

Status on PFAS legislation in EU

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Danish PFAS partnership with industry
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Disclaimer

This webinar covers product specific legislation – there can be other EU regulations regarding PFAS e.g. on environmental quality criteria, but these are not in scope of this presentation

The main focus of Danish EPA has been on the sectors: Construction, Lubricants, Energy and Electronics & semiconductors. There may therefore be questions to other parts of the uPFAS restriction proposal, which may not be possible to answer without contact to colleagues in the remaining dossier submitter countries (DE, NL, SE and NO) that worked on the dossier.

The dossier submitters send their updated and final restriction proposal to ECHA in July 2025. The proposal is therefore in the hands of ECHA and any questions in relation to the timeline and the process should be directed towards ECHA and eventually the Commission.

The information provided in this presentation only reflects the proposal prepared by the dossier submitters, which does not include the opinion of RAC and SEAC

Content

1. PFAS
2. National and EU legislation
3. REACH process and universal PFAS timeline
4. The uPFAS restriction proposal
5. Consultation on the SEAC-draft opinion and final steps
6. Questions

PFAS

PFAS

PFAS = Per- and polyfluoroalkylic substances

*PFASs are defined 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)**, i.e., with a few noted exceptions, any chemical with at least a perfluorinated methyl group ($-CF_3$) or a perfluorinated methylene group ($-CF_2-$) is a PFAS (OECD, 2021).*

~3 000 PFAS (Kemi, 2015)

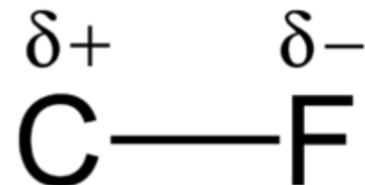
~4 730 PFAS med CAS nummer (OECD, 2018)

~12 043 (US EPA, 2021)

>10 000 (ECHA, 2023)

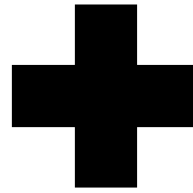
Unique technical properties :

Water- oil and smudge repellency (combination). Resistance towards extremely high and low temperature (large thermal range), alkali and acid resistance, low friction, wear resistance and electrical isolation among others.



