TEPPFA 2nd submission

Introduction

TEPPFA (The European Plastic Pipes & Fittings Association) welcomes the opportunity to share its views on the PFAS REACH Restriction Annex XV report and the potential impacts this proposal could have on the European plastic pipes and fittings manufacturing industry. This is TEPPFA's second (and final) submission to ECHA's consultation on the PFAS REACH restriction proposal.

TEPPFA's 1st submission (ref. # 4591) focused on the mapping of PFAS uses (fluoropolymers) in the EU Plastic Pipes and Fittings sector. It was identified that our sector primarily relies on fluoropolymers including PVDF, ECTFE, PTFE, FKM and FFKM, for a diverse range of critical applications, with a total of about 20 identified uses.

Table 1. Mapping of uses of fluoropolymers in the European plastic pipes and fittings manufacturing industry

	manufacturing equipment	gaskets, diaphragms, membranes, O-rings	measurement & control instruments	pipes, fittings & valves	compression sleeves
PTFE	X	X	X		
FKM	X	X	X		
FFKM		X	X		
PVDF			X	X	X
ECTFE				X	

In addition to our sectoral submissions, individual TEPPFA members also provided detailed comments, including CBI (Confidential Business Information) on socio-economic aspects related to PFAS (fluoropolymers and fluoroelastomers) they use.

<u>TEPPFA members' submissions (with 4-digit reference number)</u>

- # 4008 – PE-RT[1] containing a PFAS additive used for producing sanitary piping systems
- # 4039 - Piping systems made from fluoropolymers used for conveyance of critical media, from high-tech industries to basic chemical industry uses
- # 4294 – Fluoropolymer lubricant coating of production tools for manufacturing PE-X plastic pipes in the sanitary sector inside buildings
- # 4305 – Axial compression sleeve made of PVDF as decisive part of PE-based sanitary piping systems inside buildings

[1] PE-RT is a polyethylene (PE) resin in which the molecular architecture has been designed such that enough tie chains are incorporated to allow operation at elevated or raised temperatures (RT)

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TEPPFA member's submissions made (but no official 4-digit reference number yet allocated)

- Use of PFAS for electrolysis, sensors, use of PTFE-based lubricant (3 separate submissions) (acknowledgement of receipt codes: 8d78b270-9ba7-432b-8fc6-724ec3cef54f, c569e5f2-a58f-4d6d-88de-55b33cfb8d9b, 5699f607-5322-4031-bdbe-a7be4ff38170)

- Fluoropolymers for safe transport of media in the chemical industry, wastewater treatment plants, water and gas
(acknowledgement of receipt code: ec59e421-0627-4017-909d-c9a97dafec8b)

- PFAS uses at production sites addressing uses like Teflon-coating for welding machines/applications, Teflon coating/spray for mould/extruder preparation, O-Ring for in-house installations (Air/Cooling system, etc.)
(acknowledgement of receipt code: 25ef4a1e-dd95-4ff7-b4da-8929f03587a4)

TEPPFA members' submission pending (status: 21/9/2023)

- Polymer Processing Aids for manufacturing plastic piping systems

A list of additional submissions by non-TEPPFA members related to fluoropolymers used for the conveyance of critical media, from high-tech industries to basic chemical industry uses, can be found in Annex I.

This second TEPPFA submission complements our 1st submission by consolidating at EU sectoral level non-CBI information received from our members related to SEA aspects on the use of fluoropolymers.

Difficulties were encountered in mapping and quantifying PFAS uses in our sector since:

- Volumes of fluoropolymers used as part of components in manufacturing tool, O' Ring coatings, are difficult to assess from our sector perspective as we are not manufacturing those equipment components and materials (for example, compounds).

- When fluoropolymers are used for example as PPA (Polymer Processing Aid) in the compound, the identity of the chemical is CBI (Confidential Business Information) pertaining to the supplier and often unknown to the plastic pipe manufacturer.

