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:

There is a significant problem with the shaft requirements of the 2021 and 2024 International Mechanical Code (IMC) for refrigerant piping which - according to the original proponent at the ICC - unintentionally codified a provision that requires ventilated and drained fire-resistance rated shafts for Group A2L refrigerant piping - regardless of the quantity of refrigerant in the piping - where the piping penetrates two or more floor/ceiling assemblies.

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.

1109.3.2 Shaft ventilation.

~~Refrigerant~~ Required refrigerant pipe shafts with systems using Group A2L or B2L refrigerant shall be naturally or mechanically ventilated. Refrigerant pipe shafts with one or more systems using any Group A2, A3, B2 or B3 refrigerant shall be continuously mechanically ventilated and shall include a refrigerant detector. The shaft ventilation exhaust outlet shall comply with Section 501.3.1. Naturally ventilated shafts shall have a pipe, duct or conduit not less than 4 inches (102 mm) in diameter that connects to the lowest point of the shaft and extends to the outdoors. The pipe, duct or conduit shall be level or pitched downward to the outdoors. Mechanically ventilated shafts shall have a minimum airflow velocity in accordance with Table 1109.3.2. The mechanical ventilation shall be continuously operated or activated by a refrigerant detector. Systems utilizing a refrigerant detector shall activate the mechanical ventilation at a maximum refrigerant concentration of 25 percent of the lower flammable limit of the refrigerant. The detector, or a sampling tube that draws air to the detector, shall be located in an area where refrigerant from a leak will concentrate. The shaft shall not be required to be ventilated for double-wall refrigerant pipe where the interstitial space of the double-wall pipe is vented to the outdoors.

Reason:

This is a companion proposal to a proposal to amend IMC Section 1109.2.5 to allow exception 2 for all refrigerants as is permitted by ASHRAE 15-2022, Safety Standard for Refrigeration Systems, and will be permitted by the 2027 IMC (M75-24 is on the consent agenda for the 2027 IMC). If that proposal is accepted many refrigerant pipe shafts for A2L refrigerants would no longer be required because the maximum amount of refrigerant that could be released would be within the safe release limits specified by the IMC in Table 1103.1.

Where no shaft is required, A2L refrigerant piping could be run through stud cavities as permitted by Sec. 1109.2.2. (Note that Sec. 1109.3 requires that A2L piping systems comply with the provisions of Sec. 1109.3.1 for protection against physical damage).

If a shaft is not required, but the designer chooses to run A2L refrigerant piping in a shaft anyway for ease of construction, the requirements of Sec. 1109.3.2 should not apply. A refrigerant leak in a non-required shaft would be no more hazardous than a refrigerant leak in a stud cavity. If the stud cavity would not require ventilation and drainage, then a non-required shaft should not require ventilation and drainage

1109.3.2 Shaft ventilation.

Refrigerant pipe shafts with systems using Group A2L or B2L refrigerant shall be naturally or mechanically ventilated. Refrigerant pipe shafts with one or more systems using any Group A2, A3, B2 or B3 refrigerant shall be continuously mechanically ventilated and shall include a refrigerant detector. The shaft ventilation exhaust outlet shall comply with Section 501.3.1.

Naturally ventilated shafts shall have a pipe, duct or conduit not less than 4 inches (102 mm) in diameter that connects to the lowest point of the shaft and extends to the outdoors. The pipe, duct or conduit shall be level or pitched downward to the outdoors. Mechanically ventilated shafts shall have a minimum airflow velocity in accordance with Table 1109.3.2. The mechanical ventilation shall be continuously operated or activated by a refrigerant detector. Systems utilizing a refrigerant detector shall activate the mechanical ventilation at a maximum refrigerant concentration of 25 percent of the lower flammable limit of the refrigerant. The detector, or a sampling tube that draws air to the detector, shall be located in an area where refrigerant from a leak will concentrate. The shaft shall not be required to be ventilated for double-wall refrigerant pipe where the interstitial space of the double-wall pipe is vented to the outdoors. For refrigeration systems used in residential occupancies serving only a single dwelling unit or sleeping unit, shaft ventilation shall not be required where the pipe or tube is continuous without fittings in the shaft.

Reason:

The proposed language is taken from code change M62-24 which passed the ICC's IMC hearing committee by 13-1 and which received no public comments. M62-24 is therefore on the consent agenda for the 2027 IMC and will be the content of the 2027 IMC.

This language is also consistent with provisions addressing shaft ventilation in Section 8.5.2.2 of ASHRAE 15.2-2022, Safety Standard for Refrigeration Systems in Residential Applications and Addendum a to ASHRAE 15-2024, Safety Standard for Refrigeration Systems.

Table 1103.1

Please see the attached ICA-TSG-000001 - Toto - ASHRAE - 2024 IMC (5th page) for list of refrigerants that need critical date updated for several A2L refrigerants.

