



Testing for PFAS in Biosolids: Analytical Method & Regulatory Status in Canada

Despite the significant societal value derived from their beneficial re-use as agricultural fertilizer, there is growing international concern about biosolids as a potential source of per- and polyfluoroalkyl substances (PFAS), posing a risk to human health and the environment. As a result, the Canadian Food Inspection Agency (CFIA) recently implemented an interim standard for PFAS in biosolids in Canada.¹ The CFIA interim standard requires that biosolids contain less than 50 ppb ($\mu\text{g}/\text{kg}$) of perfluorooctane sulfonate (PFOS) as an indicator for PFAS contamination in order to be imported or sold in Canada. ALS offers 17025 accredited testing for PFAS in biosolids by US EPA Method 1633 for compliance with the interim standard.



Figure 1. Wastewater treatment plant – biosolids source

PFAS Exposure Risks from Biosolids

Biosolids are a treated solid byproduct generated by wastewater treatment plants (WWTPs) and are often used as an important resource for agricultural land applications. The terms biosolids and sewage sludge are often used interchangeably, but in fact sewage sludge refers to untreated semi-solid WWTP waste, whereas biosolids (sometimes called filter cakes) have been treated for end-use suitability or safe disposal by aerobic or anaerobic digestion, thermal drying, alkaline stabilization, composting, etc. The re-use of biosolids brings many benefits, including for soil health, nutrient enrichment, carbon sequestration, and reduced demand for synthetic fertilizer products.



Figure 2. Agricultural landspraying of biosolids

PFAS occur in municipal, commercial, and industrial wastewaters primarily through consumer and commercial use and disposal of products containing PFAS. Landfill leachate, which can contain very high levels of PFAS, is also typically introduced in WWTP influent. Toxic PFAS such as PFOS and PFOA can also be formed during wastewater treatment by the transformation of precursor compounds in the influent.

Traditional WWTP processes do not remove PFAS, which means they can persist in both the effluent (treated water released from the plant) and in produced biosolids.

¹ Notice to industry: Implementation of an interim standard for per- and polyfluoroalkyl substances (PFAS) in commercial biosolids - inspection.canada.ca

The [State of PFAS](#) report published by Environment and Climate Change Canada notes that approximately 58% of biosolids generated in Canada are used for agricultural land applications such as food crops and livestock grazing, with

the remainder being disposed by incineration or landfilling. PFAS can leach from biosolids into groundwater and surface water, and can also be taken up by plants, including agricultural products, creating pathways for human and animal exposure.

Biosolids Regulation in Canada

On October 18th 2024, the Canadian Food Inspection Agency (CFIA) implemented an interim standard for PFAS in biosolids being sold or imported as commercial fertilizer in Canada. The standard is set at 50 parts-per-billion ($\mu\text{g}/\text{kg}$) of PFOS based on dry weight as an indicator of total PFAS contamination. CFIA's notice to industry¹ stated that initial data suggests more than 90% of biosolids being produced in Canada would fall below the interim 50 ppb standard.

CFIA PFAS standard for commercial biosolids imported or sold as fertilizers - Oct 2024

Key elements of the CFIA biosolids regulation include:

- Sampling and testing are required at least every 6 months to account for seasonal variations.
- Composite or grab samples can be collected, but must be representative of the product as it will be imported or sold.

In 2023, the province of Québec issued a precautionary temporary moratorium on biosolids being imported from the US due to concerns about risk associated with imports from Maine in particular. On March 12, 2025, Québec introduced PFAS biosolids regulation through the revised Fertilizing Residual Materials (FRM) Management Code, effective November 1st 2025. The Québec limits are notably more stringent than the CFIA interim standard, setting limits for 13 PFAS compounds, with specific limits for PFOS and PFOA, and a total PFAS limit for the sum of PFBA, PFPeA, PFHxA, PFDA, PFDS, 6:2 FTS, 5:3 FTCA, 7:3 FTCA, NMeFOSAA, NEtFOSAA, and 6:2 FTUCA (a.k.a. FHUEA). For the sum of 11 PFAS included in the regulation, ALS uses a default Limit of Reporting of 10 $\mu\text{g}/\text{kg}$, calculated using the square root of the sum of squares of component LORs, as per CCME analytical methods guidance.³

² 6:2 FTUCA/ FHUEA: 6:2 fluorotelomer unsaturated carboxylic acid / 2H-perfluoro-2-octenoic acid; CAS# 70887-88-6

³ Guidance Manual for Environmental Site Characterization in Support of Environmental and Human Health Risk Assessment, Volume 4 Analytical Methods, Section 6.3.1, CCME 2016, PN 1557.

