

**Meeting Minutes**  
**Monday, March 15, 2021**  
**HFC Extruded Polystyrene (XPS) Boardstock Compliance Date Work Group**  
**Electronic-only Meeting on GoToWebinar**

Members Present: Schuyler Pulleyn, Ming Xie, Lisa Massaro, and Paul Lewandowski.

Members Absent: Walton Shepherd, Jessica Olson, and Frank Rambo.

Other Attendees: John Szymanski (attending as alternate for Jessica Olson), Tanisha Edwards, Allen Schneeburger, Katie Hellebush, Chris Nolan, Michael Dowd, Gary Graham, and Amy Kasper.

The meeting convened at 10:00 a.m. and adjourned at 10:42 a.m.

1. **Introductions and Meeting Logistics** [Michael Dowd, DEQ]. Mr. Dowd welcomed the members and introduced the DEQ staff members attending the meeting. Mr. Dowd reviewed how the meeting would proceed and discussed the agenda (Attachment 1). Draft minutes from the February 17, 2017 work group meeting (Attachment 2) had previously been distributed to the members.
2. **Introductory Remarks** [Michael Dowd, DEQ]. Mr. Dowd explained that the purpose of this work group meeting would be for the work group to discuss the straw man (Attachment 3) and for the Department to receive input from the work group on it. Appendices U and V (Attachments 4 and 5), incorporated by reference in the straw man, were provided for reference. The work group would also discuss the comments and edits provided by the work group member representing the Natural Resources Defense Council (NRDC) (Attachments 6 and 7).
3. **Discussion** [Michael Dowd, DEQ and members].
  - a. Mr. Dowd asked for comments from the work group on the straw man.
  - b. Members discussed concerns that the meaning of “enter into commerce” is confusing. Some members have seen this problem in other states with similar language and would like clarification that non-compliant product transportation, storage, and freight consolidation in Virginia are not considered “enter into commerce”. Mr. Dowd explained that the General Assembly gave us the wording but not the definition. Members indicated that such an interpretation may allow a challenge based on the Dormant Commerce Clause of the U.S Constitution. Members suggested that DEQ continue to discuss the term with DEQ attorneys. Mr. Dowd can see a difference between transportation and storage. Mr. Dowd asked members if other states allowed transportation and storage. The member from Owens Corning stated that the regulations do not explicitly allow it and he has not seen it in technical guidance. Mr. Dowd asked the group if other states provided any technical guidance. The member from DuPont offered to provide information from Maryland as an example to DEQ. Members also discussed the possibility of providing guidance in the regulatory technical document.
  - c. Mr. Dowd reviewed the basic outline of the straw man. Mr. Dowd explained that DEQ reviewed the different definitions for the same terms from the different states’ regulations and selected the definitions that worked best for Virginia for section 120. The group discussed NRDC’s alternative definition for

“manufacture.” Section 130 contains the special provisions for XPS manufacturers in Virginia. Members discussed the provision requiring a compliance date feasibility study and the date that it would be submitted. Mr. Dowd mentioned that the January 1, 2036 backstop compliance date in subsection B was taken from federal American Innovation and Manufacturing (AIM) Act of 2020 Act. Section 140 contains labeling requirements. DEQ tried to keep the labelling requirement consistent with those in other states’ regulations. Section 150 contains recordkeeping requirements. DEQ kept it to what is required to determine compliance. Section 9999 Incorporation by Reference always comes last. A member commented that DEQ had captured all of the comments and did a pretty good job of incorporating the SNAP 20 and 21 requirements, which has been an objective of the group. A member noted that this is the first reference to the AIM Act in a regulation that he has seen. Mr. Dowd stated that DEQ had had internal discussions on adding the preemptions from the AIM Act. DEQ added the language to help clarify those exclusions for inspectors and the regulated community.

**Decision:** The work group reached consensus that the items the group suggested had been included in the straw man and the members could live with the straw man as presented.

- d. Mr. Dowd asks for the group to review NRDC’s comments (Attachment 6 and 7). Mr. Dowd explained that NRDC had proposed an expanded definition of manufacture. Mr. Dowd explained that the member from NRDC was also attempting trying to clarify DEQ’s effective dates to explain that the end-use effective of 1/1/22 would apply to those end uses that had effective dates in Appendices U and V that fall before 1/1/22 and the dates that fall after 1/1/22 would remain. Mr. Graham sent a copy of the NRDC comments to the group. The member from DuPont agreed with NRDC’s comments regarding substitute and substance that DEQ could drop substitute definition. The member from Honeywell stated that they are straightforward and he is good with the January 1, 2021 dates.

**Decision:** The work group reached consensus that the comments suggested by NRDC are acceptable.

- e. Mr. Dowd explained that DEQ will consider the “enter into commerce” comments. Mr. Dowd explained that DEQ will do some tracking in house of the NRDC comments to ensure they follow the 1/3/17 regulations. DEQ will be preparing the regulation and board book for the Board Meeting in April.
- f. Mr. Dowd informed the group that the proposed regulation will be presented at the April 23rd Air Board meeting. A member asked if DEQ anticipates concern by the Board with what the work group has put together. Mr. Dowd explained that the consensus reached by the regulated industry and the non-government environmental group members will be important to the board members. A member asked if it is helpful to DEQ to have stakeholders attend the meeting and state their support. Mr. Dowd indicated that is helpful. Mr. Dowd informed the group that the link for the meeting is always available through the Virginia Town Hall website. Mr. Graham will check to see if the work group members can comment before the board votes on the regulation and provide that answer to

the work group members later. Mr. Graham will forward the link for the Air Board meeting to the work group when it is available.

4. **Meeting Summary** [Mike Dowd, DEQ].
  - a. Mr. Dowd requested that members email DEQ if they have any other issues or questions.
  - b. The member from DuPont will forward the MD language regarding “enter into commerce.”
  - c. Mr. Dowd thanked the group for assisting DEQ with the regulation.
  
5. **Next Steps** [Michael Dowd, DEQ].
  - a. Mr. Dowd reminded the member from Kingspan that DEQ will be touch to further discuss the Feasibility Study.
  - b. Mr. Dowd will have a discussion to determine what “enter into commence” means.

A [recording of the meeting](#) is available for review on-line.

Attachments:

1. DRAFT Meeting Agenda.
2. Draft Meeting Minutes for the February 17, 2021 Work Group meeting.
3. Straw Man of an HFC regulation.
4. 40CFR Part 82, Subpart G, Appendix U.
5. 40CFR Part 82, Subpart G, Appendix V.
6. NRDC Comments on the Straw Man.
7. NRDC Recommended Edits to the Straw Man

Attachment 1

**AGENDA**

**HFC Extruded Polystyrene Boardstock Compliance Date Work Group**

GotoWebinar <https://attendee.gotowebinar.com/register/1530231427807921168>

**March 15, 2021 10 am – 3 pm**

**Moderator:** Mike Dowd, Director - DEQ Air & Renewable Energy Division

**DEQ Staff:** Gary Graham – DEQ Office of Regulatory Affairs  
Amy Kasper – DEQ Office of Air Compliance Coordination

10 am	Welcome and Logistics (Dowd)
10:15 am	Introductory Remarks (Dowd)
10:30 am	Introduction of Regulation Straw Man (Dowd)
11:00 am	Discussion (Dowd)
12:30 pm	Break for Lunch
1:00 pm	Resume Discussion (Dowd)
3:00 pm	Meeting Summary and Closing Remarks (Dowd, Kasper)

**Adjourn**

Attachment 2

Draft Meeting Minutes of the February 17, 2021 Work Group Meeting  
(without Attachments)

**Meeting Minutes**  
**Wednesday, February 17, 2021**  
**HFC Extruded Polystyrene Boardstock Compliance Date Work Group**  
**Electronic-only Meeting on GoToWebinar**

Members Present: Schuyler Pulleyn, Ming Xie, Lisa Massaro, Paul Lewandowski, and Frank Rambo.

Members Absent: Walton Shepherd, Jessica Olson

Other Attendees: John Szymanski (attending as alternate for Jessica Olson), Christina Theodoridi (attending as alternate for Walton Shepherd), Tanisha Edwards, Walter Reiter, Justin Koscher, Narissa Turner, Michael Dowd, Gary Graham, and Amy Kasper.

The meeting convened at 11:03 a.m. and adjourned at 2:41 p.m.

1. **Introductions and Meeting Logistics** [Michael Dowd, DEQ]. Mr. Dowd welcomed the members and introduced the DEQ staff members attending the meeting. Mr. Dowd reviewed how the meeting would proceed and discusses the agenda (Attachment 1).
2. **Introductory Remarks** [Michael Dowd, DEQ]. Mr. Dowd explained that the work group members will look at the list of issues resulting from discussions at the first meeting (Attachment 2) and subsequent comments (Attachment 3) and attempt to reach consensus on each of them.
3. **Discussion** [Michael Dowd, DEQ and members].
  - a. Mr. Dowd asked for consensus on the start date of the regulation. Based on the written materials submitted after the January 20, 2021 meeting, the group appeared to be coalescing around the start date of January 1, 2022 for the proposed regulation, with a couple exceptions. Mr. Dowd polled the members to see if the work group could live with the January 1, 2022 start date.

**Decision:** The work group reached consensus that the start date of the proposed regulation should be January 1, 2022.
  - b. Mr. Dowd led a discussion on sell-through date. Due to the nature of the XPS product, the group members did not believe that retailers would hoard a stockpile of products. A member pointed out that XPS boardstock represents only 7% of HFC use. There was concern expressed about limiting sell through for other products covered by the regulation also. SNAP Rule 20 and 21, the USCA Model Rule, and most state rules to date allow sell through without date restrictions. Members did not want to orphan materials in the state.

**Decision:** The work group reached consensus that the regulation should include a sell-through provision for all material manufactured prior to January 1, 2022 without an end date restriction.
  - c. Mr. Dowd led a discussion of labeling, recordkeeping and reporting requirements for the regulation. Members expressed that labeling is the most important and would like to see it consistent with the USCA model rule or the Colorado, Massachusetts, or Maryland's HFC regulations. Consistency with existing regulations in other states is helpful with supply chain, as is simplicity in the regulatory compliance language. Group agrees that recordkeeping requirements

of either 3 or 5 years is achievable. A member explained that reporting requirements are not necessary or useful to DEQ. The information is always available upon request.

**Decision:** The work group reached consensus that: (i) the regulation should include labeling requirements consistent with the USCA model rule or the Colorado, Massachusetts, or Maryland's HFC regulations; (ii) the regulation should include a recordkeeping requirement of either 3 or 5 years, consistent with other Virginia regulatory requirements; and (iii) reporting requirements should be limited to a "provide copies of records upon request" provision.

- d. Mr. Dowd consulted the members concerning DuPont's and Owens Corning's comments about DEQ retaining discretion to follow SNAP rule iterations. Group members pointed out that the Virginia legislature's budget language is in flux right now and it's hard for them to comment meaningfully on that topic until the budget language is final.
- e. Mr. Dowd consulted the members concerning Honeywell's proposed changes to the definitions. Some group members expressed concern that if we open one definition from SNAP 20 or 21 it could open a long discussion with other stakeholders. The DuPont representative, Mr. Szymanski, agreed to submit DuPont's opinion of what the critical definitions are to DEQ for consideration after the meeting.
- f. Mr. Dowd led a discussion of the XPS Exemption required by the budget language (Attachment 4). The Kingspan representative informed the group that (i) Kingspan has set a goal to be net zero by 2030; (ii) Kingspan does not look at this exemption as a free pass to continue using HFCs; and (iii) Kingspan is looking to the AIM Act to determine feasibility. With only some states regulating HFCs, they would have a disadvantage in the market if there were no exemption. A member suggested that the exemption include requirements for voluntary reporting and offsets. Mr. Dowd indicated that offsets and mitigation would have to be voluntary since the State Air Pollution Control Board ("the Board") does not have the regulatory authority to require it. The Kingspan representative will discuss the topic internally and get back to DEQ with a recommendation. Mr. Dowd proposed that Kingspan consider doing a Feasibility Study and a possible Mitigation Plan. Once the Feasibility Study is complete, DEQ could reconvene the work group to discuss setting a feasible compliance date in the future. Another member suggested including a compliance date of 2036 as a backstop since the AIM Act will bring supply down to 15% by that date. DEQ will consider including a backstop date when drafting the regulation.
- g. One of the members pointed out that the XPS industry is a small portion of what is regulated in SNAP Rule 20 and 21 and that since the requirement for HFC regulation was included only in the budget bill, many in the regulated community may not know about the potential regulation. The General Assembly made this regulatory process exempt from the Administrative Process Act and so it will not go through a full stakeholder or public participation process. Once the proposed regulation is passed by the Board, it is final, so DEQ may have to start out with some enforcement discretion. The group showed interest in reviewing a draft of the regulations. Mr. Dowd agreed that it could be helpful to have the group look at the regulation beforehand but that opportunity will be time-

dependent because of the time limits in the budget language. A member also requested that there be clarification as to whether the regulation applies to new or retrofit systems, and not to existing ones.

4. **Discussion Summary** [Mike Dowd, DEQ].
  - a. The work group achieved consensus on the start date of 1/1/2022 for the regulations.
  - b. The work group achieved consensus on including a sell-through provision for anything manufactured prior to 1/1/2022.
  - c. The work group achieved consensus that they the regulation should require that records be kept for 3 to 5 years and to have them available upon request. DEQ will determine if the requirement is 3 or 5 years.
  - d. The work group achieved consensus on including labeling requirements in the regulation. The work group requests DEQ follow the USCA Model Rule and regulations in states like CO, MA, and MD.
  - e. The DuPont representative indicated that the definitions highlighted in his submitted comments (Attachment 4) have technical changes that he recommends DEQ use in the final regulation. Mr. Dowd will have to determine DEQ's authority to change the definitions from SNAP 20 and 21.
  - f. DEQ will consider adding clarifying language that the regulation is for new or retrofit systems rather than existing systems.
5. **Next Steps** [Michael Dowd, DEQ].
  - a. The Kingspan representative will respond to DEQ regarding the possibility of developing a Feasibility Study and Mitigation Plan.
  - b. Mr. Dowd will determine DEQ's authority with attorneys on adding or removing prohibited HFCs.
  - c. Mr. Dowd will discuss with DEQ attorneys to determine the parameter of DEQ's authority with respect to the budget language.
  - d. Work group members should reach out to DEQ if they have any issues with the enforcement provisions.
  - e. DEQ will continue to investigate what "enter into commence" means.

A [recording of the meeting](#) is available for review on-line.

Attachments:

1. Meeting Agenda.
2. Draft Meeting Minutes for the January 20, 2021 Work Group meeting
3. Member comments.
4. Item 378, 2020 Virginia Acts of Assembly, as amended.



Attachment 3  
Straw Man of the HFC regulation

COMMONWEALTH OF VIRGINIA  
STATE AIR POLLUTION CONTROL BOARD  
REGULATIONS FOR THE CONTROL AND ABATEMENT OF AIR POLLUTION

9VAC5 CHAPTER 145  
REGULATION FOR CONTROL OF GREENHOUSE GASES

Article 1

Prohibitions on Use of Certain Hydrofluorocarbons in Specific End-Uses

9VAC5-145-100. Applicability, prohibitions, and exemptions.

9VAC5-145-110. Definitions.

9VAC5-145-120. Compliance.

9VAC5-145-130. Special provisions applicable to extruded polystyrene boardstock and billet manufacturers.

9VAC5-145-140. Labeling and administrative requirements.

9VAC5-145-150. Records and reporting.

9VAC5-145-9999. Documents incorporated by reference.

9VAC5-145-100. Applicability, prohibitions, and exemptions.

A. The sale, lease, rent, installation or entry into commerce in the Commonwealth of Virginia by any person of any products or equipment that use or will use hydrofluorocarbons for the applications and end uses restricted by Appendix U and Appendix V of Subpart G of 40 CFR Part 82, as those read on January 3, 2017, is prohibited after the effective date specified in 9VAC5-145-120.

B. Except where an existing system is retrofitted, nothing in this article requires a person that acquired prior to January 1, 2022, a product or equipment containing a substance prohibited under this article, to cease use of that product or equipment.

C. The prohibitions of this article do not apply to products or equipment in specific applications and end-uses restricted by Appendix U and Appendix V of Subpart G of 40 CFR Part 82, as those read on January 3, 2017 that were manufactured prior to January 1, 2022.

