

February 20, 2025

Representative Amy Sheldon  
House District Addison-1  
P.O. Box 311  
East Middlebury, Vermont 05740  
(802) 828-2228  
[asheldon@leg.state.vt.us](mailto:asheldon@leg.state.vt.us)

**RE: HARDI Comment Letter for Vermont House Bill 238.**

Dear Representative Sheldon,

Vermont has been a leader on the issue of banning harmful per- and polyfluoroalkyl substances (PFAS); however, House Bill 238 (H238) would create a prohibition for complex durable goods that would remove Vermont citizens' ability to have refrigeration and air-conditioning in their businesses and homes under section 7601.10. HARDI opposes H238 unless amended to add exemptions for heating, ventilation, air-conditioning, and refrigeration (HVACR) equipment and refrigerants approved under the Environmental Protection Agency's (EPA) Significant New Alternative Policy (SNAP) program and exempting products that face unavoidable use of PFAS. Exemptions for HVACR have been adopted in PFAS prohibition policies in New Hampshire and Maine and are under consideration in the Connecticut and New Mexico legislature.

HARDI is a trade association comprised of over 1,150 member companies, more than 490 of which are U.S.-based wholesale distribution companies, including 9 wholesaler-distributor members in Vermont with 21 locations serving HVACR contractors and technicians in the state. Over 80 percent of HARDI's distributor members are classified as small businesses that collectively employ more than 60,000 U.S. workers, representing an estimated 75 percent of the U.S. wholesale distribution market of HVACR equipment, supplies, and controls.

Vermont is justified in seeking to reduce and, if possible, eliminate the use of harmful PFAS. However, not all PFAS should be considered a danger to human health. According to the EPA, more than 16,000 substances contain fluorinated carbon atoms in their molecular structure. For some, a single fluorine and carbon chain is enough to be considered per- and poly-fluoroalkyl substances.<sup>i</sup> Only a subset of these substances have the characteristics that harm human health. According to a systematic review of chemicals by NIH, the three factors that create a danger are "[p]ersistent, bioaccumulative, and toxic substances ... that can subsist for decades in human tissues and the environment."<sup>ii</sup> This letter will walk through the available science to show why hydrofluorocarbons (HFCs) approved for use in HVACR by the EPA do not meet the three requirements to classify them as dangerous PFAS and urge the addition of

exemptions for an unavoidable use, and when a separate state or federal regulation or code prohibits PFAS alternatives, such as the EPA's SNAP program.

### *Persistent*

Many PFAS are rightly called "forever chemicals" because of their persistence in the environment for "thousands of years."<sup>iii</sup> A persistent PFAS will enter the environment and not degrade over time. Typically, these dangerous PFAS either stay in the soil or become mobile, moving to water where they can enter streams, rivers, aquifers, and lakes. On the other hand, refrigerant HFCs are gases at ambient temperature; because of this, HFCs cannot be absorbed into the soil and are not water-soluble. Additionally, HFCs have a shorter life span than other PFAS, breaking down in the atmosphere after an average of 15 years.<sup>iv</sup> With such a short lifespan in the atmosphere, HFC refrigerants are not considered persistent compared to other PFAS.

### *Bioaccumulative*

"Humans, as the final link in numerous food chains, are subjected to PFAS uptake primarily through food and drinking water."<sup>v</sup> As mentioned, PFAS often enters streams, rivers, and lakes, where fish and other animals ingest them. Additionally, plants can absorb PFAS from contaminated soil or irrigation water.<sup>vi</sup> The ability of dangerous PFAS to be absorbed in human tissue and remain there for the rest of a person's life is a concern. However, toxicology reviews have found that R-32 and R-125 are not considered bioaccumulative.<sup>vii</sup> R-32 and R-125 are the components used to create R-410A, the most common refrigerant gas primarily used in air conditioners and heat pumps. In addition, as a gas, the ability of HFC refrigerants to enter the food chain is nearly impossible without first degrading from its original molecule. Additional bioaccumulation factsheets are available on other HFC refrigerants like R-134a<sup>viii</sup> and R-143a.<sup>ix</sup> R-23, R-125, R-134a, and R-143a are the components used to make the majority of HFC refrigerant blends used in HVACR. HARDI has found no safety data sheets showing an HFC refrigerant listed as bioaccumulative.

