

# Requirements and Best Practices for the Collection and Analysis of Samples for the PFAS National Primary Drinking Water Regulation

## Background

The EPA has established a National Primary Drinking Water Regulation (NPDWR) for Per- and Polyfluoroalkyl Substances (PFAS) ("the PFAS Rule"). In support of the initial monitoring required by the rule (to be completed by April 26, 2027) and the ongoing compliance monitoring thereafter, this document provides requirements and guidance for the collection, handling, and analysis of samples. The PFAS Rule requires the use of methods approved under 40 CFR 141.901 during the compliance monitoring period and under 40 CFR 141.901 or Appendix A to Subpart C of Part 141 during initial monitoring.

## PFAS Sampling Kit Requirements

A sample set is defined as samples collected from the same sample collection site at the same time. If a water system is responsible for PFAS compliance monitoring at multiple wells, then they are required to collect a field sample and prepare a companion Field Reagent Blank (FRB) for each one of those wells. If a water system is responsible for PFAS compliance monitoring at multiple entry points to the distribution system, then the water system must collect a field sample and prepare a companion FRB for each entry point.

Sampling kits for each site must contain a minimum of 3 bottles per sampling site, with approximately 10% of sampling kits containing 2 additional bottles for the preparation of laboratory fortified sample matrix (LFSM) and LFSM duplicate (LFSMD) Quality Control (QC) samples at the laboratory. Sampling kits must use polypropylene bottles fitted with polypropylene screw-caps, polyethylene bottles with polypropylene screw-caps, or other plastic materials that meet QC requirements. Aqueous samples should not come into contact with glass. Sample bottles are defined as:

- ▶ A full FRB bottle: a sealed, unpreserved bottle of PFAS-free reagent water.
  - ▶ Reagent water used for the FRBs must be analyzed prior to shipment to ensure the water is PFAS-free, meeting Laboratory Reagent Blank (LRB) method criteria (i.e., no PFAS levels greater than 1/3 of the laboratory specific minimum reporting level (MRL)).
- ▶ An empty but "preserved" FRB bottle: an empty bottle containing sample preservatives.
  - ▶ The same lot of preservative must be used for the FRBs as for the Field Sample.
- ▶ An empty but "preserved" Field Sample (FS) bottle: an empty bottle containing sample preservatives.

If used, reusable ice packs for maintaining sample temperature during shipment to the laboratory must be verified to be free of PFAS contamination. Sample kits must be able to maintain the temperature of the collected FRB and FSs such that samples are below 10°C when received by the laboratory.

## PFAS Sampling Precautions

PFAS are found in thousands of products we use every day, and contamination could be accidentally introduced into samples during sampling. Sampling instructions provided to samplers should follow the precautions listed below to minimize the possibility of contaminating samples. The following guidance is based upon the EPA's experience in sample collection under the Fifth Unregulated Contaminated Monitoring Rule (UCMR 5). The EPA provided this video to assist with sample collection under UCMR 5 but be aware that this [video](#) also includes instructions specific to the UCMR 5 sampling kit. Laboratories may provide kits that are different than those used in UCMR 5.

### Samplers should NOT

- ▶ Apply personal care products, sunscreen, or insect repellent prior to sample collection.
- ▶ Use anti-fog sprays or wipes prior to sample collection.
- ▶ Handle or use water-, oil- or stain-resistant materials prior to sample collection (i.e., water-repellant face masks, food packaging and wrappers, Gore-Tex or Tyvek clothing, plastic clipboards).
- ▶ Use permanent markers (i.e., Sharpies) to label sample bottles.
- ▶ Touch the inside of the cap or bottle.
- ▶ Touch the bottle to the faucet.
- ▶ Place the lids in a pocket (set bottle lids face up on a clean surface while sampling).
- ▶ Rinse out or overfill sampling bottles. Sampling bottles contain preservatives that need to be dissolved into the sample.

