



## ENVIRONMENTAL PROTECTION AGENCY

### 40 CFR Part 141

[EPA-HQ-OW-2024-0603; FRL-12499-01-OW]

### **Expedited Approval of Alternative Test Procedures for the Analysis of Contaminants under the Safe Drinking Water Act; Analysis and Sampling Procedures**

**AGENCY:** Environmental Protection Agency (EPA).

**ACTION:** Final rule.

**SUMMARY:** This action announces the Environmental Protection Agency's (EPA's) approval of alternative testing methods for use in measuring the levels of contaminants in drinking water to determine compliance with national primary drinking water regulations. The Safe Drinking Water Act authorizes EPA to approve the use of alternative testing methods through publication in the *Federal Register*. EPA is using this streamlined authority to make two additional methods available for analyzing drinking water samples. This expedited approach provides public water systems, laboratories, and primacy agencies with more timely access to new measurement techniques and greater flexibility in the selection of analytical methods, thereby reducing monitoring costs while maintaining public health protection.

**DATES:** This action is effective [INSERT DATE OF PUBLICATION IN THE FEDERAL REGISTER].

**ADDRESSES:** EPA has established a docket for this action under Docket ID No. EPA-HQ-OW-2024-0603. All documents in the docket are listed on the <https://www.regulations.gov> website. Although listed in the index, some information is not publicly available, e.g., confidential business information (CBI) or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, is not placed on the Internet and will be publicly available only in hard copy form. Publicly available docket materials are available electronically through <https://www.regulations.gov>.

**FOR FURTHER INFORMATION CONTACT:** Teresa Wells, Technical Support Branch, Standards and Risk Management Division, Office of Ground Water and Drinking Water (MS 140), Environmental Protection Agency, 26 West Martin Luther King Drive, Cincinnati, OH 45268; telephone number: (513) 569-7128; e-mail address: *wells.teresa@epa.gov*.

**SUPPLEMENTARY INFORMATION:**

**I. General Information**

*A. Does this Action Apply to Me?*

Public water systems are the regulated entities required to measure contaminants in drinking water samples. In addition, EPA Regions as well as States and Tribal governments with authority to administer the regulatory program for public water systems under the Safe Drinking Water Act (SDWA) may measure contaminants in water samples. When EPA sets a monitoring requirement in its national primary drinking water regulations for a given contaminant, the agency also establishes (in the regulations) standardized test procedures for analysis of the contaminant. This action makes alternative testing methods available for particular drinking water contaminants beyond the testing methods currently established in the regulations. EPA is providing public water systems, required to test water samples, with a choice of using either a test procedure already established in the existing regulations or an alternative testing method that has been approved in this action or in prior expedited approval actions. Categories and entities that may ultimately be affected by this action include:

Category	Examples of potentially regulated entities	NAICS <sup>1</sup>
State, local, & Tribal governments	State, local, and Tribal governments that analyze water samples on behalf of public water systems required to conduct such analysis; State, local, and Tribal governments that directly operate community and non-transient non-community water systems required to monitor.	924110
Industry	Private operators of community and non-transient non-community water systems required to monitor.	221310
Municipalities	Municipal operators of community and non-transient non-community water systems required to monitor.	924110

<sup>1</sup>North American Industry Classification System.

This table is not intended to be exhaustive, but rather provides a guide for readers regarding entities likely to be interested in this action. Other types of entities not listed in the table could also have some interest. To determine whether your facility is affected by this action, you should carefully examine the applicability language in the *Code of Federal Regulations* (CFR) at 40 CFR 141.2 (definition of a public water system). If you have questions regarding the applicability of this action to a particular entity, consult the person listed in the preceding **FOR FURTHER INFORMATION CONTACT** section.

