As municipalities discover that levels of perfluoroalkyl substances in water systems exceed new Federal Health Advisory levels, many questions arise. This guide can help you find answers to make your drinking water clean and safe.

What are the current Health Advisory Levels for perfluoroalkyl substances (PFASs) in drinking water?
Health advisory levels vary throughout the world. However, in May 2016, The US EPA issued Health Advisory (HA) levels of 70 parts per trillion (ppt) for PFOS and PFOA (perfluorooctane sulfonic acid and perfluorooctanoic acid, respectively). When both PFOS and PFOA are present at the same time in the water, the recommended combined health advisory level is 70 ppt.

What other names are used to refer to PFASs?
Polyfluoroalkyl substances, perfluorinated chemicals, fluorocarbon chemicals, and PFCs are additional names used. Purolite uses the terms PFASs and PFCs interchangeably.

What are short- and long-chained PFASs?
The term “long chain” is used to describe perfluoroalkyl sulfonic acids with a formula \( C_{n}F_{2n+1}SO_{3}H \) where \( n \geq 6 \) and perfluoroalkyl carboxylic acids with formula \( C_{n}F_{2n+1}COOH \) where \( n \geq 7 \), and their corresponding anions. Examples of long-chain PFASs are perfluorooctane sulfonic acid, \( C_{8}F_{17}SO_{3}H \) (PFOS), and perfluorooctanoic acid, \( C_{7}F_{15}COOH \) (PFOA). “Short-chain” PFASs would refer to those compounds where \( n \) is <6 and <7 for sulfonic and carboxylic types respectively. Examples are perfluorobutanesulfonic acid (PFBS) and perfluorobutanoic acid (PFBA).

What are the most popular methods for removal of PFASs from water and waste water?
Granular Activated Carbon (GAC) is in widespread use. Synthetic absorbent and ion exchange resins are also used. Capacity and leakage of PFASs into the treated water varies depending on the specific PFASs, the type of absorbent used, and the empty bed contact time for which the system is designed.

What technology is available that can reduce PFASs to less than detectable levels?
Recent testing has confirmed that Purofine® PFA694E can remove fluorocarbon (PFAS) compounds to non-detect (ND) levels. Detection levels were 1 ppt for PFOA, 1 ppt for PFNA, 1 ppt for PFHxP, 4 ppt for PFBS, 4 ppt for PFHxS, and 5 ppt for PFOS.

Can ion exchange resin remove both short- and long-chained PFCs?
Ion exchange resin removes PFCs by two mechanisms—by ion exchange and by adsorption. GAC predominantly removes PFCs by adsorption. Recent tests have shown that resin can remove short-chained PFC compounds—PFBS and PFBA—to non-detect (ND) levels.

Does using Purofine® PFA694E cause a change in the pH and analyte concentration in the treated water?
Purofine PFA694E is an anion resin and will change the anionic concentration of treated water for a brief period. For example, sulfate and alkalinity may be removed from the water and chloride released in its place. The length of the period of change in the background water chemistry will depend on the total dissolved solids (TDS) content concentration of the water—higher TDS results in shorter periods. After this period, there will be no perceptible change in the background water chemistry. Usually such changes stop within a day or two.

Does background water chemistry affect operating capacity of Purofine® PFA694E?
Yes, anions typically found in water will partially impact the operating capacity. Therefore, quality variances in these anions must be considered in assessing operating capacity. The resin removes PFCs by both adsorption and ion exchange mechanisms. Work is underway to quantify such impacts.

Is Purofine® PFA694E an amine-based product and is it in the Cl- or OH- form?
Purofine PFA694E has an amine-based functional group and is supplied in the chloride form as standard. However, it can be supplied in other forms such as the bicarbonate or sulfate forms. When supplied in the bicarbonate form, there will be virtually no reduction in the pH of the treated water.

What are the design best practices for Purofine® PFA694E?
Purolite can provide details on acceptable designs. In general, ion exchange resins can be operated at significantly higher specific flowrates than GAC. As such, the capital costs for ion exchange can be less. For example, a typical design flowrate for GAC is 12 BV/h or 1.5 gpm/ft\(^3\), while for resin it can be at least double that.

Is Purofine® PFA694E suitable for use in POU/POE devices?
Evaluation for this is ongoing.

Is Purofine® PFA694E certified for use in drinking water?
Yes, Purofine PFA694E is certified under ANSI/NSF-61 for use in drinking water.
Purolite—the leading manufacturer of quality ion exchange, catalyst, adsorbent and specialty high-performance resins—is the only company that focuses 100% of its resources on the development and production of resin technology.

We're ready to solve your process challenges. For further information on Purolite® products and services, visit Purolite.com or contact your nearest Technical Sales Office.