D. Notwithstanding subsection A of this section, the uses of hydrofluorocarbons specified in subdivisions 1 and 2 of this subsection are exempt from the prohibitions for the applications and end uses restricted by Appendix U and Appendix V of Subpart G of 40 CFR Part 82, as those read on January 3, 2017.

1. This article does not restrict the use of hydrofluorocarbons in the manufacturing process by extruded polystyrene boardstock and billet manufacturers located in the Commonwealth of Virginia to produce products for sale and distribution outside of the Commonwealth, as long as the manufacturer and the distributors of that product can demonstrate (i) that the extruded polystyrene boardstock or billet product is intended for distribution and sale, lease, rental, installation, or entry into commerce outside of the Commonwealth of Virginia, and

(ii) that the manufacturer and distributors have taken reasonable precautions to assure that the extruded polystyrene boardstock or billet product is not distributed within the Commonwealth for sale, lease, rental, installation, or entry into commerce. This exemption does not apply to extruded polystyrene boardstock or billet products that are sold, leased, rented, installed, or otherwise entered into commerce by any person to retail outlets within the Commonwealth. This exemption shall expire on the date specified in 9VAC5-145-130 B.

2. This article does not restrict the management or use of a regulated substance for which the Administrator of the U. S. Environmental Protection Agency has provided a mandatory allocation of allowances pursuant to subdivision (e)(4)(B)(iv)(I) of the American Innovation and Manufacturing Act of 2020 (Section 103 of Division S of H.R. 133, Consolidated Appropriations Act, 2021) for the exclusive use in applications solely for:

- a. A propellant in metered dose inhalers;
- b. Defense sprays;
- c. Structural composite preformed polyurethane foam for marine use and trailer use;
- d. The etching of semiconductor material or wafers and the cleaning of chemical vapor deposition chambers within the semiconductor manufacturing sector;
- e. Mission-critical military end uses, such as armored vehicle engine and shipyard fire suppression systems and systems used in deployable and expeditionary applications; and
- f. Onboard aerospace fire suppression.

3. The exemption in subdivision 2 of this subsection shall expire on December 28, 2025 or, in the event the Administrator of the U.S. Environmental Protection Agency has extended providing the allocation of allowances for certain essential uses pursuant to subdivision (e)(4)(B)(v)(II) of the American Innovation and Manufacturing Act of 2020 (Section 103 of Division S of H.R. 133, Consolidated Appropriations Act, 2021), to the date that extension ends, whichever is later.

E. The provisions of this article apply throughout the Commonwealth of Virginia.

9VAC5-145-110. Definitions.

A. For the purpose of applying this article and the prohibitions on hydrofluorocarbons for the applications and end uses restricted by Appendix U and Appendix V of Subpart G of 40 CFR Part 82, as those read on January 3, 2017, the words or terms shall have the meanings given them in subsection C of this section.

B. As used in this article, all terms not defined herein shall have the meanings given them in 9VAC5-10 (General Definitions) unless otherwise required by context.

C. Terms defined.

“Application” means a specific use within a major industrial sector end-use.

“Aerosol propellant” means a liquefied or compressed gas, used in whole or in part, such as a cosolvent, to expel a liquid or other material from the same self-pressurized container or from a separate container.

“Air conditioning equipment” means chillers, both centrifugal chillers and positive displacement chillers, intended for comfort cooling of occupied spaces.

“Bunstock” means a large solid block-like structure formed during the production of polyurethane, polyisocyanurate, phenolic, or polystyrene insulation.

“Capital cost” means an expense incurred in the production of goods or in rendering services, including but not limited to the cost of engineering, purchase, and installation of components or systems, and instrumentation; and contractor and construction fees.

“Class I substance” means any ozone-depleting compound defined in the Clean Air Act, as amended, 42 U.S.C. § 7671(3) (effective November 15, 1990).

“Class II substance” means any ozone-depleting compound defined in the Clean Air Act, as amended, 42 U.S.C. § 7671(4) (effective November 15, 1990).

“Centrifugal chiller” means air conditioning equipment that utilizes a centrifugal compressor in a vapor-compression refrigeration cycle typically used for commercial comfort air conditioning, but not for cooling for industrial process cooling and refrigeration.

“Cold storage warehouse” means a cooled facility designed to store meat, produce, dairy products, and other products delivered to other locations for sale to the ultimate consumer.

“Component” means a part of a refrigeration system, including but not limited to condensing units, compressors, condensers, evaporators, and receivers; and all of its connections and subassemblies, without which the refrigeration system will not properly function or will be subject to failures.

“Cumulatively replaced” means the addition of or change in multiple components within a 3-year period.

“Effective date” means the date after which new or retrofit equipment or products are prohibited, where applicable.

“End-use” means processes or classes of specific applications within industry sectors listed in Appendix U and Appendix V of Subpart G of 40 C.F.R. Part 82, as those read on January 3, 2017.

“Flexible polyurethane” means a non-rigid synthetic foam containing polymers created by the reaction of isocyanate and polyol, including that used in furniture, bedding, and chair cushions.

“Foam” means a product with a cellular structure formed via a foaming process in a variety of materials that undergo hardening via a chemical reaction or phase transition.

“Foam blowing agent” means substance that functions as a source of gas to generate bubbles or cells in the mixture during the formation of foam.

“Foam system” means a multipart liquid material that expands when mixed to form a solid or flexible substance in which thin films of material separate pockets of gas.

“Greenhouse gases” means, for the purposes of this article, the aggregate group of the following gases: carbon dioxide, nitrous oxide, methane, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.

“Household refrigerators and freezers” means refrigerators, refrigerator-freezers, freezers, and miscellaneous household refrigeration appliances intended for residential use. For the purposes of this article, the definition of household refrigerators and freezers does not include household refrigerators and freezers – compact, or household refrigerators and freezers – built-in.

“Household refrigerators and freezers – built-in” means refrigerators, refrigerator-freezers, and freezers intended for residential use with 7.75 cubic feet or greater total volume and 24 inches or less depth not including doors, handles, and custom front panels; with sides that are not finished and not designed to be visible after installation; and designed, intended, and marketed exclusively to be installed totally encased by cabinetry or panels that are attached during installation and securely fastened to adjacent cabinetry, walls or floor; and equipped with an integral factory-finished face or to accept a custom front panel.

“Household refrigerators and freezers - compact” means refrigerators, refrigerator-freezers, and freezers intended for residential use with a total refrigerated volume of less than 7.75 cubic feet (220 liters).

“Hydrofluorocarbon” or “HFC” means a class of greenhouse gases that are saturated organic compounds containing hydrogen, fluorine, and carbon.

“Integral skin polyurethane” means a synthetic self-skinning foam containing polyurethane polymers formed by the reaction of an isocyanate and a polyol, including but not limited to those used in car steering wheels and dashboards.

“Manufacturer” means a person engaged in the direct manufacture of a substitute.

“Metered dose inhaler” or “MDI” means a device that delivers a measured amount of medication as a mist that a patient can inhale, typically used for bronchodilation to treat symptoms of asthma, chronic obstructive pulmonary disease (COPD), chronic bronchitis, emphysema, and other respiratory illnesses. An MDI consists of a pressurized canister of medication in a case with a mouthpiece.

“Mixture” means any mixture or blend of two or more compounds.

“New” means:

(a) Products or equipment that are manufactured after the effective date of this article;

(b) Products or equipment that are first installed for an intended purpose with new or used components;

(c) Products or equipment that are expanded by the addition of components to increase system capacity after the effective date of this chapter; or

(d) Products or equipment replaced or cumulatively replaced such that the cumulative capital cost after the effective date of this chapter of replacement exceeds 50% of the capital cost of replacing the whole system.

“Phenolic insulation board” means boards, blocks or other shapes fabricated with phenolic foam.

“Polyolefin” means the foam sheets and tubes made of polyolefin, a macromolecule formed by the polymerization of olefin monomer units.

“Polystyrene extruded boardstock and billet” means a foam formed from predominantly styrene monomer and produced on extruding machines in the form of continuous foam slabs that can be cut and shaped into panels and used for roofing, walls, flooring, and pipes.

“Polystyrene extruded sheet” means polystyrene foam including that used for packaging, buoyancy or floatation and food-service items such as hinged polystyrene containers (for take-out from restaurants), food trays (meat and poultry) plates, bowls, and retail egg containers.

“Polyurethane” means a polymer formed principally by the reaction of an isocyanate and a polyol, including but not limited to polyisocyanurate (polyiso).

“Positive displacement chiller” means vapor compression cycle chillers that use positive displacement compressors, and are typically used for commercial comfort air conditioning. For the purpose of this article, positive displacement chiller does not include cooling for industrial process cooling and refrigeration.

“Refrigerant” or “refrigerant gas” means any substance, including blends and mixtures, which is used for heat transfer purposes.

“Refrigerated food processing and dispensing equipment” means retail food refrigeration equipment that is designed to process and dispense food and beverages that are intended for immediate or near-immediate consumption, including but not limited to chilled and frozen beverages, ice cream, and whipped cream. This end-use excludes water coolers and units designed solely to cool and dispense water.

“Refrigeration equipment” means any stationary device that is designed to contain and use refrigerant gas to establish or maintain colder than ambient temperatures in a confined space, including but not limited to retail or commercial refrigeration equipment, household refrigerators and freezers, and cold storage warehouses.

“Remote condensing units” means retail refrigeration equipment or units that have a central condensing portion and may consist of one or more compressors, condensers, and receivers assembled into a single unit, which may be located external to the sales area. The condensing portion (and often other parts of the system) is located outside the space or area cooled by the evaporator. Remote condensing units are commonly installed in convenience stores, specialty shops (e.g., bakeries, butcher shops), supermarkets, restaurants, and other locations where food is stored, served, or sold.

“Residential use” means use by a private individual of a substance, or a product containing the substance, in or around a permanent or temporary household, during recreation, or for any personal use or enjoyment. Use within a household for commercial or medical applications is not residential use, nor is use in automobiles, watercraft, or aircraft.

“Retail food refrigeration” or “commercial refrigeration” means equipment designed to store and display chilled or frozen goods for commercial sale including but not limited to stand-alone units, refrigerated food processing and dispensing equipment, remote condensing units, supermarket systems, and vending machines.

“Retrofit” means the replacement of the refrigerant used in refrigeration equipment with a different refrigerant, and any related changes to the refrigeration equipment required to maintain its operation and reliability following refrigerant replacement.

“Rigid polyurethane and polyisocyanurate laminated boardstock” means laminated board insulation made with polyurethane or polyisocyanurate foam, including that used for roofing and walls but not including rigid polyurethane appliance foam, rigid polyurethane commercial refrigeration and sandwich panels, rigid polyurethane marine flotation foam, rigid polyurethane spray foam, and rigid polyurethane one-component foam sealants.

“Rigid polyurethane appliance foam” means polyurethane insulation foam in household appliances.

“Rigid polyurethane commercial refrigeration and sandwich panels” means polyurethane foam, used to provide insulation in walls and doors, including that used for commercial refrigeration equipment, and used in doors, including garage doors.

“Rigid polyurethane high-pressure two-component spray foam” means a liquid polyurethane foam system sold as two parts (i.e., A-side and B-side) in non-pressurized containers that is field or factory applied in situ using high-pressure proportioning pumps at 800-1600 pounds per square inch (psi) and an application gun to mix and dispense the chemical components.

“Rigid Polyurethane low-pressure two-component spray foam” means a liquid polyurethane foam system sold as two parts (i.e. A-side and B-side) in containers that are pressurized to less than 250 psi during manufacture of the system for application without pumps; and are typically applied in situ relying upon a liquid blowing agent or gaseous foam blowing agent that also serves as a propellant.

“Rigid polyurethane marine flotation foam” means buoyancy or flotation polyurethane foam used in boat and ship manufacturing for both structural and flotation purposes.

“Rigid polyurethane one-component foam” means a polyurethane foam generally packaged in aerosol cans that is applied in situ using a gaseous foam blowing agent that is also the propellant for the aerosol formulation.

“Rigid polyurethane slabstock and other” means a rigid closed-cell polyurethane foam formed into slabstock insulation for panels and fabricated shapes for pipes and vessels.

“Stand-alone low-temperature unit” means a stand-alone unit that maintains food or beverages at temperatures at or below 32°F (0°C).

“Stand-alone medium-temperature unit” means a stand-alone unit that maintains food or beverages at temperatures above 32°F (0°C).

“Stand-alone unit” means retail refrigerators, freezers, and reach-in coolers (either open or with doors) where all refrigeration components are integrated and the refrigeration circuit may be entirely brazed or welded. These systems are charged with refrigerant at the factory and typically require only an electricity supply to begin operation.

“Substance” means any chemical, product substitute, or alternative manufacturing process, whether new or retrofit, intended for use in the end-uses listed in Appendix U and Appendix V of Subpart G of 40 CFR Part 82, as those read on January 3, 2017.

“Substitute” means a chemical, product replacement, or alternative manufacturing process, whether new or retrofit, that is used to perform a function previously performed by a class I substance or class II substance.

“Supermarket systems” means multiplex or centralized retail food refrigeration equipment systems designed to cool or refrigerate, which typically operate with racks of compressors installed in a machinery room and which includes both direct and indirect systems.

“Use” means any utilization of any substance, including but not limited to utilization in a manufacturing process or product in the Commonwealth of Virginia, consumption by the end-user in the Commonwealth, or in intermediate applications in the Commonwealth, such as formulation or packaging for other subsequent applications. For the purposes of this article, use excludes residential use, but it does not exclude manufacturing for the purpose of residential use.

“Vending machine” means a self-contained unit that dispenses goods that must be kept cold or frozen.

#### 9VAC5-145-120. Compliance.

A. Unless otherwise specified in this article, no owner or other person shall engage in or permit the manufacture, sale, lease, rental, installation, or entry into commerce of any equipment or product in violation of prohibitions prescribed under this article after the effective date of the prohibition.

B. The effective date of the prohibitions in Appendix U and Appendix V of Subpart G of 40 CFR Part 82, as those read on January 3, 2017, shall be January 1, 2022 unless a later effective date is specified in those appendices or in 9VAC5-145-130.

C. For the purpose of submitting compliance certifications or establishing whether or not an owner or other person has violated or is in violation of any standard in this chapter, nothing in this article shall preclude the use, including the exclusive use, of any credible evidence or information relevant to whether a source would have been in compliance with applicable requirements.

#### 9VAC5-145-130. Special provisions applicable to extruded polystyrene boardstock and billet manufacturers.

A. Extruded polystyrene boardstock and billet manufacturers located in the Commonwealth of Virginia that manufacture on and after January 1, 2022 in accordance with 9VAC5-145-100 D using hydrofluorocarbons prohibited in Appendix U and Appendix V of Subpart G of 40 CFR Part 82, as those read on January 3, 2017 shall comply with the following requirements:

1. Submit a compliance date feasibility study to the department no later than January 1, 2022, that contains a compliance schedule for meeting the prohibition on the use of hydrofluorocarbons prohibited in Appendix U and Appendix V of Subpart G of 40 CFR Part 82, as those read on January 3, 2017, in the manufacturing process for extruded polystyrene boardstock and billet.

2. The compliance date feasibility study shall be prepared in a manner acceptable to the department.

3. The compliance date feasibility study may contain a mitigation action plan for reducing HFC emissions in the Commonwealth of Virginia from January 1, 2022, until the prohibition compliance date recommended in the compliance date feasibility study required in subdivision 1 of this subsection. The mitigation action plan may detail and describe HFC mitigation efforts whether planned or implemented at the manufacturing facility, including dates of completion for any planned efforts.

B. Notwithstanding the requirements of subsection A of this section, extruded polystyrene boardstock and billet manufacturers located in the Commonwealth of Virginia shall be prohibited from using hydrofluorocarbons prohibited in Appendix U and Appendix V of Subpart G of 40 CFR Part 82, as those read on January 3, 2017 in the manufacturing process for extruded polystyrene boardstock and billet on and after January 1, 2036.

9VAC5-145-140. Labeling and administrative requirements.

A. As of January 1, 2022, except for acceptable uses listed in Appendix U and Appendix V of Subpart G of 40 CFR Part 82, as those read on January 3, 2017, any person who manufactures for sale or entry into commerce in the Commonwealth of Virginia, products or equipment in the air-conditioning, refrigeration, foam, or aerosol propellant end-uses listed in those appendices, shall provide a written disclosure to the buyer.

