Ion Exchange Solutions for **PFAS Removal**

RESINTECH® INC.
INNOVATIONS IN ION EXCHANGE

Headquartered in Camden, New Jersey, ResinTech, Inc. is a globally recognized leader in ion exchange technology for water and fluid purification. We manufacture premium quality resin-based water treatment solutions, including a broad range of resins, activated carbons, selective adsorbents, POE/POU filter cartridges, and high-purity water systems for residential, commercial laboratory, and high-tech applications. Our world-renowned technical support team and state-of-the-art laboratory offer complete water and resin testing and our proprietary MIST-X technology gives water treatment professionals the ability to perform complex ion-exchange simulations.

Ion Exchange Solutions for PFAS Removal

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Introduction to PFAS

What are PFAS?

Per- and Polyfluoroalkyl substances (PFAS) are a group of man-made chemicals characterized by a strong bond between fluorine and carbon. The strength of this bond gives PFAS compounds their durability and a resilience to natural degradation which has led to them often being referred to as "forever chemicals".

Applications and Usage

PFAS compounds have been used in industry and consumer products worldwide since the 1940s. Their remarkable hydro- and oleophobic characteristics (ability to repel both oil and water) give them utility in a seemingly endless array of applications including nonstick cookware, water repellent clothing, stain resistant fabrics and carpets, product packaging, some cosmetics, some firefighting foams, and literally tens of thousands of other products that resist grease, water, and oil.

More than 500 forever chemicals are being actively used in products and industries around the world. A United States Environmental Protection Agency (EPA) toxicity database, DSSTox, lists over 14,700 PFAS compounds in existence, while other toxicity databases lists many multiples more.

Health Risks

The same characteristics that allow PFAS to repel oil and water make them difficult to eliminate and allow them to remain in the circulatory system of living organisms.

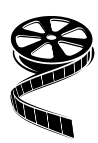
PFAS compounds bind to proteins in the blood and are reabsorbed by the human kidney. The compounds have a half-life of four to nine years within the body.

The largest epidemiological study on the health effects associated with these compounds found "probable links" to high cholesterol, thyroid disease, ulcerative colitis, testicular cancer, kidney cancer, and pregnancy-induced hypertension.

Two such compounds, perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS), have been studied the most and are largely accepted as being bad for humans. A significant amount of research involving those two compounds along with many other PFCs are currently being studied and published.

Why Test for PFAS

Whether occurring during production, usage or disposal, PFAS compounds migrate from the products we use into the soil we farm, the water we drink, and the air we breathe. Their resistance to breaking down allows them to remain in the environment.



The health-related impact of PFAS compounds was documented in the films "The Devil We Know" [2018] and "Dark Waters" [2019].

Each film centers on the town of Parkersburg, WV, the town where Dupont manufactured Teflon™ and where the health effects of PFAS first came into public view.

The number of compounds used, the wide range ofapplications, and the pervasive use of PFAS impregnated products has resulted in the compounds being ever-present at low levels in a variety of food products and throughout the environment.

In fact, in the nearly eighty years since they were first introduced, PFAS compounds have permeated human life to such a degree that they are believed to be present in the blood of 99% of the world's living organisms.

Regulatory Actions

As of this printing, the regulatory landscape for PFAS compounds in U.S. drinking water consists of an array of widely-varying state-promulgated standards and regulations.

At least 15 states have enacted at least 27 bills focused on efforts like regulating PFAS in firefighting foam and consumer products, establishing MCLs for PFAS in drinking water, and appropriating funds for remediation activities to address PFAS contamination.

As of July 2022, 21 states have proposed or adopted limits for PFAS in drinking water — the most stringent at levels as low as 5.1 ppt (California: PFOA only).

U.S. Environmental Protection Agency (EPA)

While the EPA has not yet established a national limit on PFAS exposure or a maximum contaminant level (MCL), it has issued a Lifetime Drinking Water Health Advisory Level of 70 ppt for PFOS and PFOA.

In March of 2023, the EPA announced the proposed National Primary Drinking Water Regulation (NPDWR) for six (6) PFAS compounds including perfluorooctanoic acid (PFOA), perfluorooctane sulfonic acid (PFOS), perfluorononanoic acid (PFNA), hexafluoropropylene oxide dimer acid (HFPO-DA, commonly known as GenX Chemicals), perfluorohexane sulfonic acid (PFHxS), and perfluorobutane sulfonic acid (PFBS). No action is required, however, until the PFAS NPDWR is finalized which WHO anticipates by the end of 2023. Once finalized, the proposed action will require the entire country to measure the concentration of these six compounds in drinking water, and to implement treatment systems and permit limits to achieve the MCLs.

