

November 10, 2022

Subject: PFAS REACH Restriction Dossier – Request for Exemptions

To Whom It May Concern:

Emerson is a global technology and engineering company that manufactures engineered products and provides engineering services for a broad array of industrial, commercial, and residential markets. With this communication, we would like to share our view and concern on the upcoming PFAS restriction under the EU REACH Regulation.

For the manufacture of its products, Emerson uses the following chemicals that fall within the broad PFAS definition:

- Fluoropolymers (including fluoroelastomers)
- Fluoroether lubricants (perfluoropolyethers – PFPE)
- Fluorocarbon refrigerants (F-gases)

The first two types of chemicals listed above are used within industrial monitoring and control equipment for measuring a variety of parameters such as temperature, humidity, pressure, corrosion, density as well as use in equipment such as valves, actuators and welding machines. The uses of fluoropolymers and PFPE in the equipment are numerous and include seals (e.g., o-rings), liners, wire insulation, bearings, lubricants, coatings for bearing surfaces. The equipment is used across multiple industries, notably food and beverage, chemicals, medical, construction, telecommunications, marine, amongst others.

All three types of chemicals (which again, are PFAS only because of they match the current definition) are used in equipment manufactured by Emerson for the Heating, Ventilation, Air Conditioning and Refrigeration and Hot Water Heating (HVACR) industry, also known in Europe as the Refrigeration, Air-conditioning, and Heat-pumps (RACHP) industry. The uses of these chemicals are similar (wire insulation, bearings, seals, sensors, capacitors, valves, etc.), which in turn are used as parts of compressors, heating, refrigeration, and air conditioning controls, and thermostats.

Fluoropolymers are also used in the Industrial Food and Beverage Service industry. This is one of the largest economic and labor-intensive industries in the EU. Applications in this sector utilize these materials for their unique and safety ensuring properties. The chemical inertness of fluoropolymers allows them to be disinfected by a wide range of food contact approved cleaning agents.

In our opinion, there are strong technical, scientific, socio-economic and regulatory reasons that would justify an exemption of the above-mentioned chemicals from the PFAS REACH restriction when used in the monitoring and control equipment and equipment for HVACR. We will now summarize our rationale for this request, acknowledging that we intend to provide further details during the Public Consultation.

1. Fluoropolymers and fluoroethers are different from other PFAS

Fluoropolymers and fluoroethers belong to the distinct subclass of polymeric PFAS. These chemicals are known for exhibiting clearly differentiated properties if compared to short-chain or long-chain PFAS (e.g., PFOA or equivalent chemicals). It has been demonstrated that the main commercially relevant fluoropolymers meet the definition of Polymers of Low Concern¹. Furthermore, the main concern related to fluoropolymers in terms of human and environmental exposure is the use of other PFAS as polymerization aids in the manufacturing process, rather than the fluoropolymer itself. The fluoropolymer itself is typically not water soluble in contrast to the processing aids (like PFOA) which have their fate in water. Suppliers of fluoropolymers are addressing this and making progress on the development of non-fluorinated technologies to be used in the process instead. For example, Chemours recently announced a safe non-PFAS surfactant processing aid for their Viton elastomer products.

However, it is acknowledged that full replacement of fluorinated surfactants for the manufacture of fluoropolymers may still take some time, and thus a derogation from the restriction for such PFAS polymerization aids could be required, although this could be time-limited to allow for a full transition by the suppliers. In addition, based on existing work by European regulators (e.g., Danish EPA), it is expected that neither fluoropolymers nor perfluoropolyethers will degrade to other PFAS during the End-of-Life stage, therefore it could be concluded that the environmental impact of their by-products will be negligible.

2. Fluorocarbon refrigerants are already adequately regulated in Europe

Fluorocarbon refrigerants represent another unique class of PFAS. These are part of a group of fluids that are typically gaseous under standard atmospheric conditions and are characterized as low global warming potential (LGWP) and non-ozone depleting refrigerants. These refrigerants are either hydrofluorocarbons (HFC) or hydrofluoroolefins (HFO) or blends thereof. This 'newer' generation of LGWP fluorocarbon refrigerants is being used to replace the legacy high global warming and ozone-depleting refrigerants. Despite these being chemically defined as PFAS, they are not persistent, not bio-accumulative and have low or no toxicity (per ISO 817 and ASHRAE 34). Moreover, these refrigerants are not soluble in water.

