

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: Staff

Date: July 8, 2024 (Revised 8-24-24)

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

Model Code: 2024 IMC

Telephone number: 651-284-5510

Code or Rule Section: 508

Firm/Association affiliation, if any: DLI

Topic of proposal: Makeup air

Code or rule section to be changed: 508.1.1

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).
508.1 and 508.1.1

☒ change language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).
1346.0508.1 and 1346.0508.1.1

☐ 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 ~~striketrough~~ words proposed for deletion. Include the entire code (sub) section or rule subpart that contains your proposed changes.

508.1 Makeup air. Makeup air shall be supplied during the operation of commercial kitchen exhaust systems that are provided for commercial cooking appliances. The amount of makeup air supplied to the building from all sources shall be approximately equal to the amount of exhaust air for all exhaust systems for the building. The makeup air shall not reduce the effectiveness of the exhaust system. Makeup air shall be provided by ~~gravity or mechanical means or both. Mechanical makeup air systems~~ and shall be automatically controlled to start and operate simultaneously with the exhaust system. Makeup air intake opening locations shall comply with Section 401.4.

508.1.1 Makeup air temperature. HVAC systems that serve the kitchen space shall have the additional capacity necessary for the latent and sensible loads that are introduced by the *makeup air* supplied to the kitchen space or the *makeup air* shall be conditioned by dedicated systems according to the following:

1. Makeup air shall not be less than 50°F (10°C)

2. If cooling is provided, temperature of the makeup air shall not be such that the difference in the temperature between the *makeup air* supplied to the kitchen space and the design setpoint temperature in the kitchen space is not greater than 10°F (6°C) above the kitchen space design setpoint temperature as specified by the mechanical designer of record.

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.)
Tempering of the air for commercial kitchens is addressed in model code regarding 10°F (6°C).
2. Why is the proposed code change a reasonable solution?
Providing tempering of air for workers and food safety.
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.
If cooling is provided in the kitchen, the cost might increase by requiring the makeup air system if cooling is not included in original design.
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.
Increased workers and food safety.
3. If there is a cost increase, who will bear the costs? This can include government units, businesses, and individuals.
Business owners.
4. Are there any enforcement or compliance cost increases or decreases with the proposed code change? Please explain.

No change

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 change

Regulatory Analysis

1. What parties or segments of industry are affected by this proposed code change?
Commercial kitchen HVAC installers, architects, engineers and business owners.
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?
Worker safety and food safety concerns.
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.
MNOSHA has requirements for hot temperatures and allotted time for work in such spaces.

***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.

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: **Greg Johnson**

Date: **08/13/2024**

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

Model Code: **International Mechanical Code**

Telephone number: **651-235-1215**

Code or Rule Section: **IMC 1109.2.5**

Firm/Association affiliation, if any: **self**

Topic of proposal: **Refrigerant piping shaft exception**

Code or rule section to be changed: **IMC 1109.2.5 Refrigerant pipe shafts, Exception 2.**

Intended for Technical Advisory Group ("TAG"): **Mechanical and Fuel Gas Code 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

- The proposed code change **is meant to change language** contained the model code book? If so, list section(s).

2012 & 2024 IMC Sec. 1109.2.5 Refrigerant pipe shafts, Exception 2

It will not change language contained in an existing amendment in Minnesota Rule.

The change will delete language contained in the model code book. If so, list section(s).

2012 & 2024 IMC Sec. 1109.2.5 Refrigerant pipe shafts, Exception 2

It will not delete language contained in an existing amendment in Minnesota Rule.

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

- The proposed change **is not required** by Minnesota Statute.
- Provide *specific* language you would like to see changed. Indicate proposed new words with underlining and ~~striketrough~~ words proposed for deletion. Include the entire code (sub) section or rule subpart that contains your proposed changes.

1109.2.5 Refrigerant pipe shafts. Refrigerant piping that penetrates two or more floor/ceiling assemblies shall be enclosed in a fire resistance-rated shaft enclosure. The fire resistance-rated shaft enclosure shall comply with Section 713 of the *International Building Code*.

Exceptions:

1. Refrigeration systems using R-718 refrigerant (water).
 2. Piping in a direct refrigeration system ~~using Group A1 refrigerant~~ where the refrigerant quantity does not exceed the limits of Table 1103.1 for the smallest occupied space through which the piping passes.
 3. Piping located on the exterior of the *building* where vented to the outdoors.
4. This proposed code change **will not** impact other sections of a model code book or an amendment in Minnesota Rule.

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.)

Regarding Exception 2, IMC Table 1103.1, *Refrigerant Classification, Amount and OEL* provides limits for the quantity of refrigerant that can be released to the atmosphere without creating a fire or human health hazard. IMC Table 1103.1 is duplicated from ASHRAE Standard 34, *Designation and Safety Classification of Refrigerants* Table 4-1, *Refrigerant Data and Safety Classifications*.

Restricting the shaft exception to systems using Group A1 refrigerants is inconsistent with the safe limits premise of IMC Table 1103.1 and Standard 34, Table 4-1. There is no need to restrict the use of any refrigerant provided the release of which does not exceed the tabular safety limits.

This interpretation is supported by the provisions of Exception b of Section 9.12.1.5 of ASHRAE 15-2022, *Safety Standard for Refrigeration Systems* which says:

“9.12.1.5.1 Shaft Alternative. *A shaft enclosure shall not be required for the refrigerant piping for any of the following refrigerating systems:*

- a. Systems using R-718 (water) refrigerant*
- b. Piping in a high-probability system where the refrigerant concentration does not exceed the amounts shown in ASHRAE Standard 34 3, Table 4-1 or 4-2, for the smallest occupied space through which the piping passes*
- c. Piping located on the exterior of the building where vented to the outdoors”*

Research of past editions of ASHRAE 15ⁱ shows that the exception for limited concentrations of refrigerant has applied to all refrigerants and not just A1 refrigerants since at least 1994. Similarly, research of the past editions of the Uniform Mechanical Code (UMC)ⁱⁱ shows that its parallel exception to refrigerant pipe shaft requirements also has historically not limited the exception to only A1 refrigerants.

