

Developments and Future Directions for Residential Room Air Conditioning

Sustainable Technologies for Air Conditioning Workshop
Montreal, November 18, 2017



Association of Home Appliance Manufacturers (AHAM)



- AHAM is the trade association representing manufacturers of major, portable and floor care home appliances in the US and Canada
 - Air conditioning products: Room Air Conditioner (RAC), Portable Air Conditioner (PAC), Dehumidifiers (DH)
- Standards development organization, accredited by the American National Standards Institute (ANSI)
- Represent appliance industry at safety standards meetings with the IEC, UL and the Canadian Standards Association (CSA)

Residential Air Conditioning Products

- Most of the industry in North America have been using R-410a and some are changing to R-32 and others may look at different lower GWP refrigerants including R-452B if EPA SNAP approves and as safety standards allow
- Not all lower GWP refrigerants available can be used in RAC and PAC products



Considerations for Manufacturing of Room Air Conditioners and Portable Air Conditioners with Lower GWP Refrigerants

- Only a few manufacturers in the world who produce RAC, PAC, DH
- Manufacturers would like to produce models for world distribution with fewer changes in refrigerants, where possible
- But, local standards and requirements must be met
- No “drop-in” solution for residential room air conditioners and portable air conditioners

Technical Considerations for New Alternative Refrigerants

- These portable products are subject to high heat, high humidity, and sometimes low temperatures
- Portable products are required to perform for 20-30 years without re-charging
- Products must meet required energy efficiency standards
- In the U.S. and Canada, adherence to the applicable safety standards are mandatory due to listing by approved safety certification organization
- Today, RAC & PAC are listed to UL Standard 484 and CSA C22.2 No. 117 or a harmonized Standard UL/CSA 60335-2-40, which means a limited set of refrigerants are available

Safety Standards Development

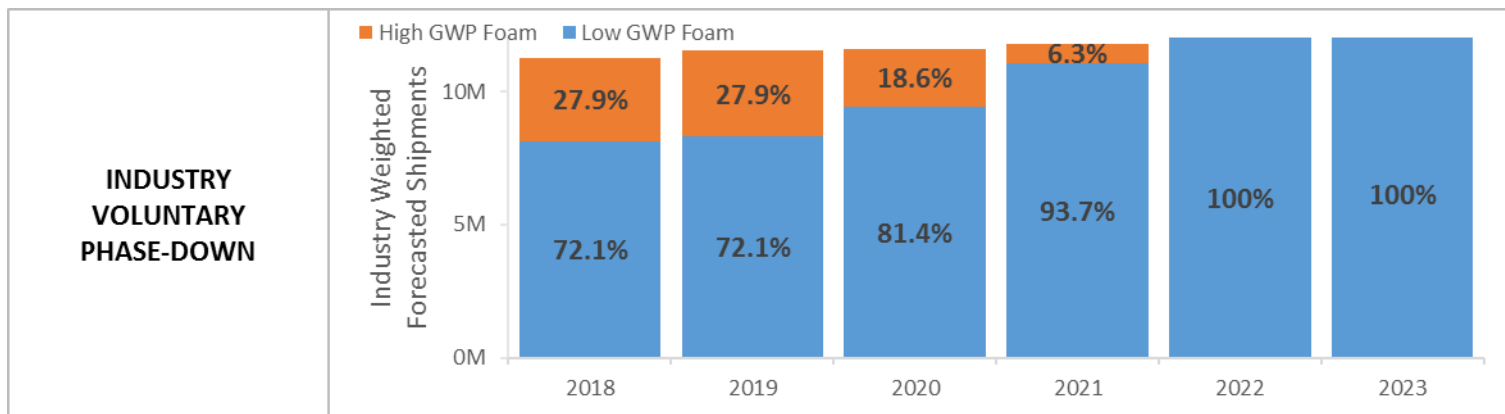
- UL 484 and C22.2 No. 117, and harmonized Standard UL/CSA 60335-2-40 Edition 2, have provisions for manufacturers to use flammable refrigerants for RACs to include A2 and A3
- Charge quantity is limited to 3 or 4 x LFL depending on which standard
- Affects RAC units with A2L refrigerant and the larger units
- AHAM has conducted joint research on A2L refrigerants to evaluate leak and ignition testing
- AHAM has also published a guidance document “Safe Servicing of Household Appliances with Flammable Refrigerants: Recommended Practices”

Safety Standards Development

- For future, RAC, PAC, and DH are planned to transition fully to UL/CSA 60335-2-40 harmonized standards. The other UL & CSA standards will be sunsetted
- This document may have different national deviations for the US and Canada from the IEC 60335-2-40 standard, including on charge limits
- The current Edition 2 of 60335-2-40 will be replaced by 2021 with Edition 3 and will include A2L refrigerants
- The final charge limits have not been set for RAC, PAC, DH at this time

Future Developments for Alternative Refrigerants

- Appliance industry announce its voluntary agreement to phase down HFCs in refrigeration products for refrigerant and foam blowing agents--
 - Compact household refrigeration products by 2021
 - Full size household refrigeration products (not built-in) by 2022
 - Built-in household refrigeration products by 2023
- Appliance industry has largely transitioned out of HFC foam blowing agents as less than 30% of products currently contain HFC foam blowing agents



Future Developments for Alternative Refrigerants

- California Air Resources Board (CARB) announced its intent to publish a regulation to phasedown HFCs, they understand the issues involved for room air conditioners and that these are hermetically sealed products
- CARB is considering charge size and other safety issues as the standards are being developed

Thank You

- Thank you for your attention
- If you have questions:

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