1. For motor-bearing refrigeration and air-conditioning equipment that is neither factory-charged nor pre-charged with refrigerant, the required disclosure or label shall state: "This equipment is prohibited from using any substance on the 'List of Prohibited Substances' for that specific end-use, in accordance with State regulations for hydrofluorocarbons."

2. Except for products and equipment with existing labeling required by state building codes and safety standards that contain the information required in subsections a and b of this subdivision, for refrigeration and air-conditioning equipment that are factory-charged or pre-charged with a hydrofluorocarbon or hydrofluorocarbon blend the required disclosure or label shall include:

a. The date of manufacture; and

b. The refrigerant and foam blowing agent that the product or equipment contains.

3. For foam products, the disclosure or label shall include one of the following alternatives:

a. The date of manufacture; and either:



(1) Identification of the foam blowing agent that the product contains; or

(2) A reference to a Safety Data Sheet (complying with 29 CFR 1910.1200 requirements), provided that the Safety Data Sheet identifies the foam blowing agent the product contains; or

b. The statement "Where sold, compliant with State HFC regulations."

4. For aerosol propellants, the disclosure or label shall include one of the following alternatives:

a. The date of manufacture; and either:

(1) Identification of the aerosol propellant that the product contains; or

(2) A reference to a Safety Data Sheet (complying with 29 CFR 1910.1200 requirements), provided that the Safety Data Sheet identifies the propellant that the product contains; or

b. The statement "Where sold, compliant with State HFC regulations."

B. If not combined with a written disclosure statement required by another jurisdiction, the written disclosure shall include the following statement signed by an authorized representative of the manufacturer: "I certify under penalty of law that the statements and information submitted in this document are to the best of my knowledge and belief true, accurate, and complete."

C. The manufacturer may substitute a date code representing the date of manufacture for the date of manufacture required in subsection A of this section.

9VAC5-145-150. Records and reporting.

A. As of January 1, 2022, any person who manufactures any product or equipment for the applications and end-uses listed in Appendix U and Appendix V of Subpart G of 40 CFR Part 82, as those read on January 3, 2017, for sale, lease, rental, installation, or entry into commerce in the Commonwealth of Virginia shall keep and maintain for five years records of the following information:

1. The date of manufacture of the equipment or product;

2. The refrigerant, aerosol propellant, and foam blowing agent blend that the equipment or product is designed to use;

3. The refrigerant, aerosol propellant, and foam blowing agent(s) in the equipment or product; and

4. Sufficient to demonstrate that the product or equipment does not contain any substances prohibited or restricted for the applications and end-uses listed in Appendix U and Appendix V of Subpart G of 40 CFR Part 82, as those read on January 3, 2017, or that the product is exempt in accordance with 9VAC5-145-110.

B. As of January 1, 2022, any person who manufactures any product or equipment for the applications and end-uses listed in Appendix U and Appendix V of Subpart G of 40 CFR Part 82, as those read on January 3, 2017, for sale, lease, rental, installation, or entry into commerce in the Commonwealth of Virginia shall make the required records available to the department upon request.

C. If a manufacturer uses a date code to meet disclosure or labeling requirements in 9VAC5-145-140 A, the manufacturer shall provide an explanation of the date code to the department upon request.

9VAC5-145-9999. Documents incorporated by reference.

40 CFR Part 82, Subpart G, Appendix U, as read on January 3, 2017.

40 CFR Part 82, Subpart G, Appendix V, as read on January 3, 2017.

Attachment 4

40CFR Part 82, Subpart G, Appendix U

## Subpart G—Significant New Alternatives Policy Program

### Appendix U to Subpart G of Part 82—Unacceptable Substitutes and Substitutes Subject to Use Restrictions Listed in the July 20, 2015 Final Rule, Effective August 19, 2015

#### AEROSOLS—UNACCEPTABLE SUBSTITUTES

End-use	Substitute	Decision	Further information
Propellants	HFC-125	Unacceptable as of January 1, 2016	HFC-125 has a Chemical Abstracts Service Registry Number (CAS Reg. No.) of 354-33-6 and it is also known by the name 1,1,1,2,2-pentafluoropropane. HFC-125 has a GWP of 3,500. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date.
			Products using this propellant that are manufactured prior to January 1, 2016 may be sold, imported, exported, distributed and used after that date.
Propellants	HFC-134a	Unacceptable as of July 20, 2016, except uses listed as acceptable, subject to use conditions	HFC-134a has a Chemical Abstracts Service Registry Number (CAS Reg. No.) of 811-97-2 and it is also known by the name 1,1,1,2-tetrafluoropropane. HFC-134a has a GWP of 1,430. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date.
			Products using this propellant that are manufactured prior to July 20, 2016 may be sold, imported, exported, distributed and used after that date.
Propellants	HFC-227ea and blends of HFC-134a and HFC-227ea	Unacceptable as of July 20, 2016, except uses listed as acceptable, subject to use conditions	HFC-227ea has a Chemical Abstracts Service Registry Number (CAS Reg. No.) of 431-89-0 and it is also known by the name 1,1,1,2,3,3,3-heptafluoropropane. HFC-134a has a Chemical Abstracts Service Registry Number (CAS Reg. No.) of 811-97-2 and it is also known by the name 1,1,1,2-tetrafluoropropane. HFC-227ea and HFC-134a have GWPs of 3,220 and 1,430, respectively. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date.

			Products using these propellants that are manufactured prior to July 20, 2016 may be sold, imported, exported, distributed and used after that date.
Propellants	HCFC-22 and HCFC-142b	Unacceptable effective September 18, 2015	Use or introduction into interstate commerce of virgin HCFC-22 and HCFC-142b for aerosols is prohibited as of January 1, 2010 under EPA's regulations at 40 CFR part 82 subpart A. These propellants have ozone depletion potentials of 0.055 and 0.065, respectively.
Solvents	HCFC-141b and blends thereof	Unacceptable effective September 18, 2015	Use or introduction into interstate commerce of virgin HCFC-141b for aerosols is prohibited as of January 1, 2015 under EPA's regulations at 40 CFR part 82 subpart A. HCFC-141b has an ozone depletion potential of 0.11.

**SUBSTITUTES ACCEPTABLE SUBJECT TO USE CONDITIONS**

<b>End-use</b>	<b>Substitute</b>	<b>Decision</b>	<b>Use conditions</b>	<b>Further information</b>
Propellants	HFC-134a	Acceptable subject to use conditions	<p>The classes of products listed below are acceptable for use from July 20, 2016 through December 31, 2017 and are unacceptable thereafter</p> <ul style="list-style-type: none"> <li>• products for functional testing of smoke detectors</li> <li>• products for which new formulations require governmental review, including: EPA pesticide registration, approval for conformance with military or space agency specifications, or FDA approval (other than MDIs)</li> </ul> <p>The classes of products listed below are acceptable for use and other uses are</p>	<p>HFC-134a has a Chemical Abstracts Service Registry Number (CAS Reg. No.) of 811-97-2 and it is also known by the name 1,1,1,2-tetrafluoropropane. HFC-134a has a GWP of 1,430. Use is allowed for the specified uses because of the technical and safety demands in these applications.</p> <p>Aerosol products using this propellant that are manufactured prior to July 20, 2016, may be sold, imported, exported, distributed and used after that date.</p>

			<p>unacceptable as of July 20, 2016:</p> <ul style="list-style-type: none"> <li>• metered dose inhalers approved by the U.S. Food and Drug Administration for medical purposes</li> <li>• cleaning products for removal of grease, flux and other soils from electrical equipment or electronics</li> <li>• refrigerant flushes</li> <li>• products for sensitivity testing of smoke detectors</li> <li>• lubricants and freeze sprays for electrical equipment or electronics</li> </ul>	
			<ul style="list-style-type: none"> <li>• sprays for aircraft maintenance.</li> <li>• sprays containing corrosion preventive compounds used in the maintenance of aircraft, electrical equipment or electronics, or military equipment.</li> <li>• pesticides for use near electrical wires or in aircraft, in total release insecticide foggers, or in certified organic use pesticides for which EPA has specifically disallowed all other lower-GWP propellants.</li> <li>• mold release agents and mold cleaners.</li> <li>• lubricants and cleaners for spinnerettes for synthetic fabrics.</li> <li>• duster sprays specifically for removal of dust from</li> </ul>	

			<p>photographic negatives, semiconductor chips, specimens under electron microscopes, and energized electrical equipment.</p> <ul style="list-style-type: none"> <li>• adhesives and sealants in large canisters.</li> <li>• document preservation sprays.</li> <li>• wound care sprays.</li> <li>• topical coolant sprays for pain relief.</li> <li>• products for removing bandage adhesives from skin.</li> </ul>	
Propellants	HFC-227ea and blends of HFC-227ea and HFC-134a	Acceptable subject to use conditions	Acceptable for use in metered dose inhalers approved by the U.S. Food and Drug Administration for medical purposes and unacceptable for all other uses as of July 20, 2016	HFC-227ea has a Chemical Abstracts Service Registry Number (CAS Reg. No.) of 431-89-0 and it is also known by the name 1,1,1,2,3,3,3-heptafluoropropane. HFC-227ea has a GWP of 3,220.
				Aerosol products using this propellant that are manufactured prior to July 20, 2016 may be sold, imported, exported, distributed and used after that date.

**REFRIGERATION AND AIR CONDITIONING—UNACCEPTABLE SUBSTITUTES**

<b>End-use</b>	<b>Substitute</b>	<b>Decision</b>	<b>Further information</b>
Retail food refrigeration (supermarket systems) (new)	HFC-227ea, R-404A, R-407B, R-421B, R-422A, R-422C, R-422D, R-428A, R-434A, R-507A	Unacceptable as of January 1, 2017	These refrigerants have GWPs ranging from 2,729 to 3,985. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date.

Retail food refrigeration (supermarket systems) (retrofit)	R-404A, R-407B, R-421B, R-422A, R-422C, R-422D, R-428A, R-434A, R-507A	Unacceptable as of July 20, 2016	These refrigerants have GWPs ranging from 2,729 to 3,985. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date.
Retail food refrigeration (remote condensing units) (new)	HFC-227ea, R-404A, R-407B, R-421B, R-422A, R-422C, R-422D, R-428A, R-434A, R-507A	Unacceptable as of January 1, 2018	These refrigerants have GWPs ranging from 2,729 to 3,985. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date.
Retail food refrigeration (remote condensing units) (retrofit)	R-404A, R-407B, R-421B, R-422A, R-422C, R-422D, R-428A, R-434A, R-507A	Unacceptable as of July 20, 2016	These refrigerants have GWPs ranging from 2,729 to 3,985. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date.
Retail food refrigeration (stand-alone medium-temperature units with a compressor capacity below 2,200 Btu/hr and not containing a flooded evaporator) (new)	FOR12A, FOR12B, HFC-134a, HFC-227ea, KDD6, R-125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R-407A, R-407B, R-407C, R-407F, R-410A, R-410B, R-417A, R-421A, R-421B, R-422A, R-422B, R-422C, R-422D, R-424A, R-426A, R-428A, R-434A, R-437A, R-438A, R-507A, RS-24 (2002 formulation), RS-44 (2003 formulation), SP34E, THR-03	Unacceptable as of January 1, 2019	These refrigerants have GWPs ranging from approximately 900 to 3,985. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date. "Medium-temperature" refers to equipment that maintains food or beverages at temperatures above 32 °F (0 °C).
Retail food refrigeration (stand-alone medium-temperature units with a compressor)	FOR12A, FOR12B, HFC-134a, HFC-227ea, KDD6, R-125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R-407A, R-407B, R-407C, R-407F, R-410A, R-410B, R-	Unacceptable as of January 1, 2020	These refrigerants have GWPs ranging from approximately 900 to 3,985. Other substitutes will be available for this end-use with lower overall risk to



capacity below 2,200 Btu/hr and containing a flooded evaporator) (new)	417A, R-421A, R-421B, R-422A, R-422B, R-422C, R-422D, R-424A, R-426A, R-428A, R-434A, R-437A, R-438A, R-507A, RS-24 (2002 formulation), RS-44 (2003 formulation), SP34E, THR-03		human health and the environment by the status change date. “Medium-temperature” refers to equipment that maintains food or beverages at temperatures above 32 °F (0 °C).
Retail food refrigeration (stand-alone medium-temperature units with a compressor capacity equal to or greater than 2,200 Btu/hr) (new)	FOR12A, FOR12B, HFC-134a, HFC-227ea, KDD6, R-125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R-407A, R-407B, R-407C, R-407F, R-410A, R-410B, R-417A, R-421A, R-421B, R-422A, R-422B, R-422C, R-422D, R-424A, R-426A, R-428A, R-434A, R-437A, R-438A, R-507A, RS-24 (2002 formulation), RS-44 (2003 formulation), SP34E, THR-03	Unacceptable as of January 1, 2020	These refrigerants have GWPs ranging from approximately 900 to 3,985. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date. “Medium-temperature” refers to equipment that maintains food or beverages at temperatures above 32 °F (0 °C).
Retail food refrigeration (stand-alone low-temperature units) (new)	HFC-227ea, KDD6, R-125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R-407A, R-407B, R-407C, R-407F, R-410A, R-410B, R-417A, R-421A, R-421B, R-422A, R-422B, R-422C, R-422D, R-424A, R-428A, R-434A, R-437A, R-438A, R-507A, RS-44 (2003 formulation)	Unacceptable as of January 1, 2020	These refrigerants have GWPs ranging from approximately 1,800 to 3,985. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date. “Low-temperature” refers to equipment that maintains food or beverages at temperatures at or below 32 °F (0 °C).
Retail food refrigeration (stand-alone units only) (retrofit)	R-404A, R-507A	Unacceptable as of July 20, 2016	These refrigerants have GWPs of approximately 3,922 and 3,985. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date.

Vending machines (new only)	FOR12A, FOR12B, HFC-134a, KDD6, R-125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R-407C, R-410A, R-410B, R-417A, R-421A, R-422B, R-422C, R-422D, R-426A, R-437A, R-438A, R-507A, RS-24 (2002 formulation), SP34E	Unacceptable as of January 1, 2019	These refrigerants have GWPs ranging from approximately 1,100 to 3,985. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date.
Vending machines (retrofit only)	R-404A, R-507A.	Unacceptable as of July 20, 2016	These refrigerants have GWPs of approximately 3,922 and 3,985. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date.

