Maryland
Department of
the Environment

Larry Hogan, Governor
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TECHNICAL SUPPORT DOCUMENT
FOR
New COMAR 26.11.33

new Regulations .01 — .06 under new chapter COMAR 26.11.33 Prohibitions on Use of Certain Hydrofluorocarbons in Aerosol Propellants, Chillers, Foam, and Stationary Refrigeration End-Uses

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PURPOSE OF REGULATORY ACTION

The Secretary of the Department proposes to adopt new Regulations .01 to .06 under new Chapter 33 Prohibitions on Use of Certain Hydrofluorocarbons in Aerosol Propellants, Chillers, Foam, and Stationary Refrigeration End-Uses. The purpose of this action is to propose new Regulations .01 to .06 under new chapter COMAR 26.11.33 Prohibitions on Use of Certain Hydrofluorocarbons in Aerosol Propellants, Chillers, Foam, and Stationary Refrigeration End-Uses. This action seeks to reduce hydrofluorocarbon (HFC) emissions by adopting specific United States Environmental Protection Agency's (EPA) Significant New Alternatives Policy Programs (SNAP) prohibitions for certain substances in air conditioning and refrigeration equipment, aerosol propellants, and foam end-uses. However, the implementation of the SNAP program has been stalled[1].

Given the uncertainty of federal implementation of these SNAP rules, Maryland, along with other U.S. Climate Alliance (USCA) states, is proposing action to reduce certain HFCs and HFC blends that have a high-global warming potential and pose a higher overall risk to human health and the environment. The draft regulation proposes to adopt specific SNAP prohibitions for HFCs in air conditioning and refrigeration equipment, aerosol propellants, and foam end-uses. The phase out of HFCs will encourage the use of available alternatives with lower greenhouse gas emissions.

BACKGROUND

A. EPA SNAP Program

The EPA's SNAP[2] program implements section 612 of the Clean Air Act (42 U.S.C.7671(k), which requires EPA to evaluate substitutes for ozone-depleting substances to reduce overall risk to human health and the environment. Through these evaluations, SNAP generates lists of acceptable and unacceptable substitutes for each of the major industrial use sectors. EPA has modified the SNAP lists many times, most often by expanding the list of acceptable substitutes, but in some cases by prohibiting the use of substitutes previously listed as acceptable.

On July 20, 2015, EPA promulgated a final rule entitled, "Protection of Stratospheric Ozone: Change of Listing Status for Certain Substitutes Under the Significant New Alternatives Policy Program," (SNAP Rule 20) 80 Fed. Reg. 42,870. On December 1, 2016, EPA promulgated a final rule entitled, "Protection of Stratospheric Ozone: New Listings of Substitutes; Changes of Listing Status; and Reinterpretation of Unacceptability for Closed Cell Foam Products Under the Significant New Alternatives Policy Program" (SNAP 21) 81 Fed. Reg. 86,778.

EPA SNAP Rules 20 and 21 listed, for purposes substitutes for ozone-depleting substances, a variety of HFCs and HFC blends as (1) unacceptable; (2) acceptable, subject to use conditions; or (3) acceptable, subject to narrowed use limits. Under this rule, EPA evaluated HFCs and HFC

[1] Mexichem Fluor, Inc. v. Envtl. Prot. Agency, 866 F.3d 451, 464 (D.C. Cir. 2017)(Mexichem I). Mexichem Fluor, Inc. v. Envtl. Prot. Agency, 760 Fed. App'x. 6 (D.C. Cir. Apr. 5, 2019)(Mexichem II).
[2] https://www.epa.gov/snap/snap-regulations

blends with a higher global warming potential relative to other alternatives in specific end-uses and determined to modify some of the listings. Specifically, the HFCs and HFC blends identified by EPA were changed from acceptable to unacceptable; acceptable, subject to use conditions; or acceptable, subject to narrowed use limits for certain HFCs and HFC blends in various end-uses in the aerosols, foam blowing, and refrigeration and air conditioning sectors where other alternatives are available or potentially available that pose lower overall risk to human health and the environment.

Shortly after EPA adopted the 2015 rule, certain manufacturers of HFCs challenged EPA's decision to remove HFCs from the list of substitutes for ozone-depleting substances and to place them on the list of prohibited ozone-depleting substances under the Act. On August 8, 2017, in Mexichem Fluor vs. U.S. EPA (Mexichem I[3]), the U.S. Court of Appeals for the D.C. Circuit limited EPA's ability to regulate HFCs under the federal SNAP Program rules and remanded the SNAP Program rules by vacating the portion of the 2015 rule requiring that manufacturers replace the HFCs and HFC blends that were lawfully substituted for ozone-depleting substances. The court, however, upheld EPA's listing of the HFCs and HFC blends in the rule. On April 5, 2019, the D.C. Circuit Court of Appeals issued the second Mexichem decision (Mexichem II[4]). This decision impacts EPA's 2016 HFC rule. The Mexichem II decision reiterated the court's finding in the first Mexichem case and vacated only that portion of the 2016 rule that required manufacturers to replace the HFCs and HFC blends that were lawfully substituted for ozone-depleting substances. The court, however, also reiterated its other finding in Mexichem I and upheld the portion of the rule that prohibits manufacturers from switching to banned HFCs and HFC blends in the future, as well as the actual listing of certain HFCs and HFC blends as banned.

EPA SNAP Program: Substitutes

EPA's SNAP program, under Section 7671(k) of the Clean Air Act, 42 U.S.C. Sec. 7401 et seq.), reviews substitutes within a comparative risk framework in the following industrial sectors: Adhesives, Coatings, and Inks; Foam Blowing Agents; Aerosols; Refrigeration and Air Conditioning; Cleaning Solvents; Sterilants; Fire Suppression and Explosion Protection; and Tobacco Expansion.[5]

The SNAP program does not provide a static list of alternatives but instead, evolves the list as EPA makes decisions that are informed by its overall understanding of the environmental and human health impacts as well as its current knowledge about available substitutes. The EPA identifies and evaluates substitutes in end-uses that have historically used ozone-depleting substances (ODS); looks at overall risk to human health and the environment of both existing and new substitutes; publishes lists of acceptable and unacceptable substitutes by end-use; promotes the use of acceptable substitutes; and provides the public with information about the potential environmental and human health impacts of substitutes. To arrive at determinations on the acceptability of substitutes, the Agency performs a cross-media analysis of risks to human

[3] Mexichem Fluor, Inc. v. Envtl. Prot. Agency, 866 F.3d 451, 464 (D.C. Cir. 2017)(Mexichem I). Mexichem Fluor, Inc. v. Envtl. Prot. Agency, 760 Fed. App'x. 6 (D.C. Cir. Apr. 5, 2019)(Mexichem II).
[4] Mexichem Fluor, Inc. v. Envtl. Prot. Agency, 760 Fed. App'x. 6 (D.C. Cir. Apr. 5, 2019)(Mexichem II).
[5] https://www.epa.gov/snap/snap-substitutes-sector

health and the environment from the use of various substitutes in different industrial and consumer uses that have historically used ODS.

EPA reviews characteristics, including the following, when evaluating each proposed substitute:

- Ozone depletion potential (ODP),
- Global warming potential (GWP),
- Toxicity,
- Flammability,
- Occupational and consumer health/safety,
- Local air quality, and
- Ecosystem effects.

B. HFC Climate Impact

HFCs are the fastest growing source of greenhouse gas emissions in the U.S. and globally, and are thousands of times more potent than carbon dioxide. Reducing emissions of HFCs will combat the adverse impacts of climate change in Maryland. In many parts of the state, the impacts are already being felt. Impacts now and into the future may include an increased risk for extreme events such as drought, storms, flooding, and forest fires; more heat-related stress; the spread of existing or new vector-borne disease or shifts in public health challenges due to climate-driven stressors; and increased erosion and inundation of low-lying areas along the state's shoreline and coast. In many cases, Maryland is already experiencing these problems. Climate change raises the stakes in managing these problems by changing their frequency, intensity, extent, and magnitude.

C. Stakeholder Engagement

The Department conducted stakeholder outreach throughout the year 2019 to inform the public and potentially affected sources of the upcoming regulations. The Department worked with USCA, multiple State environmental regulatory divisions, industry associations, industry manufacturers and installers, environmental advocates and the general public in drafting the proposed regulations[6].

REQUIREMENTS

A. Sources Affected

This proposed action applies to any person who sells, offers for sales, installs, uses, or manufactures in the State, any product or equipment if it consists of, uses, or will use a listed substance for use in an end-use listed in Table 1 in the regulation, unless an exemption is listed in Table 2.

[6] See Appendix A – Stakeholder Meeting, Appendix B – Air Quality Control Advisory Meeting, and Appendix C – Small Business Notification for a review of the Department's stakeholder outreach efforts.

The requirements focus on end-use prohibitions from the EPA's SNAP Program Rules 20 and 21 for the following sectors/categories: Aerosol Propellants; Air Conditioning; Refrigeration; and Foams.

B. General Requirements

The proposed regulations establish prohibition dates for substances in certain end-uses based on EPA's SNAP Rules 20 and 21 and consultation with other USCA states. The effective prohibition dates range from January 1, 2021 to January 1, 2024, and apply to certain end-use categories (see Table 1 below). Furthermore, the proposed regulations include a sell-through provision for products and equipment manufactured prior to the prohibition date. The regulation also allows continued use of existing products and equipment that contain banned substances acquired prior to the prohibition dates. Table 2 provides a list of exemptions by end-use category, which align with the SNAP rules.

Maryland's proposed regulations do not include all end-use restrictions found in SNAP Rules 20 and 21, such as motor vehicle air-conditioning systems (light-duty cars and trucks, buses, trains, and other forms of transportation) and residential air conditioning. The proposed end-use categories align with other USCA states' laws and regulations[7][8]and are aimed to maintain consistency with other established and upcoming state programs.

List of Prohibited Substances by end-use (Table 1)

End-use Category: Aerosol Propellants		
End-Use	Prohibited Substances	Effective Date
Aerosol Propellants	HFC-125, HFC-134a, HFC-227ea and blends of HFC-227ea and HFC-134a	January 1, 2021
End-use Category: Air Conditioning		
End-Use	**Prohibited Substances**	**Effective Date**
Centrifugal chillers (new)	FOR12A, FOR12B, HFC-134a, HFC-227ea, HFC-236fa, HFC245fa, 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, R438A, R-507A, RS-44 (2003 composition), THR-03	January 1, 2024
Positive displacement chillers (new)	FOR12A, FOR12B, HFC-134a, HFC-227ea, KDD6, R125/ 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,	January 1, 2024

[7] CA https://ww2.arb.ca.gov/resources/fact-sheets/hydrofluorocarbon-hfc-prohibitions-california
[8] WA http://lawfilesext.leg.wa.gov/biennium/2019-20/Pdf/Bills/House%20Passed%20Legislature/1112-S2.PL.pdf?q=20200128141413

	R-434A, R-437A, R438A, R-507A, RS-44 (2003 composition), SP34E, THR-03	
End-use Category: Refrigeration		
End-Use	Prohibited Substances	Effective Date
Cold storage warehouses (new)	HFC-227ea, R-125/290/134a/600a (55.0/1.0/42.5/1.5), R404A, R-407A, R-407B, R-410A, R-410B, R-417A, R-421A, R421B, R-422A, R-422B, R-422C, R-422D, R-423A, R-424A, R428A, R-434A, R-438A, R-507A, RS-44 (2003 composition)	January 1, 2023
Household refrigerators and freezers (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, R424A, R-426A, R-428A, R-434A, R-437A, R-438A, R-507A, RS24 (2002 formulation), RS-44 (2003 formulation), SP34E, 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, R424A, R-426A, R-428A, R-434A, R-437A, R-438A, R-507A, RS24 (2002 formulation), RS-44 (2003 formulation), SP34E, THR-03	January 1, 2021
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, R424A, R-426A, R-428A, R-434A, R-437A, R-438A, R-507A, RS24 (2002 formulation), RS-44 (2003 formulation), SP34E, THR-03	January 1, 2023
Supermarket Systems (Retrofit)	R-404A, R-407B, R-421B, R-422A, R-422C, R-422D, R428A, R-434A, R-507A	January 1, 2021
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, 2021
Remote Condensing Units (Retrofit)	R-404A, R-407B, R-421B, R-422A, R-422C, R-422D, R428A, R-434A, R-507A	January 1, 2021
Remote Condensing Units (New)	HFC-227ea, R-404A, R-407B, R-421B, R-422A, R-422C, R-422D, R-428A, R-434A,	January 1, 2021

	R-507A	
Stand-Alone Units (Retrofit)	R-404A, R-507A	January 1, 2021
Stand-Alone Medium-Temperature Units (New)	FOR12A, FOR12B, HFC-134a, HFC-227ea, KDD6, R125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R407A, R-407B, R-407C, R-407F, R-410A, R-410B, R417A, R-421A, R-421B, R-422A, R-422B, R-422C, R422D, R-424A, R-426A, R-428A, R-434A, R-437A, R438A, R-507A, RS-24 (2002 formulation), RS-44 (2003 formulation), SP34E, THR-03	January 1, 2021
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, R422A, R-422B, R-422C, R-422D, R-424A, R-428A, R434A, R-437A, R-438A, R-507A, RS-44 (2003 formulation)	January 1, 2021
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, R417A, R-421A, R-421B, R-422A, R-422B, R-422C, R-422D, R424A, R-428A, R-434A, R-437A, R-438A, R-507A, RS-44 (2003 formulation)	January 1, 2021
Vending Machines (Retrofit)	R-404A, R-507A	January 1, 2021
Vending Machines (New)	FOR12A, FOR12B, HFC-134a, KDD6, R125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R407C, R-410A, R-410B, R-417A, R-421A, R-422B, R422C, R-422D, R-426A, R-437A, R-438A, R-507A, RS-24 (2002 formulation), SP34E	January 1, 2022
End-use Category: Foams		
End-Use	Prohibited Substances	Effective Date
Rigid Polyurethane and Polyisocyanurate Laminated Boardstock	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof	January 1, 2021
Flexible Polyurethane	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof	January 1, 2021
Integral Skin Polyurethane	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, Formacel Z-6	January 1, 2021

Polystyrene Extruded Sheet	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, Formacel Z-6	January 1, 2021
Phenolic Insulation Board and Bunstock	HFC-143a, HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof	January 1, 2021
Rigid Polyurethane Slabstock and Other	HFC-134a, HFC-245fa, HFC-365mfc and blends thereof; Formacel TI, Formacel Z-6	January 1, 2021
Rigid Polyurethane Appliance Foam	HFC-134a, HFC-245fa, HFC-365mfc and blends thereof; Formacel TI, Formacel Z-6	January 1, 2021
Rigid Polyurethane Commercial Refrigeration and Sandwich Panels	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, Formacel Z-6	January 1, 2021
Polyolefin	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, Formacel Z-6	January 1, 2021
Rigid Polyurethane Marine Flotation Foam	HFC-134a, HFC-245fa, HFC-365mfc and blends thereof; Formacel TI, Formacel Z-6	January 1, 2021
Polystyrene Extruded Boardstock and Billet (XPS)	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, Formacel B, Formacel Z-6	July 1, 2021
Rigid polyurethane (PU) high-pressure two-component spray foam	HFC-134a, HFC-245fa, and blends thereof; blends of HFC365mfc with at least 4 percent HFC-245fa, and commercial blends of HFC-365mfc with 7 to 13 percent HFC-227ea and the remainder HFC-365mfc; Formacel TI	July 1, 2021
Rigid PU low-pressure two-component spray foam	HFC-134a, HFC-245fa, and blends thereof; blends of HFC365mfc with at least 4 percent HFC-245fa, and commercial blends of HFC-365mfc with 7 to 13 percent HFC-227ea and the remainder HFC-365mfc; Formacel TI	July 1, 2021
Rigid PU one-component foam sealants	HFC-134a, HFC-245fa, and blends thereof; blends of HFC365mfc with at least 4 percent HFC-245fa, and commercial blends of HFC-365mfc with 7 to 13 percent HFC-227ea and the remainder HFC-365mfc; Formacel TI	July 1, 2021

List of exemptions (Table 2)

End-Use Category	Prohibited Substances	Acceptable Uses

Aerosol Propellants	HFC-134a	Cleaning products for removal of grease, flux and other soils from electrical equipment; refrigerant flushes; products for sensitivity testing of smoke detectors; lubricants and freeze sprays for electrical equipment or electronics; sprays for aircraft maintenance; sprays containing corrosion preventive compounds used in the maintenance of aircraft, electrical equipment or electronics, or military equipment; pesticides for use near electrical wires, in aircraft, in total release insecticide foggers, or in certified organic use pesticides for which EPA has specifically disallowed all other lower-GWP propellants; mold release agents and mold cleaners; lubricants and cleaners for spinnerettes for synthetic fabrics; duster sprays specifically for removal of dust from photographic negatives, semiconductor chips, specimens under electron microscopes, and energized electrical equipment; adhesives and sealants in large canisters; document preservation sprays; FDA-approved MDIs for medical purposes; wound care sprays; topical coolant sprays for pain relief; and products for removing bandage adhesives from skin.
Aerosol Propellants	HFC-227ea and blends of HFC-227ea and HFC-134a	FDA-approved MDIs for medical purposes.
Air Conditioning	HFC–134a	Military marine vessels where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements.
Air Conditioning	HFC-134a and R-404A	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.
Foams – Except Rigid polyurethane (PU) spray foam	All substances	Military applications where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements until January 1, 2022.
Foams – Except Rigid polyurethane (PU) spray	All substances	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 until January 1,

foam		2025.
Rigid polyurethane (PU) two-component spray foam	All substances	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 until January 1, 2025.

COVID-19 Impacts

The Department recognizes that COVID-19 has created unforeseen circumstances across our State and that it may have affected a person's ability to comply with these regulations. Any person not able to comply with the prohibition deadlines in this regulation due to COVID-19 may submit a plan for compliance in accordance with Section 2-611 of the Environment Article. It will be necessary to clearly state and document the reason the pandemic is the cause for such delay. The Department will respond to a submitted plan within 90 days, as specified in the statute.

Proposed Prohibition Updates

As stated, the proposed regulations are intended to mirror EPA's SNAP program decisions on acceptable and unacceptable substitutes for end-uses that will be affected by the proposed rule. The SNAP program does not provide a static list of alternatives; instead, the list evolves as the EPA makes decisions that are informed by its overall understanding of the environmental and health impacts of available substitutes[9]. MDE is aware of one manufacturer's petition to EPA to update its current list based on information provided by the stakeholder[10]. Thus, should the EPA approve a proposed prohibited hydrofluorocarbon blend with a global warming potential of 750 or less for foam blowing of polystyrene extruded boardstock and billet and rigid polyurethane low-pressure two-component spray foam pursuant to the Significant New Alternatives Policy Program under Section 7671(k) of the federal Clean Air Act (42 U.S.C. Sec. 7401 et seq.), the Department shall consider initiating a rulemaking to conform the requirements established under this action with that federal action. This approach is consistent with other state programs and legislation.[11]

Existing Products and Equipment

The proposed prohibition compliance dates for specified end-uses apply only to "new" or "retrofit" equipment as defined in the proposed rule[12]; products and equipment acquired or manufactured prior to the proposed prohibition dates are exempted. The rule's intent is to allow for existing equipment, or any equipment manufactured prior to the effective date of this rule, to continue to be serviced, maintained, and/or charged with the original HFC

[9] https://www.epa.gov/snap/overview-snap
[10] Appendix E – Updates to Proposed Prohibition Request
[11] See California Senate Bill 1013, Washington House Bill 1112, and Vermont Senate Bill S.30
[12] See definitions (23) and (36)

substance/refrigerant it was designed to use. Thus, even if that particular HFC substance/refrigerant is prohibited as of the effective date of this rule, existing equipment or any equipment manufactured prior to the effective date, will not have to replace that HFC substance/refrigerant with a substitute substance.

For new refrigeration equipment, the application of the proposed definition aligns with U.S. EPA, which reclassifies systems as "new" if a modification is made which increases the capacity of the system. The proposed definition for new refrigeration equipment excludes all other changes to refrigeration system parts (e.g. display cases, handles) which do not affect the system's capacity. Therefore, end-users may repair, update, and improve their systems as long as the system capacity does not change. And as long as "retrofit" is not triggered. "Retrofit" means to convert an appliance from one refrigerant to another refrigerant and; "Retrofit" includes the conversion of the appliance to achieve system compatibility with the new refrigerant and may include changes in lubricants, gaskets, filters, driers, valves, o-rings, or appliance components.

C. Disclosure, Reporting and Recordkeeping

The proposed regulations contain disclosure, reporting, and record-keeping requirements to support enforcement of the regulations in Maryland. The requirements were developed in consultation with other USCA states, trade associations, and industry groups that may potentially be affected by the proposed rules. Where possible, Maryland sought to align requirements with established state programs to avoid patchwork regulatory requirements and to reduce the regulatory burden to industry. Additionally, the disclosure, reporting, and recordkeeping requirements seek to leverage existing federal and state requirements.

Disclosure Provisions

The disclosure section is intended to inform the end-user that the product or equipment purchased is legal in Maryland, thereby reducing the likelihood of non-compliant products entering Maryland. Furthermore, the disclosure requirements provide assurance to manufacturers that compliant substances are being used in their products and equipment, especially in situations where end-users determine which refrigerant is ultimately placed in systems. Maryland worked extensively with each industry sector to adopt disclosure language based on the type pf product and equipment.

Another goal of the disclosure provisions is to allow flexibility for compliance. The proposed rules, in some cases, implicitly offer manufacturers more than one option in determining the exact format the written disclosure is provided to consumers. For instance, refrigeration and air-conditioning equipment manufacturers may utilize a label as the mechanism for disclosure or may include required information in the product manual or other documents delivered to the end-user.

For motor-bearing refrigeration and air-conditioning equipment that is neither factory-charged nor pre-charged with refrigerant. The disclosure or label will include the following statement:

"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."

For motor-bearing refrigeration and air-conditioning equipment that is factory-charged or pre-charged with refrigerant. The disclosure or label will include the following information:

a. The date of manufacture
b. The refrigerant and foam blowing agent that the product/equipment contains

For foam products, the disclosure should be a label or sticker applied to product packaging that states:

"Where sold, compliant with State HFC regulations."

For aerosol products, the disclosure must comply with the product-dating requirements in COMAR 26.11.32.13; and the propellant must be listed in a Safety Data Sheet that complies with the requirements of 29 CFR 1910.1200.

Reporting

The proposed rule requires manufacturers, including importers and distributors, that sell products and equipment that contains or uses a proposed prohibited substance to report. Manufacturers subject to the reporting requirements will be required to report within 90 days of rule adoption which products and equipment they sell that contains or uses a proposed prohibited substance. Subsequently, manufacturers will need to provide annual updates to the Department until all their products and equipment with a prohibited substance is completely phased out. Manufacturers whose products do not contain a restricted substance are exempt from these requirements.

MDE will make an electronically-fillable reporting form publicly available by the compliance deadline[13]. All required reports shall be submitted electronically, as instructed on the reporting form, or in written format to:

Maryland Department of the Environment
Air Quality Compliance Program
1800 Washington Boulevard, Suite 715
Baltimore MD 21230
Attention: HFC Regulation Compliance Engineer

Recordkeeping

Manufacturers will be required to keep records of product or equipment manufacture date and information on the refrigerant, propellant, foam blowing agent and any additional HFC or HFC blend used in the product or equipment for three years. Manufacturers, upon request, will be required to provide a copy of the disclosure statement, label, or sticker issued to the buyer or recipient.