In the interim, the EPA has recognized PFAS as an emerging contaminant and has taken a number of interim steps while awaiting the results of pending research studies. Among them was a recommendation to include the worst PFAS contaminated sites under CERCLA, or Superfund. If approved, this would increase transparency around releases of PFAS compounds and help to hold polluters accountable for cleaning up contamination for which they are responsible.

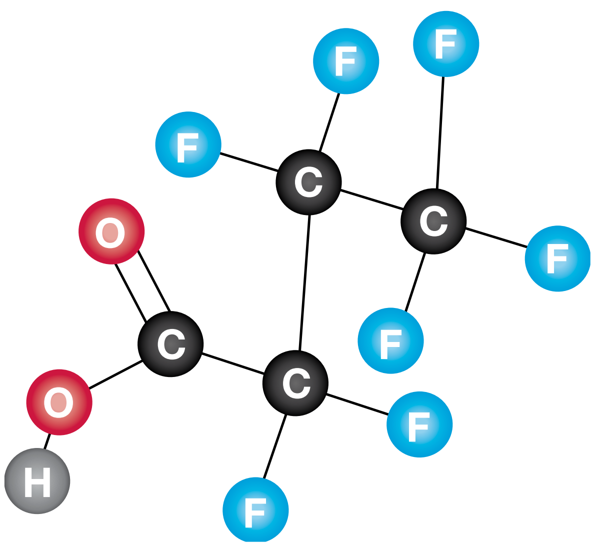
World Health Organization (WHO)

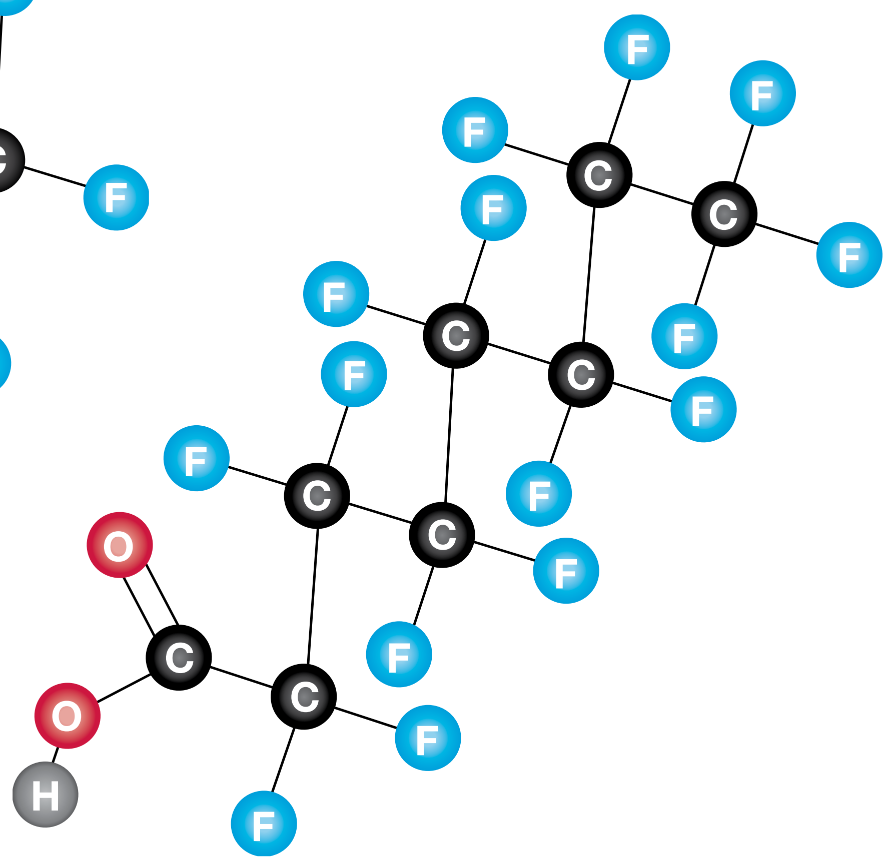
Globally, the WHO has offered draft guidance recommending a limit of 100 parts per trillion (ppt) of either PFOA or PFOS in drinking water. It also recommends a total cap of 500 ppt for combinations of up to 30 PFAS compounds.