**FOAM BLOWING AGENTS—SUBSTITUTES ACCEPTABLE SUBJECT TO NARROWED USE LIMITS**

<b>End-use</b>	<b>Substitute</b>	<b>Decision</b>	<b>Narrowed use limits</b>	<b>Further information</b>
Rigid Polyurethane: Appliance	HFC-134a, HFC-245fa, HFC-365mfc and blends thereof; Formacel TI, and Formacel Z-6	Acceptable Subject to Narrowed Use Limits	Acceptable from January 1, 2020, until January 1, 2022, in military applications and until January 1, 2025, in space- and aeronautics-related applications where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements Closed cell foam products and products containing closed cell foams manufactured with these substitutes on or before January 1, 2022, for military applications or on and before January 1, 2025, in space- and aeronautics-related	Users are required to document and retain the results of their technical investigation of alternatives for the purpose of demonstrating compliance. Information should include descriptions of: <ul style="list-style-type: none"> <li>• Process or product in which the substitute is needed;</li> <li>• Substitutes examined and rejected;</li> <li>• Reason for rejection of other alternatives, e.g., performance, technical or safety</li> </ul>

			applications, may be used after those dates	standards; and/or <ul style="list-style-type: none"> <li>• Anticipated date other substitutes will be available and projected time for switching.</li> </ul>
Rigid Polyurethane: Commercial Refrigeration and Sandwich Panels	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, and Formacel Z-6	Acceptable Subject to Narrowed Use Limits	Acceptable from January 1, 2020, until January 1, 2022, in military applications and until January 1, 2025, in space- and aeronautics-related applications where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements Closed cell foam products and products containing closed cell foams manufactured with these substitutes on or before January 1, 2022, for military applications or on and before January 1, 2025, in space- and aeronautics-related applications, may be used after those dates	Users are required to document and retain the results of their technical investigation of alternatives for the purpose of demonstrating compliance. Information should include descriptions of: <ul style="list-style-type: none"> <li>• Process or product in which the substitute is needed;</li> <li>• Substitutes examined and rejected;</li> <li>• Reason for rejection of other alternatives, e.g., performance, technical or safety standards; and/or</li> <li>• Anticipated date other substitutes will be available and projected time for switching.</li> </ul>
Flexible Polyurethane	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof	Acceptable Subject to Narrowed Use Limits	Acceptable from January 1, 2017, until January 1, 2022, in military applications and until January 1, 2025, in space- and aeronautics-related applications where reasonable efforts have been made to ascertain that other alternatives are	Users are required to document and retain the results of their technical investigation of alternatives for the purpose of demonstrating compliance. Information should

			not technically feasible due to performance or safety requirements	include descriptions of: <ul style="list-style-type: none"> <li>• Process or product in which the substitute is needed;</li> <li>• Substitutes examined and rejected;</li> <li>• Reason for rejection of other alternatives, e.g., performance, technical or safety standards; and/or</li> <li>• Anticipated date other substitutes will be available and projected time for switching.</li> </ul>
Rigid Polyurethane: Slabstock and Other	HFC-134a, HFC-245fa, HFC-365mfc and blends thereof; Formacel TI, and Formacel Z-6	Acceptable Subject to Narrowed Use Limits	Acceptable from January 1, 2019, until January 1, 2022, in military applications and until January 1, 2025, in space- and aeronautics-related applications where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements Closed cell foam products and products containing closed cell foams manufactured with these substitutes on or before January 1, 2022, for military applications or on and before January 1, 2025, in space- and aeronautics-related applications, may be used after those dates	Users are required to document and retain the results of their technical investigation of alternatives for the purpose of demonstrating compliance. Information should include descriptions of: <ul style="list-style-type: none"> <li>• Process or product in which the substitute is needed;</li> <li>• Substitutes examined and rejected;</li> <li>• Reason for rejection of other alternatives, e.g., performance, technical or safety standards; and/or</li> <li>• Anticipated date other substitutes will</li> </ul>

				be available and projected time for switching.
Rigid Polyurethane and Polyisocyanurate Laminated Boardstock	HFC-134a, HFC-245fa, HFC-365mfc and blends thereof	Acceptable Subject to Narrowed Use Limits	Acceptable from January 1, 2017, until January 1, 2022, in military applications and until January 1, 2025, in space- and aeronautics-related applications where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements Closed cell foam products and products containing closed cell foams manufactured with these substitutes on or before January 1, 2022, for military applications or on and before January 1, 2025, in space- and aeronautics-related applications, may be used after those dates	Users are required to document and retain the results of their technical investigation of alternatives for the purpose of demonstrating compliance. Information should include descriptions of: <ul style="list-style-type: none"> <li>• Process or product in which the substitute is needed;</li> <li>• Substitutes examined and rejected;</li> <li>• Reason for rejection of other alternatives, e.g., performance, technical or safety standards; and/or</li> <li>• Anticipated date other substitutes will be available and projected time for switching.</li> </ul>
Rigid Polyurethane: Marine Flotation Foam	HFC-134a, HFC-245fa, HFC-365mfc and blends thereof; Formacel TI, and Formacel Z-6	Acceptable Subject to Narrowed Use Limits	Acceptable from January 1, 2020, until January 1, 2022, in military applications and until January 1, 2025, in space- and aeronautics-related applications where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements	Users are required to document and retain the results of their technical investigation of alternatives for the purpose of demonstrating compliance. Information should include descriptions of: <ul style="list-style-type: none"> <li>• Process or product</li> </ul>

			<p>Closed cell foam products and products containing closed cell foams manufactured with these substitutes on or before January 1, 2022, for military applications or on and before January 1, 2025, in space- and aeronautics-related applications, may be used after those dates</p>	<p>in which the substitute is needed;</p> <ul style="list-style-type: none"> <li>• Substitutes examined and rejected;</li> <li>• Reason for rejection of other alternatives, e.g., performance, technical or safety standards; and/or</li> <li>• Anticipated date other substitutes will be available and projected time for switching.</li> </ul>
<p>Polystyrene: Extruded Sheet</p>	<p>HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, and Formacel Z-6</p>	<p>Acceptable Subject to Narrowed Use Limits</p>	<p>Acceptable from January 1, 2017, until January 1, 2022, in military applications and until January 1, 2025, in space- and aeronautics-related applications where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements</p> <p>Closed cell foam products and products containing closed cell foams manufactured with these substitutes on or before January 1, 2022, for military applications or on and before January 1, 2025, in space- and aeronautics-related applications, may be used after those dates</p>	<p>Users are required to document and retain the results of their technical investigation of alternatives for the purpose of demonstrating compliance. Information should include descriptions of:</p> <ul style="list-style-type: none"> <li>• Process or product in which the substitute is needed;</li> <li>• Substitutes examined and rejected;</li> <li>• Reason for rejection of other alternatives, e.g., performance, technical or safety standards; and/or</li> <li>• Anticipated date other substitutes will be available and projected time for switching.</li> </ul>

<p>Polystyrene: Extruded Boardstock and Billet</p>	<p>HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, Formacel B, and Formacel Z-6</p>	<p>Acceptable Subject to Narrowed Use Limits</p>	<p>Acceptable from January 1, 2021, until January 1, 2022, in military applications and until January 1, 2025, in space- and aeronautics-related applications where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements Closed cell foam products and products containing closed cell foams manufactured with these substitutes on or before January 1, 2022, for military applications or on and before January 1, 2025, in space- and aeronautics-related applications, may be used after those dates</p>	<p>Users are required to document and retain the results of their technical investigation of alternatives for the purpose of demonstrating compliance. Information should include descriptions of:</p> <ul style="list-style-type: none"> <li>• Process or product in which the substitute is needed;</li> <li>• Substitutes examined and rejected;</li> <li>• Reason for rejection of other alternatives, e.g., performance, technical or safety standards; and/or</li> <li>• Anticipated date other substitutes will be available and projected time for switching.</li> </ul>
<p>Integral Skin Polyurethane</p>	<p>HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, and Formacel Z-6</p>	<p>Acceptable Subject to Narrowed Use Limits</p>	<p>Acceptable from January 1, 2017, until January 1, 2022, in military applications and until January 1, 2025, in space- and aeronautics-related applications where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements</p>	<p>Users are required to document and retain the results of their technical investigation of alternatives for the purpose of demonstrating compliance. Information should include descriptions of:</p> <ul style="list-style-type: none"> <li>• Process or product in which the substitute is needed;</li> <li>• Substitutes</li> </ul>

				<p>examined and rejected;</p> <ul style="list-style-type: none"> <li>Reason for rejection of other alternatives, e.g., performance, technical or safety standards; and/or</li> <li>Anticipated date other substitutes will be available and projected time for switching.</li> </ul>
Polyolefin	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, and Formacel Z-6	Acceptable Subject to Narrowed Use Limits	<p>Acceptable from January 1, 2020, until January 1, 2022, in military applications and until January 1, 2025, in space- and aeronautics-related applications where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements</p> <p>Closed cell foam products and products containing closed cell foams manufactured with these substitutes on or before January 1, 2022, for military applications or on and before January 1, 2025, in space- and aeronautics-related applications, may be used after those dates</p>	<p>Users are required to document and retain the results of their technical investigation of alternatives for the purpose of demonstrating compliance. Information should include descriptions of:</p> <ul style="list-style-type: none"> <li>Process or product in which the substitute is needed;</li> <li>Substitutes examined and rejected;</li> <li>Reason for rejection of other alternatives, e.g., performance, technical or safety standards; and/or</li> <li>Anticipated date other substitutes will be available and projected time for switching.</li> </ul>
Phenolic Insulation Board and Bunstock	HFC-143a, HFC-134a, HFC-245fa,	Acceptable Subject to	Acceptable from January 1, 2017, until January 1, 2022, in military	Users are required to document and retain the results of their



	HFC-365mfc, and blends thereof	Narrowed Use Limits	applications and until January 1, 2025, in space- and aeronautics-related applications where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements Closed cell foam products and products containing closed cell foams manufactured with these substitutes on or before January 1, 2022, for military applications or on and before January 1, 2025, in space- and aeronautics-related applications, may be used after those dates	technical investigation of alternatives for the purpose of demonstrating compliance. Information should include descriptions of: <ul style="list-style-type: none"> <li>• Process or product in which the substitute is needed;</li> <li>• Substitutes examined and rejected;</li> <li>• Reason for rejection of other alternatives, e.g., performance, technical or safety standards; and/or</li> <li>• Anticipated date other substitutes will be available and projected time for switching.</li> </ul>
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**UNACCEPTABLE SUBSTITUTES**

<b>End-use</b>	<b>Substitute</b>	<b>Decision</b>	<b>Further information</b>
All Foam Blowing End-uses	HCFC-141b and blends thereof	Unacceptable effective September 18, 2015. Closed cell foam products and products containing closed cell foams manufactured with these substitutes on or before December 1, 2017 may be used after that date	HCFC-141b has an ozone depletion potential of 0.11 under the Montreal Protocol. EPA previously found HCFC-141b unacceptable in all foam blowing end-uses (appendix M to subpart G of 40 CFR part 82). HCFC-141b has an ozone depletion potential (ODP) of 0.11.
All Foam Blowing end-uses	HCFC-22, HCFC-142b, and blends thereof	Unacceptable effective September 18, 2015. Closed cell foam products and products containing	Use or introduction into interstate commerce of virgin HCFC-22 and HCFC-142b for foam blowing is prohibited

		closed cell foams manufactured with these substitutes on or before December 1, 2017 may be used after that date	after January 1, 2010 under EPA's regulations at 40 CFR part 82 subpart A unless used, recovered, and recycled. These compounds have ODPs of 0.055 and 0.065, respectively.
Flexible Polyurethane	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof	Unacceptable as of January 1, 2017, except where allowed under a narrowed use limit	These foam blowing agents have global warming potentials (GWPs) ranging from 725 to 1,430. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date.
Polystyrene: Extruded Sheet	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, and Formacel Z-6	Unacceptable as of January 1, 2017, except where allowed under a narrowed use limit Closed cell foam products and products containing closed cell foams manufactured with these substitutes on or before December 1, 2017 may be used after that date	These foam blowing agents have GWPs ranging from higher than 370 to approximately 1,500. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date.
Phenolic Insulation Board and Bunstock	HFC-143a, HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof	Unacceptable as of January 1, 2017, except where allowed under a narrowed use limit Closed cell foam products and products containing closed cell foams manufactured with these substitutes on or before December 1, 2017 may be used after that date	These foam blowing agents have GWPs ranging from 725 to 4,470. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date.
Integral Skin Polyurethane	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, and Formacel Z-6	Unacceptable as of January 1, 2017, except where allowed under a narrowed use limit	These foam blowing agents have GWPs ranging from higher than 370 to approximately 1,500. Other substitutes will be available for this end-use with lower overall risk to human health and the

			environment by the status change date.
Rigid Polyurethane: Slabstock and Other	HFC-134a, HFC-245fa, HFC-365mfc and blends thereof; Formacel TI, and Formacel Z-6	Unacceptable as of January 1, 2019, except where allowed under a narrowed use limit Closed cell foam products and products containing closed cell foams manufactured with these substitutes on or before January 1, 2019, may be used after that date	These foam blowing agents have GWPs ranging from higher than 370 to approximately 1,500. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date.
Rigid Polyurethane and Polyisocyanurate Laminated Boardstock	HFC-134a, HFC-245fa, HFC-365mfc and blends thereof	Unacceptable as of January 1, 2017, except where allowed under a narrowed use limit Closed cell foam products and products containing closed cell foams manufactured with these substitutes on or before December 1, 2017 may be used after that date	These foam blowing agents have GWPs ranging from 725 to 1,430. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date.
Rigid Polyurethane: Marine Flotation Foam	HFC-134a, HFC-245fa, HFC-365mfc and blends thereof; Formacel TI, and Formacel Z-6	Unacceptable as of January 1, 2020 except where allowed under a narrowed use limit Closed cell foam products and products containing closed cell foams manufactured with these substitutes on or before January 1, 2020, may be used after that date	These foam blowing agents have GWPs ranging from higher than 370 to approximately 1,500. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date.
Rigid Polyurethane: Commercial Refrigeration and Sandwich Panels	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, and Formacel Z-6	Unacceptable as of January 1, 2020 except where allowed under a narrowed use limit Closed cell foam products and products containing closed cell foams manufactured with these substitutes on or before	These foam blowing agents have GWPs ranging from higher than 370 to approximately 1,500. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date.

		January 1, 2020, may be used after that date	
Rigid Polyurethane: Appliance	HFC-134a, HFC-245fa, HFC-365mfc and blends thereof; Formacel TI, and Formacel Z-6	Unacceptable as of January 1, 2020, except where allowed under a narrowed use limit Closed cell foam products and products containing closed cell foams manufactured with these substitutes on or before January 1, 2020, may be used after that date	These foam blowing agents have GWPs ranging from higher than 370 to approximately 1,500. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date.
Polystyrene: Extruded Boardstock and Billet	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, Formacel B, and Formacel Z-6	Unacceptable as of January 1, 2021, except where allowed under a narrowed use limit Closed cell foam products and products containing closed cell foams manufactured with these substitutes on or before January 1, 2021, may be used after that date	These foam blowing agents have GWPs ranging from higher than 140 to approximately 1,500. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date.
Polyolefin	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, and Formacel Z-6	Unacceptable as of January 1, 2020, except where allowed under a narrowed use limit Closed cell foam products and products containing closed cell foams manufactured with these substitutes on or before January 1, 2020, may be used after that date	These foam blowing agents have GWPs ranging from higher than 370 to approximately 1,500. Other substitutes will be available for this end-use with lower overall risk to human health and the environment by the status change date.

**FIRE SUPPRESSION AND EXPLOSION PROTECTION AGENTS—UNACCEPTABLE SUBSTITUTES**

<b>End-use</b>	<b>Substitute</b>	<b>Decision</b>	<b>Further information</b>
Total Flooding	HCFC-22	Unacceptable effective September 18, 2015	Use or introduction into interstate commerce of virgin HCFC-22 for total flooding fire suppression and explosion protection is prohibited as of January 1, 2010 under EPA's regulations at 40 CFR part 82 subpart A.

			This chemical has an ozone depletion potential of 0.055.
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**STERILANTS—UNACCEPTABLE SUBSTITUTES**

<b>End-use</b>	<b>Substitute</b>	<b>Decision</b>	<b>Further information</b>
Sterilants	Blends containing HCFC-22	Unacceptable effective September 18, 2015	Use or introduction into interstate commerce of virgin HCFC-22 for sterilants is prohibited as of January 1, 2010 under EPA's regulations at 40 CFR part 82 subpart A. This chemical has an ozone depletion potential of 0.055.

**ADHESIVES, COATINGS AND INKS—UNACCEPTABLE SUBSTITUTES**

<b>End-use</b>	<b>Substitute</b>	<b>Decision</b>	<b>Further information</b>
Adhesives, coatings and inks	HCFC-141b and blends thereof	Unacceptable effective September 18, 2015	Use or introduction into interstate commerce of virgin HCFC-141b for adhesives, coatings and inks is prohibited as of January 1, 2015 under EPA's regulations at 40 CFR part 82 subpart A. This chemical has an ozone depletion potential of 0.11.

