



Resprep PFAS Cartridges

A Two-in-One Solution for PFAS SPE Sample Preparation

- Single cartridge with both WAX and carbon beds simplifies workflows.
- Factory-packed filter aid saves time and prevents clogs.
- Ultra-clean sorbents ensure MDLs are met.



***Prepacked filter aid
only from Restek!***

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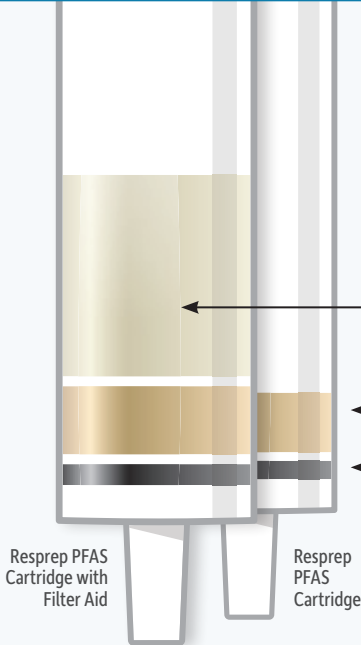
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Streamline PFAS Sample Preparation with Dual-Bed Resprep PFAS Cartridges

Effective sample preparation is essential for accurate trace-level PFAS analysis in complex sample matrices, such as non-potable waters, solids, biosolids, and tissues. Solid phase extraction (SPE) is typically used, but good results are difficult to achieve if background PFAS are present or if sample components clog the SPE cartridges. EPA Method 1633, which has been validated in multiple laboratories, uses a wool-packed weak anion exchange (WAX) cartridge for matrix extraction, followed by a dispersive graphitized carbon black (dGCB) cleanup step, with many labs adopting a carbon cartridge instead of using dGCB. While effective, this two-cartridge approach with manually packed wool adds extra time, complexity, and risk of introducing contaminants to the sample preparation process.

Resprep PFAS Cartridges Are a Simpler Solution

PFAS SPE sample preparation can be streamlined significantly with dual-bed Resprep PFAS cartridges, which combine SPE extraction and carbon cleanup into a single cartridge. In this fast, simple workflow, the ultra-clean WAX and CarboPrep Plus sorbents used in Resprep PFAS cartridges ensure that method performance requirements will be met. In addition, an optional, factory-packed filter aid eliminates the time and variability associated with manually packing glass wool. This ready-to-use solution prevents clogging so that even dirty matrices can be processed quickly with a single extraction.



Get the Dual-Bed Advantage!
One cartridge with both WAX and carbon beds simplifies and speeds up workflows.

Only available from Restek!
Factory-packed filter aid prevents clogs for faster, more consistent sample preparation.

Polymeric WAX is tested for Method 1633 PFAS to prevent background contamination during extraction.