### *Toxicity*

The American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) classifies all refrigerants as "higher toxicity" or "lower toxicity."<sup>x</sup> Common HFC refrigerants and blends like R-410A are classified as lower toxicity. However, even non-HFC refrigerants, like ammonia, are rated "higher toxicity, lower flammability" by ASHRAE or "higher flammability" like propane; even CO<sub>2</sub> is listed as "lower toxicity." Refrigerants are designed to stay in the closed loop of an air conditioner, heat pump, or refrigerating machine; only when leaked out of the machine in an enclosed space does toxicity become a concern. CO<sub>2</sub> creates dangerous conditions at concentrations as low as 5,000 ppm;<sup>xi</sup> R-32, on the other hand, required 350,000 ppm before adverse effects were observed.<sup>xii</sup> In addition, some HFCs used as refrigerants, like R-134a, are also used as propellants in metered-dose inhalers because of their short serum half-

life of between 4 and 11 minutes; this is considered a low human toxicity risk.<sup>xiii</sup> HFC refrigerants have low human toxicity and have lower toxicity compared to some non-HFC refrigerants.

According to REACH, the European Union regulation for protecting human health, HFC refrigerants do not meet the persistent, bioaccumulative, or toxicity factors necessary to make them dangerous PFAS.<sup>xiv</sup> No refrigerant is 100 percent safe; however, HFC refrigerants pose a physical and environmental hazard rather than a health hazard like the PFAS that Vermont intends to regulate. Because of this physical and environmental hazard, HFCs are already highly regulated. Unfortunately, the same proponents of eliminating HFCs faster than the Kigali Amendment to the Montreal Protocol often try to include HFCs in the definition of PFAS as an end-run around federal and international policy. The HVACR industry has worked with the international community to move to environmentally safer refrigerants. However, advocates falsely claim health hazards that do not exist to circumvent these industry agreements. HARDI has fully supported the phase-down of HFC refrigerants and is actively working with the EPA to reduce emissions of these refrigerants into the atmosphere.

#### *Other factors*

The EPA regulates the life cycle of HFC refrigerants through the Clean Air Act and the American Innovation and Manufacturing Act. Knowingly releasing HFC refrigerant gases into the atmosphere is a crime. Refrigerants within systems do not wear out like oil in a car engine; with proper tools, refrigerants can be purified back to their original quality, an action required by the EPA. Federal regulations require HVACR technicians to recover refrigerants from equipment at the end of life; this refrigerant is then sent to an EPA-certified reclaimer to purify or destroy the refrigerant. Using reclaimed refrigerant reduces the environmental impact of HFCs by ensuring they are not released into the atmosphere. This process is vital as HFC production and imports are reduced over the next 11 years as the industry reduces consumption to 258.3 million metric tons of carbon dioxide, or 85 percent from the baseline. To further reduce the impact of HFCs, the HVACR industry is moving to other refrigerants with lower global warming potential listed under the SNAP program.

Additionally, 29 out of the 30 states that have adopted PFAS policies have purposely chosen not to include or exempt the HVACR industry. The states of Alaska, Arizona, California, Colorado, Connecticut, Delaware, Florida, Georgia, Hawaii, Illinois, Indiana, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Nevada, New Hampshire, New Jersey, New York, North Carolina, Oregon, Pennsylvania, Rhode Island, Vermont, Virginia, Washington, and Wisconsin chose not to include the HVACR industry from their prohibitions. The New Hampshire and Maine legislatures adopted explicit exemptions for the HVACR industry from their PFAS prohibition. The Connecticut and New Mexico legislature has its own PFAS prohibition currently under consideration, which adopts an HVACR exemption.

HARDI believes that the HVACR industry should be exempt from PFAS prohibitions. This request is justified due to the lack of danger to human health, other states' PFAS prohibition precedent, and the enacted federal phasedown on the HVACR industry.