Short vs. Long-chain Compounds

Long chain PFAS compounds are those that have eight or more carbon atoms in their molecular structure. These compounds are used for a variety of industrial and consumer products like firefighting foams, nonstick cookware, and water-repellent clothing. Examples of long chain PFAS compounds include perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS).

Short chain PFAS compounds are those that have fewer than eight carbon atoms in their molecular structure. These compounds are used for a variety of industrial and consumer products including waxes, polishes, and adhesives. Examples of short chain PFAS compounds include perfluorobutanesulfonic acid (PFBS) and perfluoropentanoic acid (PFPeA). Short chain PFAS compounds were developed as a more environmentally friendly alternative to long chain PFAS compounds.





An example of a **short** and **long** chain PFAS compound found in the environment:

C = Carbon
F = Flourine
O = Oxygen
H = Hydrogen

Remediation Products

1. **SIR-110-HP:** Resin for residential PFAS reduction applications
2. **SIR-110-MP-HP:** Resin for municipal PFAS reduction applications
3. **AGC-PFx:** Carbon for all PFAS applications
4. **Pro Series PFAS Reduction Water Filters**

SIR-110-HP & SIR-110-MP-HP

Both versions of ResinTech SIR-110 can be used for removal of various PFAS compounds, including PFOA and PFOS, from water. Testing has shown it removes a wide range of other PFAS species in addition to these compounds. SIR-110-HP is best suited for residential and applications while it's macroporous version, SIR-110-MP-HP, is more suited for municipal and industrial applications.

Features

- PFAS removal for all applications
- WQA Gold Seal Certified for drinking water

TYPICAL PROPERTIES & PHYSICAL CHARACTERISTICS

	SIR-110-HP	SIR-110-MP-HP
Polymer Matrix	Styrenic Gel	Styrenic Macroporous
Ionic Form	Chloride	Chloride
Physical Form	Spherical Beads	Spherical Beads
Particle Size	16 to 50 US Mesh (297 - 1190µm)	16 to 50 US Mesh (297 - 1190µm)
Percent < 50 mesh (300µm)	< 1	< 1
Minimum Sphericity, Percent	90	95
Uniformity Coefficient	1.6	1.6
Temp Limit	250°F (121°C)	250°F (121°C)
Capacity (meq/mL)	0.8	0.6
Moisture Retention, Percent	38 to 50	43 to 58
Shipping Weight	40 - 42 lbs/cu.ft. (641 - 673 g/L)	40 - 42 lbs/cu.ft. (641 - 673 g/L)
Color	Yellow to Orange	White to Tan
Ideal for	Residential	Municipal and Industrial

Certifications

WQA Gold Seal*

* NSF/ANSI/CAN 61: Drinking Water System Components - Health Effects

Packaging Options

- 500 ml samples
- 1 ft^3 bags
- 1 ft^3 boxes
- 1 ft^3 drums
- 7 ft^3 drums
- 42 ft^3 supersacks

AGC-PFx

For customers wishing to use activated carbon, we recommend our acid washed granular activated carbon specially formulated for PFAS Removal.

ResinTech AGC-PFx is a premium grade, semi-moist, acid-washed, coconut shell-based granular activated carbon. It has chemically enhanced pore size to facilitate the removal of Per- and Polyfluoroalkyl compounds (PFCs) such as PFOS, PFOA, and others. AGC-PFx is intended for use as a stand-alone media bed or as a top layer with other medias to facilitate PFC removal. AGC-PFx is Gold Seal Certified by the WQA for use in potable water applications.

Features

- PFAS Reduction
- Acid-washed, dust-free
- WQA Gold Seal Certified for drinking water

TYPICAL PROPERTIES & PHYSICAL CHARACTERISTICS	
Physical Form	Carbonaceous Granules
Particle Size	12 to 40 US Mesh (400 - 1680 µm)
Percent < 40 mesh (400µm)	< 5
Temp Limit	212°F (100°C)
Moisture Retention, Percent	20 to 30
Shipping Weight	37 - 39 lbs/cu.ft. (593 - 625 g/L)
Color	Black

Certifications

WQA Gold Seal*

* NSF/ANSI/CAN 61: Drinking Water System Components - Health Effects

Packaging Options

- 1 ft^3 bags
- 1 ft^3 boxes
- 1 ft^3 drums
- 7 ft^3 drums
- 42 ft^3 supersacks

Aries Pro Series PFAS Reduction Water Filters

Aries PFOS & PFOA reduction cartridges utilize a high purity strong base anion resin exhibiting an unusually high preference for multiple PFAS compounds. The AF-10-3612 filter components are selective for a wide variety of Per- and PolyFluorinated compounds including; PFOS, PFOA, PFNA, PFHpA and PFHxS.