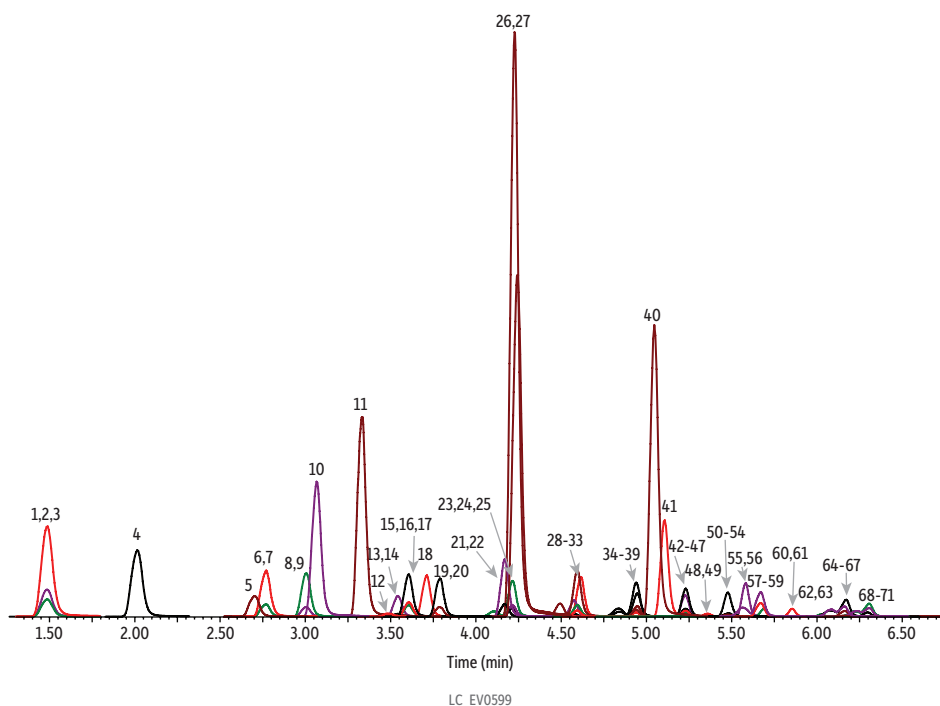
Ultra-clean CarboPrep Plus carbon bed ensures effective clean up.



Meet Performance Requirements Quickly and Consistently

Developed specifically to help labs meet PFAS performance requirements, dual-bed Resprep PFAS cartridges contain ultra-clean, high-quality WAX and carbon sorbent layers that provide effective extraction and cleanup. Every lot of our WAX sorbent is tested against Method 1633 PFAS analytes to demonstrate cleanliness and to ensure it does not contribute background PFAS. In addition, our high-performance CarboPrep Plus sorbent provides more effective and consistent cleanup than other carbon materials. The combination of both sorbents in a single cartridge makes sample preparation much faster and results in clean extracts and excellent analytical performance (Figure 1 and Table I).

Figure 1: Resprep PFAS cartridges provide effective SPE sample preparation and are faster and easier to use than separate extraction and cleanup procedures.



Column Force C18 (cat.# 9634252)
Dimensions: 50 mm x 2.1 mm ID
Particle Size: 1.8 µm
Pore Size: 100 Å
Temp.: 40 °C

Standard/Sample

Inj. Vol.: 3 µL

Mobile Phase

A: Water, 5 mM ammonium acetate
B: Methanol

Time (min)	Flow (mL/min)	%A	%B
0.00	0.4	80	20
6	0.4	5	95
6.6	0.4	5	95
6.61	0.4	80	20
7.5	0.4	80	20

Max Pressure: ~400 bar

Detector Waters Xevo TQ-S

Ion Mode: ESI-

Mode: MRM

Instrument Waters ACQUITY Premier

Sample Preparation Resprep PFAS cartridges (cat.# 28930) and a Thermo AutoTrace PFAS instrument were used for the following sample preparation procedure.

1. Spike 500 mL DI water with 200 µL of Wellington EPA-1633STK and 25 µL of Wellington MPFAC-HIF-ES.
2. Rinse cartridge with 15 mL of 1% ammonium acetate in methanol.
3. Rinse with 5 mL of 0.3 M formic acid in water.
4. Load sample onto SPE cartridge dropwise at 5 mL/min.
5. Rinse bottle with 5 mL DI water, load on to SPE cartridge dropwise at 5 mL/min, repeat.
6. Rinse bottle with 5 mL of 1:1 0.1 M formic acid:methanol and load onto SPE cartridge dropwise at 5 mL/min.
7. Flow nitrogen through cartridge for 15 minutes.
8. Rinse bottles with 5 mL of 1% ammonium hydroxide in methanol, elute into collection vessel.
9. Add 25 µL of concentrated acetic acid and 25 µL of Wellington MPFAC-HIF-IS.
10. Transfer aliquot to autosampler vial (cat. # 23243) and cap (cat. # 23244).

