



PFAS Testing in Waters: The Scope of Analyses and Current State of Legislation

ALS Czech Republic laboratories have again expanded the list of accredited analyses for the determination of PFAS.

Persistence and bioaccumulation. Two essential characteristics, and two main reasons for the analysis of PFAS (per/polyfluoroalkylated substances). PFAS are already well-known industrially produced synthetics whose steadily increasing amounts in the environment are leading to the progressive introduction of regulations and legislative limits worldwide. ALS laboratories provide accurate, fast, and reliable accredited analysis of a wide range of PFAS, the list of which, as well as the range of matrices tested, is growing.

PFAS as we know...

Forever chemicals. A name that, unfortunately, has already been adopted for this group of synthetic compounds that can be detected across the all environmental components. The unique chemical structure of PFAS (more than 5,000 of them are described today) gives the final industrial products unique properties such as the mostability, dielectric properties, or the ability to reduce the surface tension. Thanks to this, PFAS are used in various branches of industry and became a part of a whole range of products, e.g. mechanical components, electronics, fire-fighting foams, and/or common products in our homes such as cosmetic products, packaging materials, textiles or pans. High levels of PFAS detected in various components of the environment, as well as their already known adverse effects on human health, lead to the increasing demand for establishment of global PFAS regulations. The best-known representatives of this group are perfluorooctanesulfonate (PFOS) and perfluorooctanoic acid (PFOA), which were among the substances included in the Stockholm Convention in 2009 and 2019, respectively. In the future, other substances from the PFAS group are proposed to become a part, e.g. perfluor hexanesulfonate (PFHxS). ECHA (European Chemical Agency) has published a proposal for a plan to significantly reduce PFAS in almost all sectors and in the future allows their use only in those fields where they cannot be replaced.



Legislation and regulations

Until recently, PFAS legislation limits in drinking water in most of EU member states were set only for PFOS and PFOA by DIRECTIVE (EU) 2020/2184 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 December 2020 on the quality of water intended for human consumption, valid from 1 January, 2022. It provides for a transitional period by January 12, 2026 for Member States to take the necessary measures to ensure that the values of two indicators for PFAS, namely „PFAS total“ and „PFAS sum“ are met for waters intended for human consumption. A limit of 0.1 µg/L has been set for the sum of PFAS for the 20 compounds marked with (*) in Table 1. For the „PFAS total“ parameter (limit of 0.5 µg/L), technical instructions will be drawn up and subsequently the Member States will be able to decide whether to use the “PFAS total” indicator, the “PFAS sum” indicator, or both.

References

- DIRECTIVE (EU) 2020/2184 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 December 2020 on the quality of water intended for human consumption ([HERE](#))
- EnviroMail / Europe, No.2/2023: Sampling Recommendations for PFAS to Maximize Data Quality

Table 1. The list of PFAS target analytes and report limits as validated for water samples.

