Answering Question 1:

Our following comments apply to the sector **electronics and semiconductors** which is listed in table 9 of the Annex XV restriction report. The provided information is focusing on the **semiconductor manufacturing process**, which is also mentioned as a sub-use in table 9.

Electronics and semiconductor (Annex E.2.11.)			
Electronics	Given the evidence pointing to the existence of technically and economically feasible alternatives at EiF for heat transfer fluid for immersion cooling and liquid crystal displays, in combination with the inconclusive evidence pointing to the non-existence of technically and economically feasible alternatives at EiF in all other uses, no derogation is proposed.	Not applicable	Same as under RO1
Semiconductors	Given the weak evidence pointing to the non-existence of technically and economically feasible alternatives at EiF,	Ban with a transition period of 18 months and a **12-year** derogation, because the information provided suggests	Ban with a transition period of 18 months and a 5-year derogation: Same as under RO1.

133

ANNEX XV RESTRICTION REPORT – Per- and polyfluoroalkyl substances (PFASs)

Use sector (with sub-uses)	**Proposed derogation or derogation for reconsideration**	**Duration of derogation period, including substantiation**	**Cost impact of 5 and 12 year derogation periods**
	the following potential derogation is marked **for reconsideration** after the Annex XV report consultation: • [The semiconductor manufacturing process]	considerable transition times (3-10+ years) when alternatives become available.	Ban with a transition period of 18 months and a 12-year derogation: Added time for the derogation provides manufacturers with more opportunity to identify and develop cost-effective alternatives whilst limiting loss of producer and consumer surplus and welfare losses.
Energy sector (Annex E.2.12.)			
Sector as a whole	Given the sufficiently strong evidence	Ban with a transition period of 18 months	Ban with a transition period of 18 months

Figure 1: Screenshot of table 9 from the Annex XV report

Answering Question 2:

Our company is a mainly producing valves, but also other components like check valves, connectors, pressure gauges which are frequently used in various applications during the manufacturing process of a semiconductor.

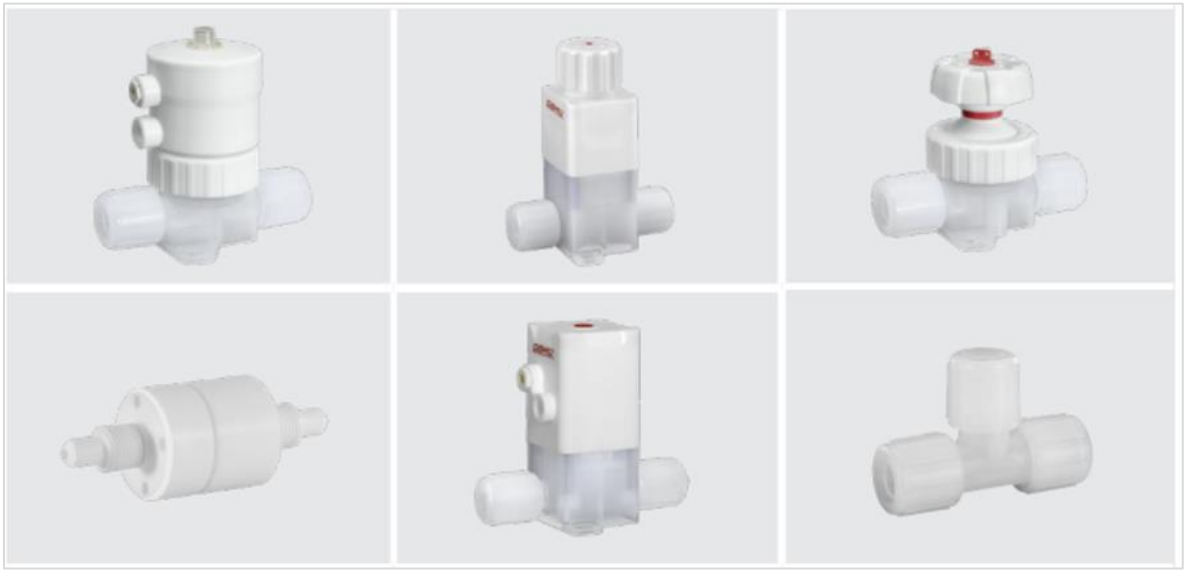


Figure 2: A small selection of pictures from our product portfolio

Our products are designed for the handling of critical fluids in a semiconductor factory. Simplified a semiconductor fab can be devided into 3 levels/floors.

