



Perfluoroalkyl Substances

Featuring: PFOS, PFOA & PFBS

1. The Science
2. The Regulations
3. Tips, Tricks & FAQs

1. The Science

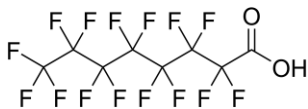
Perfluoroalkyl substances (PFAs) are man-made compounds that are stable due to the strength of the carbon-fluorine bond. They are highly resistant to biological degradation and therefore persist in all environmental matrices including soil, water, air and tissue. Long-chain PFAs have even been found in remote surface water bodies in Northeastern Canada, and as far away as ice surface samples in the Canadian Arctic. PFAs have been linked to adverse health effects in both humans and animals, including increased cholesterol levels, immune system interference, cancer, and infertility. The elimination half-lives in humans of two of the more common PFAs, PFOS and PFOA, are 5.4 and 3.8 years, respectively (EPA, 2009 & 2018).

What does this mean to the health of the environment?

It means these compounds are everywhere, they bioaccumulate, are harmful to human and animal health, and are very hard to clean up. Despite this, they continue to be widely used in the manufacturing of industrial and consumer products, including stain/water/grease repellents in carpet, non-stick coatings on cooking utensils, water-repellent textiles, sunscreen, shampoo, shaving cream, etc.

2. The Regulations

In 2018, the BC Contaminated Site Regulation (BC CSR) were amended to include limits for select PFAs in soil (PFOS) and water (PFOS, PFOA, PFBS).



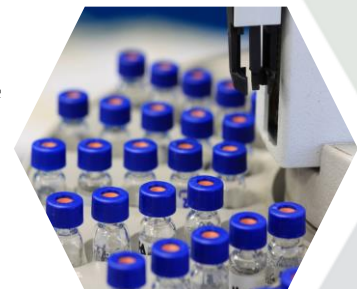
PFOS – Perfluorooctane sulfonate. Regulated in both soil and water.



PFOA – Perfluorooctanoic Acid. Regulated under drinking water (DW) standards.



PFBS – Perfluorobutane sulfonate. Regulated under drinking water (DW) standards.



2. Tips, Tricks & FAQs

FAQ #1 – How do I sample?

Due to the ubiquitous nature of these compounds, sampling is more challenging than for many standard environmental parameters. While entire texts exist that are dedicated to helping you take a good sample, the following table is intended to provide you with a basic overview of what is OK and not OK in the field.

Category	OK	Not OK
Field Documentation	<ul style="list-style-type: none"> ✓ Regular Paper ✓ Sharpie Markers 	<ul style="list-style-type: none"> × Waterproof paper or notebooks × Post-its × Non-sharpie markers × Adhesive (tape etc.)
Personal Care	<ul style="list-style-type: none"> ✓ Natural Sunscreen ✓ Natural Insect Repellants 	<ul style="list-style-type: none"> × Moisturizers × Cosmetics × Hand Cream
Food and Drink	<ul style="list-style-type: none"> ✓ Bottled water 	<ul style="list-style-type: none"> × Fast-food wrappers/containers × Pre-packaged foods
Sample Storage and Preservation	<ul style="list-style-type: none"> ✓ HDPE/ polypropylene bottles ✓ Loose Ice 	<ul style="list-style-type: none"> × LDPE or glass bottles × Teflon caps × Chemical ice packs
Clothing	<ul style="list-style-type: none"> ✓ Cotton or synthetic clothing ✓ Laundered clothing (without the use of fabric softeners) 	<ul style="list-style-type: none"> × Gore-tex or other water resistant/stain resistant materials × Tyvek × Fabric softeners/dryer sheets
Pumps and Tubing	<ul style="list-style-type: none"> ✓ HDPE/Silicon tubing ✓ Peristaltic or stainless-steel submersible pump 	<ul style="list-style-type: none"> × Teflon × Other Fluoropolymer materials

FAQ #2 – Where should I look for PFAs?

Most historical PFA investigations have focused on landfill sites (including leachate and monitoring wells), as well as nearby drinking water wells. Other areas of concern may include surface water bodies, areas where fire and/or firefighting activities have occurred, sediment dredging, wastewater treatment facilities, industrial sites including textile manufacturers and metal coating facilities, rail yards, aircraft maintenance and storage yards, etc. Their range of uses as surfactants, oil/water repellents and flame retardants make them a prime suspect on many industrial sites (including BC CSR Schedule 2 site classifications A4, C3, E10 and G1).

For more information, please contact us: teamcaro@caro.ca or 877.765.9646

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