

UL's Effort to Harmonize Product Safety Requirements for A2L, A2, and A3 Refrigerants

**San Antonio, Texas
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Learning Objectives for this Session

- First Learning Objective (The status of the UL Safety standards to when they may have requirements for the use of flammable refrigerants)
- Second Learning Objective (Current efforts at UL to harmonize the flammable refrigerant requirements with the IEC requirements)
- Third Learning Objective (Current efforts at UL to harmonize the flammable refrigerant requirements with the ASHRAE requirements)

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UL's Involvement in the Development of Flammable Refrigerant Safety Requirements

- UL's Flammable Refrigerant JTG - Executive committee and WG members
- ASHRAE 34 - actively participating & voting member
- ASHRAE 15 - actively participating & voting member
- ASHRAE 15 A2L Ad Hoc - actively participating
- IEC SC61C - actively participating & member of the US TAG
- IEC SC61D - actively participating & member of the US TAG
- IEC SC61D WG9 - actively participating & member of the US TAG

UL Flammable Refrigerants JTG

- Responding to an expected EPA Final Rule and industry's interest in the use of flammable refrigerants within refrigeration and air conditioning equipment, UL formed in late 2010 a Joint Task Group (JTG) of members from its Standards Technical Panels (STP's). UL additionally invited technically knowledgeable individuals within the industry to participate. The JTG was asked to develop recommendations for STP action to help ensure the safe and consistent use of Class A2, A2L and A3 refrigerants.

UL Flammable Refrigerants JTG

- In February 2011, UL facilitated the initial JTG meeting in Las Vegas, NV. Near the end of this meeting, the JTG established three (3) working groups (WG's).

3 WG's Established

- WG 1 was asked to develop requirements for flammable refrigerants applicable to air conditioning equipment.
- WG 2 was asked to develop similar requirements for refrigeration equipment.
- WG 3 to address requirements for the testing and evaluation of flammable refrigerants (including the new A2L types) and take into consideration the recommended requirements of the equipment WG's.
- Each WG subsequently met a number of times throughout 2011 via teleconference as well as face-to-face. The full JTG met a second time in January 2012 at UL's Northbrook, IL office.

UL Flammable Refrigerants JTG - WG 1

- Working Group #1 (Air conditioning, heat pump and similar equipment):
- Anticipating using as a guide the flammable refrigerant requirements for Class A2 and A3 presently in IEC 60335-2-40
- Expecting flammable refrigerant requirements for Class A2L to be consistent with those proposed to ISO 5149 and being considered by IEC SC61D/WG09
- Considering flammable refrigerant requirements based on 20% of the lower flammable limit (LFL)
- Preparing proposals for using a Class A2L refrigerant (deviations to IEC 60335-2-40):
 - Permit exposed surfaces near Class A2L refrigerant to be up to 700 C (1300 F)
 - Possibly increase charge limit size over the current limit required for Class 2 and 3 refrigerants
 - Possibly require air circulation by integral blower/fan for at least 10s prior to start-up
 - Permit ducted equipment based on slightly modified formulas from 60335-2-40
- Discussing possible changes to UL 474, 484, 1995 and 60335-2-40
 - Current UL 484 requirements for Class A2 and A3 refrigerants similar to those presently in IEC 60335-2-40 except permitting only a max 1 kg charge
- Awaiting results from several risk assessments sponsored by AHRI and ASHRAE

UL Air-Conditioning Standards

- UL 1995 - Heating and Cooling Equipment; Waiting on proposal from UL JTG. Current proposal for Refrigeration condensing units to use the current requirements in UL 471
- UL 484 - Room Air Conditioners; published 1 KG limit for propane.
- UL 474 – Dehumidifiers; Waiting on proposal from UL JTG
- UL 60335-2-40 - Household and Similar Electrical Appliances, Part 2: Particular Requirements for Heating and Cooling Equipment; current deviation to not allow flammable refrigerants.

UL JTG Flammable Refrigerants WG2

- Working Group #2 (Refrigeration equipment):
- Expecting to follow WG#1 and apply IEC 60335-2-40 requirements for large equipment and charges
- Discussing many possible revisions to UL 471 including:
 - Class A2L refrigerant requirements
 - Adding non-ventilated requirements from IEC 60335-2-40 to UL 471, Supplement SB
 - Discussing possible changes to other refrigeration equipment standards (e.g. UL 563 and 621)

UL Refrigeration Standards

- UL 250 - Household Refrigerators and Freezers; published 50 gram limit
- UL 471 - Commercial Refrigerators and Freezers; published 150 gram limit
- UL 60335-2-24 - Household and Similar Electrical Appliances, Part 2: Particular Requirements for Refrigerating Appliances, Ice-Cream Appliances and Ice-Makers; published 50 gram limit
- UL 399 - Drinking Water Coolers; balloted 60 grams (A3) and 270 grams (A2) limit
- UL 541 - Refrigerated Vending Machines; published 150 gram limit
- UL 563 - Ice Makers; Waiting on proposal from UL JTG
- UL 621 - Ice Cream Makers; Waiting on proposal from UL JTG

UL JTG Flammable Refrigerants WG3

- Working Group #3 (Refrigerants):
- Discussing recommended updates to UL 2182, “Safety Standard for Refrigerants” including:
- Eliminating 100 C flammability testing to harmonize with ASHRAE 34 and pending ISO 817 revision
- Incorporating optional burning velocity testing to differentiate Class 2L from Class 2 refrigerants
- Retaining Auto Ignition Temperature test to support hot surface requirements in end-use standards
- Considering hydrocarbon purity requirements (but not odorization/stenching which would require new technology)
- Not incorporating Minimum Ignition Energy (MIE) testing pending input from the other two WG’s
- Discussing test apparatus for burning velocity of Class 2L refrigerants
- Expecting to finish work around same time as WG#1 & #2 after risk assessments to ensure consistency

EPA's Significant New Alternatives Policy (SNAP)

- Rule 17- *Listing of hydrocarbon refrigerants as substitutes for household refrigerators and freezers and retail food refrigeration*
Effective Date: February 21, 2012
- The EPA will only review new applications for A2L, A2, and A3 refrigerants if there is a published ANSI approved Safety Standard.

EPA Rule 17

This rulemaking lists three hydrocarbon substitutes as acceptable, subject to use conditions, for ozone-depleting refrigerants such as CFC-12, HCFC-22, and R-502 in two end-uses: household food refrigerators and freezers and retail food refrigerators and freezers (stand-alone units only). The updates to the listings are as follows:

- Isobutane (R-600a) as a refrigerant in new household refrigerators, freezers, or combination refrigerator and freezers;
- R-441A as a refrigerant in new household refrigerators, freezers, and combination refrigerators and freezers; and
- Propane (R-290) as a refrigerant in new retail food refrigerators and freezers (stand-alone units only).

Questions?

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