Commented [M20]: This text is optional in the 2024 IRC but is proposed as mandatory here, to replace the distribution requirements that are currently in MN Rules chapter 1322 Section R403.5.6.1.

M1505.5 Local exhaust. *Local exhaust* systems shall be designed and installed in accordance with the manufacturer's installation instructions and with this section for each *kitchen*, bathroom, and toilet room. Domestic cooking exhaust equipment shall also comply with Section M1503.

Commented [M21]: Clarifies the 2024 IRC requirement for local exhaust in air-sealed dwelling units and buildings.

Exception: Where the *whole-house mechanical ventilation system* provides the *local exhaust* rate required by Section M1505.5.1, a separate *local exhaust* system shall not be required.

M1505.5.1 Local exhaust rates. *Local exhaust* systems shall ~~be designed to~~ have the capacity to exhaust ~~the minimum~~ airflow at a rate not less than that determined in accordance with Table M1505.5 at one or more speed settings. The listed exhaust airflow rate for a bathroom or toilet room exhaust fan shall equal or exceed the exhaust airflow rate in Table M1505.5 at a minimum static pressure of 0.25 inch wc at one or more speed settings in accordance with Section M1505.3. Airflow shall be field tested and verified in accordance with Section N1103.6.3.

TABLE M1505.5 MINIMUM REQUIRED LOCAL EXHAUST RATES ~~FOR ONE- AND TWO-FAMILY DWELLINGS~~

AREA TO BE EXHAUSTED	EXHAUST RATES
Kitchens	100 cfm intermittent or 25 cfm continuous
Bathrooms-Toilet Rooms	Mechanical exhaust capacity of 50 cfm intermittent or 20 cfm continuous

For SI: 1 cubic foot per minute = 0.0004719 m^3/s, 1 inch water column = 0.2488 kPa.

Commented [M22]: These exhaust rates apply to all occupancies within the scope of the IRC, so the clause, "for one- and two-family dwellings" should be deleted.

CHAPTER 16
DUCT SYSTEMS

SECTION M1602
RETURN AIR

M1602.1 Outdoor air intake openings. Outdoor air intake openings shall be located in accordance with Section ~~R325.5.1~~M1504.4. Opening protection shall be in accordance with Section ~~R325.6~~M1504.5.

Commented [M23]: Use consistent terminology, "outdoor air intake openings," throughout. Update references to correct sections.

CHAPTER 44
REFERENCED STANDARDS

HVI

Home Ventilating Institute
1740 Dell Range Blvd., Suite H, PMB 450
Cheyenne, WY 82009

916—20~~18~~25: Airflow Test Procedure
M1505.3

920-2024: Product Performance Certification and Surveillance Procedure
M1505.3

…

DEPARTMENT OF LABOR AND INDUSTRY

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: Chris Rosival

Email address: chris.rosival@state.mn.us

Telephone number: 651-284-5510

Firm/Association affiliation, if any: DLI

Code or rule section to be changed: M1503.6

Intended for Technical Advisory Group ("TAG"):

Date: 01/24/2025

Model Code: 2024 IRC

Code or Rule Section: M1503.6

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).
   M1503.6, M1503.6.1 and M1503.6.2

   ☐ 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.

M1503.6 Makeup air required. Where one or more gas, liquid or solid fuel-burning appliances that is ~~neither~~ not direct-vent ~~nor uses a mechanical draft venting system~~ is located within a dwelling unit's air barrier, each exhaust system capable of exhausting in excess of 400 cubic feet per minute (0.19 m^3/s) shall have makeup air complying with all of the following:

1.Makeup air shall be mechanically provided.

2. Makeup air shall be electrically interlocked with the kitchen exhaust system.

3. ~~or passively provided t~~Makeup air shall be provided at a rate ~~approximately~~ equal to the exhaust air rate.

4. Makeup air system ~~s~~hall be equipped with ~~not fewer than one outdoor air duct and~~ a damper complying with Section M1503.6.2.

5. Makeup air shall be designed and installed to temper incoming air to not less than 40°F (4°C) measured at the point of distribution into the space.

~~**Exception:** Makeup air is not required for exhaust systems installed for the exclusive purpose of space cooling and intended to be operated only when windows or other air inlets are open.~~

M1503.6.1 Location. *Kitchen* exhaust makeup air ~~that is ducted from the outdoors~~ shall be discharged into the same room in which the exhaust system is located or into rooms or duct systems that communicates ~~through one or more permanent openings~~ with the room in which such exhaust system is located. ~~Such permanent openings shall have a net cross-sectional area not less than the required area of the makeup air supply openings.~~

M1503.6.2 Makeup air dampers. Where makeup air is required by Section M1503.6, makeup air dampers shall comply with this section. Each damper shall be a gravity damper or an electrically operated damper that automatically opens when the exhaust system operates. Dampers shall be located to allow access for inspection, service, repair and replacement without removing permanent construction or any other ducts not connected to the damper being inspected, serviced, repaired or replaced. ~~Gravity or barometric dampers shall not be used in passive makeup air systems except where the dampers are rated to provide the design makeup airflow at a pressure differential of 0.01 in. w.c. (3 Pa) or less.~~

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 2020 IMC has language in Section 501 that will not be pulled forward. These changes address a possible negative pressure situation.

2. Why is the proposed code change a reasonable solution?
   MUA is needed for excessive negative pressure.

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.

Tempering of MUA was required in the residential energy code. Decreasing as homes with direct vent appliances will not be required to provide MUA as was required in the 2020.

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.

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?
Installers, builders 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.

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?

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.

***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: Nick Erickson

Email address: nick@hoousingfirstmn.org

Telephone number: 612-210-8332

Firm/Association affiliation, if any: Housing First MN Spec.

Code or rule section to be changed: R325.8

Intended for Technical Advisory Group ("TAG"):

Date: 12/20/24

Model Code: IECC

Code or Rule Section: MR 1309

Topic of proposal: Required Heating

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.

   R325.8 Required Heating
   Where the winter design temperature in Table R3.01.2 is below 60 F (16 C) every dwelling unit shall ~~be provided with heating facilities capable of maintaining~~ a have a heating system designed and installed to maintain a room temperature of not less than 68 F (20 C) at a point 3 feet (914mm) above the floor and 2 feet (610 MM) from exterior walls in habitable rooms at the design temperature. The installation of one or more portable space heaters shall not be used to achieve compliance with this section.
   This will require adding the definition of "Heating System" in the appropriate section.

   Heating System: A heating system consists of the heating equipment and the distribution system designed to deliver heat to the conditioned space.

   Alt: Could Call this a heating and distribution system.

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.
   Only as far as moving the Energy and Mechanical into 1309

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.)

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

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 costs. Using the current language on a three-level townhome would result in an $80,000 cost increase.

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.
   No

Regulatory Analysis

1. What parties or segments of industry are affected by this proposed code change?
   Code Officials, Home Builders, Mechanical Contractors and New Home Buyers

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?
   Increased costs that price homebuyers out of the new home market in what is already the most costly new construction market in the region.

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: The information you provide in this code change proposal form is considered Public Data and used by the TAG to consider your proposed modification to the code. Any code change proposal form submitted to DLI may be reviewed at public TAG meetings and used by department staff and the Office of Administrative Hearings to justify the need and reasonableness of any proposed rule draft subject to administrative review and is available to the public.

****Note: Incomplete forms will be returned to the submitter with instruction to complete the form. Only completed forms will be accepted and considered by the TAG. The submitter may be asked to provide additional information in support of the proposed code change.

DEPARTMENT OF LABOR AND INDUSTRY

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: C. Scott Anderson

Date: 12/10/24

Email address: c.scott.anderson@minneapolismn.gov

Model Code: 2024 IBC, IMC + IFC

Telephone number: 612-246-7303

Code or Rule Section: IBC 427, IMC 502, IFC 5306

Firm/Association affiliation, if any: City of Minneapolis

Topic of proposal: Med gas storage ventilation coordination

Code or rule section to be changed: IBC 427.2, 427.2.1, 427.2.2, IMC 502.9.1, IFC 5306.2.1, 5306.2.2

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).

☐ 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.
IBC 427.2, 427.2.1, 427.2.2, IMC 502.9.1, IFC 5306.2.1, 5306.2.2

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.

Minnesota State Building Code (IBC)

[F] 427.2 Interior supply location.
Medical gases shall be located in areas dedicated to the storage of such gases without other storage or uses. Where containers of medical gases in quantities greater than the permitted amount, as defined in IFC Table 105.5.9, are located inside the buildings, they shall be located in a 1-hour exterior room, 1-hour interior room or a gas cabinet in accordance with Section 427.2.1, 427.2.2 or 427.2.3, respectively. Rooms or areas where medical gases are stored or used in quantities exceeding the maximum allowable quantity per control area as set forth in Tables 307.1(1) and 307.1(2) shall be in accordance with Group H occupancies.

[F] 427.2.1 One-hour exterior room.
A 1-hour exterior room shall be a room or enclosure separated from the remainder of the building by fire barriers constructed in accordance with Section 707 or horizontal assemblies constructed in accordance with Section 711, or both, with a fire-resistance rating of not less than 1 hour. Openings between the room or enclosure and interior spaces shall be provided with self-closing smoke- and draft-control assemblies having a fire protection rating of not less than 1 hour. The room shall be provided with ventilation in accordance with NFPA 99. ~~Rooms shall have not less than one exterior wall that is provided with not less than two vents. Each vent shall have a minimum free air opening of not less than 36 square inches (232 cm^2) for each 1,000 cubic feet (28 m^3) at normal temperature and pressure (NTP) of gas stored in the room and shall be not less than 72 square inches (465 cm^2) in aggregate free opening area. One vent shall be within 6 inches (152 mm) of the floor and one shall be within 6 inches (152 mm) of the ceiling.~~ Rooms shall be provided with not fewer than one automatic fire sprinkler to provide container cooling in case of fire.

