Seminar 28: Update ASHRAE 15 and UL 60335-2-40, and UL 60335-2-89

Monday February 10 @ 9:45 EST

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Background

- +35 years of experience in standards
- Leadership roles with multiple standards:
  - Voting member of ASHRAE 15, 15.2, 37, MTG. Low GWP
  - Corresponding member of ASHRAE TC 2.9 and TC 8.11.
  - Convener of IEC 61C MT1 for (IEC 60335-2-34 for motor compressors)
  - Member of IEC SC 61C WG 4 and MT5
  - Member of IEC SC 61D, MT28 (IEC 60335-2-40)
  - Convenor of MT29 for refrigerant leak sensors
  - Chair of the US TAGs for IEC SC61 C and D
  - Member of CANENA SC61D WG14 for UL1995/CSA 236 and UL/CSA 60335-2-40 and SC61C WG16 for UL 60335-2-89
- William Henry Merrill Society distinguished member. He has extensive experience in the development of U.S., regional and international safety standards and was recognized with the "1906 Award" for his work on IEC SC61C MT1 for motor compressors.
- He was called to the White House Climate Policy Office and the Department of Energy in March 2024. He was asked to join a committee that is developing risk assessments and research to develop requirements for adding ultra-low GWP refrigerants (less than 10 on the GWP).

Learning Objectives

- Latest Developments in Low-GWP Refrigerants and Systems for Air-Conditioning, Commercial Refrigeration, and Related Regulations
- Flammable refrigerants are playing an increasing role in reducing the environmental impact of refrigeration and air-conditioning. However, their safe use requires new approaches in the design of the systems and equipment in compliance with the new and improved standards and safety regulations. This seminar will present the latest developments in the low-GWP refrigerants and systems for Air-Conditioning, Commercial Refrigeration, as well as the updated on the related regulations.

1. When will low GWP refrigerant be required.
2. What is the GWP limit for Commercial Refrigeration
3. What is the GWP limit for Air-Conditioning
4. What is the key mitigation for Air-Conditioning
5. What is the key mitigation for Commercial Refrigeration

Introduction

- As a result of the Montreal Protocol and the EPA AIM Act the demand for refrigerants with a low GWP, has forced the HVAC&R industry to use refrigerants that are flammable.
- The use of flammable refrigerants has required changes in various safety standards, installation, and building codes. Building and product safety codes must not only protect the building occupants, but also first responders, and the property itself.
- I will be sharing with you at a high level the changes in UL 60335-2-40 and UL 60335-2-89 that will help in the design of a safe air-conditioning system for North America

Environmental Protection Agency Significant New Alternatives Policy)