[13] Appendix F – Sample Reporting Form

PROJECTED EMISSION REDUCTIONS

HFCs are the fastest growing source of greenhouse gas emissions in the U.S. and globally, and are thousands of times more potent than carbon dioxide. With the proposed action in place, HFC emissions are expected to be reduced by 12 percent from the business as usual projection in 2020, with annual HFC emission reductions increasing to 25 percent in 2030. This translates to a total reduction of 4.95 MMTCO2E over 10 years[14].

The California Air Resources Board, in consultation with the USCA, developed a peer-reviewed HFC emissions methodology tool[15] that uses population in conjunction with climatic and other factors that influence the use of HFCs by state. With this emissions tool, all 50 states can quantify potential HFC emissions and reductions under different policy scenarios at a state-specific level. The Department used this emissions tool to evaluate the estimated Maryland HFC reductions.

The Department also evaluated emission projections against the State Greenhouse Gas Inventory developed from the Greenhouse Gas Reduction Act (GGRA) that started with the base year of 2006 and currently has a completed 2017 Inventory. HFC's are accounted for in the Maryland inventory under Industrial Processes - Consumption of substitutes for ozone depleting substances. Maryland uses the EPA State Inventory Tool under the EPA Inventory of U.S. Greenhouse Gas Emissions and Sinks reporting to populate the emissions estimates for this category.

The following table shows Maryland estimates of HFC emissions and anticipated reductions in MMTCO2E.

Table 3: Maryland Yearly Comparison of BAU vs SNAP Case for the proposed regulation specific end use categories MMTCO2E

Year & End Use	BAU	SNAP	Savings	SNAP % Savings Compared to BAU
2020	1.94	1.71	0.23	11.79%
2021	2.02	1.75	0.27	13.35%
2022	2.11	1.79	0.31	14.90%
2023	2.19	1.84	0.36	16.35%
2024	2.27	1.87	0.40	17.82%
2025	2.34	1.89	0.45	19.27%
2026	2.41	1.91	0.50	20.62%
2027	2.47	1.93	0.54	21.91%
2028	2.53	1.95	0.59	23.15%
2029	2.58	1.96	0.63	24.25%
2030	2.64	1.97	0.67	25.38%
Sum	**25.51**	**20.56**	**4.95**	

[14] See Appendix D – Emission Reduction Analysis
[15] https://www.usclimatealliance.org/data-tools

ECONOMIC IMPACT

The proposed regulatory action contains prohibitions equivalent to certain sectors of the federal SNAP Rules 20 and 21. The EPA rules are found at 40 CFR, Part 82, Subpart G – Significant New Alternatives Policy Program (SNAP) (Appendices U and V)[16]. However, on August 8, 2017 and April 5, 2019, in two separate decisions, the U.S. Court of Appeals for the D.C. Circuit partially vacated the federal SNAP Rules 20 and 21.

The EPA estimated the cumulative 20-year total cost of the SNAP Rules 20 and 21 (for the end-use sectors covered by Maryland's proposed regulation) to be $21.3 million for the entire nation. This cost is an average calculated using the published document titled "Revised Cost Analysis for Regulatory Changes to the Listing Status of High-GWP Alternatives, July 2015" prepared by prepared by ICF International, at regulations.gov docket ID EPA-HQ-OAR-2014-0198-0242[17]. The Department used information from Table 2: "Estimated Compliance Cost of the Regulatory Changes using a 7% Discount Rate" and removed the motor vehicle air-conditioning systems (light-duty cars and trucks, buses, trains and other forms of transportation) impacts. Therefore, the total national manufacture cost high estimate = $33,930,000 and low estimate = 8,680,000 with the average = $21,305,000, using 2013 dollars.

Compliance costs generally include one-time capital costs for a production facility to transition to an alternative. Incremental annual operating costs varied between industries; some saw a cost savings dues to lower raw material cost while others may have an increase. The cost analysis assumes transition of the prohibitions in the market. Lifetime of annualized costs assumptions varies based on equipment type: 25 years for foam manufacturing; 20 years for commercial refrigeration; and 10 years for aerosol product manufacturing. "The majority of potentially affected businesses are in the commercial refrigeration sector, but it is important to note that these businesses will not be affected in a single year; instead, a small proportion of businesses are expected to be affected in each year over a 15 to 20 year period, as existing retail food equipment reaches end-of-life and businesses make choices about which alternative refrigerant to use in new systems or retrofits. Even if these businesses are affected, EPA assumes that most of them will switch to R-407A. Since the composition of R-404A and R-407A are similar, the cost of the refrigerant is the same. Therefore, no annual costs or savings are assumed for this change."

A. Regulated Industries in Maryland

Potentially affected businesses in Maryland are manufacturers and end-users of consumer aerosol products, domestic and commercial refrigerated appliances, polyurethane foams, polystyrene foams, polyolefin foams, polyisocyanurate foams, and vending machines. Maryland consumers and businesses may be affected by the product transition in the market, however EPA estimates that the transition to new equipment and products with lower global warming potential substitutes will have negligible cost to end-users as market forces absorb initial cost increases and annual savings incurred to meet the end-use prohibitions. The proposed regulations do not

[16] https://www.law.cornell.edu/cfr/text/40/part-82/subpart-G
[17] Regulation.gov

prescribe that any business transition to a particular refrigerant or alternative, or a particular blowing agent, so additional costs are not estimated.

The total estimated statewide costs of the proposed regulation could be estimated by scaling the national cost to Maryland's population percentage. Maryland is 1.87 % of the U.S. population, based on 2016 Census data pulled from data.census.gov. Total U.S. population from 2010 – 2016 = 2,218,8885,062 and total Maryland population = 41,431,692.

Using this methodology, the proposed regulation is estimated to impact Maryland manufacturing business cumulatively by approximately $20,000 a year over a 20-year span. The estimated costs are likely to be inflated as some refrigerant equipment manufacturers and foam and aerosol propellant end-use manufacturers have already complied with SNAP rule prohibition effective dates of January 1, 2017 or prior, and with other state regulations like California.

Maryland research found no small business manufacturers of stand-alone refrigeration or vending machine equipment, foams or aerosol propellants in the State at this time.
Large foam manufacturers in the State are not known to produce products in the prohibited end-use tables or they have reported that their products do not use a prohibited substance in the tables. There are four foam services businesses in Maryland that staff identified and engaged with during the preproposal phase of the rulemaking process. Staff confirmed that two companies, Polystyrene Products and LiFoam, do not manufacturer products in the proposed end-use categories. Two other companies, William T. Burnett and Dart Container Corporation, have products in the end-use categories, however, the products do not use a prohibited substance listed in the proposed regulation. These companies will be subject to the labeling and on-site record keeping requirements, which will have a minor impact on their business operations.

Additionally, EPA support documents for SNAP Rules 20 and 21 quote *"This analysis finds that the final rulemaking can be presumed to have no significant economic impact on a substantial number of small entities"* nationally. The Department estimates that a proposed regulation will not have a significant small business impact.

B. Small Business

As the Department began to investigate potential impacts of the proposed regulation, it was determined that small businesses in Maryland may be potentially impacted. Based on the recently adopted HB1124 of 2019, Chapter 212 – State Government – Regulations Impacting Small Businesses that was signed into law on April 30, 2019. The Department has established a small business impact webpage with email registry and notification[18] on Maryland's regulatory development status per legislative requirements.

The Department worked with trade associations, known industry companies, USCA and environmental associations to research potentially affected Maryland sources The Department has been engaged in stakeholder outreach through phone conversations, traditional postal correspondence, one-on-one meetings and email. A pre-proposal stakeholder meeting was held on September 23, 2019. However, Maryland research found no small business manufacturers of

[18] See Appendix C – Small Business Notification

stand-alone refrigeration or vending machine equipment, foams or aerosol propellants in the State at this time. This action **will not have a significant small business impact.**

Additionally, Maryland research leaned on the EPA support documents for SNAP Rules 20 and 21 for end-use small business impacts. In addition to docket ID EPA-HQ-OAR-2014-0198-0242[19], the Department reviewed two additional documents:

- "Economic Impact Screening Analysis for Regulatory Changes to the Listing Status of High-GWP Alternatives – Revised" prepared by ICF International dated July 2015 (EPA-HQ-OAR-2014-0198-0240[20]).
- Economic Impact Screening Analysis for Regulatory Changes to the Listing Status of High-GWP Alternatives used in Refrigeration and Air Conditioning, Foams, and Fire Suppression prepared by ICF International dated Sept 2016 (EPA-HQ-OAR-2015-0663-0126[21])

The EPA national analysis found that very few businesses would incur new costs when replacing equipment on a traditional life cycle in order to meet the proposed federal standards. The Economic Impact Screening Analysis by ICF International, July 2015 report quotes the following small business impacts:

• This screening analysis finds that the rulemaking can be presumed to have no significant economic impact on a substantial number of small entities (SISNOSE).
• About 500,000 small businesses could be subject to the rulemaking, although more than 99 percent of small businesses subject to this rulemaking would be expected to experience zero compliance costs.
• For about 120 small businesses that are expected to incur compliance costs as a result of this rulemaking, their costs are estimated to be less than one percent of annual sales.
• This analysis indicates that fewer than 80 of the nearly 500,000 affected small businesses—or less than 0.1 percent—could incur costs in excess of one percent of annual sales, and that fewer than 60 small businesses could incur costs in excess of 3 percent of annual sales.

C. Government

The proposed regulation is expected to have minimal impacts on local agencies, or State government agencies. Existing air compliance inspector staff will enforce these regulations.

D. Public Health and Environment

The proposed regulation will have a positive effect on public health and the environment. Short-lived climate pollutants (SLCPs) are harmful air pollutants and potent climate forcers with a much shorter lifespan in the atmosphere than carbon dioxide. For example, just one pound of HFC-134a warms the planet as much as 1,400 pounds of carbon dioxide. Because HFCs are potent and short-lived, action taken today to reduce these pollutants can achieve significant climate benefits within a couple of decades. Furthermore, effectively designed measures to

[19] Regulations.gov
[20] Regulations.gov
[21] Regulations.gov

reduce SLCP emissions will make U.S. businesses and states more competitive globally (usclimatealliance.org).
Reducing emissions of HFC's will combat the adverse impacts of climate change in Maryland. In many parts of the state, the impacts are already being felt. Impacts now and into the future may include an increased risk for extreme events such as drought, storms, flooding, and forest fires; more heat-related stress; the spread of existing or new vector-borne disease or shifts in public health challenges due to climate-driven stressors; and increased erosion and inundation of low-lying areas along the state's shoreline and coast. In many cases, Maryland is already experiencing these problems. Climate change raises the stakes in managing these problems by changing their frequency, intensity, extent, and magnitude[22].

CORRESPONDING FEDERAL STANDARD

There is a corresponding federal standard to this proposed action, but the proposed action is not more restrictive or stringent. The proposed regulatory action contains prohibitions equivalent to certain sectors of the federal SNAP Rules 20 and 21. The EPA rules are found at 40 CFR, Part 82, Subpart G – Significant New Alternatives Policy Program (SNAP) (Appendices U and V). On August 8, 2017 and April 5, 2019, in two separate decisions, the U.S. Court of Appeals for the D.C. Circuit partially vacated the federal SNAP Rules 20 and 21. Specifically, the court partially vacated the SNAP final rules "to the extent they require manufacturers to replace HFCs with a substitute substance," however, the Court upheld EPA's listing of the HFCs and HFC blends prohibitions in the rule. Maryland has taken the Court's decisions into account in writing these regulations. The proposed regulatory action will help Maryland meet its requirements under the state's Greenhouse Gas Emissions Reduction Act.

OTHER STATE AND FEDERAL ACTION

On June 1, 2018, the USCA committed to reducing short-lived climate pollutants to meet the goals of the Paris Agreement, including HFCs[23]. Maryland has been working collaboratively with other USCA states since late 2018 to develop an HFC framework to ensure consistently amongst state programs. In developing the proposed rules, Maryland closely aligned requirements with the USCA HFC regulation framework and states with established HFC phase-out programs.

A. California

California was the first state to take action and backstopped key federal SNAP prohibitions by adopting a new CARB HFC regulation and through new legislation, the California Cooling Act (Senate Bill, or SB 1013). Both the CARB HFC Regulation and SB 1013 took effect January 1, 2019[24]. The regulation and the Senate Bill are referred to together as California SNAP, and cover

[22] https://mde.maryland.gov/programs/Air/ClimateChange/Pages/index.aspx
[23] http://www.usclimatealliance.org/slcpchallenge
[24] https://ww2.arb.ca.gov/resources/fact-sheets/hydrofluorocarbon-hfc-prohibitions-california

all the end-use specific HFC prohibitions covered by U.S. EPA SNAP Rules 20 and 21, with the exception of Mobile Vehicle Air Conditioning (MVAC).

B. Washington

Washington Department of Ecology, as directed by legislation HB 1112[25], adopted a rule in 2019 to transition away from using HFCs in products and equipment starting Jan. 1, 2020.

C. Vermont

On June 17, 2019, Vermont enacted into law bill S. 30[26] to phase out HFCs statewide.

D. Other USCA states

To date, twelve other USCA states have committed to reducing HFC emissions through legislation and regulations, including: Connecticut, Delaware, Hawaii, Massachusetts, Maine, New Jersey, New York, Oregon, and Pennsylvania[27]. The majority of these states are working together to establish cohesive programs that will reduce the regulatory burden on industry.

E. Additional Federal Actions

In October of 2016, during the 28th Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer in Kigali/Rwanda, more than 170 countries agreed to amend the Montreal Protocol to further protect the climate. This amendment became known as the Kigali Agreement[28]. In 2019, U.S. Senators introduced the American Innovation and Manufacturing (AIM) Act of 2019 (S. 2754), which would legislatively implement the same HFC restrictions as those in the Kigali Amendment. The House of Representatives has similar legislation entitled the American Innovation and Manufacturing Leadership Act of 2020 (H.R. 5544). Announced on March 12, 2020, A House Energy & Commerce panel is advancing legislation requiring EPA to implement a 15-year phasedown of hydrofluorocarbons (HFC), chemicals that act as potent greenhouse gases. Also, a public comment period has been opened for S. 2754, American Innovation and Manufacturing Act of 2019 from March 25, 2020 to April 8, 2020. The federal framework for phasedown of HFC's is complementary to state efforts. As currently drafted, the bill does not include any preemption language and would not prohibit actions at the state level to limit use of HFCs.

[25] http://lawfilesext.leg.wa.gov/biennium/2019-20/Pdf/Bills/House%20Passed%20Legislature/1112-S2.PL.pdf?q=20200413083433
[26] https://legislature.vermont.gov/Documents/2020/Docs/ACTS/ACT065/ACT065%20As%20Enacted.pdf
[27] https://www.nrdc.org/experts/david-doniger/more-states-announce-hfc-action-raising-tally-fifteen
[28] https://www.unido.org/our-focus-safeguarding-environment-implementation-multilateral-environmental-agreements-montreal-protocol/montreal-protocol-evolves-fight-climate-change

PROPOSED REGULATIONS

DSD version 07/08/2020

Title 26

DEPARTMENT OF THE ENVIRONMENT

Subtitle 11 AIR QUALITY

Chapter 33 Prohibitions on Use of Certain Hydrofluorocarbons in Aerosol Propellants, Chillers, Foam, and Stationary Refrigeration End-Uses

Authority: Environment Article, §§ 1-404, 2-103, 2-301 – 303, 2-1202 and 2-1205 Annotated Code of Maryland

All New Text Proposed

.01 Applicability.

This chapter applies to any person who sells, offers for sale, leases, rents, installs, uses, or manufactures in the State any substance for use in an end-use listed in Regulation .03 of this chapter or any product or equipment using such a substance.

.02 Definitions.

A. In this chapter, the following terms have the meanings indicated.

B. Terms Defined.

(1) "Aerosol propellant" means a compressed gas that serves to dispense the contents of an aerosol container when the pressure is released.

(2) "Air conditioning equipment" means chillers, both centrifugal chillers and positive displacement chillers, intended for comfort cooling of occupied spaces.

(3) "Bunstock" or "bun stock" means a large solid block-like structure formed during the production of polyurethane, polyisocyanurate, phenolic, or polystyrene insulation.

(4) "Capital cost" means an expense incurred in the production of goods or in rendering services, including the cost of engineering, purchase, and installation of components or systems, and instrumentation, and contractor and construction fees.

(5) Centrifugal Chiller.

(a) "Centrifugal chiller" means air conditioning equipment that utilizes a centrifugal compressor in a vapor-compression refrigeration cycle typically used for commercial comfort air conditioning.

(b) "Centrifugal chiller" does not include cooling for industrial process cooling and refrigeration.

(6) "Cold storage warehouse" means a cooled facility designed to store meat, produce, dairy products, and other products that are delivered to other locations for sale to the ultimate consumer.

(7) "Component" means:

(a) A part of a refrigeration system, including condensing units, compressors, condensers, evaporators, and receivers; and

(b) All of a refrigeration system's connections and subassemblies, without which the refrigeration system will not properly function or will be subject to failures.

(8) "Cumulatively replaced" means the addition of or change in multiple components within a 3-year period.

(9) "Effective date" or "effective date of prohibition" means the date of manufacture after which the prohibitions provided in Regulation .03B of this chapter go into effect.

(10) ''End-use'' means processes or classes of specific applications within industry sectors, including those listed in Regulation .03B of this chapter.

(11) "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.

(12) "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.

(13) "Foam blowing agent" means a substance used to produce foam.

(14) Household Refrigerators and Freezers.

(a) "Household refrigerators and freezers" means refrigerators, refrigerator-freezers, freezers, and miscellaneous household refrigeration appliances intended for residential use.

(b) "Household refrigerators and freezers" does not include household refrigerators and freezers — compact or household refrigerators and freezers — built-in.

(15) Household Refrigerators and Freezers — Built-In.

(a) "Household refrigerators and freezers — built-in" means any refrigerator, refrigerator-freezer or freezer 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.

(b) "Household refrigerators and freezers — built-in" contain sides which are not finished and not designed to be visible after installation.

(c) "Household refrigerators and freezers — built-in" are designed, intended, and marketed exclusively to be:

(i) Installed totally encased by cabinetry or panels that are attached during installation;

(ii) Securely fastened to adjacent cabinetry, walls, or floor; and

(iii) Equipped with an integral factory-finished face or accept a custom front panel.

(16) "Household refrigerators and freezers — compact" means any refrigerator, refrigerator-freezer or freezer intended for residential use with a total refrigerated volume of less than 7.75 cubic feet (220 liters).

(17) "Hydrofluorocarbons (HFCs)" means a class of greenhouse gases that are saturated organic compounds containing hydrogen, fluorine, and carbon.

(18) "Integral skin polyurethane" means a synthetic self-skinning foam containing polyurethane polymers formed by the reaction of an isocyanate and a polyol, such as that used in car steering wheels and dashboards.

(19) "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.

(20)"Medical dose inhaler", "Metered dose inhaler" or "MDI" means a device that:

(a) 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; and

(b) Consists of a pressurized canister of medication in a case with a mouthpiece.

(21) "Miscellaneous residential refrigeration appliance" means a residential refrigeration appliance smaller than a refrigerator, refrigerator-freezer, or freezer, including coolers, cooler compartments, and combination cooler refrigeration or cooler freezer products.

(22) "Motor-bearing" means refrigeration equipment containing motorized parts, including compressors, condensers, and evaporators.

(23) "New" means products or equipment:

(a) That are manufactured after the effective date of this chapter;

(b) First installed for an intended purpose with new or used components after the effective date of this chapter;

(c) Expanded after the effective date of this chapter, to handle an expanded cooling load by the addition of components in which the capacity of the system is increased, including refrigerant lines, evaporators, compressors, and condensers; or

(d) Replaced or cumulatively replaced after the effective date of this chapter such that the capital cost of replacing or cumulatively replacing components after the effective date of this chapter exceeds 50 percent of the capital cost of replacing the whole system.

(24) "Person" means any individual, firm, association, organization, manufacturer, distributor, partnership, business trust, corporation, limited liability company, company, state, or local governmental agency or public district.

(25) "Phenolic insulation board" means phenolic insulation including that used for roofing and wall insulation.

(26) "Polyolefin" means foam sheets and tubes made of polyolefin.

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

(28) "Polystyrene extruded sheet" means polystyrene foam, including that used for packaging and made into food-service items, including hinged polystyrene containers (for "take-out" from restaurants), food trays (meat and poultry), plates, bowls, and retail egg containers.

(29) Positive Displacement Chiller.

(a) "Positive displacement chiller" means vapor compression cycle chillers that use positive displacement compressors, typically used for commercial comfort air conditioning.

(b) "Positive displacement chiller" does not include cooling for industrial process cooling and refrigeration.

(30) "Refrigerant" or "refrigerant gas" means any substance, including blends and mixtures, which is used for heat transfer purposes.

(31) Refrigerated Food Processing and Dispensing Equipment.

(a) "Refrigerated food processing and dispensing equipment" means retail food refrigeration equipment that is designed to process food and beverages dispensed via a nozzle that are intended for immediate or near-immediate consumption, including chilled and frozen beverages, ice cream, and whipped cream.

(b) "Refrigerated food processing and dispensing equipment" does not include water coolers or units designed solely to cool and dispense water.

(32) "Refrigeration equipment" means any stationary device that is designed to contain and use refrigerant gas, including commercial refrigeration equipment, household refrigeration equipment, and cold storage warehouses.

(33) "Remote condensing units" means retail refrigeration equipment or units that:

(a) Have a central condensing portion, and other parts of the system, located outside the space or area cooled by an evaporator;

(b) May consist of compressor(s), condenser(s), and receiver(s) assembled into a single unit, which may be located external to the sales area; and

(c) Are commonly installed in convenience stores, specialty shops (for example, bakeries, butcher shops), supermarkets, restaurants, and other locations where food is stored, served, or sold.

(34) Residential Use.

(a) "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.

(b) "Residential use" does not include use within a household for commercial or medical application, or in automobiles, watercraft, or aircraft.

(35) "Retail food refrigeration" or "commercial refrigeration" means equipment designed to store and display chilled or frozen goods for commercial sale including stand-alone units, refrigerated food processing and dispensing equipment, remote condensing units, supermarket systems, and vending machines.

(36) Retrofit.

(a) "Retrofit" means to convert an appliance from one refrigerant to another refrigerant.

(b) "Retrofit" includes the conversion of the appliance to achieve system compatibility with the new refrigerant and may include changes in lubricants, gaskets, filters, driers, valves, o-rings, or appliance components.

(37) "Rigid polyurethane and polyisocyanurate laminated boardstock" means laminated board insulation made with polyurethane or polyisocyanurate foam, including that used for roofing and wall insulation.

(38) "Rigid polyurethane appliance foam" means polyurethane insulation foam in household appliances.

(39) "Rigid polyurethane commercial refrigeration and sandwich panels" means polyurethane insulation for use in walls and doors, including that used for commercial refrigeration equipment and garage doors.

(40) "Rigid polyurethane high-pressure two-component spray foam" means a foam product that:

(a) Is pressurized 800 — 1600 pounds per square inch (psi) during manufacture;

(b) Is sold in pressurized containers as two parts (that is, A-side and B-side);

(c) Is blown and applied in situ using high-pressure pumps to propel the foam components; and

(d) May use liquid blowing agents without an additional propellant.