Filter Benefits

- Highest capacity media for PFOS & PFOA removal
- Also removes other Per- and Poly fluorinated compounds
- Fits standard residential & industrial sized housings
- Oversized cartridge for maximum media fill
- Lot control traceability
- Made in the USA

FILTER DIMENSIONS	MAX FLOW gpm	MAX FLOW lpm	CAPACITY* Gallons	PART NUMBER
2.5 x 10 in. (Slim Line)	0.10	0.38	500	**AF-10-3612**
2.5 x 20 in. (Slim Line)	0.15	0.58	1000	**AF-20-3612**
4.5 x 10 in. (Big Blue)	0.20	0.76	1100	**AF-10-3612-BB**
4.5 x 20 in. (Big Blue)	0.50	1.89	1600	**AF-20-3612-BB**
2 x 12 in. (Quick Connect)	0.05	0.19	175	**IF-12-3612**

*Capacity measured to 90% removal based on maximum industry standards.

The Benefits of Resin Vs Carbon

While activated carbon and ion exchange can each be effective at removing PFAS compounds, ion exchange does offer several advantages over activated carbon.

1. Ion exchange yields a greater capacity
For most PFAS compounds, ResinTech SIR-110 ion exchange resins offers up to 10 times the capacity of activated carbon.

2. Effective over a wider range of compounds
Ion exchange can remove both long and short chain PFAS compounds, where as activated carbon is best at removing long chain compounds.

3. Faster kinetics
Ion exchange reacts much faster than activated carbon and requires lower empty bed contact time (EBCT).

4. Reduced capital expense
Faster kinetics and greater capacity mean that less media is required. Less media translates to smaller equipment footprint and reduced capital expense.

5. Lower operating cost
The high capacity of ion exchange resin means less frequent media changeouts.

< Ion Exchange Resin

Activated > Carbon

Detection & System Guidance

We utilize the most sensitive laboratory equipment in the world necessary to measure water composition and recommend solutions to help water work better for you.

Reportable Compounds

Each laboratory has the ability to detect chemicals down to a certain concentration, known as the MDL or "method detection limit". When testing water, ResinTech follows the Environmental Protection Agency's (EPA) testing standard 537.1 and the American Society for Testing and Materials (ASTM) standard D7968-7.

ResinTech's lab can identify concentrations for the following PFAS compounds:

ANALYTE	ACRONYM NUMBER	CHEMICAL ABSTRACT SERVICES REGISTRY NUMBER (CASRN)	MDL (ng/L)
* Perfluorooctanesulfonic acid	PFOS	1763-23-1	1.11
* Perfluorooctanoic acid	PFOA	335-67-1	1.05
* Hexafluoropropylene oxide dimer acid (GenX)	HFPO-DA	13252-13-6	1.10
* Perfluorobutanesulfonic acid	PFBS	375-73-5	0.49
* Perfluorohexanesulfonic acid	PFHxS	355-46-4	1.01
* Perfluorononanoic acid	PFNA	375-95-1	0.51
N-ethylperfluorooctane sulfonamidoacetic acid	NEtFOSAA	2991-50-6	0.73
N-methylperfluorooctane sulfonamidoacetic	NMeFOSAA	2355-31-9	0.91
Perfluorodecanoic acid	PFDA	335-76-2	0.64
Perfluorododecanoic acid	PFDoA	307-55-1	1.37
Perfluoroheptanoic acid	PFHpA	375-85-9	1.04
Perfluorohexanoic acid	PFHxA	307-24-4	0.79
Perfluorotetradecanoic acid	PFTA	376-06-7	0.93
Perfluorotridecanoic acid	PFTrDA	72629-94-8	1.28
Perfluoroundecanoic acid	PFUnA	2058-94-8	0.92
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	11CL-PF3OUdS	763051-92-9	0.54
9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid	9C1-PF3ONS	756426-58-1	1.02
4,8-Dioxa-3h-perfluorononanoic acid	ADONA	919005-14-4	1.46

* The highlighted compounds have been chosen by the Environmental Protection Agency (EPA) in a proposed legislation that would limit its levels in water. The EPA has also proposed a hazard index specifically for PFHxS, GenX Chemicals, PFNA, and PFBS as mixtures of certain PFAS compounds can pose greater danger than a single compound. See page 11 for the proposed hazard index.

