

OECD WORK ON PFAS

The OECD has been working on the topic of per- and polyfluoroalkyl substances (PFAS) for more than 20 years. Initially, work was developed under the OECD Joint Meeting of the Chemicals Committee and the Working Party on Chemicals, Pesticides and Biotechnology, now the Chemicals and Biotechnology Committee (CBC).

In 2012, the joint OECD/UNEP Global PFC Group was established in response to the International Conference on Chemicals Management (ICCM 2) 2009 Resolution II/5, calling upon intergovernmental organisations, governments and other stakeholders to “*consider the development, facilitation and promotion in an open, transparent and inclusive manner of national and international stewardship programmes and regulatory approaches to reduce emissions and the content of relevant perfluorinated chemicals of concern in products and to work toward global elimination, where appropriate and technically feasible*”.

Since 2012 the work on PFAS at the OECD has been managed by this joint group under the supervision of the CBC and has focused on facilitating the exchange of information on PFAS and supporting a global transition towards safer alternatives.

Below are the main activities and publications of the OECD on PFAS.

Characterising and understanding PFAS

One of the main areas of work at the OECD is to identify and describe all potentially existing PFAS, especially those that are on the global market. A number of publications were made to contribute to advance knowledge in characterising PFAS.

A list of PFAS on the global market

In 2007 a “*Preliminary Lists of PFOS, PFAS, PFOA, PFCA, their related Compounds and Chemicals that may degrade to PFCA*”¹ was published. In 2018, this list was updated to provide a comprehensive list of PFAS that may have been on the global market. In total, 4730 PFAS-related CAS numbers have been identified and manually categorised in this study, including several new groups of PFAS that fulfil the common definition of PFASs used at the time of the listing was done (i.e. they contain at least one perfluoroalkyl moiety) but have not yet been commonly regarded as PFASs: [*Toward a New Comprehensive Global Database of Per- and Polyfluoroalkyl Substances \(PFASs\)*](#) and the accompanying

¹ OECD (2007), Preliminary Lists of PFOS, PFAS, PFOA, PFCA, their related Compounds and Chemicals that may degrade to PFCA, OECD Series on Risk Management, No. 21, Environment, Health and Safety, Environment Directorate, OECD, [https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=env/jm/mono\(2006\)15&doclanguage=en](https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=env/jm/mono(2006)15&doclanguage=en)

[“Summary report on the new comprehensive global database of Per- and Polyfluoroalkyl Substances \(PFASs\)”](#).² [The revised PFAS definition \(next paragraph\) developed since the creation of this list would result in an even larger list of substances captured.](#)

Reviewing the Terminology of PFAS

Efforts by the OECD/UNEP Global PFC Group between June 2018 and March 2021 focused on reviewing the universe and terminology of PFAS and providing recommendations and practical guidance to stakeholders with regard to the terminology of PFASs. A report was published in 2021 on [“Reconciling Terminology of the Universe of Per- and Polyfluoroalkyl Substances: Recommendations and Practical Guidance”](#)³ that provides (1) a revised PFAS definition to comprehensively reflect the universe of PFASs and a comprehensive overview of the PFAS universe (Chapter 2), (2) practical guidance on how to use the PFAS terminology (Chapter 3), (3) a systematic approach to characterization of PFASs based on molecular structural traits to assist stakeholders, including non-experts, in making their own categorization based on their needs (Chapter 4), and (4) areas in relation to the PFAS terminology that warrant further development (Chapter 5).

Fact Cards of PFAS

The OECD/UNEP Global PFC Group between June 2018 and June 2021 worked on developing a set of 15 fact cards on major groups of PFAS. The *Fact Cards of Major Groups of PFASs*⁴ aim to provide non-expert stakeholders a quick initial glance into these groups of PFASs with some basic information on: (1) chemical identities synthesis and inherent properties such as bioaccumulation and transformation, (2) historical and ongoing industrial practices and commercial uses of some major commercial products, (3) regulatory status, (4) examples of reported occurrences in the environment and humans, and (5) major knowledge gaps in terms of previous sections.

Polymeric PFAS and Their Life Cycle

Work is underway to study specifically polymeric PFAS. To date, research has primarily focused on understanding the identity, life cycle, hazard, occurrence and exposure, and risk of non-polymeric PFASs. This has informed development of many risk management measures at the national and international level. To ensure the sound management of the entire class of PFASs, it is important to also understand polymeric PFASs, which include sidechain fluorinated polymers, fluoropolymers and perfluoropolyethers.

