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PFAS Analysis

Per-and Polyfluorinated Alkyl Substances (PFAS)

What are PFAS Compounds?

Per- and Polyfluorinated Alkyl Substances (PFAS) are a large group of manufactured compounds that are used in a wide range of industrial and consumer applications. PFAS are also the principle components in Aqueous Film Forming Foams (AFFF) firefighting products that meet military specifications.

PFAS compounds are used to repel oil and water in textile products like clothing, carpeting and furniture, as well as in food packaging and in the manufacture of fluoropolymers used in non-stick cookware. Some of the unique chemical characteristics that make PFAS compounds attractive for use in surface coatings also render them resistant to biodegradation in the environment. Therefore, PFAS compounds are persistent and have been shown to bioaccumilate in humans and wildlife. PFAS compounds have been found throughout the environment in groundwater, surface water, soil and sediment. Studies have shown detections of PFAS in air, biota and food.

Leading the Industry in PFAS Analysis

When dealing with contaminants of emerging concern, it is vital that you work with an experienced laboratory capable of providing defensible data, especially due to the lack of EPA standard methods. Utilizing industry-leading practices, Eurofins not only has dedicated laboratory space and instrumentation for PFAS analysis, but also dedicated teams who provide the highest quality results each and every time. These teams provide an unmatched level of experience, and a capacity to analyze tens of thousands of PFAS samples per month.

PFAS methodologies and regulations are continually evolving as additional compounds are identified and states continue to expand their testing requirements for these contaminants. With our dedicated teams, Eurofins is able to offer you the flexibility to develop and adapt to the continually changing analytical needs.

Eurofins offers you:

- The ability to test a wide range of matrices for **up to 75 PFAS compounds**. 70 PFAS are supported from a single LCMSMS analysis with 5 FTOH PFAS supported by GC/MS/MS analysis.
- **North America's largest capacity with 37 instruments** dedicated to PFAS analysis and a throughput of 40,000 samples per month.
- The use of **gold-standard methods** including isotope dilution, as well as EPA 537.1 and 533 for drinking water analysis.
- **Dedicated sample preparation and cleanup space** minimizing the chance of cross-contamination.
- Two laboratories dedicated to drinking water analyses that have been analyzing PFAS for over 10 years as well as additional drinking water testing capacity throughout our network of laboratories.
- Analysis for **GenX and other perfluoroether carboxylic acids (PFECA)** used as replacement compounds.
- Analytical results that **meet or exceed current regulatory and advisory limits**.
- Multiple accreditations including **DoD QSM, ISO 17025, NELAC** and various state-specific programs.

Capabilities and Capacity

Eurofins is a global leader in providing innovative and high-quality environmental analytical laboratory services. Our PFAS laboratories, located in Lancaster, Pennsylvania; Denver, Colorado; South Bend, Indiana; Monrovia and Sacramento, California; Burlington, Vermont; and Knoxville, Tennessee are equipped with state-of-the-art technology and instrumentation. With thousands of employees dedicated to environmental testing, Eurofins has the capacity and financial stability to meet your project needs.

We perform PFAS analysis on a variety of environmental matrices including:

- air
- drinking water
- groundwater
- wastewater
- soil
- sediment
- leachate
- tissue
- biosolids
- consumer products
- AFFF
- Emulsions and Fluoropolymer Dispersions
- Food, Feed and Agricultural Products
- Blood/Serum

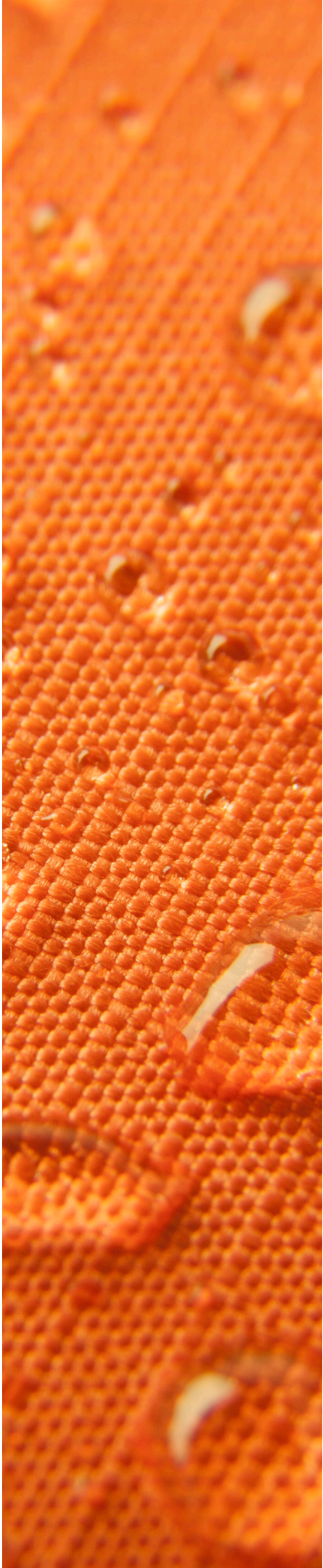
We use state-of-the-art LC/MS/MS instrumentation in support of trace-level reporting of PFAS contaminants as well as GC/MS/MS for the analysis of other emerging contaminants. Within our isolated PFAS laboratories, we run numerous dedicated systems over multiple shifts, giving us unmatched capacity for any project size. We have optimized our systems so that the data reported to you meets or exceeds all of the current regulatory or Health Advisory limits. We offer several analytical methods to meet state, federal and DoD criteria. The isotope dilution method can be utilized when testing potable water, non-potable water, soil/sediment, tissue and nontraditional matrices. For drinking water, we support EPA methods 537 and 533, without modification. To accommodate unique project reporting requirements, data can be provided in a client specific Data Deliverable format as well as a Level II, III or IV data package.

