

Per- and Polyfluoroalkyl Substances (PFAS)

EPA Methods for PFAS in Drinking Water

PFAS and U.S. Drinking Water

Per- and polyfluoroalkyl substances (PFAS) are a large group of environmentally persistent, man-made chemicals used in industrial and commercial household uses including firefighting activities, stain repellents, and non-stick cookware. Currently there are over 600 PFAS compounds that the EPA has approved for sale or import into the United States. Due to their widespread use, PFAS are being found at low ambient levels in the environment.

As concern over PFAS contamination grew, the United States Environmental Protection Agency (EPA) included six PFAS as part of the third Unregulated Contaminant Monitoring Rule and public water systems (PWSs) began monitoring these PFAS in finished drinking water supplies across the U.S. Two PFAS, perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA), were found to be present in finished drinking water of approximately 1.3% of PWSs at levels that exceed the EPA's 2016 health advisory level of 70 nanograms per liter (ng/L) for perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS), individually or combined.

The EPA and Agency for Toxic Substances and Disease Registry (ATSDR) both report that the most consistent health effect from PFAS exposure is increased cholesterol levels. There are more limited findings related to effects on the immune system, cancer, and low infants birth weights. The EPA expects to make a determination late this year to regulate PFOA and PFOS under Safe Drinking Water Act.

EPA Methods for Drinking Water

EPA Method 537.1 is currently the only published method for PFAS in drinking water. This method was used as part of the third Unregulated Contaminant Monitoring Rule to determine occurrence of PFOS, PFOA, perfluorobutanesulfonic acid (PFBS), perfluoroheptanoic acid (PFHpA), Perfluorohexanesulfonic acid (PFHxS), and perfluorononanoic acid (PFNA). However, EPA expects to publish Method 533 during 2019. EPA Method 533 is expected to expand the list of PFAS analytes for drinking water to include an additional eleven compounds, particularly short-chain compounds. Additionally, EPA is considering use of Method 533 for monitoring under the fifth Unregulated Contaminant Monitoring Rule. Refer to the table on the following page for a comparison of the PFAS analytes captured by EPA Methods 537.1 and 533.



Additional AWWA Resources

The following resources can be accessed on our [PFAS Resource webpage](#).

- Technical fact sheets covering “Overview and Prevalence”, “Sampling, Monitoring, and Analysis”, and “Treatment”
- AWWA’s Testimony to United States House and Senate on PFAS
- Relevant Journal of AWWA articles or standards
- Other related resources

Monitoring, Sampling, and Analysis

Comparison of EPA Drinking Water Methods

<u>Full Name</u>	<u>EPA Method 537.1</u>	<u>EPA Method 533</u>
Hexafluoropropylene oxide dimer acid (HFPO-DA)	X	X
N-Ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	X	
N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	X	
Perfluorobutanesulfonic acid (PFBS)	X	X
Perfluorodecanoic acid (PFDA)	X	X
Perfluorododecanoic acid (PFDoA)	X	X
Perfluoroheptanoic acid (PFHpA)	X	X
Perfluorohexanesulfonic acid (PFHxS)	X	X
Perfluorohexanoic acid (PFHxA)	X	X
Perfluorononanoic acid (PFNA)	X	X
Perfluorooctanesulfonic acid (PFOS)	X	X
Perfluorooctanoic acid (PFOA)	X	X
Perfluorotetradecanoic acid (PFTrDA)	X	
Perfluorotridecanoic acid (PFTA)	X	
Perfluoroundecanoic acid (PFUnA)	X	X
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	X	X
9-chlorohexanedecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	X	X
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	X	X
Perfluoro-1-pentanesulfonic acid (PFPeS)		X
Perfluoro-1-heptanesulfonic acid (PFHpS)		X
1H, 1H, 2H, 2H-perfluorohexane sulfonic acid (4:2 FTS)		X
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)		X
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)		X
Perfluorobutanoic acid (PFBA)		X
Perfluoropentanoic acid (PFPeA)		X
Perfluoro-4-methoxybutanoic acid (PFMBA)		X
Perfluoro-3-methoxypropanoic acid (PFMPA)		X
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)		X
Nonfluoro-3,6-dioxaheptanoic acid (NFDHA)		X