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## PFAS Sampling Precautions (Continued)

### Samplers MUST

- ▶ Wash their hands before handling sample bottles.
- ▶ Wear nitrile gloves when filling and sealing sample bottles.
- ▶ Collect a FRB at each sampling site.
  - ▶ Put on a new pair of gloves.
  - ▶ Samplers are to pour the bottle containing reagent water into the FRB blank bottle, cap and shake for 15 seconds.
  - ▶ Record sampling information as directed by the laboratory, including date, time and sampling location.
  - ▶ Dispose of gloves.
- ▶ Collect a Field Sample (FS) at each sampling site.
  - ▶ If present, remove any aerators, hoses, tubing and/or Teflon tape from the faucet.
  - ▶ Open and flush the valve to obtain a sample representative of the water entering the distribution system.
  - ▶ Reduce the stream to pencil thickness.
  - ▶ Put on a new pair of nitrile gloves.
  - ▶ Uncap the FS bottle, fill to just below the neck, and recap the bottle.
  - ▶ Record sampling information as directed by the laboratory, including date, time and sampling location.
- ▶ FRB and FS must be stored at  $\leq 6^{\circ}\text{C}$ , but not frozen.
- ▶ Arrange for sampling kits to arrive at the laboratory within 2 days/48 hours of collection (required under Method 533).

## Laboratory Sample Receipt and Sample Storage Requirements

### Laboratories MUST

- ▶ Establish sample receipt procedures to verify FRB and FS were properly preserved including:
  - ▶ Confirming sample temperature is below  $10^{\circ}\text{C}$  when received by the lab.
  - ▶ Confirming samples are received within 2 days/48 hours from collection (for Method 533).
  - ▶ Verifying sample pH of 6 to 8.
  - ▶ Verifying absence of free chlorine.
- ▶ Invalidate and recollect FRB and FS that do not meet sample receipt criteria.

Verification of free chlorine: The verification of the “absence” of free chlorine is qualitative, provided the laboratory can measure the presence of free chlorine at and above 0.1 mg/L. Note that a small separate aliquot of the sample should be used to test pH and chlorine content. To prevent sample contamination, probes and test strips cannot be placed into the bulk sample bottle. When a positive free chlorine result occurs, the method requires that it be rechecked with a second technique, such as the free chlorine DPD (diethyl-p-phenylene diamine) method. Be sure to collect enough sample volume (fully filling bottle to just below the neck) to account for the free chlorine tests and any other measurement, such as for pH. Laboratories are cautioned that using DPD reagents or test strips for the verification of the absence of free chlorine can exhibit a false positive bias due to the presence of chloramine (which can be expected in samples collected from water systems employing chloramine disinfection). To minimize this false positive potential, laboratories must evaluate results immediately (less than 1 second) after the sample is allowed to react with the DPD reagent/test strip. Color changes occur over time, and delayed readings lead to erroneous results.

### Laboratories must NOT

- ▶ Use glass sampling bottles or pipettes, as PFAS analytes can adsorb to glass surfaces.
- ▶ Add additional preservative to FRB or FS that do not meet sample receipt criteria.
- ▶ Place probes or test strips into the bulk sample collection bottle.

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## PFAS Analysis Requirements

### Laboratories MUST

Laboratories must only use the methods approved in 40 CFR 141.901 and must adhere to method flexibilities allowed in the approved methods. Generally, method flexibilities include: the use of different liquid chromatography columns, modifying liquid chromatography and mass spectrometry conditions, and the use of some consumables, if method performance is improved. The methods approved for PFAS analysis include:

- ▶ [EPA 533 \(December 2019\)](#)
- ▶ [EPA 537.1 Version 2.0 \(March 2020\)](#)
- ▶ [EPA 537.1 Version 1.0 \(November 2018\)](#) Note that EPA 537.1 Version 1.0 may only be used to comply with the initial monitoring requirements.

Laboratories wishing to analyze samples required by an NPDWR must be “certified” by a primacy agency, typically the state. Laboratory certification programs, including comparable state laboratory “NELAP accreditation” programs that use the TNI Standard, are referred to herein as “certification programs” for simplicity.

Laboratories must be audited by a certification program on a triennial basis to analyze samples under the PFAS Rule.

Laboratories must conduct an Initial Demonstration of Capability (IDC) prior to analyzing samples under the PFAS Rule, and after any allowed modification to the approved methods. Method IDCs require laboratories to determine a laboratory specific MRL. The laboratory specific MRL must be less than or equal to the Practical Quantitation Level (PQL) defined in 40 CFR 141.903(f)(1)(iv) (this is different from a Practical Quantitation Limit, as defined at 40 CFR 141.2). The PQL represents the lowest level at which a contaminant can be reliably quantified within specific limits of precision and accuracy (see 40 CFR 141.902(a)(7)).

