Water professionals are faced with increasing demands on their resources from regulatory requirements to aging infrastructure needs. Customers continue to demand safe and adequate service at just and reasonable rates. Emerging contaminants such as perfluoroalkyl substances (PFAS) have the potential for broad impacts and will increase the strain on limited water system resources. Water providers seek a path forward in the face of regulatory uncertainty with respect to Maximum Contaminant Level (MCL) final rules.
Emerging Compounds Treatment Technologies (ECT2) has been a leading innovator with significant experience in both the United States and Australia focused on how best to remove PFAS, including PFOS and PFOA, from groundwater and drinking water supplies. ECT2’s SORBIX PURE line of single use ion exchange resins provide advantages over other approaches like granular activated carbon (GAC) and reverse osmosis filtration. The combination of adsorption and ion exchange treatment mechanisms of the SORBIX PURE resin results in an extremely effective PFAS removal capacity in a mass-to-mass comparison to other technologies. The rapid kinetics of the reaction result in effective removal of PFAS at a 2.5-minute empty bed contact time. Both of these important characteristics in turn lead to reduced treatment size requirements and longer run times between media changeouts.

---

**Pilot Results**

SORBIX PURE and GAC test columns with varying empty bed contact times were piloted at the Haven well site in Portsmouth, New Hampshire. This pilot test began in October 2017. PFOS/PFOA breakthrough occurred on the GAC (5 min) test column after 2 weeks. PFOS/PFOA were approaching the current health advisory limit after 12 weeks on the GAC (10 min) column. At this point, the GAC columns were shut off.

The pilot test continued without breakthrough on SORBIX PURE resin for 14 months. The analytical methodology utilized has a reporting limit of 2 ppt.

![Graph showing PFOS + PFOA concentrations over time for different media.](image)
Translating this pilot to scale has some significant implications for operators. Scaled to 1200 gpm, SORBIX PURE treats 750 million gallons in a 2.5-min EBCT vessel. GAC scales to 60 million gallons in a 10 min EBCT vessel. The results show that SORBIX PURE can treat approximately 13 X the volume of contaminated water in a vessel that is a quarter of the size. Another way to view these results is to translate them to days of treatment prior to PFOA/PFAS breakthrough. This results in about 35 days for GAC and 434 days for SORBIX PURE. When viewed from the perspective of the expected 20-year life of the infrastructure this means less time spent by operational staff on media changeouts and the variety of operational challenges that inevitably result.

The fast kinetics of the SORBIX PURE media reaction with PFAS allow for an empty bed contact time (EBCT) of 2.5 min, compared to the typical 10 to 15-min EBCT for GAC. This translates to immediate space savings. A typical elevation for a single treatment train for a flow rate of 600 gpm provides a visual comparison of SORBIX PURE and a typical GAC approach. This dramatic space savings means that PFAS treatment may be possible in existing pump houses or treatment plants without the need for costly renovations or building expansions. In contrast, treatment plant additions result in ongoing operational costs for heating, cooling, and maintenance from the significant building volume necessary to house large GAC media vessels.

Drinking water utilities face many challenges in providing a safe, reliable product to their customers. PFAS compounds like PFOA and PFOS can be safely and reliably removed with the SORBIX PURE line of ion exchange resins. Hundreds of millions of gallons of contaminated drinking water have already been treated to non-detect levels of PFAS, providing water professionals and customers confidence in drinking water quality, and allowing the utility’s limited resources to focus on other aspects of delivering safe and reliable service.

If you have questions about the SORBIX PURE line of ion exchange resins for drinking water or other questions concerning PFAS removal, please contact ECT2 at http://www.ect2.com/contact-us.

Case Studies for ECT2’s Haven Pilot Study and Katherine Full Scale Operations can be found at http://www.ect2.com/case-studies/water.