Based on a detailed mapping of our uses (see TEPPFA 1st submission), we have identified numerous missing uses (see Question 6 Part 1), which might lead to the conclusion that, for those uses, no derogation would apply, and a ban would take effect 18 months after publication of the restriction.

In addition, considering:

* the complexity of developing new suitable piping systems and components (notably developing alternative materials, reformulating, repeating the product qualification and approval testing of replacement materials to ensure that they are safe and environmentally effective alternatives)

* their importance for EU policy initiatives such as the new Industrial Strategy (chemicals industry), the European Chips Act (semi-conductors/electronics) or the EU Green Deal

we consider that the proposed transition timelines are quite too short.

TEPPFA members and industry are continuously looking for innovative materials for their applications. Until now, no viable alternatives to fluoropolymers could be found for the identified uses meeting the same key performance criteria.

Given the above, TEPPFA argues ECHA to consider the following:

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- If fluoropolymers would remain under the scope of the current PFAS restriction, an **unlimited derogation for fluoropolymers for complete piping systems** (including components, control & measurement instruments, tools, welding machines) should be granted.

The same unlimited derogation should be granted for fluoropolymers used in industrial settings (manufacturing equipment in industrial plants).

Question 2: Emissions in end-of-life phase

- Fluoropolymer lubricant coatings of production tools are being regularly removed, replaced and disposed of through controlled incineration.

- Piping systems (pipe, fittings, valves, liner for pipes, …) used as infrastructure for the conveyance of aggressive/corrosive chemical media in chemical installation are, at end-of-life, likely to be unfit for recycling due to chemical contamination, hence would be either landfilled or incinerated.

- Sanitary piping systems using a fluoropolymer-based additive: all 3 recovery routes are possible: mechanical recycling, energy recovery or landfilling.

- Compression sleeves: are likely to follow at end-of-life the recovery route of the piping system to which it is connected. In the case of PEX pipes, today energy recovery or landfilling is the main route, but this might evolve as research on depolymerization/chemical recycling is on-going.

Question 3 Emissions in end-of-life phase

In case of incineration of fluoropolymers, the following public peer reviewed scientific study indicates a complete degradation of fluoropolymers in a setting comparable to municipal waste incineration:

Municipal incineration of PTFE (2019 Karlsruhe Institute of Technology study) – "Waste incineration of Polytetrafluoroethylene (PTFE) to evaluate potential formation of per- and Poly-Fluorinated Alkyl Substances (PFAS) in flue gas"

To show that polytetrafluoroethylene (PTFE) can be almost fully transformed into fluorine (F) (as hydrofluoric acid (HF)) and to study the possible generation of low molecular weight per- and polyfluorinated alkyl substances (PFAS), PTFE combustion under typical waste incineration conditions at the BRENDA (German acronym for "Brennkammer mit Dampfkessel") pilot plant at Karlsruhe Institute of Technology (KIT) was investigated.

Results indicate that, within procedural quantitation limits (between 0.3 and 24µg/Nm^3), *no statistically significant evidence was found to prove that the (31) investigated PFAS were created during the incineration of PTFE*. Therefore, municipal incineration of PTFE using best available technologies (BAT) is not a significant source of the studied PFAS and should be considered an acceptable form of waste treatment.

Reference: https://www.sciencedirect.com/science/article/pii/S0045653519306435
Chemosphere Volume 226, July 2019, Pages 898-906

Furthermore, Gujarat Fluorochemicals Limited (GFL), Karlsruhe Institute of Technology (KIT) and Société Générale de Surveillance (SGS) consulted by the German Federal Environment Agency (UBA), have conducted a study incinerating a mixture of 4 main commercial fluoropolymers (PTFE, PVDF, PFA and FKM) blended with wood chips under standard operating conditions for municipal and industrial waste incineration (at a process setting of 860°C and 1100°C, both with 2.0 s residence time).

The absence of organic fluorides and more specifically short-chain PFAS substances in municipal incineration flue gas confirms the complete thermal destruction of fluoropolymers during incineration.

