

Information sheet

Monitoring and testing for PFAS in organic material processing (composting)

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Monitoring and testing for PFAS in organic material processing (composting)

1. Background

Per- and poly-fluoroalkyl substances (PFAS) are a group of synthetic 'forever' chemicals that persist in the environment, bioaccumulate in living organisms and are highly mobile in soils and water. PFAS have been linked to long-term consequences in human health and the environment. The Queensland Government has recognised the importance of managing PFAS in the environment and through the environmentally relevant activities (ERAs) it regulates, including organic material processing by way of composting (ERA53). The Department of Environment, Science and Innovation (the department) has developed a Regulatory Position Statement on PFAS in organic material processing (composting) (ESR/2024/6783) to accompany the Model Operating Conditions for composting activities (ERA53 MOCs) (ESR/2015/1665).

The purpose of this information sheet is to assist composting operators to comply with the conditions of their environmental authority (EA), particularly in relation to monitoring and testing requirements.

2. Why is monitoring and testing important?

Monitoring of compost is important for operators to be able to assure themselves, the environmental regulator and consumers that the product they are producing is safe and sustainable. Monitoring and testing also ensures that operators can manage any potential contamination and be more responsive to potential risks.

For those operators that have transitioned, or are transitioning to, the ERA53 MOCs, regular monitoring and testing of compost is a regulatory requirement. Condition G28 in the ERA53 MOCs establishes PFAS limits for finished compost as well as the frequency at which monitoring is to occur, while Condition G10(j) details how PFAS monitoring is to be undertaken. The monitoring requirements outlined in the ERA53 MOCs are explained in further detail below.

3. Monitoring requirements

Condition G28 states that:

All finished compost must be monitored for the quality characteristics and at the frequency listed in Table 2 – Finished Compost Quality Characteristic Limits.

Table 2 – Finished Compost Quality Characteristic Limits

Quality Characteristic	Quality Characteristic Limit	Minimum Monitoring Frequency
PFOS + PFHxS	2 (µg/kg)	One composite sample consisting of at least five individual grab samples must be collected before the earlier of the following occurring (measured from when the most recent composite sample was taken); (a) 90 days having passed; or (b) 300 dry solid tonnes (dst) of finished compost being produced
PFOA	1 (µg/kg)	
Sum of PFBA, PFPeA, PFHxA, PFHpA, PFNA, PFDA, PFUnDA, PFDODA, PFTrDA, PFTeDA, 4:2 FTS, 6:2 FTS, 8:2 FTS and 10:2 FTS (above LOR)	3 (µg/kg)	
Sum of PFOSA (or FOSA), N-MeFOSA, N-EtFOSA, N-MeFOSE, N-EtFOSE, N-MeFOSAA and N-EtFOSAA (above LOR)	1 (µg/kg)	
PFAS leachability	To be kept to minimum practicable (µg/L)	

4. Monitoring Frequency

Consistent with the requirements of Condition G28 in the ERA53 MOCs, monitoring of finished compost must be undertaken either every 90 days or when 300 dry solid tonnes (dst) of finished compost is produced, whichever is more frequent. It is important to note that these are default monitoring frequencies, and each EA may be conditioned differently after site-specific risks are considered by the administering authority. This monitoring frequency is not limited to PFAS, but to a range of contaminants as detailed in *Table 2 – Finished Compost Quality*

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Characteristic Limits.

To determine dst of finished compost, operators measure the moisture content of the finished compost as a percent (MC%) and calculate the dry weight of finished compost using this proportion (i.e., $\text{dst} = \text{tonnes finished compost wet} \times ((100 - \text{MC}\%) / 100)$). Note that 'finished compost' is considered the organic product that has completed the onsite production process.

For example, if the weight of finished compost is 600 tonnes (wet) using a 50% moisture content, then:

$$600 \times ((100-50)/100) = 300 \text{ dst}$$

It is acknowledged the percentage of water may vary between batches, and it is not expected that the moisture content of each sample will be determined. An average moisture content for each finished compost can be established to assist in determining the corresponding testing schedule for each product type, but should be based on site-specific data, updated as necessary and be demonstratable to the administering authority upon request.