Notes A PFAS delay column (cat.# 27854) was installed before the injector.

Figure 1 continued on next page.

Figure 1 (continued)

Peaks	tR (min)	Conc. (ng/L)	Precursor 1	Product 1	Product 2	Precursor 2	Product 1
1. Perfluoro- <i>n</i> -[1,2,3,4- 13C3]butanoic acid (13C3-PFBA)	1.485	5	216	172	-	-	-
2. Perfluoro- <i>n</i> -[1,2,3,4- 13C4]butanoic acid (13C4-PFBA)	1.487	10	217	172	-	-	-
3. Perfluorobutanoic acid (PFBA)	1.489	10	213	169	-	-	-
4. Perfluoro-3-methoxypropanoic acid (PFMPA)	2.007	5	229	85	-	-	-
5. 3-Perfluoropropyl propanoic acid (3:3FTCA)	2.7	12.5	241	177	117	-	-
6. Perfluoro- <i>n</i> -[1,2,3,4,5- 13C5]pentanoic acid (13C5-PFPeA)	2.765	5	268	223	-	-	-
7. Perfluoropentanoic acid (PFPeA)	2.768	5	263	219	69	-	-
8. Perfluorobutane sulfonate (PFBS)	3.006	2.5	299	80	99	-	-
9. Sodium perfluoro-1-[2,3,4- 13C3]butanesulfonate (13C3-PFBS)	3.007	2.5	302	80	99	-	-
10. Perfluoro-4-methoxybutanoic acid (PFMBA)	3.071	5	279	85	-	-	-
11. Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	3.333	5	315	135	83	-	-
12. Nonafluoro-3,6-dioxahexanoic acid (NFDHA)	3.493	5	295	201	85	-	-
13. 1 <i>H</i> ,1 <i>H</i> ,2 <i>H</i> ,2 <i>H</i> -perfluorohexane sulfonate (4:2 FTS)	3.545	10	327	307	81	-	-
14. Sodium 1 <i>H</i> ,1 <i>H</i> ,2 <i>H</i> ,2 <i>H</i> -perfluoro-1-[1,2- 13C2]hexane sulfonate (13C2-4:2FTS)	3.55	5	329	81	309	-	-
15. Perfluorohexanoic acid (PFHxA)	3.608	2.5	313	269	119	-	-
16. Perfluoro- <i>n</i> -[1,2,3,4,6- 13C2]hexanoic acid (13C2-PFHxA)	3.609	2.5	315	270	119	-	-
17. Perfluoro- <i>n</i> -[1,2,3,4,6- 13C5]hexanoic acid (13C5-PFHxA)	3.61	2.5	318	273	120	-	-
18. Perfluoropentane sulfonate (PFPeS)	3.718	2.5	349	80	99	-	-
19. 2,3,3,3-Tetrafluoro-2-(1,1,2,2,3,3,3-heptafluoropropoxy)13C3-propanoic acid (13C3-HFPO-DA)	3.79	10	287	169	185	-	-
20. Hexafluoropropylene oxide (HFPO-DA)	3.795	10	285	169	185	-	-
21. Perfluoroheptanoic acid (PFHpA)	4.174	2.5	363	319	169	-	-
22. Perfluoro- <i>n</i> -[1,2,3,4- 13C4]heptanoic acid (13C4-PFHpA)	4.174	2.5	367	322	-	-	-
23. Perfluoro-1-hexane[18O2]sulfonic acid (18O2-PFHxS)	4.218	2.5	403	84	-	-	-
24. Sodium perfluoro-1-[1,2,3- 13C3]hexanesulfonate (13C3-PFHxS)	4.218	2.5	402	80	99	-	-
25. Perfluorohexane sulfonate (PFHxS)	4.22	2.5	399	80	99	-	-
26. 4,8-Dioxo-3 <i>H</i> -perfluorononanoic acid (ADONA)	4.232	10	377	251	85	-	-
27. 2 <i>H</i> ,2 <i>H</i> ,3 <i>H</i> ,3 <i>H</i> -Perfluorooctanoic acid (5:3FTCA)	4.247	62.5	341	237	217	-	-
28. 1 <i>H</i> ,1 <i>H</i> ,2 <i>H</i> ,2 <i>H</i> -perfluorooctane sulfonate (6:2 FTS)	4.58	10	427	407	81	-	-
29. Sodium 1 <i>H</i> ,1 <i>H</i> ,2 <i>H</i> ,2 <i>H</i> -perfluoro-1-[1,2-13C2]-octane sulfonate (13C2-6:2FTS)	4.581	5	429	81	409	-	-
30. Perfluoro- <i>n</i> -[13C8]octanoic acid (13C8-PFOA)	4.598	2.5	421	376	-	-	-
31. Perfluorooctanoic acid (PFOA)	4.601	2.5	413	369	169	-	-
32. Perfluoro- <i>n</i> -[13C4]octanoic acid (13C4-PFOA)	4.601	2.5	417	172	-	-	-
33. Perfluoroheptane sulfonate (PFHpS)	4.621	2.5	449	80	99	-	-
34. Perfluorononanoic acid (PFNA)	4.944	2.5	463	419	219	-	-
35. Perfluoro- <i>n</i> -[13C5]nonanoic acid (13C5-PFNA)	4.944	1.25	468	423	-	-	-