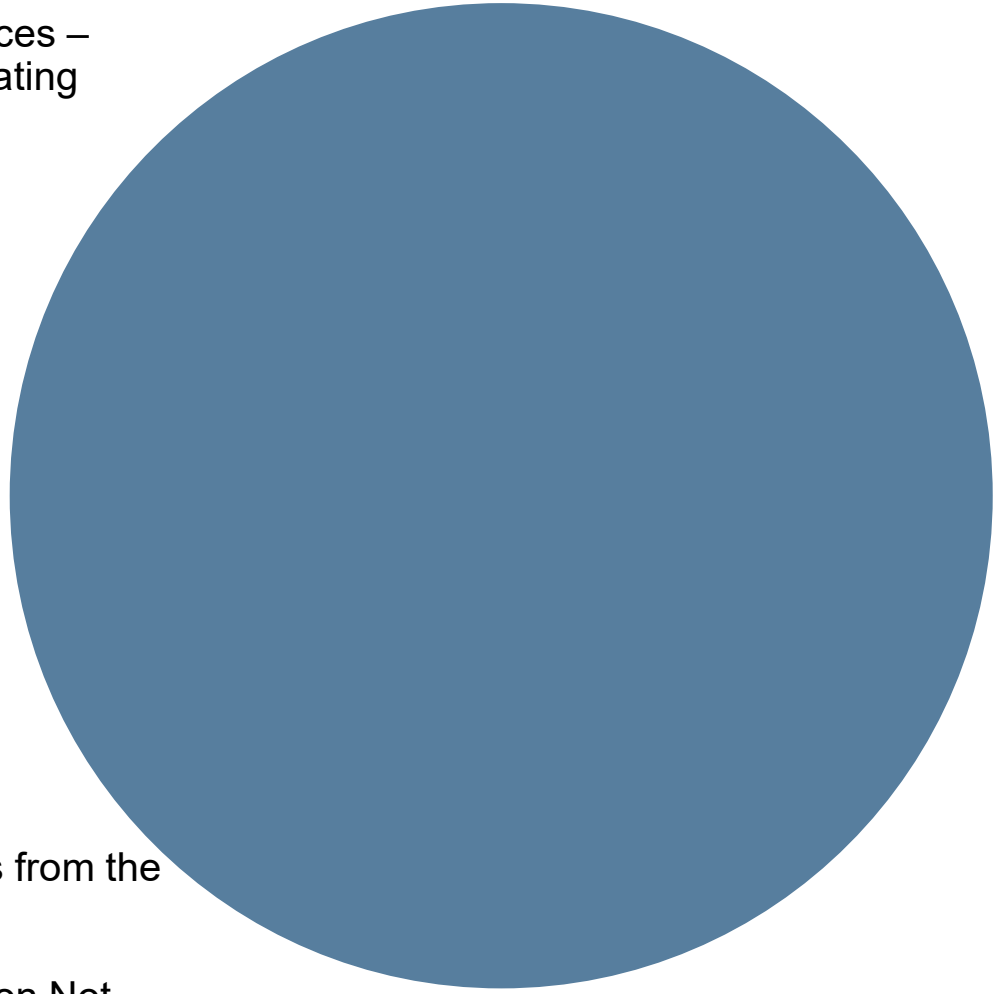
Rule	Summary Information
EPA Final Rule 19 Effective 5/11/2015	R-32, R-290, R-441A in room air conditioners. Venting exceptions for refrigerants except not for R-32
EPA Rule 23	R-452B, R-454A, R-454B, R-454C and R-457A for use in residential and light commercial air conditioning (AC) and heat pumps. Expands R-32 for residential and light commercial AC and heat pumps.
EPA Rule 25	Modifies Rule 23. Understanding that UL 484 is no longer permitted after 2024-01-01. Acceptable only for use in new equipment specifically designed for the refrigerant, including conditions requiring either: • Use consistent with UL Standard 484, 8th Edition, including testing, charge sizes, ventilation, usage space requirements, and certain hazard warnings and markings until January 1st, 2024, after which only use consistent with UL Standard 60335-2-40, 3rd Edition will apply • Use consistent with UL Standard 60335-2-40, 3rd Edition, including testing, charge sizes, ventilation, usage space requirements, and certain hazard warnings and markings
EPA Rule 26	Adds several refrigerants and EPA is finalizing use conditions that incorporate by reference the Underwriters Laboratory (UL) Standard 60335-2-89, 2nd Edition in place of UL Standards 563 and 471, respectively, Under this final rule, 10 refrigerants are listed as acceptable, subject to use conditions, in the Refrigeration & Air Conditioning sector

UL/CSA 60335-2-40 transition

- Ed. 1 published Nov. 30, 2012
- Ed. 2 published Sept. 15, 2017
- Ed. 3 published Nov. 1, 2019
- Ed. 4 published Dec. 15, 2022
- Ed. 4.1 – CANENA Working Group (WG) 14 has resolved the comments on the failed ballot.
- Ed. 4.1 – CANENA Working Group (WG) 14 with the comments resolved the second ballot has gained consensus, however 200 comments were submitted. Those comments are being resolved.
- Timeline for TS 63542 Ed. 2, For a TS the CDV is skipped. Assuming a Committee Draft is available June 2025, DTS draft available June 2026 (FDIS is called DTS). Publication expected October 2026.
- Replaces part of UL 1995, the Standard for Heating and Cooling Equipment; UL 484, the Standard for Room Air Conditioners; and UL 474, the Standard for Dehumidifiers
- These will transition under UL Solutions' Certification Changes – Action Not Required (Continuing Certification) program. **The effective date is Jan. 1, 2025.**

UL/CSA 60335-2-89 transition

- The Standard for Safety for Household and Similar Electrical Appliances – Safety – Part 2-89: Particular Requirements for Commercial Refrigerating Appliances and Ice-Cream Makers with an Incorporated or Remote Refrigerant Unit or Motor-Compressor
- Ed. 1 published Sept. 29, 2017
- Ed. 2 published Oct. 27, 2021
- Replaces:
  - **UL 471, the Standard for Commercial Refrigerators and Freezers**
  - **UL 427, the Standard for Refrigerating Units**
  - **UL 412, the Standard for Unit Coolers**
  - **UL 563, the Standard for Ice Makers**
  - **Parts of UL 1995, the Standard for Heating and Cooling Equipment**
  - **Parts of CSA C22.2 No. 120, Refrigeration Equipment**
- Ed. 3 is currently with CANENA WG 16, which is resolving comments from the preliminary draft.
- These will transition under UL Solutions' Certification Changes – Action Not Required (Continuing Certification) program. **The effective date is September 29, 2024.**