The operator will have to determine which is more frequent, either:

- a) 90 days having passed; or
- b) 300 dry solid tonnes (dst) of finished compost being produced

For example, if 300 dst of finished compost is produced every 100 days, then testing will be required 90 days. Conversely, if 300 dst of finished compost is produced every 70 days, then testing will be required when 300 dst of finished compost is produced.

5. Who can take samples?

Consistent with the model operating conditions, all testing and monitoring required by conditions of the authority must be carried out, interpreted and recorded by an appropriately qualified person (AQP). The testing, monitoring, interpretation and recording need not all be undertaken by the same person, provided they are each separately appropriately qualified.

An AQP means a person or persons who has professional qualifications, training, skills or experience relevant to the EA requirement and can give authoritative assessment, advice and analysis in relation to the EA requirement using the relevant protocols, standards, methods or literature.

When identifying an AQP to carry out, interpret and record testing and/or monitoring, operators must check the qualifications and experience of the person and satisfy themselves that they are qualified to carry out the testing and/or monitoring. This could include industry accredited courses, recognised competency or training records.

The AQP will typically prepare a sampling analysis and quality plan setting out sampling objectives and methodology, data quality objectives, field and laboratory quality assurance and quality control measures and record keeping.

Key considerations by an AQP in developing a sampling plan include ensuring:

- The requested analytical reporting levels are at a sufficient low level to enable the data to be assessed against the relevant limits.
- Samples are preserved, e.g., kept chilled and secured appropriately.
- Samples are transported to the analysing laboratories within appropriate sample holding times under chain of custody protocols.
- Samples are collected in accordance with relevant and recognised sampling guidance and standards.

It should be noted that the EA holders' assessment and engagement of an AQP to undertake responsibilities under the EA does not limit the department's ability to undertake its own assessment of the appropriateness of monitoring undertaken by the AQP on behalf of the EA holder.

6. How to take composite samples

A single large composite of material should be taken from a finished product windrow, ensuring the composite is representative by taking subsamples from several cross sections along the axis and at various depths (Figure 1A). From this composite material, once fully mixed, a primary sample as well as a field intra-laboratory duplicate sample and an inter-laboratory triplicate sample are taken (Figure 1B). A blank sample containing PFAS free water

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is also taken to the field by the sampling personnel to check no contamination arises from the sample container or from the sampling personnel and procedures.

If more than one product type is sampled, the process is repeated but with a single primary sample taken from each product composite. If using secondary sampling equipment (e.g., a shovel versus dedicated sample containers) to sample the material including across multiple product types, a rinsate sample must also be taken off the cleaned secondary equipment to check that the cleaning protocol (e.g., scrubbing and triple rinsing in PFAS free water) is effective in preventing cross contamination of the samples (Figure 1B). This would also require a second blank water sample to be collected if that container is different from the other sample containers. Avoiding the use of secondary sampling equipment will reduce sampling costs as the rinsate and potentially an additional blank sample would not be required.

Quality assurance and quality control (QAQC) samples are required in each sampling program and should be taken at a rate not less than 1x QAQC samples to every 20 primary samples taken (1:20), with 1:10 being best practice. Generally, the QAQC will consist of a blind duplicate, a triplicate and a blank sample, where the triplicate sample is sent to a secondary laboratory for testing (Figure 1B). The duplicate blank sample should be labelled such that the laboratory is not aware that it is a duplicate.

As a working example, if 4 different finished compost product types need to be tested in a single sampling round (and assuming PFAS sample jars are used to collect the subsample material), then the number of samples required are: 4 primary samples + 1 duplicate + 1 triplicate + 1 blank = 7 samples. If secondary sample equipment was used (e.g., a shovel), then this would increase to: 4 primary samples + 1 duplicate + 1 triplicate + 1 blank + 1 rinsate (+ 1 additional blank only necessary if a different type of container is used) = 8 (or 9 if a different type of container is used) samples.