In accordance with the EPA's September 2016 Technical Advisory and EPA method 537.1, Eurofins includes branched/linear isomers in the quantification of PFOA, PFOS, PFHxS, NEtFOSAA and NMeFOSAA. While a technical grade standard of PFOA is analyzed with each initial calibration for a qualitative reference and identification, branched/linear isomers are in the calibration for PFOS, PFHxS, NEtFOSAA and NMeFOSAA.

Our depth of knowledge, redundancy of systems and state-of-the-art facilities are key to our success in supporting the PFAS market. Eurofins' reinvestment in the business ensures that we continue to offer highly sensitive methods, low reporting limits and compliance with method protocols meeting regulatory guidance over the duration of the client program.

Drinking Water Analysis

Eurofins has the largest potable water testing laboratory in the United States, serving water quality professionals throughout the United States and in more than 100 countries worldwide. Eurofins' two drinking water laboratories serve more than 7,000 state and local municipalities as well as bottlers, engineering firms, consultants and federal agencies such as the EPA and U.S. Military. Eurofins is drinking water certified or approved in all 50 states and territories, and we support EPA methods 537.1 and 533, without modification.



Advanced Analytical and Forensic Tools: TOF, TOP Assay, Branched/Linear Isomers, and Non-Target Analysis

Current analytical methodologies measure a discrete list of 40 PFAS compounds on average. Many additional PFAS are not determined as discrete compounds by existing commercial methods, therefore we may be underestimating the PFAS mass present in the environment. As the investigation and treatment of sites contaminated with PFAS matures, there is a growing interest in determining the contributions of different sources to the overall contamination and understanding the true mass of PFAS present.

Eurofins has implemented several tools that illuminate additional pieces of the PFAS puzzle.

AFFF impacted samples analyzed by the TOP Assay have been shown to reveal an additional mass of PFAS compounds that can comprise of up to 70% of the fluorinated organics in the sample. The combination of the TOP analysis and the standard suite of PFAS compounds can give a more complete characterization of the PFAS contamination present.

Total Oxidizable Precursors (TOP) Assay

Water, soil, and sediment are treated with persulfate, hydroxide and heat to create a hydroxyl radical oxidation. An initial aliquot of each sample is analyzed for a suite of targeted PFAS compounds. Then a second portion of the sample is oxidized. When the oxidation is complete, the oxidized portion is extracted in the normal fashion for the same suite of PFAS compounds and then compared to the initial analysis. Increases in the concentrations in the Perfluorocarboxylic Acids (PFCAs) indicate the presence of oxidizable precursors which constitutes a portion of the hidden mass. Achievable detection limits are in the part per trillion (ppt) range.

Total Organofluorine (TOF)

The determination of total organic fluorine approaches quantitation of the unknown mass of PFAS from the angle of the fluorine content of a sample. With the use of combustion ion chromatography (CIC) a wide range of matrices are analyzed for Total Organic Fluorine (TOF), Total Absorbable Organofluorine (AOF) in water, or Extractable Organic Fluorine (EOF) in solids. Achievable detection limits are in the part per billion (ppb) range.

Extensive Compound List

As AFFF and other PFAS sources have changed vendors and formulations over the years, the concentration and composition of PFAS in those products has also changed. As the number of targeted compounds increases, the likelihood of a unique identification increases. This is not to say that increasing from a list of 30 PFAS to a list of 70 PFAS will elucidate a point source, only increase the potential for additional and unique positive identifications. Achievable detection limits are in the part per trillion (ppt) range.

Linear/Branched/Total PFAS

Separate results of the linear isomer and the sum of branched PFAS isomers for PFOA, PFOS, PFHxS, MeFOSAA, and EtFOSAA are possible. There are two main processes in which PFAS are created: Electrochemical and Telomerization. The electrochemical process produces both linear and branched isomers, but all are saturated, meaning that every carbon in the backbone is only bonded to another carbon and fluorine. The telomerization process results in mixed saturation but linear isomers only. These data reported separately can yield more information than a single value would.

