



Method Summary

The Determination of Per- and Polyfluorinated Substances (PFAS) in Water Samples by LC-MS/MS

Scope and Range

PFAS are surfactants with many industrial uses, particularly in the production of PTFE and in coatings for paper. Historically they have seen use in foaming agents, particularly aqueous film-forming foams (AFFF) used in firefighting. The release of some of these compounds into the environment is now under regulation.

This method has been validated to ISO 17025 and is accredited for groundwater, surface water and treated sewage effluent.

Quantitation range: 0.65 to 200 ng/L or higher with dilutions

| Perfluoroalkylcarboxylic Acids | | CAS | ng/L |
|---------------------------------------|-------------------------------|------------|------|
| PFBA | perfluoro-n-butanoic acid | 375-22-4 | 2 |
| PFPA | perfluoro-n-pentanoic acid | 2706-90-3 | 1 |
| PFHxA | perfluoro-n-hexanoic acid | 307-24-4 | 1 |
| PFHpA | perfluoro-n-heptanoic acid | 375-85-9 | 1 |
| PFOA | perfluoro-n-octanoic acid | 335-67-1 | 0.65 |
| PFNA | perfluoro-n-nonanoic acid | 375-95-1 | 1 |
| PFDA | perfluoro-n-decanoic acid | 335-76-2 | 1 |
| PFUnA | perfluoro-n-undecanoic acid | 2058-94-8 | 1 |
| PFDoA | perfluoro-n-dodecanoic acid | 307-55-1 | 1 |
| Perfluoroalkylsulfonates# | | | |
| PFBS | perfluoro-1-butanedisulfonate | 375-73-5 | 1 |
| PFPeS | perfluoro-1-pentadisulfonate | 2706-91-4 | 1 |
| PFHxS | perfluoro-1-hexadisulfonate | 355-46-4 | 1 |
| PFHpS | perfluoro-1-heptadisulfonate | 375-92-8 | 1 |
| Linear PFOS | perfluoro-1-octadisulfonate | 1763-23-1 | 0.65 |
| Branched PFOS | (mixture of isomers) | - | 0.65 |
| Total PFOS | (sum of linear and branched) | - | 0.65 |
| PFDS | perfluoro-1-decadisulfonate | 335-73-3 | 1 |
| Perfluorooctanesulfonamides | | | |
| PFOSA | perfluorooctanesulfonamide | 754-91-6 | 2 |
| Fluorinated Telomer Sulfonates | | | |
| 6:2 FtS | 6:2 fluorotelomer sulfonate | 27619-97-2 | 1 |

Table 1 List of per- and polyfluorinated compounds contained within suite and associated limits of detection.



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- The listed CAS numbers refer to the parent perfluoroalkylsulfonic acid. It should be noted that the method detects the perfluoroalkylsulfonate base anion which may derive from a range of substances, such as the parent acid and salts of the acid.

References

Determination of selected perfluorinated alkyl acids in drinking water by solid phase extraction and liquid chromatography/tandem mass spectrometry (LC/MS/MS), J.A. Shoemaker, P.E. Grimmitt, B.K. Boutin, version 1.1, September 2009. EPA document EPA/600/R-08/092.

Agilent Application Note 5989-6577EN, Quantitative analysis of perfluorooctanoic acid by LC/MS/MS. (2007).

DIN 38407-42 Determination of selected polyfluorinated compounds (PFC) in water using high performance liquid chromatography and mass spectrometric detection (HPLC/MS-MS) after solid-liquid extraction.

ISO 25101:2009 Water quality -- Determination of perfluorooctanesulfonate (PFOS) and perfluorooctanoate (PFOA) -- Method for unfiltered samples using solid phase extraction and liquid chromatography/mass spectrometry

Principle

Samples are extracted using solid phase extraction (SPE) and analysed by liquid chromatography coupled with a triple quadrupole mass spectrometer (LC-MS/MS). For samples known to have high concentrations of target analytes, a direct injection method is used. The direct injection method is unaccredited.

Interferences

Extracted samples may contain interferences from other compounds contained within the sample matrix. Using the principles of MS/MS, many of these interferences will be eliminated. However, there may be occasions when interferences from non-target compounds arise from similar precursor and product ions. In these cases, reported limits of detection may be raised.