

# Concerns surrounding PFAS

There are many misconceptions with PFAS chemicals that are not always fully explained or understood, and in the wake of possible bans on PFAS chemicals, it is more important than ever to gain a better understanding. In an interview with Valve World, Sandy Van Den Broeck from the European Sealing Association gives insights into the implications of a possible ban.

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**P**er- and Poly-FluoroAlkyl Substances (PFAS), is a very broad term that seems to have a lack of clarification. The term highlights that a chemical compound has a fully fluorinated carbon group, but not about whether it is harmful or not.

Speaking with ESG Director at the ESA Sandy Van Den Broeck, he agrees that PFAS chemicals are not so black and white. "It's in between," states Sandy. "PFAS, often referred to as 'forever chemicals', have been at the centre of growing regulatory scrutiny worldwide due to their persistence in the environment, potential health risks and widespread presence in various consumer products. There are more than 10,000 substances, with some being toxic and of high concern and others that are nonharmful and of lower concern, but all under the bracket of PFAS and are used in a range of applications such as non-stick cookware, water-resistant clothing, firefighting foams and industrial processes." With increasing global concern over PFAS contamination in water sources and the health risks associated with exposure, governments and regulatory bodies are imposing stricter regulations, aimed at controlling and eventually phasing out these chemicals.

The European Union, the United States, and several other countries have taken steps to regulate PFAS in drinking water, food packaging, textiles and other sectors.

In 2023, the US Environmental Protection Agency (EPA) introduced new rules under the Toxic Substances Control Act (TSCA) that impose limits on PFAS in drinking water and mandate comprehensive reporting on PFAS manufacturing, usage and disposal.

In the European Union, the European Chemicals Agency (ECHA) has been pursuing a restriction proposal to regulate the use of PFAS across member states. The European Union's Registration, Evaluation, Authorisation, and Restriction of Chemicals (REACH) framework is also driving efforts to restrict the production and use of PFAS in products like firefighting foams, textiles and food packaging.

## Categorisation

"The PFAS of high concern are the smaller molecular chain substances (single unit monomer). We can think about these as the aqueous film-forming firefighting foams (AFFF) resulting in environmental contamination, and the non-polymeric substances used in the production of polymeric PFAS," says Sandy. The long chain PFAS based materials such as fluoropolymer plastics are of lower concern, as they are non-harmful, non-bio accumulative, non-toxic and do not dissolve in water.

In particular fluoropolymers like PTFE, FKM, FFKM, are widely used in seals, gaskets, and O-rings due to their exceptional chemical resistance, thermal stability, and low friction properties.

With such distinctions in use and in severity, it seems logical for there to be better categorisation of these chemicals. However, understanding how these chemicals are used and applied and the concerns that come with them need to first be understood.

## Application

Fluoropolymers are used for industrial lubricants, insulations for semiconductors, electrolyzers, EV batteries and high-performance seals, whereas others are used for food packaging, medical instruments and protective clothing.

"Fluoropolymers are used in high-performance valve and sealing applications due to their thermal stability, excellent chemical resistance and low friction," explains Sandy. "At the moment, there are no other chemicals with the same technical properties that we can use instead of the fluoropolymers. The alternatives that are available do not last as long as they can't handle the same critical applications."

The effect of using alternatives has already been applied in companies within the valve industry.

"Major plants have tried to use existing alternatives, but the general outcome was the lifespan reduction, the maintenance costs went up and the safety risks were much higher," explains Sandy. "If you change to an inferior material, you will have an impact on efficiency, costs and safety. The main purpose of sealing devices in valves is to prevent leakages and to reduce emissions. However, if Europe decides

to ban fluoropolymers without suitable alternatives, then performance and safety will be at greater risk.”

### Health and environmental concerns

While the main issues stem from how PFAS chemicals are applied and used, there are also concerns about their impact on humans, animals and the environment. “Some PFAS chemicals, particularly those with short-chain carbon-fluoride bonds, do not break down easily, causing them to accumulate where they come into contact,” says Sandy. “When PFAS contaminates soil, it can lead to drinking water pollution and buildup in plants, making some areas unsuitable for crop growth.” Regulating and limiting these chemicals is essential for both human health and environmental protection. However, a ban alone does not provide an immediate solution. “I support protecting the environment and ensuring clean, safe drinking water,” says Sandy. “But PFAS chemicals, including fluoropolymers, have been in use since the late 1930s—we can’t simply eliminate them without effective alternatives in place.”

### Regulation issues

“There has to be a more pragmatic approach in regulating PFAS chemicals,” claims Sandy.

“I am in favour of monitoring and regulating the production of non-polymeric chemicals, but without a one-on-one alternative in place for the fluoropolymers needed in industries, it makes it more complicated.” Sandy points out that fluoropolymers enhance the durability, safety and longevity of a wider range of products. With growing regulatory pressure, manufacturers will face limited access to these materials, which are challenging to replace with equally effective alternatives. This can lead to reduced equipment reliability, particularly in high temperature and/or corrosive applications. Developing and validating new materials to replace PFAS is costly and time-consuming. New materials must undergo rigorous testing to ensure they meet safety, performance and regulatory standards, which can strain budgets. Non-compliance with PFAS regulations can lead to fines and penalties, and long-term liability for environmental contamination. Alternative sealing materials may not offer the same life span in extreme conditions, which can increase maintenance frequency and reduce efficiency of valves and sealing systems.

### Looking forward

What can be seen is that PFAS is not a clear-cut sector of chemicals. There needs to be clear

*“However, no single replacement offers the same combination of properties as fluoropolymers, which remains a key industry challenge.”*

distinctions in what is toxic and what is harmful, the usefulness of the chemicals and how they can be monitored, limited or transitioned out. “The restriction process is ongoing and will likely carry on for a while,” explains Sandy. “The European Chemical Association (ECHA) conducted a six-month public consultation in September 2023 where companies, associations and industries could submit their concerns and comments. The European Sealing Association (ESA) as a trade organisation for sealing device manufacturers has submitted an extensive response to the current PFAS consultation process by ECHA including a detailed socio-economic study for the sealing industry. Over 5,600 comments were made, and this is still being worked through. What will be next to consider is differentiating between sectors where PFAS chemicals are used to help coordinate where restrictions or derogations or even exemptions could be imposed.” ■



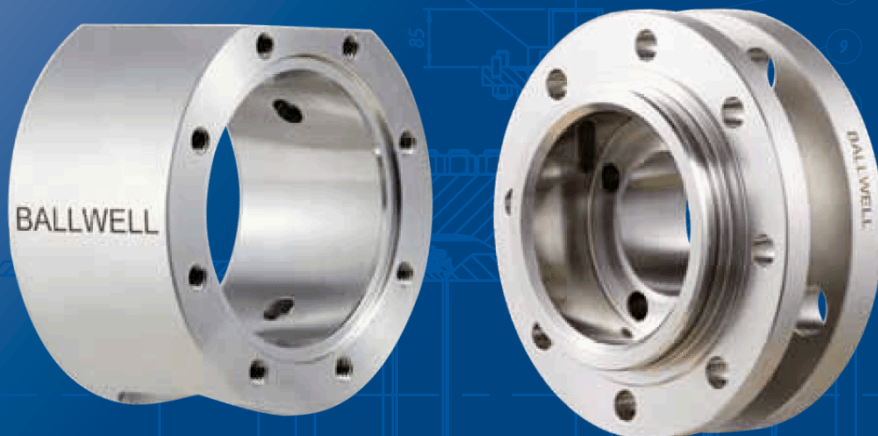
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