



## CPSC Staff Statement on: Characterizing PFAS Chemistries, Sources, Uses, and Regulatory Trends in the U.S. and International Markets

The U.S. Consumer Product Safety Commission (CPSC, or Commission) contracted with RTI International (Contract No. GS-00F-354CA, Order No. 61320622F0078) to complete a white paper for per- and polyfluoroalkyl substances (PFAS) and their use in consumer products. CPSC staff plans to use this report in ongoing work to understand hazards, exposures, and potential human health risks related to specific PFAS—or subclasses of PFAS—and consumer products.

This statement was prepared by the CPSC staff. RTI International produced the accompanying report for CPSC staff. The statement and report have not been reviewed or approved by, and do not necessarily represent the views of, the Commission. Representations on jurisdiction or CPSC policy and any recommendations or conclusions in the RTI report may not reflect the Commission views and are in no way binding on CPSC.

RTI International’s report consists of a main report that identifies and characterizes PFAS chemicals, describes information related to current and historical prevalence of PFAS in commerce and in consumer products in the United States, and characterizes regulatory and market trends related to PFAS use. The main report is accompanied by database files that present information about the data collected for the report, and that provide certain information in greater detail.

The report will be posted on CPSC’s website to keep the public informed of the technical research related to the agency’s regulatory activities. The accompanying data files also will be available to the public.

Table 1 presents the list of 6 files that resulted from RTI International’s performance of the contract (files are numbered only for convenience).

**TABLE 1. CONTRACT FILES**

	<b>Descriptive Name</b>	<b>File name</b>	<b>Brief Description</b>
1	Characterizing PFAS Chemistries, Sources, Uses, and Regulatory Trends in U.S. and International Markets	CPSC_PFAS_White Paper	Main report produced by the contractor.
2	Appendices: Characterizing PFAS Chemistries, Sources, Uses, and Regulatory Trends in U.S. and International Markets	CPSC_PFAS_Appendices	Five appendices containing detailed information to accompany the main report.
3	Supporting File with PFAS sources and uses	PFAS Source Characterization	Contains information on reported PFAS uses, use categories, and

		Database_2023.07.14.xlsx	associated data fields such as functional use, concentration, and patent descriptions
4	Supporting File with PFAS production information	PFAS Commodity Market Trends Database_2023.07.14.xlsx	Contains information on production volume, facilities, industrial sectors, import/export, trade volume, and reported releases and transfers of PFAS from facilities
5	Supporting File with PFAS chemical risk assessment information	PFAS Literature on Exposure, Toxicity, and Health Risk_2023.07.14.xlsx	Contains information on screening of peer reviewed literature and completed assessments of certain PFAS chemicals
6	Supporting File with Regulations information	PFAS regulation index_2023.07.14.xlsx	Contains a compilation of proposed or adopted regulations at the state, federal, and international levels that are primarily related to PFAS-containing consumer products.

CPSC staff notes that PFAS are a complex group of thousands of chemical substances. OECD defines PFAS as fluorinated substances that contain at least one fully fluorinated methyl or methylene carbon atom (without any H/Cl/Br/I atom attached to it).<sup>1</sup> OECD later defined fifteen major groups of PFAS.<sup>2</sup> A more recent definition based on structure and percent fluorination was used to develop PFASSTRUCTV5 list in EPA's Chemistry Dashboard.<sup>3</sup> This list was the primary list used in the contractor report. Most of the chemicals in the contractor report are not yet placed into these subcategories.

1. Perfluoroalkyl phosphonic (a) and phosphinic acids (b) (PFPAs & PFPIAs)
2. Perfluoroalkyl carboxylic (a) and dicarboxylic (b) acids
3. Perfluoroalkane sulfonic (a) and sulfinic (b) acids
4. Per- and polyfluoroalkylether carboxylic (a) and sulfonic (b) acids
5. Perfluoroalkanoyl fluorides (a) and their derivatives
6. Perfluoroalkanesulfonyl fluorides (a) and their derivatives
7. n:2 Fluorotelomer-based compounds
8. n:1 Fluorotelomer-based compounds
9. Perfluoroalkylethers (a), epoxides (b), and vinyl ethers (c) (non-polymers)
10. Perfluoroalkenes (a) and derivatives (b)
11. Specific hydrofluoro-carbons (a), -ethers (b), and -olefins (c)
12. Side-chain fluorinated aromatics
13. Fluoropolymers
14. Fluoroelastomers

<sup>1</sup> OECD (2021). Reconciling Terminology of the Universe of Per-and Polyfluorinated Substances: Recommendations and Practical Guidance. ENV/CBC/MONO(2021)25. Series on Risk Management No. 61.