SC61D/MT29

- TS-63542 Refrigerant Leak detectors
- The eighth edition of IEC 60335-2-40 has removed Annex LL from IEC 60335-2-40 and will reference TS-63542.
- MT29 is resolving the comments received from the CVD that separated Annex LL from IEC 60335-2-40.
- MT29 is also modifying the requirements to align with the requirements in UL 60335-2-40 Annex LL (CRD) to move towards one set of requirements.
- Once TS-63542 is published, it can be referenced by IEC 60335-2-89 and IEC 61010-2-011 as well.
- Timeline for TS 63542 Ed. 2, For a TS the CDV is skipped. Assuming a Committee Draft is available June 2025, DTS draft available June 2026 (FDIS is called DTS). Publication expected October 2026.
- MT29 is seeking experts to join the maintenance team

Key Change the marking requirement

- Clause 7, a new combined flame symbol that includes the refrigerant class. This is to be at least 30mm when near the refrigerant designation, and 10mm near the service ports. For smaller units a single occurrence of this marking may me sufficient. The marking shall be 30 mm if provided on the packaging of pre-charge systems.
- In the USA, the fire service stated that the yellow triangle flame symbol represented an oxidizer not a flame.

or

Marking the Refrigerant of Different Safety Classifications

- Edition 4.1 of UL 60335-2-40 has achieved consensus.
- The identical language has been proposed to edition 3 of UL60335-2-89 and will be voted on

- ***7.1DV.3 DR Modification of Clause 7.1 of the Part 2 by replacing the third dashed item in the "Addition" with the following:***
- – refrigerant or refrigerants as designated under ISO 817 (ASHRAE 34). The appliance shall be permanently marked at the factory A means shall be provided to permanently to identify the approved refrigerants. installed. **Appliances using flammable refrigerants shall not be marked with alternative refrigerants of a different safety classification per ISO 817 (ASHRAE 34).**

Charge limits UL 60335-2-89

- The first edition permitted 150 grams on self-contained units only.
- The second edition permits for self-contained: 13 X LFL (i.e. 500g A3 refrigerant; 4kg/8.8lbs A2L) charge limit.
- 8 X LFL (i.e. 300g A3 refrigerant; 2.5kg/5.4lbs A2L) for commercial appliances with doors and drawers.
- Packaged refrigerating units 3 X LFL (i.e. 114g A3 refrigerant; 918g/2lb A2L) charge limit for self-contained appliances used in a corridor or lobby.

- Much larger A2L charge sizes allowed for split and field-erected systems.

  m1 = 13 x LFL (approximately 4kg / 9 lbs)

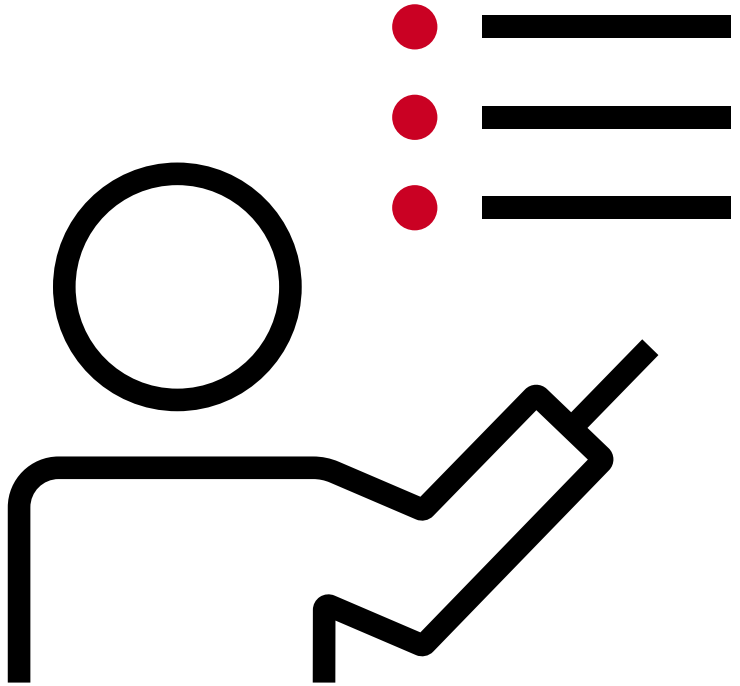
  m2 = 52 x LFL (approximately 16kg / 35 lbs)

  m3 = 260 x LFL (approximately 80kg / 176 lbs)

Training

UL Solutions offers general and custom training packages for all HVAC/R platforms for safety standards, including:

