



Introduction to the guidance on perfluorooctane sulfonate and its derivatives

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Objectives of the guidance document

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- Summarize current information about alternatives to PFOS and its derivatives
 - Document is a status report (possibly revised after the next Committee's meeting)
 - Data are only suggestive
 - Responds to specific issues relating to the Stockholm Convention only
 - Assist countries in phasing-out PFOS and phasing-in alternatives
 - Committee invites readers to provide comments and additional information such as experience in introducing alternatives

Contents of the guidance

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- Introduction, background and objectives
 - Characteristics of PFOS and its derivatives
 - Alternatives to the use of PFOS
 - Properties of alternative substances and hazard assessment
 - Comparative assessment of PFOS and possible alternatives
 - Conclusions, recommendations and future developments

Substances covered by the guidance



PFOS, its salts and PFOS-F are listed in Annex B of the Convention but guidance document contains information on alternatives to PFOS derivatives not listed.

- Many other PFOS-related chemicals and precursors exist and used in PFOS applications.
- PFOSF is the basic material for the manufacture of many PFOS precursors; it is an intermediate for production of all C8 perfluorinated alkyl sulfo compounds.
- Production and use of all C8 perfluorinated alkyl sulfo compounds are restricted through the listing of PFOSF.

Examples of PFOS precursors not listed in Annex B

Chemical name	Abbreviation	CAS no.
<i>N</i> -Methyl perfluorooctane sulfonamide	MeFOSA	31506-32-8
<i>N</i> -Methyl perfluorooctane sulfonamidoethanol	MeFOSE	2448-09-7
<i>N</i> -Methyl perfluorooctane sulfonamidoethyl acrylate	MeFOSEA	25268-77-3
Ammonium bis[2- <i>N</i> -ethyl perfluorooctane sulfonamidoethyl] phosphate ¹		30381-98-7
<i>N</i> -Ethyl perfluorooctane sulfonamide (sulfluramid)	EtFOSA	4151-50-2
<i>N</i> -Ethyl perfluorooctane sulfonamidoethanol	EtFOSE	1691-99-2
<i>N</i> -Ethyl perfluorooctane sulfonamidoethyl acrylate	EtFOSEA	432-82-5
Di[<i>N</i> -ethyl perfluorooctane sulfonamidoethyl] phosphate	EtFOSEP	67969-69-1
3-[[<i>(</i> Heptadecafluorooctyl)- sulfonyl]amino]- <i>N,N,N</i> -trimethyl-1-propanaminium iodide/perfluorooctyl sulfonyl quaternary ammonium iodide	Fluorotenside-134	1652-63-7
Potassium <i>N</i> -ethyl- <i>N</i> -[(heptadecafluorooctyl) sulfonyl] glycinate		2991-51-7
<i>N</i> -Ethyl- <i>N</i> -[3-(trimethoxysilyl)propyl] perfluorooctane sulfonamide		61660-12-6



Main uses of PFOS

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- Textile impregnation and surface protection
 - Impregnation of packaging (paper/cardboard)
 - Cleaning agents, waxes and polishes for cars and floors
 - Surface coating, paint and varnish
 - Oil production and mining
 - Photographic industry
 - Electrical and electronic parts
 - Semiconductor industry
 - Aviation hydraulic fluids
 - Pesticides
 - Medical devices
 - Metal plating
 - Fire-fighting foams
- **Fluorinated or non-fluorinated alternatives exist for nearly all uses**
 - **Today in Japan, only 3 essential applications are left for PFOS: etching agent for semiconductor, semiconductor resists and photofilm for industrial purposes**

Alternative substances

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- Shorter-chain perfluoroalkyl sulfonates
 - Shorter-chain perfluoroalkyl ketones and ethers
 - Polyfluorodialkyl ether sulfonates
 - Fluorotelomers and fluorophosphates
 - Fluorinated co-polymers
 - Fluorinated polyethers
 - Siloxanes and silicone polymers
 - Propylated aromatics
 - Sulfosuccinates
 - Stearamidomethyl pyridine chloride
 - Polypropylene glycol ether, amines, and sulfates

- ✓ **Fluorotelomers are the most commonly used alternatives to PFOS;**
- ✓ **C8 fluorotelomers degrade to PFOA;**
- ✓ **Trend towards shorter chain fluorotelomers.**

Assessment and consideration on alternatives

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- Considerations for hazard assessment:
 - Persistence
 - Bio-accumulation
 - Potential for long-range environmental transport
 - Adverse effects
 - Comparative assessment to PFOS based on technical, socioeconomic, environmental, health and safety criteria require more data than available.
 - Some alternatives or their degradation products have been detected in biota and the environment.
 - Alternatives may be less hazardous but may be more expensive and less effective than PFOS.

Recommendations and future developments

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- Need for more options and better alternatives; the more alternatives are on the market, the better and cheaper the substitutes will become.
 - Need for incentives to develop alternative substances and processes e.g. international requirements translated into national legislation.
 - Need for more public data and information on alternatives. Need for better communication in the value chain.
 - Need for a mechanism to continuously update information on the alternatives' substitution properties and their hazard, including international cooperation in assessing potential PFOS alternatives.

Thank you