When sending the samples to the laboratory for analysis, they should be accompanied by a chain of custody form and the analysis request seeking a paired standard analysis and TOPA analysis, and a test for leachability (Figure 1C). The Monitoring and Testing Standards Section below provides further detail on why both a standard analysis and TOPA analysis are required, and the test for leachability.

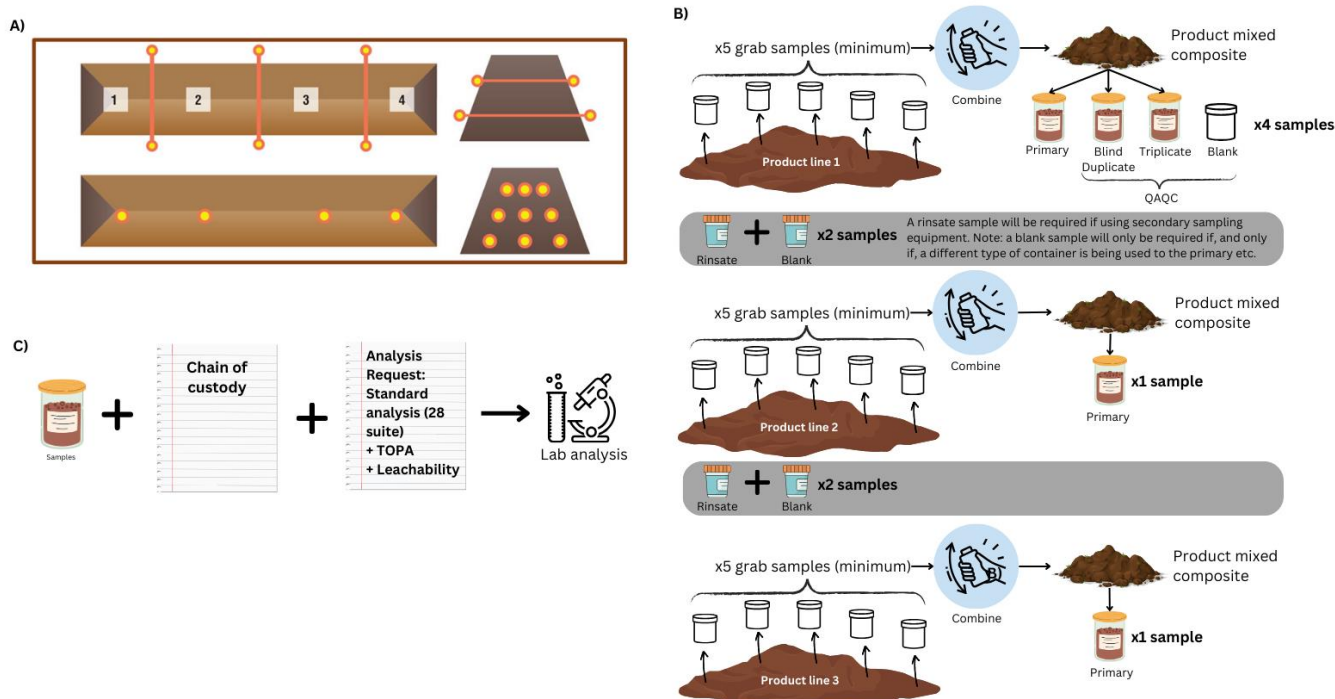


Figure 1: A) Example of where subsamples could be taken to ensure a representative composite sample. B) Shows how a product mixed composite is created using the subsamples, and the number of samples for laboratory analysis (including QAQC and rinsate samples). C) Indicates the samples and documentation to be provided to the laboratory for analysis.

7. Preventing Sample Cross Contamination

Sampling for PFAS requires specific precautions in relation to equipment and containers due to the heightened risk of cross contamination. This advice applies not just to composting EA holders, but other EA holders operating in other industries that have requirements around PFAS monitoring.

Attention should be given to the range of products that can cause PFAS contamination of samples, including new clothing, footwear, PPE and treated fabrics stain and water- resistant products, sunscreen, moisturisers, cosmetics, fast food wrappers, polytetrafluoroethylene (PTFE) materials (such as Teflon®), sampling containers with PTFE-lined lids, foil, glazed ceramics, stickers and labels, inks, sticky notes, waterproof papers, drilling fluids, decontamination solutions and reusable freezer blocks. These should not be worn or used during any stage of sampling (at site, during transport, etc.) where sample contamination could affect analytical results.

