

Universal PFAS restriction under REACH

Briefing on fluorinated gases in the universal PFAS restriction - The F-lephant in the room

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Key Facts

- The world is facing a triple planetary crisis of chemical pollution, climate emergency and biodiversity loss
- Forever chemicals PFAS are a main contributor to the chemical crisis crossing planetary boundaries – particularly the breakdown product of Fluorinated Gases: TFA
- Banning fluorinated gases is one of the most effective measures to reduce PFAS emissions¹
- F-gas alternatives are available and favourable
- The EU F-Gas Regulation aims to decrease climate impacts and does not cover a significant part of fluorinated gases that are PFAS

PFAS, also known as *Forever Chemicals*, are a chemical group of more than 10,000 substances according to the OECD definition. PFAS substances in this big and diverse group of chemicals share the property called “persistence”, i.e. that they do not or just barely degrade naturally, remaining in the environment – some of them even for centuries. Large emissions of these chemicals during their production, use and waste management has caused what is the largest pollution crisis that humanity is facing in this century so far. Authorities have concluded that health impacts such as impaired immune function, lowered birthweight in children, certain metabolic disorders and kidney cancer can with certainty be linked to PFAS exposure. Moreover, PFAS also pose high risks for ecosystems and therefore threaten the environmental integrity and accelerate biodiversity loss.

Fluorinated Gases: the gigantic but lowest hanging fruit to minimize PFAS pollution

Making up **63 % of the total PFAS emissions in the EU**, fluorinated gases² are the main contributor to the PFAS pollution. Their most known end-use is as refrigerants in manifold heating and cooling products like air conditioners, supermarket cooling units or heat pumps. Further uses are as propellants in construction materials, insulation gases in switchgear or even as anaesthetics in the health care sector.

Initially, gases of natural origin like ammonia were used as refrigerants already 150 years ago. However, with the uprising of the fluorine chemistry in the second half of the 20th century, fluorinated gases became the dominating substances for the many uses.

¹ Besides F-gases, also PFAS pesticides are a relevant source of TFA emissions, which are however outside the scope of the universal PFAS restriction. [PAN Europe, 2024]

² Not all fluorinated gases are F-gases, and vice versa. Therefore, fluorinated gases are described in the following as the gases covered by the PFAS restriction dossier only [See ECHA (2023)]

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The first fluorinated gases (CFCs) were banned through the Montreal Protocol in 1989 due to their destruction of the ozone layer. However, they were replaced with HFCs, another type of F-gases that have recently been regulated through the EU F-Gas Regulation due to their high global warming potential and therefore significant contribution to the climate crisis. The proposed alternatives, the latest generation of F-gases (HFOs) have a lower global warming potential but mostly degrade in the atmosphere to the PFAS substance Trifluoroacetic acid (TFA), which is coming down with rain, causing an extensive pollution of water bodies and the environment.

TFA – A global threat to drinking water supplies

TFA is a small, and very stable molecule that is neither of natural occurrence nor does it degrade naturally in the environment. TFA is highly soluble in water and therefore spreads rapidly through different water bodies. Based on new studies, the German Federal Institute for Risk Assessment and the Federal Environment Agency assumes TFA to be **toxic to reproduction** and aims to confirm this and further hazards³ under the Regulation for Classification, Labelling and Packaging (CLP)⁴. The German Environment Agency says that the lifetime of TFA is “practically indefinite”⁵, meaning that every molecule of TFA that is put into the environment now, will still be there for the next centuries. It is already detectable in groundwater, remote regions like the Arctic, as well as in our drinking water, household dust, and even in human blood⁶. TFA can barely be removed from water, as the technique is highly complex, immensely expensive [tens of billions per year in Europe], highly energy intensive and not realistic to implement across the EU any time soon. Because of its extreme persistence, high mobility, toxic properties and extensive emissions, and irreversible widespread occurrence in the environment, TFA is a global threat⁷.

Addressing F-gases under the REACH PFAS restriction is indispensable

Experts worldwide, including the [European Environment Agency \(EEA\)](#) and [European Chemicals Agency \(ECHA\)](#), are expressing their concerns, identifying PFAS as a global threat to human and environmental health. As the EU F-Gas Regulation only focuses on the climate impact of F-gases, their environmental impact (TFA) is not sufficiently regulated. Therefore, it is indispensable to regulate fluorinated gases further under complementary EU law. The national authorities of Germany, Denmark, the Netherlands, Norway, and Sweden have proposed to restrict the entire PFAS group, including fluorinated gases, through a [universal PFAS restriction](#) under the EU’s chemical regulation REACH. The aim of this universal PFAS restriction is to ban the production, use and placing on the market of PFAS in all uses (with few exceptions) when there are suitable alternatives available, which is for many F-gas uses already now. Extended transition periods up to 13,5 years would be granted for uses where alternatives need to be further developed and scaled up.

