

EnviroNote 1123 - October 2022

PFAS – draft EPA Method 1633



USEPA Method 1633 Analysis of Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous, Solid, Biosolids, and Tissue Samples by LC-MS/MS

The US EPA's Office of Water, in partnership with the US Department of Defense's (DoD) Strategic Environmental Research and Development Program, has published draft Method 1633, a single-laboratory validated method to test for 40 PFAS compounds in wastewater, surface water, groundwater, soil, biosolids, sediment, landfill leachate, and fish tissue. This method is the first that covers matrices other than drinking water viz US EPA Methods 537.1 and 533 and is an isotope dilution liquid chromatography tandem mass spectrometry (LC-MS/MS) method that is the gold standard for PFAS determination. The extended range of PFAS are designed to cover traditional perfluoroalkyl acids (PFAAs), fluorotelomer sulfonic acids, perfluorooctane sulfonamides, perfluorooctane sulfonamidoacetic acids and perfluorooctane sulfonamide ethanols but additionally the replacement per- and polyfluoroether carboxylic acids such as GenX & ADONA as well as ether sulfonic acids (F53B) and fluorotelomer carboxylic acids that have been shown to be the major PFAS found in landfill leachates. This expanded list is more suitable to the wider environmental surveillance rather than just fire-fighting training areas traditionally investigated.

The 1633 method requires the addition of twenty-four extracted internal standards (EIS) prior to any sample treatment as well as seven non-extracted internal standards (NIS) added just prior to analysis using LC-MS/MS. All these standards are isotopically labelled which enable recovery correction as well as to assess any bias from either signal enhancement or suppression of the native PFAS compounds during extraction and the ionisation processes. The newly published Draft PFAS National Environmental Management Plan: Version 3.0 recognises this new method in its Table 15 Methods of PFAS analysis – standard and selected non-standard methods as one of the accepted methods that test for and quantify specific target analytes, known as standard analytical suites. The standard suites are covered in the [Table below](#).



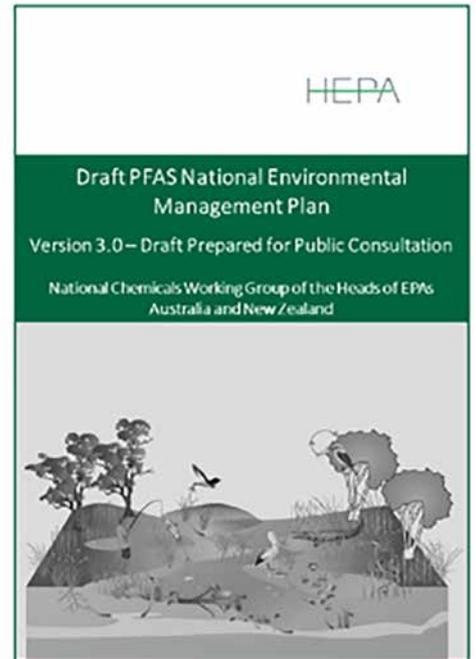
The expanded list of PFAS included in draft Method 1633 is more suitable to wider environmental surveillance rather than just fire-fighting training areas traditionally investigated

Draft NEMP 3.0 – new requirements

For all matrices including biosolids draft USEPA Method 1633 includes extensive clean-up procedures including the provision of a bile salt interference check standard containing taurodeoxycholic acid (TDCA) that commonly appears in fish tissue and of course biosolids. Draft USEPA Method 1633 provides a harmonised and validated methodology (albeit single laboratory at this point-in-time) for PFAS monitoring such as required in the draft NEMP 3.0. This approach can be applied to a multitude of matrices that have not previously been validated to provide high-quality data consistent with PFAS measurement best practices required by regulators when looking at data supporting both human health risk assessment and ecological risk assessments.

Logistics

Eurofins offers accredited testing in accordance with the draft USEPA Method 1633 as required by clients so, for a PFAS testing facility you can trust, choose Eurofins Environment Testing for quality analysis, superior customer service, and consistent reliability. To discuss logistical details for upcoming projects, then please contact your local Analytical Service Manager or one of our Business Development Team.