Laboratories must pass at least one Water Supply (WS) Proficiency Testing (PT) study, sometimes referred to as a Performance Evaluation (PE) Study, per year, pursuant to the requirements in 40 CFR 141.901(b)(2)(i). Laboratories may use any PT provider acceptable to the primacy agency, including PT providers accredited through the TNI Proficiency Testing Program.

### Laboratories must NOT

Laboratories may not make modifications to the approved methods outside of the procedural and instrument flexibilities that are described within the methods. Laboratories must not make changes to sample preservation requirements, quality control requirements, or to the extraction procedures described in the approved methods.

## Field and Laboratory Blank Analysis Requirements

If a field sample contains any method analyte at, or above, the laboratory specific MRL, the laboratory must analyze the FRB that was prepared concurrent with the collection of the field sample. To be acceptable, an FRB must have analyte concentrations that are less than one-third the laboratory specific MRL. If an FRB does not meet this criterion, sampling must be repeated.

The PQLs for regulated PFAS are specified in 40 CFR 141.903(f)(1)(v). All of these PQLs have two significant figures. Laboratory specific MRLs are calculated by a laboratory in the IDC. The laboratory specific MRL MUST be less than or equal to the PQL specified in the regulations. If either the LRB or the FRB contains the regulated PFAS at a concentration greater than one-third the laboratory specific MRL, the laboratory must invalidate the sample.

## Laboratory Certification Requirements

Laboratories wishing to analyze samples required by an NPDWR must be “certified” by the primacy agency, typically the state. State laboratory “NELAP accreditation” programs using the TNI Standard, are considered equivalent to state certification programs. Such certification programs that wish to assess laboratories to support PFAS monitoring pursuant to the PFAS Rule must incorporate procedures into their program that allow them to judge laboratory conformance with the methods approved under 40 CFR 141.901. This includes an on-site audit by the primacy agency on at least a triennial basis. The EPA supports and encourages secondary certification/accreditation through recognition of one primacy agency’s primary certification by another primacy agency (i.e., reciprocity or reciprocal certification).

To assist primacy agencies in auditing laboratories, the EPA has added PFAS-specific Certification Officer (CO) Training into the EPA’s annual CO training course for organic chemistry. This training addresses key elements of the PFAS Rule and the approved PFAS methods. COs wishing to evaluate laboratory conformance with the PFAS Rule and approved PFAS methods are expected to successfully complete the EPA CO training course for organic chemistry.

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## Laboratory Certification Requirements (Continued)

Certification programs must verify that laboratories are appropriately analyzing samples with one of the methods approved under 40 CFR 141.901 (EPA 533; EPA 537.1, V2.0). On January 16, 2025, the EPA approved an additional alternative PFAS Method (EPA 537.1, V1.0) specifically to meet initial monitoring requirements (40 CFR 141.902(b)(1) [Monitoring requirements for PFAS—Initial monitoring]). This allows historical PFAS monitoring data collected since January 2019 and analyzed using EPA 537.1, V1.0 to conditionally satisfy some or all of the initial monitoring requirements (90 FR 4658) if other regulatory requirements are met. Samples collected for purposes of compliance with the PFAS Rule, beginning April 26, 2027, must not be analyzed using EPA 537.1, V1.0.

Per to the requirements in 40 CFR 141.901(b)(2)(i), laboratories are required to pass at least one Proficiency Testing (PT) study, sometimes referred to as a Performance Evaluation (PE) Study, per year. The PT acceptance limits are 70 - 130 percent of true value for all regulated PFAS.

Additional information regarding laboratory certification requirements for the initial monitoring period can be found in the memorandum issued on November 21, 2024, titled "[PFAS National Primary Drinking Water Regulation Monitoring and Reporting](#)."

Questions regarding this document may be directed to [DWLabCert@epa.gov](mailto:DWLabCert@epa.gov).

## References

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- USEPA. 2022. *Sample Collection Training Video for EPA's Fifth Unregulated Contaminant Monitoring Rule (UCMR 5)*. <https://www.youtube.com/watch?v=8cHlxUTDPgE>

### For additional information on the PFAS Rule

Please visit the EPA PFAS NPDWR Implementation Web site at <https://www.epa.gov/dwreginfo/pfas-rule-implementation> or contact your primacy agency drinking water representative.

**Note:** The statutory provisions and the EPA regulations described in this document contain legally binding requirements. This document is not a regulation itself, nor does it change or substitute for those provisions, regulations, or EPA method requirements. The examples included in this document are intended for informational purposes only.