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Reference: https://www.gfl.co.in/upload/pages/64ca54ee691b6f4a8b2649ec9c7b291f.pdf
(Preliminary results)

Question 4 Impacts on recycling industry

We don't have relevant information to provide related to impacts of proposed concentration limits (paragraph 2 of proposed restriction) on technical and economic feasibility of recycling processes (at the recycler premises).

Question 5 Proposed derogations

As regards the identification of fluoropolymer uses and whether the proposed time-limited derogations do apply, although some uses seem to be generically mentioned in major sectors such as "chemical industry", "construction products", "petroleum and mining", "electronics and semiconductors", it is most of the time unclear whether our specific applications fit into the description of those uses. This is for example the case for drinking water piping systems conveying drinking water to the general public.

Question 6 (Part 1) Missing uses

The following missing uses (non-exhaustive list) have been identified:

Sector of Use	**PFAS missing uses** (description of uses/application)
Chemical industry	Fluoropolymer-based (pipe, fittings, valves) and fluoroelastomer-based (seals, gaskets, membranes) - pressure piping systems for the conveyance of **cold and hot aggressive chemical media** (H_2SO4 98%, HNO_3 65%, HF 70%, mixed acids) *under pressure* in manufacturing plants and distribution facilities The chemical media are manufactured in chemical plants but they find applications in many other sectors (i.e., surface treatment of glass, leather, metals; mining; fertilisers; pulp and paper; petroleum refining, etc.)
Energy sector	Fluoropolymer-based (pipe, fittings, valves) and fluoroelastomer-based (seals, gaskets, membranes) piping systems for the conveyance of: · high pure and aggressive hot chemical media for the **hydrogen production via electrolysis process** · **purified cooling water** for HVDC (High-Voltage Direct Current) transmitters · aggressive hot chemical media for **battery production and recycling**
Electronics and semiconductors	Fluoropolymer-based (pipe, fittings, valves) and fluoroelastomers-based (seals, gaskets, membranes) pressure piping systems for the conveyance of **ultra-high pure (UHP) water** and **highly aggressive oxidants** (Piranha solution, H_2SO_4 & H_2O_2) required for the manufacturing process

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Metal plating and manufacture of metal products	Fluoropolymer-based (pipe, fittings, valves) and fluoroelastomers-based (seals, gaskets, membranes) pressure piping systems for conveyance of **pickling solutions for metals** (HCl 35-37%, HNO_3 60-65%, HF 10-75%, mixed acids: HNO_3 10-22% & HF 2-8%)
Petroleum and mining	Fluoropolymer-based (pipe, fittings, valves) and fluoroelastomers-based (seals, gaskets, membranes) pressure piping systems for conveyance of **aggressive chemicals media** (organic solvents for minerals extraction, H_2SO4 98%, HNO_3 65%, etc.)
Food contact materials and packaging	Fluoropolymer-based (pipe, fittings, valves) and fluoroelastomers-based (seals, gaskets, membranes) pressure piping systems for the conveyance of: · **chemical disinfection agents** (H_2O_2, peracetic acid) and steam for disinfection of food processing equipment · **chemical reagents** (i.e. concentrated HCl, alcohol) · **food** (sauces, oils, etc.)
Laboratory equipment & filtration	Fluoropolymer-based (pipe, fittings, valves) and fluoroelastomers-based (seals, gaskets, membranes) pressure piping systems for conveyance of **high pure water and chemical reagents**
Lubricants	Fluoropolymer-based **lubricant** for restraint and non-restraint pipe connection systems in **drinking water piping systems**
Treatment of drinking water and industrial wastewater	Fluoropolymer-based (pipe, fittings, valves) and fluoroelastomers-based (seals, gaskets, membranes) pressure piping systems for the conveyance of **strong disinfection agents** (Ozone, Chlorine dioxide, Bromine, Chlorine, Peracetic acid)
Life science: Pharmaceuticals, Biotechnology	Fluoropolymer-based (pipe, fittings, valves) and fluoroelastomers-based (seals, gaskets, membranes) pressure piping systems for **chemical drain and reuse/recycling**
Industrial measurement and control instruments (pH, ORP, Chlorine, Flow, Pressure, Level, Conductivity sensors)	Safe and corrosion resistance **measurement and control instruments (sensors, ..)**, containing fluoropolymers and fluoroelastomers-based components, for contact with chemical media in many sectors
Valves for drinking water and gas piping systems	PTFE **seats for ball valves** and FKM **O-ring sealings**
Pipes for **drinking water supply systems and heating systems**	PFAS **processing aids** for PE pipes
Lubricants	Fluoropolymer **lubricant coating** of production tools for manufacturing PE-X plastic pipes in the **sanitary sector inside buildings**
Sanitary piping systems inside buildings	Axial compression sleeve as decisive part of PE-based **sanitary piping systems inside buildings** (Drinking Water, Domestic heating, Gas applications)