EPA Proposed Hazard Index

The EPA believes the following compounds are more dangerous in mixtures than other compounds by themselves. They have proposed a Health-Based Water Concentration (HBWC), or the level at which no adverse effects are expected for that compound.

The EPA will provide a formula that can be used to calculate whether the PFAS concentration in a given water sample exceeds the proposed Hazard Index. Note that not all compounds need to be present in order exceed the proposed levels.

COMPOUND	HBWC (ppt)
PFHxS	9.0
GenX Chemicals	10
PFNA	10
PFBS	2,000

Compounds PFOS and PFOA are not included in the Hazard Index because they are highly dangerous on their own. The following is the proposed MCL for both compounds:

COMPOUND	MCL (ppt)
PFOS	4.0
PFOA	4.0

The Formula:

$$\left(\frac{[\text{GenX water}]}{[10\text{ ppt}])}\right) + \left(\frac{[\text{PFBS water}]}{[2000\text{ ppt}])}\right) + \left(\frac{[\text{PFNA water}]}{[10\text{ ppt}]}\right) + \left(\frac{[\text{PFHxS water}]}{[9.0\text{ ppt}]}\right)$$

The first step is to divide the results of the water sample by the HBWC for each compound. Then add all the values together. *If the total value is greater than 1.0, it exceeds the limit of the Hazard Index.*

Making Projections

Since the concentration of organics and competing ions in the water can impact one another at various stages within a system, it is essential to have a complete understanding of the influent water chemistry before endeavoring to design any PFAS remediation solution. Once the necessary information is gathered, system recommendations and performance projections can be made.

The following is a sample of our PFAS model report:

Cations	Result	Unit
Calcium (Ca)		ppm
Magnesium (Mg)		ppm
Sodium (Na)		ppm
Potassium (K)		ppm
Iron (Fe)		ppm
Manganese (Mn)		ppm
Total Hardness		ppm as $CaCO_3$
Anions	**Result**	**Unit**
Sulfate (SO_4)		ppm
Nitrate (N)		ppm
Chloride (Cl)		ppm
Alkalinity		ppm as $CaCO_3$
Total Organic Carbon (TOC)		ppb
PFAS Compounds	**Result**	**Unit**
PFBS		ppt
PFHpA		ppt
PFHxS		ppt
PFHxA		ppt
PFOS		ppt
PFOA		ppt
Total:		ppt
Target Endpoint:	*Provided by Customer*	
Throughput To:		
Bed Volumes (BV)		
Gals/cu.ft.		

PFAS System Recommendations

ResinTech SIR-110 PFAS selective medias are long life resins that use ion exchange plus adsorption to increase the holding capacity of the media for the PFAS family of contaminants. The hydrophilic head of the PFAS compound is attracted to the ion exchange site while the hydrophobic tail is adsorbed by the polymer itself.

Common LLR Design Characteristics and Design Considerations

Long life resins are sometimes configured in a worker and polisher arrangement. Although this arrangement often doubles the initial cost of vessels, resin and local pipeworks, it offers several significant advantages compared to a single "naked" exchanger. The advantages include longer overall throughput, lower effluent contaminant concentration and the ability to monitor breakthrough of the worker vessel without risking breakthrough into the final outlet flow.

Design Criteria for Long Life Resins

One of the first steps in any ion exchange system design should always be to rough out the tank size and select a preliminary resin volume based on flow rate. This is accomplished by choosing a surface flow rate and specific flow rate that is close to optimum. A good place to start is 10 to 15 gallons per minute per square foot surface flow rate, and two to four gallons per minute per cubic foot specific flow rate (2 to 4 minute Empty Bed Contact Time).

Basic Design Criteria	
Surface/Linear Flow Rate:	10 to 15 gpm/sq.ft.
Kinetic Flow Rate:	2 to 4 gpm/cu.ft. *(2 to 4 minute EBCT)*
Bed depth:	4 to 6 feet

The surface flow rate upper limit helps to keep the pressure drop within acceptable levels. The kinetic flow rate guarantees sufficient contact time between the water and the media. Deep beds perform better than shallow beds. Resin columns should be as tall and thin as possible.