(41) "Rigid polyurethane low-pressure two-component spray foam" means a foam product that:

(a) Is pressurized to less than 250 psi during manufacture;

(b) Is sold in pressurized containers as two parts (that is, A-side and B-side); and

(c) Is typically applied in situ relying upon a gaseous foam blowing agent that also serves as a propellant so pumps typically are not needed.

(42) "Rigid polyurethane marine flotation foam" means buoyancy or flotation foam used in boat and ship manufacturing for both structural and flotation purposes.

(43) "Rigid polyurethane one-component foam sealants" means a foam packaged in aerosol cans that is applied in situ using a gaseous foam blowing agent that is also the propellant for the aerosol formulation.

(44) "Rigid polyurethane slabstock and other" means a rigid closed-cell foam containing urethane polymers produced by the reaction of an isocyanate and a polymer and formed into slabstock insulation for panels and fabricated shapes for pipes and vessels.

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

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

(47) "Stand-alone unit" means retail refrigerators, freezers, and reach-in coolers (either open or with doors) where all refrigeration components are integrated and, for the smallest types, the refrigeration circuit is entirely brazed or welded, and all are fully charged with refrigerant at the factory and typically requires only an electricity supply to begin operation.

(48) "Substance" means any chemical intended for use in the end-uses listed in Regulation .03B of this chapter.

(49) "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.

(50) Use.

(a) "Use" means any utilization of a compound or any substance, including utilization in a manufacturing process or product in the State, consumption by the end-user in the State, or in intermediate applications in the State, such as formulation or packaging for other subsequent applications.

(b) "Use" includes manufacturing for the purpose of residential use.

(c) "Use" does not include residential use.

(51) "Vending machines" means self-contained commercial food refrigeration equipment that dispense goods that must be kept hot, cold or frozen.

.03 List of Prohibited Substances.

A. The following table lists prohibited substances in specific end-uses and the applicable effective date of prohibition, unless an exemption is provided for in §C of this regulation. The prohibitions do not apply to products or equipment manufactured for listed end-uses prior to an applicable effective date.

B. Table 1 — End-Use and Prohibited Substances.

End-use Category: Aerosol Propellants		
End-Use	*Prohibited Substances*	*Effective Date*
Aerosol propellants	*HFC-125, HFC-134a, HFC-227ea and blends of HFC-227ea and HFC-134a*	*January 1, 2021*
End-use Category: Air Conditioning		
End-Use	*Prohibited Substances*	*Effective Date*
Centrifugal chillers (new)	*FOR12A, FOR12B, HFC-134a, HFC-227ea, HFC-236fa, HFC245fa, 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, R438A, R-507A, RS-44 (2003 composition), THR-03*	*January 1, 2024*
Positive displacement chillers (new)	*FOR12A, FOR12B, HFC-134a, HFC-227ea, KDD6, R125/ 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, R438A, R-507A, RS-44 (2003 composition), SP34E, THR-03*	*January 1, 2024*
End-use Category: Refrigeration		
End-Use	*Prohibited Substances*	*Effective Date*
Cold storage warehouses (new)	*HFC-227ea, R-125/290/134a/600a (55.0/1.0/42.5/1.5), R404A, R-407A, R-407B, R-410A, R-410B, R-417A, R-421A, R421B, R-422A, R-422B, R-422C, R-422D, R-423A, R-424A, R428A, R-434A, R-438A, R-507A, RS-44 (2003 composition)*	*January 1, 2023*
Household refrigerators and freezers (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, R424A, R-426A, R-428A, R-434A, R-437A, R-438A, R-507A, RS24 (2002 formulation), RS-44 (2003 formulation), SP34E, 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, R424A, R-426A, R-428A, R-434A, R-437A, R-438A, R-507A, RS24 (2002 formulation), RS-44 (2003 formulation), SP34E, THR-03*	*January 1, 2021*
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, R424A, R-426A, R-428A, R-434A, R-437A, R-438A, R-507A, RS24 (2002 formulation), RS-44 (2003 formulation), SP34E, THR-03*	*January 1, 2023*
Supermarket systems (retrofit)	*R-404A, R-407B, R-421B, R-422A, R-422C, R-422D, R428A, R-434A, R-507A*	*January 1, 2021*
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, 2021*
Remote condensing units (retrofit)	*R-404A, R-407B, R-421B, R-422A, R-422C, R-422D, R428A, R-434A, R-507A*	*January 1, 2021*
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, 2021*

Stand-alone units (retrofit)	*R-404A, R-507A*	*January 1, 2021*
Stand-alone medium-temperature units (new)	*FOR12A, FOR12B, HFC-134a, HFC-227ea, KDD6, R125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R407A, R-407B, R-407C, R-407F, R-410A, R-410B, R417A, R-421A, R-421B, R-422A, R-422B, R-422C, R422D, R-424A, R-426A, R-428A, R-434A, R-437A, R438A, R-507A, RS-24 (2002 formulation), RS-44 (2003 formulation), SP34E, THR-03*	*January 1, 2021*
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, R422A, R-422B, R-422C, R-422D, R-424A, R-428A, R434A, R-437A, R-438A, R-507A, RS-44 (2003 formulation)*	*January 1, 2021*
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, R417A, R-421A, R-421B, R-422A, R-422B, R-422C, R-422D, R424A, R-428A, R-434A, R-437A, R-438A, R-507A, RS-44 (2003 formulation)*	*January 1, 2021*
Vending machines (retrofit)	*R-404A, R-507A*	*January 1, 2021*
Vending machines (new)	*FOR12A, FOR12B, HFC-134a, KDD6, R125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R407C, R-410A, R-410B, R-417A, R-421A, R-422B, R422C, R-422D, R-426A, R-437A, R-438A, R-507A, RS-24 (2002 formulation), SP34E*	*January 1, 2022*

End-use Category: Foams

End-Use	*Prohibited Substances*	*Effective Date*
Rigid polyurethane and polyisocyanurate laminated boardstock	*HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof*	*January 1, 2021*
Flexible polyurethane	*HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof*	*January 1, 2021*
Integral skin polyurethane	*HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, Formacel Z-6*	*January 1, 2021*
Polystyrene extruded sheet	*HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, Formacel Z-6*	*January 1, 2021*
Phenolic insulation board and bunstock	*HFC-143a, HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof*	*January 1, 2021*
Rigid polyurethane slabstock and other	*HFC-134a, HFC-245fa, HFC-365mfc and blends thereof; Formacel TI, Formacel Z-6*	*January 1, 2021*
Rigid polyurethane appliance foam	*HFC-134a, HFC-245fa, HFC-365mfc and blends thereof; Formacel TI, Formacel Z-6*	*January 1, 2021*
Rigid polyurethane commercial refrigeration and sandwich panels	*HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, Formacel Z-6*	*January 1, 2021*
Polyolefin	*HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, Formacel Z-6*	*January 1, 2021*
Rigid polyurethane marine flotation foam	*HFC-134a, HFC-245fa, HFC-365mfc and blends thereof; Formacel TI, Formacel Z-6*	*January 1, 2021*
Polystyrene extruded boardstock and billet (XPS)	*HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, Formacel B, Formacel Z-6*	*July 1, 2021*
Rigid polyurethane (PU) high-pressure two-component spray foam	*HFC-134a, HFC-245fa, and blends thereof; blends of HFC365mfc with at least 4 percent HFC-245fa, and commercial blends of HFC-365mfc with 7 to 13 percent HFC-227ea and the remainder HFC-365mfc; Formacel TI*	*July 1, 2021*
Rigid polyurethane (PU) low-pressure two-component spray foam	*HFC-134a, HFC-245fa, and blends thereof; blends of HFC365mfc with at least 4 percent HFC-245fa, and commercial blends of HFC-365mfc with 7 to 13 percent HFC-227ea and the remainder HFC-365mfc; Formacel TI*	*July 1, 2021*

Rigid polyurethane (PU) one-component foam sealants	*HFC-134a, HFC-245fa, and blends thereof; blends of HFC365mfc with at least 4 percent HFC-245fa, and commercial blends of HFC-365mfc with 7 to 13 percent HFC-227ea and the remainder HFC-365mfc; Formacel TI*	*July 1, 2021*

C. Table 2 — HFC Prohibition Exemptions. The following table lists exemptions to the prohibitions in §B of this regulation.

End-Use Category	*Prohibited Substances*	*Acceptable Uses*
Aerosol propellants	*HFC-134a*	*Cleaning products for removal of grease, flux, and other soils from electrical equipment; refrigerant flushes; products for sensitivity testing of smoke detectors; lubricants and freeze sprays for electrical equipment or electronics; sprays for aircraft maintenance; sprays containing corrosion preventive compounds used in the maintenance of aircraft, electrical equipment or electronics, or military equipment; pesticides for use near electrical wires, in aircraft, in total release insecticide foggers, or in certified organic use pesticides for which EPA has specifically disallowed all other lower-GWP propellants; mold release agents and mold cleaners; lubricants and cleaners for spinnerettes for synthetic fabrics; duster sprays specifically for removal of dust from photographic negatives, semiconductor chips, specimens under electron microscopes, and energized electrical equipment; adhesives and sealants in large canisters; document preservation sprays; FDA-approved MDIs for medical purposes; wound care sprays; topical coolant sprays for pain relief; and products for removing bandage adhesives from skin.*
Aerosol propellants	*HFC-227ea and blends of HFC-227ea and HFC-134a*	*FDA-approved MDIs for medical purposes.*
Air conditioning	*HFC-134a*	*Military marine vessels where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements.*
Air conditioning	*HFC-134a and R-404A*	*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.*
Foams — except rigid polyurethane (PU) spray foam	*All substances*	*Military applications where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements until January 1, 2022.*
Foams — except rigid polyurethane (PU) spray foam	*All substances*	*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 until January 1, 2025.*
Rigid polyurethane (PU) two-component spray foam	*All substances*	*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 until January 1, 2025.*

.04 General Requirements.

A. No person may sell, lease, rent, install, use, or manufacture in the State, any product or equipment if it consists of, uses, or will use a listed substance for use in an end-use listed in Regulation .03B of this chapter, unless an exemption is listed in Regulation .03C of this chapter.

B. Existing Products and Equipment.

(1) Except where an existing system is retrofitted, nothing in this chapter requires a person that acquired a product or equipment containing a prohibited substance prior to the effective date of the prohibition in Regulation .03B of this chapter to cease use of that product or equipment.

(2) Products or equipment manufactured prior to the applicable effective date of the restrictions specified in Regulation .03B of this chapter (including spray foam systems not yet applied on-site) may be sold, imported, exported, distributed, installed, and used after the specified date of prohibition.

C. Disclosure Statement.

(1) Except for acceptable uses as listed in Regulation .03C of this chapter, as of the effective date listed in Regulation .03B of this chapter, any person who manufactures for sale, lease, rent, install, or use products or

equipment in the air-conditioning, refrigeration, foam, or aerosol propellant end-uses listed in Regulation .03 of this chapter, shall provide a written disclosure to the buyer.

(2) For motor-bearing refrigeration and air-conditioning equipment that is not factory-charged or pre-charged with a refrigerant, the 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."

(3) Except for products and equipment with existing labeling required by State building codes and safety standards which contain the information required in this subsection, the disclosure or label for refrigeration and air-conditioning equipment that are factory-charged or pre-charged with a refrigerant shall include:

(a) The date of manufacture; and

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

(4) For foam products, the disclosure shall be a label or sticker applied to product packaging that states: "Where sold, compliant with State HFC regulations."

(5) For aerosol products:

(a) Each aerosol propellant product shall comply with the product-dating requirements in COMAR 26.11.32.13; and

(b) The propellant shall be listed in a Safety Data Sheet that complies with the requirements of 29 CFR §1910.1200.

.05 Reporting.

A. Any person who manufactures for sale, lease, rent, install, or use products or equipment that contain or use a substance listed in Regulation .03B of this chapter for specific end-uses listed in Regulation .03B of this chapter, shall follow the reporting requirements as specified in §§B and C of this regulation.

B. Initial Notification.

(1) Within 90 days of the effective date of this chapter, each manufacturer shall provide the Department an initial status notification of the status of products or equipment within each end-use listed in Regulation .03B of this chapter that uses or is designed to use substances listed in Regulation .03B of this chapter.

(2) The initial status notification according to §B(1) of this section shall include:

(a) Contact information for the manufacturer;

(b) The name of the party authorized to represent the manufacturer for purposes of providing initial status notifications and status updates;

(c) All end-use categories that are applicable to the manufacturer;

(d) Which refrigerant, aerosol propellant, or foam blowing agent is being used by products within each end-use applicable to the manufacturer; and

(e) The signature and certification of the authorized representative for the manufacturer.

C. Status Update Notification.

(1) Manufacturers shall follow the requirements in §B of this regulation annually until products or equipment within each end-use listed in Regulation .03B of this chapter cease use of substances listed in Regulation .03B of this chapter.

(2) Manufacturers subject to this regulation shall notify the Department in writing when products or equipment within each end-use listed in Regulation .03B of this chapter cease use of substances listed in Regulation .03B of this chapter.

.06 Record Keeping.

A. As of the effective date of this chapter, any person who manufactures for sale, lease, rent, install, or use products or equipment in the end uses listed in Regulation .03B of this chapter, shall maintain for 3 years a copy of the following records, where applicable:

(1) The date of manufacture of the equipment or product;

(2) The refrigerant, aerosol propellant, and foam blowing agent(s) 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) A copy of the disclosure statement, label, or sticker issued to the buyer or recipient.

B. Any person who manufactures any product or equipment in the end uses listed in Regulation .03B of this chapter, shall make available, upon request, a copy of the records in §A of this regulation.

BENJAMIN H. GRUMBLES
Secretary of the Environment

APPENDIX

Appendix A – Stakeholder Meeting
Appendix B – Air Quality Control Advisory Council
Appendix C – Small Business Notification
Appendix D – Emission Reduction Analysis
Appendix E – Updates to Proposed Prohibition Request
Appendix F – Sample Reporting Form
Appendix G – Public Hearing and RTC – to be added after hearing

Appendix A

Stakeholder Meeting

Maryland Department of the Environment

Prohibition of Hydrofluorocarbons (HFCs) in Certain End-Uses

Maryland Department of the Environment (MDE)
Stakeholder Meeting
September 23, 2019

Maryland's HFC Initiative - A High Priority

- On September 11, 2018 Maryland joined with other U.S. Climate Alliance states in committing to phase out the use of HFCs.
- Maryland's September 11, 2018 Press Release
  - "This is an important and necessary step in our ongoing efforts to reach Maryland's greenhouse gas reduction goals," said Governor Larry Hogan. "Our administration is committed to climate leadership by preventing pollution and partnering with other states, businesses, and advocates to make critical progress toward protecting and preserving our environment."
  - "These fast-acting super-pollutants are a major threat to our climate progress and deserve to be phased out at the state and federal level," said Maryland Department of the Environment Secretary Ben Grumbles.

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Purpose of Today's Meeting

- The purpose of today's meeting is to provide an overview of Maryland's draft regulation prohibiting certain uses of HFCs, and to get feedback on how to make sure the regulation will work in the real world
  - Hope to get comment during the meeting today
  - We will also be taking written comment through October 14th
- The next step in our process will be to take a proposed regulation to our Advisory Council on December 16, 2019
  - This step starts our more formal rulemaking process
  - There are continued opportunities for public comment throughout this rulemaking process

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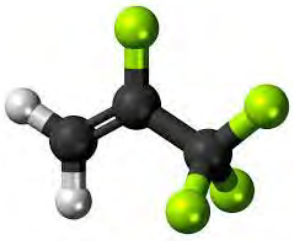
Overview

- Background
  - Greenhouse Gas Reduction Act
  - United States Climate Alliance (USCA)
  - Why regulate hydrofluorocarbons (HFCs)?
  - Federal Program
    - Legal Challenges
- Draft Regulation
- Discussion/Comments
- Next Steps



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The Greenhouse Gas Reduction Acts of 2009 & 2016

- Originated in 2007 by Executive Order which resulted in a 2008 "Climate Action Plan"
- This led to the "Greenhouse Gas Emission Reduction Act" of 2009
  - 25 % Greenhouse Gas (GHG) Emission reduction by 2020
- 2009 law reauthorized in 2016 … new goals added
  - 40 % GHG reduction by 2030
- The acts also require that the State's GHG reduction plans support a healthy economy and create new jobs

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The Maryland Commission on Climate Change (MCCC)

- MCCC codified into law in 2015
- Establishes a balanced, bipartisan Commission
  - Representatives from state and local government, the private sector, environmental advocacy groups, labor, the general public and more
- Basic charge of the Commission:
  - Provide recommendations on how to reduce GHG emissions and adapt to the impacts of climate change
- Full Commission and four working groups (Mitigation, Adaptation, Science and Communications) meet routinely
  - All meetings open to public
- MCCC has pushed for action on highly potent GHGs like HFCs and methane

https://mde.maryland.gov/programs/Air/ClimateChange/MCCC/Pages/index.aspx

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US Climate Alliance

- Maryland joined the U.S. Climate Alliance (USCA) on January 10, 2018
  - Originally, an alliance of 12 states … now 25 states
- Basic mission: to meet the goals of the Paris Climate Agreement, aiming to reduce GHG emissions by at least 26-28 percent below 2005 levels by 2025
- Maryland is working with other states on short-lived climate pollutant reductions, such as HFCs and methane

www.usclimatealliance.org/

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Why Regulate HFCs?

- HFCs are a part of a group of potent greenhouse gases (GHGs) known as short-lived climate pollutants (SLCP)
- High Global Warming Potential (GWP)
- Clear need to minimize HFC emissions now … to meet goals of leadership states and the international community to limit global warming
- HFCs emissions could offset many of the benefits of large-scale CO2 reduction programs

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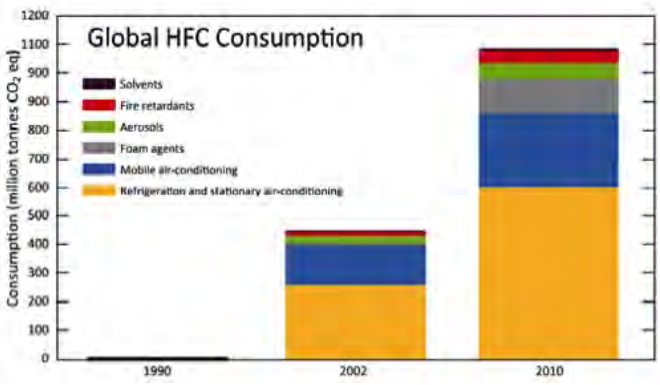
Why Regulate HFCs? (contd.)

- HFCs are the fastest growing source of GHGs
  - Globally, HFC emissions are increasing 10-15% annually



Source: https://eia-global.org/campaigns/Climate/what-are-hydrofluorocarbons

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Global Emissions Reduction Efforts

- 1987 Montreal Protocol
  - Reduce Substances that Deplete the Ozone Layer
  - CFCs were phased out, HFCs replaced them
  - HFCs don't destroy the ozone layer, however they have hundreds-thousands of times the heat-trapping power of CO2
  - They are also the fastest growing climate pollutants
  - HFCs unchecked growth could add up to 0.5 degrees Celsius to global temperatures by century's end

https://www.nrdc.org/issues/phase-down-hfcs

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Global Emissions Reduction Efforts

- 2016 Kigali Amendment
  - 150 countries signed
  - This agreement will cut off the rampant growth of HFCs and replace them with a new generation of alternative chemicals and products that use less energy and produce less pollution.

"We estimate that the HFC use avoided through the Kigali Amendment will be equal to more than 70 billion tons of CO2 over the next 35 years."

https://www.nrdc.org/issues/phase-down-hfcs

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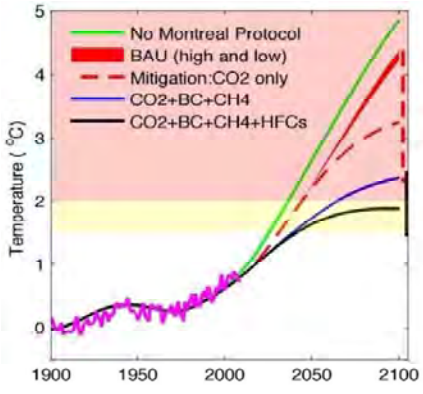
Need for HFC Reduction



- The adjacent figure shows temperature change under various GHG mitigation scenarios analyzed by researchers
- Mitigating CO2 alone won't prevent the worst climate impacts
- HFC mitigation is required to get closer to the goals of leadership states and the international community

https://www.atmos-chem-phys.net/13/6083/2013/acp-13-6083-2013.pdf

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Co-Benefits of HFCs Mitigation

- Low GWP HFC replacements will generate significant co-benefits
  - Energy efficiency benefits
  - Improved energy efficiency drives additional CO2 reductions
  - Benefits to electricity supply especially during peak demand periods
  - Benefits to Maryland's efforts to continue to make progress on air pollution … ground-level ozone, sulfur dioxide and fine particulate

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Federal Program: EPA SNAP

- EPA established the Significant New Alternative Policy (SNAP) to identify and evaluate substitutes for ozone-depleting substances
- EPA's 2015 SNAP Rule 20 & 2016 SNAP Rule 21 prohibited high-GWP HFCs by end-use
- The EPA rules were challenged

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Mexichem Fluor vs. EPA

- In August 2017, the DC Circuit Court of Appeals vacated parts of the 2015 SNAP Rule (SNAP Rule 20) "to the extent it requires manufacturers to replace HFCs with a substitute substance"
  - DC Court of Appeals also vacated parts of the 2016 Rule (SNAP Rule 21)
- Rule remanded to EPA- a new EPA rulemaking has not yet occurred
- In 2018, EPA issued guidance stating that it will not be enforcing SNAP Rule 20 or 21 until it adopts new rules reflecting the Court's decision. This has lead to uncertainty of compliance of both the 2015 and 2016 SNAP rules on the federal level.

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States Initiate Action

- In the face of stalled federal regulations and to provide regulatory certainty, Maryland and other USCA states are working to move forward with state programs to prohibit the use of certain HFCs
- State programs will require affected sources to transition to widely available alternatives that are less harmful to the environment
- USCA and state efforts are strongly supported by much of the private sector involved in this issue and the environmental community
- Three states already have legislation or regulation adopting the HFC prohibitions in SNAP rules 20 & 21: CA, WA, and VT.
  - Other states moving forward include: DE, CT, and NY

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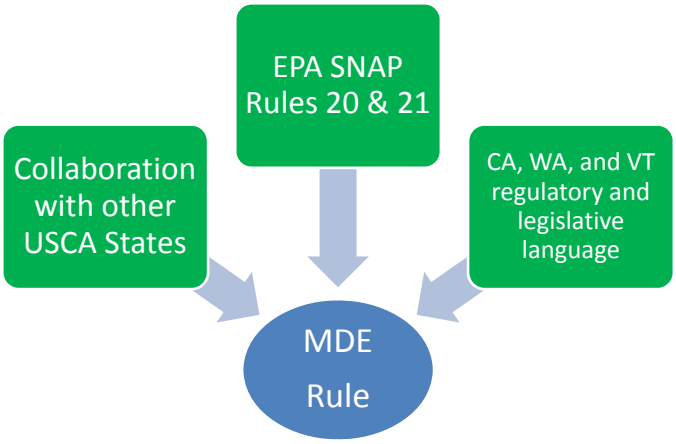
Where Did Maryland's Regulatory Language Come From?



