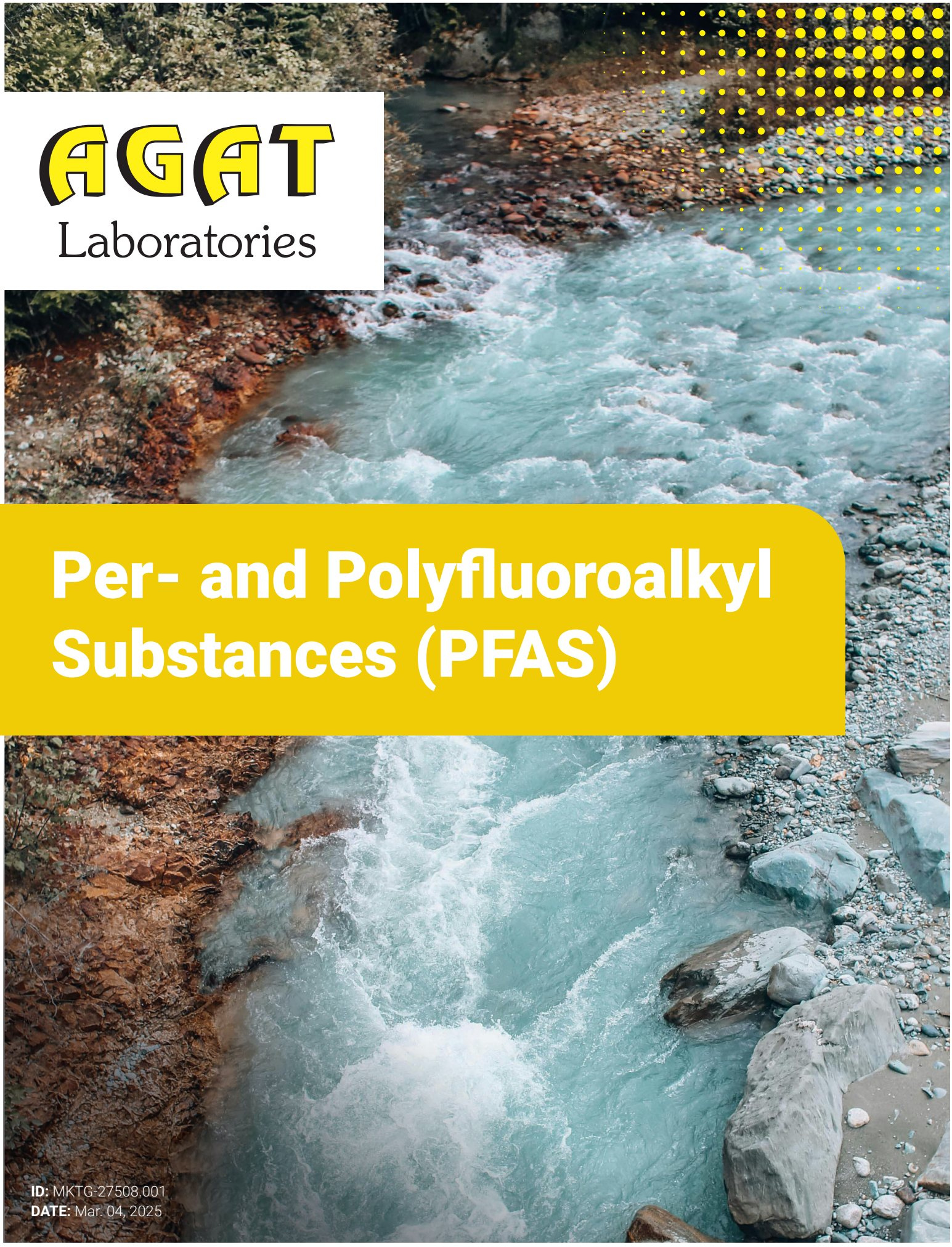
AGAT Laboratories

Per- and Polyfluoroalkyl Substances (PFAS)



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AGAT Laboratories

AGAT Laboratories is a North American leader in analytical services, delivering precise and trustworthy results across the globe. With over four decades of expertise, we've become one of the most geographically diverse and technically advanced laboratories.