[F] 427.2.2 One-hour interior room.
Where an exterior wall cannot be provided for the room, a 1-hour interior room or enclosure shall be provided and separated from the remainder of the building by fire barriers constructed in accordance with Section 707 or horizontal assemblies constructed in accordance with Section 711, or both, with a fire-resistance rating of not less than 1 hour. Openings between the room or enclosure and interior spaces shall be provided with self-closing smoke- and draft-control assemblies having a fire protection rating of not less than 1 hour. An automatic sprinkler system shall be installed within the room. The room shall be provided with ventilation in accordance with NFPA 99. ~~The room shall be exhausted through a duct to the exterior. Supply and exhaust ducts shall be enclosed in a 1-hour rated shaft enclosure from the room to the exterior. Approved mechanical ventilation shall comply with the International Mechanical Code and be provided with a minimum rate of 1 cubic foot per minute per square foot (0.00508 $m^3/s/m^2$) of the area of the room.~~

Minnesota State Mechanical Code (IMC)

[F] 502.9.1 Compressed gases—medical gas systems.
Rooms for the storage of compressed medical gases in amounts exceeding the permit amounts for compressed gases in the International Fire Code, and that do not have an exterior wall, shall be exhausted through a duct to the exterior of the building. ~~Both separate airstreams shall be enclosed in a 1-hour-rated shaft enclosure from the room to the exterior. Approved mechanical ventilation shall be provided at a minimum rate of 1 cfm/ft^2 [0.00508 m^3/(s • m^2)] of the area of the room.~~ The room shall be provided with ventilation in accordance with NFPA 99.

Gas cabinets for the storage of compressed medical gases in amounts exceeding the permit amounts for compressed gases in the International Fire Code shall be connected to an exhaust system. The average velocity of ventilation at the face of access ports or windows shall be not less than 200 feet per minute (1.02 m/s) with a minimum velocity of 150 feet per minute (0.76 m/s) at any point at the access port or window.

Minnesota State Fire Code (IFC)

5306.2.1 One-hour exterior rooms.
A 1-hour exterior room shall be a room or enclosure separated from the remainder of the building by *fire barriers* constructed in accordance with Section 707 of the *International Building Code* or horizontal assemblies constructed in accordance with Section 711 of the *International Building Code*, or both, with a *fire-resistance rating* of not less than 1 hour. Openings between the room or enclosure and interior spaces shall be self-closing smoke- and draft-control assemblies having a *fire protection rating* of not less than 1 hour. The room shall be provided wth ventilation in accordance with NFPA 99 ~~Rooms shall have not less than one exterior wall that is provided with not less than two vents. Each vent shall have a minimum free opening area of 36 square inches (232 cm^2) for each 1,000 cubic feet (28 m^3) at *normal temperature and pressure* (NTP) of gas stored in the room and shall be not less than 72 square inches (465 cm^2) in aggregate free opening area. One vent shall be within 6 inches (152 mm) of the floor and one shall be within 6 inches (152 mm) of the ceiling.~~ Rooms shall be provided with not less than one automatic sprinkler to provide container cooling in case of fire.

5306.2.2 One-hour interior room.
Where an exterior wall cannot be provided for the room, a 1-hour interior room shall be a room or enclosure separated from the remainder of the building by *fire barriers* constructed in accordance with Section 707 of the *International Building Code* or horizontal assemblies constructed in accordance with Section 711 of the *International Building Code*, or both, with a *fire-resistance rating* of not less than 1 hour. Openings between the room or enclosure and interior spaces shall be self-closing, smoke- and draft-control assemblies having a *fire protection rating* of not less than 1 hour. An *automatic sprinkler system* shall be installed within the room. The room shall be exhausted through a duct to the exterior. The room shall be provided wth bentilation in accordance with NFPA 99 ~~Supply and exhaust ducts shall be enclosed in a 1-hour-rated shaft enclosure from the room to the exterior. *Approved* mechanical ventilation shall comply with the *International Mechanical Code* and be provided at a minimum rate of 1 cfm per square foot [0.00508 m^3/(s • m^2)] of the area of the room.~~

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, IBC, IMC and IFC as noted above

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.)
   There is a conflict in the ventilation requirements between the IMC, IBC, IFC and NFPA 99.

2. Why is the proposed code change a reasonable solution?
   Currently the conflict between the I codes and NFPA cannot be reconciled. One must be set as the standard and the NFPA standard addresses concerns about temperature needs of the medical gasses that the I codes do not.

3. What other factors should the TAG consider?
   NO

Cost/Benefit Analysis

1. Will the proposed code change increase or decrease costs? Please explain and provide estimates if possible.
   This change should not result in a change in construction cost once a single set of criteria is established.

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 cost change

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?
   Architects, Contractors, Developers, Building Owners, Contractors, 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?
   Not adopting this change will result in continued difficulty in finding a compliance path that satisfies all of the conflicting code 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: John G. Smith, P.E.

Date: January 20, 20256

Email address: jgsmith76@gmail.com

Model Code: 2024 IMC

Telephone number: 612 867 3145

Code or Rule Section 1206.1

Firm/Association affiliation, if any: ACEC

Code or rule section to be changed: 1206 Piping Installations

Intended for Technical Advisory Group ("TAG"): 1346 Mechanical and Fuel Gas 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).
   Section 1206 – Piping Installation

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

   1346.1206 Section 1206 Piping Installation

   ☐ 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).

   1346.1206 Section 1206.1.1 Prohibited tee applications.

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

Change language in Minnesota Rule, add language to model code book.

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.

   Delete existing MN rule:

   1346.1206 SECTION 1206 PIPING INSTALLATION.

   ~~**Subpart 1.**~~

   ~~Section 1206.1.1.~~
   ~~IMC Section 1206.1.1 is amended to read as follows:~~

   ~~**1206.1.1 Prohibited tee applications.** Fluid in the supply side of a hydronic system shall not enter a tee fitting through the branch opening. Fluid from two returns shall not enter on the run of the same tee.~~

   Add new language:

   1206.1.1 Prohibited tee applicaitions. A bullhead tee is one in which the branch connection is larger than the straight through run connections. Supply flow into the branch connection or return through the branch connection of a tee fitting shall be avoided where possible and must be a bullhead tee fitting where used. Use of a bullhead tee of either arrangement shall not be permitted immediately before or after boilers, chillers or associated pumps.

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

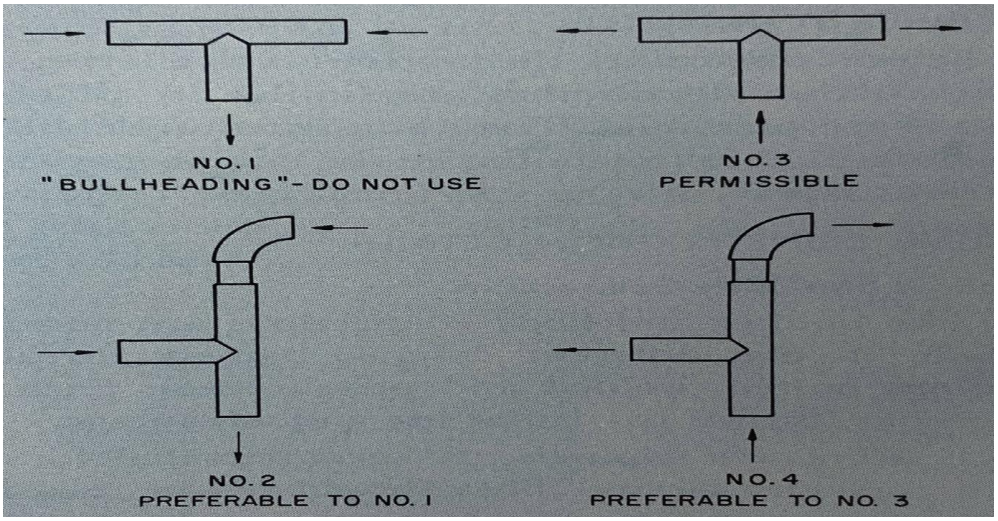
Need and Reason

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.)

   Bullhead tees have been controversial for many years, and there does not appear to be concensus in the industry of what a “bullhead tee” connection, and how they may be applied. Through research in piping books, previous codes, and conversations with seasoned engineers and pipe fitters I learned the following:

   Manufacturers define a bullhead tee fitting as a tee fitting where the branch connection is larger than the through run connections. They do not differentiate if water is being supplied through the branch connection or returned through the branch connection.

   In the Carrier book “Handbook of Air Conditioning System Design”, there is
   “Tees should be installed to prevent ”bullheading” as illustrated in Fig. 5. “Bullheading” causes turbulence which adds greatly to the pressure drop and may also introduce hammering in the line.”
   Note that they state “returning through the branch connection” is not acceptable, whereas supplying through the branch connection is acceptable.

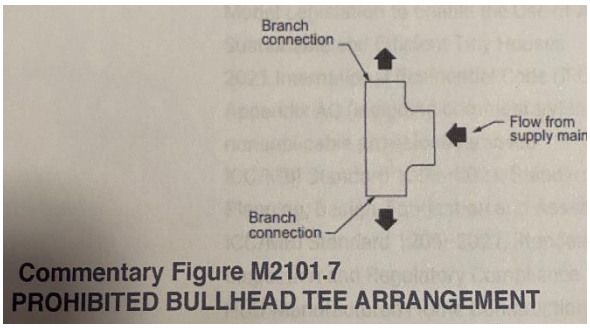


Veterans Administration Master Spec includes the following:
Section 23 21 13 Hydronic Piping, Installation 3.1H (underline added): “Tee water piping run outs or branches into the side of mains or other branches. Avoid bull-head tees, which are two return lines entering opposite ends of a tee and exiting out the common side.”