Design Limits

- Minimum 0.5 gpm/cu.ft. volume flow rate
- Minimum 2 gpm/sq.ft. surface flow rate
- Maximum 20 gpm/sq.ft. surface flow rate
- Maximum 25 psid loss for cation resin beds
- Maximum 20 psid loss for anion resin beds
- Maximum 7 foot deep beds

Hardness Considerations:

SIR-110 products are anion exchange resins in the chloride form. While being PFAS selective they do undergo changes in ionic form. The resin will chromatographically remove Nitrate, Sulfate, and Alkalinity during the service cycle. Hardness in the influent may result in unwanted precipitation or fouling of the bed. A fouled bed will result in high pressure drop and reduced flow rates. We recommend that water with greater than 10 grains per gallon of hardness be softened prior to the use of long life anion exchange resins.

Sample Collection

To help remove the guesswork and ensure your collection materials are free of potential contamination, ResinTech makes easy testing kits available for purchase. Each kit includes detailed instructions and collection material. You simply gather the samples and ship them to us. Results are ready in just 7 to 10 days!

The following kits were designed to address PFAS concerns:

PFOS & PFOA Compounds Only *$249* This kit reports on PFOS & PFOA compounds only.
PFAS Full Spectrum *$499* This kit reports on 18 common PFAS compounds.
PFAS Full Spectrum + Water Chemistry *$999* This kit reports on 18 common PFAS compounds <u>plus</u> complete water chemistry.

BEFORE YOU BEGIN SAMPLE COLLECTION...

It is important to take care when collecting your samples. Due to the ubiquitous nature of PFAS in consumer products, there is a higher than average risk for sample contamination during collection. It is therefore important to take precautions to mitigate the risk of contamination when gathering a sample.

Avoid of the following:

Clothing

Any waterproof material

Personal Care Products

Some lotions, cleansers, and shaving cream

Objects Around the Sample Site

Such as non-stick pans in the kitchen

Containers

Some food and liquid storage containers

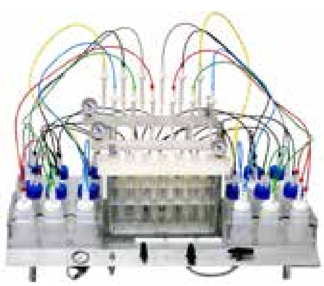
The sampling site should be free of any materials that have the potential to contain PFAS.

State-of-the-art Equipment

Identifying specific PFAS compounds and measuring their concentrations to part per trillion level requires the kind of technology that very few labs in the water treatment industry possess. In fact, many of the companies that claim to perform PFAS testing today actually send their water samples to ResinTech for analysis.

ResinTech utilizes the following equipment to diagnose PFAS compound speciation and concentration:

The **SuperVap - Model 24** system is an automated, standalone, direct-to-vial concentrator that replaces older techniques such as KD, nitrogen blow down and water baths. By automating what were once manual evaporation and concentration processes, the SuperVap concentration system accelerates sample throughput and improves the consistency of lab results by eliminating the variability inherent in manual sample prep procedures.



The **EZ-PFC** allows us to perform solid phase extractions for 6 samples in less than 50 minutes achieving high recoveries and excellent precision for all analytes. With the EZPFC we can run multi-cartridge applications for any SPE PFAS/PFOS/PFOA method requiring more than one cartridge. The EZPFC system uses existing EPA Methods 537, 537.1 and other methods for PFAS/PFOS/PFOA extraction and analysis in various matrices.

ResinTech uses an **Agilent 6410B LC/MS** for liquid chromatography and mass spectrometry associated with PFAS compounds.

Liquid chromatography (LC) is a powerful analytical technique used to separate and analyze PFAS compounds. Mass spectrometry (MS) is used to identify and quantify PFAS compounds in a sample. This information can then be used to assess the potential health risks associated with exposure to PFAS compounds.

Case Studies In PFAS Remediation

Research in the field is crucial to learning the effectiveness and limitations of our products. The following case studies assisted in furthering our understanding of PFAS and the intricacies of removal.

Regional Airport - Surface Water Collection Pond

The Challenge

July, 2019 - A regional airport wanted to investigate the removal of per and poly-fluorinated compounds from a surface water collection pond. The water in question was runoff collected from winter airplane de-icing operations.