- Process level
- Distribution level
- Supply level

The handling of the critical fluids starts at the bottom of the factory (supply level) where the chemicals are storraged and particulaty pre-treaded for their final use. All chemicals are running through the distribution level and arrive at the process level where they often receive a final treatment (e.g.heating) before they get finally processed. (Figure 3).

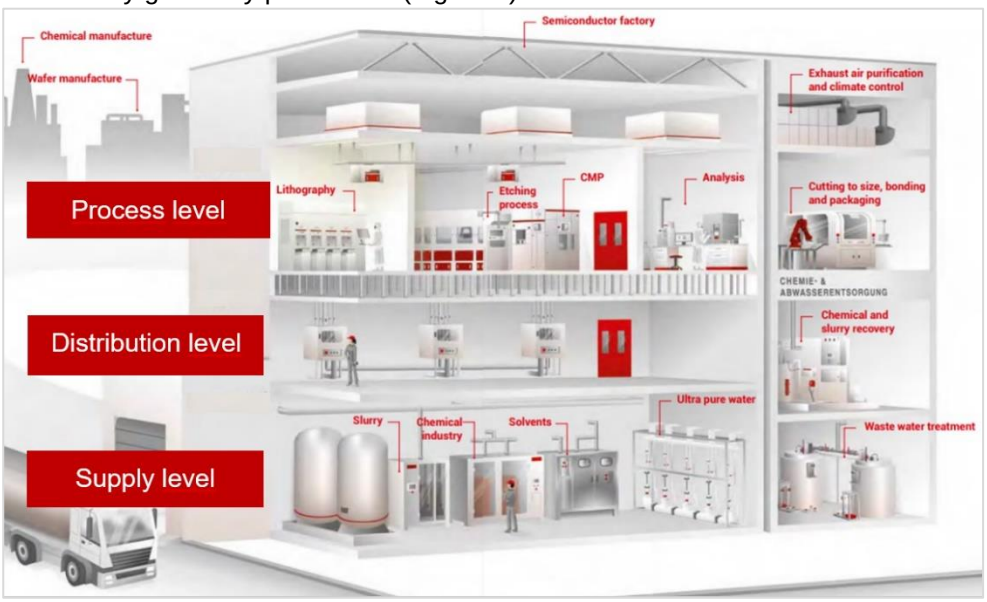


Figure 3: Visualization of a semiconductor factory

Some examples for typically used fluids/chemicals in the manufacturing process of a semiconductor are:

- Hydrofluoric acid (HF)
- Nitric acid (HNO_3)
- Tetramethylammoniumhydroxid (TMAH)
- Chemical Mechanical Polishing Slurry (CMP-Slurry)
- Ultra pure water (UPW)

Most of the used chemicals are processed at high temperatures and high concentrations which makes them very reactive. Our products are used to handle and transport these fluids which means that they are constantly in direct contact with them. Our products are not allowed to react with these chemicals and they also must be resistant against very high temperatures. Therefore, we are consciously using Fluoropolymers (e.g. PFA, PVDF, PTFE, ECTFE) in our products because of their following, special properties:

- Fluoropolymers are not toxic
- Fluoropolymers are not mobile
- Fluoropolymers do not dissolve in water
- Fluoropolymers do not contaminate water and other fluids
- Fluoropolymers do not generate microplastics
- Fluoropolymers are highly temperature resistant
- Fluoropolymers are highly chemical resistant
- Fluoropolymers are highly non sticking

All these properties are required to guarantee the save and process stable production in a semiconductor factory. According to the current state of the art this challenging combination of requirements can only be achieved by using Fluoropolymers. The current restriction proposal is not only affecting a big number of PFAS but also the small group of Fluoropolymers. **With this contribution we urgently request to exclude the Fluoropolymers used in the semiconductor manufacturing industry from the restriction scope.**

There is a standard established in the semiconductor industry named SEMI F57. This standard was established to specify high purity materials and components used in ultrapure water and liquid chemical distribution systems. As you can see in Figure 4 below, the SEMI F57 requires the observance of several quantitative and qualitative measures.