This prohibits the branch connection being a return connection.

2021 International Tiny House Provisions Chapter 21 Hydronic Piping:
M2101.7 Prohibited tee applications. Fluid in the supply side of a hydronic system shall not enter a tee fitting through the branch opening.

IC Commentary Figure M2101.7 depicts a prohibited “bullhead” tee arrangement. Installation of such a connection creates excessive pressure drop, poor system performance and possible cavitation (air bubbles) that cause erosion of metal pipes. Supply side flow must not enter a tee from the branch opening. This section does not apply to tees in return piping arrangement because the flow entering a tee branch opening merges with the unidirectional flow in the run of the tee.



This prohibits the branch connection being a supply connection.

Reasons given to avoid a bullhead connection (of either configuration) are excessive pressure drop, potential cavitation, and excessive noise. I found tables of pressure drops for this type of fitting and they are very comparible to standard tee fittings. I suspect that cavitation would be more of a concern with the branch being a return arrangement, which is contradictory to the 2021 Tiny House commentary.

Review of previous codes (1982 MN HVAC, 2004 MN Mechanical, 2006 IMC, 2020 IMC) resulted in recommendations to avoid these types of fittings (but allows them) or prohibiting them with the supply water entering the branch connection. In other words, there is no clear agreement of where they can be used and in what configuration.

A tee manufacturer states on their website: (support.boshart.com):
“Bull head pipe tees are widely used in low pressure heating and air conditioning and gas distribution systems. In a bull head tee, the flow typically enters the tee through the “branch” connection and the outlet is split between the two equal “run” connections. This is ideal for supplying flow to smaller diameter piping in two opposite directions without the need for reducers.”

Note “the flow typically enters the tee through the “branch.””

In discussions with a piping instructor at the piping union training center, I was told that he has seen flow balance problems with the branch connection being the supply connection immediately after a boiler, particularly with residential systems which typically have minimal flow balancing capabilities.

In summary, there is no clear engineering reason nor agreement as to when bullhead connections are allowable and in what configuration. The proposed changes I feel are a reasonable approach to the issue which still allows the bullhead connections (which may work better in tight clarance applicaiions) but with restraint to avoid problems.

2. Why is the proposed code change a reasonable solution? For all the reasons above.

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.

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?
   Owners, contractors, building officials.

Owners, contractors, 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?

   If there are no restrictions on the use of bullhead tees, there may be flow issues which can cause equipment problems or heating/cooling terminal unit capacity issues.

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: Kevin Johnson

Date: 1/15/2025

Email address: kevin.johnson@ci.stcloud.mn.us

Model Code: 1346

Telephone number: 320-255-7233

Code or Rule Section: Chapter 9 IFGC

Firm/Association affiliation, if any: City of St Cloud

Topic of proposal: Chapter 9

Code or rule section to be changed: All of Chapter 9

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 Chapter 9 does not exist in model code and has existed in the MNFGC

   ☒ change language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).
   Yes, Chapter 9

   ☐ 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).
   yes Chapter 9

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

1346.5900 CHAPTER 9 INSTALLATION AND TESTING OF FUEL GAS-FIRED ~~EQUIPMENT~~ Appliances

Subpart 1. Chapter 9.
The IFGC is amended by adding a chapter to read as follows:

CHAPTER 9 INSTALLATION AND TESTING OF FUEL GAS-FIRED ~~EQUIPMENT~~ Appliances

Subp. 2. Installation and testing of fuel gas-fired ~~equipment~~ appliances; general.
Chapter 9 shall regulate the installation and testing or repair of gas or fuel burning systems, gas or fuel burners, and gas or fuel burning ~~*equipment*~~ appliances installed within, or in conjunction with, building or structures. The requirements of this chapter shall apply to the following ~~*equipment*~~ appliances:

1. ~~*Equipment*~~ *Appliances* utilized to provide control of environmental conditions.

   Exception: ~~*Equipment* and~~ *Appliances listed* and *labeled* to an appropriate standard by a nationally recognized testing laboratory, which is qualified to evaluate the ~~*equipment* or~~ *appliance*, when installed and tested according to the manufacturer's installation instructions and an approved report is provided to the AHJ and a copy left attached to the appliance at the main valve.

2. ~~*Equipment*~~ All Appliances with a fuel input of 1,000,000 Btu/hr or greater.
3. Unlisted ~~*equipment*~~ and *approved Appliances*.
4. Miscellaneous ~~*equipment*~~ appliances when required by the building official.

Subp. 3. Placing equipment in operation.
After completion of the installation, all safety and operating controls and venting shall be tested before placing the burner in service. The correct input of fuel shall be determined and the fuel-to-air ratio set. Each gas or fuel burner shall be adjusted to its proper input according to the manufacturer's instructions. Overrating the burners or *appliance* is prohibited. ~~Btu/hr input range shall be appropriate to the *appliance*.~~

~~1. The rate of flow of the gas or fuel shall be adjusted to within plus or minus two percent of the required Btu/hr rating at the manifold pressure specified by the manufacturer. When the prevailing pressure is less than the manifold pressure specified, the rates shall be adjusted at the prevailing pressure.~~

~~2. For conversion burners installed in hot water (liquid) boilers or warm air furnaces, the rate of flow of the gas or fuel in Btu/hr shall be adjusted to within plus or minus five percent of the calculated Btu/hr heat loss of the building in which it is installed, or the design load, and shall not exceed the design rate of the *appliance*.~~

~~3. For conversion burners installed in steam boilers, the gas or fuel hourly input demand shall be adjusted to meet the steam load requirements. The gas or fuel input demand necessitated by an oversized boiler shall be established and added to the input demand for load requirements to arrive at a total input demand.~~

~~**Subp. 4. Pilot operation.**~~

~~Pilot flames shall ignite the gas or fuel at the main burner or burners and shall be adequately protected from drafts. Pilot flames shall not become extinguished during pilot cycle when the main burner or burners are turned on or off in a normal manner, either manually or by automatic controls.~~

Subp. 5. Burner operation.

When testing to determine compliance with this section, care shall be exercised to prevent the accumulation of unburned gas or fuel in the *appliance* or flues that might result in explosion or fire.

1.The flames from each burner shall freely ignite the gas or fuel from adjacent burners when operating at the prevailing gas or fuel pressure and when the main control valve is regulated to deliver at one-third of the fuel gas or fuel rate.

2.Burner flames shall not flash back after immediate ignition nor after turning the fuel cock until the flow rate to the burner is one-third the full supply.

3.Burner flames shall not flash back when the gas or fuel is turned on or off by an automatic control mechanism.

4.Main burner flames shall ignite freely from each pilot when the main control valve is regulated to one-third the full gas or fuel rate and when the pilot flame is reduced to a minimum point at which it will actuate the safety device.

5.When ignition is made in a normal manner, the flame shall not flash outside the *appliance*.

6.Burners shall not expel gas or fuel through air openings when operating at prevailing pressure.

7.Burners shall have proper fuel-air mixture to ensure smooth ignition of the main burner.

8.Dual fuel burners may have controls common or independent to both fuels. Transfer from one fuel to the other shall be by a manual interlock switching system to prevent the gas and other fuel being used simultaneously except by special permission from the building official. The building official shall consider whether an exception will provide equivalent safety. The transfer switch shall have a center off position and shall not pass through the center off position without stopping in the center off position.

Subp. 6. Method of test.

1.**Operational checking.** The Appliance manufacturers start up testing procedure to be followed and shall include testing of Tthe flue gas, venting, safety and operating controls of the *appliance* shall be checked to ensure proper and safe operation.

2.**Method of test— atmospheric type/induced draft type/fan-assisted type.** Category I, II, III, IV vented appliances. The *appliance* shall be allowed to operate until the stack temperature becomes stabilized after which a sample of the undiluted flue products shall be taken from the *appliance* flue outlet. The sample taken shall be analyzed for carbon monoxide, carbon dioxide and oxygen. Stack temperature shall be noted.

Note: *Appliance* designs incorporating induced draft assemblies may require a flue gas sample to be taken after the draft regulator or induced draft fan.

3.1.**Performance standards for atmospheric type.**

a.Minimum of 75 percent efficiency as determined by flue gas analysis method at *appliance* flue outlet.

b.Carbon monoxide concentration in flue gas not greater than 0.04 percent on an air-free basis.

c.Stack temperature not greater than 480°F, plus ambient.

d.Carbon dioxide concentration between 6 and 9 percent, inclusive.

e.Oxygen concentration between 4 and 10 percent, inclusive.

3.2.**Performance standards for induced draft type/fanassisted type.**

a.Minimum of 75 percent efficiency as determined by flue gas analysis method at *appliance* flue outlet.

b.Carbon monoxide concentration in flue gas not greater than 0.04 percent on an air-free basis.

c.Stack temperature not greater than 480°F, plus ambient.

d.Oxygen concentration between 4 and 10 percent, inclusive, with carbon dioxide concentration between 6 and 9 percent, inclusive.

Note: Induced draft type and fan-assisted type *appliances* may require a sample to be taken after the induced draft fan, which may cause oxygen figures in excess of limits stated. In

such cases, safe fuel combustion ratios shall be maintained and be consistent with appliance listing.

4.**Method of test – power type.** The *appliance* shall be allowed to operate until the stack temperature becomes stabilized after which a sample of the undiluted flue products shall be taken from the *appliance* flue outlet. The sample shall be analyzed for carbon monoxide, carbon dioxide and oxygen. Stack temperature shall be recorded.