Hazards

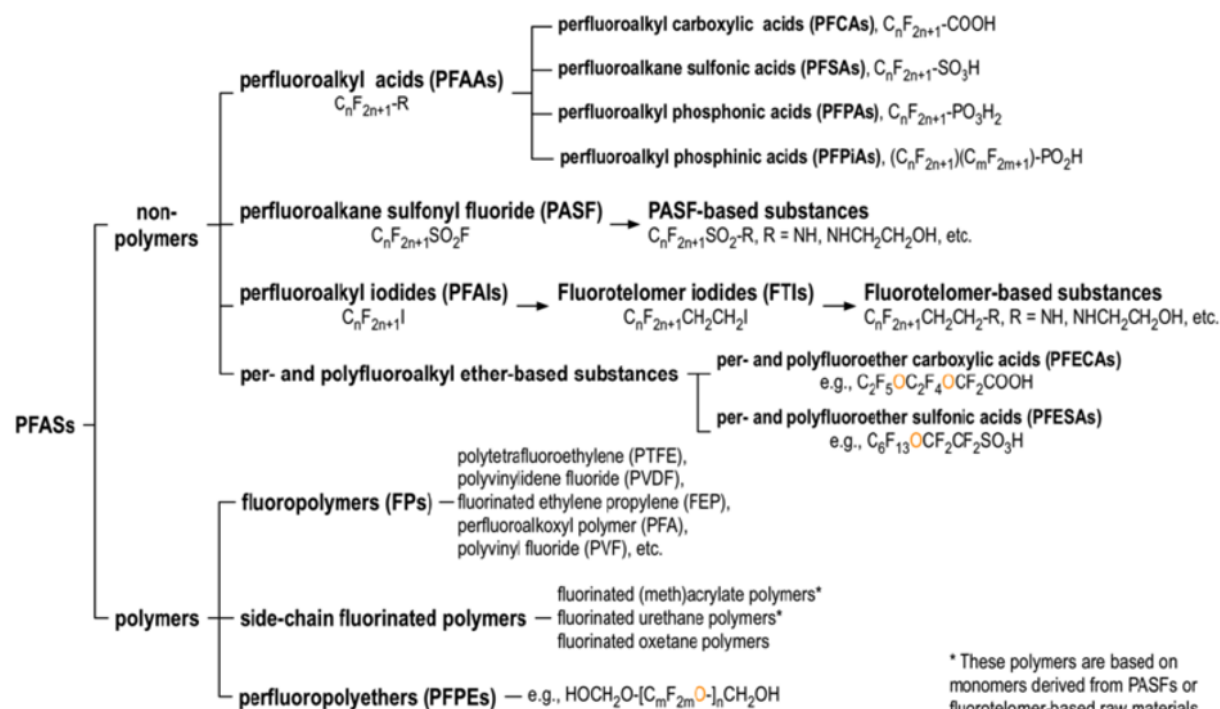
**Very high
persistence**



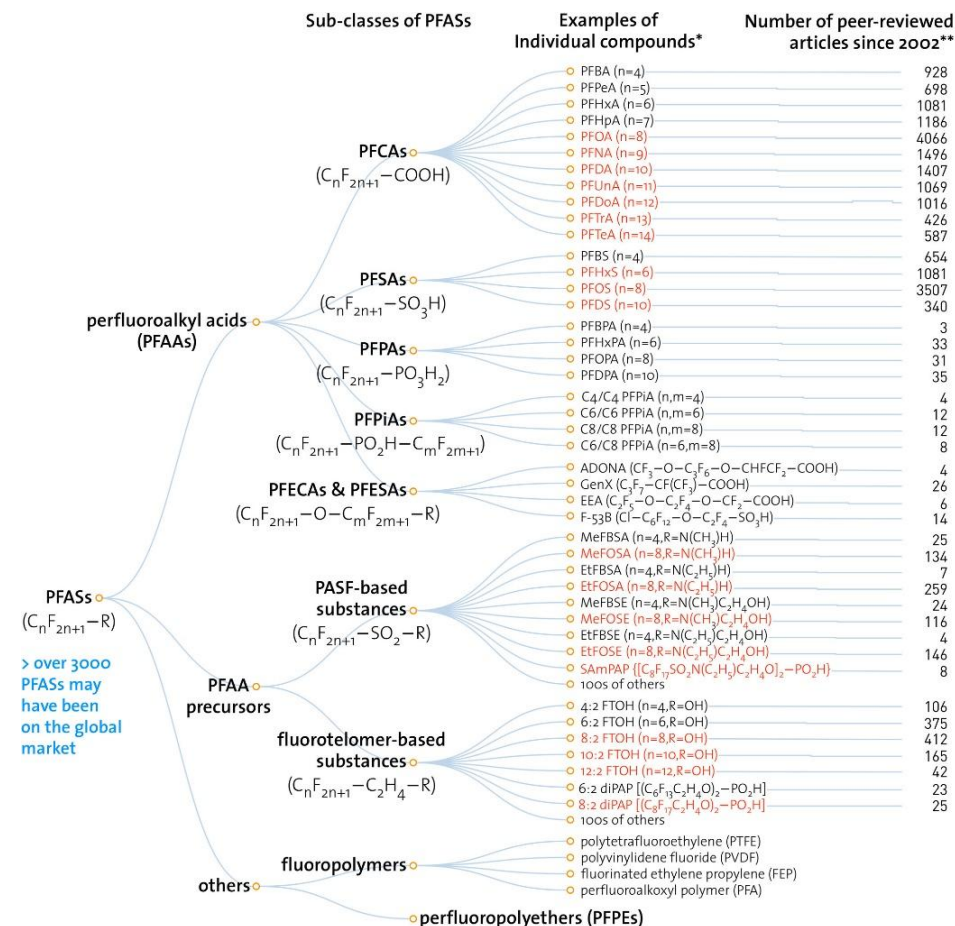
- Bioaccumulation
- Mobility
- Long range transport potential
- Enrichment in plants
- (Eco)toxicity
- Hormone-like effects
- Combination effects

