

25.09.2023
Brussels, Belgium

Re: Submission of ATMOsphere to the PFAS Restriction Intention.

Dear policy officers working on the PFAS Restriction Intention,

We welcome the opportunity to submit further comments related to the availability of alternatives to PFAS that are fluorinated gasses used in cooling and heating systems.

[ATMOsphere](#) is a global market accelerator with the mission to scale up clean cooling and heating. We focus our work on supporting companies and technologies that supply heat and cool without relying on halogenated refrigerants. These have first contributed to the depletion of the ozone layer, to global warming and are now found to be persistent chemicals such as per- and polyfluoroalkyl substances (PFAS) that pollute water due to their degradation products, such as trifluoroacetic acid (TFA), among other issues of concerns.

In fact, the leakage of fluorinated refrigerants from heating and cooling systems worldwide is assumed to be among the most important contributors to TFA pollution from precipitation. Most notably, refrigerant R1234yf decomposes 100% into TFA, and this refrigerant is part of a wide variety of other blended substances used as refrigerants across the whole heating, ventilation, air-conditioning and refrigeration industry (HVAC&R). TFA is found widely in the environment, and its concentrations are increasing study by study.¹ A compendium of the recent studies conducted on TFA pollution is available at this [link](#), evidencing an increase in the accumulation of TFA throughout Europe.²

The approach of the PFA Restriction Proposal is commendable, as it sets persistence as a trigger for policy action. Persistence is a multiplier of toxicity: with chemical compounds persisting in the environment, and no halt to their release, any safe limit will eventually be passed. This will happen unless emissions are reduced, i.e., these substances are not deployed anymore. This can happen immediately in new heating and cooling systems which can easily shift to alternatives to fluorinated gasses.

As the table below shows, multiple non-halogenated alternatives can replace F-gasses that are PFAS.

¹ Deutsche UmweltHilfe (2023). Deep Dive TFA: small molecule, big consequences. ATMOsphere Europe Summit 2023. Available online at:

<https://drive.google.com/file/d/1lqvzW-9gUMpPSPDarCThFAdkzDG3fAWV/view>

² ATMOsphere (2022). The Rising Threat of HFOs and TFA to Health and the Environment. Available online at: <https://atmosphere.cool/hfo-tfa-report/>



**Today we do NOT
need HFCs/ HFOs
for NEW
equipment**

	CO ₂ / R744	NH ₃ / R717	HC	H ₂ O / R718	Air / R729
Domestic applications	✓		✓	✓	
Commercial refrigeration	✓	✓	✓	✓	
Industrial refrigeration and heat pump systems	✓	✓	✓	✓	✓
Water and space heating heat pumps	✓	✓	✓		
Chillers	✓	✓	✓	✓	
Vehicle air conditioning	✓		✓		✓

Sources: Hafner, A., Ciconkov, R. (2021). Current state and market trends in technologies with natural refrigerants. 9th IIR Conference: Ammonia and CO2 Refrigeration Technologies, Ohrid, 2021; European Commission (2022) EU F-gas Technical Annexes to the Revision; Norwegian Chemical Agency (2022) Report Summary F-gas Uses.

Regarding the proposal, we appreciate the level of detail that has been dedicated in the analysis of our sector (Application of F-gasses, Refrigerants). It is clear that policymakers informing this section of the proposal have thoroughly understood the technical and commercial availability of systems for heating and cooling not relying on halogenated substances.

We would like to complement your analysis by providing the latest information on the state of the art of technologies not relying on halogenated substances across a wide variety of applications, whether stationary or mobile, or whether intended to deliver heating, cooling or refrigeration. In fact, our recent ATMOsphere Europe Summit 2023 highlighted the ability of natural refrigerants to replace entirely fluorinated refrigerants that are PFAS in all segments of the HVAC&R industry. By checking the presentations at this [link](#), policymakers can get a wealth of knowledge on systems powered by all sorts of working fluids that are not halogenated: carbon dioxide, hydrocarbons, ammonia, and including water and air. The presentation covers stationary cooling, heating and refrigeration systems (such as heat pumps), as well as mobile circuits, whether for electric cars, trucks, vans, trains, trailers and reefer containers. We welcomed speakers from Deutsche Bahn, Hanon Systems, Delhaize, Copeland, GIZ as well as participants from Volkswagen, Skoda among many others: all of these companies or entities are working with/ are interested in systems not relying on halogenated refrigerants. The presentations are divided according to the panels, which can be easily searched in the webpage.