5.**Performance standards for power type.**

a.Minimum of 80 percent efficiency as determined by flue gas analysis method at *appliance* flue outlet.

b.Carbon monoxide concentration in flue gas not greater than 0.04 percent.

c.Stack temperature not greater than 480°F plus ambient, or 125°F in excess of fluid temperature plus ambient.

d.Carbon dioxide concentration between 6 and 9 percent, inclusive.

e.Oxygen concentration between 3 and 10 percent, inclusive.

6.After completion of the test of newly installed gas or fuel burner *equipment* as provided in this section, complete test records shall be filed with the building official on an *approved* form. The tag stating the date of the test and the name of the installer shall be attached to the *appliance* at the main valve.

7.**Oxygen concentration.**

a.The concentration of oxygen in the undiluted flue products of gas or fuel burners shall in no case be less than 3 percent nor more than 10 percent, shall be in conformance with *applicable* performance standards and shall be consistent with the *appliance* listing.

b.The allowable limit of carbon monoxide shall not exceed 0.04 percent.

c.The flue gas temperature of a gas appliance, as taken on the appliance side of the draft regulator, shall not exceed applicable performance standards and shall be consistent with the appliance listing.

8.**Approved oxygen trim system.** The oxygen figures may not apply when there is an *approved* oxygen trim system on the burner that is designed for that use, including a low oxygen interlock when approved by the building official. The building official shall consider whether an exception will provide equivalent safety.

93.**Supervised start-up.**

a.Supervised start-up may be required to verify safe operation of gas or fuel burner Or appliance and to provide documentation that operation is consistent with this code, listing and *approval*. Supervised start-up is required for all fuel burners or appliance in b, c, and d. Supervised start-up requires that fuel burners shall be tested in the presence of the building official in an *approved* manner. Testing shall include safety and operating controls, input, flue gas analysis, and venting. Flue gas shall be tested at high, medium and low fires. Provisions shall be made in the system to allow firing test in warm weather. After completion of the test of newly installed gas or fuel burner ~~*equipment*~~ or appliance as provided in this section and manufactures test procedures, complete test records shall be filed with the building official on an *approved* form. ~~The tag~~ A copy of the record ~~stating the date of the test and the name of the installer~~ shall be attached to the *appliance* at the main valve.

b.Gas and fuel burners of 1,000,000 Btu/hr input or more require a supervised start-up as in a.

c.Installation of oxygen trim systems, modulating dampers, or other draft control or combustion devices require a supervised start-up as in a.

d.All direct fired heaters require a supervised start-up as in a.

10.A complete control diagram of the installation and suitable operating instructions shall be supplied to the building official.

Subp. 7. Pressure regulators.

~~A.General.~~

~~1.Regulators shall be provided with access for servicing.~~

~~2.Regulators shall be provided with a shutoff valve, union and test taps (both upstream and downstream of the regulator) for servicing.~~

~~3.All regulators with inlet gas pressure exceeding 14 inches water column pressure or used on an *appliance* having an input exceeding 400,000 Btu/hr shall have an *approved* high pressure manual gas valve in the supply piping upstream of the regulator.~~

~~4.All regulators with inlet gas pressure exceeding 14 inches water column pressure or used on an *appliance* having an input exceeding 400,000 Btu/hr shall be vented to the outdoors in separate vents sized according to the manufacturer's specifications.~~

~~**Exception:** Regulators equipped with limiting orifices installed in accordance with amended IFGC Section 410.3.~~

~~5.Regulators may not be vented into a combustion chamber or an appliance vent.~~

~~6.Regulator vents shall terminate at least 3 feet (914 mm) from doors, operable windows, nonmechanical intake openings, and openings into direct-vent *appliances*. The vent termination shall be located at least 12 inches (305 mm) above grade and shall be suitably screened and hooded to prevent accidental closure of the vent pipe.~~

~~7.All pounds-to-pounds and pounds-to-inches regulators used as *appliance* regulators where downstream controls are not rated for upstream pressure shall be of the full lock-up type.~~

~~B.Appliance.~~

~~1.*Appliance* regulators shall be installed consistent with the listing and *approval* of the equipment and the listing and *approval* of the regulator manufacturer.~~

~~2.Each gas burner or *appliance* shall have its own gas pressure regulator. This *appliance* regulator is in addition to any pounds-to-pounds or poundsto inches regulators in the system.~~

~~Subp. 8. Equipment information.~~

~~A.All installations of gas or fuel burners with input above 400,000 Btu/hr and all combination gas or fuel burners shall be *approved* before installation. The following information shall be supplied if required by the building official.~~

~~1.Name, model, and serial number of the burner.~~

~~2.Input rating and type of fuel.~~

~~3.Name of the nationally recognized testing laboratory that tested and *listed* the unit.~~

~~4.Name, model, and serial number of the furnace or boiler that the burner will be installed in if not part of a complete package.~~

~~5.A complete wiring diagram showing the factory and fuel wiring installed or to be installed including all controls, identified by the brand name and model number.~~

~~6.A print of the gas or fuel train from the manual shutoff to the *appliance* showing all controls that will be installed, their names, model numbers, and approvals.~~

~~B.All installations of gas or fuel burners with input above 400,000 Btu/hr and all combination gas and oil or other combination fuel burners that are installed in new or renovated boiler or *equipment* rooms, or are installed in a package with the boiler or furnace, shall include the following information in addition to that required in item A, subitems 1 to 6.~~

~~1.A complete piping diagram from the supply source showing all components and materials identified by brand name and model number with relevant approvals.~~

~~2.Detailed provisions for combustion air, venting, and stacks.~~

~~3.A floor plan drawn to scale showing all relevant *equipment*. Plans and specifications shall be *approved* before proceeding with an installation.~~

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 is an existing MN amendment that needs an update.

2. Why is the proposed code change a reasonable solution?
   This will keep a clear path for inspectors to request/demand a test report on a new fuel burning appliance.
   It eliminates sections that are covered in the base code. Some definitions have changed

3. What other factors should the TAG consider?
   Recording the temperature rise and falling into a prescribed range is required in the manufactures literature.

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.
   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, Many municipalities already require this

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?

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.
   Installing contractors

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 this MN amendment is discarded municipalities may stop verifying that the gas fired appliance has been tested to its UL listing upon installation. The appliance may not last as long as intended and the cost of operation may be higher than designed.

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: The information you provide in this code change proposal form is considered Public Data and used by the TAG to consider your proposed modification to the code. Any code change proposal form submitted to DLI may be reviewed at public TAG meetings and used by department staff and the Office of Administrative Hearings to justify the need and reasonableness of any proposed rule draft subject to administrative review and is available to the public.

****Note: Incomplete forms will be returned to the submitter with instruction to complete the form. Only completed forms will be accepted and considered by the TAG. The submitter may be asked to provide additional information in support of the proposed code change.

DEPARTMENT OF LABOR AND INDUSTRY

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: Jesse Soller

Date: 11-25-2024

Email address: Jesse.Soller@state.mn.us

Model Code: 2024 IRC

Telephone number: 651-284-5275

Code or Rule Section: 1601.1.1

Firm/Association affiliation, if any: Minnesota Department of Labor

Code or rule section to be changed: 1601.1.1

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).
   1601.1.1 subpart 5 and 7

   ☐ 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 words proposed to be deleted. Include the entire code (sub) section or rule subpart that contains your proposed changes.

M1601.1 Duct design. Duct systems serving heating, cooling and ventilation equipment shall be installed in accordance with the
provisions of this section and ACCA Manual D, the appliance manufacturer's installation instructions or other approved methods.
M1601.1.1 Above-ground duct systems. Above-ground duct systems shall conform to the following:
1. Equipment connected to duct systems shall be designed to limit discharge air temperature to not greater than 250°F
(121°C).
2. Factory-made ducts shall be listed and labeled in accordance with UL 181 and installed in accordance with the manufacturer's
instructions.
3. Fibrous glass duct construction shall conform to the SMACNA Fibrous Glass Duct Construction Standards or NAIMA Fibrous
Glass Duct Construction Standards.
4. Field-fabricated and shop-fabricated metal and flexible duct constructions shall conform to the SMACNA HVAC Duct
Construction Standards—Metal and Flexible except as allowed by Table M1601.1.1. Galvanized steel shall conform to
ASTM A653.
~~5. The use of gypsum products to construct return air ducts or plenums is permitted, provided that the air temperature does not exceed 125°F (52°C) and exposed surfaces are not subject to condensation.~~
5~~6.~~ Duct systems shall be constructed of materials having a flame spread index of not greater than 200.
~~7. Stud wall cavities and the spaces between solid floor joists to be used as air plenums shall comply with the following conditions:~~
~~7.1. These cavities or spaces shall not be used as a plenum for supply air.~~
~~7.2. These cavities or spaces shall not be part of a required fire-resistance-rated assembly.~~
~~7.3. Stud wall cavities shall not convey air from more than one floor level.~~
~~7.4. Stud wall cavities and joist-space plenums shall be isolated from adjacent concealed spaces by tight-fitting fireblocking in accordance with Section R302.11. Fireblocking materials used for isolation shall comply with Section R302.11.1.~~
~~7.5. Stud wall cavities in the outside walls of building envelope assemblies shall not be utilized as air plenums.~~
~~7.6. Building cavities used as plenums shall be sealed~~.
6~~8~~. Volume dampers, equipment and other means of supply, return and exhaust air adjustment used in system balancing shall be provided with access.

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?
   Subpart 5 gypsum board would be impossible to test air leakage per N1103.3.8 (R403.3.8) Duct system leakage. Subpart 7 The current Minnesota energy code does not allow for stud walls or space between floor joist to be used at plenums.
2. Why is the proposed code change a reasonable solution?