Same goal: Require the transition from high-GWP substances to widely available environmentally-friendly alternatives

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Draft Regulations
Major Sectors Affected

- Applies to any person who sells, offers for sale, installs, uses, or introduces into commerce in Maryland, any substance for use in an end-use listed in the regulation

Air Conditioning
- Centrifugal chillers (new)
- Positive displacement chillers (new)

Refrigeration
- Cold storage warehouses (new)
- Household refrigerators and freezers (new)

Foams
- Flexible Polyurethane
- Integral Skin Polyurethane

Aerosol Propellants

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Draft Regulation

Prohibited Substances and Effective Dates

1. Aligns end-use categories, substances, and dates with other USCA States and EPA SNAP Rules 20 and 21, where possible
2. HFC prohibitions only for those end-use categories explicitly stated
3. Maryland is not including mobile AC prohibitions at this time (Light Vehicles MVAC). Maryland will continue to follow this issue and collaborate with other USCA states on it.
4. EPA alternatives: https://www.epa.gov/snap/snap-substitutes-sector

Two dates shown in draft proposal: MDE seeking comments on proposed dates

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Draft Regulation

Prohibited Substances and Effective Dates

End-Use	Prohibited Substance	Effective Date
AEROSOL PROPELLANTS		
Aerosol Propellants	HFC-125, HFC-134a, HFC-227ea and blends of HFC-227ea and HFC-134a	January 1, 2021 (or September 1, 2021)

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Draft Regulation

Prohibited Substances and Effective Dates

End-Use	Prohibited Substance	Effective Date
AIR CONDITIONING		
Centrifugal chillers (new)	FOR12A, FOR12B, HFC-134a, HFC-227ea, HFC-236fa, HFC245fa, 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, R438A, R-507A, RS-44 (2003 composition), THR-03	January 1, 2024
Positive displacement chillers (new)	FOR12A, FOR12B, HFC-134a, HFC-227ea, KDD6, R125/ 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, R438A, R-507A, RS-44 (2003 composition), SP34E, THR-03	January 1, 2024

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Draft Regulation

Prohibited Substances and Effective Dates

End-Use	Prohibited Substance	Effective Date
REFRIGERATION		
Cold storage warehouses (new)	HFC-227ea, R-125/290/134a/600a (55.0/1.0/42.5/1.5), R404A, R-407A, R-407B, R-410A, R-410B, R-417A, R-421A, R421B, R-422A, R-422B, R-422C, R-422D, R-423A, R-424A, R428A, R-434A, R-438A, R-507A, RS-44 (2003 composition)	January 1, 2023

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Draft Regulation

Prohibited Substances and Effective Dates

End-Use	Prohibited Substance	Effective Date
REFRIGERATION		
Household refrigerators and freezers—compact (new)	HFC-227ea, R-125/290/134a/600a (55.0/1.0/42.5/1.5), R404A, R-407A, R-407B, R-410A, R-410B, R-417A, R-421A, R421B, R-422A, R-422B, R-422C, R-422D, R-423A, R-424A, R428A, R-434A, R-438A, R-507A, RS-44 (2003 composition)	January 1, 2021 (or September 1, 2021)
Household refrigerators and freezers (new)	Same as above	January 1, 2022
Household refrigerators and freezers—built in appliances (new)	Same as above	January 1, 2023

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Draft Regulation

Prohibited Substances and Effective Dates

End-Use	Prohibited Substance	Effective Date
REFRIGERATION		
Supermarket Systems (Retrofit)	R-404A, R-407B, R-421B, R-422A, R-422C, R-422D, R428A, R-434A, R-507A	January 1, 2021 (or September 1, 2021)
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, 2021 (or September 1, 2021)

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Draft Regulation

Prohibited Substances and Effective Dates

End-Use	Prohibited Substance	Effective Date
REFRIGERATION		
Remote Condensing Units (Retrofit)	R-404A, R-407B, R-421B, R-422A, R-422C, R-422D, R428A, R-434A, R-507A	January 1, 2021 (or September 1, 2021)
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, 2021 (or September 1, 2021)

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Draft Regulation

Prohibited Substances and Effective Dates

End-Use	Prohibited Substance	Effective Date
REFRIGERATION		
Stand-Alone Units (Retrofit)	R-404A, R-507A	January 1, 2021 (or September 1, 2021)
Stand-Alone Medium-Temperature Units (New)	FOR12A, FOR12B, HFC-134a, HFC-227ea, KDD6, R125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R407A, R-407B, R-407C, R-407F, R-410A, R-410B, R417A, R-421A, R-421B, R-422A, R-422B, R-422C, R422D, R-424A, R-426A, R-428A, R-434A, R-437A, R438A, R-507A, RS-24 (2002 formulation), RS-44 (2003 formulation), SP34E, THR-03	January 1, 2021 (or September 1, 2021)
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, R422A, R-422B, R-422C, R-422D, R-424A, R-428A, R434A, R-437A, R-438A, R-507A, RS-44 (2003 formulation)	January 1, 2021 (or September 1, 2021)

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Draft Regulation

Prohibited Substances and Effective Dates

End-Use	Prohibited Substance	Effective Date
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, R417A, R-421A, R-421B, R-422A, R-422B, R-422C, R-422D, R424A, R-428A, R-434A, R-437A, R-438A, R-507A, RS-44 (2003 formulation)	January 1, 2021 (or September 1, 2021)

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Draft Regulation

Prohibited Substances and Effective Dates

End-Use	Prohibited Substance	Effective Date
REFRIGERATION		
Vending Machines (Retrofit)	R-404A, R-507A	January 1, 2021 (or September 1, 2021)
Vending Machines (New)	FOR12A, FOR12B, HFC-134a, KDD6, R125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R407C, R-410A, R-410B, R-417A, R-421A, R-422B, R422C, R-422D, R-426A, R-437A, R-438A, R-507A, RS-24 (2002 formulation), SP34E	January 1, 2021 (or September 1, 2021)

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Draft Regulation

Prohibited Substances and Effective Dates

End-Use	Prohibited Substance	Effective Date
FOAM		
Flexible Polyurethane	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof	January 1, 2021 or September 1, 2021
Integral Skin Polyurethane	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, Formacel Z-6	January 1, 2021 or September 1, 2021
Polystyrene Extruded Sheet	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, Formacel Z-6	January 1, 2021 or September 1, 2021
Phenolic Insulation Board and Bunstock	HFC-143a, HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof	January 1, 2021 or September 1, 2021
Polyolefin	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, Formacel Z-6	January 1, 2021 or September 1, 2021
Polystyrene Extruded Boardstock and Billet (XPS)	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, Formacel B, Formacel Z-6	January 1, 2021 or September 1, 2021

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Draft Regulation

Prohibited Substances and Effective Dates

End-Use	Prohibited Substance	Effective Date
FOAM		
Rigid Polyurethane and Polyisocyanurate Laminated Boardstock	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof	January 1, 2021 or September 1, 2021
Rigid Polyurethane Slabstock and Other	HFC-134a, HFC-245fa, HFC-365mfc and blends thereof; Formacel TI, Formacel Z-6	January 1, 2021 or September 1, 2021
Rigid Polyurethane Appliance Foam	HFC-134a, HFC-245fa, HFC-365mfc and blends thereof; Formacel TI, Formacel Z-6	January 1, 2021 or September 1, 2021
Rigid Polyurethane Commercial Refrigeration and Sandwich Panels	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, Formacel Z-6	January 1, 2021 or September 1, 2021
Rigid Polyurethane Marine Flotation Foam	HFC-134a, HFC-245fa, HFC-365mfc and blends thereof; Formacel TI, Formacel Z-6	January 1, 2021 or September 1, 2021

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Draft Regulation

Prohibited Substances and Effective Dates

End-Use	Prohibited Substance	Effective Date
FOAM		
Rigid polyurethane (PU) high-pressure two-component spray foam	HFC-134a, HFC-245fa, and blends thereof; blends of HFC365mfc with at least 4 percent HFC-245fa, and commercial blends of HFC-365mfc with 7 to 13 percent HFC-227ea and the remainder HFC-365mfc; Formacel TI	January 1, 2021 (or September 1, 2021)
Rigid PU low-pressure two-component spray foam	Same as above	January 1, 2021 (or September 1, 2021)
Rigid PU one-component foam sealants	Same as above	January 1, 2021 (or September 1, 2021)

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Draft Regulation

Clarifying Language

- In line with the DC Circuit Court's decision in *Mexichem Fluor v. EPA*, Maryland's regulation contains the following language:

  "Except where existing equipment is retrofit, any person who sells, offers for sale, installs, uses, or introduces into commerce in the State, any substance for use in an end-use listed in Regulation .03 of this chapter prior to the effective dates of the prohibitions specified in Table 1 of §B of this regulation is not required to cease use of the prohibited substance after the effective dates specified in Table 1 of §B of this regulation."

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Draft Regulation

Disclosure Statement and Recordkeeping

- Disclosure statement: end-user/buyer guidance
  - Provide assurance to owners and manufacturers that compliant substances are being used in products and equipment
  - Based off of language for Refrigeration and AC in CA regulations
  - Maryland expects a disclosure provision to be common amongst USCA states over the few years. We are seeking stakeholder input on this provision
- Recordkeeping information required on-site for 5 years

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Summary

- GGRA, USCA, MCCC, and Governor Initiative are drivers to MDE action
  - HFCs are a growing short-lived climate pollutant and action is needed now
- Federal rule stalled
- MDE seeking comments on the entire draft regulation, and is seeking specific comments on:
  1. Effective dates on prohibitions
  2. Disclosure provisions

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Schedule

- Stakeholder Meeting: Today
- Comments Due: October 14, 2019
- Air Quality Control Advisory Council: December 16, 2019
- Proposed Regulation in the Maryland Register: May 2020
- Public Hearing and final comment period: June 2020
- Rule Adoption and Effective: Fall 2020

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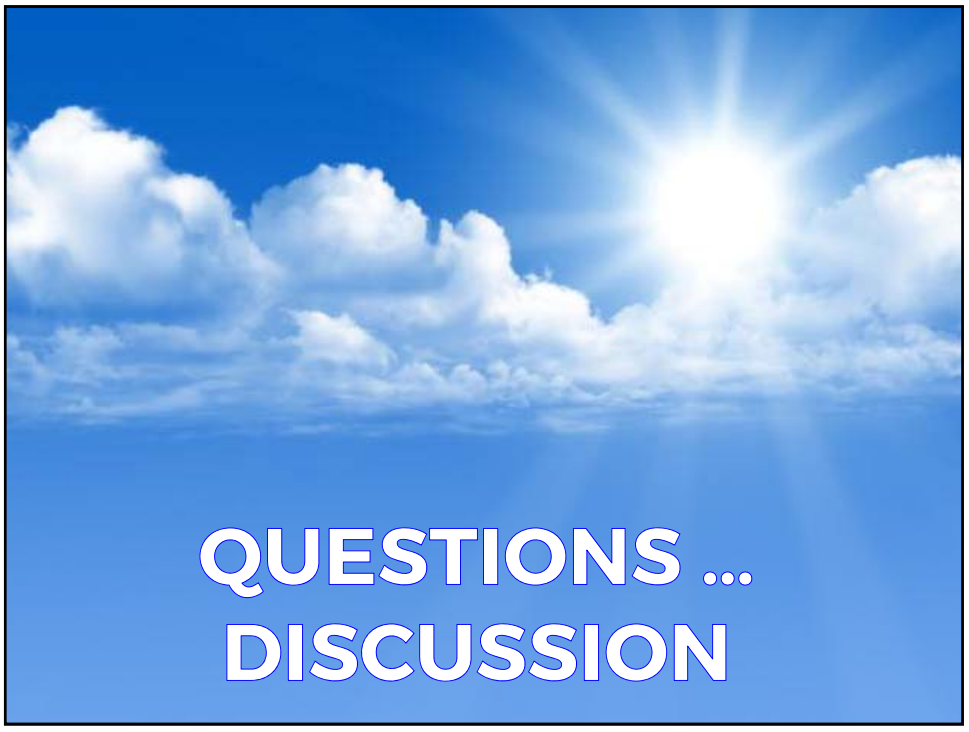


Appendix B

Air Quality Control Advisory Council Meeting

Maryland Department of the Environment

Prohibition of Hydrofluorocarbons in Certain End-Uses

Megan Ulrich, Joshua Shodeinde and Tad Aburn, MDE

AQCAC Meeting, September 16, 2019

Today's Briefing

- One of two major climate change regulations we will be taking to AQCAC on December 16, 2020 for approval
- Today - Just a short preview
- Stakeholder Meeting on September 23rd. AQCAC members are invited
- This is supposed to be a fifteen minute preview … the topic is interesting and important so MDE will work with AQCAC Chair to manage discussion

2

Overview

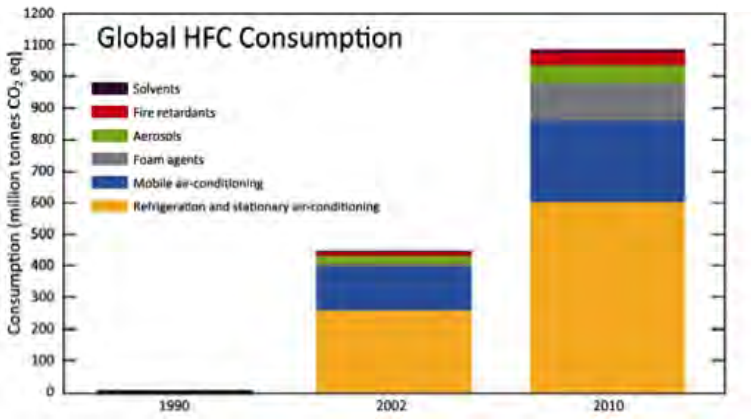
- Background
  - Why regulate hydrofluorocarbons (HFCs)?
  - Greenhouse Gas Reduction Act
  - United States Climate Alliance (USCA)
  - Federal Program
    - Legal Challenges
- Proposed Regulation
- Next Steps
- Questions

Why Regulate HFCs?

- HFCs are a part of a group of potent greenhouse gases (GHGs) known as short-lived climate pollutants (SLCP)
- High Global Warming Potential (GWP)
- Clear need to minimize HFC emissions now … to meet goals of leadership states and the international community to limit global warming
- HFCs emissions could offset many of the benefits of large-scale CO2 reduction programs

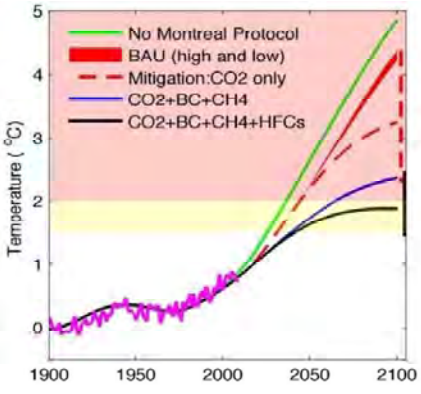
Why Regulate HFCs (continued)

- HFCs are the fastest growing source of GHGs



Source: https://eia-global.org/campaigns/Climate/what-are-hydrofluorocarbons

Why Regulate HFCs (continued)



- The adjacent figure shows temperature change under various GHG mitigation scenarios analyzed by researchers
- Mitigating CO2 alone won't prevent the worst climate impacts
- HFC mitigation is required to get closer to the goals of leadership states and the international community

https://www.atmos-chem-phys.net/13/6083/2013/acp-13-6083-2013.pdf

Co-Benefits of HFCs Mitigation

- Low GWP HFC replacements will generate significant co-benefits
  - Energy efficiency benefits
  - Improved energy efficiency drives additional CO2 reductions
  - Benefits to electricity supply especially during peak demand periods
  - Benefits to Maryland's efforts to continue to make progress on air pollution … ground-level ozone, sulfur dioxide and fine particulate

The Greenhouse Gas Emission Reduction Acts (GGRA) of 2009 and 2016

- Originated in 2007 by Executive Order which resulted in a 2008 "Climate Action Plan"
- This led to the "Greenhouse Gas Emission Reduction Act" of 2009
  - 25 % Greenhouse Gas (GHG) Emission reduction by 2020
- 2009 law reauthorized in 2016 … new goals added
  - 40 % GHG reduction by 2030
- The acts also require that the State's GHG reduction plans support a healthy economy and create new jobs

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US Climate Alliance

- Maryland joined the U.S. Climate Alliance (USCA) on January 10, 2018
  - Originally, an alliance of 12 states … now 25 states
- Basic mission: to meet the goals of the Paris Climate Agreement, aiming to reduce GHG emissions by at least 26-28 percent below 2005 levels by 2025
- Maryland is working with other states on short-lived climate pollutant reductions, such as HFCs and methane

www.usclimatealliance.org/

Federal Program: EPA SNAP

- EPA established the Significant New Alternative Policy (SNAP) to identify and evaluate substitutes for ozone-depleting substances
- EPA's 2015 SNAP Rule 20 & 2016 SNAP Rule 21 prohibited high-GWP HFCs by end-use
- The EPA rules were challenged

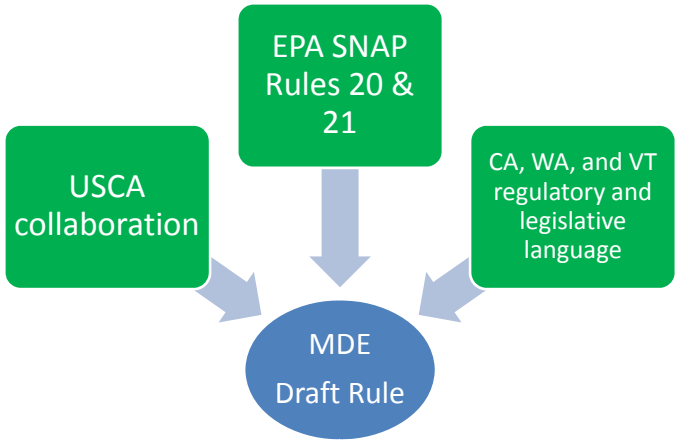
Mexichem Fluor vs. EPA

- In August 2017, the DC Circuit Court of Appeals vacated parts of the 2015 SNAP Rule (SNAP Rule 20) "to the extent it requires manufacturers to replace HFCs with a substitute substance"
  - DC Court of Appeals also vacated parts of the 2016 Rule (SNAP Rule 21)
- Rule remanded to EPA- a new EPA rulemaking has not yet occurred
- In 2018, EPA issued guidance stating that it will not be enforcing SNAP Rule 20 or 21 until it adopts new rules reflecting the Court's decision. This has lead to uncertainty of compliance of both the 2015 and 2016 SNAP rules on the federal level.

States Initiate Action

- In the face of stalled federal regulations and to provide regulatory certainty, Maryland and other USCA states are working to move forward with state programs to prohibit the use of certain HFCs
- State programs will require affected sources to transition to widely available alternatives that are less harmful to the environment
- USCA and state efforts are strongly supported by much of the private sector involved in this issue and the environmental community
- Three states already have legislation or regulation adopting the HFC prohibitions in SNAP rules 20 & 21: CA, WA, and VT.
  - Other states moving forward include: DE, CT, and NY

How Did MDE Build the Regulation



The Draft Regulation
Basic Requirement

- Rule will prohibit the use of certain HFCs for certain end uses
- Includes many definitions
  - Lists prohibited HFCs
  - Defines end uses
- The rule lists which HFCs are prohibited in specific end-uses … and the effective date of prohibition
- Copy of draft regulation to be used at the September 23rd stakeholder meeting included in your package
  - Regulation for 12/16 AQCAC meeting likely to be updated

Draft Regulations
End Use Categories

Aerosol Propellants

Air Conditioner

- Centrifugal Chillers (new)
- Positive Displacement Chillers (new)

Draft Regulations
End Use Categories - Continued

Refrigeration

- Cold storage warehouses
- Household refrigerators and freezers
- Supermarket systems (retrofitted and new)
- Remote condensing units
- Refrigerated food processing and dispensing equipment
- Vending Machines

Foams

- Rigid Polyurethane and Polyisocyanurate Laminated Boardstock
- Flexible Polyurethane
- Integral Skin Polyurethane
- Polystyrene Extruded Sheet
- Polyolefin
- Phenolic Insulation Board and Bunstock
- Polystyrene Extruded Boardstock and Billet (XPS)

Timeline

- Stakeholder Meeting: September 23, 2019
- Presented to AQCAC for Approval: December 16, 2019
- Public hearing: June 2020
- Rule Adoption and Effective: Fall 2020

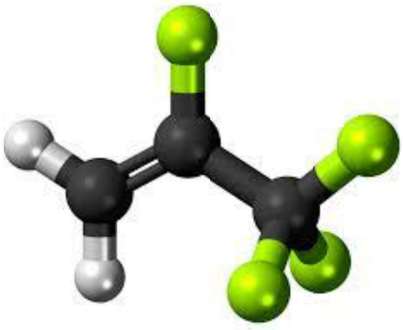
Maryland Department of the Environment

Prohibition of Hydrofluorocarbons (HFCs) in Certain End-Uses

Joshua Shodeinde, Maryland Department of the Environment (MDE)
Air Quality Control Advisory Council
December 16, 2019

Overview

- Federal Program
  - Legal Challenges
  - State Action
- Proposed Regulation
- Timeline
- Questions/Discussions



DELAYS WITH THE FEDERAL PROGRAM

Federal Program: EPA SNAP

- EPA established the Significant New Alternative Policy (SNAP) to identify and evaluate substitutes for ozone-depleting substances
- EPA's 2015 SNAP Rule 20 & 2016 SNAP Rule 21 prohibited high global warming potential (GWP) HFCs by end-use
- The EPA rules were challenged

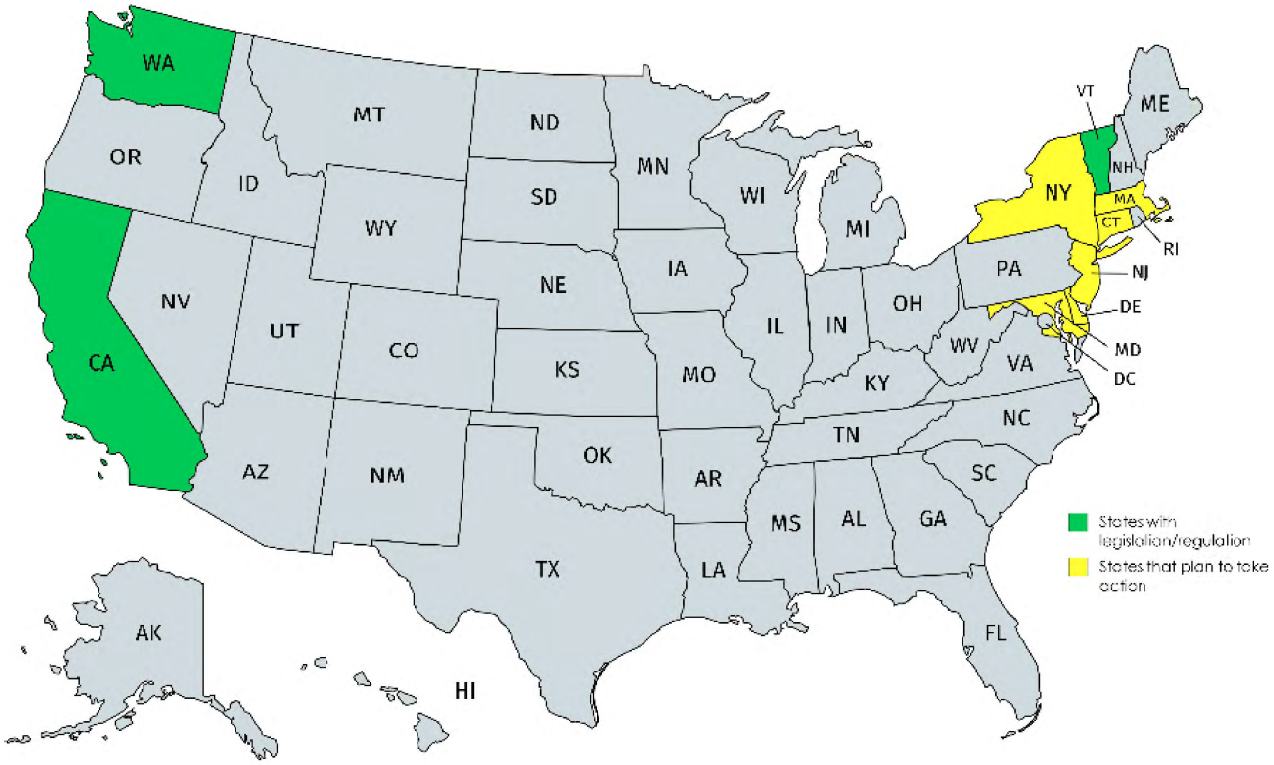
Mexichem Fluor vs. EPA

- In August 2017, the DC Circuit Court of Appeals vacated parts of the 2015 SNAP Rule (SNAP Rule 20) "to the extent it requires manufacturers to replace HFCs with a substitute substance"
  - DC Court of Appeals also vacated parts of the 2016 Rule (SNAP Rule 21)
- Rule remanded to EPA - a new EPA rulemaking has not yet occurred
- In 2018, EPA issued guidance stating that it will not be enforcing SNAP Rule 20 or 21 until it adopts new rules reflecting the Court's decision. This has lead to uncertainty of compliance of both the 2015 and 2016 SNAP rules on the federal level.