The PFAS National Environmental Management Plan 2.0 (PFAS NEMP) recommends:

- Prior to sampling, the sampling personnel must wash their hands with plain soap and rinse thoroughly in tap water before donning a clean, new pair of disposable nitrile gloves.
- Teflon®-coated materials and aluminium foil may not come into contact with the sample.
- All samples should be double-bagged.
- During sample processing and storage, minimise the exposure of the sample to light.
- Chemical or gel-based coolant products (e.g., BlueIce®) to maintain samples at 4 °C following sample collection is not recommended.

The PFAS NEMP also details field quality assurance and quality control applicable to PFAS monitoring including decontamination of sampling equipment, sampling containers, sample handling including storage and transport, and quality control samples including duplicates and blanks.

8. Feedstock Monitoring

Generally, EAs do not condition monitoring of compost feedstocks, however the administering authority may condition feedstock monitoring following consideration of site-specific risks. Nevertheless, EA holders should satisfy themselves that any feedstock is suitable to produce safe and sustainable compost in accordance with the finished compost limits in *Table 2 – Finished Compost Quality Characteristic Limits*. This may be achieved through requesting feedstock providers to provide quality assured representative PFAS analysis results of feedstocks where PFAS contamination risk is higher (e.g., biosolids, paper waste, some industrial waste grease trap waste).

9. Monitoring and testing standards

Condition G10(j) in the ERA53 MOCs states that:

All testing and monitoring required by the conditions of this environmental authority:

(j) For PFAS monitoring, must:

- use analysis techniques that achieve lowest practicable limits of reporting (LOR <0.5 µg/kg solids; LOR <0.001 µg/L for liquids) and maximise extraction of PFAS from samples; and*
- comply with recommendations in the PFAS National Environmental Management Plan (NEMP)¹ Version 2.0 or more recent editions adopted by the Queensland Government; and*
- incorporate paired standard and Total Oxidisable Precursor (TOP) Assay analysis to determine PFAS concentrations and must include at least:*

(A) Perfluoroalkyl carboxylic acids (C₄-C₁₄); and

¹ The PFAS NEMP is available online on the Australian Government Department of Agriculture, Water and Environment website at <https://www.environment.gov.au/>

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- (B) Perfluoroalkyl sulfonic acids (C₄-C₁₀); and
- (C) Perfluorooctane sulfonamide (PFOSA or FOSA); and
- (D) N-alkyl perfluorooctane sulfonamide (N-MeFOSA, N-EtFOSA)
- (E) N-alkyl perfluorooctane sulfonamido ethanol (N-MeFOSE, N-EtFOSE); and
- (F) N-alkyl perfluorooctane sulfonamido acetic acids (N-MeFOSAA, N-EtFOSAA); and
- (G) n:2 Fluorotelomer sulfonic acids (n= 4, 6, 8 & 10)

- iv. For leachability, be undertaken using the **Australian Standard Leaching Procedure (ASLP)** with an unbuffered leach solution.

Why two tests are required (paired standard and TOPA analysis)

The department requires an operator to test for PFAS using **both** paired standard analysis and a TOPA analysis. Both are required as neither a TOPA nor the standard suite alone provide sufficient assessment of PFAS to evaluate compliance with the EA conditions. Stand alone, these analysis techniques are insufficient to fully inform the levels of PFAS and provide an effective characterisation. Figure 2 is a visual representation highlighting the importance of conducting both a paired standard and TOPA analysis for fully capture the extent of any present PFAS. Under the PFAS NEMP, the standard analysis also forms part of the quality checks on the TOPA analysis.