Water Composition	
TOC	692 ppm
Iron	12.4 ppm
pH	4.96
NO_3-N	6.6 ppm

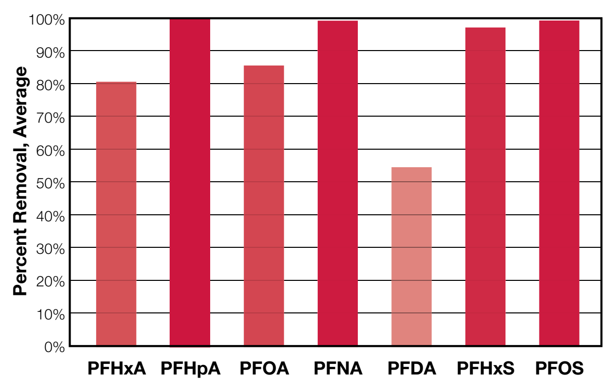
The water contained significant amounts of salts, natural occurring organics (TOC) and PFC's.

Influent PFAS	
PFHxA	36.5 ppt
PFHpA	7.32 ppt
PFOA	143 ppt
PFNA	1,000 ppt
PFDA	38.1 ppt
PFHxs	385 ppt
PFOS	4,245 ppt

System Design

Due to the wide variety of fluorinated compounds, a combination of ResinTech Granular Activated Carbon, **AGC-PFx** and ion exchange resin, **SIR-110-HP** were run in stacked column configuration. The flow rate was kept on the low operational side of system design at 1/10 Bed Volume per minute.

Percent Removal of PFAS Species



The Outcome

The combination of AGC-PFx and SIR-110-HP achieved PFAS removal of >90% (for 4/7 PFAS tested) even in a de-icing solution matrix with high TOC present.

Key Takeaways:

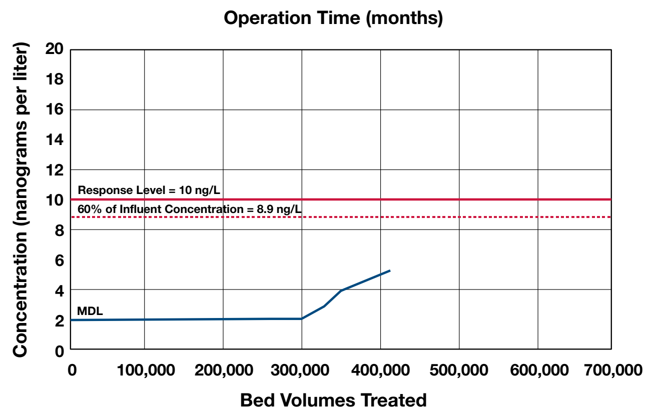
- The mix of carbon and resin has a high selectivity for PFAS compounds
- PFOS is preferred over PFOA
- PFOA breaks as the TOC breaks

Municipal Pilot Plant - 8 PFAS Compounds

The Challenge

September, 2021 - A pilot plant was commissioned to compare the removal of PFOS and PFOA contaminants using Granular Activated Carbons and Ion Exchange Resin. The resultant data is intended to be used to design a full-scale system to run at 1,500 gallons per minute.

Results of SIR-110-HP

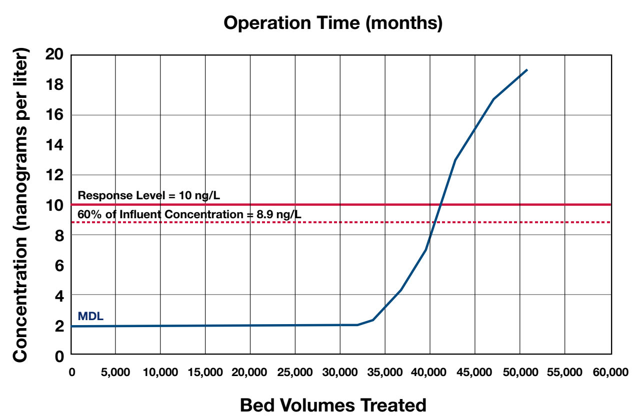


Water Composition

PFC's	INFLUENT CONCENTRATION (ng/L)		
Compound	**MIN**	**MAX**	**AVG.**
PFOA	14	17	14.9
PFOS	32	43	36.2
PFHxS	5.9	7.2	6.5
PFBS	7.6	10	9.0
PFHxA	3.5	7	5.0
PFHpA	2.6	4.9	3.6
PFNA	3.3	4	3.6
PFDA	<2.0	2.1	0.7

The water contained significant amounts of salts, natural occurring organics (TOC) and PFC's.