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Table 1. Names, Abbreviations, and CAS Registry Numbers for Target PFAS

PFAS Compounds (n=40)	Acronym	CASRN	EPA Method 533	EPA Method 537.1	EPA Method 1633
Perfluoroalkyl carboxylic acids (C4-C14)					
Perfluorobutanoic acid	PFBA	375-22-4	X		X
Perfluoropentanoic acid	PFPeA	2706-90-3	X		X
Perfluorohexanoic acid	PFHxA	307-24-4	X	X	X
Perfluoroheptanoic acid	PFHpA	375-85-9	X	X	X
Perfluorooctanoic acid	PFOA	335-67-1	X	X	X
Perfluorononanoic acid	PFNA	375-95-1	X	X	X
Perfluorodecanoic acid	PFDA	335-76-2	X	X	X
Perfluoroundecanoic acid	PFUnA	2058-94-8	X	X	X
Perfluorododecanoic acid	PFDoA	307-55-1	X	X	X
Perfluorotridecanoic acid	PFTrDA	72629-94-8		X	X
Perfluorotetradecanoic acid	PFTeDA	376-06-7		X	X
Perfluoroalkyl sulfonic acids (C3-C10)					
Perfluoropropanesulfonic acid	PFPrS	423-41-6			
Perfluorobutanesulfonic acid	PFBS	375-73-5	X	X	X
Perfluoropentane sulfonic acid	PFPeS	2706-91-4	X		X
Perfluorohexane sulfonate	PFHxS	355-46-4	X	X	X
Perfluoroheptane sulfonate	PFHpS	375-92-8	X		X
Perfluorooctane sulfonic acid,g,h	PFOS	1763-23-1	X	X	X
Perfluorononanesulfonic acid	PFNS	68259-12-1			X
Perfluorodecanesulfonic acid	PFDS	67906-42-7			X
Perfluoroalkane sulfonamides					
Perfluorooctane sulfonamide	FOSA	754-91-6			X
N-Methylperfluorooctane sulfonamide	MeFOSA	31506-32-8			X
N-Ethylperfluorooctane sulfonamide	EtFOSA	4151-50-2			X
Perfluorooctane sulfonamide ethanols					
N-Methylperfluorooctane sulfonamidoethanol	MeFOSE	24448-09-7			X
N-Ethylperfluorooctane sulfonamidoethanol	EtFOSE	1691-99-2			X
Perfluorooctane sulfonamidoacetic acids					
N-Ethylperfluorooctanesulfonamido acetic acid	N-EtFOSAA	2991-50-6		X	X
N-Methylperfluorooctanesulfonamido acetic acid	N-MeFOSAA	2355-31-9		X	X
Fluorotelomer sulfonic acids					
1H,1H,2H,2H-Perfluorohexanesulfonic Acid	4:2 FTSA	757124-72-4	X		X
1H,1H,2H,2H-Perfluorooctanesulfonic Acid	6:2 FTSA	27619-97-2	X		X
1H,1H,2H,2H-Perfluorodecanesulfonic Acid	8:2 FTSA	39108-34-4	X		X
1H, 1H, 2H, 2H-perfluorododecane sulfonic Acid	10:2 FTSA	120226-60-0			
Per- and Polyfluoroether carboxylic acids					
Hexafluoropropylene oxide dimer acid	HFPO-DA [GenX]f	13252-13-6b	X	X	X
4,8-dioxo-3H-perfluorononanoic acid	ADONA	919005-14-4e	X	X	X
Nonafluoro-3,6-dioxaheptanoic acid	NFDHA	151772-58-6	X		X
Perfluoro(2-ethoxyethane)sulfonic acid	PFEESA	113507-82-7	X		X
Perfluoro-3-methoxypropanoic acid	PFMPA	377-73-1	X		X
Perfluoro-4-methoxybutanoic acid	PFMBA	863090-89-5	X		X
Perfluoro(3,5-dioxahexanoic) acid	PF02HxA	39492-88-1			X
Ether sulfonic acids					
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	11Cl-PF30UdS [11Cl-F53B]	763051-92-9c	X	X	X
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid	9Cl-PF3ONS [9Cl-F53B]	756426-58-1d	X	X	X
Perfluoro(2-ethoxyethane)sulfonic acid	PFEESA	113507-82-7	X		X
Fluorotelomer carboxylic acids					
3-Perfluoropropyl propanoic acid	3:3 FTCA	356-02-5			X
2H,2H,3H,3H-Perfluorooctanoic acid	5:3 FTCA	914637-49-3			X
3-Perfluoroheptyl propanoic acid	7:3FTCA	812-70-4			X