Additionally, there is already a structured phase-down process established for refrigerants via the EU F-Gas Regulation², which strikes a balance between reducing F-gas emissions and achieving the EU's climate and energy goals. To tackle the global climate change crisis, F-gases such as HFC/HFO's, must be contained, their consumption phased down and their emissions reduced as much and as fast as possible, but in a systematic manner.

¹ [Ref: A Critical Review Of The Application Of Polymer Of Low Concern Regulatory Criteria To fluoropolymers II: Fluoroplastics, and fluoroelastomers, *Stephen H. Korzeniowski, et. al., Integrated Environmental Assessment and Management — Volume 00, Number 00—pp. 1–30, Received: 9 March 2022 | Revised: 7 June 2022 | Accepted: 7 June 2022*

² Regulation (EU) No 517/2014 of the European Parliament and of the Council of 16 April 2014 on fluorinated greenhouse gases

In the HVACR sector, HFC's and HFO's are used as refrigerants for cooling and heating technologies, which are key to achieve Europe's climate and energy goals. The current EU F-Gas Regulation requires the HVACR industry to reduce HFC consumption by 88% in 2030 compared to 2015 levels and has effectively become the gold standard worldwide for reducing F-gas emissions. The first impact of the regulation on overall F-gas emissions has already been reported³, indicating a consumption of HFCs in 2020 52% below the maximum imposed by the Montreal Protocol's Kigali amendment.

The F-gas regulation addresses F-Gas emissions to the atmosphere, through monitoring, leak checking, labelling, training, and obligations to Recover, Recycle and Reclaim (RRR) F-gases.

3. F-Gas refrigerants are needed to meet EU Green Deal and RePowerEU targets

The biggest contribution of the HVACR industry to the European Green Deal and RePowerEU is to move heating and cooling away from fossil fuel use and towards efficient heat pump equipment based on fossil-fuel-free electricity. Modelling carried out by The Refrigeration, Air Conditioning and Heat Pump industry trade association in the EU (EPEE) shows that abated CO₂ in 2050 from heat pump systems will be 47 times greater than their direct (i.e., refrigerant leaking) and indirect (i.e., electricity) greenhouse gas emissions. Fulfilling the EU's 55% decarbonization target by 2030 will necessitate a massive replacement of fossil fuel heating with electric Heat Pumps.

There is a risk that the PFAS restriction may interfere with and compromise the energy efficiency and decarbonization goals of the Green Deal and RePowerEU if refrigerants are included in the EU broad definition of PFAS. The Kigali Amendment is expected to reduce global warming by up to 0.4°C by 2100. LGWP fluorinated refrigerants are crucial for turning this into a reality. A looming REACH restriction would put this opportunity at risk, creating a climate of uncertainty and likely slowing down the ongoing refrigerant transition, thus affecting the energy efficiency targets.

4. Fluorinated chemicals used by Emerson are critical in industrial applications with high societal value

➤ *Equipment for industrial monitoring and control*

Complex electromechanical products containing fluoropolymers are used by a vast range of end-use industries. The fluoropolymers are discrete solid plastic parts that are embedded or lined within the components of the end products or plastic used in the construction of electronic components. They can be disassembled and separated at the end-of-life for processing or re-use. The fluoropolymers are present due to their ability to deliver a wide variety of properties required for the monitoring and control equipment products to function effectively. Such properties include inertness (corrosion and chemical resistance), sliding wear resistance, high temperature and cold temperature resistance, low friction, low flammability, sealing (ability to conform or yield under pressure), ability to resist gas

³ European Environmental Agency [2021 Report on Fluorinated Greenhouse Gases](#)

absorption and have high dielectric properties. Products containing fluoropolymers benefit from a long service life resulting from fulfilment of these properties (15+ years).

The end-use applications are numerous and widespread: Medical, Chemical, Construction, Industrial Monitoring And Control, Food & Beverage, Life Sciences, Marine, Metals & Mining, Oil & Gas Extraction And Production, Power, Pulp & Paper, Refining, Biofuels, Telecommunications, Textiles, Water Distribution And Wastewater Collection, Bottling, Pump Management, Capping And Sealing, Fabrication And Assembly, Tire Manufacturing, Food Processing, Metal Stamping, Winemaking, Solar Energy, Clean Steam Production, Brewing, Water Treatment, Chromatography, Hydrogen Generation. The societal impact of interrupting these would be colossal.