- UL/IEC 60335-1, the Standard for Safety of Household and Similar Appliances, Part 1: General Requirements
- UL/IEC 60335-2-40, the Standard for Household and Similar Electrical Appliances – Safety – Part 2-40: Requirements for Electrical Heat Pumps, Air-Conditioners and Dehumidifiers
- UL/IEC 60335-2-89, Particular Requirements for Commercial Refrigerating Appliances and Ice-Makers with an Incorporated or Remote Refrigerant Unit or Motor-Compressor
- UL/IEC 60335-2-24, the Standard for Household and Similar Electrical Appliances – Safety – Part 2-24: Particular Requirements for Refrigerating Appliances, Ice-Cream Appliances and Ice-Makers
- UL/IEC 60335-2-34, the Standard for Household and Similar Electrical Appliances – Safety – Part 2-34: Particular Requirements for Motor-Compressors



Questions?

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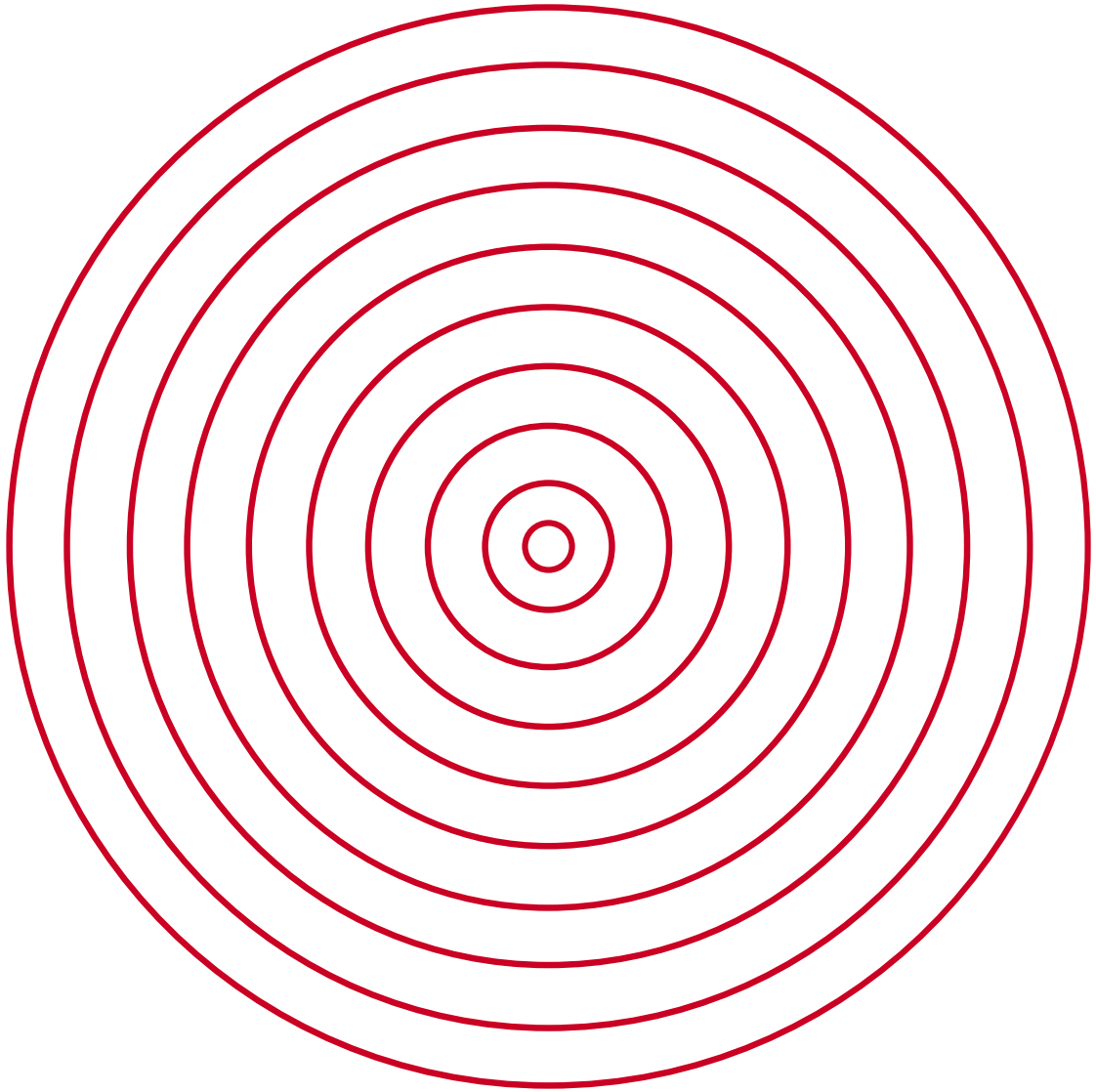

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Thank you

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