If this section is left in it may confuse contractors and code officials that using stud walls or floor joist as plenums is allowed.

3. What other considerations should the TAG consider?

Cost/Benefit Analysis

1. Will the proposed code change increase or decrease costs? Please explain.
   No change

2. If there is an increased cost, will this cost be offset by a safety or other benefit? Please explain.

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

4. 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? 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?
   Subpart 5 minimal affect cannot sheet rock stud wall cavities and will have to run duct instead of sheetrock. Subpart 7 None, the energy code currently says it is not allowed.

2. What are the probable costs to the agency and to any other State agencies of implementing and enforcing of the proposed rule? Is there an anticipated effect on state revenues?
   No change

3. Are there less costly intrusive methods for achieving the purpose of the proposed rule?
   NO

4. Can you think of other means or methods to achieve the purpose of the proposed code change? If so, please explain what they are and why your proposed change is the preferred method or means to achieve the desired result.
   No

5. What are the probable costs of complying with the proposed rule, including the portion of the total costs that will be borne by identifiable categories of affected parties, such as separate classes of governmental units, businesses, or individuals?
   None

6. What are the probable costs or consequences of not adopting the proposed rule, including those costs or consequences borne by identifiable categories of affected parties, such as separate classes of government units, businesses, or individuals?
   No

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

8. Please include an assessment of the cumulative effect of the rule with other federal and state regulations related to the specific purpose of the rule.
   I am not aware of any impact that this proposed change would have.

   ***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: January 20, 20256

Email address: jgsmith76@gmail.com

Model Code: 2024 IRC

Telephone number: 612 867 3145

Code or Rule Section M2101.7

Firm/Association affiliation, if any: ACEC

Code or rule section to be changed: M2101.7 Prohibited tee applications

Intended for Technical Advisory Group ("TAG"): 1346 IRC

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).
   Section M2101.7 Prohibited tee applications

   ☐ 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.

   Change language in Minnesota Rule, add language to model code book.
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.

   M2101.7 Prohibited tee applications. ~~Fluid in the supply side of a hydronic system shall not enter a tee fitting through the branch opening.~~ A bullhead tee is one in which the branch connection is larger than the straight through run connections. Supply flow into the branch connection or return through the branch connection of a tee fitting shall be avoided where possible and must be a bullhead tee fitting where used. Use of a bullhead tee of either arrangement shall not be permitted immediately before or after boilers, chillers or associated pumps.

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

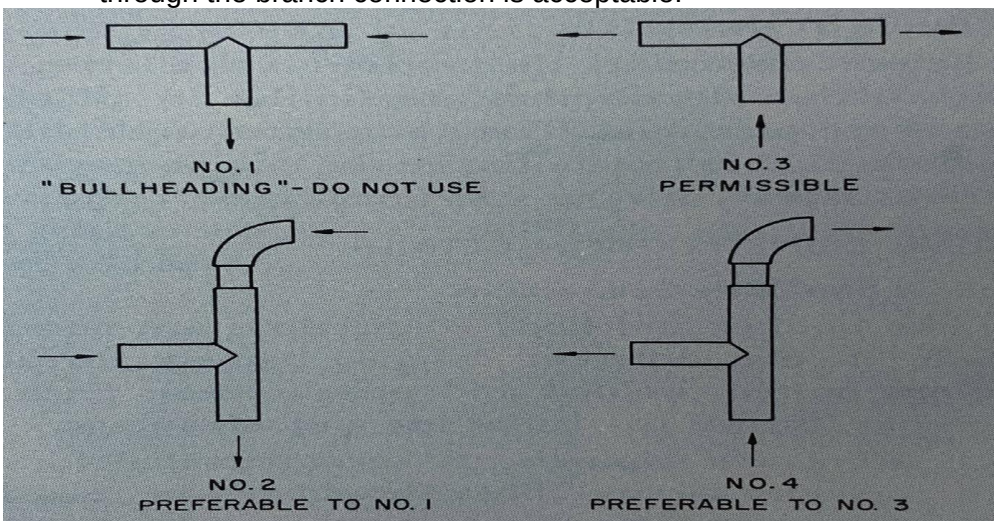
Need and Reason

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.)

   Bullhead tees have been controversial for many years, and there does not appear to be concensus in the industry of what a “bullhead tee” connection, and how they may be applied. Through research in piping books, previous codes, and conversations with seasoned engineers and pipe fitters I learned the following:

   Manufacturers define a bullhead tee fitting as a tee fitting where the branch connection is larger than the through run connections. They do not differentiate if water is being supplied through the branch connection or returned through the branch connection.

   In the Carrier book “Handbook of Air Conditioning System Design”, there is
   “Tees should be installed to prevent ”bullheading” as illustrated in Fig. 5. “Bullheading” causes turbulence which adds greatly to the pressure drop and may also introduce hammering in the line.”
   Note that they state “returning through the branch connection” is not acceptable, whereas supplying through the branch connection is acceptable.



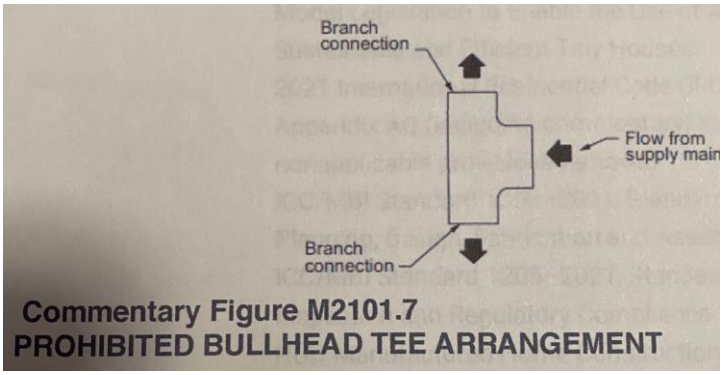
   Veterans Administration Master Spec includes the following:

Section 23 21 13 Hydronic Piping, Installation 3.1H (underline added): “Tee water piping run outs or branches into the side of mains or other branches. Avoid bull-head tees, which are two return lines entering opposite ends of a tee and exiting out the common side.”

This prohibits the branch connection being a return connection.

2021 International Tiny House Provisions Chapter 21 Hydronic Piping:
M2101.7 Prohibited tee applications. Fluid in the supply side of a hydronic system shall not enter a tee fitting through the branch opening.

IC Commentary Figure M2101.7 depicts a prohibited “bullhead” tee arrangement. Installation of such a connection creates excessive pressure drop, poor system performance and possible cavitation (air bubbles) that cause erosion of metal pipes. Supply side flow must not enter a tee from the branch opening. This section does not apply to tees in return piping arrangement because the flow entering a tee branch opening merges with the unidirectional flow in the run of the tee.



This prohibits the branch connection being a supply connection.

Reasons given to avoid a bullhead connection (of either configuration) are excessive pressure drop, potential cavitation, and excessive noise. I found tables of pressure drops for this type of fitting and they are very comparible to standard tee fittings. I suspect that cavitation would be more of a concern with the branch being a return arrangement, which is contradictory to the 2021 Tiny House commentary.

Review of previous codes (1982 MN HVAC, 2004 MN Mechanical, 2006 IMC, 2020 IMC) resulted in recommendations to avoid these types of fittings (but allows them) or prohibiting them with the supply water entering the branch connection. In other words, there is no clear agreement of where they can be used and in what configuration.

A tee manufacturer states on their website: (support.boshart.com):
“Bull head pipe tees are widely used in low pressure heating and air conditioning and gas distribution systems. In a bull head tee, the flow typically enters the tee through the “branch” connection and the outlet is split between the two equal “run” connections. This is ideal for supplying flow to smaller diameter piping in two opposite directions without the need for reducers.”

Note “the flow typically enters the tee through the “branch.””

In discussions with a piping instructor at the piping union training center, I was told that he has seen flow balance problems with the branch connection being the supply connection immediately after a boiler, particularly with residential systems which typically have minimal flow balancing capabilities.

In summary, there is no clear engineering reason nor agreement as to when bullhead connections are allowable and in what configuration. The proposed changes I feel are a reasonable approach to

the issue which still allows the bullhead connections (which may work better in tight clarance applicaiions) but with restraint to avoid problems.

2. Why is the proposed code change a reasonable solution? For all the reasons above.

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.

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?
   Owners, contractors, building officials.

   Owners, contractors, 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?

If there are no restrictions on the use of bullhead tees, there may be flow issues which can cause equipment problems or heating/cooling terminal unit capacity issues.

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: Chris Rosival

Email address: chris.rosival@state.mn.us

Telephone number: 651-284-5510

Firm/Association affiliation, if any: DLI

Code or rule section to be changed: M2101.11

Intended for Technical Advisory Group ("TAG"):

Date: 01/24/2025

Model Code: 2024 IRC

Code or Rule Section: M2101.11

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).
   M2101.11

   ☐ 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.

   M2101.11 Used materials. ~~Used pipe, fittings, valves and other materials shall not be reused in hydronic systems.~~ Reused pipe, fittings, valves or other materials shall be clean and free from foreign materials and shall be approved by the code official for reuse.

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 2024 unamended IMC uses this language for used materials. Without this amendment, all piping might be deemed to be removed, even on a changeout.

2. Why is the proposed code change a reasonable solution?
   Existing piping is always used, if in satisfactory condition.

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 as all the piping will not required to be replaced.

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.

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?
   Installers, builders 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.

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?

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.

***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)

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Telephone number: 612 867 3145

Date: January 6, 2025
Revised January 17, 2025

Model Code: 2024 IRC

Code or Rule Section: M2101.22.6 Expansion Tanks

Firm/Association affiliation, if any: ACEC

Code or rule section to be changed: Hydronic Piping - Expansion Tanks

Intended for Technical Advisory Group ("TAG"): 1346 Mechanical and Fuel Gas 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).
   M2003 Expansion Tanks, M2003.1 General

   ☐ 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.

