FIRE SUPPRESSION SYSTEMS ASSOCIATION

Comments on Annex XV Restriction Report on per- and polyfluoroalkyl substances (PFAS)

The Fire Suppression Systems Association (FSSA, www.fssa.net) is a membership organisation whose more than 150 members include the manufacturers and designer-installers of automatic special hazard fire suppression systems. As an authority within the special hazard industry, the FSSA appreciates the opportunity to provide comments on the Annex XV Report proposing restrictions on per- and polyfluoroalkyl substances (PFAS) under REACH .

Special hazard fire suppression systems are designed to limit damage to high value assets from fire events. These systems include a wide range of non-water fire extinguishing agents. These agents include carbon dioxide, water mist, foam, dry chemical, aerosols, hybrid systems, inert gas type clean agents, and halogenated gas type clean agents. As defined by the National Fire Protection Association (NFPA, www.nfpa.org), a clean agent is a gaseous fire suppressant that is electrically nonconducting and that does not leave a residue upon evaporation. As used in this document, the term "Clean Agents" refer only to halogenated gas clean agents that presently face use restrictions under the regulatory framework in development. These agents include:

ASHRAE Name	Chemical Name	CAS Registry #	Formula
HFC-227ea	Heptafluoropropane	CAS 431-89-0	CF_3CHFCF_3
HFC-125	Pentafluoroethane	CAS 35433-6	CF_3CHF_2
FK-5-1-12	Perfluoro(2-methyl-3-pentanone)	CAS 756-13-8	$CF_3CF_2COCF(CF_3)_2$
HFC-236fa	Hexafluoropropane	CAS 690-39-1	$CF_3CH_2CF_3$
2-BTP	Bromotrifluoropropene	CAS 1514-82-5	$C_3H_2BrF_3$
HCFC Blend B	HCFC-123 + gas blend	CAS 306-83-2	$C_2HCl_2F_3$+Ar+CF_4
Halocarbon Blend 55 [50% FK-5-1-12 & 50% HCFO-1233zd(E)]	Perfluoro(2-methyl-3-pentanone) 1-Chloro-3,3,3-trifluoropropene	CAS 756-13-8 CAS 2730-43-0	$CF_3CF_2COCF(CF_3)_2$ Trans CF3CHCClH

Special hazard fire suppression systems, using Clean Agents, provide critical fire protection and life safety to high hazard and/or high value infrastructure and/or essential facilities such as:

- National defence systems,
- Transportation infrastructure
- Commercial and military aviation,
- Telecommunication systems, data processing and storage installations,
- Petrochemical facilities and energy pipelines,
- Explosion hazards,
- Power generation, transmission, and control
- Irreplaceable art objects and documents

Clean Agents are gaseous in use and do not precipitate to groundwater. It is important to note that Clean Agents are only released to the environment in the unlikely event of a fire or explosion or accidental discharge.

As an organisation dedicated to life safety and property protection, FSSA supports rational science-based efforts to eliminate sources of harm to humans and the environment. Due to the high risk to society in eliminating all PFAS materials due to an unnecessarily broad classification of compounds, we advocate for a scientific approach that distinguishes between **P**ersistent, **B**ioaccumulative and **T**oxic PFAS (PBTs) compounds from those which are not known to be PBT, based upon the best available science. It is also important to note the distinction between Clean Agents and other fire protection agents such as AFFF or ATC firefighting foams which are known PBTs. Current science supports that Clean Agents used in fire and explosion protection applications are not persistent, or bioaccumulating and have low toxicity when used in accordance with current codes and standards. For these reasons alone legislation or regulation of the sale or use of PFAS should exclude Clean Agents.

Treating all PFAS compounds as a single regulatory group is an approach that is inappropriate and unnecessary. PFAS is a large, diverse group of chemical compounds. All PFAS are not the same and their properties vary widely. Chemical and structural differences among different types of PFAS result in vast differences in physical-chemical properties. Their striking differences, both chemically and physically, must be considered in any effort to understand and address potential health and/or environmental risks.

Implementing broad regulations that ban all PFAS compounds without first considering the scientific evidence and carefully assessing the impact such a ban could have on society, could result in unintended consequences. Furthermore, banning all PFAS compounds is likely to hamper the ability of businesses and consumers to access essential products and obtain replacement parts that are needed to keep mission critical operations functioning.

Trends in Clean Agent Use

Clean Agents, when used as fire extinguishing agents, provide features and performance far beyond standard code requirements for general fire protection. Clean Agents are an additive, elective technology, chosen to protect critical resources. Since the phase out of halon many fire protection applications have already switched to alternative, non-halogenated gas technologies where technically feasible.[1] Clean Agents, however, remain a relevant and necessary technology for protecting hazards where the risk of loss outweighs the significant additive cost of Clean Agents, as well as the performance limits of alternative protective measures.