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Energy sector (Oil & Gas)	Multilayer PE pipes with PVDF barrier for the **conveyance of hydrocarbons** (in service stations, airports, marinas, …)

Socio-economic aspects and analyses of alternatives have been detailed in the individual confidential TEPPFA members' submissions (see above list).

The non-confidential part of the following 2 submissions can be synthesised as follows:

o Submission # 4008 – PE-RT containing a PFAS additive used for producing sanitary piping systems (drinking water supply systems & heating systems) examines 3 examples for missing uses in water piping systems (pipe, fitting and sealing rings).

It highlights the time requested to find adequate alternatives to PFAS additives in PE-RT resins for water system pipes:

- Development time: 3 years (at least) to find a suitable non-PFAS additive
- Recertification for drinking water applications (hygienic standards at national level & mechanical requirements): 3 to >5 years

If a new PE-RT material needs to be used, the qualification phase includes mechanical tests and ageing tests of the PE-RT material that are very time-consuming: one of those tests, the long-term hydrostatic strength test already requires up to 10.000 hours (> 1 year) according to DIN 16887 (Determination of the long-term hydrostatic pressure resistance of thermoplastics pipes). Then test specimens manufactured under serial conditions are later needed for the accredited tests in a limited number of official test institutes. For multilayer piping systems intended to be used for hot and cold-water installations inside buildings for the conveyance of water or heating systems, additional pressure creep tests of 8760h (1 year) must then be performed according to EN ISO 21003 by an accredited test laboratory. This whole drinking water approval and certification will take an additional 3-5 years.

o Submission # 4039 - Piping systems made from fluoropolymers used for conveyance of critical media, from high-tech industries to basic chemical industry uses:

In the case of conveyance of harsh chemicals, driving forces are the fluid handling and safety requirements used by many EU industries thus, any derogation limited on specifically listed sectors/uses/sub-uses will be incomplete. The full certification process is explained under Question 8.

Question 7 Potential derogations

Potential derogations have already been reported in TEPPFA's first submission (ref. # 4591) and in more detail in the following TEPPFA members' submissions as regards SEA aspects and analysis of alternatives:

o Submission # 4039 - Piping systems made from fluoropolymers used for conveyance of critical media, from high-tech industries to basic chemical industry uses: **Semi-conductors (derogation 5ee)**: Even if the fluoropolymer piping systems (for conveyance of ultra-high purity water/harsh chemicals) are an essential piece of any upper-level Semi-conductor manufacturing plant, it is not clearly stated in the restriction proposal if this potential derogation applies to them.

o Submission # 4294 – Fluoropolymer lubricant coating of production tools for manufacturing PE-X plastic pipes in the sanitary sector inside buildings: **Lubricant (derogation 5s)**

We have not received any SEA information as regards **derogation 6f** for petroleum & mining, which is nevertheless relevant for multilayer plastic pipes for the conveyance of hydrocarbons.

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Question 8 Other identified uses

With regard to “chemical industry”, many sectors/uses are mentioned in the matrix (Table A.1 of Annex A) however, piping systems in these sectors/uses are rarely specifically mentioned in the restriction dossier.

