

12 Questions about PFAS and Photovoltaics

1 What are PFAS?

PFAS (pronounced pefas) stands for per- and polyfluorinated alkyl substances. They are human-made industrial chemicals that do not occur naturally in the environment. As a large family of chemicals, PFAS comprise over 10,000 substances that are used in the manufacture of a wide range of products due to their special properties. Among other things, they are water-, grease- and dirt-repellent, but also particularly resistant and non-flammable.

2 Where are PFAS found?

PFAS are widely used and have been used for decades in a variety of applications and products, including

- industrial products, such as pipes and gaskets
- fire-fighting foam and protective adhesives
- Household products, such as coated (Teflon®) pans, coated baking paper, disposable crockery and cutlery, cleaning agents, carpets
- Food packaging
- Vehicle production
- Medical products
- Footwear and textiles, e.g. outdoor clothing (Gore-Tex®), military clothing
- Production of e.g. fluoropolymers and various other plastics
- Impregnating and lubricating agents
- Ski waxes (since the 2023/24 season, fluor wax has been banned from IBU and FIS races)
- Cosmetics, e.g. mascara, make-up, lipsticks
- Special areas of application for the energy transition

3 Which components in the PV sector may contain PFAS?

Perfluorinated and polyfluorinated alkyls are the starting point for fluoropolymers, the most important representatives of which include PVF, PVDF, PTFE, PCTFE, PFA and ETFE, which are also used for coatings/layers in polymer front and backsheets of PV modules. PFAS are also used in the manufacturing process of semiconductors (e.g. for cleaning the surfaces) and in the insulation (coating/encapsulation) of electronic components (e.g. inverters). PFAS are also used in polysilicon production and electricity storage systems.

4 What is the problem with PFAS?

Due to their special physico-chemical properties, the majority of PFAS are very persistent when released into the environment, i.e. they remain in the environment longer than other synthetic substances. Furthermore, once PFAS are released into the environment, they are very difficult (and extremely costly) to remove. As a result, PFAS unfortunately also end up in the environment and can already be detected in the human food chain and in people themselves.

5 How do PFAS get into the environment or into groundwater and drinking water?

PFAS can be released directly into the environment during their manufacture or during the manufacture of products containing PFAS. However, they can also be released indirectly during the use and disposal of these products. In particular, PFAS enter groundwater and drinking water, for example via wastewater from industrial and municipal sewage treatment plants, via fire-fighting foams, via contaminated soil and via the air.

6 Can PFAS in PV modules be washed out during the use phase and thus contaminate the groundwater?

There is no evidence that PFAS leach out during the use phase of intact PV modules and subsequently lead to contamination of groundwater and drinking water.

The greatest risk of PFAS contamination is during the production of PFAS and PFAS-containing products. Furthermore, small quantities of fluorine-containing film and material with fluorine adhesion can be produced during module recycling. These substances can be eliminated during the thermal treatment of the waste.

7 How does the EU currently regulate PFAS?

Some PFAS (e.g. PFOA, PFOS) have already been classified as substances of very high concern by the European Chemicals Agency. Their production and use is currently regulated by the EU REACH Regulation. The European Waste Water Regulation restricts the use of PFAS in certain industrial sectors and the European Food Safety Authority and the EU Drinking Water Directive set safety limits for PFAS.

10 Are there currently alternatives on the PV market?

Yes and no. The front and back foil of a PV module can be replaced by glass or (bio-)PET alternatives and other polymers. The use of glass in particular also improves the recyclability and recycling potential of the PV module.

In the storage industry, on the other hand, PFAS are currently still indispensable as binders. The use of PFAS in semiconductors and inverters, for example, is also not yet substitutable. However, the entire industry is already promoting research and development in these areas.

8 How does Austria currently regulate PFAS?

The Austrian Drinking Water Ordinance does not yet contain any limit values for PFAS. However, there are plans to include the parameter "sum of PFAS" - in accordance with the EU Drinking Water Directive - in the national ordinance. From 12.01.2026, a limit value of 0.1 µg/l is to apply for a total of 20 selected PFAS that are considered to be of concern. Water suppliers in Austria will then also have to regularly test PFAS in drinking water.

11 How can you recognize PFAS alternatives?

The labeling of PFAS in products is voluntary. Some module manufacturers already advertise with pollutant-free products and offer PV modules that are labeled as lead-free and PFAS-free.

12 Where can I find out more about PFAS in Austria?

Bundesministerium für Klimaschutz: [Nachweis von PFAS-Chemikalien: Gekommen um zu bleiben \(bmk.gv.at\)](https://www.bmk.gv.at/themen/klima_umwelt/chemiepolitik/umweltschadstoffe/pfas/nachweis.html)
Österreichische Agentur für Gesundheit und Ernährungssicherheit: [Per- und polyfluorierte Alkylverbindungen \(PFAS\) - AGES](https://echa.europa.eu/de/hot-topics/perfluoroalkyl-chemicals-pfas)
Umweltbundesamt Österreich: [Per- und polyfluorierte Alkylsubstanzen - PFAS \(umweltbundesamt.at\)](https://www.umweltbundesamt.at/umweltthemen/stoffradar/pfas)

9 What further regulatory steps are planned across the EU?

The EU is aiming to restrict all PFAS unless their use is demonstrably indispensable for the common good. An EU-wide proposal published at the beginning of 2023 stipulates that PFAS may only be used in areas where there will be no alternatives in the foreseeable future or where the socio-economic advantages outweigh the disadvantages for people and the environment. If the restriction is implemented as proposed, the use of PFAS will no longer be permitted in the future, particularly in consumer products (e.g. household goods, textiles, food packaging), as suitable alternatives already exist in these areas. A decision by the European Commission is expected in 2025 at the earliest, which means that the PFAS restriction could take effect from 2026/27.

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