Wednesday, February 19, 2025

ICC Interim Critical Amendment (ICA)

This is the starting point to request an interim code amendment to an existing code outside of the normal code development cycle. You can refer to ICC's CP-28 Section 2.3.

This online form takes you through the process to submit an interim critical amendment request.

Critical Nature

By definition the proposed amendment is required outside of the normal code development cycle because it is an issue of a critical nature and is an immediate threat to health and safety that warrants a timelier response than allowed by the Code Development Process schedule.

The proposed change:

- Corrects an error or omission overlooked during the regular code cycle
- Mitigates a previously unknown hazard

[redacted]

Scale of the problem/risk

- Local (single state)
- Local (multiple states / regions)
- National
- Global

Submitter Information

This section collects required information for the submitter seeking an ICA.

Name Emily Toto

Email [redacted]

Phone Number [redacted]

Who are you representing? ASHRAE

Represented Entity

You stated that you are representing an entity other than yourself. The following information identified with an "*" is required to process your request for an ICA.

Are you legal a representative for that entity? No

Represented Entity's Address

180 Technology Pkwy NW
Peachtree Corners, GA, 30092

Represented Entity's Email standards.section@ashrae.org

Represented Entity's Phone Number (404) 636-8400

Requested Amendment Information

The following information is required to process the request for an ICA.

I-Code(s) Impacted

IMC (International Mechanical Code)

Sections of the selected I-Code Impacted

Table 1103.1

Suggested New Language

Please see attached pdf

Justification for the change.

Please be as succinct as possible describing why the ICA needed now and cannot be processed during the normal code development process.

Justification

The 2024 edition of the International Mechanical Code (IMC) was updated to include reference to the 2022 edition of ASHRAE Standard 34. Additionally, Table 1103.1 was also updated to align with the latest information, at that time, from ASHRAE Standard 34. As part of this effort, values for Refrigerant Concentration Limits (RCLs) and Lower Flammability Limits (LFLs) were also included in this table, as were new refrigerants from the 2022 edition of ASHRAE Standard 34.

Unfortunately, the 2022 edition of ASHRAE Standard 34 contained errors for a number of these newly incorporated refrigerant properties. As such, updates to Table 1103.1 are needed to resolve potential safety concerns that may now arise from the use of incorrect RCLs and LFLs for Safety Group A2L refrigerant blends that were adopted into the 2024 edition of the IMC. Given the ongoing transition towards Safety Group A2L refrigerants, which are classified as having “Lower Flammability” per ASHRAE Standard 34, the need for these changes is critical.

ASHRAE Standard 15, ASHRAE Standard 15.2, and UL/CSA 60335-2-40 all rely on the correct values listed in ASHRAE Standard 34. The IMC requires mechanical equipment to be installed in accordance with the manufacturer's instructions. The installation instructions are based on UL/CSA 60335-2-40. This will result in a conflict with the values listed in the IMC resulting in confusion with the Code Official regarding enforcement. This adds to the need for these critical changes.

Errors in some of the refrigerant properties for A2L refrigerant blends were unintentionally propagated in ASHRAE Standard 34. Code change proposals submitted to ICC for consideration by the IMC Code Change Committee were believed to contain accurate refrigerant property information, based on published values in the 2022 edition of ASHRAE Standard 34. Once these errors were discovered, corrective action was taken by SSPC34, as demonstrated by the publication of Addendum a to the 2022 edition of ASHRAE Standard 34. Regrettably, these errors were not discovered and corrected in time for the 2024 edition of the IMC, which included updates based on the 2022 edition of ASHRAE Standard 34. A proposal to update the refrigerant properties in Table 1103.1 has been submitted by ASHRAE for the 2027 IMC. The Code Change Committee recommended approval of the changes to update this table. However, this does not rectify the values that currently exist in the 2024 edition of this code.

References to the refrigerant quantities in Table 1103.1, based on either RCL or LFL, are used repeatedly throughout Chapter 11 of the IMC, such as for classifying low-probability systems (e.g., Section 1103.3.1), determining when components need to be located outdoors or in machinery rooms (Section 1104.2), charge limits for Institutional Occupancies (e.g., Section 1104.2.1), A2L machinery room detector activation levels (e.g., Table 1106.4.2), exceptions for refrigerant pipe shafts (e.g., Section 1109.2.5), and

for refrigerant test gas concentrations for factory test procedures (e.g., Section 1110.4). They are also used throughout safety standards, such as ASHRAE Standard 15, as a basis for leak mitigation actions. As such, it is imperative that these values are correct.