The limitation of the refrigerant pipe shaft exception to A1 refrigerants was introduced by code change M99-18 (Julius Ballanco, proponent). Code change M99-18 was an extensive proposal introducing more than sixty new sections, subsections, and tables addressing refrigerant piping.

The reason statement for M99-18 did not provide a reason to limit the shaft exception to A1 refrigerants, merely stating: “*There are three exceptions proposed to the shaft requirements in Section 1109.2.5.1, one is when water is use, that is R718 refrigerant. The second is for the use of Group A1 refrigerants provided the smallest space in which the pipe pass meets the RCL requirements for the refrigerant. The last exception is for when the piping is installed on the outside of the building where any leak would vent to atmosphere.*”

Similarly, a review of the video of the M99-18 hearing testimony and committee discussion at the Committee Action Hearingsⁱⁱⁱ and testimony at the Public Comment Hearings^{iv} shows that there was no discussion of the refrigerant pipe shaft provisions or the limitation of Exception 2 to A1 refrigerants.

Code consultant Greg Johnson contacted the M99-18 proponent, Julius Ballanco, to inquire about the shaft exception limitation to A1 refrigerants and received the following personal communication:

“You are correct that ASHRAE 15 never restricted the exception for shafts to Group A1 refrigerants. I chaired the refrigerant piping working group that rewrote all of the piping requirements in ASHRAE 15. When we started the rewrite, we reviewed the IMC requirements for refrigerant piping and found them to be completely inadequate. As a result, I submitted a code change using the [refrigerant piping working group’s] current draft of the refrigerant piping requirements. Within that draft was a limitation to Group A1 refrigerants not being enclosed in a pipe shaft. Since it was a part of the overall rewrite, I never wrote the reason for the A1 limitation, nor did I discuss it during testimony.”

*Of course, after multiple versions (9 total) of the refrigerant piping rewrite, **the A1 limitation was removed**. ASHRAE was supposed to catch that change during the 2021 ICC Code Cycle. However, it was missed because the final PPR of the refrigerant piping rewrite had not been issued or approved. The galley proof was approved in January 2022, after the end of the code change cycle. Which brings us to the 2024 cycle for the 2027 I-codes. The modification has been approved for the committee and should be accepted.” <emphasis added>*

Mr. Ballanco is referencing code change M75-2024 when he states, “The modification has been approved for the committee and should be accepted.”

Further, Mr. Ballanco has issued a statement (appended) that clarifies: “SSPC 15 Refrigerant Piping Working Group had nine revisions to the original draft of the piping requirements. During those revisions, the limitation for shaft alternatives to only systems using Group A1 refrigerants was removed. **There was no technical justification for limiting the shaft alternative to a single group of refrigerants**. With the anticipated increased use of Group A2L refrigerants, it was noted that the shaft alternative must also apply to these refrigeration systems.” <emphasis added>

M75-24^{vi} (Greg Johnson, National Multifamily Housing Council; Vladimir G. Kochkin, National Association of Home Builders; Andrew Klein, BOMA International; Emily Toto, ASHRAE, proponents) proposes to return the applicability of Exception 2 to any refrigerant that does not exceed the safe quantity limits of IMC Table 1103.1.

M75-24 was heard and passed unanimously by the IMC hearing committee in April 2024.^{vii} There was no testimony in opposition and no discussion of the details. No public comments on M75-24 were received in opposition to returning the applicability of Exception 2 to all refrigerants.^{viii} This means M75-24 will advance to the consent agenda for the 2027 IMC which also means the exception to refrigerant shaft requirements will be restored to all refrigerants in the 2027 IMC.

2. Why is the proposed code change a reasonable solution?
The change will make MN Rules consistent with ASHRAE 15-2022 and the 2027 IMC.
3. What other factors should the TAG consider?

The change supports housing affordability.

Cost/Benefit Analysis

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

It will decrease costs. Costs are estimated to be reduced by roughly \$1,000 per piping run per floor of an R-2 multifamily building. \$22,400 estimated avoided total cost per mechanical room.

- 2. There is no increased cost.**
- 3. There is no increased cost to be borne.**
- 4. There is no increased enforcement or compliance cost to be borne.**
5. The cost of complying with the proposed code change in the first year after the rule takes effect **will not** 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, and the public benefit from reduced costs associated with not providing building construction not needed for safe use of the building.

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 other means or method achieves the purpose of the code change.

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?

A multifamily designer client has estimated that the cost of the unnecessary limitation proposed to be deleted could be \$250K for a 300 unit multifamily building.

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

The proposed change is needed because of US EPA's prohibition of high global warming potential refrigerants (A1s). Only A2L refrigerants will be permitted for residential applications to comply with code and US EPA rules.

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- ⁱ [ASHRAE 15-1994](#), Sec. 8.12.3, Exc. (e); [ASHRAE 15-2001](#), Sec. 8.10.3, Exc. (e); [ASHRAE-15-2004](#), Sec. 8.10.3, Exc. (e); [ASHRAE 15-2007](#), Sec. 8.10.3, Exc. (e); [ASHRAE 15-2010](#), Sec. 8.10.3, Exc. (d); [ASHRAE 15-2013](#), Sec. 8.10.3, Exc. (4); [ASHRAE 15-2016](#), Sec. 8.10.3, Exc. (4); [ASHRAE 15-2019](#), Sec. 8.10.3, Exc. (4)
 - ⁱⁱ [UMC-2015](#), Sec. 1109.3 Exc. (4); [UMC-2018](#), Sec. 1109.3, Exc. (4); [UMC-2021](#), Sec. 1109.3, Exc. (4); [UMC-2024](#), Sec. 1109.3, Exc. (4)
 - ⁱⁱⁱ [M99-18 committee action hearing video](#)
 - ^{iv} [M99-18 public comment hearing video](#)
 - ^v 07-01-2024 email from Julius Ballanco to Greg Johnson
 - ^{vi} [M75-24 code change proposal](#)
 - ^{vii} [M75-24 committee action hearing video](#)
 - ^{viii} Personal communication with ICC code development staff

M75-24

IMC®: 1109.2.5

Proponents: Greg Johnson, Johnson & Associates Consulting Services, National Multifamily Housing Council (gjohnsonconsulting@gmail.com); Vladimir G. Kochkin, National Association of Home Builders - NAHB, NAHB (vkochkin@nahb.org); Andrew Klein, A S Klein Engineering, PLLC, BOMA International (andrew@asklein.com); Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org)

2024 International Mechanical Code

Revise as follows:

1109.2.5 Refrigerant pipe shafts. Refrigerant piping that penetrates two or more floor/ceiling assemblies shall be enclosed in a fire-resistance-rated shaft enclosure. The fire-resistance-rated shaft enclosure shall comply with Section 713 of the International Building Code.