36. Perfluoro- <i>n</i> -[13C9]nonanoic acid (13C9-PFNA)	4.944	1.25	472	427	-	-	-
37. Perfluorooctane sulfonate (PFOS)	4.949	2.5	499	80	99	-	-
38. Sodium perfluoro-[13C4]octanesulfonate (13C4-PFOS)	4.95	2.5	503	80	99	-	-
39. Sodium perfluoro-[13C8]octanesulfonate (13C8-PFOS)	4.95	2.5	507	80	99	-	-
40. 3-Perfluoroheptyl propanoic acid (7:3FTCA)	5.046	62.5	441	317	337	-	-
41. 9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	5.114	10	531	351	-	533	353
42. Perfluorodecanoic acid (PFDA)	5.237	2.5	513	469	219	-	-
43. Perfluoro- <i>n</i> -[1,2,3,4,5,6- 13C2]decanoic acid (13C2-PFDA)	5.237	1.25	515	470	-	-	-
44. Perfluoro- <i>n</i> -[1,2,3,4,5,6- 13C6]decanoic acid (13C6-PFDA)	5.237	1.25	519	474	-	-	-
45. 1 <i>H</i> ,1 <i>H</i> ,2 <i>H</i> ,2 <i>H</i> -perfluorodecane sulfonate (8:2 FTS)	5.238	10	527	507	81	-	-
46. Sodium 1 <i>H</i> ,1 <i>H</i> ,2 <i>H</i> ,2 <i>H</i> -perfluoro-1-[1,2- 13C2]-decane sulfonate (13C2-8:2FTS)	5.238	5	529	81	509	-	-
47. Perfluorononanesulfonic acid (PFNS)	5.239	2.5	549	80	99	-	-
48. <i>N</i> -methyl- <i>d</i> 3-perfluoro-1-octanesulfonamidoacetic acid (D3-NMeFOSAA)	5.361	5	573	419	-	-	-
49. <i>N</i> -methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	5.366	2.5	570	419	483	-	-
50. Perfluorodecanesulfonic acid (PFDS)	5.475	2.5	599	80	99	-	-
51. Perfluoroundecanoic acid (PFUnA)	5.486	2.5	563	519	269	-	-
52. Perfluoro- <i>n</i> -[1,2,3,4,5,6,7- 13C7]undecanoic acid (13C7-PFUnA)	5.486	1.25	570	525	-	-	-
53. <i>N</i> -ethyl- <i>d</i> 5-perfluoro-1-octanesulfonamidoacetic acid (D5-NEtFOSAA)	5.487	5	589	419	-	-	-
54. <i>N</i> -ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	5.487	2.5	584	419	526	-	-
55. 11-Chloroicosadecafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	5.59	10	631	451	-	633	453
56. Perfluorooctanesulfonamide (PFOSA)	5.669	2.5	498	78	478	-	-
57. Perfluoro-1-[13C8]octanesulfonamide (13C8-PFOSA)	5.669	2.5	506	78	-	-	-
58. Perfluorododecanoic acid (PFDoA)	5.691	2.5	613	569	319	-	-
59. Perfluoro- <i>n</i> -[1,2- 13C2]dodecanoic acid (13C2-PFDoA)	5.692	1.25	615	570	-	-	-
60. Perfluorododecanesulfonic acid (PFDoS)	5.861	2.5	699	80	99	-	-
61. Perfluorotridecanoic acid (PFTDA)	5.876	2.5	663	619	169	-	-
62. Perfluorotetradecanoic acid (PFTeDA)	6.031	2.5	713	669	169	-	-
63. Perfluoro- <i>n</i> -[1,2- 13C2]tetradecanoic acid (13C2-PFTeDA)	6.031	1.25	715	670	-	-	-
64. <i>N</i> -methyl perfluorooctanesulfonamide (NMeFOSA)	6.158	2.5	512	219	169	-	-
65. <i>N</i> -methyl- <i>D</i> 3-perfluoro-1-octanesulfonamide (D3-NMeFOSA)	6.159	2.5	515	219	-	-	-
66. <i>N</i> -methyl perfluorooctanesulfonamidoethanol (NMeFOSE)	6.166	25	616	59	-	-	-
67. <i>N</i> -methyl- <i>D</i> 7-perfluorooctanesulfonamidoethanol (D7-NMeFOSE)	6.167	25	623	59	-	-	-
68. <i>N</i> -ethyl- <i>D</i> 5-perfluoro-1-octanesulfonamide (D5-NEtFOSA)	6.295	2.5	531	219	-	-	-
69. <i>N</i> -ethyl perfluorooctanesulfonamide (NEtFOSA)	6.296	2.5	526	219	169	-	-
70. <i>N</i> -ethyl perfluorooctanesulfonamidoethanol (NEtFOSE)	6.298	25	630	59	-	-	-
71. <i>N</i> -ethyl- <i>D</i> 9-perfluorooctanesulfonamidoethanol (D9-NEtFOSE)	6.298	25	639	59	-	-	-