### **Abbreviations and Acronyms Used in this Action**

AMCD: Automated Micro Chlorine Detection

CFR: *Code of Federal Regulations*

EPA: United States Environmental Protection Agency

FRB: Field Reagent Blank

LC/MS/MS: Liquid Chromatography/Tandem Mass Spectrometry

NAICS: North American Industry Classification System

PFAS: Per- and Polyfluorinated Alkyl Substances

SDWA: The Safe Drinking Water Act

## **II. Background**

### *A. What is the Purpose of This Action?*

In this action, EPA is approving two analytical methods for determining contaminant concentrations in drinking water samples collected under SDWA. Regulated entities required to sample and monitor may use either the testing methods already established in existing regulations or the alternative testing methods being approved in this action or in prior expedited approval actions. The new methods are listed along with other methods similarly approved through previous expedited actions in 40 CFR part 141, appendix A to subpart C and on EPA's drinking water methods website at <https://www.epa.gov/dwanalyticalmethods>.

### *B. What is the Basis for This Action?*

When EPA determines that an alternative analytical method is “equally effective” (i.e., as effective as a method that has already been promulgated in the regulations), SDWA allows EPA to approve the use of the alternative testing method through publication in the *Federal Register* (see section 1401(1) of SDWA). EPA is using this streamlined approval authority to make two additional methods available for determining contaminant concentrations in drinking water samples collected under SDWA. EPA has determined that, for each contaminant or group of contaminants listed in section III of this preamble, the additional testing methods being approved in this action are as effective as one or more of the testing methods already approved in the regulations for those contaminants. Section 1401(1) of SDWA states that the newly approved methods “shall be treated as an alternative for public water systems to the quality control and testing procedures listed in the regulation.” Accordingly, this action makes these additional two analytical methods legally available as options for meeting EPA’s monitoring requirements.

This action does not add regulatory language, but does, for informational purposes, update an appendix to the regulations at 40 CFR part 141 that lists all methods approved under section 1401(1) of SDWA. Accordingly, while this action is not a rule, it is updating CFR text and therefore is being published in the “Final Rules” section of the *Federal Register*.

### **III. Summary of Approvals**

EPA is approving two methods that are equally effective relative to methods previously promulgated in the regulations. By means of this action, these two methods are added to appendix A to subpart C of 40 CFR part 141.

#### *A. Methods developed by EPA*

1. EPA Method 537.1, Version 1.0. Determination of Selected Per- and Polyfluorinated Alkyl Substances (PFAS) in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS) (USEPA 2018). The EPA’s April 26, 2024, *Federal Register* publication for the PFAS National Primary Drinking Water Regulation (89 FR 32532) describes EPA Method 533 (“Determination of PFAS in Drinking

Water by Isotope Dilution Anion Exchange Solid Phase Extraction and LC/MS/MS,” November 2019, 815-B-19-020) (USEPA 2019) and EPA Method 537.1, version 2.0 (“Determination of Selected PFAS in Drinking Water by Solid Phase Extraction and LC/MS/MS,” March 2020, EPA/600/R-20/006) (USEPA 2020) as acceptable methods for the analyses specified by the National Primary Drinking Water Regulation.

The primary difference between Method 537.1, version 1.0 and Method 537.1, version 2.0 is the field reagent blank (FRB) preparation. Version 2.0 exposes the FRB to the preservative (Trizma) at the time of field sample collection, whereas version 1.0 combines the lab reagent water and the preservative together in the FRB prior to field sampling. Version 2.0 was created to more-closely mimic the FRB process used in Method 533. Additionally, version 2.0 specifies the use of solid phase extraction cartridge sorbents containing a styrene divinylbenzene polymeric sorbent phase that may not be modified with monomers other than SDVB. The method versions are otherwise identical.

EPA has determined that EPA Method 537.1, version 1.0 is equally effective relative to Method 537.1, version 2.0 for the purposes of the analyses specified in 40 CFR 141.902(b)(1) [*Monitoring requirements for PFAS—Initial monitoring*]. The basis for this determination is discussed in Adams 2024a. Therefore, EPA is approving EPA Method 537.1, version 1.0 for determination of selected PFAS in drinking water to support initial monitoring required by the PFAS National Primary Drinking Water Regulation. EPA Method 537.1, version 1.0 is available at the National Service Center for Environmental Publications at <https://www.epa.gov/nscep>.

