PACE® ASTM D8421/EPA 8327

Pace® has been at the forefront of PFAS testing and method development for decades. Now, we're excited to offer another powerful analytical tool for PFAS analysis: ASTM D8421/EPA 8327. This method uses isotope dilution and LC/MS/MS (Liquid Chromatography Tandem Mass Spectrometry) to analyze for up to 44 short-chain and long-chain PFAS in both aqueous and solid matrices. ASTM D8421/EPA 8327 offers a number of advantages over other PFAS test methods:

- Pace® can cite either ASTM D8421 or Method 8327.
- The Pace® approach incorporates isotope dilution calibration and quantification.
- ASTM D8421/EPA 8327 can analyze for up to 44 PFAS compounds.
- Detection limits meet EPA RSLs (Regional Screening Levels) and DOD OSD (Office of the Secretary of Defense) screening levels for soil and water.
- Results can be delivered faster than more procedurally challenging methods, such as Draft Method 1633.
- Optimized procedural requirements translate into a lower price point than other PFAS methods.
- A low-volume method, only a 5 mL sample is required.

METHOD CITATION

EPA 8327 is an SW-846 method published using ASTM D7979 as a reference method but written and validated using requirements for publication in the SW-846 compendium. ASTM D7979 is the same reference method used to develop ASTM D8421.

ASTM D8421 includes optional language to incorporate isotope dilution. However, as is the case with all SW-846 methods, EPA 8327 is "performance based" and allows alternative calibration schemes if validated. Pace® applied isotope dilution quantification to its procedure and validated the method under that calibration and quantification schema. The end result is a method so technically similar, Pace® is able to cite either method when following ASTM D8421/EPA 8327.

VALIDATION

ASTM D8421 has recently been validated by an inter-laboratory study (ILS) and using both reagent water and difficult matrices including landfill leachate, metal finisher wastewater, POTW (Publically Owned Treatment Works) influent and effluent, and other non-potable water. The method was validated for 44 compounds. Notably, this includes all 18 or 25 PFAS compounds in the two EPA drinking water methods, EPA 537.1 and 533, respectively, as well as all 40 compounds included in Draft Method 1633.

Additionally, Pace® successfully performed a comprehensive validation of its procedure using requirements prescribed by EPA and NELAC, including initial demonstration of capability (IDOC), 40CFR-compliant method detection limit (MDL) studies, and NELAC-compliant proficiency testing (PT).

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FAQs

Q: What Are the Reporting Limits?

A: As published, the majority of the 44 compounds in the ASTM D8421/EPA 8327 compound list can be quantitated down to 10 ng/L (ppt), with their respective MDLs being 3 to 5 times lower than that. Although this is not a drinking water method, it is fair to note that the Pace® MDLs for this method meet even the recently proposed drinking water standards for the 6 PFAS compounds, as well as their associated EPA RSLs. We believe that the sensitivity of this method will sufficiently meet MOST data quality objectives (DQO), as well as MOST state-level action limits.

Q: Can You Analyze Soil by This Method?

A: Yes, Pace® fully validated this method for both soil and water matrices. (Refer to the chart on page 3 for detection limits per matrix and compound.) Our method procedure incorporates a soil extraction defined in ASTM D7968, followed by the analysis conforming with ASTM D8421/EPA 8327.

Q: Is This Method a "Screening" Level Method?

A: The short answer to this question is no. However, "screening method" is a user-defined term without a universal understanding or definition. At its essence, ASTM D8421 is a definitive method by most definitions or interpretations. Even SW-846 Method 8327 is a definitive method; however, some federal and state stakeholders have determined that data from Method 8327 should be used as "screening-level." In these instances, this classification is notably not based on the method, but rather their programmatic DQOs and requirements.

ASTM D8421 was single-lab validated prior to publication and is currently going through an ILS that will result in a revised method to incorporate the statistical QC requirements achieved by the participating laboratories. Although validation does not determine whether a method can be considered definitive, there is rapidly growing acceptance (and certification) for EPA 8327 and ASTM D8421, both of which now have method codes in TNI NELAC LAMS.

Q: Is Pace® Certified for This Method?

A: Pace® is in the process of becoming TNI/NELAC-certified for ASTM D8421/EPA 8327. We have completed all required method validation activities and have passed the required proficiency testing (PT) samples. At this time, we are aware of only a handful of states that certify for PFAS in non-potable water and solids that include ASTM D8421 or Method 8327 in their fields of accreditation. Pace® anticipates this list of states will grow as a greater understanding of this method and its advantages are better known.

The Department of Defense (DOD) has already shown great interest in its utility as a screening tool (screening-level DQO) in implementing its PFAS strategy across the country. Pace® is scheduled to use this method on several high-profile DOD investigations throughout the second half of 2023.

CONTACT PACE® TO DISCUSS YOUR PROJECT REQUIREMENTS

Pace® has validated ASTM D8421/EPA 8327 and believes it will have great utility across a wide range of regulatory programs and an equally wide range of non-regulatory programs (e.g., treatability studies). While this method will not fit every DQO; when suitable, it will provide reliable, reproducible data at a lower sample volume and lower cost than other published methods.

