



Per and Polyfluoroalkyl Substances (PFAS) Update

Overview

Much has been written regarding the rapidly evolving topic of PFAS in the environment. Regulatory criteria and the associated PFAS compound lists at the state and federal level are in a constant state of flux. From the laboratory perspective, these facts coupled with the limited availability of EPA methodology creates a challenging effort to keep pace with the ever changing landscape.

United States Environmental Protection Agency (USEPA) issued a drinking water health advisory limit (HAL) of 70 ng/L (ppt) for two PFAS compounds, perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS), individually or in combination. USEPA has not established a Maximum Contaminant Level (MCL) under the Safe Drinking Water Act for any of the PFAS compounds. Several states have issued PFAS related technical bulletins, regulatory guidance and action levels.

What we offer

Method 537.1, and Method 537 which it replaced, are analytical methods developed by the EPA for the analysis of drinking water. These methods were designed to support Safe Drinking Water Act compliance and associated drinking water applications. Significant modifications to these methods are not allowed and as such the use of these methods is limited to drinking water and very clean aqueous samples. In addition, Method 537.1 is only applicable to the 18 PFAS compounds listed in the method. If any PFAS compounds other than these are required or if the samples are anything other than clean water, the isotope dilution method should be used. The isotope dilution method incorporates isotopically-enriched forms of PFAS compounds into the sample analysis to greatly improve target compound quantitation and reduce uncertainty. Our isotope dilution procedure incorporates the maximum number of commercially available extracted internal standards, consisting of (18) ^{13}C -enriched and (2) ^2H -enriched compounds. As more of these reference standards become available, they will be incorporated into our method. Alpha Analytical routinely analyzes for up to 24 compounds using this technique, which is commonly associated with the current state of Michigan and the DoD QSM 5.1 lists. Alpha can also expand this list to include up to 36 PFAS compounds depending on the application, as shown on the attached table.

Sample preparation is also key to the generation of representative results. This is especially true for aqueous samples such as silty ground waters and wastewaters but it is the utmost importance for solid samples. Alpha Analytical has developed specific extraction protocols for a wide range of environmental media including particulate-laden aqueous samples as well as soils, sediments, biosolids, tissues, etc. We have worked specifically with fish, shellfish, produce, and food as well as landfill leachates and waste materials. Our sediment and tissue PFAS analysis capabilities draw on the overall human health and ecological risk assessment support infrastructure that exists at our Mansfield MA specialty laboratory. Alpha Analytical can also provide PFAS analysis of SPLP extractions as well as the Total Oxidizable Precursors (TOP) assay. The TOP assay is an analysis by difference approach that utilizes an oxidative pretreatment step that can provide an estimate of the total concentration of the additional polyfluorinated compounds that may be present in the sample but are not specifically analyzed for. Alpha's TOP assay PFAS compound list is also shown on the attached table.

Alpha Analytical holds NELAP as well as many state certifications for PFAS analysis. Please see our website for specific certification information. Alpha also holds DoD certification and we are fully compliant with DoD/DOE QSM 5.2. Standard turnaround time is 10 business days for aqueous and 15 business days for solids. The expanded compound list currently available from Alpha is shown here along some current regulatory PFAS compound lists. Please note that any subset of these compounds is available for analysis and that the PFAS compounds listed under the Method 537.1 table heading can also be analyzed by the isotope dilution method.