² OECD (2018), Toward a New Comprehensive Global Database of Per- And Polyfluoroalkyl Substances (PFASs): Summary Report On Updating the OECD 2007 List Of PFASs, OECD Series on Risk Management, No. 39, Environment, Health and Safety, Environment Directorate, OECD, [https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=ENV-JM-MONO\(2018\)7&doclanguage=en](https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=ENV-JM-MONO(2018)7&doclanguage=en)

³ OECD (2021), Reconciling Terminology of the Universe of Per- and Polyfluoroalkyl Substances: Recommendations and Practical Guidance, OECD Series on Risk Management, No. 61, OECD Publishing, Paris, <https://www.oecd.org/chemicalsafety/portal-perfluorinated-chemicals/terminology-per-and-polyfluoroalkyl-substances.pdf>

⁴ OECD (2022), Reconciling Terminology of the Universe of Per- and Polyfluoroalkyl Substances: Recommendations and Practical Guidance, OECD Series on Risk Management, No. 68, OECD Publishing, Paris, [https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=ENV/CBC/MONO\(2022\)1&doclanguage=en](https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=ENV/CBC/MONO(2022)1&doclanguage=en)

A first report was published in 2023 on Understanding Side-Chain Fluorinated Polymers and Their Life Cycle⁵. This report summarizes efforts by the OECD/UNEP Global PFC Group, between July 2021 and April 2022, in synthesizing publicly available scientific and technical information on the life cycle of SCFPs, which are polymers with a non-fluorinated polymer backbone and with substructures that meet the OECD PFAS definition (hereafter referred to as “PFAS moieties”) on the side chains. The report provides a comprehensive overview on the chemical identities of SCFPs that have been on the global market, including a non-exhaustive list of 103 SCFPs and 42 monomers.

A report is being finalised on Understanding Perfluoropolyethers (PFPEs) and Their Life Cycle. Another report will be developed in 2024 focusing on Fluoropolymers.

Assessment of PFAS Compounds

As part of a wider OECD activity on the assessment of High Product Volume (HPV) chemicals, Perfluorooctane Sulfonate (PFOS) and its salts (2002)⁶ and Perfluorooctanoic acid (PFOA) and Ammonium PFOA (2009)⁷ were assessed.

The OECD’s Working Party on Hazard Assessment continues to discuss grouping approaches for the assessment of PFAS compounds.

Synthesis paper on per- and polyfluorinated chemicals (PFCs)

In 2014, the OECD/UNEP Global PFC Group published a synthesis report, the objective of which was to provide an overview of the current understanding of PFASs, regarding their major historical and current uses, scientific information about their relevance for human health and the environment (sources to the environment, human exposure, environmental fate and potential adverse effects on humans), alternatives and regulatory approaches.

OECD (2014), Synthesis paper on per- and polyfluorinated chemicals (PFCs), OECD Series on Risk Management, No. 27, Environment, Health and Safety, Environment Directorate, OECD

Production and Emissions

Some of the first projects conducted at the OECD on PFAS were aiming to understand the levels and trends of PFASs in the global environment and biota, starting with source identification and quantification. Surveys were conducted in 2004, 2006 and 2009:

⁵ OECD (2022), Synthesis Report on Understanding Side-Chain Fluorinated Polymers and Their Life Cycle, OECD Series on Risk Management, No. 73, Environment, Health and Safety, Environment Directorate, OECD, <https://www.oecd.org/chemicalsafety/portal-perfluorinated-chemicals/synthesis-report-on-understanding-side-chain-fluorinated-polymers-and-their-life-cycle.pdf>

⁶ OECD (2002), Hazard Assessment of Perfluorooctane sulfonic acid and its salts. https://hvpchemicals.oecd.org/ui/SIDS_Details.aspx?id=a5f56887-8f28-43a5-8ca9-793bec1ec2f3

⁷ OECD (2009), Hazard Assessment of Perfluorooctanoic Acid and Ammonium Perfluorooctanoic Acid, https://hvpchemicals.oecd.org/ui/SIDS_Details.aspx?id=ff9eac38-0716-432e-b30a-c190fdeddaf7

- the 2004 and 2006 surveys requested participating countries to provide information on all PFAS and related products manufactured in or imported into their jurisdictions⁸,
- the 2009 survey focused on manufacturers of a defined list of PFASs and/or PFAS-containing products in OECD and non-OECD countries⁹.

Despite issues related to confidentiality and incomplete response, the surveys provided useful information on the actual market shift of the production and use of PFASs.

To continue researching on these issues, the Global PFC Group published a report on "*Working Towards A Global Emission Inventory of PFASs: Focus on PFCAs – Status Quo and the Way Forward*"¹⁰ in 2015. The report uses perfluoroalkyl carboxylic acids (PFCAs) as a reference to present an overall picture of global and regional emissions of PFASs and other related fluorinated substances due to the numerous interlinkages between PFCAs and many other fluorinated substances. The analysis provides a comprehensive overview of the current understanding of historical and ongoing global and regional emissions of C4– C14 PFCAs and identifies critical gaps and key uncertainties in terms of data collection and integration to accurately measure global and regional emissions of C4–C14 PFCAs.