[80 FR 42953, July 20, 2015, as amended at 81 FR 86885, Dec. 1, 2016]

Attachment 5

40CFR Part 82, Subpart G, Appendix V

## Subpart G—Significant New Alternatives Policy Program

### Appendix V to Subpart G of Part 82—Substitutes Subject to Use Restrictions and Unacceptable Substitutes Listed in the December 1, 2016 Final Rule

#### REFRIGERANTS—ACCEPTABLE SUBJECT TO USE CONDITIONS

End-use	Substitute	Decision	Use conditions	Further information
Commercial ice machines (self-contained) (new only)	Propane (R-290)	Acceptable, subject to use conditions	As of January 3, 2017: This refrigerant may be used only in new equipment designed specifically and clearly identified for the refrigerant— <i>i.e.</i> , this refrigerant may not be used as a conversion or “retrofit” refrigerant for existing equipment	Applicable OSHA requirements at 29 CFR part 1910 must be followed, including those at 29 CFR 1910.106 (flammable and combustible liquids), 1910.110 (storage and handling of liquefied petroleum gases), 1910.157 (portable fire extinguishers), and 1910.1000 (toxic and hazardous substances).
			This refrigerant may be used only in self-contained commercial ice machines that meet all requirements listed in Supplement SA to UL 563. <sup>1 2 5</sup> In cases where this rule includes requirements more stringent than those in UL 563, the equipment must meet the requirements of the final rule in place of the requirements in the UL Standard	

			The charge size must not exceed 150g (5.29 oz) in each refrigerant circuit of a commercial ice machine	Proper ventilation should be maintained at all times during
			As provided in clauses SA6.1.1 and SA6.1.2 of UL 563, the following markings must be attached at the locations provided and must be permanent:	the manufacture and storage of equipment containing hydrocarbon refrigerants through
			(a) “DANGER— Risk of Fire or Explosion. Flammable Refrigerant Used. Do Not Use Mechanical Devices To Defrost Refrigerator. Do Not Puncture Refrigerant Tubing.” This marking must be provided on or near any evaporators that can be contacted by the consumer	adherence to good manufacturing practices as per 29 CFR 1910.106. If refrigerant levels in the air surrounding the equipment rise above one-
			(b) “DANGER— Risk of Fire or Explosion. Flammable Refrigerant Used. To Be Repaired	fourth of the lower flammability limit, the space should be evacuated and re-entry should occur only after the space has been properly ventilated.



			Only By Trained Service Personnel. Do Not Puncture Refrigerant Tubing.” This marking must be located near the machine compartment	
			(c) “CAUTION— Risk of Fire or Explosion. Flammable Refrigerant Used. Consult Repair Manual/Owner's Guide Before Attempting To Service This Product. All Safety Precautions Must be Followed.” This marking must be located near the machine compartment	Technicians and equipment manufacturers should wear appropriate personal protective equipment, including
			(d) “CAUTION— Risk of Fire or Explosion. Dispose of Properly In Accordance With Federal Or Local Regulations. Flammable Refrigerant Used.” This marking must be provided on the exterior of the refrigeration equipment	chemical goggles and protective gloves, when handling propane. Special care should be taken to avoid contact with
			(e) “CAUTION—	the skin since propane, like many

			<p>Risk of Fire or Explosion Due To Puncture Of Refrigerant Tubing; Follow Handling Instructions Carefully. Flammable Refrigerant Used.” This marking must be provided near all exposed refrigerant tubing</p>	<p>refrigerants, can cause freeze burns on the skin.</p>
			<p>All of these markings must be in letters no less than 6.4 mm ( ¼ inch) high The 05equipment 05must 05have 05red 05Pantone 05Matching 05System</p>	<p>A Class B dry powder type fire extinguisher should be kept nearby.</p>
			<p>(PMS) #185 marked pipes, hoses, or other devices through which the refrigerant passes, to indicate the use of a flammable refrigerant. This color must be applied at all service ports and other parts of the system where service puncturing or other actions creating an opening from the refrigerant circuit</p>	<p>Technicians should only use spark-proof tools when working on equipment with propane. Any recovery equipment used should be designed for flammable refrigerants. Any refrigerant releases should be in a well-ventilated area, such as outside of a building. Only technicians specifically trained in handling flammable refrigerants should service equipment containing propane. Technicians should gain an understanding of minimizing the risk of fire and the steps to use flammable refrigerants safely. Room occupants should evacuate the space immediately following the accidental release of this refrigerant. If a service port is added then,</p>

			to the atmosphere might be expected and must extend a minimum of one (1) inch in both directions from such locations	commercial ice machines or equipment using propane should have service aperture fittings that differ from fittings used in equipment or containers using non-flammable refrigerant. “Differ” means that either the diameter differs by at least 1/16 inch or the thread direction is reversed ( <i>i.e.</i> , right-handed 06vs. 06left-handed).
				These different fittings should be permanently affixed to the unit at the point of service and maintained until the end-of-life of the unit, and should not be accessed with an adaptor.
Very low temperature refrigeration equipment (new only)	Propane (R-290)	Acceptable, subject to use conditions	As of January 3, 2017: This refrigerant may be used only in new equipment designed specifically and clearly identified for the refrigerant— <i>i.e.</i> , this refrigerant may not be used as a conversion or “retrofit” refrigerant for existing equipment	Applicable OSHA requirements at 29 CFR part 1910 must be followed, including those at 29 CFR 1910.106 (flammable and combustible liquids), 1910.110 (storage and handling of liquefied petroleum gases), 1910.157 (portable fire extinguishers), and 1910.1000 (toxic and hazardous substances).
			This refrigerant may be used only in self-contained commercial ice machines that meet all requirements listed in Supplement SA to UL 563. <sup>1 2 5</sup> In cases where this rule includes requirements more stringent than those	

			in UL 563, the equipment must meet the requirements of the final rule in place of the requirements in the UL Standard	
			The charge size for the equipment must not exceed 150 grams (5.29 ounces) in each refrigerant circuit of the very low temperature refrigeration equipment	Proper ventilation should be maintained at all times during the 05manufacture 05and 05storage
			As provided in clauses SA6.1.1 and SA6.1.2 of UL 563, the following markings must be attached at the locations provided and must be permanent:	of equipment containing hydrocarbon refrigerants through adherence 06to 05good 05manufac-
			(a) "DANGER— Risk of Fire or Explosion. Flammable Refrigerant Used. Do Not Use Mechanical Devices To Defrost Refrigerator. Do Not Puncture Refrigerant Tubing." This marking must be provided on or near any	turing practices as per 29 CFR 1910.106. If refrigerant levels in the air surrounding the equipment rise above one-fourth of the lower flammability

			evaporators that can be contacted by the consumer	
			(b) "DANGER— Risk of Fire or Explosion. Flammable Refrigerant Used. To Be Repaired Only By Trained Service Personnel. Do Not Puncture Refrigerant Tubing." This marking must be located near the machine compartment	limit, the space should be evacuated and re-entry should occur only after the space has been properly ventilated.
			(c) "CAUTION— Risk of Fire or Explosion. Flammable Refrigerant Used. Consult Repair Manual/Owner's Guide Before Attempting To Service This Product. All Safety Precautions Must be Followed." This marking must be located near the machine compartment	Technicians and equipment manufacturers should wear appropriate personal protective equipment, including chemical goggles and protective
			(d) "CAUTION— Risk of Fire or Explosion. Dispose of Properly In Accordance With Federal Or Local	tive gloves, when handling propane. Special care should be taken to avoid contact with the skin since propane, like many refrigerants, can cause freeze burns on the skin.

			<p>Regulations. Flammable Refrigerant Used.” This marking must be provided on the exterior of the refrigeration equipment</p>	
			<p>(e) “CAUTION— Risk of Fire or Explosion Due To Puncture Of Refrigerant Tubing; Follow Handling Instructions Carefully. Flammable Refrigerant Used.” This marking must be provided near all exposed refrigerant tubing</p>	<p>A Class B dry powder type fire extinguisher should be kept nearby. Technicians should use</p>
			<p>All of these markings must be in letters no less than 6.4 mm ( ¼ inch) high</p>	<p>spark-proof tools when working on equipment with pro-</p>
			<p>The equipment must have red Pantone Matching System (PMS) #185 marked pipes, hoses, or other devices through which the refrigerant passes, to indicate the use of a flammable refrigerant. This color must be</p>	<p>pane. Any recovery equipment used should be designed for flammable refrigerants. Any refrigerant releases should be in a well-ventilated area, such as outside of a building. Only technicians specifically trained in handling flammable refrigerants should service equipment containing propane. Technicians should gain an understanding of minimizing the risk of fire and the steps to use flammable refrigerants safely.</p>

			<p>applied at all service ports and other parts of the system where service puncturing or other actions creating an opening from the refrigerant circuit to the atmosphere might be expected and must extend a minimum of one (1) inch in both directions from such locations</p>	<p>Room occupants should evacuate the space immediately following the accidental release of this refrigerant.</p>
				<p>If a service port is added then, commercial ice machines or equipment using propane should have service aperture fittings that differ from fittings used in equipment or containers using non-flammable refrigerant. “Differ” means that either the diameter differs by at least 1/16 inch or the thread direction is reversed (<i>i.e.</i>, right-handed 06vs. 06left-handed).</p>
				<p>These different fittings should be permanently affixed to the unit at the point of service and maintained until the end-of-life of the unit, and should not be accessed with an adaptor.</p>
Water coolers (new only)	Propane (R-290)	Acceptable, subject to use conditions	<p>As of January 3, 2017: This refrigerant may be used only in new equipment designed specifically and clearly identified for the refrigerant—<i>i.e.</i>, this refrigerant may not be used as</p>	<p>Applicable OSHA requirements at 29 CFR part 1910 must be followed, including those at 29 CFR 1910.94 (ventilation) and 1910.106 (flammable and combustible liquids), 1910.110 (storage and handling of liquefied petroleum gases), 1910.157 (portable fire extinguishers), 05and031910.100004(toxic and hazardous substances).</p>

		<p>a conversion or “retrofit” refrigerant for existing equipment  This refrigerant may be used only in water coolers that meet all requirements listed in Supplement SB to UL 399<sup>1 2 3</sup> In cases where the rule includes requirements more stringent than those of the UL 399, the appliance must meet the requirements of the final rule in place of the requirements in the UL Standard</p>	
		<p>The charge size must not exceed 60 grams (2.12 ounces) per refrigerant circuit in the water cooler  The equipment must have red PMS #185 marked pipes, hoses, or other devices through which the refrigerant passes, to indicate the use of a flammable refrigerant. This color must be applied at all service ports and other parts of the system where service puncturing</p>	<p>Proper ventilation should be maintained at all times during the manufacture and storage of equipment containing hydrocarbon refrigerants through adherence to good manufacturing practices as per 29 CFR 1910.106. If refrigerant levels in the air surrounding the equipment rise above one-fourth of the lower flammability limit, the space should be evacuated and re-entry should occur only after the space has been properly ventilated.</p>



			<p>or other actions creating an opening from the refrigerant circuit to the atmosphere might be expected and must extend a minimum of one (1) inch in both directions from such locations</p> <p>As provided in clauses SB6.1.2 to SB6.1.5 of UL 399, the following markings must be attached at the locations provided and must be permanent:</p> <p>(a) “DANGER—Risk of Fire or Explosion. Flammable Refrigerant Used. Do Not Use Mechanical Devices To Defrost Refrigerator. 04Do 04Not 04Puncture 04Refrigerant 04Tubing.” 04This</p>	
			<p>marking must be provided on or near any evaporators that can be contacted by the consumer</p> <p>(b) “DANGER—Risk of Fire or Explosion. Flammable Refrigerant Used. To Be Repaired</p>	<p>Technicians and equipment manufacturers should wear appropriate personal protective equipment, including chemical goggles and protective gloves, when handling propane. Special care should be taken to avoid contact with the skin since propane, like many refrigerants, can cause freeze burns on the skin.</p>

			Only By Trained Service Personnel. Do Not Puncture Refrigerant Tubing.” This marking must be located near the machine compartment	
			(c) “CAUTION— Risk of Fire or Explosion. Flammable Refrigerant Used. Consult Repair Manual/Owner's Guide Before Attempting To Service This Product. All Safety Precautions Must be Followed.” This marking must be located near the machine compartment	A Class B dry powder type fire extinguisher should be kept nearby. Technicians should only use spark-proof tools when work-
			(d) “CAUTION— Risk of Fire or Explosion. Dispose of Properly In Accordance With Federal Or Local Regulations. Flammable Refrigerant Used.” This marking must be provided on the exterior of the refrigeration equipment	ing on equipment with flammable refrigerants. Any recovery equipment used should be designed for flamm-
			(e) “CAUTION—	mable refrigerants.

			<p>Risk of Fire or Explosion Due To Puncture Of Refrigerant Tubing; Follow Handling Instructions Carefully. Flammable Refrigerant Used.” This marking must be provided near all exposed refrigerant tubing</p>	<p>Any refrigerant releases should be in a well-ventilated area, such as outside of a building. Only technicians specifically trained in handling flammable refrigerants should service equipment containing propane. Technicians should gain an understanding of minimizing the risk of fire and the steps to use flammable refrigerants safely. Room occupants should evacuate the space immediately following the accidental release of this refrigerant. If a service port is added, then water coolers or equipment using propane should have service aperture fittings that differ from fittings used in equipment or containers using non-flammable refrigerant. “Differ” means that either the diameter differs by at least 1/16 inch or the thread direction is reversed (<i>i.e.</i>, right-handed vs. left-handed). 10These 10different</p>
				<p>fittings should be permanently affixed to the unit at the point of service and maintained until the end-of-life of the unit, and should not be accessed with an adaptor.</p>

<sup>1</sup>The Director of the Federal Register approves this incorporation by reference (5 U.S.C. 552(a) and 1 CFR part 51). You may inspect a copy at U.S. EPA's Air and Radiation Docket; EPA West Building, Room 3334, 1301 Constitution Ave. NW., Washington, DC or at the National Archives and Records Administration (NARA). For questions regarding access to these standards, the telephone number of EPA's Air and Radiation Docket is 202-566-1742. For information on the availability of this material at NARA, call 202-741-6030, or go to: [http://www.archives.gov/federal\\_register/code\\_of\\_federal\\_regulations/ibr\\_locations.html](http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html).

<sup>2</sup>You may obtain the material from: Underwriters Laboratories Inc. (UL) COMM 2000; 151 Eastern Avenue, Bensenville, IL 60106; [orders@comm-2000.com](mailto:orders@comm-2000.com); 1- 888-853-3503 in the U.S. or Canada (other countries dial +1-415- 352-2168); <http://ulstandards.ul.com/> or [www.comm-2000.com](http://www.comm-2000.com).

<sup>3</sup>UL 399, Standard for Safety: Drinking Water Coolers.—Supplement SB: Requirements for Drinking Water Coolers Employing a Flammable Refrigerant in the Refrigerating System, 7th edition, Dated August 22, 2008, including revisions through October 17, 2013.

<sup>4</sup>UL 471, Standard for Safety: Commercial Refrigerators and Freezers—Supplement SB: Requirements for Refrigerators and Freezers Employing a Flammable Refrigerant in the Refrigerating System, 10th edition, Dated November 24, 2010.

<sup>5</sup>UL 563, Standard for Safety: Ice Makers.—Supplement SA: Requirements for Ice Makers Employing a Flammable Refrigerant in the Refrigerating System, 8th edition, Dated July 31, 2009, including revisions through November 29, 2013.