2 Scope

2.1 This Specification focuses on polymer material and component performance and validation. Operational requirements to ensure polymer materials and components meet the intent of this Document are provided where appropriate. A summary list follows:

2.1.1 *Quantitative Measures of Compliance*

- Metallic Contribution Limits
- Ionic Contribution Limits
- Total Organic (Oxidizable) Carbon Contribution Limits
- Surface Roughness Limits

2.1.2 *Qualitative Measures of Compliance*

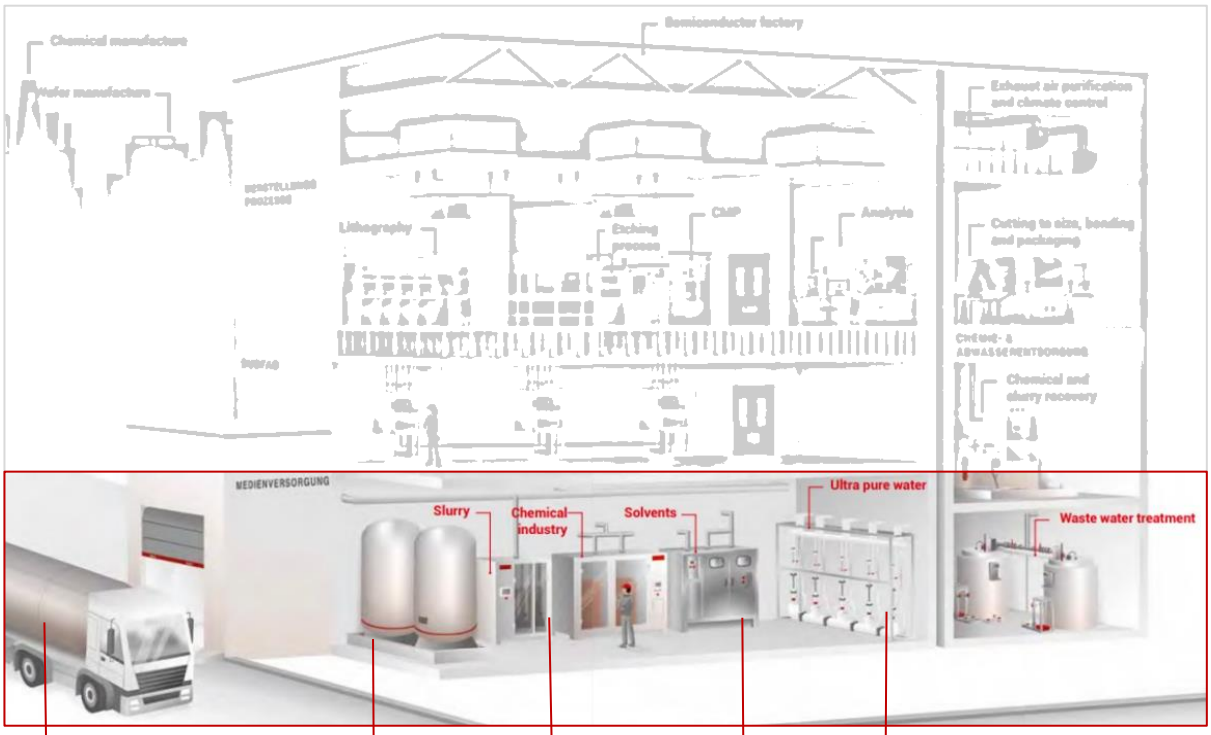
- Mechanical Properties
- Physical Properties
- Chemical Resistance
- Reliability
- Traceability Requirements
- Packaging Requirements
- Certification

Figure 4: Scope of SEMI F57

The SEMI F57 is not forcing the industry to use Fluoropolymers, but in the past decades only Fluoropolymers were able to meet the metallic/ionic/organic contribution limits **in combination with the** surface roughness limits and the needed mechanical/physical/chemical resistance. For this reason also global endusers only permit the use of components made of Fluoropolymers in their in-house specifications.