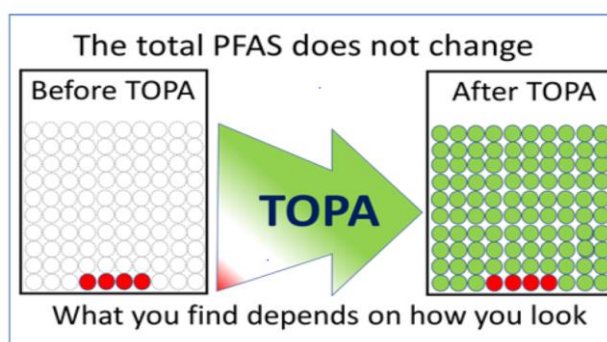


Figure 2: Visual representation of fully characterising PFAS use both a standard analysis (red) and TOPA analysis (green).

The standard analysis commonly available in Australia typically tests only for 28 PFAS (out of the more than 14,000 PFAS compounds). In addition to the standard analysis, a TOPA analysis checks for the presence of many precursor compounds. It does this by oxidising many PFAS compounds outside this standard suite of 28 to some of the compounds within that suite, allowing detection in the subsequent analysis. This is considered reasonably practicable and consistent with management measures recommended by the PFAS NEMP and undertaken in Queensland generally in other industries (e.g. biosolids requirement is the same). There may be cases where an operator, as part of the site's feedstock management program, may need to carry out additional more specific monitoring if information about a source becomes available suggesting PFAS contamination is unlikely to be detected by this generic approach.

Further, operators will need to identify where any of the analytes from the paired analysis meet the lowest practicable limit of reporting (generally LOR <0.5 µg/kg solids and LOR <0.001 µg/L for liquids).

Standard Analysis

The standard analysis (28 suite) should test directly for the below 28 PFAS:

- Perfluorobutanoic acid (PFBA)
- Perfluoropentanoic acid (PFPeA)
- Perfluorohexanoic acid (PFHxA)
- Perfluoroheptanoic acid (PFHpA)
- Perfluorooctanoic acid (PFOA)

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Perfluorononanoic acid (PFNA)
Perfluorodecanoic acid (PFDA)
Perfluoroundecanoic acid (PFUnA)
Perfluorododecanoic acid (PFDoDA)
Perfluorotridecanoic acid (PFTrDA)
Perfluorotetradecanoic acid (PFTeDA)
Perfluorobutane sulfonic acid (PFBS)
Perfluoropentane sulfonic acid (PFPeS)
Perfluorohexane sulfonic acid (PFHxS)
Perfluoroheptane sulfonic acid (PFHpS)
Perfluorooctane sulfonic acid (PFOS)
Perfluorodecane sulfonic acid (PFDS)
4:2 Fluorotelomer sulfonic acid (4:2 FTS)
6:2 Fluorotelomer sulfonic acid (6:2 FTS)
8:2 Fluorotelomer sulfonic acid (8:2 FTS)
10:2 Fluorotelomer sulfonic acid (10:2 FTS)
Perfluorooctane sulfonamide (PFOSA or FOSA)
N-Methyl perfluorooctane sulfonamide (N-MeFOSA)
N-Ethyl perfluorooctane sulfonamide (N-EtFOSA)
N-Methyl perfluorooctane sulfonamido ethanol (N-MeFOSE)
N-Ethylperfluorooctane sulfonamido ethanol (N-EtFOSE)
N-Methyl perfluorooctane sulfonamido acetic acid (N-MeFOSAA)

It is noted that some laboratories performing the standard 28 suite of PFAS do not include the FOSAA analytes (i.e., N-MeFOSAA and N-EtFOSAA). Laboratories may change their analysis suites over time, and where laboratories do offer FOSAA in their suite, it should be analysed for. However, for the purposes of compliance with the MOCs for ERA53, when ordering the 28 suite of PFAS and the laboratory does not include FOSAA in this suite then the sum of these 8 carbon chain sulphonamides in the suite of 28 is acceptable for compliance purposes. These substances are precursors of PFOS.

Leachability Testing

Leachability testing should be requested using the Australian Standard Leaching Procedure (ASLP) with an unbuffered leach solution. Essentially, this requires the analysis request form to indicate that distilled water of neutral pH should be used to check the degree to which PFAS leach from the product, rather than an acid solution, which is commonly used in checking waste acceptance for landfill and impact of acid rain.