Exceptions:

1. *Refrigeration* systems using R-718 refrigerant (water).
2. Piping in a direct refrigeration system ~~using Group A1 refrigerant~~ where the refrigerant quantity does not exceed the limits of Table 1103.1 for the smallest occupied space through which the piping passes.
3. Piping located on the exterior of the *building* where vented to the outdoors.

Reason: JOHNSON: This will make the IMC consistent with Section 9.12.1.5 of ASHRAE 15-2022. Note that IMC Section 1109.2.2 still requires piping protection, either within building elements or protective enclosures.

TOTO: This section was added to the IMC before the completion of the changes to ASHRAE 15. ASHRAE 15 removed the limitation in exception 2 as applying only to Group A1 refrigerants. It was determined that any refrigerant meeting the limitations of Table 1103.1 are safe to install without a shaft enclosure. This modification is consistent with ASHRAE 15-2022.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

JOHNSON: Costs are estimated to be reduced by roughly \$1,000 per piping run per floor of an R-2 multifamily building.

TOTO: This may reduce the cost of construction by eliminating the shaft requirements for all refrigerants that do not exceed the safe limitations in the code. \$22,400 estimated avoided total cost per mechanical room.

Estimated Immediate Cost Impact Justification (methodology and variables):

JOHNSON: Lineal feet of shaft-wall system avoided estimated to be 20 feet. Height of ceiling estimated to be 9 feet. Cost of installed shaft system estimated to be \$7.00 per square foot. $20 \times 9 \times \$7 = \960 . \$960 was rounded to \$1,000.

TOTO: This change provides a lower cost alternative to the installation of a pipe shaft. Assumed area of avoided shaft wall system = 10 ft high X 40 lineal ft (\$ sided enclosure) = 400 sf of shaft wall area. Assume shaft liner wall board is \$34 per sf (kamcoboston.com), assume shaft framing materials are \$8 per sf (schillings.com), assume \$4 per sf labor (forbes.com), = \$56 per sf for installed shaft wall without finishing. $\$56 \text{ per sf} \times 400 \text{ sf} = \text{\$22,400 estimated avoided total cost per mechanical room.}$

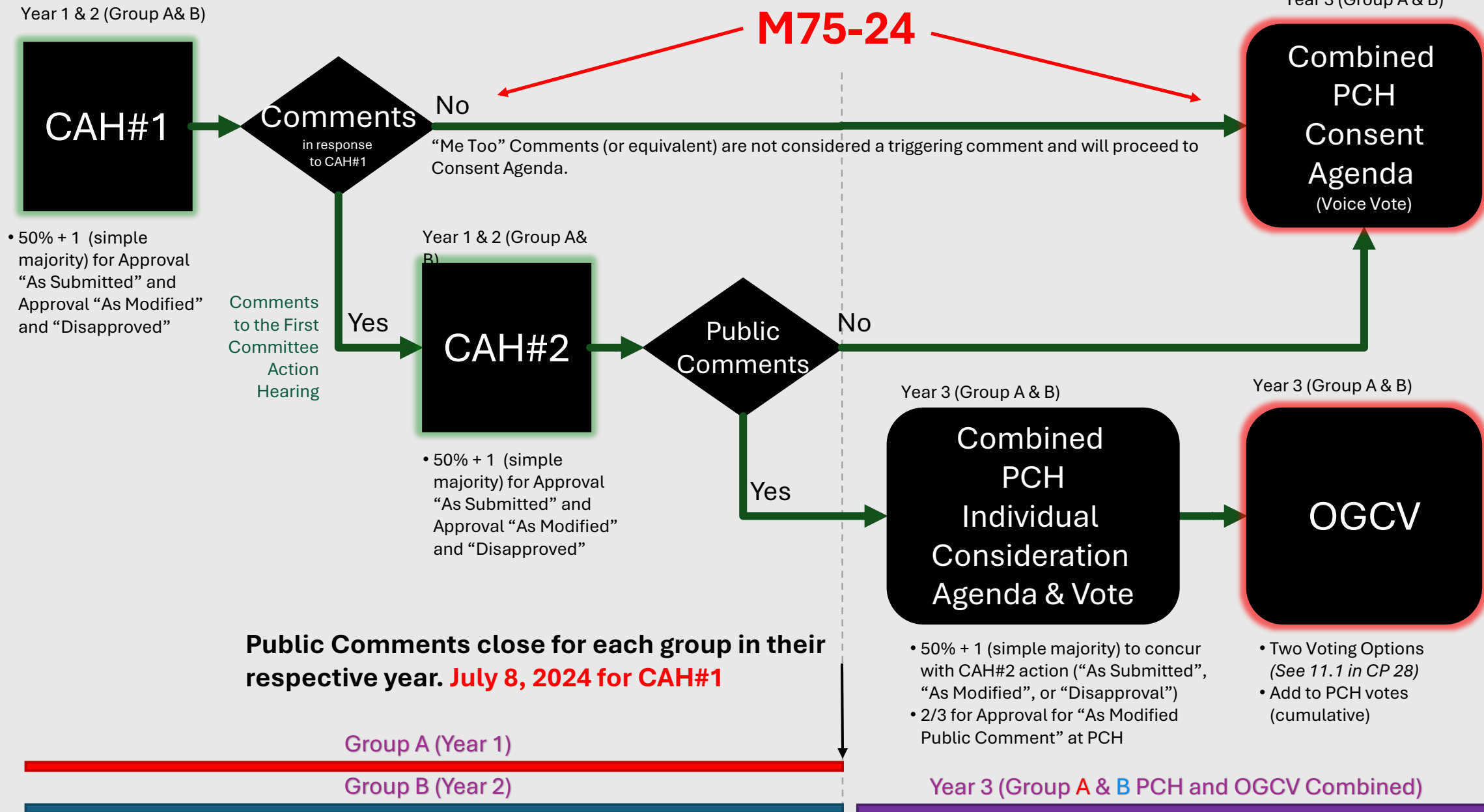
Estimated Life Cycle Cost Impact:

JOHNSON: N/A

Estimated Life Cycle Cost Impact Justification (methodology and variables):

JOHNSON: N/A

Progression to Consensus or Individual Vote





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JULIUS A. BALLANCO, P.E.
President

July 10, 2024

Refrigerant Piping Connecting (or Passing Through) Multiple Floor Levels Based on ASHRAE 15 with a Reference to the ICC International Mechanical Code

Executive Summary: Where refrigerant piping passes through different floor levels in a building, design professionals have the option of locating the piping in a fire-resistance rated pipe shaft, or within the building elements with each floor/ceiling penetration properly protected.

The 2021 and 2024 editions of the ICC International Mechanical Code have a limitation on refrigeration systems using Group A1 refrigerants for exceptions to the pipe shaft requirements. This limitation was only proposed, but not accepted, by ASHRAE 15. The limitation is being removed in the 2027 edition of the Mechanical Code. Code Officials should accept the allowance of the exceptions for any system, in accordance with alternative approval.

Pipe Shaft Option: When refrigerant piping is located in a pipe shaft, the Building Code regulates the fire-resistant rating of the shaft. Shafts that connect three stories or less must be 1 hour fire-resistance rated. Shafts connecting four or more stories must be 2-hour fire-resistance rated. Every pipe penetration of the shaft wall, whether horizontal or vertical, must be protected with a through penetration pipe protection to maintain the fire-resistance rating of the shaft.

When the refrigerant piping contains a Group A2L refrigerant, the pipe shaft must be ventilated. The ventilation can either be by natural or mechanical means. If natural ventilation is selected, a 4-inch round duct or pipe must be at the base of the shaft and open to the outdoors. There must also be an opening at the top of the shaft, to allow the free flow of air for natural ventilation.

If the shaft is mechanically ventilated, a refrigerant detector is required at the base of the shaft to detect any leaking refrigerant, thus activating the mechanical ventilation. The ventilation rate is based on the inside area of the shaft. ASHRAE 15 specifies the ventilation rate for the given size of the shaft.

Penetration Protection Option: Piping is typically enclosed within the building elements. Refrigerant piping may also be enclosed within the building elements. Where the refrigerant piping passes through a floor/ceiling assembly, the annular space around the pipe must be protected with a through penetration protection means. This is typically accomplished with a fire rated caulking material.

If the refrigerant piping passes through a fire-resistance rated wall assembly, the annular space must be protected with a through penetration protection means. The through penetration protection must be the same or higher rating than the wall assembly.

Substantiation Detailing the Executive Summary

The refrigerant piping requirements in the 2022 edition of ASHRAE 15 have been completely rewritten. The new requirements were developed by the Refrigerant Piping Working Group of SSPC 15. Many of the piping requirements remain the same as previous editions of the standard, merely coordinated into a new format.

One of the issues that appears confusing is the installation of refrigerant piping between multiple floors, specifically three or more floors. Section 9.12.1.5 states, in part, *“Refrigerant piping that penetrates two or more floor/ceiling assemblies shall be enclosed in a fire-resistance-rated shaft enclosure. The fire-resistance-rated shaft enclosure shall comply with the requirements of the building code.”*

The following section, 9.12.1.5.1, lists alternatives to installing refrigerant piping in a fire-resistance rated shaft. The second item listed for shaft alternatives states, *“Piping in a high-probability system where the refrigerant concentration does not exceed the amounts shown in ASHRAE Standard 34³, Table 4-1 or 4-2, for the smallest occupied space through which the piping passes.”*

While both Section 9.12.1.5 and 9.12.1.5.1 appear to be new requirements, they are actually a rewrite of Section 8.10.3 of the 2019 and prior editions of ASHRAE 15. Rather than including exceptions to the shaft requirements, the new Section 9.12.1.5.1 uses the term, “shaft alternative.” In effect, shaft alternatives are exceptions to the shaft requirements.

The requirement for a pipe shaft dates back to when the Building Code mandated pipe shafts where piping extended three or more stories in a building. The 1984 BOCA Building Code had the following statement in Section 1410.4:

Section 1410.4 Ducts and pipe shafts: *In all buildings other than buildings of Use Group R-3, vertical pipes arranged in groups of two or more which penetrate two or more floors and occupy an area of more than 1 square foot shall be enclosed by construction having a fire-resistance rating specified in Table 401.*

It should be noted that Use Group R-3 is the classification for one- and two-family dwellings.

Section 9.12.2.2 of ASHRAE 15 specifies requirements to ventilate a pipe shaft where refrigerant piping using Group A2L refrigerants is used. Shaft ventilation can be accomplished by either natural or mechanical means. For natural ventilation, Item a of Section 9.12.2.2 requires a minimum of a 4-inch diameter pipe, duct, or conduit at the lowest point of the shaft and open to the outdoors. A means of make up air must be at the top of the shaft.

Mechanical ventilation, identified in Item b of Section 9.12.2.2, is based on the area of the pipe shaft. Table 9-12 specifies the minimum ventilation rate. A pipe shaft of 20 square inches or less requires a minimum of 100 cfm of ventilation. A pipe shaft greater than 20 square inches, and less than or equal to 250 square inches, requires a minimum of 200 cfm of ventilation.