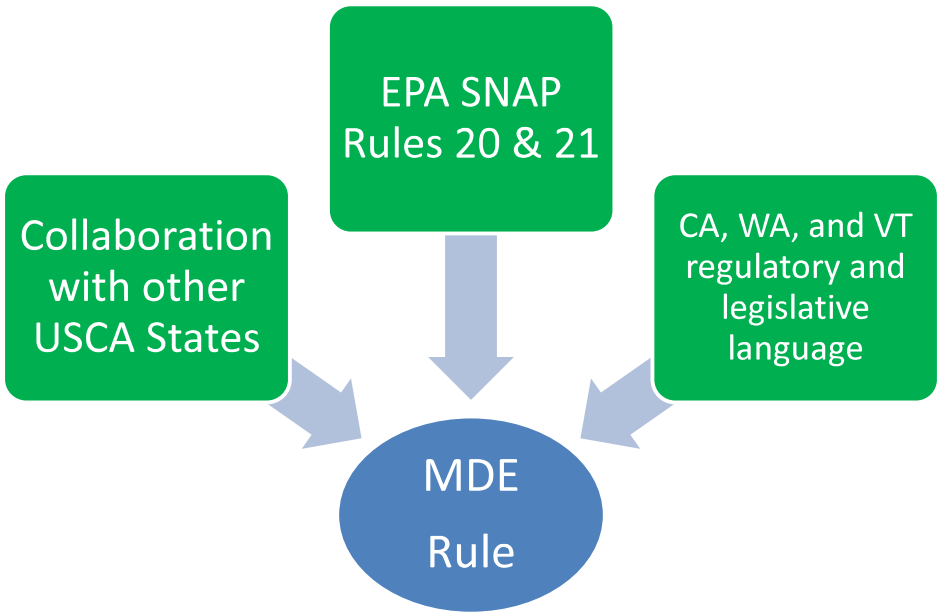
States Initiate Action

- In the face of stalled federal regulations and to provide regulatory certainty, Maryland and other US Climate Alliance (USCA) states are moving forward with state programs to prohibit the use of certain HFCs
- State programs will require affected sources to transition to widely available alternatives that are less harmful to the environment
- USCA and state efforts are strongly supported by much of the private sector involved in this issue and the environmental community

States Initiate Action, contd.



Where Did Maryland's Regulatory Language Come From?



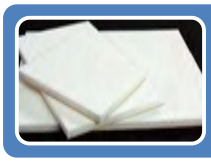
Same goal: Require the transition from high-GWP substances to widely available environmentally-friendly alternatives

Proposed Regulations
Major Sectors Affected

- Applies to any person who sells, offers for sale, installs, uses, or introduces into commerce in Maryland, any substance for use in an end-use listed in the regulation

Air Conditioning
- Centrifugal chillers (new)
- Positive displacement chillers (new)

Refrigeration
- Cold storage warehouses (new)
- Household refrigerators and freezers (new)



Foams
- Flexible Polyurethane
- Integral Skin Polyurethane

Aerosol
- Propellants

Proposed Regulation

Prohibited Substances and Effective Dates, Table Footnotes

1. Aligns end-use categories, substances, and dates with other USCA States and EPA SNAP Rules 20 and 21, where possible
2. HFC prohibitions only for those end-use categories explicitly stated

3. EPA alternatives: https://www.epa.gov/snap/snap-substitutes-sector

4. Products/equipment manufactured or acquired prior to the prohibition date can still be sold or used after the prohibition date.

Proposed Regulation

Prohibited Substances and Effective Dates

End-Use	Prohibited Substance	Effective Date
AEROSOL PROPELLANTS		
Aerosol Propellants	HFC-125, HFC-134a, HFC-227ea and blends of HFC-227ea and HFC-134a	January 1, 2021

Proposed Regulation

Prohibited Substances and Effective Dates

End-Use	Common application(s)	Prohibited Substance	Effective Date
AIR CONDITIONING			
Centrifugal chillers (new)	*Commercial comfort air conditioning*	FOR12A, FOR12B, HFC-134a, HFC-227ea, HFC-236fa, HFC245fa, 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, R438A, R-507A, RS-44 (2003 composition), THR-03	January 1, 2024
Positive displacement chillers (new)	*Commercial comfort air conditioning*	FOR12A, FOR12B, HFC-134a, HFC-227ea, KDD6, R125/ 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, R438A, R-507A, RS-44 (2003 composition), SP34E, THR-03	January 1, 2024

Proposed Regulation

Prohibited Substances and Effective Dates

End-Use	Prohibited Substance	Effective Date
REFRIGERATION		
Cold storage warehouses (new)	HFC-227ea, R-125/290/134a/600a (55.0/1.0/42.5/1.5), R404A, R-407A, R-407B, R-410A, R-410B, R-417A, R-421A, R421B, R-422A, R-422B, R-422C, R-422D, R-423A, R-424A, R428A, R-434A, R-438A, R-507A, RS-44 (2003 composition)	January 1, 2023

Proposed Regulation

Prohibited Substances and Effective Dates

End-Use	Prohibited Substance	Effective Date
REFRIGERATION		
Household refrigerators and freezers—compact (new)	HFC-227ea, R-125/290/134a/600a (55.0/1.0/42.5/1.5), R404A, R-407A, R-407B, R-410A, R-410B, R-417A, R-421A, R421B, R-422A, R-422B, R-422C, R-422D, R-423A, R-424A, R428A, R-434A, R-438A, R-507A, RS-44 (2003 composition)	January 1, 2021
Household refrigerators and freezers (new)	Same as above	January 1, 2022
Household refrigerators and freezers—built in appliances (new)	Same as above	January 1, 2023

Proposed Regulation

Prohibited Substances and Effective Dates

End-Use	Prohibited Substance	Effective Date
REFRIGERATION		
Supermarket Systems (Retrofit)	R-404A, R-407B, R-421B, R-422A, R-422C, R-422D, R428A, R-434A, R-507A	January 1, 2021
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, 2021

Proposed Regulation

Prohibited Substances and Effective Dates

End-Use	Common application(s)	Prohibited Substance	Effective Date
REFRIGERATION			
Remote Condensing Units (Retrofit)	Refrigeration in convenience stores, bakeries, restaurants	R-404A, R-407B, R-421B, R-422A, R-422C, R-422D, R428A, R-434A, R-507A	January 1, 2021
Remote Condensing Units (New)	Same as above	HFC-227ea, R-404A, R-407B, R-421B, R-422A, R-422C, R-422D, R-428A, R-434A, R-507A	January 1, 2021

Proposed Regulation

Prohibited Substances and Effective Dates

End-Use	Prohibited Substance	Effective Date
REFRIGERATION		
Stand-Alone Units (Retrofit)	R-404A, R-507A	January 1, 2021
Stand-Alone Medium-Temperature Units (New)	FOR12A, FOR12B, HFC-134a, HFC-227ea, KDD6, R125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R407A, R-407B, R-407C, R-407F, R-410A, R-410B, R417A, R-421A, R-421B, R-422A, R-422B, R-422C, R422D, R-424A, R-426A, R-428A, R-434A, R-437A, R438A, R-507A, RS-24 (2002 formulation), RS-44 (2003 formulation), SP34E, THR-03	January 1, 2021
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, R422A, R-422B, R-422C, R-422D, R-424A, R-428A, R434A, R-437A, R-438A, R-507A, RS-44 (2003 formulation)	January 1, 2021

Proposed Regulation

Prohibited Substances and Effective Dates

End-Use	Prohibited Substance	Effective Date
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, R417A, R-421A, R-421B, R-422A, R-422B, R-422C, R-422D, R424A, R-428A, R-434A, R-437A, R-438A, R-507A, RS-44 (2003 formulation)	January 1, 2021

Proposed Regulation

Prohibited Substances and Effective Dates

End-Use	Prohibited Substance	Effective Date
REFRIGERATION		
Vending Machines (Retrofit)	R-404A, R-507A	January 1, 2021
Vending Machines (New)	FOR12A, FOR12B, HFC-134a, KDD6, R125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R407C, R-410A, R-410B, R-417A, R-421A, R-422B, R422C, R-422D, R-426A, R-437A, R-438A, R-507A, RS-24 (2002 formulation), SP34E	January 1, 2022

Proposed Regulation

Prohibited Substances and Effective Dates

End-Use	Common application(s)	Prohibited Substance	Effective Date
FOAM			
Flexible Polyurethane	Furniture, bedding, chair cushions	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof	January 1, 2021
Integral Skin Polyurethane	Car steering wheels and dashboards	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, Formacel Z-6	January 1, 2021
Polystyrene Extruded Sheet	Packaging and food-services items, take-out containers, food trays	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, Formacel Z-6	January 1, 2021
Phenolic Insulation Board and Bunstock	Roofing and wall insulation	HFC-143a, HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof	January 1, 2021
Polyolefin	Foam sheets and tubes	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, Formacel Z-6	January 1, 2021
Polystyrene Extruded Boardstock and Billet (XPS)**	Roofing, walls, flooring, and pipes	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, Formacel B, Formacel Z-6	January 1, 2021*

Proposed Regulation

Prohibited Substances and Effective Dates

End-Use	Common application(s)	Prohibited Substance	Effective Date
FOAM			
Rigid Polyurethane and Polyisocyanurate Laminated Boardstock	Roofing and wall insulation	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof	January 1, 2021
Rigid Polyurethane Slabstock and Other	Insulation for panels; fabricated shapes for pipes	HFC-134a, HFC-245fa, HFC-365mfc and blends thereof; Formacel TI, Formacel Z-6	January 1, 2021
Rigid Polyurethane Appliance Foam	Insulation foam in residential refrigerators and freezers	HFC-134a, HFC-245fa, HFC-365mfc and blends thereof; Formacel TI, Formacel Z-6	January 1, 2021
Rigid Polyurethane Commercial Refrigeration and Sandwich Panels	Insulation in walls and doors, including for commercial refrigeration equipment and garage doors	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, Formacel Z-6	January 1, 2021
Rigid Polyurethane Marine Flotation Foam	Buoyancy or floatation foam used in boat and ship manufacturing	HFC-134a, HFC-245fa, HFC-365mfc and blends thereof; Formacel TI, Formacel Z-6	January 1, 2021

Proposed Regulation

Prohibited Substances and Effective Dates

End-Use	Common application(s)	Prohibited Substance	Effective Date
FOAM			
Rigid polyurethane (PU) high-pressure two-component spray foam	Applied in situ	HFC-134a, HFC-245fa, and blends thereof; blends of HFC365mfc with at least 4 percent HFC-245fa, and commercial blends of HFC-365mfc with 7 to 13 percent HFC-227ea and the remainder HFC-365mfc; Formacel TI	January 1, 2021*
Rigid PU low-pressure two-component spray foam**	Applied in situ	Same as above	January 1, 2021*
Rigid PU one-component foam sealants	Applied in situ	Same as above	January 1, 2021*

Proposed Regulation

Prohibited Substances and Effective Dates, Specific Stakeholder Requests

* Request from stakeholder to extend prohibition date for 4 foam end-uses to January 1, 2022

- MDE is proposing to keep prohibition dates as is. The Department is staying consistent with USCA states.

** Request from stakeholder to allow listed HFC blends with a global warming potential less than 750 approved by EPA to be compliant with regulation

- MDE plans to include in the technical support document that the Department will initiate proposed amendments should EPA approve a previously banned substance

Proposed Regulation

Disclosure Statement and Recordkeeping

- **Disclosure statement:** end-user/buyer guidance
  - Enforcement mechanism
  - Provide assurance to owners and manufacturers that compliant substances are being used in products and equipment
  - Worked extensively with each major industry sector to craft language that is not overly burdensome and leveraged pre-existing labeling
  - Maryland expects a disclosure provision to be common amongst USCA states over the next few years
- **Recordkeeping:** information required on-site for 5 years

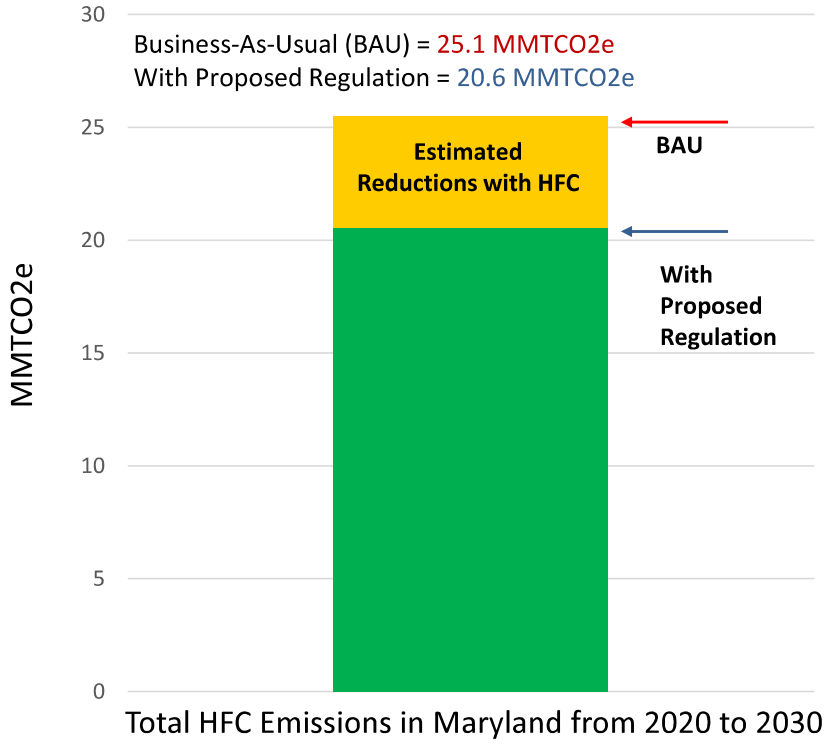
Proposed Regulation

Reporting

- **Applicability:** manufacturers with products/equipment that contain substances that will be prohibited
  - Manufacturers that have transitioned away from using substances are not subject to this requirement
- **Requirement:** Manufacturers will be required to inform MDE annually of products/equipment that contain substances that will be prohibited, and inform MDE when the manufacturer phases out the use of the substance in products/equipment
- Mirrors Washington State's (WA) language and will model WA's reporting form

Potential Emissions Reduction

- Using the US Climate Alliance Emission tool:



Tentative Schedule

- Air Quality Control Advisory Council: Today
- Proposed Regulation in the Maryland Register: May 2020
- Public Hearing and final comment period: June 2020
- Rule Adoption and Effective: Fall 2020


QUESTIONS …
DISCUSSION

Maryland Department of the Environment

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New Regulations under new Chapter COMAR 26.11.33

Prohibitions on Use of Certain Hydrofluorocarbons in Aerosol Propellants, Chillers, Foam, and Stationary Refrigeration End-Uses

December 2, 2019

Purpose

The primary purpose of this action is to propose new Regulations .01 to .05 under new chapter COMAR 26.11.33 Prohibitions on Use of Certain Hydrofluorocarbons in Aerosol Propellants, Chillers, Foam, and Stationary Refrigeration End-Uses. This action seeks to reduce hydrofluorocarbon (HFC) emissions by adopting specific United States Significant New Alternatives Policy Programs (SNAP) prohibitions for certain substances in air conditioning and refrigeration equipment, aerosol propellants, and foam end-uses.

Submission to EPA as Revision to Maryland's State Implementation Plan (SIP)

N/A

Background

The U.S. Environmental Protection Agency's (EPA) Significant New Alternatives Policy (SNAP) program implements section 612 of the amended Clean Air Act of 1990, which requires EPA to evaluate substitutes for the ozone-depleting substances to reduce overall risk to human health and the environment. Through these evaluations, SNAP generates lists of acceptable and unacceptable substitutes for each of the major industrial use sectors. EPA has modified the SNAP lists many times, most often by expanding the list of acceptable substitutes, but in some cases by prohibiting the use of substitutes previously listed as acceptable.

On July 20, 2015, EPA promulgated a final rule entitled, "Protection of Stratospheric Ozone: Change of Listing Status for Certain Substitutes Under the Significant New Alternatives Policy Program," 80 Fed. Reg. 42,870, which listed, for purposes substitutes for ozone-depleting substances, a variety of HFCs and HFC blends as (1) unacceptable; (2) acceptable, subject to use conditions; or (3) acceptable, subject to narrowed use limits. Under this rule, EPA evaluated HFCs and HFC blends with a higher global warming potential relative to other alternative in specific end-uses and determined to modify their listings. Specifically, the HFCs and HFC blends identified by EPA were changed from acceptable to unacceptable; acceptable, subject to use conditions; or acceptable, subject to narrowed use limits for certain HFCs and HFC blends in various end-uses in the aerosols, foam blowing, and refrigeration and air conditioning sectors where other alternatives are available or potentially available that pose lower overall risk to human health and the environment.

Shortly after EPA adopted the 2015 rule, certain manufacturers of HFCs challenged EPA's decision to remove HFCs from the list of substitutes for ozone-depleting substances and to

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place them on the list of prohibited ozone-depleting substances under the Act. On August 8, 2017, in *Mexichem Fluor vs. U.S. EPA (Mexichem I),* the U.S. Court of Appeals for the D.C. Circuit significantly limited EPA's ability to regulate HFCs under the federal SNAP Program rules and remanded the SNAP Program rules by vacating the portion of the 2015 rule requiring that manufactures replace the HFCs and HFC blends that were lawfully substituted for ozone-depleting substances.[1] The court, however, upheld EPA's listing of the HFCs and HFC blends in the rule. On April 5, 2019, the D.C. Circuit Court of Appeals issued the second *Mexichem* decision (*Mexichem II).*[2] This decision impacts EPA's 2016 HFC rule. The *Mexichem II decision* reiterated the court's finding in the first *Mexichem* case and vacated only that portion of the 2016 rule that required manufactures to replace the HFCs and HFC blends that were lawfully substituted for ozone-depleting substances. The court, however, also reiterated its other finding in *Mexichem I* and upheld the portion of the rule that prohibits manufacturers from switching to banned HFCs and HFC blends in the future, as well as the actual listing of certain HFCs and HFC blends as banned.

EPA's SNAP program, under Section 7671(k) of the Clean Air Act, 42 U.S.C. Sec. 7401 et seq.), reviews substitutes within a comparative risk framework in the following industrial sectors:

- Adhesives, Coatings, and Inks
- Foam Blowing Agents
- Aerosols
- Refrigeration and Air Conditioning
- Cleaning Solvents
- Sterilants
- Fire Suppression and Explosion Protection
- Tobacco Expansion

The SNAP program does not provide a static list of alternatives but instead, evolves the list as EPA makes decisions that are informed by its overall understanding of the environmental and human health impacts as well as its current knowledge about available substitutes. The EPA identifies and evaluates substitutes in end-uses that have historically used ozone-depleting substances (ODS); looks at overall risk to human health and the environment of both existing and new substitutes; publishes lists of acceptable and unacceptable substitutes by end-use; promotes the use of acceptable substitutes; and provides the public with information about the potential environmental and human health impacts of substitutes. To arrive at determinations on the acceptability of substitutes, the Agency performs a cross-media analysis of risks to human health and the environment from the use of various substitutes in different industrial and consumer uses that have historically used ODS. EPA reviews characteristics, including the following, when evaluating each proposed substitute:

[1] *Mexichem Fluor, Inc. v. Envtl. Prot. Agency (Mexichem I)*, 866 F.3d 451, 464 (D.C. Cir. 2017).
[2] *Mexichem Fluor, Inc. v. Envtl. Prot. Agency (Mexichem II),* 760 Fed. App'x. 6 (D.C. Cir. Apr. 5, 2019)

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- Ozone depletion potential (ODP),
- Global warming potential (GWP),
- Toxicity,
- Flammability,
- Occupational and consumer health/safety,
- Local air quality, and
- Ecosystem effects.

HFCs are the fastest growing source of greenhouse gas emissions in the U.S. and globally, and are thousands of times more potent than carbon dioxide. With federal efforts to regulate HFCs stalled, Maryland as part of the U.S. Climate Alliance, is proposing action to reduce certain HFCs and HFC blends that have a high-global warming potential and pose a higher overall risk to human health and the environment. The draft regulation proposes to adopt specific SNAP prohibitions for HFCs in air conditioning and refrigeration equipment, aerosol propellants, and foam end-uses. The phase out of HFCs will encourage the use of available alternatives with lower greenhouse gas emissions.

Sources Affected

This proposed action applies to any person who sells, offers for sales, installs, or introduces into commerce in Maryland any substance in end-uses listed in the Tables below.

The requirements focus on end-use prohibitions from the EPA's SNAP Program Rules 20 and 21 for the following sectors/categories: Aerosol Propellants, Air Conditioning, Refrigeration and Foams.

The manufacturing industry may potentially be affected by the regulations to develop end-use products without prohibited substances. The stakeholder research that the Department conducted found no refrigeration, aerosol propellant, nor air-conditioning manufacturers in Maryland and one manufacturer in the foam industry in the state.