**REFRIGERANTS—SUBSTITUTES ACCEPTABLE SUBJECT TO NARROWED USE LIMITS**

<b>End-use</b>	<b>Substitutes</b>	<b>Decision</b>	<b>Narrowed use limits</b>	<b>Further information</b>
Centrifugal chillers (new only)	HFC-134a	Acceptable subject to narrowed use limits	Acceptable after January 1, 2024, only in military marine vessels where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements	Users are required to document and retain the results of their technical investigation of alternatives for the purpose of demonstrating compliance. Information should include descriptions of: <ul style="list-style-type: none"> <li>• Application in which the substitute is needed;</li> <li>• Substitutes examined and rejected;</li> <li>• Reason for rejection of other alternatives, e.g., performance, technical or safety standards; and/or</li> <li>• Anticipated date other substitutes will be available and qualified and projected time for switching.</li> </ul>
Centrifugal chillers (new only)	HFC-134a and R-404A	Acceptable subject to narrowed use limits	Acceptable after January 1, 2024, only in human-rated spacecraft and related support equipment where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements	Users are required to document and retain the results of their technical investigation of alternatives for the purpose of demonstrating compliance. Information should include descriptions of: <ul style="list-style-type: none"> <li>• Application in which the substitute is needed;</li> <li>• Substitutes examined and rejected;</li> </ul>

				<ul style="list-style-type: none"> <li>• Reason for rejection of other alternatives, e.g., performance, technical or safety standards; and/or</li> <li>• Anticipated date other substitutes will be available and qualified and projected time for switching.</li> </ul>
Positive displacement chillers (new only)	HFC-134a	Acceptable subject to narrowed use limits	Acceptable after January 1, 2024, only in military marine vessels where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements	<p>Users are required to document and retain the results of their technical investigation of alternatives for the purpose of demonstrating compliance. Information should include descriptions of:</p> <ul style="list-style-type: none"> <li>• Application in which the substitute is needed;</li> <li>• Substitutes examined and rejected;</li> <li>• Reason for rejection of other alternatives, e.g., performance, technical or safety standards; and/or</li> <li>• Anticipated date other substitutes will be available and qualified and projected time for switching.</li> </ul>
Positive displacement chillers (new only)	HFC-134a and R-404A	Acceptable subject to narrowed use limits	Acceptable after January 1, 2024, only in human-rated spacecraft and related support equipment where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements	<p>Users are required to document and retain the results of their technical investigation of alternatives for the purpose of demonstrating compliance. Information should include descriptions of:</p> <ul style="list-style-type: none"> <li>• Application in which the substitute is needed;</li> <li>• Substitutes examined and rejected;</li> <li>• Reason for rejection of</li> </ul>

				<p>other alternatives, e.g., performance, technical or safety standards; and/or</p> <ul style="list-style-type: none"> <li>• Anticipated date other substitutes will be available and qualified and projected time for switching.</li> </ul>
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**REFRIGERANTS—UNACCEPTABLE SUBSTITUTES**

<b>End-use</b>	<b>Substitutes</b>	<b>Decision</b>	<b>Further information</b>
Centrifugal chillers (new only)	FOR12A, FOR12B, HFC-134a, HFC-227ea, HFC-236fa, HFC-245fa, R-125/134a/600a (28.1/70/1.9), R-125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R-407C, R-410A, R-410B, R-417A, R-421A, R-422B, R-422C, R-422D, R-423A, R-424A, R-434A, R-438A, R-507A, RS-44 (2003 composition), and THR-03	Unacceptable as of January 1, 2024 except where allowed under a narrowed use limit	These refrigerants have GWPs ranging from approximately 900 to 9,810. Other alternatives will be available for this end-use with lower overall risk to human health and the environment by the status change date.
Centrifugal chillers (new only)	Propylene (R-1270) and R-443A	Unacceptable as of January 3, 2017	These refrigerants are highly photochemically reactive in the lower atmosphere and may deteriorate local air quality (that is, may increase ground level ozone). Other alternatives are available for this end-use with lower overall risk to human health and the environment.
Cold storage warehouses (new only)	HFC-227ea, R-125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R-407A, R-407B, R-410A, R-410B, R-417A, R-421A, R-421B, R-422A, R-422B, R-422C, R-422D, R-423A, R-424A, R-428A, R-434A, R-	Unacceptable as of January 1, 2023	These refrigerants have GWPs ranging from approximately 2,090 to 3,990. Other alternatives will be available for this end-use with lower overall risk to human health and

	438A, R-507A, and RS-44 (2003 composition)		the environment by the status change date.
Cold storage warehouses (new only)	Propylene (R-1270) and R-443A	Unacceptable as of January 3, 2017	These refrigerants are highly photochemically reactive in the lower atmosphere and may deteriorate local air quality (that is, may increase ground level ozone). Other alternatives are available for this end-use with lower overall risk to human health and the environment.
Household refrigerators and freezers (new only)	FOR12A, FOR12B, HFC-134a, KDD6, R-125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R-407C, R-407F, R-410A, R-410B, R-417A, R-421A, R-421B, R-422A, R-422B, R-422C, R-422D, R-424A, R-426A, R-428A, R-434A, R-437A, R-438A, R-507A, RS-24 (2002 formulation), RS-44 (2003 formulation), SP34E, and THR-03	Unacceptable as of January 1, 2021	These refrigerants have GWPs ranging from approximately 900 to 3,985. Other alternatives will be available for this end-use with lower overall risk to human health and the environment by the status change date.
Positive displacement chillers (new only)	FOR12A, FOR12B, HFC-134a, HFC-227ea, KDD6, R-125/134a/600a (28.1/70/1.9), R-125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R-407C, R-410A, R-410B, R-417A, R-421A, R-422B, R-422C, R-422D, R-424A, R-434A, R-437A, R-438A, R-507A, RS-44 (2003 composition), SP34E, and THR-03	Unacceptable as of January 1, 2024 except where allowed under a narrowed use limit	These refrigerants have GWPs ranging from approximately 900 to 3,985. Other alternatives will be available for this end-use with lower overall risk to human health and the environment by the status change date.
Positive displacement chillers (new only)	Propylene (R-1270) and R-443A	Unacceptable as of January 3, 2017	These refrigerants are highly photochemically reactive in the lower atmosphere and may deteriorate local air quality (that is, may increase

			ground level ozone). Other alternatives are available for this end-use with lower overall risk to human health and the environment.
Residential and light commercial air conditioning and heat pumps (new only)	Propylene (R-1270) and R-443A	Unacceptable as of January 3, 2017	These refrigerants are highly photochemically reactive in the lower atmosphere and may deteriorate local air quality (that is, may increase ground level ozone). Other alternatives are available for this end-use with lower overall risk to human health and the environment.
Residential and light commercial air conditioning—unitary split AC systems and heat pumps (retrofit only)	All refrigerants identified as flammability Class 3 in ANSI/ASHRAE Standard 34-2013 <sup>1 2 3</sup> All refrigerants meeting the criteria for flammability Class 3 in ANSI/ASHRAE Standard 34-2013. This includes, but is not limited to, refrigerant products sold under the names R-22a, 22a, Blue Sky 22a refrigerant, Coolant Express 22a, DURACOOOL-22a, EC-22, Ecofreeez EF-22a, Envirosafe 22a, ES-22a, Frost 22a, HC-22a, Maxi-Fridge, MX-22a, Oz-Chill 22a, Priority Cool, and RED TEK 22a	Unacceptable as of January 3, 2017	These refrigerants are highly flammable and present a flammability risk when used in equipment designed for nonflammable refrigerants. Other alternatives are available for this end-use with lower overall risk to human health and the environment.
Retail food refrigeration (refrigerated food processing and dispensing equipment) (new only)	HFC-227ea, KDD6, R-125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R-407A, R-407B, R-407C, R-407F, R-410A, R-410B, R-417A, R-421A, R-421B, R-422A, R-422B, R-422C, R-422D, R-424A, R-428A, R-	Unacceptable as of January 1, 2021	These refrigerants have GWPs ranging from approximately 1,770 to 3,990. Other alternatives will be available for this end-use with lower overall risk to human health and



	434A, R-437A, R-438A, R-507A, RS-44 (2003 formulation)		the environment by the status change date.
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<sup>1</sup>The Director of the Federal Register approves this incorporation by reference (5 U.S.C. 552(a) and 1 CFR part 51). You may inspect a copy at U.S. EPA's Air and Radiation Docket; EPA West Building, Room 3334, 1301 Constitution Ave. NW., Washington, DC or at the National Archives and Records Administration (NARA). For questions regarding access to this standard, the telephone number of EPA's Air and Radiation Docket is 202-566-1742. For information on the availability of this material at NARA, call 202-741-6030, or go to: [http://www.archives.gov/federal\\_register/code\\_of\\_federal\\_regulations/ibr\\_locations.html](http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html).

<sup>2</sup>You may obtain this material from: American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) 6300 Interfirst Drive, Ann Arbor, MI 48108; 1-800-527-4723 in the U.S. or Canada; [http://www.techstreet.com/ashrae/ashrae\\_standards.html?ashrae\\_auth\\_token=](http://www.techstreet.com/ashrae/ashrae_standards.html?ashrae_auth_token=).

<sup>3</sup>ANSI/ASHRAE Standard 34-2013, Designation and Safety Classification of Refrigerants, 2013.

**FOAM BLOWING AGENTS—SUBSTITUTES ACCEPTABLE SUBJECT TO NARROWED USE LIMITS**

<b>End-use</b>	<b>Substitutes</b>	<b>Decision</b>	<b>Narrowed use limits</b>	<b>Further information</b>
Rigid PU: Spray foam—high-pressure two-component	HFC-134a, HFC-245fa, and blends thereof; blends of HFC-365mfc with at least four percent HFC-245fa, and commercial blends of HFC-365mfc with seven to 13 percent HFC-227ea and the remainder HFC-365mfc; and Formacel TI	Acceptable subject to narrowed use limits	Acceptable from January 1, 2020, until January 1, 2025, only in military or space- and aeronautics-related applications where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements Closed cell foam products and products containing closed cell foams manufactured with these substitutes on or before January 1, 2025, may be used after that date	Users are required to document and retain the results of their technical investigation of alternatives for the purpose of demonstrating compliance. Information should include descriptions of: <ul style="list-style-type: none"> <li>• Process or product in which the substitute is needed;</li> <li>• Substitutes examined and rejected;</li> <li>• Reason for rejection of other alternatives, e.g., performance, technical or safety standards; and/or</li> </ul>

				<ul style="list-style-type: none"> <li>Anticipated date other substitutes will be available and projected time for switching.</li> </ul>
Rigid PU: Spray foam—low-pressure two-component	HFC-134a, HFC-245fa, and blends thereof; blends of HFC-365mfc with at least four percent HFC-245fa, and commercial blends of HFC-365mfc with seven to 13 percent HFC-227ea and the remainder HFC-365mfc; and Formacel TI	Acceptable subject to narrowed use limits	<p>Acceptable from January 1, 2021, until January 1, 2025, only in military or space- and aeronautics-related applications where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements</p> <p>Low pressure two-component spray foam kits manufactured with these substitutes on or before January 1, 2025, for military or space- and aeronautics-related applications may be used after that date</p>	<p>Users are required to document and retain the results of their technical investigation of alternatives for the purpose of demonstrating compliance. Information should include descriptions of:</p> <ul style="list-style-type: none"> <li>Process or product in which the substitute is needed;</li> <li>Substitutes examined and rejected;</li> <li>Reason for rejection of other alternatives, e.g., performance, technical or safety standards; and/or</li> <li>Anticipated date other substitutes will be available and projected time for switching.</li> </ul>

**FOAM BLOWING AGENTS—UNACCEPTABLE SUBSTITUTES**

<b>End-use</b>	<b>Substitutes</b>	<b>Decision</b>	<b>Further information</b>
Flexible PU	Methylene chloride	Unacceptable as of January 3, 2017	Methylene chloride is a carcinogen and may present a toxicity risk. Other alternatives are available for this end-use with lower overall risk to human health and the environment.

Rigid PU: Spray foam—one component foam sealants	HFC-134a, HFC-245fa, and blends thereof; blends of HFC-365mfc with at least four percent HFC-245fa, and commercial blends of HFC-365mfc with seven to 13 percent HFC-227ea and the remainder HFC- 365mfc; and Formacel TI	Unacceptable as of January 1, 2020 One-component foam sealant cans manufactured with these substitutes on or before January 1, 2020, may be used after that date	These foam blowing agents have GWPs ranging from higher than 730 to approximately 1,500. Other alternatives will be available for this end-use with lower overall risk to human health and the environment by the status change date.
Rigid PU: Spray foam—high- pressure two- component	HFC-134a, HFC-245fa, and blends thereof; blends of HFC-365mfc with at least four percent HFC-245fa, and commercial blends of HFC-365mfc with seven to 13 percent HFC-227ea and the remainder HFC- 365mfc; and Formacel TI	Unacceptable as of January 1, 2020, except where allowed under a narrowed use limit. Closed cell foam products and products containing closed cell foams manufactured with these substitutes on or before January 1, 2020, may be used after that date	These foam blowing agents have GWPs ranging from higher than 730 to approximately 1,500. Other alternatives will be available for this end-use with lower overall risk to human health and the environment by the status change date.
Rigid PU: Spray foam—low- pressure two- component	HFC-134a, HFC-245fa, and blends thereof; blends of HFC-365mfc with at least four percent HFC-245fa, and commercial blends of HFC-365mfc with seven to 13 percent HFC-227ea and the remainder HFC- 365mfc; and Formacel TI	Unacceptable as of January 1, 2021, except where allowed under a narrowed use limit Low pressure two- component spray foam kits manufactured with these substitutes on or before January 1, 2025, may be used after that date	These foam blowing agents have GWPs ranging from higher than 730 to approximately 1,500. Other alternatives will be available for this end-use with lower overall risk to human health and the environment by the status change date.

**FIRE SUPPRESSION AND EXPLOSION PROTECTION AGENTS—ACCEPTABLE SUBJECT TO USE  
CONDITIONS**

<b>End-use</b>	<b>Substitute</b>	<b>Decision</b>	<b>Use conditions</b>	<b>Further information</b>
Streaming	2-BTP	Acceptable, subject to use conditions	As of January 3, 2017, acceptable only for use in handheld extinguishers in aircraft	This fire suppressant has a relatively low GWP of 0.23-0.26 and a short atmospheric lifetime of approximately seven days. This agent is subject to requirements contained in a Toxic Substance Control Act (TSCA) section 5(e) Consent Order and any subsequent TSCA section 5(a)(2) Significant New Use Rule

				<p>(SNUR).</p> <p>For establishments manufacturing, installing and maintaining handheld extinguishers using this agent:</p> <p>(1) Use of this agent should be used in accordance with the latest edition of NFPA Standard 10 for Portable Fire Extinguishers;</p> <p>(2) In the case that 2-BTP is inhaled, person(s) should be immediately removed and exposed to fresh air; if breathing is difficult, person(s) should seek medical attention;</p> <p>(3) Eye wash and quick drench facilities should be available. In case of ocular exposure, person(s) should immediately flush the eyes, including under the eyelids, with fresh water and move to a non-contaminated area;</p> <p>(4) Exposed person(s) should remove all contaminated clothing and footwear to avoid irritation, and medical attention should be sought if irritation develops or persists;</p> <p>(5) Although unlikely, in case of ingestion of 2-BTP, the person(s) should consult a physician immediately;</p> <p>(6) Manufacturing space should be equipped with specialized engineering controls and well ventilated with a local exhaust system and low-lying source ventilation to effectively mitigate potential occupational exposure; regular testing and monitoring of the workplace atmosphere should be conducted;</p> <p>(7) Employees responsible for chemical processing should wear the appropriate PPE, such as protective gloves, tightly sealed goggles, protective work clothing, and suitable respiratory protection in case of accidental release or insufficient ventilation;</p> <p>(8) All spills should be cleaned up immediately in accordance with good</p>
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				<p>industrial hygiene practices; and</p> <p>(9) Training for safe handling procedures should be provided to all employees that would be likely to handle containers of the agent or extinguishing units filled with the agent.</p>
Total flooding	2-BTP	Acceptable, subject to use conditions	As of January 3, 2017, acceptable only for use in engine nacelles and auxiliary power units on aircraft	<p>This fire suppressant has a relatively low GWP of 0.23-0.26 and a short atmospheric lifetime of approximately seven days.</p> <p>This agent is subject to requirements contained in a TSCA section 5(e) Consent Order and any subsequent TSCA section 5(a)(2) SNUR.</p> <p>For establishments manufacturing, installing, and servicing engine nacelles and auxiliary power units on aircraft using this agent:</p> <p>(1) This agent should be used in accordance with the safety guidelines in the latest edition of the National Fire Protection Association (NFPA) 2001 Standard for Clean Agent Fire Extinguishing Systems;</p> <p>(2) In the case that 2-BTP is inhaled, person(s) should be immediately removed and exposed to fresh air; if breathing is difficult, person(s) should seek medical attention;</p> <p>(3) Eye wash and quick drench facilities should be available. In case of ocular exposure, person(s) should immediately flush the eyes, including under the eyelids, with fresh water and move to a non-contaminated area.</p> <p>(4) Exposed person(s) should remove all contaminated clothing and footwear to avoid irritation, and medical attention should be sought if irritation develops or persists;</p> <p>(5) Although unlikely, in case of ingestion of 2-BTP, the person(s) should consult a physician immediately;</p>

				<p>(6) Manufacturing space should be equipped with specialized engineering controls and well ventilated with a local exhaust system and low-lying source ventilation to effectively mitigate potential occupational exposure; regular testing and monitoring of the workplace atmosphere should be conducted;</p> <p>(7) Employees responsible for chemical processing should wear the appropriate PPE, such as protective gloves, tightly sealed goggles, protective work clothing, and suitable respiratory protection in case of accidental release or insufficient ventilation;</p> <p>(8) All spills should be cleaned up immediately in accordance with good industrial hygiene practices;</p> <p>(9) Training for safe handling procedures should be provided to all employees that would be likely to handle containers of the agent or extinguishing units filled with the agent;</p> <p>(10) Safety features that are typical of total flooding systems such as pre-discharge alarms, time delays, and system abort switches should be provided, as directed by applicable OSHA regulations and NFPA standards; use of this agent should also conform to relevant OSHA requirements, including 29 CFR 1910, subpart L, sections 1910.160 and 1910.162.</p>
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Attachment 6  
NRDC Comments on the Straw Man

Gary Graham  
Office of Regulatory Affairs  
Virginia Department of Environmental Quality  
1111 East Main Street, Suite 1400  
Richmond, Virginia 23218

March 12, 2021

Dear Mr. Graham,

The Natural Resources Defense Council (NRDC) appreciates the opportunity to contribute to the HFC XPS Boardstock Manufacturer Compliance Date Work Group. This rule is critical to reducing emissions of climate pollutants in Virginia.

