PFAS Chemicals Clarified – *Executive Statement*

These chemicals are not equal and should not be regulated as if they are

By Fluid Sealing Association® Members

Goal: Communicate and raise awareness about the value and criticality of industrial sealing solutions. It focuses on seals that containing polytetrafluoroethylene (PTFE). PTFE is commonly referred to by its brand names, such as Teflon™, manufactured by Chemours, chemours.com; Enflon® PREM, manufactured by Enflo, enflow.com; Gore PTFE Fiber Solutions, manufactured by W. L. Gore & Associates, Inc., gore.com; and DYNEON™, manufactured by 3M, 3m.com.

Hazardous perfluoroalkyl and polyfluoroalkyl substances (PFAS) chemicals concern us all. However, nonhazardous PFAS, like PTFE, provide many benefits. PTFE is also responsible for sales of about $676 million in the U.S. and thousands of jobs. Grouping them all into one **sweeping regulation or legislative action may be detrimental to industrial personnel safety and the environment.**

Some PFAS are chemicals of concern, and these should be regulated to avoid their entering drinking water and the environment. Two of these are perfluorooctanoic acid (PFOA) and perfluorooctane sulfonic acid (PFOS). These are **two** chemicals of concern among **thousands**.

In many industries, PFAS chemicals protect personnel, environmental, and equipment safety. Industries select PTFE because of its superior chemical resistance, low coefficient of friction, and high-temperature threshold. An indispensable industrial material, PTFE cannot be replaced in sealing applications. Other materials do not provide the same safety and performance. *Reputable and responsible producers of PTFE raw material have proactively removed PFOA from their processes. Fluid Sealing Association (FSA) member companies source PTFE from the producers that remove PFOA from their processes. This removal ensures that the FSA member products with PTFE are safe to use.*

All PFAS are not the same. Each should be treated differently. Umbrella legislation or regulation against all PFAS could end the use of PTFE—a protector of people, the environment, and industrial equipment.

Principal Paper Points

This table summarizes the main takeaways from the full paper:

<table>
<tr><td>● Some PFAS (including PFOA and PFOS) are chemicals of concern.</td><td colspan="2">PTFE has many benefits for plant personnel and the environment</td></tr>
<tr><td>● Responsible industrial PTFE manufacturers have removed PFOA from its products.</td><td>○ Able to withstand most chemicals used in industry.</td><td>○ High temperature limit.</td></tr>
<tr><td>● Some PFAS chemicals are safe to use; nonhazardous PFAS should not be regulated in the same group with hazardous chemicals.</td><td>○ Low coefficient of friction (little wear or heat buildup).</td><td>○ Excellent electrical Insulation properties</td></tr>
<tr><td>● Current and upcoming legislation and regulations include broad, sweeping language applying to all PFAS. We suggest that the language exclude nonhazardous PFAS and/or specify the hazardous chemicals by name.</td><td>○ When used to seal valves in pressurized vessels it prevents the leakage of fugitive emissions (a significant contributor to greenhouse gas emissions).</td><td>○ PTFE-based packing and gaskets provide some of the lowest fugitive emission leakage rates in refineries and chemical plants.</td></tr>
<tr><td>● The Fluid Sealing Association (FSA) is an international association of companies that manufacture fluid sealing devices. Fluid sealing products improve energy savings, reduce emissions, and improve worker safety and equipment reliability. These technologies assist in the battle against climate change.</td><td>○ Protects personnel and equipment: Near-zero emissions mean near-zero exposure to personnel.</td><td>○ A key factor in the effort to decrease fugitive emissions and battle climate change.</td></tr>
</table>

PFAS Chemicals Clarified

These chemicals are not equal and should not be regulated as if they are.

By Fluid Sealing Association Members

Hazardous perfluoroalkyl and polyfluoroalkyl substances (PFAS) concern us all. However, nonhazardous PFAS, like polytetrafluoroethylene (PTFE), provide many benefits. PTFE is commonly referred to by its brand names, such as Teflon™, manufactured by Chemours, chemours.com; Enflon® PREM, manufactured by Enflo, enflow.com; Gore PTFE Fiber Solutions, manufactured by W. L. Gore & Associates, Inc., gore.com; and DYNEON™, manufactured by 3M, 3m.com. Grouping all PFAS into one **sweeping regulation or legislation may be detrimental to industrial personnel safety and the environment**.

PFAS Chemical Description

Some materials and chemicals are health hazards for people. This includes some PFAS. Two hazardous PFAS chemicals are perfluorooctanoic acid (PFOA) and perfluorooctane sulfonic acid (PFOS). These are **two** chemicals of concern among **thousands**.

PFOA Use Concerns

About 20 years ago, PFOA and PFOS were categorized as chemicals of concern because they impact the health of humans and animals. Sometimes, people discuss PFOA and PFOS using the generic label PFAS instead of the specific chemical names. This implies that all PFAS are hazardous when they are not. The generalization causes confusion about other, nonhazardous PFAS chemicals.

An Environmental Protection Agency (EPA) drinking water advisory specifically regulates PFOA and PFOS. This advisory limits detectable amounts to 70 parts per trillion individually or combined, according to a Bloomberg Law article (Sept. 11, 2019). However, these are **two** PFAS chemicals among more than **9,000**. Some chemicals warrant concern. Others do not.

PTFE Industry Removed PFOA

PTFE changed the world of sealing devices. Industries select PTFE because it is one of the most chemically resistant materials available (more on PTFE benefits in the next section). When PTFE was first manufactured, small amounts of PFOA were used, and trace amounts remained in the raw fiber. About 20 years ago, responsible PTFE manufacturers removed PFOA from their production processes.