Table I: Target recoveries (70-135%) were met for all PFAS in reagent water samples prepared using Resprep PFAS cartridges.

Compound	Abbreviation	MDL (ng/L)	Blank (ng/L)*	Accuracy (%Recovery)	Precision (%RSD)
Perfluorobutanoic acid	PFBA	0.34	ND	112	5
Perfluoro-3-methoxypropanoic acid	PFMPA	0.20	ND	109	6
3-Perfluoropropyl propanoic acid	3:3FTCA	0.31	ND	95	6
Perfluoropentanoic acid	PFPeA	0.26	ND	111	6
Perfluorobutane sulfonate	PFBS	0.19	ND	101	5
Perfluoro-4-methoxybutanoic acid	PFMBA	0.18	ND	111	6
Perfluoro(2-ethoxyethane)sulfonic acid	PFEESA	0.15	ND	94	5
Nonafluoro-3,6-dioxahheptanoic acid	NFDHA	0.46	ND	121	5
1H,1H,2H,2H-perfluorohexane sulfonate	4:2 FTS	0.36	ND	104	5
2H,2H,3H,3H-Perfluorooctanoic acid	5:3FTCA	1.48	ND	102	6
Perfluorohexanoic acid	PFHxA	0.08	ND	113	5
Perfluoropentane sulfonate	PFPeS	0.07	ND	122	4
Hexafluoropropylene oxide dimer acid	HFPO-DA	0.40	ND	114	12
Perfluoroheptanoic acid	PFHpA	0.08	ND	109	5
Perfluorohexane sulfonate	PFHxS	0.07	ND	104	7
4,8-Dioxa-3H-perfluorononanoic acid	ADONA	0.39	ND	99	9
1H,1H,2H,2H-perfluorooctane sulfonate	6:2 FTS	0.37	ND	107	4
3-Perfluoroheptyl propanoic acid	7:3FTCA	2.32	ND	100	6
Perfluoroheptane sulfonate	PFHpS	0.76	ND	121	8
Perfluorooctanoic acid	PFOA	0.32	ND	104	2
