

The HVACR Industry Is Taking a Responsible Approach to Ensure the Safe Use of Flammable Refrigerants

The HVACR industry is transitioning to low global warming potential (GWP) refrigerants due to environmental concerns and regulatory requirements. The California Air Resource Board (CARB) is considering a January 1, 2023 transition to low-GWP refrigerants. Many of these low-GWP refrigerants are classified as lower flammability, which has required the update of relevant safety standards and codes to enable the use of these more environmentally friendly refrigerants in a timely and cost-effective manner.

Over the past decade, industry and industry associations have collaborated with federal and state governments to conduct research about refrigerant flammability and the safe use of these refrigerants. The Air-Conditioning, Heating and Refrigeration Technology Institute (AHRTI) has been leading a research program, "The Flammable Refrigerants Research Initiative," aimed at generating publicly available and sound technical data to support Underwriters Laboratory (UL) and American Society of Heating and Refrigeration Engineers (ASHRAE) safety standard modifications related to the use of flammable refrigerants. This \$6 million plus initiative is jointly funded by Air-Conditioning, Heating, Refrigeration Institute (AHRI), ASHRAE, CARB and the U.S. Department of Energy (DOE) to develop scientific findings and produce publicly available technical references to support code and standard activities related to the use of flammable refrigerants.

Flammable Refrigerants Research Initiative

AHRTI surveyed 46 relevant safety standards committees and working groups related to flammable refrigerants for technical data gaps to identify and understand refrigerant flammability risk, including the impact of refrigerant charge size, refrigerant detector technologies, mitigation effectiveness and equipment installation. The reports from these high priority projects have been shared with the standards communities and the public, and used to support changes to safety standards. The list of these projects is attached in Exhibit-1.

AHRTI performed an industry analysis of potential risk with several whole room-scale air-conditioning and refrigeration leak and ignition tests using rapid liquid refrigerant releases and multiple strong ignition sources placed in locations where combustible mixtures were most likely to occur. For example, these unrealistic release and ignition scenarios showed that refrigerant detection systems would need a faster response time than the 30 second response originally envisioned by the safety standards. This detection response time change has been adopted by the relevant safety standards such as ASHRAE Standard 15 and UL 60335-2-40.

Another AHRI project evaluated potential ignition sources in homes. The project demonstrated that many household sources (e.g. burning cigarette, sparks from common household appliances and tools etc.) could not ignite lower flammability refrigerants.

After critical testing was completed, safety standards were upgraded. However, much like other industries, AHRTI is continuing to explore ways to optimize systems using lower flammability refrigerants (e.g., AHRTI-9014: Assess Refrigerant Detector Characteristics for Use in HVACR Equipment) and summarize previous learnings by other industries already using lower flammability refrigerants (e.g., ASHRAE-1855: Determination of the Impact of Combustion byproducts on the Safe Use of Flammable Fluorinated Refrigerants).

For additional information or to participate in the AHRI Safe Refrigerant Transition Task Force¹, go to <https://ahrinet.org/SafeRefrigerant>.

¹ The AHRI Safe Refrigerant Transition Task Force (SRTTF) is comprised of 50 organizations including AHRI members, training groups, contracting groups, fire service organizations, state and federal government agencies, unions, and others. The goal of the SRTTF is to lead the charge in enabling the safe and reliable use of mildly flammable refrigerants.

