

This fact sheet has been prepared by the technical staff of No-Pollution Enterprises. It is intended to keep our visitors informed of 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). The most investigated classes of PFASs are the perfluorocarboxylate acids (PFCAs) and perfluoroalkyl sulfonic acids (PFASAs). The most studied PFAS are perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS). These chemicals are known to cause health problems. Please refer to other Facts Sheets for relevant information on these chemicals.

The greatest portion of the chronic exposure to PFOS and PFOA results from the intake of contaminated foods and drinking water. Consumer products cause a minor portion of the consumer exposure to PFOS and PFOA. Of these, it is mainly impregnation sprays, treated carpets in homes, and coated food contact materials that may lead to consumer exposure to PFOS and PFOA.

Please refer to other Facts Sheets for relevant information on these chemicals.

### PFOS STUDIES

Published studies support that PFOS is distributed within the body and can be transferred from pregnant women to their unborn children and offspring. PFOS is detected in both umbilical cord blood and breast milk, indicating that maternal transfer occurs. PFOS has been detected in breast milk samples from healthy women. A study of 70 human breast milk samples with patients from Germany and Hungary detected PFOS in all 70 samples at concentrations ranging from 28 to 309 ng/L.

The Center for Disease Control's (CDC's) Fourth National Report on Human Exposure to Environmental Chemicals included exposure data for PFOS from 2003 to 2004 collected by NHANES. PFOS was detected in 99.9% of the general US population. Since that time, the CDC has issued several updates to the tables. The most recent update was released in 2015. Taken together, the data suggest that PFOS concentrations in human serum in the US declined between 1999 and 2010. Over the course of the study, the geometric mean concentration of PFOS in human serum decreased from 30.4 µg/L to 6.31 µg/L and the 95th percentile concentration decreased from 75.7 µg/L to 21.7 µg/L. During this time, there has been a major reduction in environmental emissions by the manufacturers as well as a phase-out of production of C8 compounds in the United States. Analysis of the NHANES 2003–2004 subsample demonstrated higher levels of PFOS and PFOA in males and a slight increase in levels of PFOS with age.

### EU FOOD AND SAFETY AUTHORITY FINDINGS

In 2008, the European Union's European Food and Safety Authority (EFSA) published a report – “PFOS, PFOA, and Their Salts. Scientific Opinion of the Panel on Contaminants in the Food Chain (CONTAM)” which commented on the levels of PFOS and PFOA found in the human food chain and the associated human health risks. The report highlighted the following:

- PFOS exposure comes from both food and non-food sources and precursors.
- Fish seems to be an important source of human exposure to PFOS; concentrations of PFOS in fish are almost invariably higher than PFOA concentrations and its concentration in liver is consistently higher than those in fillet.
- PFOS has been shown to bioaccumulate in fish and has a kinetic bioconcentration factor estimated to be in the range 1000 – 4000.
- Drinking water is estimated to contribute less than 0.5% of the indicative exposure.
- Risks are more critical for children as the possible pathways of non-food human exposure to PFOS have been estimated to decrease when moving from childhood into adulthood.
- Following absorption, PFOS is only slowly eliminated and therefore accumulates in the body.
- PFOS shows moderate acute toxicity. In subacute and chronic studies, the liver was the major target organ and developmental toxicity was also seen.
- PFOS induced liver tumors in rats, apparently due to a non-genotoxic mode of action; however, epidemiological studies in PFOS-exposed workers have not shown convincing evidence of an increased cancer risk.
- The very limited epidemiological data available for the general population do not indicate a risk of reduced birth weight or gestational age.
- Indicative dietary exposure of 60ng/kg /body-weight per day is below the TDI (Tolerable Daily Intake) of 150ng/kg body-weight per day but that the most highly exposed people within the general population might slightly exceed this TDI.