The PFAS universe

Per- and polyfluoroalkyl substances (PFASs)



* These polymers are based on monomers derived from PASFs or fluorotelomer-based raw materials.



Organisation for Economic Cooperation and Development, 2015. Working Towards a Global Emission Inventory of PFASs: Focus on PFCAs – Status Quo and the Way Forward. Paris: Environment, Health and Safety, Environmental Directorate, OECD/UNEP Global PFC Group.

* PFASs in RED are those that have been restricted under national/regional/global regulatory or voluntary frameworks, with or without specific exemptions (for details, see OECD (2015), Risk reduction approaches for PFASs. <http://oe.cd/iAN>).

** The numbers of articles (related to all aspects of research) were retrieved from SciFinder® on Nov. 1, 2016.

A Never-Ending Story of Per- and Polyfluoroalkyl Substances (PFASs)?

Zhanyun Wang, Jamie C. DeWitt, Christopher P. Higgins, and Ian T. Cousins
Environmental Science & Technology 2017 51 (5), 2508-2518
DOI: 10.1021/acs.est.6b04806



National and EU legislation

Danish legislation

PFAS in food contact materials (2020)

- PFAS in cardboard and paper in food contact materials are banned, unless a barrier ensures no migration to the food
- Covers placing on market
- Limit: 20 ug/g (20 PPM) organic fluorine

PFAS in firefighting-foam concentrate for training purposes (2023)

- Import and sale
- Limit: 1 PPM (1mg/kg) in firefighting foam concentrate

PFAS in apparel, footwear and impregnation agents for consumers (2025)

- Import and sale for consumers
- Articles and mixtures in accordance with REACH. Covers uses such as membranes and coatings
- Limit: 50 mg F/kg
- Applies on the 1st of Juli 2026 with a transition period for stocks until 1st of January 2027.

PFAS active substances that can degrade to TFA (2025/2026)

- Six active substances - Fluazinam, Fluopyram, Diflufenican, Mefentrifluconazol, Tau-fluvalinat and Flonicamid
- Banning 33 pesticides
- Sale and use
- Applies between the 30th of August 2025 and the 30th of November 2026, dependent on the availability of alternatives

EU PFAS regulation in force

Substances/ Substance groups	REACH (EU)	Stockholmkonventionen (Globalt) / POP (EU)	Limit values
PFOS and its derivatives	Ban (2006-2009)	Ban since 2009	0.025 mg/kg for PFOS and salts (new limit) 1 mg/kg for PFOS-related substances (new limit)
PFOA, its salts and related compounds		Ban since 2020	0.025 mg/kg for PFOA 1 mg/kg for PFOA-related substances
TDFA and mono-, di- or tri-O-(alkyl) derivatives	Restricted since 2021		In spray products if the concentration $\geq 2\mu\text{g/kg}$ $\rightarrow$ only allowed for professional use
C9-C14 PFCA, its salts and related substances	Restricted since 2023.	Proposal for restriction of C9-C21 submitted in 2022. Included under the Stockholm Convention in 2025 – still not fully adopted.	25 ppb for the sum of C9-C14 PFCA 260 ppb for the sum of C9-C14 related substances.
PFHxS, its salts and related compounds		Restricted since 2023	0.025 mg/kg for PFHxS and its salts 1 mg/kg for the sum of all PFHxS-related substances

Hazardous classification - CLP

≈160 substances

Substance of very high concern (SVHC)