10. Which laboratories can undertake tests?

There are a number of laboratories servicing Queensland in relation to standard and TOPA analysis (currently 6 laboratories as at February 2024).

Operators can search for accredited NATA laboratories for PFAS testing in Queensland by visiting the NATA website: <https://nata.com.au/find-organisation/>

11. What to ask for from the laboratory

Operators (or their AQP) should ask the laboratory for:

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- Standard PFAS suite for finished compost and liquid samples e.g., rinsate, blanks
- TOPA analysis for finished compost and liquid (blank water) checking the same suite post oxidation
- LOR <0.5 µg/kg solids
- LOR < 0.001 µg/L for liquid samples and assessing leachability from solids
- Leachability testing using the ASLP with an unbuffered leach solution

Each laboratory has its own codes, talk to your preferred laboratory in relation to any codes or ways to request the information.

The laboratory will have a quality assurance and control plan. The laboratory should provide you with advice of compliance with maximum acceptable holding times, correct sampling containers and minimum volumes, whether recoveries of standards are within acceptable ranges and rationale if any limits of reporting have been adjusted.

12. Interpreting laboratory results

Using the information from the monitoring and testing results, operators should identify results for compounds with individual limits, e.g., PFOA, and sum the different PFAS into their respective groupings.

The first step in this process is to identify which analytes in the certificate of analysis exceed the limits of reporting (LOR).

The second step is to group (i.e., sum) relevant analytes to determine compliance with condition G28. For the purposes of calculating the sum for each of the relevant PFAS groups, only analytes which were reported above the LORs need to be included in the sum.

As an example, where the analysis of a sample reports PFBA at <0.5µg/kg, PFPeA at 0.8 µg/kg, PFHxA at <0.5 µg/kg, and PFHpA at <0.5µg/kg, the summed result to be compared to the limit the of 3 µg/kg in Table 2: Finished Compost Quality Characteristic Limits will be 0.8 µg/kg. As 0.8 µg/kg < 3 µg/kg, this result is taken as compliant with the MOCs.

A worked example is provided in Appendix 1 to demonstrate how laboratory results may be used to manually calculate PFAS levels, identify and sum the relevant PFAS groupings, and assess compliance with licence conditions.

Where the laboratory has raised the LOR for a particular PFAS, then additional professional judgement is required to determine whether a risk exists, especially if the LOR is greater than the limit value. You may need to contact the laboratory to understand why the LOR was increased and whether it is possible to reanalyse the sample.

The laboratory will typically provide a statement of compliance with sample container, preservation and holding time requirements and laboratory quality control checks. This information should be reviewed to check for any non-conformity.

There are currently no limits prescribed in the MOC on leachability of products to enable operators to gain additional information on practicable levels that can be achieved and identify feedstock of higher risk of leaching. High leachability represents a greater risk of environmental harm in product usage and a greater risk of causing problematic water quality in water storages at the processing site.

13. Presenting the results to the department

Compost operators have multiple options to assist in presenting the summed laboratory results to the department for compliance with the EA conditions. These may include:

- When sending the samples for testing to laboratories, operators may request the laboratories to sum the following quality characteristics as part of their results:
 - a) PFOS + PFHxS,
 - b) PFOA,
 - c) Sum of PFBA, PFPeA, PFHxA, PFHpA, PFNA, PFDA, PFUnDA, PFDoDA, PFTTrDA, PFTTeDA, 4:2 FTS, 6:2 FTS, 8:2 FTS and 10:2 FTS (above LOR), and
 - d) Sum of PFOSA (or FOSA), N-MeFOSA, N-EtFOSA, N-MeFOSE, N-EtFOSE, N-MeFOSAA and N-EtFOSAA (above LOR).
- Use a computer program to upload the laboratory results and automatically sum the relevant PFAS groups (subscription for specific software such as ESDAT may be required).

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- Manually enter laboratory results into a spreadsheet and sum relevant PFAS groups (see Appendix 1).

The environmental regulator has engaged with a number of labs to ensure they are aware of the requirements for finished compost and can support their clients with appropriate reporting.