#### B. *Methods Developed by Vendors*

1. e-sens AMCD Method – e-sens, Inc. Automated Micro Chlorine Detection (AMCD) Method for the Determination of Residual Free and Total Chlorine in Water (e-sens, Inc. 2023a). e-sens AMCD Method uses a three-electrode electrochemical cell, comprised of a reference electrode, a platinum micro array working electrode, and a platinum counter electrode. The working electrode and the counter electrode are batch-produced on a silicon substrate, and the

electrical outputs are processed by an onboard potentiostat. For free chlorine, after electrode conditioning, the embedded microfluidic system adds a precise amount of a concentrated phosphate buffer to each sample to adjust its ionic strength and pH. A standard voltammetry procedure is then invoked on the buffered sample and the faradaic current through the electrochemical cell is recorded. The current magnitude is proportional to the concentration of free chlorine in the sample. The recorded current response is fit to a calibration curve obtained upon manufacture of the sensor and the concentration of free chlorine is reported. For total chlorine, the free chlorine measurement is immediately followed by the total chlorine measurement. A new aliquot of sample is mixed with ammonium chloride, which instantly converts various chlorine species to monochloramine. A concentrated phosphate buffer is then added into the sample to disproportionate monochloramine to form dichloramine, which is readily reduced at the surface of the platinum working electrode. A standard voltammetry procedure is then invoked on the buffered sample and the faradaic current through the electrochemical cell is recorded. The current magnitude is proportional to the concentration of total chlorine in the sample. The recorded current response is fit to a calibration curve obtained upon manufacture of the sensor and the concentration of total chlorine is reported.

Approved methods for free and total chlorine are listed at 40 CFR 141.74(a)(2) and 141.131(c)(1). The performance characteristics of e-sens AMCD Method were compared to the performance characteristics of the approved Standard Methods 4500-Cl G (APHA 2000). The validation study report (e-sens, Inc. 2023b) summarizes the results obtained from three different laboratories using three different ground water matrixes, and three different surface water matrixes collected from six different locations.

EPA has determined that e-sens AMCD Method is equally effective relative to Standard Methods 4500-Cl G. The basis for this determination is discussed in Adams 2024b. Therefore, EPA is approving the e-sens AMCD Method for determining free and total chlorine in drinking water. A copy of the method is available from e-sens, Inc., 630 Komas Dr., Ste 235, Salt Lake

City, Utah 84108.

#### **IV. Statutory and Executive Order Reviews**

As noted in section II of this preamble, under the terms of SDWA section 1401(1), this streamlined method approval action is not a rule. Accordingly, the Congressional Review Act, 5 U.S.C. 801 et seq., as added by the Small Business Regulatory Enforcement Fairness Act of 1996, does not apply because this action is not a rule for purposes of 5 U.S.C. 804(3).

Similarly, this action is not subject to the Regulatory Flexibility Act because it is not subject to notice and comment requirements under the Administrative Procedure Act or any other statute. In addition, because this approval action is not a rule, but simply makes alternative testing methods available as options for monitoring under SDWA, EPA has concluded that other statutes and executive orders generally applicable to rulemaking do not apply to this approval action.

#### **V. References**

Adams, W. 2024a. Memo to the record describing basis for expedited approval of EPA Method 537.1, Version 1.0. December 5, 2024. (Available at <https://www.regulations.gov>; docket ID No. EPA-HQ-OW-2024-0603.)

Adams, W. 2024b. Memo to the record describing basis for expedited approval of e-sens Automated Micro Chlorine Detection Method November 26, 2024. (Available at <https://www.regulations.gov>; docket ID No. EPA-HQ-OW-2024-0603.)

American Public Health Association (APHA). 2000. Standard Methods 4500-C1 D, E, F, G, H, I-00. Chlorine (Residual). D. Amperometric Titration Method. E. Low-Level Amperometric Titration Method. F. DPD Ferrous Titrimetric Method. G. DPD Colorimetric Method. H. Syringaldehyde (FACTS) Method. I. Iodometric Electrode Technique. Approved by Standard Methods Committee 2000. Standard Methods Online (Available at <https://www.standardmethods.org>.)