<sup>2</sup> OECD (2022). Fact Cards of Major Groups of Per-and Polyfluoroalkyl Substances (PFASs). ENV/CBC/MONO(2022)1. Series on Risk Management No. 68.

<sup>3</sup> Gaines, L. G., Sinclair, G., & Williams, A. J. (2023). A proposed approach to defining per-and polyfluoroalkyl substances (PFAS) based on molecular structure and formula. *Integrated Environmental Assessment and Management*.

## 15. Perfluoropolyethers

The contractor report identified 16,229 PFAS, of which 863 had reported use or detection in consumer products, 387 had reported industrial use information, 83 had information on exposure and human health risks, and 30 had information on policies and regulations. These numbers are based on the combination of data sources described in the contractor report. Consideration of additional data sources outside of the contractor report may increase or decrease the total number of PFAS chemicals and subsets of PFAS used in consumer products or with other defined characteristics.

Note, the contractor report uses the word industry when describing PFAS with reported industrial uses based on recent Chemical Data Reporting (CDR) or Toxics Release inventory (TRI). CPSC staff prefers the term chemicals used “in commerce” and considers presence on any U.S. or international chemical inventory, potential uses in patents, and reported uses in the literature or identified through product testing as data sources. The universe of PFAS chemicals, PFAS chemicals identified in commerce, and PFAS chemicals associated with consumer products will also vary over time as certain PFAS have been phased-out while others are emerging. CPSC staff compiled additional data sources not explicitly considered in the contractor report to provide context for how numbers of PFAS chemicals can change based on which data sources are considered.

**TABLE 2. PFAS CHEMISTRY CROSS TAB AND DATA SOURCES**

Data Field	Data Field Category	Data Field Description	Data Source	Number of PFAS chemicals
PREFERRED_NAME	Chem ID	Preferred Name	RTI Report	16229
CASRN	Chem ID	Chemical Registry Number	Batch Search Dashboard	14576
DTXSID	Chem ID	Unique identifier Chemistry Dashboard	Batch Search Dashboard	15999
PFASSTRUCTV5	Chem ID	PFAS version 5 list from EPA	Gaines et al (2023)	14735
NUMBER OF PATENTS_ANY	Market and Use	Number of PFAS chemicals with >0 patents reported in pubchem	Batch Search PUBCHEM	7874
PUBCHEM Use and Mnfg. Info	Market and Use	Number of PFAS chemicals that have any information in the use and manufacturing data-field in PUBCHEM	Batch Search PUBCHEM	4225
TSCA 8A7 Reporting Rule	Market and Use	Number of PFAS that may be covered by 2021 reporting rule (PFAS on active inventory- in U.S. commerce).	EPA 2021 <sup>4</sup>	1364 (669)
TSCA INV ANY	Market and Use	Presence on any TSCA inventory Active or inactive list since 2020	Batch Search Dashboard	1196

<sup>4</sup> EPA 2021. Toxic Substances Control Act Reporting and Recordkeeping Requirements for Perfluoroalkyl and Polyfluoroalkyl Substances. Available at: <https://www.regulations.gov/document/EPA-HQ-OPPT-2020-0549-0001>

EINECS	Market and Use	European Inventory of Existing Commercial Chemical Substances	Batch Search Dashboard	663
KEMI Market	Market and Use	KEMI Market List contains chemicals expected to be on the market.	Batch Search Dashboard	303
CANADADSL	Market and Use	Canadian Domestic Substances List	Batch Search Dashboard	252
UNEP Chemicals in Plastics	Consumer Products	UNEP chemicals in plastics report	UNEP 2023 <sup>5</sup>	352
PFAS chemicals with >1,000 patents	Consumer Products	Increased likelihood of consumer product applications based on large number of patents	Batch Search PUBCHEM	617

<sup>5</sup> UNEP 2023. Chemicals in Plastics- A Technical Report. Available at. <https://www.unep.org/resources/report/chemicals-plastics-technical-report>