I. Conveyance and dosage of harsh/corrosive chemical media in manufacturing plants, transport, and distribution facilities

a. Annual tonnage and emissions and type of PFAS

PVDF & ECTFE are used for piping systems (pipe, fittings, valves, liner for pipes, sensors) for **above ground applications** as infrastructure **for the conveyance of chemical media** (strong inorganic acids (sulfuric acid, nitric acid, hydrofluoric acid, hydrochloric acid, mixed acids), ozone, ultrapure water, bromine, peracetic acid, chemical drainage, etc.) in chemical installations and manufacturing equipment.

Those materials have been reliably and successfully used for years in demanding chemical engineering applications and processes:

Main application areas: metal pickling, disinfection, pharma, biotechnology, microelectronics, food, beverage, automotive batteries, fracking process, fertilizers, paper bleaching, tanks for storing chemicals during the manufacturing process (see Table 1 below).

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Table 1 – Main application areas of PFAS - Safe conveyance and dosage of chemical media in

Application	Fluoropolymers	Uses	Chemical media	Role	Characteristics	Industrial applications
Safe conveyance and dosage of chemical media in manufacturing plants, transport and distribution facilities	Piping materials: PVDF ECTFE PFA Sealing materials/elastomers: PTFE FKM FFKM	Chemical Industry	Sulfuric acid, H_2SO_4	Reactant Catalyst pH adjustment	Strong acid Exotermy Powerful oxidising agent Extremely corrosive	Phosphate Fertilizers Petroleum refining Batteries Metal mining Leather/Textile Water treatment Pulp and paper Pickling operations in steel mills Ethanol production
			Nitric acid, HNO_3	Reagent Etchant	Powerful oxidising agent Extremely corrosive	Fertilizers Explosives Pickling operations in steel mills
			Hydrochloric acid, HCl	Reagent pH adjustment Disinfectant Slimicide (prevents the growth of slime in paper stock)	Corrosive to metals High diffusion rate	Steel production Oil production Textile Rubber Pool sanitisation Food production and processing
			Hydrofluoric acid, HF	Etchant Reagent Cleanser Catalyst	Extremely corrosive High diffusion rate	Pharmaceuticals Gasoline Stainless steel Aluminum Electrical components Incandescent light bulbs
			Mixed acids	Etchant	Powerful oxidising agent Extremely corrosive	Metal pickling operations Nitrophosphate fertilizers
		Drinking- and industrial waste water treatment	Ozone Peracetic acid Bromine Chlorine Chlorine dioxide	Disinfectants	Powerful oxidising agents Extremely corrosive	Water Treatment
		Food & beverages	Sauces Oils Alcohols Disinfectants Conc. HCl	Food/Processing aids/Disinfectants	High difussion rate Corrosive to metals	Food production and processing
		Life science	Chemical Drain and Reuse / -cycling	various	Extremely corrosive High diffusion rate	Pharmaceuticals Biotechnology
		Laboratory equipmemt	Purified water	Sampling	High purity	Drinking water supply/transport
		Microelectronics	Ultra high pure water, H2O	Cleanser	High purity	Semiconductors
			Piranha solution (H2SO4 & H2O2)	Etchant	Powerful oxidising agent Extremely corrosive	Semiconductors Photovoltaic cells

For additional information, see Annex I

b. Key functionalities provided by PFAS

In those applications, PFAS-related key performance criteria for suitable piping systems are:
- Operation at high temperatures (up to 120°C)
- Operation under high-pressure (up to 16 bar) and high mechanical load
- Very good chemical resistance (to resist oxidation and chemical attack)
- High purity
- Long service life
- Inherent Flame retardancy

c. Number of companies affected: unknown to TEPPFA.

d. Availability, technical and economic feasibility, hazards and risks of alternatives