Non-Targeted Analysis (NTA)

While a long compound list and the ability to differentiate linear and branched isomers are powerful tools, there are estimated to be thousands of PFAS in-use or with legacy usage. As there are only analytical standards for a fraction of these compounds, additional instrumentation is needed to identify PFAS without commercially available standards. This task is best suited for Quadrupole-Time-Of-Flight Mass Spectrometry (QTOF-MS). This data results in exact mass, capable of matching identified compounds to a library of exact mass spectra (unique fragments of the original compound). Eurofins has recently expanded our PFAS library from 300 compounds to ~2400 compounds. This allows for unknown compounds to be identified with chemical formula, name, and CAS number.

PFAS Certifications & Accreditations

Eurofins is accredited in each state, where certification is offered, for method(s) of PFAS Analysis. Our laboratories hold certification with the Department of Defense (DoD) ELAP program and state accreditations for per- and polyfluorinated chemical analysis that follow QSM Table B15 protocol.

	EPA 537.1 Potable Water (SDWA)	Non Potable (CWA)	Solid Waste (RCRA)
Alabama	✓	✓	✓
Alaska	✓	✓	✓
Arizona	✓	✓	✓
Arkansas	✓	✓	✓
California	✓	✓	✓
Colorado	✓	✓	✓
Connecticut	✓	✓	✓
Delaware	✓	✓	✓
Florida	✓	✓	✓
Georgia	✓	✓	✓
Hawaii	✓	✓	✓
Idaho	✓	✓	✓
Illinois	✓	✓	✓
Indiana	✓	✓	✓
Iowa	✓	✓	✓
Kansas	✓	✓	✓
Kentucky	✓	✓	✓
Louisiana	✓	✓	✓
Maine	✓	✓	✓
Maryland	✓	✓	✓
Massachusetts	✓	✓	✓
Michigan	✓	✓	✓
Minnesota	✓	✓	✓
Mississippi	✓	✓	✓
Missouri	✓	✓	✓

	EPA 537.1 Potable Water (SDWA)	Non Potable (CWA)	Solid Waste (RCRA)
Montana	✓	✓	✓
Nebraska	✓	✓	✓
Nevada	✓	✓	✓
New Hampshire	✓	✓	✓
New Jersey	✓	✓	✓
New Mexico	✓	✓	✓
New York	✓	✓	✓
North Carolina	✓	✓	✓
North Dakota	✓	✓	✓
Ohio	✓	✓	✓
Oklahoma		✓	✓
Oregon	✓	✓	✓
Pennsylvania	✓	✓	✓
Rhode Island	✓	✓	✓
South Carolina	✓	✓	✓
South Dakota	✓	✓	✓
Tennessee	✓	✓	✓
Texas	✓	✓	✓
Utah	✓	✓	✓
Vermont	✓	✓	✓
Virginia	✓	✓	✓
Washington	✓	✓	✓
West Virginia	✓	✓	✓
Wisconsin	✓	🕓	🕓
Wyoming	✓	✓	✓

✓ Certifications or Accreditation Held

✓ Certification Not Offered by State

Eurofins is able to support work without state specific accreditation.

🕓 Accreditation in Process

Note: Certifications are subject to change. Last updated: 2/2021

Sampling Preservatives and Bottles

Matrix	Container/Preservation	Method
Potable Water	2 x 250mL Plastic/ ammonium acetate	EPA 533
Potable Water	2 x 250mL Plastic/Trizma	EPA 537.1
Aqueous	2 x 250mL Plastic/ none	537 Isotope Dilution
Aqueous (DOD)	2 x 250mL Plastic/ none	537 Isotope Dilution QSM 5.1 table B-15
TOP in Water (Pre-Oxidation)	3 x 250mL Plastic/ none	537 Isotope Dilution
TOP in Water (Post-Oxidation)	3 x 250mL Plastic/ none	537 Isotope Dilution
Solid	1 x 125mL Plastic/ none	537 Isotope Dilution
Solid (DOD)	1 x 125mL Plastic/ none	537 Isotope Dilution QSM 5.1 table B-15
AFFF	1 x 250mL Plastic/ none	537 Isotope Dilution

Eurofins provides sample collection bottles made of high-density polyethylene plastic (HDPE) and lids that are free of Teflon™ lining.

Eurofins Locations for PFAS Analysis

Eurofins Eaton Analytical
Monrovia, CA and South Bend, IN

- PFAS in drinking water
- Largest drinking water lab in the country
- Backup capacity between two labs to accommodate project schedules
- NELAP / ISO 17025 accredited

Eurofins Lancaster Laboratories Environmental
Lancaster, PA

- PFAS in drinking water, groundwater, wastewater, soil, sediment, tissue, biosolids, AFFF, milk, food and vegetation and consumer products
- DoD / NELAP / ISO 17025 accredited
- Total Oxidizable Precursors (TOP) Assay
- Total Organic Fluorine (TOF) Analysis
- Non-Target Analysis (NTA)

Eurofins TestAmerica
West Sacramento, CA; Denver, CO; Burlington, VT; Knoxville, TN

- PFAS in drinking water, groundwater, wastewater, soil, sediment, tissue, blood/serum, biosolids, AFFF, consumer products and air
- DoD / NELAP / ISO 17025 accredited
- Total Oxidizable Precursors (TOP) Assay
- Non-Target Analysis (NTA)

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