   M2101.22.6 Expansion Tanks. ~~Shutoff valves shall be installed at connections to nondiaphragm-type expansion tanks.~~ Shutoff valves shall be installed at connections to expansion tanks. The valve between mains and an expansion tank shall have permanently attached thereto a metal tag that contains the following language stamped or etched thereon: "This valve must be open at all times, except when draining expansion tank."

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 wording matches the proposed change to IMC 1205.1.6 Expansion Tanks as tank applications in both instances are essentially the same.

   Shut off valves to isolate expansion tanks for servicing are important, regardless if the tank is nondiaphragm or diaphragm style. I find no reason to require them only for nondiaphragm style of tanks.
   Requiring the tag is important to identify the importance of maintaining the valve in the open position except when servicing the expansion tank. Closing the valve can and will cause system overpressure conditions which will pop the relief valve. This relief valve action can be intermitant, and could be difficult to identify the cause. The metal tag is intended to eliminate inadvertent shutoff of the valve.

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

   It has been common practice for many years and considered to be a part of a good installation.

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.

   Minimal cost increase, but no cost increase when compared to how installations have been performed for many years.

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.

Will reduce/eliminate potential operation problems with closed systems with relief valves.

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?
   Contractors, design engineers, 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?

   System operational issues if the valve is inadvertently shut off, more difficulty servicing diaphragm expansion tanks if no valve is installed in those 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: Brian Stemwedel

Date: 1/07/2025

Email address: Bstemwedel@goldenvalleymn.gov

Model Code: Res. Mech. Code

Telephone number: (612)275-1436

Code or Rule Section: M2103

Firm/Association affiliation, if any: AMBO

Topic of proposal: Pressurizing during installation

Code or rule section to be changed: Residential Mechanical Code M2103

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 in the model code book? If so, list section(s).
   IRC M2103

   ☐ 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.
   M2103.4 Testing. Piping or tubing to be embedded in concrete shall be tested by applying a hydrostatic pressure of not less than 100 psi (690 kPa)~~. The pressure shall be maintained for 30 minutes, during which the joints shall be visually inspected for leaks.~~
   and shall be pressure tested prior to pouring concrete. During pouring, the pipe shall be maintained at the proposed operating pressure.

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 requirement is in the Commercial Mechanical Code [1209.2 MMC] and is good practice to indicate damage to embedded hydronic piping during placement of concrete. Repairs are easier to complete prior to concrete setting.
2. Why is the proposed code change a reasonable solution?
   This carries forward a requirement already in the MN Mechanical Code

3. What other factors should the TAG consider?
   N/A

Cost/Benefit Analysis

1. Will the proposed code change increase or decrease costs? Please explain and provide estimates if possible.
   The Code change has potential to decrease costs of repairs if damage is identified during concrete placement. Repairs after concrete has cured are more expensive and involve multiple trades (concrete contractors, mechanical contractors.
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.
   No

Regulatory Analysis

1. What parties or segments of the industry are affected by this proposed code change?
   Contractors, Code Officials, Designers, 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.

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 associated with repairs after concrete has cured. Damage to embedded piping would be more easily detected during placement of concrete if pressure is maintained during the process

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: Chris Rosival

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Telephone number: 651-284-5510

Firm/Association affiliation, if any: DLI

Code or rule section to be changed: G2403

Intended for Technical Advisory Group ("TAG"):

Date: 01/23/2025

Model Code: 2024 IRC

Code or Rule Section: G2403

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).
   G2403

   ☐ 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.

   ~~CODE. These regulations, subsequent amendments thereto, or any emergency rule or regulation that the administrative authority having jurisdiction has lawfully adopted.~~

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.)

   Existing definition in the IRC-CODE. For purposes of this chapter, “the code” or “this code” means the Minnesota Residential Code, Minnesota Rules, Chapter 1309.

2. Why is the proposed code change a reasonable solution?
   The IRC has an amended definition of Code that does not differ from the definition needed in G2403

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.

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.

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?
   Homeowners, mechanical contractors and 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.

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?

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.

   ***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: Chris Rosival

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Telephone number: 651-284-5510

Firm/Association affiliation, if any: DLI

Code or rule section to be changed: G2406.2

Intended for Technical Advisory Group ("TAG"):

Date: 01/23/2025

Model Code: 2024 IRC

Code or Rule Section: G2406

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).
   G2406

   ☐ 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.

   G2406.2 (303.3) Prohibited locations. *Appliances* shall not be located in sleeping rooms, bathrooms, toilet rooms, storage *closets* or surgical rooms, or in a space that opens only into such rooms or spaces, except where the installation complies with one of the following:
   1. The *appliance* is a *direct-vent appliance* installed in accordance with the conditions of the listing and the manufacturer's instructions.
   2. *Vented room heaters*, wall *furnaces* , *vented decorative appliances* , vented gas *fireplaces* , vented gas *fireplace* heaters and decorative *appliances* for installation in vented solid fuel burning *fireplaces* are installed in rooms that meet the required volume criteria of **Section G2407.5**.
   3. Deleted ~~A single wall-mounted *unvented room heater* is installed in a bathroom and such *unvented room heater* is equipped as specified in **Section G2445.6** and has an input rating not greater than 6,000 *Btu*/h (1.76 kW). The bathroom shall meet the required volume criteria of **Section G2407.5**~~.
   4. Deleted ~~A single wall-mounted *unvented room heater* is installed in a bedroom and such *unvented room heater* is equipped as specified in **Section G2445.6** and has an input rating not greater than 10,000 *Btu*/h (2.93 kW). The bedroom shall meet the required volume criteria of **Section G2407.5**~~.
   5. The *appliance* is installed in a room or space that opens only into a bedroom or bathroom, and such room or space is used for no other purpose and is provided with a solid weather stripped door equipped with an *approved* self-closing device. *Combustion air* shall be taken directly from the outdoors in accordance with **Section G2407.6**.
   6. A *clothes dryer* is installed in a residential bathroom or toilet room having a permanent opening with an area of not less than 100 square inches (0.06 m2) that communicates with a space outside of a sleeping room, bathroom, toilet room or storage *closet*.

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.)
   Minnesota has had this amendment in 1346 for quite a few code cycles. Our homes are built too tight to allow unvented appliances.

2. Why is the proposed code change a reasonable solution?
   To protect the safety of Minnesota IRC occupants

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.

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.

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?
   Homeowners, mechanical contractors and HVAC 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.

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?
   CO deaths

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.

***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.
Email address: jgsmith76@gmail.com

Date: January 23, 2025
Model Code: 2024 IRC

Telephone number: 612 867 3145

Code or Rule Section: G2407 Combustion Air

Firm/Association affiliation, if any: ACEC

Code or rule section to be changed: Section G2407-Combustion, Ventilation and Dilution Air

Intended for Technical Advisory Group ("TAG"): 1346 Mechanical and Fuel Gas 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).
   2407

   ☐ change language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).
   MN Rules 1346 304.1-304.6.2

   ☐ 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.
   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.

SECTION G2407 (304) (IRC)—COMBUSTION, VENTILATION AND DILUTION AIR

G2407.1 (304.1) General. G2407.2 through G2407.12 describe requirements for combustion, ventilation and dilution air. ~~Where chemicals that generate corrosive or flammable products such as aerosol sprays are routinely used, one of the following shall apply to fired appliances where these chemicals can enter combustion air:~~

~~1. Fired appliances shall be located in a mechanical room separate or partitioned off from other areas with provisions for combustion and dilution air from outdoors.~~

~~2. The appliances shall be direct vent and installed in accordance with the appliance manufacturer's installation instructions.~~

G2407.2 (304.2) Appliance location. *Appliances* shall be located so as not to interfere with proper circulation of combustion, ventilation and dilution air.

G2407.3 (304.3) Draft hood/regulator location. Where used, a draft hood or a barometric draft regulator shall be installed in the same room or enclosure as the *appliance* served to prevent any difference in pressure between the hood or regulator and the *combustion air* supply.

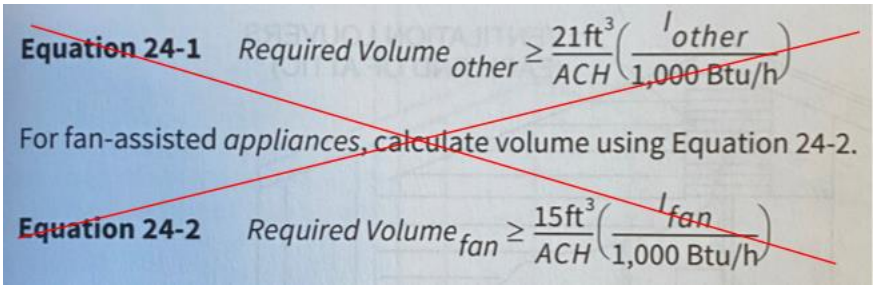
G2407.4 (304.4) Makeup air provisions. Where exhaust fans, clothes dryers and kitchen ventilation systems interfere with the operation of *appliances*, makeup air shall be provided.