Commercial Availability and Current Uses of Alternatives

Work has been developed to collect information on commercial availability and market trends of alternatives to PFAS, as well as on the hazard profile of the identified alternatives, focusing on specific industry sectors. The following reports have been published to date:

- PFASs and alternatives in food packaging (paper and paperboard): Report on the commercial availability and current uses¹¹;

⁸ OECD (2005), [Survey Results on Production and Use of PFOs, PFAs and PFOA, related Substances and Products/Mixtures containing these Substances](https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=env/jm/mono(2005)1&doclanguage=en), OECD Series on Risk Management, No. 19, OECD Publishing, Paris, [https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=env/jm/mono\(2005\)1&doclanguage=en](https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=env/jm/mono(2005)1&doclanguage=en);

OECD (2006), Survey Results on Production and Use of PFOS, PFAS, PFOA, PFCA, Related Substances and Products/Mixtures containing these Substances, OECD Series on Risk Management, No. 22, OECD Publishing, Paris, [https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?doclanguage=en&cote=env/jm/mono\(2006\)36](https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?doclanguage=en&cote=env/jm/mono(2006)36)

⁹ OECD (2011), Outcome of the 2009 Survey on Production, Use and Release of PFOS, PFAS, PFOA, PFCA, Related Substances and Products/Mixtures containing these Substances, OECD Series on Risk Management, No. 24, OECD Publishing, Paris, [https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=env/jm/mono\(2011\)1&doclanguage=en](https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=env/jm/mono(2011)1&doclanguage=en)

¹⁰ OECD (2015), Working Towards A Global Emission Inventory of PFASs: Focus on PFCAs – Status Quo and the Way Forward, OECD Series on Risk Management, No. 30, OECD Publishing, Paris, <https://www.oecd.org/chemicalsafety/risk-management/Working%20Towards%20a%20Global%20Emission%20Inventory%20of%20PFASS.pdf>

¹¹ OECD (2020), PFASs and Alternatives in Food Packaging (Paper and Paperboard) Report on the Commercial Availability and Current Uses, OECD Series on Risk Management, No. 58, Environment, Health and Safety, Environment Directorate, OECD, <https://www.oecd.org/chemicalsafety/portal-perfluorinated-chemicals/PFASs-and-alternatives-in-food-packaging-paper-and-paperboard.pdf>

- PFAS and Alternatives in Food Packaging (Paper and Paperboard): Hazard Profile¹²;
- PFAS and Alternatives in Coatings, Paints and Varnishes (CPVs): Report on the Commercial Availability and Current Uses¹³.
- PFAS and Alternatives in Coatings, Paints and Varnishes (CPVs): Hazard Profile¹⁴.

A report on PFAS and Alternatives in Cosmetics, including their commercial availability and current uses is under preparation for publication.

Risk Reduction Initiatives across Countries

This work includes the regular collection of information on risk reduction initiatives developed by countries for PFAS. A report was published in 2015 on “*Risk Reduction Approaches for PFASs – A Cross-Country Analysis*”¹⁵ and information from countries is collected twice per year to update the country information page of the OECD Web Portal on PFAS.

OECD Web Portal on PFAS and Webinars

The OECD work on PFAS is communicated via a Web Portal that is regularly being updated, <https://www.oecd.org/chemicalsafety/portal-perfluorinated-chemicals/>. It regroups all the publications from the OECD/UNEP Global PFC Group, information on country risk reduction initiatives for PFAS and the recording of webinars. Webinars are organised two to three times per year to publicise the reports published by the Group and also with invited experts to share knowledge and experience on PFAS, in particular on the development of alternatives.

¹² OECD (2022), PFAS and Alternatives in Food Packaging (Paper and Paperboard): Hazard Profile, OECD Series on Risk Management, No. 69, Environment, Health and Safety, Environment Directorate, OECD, [https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=env/cbc/mono\(2022\)2&doclanguage=en](https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=env/cbc/mono(2022)2&doclanguage=en)

¹³ OECD (2022), Per- and Polyfluoroalkyl Substances and Alternatives in Coatings, Paints and Varnishes (CPVs), Report on the Commercial Availability and Current Uses, OECD Series on Risk Management, No. 70, Environment, Health and Safety, Environment Directorate, OECD, <https://www.oecd.org/chemicalsafety/portal-perfluorinated-chemicals/per-and-polyfluoroalkyl-substances-alternatives-in-coatings-paints-varnishes.pdf>

¹⁴ OECD (2023), Report on Per- and Polyfluoroalkyl Substances and Alternatives in Coatings, Paints and Varnishes (CPVs): Hazard Profile, OECD Series on Risk Management, No. 80, Environment, Health and Safety, Environment Directorate, OECD, [https://one.oecd.org/document/ENV/CBC/MONO\(2023\)22/en/pdf](https://one.oecd.org/document/ENV/CBC/MONO(2023)22/en/pdf)

¹⁵ OECD (2015), Risk Reduction Approaches for PFASs – A Cross-Country Analysis, OECD Series on Risk Management, No. 29, Environment, Health and Safety, Environment Directorate, OECD, https://www.oecd.org/env/ehs/risk-management/Risk_Reduction_Approaches%20for%20PFASS.pdf

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