- USEPA. 2018. EPA Method 537.1, Version 1.0. Determination of Selected Per- and Polyfluorinated Alkyl Substances (PFAS) in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS). EPA/600/R-18/352. November 2018. (Available at <https://www.regulations.gov>; docket ID No. EPA-HQ-OW-2024-0603.)
- USEPA. 2019. EPA Method 533. Determination of PFAS in Drinking Water by Isotope Dilution Anion Exchange Solid Phase Extraction and LC/MS/MS. EPA 815-B-19-020. November 2019. (Available at <https://www.regulations.gov>; docket ID No. EPA-HQ-OW-2024-0603.)
- USEPA. 2020. EPA Method 537.1, Version 2.0. Determination of Selected Per- and Polyfluorinated Alkyl Substances (PFAS) in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS). EPA/600/R-20/006. March 2020. (Available at <https://www.regulations.gov>; docket ID No. EPA-HQ-OW-2024-0603.)
- e-sens, Inc. 2023a. e-sens AMCD Method. e-sens, Inc. Automated Micro Chlorine Detection (AMCD) Method for the Determination of Residual Free and Total Chlorine in Water. December 2023. (Available at <https://www.regulations.gov>; docket ID No. EPA-HQ-OW-2024-0603.)
- e-sens, Inc. 2023b. Alternate Test Procedure Validation Study Report of e-sens, Inc. Automated Micro Chlorine Detection (AMCD) Method for the Determination of Residual Free and Total Chlorine in Water. December 2023. (Available at <https://www.regulations.gov>; docket ID No. EPA-HQ-OW-2024-0603.)

#### **List of Subjects in 40 CFR Part 141**

Environmental protection, Chemicals, Indians-lands, Intergovernmental relations, Reporting and recordkeeping requirements, Water supply.

*Jennifer L. McLain,*  
**Director,**  
**Office of Ground Water and Drinking Water.**

For the reasons stated in the preamble, the Environmental Protection Agency amends 40 CFR part 141 as follows:

**PART 141—NATIONAL PRIMARY DRINKING WATER REGULATIONS**

1. The authority citation for part 141 continues to read as follows:

**Authority:** 42 U.S.C. 300f, 300g-1, 300g-2, 300g-3, 300g-4, 300g-5, 300g-6, 300j-4, 300j-9, and 300j-11.

2. Amend Appendix A to subpart C of Part 141 by:

- a. In the table entitled “Alternative Testing Methods for Contaminants Listed at 40 CFR 141.74(a)(2)” revise the entries for “Free Chlorine” and “Total Chlorine”;
- b. In the table entitled “Alternative Testing Methods for Contaminants Listed at 40 CFR 141.131(c)(1)” revise the entries for “Free Chlorine” and “Total Chlorine”;
- c. Add the table entitled “Alternative Testing Methods for Contaminants Listed at 40 CFR 141.901(b)(1)” after the table entitled “Alternative Testing Methods for Contaminants Listed at 40 CFR 141.852(a)(5)” and before the table entitled “Alternative Testing Methods for Contaminants Listed at 40 CFR 143.4(b)”;
- d. Add footnotes 69 and 70.

The revisions and additions read as follows:

**APPENDIX A TO SUBPART C OF PART 141—ALTERNATIVE TESTING METHODS APPROVED FOR ANALYSES UNDER THE SAFE DRINKING WATER ACT**