Groups	Analytes	Abbreviation	Standard method (µg/L)	Low-limits method (µg/L)
Perfluoroalkyl-carboxylic acids	Perfluorobutanoic acid	PFBA*	0.01	0.002
	Perfluoro-3-methoxypropanoic acid	PFMPA	0.025	0.001
	Perfluoropentanoic acid	PFPeA*	0.01	0.0003
	Perfluoro-4-methoxybutanoic acid	PFMBA	0.025	0.001
	Perfluorohexanoic acid	PFHxA*	0.01	0.0003
	2,3,3,3-tetrafluoro-2-(heptafluoropropoxy) propanoic acid	HFPO-DA	0.02	0.001
	Perfluoroheptanoic acid	PFHpA*	0.01	0.0003
	4,8-dioxa-3H-perfluorononanoic acid	DONA	0.01	0.002
	7H-perfluoroheptanoic acid	HPFHpA	0.01	0.001
	Perfluorooctanoic acid	PFOA*	0.005	0.0003
	Perfluoro-3,7-dimethyloctanoic acid	P37DMOA	0.01	0.001
	Perfluorononanoic acid	PFNA*	0.01	0.0003
	Perfluorodecanoic acid	PFDA*	0.01	0.0003
	2H,2H,3H,3H-perfluoroundecanoic acid	H4PFUnDA	0.02	0.0003
	Perfluoroundecanoic acid	PFUnDA*	0.01	0.0003
	Perfluorododecanoic acid	PFDoDA*	0.01	0.0003
	Perfluorotridecanoic acid	PFTrDA*	0.01	0.0003
	Perfluorotetradecanoic acid	PFTeDA	0.025	0.0003
	Perfluorohexadecanoic acid	PFHxDA	0.05	n.a.
	Perfluorooctadecanoic acid	PFOcDA	0.05	n.a.
Perfluoroalkyl-sulfonic acids	Perfluoropropane sulfonic acid	PFPrS	0.02	0.001
	Perfluoro(2-ethoxyethane)sulfonic acid	PFEESA	0.1	0.001
	Perfluorobutane sulfonic acid	PFBS*	0.01	0.0003
	Perfluoropentane sulfonic acid	PFPeS*	0.01	0.0003
	Perfluorohexane sulfonic acid	PFHxS*	0.01	0.0003
	Perfluoroheptane sulfonic acid	PFHpS*	0.01	0.0003
	Perfluorooctane sulfonic acid	PFOS*	0.005	0.0003
	Perfluoro-4-ethylcyclohexanesulfonic acid	PFECHS	0.01	0.0003
	Perfluorononane sulfonic acid	PFNS*	0.01	0.0003
	Perfluorodecane sulfonic acid	PFDS*	0.01	0.0003
	Perfluoroundecane sulfonic acid	PFUnDS*	0.01	0.001
	Perfluorododecane sulfonic acid	PFDoDS*	0.01	0.0003
	Perfluorooctane sulfonic acid	PFTrDS*	0.02	0.001
Perfluorinated telomer sulfonates	4:2 Fluorotelomer sulfonic acid	4:2 FTS	0.01	0.0003
	6:2 Fluorotelomer sulfonic acid	6:2 FTS	0.01	0.0003
	8:2 Fluorotelomer sulfonic acid	8:2 FTS	0.01	0.0003
	10:2 Fluorotelomer sulfonic acid	10:2 FTS	0.01	n.a.
Perfluorinated sulfonamides	Perfluorooctane sulfonamide	FOSA	0.01	0.0003
	N-Methyl perfluorooctane sulfonamide	MeFOSA	0.05	0.002
	N-Ethyl perfluorooctane sulfonamide	EtFOSA	0.05	0.002
Perfluorinated sulfonamidoethanols	N-Methyl perfluorooctane sulfonamidoethanol	MeFOSE	0.025	0.002
	N-Ethyl perfluorooctane sulfonamidoethanol	EtFOSE	0.025	0.002
Perfluorooctane-sulfoamidoacetic acids	Perfluorooctane sulfonamidoacetic acid	FOSAA	0.01	0.001
	N-Methyl perfluorooctane sulfonamidoacetic acid	MeFOSAA	0.01	0.001
	N-Ethyl perfluorooctane sulfonamidoacetic acid	EtFOSAA	0.01	0.001
	2H,2H,3H,3H-perfluorohexanoic acid	3:3 FTCA	0.1	0.0003
	2H,2H-perfluorooctanoic acid	6:2 FTCA	0.1	0.001
Fluorotelomer carboxylic acids	2H,2H,3H,3H-perfluorooctanoic acid	5:3 FTCA	0.02	0.001
	2H-perfluoro-2-octenoic acid	6:2 FTUCA	0.02	0.001
	2H,2H,3H,3H-perfluorodecanoic acid	7:3 FTCA	0.02	0.0003
	2H,2H-perfluorodecanoic acid	8:2 FTCA	0.1	0.001
	2H-perfluoro-2-decenoic acid	8:2 FTUCA	0.02	0.001
Chlorinated perfluoroalkyl sulfonic acids	9-chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	9Cl-PF3ONS	0.01	0.001
	11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	11Cl-PF3OUdS	0.01	0.002

* Analytes included in the sum of 20 PFAS in drinking water according to DIRECTIVE (EU) 2020/2184 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 December 2020 on the quality of water intended for human consumption.