Sincerely,



Todd Titus

Director of State and Public Affairs

Heating, Air-conditioning, & Refrigeration Distributors International

---

<sup>i</sup> Environmental Protection Agency, CompTox Chemicals Dashboard v2.3.0,

PFAS structures: <https://comptox.epa.gov/dashboard/chemical-lists/PFASSTRUCT>

PFAS without explicit structures: <https://comptox.epa.gov/dashboard/chemical-lists/PFASDEV>

<sup>ii</sup> Fernández-Martínez, N. F., Ching-López, A., Olry de Labry Lima, A., Salamanca-Fernández, E., Pérez-Gómez, B., Jiménez-Moleón, J. J., Sánchez, M. J., & Rodríguez-Barranco, M. (2020). Relationship between exposure to mixtures of persistent, bioaccumulative, and toxic chemicals and cancer risk: A systematic review. *Environmental research*, 188, 109787. <https://doi.org/10.1016/j.envres.2020.109787>

<sup>iii</sup> Washington Department of Ecology, Per- and polyfluoroalkyl substances (PFAS), <https://ecology.wa.gov/waste-toxics/reducing-toxic-chemicals/addressing-priority-toxic-chemicals/pfas>

<sup>iv</sup> Climate & Clean Air Coalition, Hydrofluorocarbons (HFCs), <https://www.ccacoalition.org/short-lived-climate-pollutants/hydrofluorocarbons-hfcs>

<sup>v</sup> Brunn, H., Arnold, G., Körner, W. *et al.* Correction: PFAS: forever chemicals—persistent, bioaccumulative and mobile. Reviewing the status and the need for their phase out and remediation of contaminated sites. *Environ Sci Eur* 35, 30 (2023). <https://doi.org/10.1186/s12302-023-00730-7>

<sup>vi</sup> Ghisi, R., Vamerali, T., & Manzetti, S. (2019). Accumulation of perfluorinated alkyl substances (PFAS) in agricultural plants: A review. *Environmental research*, 169, 326–341. <https://doi.org/10.1016/j.envres.2018.10.023>

<sup>vii</sup> George M. Rusch (2018) The development of environmentally acceptable fluorocarbons, *Critical Reviews in Toxicology*, 48:8, 615-665, DOI: 10.1080/10408444.2018.1504276

<sup>viii</sup> Safety Data Sheet – R-134a, A-Gas, [https://dimplexthermal.com/wp-content/uploads/2016/05/SDS\\_R-134a\\_V01.pdf](https://dimplexthermal.com/wp-content/uploads/2016/05/SDS_R-134a_V01.pdf)

<sup>ix</sup> Safety Data Sheet – R-143a, National Refrigerants, [https://nationalref.com/wp-content/uploads/2019/05/SDS\\_R143a\\_CLP.pdf](https://nationalref.com/wp-content/uploads/2019/05/SDS_R143a_CLP.pdf)

<sup>x</sup> ASHRAE, Update on New Refrigerants Designations and Safety Classification, [https://www.ashrae.org/file%20library/technical%20resources/bookstore/factsheet\\_ashrae\\_english\\_november2022.pdf](https://www.ashrae.org/file%20library/technical%20resources/bookstore/factsheet_ashrae_english_november2022.pdf)

<sup>xi</sup> Occupational Safety and Health Administration, OSHA Hazard Information Bulletins Potential Carbon Dioxide (CO<sub>2</sub>) Asphyxiation Hazard When Filling Stationary Low Pressure CO<sub>2</sub> Supply Systems, <https://www.osha.gov/publications/hib19960605>

<sup>xii</sup> Safety Data Sheet – R-32, Chemours, [https://hdsupplysolutions.com/wcsstore/ExtendedSitesCatalogAssetStore/product/fm/additional/15/150110\\_MS\\_DS-PDF.pdf](https://hdsupplysolutions.com/wcsstore/ExtendedSitesCatalogAssetStore/product/fm/additional/15/150110_MS_DS-PDF.pdf)

<sup>xiii</sup> Ritchie, G. D., Kimmel, E. C., Bowen, L. E., Reboulet, J. E., & Rossi, J., 3rd (2001). Acute neurobehavioral effects in rats from exposure to HFC 134a or CFC 12. *Neurotoxicology*, 22(2), 233–248. [https://doi.org/10.1016/s0161-813x\(01\)00011-0](https://doi.org/10.1016/s0161-813x(01)00011-0)

<sup>xiv</sup> REACH Online, Annex XIII: Criteria for The Identification of Persistent, Bioaccumulative and Toxic Substances, and Very Persistent and Very Bioaccumulative Substances, <https://reachonline.eu/reach/en/annex-xiii.html>