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<b>ALTERNATIVE TESTING METHODS FOR DISINFECTANT RESIDUALS LISTED AT 40 CFR 141.74(a)(2)</b>
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<b>Residual</b>	<b>Methodology</b>	<b>EPA Methods</b>	<b>SM 21<sup>st</sup> Edition <sup>1</sup></b>	<b>SM 22<sup>nd</sup> Edition <sup>28</sup>, SM 23<sup>rd</sup> Edition <sup>49</sup>, SM 24<sup>th</sup> Edition <sup>66</sup></b>	<b>ASTM <sup>4</sup></b>	<b>Other</b>
Free Chlorine	Amperometric Titration		4500-C1 D	4500-C1 D	D 1253-08, -14	
	DPD Ferrous Titrimetric		4500-C1 F	4500-C1 F		
	DPD Colorimetric		4500-C1 G	4500-C1 G		Hach Method 10260 <sup>31</sup>
	Indophenol Colorimetric					Hach Method 10241 <sup>34</sup>
	Syringaldazine (FACTS)		4500-C1 H	4500-C1 H		
	On-line Chlorine Analyzer	EPA 334.0 <sup>16</sup>				
	Amperometric Sensor					ChloroSense <sup>17</sup> , ChloroSense, Rev. 1.1 <sup>59</sup> , e-sens AMCD Method <sup>69</sup>
Total Chlorine	Amperometric Titration		4500-C1 D	4500-C1 D	D 1253-08, -14	
	Amperometric Titration (Low level measurement)		4500-C1 E	4500-C1 E		
	DPD Ferrous Titrimetric		4500-C1 F	4500-C1 F		
	DPD Colorimetric		4500-C1 G	4500-C1 G		Hach Method 10260 <sup>31</sup>
	Indophenol Colorimetric	127 <sup>55</sup>				
	Iodometric Electrode		4500-C1 I	4500-C1 I		
	On-line Chlorine Analyzer	EPA 334.0 <sup>16</sup>				
	Amperometric Sensor					ChloroSense <sup>17</sup> , ChloroSense, Rev. 1.1 <sup>59</sup> , e-sens AMCD Method <sup>69</sup>
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**ALTERNATIVE TESTING METHODS FOR DISINFECTANT RESIDUALS LISTED AT 40 CFR 141.131(c)(1)**

<b>Residual</b>	<b>Methodology</b>	<b>SM 21<sup>st</sup> Edition <sup>1</sup></b>	<b>SM 22<sup>nd</sup> Edition <sup>28</sup>, SM 23<sup>rd</sup> Edition <sup>49</sup>, SM 24<sup>th</sup> Edition <sup>66</sup></b>	<b>ASTM <sup>4</sup></b>	<b>Other</b>
Free Chlorine	Amperometric Titration	4500-C1 D	4500-C1 D	D 1253-08, -14	
	DPD Ferrous Titrimetric	4500-C1 F	4500-C1 F		
	DPD Colorimetric	4500-C1 G	4500-C1 G		Hach Method 10260 <sup>31</sup>
	Indophenol Colorimetric				Hach Method 10241 <sup>34</sup>
	Syringaldazine (FACTS)	4500-C1 H	4500-C1 H		
	Amperometric Sensor				ChloroSense <sup>17</sup> , ChloroSense, Rev. 1.1 <sup>59</sup> , e-sens AMCD Method <sup>69</sup>
	On-line Chlorine Analyzer				EPA 334.0 <sup>16</sup>
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Total Chlorine	Amperometric Titration	4500-C1 D	4500-C1 D	D 1253-08, -14	
	Low level Amperometric Titration	4500-C1 E	4500-C1 E		
	DPD Ferrous Titrimetric	4500-C1 F	4500-C1 F		
	DPD Colorimetric	4500-C1 G	4500-C1 G		Hach Method 10260 <sup>31</sup>
	Iodometric Electrode	4500-C1 I	4500-C1 I		
	Amperometric Sensor				ChloroSense <sup>17</sup> , ChloroSense, Rev. 1.1 <sup>59</sup> , e-sens AMCD Method <sup>69</sup>

	On-line Chlorine Analyzer				EPA 334.0 <sup>16</sup>
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**ALTERNATIVE TESTING METHODS FOR INTIAL MONITORING ONLY OF CONTAMINANTS LISTED AT 40 CFR 141.901(b)(1)**