A pipe shaft remains an option for enclosing refrigerant piping. The ICC International Building Code has the following requirement for a shaft fire-resistance rating:

713.4 Fire-resistance rating. *Shaft enclosures shall have a fire-resistance rating of not less than 2 hours where connecting four stories or more, and not less than 1 hour where connecting less than four stories. The number of stories connected by the shaft enclosure shall include any basements but not any mezzanines. Shaft enclosures shall have a fire-resistance rating not less than the floor assembly penetrated, but need not exceed 2 hours. Shaft enclosures shall meet the requirements of Section 703.2.1.1.*

By 1987, all of the model building codes were revised to remove the mandatory requirement for a pipe shaft. A pipe shaft was still permitted as an optional design, however, the building codes added extensive pipe penetration requirements for floor/ceiling penetrations when a pipe shaft is not installed. Those requirements remain in the current ICC International Building Code. Section 714 specifies penetration protection requirements. When a through penetration firestop system is used to protect the annular space, the system must be tested to ASTM E814 or UL 1479.

There are special exceptions for penetrations of copper and steel pipe 6 inches in diameter or less. When passing through concrete or masonry, the annular space can be filled with mortar, provided the penetration does not allow the passage of smoke or flame.

Item b in Section 9.12.1.5.1 of ASHRAE 15 is consistent with the International Building Code allowance for multi-floor piping with penetration protection rather than a pipe shaft. ASHRAE 15 directs the user to the Building Code to determine the requirements for penetration protection.

When utilizing Item b in Section 9.12.1.5.1, the design professional must perform an analysis of the potential leak of refrigerant into the smallest space in which the piping passes. The 2022 edition of ASHRAE 15 added new requirements for analyzing potential refrigerant leaks. This included the addition of effective dispersal volume charge (EDVC), as well as, effective dispersal volume (EDV). Section 7.2.3.1.1 added exempted spaces when determining the EDV. The section reads, *“The areas that contain only continuous refrigerant piping, or contain only joints and connections that have been tested in accordance with Section 9.13, are exempt from the effective dispersal volume calculation unless these areas are part of connected spaces per Section 7.2.3.2.”*

Section 9.13, referenced in the exempted spaces section, is the new robust testing requirements for field installed refrigerant piping. Testing is required for all field installed refrigerant piping, hence, if the piping installation complies with ASHRAE 15, spaces containing only the piping, including joints and connections, are exempt from the EDV calculations.

Where the refrigerant piping, connecting three or more stories, is not located in a fire-resistance rated shaft, Item b of Section 9.12.1.5.1 requires an analysis of the leak potential into the spaces in which the piping passes through. However, Section 7.2.3.2 exempts spaces from the EDV calculation if the space only contains tested refrigerant piping, joints, and connections. When installed in such a manner, the International Building Code requires all pipe penetrations of floor/ceiling assemblies to be properly protected.

ICC International Mechanical Code: At the time the ASHRAE SSPC 15 Refrigerant Piping Working Group began rewriting the refrigerant piping requirements in ASHRAE 15, it was noted that the refrigerant piping requirements in the 2018 edition of the ICC International Mechanical Code were woefully inadequate. A code change was submitted, using an early draft of the changes to the refrigerant piping requirements in

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Refrigerant Piping Connecting (or Passing Through) Multiple Floor Levels

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ASHRAE 15. Included in that early draft were the refrigerant pipe shaft provisions listed as Section 1109.2.5. Rather than shaft alternatives, the code change listed exceptions to a refrigerant pipe shaft section.

The second exception in the proposed code change added a limitation as only being applicable to refrigeration systems using Group A1 refrigerants. The exception reads:

2. Piping in a direct system using Group A1 refrigerant where the refrigerant quantity does not exceed the limits of Table 1103.1 for the smallest occupied space through which the piping passes.

This limitation for systems using Group A1 refrigerants was part of a very large code change. Most of the emphasis and review were of the other sections in the proposed change. Exception 2 was not identified in the code change substantiation, nor was it discussed during testimony on the code change.

SSPC 15 Refrigerant Piping Working Group had nine revisions to the original draft of the piping requirements. During those revisions, the limitation for shaft alternatives to only systems using Group A1 refrigerants was removed. There was no technical justification for limiting the shaft alternative to a single group of refrigerants. With the anticipated increased use of Group A2L refrigerants, it was noted that the shaft alternative must also apply to these refrigeration systems.

When the exception to Section 1109.2.5 was added to the 2021 ICC International Mechanical Code, the code became inconsistent with ASHRAE 15. The 2019 edition of ASHRAE 15 did not include the update from the Refrigerant Piping Working Group, however, the standard always permitted the shaft exception for a system using any refrigerant.

The final approval of the refrigerant piping rewrite to ASHRAE 15 occurred in the early part of 2022, after the final consideration of code changes to the 2024 ICC International Mechanical Code. In accordance with ASHRAE policy, a code change could not be submitted to ICC to correct exception 2 to Section 1109.2.5 since the piping change had not been accepted by ASHRAE.

The 2022 edition of ASHRAE 15, which is referenced in the 2024 edition of the ICC International Mechanical Code, updated the refrigerant piping requirements. The shaft alternatives allowable for all refrigerants was included in the 2022 edition of ASHRAE 15. Thus, there is a conflict between the Mechanical Code and the referenced standards regarding the exception or alternative to refrigerant pipe shafts.

The SSPC 15 Code Change Working Group noted this conflict and proposed a change, M75-24, to the 2027 edition of the ICC International Mechanical Code to remove the limitation applying to only Group A1 refrigerants. Code change M75-24, sponsored by ASHRAE and others, was unanimously approved by the Mechanical Code Committee. The result of this code change will make the Mechanical Code consistent with ASHRAE 15 regarding the allowance of the exception, or shaft alternative, being applicable to all refrigeration systems.

It is appropriate for code officials to grant an alternative approval in accordance with Section 104.2.3 of the ICC International Mechanical Code. The alternative approval would be to allow the use of Exception 2 to Section 1109.2.5 as applying to a refrigeration system using any refrigerant. The alternative approval would be consistent with ASHRAE 15 and the 2027 edition of the ICC International Mechanical Code.

