

Halogenated Clean Agents and PFAS

PFAS (perfluoroalkyl and polyfluoroalkyl substances) refers to a class of chemicals that contain fluorine atoms bonded to carbon atoms. They became commercially available in the late 1940's/1950's and are used in numerous industries worldwide. Some of these industries include aerospace, automotive, medical devices, military, semiconductors, electronics, textiles, paper products, fire protection, cleaning products and so on. Many PFAS chemicals are persistent in the environment, and some have made their way into groundwater and drinking water from the use of PFAS chemicals as well as from PFAS manufacturing facilities. This has led to efforts by legislators and regulators to restrict the sale and use of PFAS chemicals and products containing them.

Historically PFAS was used to describe specific longer chain compounds such as the eight-carbon chemicals PFOS (perfluorooctane sulfonate) and PFOA (perfluorooctanoic acid). More recent PFAS definitions have broadened to include over 4,000 different fluorinated compounds ranging from gases to liquids to solids and including carbon chain lengths as short as a single carbon. As a result, some PFAS definitions now encompass halogenated clean agents used for fire protection.

PFAS Definitions

There are different definitions of PFAS that encompass different halogenated clean agents. Some of the key definitions are shown below.

United States Environmental Protection Agency (EPA)

The definition of PFAS in EPA's Toxic Substance Control Act (TSCA) PFAS reporting rule is as follows:

PFAS means any chemical substance or mixture containing a chemical substance that structurally contains at least one of the following three sub-structures:

- (1) R-(CF₂)-CF(R')R'', where both the CF₂ and CF moieties are saturated carbons*
- (2) R-CF₂OCF₂-R', where R and R' can either be F, O, or saturated carbons*
- (3) CF₃C(CF₃)R'R'', where R' and R'' can either be F or saturated carbons*

Under this definition FK-5-1-12, HFC-227ea and HFC-125, among other EPA SNAP approved halon substitutes and/or substitute blend components, are PFAS.

Maine and Minnesota

Maine and Minnesota have both passed laws that would restrict the sale of products containing PFAS in the future. The definition of PFAS in these laws, which is also being used in other states, is as follows:

PFAS means a class of fluorinated organic chemicals containing at least one fully fluorinated carbon atom.

Under this definition FK-5-1-12, HFC-227ea, HFC-125, HFC-236fa, HCFC-123 and 2-BTP are PFAS.

European Chemicals Agency (ECHA) PFAS Restriction Proposal

The definition of PFAS in the ECHA PFAS REACH restriction proposal follows the language established by the Organization for Economic Cooperation and Development (OECD) and is as follows:

Any substance that contains at least one fully fluorinated methyl (CF₃-) or methylene (-CF₂-) carbon atom (without any H/Cl/Br/I attached to it).

Under this definition FK-5-1-12, HFC-227ea, HFC-125, HFC-236fa, HCFC-123 and 2-BTP are PFAS.

PFAS Legislation and Regulation

Initial regulatory actions on PFAS were focused on individual substances such as PFOS and PFOA that are known to be persistent, bioaccumulative and toxic (PBT). Some recent legislative and regulatory proposals are focused on all PFAS substances based only on their persistence in the environment, regardless of whether they are bioaccumulative and/or toxic.

US EPA TSCA Reporting and Recordkeeping Requirements for PFAS

On October 11, 2023, EPA published a final rule under TSCA that requires companies that manufacture or import PFAS substances to report to EPA going back to 2011. This means that any company that was the importer of record for imports of FK-5-1-12, HFC-227ea or HFC-125 anytime between 2011 and now must report. Reporting is due to EPA by May 2025. Companies that already report to EPA on imports of

HFCs under the greenhouse gas (GHG) reporting program may not be required to report those imports again under the PFAS program. Additional information on the rule and instructions for reporting can be found at the following link:

<https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/tsca-section-8a7-reporting-and-recordkeeping>