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Application	Fluoropolymers	Other piping materials*	
		Material type	Disadvantages
Safe conveyance and dosage of chemical media in manufacturing plants, transport and distribution facilities	Piping materials: PVDF ECTFE PFA Sealing materials/elastomers: PTFE FKM FFKM	**Piping materials**: PE, PP, PVC-U, PVC-C, PA, FRP Stainless steel Tantalum Hastelloy Titanium **Sealing materials:** EPDM/NBR/silicone	**Plastics:** Strong oxidation Embrittelment Diffusion Accelerated corrosion of joints Application limited by temperature/pressure High maintenance costs due to short service life **Elastomers:** Considerable corrosion/damage in short time --> high demand of spare parts--> high maintenance costs **Metals:** Corrosion resistance depending on temperature/media/concentration Not suitable for metal pickling and reducing media Contamination of the high pure media by metal ions Still require the use of sealing parts

* See *ISO /DTR 10358:2020(E) Chemical resistance classification, Compass* Chemical Resistance

• Functionality differences and consequences for downstream users and consumers

The impact could be huge due to the cascading effect, but it is very difficult to monetise/assess.

e. Alternatives are not yet technically or economically available, therefore not viable

Several alternative polymers (PE, PP, PVC, PA, etc.) and metallic materials (Stainless Steel, Titanium, Hastelloy, etc) for piping systems are currently known and already marketed. But each alternative material fits only a limited application area depending on the application requirements and customers own specifications. The fact is that for highly critical and demanding industrial applications under harsh conditions and using pure chemical media, requiring safety under severe operational conditions

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(pressure up to 16 bar and temperature up to 120°C) combined with long service life (>25 years), only fluoropolymers have demonstrated to be reliable and best suited.

Since the commodity and engineered plastics (PE, PP, PVC, PA, etc.) have demonstrated suitability for limited application areas, searching for alternatives to the high-performance plastics like fluoropolymers (PVDF, PTFE, ECTFE, FKM etc) could only be directed to the very narrow material group of the ultra-performance plastics. Still, multiple factors such as: very high price, low material availability, extensive and time-consuming testing and certification setups, lack of material long term references required by operators of chemical plants (for example the metal surface treatment, etc) and, currently unknown but possible, future regulatory limitations of such materials, will drastically decrease the investment readiness and thus the marketing chances of such materials.

For clarity, below a short summary of the required standardised testing for piping materials and systems:

Firstly, every new material formulation is subject to material specific test methods, e.g. Tensile properties (EN ISO 527-1), Notched Impact Strength (ISO 179/1eA), Water uptake (ISO 62/DIN 8063-5), Fire classification (EN ISO 11925-2), etc.

The most demanding and time-consuming test method is the determination of the Minimum Required long-term hydrostatic Strength (MRS value) according to ISO 9080[2]. It requires material testing at two or more temperatures and times of 9000 h or longer, thus far exceeding a 1-year testing period.

Secondly, upon the material testing, the extruded pipes and injection moulded fittings and valves for industrial applications must undergo type testing (which shall be carried out whenever there is a change in design, in compound/formulation and/or in the production method). Thus, long-term (up to 1000 h) internal pressure tests at 20°C and 60°C for piping components and as well for jointing are required according to EN ISO 15493[3].

Finally, the whole piping system (consisting of pipes, fittings, jointing elements and valves) must be subject to chemical resistance testing to ensure safe conveyance of chemicals in chemical plants. The technical report ISO TR 10358[4] as well as ISO 4433[5] give guidance on material suitability and material testing methods for chemicals at different temperatures but only for non-pressure applications.

Testing reports from RISE[6], since 1987 up to date, and as well the DIBt [7] chemical resistance lists, containing de-rating factors, indicate the considerable relevance of pressure and temperature for the chemical resistance of the whole piping system. Since most of the industrial processes require conveyance of chemicals under pressure and temperature, the long-term pressure testing with chemicals in laboratory at two or more temperatures (up to 3000 h for each temperature) and on field (up to 2-3 years) as well as long term references (based on years of experience with certain material formulations and jointing methods in existing chemical plants) are key criteria for designers and operators of chemical plants.

Considering the limited lab capacity in Europe, the high costs (up to 15.000€ per chemical, per single temperature and per 1.000h) and long testing period (as mentioned above), the financial and time related efforts for reformulating a material recipe become huge.