~~**G2407.5 (304.5) Indoor combustion air.** The required volume shall be determined in accordance with Section G2407.5.1 or G2407.5.2, except that where the air infiltration rate is known to be less than 0.40 air changes per hour (ACH), Section G2407.5.2 shall be used. The total required volume shall be the sum of the required volume calculated for all *appliances* located within the space. Rooms communicating directly with the space in which the *appliances* are installed through openings not furnished with doors, and through *combustion air* openings sized and located in accordance with Section G2407.5.3, are considered to be part of the required volume.~~

~~**G2407.5.1 (304.5.1)Standard method.** The minimum required volume shall be 50 cubic feet per 1,000 Btu/h (4.8 m3/kW) of the *appliance* input rating.~~

~~**G2407.5.2 (304.5.2) Known air-infiltration-rate method.** Where the air infiltration rate of a structure is known, the minimum required volume shall be determined as follows:~~

~~For *appliances* other than fan-assisted, calculate volume using Equation 24-1.~~



~~where:~~

~~I_{other} = All appliances other than fan assisted (input in Btu/h).~~

~~I_{fan} = Fan-assisted *appliance* (input in Btu/h).~~

~~*ACH* = Air change per hour (percent of volume of space exchanged per hour, expressed as a decimal).~~

~~For purposes of this calculation, an infiltration rate greater than 0.60 ACH shall not be used in Equations 24-1 and 24-2.~~

~~**G2407.5.3 (304.5.3) Indoor opening size and location.** Openings used to connect indoor spaces shall be sized and located in accordance with Sections G2407.5.3 and G2407 .5.3.2 (see Figure G2407.5.3).~~
~~**G2407.5.3.1 (304.5.3.1) Combining spaces on the same story.** Where combining spaces on the same story, each opening shall have a minimum free area of 1 square inch per 1,000 Btu/h (2200 mm2/kW) of the total input rating of all *appliances* in the space, but not less than 100 square inches (0.06 m2). One permanent opening shall commence within 12 inches (305 mm) of the top and one permanent opening shall commence within 12 inches (305 mm) of the bottom of the enclosure. The minimum dimension of air openings shall be not less than 3 inches (76 mm).~~
~~**G2407.5.3.2 (304.5.3.) Combining spaces in different stories.** The volumes of spaces in different stories shall be considered to be communicating spaces where such spaces are connected by one or more permanent openings in doors or floors having a total minimum free area of 2 square inches per 1,000 Btu/h (4402 mm2/kW) of total input rating of all *appliances*.~~

G2407.6 (304.6) Outdoor combustion air. Outdoor *combustion air* shall be provided through opening(s) to the outdoors in accordance with the following: ~~G2407.6.1 or G2407.6.2~~. The minimum dimension of air openings shall be ~~not less than~~ 3 inches (76 mm).

1. Table G2407.6: Used to determine combustion air requirements for Category I, III, and IV gas-fired appliances when the combined input is up to and including 400,000 Btu/hr.

2. Section G2407.6.1: Used to determine combustion air requirements for power burner appliances equipped with a draft control device and having an input above 400,000 Btu/hr shall have a net free area of 0.2 square inches per 1,000 Btu/hr. Combustion air shall be provided from a single opening from the outdoors. In lieu of this requirement, combustion air requirements specified by the manufacturer for a specific power burner appliance may be approved by the building official.

3. Section G2407.6.2: Used to determine combustion air requirements for power burner appliances not equipped with a draft control device and having an input above 400,000 Btu/hr shall have a net free area of 0.1 square inches per 1,000 Btu/hr. Combustion air shall be provided from a single opening from the outdoors. In lieu of this requirement, combustion air requirements specified by the manufacturer for a specific power burner appliance may be approved by the building official.

TABLE G2407.6
COMBUSTION AIR REQUIREMENTS FOR CATEGORY I, III, AND IV GAS-FIRED APPLIANCES WHEN THE COMBINED INPUT IS UP TO AND INCLUDING 400,000 BTU/HR

TOTAL INPUT OF APPLIANCES[1],THOUSANDS OF BTU/HR (KW)	REQUIRED FREE AREA OF AIR-SUPPLY OPENING OR DUCT, SQUARE INCHES (SQ MM)	ACCEPTABLE APPROXIMATE ROUND DUCT EQUIVALENT DIAMETER[2], INCH (MM)
25 (8)	7 (4500)	3 (76)
50 (15)	7 (4500)	3 (76)
75 (23)	11 (7000)	4 (100)
100 (30)	14 (9000)	4 (100)
125 (37)	18 (12 000)	5 (125)
150 (45)	22 (14 000)	5 (125)
175 (53)	25 (16 000)	6 (150)
200 (60)	29 (19 000)	6 (150)
225 (68)	32 (21 000)	6 (150)
250 (75)	36 (23 000)	7 (175)
275 (83)	40 (26 000)	7 (175)

300 (90)	43 (28 000)	7 (175)
325 (98)	47 (30 000)	8 (200)
350 (105)	50 (32 000)	8 (200)
375 (113)	54 (35 000)	8 (200)
400 (120)	58 (37 000)	9 (225)

1. For total inputs falling between listed capacities, use next largest listed input.
2. Opening size based on maximum equivalent duct length of 20 feet. For equivalent duct lengths in excess of 20 feet up to and including a maximum of 50 feet increase round duct diameter by one size.

G2407.6.1 (304.6.1) Two-permanent-openings method. Two permanent openings, one commencing within 12 inches (305 mm) of the top and one commencing within 12 inches (305 mm) of the bottom of the enclosure, shall be provided. The openings shall communicate directly or by ducts with the outdoors or spaces that freely communicate with the outdoors.

Where directly communicating with the outdoors, or where communicating with the outdoors through vertical ducts, each opening shall have a minimum free area of 1 square inch per 4,000 Btu/h (550 mm^2/kW) of total input rating of all *appliances* in the enclosure [see Figures G2407.6.1(1) and G2407.6.1(2)].

Where communicating with the outdoors through horizontal ducts, each opening shall have a minimum free area of not less than 1 square inch per 2,000 Btu/h (1100 mm^2/kW) of total input rating of all *appliances* in the enclosure [see Figure G2407.6.1(3)].

G2407.6.2 (304.6.2) One-permanent-opening method. One permanent opening, commencing within 12 inches (305 mm) of the top of the enclosure, shall be provided. The *appliance* shall have clearances of not less than 1 inch (25 mm) from the sides and back and 6 inches (152 mm) from the front of the *appliance*. The opening shall directly communicate with the outdoors, or through a vertical or horizontal duct, to the outdoors or spaces that freely communicate with the outdoors (see Figure G2407.6.2) and shall have a minimum free area of 1 square inch per 3,000 Btu/h (734 mm^2/kW) of the total input rating of all *appliances* located in the enclosure and not less than the sum of the areas of all vent connectors in the space.

~~**G2407.7 (304.7) Combination indoor and outdoor combustion air.** The use of a combination of indoor and outdoor *combustion air* shall be in accordance with Sections G2407.7.1 through G2407.7.3.~~

~~**G240707.1 (304.7.1) Indoor openings.** Where used, openings connecting the interior spaces shall comply with Section G2407.6.~~

~~**G2407.7.2 (304.7.2) Outdoor opening location.** Outdoor opening(s) shall be located in accordance with Section G2407.6.~~

~~**G2407.7.3 (304.7.3) Outdoor opening(s) size.** The outdoor opening(s) size shall be calculated in accordance with the following:~~

~~1. The ratio of interior spaces shall be the available volume of all communicating spaces divided by the required volume.~~
~~2. outdoor size reduction factor shall be one minus the ratio of interior spaces.~~
~~3. The minimum size of outdoor opening(s) shall be the full size of outdoor opening(s) calculated in accordance with Section G2407.6, multiplied by the reduction factor. The minimum dimension of air openings shall be not less than 3 inches (76 mm).~~

G2407.8 (304.8) Engineered installations. Engineered *combustion air* installations shall provide an adequate supply of combustion, ventilation and dilution air determined using engineering methods.

G2407.9 (304.9) Mechanical combustion air supply. Where all *combustion air* is provided by a mechanical air supply system, the *combustion air* shall be supplied from the outdoors at a rate not less than 0.35 cubic feet per minute per 1,000 Btu/h (0.034 m^3/min per kW) of total input rating of all *appliances* located within the space.

G2407.9.1 (304.9.1) Makeup air. Where exhaust fans are installed, makeup air shall be provided to replace the exhausted air.

G2407.9.2 (304.9.2) Appliance interlock. Each of the *appliances* served shall be interlocked with the mechanical air supply system to prevent main burner operation when the mechanical air supply system is not in operation.

G2407.9.3 (304.9.3) Combined combustion air and ventilation air system. Where *combustion air* is provided by the building's mechanical ventilation system, the system shall provide the specified *combustion air* rate in addition to the required ventilation air.

G2407.10 (304.10) Louvers and grilles. The required size of openings for combustion, ventilation and dilution air shall be based on the net free area of each opening. Where the free area through a design of louver, grille or screen is known, it shall be used in calculating the size opening required to provide the free area specified. Where the design and free area of louvers and grilles are not known, it shall be assumed that wood louvers will have 25-percent free area and metal louvers and grilles will have ~~75~~-50 percent free area. Screens shall have a mesh size not smaller than 1/4 inch (6.4 mm). Nonmotorized louvers and grilles shall be fixed in the open position. Motorized louvers shall be interlocked with the *appliance* so that they are proven to be in the full open position prior to main burner ignition and during main burner operation. Means shall be provided to prevent the main burner from igniting if the louvers fail to open during burner start-up and to shut down the main burner if the louvers close during operation.