Our clients span across diverse sectors, including environmental consulting, energy, mining, food and agriculture, life sciences, and government agencies.

We proudly serve industries across Canada, USA and beyond, delivering accurate and defensible results that drive informed decisions and support public health, safety, and environmental stewardship.

AGAT Laboratories specializes in the following scientific areas:

- Advanced Rock Properties
- Agricultural Analysis
- Air Quality Monitoring
- Forensic Investigations
- Core & Materials Testing
- Environmental Chemistry
- Food Testing
- Geology & Petrology
- Geotechnical Testing
- Lubricants & Fuels Testing
- Mining Geochemistry
- Oil Sands Analysis
- Petroleum Testing
- Reservoir Characterization
- Ultra-trace & Ecotoxicology

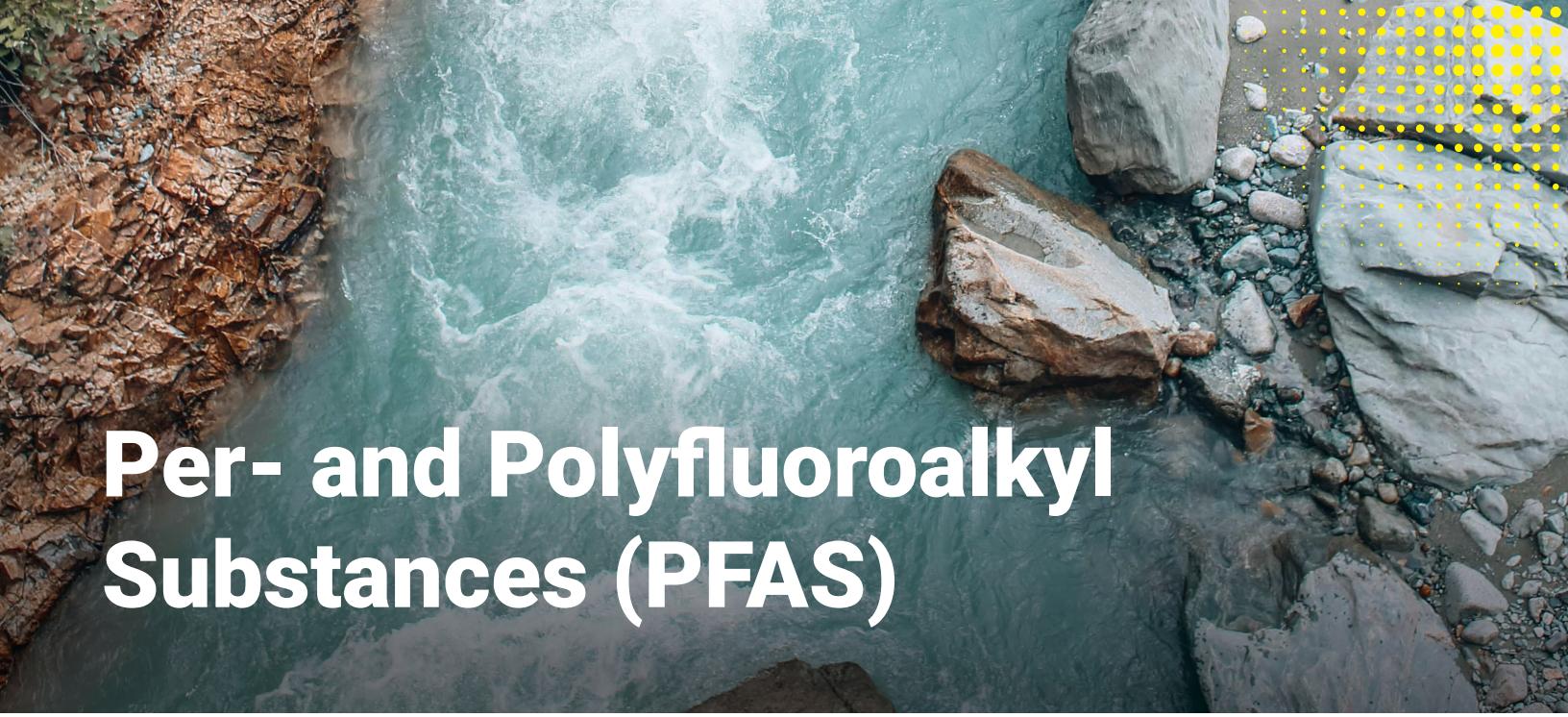
Core Values

- **Integrity –** We do the right thing for the right reason, upholding our ethics no matter the outcome, putting quality above all.
- **Accountability –** We admit when we are wrong and take ownership of our actions.
- **Respect –** We value personal diversity while treating all people with dignity.
- **Unity –** We support one another, share a common direction, lift each other up and celebrate our achievements as one.
- **Innovation –** We push the boundaries of science and technology to provide uniqueness in our processes, culture, and scientific advancements.
- **Passion –** We exude enthusiasm in all that we do, valuing the fun and enjoyable environment that we exist in while embracing every challenge along the way.

Our Purpose

To provide "**Service Beyond Analysis**" to three key pillars:

- **Our People**
- **Our Clients**
- **Our Communities**



Per- and Polyfluoroalkyl Substances (PFAS)

PFAS in the Environment

Per- and polyfluoroalkyl substances (PFAS) have many industrial and commercial applications due to their ability to repel oil and water, reduce friction, and their resistance to high temperatures. Non-stick coatings, textile applications and firefighting foams represent some of the most common uses of PFAS. Because of their widespread use since the manufacturing of these chemicals began in the 1940s, PFAS can be detected in human and mammalian serum all over the world.

Manufacturing and use of PFAS has resulted in their presence in the environment. The health effects of Perfluorooctyl Sulfonate (PFOS) and Perfluorooctanoic Acid (PFOA) have been widely studied and are associated with several adverse health effects. They are very persistent in the environment and are bioaccumulative.