Table 1. Current & Pending Canadian PFAS Biosolids Regulations

Regulated PFAS	CFIA Interim Standard	Québec FRM Management Code (lowest)
PFOS	50 $\mu\text{g}/\text{kg}$	11 $\mu\text{g}/\text{kg}$
PFOA	-	8 $\mu\text{g}/\text{kg}$
Total PFAS (sum of 11)	-	120 $\mu\text{g}/\text{kg}$

The regulation also confirms the temporary ban on US biosolids will be maintained until November 2028.

Québec Fertilizing Residual Materials (FRM) Management Code - March 2025

In the USA, several states regulate PFAS in biosolids (e.g., Colorado, Michigan, New York), with limits for PFOS and/or PFOA in the range of 20 – 100 $\mu\text{g}/\text{kg}$ (as dry weight). In 2022, Maine imposed a ban on new permits for land applications of biosolids (septage). Hawaii, Rhode Island, Vermont, and Washington are in the process of establishing regulations. In January 2025, the US EPA issued a [Draft Sewage Sludge Risk Assessment for PFOA and PFOS](#) indicating possible human health risks above EPA acceptable thresholds under some scenarios for land-applied sewage sludge containing only 1 part-per-billion ($\mu\text{g}/\text{kg}$) of PFOS or PFOA (fifty times lower than the CFIA limit). The EPA risk assessment may put downward pressure on limits for PFAS in biosolids or sewage sludge in the USA and elsewhere. The ALS method is situated to test biosolids down to these levels today.

Laboratory Method for PFAS in Biosolids

The CFIA interim standard requires biosolid sample analysis by an accredited lab using US EPA Method 1633, which prescribes specific sample extraction protocols for biosolids. Percent solids determination is required to report results

Table 2. Test and Sampling Details

Test Method	EPA Method 1633
ALS Canada Method Code	E745P.B
Sample Container	120 mL HDPE (no PTFE liner)
Preservation and Storage	$\leq 6^\circ\text{C}$ (ship to lab within 48 hrs of sampling)
Hold time	28 days (Canadian Provincial Requirements)

as dry weight concentrations. ALS capabilities for PFAS in biosolids are listed in Table 3, and include testing for all 40 analytes from EPA 1633, plus 6:2 FTUCA,² an additional analyte identified by the Québec regulation as being important for biosolids.

For biosolids and other semi-solid samples where dry weight concentrations are required (e.g. sewage sludges, filter cakes), the Limits of Reporting shown in Table 3 can be met for typical dewatered or dried biosolids where percent solids are > 10%. This method may be used for samples with solids content below 10% if dry weight reporting is required, but LORs will be increased proportionately. For liquid biosolids or sludges < 2% solids where low LORs are needed (e.g. to meet Quebec limits), special testing arrangements and advance communication are required.

US EPA Method 1633 incorporates industry best practices for PFAS testing in complex matrices such as biosolids, including:

- LC-MS/MS instrumentation operated in Multiple Reaction Mode (MRM) for optimal sensitivity and selectivity.
- Isotope Dilution (ID) calibration to correct for loss during sample preparation and for sample matrix effects.
- Sample extracts are extensively purified to remove coextracted interferences using both activated carbon and Solid Phase Extraction (SPE).

Sample Collection and Handling

Biosolids samples for PFAS testing should be protected from light and shipped with sufficient ice to maintain temperature at 0-6°C from time of collection until arrival at the laboratory within 48 hours of sample collection. For cooling of PFAS samples, ALS recommends double bagged regular ice in sealed poly bags (e.g., Ziploc®), or HDPE bottles filled with water and frozen. Chemical or “blue” ice should be avoided (most brands are untested for PFAS). Avoid exposure of samples to Teflon (e.g., cap liners from other sample bottles).

To avoid cross-contamination, special precautions are important for the collection of samples for PFAS testing. Due to the prevalence of perfluorinated substances in consumer products such as waterproof clothing and fabrics, sunscreens, lotions and cleansers, grease-proof and waterproof food packaging, cleaning products, fabric softeners, and cosmetics, care should be taken to avoid potential transfer from such items.

ALS applies a 28 day hold time for PFAS in biosolids to meet current Canadian provincial requirements. Please identify samples expected to contain high levels of PFAS on Chains of Custody (COCs).