G2407.11 (304.11) Combustion air ducts. *Combustion air* ducts shall comply with all of the following:

1. ~~Ducts shall be constructed of galvanized steel complying with Chapter 16 or of a material having equivalent corrosion resistance, strength and rigidity.~~
   ~~**Exception:** Within dwellings units, unobstructed stud and joist spaces shall not be prohibited from conveying *combustion air* , provided that not more than one required fireblock is removed~~.
   Ducts shall be of galvanized steel or an equivalent corrosion-resistant material. If flexible duct is used, increase the duct diameter by one size. Flexible duct shall be stretched with minimal sags.
2. Ducts shall terminate in an unobstructed space allowing free movement of *combustion air* to the *appliances*.
3. Ducts shall serve a single enclosure.
4. Ducts shall not be combined to serve both upper and lower *combustion air* openings where both such openings are used. The separation between ducts serving upper and lower *combustion air* openings shall be maintained to the source of *combustion air.*
5. Ducts shall not terminate in an attic space or crawl space. ~~be screened where terminating in an attic space.~~
6. Horizontal upper *combustion air* ducts shall not slope downward toward the source of *combustion air*.
7. The remaining space surrounding a chimney liner, gas vent, special gas vent or plastic *piping* installed within a masonry, metal or factory-built chimney shall not be used to supply *combustion air*.
   Exception: Direct-vent gas-fired *appliances* designed for installation in a solid fuel burning *fireplace* where installed in accordance with the manufacturer's instructions.
8. *Combustion air* intake openings located on the exterior of a building shall have the lowest side of such openings located not less than 12 inches (305 mm) vertically from the adjoining finished ground level.
9. Where a common exterior hood is used for gravity combustion air and powered makeup air, the hood shall be partitioned to prevent cross flow between the openings.

G2407.12 (304.12) Protection from fumes and gases. Where chemicals that generate corrosive or flammable products such as aerosol sprays are routinely used, one of the following shall apply to fired *appliances* where these chemicals can enter combustion air:

1. Fired appliances shall be located in a mechanical room separate or partitioned off from other areas with provisions for combustion and dilution air from outdoors.
2. The appliances shall be direct vent and installed in accordance with the appliance manufacturer's installation instructions.

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.)

   Section G2407.5 (304.5) Indoor Combustion Air and its subparagraphs should be deleted in their entirety. The indoor combustion air method relies on building infiltration in the appliance room and adjacent rooms with direct communication through permanent openings to provide combustion air. In G2407.5.1 (304.5.1) Standard Method, the infiltration rate is based on 0.50 ACH. Subparagraph G2407.5.2 (304.5.2) Known Air-Infiltration-Rate method (KAIR), equation 24-1 (other than fan assisted appliances) or 24-2 (fan assisted appliances), is used when the air infiltration rate of the structure is known to be less than 0.40 ACH and not greater than 0.60 ACH. It is unclear and even misleading of how the ACH is to be identified for calculation purposes and I could find no definitive method of how this should be determined. Typical air door tests identify the building ACH at 50 Pa pressure but this is not clearly identified as the proper method to use. An Energy Star building has a requirement of 3 ACH or less at 50 Pa (3 ACH50 which is equivalent to 0.20 inches w.c. or 25 mph wind). A very tight passive house has an ACH of no greater than 0.60 ACH50. How equations 24-1 and 24-2 were derived could not be determined, and I question their validity and reliability to calculate the volume of outdoor air introduced through building infiltration. Using ACH50 testing is a valid method to identify how well sealed a building is, but in my opinion should not be used for calculating combustion air. I would also note that an air door test creates a negative condition in the entire building, thereby causing infiltration on all exposures. In actual building operating conditions, about one-half of the building will be infiltrating (windward sides) while about one-half of the building will be exfiltrating (leeward sides), which further reduces the volume of air available for combustion air. I would also note that the ACH results from all exposed surfaces – if an appliance room is below grade, its infiltration rate will be significantly reduced, thereby resulting is much less combustion air than anticipated. The combustion air for a building should be through unobstructed openings which provide free flow of air as required by the appliances.

   Combustion air design requirements are based on a review of NFPA 54, AGA, ASHRAE, CSA B149.1-10, NB-132, existing MN code and several equipment manufacturer recommendations.

   Table G2407.6 for appliances less than or equal to 400,000 Btuh input is based on CSA tables except that the table applies to non draft controlled and draft controlled appliances.

2. Why is the proposed code change a reasonable solution? It further clarifies requirements which are in the 2020 MN IFGC code and provides simpler information to contractors who may need the information.

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 changes.

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.
   Should make compliance and enforcement more uniform and easier to achieve.

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?
   Owners, contractors, building officials.
   Owners, contractorts, design engineers, building code 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?

   Confusion and inconsistency in the design of combustion air requirements. Proposed solutions may be different than what would be required by code officials.

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: Chris Rosival

Date: 01/24/2025

Email address: chris.rosival@state.mn.us

Model Code: 2024 IRC

Telephone number: 651-284-5510

Code or Rule Section: M2417

Firm/Association affiliation, if any: DLI

Code or rule section to be changed: M2417.4 and M2417.4.1

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).
   M2417.4 and M2417.4.1

   ☐ 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.

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.

   G2417.4 (406.4) Test pressure measurement. Test pressure shall be measured ~~with a manometer or with a pressure-measuring device designed and calibrated to read, record, or indicate a pressure loss caused by leakage during the pressure test period~~ with gauges of 2 psi (13.8 kPa) incrementation or less and shall have a pressure range not greater than twice the test pressure applied. The source of pressure shall be isolated before the pressure tests are made. ~~Mechanical gauges used to measure test pressures shall have a range such that the highest end of the scale is not greater than five times the test pressure~~ The test pressure shall be within the middle 50 percent of the test gauge pressure range.

   G2417.4.1 (406.4.1) Test pressure. The test pressure to be used shall be not less than ~~11/2 times the proposed maximum working pressure, but not less than 3 psig (20 kPa gauge)~~ 25 psig (172 kPa gauge). ~~Where the test pressure exceeds 125 psig (862 kPa gauge), the test pressure shall not exceed a value that produces a hoop stress in the piping greater than 50 percent of the specified minimum yield strength of the pipe.~~

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.)
   This language follows the IFGC amendment for gas pipe testing.

2. Why is the proposed code change a reasonable solution?
   IFGC kept the amendment and contractors are used to the 25 psi test.

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.

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.

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?
   Installers, builders 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.

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?

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.

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DEPARTMENT OF LABOR AND INDUSTRY

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: Chris Rosival

Date: 01/24/2025

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Model Code: 2024 IRC

Telephone number: 651-284-5510

Code or Rule Section: M2420

Firm/Association affiliation, if any: DLI

Code or rule section to be changed: M2420.1.3 & M2420.2

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).
   M2420.2

   ☐ 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.

   G2420.1.3 (409.1.3) Access to shutoff valves. Shutoff valves shall be located in places so as to provide access for ease of operation and shall be installed so as to be protected from damage.
   G2420.1.4 Main shutoff valve. Piping systems entering the building shall be provided with an approved main shutoff valve before the first branch takeoff and installed in the first available location inside the building 5 feet or less above the floor that provides ready access and shall have a permanently attached handle.
   G2420.2 (409.2) Meter valve. Every meter shall be equipped with a shutoff valve located on the building supply side of the meter.

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.)
   This language follows the IFGC amendment for gas valve installation.

2. Why is the proposed code change a reasonable solution?
   IFGC TAG approved the amendment, and contractors are used to the valve location.

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.

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.

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?
   Installers, builders 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.

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?

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.

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DEPARTMENT OF LABOR AND INDUSTRY

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: Chris Rosival

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Firm/Association affiliation, if any: DLI

Code or rule section to be changed: G2445.1

Intended for Technical Advisory Group ("TAG"):

Date: 01/23/2025

Model Code: 2024 IRC

Code or Rule Section: G2445

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).
   G2445

   ☐ 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.

SECTION G2445 (621)
UNVENTED ROOM HEATERS
G2445.1 Unvented room heaters and unvented decorative appliances shall not be installed in any dwelling or occupancy. ~~(621.1) General. Unvented room heaters shall be listed in accordance with ANSI Z21.11.2 and shall be installed in accordance with the conditions of the listing and the manufacturer's instructions.~~
~~G2445.2 (621.2) Prohibited use. One or more unvented room heaters shall not be used as the sole source of comfort heating in a dwelling unit .~~
~~G2445.3 (621.3) Input rating. Unvented room heaters shall not have an input rating in excess of 40,000 Btu/h (11.7 kW).~~
~~G2445.4 (621.4) Prohibited locations. The location of unvented room heaters shall comply with Section G2406.2.~~
~~G2445.5 (621.5) Room or space volume. The aggregate input rating of all unvented appliances installed in a room or space shall not exceed 20 Btu/h per cubic foot (207 W/m3) of volume of such room or space. Where the room or space in which the appliances are installed is directly connected to another room or space by a doorway, archway or other opening of comparable size that cannot be closed, the volume of such adjacent room or space shall be permitted to be included in the calculations.~~
~~G2445.6 (621.6) Oxygen-depletion safety system. Unvented room heaters shall be equipped with an oxygen-depletion-sensitive safety shutoff system. The system shall shut off the gas supply to the main and pilot burners when the oxygen in the surrounding atmosphere is depleted to the percent concentration specified by the manufacturer, but not lower than 18 percent. The system shall not incorporate field adjustment means capable of changing the set point at which the system acts to shut off the gas supply to the room heater.~~
~~G2445.7 (621.7) Unvented decorative room heaters. An unvented decorative room heater shall not be installed in a factory-built fireplace unless the fireplace system has been specifically tested, listed and labeled for such use in accordance with UL 127.~~
~~G2445.7.1 (621.7.1) Ventless firebox enclosures. Ventless firebox enclosures used with unvented decorative room heaters shall be listed as complying with ANSI Z21.91.~~

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.)
   Minnesota has had this amendment in 1346 for quite a few code cycles. Our homes are built too tight to allow unvented appliances.

2. Why is the proposed code change a reasonable solution?
   To protect the safety of Minnesota IRC occupants

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.

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.

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?
   Homeowners, mechanical contractors and HVAC 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.

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?
   CO deaths

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.

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