Table 1: End-use and Prohibited Substances
Aerosol Propellants

End-Use	Prohibited Substances	Effective Date
Aerosol Propellants	HFC-125, HFC-134a, HFC-227ea and blends of HFC-227ea and HFC-134a	January 1, 2021

Air Conditioning

End-Use	Prohibited Substances	Effective Date
Centrifugal chillers (new)	FOR12A, FOR12B, HFC-134a, HFC-227ea, HFC-236fa, HFC245fa, R-125/ 134a/ 600a (28.1/70/1.9), R-125/ 290/ 134a/ 600a	January 1, 2024

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Prohibitions on Use of Certain Hydrofluorocarbons in Aerosol Propellants, Chillers, Foam, and Stationary Refrigeration End-Uses

End-Use	Prohibited Substances	Effective Date
	(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, R438A, R-507A, RS-44 (2003 composition), THR-03	
Positive displacement chillers (new)	FOR12A, FOR12B, HFC-134a, HFC-227ea, KDD6, R125/ 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, R438A, R-507A, RS-44 (2003 composition), SP34E, THR-03	January 1, 2024

Refrigeration

End-Use	Prohibited Substances	Effective Date
Cold storage warehouses (new)	HFC-227ea, R-125/290/134a/600a (55.0/1.0/42.5/1.5), R404A, R-407A, R-407B, R-410A, R-410B, R-417A, R-421A, R421B, R-422A, R-422B, R-422C, R-422D, R-423A, R-424A, R428A, R-434A, R-438A, R-507A, RS-44 (2003 composition)	January 1, 2023
Household refrigerators and freezers (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, R424A, R-426A, R-428A, R-434A, R-437A, R-438A, R-507A, RS24 (2002 formulation), RS-44 (2003 formulation), SP34E, 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, R424A, R-426A, R-428A, R-434A, R-437A, R-438A, R-507A, RS24 (2002 formulation), RS-44 (2003 formulation), SP34E, THR-03	January 1, 2021
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, R424A, R-426A, R-428A,	January 1, 2023

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	R-434A, R-437A, R-438A, R-507A, RS24 (2002 formulation), RS-44 (2003 formulation), SP34E, THR-03	
Supermarket Systems (Retrofit)	R-404A, R-407B, R-421B, R-422A, R-422C, R-422D, R428A, R-434A, R-507A	January 1, 2021
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, 2021
Remote Condensing Units (Retrofit)	R-404A, R-407B, R-421B, R-422A, R-422C, R-422D, R428A, R-434A, R-507A	January 1, 2021
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, 2021
Stand-Alone Units (Retrofit)	R-404A, R-507A	January 1, 2021
Stand-Alone Medium-Temperature Units (New)	FOR12A, FOR12B, HFC-134a, HFC-227ea, KDD6, R125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R407A, R-407B, R-407C, R-407F, R-410A, R-410B, R417A, R-421A, R-421B, R-422A, R-422B, R-422C, R422D, R-424A, R-426A, R-428A, R-434A, R-437A, R438A, R-507A, RS-24 (2002 formulation), RS-44 (2003 formulation), SP34E, THR-03	January 1, 2021
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, R422A, R-422B, R-422C, R-422D, R-424A, R-428A, R434A, R-437A, R-438A, R-507A, RS-44 (2003 formulation)	January 1, 2021
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, R417A, R-421A, R-421B, R-422A, R-422B, R-422C, R-422D, R424A, R-428A, R-434A, R-437A, R-438A, R-507A, RS-44 (2003 formulation)	January 1, 2021
Vending Machines (Retrofit)	R-404A, R-507A	January 1, 2021
Vending Machines (New)	FOR12A, FOR12B, HFC-134a, KDD6, R125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R407C, R-410A, R-410B, R-417A, R-421A, R-422B, R422C, R-422D, R-426A, R-437A, R-438A, R-507A, RS-24 (2002 formulation), SP34E	January 1, 2022

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Foams

End-Use	Prohibited Substances	Effective Date
Rigid Polyurethane and Polyisocyanurate Laminated Boardstock	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof	January 1, 2021
Flexible Polyurethane	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof	January 1, 2021
Integral Skin Polyurethane	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, Formacel Z-6	January 1, 2021
Polystyrene Extruded Sheet	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, Formacel Z-6	January 1, 2021
Phenolic Insulation Board and Bunstock	HFC-143a, HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof	January 1, 2021
Rigid Polyurethane Slabstock and Other	HFC-134a, HFC-245fa, HFC-365mfc and blends thereof; Formacel TI, Formacel Z-6	January 1, 2021
Rigid Polyurethane Appliance Foam	HFC-134a, HFC-245fa, HFC-365mfc and blends thereof; Formacel TI, Formacel Z-6	January 1, 2021
Rigid Polyurethane Commercial Refrigeration and Sandwich Panels	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, Formacel Z-6	January 1, 2021
Polyolefin	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, Formacel Z-6	January 1, 2021
Rigid Polyurethane Marine Flotation Foam	HFC-134a, HFC-245fa, HFC-365mfc and blends thereof; Formacel TI, Formacel Z-6	January 1, 2021
Polystyrene Extruded Boardstock and Billet (XPS)	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, Formacel B, Formacel Z-6	January 1, 2021
Rigid polyurethane (PU) high-pressure two-component spray foam	HFC-134a, HFC-245fa, and blends thereof; blends of HFC365mfc with at least 4 percent HFC-245fa, and commercial blends of HFC-365mfc with 7 to 13 percent HFC-227ea and the remainder HFC-365mfc; Formacel TI	January 1, 2021
Rigid PU low-pressure two-component spray foam	HFC-134a, HFC-245fa, and blends thereof; blends of HFC365mfc with at least 4 percent HFC-245fa, and commercial blends of HFC-365mfc with 7 to 13 percent HFC-227ea and the remainder HFC-365mfc; Formacel TI	January 1, 2021

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Rigid PU one-component foam sealants	HFC-134a, HFC-245fa, and blends thereof; blends of HFC365mfc with at least 4 percent HFC-245fa, and commercial blends of HFC-365mfc with 7 to 13 percent HFC-227ea and the remainder HFC-365mfc; Formacel TI	January 1, 2021

Requirements

The proposed regulations establish prohibition dates for substances in certain end-uses based on EPA's SNAP Rules 20 and 21. The effective prohibition dates range from January 1, 2021 to January 1, 2024. The requirements are focused on end-use (see Tables 1above).

The proposed regulation includes a sell-through provision for products and equipment manufactured prior to the prohibition date. The regulation also allows continued use of existing products and equipment that contain banned substances acquired prior to the prohibition dates.

The following exemptions are provided in the regulation (Table 2 below), which align with the SNAP rules.

Table 2: HFC Prohibition Exemptions

End-Use Category	Prohibited Substances	Acceptable Uses
Aerosol Propellants	HFC-134a	Cleaning products for removal of grease, flux and other soils from electrical equipment; refrigerant flushes; products for sensitivity testing of smoke detectors; lubricants and freeze sprays for electrical equipment or electronics; sprays for aircraft maintenance; sprays containing corrosion preventive compounds used in the maintenance of aircraft, electrical equipment or electronics, or military equipment; pesticides for use near electrical wires, in aircraft, in total release insecticide foggers, or in certified organic use pesticides for which EPA has specifically disallowed all other lower-GWP propellants; mold release agents and mold cleaners; lubricants and cleaners for spinnerettes for synthetic fabrics; duster sprays specifically for removal of dust from photographic negatives, semiconductor chips, specimens under electron microscopes, and energized electrical equipment; adhesives and

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		sealants in large canisters; document preservation sprays; FDA-approved MDIs for medical purposes; wound care sprays; topical coolant sprays for pain relief; and products for removing bandage adhesives from skin.
Aerosol Propellants	HFC-227ea and blends of HFC-227ea and HFC-134a	FDA-approved MDIs for medical purposes.
Air Conditioning	HFC–134a	Military marine vessels where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements.
Air Conditioning	HFC-134a and R-404A	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.
Foams – Except Rigid polyurethane (PU) spray foam	All substances	Military applications where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements until January 1, 2022.
Foams – Except Rigid polyurethane (PU) spray foam	All substances	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 until January 1, 2025.
Rigid polyurethane (PU) two-component spray foam	All substances	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 until January 1, 2025.

Maryland's proposed regulations do not include all of the end-use restrictions found in SNAP Rules 20 and 21, such as motor vehicle air-conditioning systems (light-duty cars and trucks, buses, trains and other forms of transportation) and residential air conditioning. The proposed end-use categories align with other United States Climate Alliance States.

Furthermore, the proposed regulation has record-keeping and disclosure statement requirements. Manufacturers are required to keep records of product or equipment manufacturer date and information on the refrigerant, propellant, foam blowing agent and any additional HFC or HFC blend used in the product or equipment. Manufacturers are also

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required to provide a copy of the disclosure statement, label, or sticker issued to the buyer or recipient.

Projected Emission Reductions

With the proposed regulations in place, HFC emissions are expected to be reduced by 12% of the business as usual projection in 2020, annually increasing to 25% in 2030. This translates to a total reduction of 4.95 MMTCO2E over 10 years.

The California Air Resources Board, in consultation with the United States Climate Alliance, developed a peer-reviewed HFC emissions methodology that uses population in conjunction with climatic and other factors that influence the use of HFCs by state. With this emissions tool[3], all 50 states can quantify potential HFC emissions and reductions under different policy scenarios at a state-specific level. The Department used this emissions tool to evaluate the estimated Maryland HFC reductions.

The Department also evaluated emission projections against the State Greenhouse Gas Inventory developed from the Greenhouse Gas Reduction Act (GGRA) that started with the base year of 2006 and currently has a completed 2017 Inventory. HFC's are accounted for in the Maryland inventory under Industrial Processes - Consumption of substitutes for ozone depleting substances. Maryland uses the EPA State Inventory Tool under the EPA Inventory of U.S. Greenhouse Gas Emissions and Sinks reporting[4] to populate the emissions estimates for this category.

Economic Impact on Affected Sources, the Department, other State Agencies, Local Government, other Industries or Trade Groups, the Public

The U.S. EPA estimated the cumulative 20-year total cost of the refrigerant portions of SNAP Rules 20 and 21 in the regulation to be $23.5 million for the entire nation, for the end-use sectors covered by Maryland's proposed regulation[5]. Affected businesses in Maryland are manufacturers of consumer aerosol products, domestic and commercial refrigerated appliances, polyurethane foams, polystyrene foams, polyolefin foams, polyisocyanurate foams, and self-contained retail food equipment and vending machines. Maryland consumers and businesses may be affected by the product transition in the market, however EPA estimates that the transition to new equipment and products with lower global warming potential substitutes will have negligible cost to end-users as market forces absorb initial cost increases and annual savings incurred to meet the end-use prohibitions.

[3] https://www.usclimatealliance.org/data-tools
[4] https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks
[5] CARB's Initial Statement of Reasons (ISOR) - https://ww2.arb.ca.gov/rulemaking/2018/high-global-warming-potential-refrigerant-emissions-reductions-regulation

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The proposed regulations do not prescribe that any business transition to a particular refrigerant or alternative so additional costs are not estimated. EPA support documents quote "The majority of potentially affected businesses are in the commercial refrigeration sector, but it is important to note that these businesses will not be affected in a single year; instead, a small proportion of businesses are expected to be affected in each year over a 15 to 20 year period, as existing retail food equipment reaches end-of-life and businesses make choices about which alternative refrigerant to use in new systems or retrofits"[6].

Maryland is 1.87% percent of the U.S. population. The total estimated statewide costs of the proposed regulation could be estimated by scaling the national cost to Maryland's population percentage. It is therefore estimated to impact Maryland business by approximately $440 thousand over 20 years. The estimated costs are likely to be over conservative because some refrigerant equipment manufacturers and foam and aerosol propellant end-use manufacturers have already complied with the SNAP rules that have a prohibition effective date of January 1, 2017 or prior,

Small business impact statements follow in the next section below.

The proposed regulation is expected to have no impacts on local agencies, or State government agencies. Existing air compliance inspector staff will enforce these regulations.

The proposed regulation will have a positive effect on public health and the environment. Short-lived climate pollutants (SLCPs) are harmful air pollutants and potent climate forcers with a much shorter lifespan in the atmosphere than carbon dioxide. For example, just one pound of HFC-134a warms the planet as much as 1,400 pounds of carbon dioxide. Because HFCs are potent and short-lived, action taken today to reduce these pollutants can achieve significant climate benefits within a couple of decades. Furthermore, effectively designed measures to reduce SLCP emissions will make U.S. businesses and states more competitive globally[7].

Reducing emissions of HFC's will combat the adverse impacts of climate change in Maryland. In many parts of the state, the impacts are already being felt. Impacts now and into the future may include an increased risk for extreme events such as drought, storms, flooding, and forest fires; more heat-related stress; the spread of existing or new vector-borne disease or shifts in public health challenges due to climate-driven stressors; and increased erosion and inundation of low-lying areas along the state's shoreline and coast. In many cases, Maryland is already experiencing these problems. Climate change raises the stakes in managing these problems by changing their frequency, intensity, extent, and magnitude.

[6] Revised Cost Analysis for Regulatory Changes to the Listing Status of High-GWP Alternatives - EPA-HQ-OAR-2014-0198-0242

[7] http://www.usclimatealliance.org/slcp-challenge-to-action

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Facts About …

New Regulations under new Chapter COMAR 26.11.33

Prohibitions on Use of Certain Hydrofluorocarbons in Aerosol Propellants, Chillers, Foam, and Stationary Refrigeration End-Uses

Economic Impact on Small Businesses

The U.S. EPA national analysis found that very few businesses would incur new costs when replacing equipment on a traditional life cycle in order to meet the proposed federal standards. The focus of cost impact from federal standards is on manufacturers who are not small businesses.

The U.S. EPA published a report on small business impact for SNAP 21 titled "Economic Impact Screening Analysis for Regulatory Changes to the Listing Status of High-GWP Alternatives – Revised" prepared by ICF International dated July 2015[8].

The ICF International, July 2015 report quotes:

- *This screening analysis finds that the rulemaking can be presumed to have no significant economic impact on a substantial number of small entities (SISNOSE).*
- *About 500,000 small businesses could be subject to the rulemaking, although more than 99% of small businesses subject to this rulemaking would be expected to experience zero compliance costs.*
- *For about 120 small businesses that are expected to incur compliance costs as a result of this rulemaking, their costs are estimated to be less than 1% of annual sales.*
- *This analysis indicates that fewer than 80 of the nearly 500,000 affected small businesses—or <0.1%—could incur costs in excess of 1% of annual sales, and that fewer than 60 small businesses could incur costs in excess of 3% of annual sales.*

Total annualized compliance costs across nationally affected small businesses are estimated at approximately $4.5-$7.7 million at a 7% discount rate, or $2.3-$4.7 million at a 3% discount rate. Maryland and other USCA States are not proposing regulation for the mobile sources at this time.

Affected small businesses nationally are manufacturers of consumer aerosol products, domestic and commercial refrigerated appliances, polyurethane foams, polystyrene foams, polyolefin foams, polyisocyanurate foams, and self-contained retail food equipment and vending machines. Maryland research found no small manufacturers of stand-alone refrigeration, vending machine equipment or foams in the State at this time.

[8] Economic Impact Screening Analysis for Regulatory Changes to the Listing Status of High-GWP Alternatives – Revised EPA-HQ-OAR-2014-0198-0240

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Is there an Equivalent Federal Standard to this Proposed Regulatory Action?

The proposed regulatory action contains prohibitions equivalent to certain sectors of the federal SNAP Rules 20 and 21. The EPA rules are found at 40 CFR, Part 82, Subpart G – Significant New Alternatives Policy Program (SNAP) (Appendices U and V). However, on August 8, 2017 and April 5, 2019, in two separate decisions, the U.S. Court of Appeals for the D.C. Circuit partially vacated the federal SNAP Rules 20 and 21, which provide the basis for this proposed regulatory action. Specifically, the court partially vacated the SNAP final rule issued on July 20, 2015 "to the extent it requires manufacturers to replace HFCs with a substitute substance," but upheld EPA's listing of the HFCs and HFC blends in the rule.

Draft 12/3/2019

Title 26

DEPARTMENT OF THE ENVIRONMENT

Subtitle 11 AIR QUALITY

Chapter 33 Prohibitions on Use of Certain Hydrofluorocarbons in Aerosol Propellants, Chillers, Foam, and Stationary Refrigeration End-Uses

Authority: Environment Article, §§ 1-404, 2-103, 2-301 – 303, 2-1202 and 2-1205 Annotated Code of Maryland

All New Text

.01 Applicability

This chapter applies to any person who sells, offers for sale, installs, uses, or introduces into commerce in the State, any substance for use in an end-use listed in Regulation .03 of this chapter.

.02 Definitions

A. In this chapter, the following terms have the meaning indicated.

B. Terms Defined.

(1) "Aerosol Propellant" means a compressed gas that serves to dispense the contents of an aerosol container when the pressure is released.

(2) "Air Conditioning Equipment" means chillers, both centrifugal chillers and positive displacement chillers, intended for comfort cooling of occupied spaces.

(3) "Bunstock" or "bun stock" means a large solid block-like structure formed during the production of polyurethane, polyisocyanurate, phenolic, or polystyrene insulation.

(4) "Capital Cost" means an expense incurred in the production of goods or in rendering services, including the cost of engineering, purchase, and installation of components or systems, and instrumentation, and contractor and construction fees.

(5) Centrifugal Chiller.

(a) "Centrifugal chiller" means air conditioning equipment that utilizes a centrifugal compressor in a vapor-compression refrigeration cycle typically used for commercial comfort air conditioning.

(b) "Centrifugal chiller" does not include cooling for industrial process cooling and refrigeration.

(6) "Cold Storage Warehouse" means a cooled facility designed to store meat, produce, dairy products, and other products that are delivered to other locations for sale to the ultimate consumer.

(7) "Component" means:

(a) A part of a refrigeration system, including condensing units, compressors, condensers, evaporators, and receivers; and

(b) All of a refrigeration system's connections and subassemblies, without which the refrigeration system will not properly function or will be subject to failures.

(8) "Cumulatively Replaced" means the addition of or change in multiple components within a three-year period.

(9) “Effective Date” or “Effective Date of Prohibition” means the date of manufacture after which the prohibitions provided in Table 1 of this chapter go into effect.

(10) ‘‘End-use’’ means processes or classes of specific applications within industry sectors, including those listed in Table 1 of this chapter.

(11) “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.

(12) “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.

(13) “Foam Blowing Agent” means a substance used to produce foam.

(14) "Household Refrigerators and Freezers.

(a) “Household Refrigerators and Freezers” means refrigerators, refrigerator-freezers, freezers, and miscellaneous household refrigeration appliances intended for residential use.

(b) “Household Refrigerators and Freezers” does not include “household refrigerators and freezers - compact”, or “household refrigerators and freezers - built-in.”

(15) “Household Refrigerators and Freezers Compact” means any refrigerator, refrigerator-freezer or freezer intended for residential use with a total refrigerated volume of less than 7.75 cubic feet (220 liters).

(16) Household Refrigerators and Freezers – Built-in.

(a) “Household Refrigerators and Freezers - Built-in” means any refrigerator, refrigerator-freezer or freezer 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,

(b) “Household Refrigerators and Freezers - Built-in” contain sides which are not finished and not designed to be visible after installation, and

(c) “Household Refrigerators and Freezers - Built-in” are designed, intended, and marketed exclusively to be:

(i) Installed totally encased by cabinetry or panels that are attached during installation;

(ii) Securely fastened to adjacent cabinetry, walls or floor; and

(iii) Equipped with an integral factory-finished face or accept a custom front panel.

(17) "Hydrofluorocarbons" means a class of greenhouse gases that are saturated organic compounds containing hydrogen, fluorine, and carbon.

(18) “Integral Skin Polyurethane” means a synthetic self-skinning foam containing polyurethane polymers formed by the reaction of an isocyanate and a polyol, such as that used in car steering wheels and dashboards.

(19) "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.

(20) MDI.

(a) “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,

(b) “MDI” consists of a pressurized canister of medication in a case with a mouthpiece; and

(c) “MDI” means “Metered Dose Inhaler” or “Medical Dose Inhaler.”

(21) “Miscellaneous Residential Refrigeration Appliance” means a residential refrigeration appliance smaller than a refrigerator, refrigerator-freezer, or freezer; and which includes coolers, cooler compartments, and combination cooler refrigeration or cooler freezer products.

(22) “Motor-bearing” means refrigeration equipment containing motorized parts, including compressors, condensers, and evaporators.

(23) “New” means products or equipment:

(a) That are manufactured after the effective date of this chapter;

(b) First installed for an intended purpose with new or used components after the effective date of this regulation;

(c) Expanded after the effective date of this regulation, to handle an expanded cooling load by the addition of components in which the capacity of the system is increased, including refrigerant lines, evaporators, compressors, and compressors; or

(d) Replaced or cumulatively replaced after the effective date of this regulation such that the capital cost of replacing or cumulatively replacing components after the effective date of this regulation exceeds 50% of the capital cost of replacing the whole system.

(24) “Person” means any individual, firm, association, organization, manufacturer, distributor, partnership, business trust, corporation, limited liability company, company, state, or local governmental agency or public district.

(25) “Phenolic Insulation Board” means phenolic insulation including that used for roofing and wall insulation.

(26) “Polyolefin” means foam sheets and tubes made of polyolefin.

(27) “Polystyrene Extruded Boardstock and Billet (XPS)” means a foam formed from predominantly styrene monomer and produced on extruding machines in the form of continuous foam slabs which can be cut and shaped into panels used for roofing, walls, flooring, and pipes.

(28) Polystyrene Extruded Sheet.

(a) “Polystyrene Extruded Sheet” means polystyrene foam including that used for packaging.

(b) “Polystyrene Extruded Sheet” is also made into food-service items, including hinged polystyrene containers (for "take-out" from restaurants); food trays (meat and poultry) plates, bowls, and retail egg containers.

(29) Positive Displacement Chiller.

(a) “Positive Displacement Chiller” means vapor compression cycle chillers that use positive displacement compressors, typically used for commercial comfort air conditioning.

(b) “Positive Displacement Chiller” does not include cooling for industrial process cooling and refrigeration.

(30) “Refrigerant” or “Refrigerant Gas” means any substance, including blends and mixtures, which is used for heat transfer purposes.

(31) Refrigerated Food Processing and Dispensing Equipment.

(a) “Refrigerated Food Processing and Dispensing Equipment” means retail food refrigeration equipment that is designed to process food and beverages dispensed via a nozzle that are intended for immediate or near-immediate consumption, including chilled and frozen beverages, ice cream, and whipped cream.

(b) “Refrigerated Food Processing and Dispensing Equipment” does not include water coolers, or units designed solely to cool and dispense water.

(32) “Refrigeration Equipment” means any stationary device that is designed to contain and use refrigerant gas, including commercial refrigeration equipment, household refrigeration equipment, and cold storage warehouses.

(33) “Remote Condensing Units” means retail refrigeration equipment or units that:

(a) Have a central condensing portion, and other parts of the system, located outside the space or area cooled by an evaporator;

(b) May consist of compressor(s), condenser(s), and receiver(s) assembled into a single unit, which may be located external to the sales area; and

(c) 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.

(34) Residential use.

(a) “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.

(b) “Residential use” does not include use within a household for commercial or medical application.

(c) “Residential use” does not include use in automobiles, watercraft, or aircraft.

(35) “Retail Food Refrigeration” or “Commercial Refrigeration” means equipment designed to store and display chilled or frozen goods for commercial sale including stand-alone units, refrigerated food processing and dispensing equipment, remote condensing units, supermarket systems, and vending machines.

(36) Retrofit.

(a) “Retrofit” means to convert an appliance from one refrigerant to another refrigerant.

(b) “Retrofit” includes the conversion of the appliance to achieve system compatibility with the new refrigerant and may include changes in lubricants, gaskets, filters, driers, valves, o-rings, or appliance components.