To underline the irreplaceability of Fluoropolymers for the semiconductor production please see some use cases on each of the production levels in a semiconductor factory:

Fluoropolymer used in the supply area:



Coated carriers

CMP-Slurry supply

Please find the picture in our confidential attachment.

Chemical supply

Please find the picture in our confidential attachment.

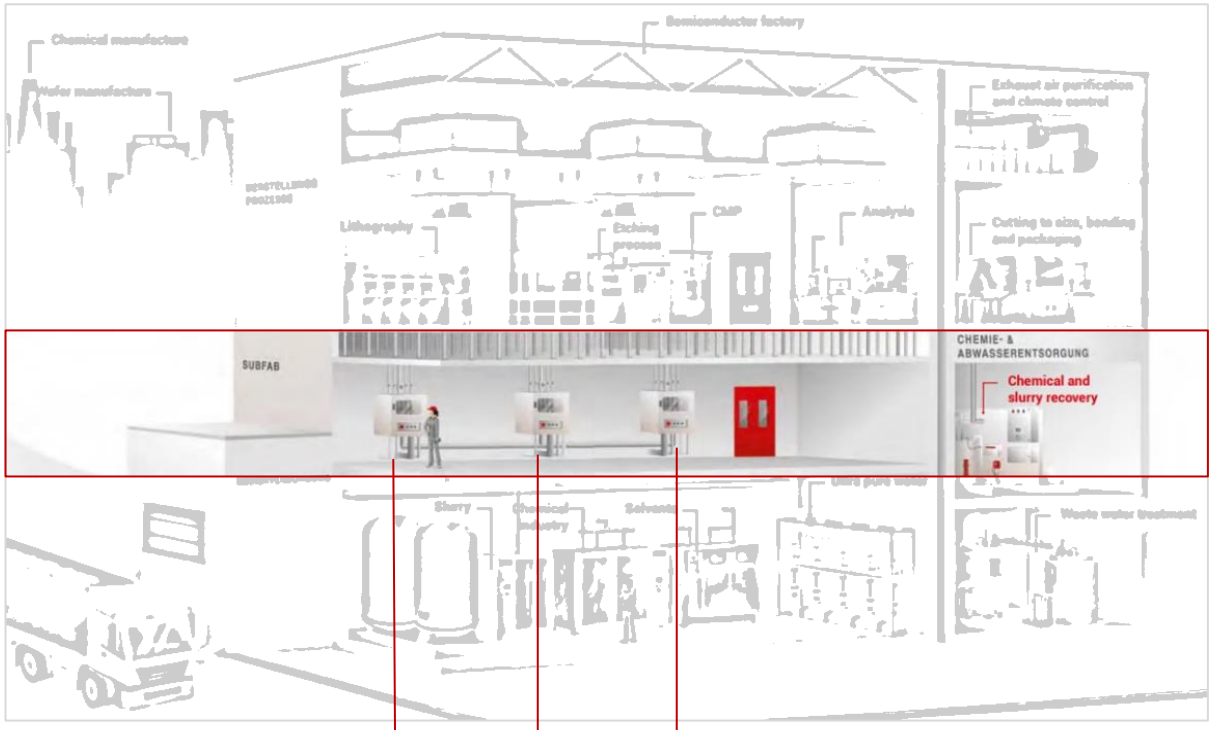
Ultra pure solvent supply

Please find the picture in our confidential attachment.

Ultra pure water supply

Please find the picture in our confidential attachment.