Results of Activated Carbon



System Design

ITEM	GAC	IX	UNITS
Bed Depth	4.0	2.4	feet
Flow/Volume	0.7	6.0	gpm/cu.ft.
EBCT	10.2	1.2	minutes

Municipal Water System - 600 gpm

The Challenge

May to November, 2019 - The city of Stuart, FL needed to construct an advanced treatment system to remove multiple PFAS compounds from contaminated groundwater.

System Design

Media	Polymer Structure	Volume (ft³)	Bed Height (ft)
AGC-PFx	Coconut Shell	113	1
SIR-110-HP	Styrene DVB	452	4
Total	-	**565**	**5**

The system, designed by Kimley-Horm Engineers, was the first IX system for PFAS in Florida and at the time the largest PFAS removal system in the US. The vessel had a 12' diameter, and a downflow flowrate of up to 600 gpm.

Inlet Water Quality			
Chloride	24 ppm	**PFOS**	~100 ppt
Sulfate	20 ppm	**PFOA**	~12.5 ppt
TOC	7 ppm as C	**PFNA**	~3 ppt
pH	7.2	**PFHpA**	~5 ppt
Iron	0.5 ppm	**PFHxS**	~30 ppt
TDS	360 ppm	**PFBS**	~7 ppt

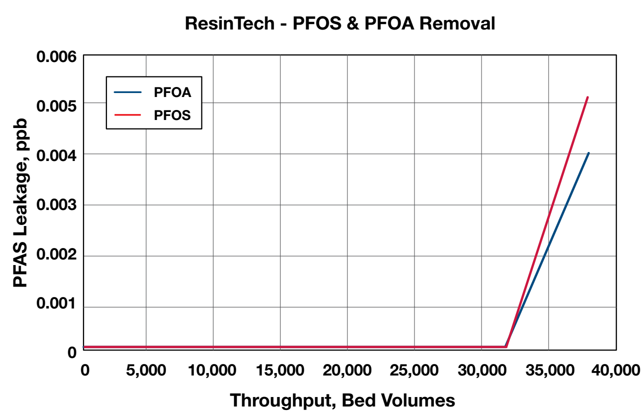
Configuration

Layered bed of **AGC-PFx** making up the top 20% of the bed and **SIR-110-HP** making up the bottom 80% of the bed. The top layer of activated carbon was included because of the relatively high TOC in the shallow well water being treated.

Samples were taken from ports located at 25%, 50%, 75%, and 100% of the vessel height periodically for months to observe PFAS removal.

Results

From May to November 2019, the ResinTech media treated 124,791,000 gallons of water, (29,495 BV) with no PFAS compounds detected in the effluent.



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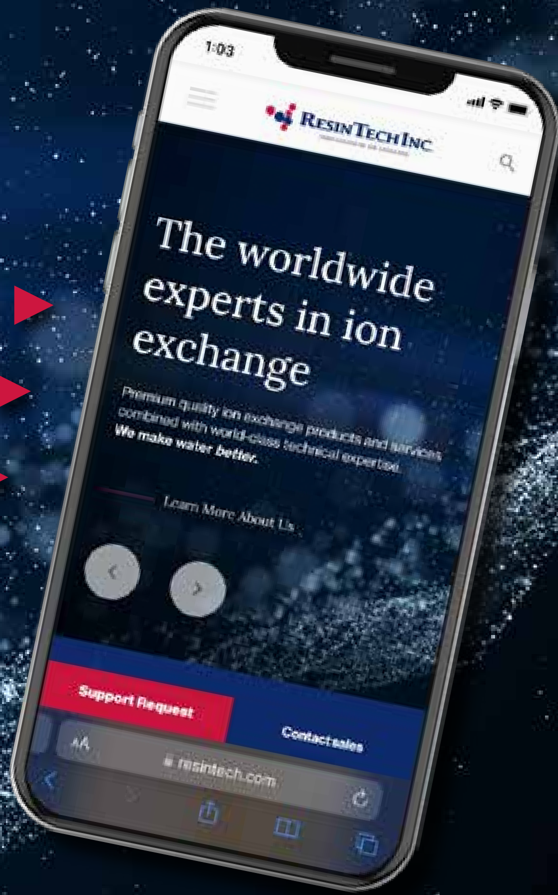

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The ResinTech website is a powerful resource for the water professional to the end user alike. Our industry-leading technical support and knowledgeable sales representatives are accessible at the push of a button. Visit resintech.com today!

INNOVATIONS IN ION EXCHANGE

RESINTECH
WORLD HEADQUARTERS

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