14. Keeping records

The following records must be kept for all monitoring undertaken to assess that the composting process parameters are being met:

- a) copy of the sampling analysis quality plan,
- b) dry solid tonne (dst) estimations,
- c) records of all analysis results, measurements or observations of organic products tested, product type (if more than one) and the name/s of the person/s undertaking the assessment,
- d) records of any samples taken (including sample date ID, laboratory holding time, storage method and storage location), and
- e) evaluation of quality control samples for any quality issues, e.g., PFAS in blanks, relative percent differences versus sampling plan's data quality objectives.

Appendix 1

An example of how laboratory results may be used to manually calculate PFAS levels, identify and sum the relevant PFAS groupings, and assess compliance with condition G28. In this example, samples 1, 2, 8, 9 and 10 are non-compliant (shown in red) as they are above the PFAS limits in condition G28.

Sample ID	Date	Unit	Perfluoropropanesulfonic acid - PFPrS	Perfluorobutanesulfonic acid - PFBS	Perfluoropentanesulfonic acid - PFPeS	Perfluorohexanesulfonic acid - PFHxS	Perfluoroheptanesulfonic acid - PFHpS	Perfluorooctanesulfonic acid - PFOS	Perfluorononanesulfonic acid - PFNS	Perfluorodecanesulfonic acid - PFDS	Perfluorobutanoic acid - PFBA	Perfluoropentanoic acid - PFPeA	Perfluorohexanoic acid - PFHxA	Perfluoroheptanoic acid - PFHpA	Perfluorooctanoic acid - PFOA	Perfluorononanoic acid - PFNA	Perfluorodecanoic acid - PFDA	Perfluoroundecanoic acid - PFUnDA	Perfluorododecanoic acid - PFDoDA	Perfluorotridecanoic acid - PFTriDA	Perfluorotetradecanoic acid - PFTeDA	4:2 Fluorotelomer sulfonic acid - 4:2 FTS	6:2 Fluorotelomer sulfonic acid - 6:2 FTS	8:2 Fluorotelomer sulfonic acid - 8:2 FTS	10:2 Fluorotelomer sulfonic acid - 10:2 FTS	Perfluorooctane sulfonamide - PFOSA or FOSA	N-Methyl perfluorooctane sulfonamide - N-MeFOSA	N-Ethyl perfluorooctane sulfonamide - N-EtFOSA	N-Methyl perfluorooctane sulfonamide ethanol - N-MeFOSE	N-Ethyl perfluorooctane sulfonamide ethanol - N-EtFOSE	N-Methyl Perfluorooctane sulfonamide acetic acid - N-MeFOSAA	N-Ethyl Perfluorooctane sulfonamide acetic acid - N-EtFOSAA	Total (detected) PFAS	PFOS + PFHxS (above LOR)	PFOA	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFNA, PFDA, PFUnDA, PFDoDA, PFTriDA, PFTeDA, 4:2 FTS, 6:2 FTS, 8:2 FTS and 10:2 FTS (above LOR)	Sum of PFOSA (or FOSA), N-MeFOSA, N-EtFOSA, N-MeFOSE, N-EtFOSE, N-MeFOSAA and N-EtFOSAA (above LOR)		
