SECTION III. Non-confidential comments

General Comments

- [x] Scope or restriction option analysis
- [x] Hazard or exposure
- [x] Environmental emissions
- [x] Baseline
- [ ] Description of analytical methods
- [x] Information on alternatives
- [x] Information on benefits
- [x] Other socio economic analysis (SEA) issues
- [ ] Transitional period
- [x] Request for exemption

General Comments

Baseline

- We are a manufacturer of thermoplastic semi-finished parts like sheets, rods, pipes and fittings
- Materials: Standard thermoplastics: PE, PP or PVC. Fluoropolymers: PVDF, ECTFE, FEP and PFA.
- Our fluoropolymer products are materials for the manufacture of process equipment, storage tanks or pipingsystems to handle aggressive chemicals at critical temperatures.
- Sectors of use: chemical industry, semiconductor industry, photovoltaic industry as well as environmental technology (wastewater or waste gas treatment), energy sector, petroleum and mining
- Exhaustive list of fluoropolymer uses not possible to deliver → we actively invited our customers to participate in the public consultations to enable the most complete picture possible

General Comments

Scope or restriction option analysis + Hazard or exposure

- We support the proposed restriction regarding PFAS of concern (especially PFAAs and their precursors)
- We consider the proposal to be too broad with respect to the fluoropolymers (polymers consisting of a polymeric fluorinated carbon backbone)
    - they do not have the same critical toxicological or environmental profile
    - fluoropolymers are "polymers of low concern" according to the OECD definition
    - Development efforts for non-fluorosurfactant fluoropolymers are increasing, complete conversion of production processes is expected soon
    - fluoropolymers are not known to decompose into low molecular weight PFAS of concern

Sources:

- Henry et al., *Integr Environ Assess Manag* **2018**;14:316–334
- Korzeniowski et al., *Integr Environ Assess Manag* **2023**;19:326–354.

General Comments

Environmental emissions

- We ensure that no granulate of the raw material are lost ("Zero Granulate Loss" initiative)
- Production waste is returned into the production process immediately wherever possible, partially reprocessing step necessary
    - Various activities are underway with recyclers to reuse any production waste
- Investigation by TÜV Rheinland confirmed all limit values of the "TA Luft 2002" are complied with (investigation according to the new "TA Luft 2021" is in preparation)
- At end of life: possibility to recycle (grind and re-extrude) thermoplastic fluoropolymers (often downcycling)
- Chemical recycling (upcycling) offers an additional solution, industrial pilot plants for this technology exist, we participate in a development project with a raw material supplier
- In case of incineration, safe mineralization of fluoropolymers at temperatures > 800°C. New study by Gujarat Fluorochemicals Limited (https://www.gfl.co.in/) will be published during May 2023 and will be included in the further public consultation.

General Comments

Information on benefits + alternatives

- Fluoropolymers are unique in resisting in critical applications (equipment for aggressive chemicals at temperatures up to 180°C)
- Designed for decades of service life (25+ years)
- Highest safety for the plant operation
- Theoretical alternatives: standard thermoplastics, steels, enameled steel or (glass)fiber-reinforced plastic
  - ➢ significantly shorter service live (< 5 years) in critical applications, partially not usable at all
  - ➢ increased number of repairs/replacements of equipment (contradicts sustainability goals)
  - ➢ increased risk of release of hazardous substances into the environment due to premature failure

➢ Fluoropolymers are used in these applications, despite their high cost as well as challenging processing, only when conditions absolutely require it

Sources (see confidential attachment):

- Technical Report: "Analysis of alternatives to fluoropolymers and potential impacts related to substitution in different sectors of use" by CHEMSERVICE
- Chemical Resistance studies by RISE (Research Institutes of Sweden) resp. Swerea KIMAB

General Comments

Request for exemption

- We call for the exclusion of all fluoropolymers (polymers consisting of a polymeric fluorinated carbon backbone) from the PFAS restriction proposal
  - These materials have no hazardous properties
  - Persistence itself is not a dangerous property; on the contrary, these materials enable sustainable (reduced material use) and safe operation of industrial applications
  - Decisive materials, without viable alternatives in a number of industries crucial for Europe: Semiconductor production (European Chips Act), electric vehicles and renewable energies (European Green Deal) or healthcare technology, to name only a few
- Chemical Industry (Annex A, Table A.1 → Orange use not researched in detail) must be recognized as a sector for which applications do not have viable alternatives
  - At least further derogations must be granted
  - Please find more information in our answer to question 6

Please contact us in case of further questions and possibly required details. We will be happy to help and support you.

Specific Information Requests

6: Missing uses – Analysis of alternatives and socio-economic analysis

- **Chemical Industry**

- Analogous to the sector “petroleum and mining” we propose the sub-sector “Fluoropolymer applications”.
- Fluoropolymer applications for the handling of aggressive chemicals at critical temperatures
- Semi-finished products used to manufacture storage tanks, process vessels, exhaust gas scrubbers, pipingsystems, pumps, distribution systems,…

Specific Information Requests 6: Missing uses

a. The annual tonnage and emissions (at sub-sector level) and type of PFAS associated with the relevant use.

For the total tonnage of our materials, please refer to the confidential attachment.