(37) “Rigid Polyurethane and Polyisocyanurate Laminated Boardstock” means laminated board insulation made with polyurethane or polyisocyanurate foam, including that used for roofing and wall insulation.

(38) “Rigid Polyurethane Appliance Foam” means polyurethane insulation foam in household appliances.

(39) “Rigid Polyurethane Commercial Refrigeration and Sandwich Panels” means polyurethane insulation for use in walls and doors, including that used for commercial refrigeration equipment, and used in doors, including garage doors.

(40) “Rigid Polyurethane High-pressure Two-component Spray Foam” means a foam product that:

(a) Is pressurized 800-1600 pounds per square inch (psi) during manufacture;

(b) Is sold in pressurized containers as two parts (i.e., A-side and B-side);

(c) Is blown and applied in situ using high-pressure pumps to propel the foam components; and

(d) May use liquid blowing agents without an additional propellant.

(41) “Rigid Polyurethane Low-pressure Two-component Spray Foam” means a foam product that:

(a) Is pressurized to less than 250 psi during manufacture;

(b) Is sold in pressurized containers as two parts (i.e., A-side and B-side); and

(c) Is typically applied in situ relying upon a gaseous foam blowing agent that also serves as a propellant so pumps typically are not needed.

(42) “Rigid Polyurethane Marine Flotation Foam” means buoyancy or flotation foam used in boat and ship manufacturing for both structural and flotation purposes.

(43) “Rigid Polyurethane One-component Foam Sealants” means a foam packaged in aerosol cans that is applied in situ using a gaseous foam blowing agent that is also the propellant for the aerosol formulation.

(44) “Rigid Polyurethane Slabstock and Other” means a rigid closed-cell foam containing urethane polymers produced by the reaction of an isocyanate and a polymer and formed into slabstock insulation for panels and fabricated shapes for pipes and vessels.

(45) “Stand-alone Unit” means retail refrigerators, freezers, and reach-in coolers (either open or with doors) where all refrigeration components are integrated and, for the smallest types, the refrigeration circuit is entirely brazed or welded; and all are fully charged with refrigerant at the factory and typically requires only an electricity supply to begin operation.

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

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

(48) “Substance” means any chemical intended for use in the end-uses listed in Table 1 of this chapter.

(49) “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.

(50) Use.

(a) “Use” means any utilization of a compound or any substance, including utilization in a manufacturing process or product in the State, consumption by the end-user in the State, or in intermediate applications in the State, such as formulation or packaging for other subsequent applications.

(b) “Use” excludes residential use.

(c) “Use” includes manufacturing for the purpose of residential use.

(51) “Vending Machines” means self-contained commercial food refrigeration equipment that dispense goods that must be kept hot, cold or frozen.

.03 List of Prohibited Substances.

A. The following table list prohibited substances in specific end-uses and the applicable effective date of prohibition, unless an exemption is provided for in §C of this regulation. The prohibitions do not apply to products or equipment manufactured for listed end-uses prior to an applicable effective date.

B. Table 1.

Table 1. End-use and Prohibited Substances

End-use Category: Aerosol Propellants		
End-Use	**Prohibited Substances**	**Effective Date**
Aerosol Propellants	HFC-125, HFC-134a, HFC-227ea and blends of HFC-227ea and HFC-134a	January 1, 2021
End-use Category: Air Conditioning		
End-Use	**Prohibited Substances**	**Effective Date**
Centrifugal chillers (new)	FOR12A, FOR12B, HFC-134a, HFC-227ea, HFC-236fa, HFC245fa, 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, R438A, R-507A, RS-44 (2003 composition), THR-03	January 1, 2024
Positive displacement chillers (new)	FOR12A, FOR12B, HFC-134a, HFC-227ea, KDD6, R125/ 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, R438A, R-507A, RS-44 (2003 composition), SP34E, THR-03	January 1, 2024
End-use Category: Refrigeration		
End-Use	**Prohibited Substances**	**Effective Date**
Cold storage warehouses (new)	HFC-227ea, R-125/290/134a/600a (55.0/1.0/42.5/1.5), R404A, R-407A, R-407B, R-410A, R-410B, R-417A, R-421A, R421B, R-422A, R-422B, R-422C, R-422D, R-423A, R-424A, R428A, R-434A, R-438A, R-507A, RS-44 (2003 composition)	January 1, 2023
Household refrigerators and freezers (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, R424A, R-426A, R-428A, R-434A, R-437A, R-438A, R-507A, RS24 (2002 formulation), RS-44 (2003 formulation), SP34E, 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, R424A, R-426A, R-428A, R-434A, R-437A, R-438A, R-507A, RS24 (2002 formulation), RS-44 (2003 formulation), SP34E, THR-03	January 1, 2021
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, R424A, R-426A, R-428A, R-434A, R-437A, R-438A, R-507A, RS24 (2002 formulation), RS-44 (2003 formulation), SP34E, THR-03	January 1, 2023
Supermarket Systems (Retrofit)	R-404A, R-407B, R-421B, R-422A, R-422C, R-422D, R428A, R-434A, R-507A	January 1, 2021
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, 2021
Remote Condensing Units (Retrofit)	R-404A, R-407B, R-421B, R-422A, R-422C, R-422D, R428A, R-434A, R-507A	January 1, 2021
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, 2021
Stand-Alone Units (Retrofit)	R-404A, R-507A	January 1, 2021
Stand-Alone Medium-Temperature Units (New)	FOR12A, FOR12B, HFC-134a, HFC-227ea, KDD6, R125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R407A, R-407B, R-407C, R-407F, R-410A, R-410B, R417A, R-421A, R-421B, R-422A, R-422B, R-422C, R422D, R-424A, R-426A, R-428A, R-434A, R-437A, R438A, R-507A, RS-24 (2002 formulation), RS-44 (2003 formulation), SP34E, THR-03	January 1, 2021
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, R422A, R-422B, R-422C, R-422D, R-424A, R-428A, R434A, R-437A, R-438A, R-507A, RS-44 (2003 formulation)	January 1, 2021

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, R417A, R-421A, R-421B, R-422A, R-422B, R-422C, R-422D, R424A, R-428A, R-434A, R-437A, R-438A, R-507A, RS-44 (2003 formulation)	January 1, 2021
Vending Machines (Retrofit)	R-404A, R-507A	January 1, 2021
Vending Machines (New)	FOR12A, FOR12B, HFC-134a, KDD6, R125/290/134a/600a (55.0/1.0/42.5/1.5), R-404A, R407C, R-410A, R-410B, R-417A, R-421A, R-422B, R422C, R-422D, R-426A, R-437A, R-438A, R-507A, RS-24 (2002 formulation), SP34E	January 1, 2022
End-use Category: Foams		
End-Use	**Prohibited Substances**	**Effective Date**
Rigid Polyurethane and Polyisocyanurate Laminated Boardstock	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof	January 1, 2021
Flexible Polyurethane	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof	January 1, 2021
Integral Skin Polyurethane	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, Formacel Z-6	January 1, 2021
Polystyrene Extruded Sheet	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, Formacel Z-6	January 1, 2021
Phenolic Insulation Board and Bunstock	HFC-143a, HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof	January 1, 2021
Rigid Polyurethane Slabstock and Other	HFC-134a, HFC-245fa, HFC-365mfc and blends thereof; Formacel TI, Formacel Z-6	January 1, 2021
Rigid Polyurethane Appliance Foam	HFC-134a, HFC-245fa, HFC-365mfc and blends thereof; Formacel TI, Formacel Z-6	January 1, 2021
Rigid Polyurethane Commercial Refrigeration and Sandwich Panels	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, Formacel Z-6	January 1, 2021
Polyolefin	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, Formacel Z-6	January 1, 2021
Rigid Polyurethane Marine Flotation Foam	HFC-134a, HFC-245fa, HFC-365mfc and blends thereof; Formacel TI, Formacel Z-6	January 1, 2021
Polystyrene Extruded Boardstock and Billet (XPS)	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, Formacel B, Formacel Z-6	January 1, 2021

Rigid polyurethane (PU) high-pressure two-component spray foam	HFC-134a, HFC-245fa, and blends thereof; blends of HFC365mfc with at least 4 percent HFC-245fa, and commercial blends of HFC-365mfc with 7 to 13 percent HFC-227ea and the remainder HFC-365mfc; Formacel TI	January 1, 2021
Rigid PU low-pressure two-component spray foam	HFC-134a, HFC-245fa, and blends thereof; blends of HFC365mfc with at least 4 percent HFC-245fa, and commercial blends of HFC-365mfc with 7 to 13 percent HFC-227ea and the remainder HFC-365mfc; Formacel TI	January 1, 2021
Rigid PU one-component foam sealants	HFC-134a, HFC-245fa, and blends thereof; blends of HFC365mfc with at least 4 percent HFC-245fa, and commercial blends of HFC-365mfc with 7 to 13 percent HFC-227ea and the remainder HFC-365mfc; Formacel TI	January 1, 2021

C. The following table list exemptions to the prohibitions in §B of this regulation.

Table 2. HFC Prohibition Exemptions

End-Use Category	Prohibited Substances	Acceptable Uses
Aerosol Propellants	HFC-134a	Cleaning products for removal of grease, flux and other soils from electrical equipment; refrigerant flushes; products for sensitivity testing of smoke detectors; lubricants and freeze sprays for electrical equipment or electronics; sprays for aircraft maintenance; sprays containing corrosion preventive compounds used in the maintenance of aircraft, electrical equipment or electronics, or military equipment; pesticides for use near electrical wires, in aircraft, in total release insecticide foggers, or in certified organic use pesticides for which EPA has specifically disallowed all other lower-GWP propellants; mold release agents and mold cleaners; lubricants and cleaners for spinnerettes for synthetic fabrics; duster sprays specifically for removal of dust from photographic negatives, semiconductor chips, specimens under electron microscopes, and energized electrical equipment; adhesives and sealants in large canisters; document preservation sprays; FDA-approved MDIs for medical purposes; wound care sprays; topical coolant sprays for pain

		relief; and products for removing bandage adhesives from skin.
Aerosol Propellants	HFC-227ea and blends of HFC-227ea and HFC-134a	FDA-approved MDIs for medical purposes.
Air Conditioning	HFC–134a	Military marine vessels where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements.
Air Conditioning	HFC-134a and R-404A	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.
Foams – Except Rigid polyurethane (PU) spray foam	All substances	Military applications where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements until January 1, 2022.
Foams – Except Rigid polyurethane (PU) spray foam	All substances	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 until January 1, 2025.
Rigid polyurethane (PU) two-component spray foam	All substances	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 until January 1, 2025.

.04 General Requirements.

A. No person may sell, install, use, or introduce into commerce in the State, any listed substance for use in any air-conditioning, refrigeration, foam, or aerosol propellant end-use listed as prohibited in Regulation .03B of this chapter, unless an exemption is listed in Regulation .03C.

B. Existing Products and Equipment.

(1) Except where an existing system is retrofit, nothing in this chapter requires a person that acquired a product or equipment containing a prohibited substance prior to an effective date of the prohibition in Table 1 of this chapter cease use of that product or equipment.

(2) Products or equipment manufactured prior to the applicable effective date of the restrictions specified in Table 1 of this chapter (including spray foam systems not yet

applied on site) may be sold, imported, exported, distributed, installed, and used after the specified date of prohibition.

C. Disclosure Statement. As of the effective date listed in Table 1 of this chapter, any person who manufactures for sell or entry into commerce in the State, products or equipment in the air-conditioning, refrigeration, foam, or aerosol propellant end-uses listed in Regulation .03 of this chapter, must provide a written disclosure to the buyer.

(1) For motor-bearing refrigeration and air-conditioning equipment that is not factory-charged or pre-charged with a refrigerant, the disclosure or label must 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 hydrofluorocarbon."

(2) Except for products and equipment with existing labeling required by state building codes and safety standards which contain the information required in §C(2)(a) and (b) of this regulation, the disclosure or label for refrigeration and air-conditioning equipment that are factory-charged or pre-charged with a refrigerant should include:

(a) The date of manufacture; and

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

(3) For foam products, the disclosure should be a label or sticker applied to product packaging that states:

"Where sold, compliant with State HFC regulations."

(4) For aerosol products:

(a) Each aerosol propellant product must comply with the product-dating requirements in COMAR 26.11.32.13; and

(b) The propellant must be listed in a Safety Data Sheet that complies with the requirements of 29 CFR 191.1200.

.05 Reporting.

A. Any person who manufactures for sell or entry into commerce in the State, products or equipment that contains or uses a substance listed in Table 1 of this chapter for end-uses listed in Table 1 of this chapter, shall follow the reporting requirements as specified in §§B and C of this regulation.

B. Initial Notification.

(1) Within 90 days of the effective date of this chapter, each manufacturer shall provide the Department an initial status notification of the status of products or equipment within each end-use listed in Table 1 of this chapter that uses or is designed to use substances listed in Table 1 of this chapter.

(2) The initial status notification according to §B(1) of this section shall include:

(a) Contact information on the manufacturer;

(b) The name of the party authorized to represent the manufacturer for purposes of providing initial status notifications and status updates;

(c) All end-use categories that are applicable to the manufacturer;

(d) Which refrigerant, aerosol propellant, or foam blowing agent are being used by products within each end-use applicable to the manufacturer; and

(e) Signature and certification by the authorized representative for the manufacturer.

C. Status Update Notification.

(1) Manufacturers shall follow the requirements in §B annually until products or equipment within each end-use listed in Table 1 of this chapter cease use of substances listed in Table 1 of this chapter.

(2) Manufacturers subject to this regulation shall notify the Department in writing when products or equipment within each end-use listed in Table 1 of this chapter cease use of substances listed in Table 1 of this chapter.

.06 Recordkeeping.

As of the effective date of this chapter, any person who manufactures any product or equipment in the end uses listed in Table 1 of this chapter, for sale or entry into commerce in the State, must maintain for five years and make available, upon request, a copy of the following records, where applicable:

A. Date of manufacture of the equipment or product.

B. The refrigerant, aerosol propellant, and foam blowing agent(s) blend that the equipment or product is designed to use.

C. Where applicable, the refrigerant, aerosol propellant, and foam blowing agent(s) in the equipment or product.

D. A copy of the disclosure statement, label, or sticker issued to the buyer or recipient.

Appendix C

Small Business Notification

Air & Radiation
Land & Materials
Water
Small Business Regulations Home
MDE Regulations Home

Proposed Air & Radiation Regulations with Small Business Impact

Ch. 212 (HB 1124) of 2019 - State Government - Regulations Impacting Small Businesses

Sign-up for email notifications

1. **Prohibitions on Use of Certain Hydrofluorocarbons in Aerosol Propellants, Chillers, Foam, and Stationary Refrigeration End-Uses [COMAR 26.11.33]**
   - Notice of Stakeholder Meeting Monday September 23, 2019
     1 pm - 3 pm at 1800 Washington Blvd

   Date Posted: September 10, 2019

2. **Prohibitions on Use of Certain Hydrofluorocarbons in Aerosol Propellants, Chillers, Foam, and Stationary Refrigeration End-Uses [COMAR 26.11.33]**
   - Draft Regulation Proposal to the Air Quality Control Advisory Council on December 16, 2019 at 8:15 am – Meeting agenda and materials published here
   - Fact Sheet (Compliance Guide) and Draft Regulation

   Date Posted: December 5, 2019

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Related Link:

MDE Air & Radiation Regulations

Contact Us

Privacy

Accessibility

1800 Washington Blvd., Baltimore, MD 21230

(410) 537-3000

Carolyn A Jones -MDE- <carolyna.jones@maryland.gov>

Maryland Department of the Environment HFC Stakeholder Meeting

1 message

Joshua Shodeinde -MDE- <joshua.shodeinde@maryland.gov> Fri, Aug 23, 2019 at 4:47 PM
To: Danielle Wright <danielle.wright@nasrc.org>, Helen Walter-Terrinoni <HWalter-Terrinoni@ahrinet.org>, john.sheff@danfoss.com, Justin Koscher <jkoscher@pima.org>, Kevin Messner <kmessner@aham.org>, spierce@aham.org, Stephen Wieroniey <Stephen_Wieroniey@americanchemistry.com>, wfisher@namanow.org, Mmvoytek@mdra.org, pschoening@hardinet.org, kirsten_mcneil@iiar.org, Lisa Massaro <lisa.m.massaro@dupont.com>, Allison Maginot <AMaginot@ahrinet.org>, Amy.Chiang@honeywell.com, "Olson, Jessica" <Jessica.Olson2@honeywell.com>, "Morris, Thomas" <thomas.morris@honeywell.com>, CHANEJS@cpchem.com, jeffrey.fort@dentons.com, rajan.rajendran@emerson.com, Harshad.Inamdar@rheem.com, jpaquette@structuralconcepts.com, bruce.hierlmeier@zero-zone.com, smandracchia@hudsontech.com, dave.winningham@alliedair.com, tfinnessey@usclimatealliance.org, Julie Cerqueira <jcerqueira@usclimatealliance.org>, Leah Kelly <lkelly@environmentalintegrity.org>, Joshua Berman <josh.berman@sierraclub.org>
Cc: George Aburn -MDE- <tad.aburn@maryland.gov>, Brian Hug -MDE- <brian.hug@maryland.gov>, Chris Hoagland -MDE- <chris.hoagland@maryland.gov>, Randy Mosier <randy.mosier@maryland.gov>, Carolyn A Jones <carolyna.jones@maryland.gov>, Megan Ulrich -MDE- <megan.ulrich@maryland.gov>, Erick Thunell -MDE- <erick.thunell1@maryland.gov>

Good Afternoon,

The Maryland Department of the Environment (MDE) would like to convene a stakeholder group on **September 23, 2019** to discuss prohibiting the use of certain hydrofluorocarbons (HFCs) in aerosol propellants, chillers, foam, and stationary refrigeration end-uses in Maryland. We have identified your organization/business as potentially being impacted by an MDE rule, and we are contacting you in an effort to compile a list of interested parties. Please inform us if you would like to continue to receive e-mail notifications on this topic, if we should add other pertinent individuals to this distribution list, or if you would like to be removed.

You may also sign-up for email communication from our office through the weblink below:

https://mde.maryland.gov/programs/Regulations/HB1124/Pages/index.aspx

Meeting materials for the September 23rd meeting will be distributed prior to the meeting and a conference line will be made available for your convenience. Please contact me via e-mail at joshua.shodeinde@maryland.gov or at 410-537-3866 should you have any questions.

Thank you and we look forward to your engagement on this topic.

Sincerely,

Joshua Shodeinde

--
Joshua Shodeinde
Regulatory and Compliance Engineer

Maryland Department of the Environment
Air and Radiation Administration
Air Quality Planning Program
1800 Washington Blvd, STE 730
Baltimore, MD 21230
410.537-3866
joshua.shodeinde@maryland.gov

Appendix D

Emission Reduction Analysis

Maryland Department of the Environment

Appendix D

Emission Reduction Calculations HFC TSD

January 2020

Appendix D – Emission Reduction Calculations proposed HFC regulation

Introduction

The purpose of this action is to propose new Regulations .01 to .06 under new chapter COMAR 26.11.33 Prohibitions on Use of Certain Hydrofluorocarbons in Aerosol Propellants, Chillers, Foam, and Stationary Refrigeration End-Uses. This action seeks to reduce hydrofluorocarbon (HFC) emissions by adopting specific United States Significant New Alternatives Policy Programs (SNAP) prohibitions for certain substances in air conditioning and refrigeration equipment, aerosol propellants, and foam end-uses.

The Maryland regulations follow the U.S. EPA SNAP Rule 20 & 21, California and Washington legislation and regulations recently adopted and guidance discussed through the United Sates Climate Alliance (USCA[1]). Other USCA States are actively engaging to propose HFC phase-outs. USCA States are following a model regulatory framework to promote consistency. Because HFCs are potent and short-lived, action taken today to reduce these pollutants can achieve significant climate benefits within a couple of decades. Furthermore, effectively designed measures to reduce short-lived climate pollutants (SLCP) emissions will make U.S. businesses and states more competitive globally.

The California Air Resources Board promulgated regulations to phase out HFC's in November of 2018[2] in addition to previous legislation for HFCs. California adopts some of the SNAP 20 & 21 categories but not all.

The Maryland proposed specific End-use HFC Prohibitions are listed in Table 1 under proposed Regulation .03. Some SNAP categories from 20 & 21 are not included by Maryland, or other USCA States, more explanation follows under the emissions calculations.

Throughout 2018 the USCA worked together to improve methods used to estimate HFC emissions at the state level. Until now, state-level HFC emissions inventories could only be

[1] https://www.usclimatealliance.org/

[2] https://ww2.arb.ca.gov/resources/fact-sheets/hydrofluorocarbon-hfc-prohibitions-california

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Emission Reduction Calculations HFC TSD

estimated by scaling national estimates by state population. The California Air Resources Board, in consultation with the USCA, developed a peer-reviewed HFC emissions methodology tool that uses population in conjunction with climatic and other factors that influence the use of HFCs by state, resulting in improved state-specific HFC emissions estimates. Now all 50 states can quantify potential HFC emissions and reductions under different policy scenarios at a state-specific level. Find more information on this through the Short-Lived Climate Pollutant's webpage. United States Climate Alliance webpage August 2019 https://www.usclimatealliance.org/data-tools

Projected HFC Emissions and Tools

The Department used the US Climate Alliance/ California Air Resources Board SLCP Emissions Tool (dated Aug. 22, 2019) and the Maryland State Greenhouse Gas Inventory to calculate expected hydrofluorocarbons (HFC) emission reductions.

With the proposed action in place, HFC emissions are expected to be reduced by 12 % from the business as usual projection in 2020, with annual HFC emission reductions increasing to 25 % in 2030. This translates to a total reduction of 4.95 MMTCO2E over 10 years.

The US Climate Alliance/ California Air Resources Board SLCP Emissions Tool uses population in conjunction with climatic and other factors that influence the use of HFCs by state. With this emissions tool, all 50 states can quantify potential HFC emissions and reductions under different policy scenarios at a state-specific level. The US Climate Alliance/ California Air Resources Board SLCP Emissions Tool, as an excel spreadsheet, includes state's population, number of households with AC, and number of light-duty vehicles in 2005 through 2030. Any of the input values in the tab sheets can be changed or sorted. A list of data sources used in the tool is provided below.