Since 2014, the use of HFC-based Clean Agents in the EU has decreased by 95% because of the European F-Gas regulations. Ongoing requirement for Clean Agent fire suppression has primarily been supported through the installation of new FK–5-1-12 or inert gas systems. The ongoing volume reductions in the F-Gas regulations will continue to reduce commercial volumes of HFC-based Clean Agents. With this regulation in place and functioning as planned it is difficult to understand the statement on p258 of Annex E that “A 12-year derogation of all fluorinated gases use in fire suppressants will lead to additional emissions of 102 183T”. These additional emissions would represent more than 5x the current stock of 20 201T, as stated in Annex A Table

[1] UNEP HTOC Assessment Report 2018
/sites/default/files/assessment_panels/HTOC_assessment_2018.pdf

A.36. Table A.36 estimates 863 T of PFAS sold in fire suppression equipment annually; stocks of 20,201 T; and annual decommissioning of 208 T. This provides an annual growth estimate of 655 T annually, growing stocks to 28,061 T in 12 years. Applying the 3.5% emissions rate from the Exponent F-Gas Report against the volume estimates results in total emissions ranging between 8 500 T and 11 785 T, a factor of 10 lower than the estimate in Annex E. Of available estimates for clean agent emission, the Exponent F-Gas value of 3.5% is the highest. Other values proposed for Clean Agent emission are:

Fire Suppression Technical Options Committee (FSTOC) 2022 Assessment Report – 3%.[2]
US EPA Vintaging Model – 1.5% between 2003–2019, 1% after 2019.[3]

FSSA believes that emission rates in the EU should be similar to the US due to similar hardware systems as well as service and maintenance practices.

Limiting the release of extinguishing agents from installed systems, while actively recovering and recycling the agent when no longer required for protection, enhances the value in use of these substances. This in turn further reduces potential future emissions. As experienced with Halon, the globally installed base of F-gas fire systems are actively recovered and recycled to support new and existing critical systems, limiting emission and release of agent for decades in a circular product life cycle. [4] Eliminating the responsible use of the agents, as proposed by this regulation, removes the market for recycling, destroys the value in use, and promotes unnecessary and irresponsible release to the atmosphere.

F-gases have been commercialised as replacements for ozone-depleting substances such as chlorofluorocarbons (CFCs) and halons. The development of these chemicals for use in fire and explosion suppression applications has been instrumental in achieving the accelerated halon production phaseout mandated by the Montreal Protocol on Substances that Deplete the Ozone Layer. At the same time, the use of this class of chemicals carries with it some environmental concern and, therefore, the need to minimise emissions.

Impacts on the Recycling Industry – there currently exists a sufficient Clean Agent recycling industry that will minimise emissions (**End of Life –** end of life emissions are low because most are recovered and reclaimed, only 1% are emitted).

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[2] Montreal Protocol Fire Suppression Technical Options Committee (FSTOC) Assessment Report, December 2022

[3] US Environmental Protection Agency (EPA) Vintaging Model Peer Review: Fire Extinguishing, Presentation for HARC, February 2019

[4] HEEP – A Program for Tracking Fire Protection Emissions of HFCs and PFCs
https://www.nist.gov/system/files/documents/el/fire_research/R0601303.pdf
HEEP Final Report 2020
https://www.harc.org/_files/ugd/4e7dd1_64188eee6f554bf5966fbd24f97b552a.pdf

- **Non-PFAS alternatives – inert gases, CO_2**
- **Not in Kind alternatives to "PFAS" agents and where they can and can't replace "PFAS"**

The range of applications and the unique requirements of individual facilities make it very challenging to propose that a single alternative non-PFAS technology is viable across a general use category – such as "Data Centres", "Control Rooms", or "Commercial Aviation". Each data centre, for example, has a different physical configuration, supports different functions and applications, and as such, requires different levels of fire protection technology to protect the hazard.

Need for revised wording of the derogation for clean fire suppressing agents: While damage to assets and risk to human health are clearly important parameters, there are other critical performance considerations including speed of extinguishment, time required for agent discharge, weight of the agent and equipment, and space required for the agent and equipment. There are installation configurations where no alternative meets all of these requirements except for Clean Agents. For example, inert gas systems require a much larger footprint for cylinder storage as well as a larger footprint for ventilation of the protected space. Many installations do not have sufficient space for this. Need to incorporate all of these.

Onboard aircraft fire suppression – what is it and what's used? (HFC's and 2-BTP)

Use and emissions of PFAS agents in fire suppression: reference industry volumes in Annex A, page 71 and Annex XV Report, page 171,Table 13

Derogation xii p258 of Annex E states that "A 12-year derogation of all fluorinated gases use in fire suppressants will lead to additional emissions of 102 183T". More information is required to understand these additional emissions since they represent more than 5x the current stock as stated in annex A table 36 of 20 201T. The European F-Gas regulation phase down schedule has reduced the use of fluorinated clean agents in new fire suppression systems to critical uses – and will continue to put further pressure on commercial volumes as the ruling continues reducing allowed volumes. The Kigali Amendments will further reduce new supplies of F-Gas fire suppressing agents to the market over time.

Conclusion

The FSSA comments attached provide data supporting a time unlimited derogation for Clean Agent fire suppressants. This information indicates:

1) The unlikely threat to human health and the environment from the continued use of Clean Agents. When used as required by regulations, the likelihood of negative effects from

exposure to the chemical, breakdown components, or possible chemical combinations, is very small.

2) The Socio-economic cost of the present EU REACH Restriction as proposed is exceedingly high. If brought into force as proposed, it would require sensitive technical and archival operations to go unprotected or insufficiently protected from fire, or relocation to jurisdictions without such restrictions.

A time unlimited derogation would allow continued use for critical applications, balance the socio-economic impacts with the likelihood of harm to human health and the environment, and provide a stable and viable recycle market to support fire systems in critical service. A quantitative science-based approach to identifying, then regulating substances of concern is a working solution to managing justified concern over PBT chemicals and their breakdown components.