

ANALYTICAL GUIDELINES FOR PFCS

TECHNICAL
BULLETIN

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Background

Perfluorinated carbon compounds (PFCs) are man-made chemicals that, because of their stability under extreme heat and chemical stress, as well as their surfactant properties, have been used in a variety of applications including:

- Industrial polymers (Teflon™)
- Stain repellants (Scotch Guard™)
- Aqueous film forming foams (AFFF)

Of particular concern are perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) which are persistent (meaning that they take a very long time to break down in the environment) and can “bioaccumulate” or build up in certain living organisms. PFOS was added to Annex B of the Stockholm Convention on Persistent Organic Pollutant (POP) in May 2009.

Regulatory Status

Canada

In August, 2010, Health Canada issued the following provisional drinking water guidance values (DWGV) for PFOA and PFOS:

PFOA (ug/L)	PFOS (ug/L)
0.7	0.3

United States

In addition to the USEPA issuing a “provisional health advisory” for the acceptable level of PFOA and PFOS for short term exposure, three States have established drinking water guidelines for PFOA and one for PFOS.

State	PFOA (ug/L)	PFOS (ug/L)
USEPA	0.4	0.2
Minnesota	0.3	0.2
New Jersey	0.04	N/A
North Carolina	2	N/A

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European Union

The UK Health Protection Agency (HPA) and the Department of Environmental Protection in Germany have advised the following maximum acceptable concentrations of PFOA and PFOS in drinking water:

Agency	PFOA (ug/L)	PFOS (ug/L)
UK HPA	10	0.3
German	0.1 (sum of PFOA and PFOS)	

Analytical Method

Water samples undergo solid phase extraction, followed by extract clean up and concentration, then analysis by isotope dilution liquid chromatography/tandem mass spectrometry (LC/MS/MS).

Soil samples are homogenized in water then undergo a liquid/liquid extraction, followed by concentration and analysis by isotope dilution liquid chromatography/tandem mass spectrometry (LC/MS/MS).

Maxxam is accredited by the Standards Council of Canada (SCC) and by the US Department of Defense for perfluorinated compound (PFC) analysis in environmental matrices.

Reported Parameters

Maxxam's Mississauga facility currently reports PFOS/PFOA in water and soil under the test codes PFOSALCM-W and PFOSALCM-S respectively. Parameters reported include PFOS/PFOA as well as 11 additional PFCs of environmental concern. The detection limits for these parameters have been validated at trace levels in anticipation of increasingly lower regulatory criteria. Because of the ubiquitous nature of PFOS and PFOA, samples often require dilution, and as with all analyses, the RDL are adjusted accordingly.

Parameter	Abbreviation	Maxxam RDL	
		Water (ug/L)	Soil (ug/L)
Perfluorobutanoic acid	PFBA	0.02	0.1
Perfluorobutane Sulfonate	PFBS	0.02	0.1
Perfluoropentanoic acid	PFPeA	0.02	0.1
Perfluorohexanoic acid	PFHxA	0.02	0.1
Perfluorohexane sulfonate	PFHxS	0.02	0.1
Perfluoroheptanoic acid	PFHpA	0.02	0.1
Perfluorooctane sulfonamide	PFOSA	0.02	0.1
Perfluoro-n-Octanoic acid	PFOA	0.02	0.1



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Parameter	Abbreviation	Maxxam RDL	
		Water (ug/L)	Soil (ug/L)
Perfluorooctane sulfonate	PFOS	0.02	0.1
Perfluorononanoic acid	PFNA	0.02	0.1
Perfluorodecanoic acid	PFDA	0.02	0.1
Perfluoroundecanoic acid	PFUnA	0.02	0.1
Perfluorododecanoic acid	PFDoA	0.02	0.1
Perfluorodecane Sulfonate	PFDS	0.02	0.1
Perfluorotridecanoic acid	PFTTrDA	0.02	0.1
Perfluorotetradecanoic acid	PFTeDA	0.02	0.1

Sample Containers / Holding Time

Water (PFOS/PFOA/PFCs)

Samples should be collected in polypropylene or polyethylene (HDPE) bottles fitted with an unlined (no Teflon), polypropylene screw cap. A minimum of 500 mL of sample is required. Hold time is 28 days with proper storage (1-6°C, minimum exposure to light).

Soil (PFOS/PFOA/PFCs)

Samples should be collected in polypropylene or polyethylene (HDPE) wide-mouth bottles fitted with an unlined (no Teflon), polypropylene screw cap. A minimum of 50 g of sample is required. Hold time is 28 days with proper storage (1-6°C, minimum exposure to light).

Analytical Turnaround Time (TAT)

Standard TAT: 10 business days.

Priority TAT: By pre-arrangement only.

Notes:

- All sources of Teflon should be avoided during collection and storage. These are potential sources of PFC interference.
- Glass containers should also be avoided due to potential loss of analyte through adsorption. Samples should be chilled during shipment (< 10°C, do not freeze).