Perfluorooctane sulfonate	PFOS	0.20	ND	112	7
Perfluorooctanesulfonamide	PFOSA	0.21	ND	81	11
Perfluorononanoic acid	PFNA	0.08	ND	114	5
N-methyl perfluorooctanesulfonamide	NMeFOSA	0.07	ND	104	13
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	9Cl-PF3ONS	0.61	ND	85	11
Perfluoronananesulfonic acid	PFNS	0.25	ND	79	7
Perfluorodecanoic acid	PFDA	0.18	ND	117	8
N-ethyl perfluorooctanesulfonamide	NEtFOSA	0.14	ND	112	15
1H,1H,2H,2H-perfluorodecane sulfonate	8:2 FTS	0.91	ND	113	11
Perfluoroundecanoic acid	PFUnA	0.26	ND	125	12
N-methyl perfluorooctanesulfonamidoacetic acid	NMeFOSAA	0.15	ND	95	12
N-ethyl perfluorooctanesulfonamidoacetic acid	NEtFOSAA	0.23	ND	93	12
Perfluorodecanesulfonic acid	PFDS	0.25	ND	94	23
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	11Cl-PF30UdS	0.56	ND	77	25
Perfluorododecanoic acid	PFDoA	0.27	ND	118	15
N-methyl perfluorooctanesulfonamidoethanol	NMeFOSE	1.11	ND	106	9
N-ethyl perfluorooctanesulfonamidoethanol	NEtFOSE	1.10	ND	111	9
Perfluorotridecanoic acid	PFTTrDA	0.33	ND	108	15
Perfluorododecanesulfonic acid	PFDoS	0.13	ND	89	12
Perfluorotetradecanoic acid	PFTeDA	0.32	ND	102	23

*ND = Not detected above MDL.

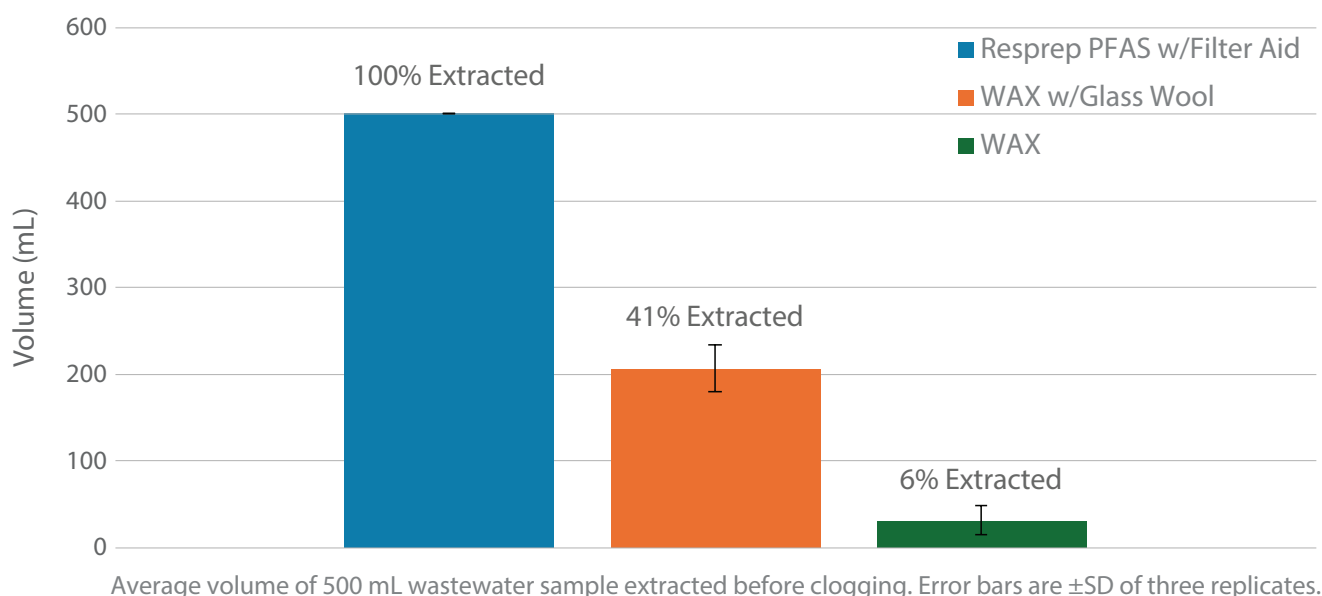
Factory-Packed Filter Aid Option Ensures Faster, More Effective Sample Prep