We applaud DEQ for the proposed rule language. The language reflects areas of general agreement reached during the two previous Work Group meetings and addresses several of the issues that were discussed among the participating stakeholders. We would like to offer a few modifications to ensure clarity and uniformity with the actions of other states and the U.S. Environmental Protection Agency (EPA).

First, the prohibitions under the “Compliance” section (9VAC5-145-120) come into effect on January 1, 2022 independent of the end-use. We encourage you to establish effective dates differentiated by end-use, closely mirroring the U.S. Environmental Protection Agency’s (EPA) Significant New Alternatives Policy (SNAP) Rules 20 and 21. For those end-uses for which the effective dates in the SNAP rules are already in the past, we encourage you to adopt a January 1, 2022 effective date in Virginia at the latest. For the end-uses with future effective dates in the EPA SNAP rules, we encourage you to align Virginia’s schedule with those dates outlined in the SNAP rules. Please see *Appendix A* for more detail.

Subsequently, we urge you to effectuate subsections B. and C. of 9VAC5-145-100 based on the differentiated effective date of the prohibitions.

Lastly, we urge you to expand the definition of “manufacturer” to include entities that make products and equipment that use HFCs, in addition to the HFC manufacturers.

We have included the suggested modifications as redline.

Sincerely,

Christina Theodoridi

Technical Analyst  
Natural Resources Defense Council  
ctheodoridi@nrdc.org



Appendix A

End-use	Prohibited Substances in SNAP Rules 20 & 21	Proposed effective date
<b>Aerosol Products</b>		
Propellants	HFC-125, HFC-134a, HFC-227ea and blends of HFC-227ea and HFC-134a	January 1, 2022
<b>Foam Blowing Agents</b>		
Rigid Polyurethane (PU) and Polyisocyanurate Laminated Boardstock	HFC-134a, HFC-245fa, HFC-365mfc and blends thereof	January 1, 2022
Rigid Polyurethane Slabstock and Other	HFC-134a, HFC-245fa, HFC-365mfc and blends thereof; Formacel TI, and Formacel Z-6	January 1, 2022
Rigid Polyurethane Appliance Foam	HFC-134a, HFC-245fa, HFC-365mfc and blends thereof; Formacel TI, and Formacel Z-6	January 1, 2022
Rigid Polyurethane Commercial Refrigeration and Sandwich Panels	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, and Formacel Z-6	January 1, 2022
Rigid Polyurethane Marine Flotation Foam	HFC-134a, HFC-245fa, HFC-365mfc and blends thereof; Formacel TI, and Formacel Z-6	January 1, 2022
Rigid PU high-pressure two-component spray foam	HFC-134a, HFC-245fa, and blends thereof; blends of HFC-365mfc with at least four percent HFC-245fa, and commercial blends of HFC-365mfc with 7 to 13 percent HFC-227ea and the remainder HFC-365mfc; and Formacel TI	January 1, 2022
Rigid PU one-component foam sealants	HFC-134a, HFC-245fa, and blends thereof; blends of HFC-365mfc with at least four percent HFC-245fa, and commercial blends of HFC-365mfc with 7 to 13 percent HFC-227ea and the remainder HFC-365mfc; and Formacel TI	January 1, 2022
Flexible Polyurethane	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof	January 1, 2022
Integral Skin Polyurethane	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, and Formacel Z-6	January 1, 2022
Flexible PU foam	Methylene chloride	January 1, 2022
Polystyrene Extruded Sheet	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, and Formacel Z-6	January 1, 2022
Polystyrene Extruded Boardstock and Billet (XPS)	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, Formacel B, and Formacel Z-6	January 1, 2022
Polyolefin	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, Formacel Z-6	January 1, 2022

Phenolic Insulation Board and Bunstock	HFC-143a, HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof	January 1, 2022
Rigid PU low-pressure two-component spray foam	HFC-134a, HFC-245fa, and blends thereof; blends of HFC-365mfc with at least four percent HFC-245fa, and commercial blends of HFC-365mfc with 7 to 13 percent HFC-227ea and the remainder HFC-365mfc; and Formacel TI	January 1, 2022
<b>Food Refrigeration Equipment</b>		
Supermarket Systems (New)	HFC-227ea, R-404A, R-407B, R-421B, R-422A, R-422C, R-422D, R-428A, R-434A, R-507A	January 1, 2022
Supermarket Systems (Retrofit)	R-404A, R-407B, R-421B, R-422A, R-422C, R-422D, R-428A, R-434A, R-507A	January 1, 2022
Remote Condensing Units (New)	HFC-227ea, R-404A, R-407B, R-421B, R-422A, R-422C, R-422D, R-428A, R-434A, R-507A	January 1, 2022
Remote Condensing Units (Retrofit)	R-404A, R-407B, R-421B, R-422A, R-422C, R-422D, R-428A, R-434A, R-507A	January 1, 2022
Stand-Alone Units (Retrofit)	R-404A, R-507A	January 1, 2022
Stand-Alone Medium-Temperature Units with a compressor capacity <u>below</u> 2,200 Btu/hour and not containing a flooded evaporator (New)	FOR12A, FOR12B, HFC-134a, HFC-227ea, KDD6, R-125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R-407A, R-407B, R-407C, R-407F, R-410A, R-410B, R-417A, R-421A, R-421B, R-422A, R-422B, R-422C, R-422D, R-424A, R-426A, R-428A, R-434A, R-437A, R-438A, R-507A, RS-24 (2002 formulation), RS-44 (2003 formulation), SP34E, THR-03	January 1, 2022
Stand-Alone Medium-Temperature Units with a compressor capacity <u>equal to or greater than</u> 2,200 Btu/hour and Stand-Alone Medium-Temperature Units containing a flooded evaporator (New)	FOR12A, FOR12B, HFC-134a, HFC-227ea, KDD6, R-125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R-407A, R-407B, R-407C, R-407F, R-410A, R-410B, R-417A, R-421A, R-421B, R-422A, R-422B, R-422C, R-422D, R-424A, R-426A, R-428A, R-434A, R-437A, R-438A, R-507A, RS-24 (2002 formulation), RS-44 (2003 formulation), SP34E, THR-03	January 1, 2022
Stand-Alone Low-Temperature Units (New)	HFC-227ea, KDD6, R-125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R-407A, R-407B, R-407C, R-407F, R-410A, R-410B, R-417A, R-421A, R-421B, R-422A, R-422B, R-422C, R-422D, R-424A, R-428A, R-434A, R-437A, R-438A, R-507A, RS-44 (2003 formulation)	January 1, 2022

Vending Machines (New)	FOR12A, FOR12B, HFC-134a, KDD6, R-125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R-407C, R-410A, R-410B, R-417A, R-421A, R-422B, R-422C, R-422D, R-426A, R-437A, R-438A, R-507A, RS-24 (2002 formulation), SP34E	January 1, 2022
Vending Machines (Retrofit)	R-404A, R-507A	January 1, 2022
Retail food refrigeration – refrigerated food processing and dispensing equipment (new)	HFC-227ea, KDD6, R-125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R-407A, R-407B, R-407C, R-407F, R-410A, R-410B, R-417A, R-421A, R-421B, R-422A, R-422B, R-422C, R-422D, R-424A, R-428A, R-434A, R-437A, R-438A, R-507A, RS-44 (2003 formulation)	January 1, 2022
Household refrigerators and freezers - non-compact or built-in appliances (new)	FOR12A, FOR12B, HFC-134a, KDD6, R-125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R-407C, R-407F, R-410A, R-410B, R-417A, R-421A, R-421B, R-422A, R-422B, R-422C, R-422D, R-424A, R-426A, R-428A, R-434A, R-437A, R-438A, R-507A, RS-24 (2002 formulation), RS-44 (2003 formulation), SP34E, and THR-03	January 1, 2022
Household refrigerators and freezers—compact (new)	FOR12A, FOR12B, HFC-134a, KDD6, R-125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R-407C, R-407F, R-410A, R-410B, R-417A, R-421A, R-421B, R-422A, R-422B, R-422C, R-422D, R-424A, R-426A, R-428A, R-434A, R-437A, R-438A, R-507A, RS-24 (2002 formulation), RS-44 (2003 formulation), SP34E, and THR-03	January 1, 2022
Household refrigerators and freezers—built in appliances (new)	FOR12A, FOR12B, HFC-134a, KDD6, R-125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R-407C, R-407F, R-410A, R-410B, R-417A, R-421A, R-421B, R-422A, R-422B, R-422C, R-422D, R-424A, R-426A, R-428A, R-434A, R-437A, R-438A, R-507A, RS-24 (2002 formulation), RS-44 (2003 formulation), SP34E, and THR-03	January 1, 2023
Cold storage warehouses (new)	HFC-227ea, R-125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R-407A, R-407B, R-410A, R-410B, R-417A, R-421A, R-421B, R-422A, R-422B, R-422C, R-422D, R-423A, R-424A, R-428A, R-434A, R-438A, R-507A, and RS-44 (2003 composition)	January 1, 2023
<b>Stationary Air Conditioning Equipment</b>		
Centrifugal chillers (new)	FOR12A, FOR12B, HFC-134a, HFC-227ea, HFC-236fa, HFC-245fa, R-125/134a/600a	January 1, 2024

	(28.1/70/1.9), R-125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R-407C, R-410A, R-410B, R-417A, R-421A, R-422B, R-422C, R-422D, R-423A, R-424A, R-434A, R-438A, R-507A, RS-44 (2003 composition), and THR-03	
Positive displacement chillers (new)	FOR12A, FOR12B, HFC-134a, HFC-227ea, KDD6, R-125/134a/600a (28.1/70/1.9), R-125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R-407C, R-410A, R-410B, R-417A, R-421A, R-422B, R-422C, R-422D, R-424A, R-434A, R-437A, R-438A, R-507A, RS-44 (2003 composition), SP34E, and THR-03	January 1, 2024

Attachment 7

NRDC Recommended Edits to the Straw Man

COMMONWEALTH OF VIRGINIA  
STATE AIR POLLUTION CONTROL BOARD  
REGULATIONS FOR THE CONTROL AND ABATEMENT OF AIR POLLUTION

9VAC5 CHAPTER 145  
REGULATION FOR CONTROL OF GREENHOUSE GASES

Article 1

Prohibitions on Use of Certain Hydrofluorocarbons in Specific End-Uses

9VAC5-145-100. Applicability, prohibitions, and exemptions.

9VAC5-145-110. Definitions.

9VAC5-145-120. Compliance.

9VAC5-145-130. Special provisions applicable to extruded polystyrene boardstock and billet manufacturers.

9VAC5-145-140. Labeling and administrative requirements.

9VAC5-145-150. Records and reporting.

9VAC5-145-9999. Documents incorporated by reference.

9VAC5-145-100. Applicability, prohibitions, and exemptions.

A. The sale, lease, rent, installation or entry into commerce in the Commonwealth of Virginia by any person of any products or equipment that use or will use hydrofluorocarbons for the applications and end uses restricted by Appendix U and Appendix V of Subpart G of 40 CFR Part 82, as those read on January 3, 2017, is prohibited after the effective date specified in 9VAC5-145-120.

B. Except where an existing system is retrofitted, nothing in this article requires a person that acquired prior to **the effective date of the restrictions specified in 9VAC5-145-120**, a product or equipment containing a substance prohibited under this article, to cease use of that product or equipment.

C. The prohibitions of this article do not apply to products or equipment in specific applications and end-uses restricted by Appendix U and Appendix V of Subpart G of 40 CFR Part 82, as those read on January 3, 2017 that were manufactured prior to **the effective date of the restrictions specified in 9VAC5-145-120**.

D. Notwithstanding subsection A of this section, the uses of **hydrofluorocarbons** specified in subdivisions 1 and 2 of this subsection are exempt from the prohibitions for the applications and end uses restricted by Appendix U and Appendix V of Subpart G of 40 CFR Part 82, as those read on January 3, 2017.

1. This article does not restrict the use of hydrofluorocarbons in the manufacturing process by extruded polystyrene boardstock and billet manufacturers located in the Commonwealth of Virginia to produce products for sale and distribution outside of the Commonwealth, as long as the manufacturer and the distributors of that product can demonstrate

(i) that the extruded polystyrene boardstock or billet product is intended for distribution and sale, lease, rental, installation, or entry into commerce outside of the Commonwealth of Virginia, and (ii) that the manufacturer and distributors have taken reasonable precautions to assure that the extruded polystyrene boardstock or billet product is not distributed within the Commonwealth for sale, lease, rental, installation, or entry into commerce. This exemption does not apply to extruded polystyrene boardstock or billet products that are sold, leased, rented, installed, or otherwise entered into commerce by any person to retail outlets within the Commonwealth. This exemption shall expire on the date specified in 9VAC5-145-130 B.

2. This article does not restrict the management or use of a regulated substance for which the Administrator of the U. S. Environmental Protection Agency has provided a mandatory allocation of allowances pursuant to subdivision (e)(4)(B)(iv)(I) of the American Innovation and Manufacturing Act of 2020 (Section 103 of Division S of H.R. 133, Consolidated Appropriations Act, 2021) for the exclusive use in applications solely for:

- a. A propellant in metered dose inhalers;
- b. Defense sprays;
- c. Structural composite preformed polyurethane foam for marine use and trailer use;
- d. The etching of semiconductor material or wafers and the cleaning of chemical vapor deposition chambers within the semiconductor manufacturing sector;
- e. Mission-critical military end uses, such as armored vehicle engine and shipyard fire suppression systems and systems used in deployable and expeditionary applications; and
- f. Onboard aerospace fire suppression.

3. The exemption in subdivision 2 of this subsection shall expire on December 28, 2025 or, in the event the Administrator of the U.S. Environmental Protection Agency has extended providing the allocation of allowances for certain essential uses pursuant to subdivision (e)(4)(B)(v)(II) of the American Innovation and Manufacturing Act of 2020 (Section 103 of Division S of H.R. 133, Consolidated Appropriations Act, 2021), to the date that extension ends, whichever is later.

E. The provisions of this article apply throughout the Commonwealth of Virginia.

9VAC5-145-110. Definitions.

A. For the purpose of applying this article and the prohibitions on hydrofluorocarbons for the applications and end uses restricted by Appendix U and Appendix V of Subpart G of 40 CFR Part 82, as those read on January 3, 2017, the words or terms shall have the meanings given them in subsection C of this section.

B. As used in this article, all terms not defined herein shall have the meanings given them in 9VAC5-10 (General Definitions) unless otherwise required by context.

C. Terms defined.

“Application” means a specific use within a major industrial sector end-use.

“Aerosol propellant” means a liquefied or compressed gas, used in whole or in part, such as a cosolvent, to expel a liquid or other material from the same self-pressurized container or from a separate container.

“Air conditioning equipment” means chillers, both centrifugal chillers and positive displacement chillers, intended for comfort cooling of occupied spaces.

“Bunstock” means a large solid block-like structure formed during the production of polyurethane, polyisocyanurate, phenolic, or polystyrene insulation.

“Capital cost” means an expense incurred in the production of goods or in rendering services, including but not limited to the cost of engineering, purchase, and installation of components or systems, and instrumentation; and contractor and construction fees.

“Class I substance” means any ozone-depleting compound defined in the Clean Air Act, as amended, 42 U.S.C. § 7671(3) (effective November 15, 1990).

“Class II substance” means any ozone-depleting compound defined in the Clean Air Act, as amended, 42 U.S.C. § 7671(4) (effective November 15, 1990).

“Centrifugal chiller” means air conditioning equipment that utilizes a centrifugal compressor in a vapor-compression refrigeration cycle typically used for commercial comfort air conditioning, but not for cooling for industrial process cooling and refrigeration.

“Cold storage warehouse” means a cooled facility designed to store meat, produce, dairy products, and other products delivered to other locations for sale to the ultimate consumer.