Data references for inputs to the US Climate Alliance/ California Air Resources Board SLCP Emissions Tool

- *Population Projections, United States, 2004 - 2030, by state, age and sex, on CDC WONDER Online Database, September 2005. Accessed at http://wonder.cdc.gov/population-projections.html on May 30, 2018 4:03:13 PM*

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- *Annual Estimates of Housing Units for the United States, Regions, Divisions, States, and Counties: April 1, 2010 to July 1, 2017 on US Census Bureau American FactFinder Online Database, May 2018. Accessed at https://www.census.gov/data/tables/2017/demo/popest/total-housing-units.html on May 30, 2018 at 4:15 PM*
- *2005 Residential Energy Consumption Survey (RECs) Survey Data on U.S. Energy Information Administration (EIA) Webpage. Accessed at https://www.eia.gov/consumption/residential/data/2005/ on September 9, 2018 10:44 AM*
- *2009 Residential Energy Consumption Survey (RECs) Survey Data on U.S. Energy Information Administration (EIA) Webpage, 19 August 2011. Accessed at https://www.eia.gov/consumption/residential/data/2009/ on June 1, 2018 9:16 AM*
- *2015 Residential Energy Consumption Survey (RECs) Survey Data on U.S. Energy Information Administration (EIA) Webpage. Accessed at https://www.eia.gov/consumption/residential/data/2015/#ac on September 9, 2018 10:44 AM*
- *United States Environmental Protection Agency (US EPA). MOVES 2014a: Latest Version of Motor Vehicle Emissions Simulator (MOVES). https://www.epa.gov/moves/moves2014a-latest-version-motor-vehicle-emission-simulator-moves (accessed 10 August 2018) (US EPA, 2015)*

Hydrofluorocarbons are used as refrigerants and in other applications, and they are the fastest growing source of greenhouse gas emissions. Under the Kigali Amendment to the Montreal Protocol, the world agreed to phase down their use and transition to climate friendly alternatives. In many cases, transitioning to new equipment with lower global warming potential (GWP) refrigerants offers energy efficiency benefits and net cost savings. The U.S. has yet to ratify the Kigali Amendment, and federal rules restricting the use of HFCs have been partly vacated by the D.C. Court of Appeals. U.S. Climate Alliance states are stepping up to fill this void and protect American companies and jobs, and are considering adopting their own regulations to transition away from HFCs.[3]

[3] Executive Summary USCA "A roadmap for reducing short-lived climate pollutants to meet the goals of the Paris Agreement, September 2018"

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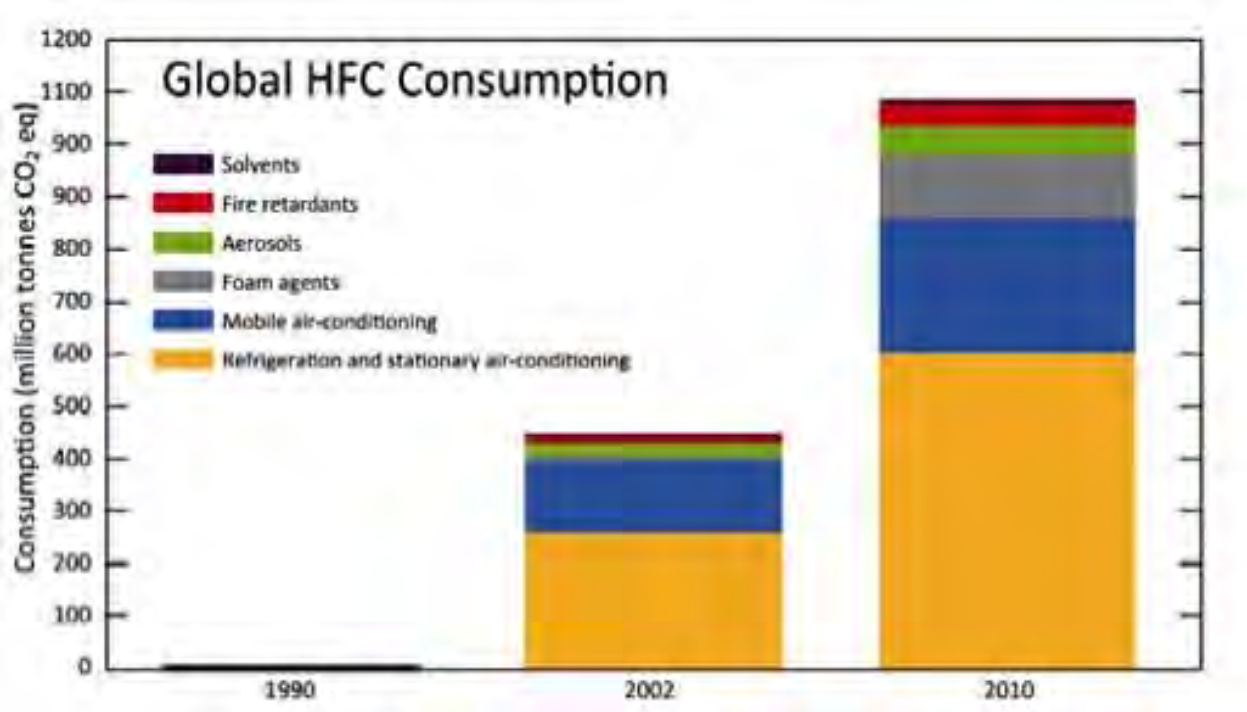
HFCs are the fastest growing source of GHGs,

Source: https://eia-global.org/campaigns/Climate/what-are-hydrofluorocarbons



The following list shows US Climate Alliance/ California Air Resources Board SLCP Emissions Tool category breakout for HFCs. These categories follow the SNAP end-use categories. Emissions are assigned by category by State following data inputs described above.

Foam Blowing Agents
Aerosol Propellants
Solvents and Fire Suppressant
Commercial Refrigeration
Industrial Refrigeration
Domestic Refrigeration
Stationary Air Conditioning>50lbs Commercial
Stationary Air Conditioning<50lbs Commercial
Stationary AC Residential Heat Pumps
Stationary Central AC Residential
Stationary Room unit AC Residential
Light-duty MVAC
Heavy-duty MVAC
Transport Refrigeration

Maryland Department of the Environment

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The US Climate Alliance/ California Air Resources Board SLCP Emissions Tool includes evaluation of several policy paths for HFC emission reductions. The tool included the following scenarios: BAU, RMP, SNAP, Kigali, RMP + SNAP, SNAP + Kigali, SLCP, RMP+SNAP+SLCP, All 4.

- Business as Usual (BAU)
- California Refrigerant Management Program (RMP)[4].
- Significant New Alternatives Policy Programs (SNAP) prohibitions[5] – Rule 20 Final July 2015 and Rule 21 Final December 2016.
- Kigali Amendment to the Montreal Protocol (Kigali) The world has agreed to transition away from HFCs. It begins to phase down the production and use of HFCs starting in 2019, reaching 85 percent reduction by 2050.
- US Climate Alliance States actions on HFCs to lock in SNAP (SLCP)

To use the Emissions Tool to apply to the proposed Maryland regulations, the Department chose only the SNAP rule reductions column to represent anticipated emission reductions.

Also, to align with other USCA States, only certain HFC categories from SNAP are proposed for prohibition at this time by the States. Therefore, the Department also needed to adjust the figures for only those categories under prohibitions from this proposed regulation.

The proposed regulation includes end use prohibitions for only:

Commercial Refrig.
Industrial Refrig.
Domestic Refrig.
Stationary AC > 50 lbs. Commercial
Stationary AC <50 lbs. Commercial
Foam
Aerosol Propellants

The proposed regulation does not include the following: Light-duty MVAC, Heavy-duty MVAC, Transport Refrigeration Solvents, Stationary AC Residential Heat Pumps, Stationary Central AC Residential, Stationary Room Unit AC Residential, and Solvents and Fire Suppressant; and therefore those HFC emissions were excluded.

[4] https://ww2.arb.ca.gov/our-work/programs/refrigerant-management-program
[5] https://www.epa.gov/snap/snap-regulations

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The Department includes emissions from HFCs in the State as predicted by the Maryland Greenhouse Gas Inventory. The Maryland Greenhouse Gas Inventory was created with a base year of greenhouse gas emissions for 2006. The last inventory update that has been completed is 2017 and can be found at the following website: https://mde.maryland.gov/programs/Air/ClimateChange/Pages/GreenhouseGasInventory.aspx

HFC's are accounted for in the Maryland inventory under Industrial Processes, Consumption of substitutes for ozone depleting substances. Maryland uses the EPA State Inventory Tool under the EPA Inventory of U.S. Greenhouse Gas Emissions and Sinks reporting for this HFC category emissions reported. https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks

The Department calculated a comparison percentage for the overall HFC category in the US Climate Alliance/ California Air Resources Board SLCP Emissions Tool verse Maryland Greenhouse Gas Inventory. This factor was determined to be 0.83. This factor was applied when estimating potential emission reductions for Maryland.

Maryland Projected Emission Reductions

The following table shows US Climate Alliance/ California Air Resources Board SLCP Emissions Tool figures for Maryland, calculated by selecting the State of Maryland which gives total HFC, then selecting only the categories proposed for regulation with this action, then proportioning to the Maryland Greenhouse Gas Inventory. The following table shows Maryland estimates of HFC emissions and anticipated reductions in MMTCO2E.

With the proposed action in place, HFC emissions are expected to be reduced by 12 % from the business as usual projection in 2020, with annual HFC emission reductions increasing to 25 % in 2030. This translates to a total cumulative reduction of 4.95 MMTCO2E over 10 years.

Maryland Department of the Environment

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Emission Reduction Calculations HFC TSD

Table: Maryland Yearly Comparison of BAU vs SNAP Case for the proposed regulation prohibiting HFC's in specific end use categories

*Values in MMTCO2E

Year & End Use	BAU*	SNAP*	Savings*	SNAP % Savings Compared to BAU
2020	1.94	1.71	0.23	11.79%
2021	2.02	1.75	0.27	13.35%
2022	2.11	1.79	0.31	14.90%
2023	2.19	1.84	0.36	16.35%
2024	2.27	1.87	0.40	17.82%
2025	2.34	1.89	0.45	19.27%
2026	2.41	1.91	0.50	20.62%
2027	2.47	1.93	0.54	21.91%
2028	2.53	1.95	0.59	23.15%
2029	2.58	1.96	0.63	24.25%
2030	2.64	1.97	0.67	25.38%
Sum	**25.51**	**20.56**	**4.95**	

Notes for comparison with CA rulemaking for HFC. CARB ISOR [6].

- California annual GHG reductions are estimated to be up to 3.4 $MMTCO_2E$ by the year 2030, with cumulative reductions of 22.9 $MMTCO_2E$ from 2018 through 2030. CARB ISOR.
- California does not expect any increase in the indirect CO2 emissions from increased energy usage, as the lower-GWP replacement refrigerant technologies that would be chosen are either more energy efficient or equal in energy efficiency to the baseline high-GWP refrigerants. CARB ISOR.
- California assumes 25% overlap from SNAP reductions and global Kigali phase-down. CARB ISOR Appendix B

[6] CARB Initial Statement of Reasons (ISOR), Date of Release January 30, 2018 - https://ww2.arb.ca.gov/rulemaking/2018/high-global-warming-potential-refrigerant-emissions-reductions-regulation

Appendix E

Updates to Proposed Prohibition Request

Performance Building Solutions
1501 Joseph Dr.
Midland, MI 48642

September 19, 2019

The Honorable Benjamin H. Grumbles
Secretary of the Environment
Maryland Department of the Environment
1800 Washington Blvd.
Baltimore, Maryland 21230

Dear Secretary Grumbles,

As Maryland contemplates regulation to reduce the use of hydrofluorocarbons (HFCs), DuPont encourages the state to ensure prohibitions are consistent with similar finalized regulations and legislation in other states. DuPont supports a harmonized regulatory framework for reducing HFCs.

A minor modification based on the 2015 and 2016 US EPA Significant New Alternatives Policy (SNAP) rules has been adopted in California, Washington and Vermont, and should be included in Maryland's regulation.

This change, impacting two niche foam types, is the result of collaboration between the Natural Resources Defense Council, blowing agent suppliers, and DuPont's Performance Building Solutions business. The modification is noted in the table below with asterisks.

End use	Substitutes Prohibition	Effective Date
Polystyrene Extruded Boardstock and Billet (XPS)	HFC-134a, HFC-245fa, HFC-365mfc, and blends thereof; Formacel TI, Formacel B, and Formacel Z-6. **	1-Jan-21
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.**	1-Jan-21
*If the United States Environmental Protection Agency approves a previously prohibited hydrofluorocarbon blend with a global warming potential of 750 or less for foam blowing of polystryrene extruded boardstock and billet and rigid polyurethane low-pressure two-component spray foam pursuant to the Significant New Alternatives Policy Program under Section 7671(k) of the federal Clean Air Act (42 U.S.C. Sec. 7401 et seq.), the department shall expeditiously initiate a rulemaking to conform the requirements established under this section with that federal action.		

The US EPA SNAP program previously approved several of the above HFC blends with global warming potentials (GWPs) at or under 750 **for other end uses**. Unfortunately, the needs of our DuPont niche foam end uses were overlooked during those previous applications, leaving us without permitted HFC blend options. Without this nuanced change the Maryland regulation would continue this oversight and block our ability to innovate. We have been working with the SNAP technical career staff to include new innovative technologies for XPS and 2K-LP in the Federal approval lists as they become developed. We hope that Maryland will follow the lead of other states to include blend options as outlined above, so that we can continue to bring our energy efficient products to market.

DuPont Performance Building Solutions commercializes a variety of thermal insulation and air sealing products and technologies which improve the energy efficiency (EE) performance of buildings. We collaborate with other companies, nonprofits, and across industry to promote progressive policies and standards such as energy efficient and resilient building codes on a local, state, and national level. We believe that overly aggressive HFC phase out timing, with the very limited basket of options currently approved for foam use, fails to meet the flexibility needs of the market and jeopardizes these energy efficiency products that provide environmental benefits.

Environmental impact of foam insulation: HFCs are a limited but critical ingredient required in the manufacturing process of our foam insulation products, which include extruded polystyrene STYROFOAM™ Brand Insulation (XPS) and two component low pressure spray polyurethane foam (2K-LP SPF) insulation and sealants. Although there are limited emissions attributed to the manufacture of our XPS insulation, the use of STYROFOAM™ building insulation has a large net positive contribution to GHG emissions reduction thanks to the energy savings the insulation provides throughout its lifetime. Based on published Life Cycle information, **current STYROFOAM™ insulation produced using HFCs will prevent at least 28 times more GHG emissions relative to its own carbon footprint over 50 years.**[1] Therefore, with no change to today's XPS product, use of STYROFOAM™ Brand Insulation with HFC technology would lower Maryland's GHG emissions, helping the state move towards its GHG reduction targets.

Maryland's regulation may not result in the intended environmental outcome: DuPont understands and appreciates the intent of Maryland in regulating HFCs to reduce GHG emissions, and we are aligned in your objective of GHG emissions reduction. It is with this common goal that we highly encourage Maryland Department of the Environment (MDE) to avoid creating its own conversion program that forces a complete phase out of HFC use in foams, due to its severe and unintended consequence for this energy efficiency industry. We urge the MDE to instead consider a more holistic approach to GHG emissions reduction as acknowledged by other states.

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[1] Life Cycle Greenhouse Gas Emissions Reduction From Rigid Thermal Insulation Use in Buildings M.H. Mazor, J.D. Mutton, D.A.M. Russell, G.A. Keoleian, J. Ind. Ecology, 15, 2, pp 284–299, April 2011.

In support of our comments, several documents are attached to this letter.

If you have further questions or would like more information, please do not hesitate to contact us.

Sincerely,

Lisa Massaro
Advocacy & Product Stewardship Manager
Performance Building Solutions
Lisa.M.Massaro@DuPont.com

Appendix F

Sample Reporting Form

Instructions for Maryland HFC Reduction Program: Product Manufacturer Notification

Maryland
Department of the Environment

1. Fill out form using Adobe Reader.
2. Submit your completed form using our online reporting system. For complete instructions about how to submit your form, go to mde.maryland.gov/programs/Air/AirQualityCompliance/Pages/index.aspx.

If you have questions, email MDE at christopher.wheeling@maryland.gov

1. Type of Notification	
Initial Notification	Check this box for initial notification. Check this box only if this form is submitted before the prohibition date applicable to the end-use you are reporting. Initial notification is due to MDE by **DATE**.
Status Update Notification for Prohibitions Taking Effect	Check this box for status update notification. Check the box next to the year the prohibition apply. Status update notification is due to MDE by **DATE** after the effective date of prohibition.
2. Manufacturer Information	
Name	Manufacturer Name
Address/City/State/Postal Code/Country	Manufacturer Address
3. Manufacturer Representative Information	
Name	Name of individual signing form
Organization	Signer's employer
Mailing Address/City/State/Postal Code/Country	Signer's address
Phone Number (Ext)	Signer's phone number, including country code if outside U.S.
Email Address	Signer's email address
4. Product Information	
End-Use	Go to pages X-X. If the end-use you are reporting is not listed, describe under "other."
Are any products within this end-use sold, leased, rented, installed, used, or manufactured in Maryland by manufacturer?	Check "yes" or "no" for all prohibited substances in use, intended for use, or embedded in any product within the applicable end-use manufactured as of the date of this notification. **For initial notification:** 1. Fill out page 2. Check "yes" or "no" for each end-use. 2. If yes, fill out related table for each end-use (pages 3-6). 3. If no, you're done. **For status update notification:** 1. Fill out page 2. Check "yes" or "no" for each end-use. 2a. If no, check "no restricted prohibited substance used" at the top of each end-use (pages X-X). **OR** 2b. If yes, fill out related table for each end-use (pages X-X).
5. Certification Statement and Signature	
Certification Statement	Read the certification statement.
Representative Signature	Sign the form. The signer must be the individual listed in section 3.
Representative Name	Type the name of the individual signing the form. This must be the individual listed in section 3.
Date	Date the form was signed.

Maryland
Department of the Environment

Maryland HFC Reduction Program: Product Manufacturer Notification

If you have questions, email MDE at christopher.wheeling@maryland.gov

1. Type of Notification

☐ Initial Notification

☐ Status Update Notification for Prohibition Taking Effect in (check one) ☐ 2021 ☐ 2022 ☐ 2023 ☐ 2024

2. Manufacturer Information

Name	
Address	
City	
State/Province/Region	
Postal Code	
Country	

3. Manufacturer Representative Information

First Name	
Last Name	
Organization	
Mailing Address	
City	
State/Province/Region	
Postal Code	
Country	
Phone Number (Ext)	
Email Address	

4. End-Use Information (pages X-X)

5. Certification Statement and Signature

I certify that:

- I am authorized by an agreement binding on the manufacturer to provide this notification on behalf of the manufacturer.
- I have all the necessary authority to carry out my duties and responsibilities on behalf of the manufacturer and that the manufacturer shall be fully bound by my representations, actions, inactions, or submissions.
- The manufacturer shall be bound by any order issued to me or to the manufacturer by MDE or a court regarding the manufacturer.

Representative Signature	Representative Name	Date

End-Use	Are any products within this end-use sold, leased, rented, installed, used, or manufactured in Maryland by manufacturer as of the date of this notification?
Aerosol Propellants	
Aerosol Propellants	Yes ☐ No ☐
Air Conditioning	
Centrifugal Chillers (new)	Yes ☐ No ☐
Positive Displacement Chillers (new)	Yes ☐ No ☐
Refrigeration	
Cold Storage Warehouse (new)	Yes ☐ No ☐
Household refrigerators and freezers (new)	Yes ☐ No ☐
Household refrigerators and freezers-compact (new)	Yes ☐ No ☐
Household refrigerators and freezers-built in appliances (new)	Yes ☐ No ☐
Supermarket Systems (Retrofit)	Yes ☐ No ☐
Supermarket Systems (New)	Yes ☐ No ☐
Remote Condensing Units (Retrofit)	Yes ☐ No ☐
Remote Condensing Units (New)	Yes ☐ No ☐
Stand-Alone Units (Retrofit)	Yes ☐ No ☐
Stand-Alone Medium Temperature Units (New)	Yes ☐ No ☐
Stand-Alone Low Temperature Units (New)	Yes ☐ No ☐
Refrigerated food processing and dispensing equipment (new)	Yes ☐ No ☐
Vending Machines (Retrofit)	Yes ☐ No ☐
Vending Machines (New)	Yes ☐ No ☐
Foams	
Rigid Polyurethane and Polyisocyanurate Laminated Boardstock	Yes ☐ No ☐
Flexible Polyurethane	Yes ☐ No ☐
Integral Skin Polyurethane	Yes ☐ No ☐
Polystyrene Extruded Sheet	Yes ☐ No ☐
Phenolic Insulation Board and Bunstock	Yes ☐ No ☐
Rigid Polyurethane Slabstock and Other	Yes ☐ No ☐
Rigid Polyurethane Appliance Foam	Yes ☐ No ☐
Rigid Polyurethane Commercial Refrigeration and Sandwich Panels	Yes ☐ No ☐
Polyolefin	Yes ☐ No ☐
Rigid Polyurethane Marine Flotation Foam	Yes ☐ No ☐
Polystyrene Extruded Boardstock and Billet (XPS)	Yes ☐ No ☐

Rigid Polyurethane (PU) high-pressure two-component spray foam	Yes ☐ No ☐
Rigid Polyurethane (PU) low-pressure two-component spray foam	Yes ☐ No ☐
Rigid Polyurethane (PU) one-component foam sealants	Yes ☐ No ☐
Other	
List	
1.	Yes ☐ No ☐
2.	Yes ☐ No ☐
3.	Yes ☐ No ☐
4.	Yes ☐ No ☐
5.	Yes ☐ No ☐

Aerosol Propellants

Prohibited Substance	**USED**
HFC-125	☐
HFC-134a	☐
HFC-227ea	☐
Blends of HFC-227ea and HFC134a	☐

Air Conditioning

Prohibited Substance	Centrifugal Chillers (new)	Positive Displacement Chillers (new)
No Prohibited Substance Used	☐	☐
FOR12A	☐	☐
FOR12B	☐	☐
HFC-134a	☐	☐
HFC-227ea	☐	☐
HFC-236fa	☐	☐
HFC-245fa	☐	☐
KDD6	☐	☐
R-125/ 134a/ 600a (28.1/70/1.9)	☐	☐

R-125/ 290/ 134a/ 600 (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-437A	☐	☐
R-438A	☐	☐
R-507A	☐	☐
RS-44 (2003 composition)	☐	☐
SP34E	☐	☐
THR-03	☐	☐

Refrigeration

Prohibited Substance	Cold Storage Warehouse (new)	Household refrigerators and freezers (new)	Household refrigerators and freezers-compact (new)	Household refrigerators and freezers-built in appliances (new)	Supermarket Systems (Retrofit)	Supermarket Systems (New)	Remote Condensing Units (Retrofit)	Remote Condensing Units (New)	Stand-Alone Units (Retrofit)	Stand-Alone Medium Temperature Units (New)	Stand-Alone Low Temperature Units (New)	Refrigerated food processing and dispensing equipment (new)	Vending Machines (Retrofit)	Vending Machines (New)
No Prohibited Substance Used	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
FOR12A	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
FOR12B	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
HFC-134a	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
HFC-227ea	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
HFC-236fa	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
KDD6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
R-125/ 290/ 134a/ 600 (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-423A	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
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	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Foams

Prohibited Substance	Rigid Polyurethane and Polyisocyanurate Laminated Boardstock	Flexible Polyurethane	Integral Skin Polyurethane	Polystyrene Extruded Sheet	Phenolic Insulation Board and Bunstock	Rigid Polyurethane Slabstock and Other	Rigid Polyurethane Appliance Foam	Rigid Polyurethane Commercial Refrigeration and Sandwich Panels	Polyolefin	Rigid Polyurethane Marine Flotation Foam	Polystyrene Extruded Boardstock and Billet (XPS)	Rigid Polyurethane (PU) high-pressure two-component spray foam	Rigid Polyurethane (PU) low-pressure two-component spray foam	Rigid Polyurethane (PU) one-component foam sealants
No Prohibited Substance Used	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
HFC134a	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
HFC245fa and blends thereof	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

HFC365mfc and blends thereof	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Blends of HFC365mfc with at least 4 percent HFC245fa	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Commercial blends of HFC365mfc with 7 to 13 percent HFC-227a and the reminder HFC-365mfc	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Formacel TI	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Formacel B	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Formacel Z-6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Other

Other End-Uses	Prohibited Substance

Appendix G

Public Hearing – information to be added after the hearing