PFAS can be released into the environment from sources such as the use for firefighting foams at airports, military sites and major industrial facilities such as refineries. These all have important firefighting training activities and, in some cases, application during fire events. After usage PFAS can migrate to soil, groundwater, surface water, drinking water, and eventually landfill leachate and wastewater.

Key Industries supported with PFAS analysis include:

- Firefighters & First Responders
- Government Agencies
- Airports
- Energy, Oil, & Gas
- Wastewater Infrastructure
- Manufacturers

Why AGAT Stands Out in PFAS Testing

- Leading Turnaround Times
- Team of Technical Experts
- Critical Lab Capacity
- Coast to Coast Coverage

Analytical Method

In light of ongoing regulatory evaluations in various countries, AGAT has opted to align with established guidelines, particularly those published by the US Environmental Protection Agency, which encompasses several robust methods for PFAS analysis. This approach ensures that our PFAS testing protocols remain in harmony with widely recognized standards, promoting consistency and reliability in our analytical services. AGAT Laboratories offers PFAS analysis complying with the most current versions of EPA 533, EPA 537.1 for drinking water and EPA 1633 for other matrices, covering all compounds in those methods.

Reporting Packages

AGAT offers both a standard list of PFAS and an extended list of PFAS compounds. The standard list, based on legacy PFAS, can be used to meet current regulatory criteria and includes the most widely studied PFAS compounds, in particular PFOA and PFOS. The extended list includes many additional precursors and new generation PFAS capable of degrading in the environment to form PFOS and other PFAS. It can be used as a tool to determine what precursors are present and if they will form PFOS and other PFAS. AGAT Laboratories offers several different lists to accommodate specific project requirements.

Accreditation

AGAT Laboratories is accredited by the Standards Council of Canada for the LC-MS/MS analysis of compounds listed in the table on the following page, and CALA in the Mississauga location. In water and soil samples, with ongoing plans to expand our scope of analysis to enhance service for international clientele and keep aligned with the evolving regulatory requirements and method improvements.

Field Sampling

Given the ubiquitous nature of PFAS, the material and procedure normally used for environmental sampling may cause cross-contamination when collecting samples. It is important to plan ahead for sample collection activities to ensure the potential for cross contamination is minimized.