Contact Pace®

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D8421/8327 COMPOUND LIST AND REPORTING LIMITS						
METHOD			ASTM D8421/ EPA 8327		ASTM D8421/ EPA 8327	
TARGET	ACRONYM	CAS RN	LOQ	MDL	LOQ	MDL
PERFLUOROALKYL CARBOXYLIC ACID (PFCA)			NG/L		µG/KG	
Perfluorobutanoic acid	PFBA	375-22-4	50	8.3	0.5	0.013
Perfluoropentanoic acid	PFPEA	2706-90-3	50	14.3	0.5	0.031
Perfluorohexanoic acid	PFHXA	307-24-4	10	1.4	0.1	0.004
Perfluoroheptanoic acid	PFHPA	375-85-9	10	3.2	0.1	0.010
Perfluorooctanoic acid	PFOA	335-67-1	10	4.1	0.1	0.013
Perfluorononanoic acid	PFNA	375-95-1	10	2.2	0.1	0.006
Perfluorodecanoic acid	PFDA	335-76-2	10	2.2	0.1	0.015
Perfluoroundecanoic acid	PFUNA	2058-94-8	10	1.4	0.1	0.008
Perfluorododecanoic acid	PFDOA	307-55-1	10	2.0	0.1	0.006
Perfluorotridecanoic acid	PFTRDA	72629-94-8	10	5.8	0.1	0.008
Perfluorotetradecanoic acid	PFTEDA	376-06-7	50	50	0.5	0.500
PERFLUOROALKANE SULFONIC ACID (PFSA)						
Perfluorobutanesulfonic acid	PFBS	375-73-5	10	3.5	0.1	0.007
Perfluoropentanesulfonic acid	PFPES	2706-91-4	10	2.9	0.1	0.007
Perfluorohexanesulfonic acid	PFHXS	355-46-4	10	1.6	0.1	0.004
Perfluoroheptanesulfonic acid	PFHPS	375-92-8	10	1.6	0.1	0.006
Perfluorooctanesulfonic acid	PFOS	1763-23-1	10	1.6	0.1	0.004
Perfluorononanesulfonic acid	PFNS	68259-12-1	10	1.9	0.1	0.005
Perfluorodecanesulfonic acid	PFDS	335-77-3	10	2.6	0.1	0.006
Perfluorododecanesulfonic acid	PFDOS	79780-39-5	50	50	0.5	0.500
PERFLUOROALKANE SULFOMIDES (FASA) AND DERIVATIVES						
Perfluorooctanesulfonamide	PFOSA	754-91-6	10	1.6	0.1	0.003
N-ethyl perfluorooctane sulfonamidoethanol	NETFOSE	1691-99-2	10	2.6	0.1	0.004
N-methyl perfluorooctane sulfonamidoethanol	NMEFOSE	24448-09-7	10	4.5	0.1	0.013
N-ethyl perfluorooctane sulfonamide	NETFOSA	4151-50-2	10	2.6	0.1	0.004
N-methyl perfluorooctane sulfonamide	NMEFOSA	31506-32-8	10	2.1	0.1	0.006
N-ethyl perfluorooctanesulfonamidoacetic acid	NETFOSAA	2991-50-6	10	3.5	0.1	0.013
N-methyl perfluorooctanesulfonamidoacetic acid	NMEFOSAA	2355-31-9	10	2.7	0.1	0.011
FLUOROTELOMER SULFONIC ACID (FTSA)						
4:2 Fluorotelomer sulfonic acid	4:2 FTS	757124-72-4	10	1.9	0.1	0.010
6:2 Fluorotelomer sulfonic acid	6:2 FTS	27619-97-2	20	4.4	0.2	0.035
8:2 Fluorotelomer sulfonic acid	8:2 FTS	39108-34-4	10	5.2	0.1	0.023
PERFLUOROALKYL ETHER CARBOXYLIC ACID (PFECA)						
Perfluoro-3-methoxypropanoic acid	PFMPA	377-73-1	10	1.4	0.1	0.003
Perfluoro-4-methoxybutanoic acid	PFMBA	863090-89-5	10	2.0	0.1	0.003
Hexafluoropropylene oxide dimer acid	HFPO-DA	13252-13-6	10	2.4	0.1	0.004
Nofluoro-3,6-dioxaheptanoic acid	NFDHA	151772-58-6	10	1.8	0.1	0.008
4,8-dioxa-3H-perfluorononanoic acid	ADONA	919005-14-4	10	1.7	0.1	0.005

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D8421/8327 COMPOUND LIST AND REPORTING LIMITS, CONT.						
METHOD			ASTM D8421/ EPA 8327		ASTM D8421/ EPA 8327	
TARGET	ACRONYM	CAS RN	LOQ	MDL	LOQ	MDL
POLYFLUOROALKYL ETHER SULFONIC ACID (PFESA)			NG/L		µG/KG	
Perfluoro(2-ethoxyethane)sulfonic acid	PFEESA	113507-82-7	10	1.0	0.1	0.005
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	9CL-PF3ONS	756426-58-1	10	1.8	0.1	0.004
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	11CL-PF3OUDS	763051-92-9	10	3.0	0.1	0.004
FLUOROTELOMER CARBOXYLIC ACID (FTCA)						
3-Perfluoropropyl propanoic acid	3:3FTCA	356-02-5	40	5.0	0.4	0.014
2H,2H,3H,3H-Perfluorooctanoic acid	5:3FTCA	914637-49-3	40	4.9	0.4	0.018
3-Perfluoroheptyl propanoic acid	7:3FTCA	812-70-4	40	2.7	0.4	0.013
OTHER						
Pentafluorpropanoic acid	PFPrA	422-64-0	200	34	2.0	0.061
2H-perfluoro-2-octenoic acid	FHUEA	70887-88-6	10	4.6	0.1	0.011
2H-perfluoro-2-decenoic acid	FOUEA	70887-84-2	10	3.2	0.1	0.011
Bis(trifluoromethane)sulfonimide	HQ-115	90076-65-6	10	3.0	0.1	0.004

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