Exclusive to Restek, Resprep PFAS cartridges are also available with a factory-packed filter aid that prevents clogs and keeps samples flowing better than manually packed glass wool. As shown in Table II, when technicians follow Method 1633 instructions to pack glass wool to half the height of the cartridge barrel for all sample matrices (Section 12.1.1), the amount of wool and packing density can vary significantly, which means sample flow and clogging can also be affected. The filter aid used in Resprep PFAS cartridges is uniform and provides effective, consistent filtering and protection. In an experiment comparing the flow of diluted ASTM wastewater matrix through Resprep PFAS cartridges with filter aid, WAX cartridges with manually packed wool, and WAX cartridges alone, only the Resprep PFAS cartridges with the factory-packed filter aid did not clog and were able to extract the full sample volume (Figure 2).

Table II: When cartridges are packed manually following the height-based instructions in Method 1633, the amount of glass wool and packing density can vary significantly between cartridges and technicians, which can affect method performance.

	Technician 1	Technician 2	Technician 3	Technician 4
Average mg wool (n = 3)	39	150	51	116
SD	2	13	7	49
%RSD	5%	8%	14%	42%

Figure 2: Only Resprep PFAS cartridges with a factory-packed filter aid successfully extracted all 500 mL of 2.5x diluted ASTM wastewater matrix (total suspended solids = 100 mg/L).



Simplify your sample prep—save time, reduce variation, and ensure performance with Resprep PFAS cartridges with a factory-packed filter aid!

Resprep PFAS Cartridges

- Optional factory-packed filter aid prevents clogging so samples are processed completely, in less time, and more consistently than with manually packed glass wool.
- Streamlined sample prep: WAX and CarboPrep Plus carbon sorbents are factory packed in a single dual-bed SPE cartridge for a faster, simpler workflow.
- Ultra-clean polymeric and carbon sorbents—every WAX lot is tested for Method 1633 PFAS to ensure method detection limits can be met.
- Compatible with both vacuum manifolds and automated systems.



582051

Carbon on top for solid samples.

Catalog No.	Product Name	Sorbent Phase	Volume (mL)	Units
28930	Resprep PFAS Cartridge	WAX 150 mg/GCB 50 mg	6	30-pk.
28931	Resprep PFAS Cartridge with Filter Aid	Filter aid 2000 mg/ WAX 150 mg/GCB 50 mg	6	30-pk.
582051*	Resprep PFAS Cartridge	GCB 50 mg/WAX 150 mg	6	30-pk.

*Please contact Restek Customer Service to order custom catalog no. 582051.

WAX on top for aqueous samples.





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