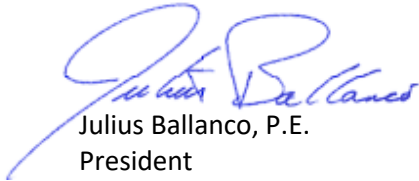
July 10, 2024

Refrigerant Piping Connecting (or Passing Through) Multiple Floor Levels

Page 5

Summary: ASHRAE 15 grants the design professional the option to install refrigerant piping in a fire-resistance rated shaft, or to protect every floor/ceiling penetration in accordance with the Building Code. Code Officials enforcing the 2021 or 2024 edition of the ICC International Mechanical Code should grant an alternative approval for refrigeration systems using refrigerants, other than Group A1 refrigerants, to not be located in a pipe shaft based on the requirements in ASHRAE 15.

Respectfully submitted,



Julius Ballanco, P.E.
President

(Note: Julius Ballanco was the Chair of the SSPC 15 Refrigerant Piping Working Group and proponent of the ICC refrigerant piping code change.)

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: John G. Smith, P.E.

Date: August 28, 2024

Email address: jgsmith76@gmail.com

Model Code: 2024 IMC

Telephone number: 612 867 3145

Code or Rule Section: 1205.1.6
Expansion Tanks

Firm/Association affiliation, if any: ACEC

Code or rule section to be changed: Expansion Tanks

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

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).
1205.1.6 Expansion Tanks

☒ change language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).
MN 1346 1205.1.6 Expansion tanks

☐ 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 ~~striketrough~~ words proposed for deletion. Include the entire code (sub) section or rule subpart that contains your proposed changes.

Delete MN 1346.1205.1.6 Expansion tanks entirely.

Revise IMC 1205.1.6 as follows:

1205.1.6 Expansion tanks. Shutoff valves shall be installed at connections to ~~nondiaphragm-type~~ 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.)

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 intermittent, 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.

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: Staff

Date: August 24, 2024

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

Model Code: 2024 IMC & 2024 IBC

Telephone number: 651-284-5510

Code or Rule Section: 1346.1206.1.1 &
1305.3005.7

Firm/Association affiliation, if any: DLI

Topic of proposal: Hydronic piping in elevator
rooms

Code or rule section to be changed: Hydronic Piping

Intended for Technical Advisory Group ("TAG"):

General Information

	<u>Yes</u>	<u>No</u>
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).

MR 1346.1206.1 & MR 1305.3005.7

☐ 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 ~~striketrough~~ words proposed for deletion. Include the entire code (sub) section or rule subpart that contains your proposed changes.

SECTION 1206

PIPING INSTALLATION

1206.1 General. Piping, valves, fittings and connections shall be installed in accordance with the conditions of approval.

1206.1.1 Elevator machine rooms. Hydronic piping shall not enter or pass through elevator machine rooms.

3005.7 Mechanical piping. Hydronic piping shall not enter or pass through elevator machine rooms.

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.

Copying the amendment in the IMC and IBC.

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.)
MR 1307 does not allow hydronic piping in machine rooms and this is not addressed in MR 1346.
2. Why is the proposed code change a reasonable solution?
This CCP is a simple clarification to specify where hydronic piping is not allowed.
3. What other factors should the TAG consider?
None

Cost/Benefit Analysis

1. Will the proposed code change increase or decrease costs? Please explain and provide estimates if possible.
N/A
2. If there is an increased cost, will this cost be offset by a safety or other benefit? Please explain. If the benefit is quantifiable (for example energy savings), provide an estimate if possible.
N/A.
3. If there is a cost increase, who will bear the costs? This can include government units, businesses, and individuals.
N/A
4. Are there any enforcement or compliance cost increases or decreases with the proposed code change? Please explain.
N/A
5. Will the cost of complying with the proposed code change in the first year after the rule takes effect exceed \$25,000 for any one small business or small city ([Minn. Stat. § 14.127](#))? A small business is any business that has less than 50 full-time employees. A small city is any statutory or home rule charter city that has less than ten full-time employees. Please explain.
No change

Regulatory Analysis

1. What parties or segments of industry are affected by this proposed code change?
Designers, installers and mechanical inspectors.
2. Can you think of other means or methods to achieve the purpose of the proposed code change? What might someone opposed to this code change suggest instead? Please explain what the alternatives are and why your proposed change is the preferred method or means to achieve the desired result.
No.
3. What are the probable costs or consequences of not adopting the code change, including those costs or consequences borne by identifiable categories of affected parties, such as separate classes of government units, businesses, or individuals?
Possible cost increases for changes needed to comply with MR 1307
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: 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.

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: Staff

Date: 7/26/2024

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

Model Code:

Telephone number: 651-284-5510

Code or Rule Section: 1346.5101

Firm/Association affiliation, if any:

Topic of the proposal: Administration

Code or rule section to be changed: MN Mechanical Code 1346.5101 Administration

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).
Administration Chapter MN Mechanical Code

☒ 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 ~~striketrough~~ words proposed for deletion. Include the entire code (sub) section or rule subpart that contains your proposed changes.

1346.5101

ADMINISTRATION

~~Subpart 1. Scope.~~

~~This code shall apply to the installation of fuel gas piping systems, fuel gas appliances, gaseous hydrogen systems, and related accessories in accordance with this code.~~

~~Subp. 2. Gaseous hydrogen systems.~~

~~Gaseous hydrogen systems shall be regulated by IFGC Chapter 7, as amended.~~

~~Subp. 3. Piping systems.~~

~~This code applies to piping systems for natural gas with an operating pressure of 125 pounds per square inch gauge (psig) (862 kPa gauge) or less, and for LP-gas with an operating pressure of 20 psig (140 kPa gauge) or less, except as provided in IFGC Section 402.6.1. Coverage shall extend from the point of delivery to the outlet of the appliance shutoff valves. Piping system requirements shall include design, materials, components, fabrication, assembly, installation, testing, inspection, operation, and maintenance.~~

1346.5101

ADMINISTRATION

Subpart 1. Scope. This code shall apply to the installation of fuel-gas *piping* systems, *fuel gas appliances, gaseous hydrogen systems* and related accessories in accordance with ~~Sections 101.2.2 through 101.2.6~~ this code.