≈90 substances

Up-coming EU PFAS regulation

Substances/ Substance groups	REACH (EU)	Other legislation	Limit values
PFHxA, salts and related substances - adopted	Restriction becomes active for specific applications on the 10th of October 2026*		25 ppb for the sum of PFHxA and its salts or 1000 ppb for the sum of PFHxA-related substances.
PFAS in firefighting foam - adopted	Entry into force on the 23rd of October 2025. Becomes active for specific uses from the 23rd of October 2026		1 mg/L in firefighting foam and concentrate. 50 mg/L in existing systems, where fluorine-free alternatives are in use
PFAS in food-contact packaging		Adopted in Regulation (EU) 2025/40 (PPWR), active from 12th of August 2026	25 PPB for any PFAS, 250 PPB for sum, 50 PPM total fluor
PFAS in toys		Adopted in REGULATION (EU) 2025/2509 - on the safety of toys, active from 1st of August 2030.	Intentional use - no limit values.
Universal PFAS restriction – not adopted	Submitted to ECHA on the 13th of January 2023, proposal updated in 2025 – RAC opinion adopted, SEAC draft opinion still in development.		Proposed limit values: 25 PPB for any PFAS, 250 PPB for sum, 50 PPM total fluorine

*For the general public; Textiles, footwear, paper and cardboard for food contact materials, mixtures and cosmetics

Waste limits

Substances/ Substance groups	Stockholmkonventionen (Globalt) / POP (EU)	Limit values
PFOS and its derivatives	Specific limit	50 mg/kg
PFOA, its salts and related compounds	Specific limit	1 mg/kg for PFOA and salts 40 mg/kg for the sum of PFOA-related substances
PFHxS, its salts and related compounds	Specific limit	1 mg/kg for PFOA and salts 40 mg/kg for the sum of PFOA-related substances

Substances classified as hazardous under CLP can be considered as hazardous waste based on:

- The classification e.g. Ox. Gas 1
- The classification and the concentration e.g. STOT SE >1%

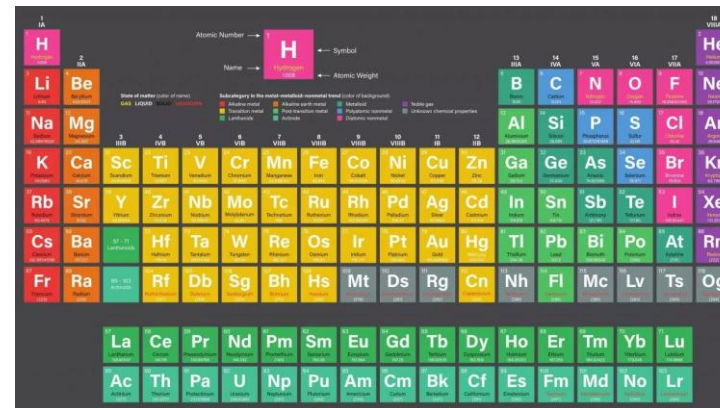
The concentration varies depending on the classification. The range of classification is between 0.1% and 55% - the classifications and limits are available in the waste framework directive.

REACH process and uPFAS timeline

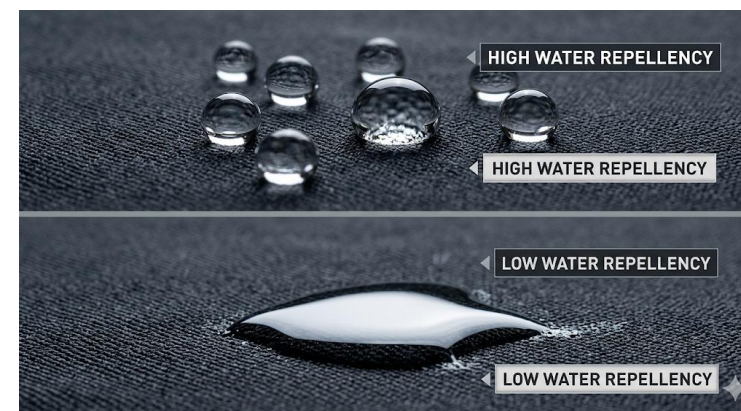
Restriction under REACH

- Restriction proposal:
 - ✓ Chemical identity
 - ✓ Hazards, effects and risk
 - ✓ Applications
 - ✓ Availability of alternatives
 - ✓ Socio-economic analysis