We believe that of particular interest for the consultation might be the panels on (commercialisation of) heat pumps, a hot topic discussed under the revision of the EU F-gas Regulation, showcasing multiple examples of systems delivering heat, even at high temperatures, without the support of halogenated substances such as PFAS. Another panel of sure interest is that regarding mobile systems: as estimated by the German Environment Agency, mobile systems are expected to be among the most refrigerant-demanding systems, corresponding to a great amount of emission leaking from them. In fact, the European Commission used as an educated estimate a leakage rate from operating systems of 10% of the annual charge of cars,³ which, multiplied by the amount of cars currently on European (but also global) roads, makes this segment extremely pivotal and fully addressable.

Finally, we would like to point out that the unlimited derogation (j) regarding refrigerants in HVACR-equipment in buildings where national safety standards and building codes prohibit the use of alternatives, should be changed with a better suited time-limit derogation of 13.5 years as of EiF.

To support our statement, we would like to refer to the process of the revision leading to the standard IEC 60335-2-40 Ed. 7 on air-conditioners and heat pumps. This revision, which is widely considered as complex and particularly challenging by convenors and participants, took 7 years from inception to its final conclusion.⁴ This example gives plenty of time to authorities to comply with the restriction suggested of 13.5 years, and make the unlimited derogation not justifiable, especially in a context of these authorities pushed to act in light of the restriction on some of these halogenated substances. Even considering the transposition of the IEC standards into harmonized European law, i.e., EC standards, this would take a maximum 2-3 years, concluding the process well ahead of the restriction proposed in the consultation.

The pressure that would trigger a 13.5 year deadline would also prompt national authorities in their effort to update building codes throughout Europe. In fact, according to the European Commission Assessment leading to the revision of the EU F-gas Regulation, only three European countries (France, Italy and Spain) cannot currently accept flammable refrigerants due to their outdated building codes. However, authorities are in the process of updating them, therefore it seems wasteful to allow for an unlimited exclusion where work is undergoing and expected to be finished in relatively short time frames.⁵

³ Support contract for an Evaluation and Impact Assessment for amending Regulation (EU) No 517/2014 on fluorinated greenhouse gases. Available online at:

https://climate.ec.europa.eu/system/files/2022-04/f-gases_external_preparatory_study_annexes_en.pdf

⁴ Asbjørn Vonsild. IEC 60335-2-40 Ed. 7 — New possibilities for hydrocarbons. ATMOSphere World Summit 2022. Available online at:

<https://drive.google.com/file/d/17GdPcP8QMjIQDrRAbbdiC2sBqEmIRoCE/view>

⁵ Support contract for an Evaluation and Impact assessment for amending Regulation (EU) No 517/2014 on fluorinated greenhouse gasses. Available online at:

https://climate.ec.europa.eu/system/files/2022-04/f-gas_evaluation_report_en.pdf

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As said, a clear time limit would push competent authorities to act. A time limit of 13.5 years would better justify this derogation: eventually, the provision could be amended allowing for the use of F-gasses that are PFAS only following unsuccessful revisions of standards and building codes.

ATMOsphere therefore asks the policy makers at the European Chemical Agency to maintain the level of ambition in tackling F-gasses that are labeled PFAS as shown in the current proposal. Substances used to replace f-gasses that are considered PFAS are available, deliver equal or better efficiencies⁶ and are safely deployed across all HVAC&R applications. We urge policymakers to yield this low hanging fruit in the PFAS discussion, even shortening derogation time where feasible.

In any case, derogation (j) seems to be unnecessary especially with regard to the contextual work currently being done to ease the safe uptake of flammable refrigerants in heating and cooling systems: therefore, we do not agree with the unlimited derogation granted in point (j) and suggest a shorter one of 13.5 years instead as explained above.

We thank you for your attention and remain available should you require any further information.

ATMOsphere

⁶ See for instance, different articles showcasing energy savings when natural refrigerant systems are deployed in comparison to benchmark systems using halogenated systems:
<https://hydrocarbons21.com/?s=energy+efficiency>, <https://r744.com/?s=energy+efficiency>,
<https://ammonia21.com/?s=energy+efficiency>