Exception: Detached one- and two-family dwellings and townhouses not more than three stories above grade plane in height with separate means of egress and their accessory structures not more than three stories above grade plane in height, shall comply with this code or the *International Residential Code*.

Subpart 2. [A] 101.2.1 Appendices. Provisions in the appendices shall not apply unless specifically adopted.

Subpart 3. [A] 101.2.2 Gaseous hydrogen systems. *Gaseous hydrogen systems* shall be regulated by Chapter 7.

Subpart 3[A] 101.2.3 Piping systems. These regulations cover *piping* systems for natural gas with an operating pressure of 125 pounds per square inch gauge (psig) (862 kPa gauge) or less, and for *LP-gas* with an operating pressure of 20 psig (140 kPa gauge) or less, except as provided in Section 402.7. Coverage shall extend from the *point of delivery* to the outlet of the *appliance* shutoff valves. *Piping* system requirements shall include design, materials, components, fabrication, assembly, installation, testing, inspection, operation and maintenance.

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

No

Need and Reason

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

The scoping provisions addressed an code section not in existence in the 2024 IFGC

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

3. What other factors should the TAG consider?

None

Cost/Benefit Analysis

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

N/A

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

N/A

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

N/A

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

N/A

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

N/A

Regulatory Analysis

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

Building owners, HVAC installers and jurisdictions.

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?

None

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

None

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

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: Staff

Date: 7/26/2024

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

Model Code:

Telephone number: 651-284-5510

Code or Rule Section: 1346.5101,
1346. 5301.1, 1346.5401.2

Firm/Association affiliation, if any:

Topic of the proposal: Administration

Code or rule section to be changed: MN Mechanical Code 1346.5101 Administration

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).
Administration Chapter MN Mechanical Code

☒ 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 ~~strike through~~ words proposed for deletion. Include the entire code (sub) section or rule subpart that contains your proposed changes.

Subp. 5. Systems, appliances, and equipment outside the scope.

This code shall not apply to the following:

1. Portable LP and natural gas appliances and equipment of all types that are not connected to a fixed fuel piping system s and LP containers with a capacity of less than 100 pounds.
2. Installation of farm appliances and equipment such as brooders, dehydrators, dryers, and irrigation equipment.
3. Raw material (feedstock) applications except for piping to special atmosphere generators.
4. Oxygen-fuel gas cutting and welding systems.
5. Industrial gas applications using gases such as acetylene and acetylenic compounds, hydrogen, ammonia, carbon monoxide, oxygen, and nitrogen.
6. Petroleum refineries, pipeline compressor or pumping stations, loading terminals, compounding plants, refinery tank farms, and natural gas processing plants.
7. Integrated chemical plants or portions of such plants where flammable or combustible liquids or gases are produced by, or used in, chemical reactions.
8. LP-gas installations at utility gas plants.
9. Liquefied natural gas (LNG) installations.
10. Fuel gas piping in power and atomic energy plants.
11. Proprietary items of equipment, apparatus, or instruments such as gas-generating sets, compressors, and calorimeters.
12. LP-gas equipment for vaporization, gas mixing, and gas manufacturing.
- ~~13. Temporary LP-gas piping for buildings under construction or renovation that is not to become part of the permanent piping system.~~
- ~~14~~13. Installation of LP-gas systems for railroad switch heating.
- ~~15~~14. Installation of hydrogen gas, LP-gas, and compressed natural gas (CNG) systems on vehicles.
- ~~16~~15. Except as provided in IFGC Section 401.1.1, gas piping, meters, gas pressure regulators, and other appurtenances used by the serving gas supplier in the distribution of gas, other than undiluted LP-gas.
- ~~17~~16. Building design and construction, except as specified in this rule.
- ~~18~~17. Piping systems for mixtures of gas and air within the flammable range with an operating pressure greater than 10 psig (69 kPa gauge).
- ~~19~~18. Portable fuel cell appliances that are neither connected to a fixed piping system nor interconnected to a power grid.

1346.5301.1 Scope.

This chapter shall govern the approval and installation of all *equipment* and appliances that comprise parts of the installations regulated by this code in accordance with ~~Section 101.2.~~MR 1346.5101. Temporary LP appliances and equipment connected to a LP gas container with a capacity of 100 pounds or larger shall comply with MR 1346.5401.2. Temporary natural gas appliances shall be connected to a natural gas piping system. All temporary LP or natural gas appliances must be listed and labeled, be installed in accordance the terms of the listing, and have combustion air provided from the outdoors sized with a minimum free area of 1 square inch per 3,000 Btu per hour input.

1346.5401.2 Liquefied petroleum gas storage.

The storage system for liquefied petroleum gas shall be designed and installed in accordance with the *International Fire Code* and NFPA 58. For the purposes of 1346.5301.1, LP gas containers shall not be connected to a common manifold for the purposes of temporary LP appliances and equipment connected to a LP gas container with a capacity of 100 pounds or larger.

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 proposal will provide a safer work environment. Temporary LP gas should not be exempt from meeting code requirements. Worker safety is a very important. A non-code compliant temporary LP gas line and unlisted appliance could create hazardous situations.

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

This change is as easy way to verify temporary LP gas piping is installed safely.

3. What other factors should the TAG consider?

A previous incident could have been avoided if temporary LP gas piping system, and listed gas appliances, were required to be installed per code and inspected.

Cost/Benefit Analysis

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

The change proposal will have cost increases to contractors, jurisdictions and builders because of the requirements the piping be approved.

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

The increased cost will be offset by worker safety. One accident will cost way more than the increased fees needed code compliant temporary LP gas installation

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

The building owners will bear the cost for this increase.

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

Enforcement costs could be offset by permit fees.

5. Will the cost of complying with the proposed code change in the first year after the rule takes effect exceed \$25,000 for any one small business or small city ([Minn. Stat. § 14.127](#))? A small business is

any business that has less than 50 full-time employees. A small city is any statutory or home rule charter city that has less than ten full-time employees. Please explain.

