



EnviroMail™ 01 *United States*

Perfluoroalkyl Substances (PFAS)

Background

Perfluoroalkyl Substances (PFAS) are a class of synthetic compounds widely used in industrial applications that are characterized by a fully fluorinated hydrophobic linear carbon chain attached to a hydrophilic functional group. PFAS' are of interest due to their extreme persistence in the environment, ability to bioaccumulate, toxicity potential, and adverse human health effects.

The chemical structure of PFAS gives them unique properties, such as thermal stability and the ability to repel water and oil, making them useful in a wide variety of industrial and consumer products (fabric stain protectors, waterproofing of fabric, non-stick cookware, food packaging, lubricants, firefighting foams).

Perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) are two of the best known and most studied PFAS'. In their ionic form, they are water soluble and can readily migrate from soil to groundwater, where they can be transported long distances. PFOS is the predominant PFAS found in aquatic species around the world.

Other PFAS' of environmental concern include Perfluorooctane sulfonamides, sulfonamido ethanols, Fluorotelomer sulfonates, and other forms of Perfluoro carboxylates and Perfluoro sulfonates.

The EPA Science Advisory Board suggests that PFOA is likely to be carcinogenic and the American Conference of Governmental Industrial Hygienists has classified PFOA as a Group 3 carcinogen. The U.S. National Health and Nutrition Survey indicates serum PFOA and PFOS are associated with thyroid disease in the U.S. population and several PFAS' are now part of the EPA UCMR-3 list.

ALS Testing Capabilities

The ALS laboratory in Kelso, Washington utilizes three methods for the analysis of PFAS:

- In-house analytical method for water, soil, sediment, and tissues by LC/MS/MS
- EPA Method 537 selected perfluorinated alkyl acids in Drinking Water by LC/MS/MS
- ASTM D7979-15 PFAS' in water, sludge, influent, effluent, and wastewater by LC/MS/MS



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

The Kelso facility offers PFAS analysis of water, soil, sediments, biosolids, and tissues matrices. The laboratory holds DoD accreditation, as well as several state certifications for this analysis.

The standard Method Reporting Limits at the Kelso laboratory are:

- Water: 5 ng/L
- Soil/Sediment: 1 ug/Kg
- Tissues: 0.25 ug/Kg

Sampling Requirements:

Care must be taken to ensure samplers are not wearing clothing containing PFAS. Bottles must 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: 60mL HDPE (water), and 125mL HDPA (soils), no preservative

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Click here to watch our technical webinar on PFAS analysis.

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Analyte List	Matrix/Method		Waters Standard Level	Waters Low Level	Soils
	TEST PARAMETER	Acronym	CAS No.	MRL (ng/L)	MRL (ng/L)
Perfluoroalkane Sulfonic Acids					
Perfluorobutane sulfonic acid	PFBS	375-73-5	5.0	1.0	0.25
Perfluorohexane sulfonic acid	PFHxS	355-46-4	5.0	1.0	0.25
Perfluoroheptane sulfonic acid	PFHpS	375-92-8	5.0	1.0	TBD
Perfluorooctane sulfonic acid	PFOS	1763-23-1	5.0	1.0	0.50
Perfluorodecane sulfonic acid	PFDS	335-77-3	5.0	1.0	0.25
Perfluoroalkane Carboxylic Acids					
Perfluorobutanoic acid	PFBA	375-22-4	10	1.0	2.0
Perfluoropentanoic acid	PFPeA	2706-90-3	5.0	1.0	0.25
Perfluorohexanoic acid	PFHxA	307-24-4	5.0	1.0	1.0
Perfluoroheptanoic acid	PFHpA	375-85-9	5.0	1.0	0.25
Perfluorooctanoic acid	PFOA	335-67-1	2.0	1.0	0.25
Perfluorononanoic acid	PFNA	375-95-1	5.0	1.0	0.25
Perfluorodecanoic acid	PFDA	335-76-2	5.0	1.0	0.25
Perfluoroundecanoic acid	PFUnDA	2058-94-8	5.0	1.0	0.25
Perfluorododecanoic acid	PFDoDA	307-55-1	5.0	1.0	0.25
Perfluorotridecanoic acid	PFTrDA	72629-94-8	5.0	1.0	0.25
Perfluorotetradecanoic acid	PFTeDA	376-06-7	5.0	1.0	TBD
Perfluoroalkyl Sulfonamides					
Perfluorooctane sulfonamide	FOSA	754-91-6	5.0	1.0	0.50
N-Methyl perfluorooctane sulfonamide	MeFOSA	31506-32-8	5.0	1.0	TBD
N-Ethyl perfluorooctane sulfonamide	EtFOSA	4151-50-2	5.0	1.0	TBD
N-Methyl perfluorooctane sulfonamidoethanol	MeFOSE	24448-09-7	5.0	1.0	TBD
N-Ethyl perfluorooctane sulfonamidoethanol	EtFOSE	1691-99-2	5.0	1.0	TBD
N-Methyl perfluorooctane sulfonamidoacetic acid	MeFOSAA	2355-31-9	10	1.0	TBD
N-Ethyl perfluorooctane sulfonamidoacetic acid	EtFOSAA	2991-50-6	5.0	1.0	TBD
(n:2) Fluorotelomer Sulfonic Acids					
4:2 Fluorotelomer sulfonic acid	4:2 FTS	757124-72-4	5.0	TBD	TBD
6:2 Fluorotelomer sulfonic acid	6:2 FTS	27619-97-2	5.0	1.0	TBD
8:2 Fluorotelomer sulfonic acid	8:2 FTS	39108-34-4	5.0	1.0	TBD
10:2 Fluorotelomer sulfonic acid	10:2 FTS	120226-60-0	5.0	TBD	TBD
Hexafluoropropylene Oxide Dimer Acid					
2,3,3,3-Tetrafluoro-2-(1,1,2,2,3,3,3-heptafluoropropoxy)propanoic acid	HFPO-DA	13252-13-6	5.0	TBD	TBD

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