



EnviroMail™ 01 *Canada*

Perfluoroalkyl Substances (PFAS)

Perfluoroalkyl Substances (PFAS) are a family of man-made, fluorine-containing chemicals, some of which have been used in commercial and industrial applications since the 1950's. Formulations such as Teflon™ and Scotchgard™ contain these chemicals, imparting properties such as resistance to heat, water and staining. Due to their persistence, toxicity and bioaccumulative potential, there is concern regarding their possible effects on the environment and human health. In 2009, the Stockholm Convention list of persistent organic pollutants (POPs) was expanded to include Perfluorooctane sulfonic acid (PFOS), its salts and Perfluorooctane sulfonyl fluoride in Annex B with acceptable purposes and specific exemptions.

Aqueous film forming foams (AFFF), which are used in firefighting, contain PFAS. The US military is the largest user of AFFF, however they have been used historically by many agencies internationally for fire-fighting and related training exercises. These compounds are also used extensively in many industries such as aerospace and electronics, so contaminated sites are not limited to firefighting activities. The use of AFFF has led to groundwater and surface water contamination in affected areas, a problem made worse by the ability of some PFAS to migrate through water.

Two of the most commonly used PFAS compounds have historically been PFOS and Perfluorooctanoic Acid (PFOA). The production of PFOS-based AFFF products ceased in 2002, but huge stockpiles remain at various locations throughout the world. The European Union required the removal of all stockpiles of PFOS-based AFFF from service by June 27, 2011 and Environment Canada required the removal of existing stockpiles by May 29, 2013. Since this family of chemicals has such unique physical properties, closely related compounds (often shorter chained analogues of PFOS and PFOA) have been substituted for PFOS and PFOA in AFFF and other commercial applications. Therefore the need-to test for additional PFAS compounds is becoming more important.

Sampling Requirements:

Care must be taken to ensure samplers are not wearing clothing containing PFAS. Bottles must be HDPE, with no Teflon™ lid. PTFE (Teflon) plus rubber should be avoided during sampling and storage (e.g. tubing, bailers). For further information please contact your local ALS Client Services Team.

ALS bottles: 250mL HDPE, with 14-day holding time.

Regulatory Status:



PFAS is commonly used in firefighting foams due to its unique ability to repel water and oil.

The 2017 British Columbia Contaminated Sites Regulation (CSR) Omnibus Schedule 3.2 Water Standard includes:

Analyte	Limit (µg/L)
Perfluorobutane sulfonic acid (PFBS)	80
Perfluorooctane sulfonic acid (PFOS)	0.3
Perfluorooctanoic acid (PFOA)	0.2

The Health Canada proposed guideline is:

Analyte	Limit (µg/L)
Perfluorooctane sulfonic acid (PFOS)	0.6
Perfluorooctanoic acid (PFOA)	0.3
Perfluorobutanoate (PFBA)	30
Perfluorobutane sulfonate (PFBS)	15
Perfluorohexanesulfonate (PFHxS)	0.6
Perfluoropentanoate (PFPeA)	0.2
Perfluorohexanoate (PFHxA)	0.2
Perfluoroheptanoate (PFHpA)	0.2
Perfluorononanoate (PFNA)	0.2

The ALS laboratory in Waterloo, Ontario supports the testing required to comply with current Canadian requirements such as the BC CSR Regulation and the proposed Health Canada Guidelines. ALS has the ability to test for levels much lower than limits listed above to increase the level of confidence of the testing, and can also report an expanded list of 28 PFAS compounds. These capabilities help to ensure that current data may be evaluated against future standards, should regulated PFAS lists expand or limits become more stringent.

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Analyte List	Matrix/Method		Waters Standard Level	Waters Low Level	Soils
	TEST PARAMETER	Acronym	CAS No.	LOR (ug/L)	LOR (ug/L)
Perfluoroalkane Sulfonic Acids					
Perfluorobutane sulfonic acid	PFBS	375-73-5	0.02	0.001	0.1
Perfluoropentane sulfonic acid	PFPeS	2706-91-4	0.02	0.005	0.1
Perfluorohexane sulfonic acid	PFHxS	355-46-4	0.02	0.001	0.1
Perfluoroheptane sulfonic acid	PFHpS	375-92-8	0.02	0.001	0.1
Perfluorooctane sulfonic acid	PFOS	1763-23-1	0.1	0.005	0.5
Perfluorodecane sulfonic acid	PFDS	335-77-3	0.1	0.005	0.5
Perfluoroalkane Carboxylic Acids					
Perfluorobutanoic acid	PFBA	375-22-4	2	2	300
Perfluoropentanoic acid	PFPeA	2706-90-3	0.02	0.001	0.1
Perfluorohexanoic acid	PFHxA	307-24-4	0.02	0.001	0.1
Perfluoroheptanoic acid	PFHpA	375-85-9	0.02	0.001	0.1
Perfluorooctanoic acid	PFOA	335-67-1	0.02	0.001	0.1
Perfluorononanoic acid	PFNA	375-95-1	0.02	0.001	0.1
Perfluorodecanoic acid	PFDA	335-76-2	0.1	0.005	0.5
Perfluoroundecanoic acid	PFUnDA	2058-94-8	0.02	0.001	0.1
Perfluorododecanoic acid	PFDoDA	307-55-1	0.1	0.005	0.5
Perfluorotridecanoic acid	PFTrDA	72629-94-8	0.1	0.005	0.5
Perfluorotetradecanoic acid	PFTeDA	376-06-7	0.1	0.005	0.5
Perfluoroalkyl Sulfonamides					
Perfluorooctane sulfonamide	FOSA	754-91-6	0.1	0.005	0.5
N-Methyl perfluorooctane sulfonamide	MeFOSA	31506-32-8	0.1	0.005	0.5
N-Ethyl perfluorooctane sulfonamide	EtFOSA	4151-50-2	0.1	0.005	0.5
N-Methyl perfluorooctane sulfonamidoethanol	MeFOSE	24448-09-7	0.1	0.005	0.5
N-Ethyl perfluorooctane sulfonamidoethanol	EtFOSE	1691-99-2	0.02	0.001	0.1
N-Methyl perfluorooctane sulfonamidoacetic acid	MeFOSAA	2355-31-9	0.02	0.005	0.1
N-Ethyl perfluorooctane sulfonamidoacetic acid	EtFOSAA	2991-50-6	0.02	0.005	0.1
(n:2) Fluorotelomer Sulfonic Acids					
4:2 Fluorotelomer sulfonic acid	4:2 FTS	757124-72-4	0.02	0.005	1
6:2 Fluorotelomer sulfonic acid	6:2 FTS	27619-97-2	0.02	0.005	0.1
8:2 Fluorotelomer sulfonic acid	8:2 FTS	39108-34-4	0.02	0.005	1
10:2 Fluorotelomer sulfonic acid	10:2 FTS	120226-60-0	0.02	0.005	1

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