



Australian Government

Department of Sustainability, Environment,
Water, Population and Communities

PERFLUOROOCTANE SULFONATE (PFOS) AND THE STOCKHOLM CONVENTION

What is the Stockholm Convention on Persistent Organic Pollutants?

The Stockholm Convention on Persistent Organic Pollutants (POPs) is a global treaty to protect human health and the environment from chemicals that remain intact in the environment for long periods, become widely distributed geographically, accumulate in the tissue of humans and wildlife, and have adverse effects on human health or on the environment.

There are now 172 countries that have joined the Stockholm Convention. Australia became a party to the Convention in 2004. The Convention requires parties to take measures to eliminate or reduce the release of POPs into the environment. It also aims to ensure the sound management of stockpiles and wastes that contain POPs. For more information on the Stockholm Convention please visit <http://chm.pops.int/Home/tabid/36/language/en-US/Default.aspx>

What does the Stockholm Convention have to do with Perfluorooctane Sulfonate (PFOS)?

In 2009, nine new chemicals, including PFOS and related derivatives, were listed under the Stockholm Convention due to their demonstrated toxicity, bioaccumulation, persistence in the environment and ability to travel long distances from the point of release or application.

The nine new chemicals listed as persistent organic pollutants include:

- **Pesticides:** chlordecone, alpha hexachlorocyclohexane, beta hexachlorocyclohexane, lindane, pentachlorobenzene; and
- **Industrial chemicals:** hexabromobiphenyl, hexabromodiphenyl ether and heptabromodiphenyl ether, pentachlorobenzene, perfluorooctane sulfonic acid, its salts and perfluorooctane sulfonyl fluoride, tetrabromodiphenyl ether and pentabromodiphenyl ether.



Listing of these chemicals places an obligation on parties to eliminate or significantly restrict the use of these chemicals (some essential uses are retained). Please see “**Treaty making for the nine new chemicals**” for more details about what this means for Australia.

What is PFOS?

Perfluorooctane sulfonate (PFOS) refers to fully fluorinated eight-carbon chain length sulfonate-containing substances. PFOS and related chemicals have surfactant properties and many specialty applications including heat, chemical and abrasion resistance, and as dispersion, wetting and surface treatments.

Where is PFOS used?

PFOS derivatives are or have been used in a wide variety of applications such as textiles and leather products, metal plating, food packaging, fire fighting foams, floor polishes, denture cleansers, shampoos, coatings and coating additives, in the photographic and photolithographic industry, and in hydraulic fluids in the aviation industry.

In Australia, a government survey in 2008 found that 99 per cent of PFOS imported into Australia was for the prevention of misting in chrome plating in order to lower a worker’s exposure to toxic hexavalent chromium. The Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) is currently interested in understanding to what extent Australia’s chromium plating industry uses closed-loop systems and is looking to consult with stakeholders in the industry to seek input and feedback.

Are there different types of PFOS?

The PFOS derivative commonly used in hexavalent chromium plating is the tetraethylammonium salt (found under trade names such as Fluorotenside-248 and SurTec 960), typically in a 5–10 per cent solution. The potassium, lithium, diethanolamine, and ammonium salts may also be used. Although

many complex PFOS derivatives are not specified in Annex B, they are effectively captured through the listing of perfluorooctane sulfonyl fluoride (PFOSF), which is an intermediate material for production of all PFOS related compounds.

What are the implications for the Australian chromium plating industry?

It is the department’s understanding that most PFOS used in Australia is for mist suppression in metal plating, particularly hexavalent chromium plating. Long-term use of PFOS for this purpose is allowed under the Stockholm Convention only for closed-loop systems. Other systems for metal plating have been allowed only for a limited time - a five-year specific exemption, with the possibility of another five-year extension.

Other OECD countries such as the European Union, Canada and Japan have moved, or are moving, to closed-loop systems. Consequently, there will be international pressure on Australia to move to closed loop systems by 2015 or 2020, or to phase out the use of PFOS chemicals for mist suppression.

The department is seeking your views and input regarding the current uses of PFOS in the industry, and the viability and expected timeframes of various options to meet potential obligations under the Convention, in order to work towards a practical solution.

Some possible options for consideration include:

- use of alternative mist suppression chemicals
- move to closed-loop systems, if not already in use by the industry, where the continued use of PFOS is allowable under an acceptable purpose
- investigate the feasibility of alternative mist suppression systems.

Companies also will need to consider workplace safety regulations in relation to exposures to hexavalent chromium and state/territory/local government regulations on the disposal of PFOS wastes.