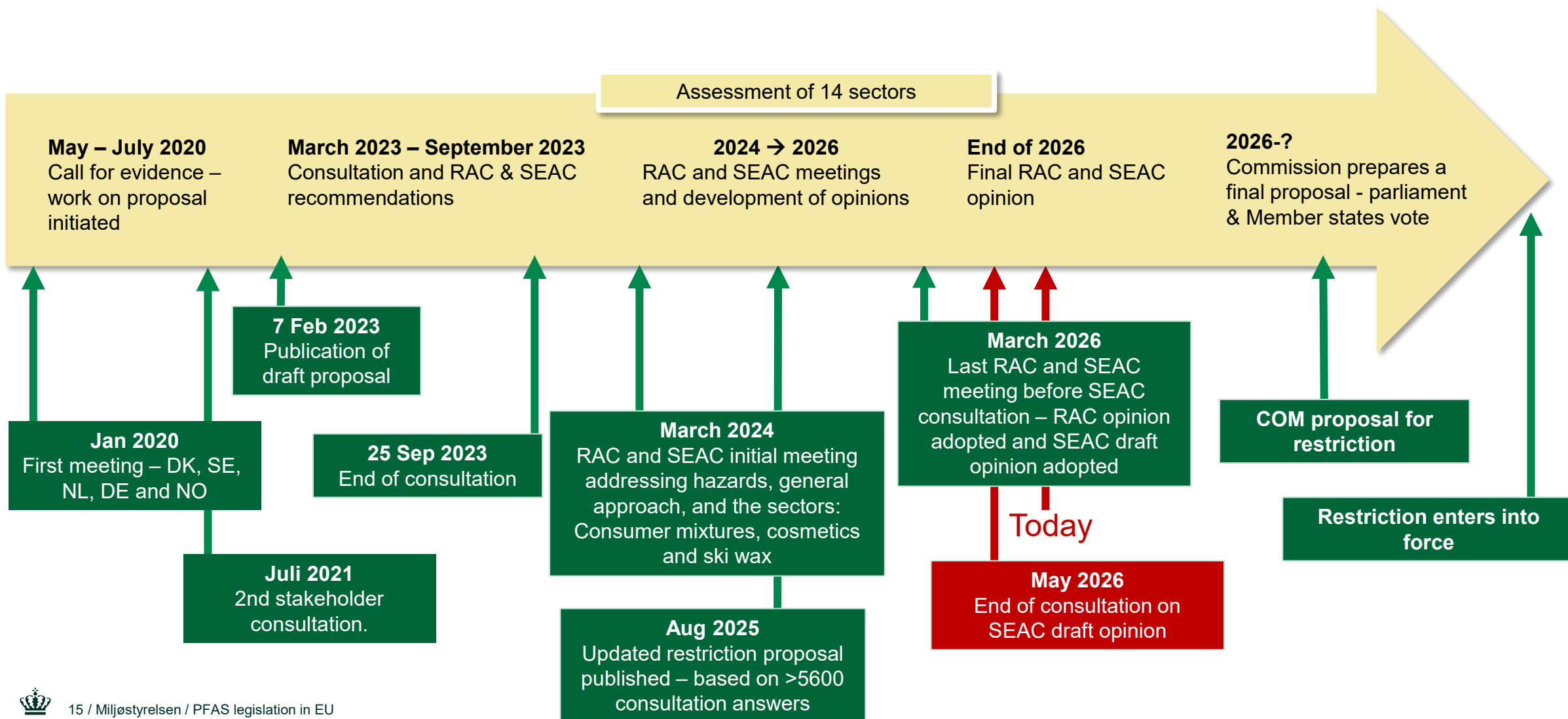
European Chemicals Agency (ECHA)
Risk Assessment Committee (RAC)
Socio-economic Analysis Committee (SEAC)