These industries using such equipment comprise hundreds of thousands of workers worldwide. Removing fluoropolymers and fluoroethers would cause an economic repercussion due to the lack of viable, readily available substitutes that would provide the equivalent combination of desired properties. Moreover, even if alternatives were available, these industries typically require very long lead times to requalify new materials due to adherence with regulatory re-certification processes.

➤ *Heating, Ventilation, Air Conditioning and Refrigeration and Hot Water Heating (HVACR)*

Throughout the value chain, this industry has manufacturing, research and development facilities across the EU. These HVACR companies realize a turnover of over 30 billion Euros, employ more than 200,000 people in Europe and also create indirect employment through a vast network of small and medium-sized enterprises such as contractors who install, service and maintain equipment bringing the total employment well over 200K.

The HVACR industry plays a vital role in society. It provides critical climate control and ventilation in homes, hospitals, schools, elder care facilities, and most buildings. The following are critical end-use functions:

Transportation and storage of food and other perishables, reach-in food store display cases, walk-in coolers, computer room cooling, breweries, building dehumidification, ice machines, ultra-low temperature/cryogenic freezing, warehouse climate controlled storage, process chillers in industrial plants, indoor farming, shop air drying, dental air compression, ocean refrigeration containers, rail and bus air conditioning (and monitoring), truck/trailer refrigeration, controlled storage of medicines such as vaccines and laboratory specimens, and industrial and commercial chillers providing temperature control for critical manufacturing processes. Even a small perturbation, due to the unavailability of fluoropolymers, fluorocarbon refrigerants and fluoroethers, would be substantial in terms of its impact on access to critical products for the population.

Also, Heat Pump electrification technology for heating of water and air (as alternatives to natural gas/coal heating) is vital for reducing carbon emissions and to support the Green Deal and RePowerEU in the EU and other such policies elsewhere. HVACR equipment were

especially critical during the pandemic and during severe climate events that are becoming all too frequent.

Natural refrigerants will play a big part in lowering Global Warming in the future; however, it should be noted that converting from an average fluorocarbon refrigerant system to a CO₂ natural refrigerant system requires brand new and more complex equipment that is impacted by about a 15% premium cost increase (first cost). Moreover, with CO₂, the use of fluoropolymer seals and bearings is even more critical because of CO₂'s very high intrinsic gas pressure.

➤ *Industrial Food and Beverage Service Industry*

The overall food and beverage industry in the EU is the largest manufacturing industry (as of 2020) and generates a turnover of 1.2 trillion Euros with 266 billion Euros in value added. This industry category represents a very important product sector because it serves markets that are fundamental to society. Interruption would undoubtedly cause food-chain and consumer supply issues.

This industry employs 4.8 million people in the EU. Given that food quality (bacterial control, etc.) is fundamental to the success of this industry and for the health benefit of society, any potential ban of the use of fluoropolymers in the sector without suitable, available alternatives having been fully verified should be considered very carefully.

Conclusions

Fluoropolymers, fluoroether lubricants, and refrigerants are three subclasses of PFAS that are clearly differentiated from other substances in this very broad group of chemicals. There is strong evidence that suggests that these materials will not give rise to situations of concern for human health or the environment, acknowledging as well that industry continues to make significant progress to limit the use of PFAS polymerization aids and to introduce adequate abatement techniques to keep emissions of potentially harmful fluorinated by-products under adequate control.

Fluoropolymers are known for providing many beneficial properties simultaneously (combined in single products) that allow the continued development of applications critical to society, not only related to technological progress but specifically in terms of safety to the population and development of green energy alternatives. Furthermore, existing regulation at EU level on F-gases has proven to be efficient to ensure a reduction in the use of these chemicals, while allowing their continued use where essential.

In conclusion, Emerson believes that there are reasons to provide an exemption to these chemicals as part of the upcoming PFAS restriction under REACH. This position is consistent with Emerson's continued commitment to preserving environmental sustainability and human health and as an advocate of restricting the use of harmful substances. Emerson is also committed to compliance with all relevant environmental laws and regulations in the countries in which we operate; and Emerson supports approaching the regulation of PFAS in

an organized and science-based fashion where both hazard and risk as well as other EU policies on sustainability are considered when making technical and regulatory decisions.

Thank you for your consideration with this request. If you have any questions, please feel free to contact me.

Best Regards,

A handwritten signature in blue ink, reading "D. Koepke". The signature is fluid and cursive, with a large initial "D" and a stylized "Koepke".

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