Treaty making for the nine new chemicals

The Conference of the Parties to the Stockholm Convention agreed in May 2009 to add nine new chemicals to the Convention's Annexes, after several years of scientific work to establish that they met the Convention's criteria regarding toxicity, persistence in the environment and bioaccumulation.

For 151 parties, the treaty amendment adding the nine chemicals to Annexes A, B and C came into force on 26 August 2010. For Australia, an amendment to the Annexes only enters into force upon Australia's ratification of that amendment. Accordingly, Australia must now undertake a domestic treaty-making process, which in broad terms, includes the following elements:

- preparation of a Regulatory Impact Statement (RIS)
- preparation of a National Impact Analysis
- consideration by the Federal Cabinet and the Executive Council

An initial RIS on the-then proposed listings was undertaken prior to the conference of the parties meeting in 2009, but the technical implications of the listings must now be explored and resolved in greater detail. Significant stakeholder consultation is needed to refine the issues and quantify impacts. The chromium plating industry is clearly a stakeholder of interest in this process, and the department would value further consultation with the industry over the next six months on specific matters as the work progresses.

Table 1: PFOS Chemicals added to the Annexes of the Stockholm Convention in 2009

PFOS Substance	Effect of Listing
<p>Perfluorooctane sulfonate (PFOS)</p> <p>Perfluorooctane sulfonic acid (CAS No: 1763-23-1), its salts and perfluorooctane sulfonyl fluoride (PSOSF) (CAS No: 307-35-7)</p> <p>For example:</p> <ul style="list-style-type: none"> • Potassium perfluorooctane sulfonate (CAS no. 2795-39-3); • Lithium perfluorooctane sulfonate (CAS no. 29457-72-5); • Ammonium perfluorooctanesulfonate (CAS no. 29081-56-9); • Diethanolammonium perfluorooctane sulfonate (CAS no. 70225-14-8); • Tetraethylammonium perfluorooctane sulfonate (CAS no. 56773-42-3); • Didecyldimethylammonium perfluorooctane sulfonate (CAS no. 251099-16-8) 	<p>Ban on production and use except for specified acceptable purposes and specific exemptions:¹</p> <p>Acceptable purposes: (not time limited)</p> <ul style="list-style-type: none"> • Photo-imaging • Photo-resist and anti-reflective coatings for semi-conductors • Etching agent for compound semi-conductors and ceramic filters • Aviation hydraulic fluids • Metal plating (hard metal plating) only in closed-loop systems • Certain medical devices (such as ethylene tetrafluoroethylene copolymer (ETFE) layers and radio-opaque ETFE production, in-vitro diagnostic medical devices, and CCD colour filters) • Fire-fighting foam • Insect baits for control of leaf-cutting ants from <i>Atta</i> spp. and <i>Acromyrmex</i> spp. <p>Specific exemptions: (5 years initially, renewal possible)</p> <ul style="list-style-type: none"> • Photo masks in the semiconductor and liquid crystal display (LCD) industries • Metal plating (hard metal plating) • Metal plating (decorative plating) • Electric and electronic parts for some colour printers and colour copy machines • Insecticides for control of red imported fire ants and termites • Chemically driven oil production • Carpets • Leather and apparel • Textiles and upholstery • Paper and packaging • Coatings and coating additives • Rubber and plastics <p>In addition a new Part III is added to Annex B. In summary, Part III includes the following additional obligations:</p> <ul style="list-style-type: none"> • Parties must register for acceptable purposes they intend to use • Parties to report every four years on progress to phase out PFOS • Parties to phase out PFOS use where suitable alternatives are available • Parties to develop and implement an action plan to phase out PFOS • Parties to promote research and development on alternatives to PFOS • The Conference of the Parties to evaluate the continuing need for the above acceptable purposes and specific exemptions no later than 2015 and every four years thereafter.

Note 1: The Convention allows the following uses of listed chemicals: laboratory scale research and reference samples, unintentional trace contaminants in products and articles and the continued use of pre-existing articles containing an Annex A or B listed chemical.

Have your say

The Department is seeking information from industry, especially the metal plating industry, about the current and expected use of PFOS, as well as suggestions for practical ways to meet the obligations under the convention.

We are also seeking information more broadly across other industry areas from companies that may be using PFOS or derivatives in other applications, to better understand PFOS use in Australia. To participate in industry forums or for further information on the Stockholm Convention please contact us on the number below.

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