About PFAs, also known as “Forever Chemicals”

Prepared April 21, 2026. This fact sheet relies primarily on EPA, ATSDR/CDC, National Academies, OECD, IARC, FDA, and the European Environment Agency.

What Are PFAS:

- PFAS (per- and polyfluoroalkyl substances) are a broad class of manufactured chemicals valued in manufacturing for imparting resistance to water, oil, grease, stains, and heat.
- They are called “forever chemicals” because they contain carbon-fluorine bonds, which are amongst the strongest bonds in chemistry and make these chemicals persistent in the environment and resistant to typical degradation.
- PFAS (specifically PTFE) were used during WWII in parts of the Manhattan Project because they’re extremely resistant to heat and chemical reactions.
- Certain PFAS have been used since the 1940s in industrial processes, and over time, PFAS have been used in products such as firefighting foam, textiles, food packaging, non-stick cookware, personal care items, electronics, and coatings.
- Some PFAS are linked to human health effects, and the combination of persistence, mobility, and widespread exposure poses a major public health and environmental problem. Not all PFAS may present the same risks.
- PFAS are often found in drinking water and food, as well as in household dust, air, workplaces, and consumer products.
- They persist for very long periods, travel through water, soil, and air, and can move far from the point of release.
- Certain PFAS can bioaccumulate and can circulate through food webs.
- Their mobility means contamination can spread into drinking-water sources, agricultural systems, fisheries, and wildlife habitats.
- Because many PFAS are highly persistent and hard to destroy, cleanup is expensive and could shift contamination from one medium to another unless disposal is carefully managed.
    - Minnesota Pollution Control Agency explained that while PFAS chemicals in Minnesota can be bought for $50-$1,000 per pound, it takes $2.7 million to $18 million to remove and destroy each pound of PFAS from wastewater and biosolid.
- PFAS are not one chemical. They are a large family, with thousands of substances and different exposure and toxicity profiles. That means scientists avoid blanket claims that all PFAS have the same risk.
- At the same time, many scientists and regulators treat PFAS as a class or as subclasses of concern because they may share common characteristics: persistence in the environment, widespread environmental dispersion, and difficult cleanup.
- Nearly everyone in the United States has measurable levels of PFAS in their blood, according to the CDC’s NHANES Study and ongoing studies of PFAS exposure in the American population.
    - The National Health and Nutrition Examination Survey (NHANES) is a CDC program that assesses the health and nutritional status of U.S. adults and children.

- The National Academies concluded there is sufficient evidence of association between PFAS exposure and decreased antibody response, dyslipidemia (higher cholesterol), decreased infant and fetal growth, and kidney cancer. It found limited or suggestive evidence for testicular cancer, thyroid disease or dysfunction, liver enzyme alterations, pregnancy-induced hypertension, and ulcerative colitis.
- ATSDR/CDC similarly identifies potentially associated effects, including increased cholesterol, lower birth weight, lower antibody response to vaccines, kidney and testicular cancer, hypertensive disorders of pregnancy, preeclampsia, and changes in liver enzymes.
- IARC now classifies PFOA as carcinogenic to humans (Group 1) and PFOS as possibly carcinogenic to humans (Group 2B). Intentional use of PFOA in manufacturing was purportedly phased out in the United States by 2015.

Where PFAS are found
Public drinking water systems and private wells
Soil, rivers, lakes, groundwater, air, fish, and wildlife
Near landfills, waste sites, wastewater systems, incinerators, airports, military bases, and manufacturing facilities
Food and food-contact materials
Household dust and indoor environments
Some cosmetics, dental floss, stain-resistant fabrics, sealants, and other consumer goods

Why industry used them
To make products grease-resistant, oil-resistant, water-resistant, stain-resistant, and heat-resistant
For non-stick and low-friction performance
For specialized industrial uses in semiconductors, electroplating, electronics, and fluoropolymer manufacturing
In aqueous film-forming foam (AFFF) for fuel fires
In coatings for textiles, paper, leather, and construction materials
In some historical food-packaging applications, because of the grease-proofing performance

Not every PFAS has even been identified by analytical, let alone fully characterized from an environmental, ecological, or human health perspective. There's a lot we still don't know.

- Risks of exposure for many newly identified or less-studied PFAS.
- Exactly how mixtures of many PFAS interact in real-world exposure scenarios.
- Whether some PFAS replacements for PFOA are materially safer over the long term or simply less studies.
- Risk differences across age, pregnancy, occupation, and communities with contaminated water or food sources.
- What certain PFAS may be doing to the planet.

Sources:

- U.S. EPA, "PFAS Explained" and "Our Current Understanding of the Human Health and Environmental Risks of PFAS," accessed April 21, 2026.
- ATSDR/CDC, "PFAS Information for Clinicians – 2024" and PFAS health-effects pages, accessed April 21, 2026.
- National Academies of Sciences, Engineering, and Medicine, Guidance on PFAS Exposure, Testing, and Clinical Follow-Up (2022).
- OECD, Summary report on the new comprehensive global database of Per- and Polyfluoroalkyl Substances (PFASs) (2018).
- International Agency for Research on Cancer (IARC), Monographs Volume 135: Perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) (2025).
- U.S. FDA, "FDA, Industry Actions End Sales of PFAS Used in U.S. Food Packaging," accessed April 21, 2026.
- European Environment Agency, PFAS pollution in European waters (2024).
- National Institute of Environmental Health Sciences, "Perfluoroalkyl and Polyfluoroalkyl Substances," accessed April 21, 2026.
- NJDEP, "Per- and Polyfluoroalkyl Substances (PFAS)," accessed April 21, 2026.
- Minnesota Department of Health, "PFAS and Health," accessed April 21, 2026.
- They Poisoned the World: Life and Death in the Age of Forever Chemicals by Mariah Blake, Published May 6, 2025.
- Minnesota Pollution Control Agency, "PFAS," accessed April 21, 2026.
- Agency for Toxic Substances and Disease Registry (ATSDR), Fast Facts PFAS in the Human Population, accessed April 21, 2026.
- Agency for Toxic Substances and Disease Registry (ATSDR),Human Exposure PFAS Information, accessed April 21, 2026.