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[2] ISO 9080 - Plastics piping and ducting systems. Determination of the long-term hydrostatic strength of thermoplastics materials in pipe form by extrapolation

[3] EN ISO 15493 - Plastics piping systems for industrial applications — Acrylonitrile-butadiene-styrene (ABS), unplasticized poly(vinyl chloride) (PVC-U) and chlorinated poly(vinyl chloride) (PVC-C) — Specifications for components and the system — Metric series

[4] ISO TR 10358 - Plastics pipes and fittings for industrial applications — Collection of data on combined chemical-resistance

[5] ISO 4433 - Thermoplastics pipes — Resistance to liquid chemicals — Classification — Part 1: Immersion test method

[6] RISE - Research Institutes of Sweden

[7] DIBt – Deutsches Institut für Bautechnik

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The complexity of substitution will also greatly depend on the number of components of the piping system impacted. Due to the fact that a piping system consists of several components (pipes, fitting, valves, tanks, vessels etc) which are designed to fit each other, there is not only one compound but several compounds to be reformulated to develop a non-PFAS final article. Any fundamental change in the formulation will require complex, long (several years) and costly testing (including industrial field tests) and full recertification, without certainty that the new formulations will meet stringent requirements imposed by that sector

Question 9 Degradation potential

We have no relevant information to provide.

Question 10 Analytical methods

There are considerable analytical challenges to detect a wide array of PFAS in potentially low concentration levels and a lack of standardised analytical methods to do that. A March 2023 PFAS report by the US Joint Subcommittee on Environment, Innovation and Public Health PFAS Strategy Team of the National Science and Technology Council is clear about that:

“All of the existing analytical methods, with the exception of EPA 162139, include a discrete list of PFAS target analytes with defined chemical structures for which the methods have been validated, which varies across methods. Such analyses, known as targeted analyses, quantify individual PFAS through a comparison with a PFAS solution of a known concentration. The number of PFAS that can be quantified through targeted analysis is limited”.

“Methods that are under development to quantitate a total PFAS concentration currently appear to, in general, be unable to quantify in the low parts per trillion (ppt) quantitation range.”

In “Shared Challenges”, as a conclusion for “Analytical Technology”, it is concluded that “Current challenges include a lack of intra- and interlaboratory-validated methods for a wider range of PFAS, particularly at very low concentration levels”.

Reference: https://www.whitehouse.gov/wp-content/uploads/2023/03/OSTP-March-2023-PFAS-Report

PFAS Emissions during manufacturing & use of plastic piping systems

Notwithstanding the analytical challenges mentioned in Q10, the following elements hint at very limited or no emissions at all during manufacturing and/or use for some of the reported PFAS applications:

- companies manufacturing pipes, fittings and ancillary equipment for the semi-conductor/chips/microelectronic industry apply “clean room” conditions, hence every Input/Output is controlled & filtered. All their production lines follow the same standard for their full product portfolio, including conveyance of harsh chemical media to avoid cross-contamination issues.

- the use of fluoropolymer material without volatile PFAS is promoted – whenever possible – to avoid emissions during the manufacturing and use stage.

III. Conclusion

We reiterate the conclusion of our previous submission.

The environmental and toxicological profiles of fluoropolymers are distinctly different to the majority of other non-polymeric PFAS which are lower molecular weight substances. Fluoropolymers do not

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display the environmental and toxicological profiles associated with some PFAS that could be considered of concern. Hence, we request ECHA to evaluate fluoropolymers separately from other PFAS and even to remove fluoropolymers from the scope of the PFAS restriction.

Fluoropolymers used in our sector are primarily industry-only and professional uses where the risk for workers/operators is adequately controlled. For materials intended to be used for drinking water applications, all materials are checked according to positive lists. In addition, migration tests are necessary for all materials used in drinking water, according to national regulations (for ex. UBA, KTW-BWGL, Drinking water regulation in Germany).