“Component” means a part of a refrigeration system, including but not limited to condensing units, compressors, condensers, evaporators, and receivers; and all of its connections and subassemblies, without which the refrigeration system will not properly function or will be subject to failures.

“Cumulatively replaced” means the addition of or change in multiple components within a 3-year period.

“Effective date” means the date after which new or retrofit equipment or products are prohibited, where applicable.

“End-use” means processes or classes of specific applications within industry sectors listed in Appendix U and Appendix V of Subpart G of 40 C.F.R. Part 82, as those read on January 3, 2017.

“Flexible polyurethane” means a non-rigid synthetic foam containing polymers created by the reaction of isocyanate and polyol, including that used in furniture, bedding, and chair cushions.

“Foam” means a product with a cellular structure formed via a foaming process in a variety of materials that undergo hardening via a chemical reaction or phase transition.

“Foam blowing agent” means substance that functions as a source of gas to generate bubbles or cells in the mixture during the formation of foam.

“Foam system” means a multipart liquid material that expands when mixed to form a solid or flexible substance in which thin films of material separate pockets of gas.

“Greenhouse gases” means, for the purposes of this article, the aggregate group of the following gases: carbon dioxide, nitrous oxide, methane, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.

“Household refrigerators and freezers” means refrigerators, refrigerator-freezers, freezers, and miscellaneous household refrigeration appliances intended for residential use. For the purposes of this article, the definition of household refrigerators and freezers does not include household refrigerators and freezers – compact, or household refrigerators and freezers – built-in.

“Household refrigerators and freezers – built-in” means refrigerators, refrigerator-freezers, and freezers intended for residential use with 7.75 cubic feet or greater total volume and 24 inches or less depth not including doors, handles, and custom front panels; with sides that are not finished and not designed to be visible after installation; and designed, intended, and marketed exclusively to be installed totally encased by cabinetry or panels that are attached during installation and securely fastened to adjacent cabinetry, walls or floor; and equipped with an integral factory-finished face or to accept a custom front panel.

“Household refrigerators and freezers - compact” means refrigerators, refrigerator-freezers, and freezers intended for residential use with a total refrigerated volume of less than 7.75 cubic feet (220 liters).

“Hydrofluorocarbon” or “HFC” means a class of greenhouse gases that are saturated organic compounds containing hydrogen, fluorine, and carbon.

“Integral skin polyurethane” means a synthetic self-skinning foam containing polyurethane polymers formed by the reaction of an isocyanate and a polyol, including but not limited to those used in car steering wheels and dashboards.

**"Manufacturer" means any person, firm, association, partnership, corporation, governmental entity, organization, or joint venture that produces any product that contains or uses hydrofluorocarbons or is an importer or domestic distributor of such a product.**

“Metered dose inhaler” or “MDI” means a device that delivers a measured amount of medication as a mist that a patient can inhale, typically used for bronchodilation to treat symptoms of asthma, chronic obstructive pulmonary disease (COPD), chronic bronchitis, emphysema, and other respiratory illnesses. An MDI consists of a pressurized canister of medication in a case with a mouthpiece.

"Mixture" means any mixture or blend of two or more compounds.

“New” means:

- (a) Products or equipment that are manufactured after the effective date of this article;
- (b) Products or equipment that are first installed for an intended purpose with new or used components;



(c) Products or equipment that are expanded by the addition of components to increase system capacity after the effective date of this chapter; or

(d) Products or equipment replaced or cumulatively replaced such that the cumulative capital cost after the effective date of this chapter of replacement exceeds 50% of the capital cost of replacing the whole system.

“Phenolic insulation board” means boards, blocks or other shapes fabricated with phenolic foam.

“Polyolefin” means the foam sheets and tubes made of polyolefin, a macromolecule formed by the polymerization of olefin monomer units.

“Polystyrene extruded boardstock and billet” means a foam formed from predominantly styrene monomer and produced on extruding machines in the form of continuous foam slabs that can be cut and shaped into panels and used for roofing, walls, flooring, and pipes.

“Polystyrene extruded sheet” means polystyrene foam including that used for packaging, buoyancy or floatation and food-service items such as hinged polystyrene containers (for take-out from restaurants), food trays (meat and poultry) plates, bowls, and retail egg containers.

“Polyurethane” means a polymer formed principally by the reaction of an isocyanate and a polyol, including but not limited to polyisocyanurate (polyiso).

“Positive displacement chiller” means vapor compression cycle chillers that use positive displacement compressors, and are typically used for commercial comfort air conditioning. For the purpose of this article, positive displacement chiller does not include cooling for industrial process cooling and refrigeration.

“Refrigerant” or “refrigerant gas” means any substance, including blends and mixtures, which is used for heat transfer purposes.

“Refrigerated food processing and dispensing equipment” means retail food refrigeration equipment that is designed to process and dispense food and beverages that are intended for immediate or near-immediate consumption, including but not limited to chilled and frozen beverages, ice cream, and whipped cream. This end-use excludes water coolers and units designed solely to cool and dispense water.

“Refrigeration equipment” means any stationary device that is designed to contain and use refrigerant gas to establish or maintain colder than ambient temperatures in a confined space, including but not limited to retail or commercial refrigeration equipment, household refrigerators and freezers, and cold storage warehouses.

“Remote condensing units” means retail refrigeration equipment or units that have a central condensing portion and may consist of one or more compressors, condensers, and receivers assembled into a single unit, which may be located external to the sales area. The condensing portion (and often other parts of the system) is located outside the space or area cooled by the evaporator. Remote condensing units are commonly installed in convenience stores, specialty shops (e.g., bakeries, butcher shops), supermarkets, restaurants, and other locations where food is stored, served, or sold.

“Residential use” means use by a private individual of a substance, or a product containing the substance, in or around a permanent or temporary household, during recreation, or for any personal use or enjoyment. Use within a household for commercial or medical applications is not residential use, nor is use in automobiles, watercraft, or aircraft.

“Retail food refrigeration” or “commercial refrigeration” means equipment designed to store and display chilled or frozen goods for commercial sale including but not limited to stand-alone units, refrigerated food processing and dispensing equipment, remote condensing units, supermarket systems, and vending machines.

“Retrofit” means the replacement of the refrigerant used in refrigeration equipment with a different refrigerant, and any related changes to the refrigeration equipment required to maintain its operation and reliability following refrigerant replacement.

“Rigid polyurethane and polyisocyanurate laminated boardstock” means laminated board insulation made with polyurethane or polyisocyanurate foam, including that used for roofing and walls but not including rigid polyurethane appliance foam, rigid polyurethane commercial refrigeration and sandwich panels, rigid polyurethane marine flotation foam, rigid polyurethane spray foam, and rigid polyurethane one-component foam sealants.

“Rigid polyurethane appliance foam” means polyurethane insulation foam in household appliances.

“Rigid polyurethane commercial refrigeration and sandwich panels” means polyurethane foam, used to provide insulation in walls and doors, including that used for commercial refrigeration equipment, and used in doors, including garage doors.

“Rigid polyurethane high-pressure two-component spray foam” means a liquid polyurethane foam system sold as two parts (i.e., A-side and B-side) in non-pressurized containers that is field or factory applied in situ using high-pressure proportioning pumps at 800-1600 pounds per square inch (psi) and an application gun to mix and dispense the chemical components.

“Rigid Polyurethane low-pressure two-component spray foam” means a liquid polyurethane foam system sold as two parts (i.e. A-side and B-side) in containers that are pressurized to less than 250 psi during manufacture of the system for application without pumps; and are typically applied in situ relying upon a liquid blowing agent or gaseous foam blowing agent that also serves as a propellant.

“Rigid polyurethane marine flotation foam” means buoyancy or flotation polyurethane foam used in boat and ship manufacturing for both structural and flotation purposes.

“Rigid polyurethane one-component foam” means a polyurethane foam generally packaged in aerosol cans that is applied in situ using a gaseous foam blowing agent that is also the propellant for the aerosol formulation.

“Rigid polyurethane slabstock and other” means a rigid closed-cell polyurethane foam formed into slabstock insulation for panels and fabricated shapes for pipes and vessels.

“Stand-alone low-temperature unit” means a stand-alone unit that maintains food or beverages at temperatures at or below 32°F (0°C).

“Stand-alone medium-temperature unit” means a stand-alone unit that maintains food or beverages at temperatures above 32°F (0°C).

“Stand-alone unit” means retail refrigerators, freezers, and reach-in coolers (either open or with doors) where all refrigeration components are integrated and the refrigeration circuit may be entirely brazed or welded. These systems are charged with refrigerant at the factory and typically require only an electricity supply to begin operation.

“Substance” means any chemical, product substitute, or alternative manufacturing process, whether new or retrofit, intended for use in the end-uses listed in Appendix U and Appendix V of Subpart G of 40 CFR Part 82, as those read on January 3, 2017.

“Substitute” means a chemical, product replacement, or alternative manufacturing process, whether new or retrofit, that is used to perform a function previously performed by a class I substance or class II substance.

“Supermarket systems” means multiplex or centralized retail food refrigeration equipment systems designed to cool or refrigerate, which typically operate with racks of compressors installed in a machinery room and which includes both direct and indirect systems.

“Use” means any utilization of any substance, including but not limited to utilization in a manufacturing process or product in the Commonwealth of Virginia, consumption by the end-user in the Commonwealth, or in intermediate applications in the Commonwealth, such as formulation or packaging for other subsequent applications. For the purposes of this article, use excludes residential use, but it does not exclude manufacturing for the purpose of residential use.

“Vending machine” means a self-contained unit that dispenses goods that must be kept cold or frozen.

9VAC5-145-120. Compliance.

A. Unless otherwise specified in this article, no owner or other person shall engage in or permit the manufacture, sale, lease, rental, installation, or entry into commerce of any equipment or product in violation of prohibitions prescribed under this article after the effective date of the prohibition.

B. The effective date of the prohibitions in Appendix U and Appendix V of Subpart G of 40 CFR Part 82, as those read on January 3, 2017, shall be the following, unless a later effective date is specified in those appendices or in 9VAC5-145-130:

1. January 1, 2022 for:

- (a) Propellants;
- (b) Rigid polyurethane applications and spray foam, flexible polyurethane, integral skin polyurethane, flexible polyurethane foam, polystyrene extruded sheet, polyolefin, phenolic insulation board and bunstock;
- (c) Supermarket systems, remote condensing units and stand-alone units;
- (d) Refrigerated food processing and dispensing equipment;
- (e) Compact residential consumer refrigeration products;
- (f) Polystyrene extruded boardstock and billet and rigid polyurethane low-pressure two component spray foam;

(g) Residential consumer refrigeration products other than compact and built-in residential consumer refrigeration products; and

(h) Vending machines.

2. January 1, 2023, for:

(a) Cold storage warehouses; and

(b) Built-in residential consumer refrigeration products.

3. January 1, 2024, for centrifugal chillers and positive displacement chillers

C. For the purpose of submitting compliance certifications or establishing whether or not an owner or other person has violated or is in violation of any standard in this chapter, nothing in this article shall preclude the use, including the exclusive use, of any credible evidence or information relevant to whether a source would have been in compliance with applicable requirements.

9VAC5-145-130. Special provisions applicable to extruded polystyrene boardstock and billet manufacturers.

A. Extruded polystyrene boardstock and billet manufacturers located in the Commonwealth of Virginia that manufacture on and after January 1, 2022 in accordance with 9VAC5-145-100 D using hydrofluorocarbons prohibited in Appendix U and Appendix V of Subpart G of 40 CFR Part 82, as those read on January 3, 2017 shall comply with the following requirements:

1. Submit a compliance date feasibility study to the department no later than January 1, 2022, that contains a compliance schedule for meeting the prohibition on the use of hydrofluorocarbons prohibited in Appendix U and Appendix V of Subpart G of 40 CFR Part 82, as those read on January 3, 2017, in the manufacturing process for extruded polystyrene boardstock and billet.

2. The compliance date feasibility study shall be prepared in a manner acceptable to the department.

3. The compliance date feasibility study may contain a mitigation action plan for reducing HFC emissions in the Commonwealth of Virginia from January 1, 2022, until the prohibition compliance date recommended in the compliance date feasibility study required in subdivision 1 of this subsection. The mitigation action plan may detail and describe HFC mitigation efforts whether planned or implemented at the manufacturing facility, including dates of completion for any planned efforts.

B. Notwithstanding the requirements of subsection A of this section, extruded polystyrene boardstock and billet manufacturers located in the Commonwealth of Virginia shall be prohibited from using hydrofluorocarbons prohibited in Appendix U and Appendix V of Subpart G of 40 CFR Part 82, as those read on January 3, 2017 in the manufacturing process for extruded polystyrene boardstock and billet on and after January 1, 2036.

9VAC5-145-140. Labeling and administrative requirements.

A. As of January 1, 2022, except for acceptable uses listed in Appendix U and Appendix V of Subpart G of 40 CFR Part 82, as those read on January 3, 2017, any person who manufactures for sale or entry into commerce in the Commonwealth of Virginia, products or

equipment in the air-conditioning, refrigeration, foam, or aerosol propellant end-uses listed in those appendices, shall provide a written disclosure to the buyer.

1. For motor-bearing refrigeration and air-conditioning equipment that is neither factory-charged nor pre-charged with refrigerant, the required disclosure or label shall state: "This equipment is prohibited from using any substance on the 'List of Prohibited Substances' for that specific end-use, in accordance with State regulations for hydrofluorocarbons."

2. Except for products and equipment with existing labeling required by state building codes and safety standards that contain the information required in subsections a and b of this subdivision, for refrigeration and air-conditioning equipment that are factory-charged or pre-charged with a hydrofluorocarbon or hydrofluorocarbon blend the required disclosure or label shall include:

a. The date of manufacture; and

b. The refrigerant and foam blowing agent that the product or equipment contains.

3. For foam products, the disclosure or label shall include one of the following alternatives:

a. The date of manufacture; and either:

(1) Identification of the foam blowing agent that the product contains; or

(2) A reference to a Safety Data Sheet (complying with 29 CFR 1910.1200 requirements), provided that the Safety Data Sheet identifies the foam blowing agent the product contains; or

b. The statement "Where sold, compliant with State HFC regulations."

4. For aerosol propellants, the disclosure or label shall include one of the following alternatives:

a. The date of manufacture; and either:

(1) Identification of the aerosol propellant that the product contains; or

(2) A reference to a Safety Data Sheet (complying with 29 CFR 1910.1200 requirements), provided that the Safety Data Sheet identifies the propellant that the product contains; or

b. The statement "Where sold, compliant with State HFC regulations."

B. If not combined with a written disclosure statement required by another jurisdiction, the written disclosure shall include the following statement signed by an authorized representative of the manufacturer: "I certify under penalty of law that the statements and information submitted in this document are to the best of my knowledge and belief true, accurate, and complete."

C. The manufacturer may substitute a date code representing the date of manufacture for the date of manufacture required in subsection A of this section.

9VAC5-145-150. Records and reporting.

A. As of January 1, 2022, any person who manufactures any product or equipment for the applications and end-uses listed in Appendix U and Appendix V of Subpart G of 40 CFR Part 82, as those read on January 3, 2017, for sale, lease, rental, installation, or entry into commerce in the Commonwealth of Virginia shall keep and maintain for five years records of the following information:

1. The date of manufacture of the equipment or product;
2. The refrigerant, aerosol propellant, and foam blowing agent blend that the equipment or product is designed to use;
3. The refrigerant, aerosol propellant, and foam blowing agent(s) in the equipment or product; and
4. Sufficient to demonstrate that the product or equipment does not contain any substances prohibited or restricted for the applications and end-uses listed in Appendix U and Appendix V of Subpart G of 40 CFR Part 82, as those read on January 3, 2017, or that the product is exempt in accordance with 9VAC5-145-110.

B. As of January 1, 2022, any person who manufactures any product or equipment for the applications and end-uses listed in Appendix U and Appendix V of Subpart G of 40 CFR Part 82, as those read on January 3, 2017, for sale, lease, rental, installation, or entry into commerce in the Commonwealth of Virginia shall make the required records available to the department upon request.

C. If a manufacturer uses a date code to meet disclosure or labeling requirements in 9VAC5-145-140 A, the manufacturer shall provide an explanation of the date code to the department upon request.

9VAC5-145-9999. Documents incorporated by reference.

40 CFR Part 82, Subpart G, Appendix U, as read on January 3, 2017.

40 CFR Part 82, Subpart G, Appendix V, as read on January 3, 2017.