
TECHNICAL NOTE

PFAS ANALYSIS IN GROUND, SURFACE, & SALINE WATERS

Perfluoro-alkyl and polyfluoro-alkyl substances (PFASs) are a family of thousands of synthetic fluorinated organic compounds with multiple C-F bonds. The C-F bond is the shortest and strongest bond in nature, and is responsible for most of the functional characteristics of these compounds.

PFAS's have been used in diverse ways for more than 50 years to make products non-stick, water-repellant, and resistant to fire and climatic conditions. They are persistent in the environment and resistant to normal degradation, meaning that PFAS residues are commonly found in soil, sediments, environmental water, and biota. They are considered to have potential adverse effects on environmental and human health.

The best known PFAS compounds are perfluorooctane sulfonate (PFOS), perfluorohexane sulfonate (PFHxS), and perfluorooctanoic acid (PFOA). There are environmental guidelines for PFOS, PFHxS, and PFOA set by the Heads of EPAs Australia and New Zealand (HEPA) in the "PFAS National Environmental Management Plan" (January 2018).

Method Summary

Analytica's PFAS method is validated for the determination of 31 PFASs (or 35 compounds if we include mono-branched and di-branched PFHxS and PFOS) in drinking water, fresh water, and waste water. The method may also be applied to soda or sulphur spring water or sea water subject to performance verification. The compounds analysed and their reporting limits (RL) are listed in Table 1 back page)

In Analytica's method, water samples are prepared using SPE (solid phase extraction), and analysed using LC-MS/MS. The method is based on EPA method 537 (2009), ISO 25101 (2009), and another 2005 published paper on analysis of perfluorinated acid in water and biota. References are available on request

Method uncertainty is estimated to be approximately 25%.

Quality Control

Each batch of analysed samples will incorporate a range of laboratory QC samples including:

- A blank (Type 1 water)
- Low and high spiked samples into Type 1 water.
- A sample duplicate.
- Low and high spikes into sample duplicates.

Samplers are encouraged to consider which QC samples should be collected during the sampling process – we are happy to discuss further on request.

Table 1: Compound list

Compound name	Abbreviation	CAS	RL (ng/L)	
Perfluorinated sulfonic acids (PFSA)			trace	Ultra-trace for fresh water*
Perfluoro-1-propanesulfonic acid	L-PFPrS	423-41-6	1	1
Perfluoro-1-butanesulfonic acid	L-PFBS	375-73-5	1	1
Perfluoro-1-pentanesulfonic acid	L-PFPeS	2706-91-4	1	1
Perfluoro-1-hexanesulfonic acid	L-PFHxS	355-46-4	1	0.1
Trifluoromethylperfluoropentanesulfonic acid	PFHxS mono branched		1	1
Di(trifluoromethyl)perfluorobutanesulfonic acid	PFHxS di branched		1	1
Perfluoro-1-heptanesulfonic acid	L-PFHpS	375-92-8	1	1
Perfluoro-1-octanesulfonic acid	L-PFOS	1763-23-1	1	0.1
Trifluoromethylperfluoroheptanesulfonic acid	PFOS mono branched		1	1
Di(trifluoromethyl)perfluorohexanesulfonic acid	PFOS di branched		1	1
Perfluoro-1-nonanesulfonic acid	L-PFNS	68259-12-1	1	1
Perfluoro-1-decanesulfonic acid	L-PFDS	335-77-3	1	1
Perfluoroalkylcarboxylic acid (PFCA)				
Perfluoro-n-butanoic acid	PFBA	375-22-4	1(10**)	1
Perfluoro-n-pentanoic acid	PFPeA	2706-90-3	1(10**)	1
Perfluoro-n-hexanoic acid	PFHxA	307-24-4	1	1
Perfluoro-n-heptanoic acid	PFHpA	375-85-9	1	1
Perfluoro-n-octanoic acid	PFOA	335-67-1	1	0.5
Perfluoro-n-nonanoic acid	PFNA	375-95-1	1	1
Perfluoro-n-decanoic acid	PFDA	375-76-2	1	1
Perfluoro-n-undecanoic acid	PFUdA	2058-94-8	1	1
Perfluoro-n-dodecanoic acid	PFDoA	307-55-1	1	1
Perfluoro-n-tridecanoic acid	PFTrDA	72629-94-8	1	1
Perfluoro-n-tetradecanoic acid	PFTeDA	376-06-7	1	1
Perfluorinated sulfonamides (PFOSA)				
Perfluoro-1-octanesulfonamide	FOSA	754-91-6	1	1
N-ethylperfluoro-1-octanesulfonamide	N-EtFOSA	4151-50-2	1	1
N-methylperfluoro-1-octanesulfonamide	N-MeFOSA	31506-32-8	1	1
Perfluorinated sulfonamidoacetic acids (PFOSAA)				
Perfluoro-1-octanesulfonamidoacetic acid	FOSAA	2806-24-8	1	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid	N-EtFOSAA	2991-50-6	1	1
N-methylperfluoro-1-octanesulfonamidoacetic acid	N-MeFOSAA	2355-31-9	1	1
Fluorotelomer sulfonates (FTS)				
1H,1H,2H,2H-perfluoro-1-hexanesulfonic acid	4:2 FTS	757124-72-4	1	1
1H,1H,2H,2H-perfluoro-1-octanesulfonic acid	6:2 FTS	27619-97-2	1	1
1H,1H,2H,2H-perfluoro-1-decanesulfonic acid	8:2 FTS	39108-34-4	1	1
Perfluoroalkylsulfonamidoethanols (PFOSEs)				
2-(N-ethylperfluoro-1-octanesulfonamido)-ethanol	N-EtFOSE	1691-99-2	1	1
2-(N-methylperfluoro-1-octanesulfonamido)-ethanol	N-MeFOSE	24448-09-7	1	1
GenX				
hexafluoropropylene oxide dimer acid (Tetrafluoro-2-heptafluoropropoxy-propanoic acid)	HFPO-DA	13252-13-6	1	1

*RL in fresh water if requested.

**RL in waste water