[Please contact your ALS Project Manager for more information or to request sampling supplies.](#)

Table 3. ALS Canada PFAS Analytes in Biosolids by EPA Method 1633

PFAS Parameters Reported	Abbreviation	CAS Number	ALS Canada Method 1633 Limits of Reporting (µg/kg)	CFIA Biosolids Interim Standard (µg/kg)	Québec FRM Management Code (Lowest, µg/kg)
Perfluoroalkyl carboxylic acids					
Perfluorobutanoic acid	PFBA	375-22-4	2		✓
Perfluoropentanoic acid	PFPeA	2706-90-3	1		✓
Perfluorohexanoic acid	PFHxA	307-24-4	1		✓
Perfluoroheptanoic acid	PFHpA	375-85-9	1		
Perfluorooctanoic acid	PFOA	335-67-1	1		8
Perfluorononanoic acid	PFNA	375-95-1	1		
Perfluorodecanoic acid	PFDA	335-76-2	1		✓
Perfluoroundecanoic acid	PFUnA	2058-94-8	1		
Perfluorononanoic acid, 4,8-dioxa-3H-	ADONA	919005-14-4	1		
Perfluorododecanoic acid	PFDoA	307-55-1	1		
Perfluorotridecanoic acid	PFTTrDA	72629-94-8	1		
Perfluorotetradecanoic acid	PFTeDA	376-06-7	1		
Nonafluoro-3,6-dioxaheptanoic acid	NFDHA	151772-58-6	4		
Perfluoro-4-methoxybutanoic acid	PFMBA	863090-89-5	1		
Perfluoro-3-methoxypropanoic acid	PFMPA	377-73-1	1		
Hexafluoropropylene oxide dimer acid	HFPO-DA (GenX)	13252-13-6	4		
Perfluoroalkyl sulfonic acids					
Perfluorobutanesulfonic acid	PFBS	375-73-5	1		
Perfluoropentanesulfonic acid	PFPeS	2706-91-4	2		
Perfluorohexanesulfonic acid	PFHxS	355-46-4	1		
Perfluoroheptanesulfonic acid	PFHpS	375-92-8	1		
Perfluorooctanesulfonic acid	PFOS	1763-23-1	1	50	11
Perfluorodecane sulfonic acid	PFDS	335-77-3	1		✓
Perfluorononanesulfonic acid	PFNS	68259-12-1	2		
Perfluorododecanesulfonic acid	PFDoS	79780-39-5	2		
Perfluorooctane sulfonamides					
Perfluorooctanesulfonamide	PFOSA	754-91-6	1		
Methyl perfluorooctanesulfonamide, n-	NMeFOSA	31506-32-8	1		
Ethyl perfluorooctanesulfonamide, n-	NEtFOSA	4151-50-2	1		
Perfluorooctane sulfonamidoacetic acids					
Methyl perfluorooctanesulfonamidoacetic acid, n-	NMeFOSAA	2355-31-9	2		✓
Ethyl perfluorooctanesulfonamidoacetic acid, n-	NEtFOSAA	2991-50-6	2		✓
Perfluorooctane sulfonamide ethanols					
Methyl perfluorooctanesulfonamidoethanol, n-	NMeFOSE	24448-09-7	2		
Ethyl perfluorooctanesulfonamidoethanol, n-	NEtFOSE	1691-99-2	2		
Ether sulfonic acids					
Hexadecafluoro-3-oxanonane-1-sulfonic acid, 9-chloro-	9CL-PF3ONS	756426-58-1	1		
Eicosafluoro-3-oxaundecane-1-sulfonic acid, 11-chloro-	11CL-PF3OUdS	763051-92-9	1		
Perfluoro(2-ethoxyethane)sulfonic acid	PFEESA	113507-82-7	1		
Fluorotelomer sulfonic acids					
Fluorotelomer sulfonic acid, 4:2	4:2 FTS	757124-72-4	1		
Fluorotelomer sulfonic acid, 6:2	6:2 FTS	27619-97-2	5		✓
Fluorotelomer sulfonic acid, 8:2	8:2 FTS	39108-34-4	2.5		
Unsaturated fluorotelomer acids					
6:2 Fluorotelomer unsaturated carboxylic acid	6:2 FTUCA	70887-88-6	10		✓
Fluorotelomer carboxylic acids					
Fluorotelomer carboxylic acid, 3:3	3:3 FTCA	356-02-5	5		
Fluorotelomer carboxylic acid, 5:3	5:3 FTCA	914637-49-3	5		✓
Fluorotelomer carboxylic acid, 7:3	7:3 FTCA	812-70-4	5		✓
Québec FRM Management Code Total PFAS (Sum of 11 compounds indicated with ✓)			10		120