Some of the errors identified by this ICA include larger RCLs or LFLs in Table 1103.1. These errors may lead to Code Officials erroneously approving larger refrigerant charge sizes for air conditioning and refrigeration (ACR) systems than would be allowed by safety standards, such as ASHRAE Standard 15 and UL/CSA 60335-2-40. This could result in the erosion of safety factors designed to prevent flammable concentrations of refrigerant from forming in a space. This could also result, for example, in the use of improper settings for refrigerant detection levels in machinery rooms, impeding the effective use of ventilation as a life saving measure. Going forward, the corrections proposed by this ICA to Table 1103.1 would help prevent the use of incorrect values of RCL and LFL that could lead to unsafe installations of ACR systems using Group A2L refrigerants.

Additionally, the EPA's Technology Transition Rule imposed a 700 GWP limit for most new air conditioning system installations, starting January 1, 2025. As such, air conditioning equipment manufacturers have now shifted to the use of A2L refrigerants in new systems. Given the passing of this deadline, and with states now adopting or using the 2024 edition of the IMC, the changes provided by this ICA are urgently required. As the values of RCL and LFL are key to safety mitigations used in next generation ACR system installations, this ICA will help to ensure a safe and effective refrigerant transition.

Finally, a similar proposal (TIA 003-24) was submitted to and unanimously approved by the UMC Technical Committee of IAPMO for both Technical Merit and Emergency Nature and issued by the IAPMO Standards Council on November 06, 2024.

Date Required

Identify the date that this ICA is required by to avoid the issues noted in your justification. Please be sure to explain in your justification above why this date is required. Some ICA's are not needed currently but are needed before next expected publish date of the normal development cycle. If it is needed now, please just select today's date.

Date

Wednesday, February 19, 2025

Supporting Documents

[redacted]

Written Endorsement

You need to have the written endorsement of two (2) members from the relevant code development committees that are responsible for the affected code sections.

If you have those available now, please provide them now. If you do not have those now, you can submit those later via email to codeapps@iccsafe.org.

If you do not have contact information for the relevant committee members the ICC staff will send your ICA request to them to see if any are interested in endorsing the proposed ICA. We will contact you after we hear from the committee members as to their position on the ICA submitted. Additionally, your contact information will be provided to the relevant committee members so they can reach out directly to you with any questions.

Written Endorsement Method

I do not have contact information for the relevant committees and wish for the ICC staff to submit this ICA to the committee members on my behalf.

Signature (I authorize the ICC Staff to submit this ICA request packet to the relevant committee's members asking for endorsement support of the proposed changes.)

ICA Submission ID #ICA-TSG-000001

Interim Critical Amendment (ICA) to the 2024 International Mechanical Code (IMC)

Reference Code Section: 2024 IMC Table 1103.1

Submitter Name: Emily Toto
Company: ASHRAE
Phone Number: (678) 539-1194
Date: February 19, 2025

Proposed language for ICA:

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						
				RCL			LFL			OEL
				Lb/MCf	ppm	g/m³	Lb/MCf	ppm	g/m³	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	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)

Substantiation

The 2024 edition of the International Mechanical Code (IMC) was updated to include reference to the 2022 edition of ASHRAE Standard 34. Additionally, Table 1103.1 was also updated to align with the latest information, at that time, from ASHRAE Standard 34. As part of this effort, values for Refrigerant Concentration Limits (RCLs) and Lower Flammability Limits (LFLs) were also included in this table, as were new refrigerants from the 2022 edition of ASHRAE Standard 34.

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Critical Nature

In accordance with ICC's CP#28-05 – Code Development procedures, this proposal qualifies as an Interim Critical Amendment (ICA) by meeting factors **a** and **c** of **Section 2.3.2.3**.

a) The proposed ICA corrects an error or an omission that was overlooked during the regular code development process.

&

c) The proposed ICA mitigates a previously unknown hazard.

Errors in some of the refrigerant properties for A2L refrigerant blends were unintentionally propagated in ASHRAE Standard 34. Code change proposals submitted to ICC for consideration by the IMC Code Change Committee were believed to contain accurate refrigerant property information, based on published values in the 2022 edition of ASHRAE Standard 34. Once these errors were discovered, corrective action was taken by SSPC34, as demonstrated by the publication of Addendum a to the 2022 edition of ASHRAE Standard 34. Regrettably, these errors were not discovered and corrected in time for the 2024 edition of the IMC, which included updates based on the 2022 edition of ASHRAE Standard 34. A proposal to update the refrigerant properties in Table 1103.1 has been submitted by ASHRAE for the 2027 IMC. The Code Change Committee recommended approval of the changes to update this table. However, this does not rectify the values that currently exist in the 2024 edition of this code.

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Submitter signature: Emily Toto

Date: 2/19/2025