N/A

Regulatory Analysis

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

Building owners, HVAC installers and jurisdictions.

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?

Loss of life and catastrophic building damage from a gas leak.

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.

Fire code and OSHA requirements

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

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: Staff

Date: 8/22/24

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

Model Code:

Telephone number: 651-284-5510

Code or Rule Section: 411.1

Firm/Association affiliation, if any:

Topic of the proposal: Connecting appliances

Code or rule section to be changed: MN Mechanical Code 1346.411.1

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 in the model code book? If so, list section(s).
411.1

☐ 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 ~~striketrough~~ words proposed for deletion. Include the entire code (sub) section or rule subpart that contains your proposed changes.

SECTION 411 (IFGC)

APPLIANCE AND MANUFACTURED HOME CONNECTIONS

411.1 Connecting appliances. Except as required by **Section 411.1.1**, *appliances* shall be connected to the *pipng* system by one of the following:

1. Rigid metallic pipe and fittings.
2. Corrugated stainless steel tubing (CSST) where installed in accordance with the manufacturer's instructions.
3. Semirigid metallic tubing and metallic fittings. Lengths shall not exceed 6 feet (1829 mm) and shall be located entirely in the same room as the *appliance* . Semirigid metallic tubing shall not enter a motor-operated *appliance* through an unprotected knockout opening.
4. *Listed* and *labeled appliance* connectors in compliance with **ANSI Z21.24/CSA 6.10** and installed in accordance with the manufacturer's instructions and located entirely in the same room as the *appliance* .
5. *Listed* and *labeled* quick-disconnect devices in compliance with **ANSI Z21.41/CSA 6.9** used in conjunction with *listed* and *labeled appliance* connectors.
6. *Listed* and *labeled* convenience outlets in compliance with **ANSI Z21.90/CSA 6.24** used in conjunction with *listed* and *labeled appliance* connectors.
7. *Listed* and *labeled* outdoor *appliance* connectors in compliance with **ANSI Z21.75/CSA 6.27** and installed in accordance with the manufacturer's instructions.
8. Listed outdoor gas hose connectors in compliance with **ANSI Z21.54** used to connect portable outdoor *appliances* . The gas hose connection shall be made only in the outdoor area where the *appliance* is used, and shall be to the gas *pipng* supply at an *appliance* shutoff valve, a listed quick-disconnect device or listed gas convenience outlet.
9. Gas hose connectors for use in laboratories and educational facilities in accordance with **Section 411.4**.

10. Gas hose connectors for temporary natural and LP gas appliances and equipment in compliance with CSA 8.3-2015.

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 proposal adds a standard for temporary natural and LP gas hose.

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

Removing the exemption for temporary LP gas (1346.5101, Item 13) requires a standard for the hose used in that application. Also, a reference standard for natural gas hose has never been included in the model 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.

N/A

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

N/A

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

N/A

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

N/A

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

N/A

Regulatory Analysis

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

Building owners, HVAC installers and jurisdictions.

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?

Loss of life and catastrophic building damage from a gas leak.

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 instructions to complete the form. Only completed forms can be considered by the TAG.

CODE CHANGE PROPOSAL FORM

(Must be submitted electronically)

Author/requestor: Tom De Genaro

Date: 10/23/24

Email address: tom@michelsales.com

Model Code: IFGC

Telephone number: 952-923-0356

Code or Rule Section: **503.4.1 Plastic Piping**

Firm/Association affiliation, if any: Michel Sales Agency

Topic of proposal: UL1738 Venting adoption

Code or rule section to be changed: **503.4.1 Plastic Piping** The plastic venting materials shall be labeled in accordance with the product standards specified by the appliance manufacturer or shall be listed and labeled in accordance with UL 1738.

Intended for Technical Advisory Group ("TAG"):

General Information

	<u>Yes</u>	<u>No</u>
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). IFGC 2021 **503.4.1 Plastic Piping**

☐ 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 ~~striketrough~~ words proposed for deletion. Include the entire code (sub) section or rule subpart that contains your proposed changes.

This is staff's interpretation of the CCP:

503.4.1 Plastic piping. ~~Where plastic piping is used to vent an appliance, the appliance shall be listed for use with such venting materials and the appliance manufacturer's installation instructions shall identify the specific plastic piping material.~~ The plastic pipe venting materials shall be *labeled* in accordance with the product standards specified by the *appliance* manufacturer ~~or shall be listed and labeled in accordance with UL 1738.~~

I propose striking the following two lines:

503.4.1 Plastic Piping The plastic venting materials shall be labeled in accordance with the product standards specified by the appliance manufacturer ~~or shall be listed and labeled in accordance with UL 1738.~~

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 wording result in consistent venting practices and provide only UL listed venting systems that are specifically tested and proven to work for flue gas applications,

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

UL is a safety standard applicable to venting. Currently, venting is being installed that has not been tested for the applications. All other applications have a governing code, venting has avoided having a consistent testing application applied until the advent of UL1738.

3. What other factors should the TAG consider?

Constituency with other states adopting as well as the entire country of Canada implementing this rule change.

Cost/Benefit Analysis

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

It will be a slight increase based on part for part pending the cost of the UL 1738 material selected, the market conditions of raw materials and the method installation. Some versions install slightly quicker because of joining methods and weight reduction.

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

Yes, safety. UL 1738 venting is specifically tested for the use in flue gas applications unlike many materials currently being utilized. If polypropylene material is selected- it is fully recyclable. Stainless steel is also recyclable.

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

Potentially all three, but this is not a drastic increase given the safety offset.

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.

Only if code dictated old methods be replaced.

Regulatory Analysis

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

HVAC and Plumbing installations that are category IV venting (Condensing equipment)

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

Staying with current, untested methods would be the alternative.

The alternatives are to keep venting with PVC or CPVC that is tested for the application and often not recommended by the manufacture of the plastic pipe itself.

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?

When there is no safety standard applied, the risk is safety of any building occupants that have appliances that create exhaust.

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.

NFPA 54, NFGC, IFGC all have verbiage referencing utilizing UL1738 listed venting.

***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.