Parameter	Acronym	CAS	UCMR 6	CT / VT	MA	NH	537/537.1	DoD	NY	MI	WI	Alpha TOP
PERFLUOROALKYLCARBOXYLIC ACIDS (PFCA's)												
Perfluorobutanoic acid	PFBA	375-22-4				x		x	x	x	x	x
Perfluoropentanoic acid	PFPeA	2706-90-3				x		x	x	x	x	x
Perfluorohexanoic acid	PFHxA *	307-24-4				x	x	x	x	x	x	x
Perfluoroheptanoic acid	PFHpA *	375-85-9	x	x	x	x	x	x	x	x	x	x
Perfluorooctanoic acid	PFOA *	335-67-1	x	x	x	x	x	x	x	x	x	x
Perfluorononanoic acid	PFNA *	375-95-1	x	x	x	x	x	x	x	x	x	x
Perfluorodecanoic acid	PFDA *	335-76-2			x		x	x	x	x	x	x
Perfluoroundecanoic acid	PFUnA *	2058-94-8					x	x	x	x	x	x
Perfluorododecanoic acid	PFDoA *	307-55-1					x	x	x	x	x	x
Perfluorotridecanoic acid	PFTriDA *	72629-94-8					x	x	x	x	x	x
Perfluorotetradecanoic acid	PFTA *	376-06-7					x	x	x	x	x	x
Perfluorohexadecanoic acid	PFHxDA	67905-19-5									x	
Perfluorooctadecanoic acid	PFODA	16517-11-6									x	
PERFLUOROALKYLSULFONIC Acids (PFAS's)												
Perfluorobutanesulfonic acid	PFBS *	375-73-5	x			x	x	x	x	x	x	x
Perfluoropentanesulfonic acid	PFPeS	2706-91-4						x		x	x	x
Perfluorohexanesulfonic acid	PFHxS *	355-46-4	x	x	x	x	x	x	x	x	x	x
Perfluoroheptanesulfonic acid	PFHpS	375-92-8						x	x	x	x	x
Perfluorooctanesulfonic acid	PFOS *	1763-23-1	x	x	x	x	x	x	x	x	x	x
Perfluorononanesulfonic acid	PFNS	68259-12-1						x		x	x	x
Perfluorodecanesulfonic acid	PFDS	335-77-3						x	x	x	x	x
Perfluorododecanesulfonic acid	PFDoS	79780-39-5								x	x	
PERFLUOROCTANESULFONAMIDES (FOSAs)												
Perfluorooctanesulfonamide	FOSA	754-91-6						x	x	x	x	
N-methylperfluoro-1-octanesulfonamide	NMeFOSA	31506-32-8						X QSM 5.2			x	
N-ethylperfluoro-1-octanesulfonamide	NEtFOSA	4151-50-2									x	
TELOMER SULFONIC ACIDS												
1H,1H,2H,2H-perfluorohexanesulfonic acid (4:2)	4:2FTS	757124-72-4						x		x	x	
1H,1H,2H,2H-perfluorooctanesulfonic acid (6:2)	6:2FTS	27619-97-2						x	x	x	x	
1H,1H,2H,2H-perfluorodecanesulfonic acid (8:2)	8:2FTS	39108-34-4						x	x	x	x	
1H,1H,2H,2H-perfluorododecanesulfonic (10:2)	10:2FTS	120226-60-0									x	
PERFLUOROCTANESULFONAMIDOACETIC ACIDS												
N-methyl perfluorooctanesulfonamidoacetic acid	NMeFOSAA *	2355-31-9					x	x	x	x	x	
N-ethyl perfluorooctanesulfonamidoacetic acid	NEtFOSAA *	2991-50-6					x	x	x	x	x	
NATIVE PERFLUOROCTANESULFONAMIDOETHANOLS (FOSEs)												
2-(N-methylperfluoro-1-octanesulfonamido)-ethanol	NMeFOSE	24448-09-7									x	
2-(N-ethylperfluoro-1-octanesulfonamido)-ethanol	NEtFOSE	1691-99-2									x	
PERFLUOROALKYL ETHER CARBOXYLIC ACIDS (PFECAs)												
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid ("GenX")	HFPO-DA*	62037-80-3					x				x	
4,8-dioxa-3H-perfluorononanoic acid	ADONA *	919005-14-4					x				x	
CHLORO-PERFLUOROALKYLSULFONATE												
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	11Cl-PF3OUdS *	763051-92-9					x				x	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid	9Cl-PF3ONS *	756426-58-1					x				x	

* also available by Method 537.1 for drinking water samples

Please contact your Alpha Analytical Project Manager or Account Representative for more information.
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