																																						7	8
Sample 1	20/01/2024	µg/kg	<0.1	0.3	<0.1	0.3	<0.1	1.3	<0.1	<0.2	0.8	0.7	1.9	0.4	1.1	0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.1	<0.1	<0.2	<0.2	<1	<1	<1	<1	<0.5	<0.2	<0.2	7	1.6	1.1	4	0		
Sample 2	20/01/2024	µg/kg	<0.1	0.3	<0.1	0.3	<0.1	0.2	<0.1	<0.2	1.3	0.9	3.1	0.6	1.4	0.2	0.8	<0.5	<0.5	<0.5	<0.5	<0.5	0.8	<0.1	<0.2	<0.2	<1	0.3	<1	<1	<1	<0.5	<0.2	<0.2	10.2	0.5	1.4	7.7	0.3
Sample 3	20/01/2024	µg/kg	<0.1	0.3	<0.1	0.6	<0.1	1.2	<0.1	<0.2	<0.5	0.9	1.2	0.5	0.9	0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.1	<0.1	<0.2	<0.2	<1	<1	<1	<1	<0.5	<0.2	0.3	6.1	1.8	0.9	2.8	0.3		
Sample 4	20/01/2024	µg/kg	<0.1	0.3	<0.1	0.2	<0.1	1.3	<0.1	<0.2	0.3	0.4	1.2	0.1	0.4	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.1	<0.1	<0.2	<0.2	<1	<1	<1	<1	<0.5	<0.2	<0.2	4.2	1.5	0.4	2	0		
Sample 5	20/01/2024	µg/kg	<0.1	0.3	<0.1	0.1	<0.1	1.2	<0.1	<0.2	0.4	0.4	1.1	<0.1	0.3	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.1	<0.1	<0.2	<0.2	<1	<1	<1	<1	<0.5	<0.2	<0.2	3.8	1.3	0.3	1.9	0		
Sample 6	20/01/2024	µg/kg	<0.1	0.3	<0.1	0.2	<0.1	1.7	<0.1	<0.2	0.4	0.3	0.9	<0.1	0.3	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.1	<0.1	<0.2	<0.2	<1	<1	<1	<1	<0.5	<0.2	<0.2	4.1	1.9	0.3	1.6	0		
Sample 7	20/01/2024	µg/kg	<0.1	0.2	<0.1	0.1	<0.1	1.4	<0.1	<0.2	<0.5	0.4	0.4	0.1	0.6	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	<0.1	<0.2	<0.2	<1	<1	<1	<1	<0.5	<0.2	<0.2	4.4	1.5	0.6	2.1	0		
Sample 8	20/01/2024	µg/kg	<0.1	2.3	<0.1	0.3	<0.1	1.3	<0.1	<0.2	0.9	<0.2	0.9	<0.5	0.5	0.6	0.9	0.6	<0.5	<0.5	<0.5	<0.5	<0.1	<0.1	<0.2	<0.2	<1	0.4	<1	<1	<1	<0.5	0.2	0.5	8.5	1.6	0.6	2.9	1.1
Sample 9	20/01/2024	µg/kg	<0.1	1.5	<0.1	0.2	<0.1	0.9	<0.1	<0.2	<0.5	<0.2	0.9	0.3	1.5	0.5	0.7	<0.5	<0.5	<0.5	<0.5	<0.1	<0.1	<0.2	<0.2	<1	<1	<1	<1	<0.5	<0.2	0.3	7.6	1.1	1.5	3.2	0.3		
Sample 10	20/01/2024	µg/kg	<0.1	2.5	<0.1	0.2	<0.1	1.2	<0.1	<0.2	0.5	<0.2	1.5	0.5	0.4	1.2	0.6	<0.5	0.9	<0.5	<0.5	<0.1	0.1	<0.2	<0.2	<1	<1	<1	<1	<0.5	0.4	0.2	10.2	1.4	0.4	5.3	0.6		

MOC PFAS Groupings	Limit	SAMPLE									
		1	2	3	4	5	6	7	8	9	10
PFOS + PFHxS (above LOR)	2	1.6	0.5	1.8	1.5	1.3	1.9	1.5	1.6	1.1	1.4
PFOA	1	1.1	1.4	0.9	0.4	0.3	0.3	0.6	0.6	1.5	0.4
Sum of PFBA, PFPeA, PFHxA, PFHpA, PFNA, PFDA, PFUnDA, PFDoDA, PFTriDA, PFTeDA, 4:2 FTS, 6:2 FTS, 8:2 FTS and 10:2 FTS (above LOR)	3	4	7.7	2.8	2	1.9	1.6	2.1	2.9	3.2	5.3
Sum of PFOSA (or FOSA), N-MeFOSA, N-EtFOSA, N-MeFOSE, N-EtFOSE, N-MeFOSAA and N-EtFOSAA (above LOR)	1	0	0.3	0.3	0	0	0	0	1.1	0.3	0.6