Revise Table 1103.1 as follows:

TABLE 1103.1-REFRIGERANT CLASSIFICATION, AMOUNT AND OEL-continued

CHEMICAL REFRIGERANT	FORMULAS	CHEMICAL NAME OF BLENDS	REFRIGERANT SAFETY GROUP CLASSIFICATION	AMOUNT OF REFRIGERANT PER OCCUPIED SPACE						OEL
				RCL			LFL			
				Lb/MCf	ppm	g/m^3	Lb/MCf	ppm	g/m^3	ppm
R-444A	zeotrope	R-32/152a/1234ze(E) (12.0/5.0/83.0)	A2L	~~5.1~~5.0	21,000	~~81~~80	19.9	82,000	~~324.8~~319.4	850
R-444B	zeotrope	R-32/152a/1234ze(E) (41.5/10.0/48.5)	A2L	4.3	23,000	~~69~~70	17.3	93,000	~~277.3~~278.1	930
R-445A	zeotrope	R-744/134a/1234ze (E) (6.0/9.0/85.0)	A2L	~~4.2~~5.4	16,000	~~67~~87	~~2.7~~21.6	63,000	347.4	930
R-446A	zeotrope	R-32/1234ze(E)/600 (68.0/29.0/3.0)	A2L	~~2.5~~3.7	~~16,000~~23,000	~~39~~59	~~13.5~~14.8	~~62,000~~93,000	~~217.4~~237.7	960
R-447A	zeotrope	R-32/125/1234ze(E) (68.0/3.5/28.5)	A2L	~~2.6~~5.2	~~16,000~~32,000	~~42~~83	~~18.9~~20.6	~~65,000~~128,000	~~303.5~~331.4	960
R-447B	zeotrope	R-32/125/1234ze(E) (68.0/8.0/24.0)	A2L	~~2.6~~4.8	~~16,000~~30,000	~~42~~78	~~20.6~~19.5	121,000	312.7	970
R-451A	zeotrope	R-1234yf/134a (89.8/10.2)	A2L	~~5.0~~5.3	18,000	81	~~20.3~~21.3	~~70,000~~74,000	~~326.6~~341.6	530
R-451B	zeotrope	R-1234yf/134a (88.8/11.2)	A2L	5.0	18,000	81	~~20.3~~21.3	~~70,000~~74,000	~~326.6~~341.6	530
R-454A	zeotrope	R-32/1234yf (35.0/65.0)	A2L	~~3.2~~4.4	~~16,000~~21,000	~~52~~70	~~18.3~~17.5	~~63,000~~84,000	~~293.9~~281.4	690
R-454B	zeotrope	R-32/1234yf (68.9/31.1)	A2L	~~3.1~~4.6	~~19,000~~29,000	~~49~~74	~~22.0~~18.5	~~77,000~~115,000	~~352.6~~296.8	850
R-454C	zeotrope	R-32/1234yf (21.5/78.5)	A2L	~~4.4~~4.6	19,000	~~71~~73	~~18.0~~18.2	~~62,000~~77,000	~~289.5~~291.7	620
R-455A	zeotrope	R-744/32/1234yf (3.0/21.5/75.5)	A2L	~~4.9~~6.8	~~22,000~~30,000	~~79~~108	26.9	118,000	432.1	650

(portions of table not shown remain unchanged)

Reason:

Errors exist in Table 1103.1 in the 2024 IMC. These errors came from ASHRAE 34-2022 and have been corrected in ASHRAE 34-2024. These refrigerants have been approved for the 2027 IMC using the ASHRAE 34-2024 as a referenced stand in Chapter 15. This proposal is to update those refrigerants to the corrected values as noted in the ICA - TSG-000001 - Toto - ASHRAE - 2024 IMC.

CHAPTER 15
REFERENCED STANDARDS

ASHRAE	ASHRAE 1791 Tullie Circle, NE Atlanta, GA 30329
15—~~2022~~2024	Safety Standard for Refrigeration Systems 1101.1.1, 1106.4.2, 1106.4.3, 1110.6
34—~~2022~~2024	Designation and Safety Classification of Refrigerants 202, 1102.2.1, 1103.1

Reason:

The 2024 editions of ASHRAE 15 and ASHRAE 34 contain many updates that are significant to the use of A2L refrigerants. ASHRAE 34-2024 corrects numerous errors in the refrigerant table from the 2022 edition. ASHRAE 15-2024 contains key updates including requirements for pressure relief devices, refrigeration detection systems, using consistent terminology, and further harmonizes with ASHRAE 34.

CHAPTER 44
REFERENCED STANDARDS

ASHRAE	ASHRAE 1791 Tullie Circle, NE Atlanta, GA 30329
34—~~2022~~2024	Designation and Safety Classification of Refrigerants M1411.1

Reason:

With the change to Low GWP Refrigerants, the Residential Code needs to be updated to address the use of Group A2L refrigerants in high probability (direct) systems. All of the commonly used Low GWP replacement refrigerants for direct systems fall into the category of Group A2L in the 2024 edition of ASHRAE 34. The 2024 edition of ASHRAE 34 also corrects errors in the refrigerant table from the 2022 edition.