A periodic table of elements with a dark background. Elements are color-coded by groups: 1A (pink), 2A (orange), 3A (yellow), 4A (light green), 5A (green), 6A (teal), 7A (blue), 8A (purple), 9A (dark purple), 10A (dark blue), 11A (blue), 12A (light blue), 13A (green), 14A (teal), 15A (blue), 16A (purple), 17A (dark purple), 18A (pink). The table includes labels for Atomic Number, Symbol, Name, and Atomic Weight. The elements are arranged in rows and columns, with the lanthanide and actinide series at the bottom.



Universal PFAS Timeline



The uPFAS restriction proposal

14 original sectors

- Textiles (TULAC)
- Food contact materials and packaging
- Metal plating and manufacture of metal products
- Consumer mixtures and miscellaneous consumer articles
- Cosmetic
- Ski-wax
- Applications of fluorinated gases
- Medical devices
- Transport
- Electronics and semiconductors
- Energy
- Construction products
- Lubricants
- Petroleum and mining

8 additional new sectors

- Textiles (TULAC)
 - Food contact materials and packaging
 - Metal plating and manufacturing of metal products
 - Consumer mixtures and miscellaneous consumer articles
 - Cosmetic
 - Ski-wax
- => Additional sectors assessed in BD:**
- Printing applications
 - Sealing applications
 - Machinery applications
 - Other medical applications
 - Military applications
 - Explosives
 - Technical textiles
 - Broader industrial uses
- Applications of fluorinated gases
 - Medical devices
 - Transport
 - Electronics and semiconductors
 - Energy
 - Construction products
 - Lubricants
 - Petroleum and mining

PFAS manufacturing

- Manufacture of PFASs in the EU from raw materials like monomers or starting compounds
- Does not include formulation of PFAS containing mixtures or production of articles



Cross-cutting assessments

- Second-hand market.
- Spare parts for complex objects already in end use.
- Secondary (recycled) materials (e.g., paper, plastics and textiles).
- Scientific research & development (SR&D).
- Product & process-oriented research & development (PPORD).



PFAS uses outside of assessment scope

- Active substances in medicinal products for human & veterinary use.
- Active substances in PPP & biocides.

Overarching (generic) applications of PFASs

- Electronics and semiconductors – wires/cables; electrical and photonic components (inc. data storage); semiconductor manufacturing processes; heat transfer/management fluids.
- Lubricants – mixtures for low-viscosity lubrication, greases, solid/dry films (e.g., piston-rings) and slip/release agents – including in sealed articles/objects
- Sealing applications* – fluoropolymers and perfluoropolyethers used (i) to prevent leakage (ii) to contain pressures (iii) to exclude contamination (e.g., o-rings, gaskets, pipes & tubing)
- Machinery applications* – fluoropolymers and perfluoropolyethers used (i) for self-lubricating (low friction) parts (ii) as structural elements (iii) as coatings for protection/durability

Sector-specific applications of PFASs (overarching applications of PFASs and PFAS manufacturing are not within the scope of sector-specific assessments)

Consumer mixtures & miscellaneous consumer articles

- **Uses in scope:** eyewear anti-fog; musical strings; fishing lines; synthetic turf
- **Related uses in other sectors:** home textile treatments; razor blade coatings.



Cosmetics

- **Uses in scope:** PFAS ingredients in cosmetic products; PFASs used to manufacture cosmetic ingredients (e.g., peptide synthesis).
- **Related uses in other sectors:** manufacturing equipment; product packaging.



Ski wax

- **Uses in scope:** formulation & use of ski waxes.



