

This fact sheet has been prepared by the technical staff of No-Pollution Enterprises. It is intended to keep our visitors informed of dangerous chemicals that have been detected in a number of drinking water supply sources across the country. Please refer to other Facts Sheets for relevant information on these chemicals.

CHEMICAL STRUCTURES AND NAMES

Any organic or inorganic substance that contains at least one fluorine atom is referred to as a fluorinated substance. Their chemical, physical, and biological properties can differ significantly. A subset of fluorinated substances are the highly fluorinated aliphatic substances that contain one or more carbon atoms on which the fluorine atoms have replaced the hydrogen atoms that would normally be found in nonfluorinated substances. These subsets contain the perfluoroalkyl moiety with the form of C_nF_{2n+1} and are referred to as perfluoroalkyl or polyfluoroalkyl substances having the acronym **PFAS**.

PFASs comprise a large group of chemicals that are both chemically and thermally stable and are both lipophobic (have no affinity for oils) and hydrophobic (have no affinity for water), making them useful as surfactants for polymer manufacturing. PFASs are composed of two main parts; one that is formed out of a hydrophobic alkyl chain as well as a hydrophilic functional group. There are a total of 146 perfluorochemicals and 469 fluorochemicals. The most investigated classes of PFASs are the perfluorocarboxylateacids (PFCAs) and perfluoroalkyl sulfonic acids (PFSAs). The most studied PFCA compound is perfluorooctanoic acid (PFOA) and for PFSA it is perfluorooctane sulfonate (PFOS).

Because of the use of PFASs in many industries and the difficulty of natural processes to degrade the compounds, environmental contamination is a global concern. PFASs have been found to be able to bioaccumulate (become concentrated inside the body) and biomagnify (the concentration increases at each trophic level through the food web) in arctic, temperate, and subtropical systems.

Multiple studies have shown adverse health effects from these chemicals at very low concentrations in humans. The U.S. EPA entered into an agreement with fluorochemical manufacturers to comply with a PFOA/PFOS Stewardship program and cease production of all fluorinated compounds with an eight carbon chain (C8) base before 2015. However, this measure only prevents the problems from spreading and does not address legacy pollution. PFOS has a reported environmental half-life between 4 and 41 years, and hence contaminated groundwater poses a potential risk for some communities. Sites currently contaminated with PFAS will remain contaminated well into the future. The figures below provide a few examples of the chemical structures PFAS compounds and chemical classes.