"A universal ban on PFAS is essential to protect public health, safeguard water quality, and encourage the development of safer alternatives. The cost of inaction is far too high, especially when human health is at stake" - EurEau President Pär Dalhielm

³ TFA will be categorized in the hazard classes ‘Persistent, Mobile, Toxic’ (PMT) and ‘very persistent, very mobile’ (vPvM), with much more serious regulatory consequences

⁴ [Registry of CLH intentions until outcome - ECHA](#)

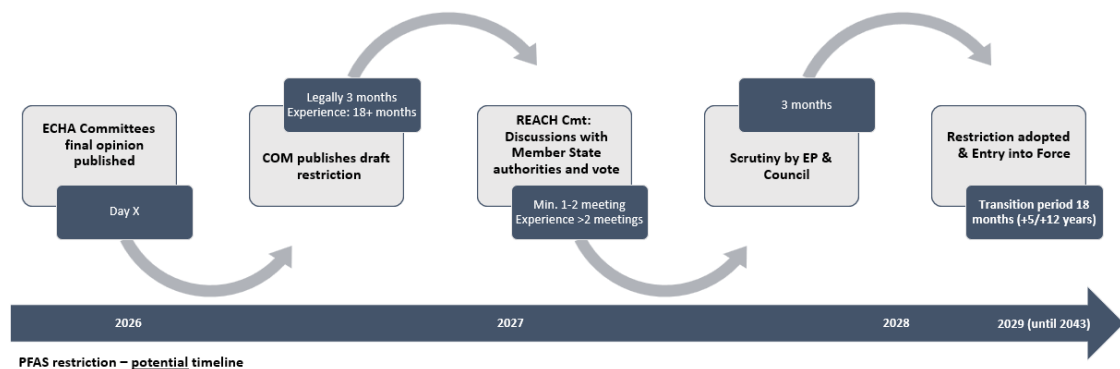
⁵ Umweltbundesamt (2022) [Reducing the input of chemicals into waters: trifluoroacetate \(TFA\) as a persistent and mobile substance with many sources](#)

⁶ Zheng, et al. (2023) "Elevated levels of ultrashort-and short-chain perfluoroalkyl acids in US homes and people." Environmental Science & Technology 57.42 (2023): 15782-15793

⁷ [The Global Threat from the Irreversible Accumulation of Trifluoroacetic Acid \(TFA\) | Environmental Science & Technology](#)

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PFAS free alternatives - available and favourable

PFAS-free technology is possible and most importantly available for almost all uses of fluorinated gases as refrigerants, propellants and insulation gases using **natural alternatives** - the main ones being for example CO₂ (R744), hydrocarbons such as propane (R290), ammonia (R717), air (R729) and even water (R718)⁸.

While these natural alternatives also need to be industrially sourced or processed, they are of natural origin or occur naturally in the environment and are therefore designated as *natural*. All natural alternatives have in common to be:

- ✓ Climate friendly: GWPs ≤ 1
- ✓ Efficient: many technologies using natural alternatives have similar or higher energy efficiency than F-gas products
- ✓ Market-ready: technologies using natural alternatives are established since decades and available on the market from EU companies. Further technologies are being developed.
- ✓ Non-patented: preventing dependencies from single international manufacturers and increasing availability

Our key recommendations

- 1) Support the swift restriction of Fluorinated Gases within the uPFAS restriction under REACH as an indispensable complementary legislation to the EU F-Gas Regulation, to rectify Europe's PFAS pollution at source
- 2) Ensure initiatives that support companies in transitioning to PFAS-free alternatives as available for most applications of fluorinated gases
- 3) Apply the Precautionary Principle and protect European drinking water sources by minimizing all TFA emissions from F-gases, pesticides and other sources

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⁸ Glüge et al (2024) Finding non-fluorinated alternatives to fluorinated gases used as refrigerants. *Environ. Sci.: Processes Impacts*, 2024, **26**, 1955-1974. DOI: [10.1039/D4EM00444B](https://doi.org/10.1039/D4EM00444B)