Fluid Sealing Association (FSA) member companies use PTFE from manufacturers that do not include PFOA in their processes. The ability to detect PFOA in water has improved over time. Detection began at parts per million, then parts per billion, and now parts per trillion. Removing traces of PFOA from PTFE has been a proactive goal for many years in the sealing industry. FSA member manufacturers source PTFE from producers that do not include PFOA in their manufacturing process.

PTFE Benefits & Use

PTFE is one of the most chemically resistant materials because of its nonreactive strength of carbon–fluorine bonds. Industry uses it to seal reactive and corrosive chemicals because of this strength. It has properties unlike any other plastic, including:

- Inert and impervious to most industrial
- One of the lowest coefficients of friction
- High temperature limit (typically 500°F/ 260°C)
- Excellent electrical insulation properties

These characteristics make PTFE indispensable in a wide range of industrial applications. No single material can replace PTFE in industrial sealing applications and provide the same safety and performance. Some PTFE application examples include:

- Valves and flanges in which fugitive emissions are a concern: PTFE seals provide the best sealing performance over almost any other material. This includes fugitive emissions services in refineries and chemical plants
- Personnel and equipment safety: Near-zero emissions mean near-zero exposure of plant personnel to hazardous chemicals or dangerous conditions (i.e. from leakage of a flammable gas).
- Hot gases transmitted through pollution-reduction equipment, ducts, and chimney stacks: PTFE-coated fabrics and PTFE-laminated material are used in expansion joints in all industries that move hot gasses. These include power plants, cement plants, steel mills, refineries, and smelters. No other material can match the benefits of PTFE in these applications.

Of note is that PTFE prevents leakage from industrial equipment, particularly pressurized tanks and valves in the oil and gas industry. Leaks from these assets contribute to greenhouse gas emissions. PTFE seals' ability to reduce leakage rates to almost zero makes it a cornerstone in the effort to decrease fugitive emissions and battle climate change.

Relevant Existing & Upcoming Legislation

Congressional activity on PFAS has increased during the last two years. Most recently, Representatives Debbie Dingell (D-MI) and Fred Upton (R-MI) proposed the *PFAS Action Act of 2021* (H.R. 2467), which will serve as the primary vehicle for congressional PFAS action in 2021.

The proposal was originally introduced during the 116th Congress. It contained only one provision, which designated **all** PFAS as "hazardous substances" under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA of "Superfund"). The bill underwent substantial amendment in committee and on the House floor, before it passed by a vote of 247-159 in January 2020. As introduced this year, the amended bill offers a comprehensive framework for the regulation of PFAS, including:

- Narrowing the designation provision: Only certain PFAS (PFOA and PFOS) are designated as "hazardous substances" under CERCLA and "hazardous air pollutants" under the Clean Air Act
- Essentially banning the future production of new and innovative PFAS under the Toxic Substances Control Act (TSCA)
- Creating a voluntary label for PFAS in cookware and other products
- Requiring promulgation of a national primary drinking water regulation for certain PFAS chemicals

This bill stalled before the last Congress. However, some House members expressed that it may fare better since Democrats hold the majority in the Senate.

The EPA has also set PFAS policy. It initiated a modest PFAS Action Plan two years ago under the Trump administration. To date, little significant policy changes have occurred. Under the Biden administration, the EPA appears poised to take different actions, which may include the designation of certain PFAS as "hazardous" and new regulations under the Clean Air Act and the Safe Drinking Water Act.*

PTFE Regulatory Action Implications

PTFE is used in most industries. As a result, its use and manufacture create jobs on a global scale. Specifically in the fluid sealing industry (more on this sector in the next section), 5,679 people are employed in the U.S. by fluid sealing manufacturers. This number does **not** include some states with incomplete employment reporting or the global network of distributors that partner with these manufacturers.

PTFE seal technology also improves personnel safety. With some fluids, such as sour gas with hydrogen sulfide, personnel may be exposed to hazardous chemicals and/or vapors if leaks were to occur. Fugitive emissions must be mitigated to slow climate change. PTFE, with its ability to seal to near-zero emissions, is not replaceable by one single seal material

The Fluid Sealing Association: How We Can Help

The Fluid Sealing Association is an international association of companies that manufacture fluid sealing devices such as mechanical seals, compression packing, expansion joints, and gaskets. The products made by the member companies operate in almost every process industry, including chemical, food and beverage, oil and gas, mining, power generation, and water and wastewater. These products keep processes moving and utilities working in every state and every country.

Fluid sealing products, including those with PTFE, serve an essential role. They improve energy savings, reduce emissions, and improve worker safety and overall equipment reliability. The FSA promotes the use of these technologies that ultimately help in the battle against climate change.

Next Steps

Hazardous PFAS chemicals, including PFOA and PFOS, concern everyone. Lumping all PFAS into one regulation or legislation does not make sense and may do more harm than good to personnel safety and the environment. PTFE proactively protects people, the environment, and equipment. Many PFAS are not hazardous. Please do not regulate them as if they are.

*More detailed information on legislation and regulation available on request.

Resources

Grand View Research sample report, dated JAN2016
Cotruvo, Joseph. "INSIGHT: We Need Scientifically Credible Health Benchmarks for PFAS," Bloomberg Law.
https://news.bloomberglaw.com/environment-and-energy/insight-we-need-scientifically-credible-health-benchmarks-for-pfas