Specific Information Requests 6: Missing uses

b. The key functionalities provided by PFAS for the relevant use.

- Resistance to aggressive chemicals, e.g. acids (hydrofluoric acid, hydrochloric acid, nitric acid, sulfuric acid), alkalis (sodium and potassium hydroxide) or halogens (chlorine, bromine)
- Resistance to high temperatures; up to 180°C in linings / composite construction
- Low permeation rates of aggressive media through fluoropolymer linings
- Anti-adhesion properties
- Flexural fatigue properties
- Targeted service life of 25+ years

Specific Information Requests 6: Missing uses

b. The key functionalities provided by PFAS for the relevant use.

Application examples:

- Lining of flue gas duct in desulfurization plant (gas temperature 100°C, chemicals including SO_3) → too high temperature for use of PVC, rapid embrittlement (few months) of PP → Material selection: ECTFE
- Metal Pickling Plants: Piping for mixed acid (10-25 wt% HNO_3, 4-8 wt% HF) and 62% nitric acid at -20 to 40°C. Corrosion and stress cracking of PP → Usage of PVDF in pressure pipes allows safe transport of the acids.
- Large-scale synthesis of fine chemicals, e.g. epichlorohydrin, process chemicals: chloropropanol, hydrochloric acid, glycerol, chlorine; reaction temperature up to 140°C → Material selection: PFA
- Storage of high purity chemicals like hydrofluoric acid (HF) or potassium hydroxide (KOH) (also important in semiconductor industry): Fluoropolymers have much lower additive content compared to standard thermoplastics such as PVC and PP → Purity of chemicals is maintained and chemical resistance is given, steels/ceramics lead to contamination, glass not resistant to HF → Material selection: PFA

Specific Information Requests 6: Missing uses

c. The number of companies in the sector estimated to be affected by the restriction.

- We do not know the number of companies affected. Only our customers (representing the manufacturers of CPI equipment) are more than 100 companies
- End-user of this equipment is the entire industry of basic and fine chemicals and pharmaceuticals, which are necessary for the further value chain of a variety of other products

Specific Information Requests 6: Missing uses

d. The availability, technical and economic feasibility, hazards and risks of alternatives for the relevant use, including information on the extent (in terms of market shares) to which alternative-based products are already offered on the EU market and whether any shortages in the supply of relevant alternatives are expected.

- Possible alternative thermoplastics:
  - Polyvinylchloride (PVC) or Polypropylene (PP)
  - Good availability, less expensive than fluoropolymers
  - Limited temperature range: PVC up to 60°C, PP up to 100°C
  - Limited chemical resistance, especially at temperature limits (please refer to the DIBt list of media; https://www.dibt.de/fileadmin/dibt-website/Dokumente/Referat/II2/Behaelter_Auffangvorrichtungen_Rohre_Kunststoff_Medienlisten_40.pdf)
  - Increase in the risk of failure, including subsequent exposure of humans and the environment to toxic chemicals
  - Limited expected service life (<5 years), regular repairs and replacement of equipment necessary

Specific Information Requests 6: Missing uses

d. The availability, technical and economic feasibility, hazards and risks of alternatives for the relevant use, including information on the extent (in terms of market shares) to which alternative-based products are already offered on the EU market and whether any shortages in the supply of relevant alternatives are expected.

- Due to lower cost and easier processing, these materials always are used when conditions allow
- Use of fluoropolymers only when absolutely required by the conditions (especially chemical and thermal) - ensure a safe operation of the process
- A material that can replace fluoropolymers one-to-one in these applications must be at least as persistent (chemically and thermally stable)
- Other possible alternatives, which lie outside our technical competence as a manufacturer of semi-finished thermoplastic products, were examined in the *Technical Report: "Analysis of alternatives to fluoropolymers and potential impacts related to substitution in different sectors of use" by CHEMSERVICE.*

Further sources (please see confidential attachment):

- Chemical Resistance studies by RISE (Research Institutes of Sweden) resp. Swerea KIMAB

Specific Information Requests 6: Missing uses

e. For cases in which alternatives are not yet available, information on the status of R&D processes for finding suitable alternatives, including the extent of R&D initiatives in terms of time and/or financial investments, the likelihood of successful completion, the time expected to be required for substitution (including any relevant certification or regulatory approvals) and the major challenges encountered with alternatives which were considered but subsequently disregarded.

- Existing applications for which, to the best of our knowledge, there are no viable alternatives (see examples under point b.)
- For standard thermoplastics, even with further research, there will be significantly lower temperature and chemical resistance limits than for fluoropolymers due to their inherent chemical properties
- Despite high market pressure (high prices and shortage of fluoropolymers in recent years) no viable alternatives could be developed
- No information on R&D processes of different materials

Specific Information Requests 6: Missing uses

f. For cases in which substitution is technically and economically feasible but more time is required to substitute:

- Please see answer to point e.
- In case viable alternatives will be found in future, we expect a 5-year period for approvals (e.g. DIBt or FM 4910) until possible use

Specific Information Requests 6: Missing uses

g. For cases in which substitution is not technically or economically feasible, information on what the socio-economic impacts would be for companies, consumers, and other affected actors. If available, please provide the annual value of EU sales and profits of the relevant sector, and employment numbers for the sector.

Please find data concerning our company in the confidential attachment.