Specific Glitch Criteria:

(a) Whether the proposed code change falls within the glitch criteria stated above.
Yes, this proposed code change meets the criteria of "conflicts within the updated code."

(b) Whether the proposed code change has a Florida specific need.
This proposed code change is necessary in every state and local jurisdiction that adopts the 2024 International Mechanical Code.

(c) What the impact is on small businesses.
The pipe shaft requirements in this proposed code change could benefit small businesses by alleviating burdensome requirements. The corrections in Table 1103.1 would benefit all users of the code.

(d) Whether the proposed code change has a reasonable and substantial connection with the health, safety, and welfare of the general public.
Yes, this proposed code change corrects errors in Table 1103.1 which would list incorrect values for the lower flammability limit (LFL) and refrigerant charge limit for some refrigerants.

(e) Whether the proposed code change strengthens or improves the Florida Building Code.
Correct, this proposed code change corrects errors in Table 1103.1 which would otherwise be present in the code and updates the requirements to align with the current industry standards.

(f) The proposed code change does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities.
Correct, this proposed code change will only correct errors in the refrigerant table, align with current standards, and will not have an effect on the items listed here.

(g) The proposed code change does not degrade the effectiveness of the Florida Building Code.
The proposed change corrects errors in the code and will not have a negative impact on the effectiveness of the code.

These amendments meet glitch criteria.

(a) Whether the proposed code change falls within the glitch criteria stated above.

Yes. This proposed code change satisfies the glitch criteria because it corrects conflicts and technical inaccuracies that would otherwise be incorporated into the Florida Building Code through adoption of the updated model code and referenced standards. Specifically, it updates provisions related to Group A2L refrigerants and corrects errors contained in Table 1103.1, ensuring consistency with the 2024 edition of ASHRAE 34.

(b) Whether the proposed code change has a Florida-specific need.

Yes. Florida has one of the nation's largest residential HVAC markets due to its year-round cooling demands, rapid population growth, and high volume of residential construction and equipment replacement. As manufacturers transition to low-GWP Group A2L refrigerants to comply with federal refrigerant regulations, these refrigerants will become the predominant products installed throughout Florida. Updating the Florida Building Code to reference the current ASHRAE 34 refrigerant classifications and requirements is necessary to ensure that designers, installers, inspectors, and code officials have accurate and consistent requirements for systems that will be widely used across the state. Failure to update these provisions would create inconsistencies in the Florida code and could result in confusion during design, permitting, inspection, and enforcement.

(c) What the impact is on small businesses.

The proposed code change will have a positive impact on Florida's many small HVAC contractors, mechanical engineers, distributors, and code consulting firms by providing clear and technically accurate requirements for the refrigerants now entering the marketplace. Eliminating outdated provisions and correcting the refrigerant table reduces uncertainty, minimizes redesign and permitting issues, and helps avoid unnecessary construction costs. The revised pipe shaft provisions also remove unnecessary regulatory burdens while maintaining appropriate safety requirements.

(d) Whether the proposed code change has a reasonable and substantial connection with the health, safety, and welfare of the general public.

Yes. The proposed code change has a direct relationship to public health and safety by ensuring that the Florida Building Code contains accurate lower flammability limit (LFL) values, refrigerant charge limits, and installation requirements for Group A2L refrigerants. Accurate technical criteria are essential for the safe design, installation, inspection, and operation of residential HVAC systems throughout Florida, where air-conditioning systems operate for much of the year and are installed in nearly every residence.

(e) Whether the proposed code change strengthens or improves the Florida Building Code.

Yes. The proposed change strengthens the Florida Building Code by correcting technical errors, incorporating the current ASHRAE 34 refrigerant classifications, and aligning Florida's requirements with current industry standards and the refrigerants being installed in new residential HVAC systems. These updates improve code clarity, consistency, and enforceability while supporting the safe implementation of new refrigerant technologies across Florida.

(f) Whether the proposed code change discriminates against materials, products, methods, or systems of construction of demonstrated capabilities.

No. The proposed code change does not discriminate against any material, product, method, or system of construction. It simply updates the code to reflect current nationally recognized technical standards and corrects existing errors. The revisions provide consistent requirements applicable to all compliant products and installation methods without favoring any manufacturer or technology.

(g) Whether the proposed code change degrades the effectiveness of the Florida Building Code.

No. The proposed code change improves, rather than degrades, the effectiveness of the Florida Building Code by correcting technical inaccuracies, eliminating conflicts with current referenced standards, and providing enforceable requirements for the low-GWP refrigerants that will be commonly used in Florida's residential HVAC systems. These revisions enhance code accuracy, support consistent enforcement statewide, and improve the overall reliability of the code.