Compound List/Capabilities

	Abbreviation
Perfluorobutanoic acid	PFBA
Perfluoropentanoic acid	PFPeA
Perfluorohexanoic acid	PFHxA
Perfluoroheptanoic acid	PFHpA
Perfluorooctanoic acid	PFOA
Perfluorononanoic acid	PFNA
Perfluorodecanoic acid	PFDA
Perfluoroundecanoic acid	PFUnA
Perfluorododecanoic acid	PFDoA
Perfluorotridecanoic acid	PFTrDA
Perfluorotetradecanoic acid	PFTeDA
Perfluorobutanesulfonic acid	PFBS
Perfluoropentanesulfonic acid	PFPeS
Perfluorohexanesulfonic acid	PFHxS
Perfluoroheptanesulfonic acid	PFHpS
Perfluorooctanesulfonic acid	PFOS
Perfluorononanesulfonic acid	PFNS
Perfluorodecanesulfonic acid	PFDS
Perfluorododecanesulfonic acid	PFDoS
4:2 Fluorotelomer sulfonic acid	4:2-FTS
6:2 Fluorotelomer sulfonic acid	6:2-FTS
8:2 Fluorotelomer sulfonic acid	8:2-FTS
Perfluorooctanesulfonamide	PFOSA
N-methyl perfluorooctanesulfonamide	NMeFOSA
N-ethyl perfluorooctanesulfonamide	NEtFOSA
N-methyl perfluorooctanesulfonamidoacetic acid	NMeFOSAA
N-ethyl perfluorooctanesulfonamidoacetic acid	NEtFOSAA
N-methylperfluorooctanesulfonamidoethanol	NMeFOSE
N-ethyl perfluorooctanesulfonamidoethanol	NEtFOSE
Hexafluoropropylene oxide dimer acid	HFPO-DA
4,8-Dioxa-3H-perfluorononanoic acid	ADONA
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	9Cl-PF3ONS
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	11-Cl-PF3OUdS
3-Perfluoropropyl propanioic acid	3:3FTCA
2H, 2H, 3H, 3H-Perfluorooctanoic acid	5:3FTCA
3-Perfluoropropyl propanioic acid	7:3FTCA
Perfluoro(2-ethoxyethane)sulfonic acid	PFEESA
Perfluoro-3-methoxypropanoic acid	PFMPA
Perfluoro-4-methoxybutanoic acid	PFMBA
Nonafluoro-3,6-dioxaheptanoic acid	NFDHA
2H-perfluoro-octenoic acid	FHUEA
2H-perfluoro-decanoic acid	FOUEA
2H-Perfluoro-dodecanoic acid	FDUEA

Sampling Considerations

- Avoid clothing treated with water-resistant, waterproof and/or stain-treated clothing. (i.e. Gore-Tex, Tyvek). Waterproof clothing made with polyurethane, polyvinyl chloride (PVC), rubber or neoprene is recommended.
- Polypropylene (PP), silicone, stainless steel, nylon, acetate, cotton materials and equipment parts can be used during sampling.
- Samples should not be in contact with glass or low-density polyethylene (LDPE).
- Clothing with natural fibers is preferred.
- Clothing should be well laundered, not new, and free of laundry soaps and fabric softeners. Water rinse is recommended before dryer.
- Waterproof notebooks and pads are NOT permitted on site. Gel pens are recommended.
- Powderless nitrile gloves should be worn at all stages of sampling and changed frequently, including but not limited to decontamination, manipulation, sampling, blank sampling, etc.
- Avoid any cosmetics, moisturizers, fragrances, and creams. Sunscreens and insect repellent must be applied outside of the sampling area when necessary preferably at least half an hour before sampling. Hands must be washed well after application of sunscreens and insect repellents.
- Avoid packaged food in sampling area.

Sampling Supplies

- Request all containers, equipment rinse water from the laboratory.
- It is recommended to request a field blank, a trip blank, an equipment blank, and enough containers for duplicate samples for your field program.
- High-density polyethylene (HDPE) sampling bottles and jars with Teflon-free lids must be used.
- PFAS free water is available through AGAT.
- Do not use chemical ice packs.

Please note that this is not an exhaustive list of all sampling guidelines, but focuses on key areas of consideration. For more information please contact your designated AGAT representative or **info@agatlabs.com**.

Notes:

AGAT Laboratories

Visit us at
www.agatlabs.com
and learn more about our wide range
of laboratory services.