Maine and Minnesota PFAS Laws

As currently written, the Maine and Minnesota PFAS laws would prohibit the sale of products containing intentionally added PFAS in 2032. As shown above these prohibitions would affect most of the halogenated clean agents used for fire protection. Both laws contain provisions for products to be exempted from the sale prohibitions as currently unavoidable uses (CUU). HARC recently made submissions to Maine and Minnesota with information on important uses of halogenated clean agents that are likely to continue beyond 2032 and suggested they be classified as CUUs. The Maine law was recently amended and now includes an exemption from the restrictions for certain uses of halogenated chemicals in applications where they are EPA SNAP approved such as air conditioning and refrigeration. Maine is currently reevaluating what products are covered and how CUUs should be determined, and a proposed rule is expected this summer. HARC expects that both laws will likely change before the sales prohibitions become final.

https://www.revisor.mn.gov/statutes/2023/cite/116.943?keyword_type=all&keyword=PFAS

<https://legislature.maine.gov/legis/statutes/38/title38sec1614.html>

<https://legislature.maine.gov/backend/App/services/getDocument.aspx?documentId=107194>

ECHA PFAS Restriction Proposal

In March 2023, ECHA released for public consultation a proposal by five European countries - Germany, the Netherlands, Norway, Sweden, Denmark – for a broad REACH restriction covering PFAS substances. As shown above the proposed restriction would encompass most of the halogenated clean agents used for fire protection.

The proposal, which is generally referred to as the universal PFAS or U-PFAS restriction, would prohibit the manufacture, import, and sale in the European Union of most PFAS substances and products containing them 18 months after becoming final (entry into force). It includes time-limited derogations (exemptions) for many PFAS applications that don't currently have alternatives. The proposal acknowledges that there are no current alternatives and none in development for many uses of halogenated clean agents and includes a 12-year derogation for “clean fire suppressing agents where current alternatives damage the assets to be protected or pose a risk to human health.” Based on the expected timing of the PFAS restriction, this would

delay the prohibition on halogenated clean agents until the 2040 timeframe. In response to the public consultation, HARC made submissions to ECHA in June and September 2023 with extensive information on halogenated clean agents. The HARC submissions noted that there are likely to be continuing uses of halogenated clean agents beyond 2040 and suggested a time-unlimited derogation for halogenated clean agents be included in the restriction.

The U-PFAS restriction proposal along with the approximately 5,000 comments submitted in response to the public consultation that closed September 30, 2023, are currently under review by the ECHA Committee for Risk Assessment (RAC) and ECHA Committee for Socio-Economic Analysis (SEAC). Once they have completed their review, RAC and SEAC will publish draft opinions that will assess whether the proposed restriction is the appropriate regulation to address the risks presented by PFAS substances. In their opinions, RAC and SEAC are likely to suggest modifications to the original proposal based on the information received during the consultation. The RAC and SEAC draft opinions will then undergo their own public consultation prior to being finalized. Once finalized, the compiled RAC and SEAC opinion could form the basis of a European Commission proposal for a regulation that would be sent to the European Parliament and Council for final adoption. Based on the current schedule, it seems unlikely that a PFAS REACH restriction could be finalized and enter into force before 2027.

<https://echa.europa.eu/documents/10162/1c480180-ece9-1bdd-1eb8-0f3f8e7c0c49>

Outlook

The proposed prohibitions on halogenated clean agents as PFAS are still several years away. HARC expects that the scope of any prohibitions or other forms of restrictions could change prior to implementation. Some of the current proposals that would regulate all PFAS chemicals as a group are being reconsidered due to the complexity of regulating thousands of substances used in hundreds of industries at the same time. Recent legislation in some US states is targeted at specific uses of PFAS, particularly in consumer products, rather than all PFAS in all uses. In addition, there is continued scientific debate about whether the degradation products of the fluorinated gases that are used as replacements for ozone depleting substances (ODS) and GHGs present the type of significant risk to human health and the environment that would justify a ban on their manufacture and use. HARC will continue to monitor legislative and regulatory activity on PFAS and provide information to environmental authorities on the importance of halogenated clean agents for protecting people and high-value assets from fire.