Contaminant	Methodology	EPA method
Perfluorobutane Sulfonate (PFBS)	SPE LC-MS/MS	537.1, version 1.0 <sup>70</sup>
Perfluorohexane Sulfonate (PFHxS)	SPE LC-MS/MS	537.1, version 1.0 <sup>70</sup>
Perfluorononanoate (PFNA)	SPE LC-MS/MS	537.1, version 1.0 <sup>70</sup>
Perfluorooctanesulfonic Acid (PFOS)	SPE LC-MS/MS	537.1, version 1.0 <sup>70</sup>
Perfluorooctanoic Acid (PFOA)	SPE LC-MS/MS	537.1, version 1.0 <sup>70</sup>
2,3,3,3-Tetrafluoro-2-(heptafluoropropoxy)propanoate (HFPO-DA or GenX Chemicals)	SPE LC-MS/MS	537.1, version 1.0 <sup>70</sup>

<sup>1</sup> *Standard Methods for the Examination of Water and Wastewater*, 21st edition (2005). Available from American Public Health Association, 800 I Street NW, Washington, DC 20001-3710.

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<sup>4</sup> Available from ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959 or <http://astm.org>. The methods listed are the only alternative versions that may be used.

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<sup>16</sup> EPA Method 334.0. “Determination of Residual Chlorine in Drinking Water Using an On-line Chlorine Analyzer,” September 2009. EPA 815-B-09-013. Available at <https://www.nemi.gov>.

<sup>17</sup> ChloroSense. “Measurement of Free and Total Chlorine in Drinking Water by Palintest ChloroSense,” August 2009. Available at <https://www.nemi.gov> or from Palintest Ltd, 1455 Jamike Avenue (Suite 100), Erlanger, KY 41018.

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<sup>28</sup> *Standard Methods for the Examination of Water and Wastewater*, 22nd edition (2012). Available from American Public Health Association, 800 I Street NW, Washington, DC 20001-3710.

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<sup>31</sup> Hach Company. “Hach Method 10260-Determination of Chlorinated Oxidants (Free and Total) in Water Using Disposable Planar Reagent-filled Cuvettes and Mesofluidic Channel Colorimetry,” April 2013. 5600 Lindbergh Drive, P.O. Box 389, Loveland, CO 80539.

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<sup>34</sup> Hach Company. “Hach Method 10241-Spectrophotometric Measurement of Free Chlorine (Cl<sub>2</sub>) in Drinking Water,” November 2015. Revision 1.2. 5600 Lindbergh Drive, P.O. Box 389, Loveland, CO 80539.

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<sup>49</sup> *Standard Methods for the Examination of Water and Wastewater*, 23rd edition (2017). Available from American Public Health Association, 800 I Street NW, Washington, DC 20001-3710.

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<sup>55</sup> EPA Method 127. “Determination of Monochloramine Concentration in Drinking Water.” January 2021. EPA 815-B-21-004. Available at the National Service Center for Environmental Publications at <https://www.epa.gov/nscep>.

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<sup>59</sup> ChloroSense, Rev. 1.1. “Free and Total Chlorine in Drinking Water by Amperometry using Disposable Sensors.” February 2020. Palintest Ltd, 400 Corporate Circle, Suite J, Golden, CO 80401.

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<sup>66</sup> *Standard Methods for the Examination of Water and Wastewater*, 24th edition (2023). Available from American Public Health

Association, 800 I Street NW, Washington, DC 20001-3710.

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<sup>69</sup> e-sens, Inc. “e-sens, Inc. Automated Micro Chlorine Detection (AMCD) Method for the Determination of Residual Free and Total Chlorine in Water.” December 2023. Available from e-sens, Inc., 630 Komas Dr., Ste 235, Salt Lake City, Utah 84108.

<sup>70</sup> EPA Method 537.1, Version 1.0. “Determination of Selected Per- and Polyfluorinated Alkyl Substances (PFAS) in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS).” November 2018. EPA/600/R-18/352. Approved as alternative testing method to support initial PFAS monitoring (for monitoring-frequency determinations) until April 26, 2027 as described at 40 CFR 141.902(b)(1) [Monitoring requirements for PFAS – Initial monitoring]. Available at the National Service Center for Environmental Publications at <https://www.epa.gov/nscep>.  
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