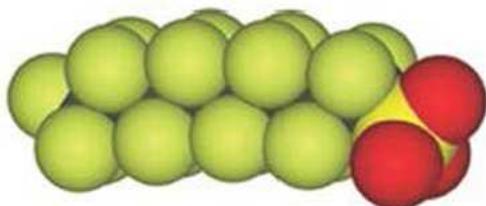


Per- and Polyfluorinated Alkyl Substances

Emerging Chemical Contaminant Compounds

Per- and Polyfluorinated Alkyl Substances (PFASs) are manmade compounds that are characterised by long, fluorinated carbon chains with different functional head groups.



PFASs are used in products to resist grease, oil, stains & water, and are also used in fire-fighting foams and appear in products which have water and soil repellency properties. PFASs finishes are popular for their performance in the high traffic environment associated with hospitals and medical facilities as well as waterproof clothing, fast food wrappers, pizza boxes, popcorn bags, stain-resistant carpet, paint, and windshield washer fluid.

Speciality fire-fighting applications have included Aqueous Film Forming Foams (AFFF) and Alcohol-Type Concentrate (ATC) that were used to extinguish Class B fires that involve flammable fuels. Perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) are the most researched of the PFASs, but recent studies have identified at least thirteen other related chemicals that are largely unresearched. The carbon-fluorine bond of these chemicals is incredibly strong, which makes it resist breakdown and causes PFASs to build up in the food chain.

Once PFASs are released into the environment, they remain indefinitely and "are stable to acids, bases, oxidants, and reductants and are generally not believed to undergo metabolic or other degradation in the environment".

According to the United States Environmental Protection Agency (EPA), PFASs have become concentrated in humans and other animals due their presence in the environment as well as exposures from food and consumer products. PFASs bioaccumulate and are subject to long-range atmospheric transport. On 26 August 2010, the Stockholm Convention on Persistent Organic Pollutants (POPs) which is an international environmental treaty that aims to eliminate or restrict the production and use of POPs mandated a restriction on Perfluorooctanesulfonic acid (PFOS), its salts and perfluorooctanesulfonyl fluoride (PFOSF). Australia as a signatory to the aforementioned convention is bound at assessing the risks of PFASs and through its various agencies are conducting research into the presence of PFASs in human and ecological populations.

The EPA set a lifetime drinking water Health Advisory (HA) for PFOA of 0.07 micrograms per litre (µg/L) and for PFOS of 0.07 micrograms per litre (µg/L) <https://www.epa.gov/ground-water-and-drinking-water/drinking-water-health-advisories-pfoa-and-pfos>. In drinking water where both PFOA and PFOS are found together, EPA recommends that the concentrations be added together. The HA for combined PFOS and PFOA is set at 0.07 micrograms per litre (µg/L). HAs are set to protect the population at large including sensitive individuals and are protective of both short-term as well as a lifetime of drinking water at these concentrations.

EnviroNote No. 1035 (re-issued) - June 2016

Eurofins

Contacts for further Information

Rhonda Chouman +61 3 8564 5000
Scott Carroll +61 2 9900 8410
Matt Deaves +61 8 9251 9600
Technical Support
Dr Bob Symons +61 2 9900 8400

Michael Horne
Peter Gratwick

+61 7 3902 4606
+61 448 176 035

Laboratories

Melbourne
Sydney
Brisbane
Perth

Offices

Newcastle
Adelaide
Darwin

E: EnviroSales@eurofins.com
W: <http://environment.eurofins.com.au/>

US EPA Method 537 ver 1.1 - Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC-MS/MS)

Eurofins | mgt are using this isotope dilution LC-MS/MS methodology for water and a modified version for soil and sediment samples that delivers typical LORs for waters of 0.01 µg/L and for solids 5 µg/kg for the following PFASs. Lower ultra-trace LORs are available upon request.

Native PFASs

Perfluoroalkyl carboxylic acids (PFCAs)^a

Perfluorobutanoic acid
Perfluoropentanoic acid
Perfluoro-n-hexanoic acid
Perfluoro-n-heptanoic acid
Perfluoro-n-octanoic acid
Perfluoro-n-nonanoic acid
Perfluoro-n-decanoic acid
Perfluoro-n-undecanoic acid
Perfluoro-n-dodecanoic acid
Perfluoro-n-tridecanoic acid
Perfluoro-n-tetradecanoic acid

Perfluoroalkane sulfonic acids (PFASs)^b & Perfluoroalkane sulfonates (PFASs)^b

Perfluorobutanesulfonic acid
Perfluoro-n-hexane sulfonate
Perfluoro-n-heptane sulfonate
Perfluoro-n-octane sulfonate

Perfluoroalkane sulfonamides (FASAs)^b

Perfluorooctane sulfonamide
N-methylperfluoro-1-octane sulfonamide
N-ethylperfluoro-1-octanesulfonamide
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol

Fluorotelomer substances^b

n:2 Fluorotelomer sulfonic acids

1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2 FTS)
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2 FTS)
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2 FTS)

Labelled Surrogate Standards

Perfluoro-n-[1,2,3,4-¹³C₄]butanoic acid
Perfluoro-n-[1,2-¹³C₂]hexanoic acid
Perfluoro-n-[1,2,3,4-¹³C₄]octanoic acid
Perfluoro-n-[1,2,3,4,5-¹³C₅]nonanoic acid
Perfluoro-n-[1,2,3,4,5,6,7,8,9-¹³C₉]decanoic acid
Perfluoro-n-[2,3,4,5,6,7,8,9,10-¹³C₉]undecanoic acid
Perfluoro-n-[1,2-¹³C₂]dodecanoic acid
Perfluoro-n-[1,2,3,4-¹³C₄]octane sulfonic acid
Perfluoro-1-[1,2-¹⁸O₂]-hexane sulfonic acid
N-methyl-D₃-perfluoro-1-octanesulfonamide
Perfluoro-n-[1,2,3,4,5,6,7,8-¹³C₈]octanoic acid
1H,1H,2H,2H-Perfluoro-[1,2-¹³C₂]octanesulfonic Acid (6:2 FTS)

^aSubstances originating by electrochemical fluorination (ECF) process;

^bSubstances originating by fluorotelomer process.

Eurofins | mgt Experience

Eurofins | mgt's Brisbane centre-of-excellence have considerable experience in the analysis of PFASs in a range of matrices and obtained excellent results in a recent proficiency study conducted by the National Measurement Institute.

Please contact your local Analytical Service Manager or one of our Business Development Team listed below for further details.

Results You Can Trust