Currently, most of these uses cannot be readily substituted by viable alternatives offering the same key performance and properties (mainly durability, high thermal and chemical resistance, resistance to friction, resistance to corrosion, pressure, purity and creep resistance…) delivered by fluoropolymers.

We would also like to emphasize that most of these uses are indispensable to reach the objectives set out in various EU policy initiatives such as the new Industrial Strategy (chemicals industry), the European Chips Act (semiconductors/electronics) or the EU Green Deal, which rely on the performance and functionality of these fluoropolymers.

Additionally, for the assessment of alternatives it is not enough to just search for a new suitable material. For piping systems (one system consists of > 5000 individual components developed over the last 25 years), the on-site jointing, installation and operational conditions need to also be considered.

Furthermore, we are working within a heavily regulated field (EU & national drinking water regulations, material regulations, testing protocols) which has a huge impact on the timeline since certification of alternatives takes years and only few official certificated laboratories can be selected for this process.

In conclusion:

If fluoropolymers would remain under the scope of the current PFAS restriction, an unlimited derogation for fluoropolymers for complete piping systems (including components, control & measurement instruments, tools, welding machines) as well as for fluoropolymers used in industrial settings (manufacturing equipment in industrial plants) should be granted.

Editor's Note:

TEPPFA, The European Plastic Pipes & Fittings Association, has been founded in 1991 with headquarters in Brussels. TEPPFA's 14 multinational company members and 15 national associations across Europe represent 350 companies that manufacture plastic pipes and fittings and around 65% of EU market share. TEPPFA members have a consolidated annual production volume of 3 million tonnes, directly employing 40,000 people with €12 billion combined annual sales.

Plastic piping solutions are subdivided into two application groups: above ground systems for hot and cold water, surface heating and cooling, wastewater discharge and rainwater drainage, and below ground systems for sewers, stormwater and drainage, drinking water and gas supply and cable ducts

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Annex I – List of additional submissions related to the "Conveyance and dosage of harsh/corrosive chemical media in manufacturing plants, transport and distribution facilities"

3919: Austria
- Wet Sulfuric Acid
- High-alloy steels like Hastelloy, Inconel and also Titanium, Zirconium are not chemical resistant against the stated operation conditions (Condensing, Fuming Sulfuric Acid at operation temperature of 260 °C);

3954/3955: Austria
- Tanks (200°C up to 260°C (e.g. H_2SO_4, NaOH, HNO_3, HF, HCl, NaOCl, …))

3955: Austria
- PFA, power plants and waste incineration heat-exchangers
- Good reasoning and sources

3957: Austria
- Sulfuric Acid storage for water treatment on ships /ECTFE sheet

4079: Austria
- On SEMI with hot/cold UPW

4092: Austria
- PTFE Diaphragme (valves) in SEMI

4093: Austria
- ECTFE fluoropolymers used for chlorination systems

4095: Austria
- Specific Use case: Sealings/gaskets and O-rings made of fluoropolymers
- FPM, FKM/FFKM, PTFE

4096: Austria
- In our view, the Annex XV, Table 8 restriction report does not cover relevant and essential uses of fluoropolymers in the critical sectors: Chemistry, Semiconductor, Energy...
  10 specific case studies already submitted. 14 case studies in preparation.

4095: Germany/Simona

- Sectors of use: chemical industry, semi-conductor industry, photovoltaic industry as well as environmental technology (wastewater or waste gas treatment), energy sector, petroleum and mining.

4258: Germany
- There are no alternatives to fluoropolymers and fluoroelastomers in e.g. chemical industry, plant and vehicle construction in medical technology, etc.
  The operation of e.g. fuel cells is impossible without these materials.

4259: Wacker Chemie
- Close of factories, use semiconductors Plant engineering (not listed there), industrial production of chemicals.

4450: Germany/Merck
- Use of fluoropolymers in the chemical industry was not considered as a derogation in the Restriction proposal.

4549: Germany/Semiconductors (Infineon)

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4589: GFL/Germany

5907: Austria - Flue-gas applications

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