Fluoropolymer used in the distribution area:



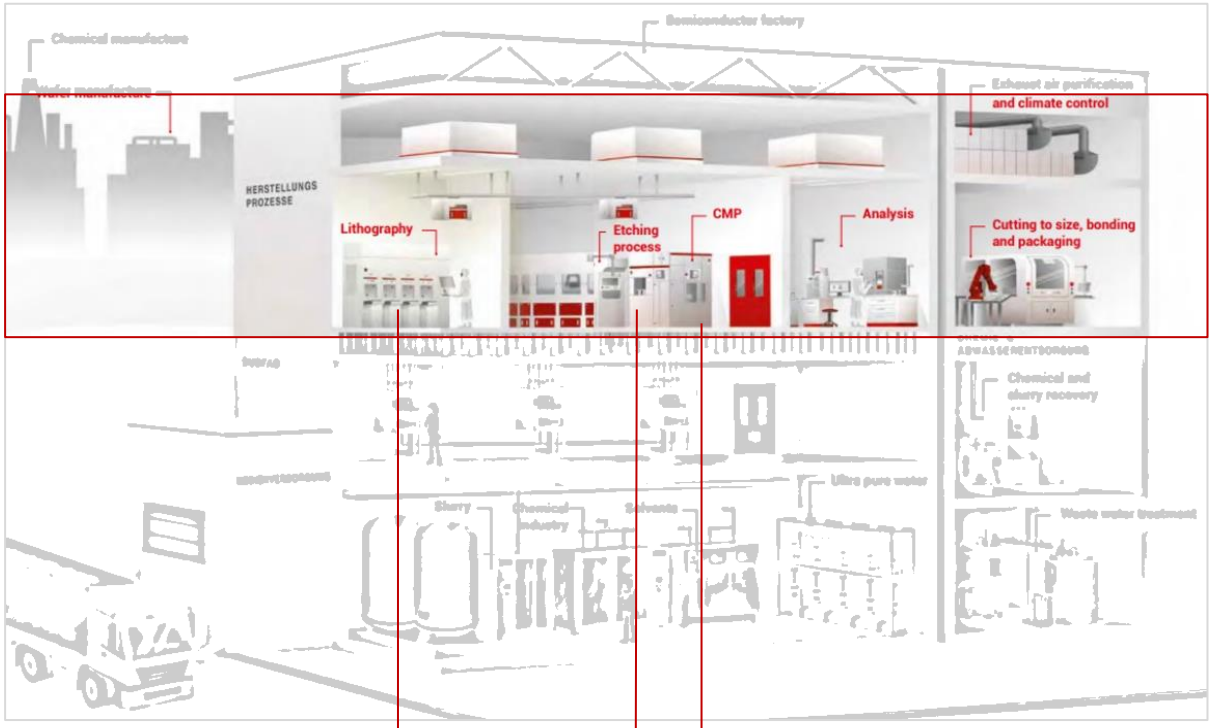
Distribution of various chemicals from the supply are into the process area

Please find the picture in our confidential attachment.

Please find the picture in our confidential attachment.

Please find the picture in our confidential attachment.

Fluoropolymer used in the process area:



Light breaking lense filled with Ultra-pure-water

Please find the picture in our confidential attachment.

Polishing with CMP-Slurry

Please find the picture in our confidential attachment.

Wet etching bench

Please find the picture in our confidential attachment.

Answering Question 7:

Fluoropolymers are high performance materials which are known for the following properties:

- not toxic
- not mobile
- not dissolving in water
- not emitting microplastics
- highly temperature resistant
- highly chemical resistant
- highly non sticking

They are some of the most expensive high-end plastics in the industry. That's why they are only used if no other material is fulfilling the needed combination of properties.
Fluoropolymers have their unique characteristics due to the chemical construction. **That's why even new materials in future must be Fluoropolymers if their characteristics have to be similar. Therefore, Fluoropolymers will always be indispensable for the manufacturing of a semiconductor.**