Medical devices

- **Uses in scope:** implantable, invasive & other medical devices (e.g., wound treatment, sterilisation gases); sterile & non-sterile medical device packaging.
- **Related uses in other sectors:** excipients, immediate packaging, medicinal product packaging, drug delivery devices, medical textiles & venting, PPE, IVDs.



Other medical applications*

- **Uses in scope:** excipients, immediate packaging, drug delivery devices e.g., metered-dose inhalers (MDIs), pre-filled syringes, injection pens.



TULAC (textiles, leather, upholstery, apparel, carpets)

- **Uses in scope:** home textiles and treatment agents (e.g., carpets/upholstery); consumer and professional apparel; PPE; leather.
- **Related uses in other sectors:** packaging, optical fibres, printing inks, technical textiles, dry cleaning of textiles.



Petroleum & mining

- **Uses in scope:** anti-foaming agents, tracers, wetting agents, foam stabilisers.
- **Related uses in other sectors:** Industrial automation/monitoring/control (IAMC).



Energy

- **Uses in scope:** wind turbines, solar panels, batteries, switchgear, hydrogen fuel cells & electrolyzers.
- **Related uses in other sectors:** oil & gas, hydropower, battery vents, hydrogen storage, solid-oxide fuel cells, IAMC.



Construction products

- **Uses in scope:** Architectural coatings, paints & adhesives, greenhouse roofing, coil coated materials, anti-drip polymer additives, polymer processing aids, window frames, plumbing, bridge & building bearings.
- **Related uses in other sectors:** architectural & weatherproofing membranes, foam blowing agents (foam insulation), plain bearings for non-building applications, cable/wire insulation, metal plating & coil coating processes.



Metal plating & manufacture of metal products

- **Uses in scope:** wetting agents & mist-suppressants, production of coated metal articles/objects, razor blade coatings.
- **Related uses in other sectors:** downstream use of coated metal products.



Transport

- **Uses in scope:** automotive, aerospace, watercraft, rail, agricultural, forestry, construction and industrial vehicles; mobile air conditioning (MAC) & heat pumps; transport refrigeration; reflective signage.
- **Related uses in other sectors:** batteries & fuel cells, textiles in vehicles, PPE, aircraft fire-extinguishers, pyrotechnic charges (e.g., airbags).



Technical textiles*

- **Uses in scope:** Outdoor textiles (e.g., tents, furniture), architectural & weatherproofing membranes (tensile & non-tensile), filtration & separation media, medical textiles, textiles in transport vehicles (excluding interior).
- **Related uses in other sectors:** greenhouse roofing, medical devices, fuel cells, TULAC, printing inks, solvents for dry cleaning.



Broader industrial uses*

- **In scope:** catalysts and processing aids (e.g., ionic liquids), solvents (for cleaning or extraction), hydraulic fluids
- **Related uses in other sectors:** metal plating; anti-acid coatings; hydraulic fluids in vehicles.



Fluorinated gases

- **In scope:** heating, ventilation, air-conditioning & refrigeration (HVACR); foam blowing agents (foam insulation); propellants; clean-fire suppression; cover gases, insulating gases in electrical equipment, paper preservation.
- **Related uses in other sectors:** metered dose inhalers (MDIs), MAC, transport refrigeration, immersion cooling of electronic equipment.



Food contact materials (FCMs) & packaging

- **In scope:** consumer and industrial cookware, packaging for oil/grease resistance & water repellence (baking paper/vehicle wraps), polymer processing aids for plastic film production, printing inks & lacquers for FCMs.
- **Related uses in other sectors:** medicine/medical device packaging, water treatment membranes.



Printing*

- **In scope:** consumables (e.g., toners, latex printing inks, PTFE wax/powder), photosensitive materials, surfactants, permanent parts (e.g., plates and rollers)
- **Related uses in other sectors:** printing inks & lacquers for FCMs



Explosives*

- **In scope:** military and civil applications – mining, pyrotechnics for vehicle safety (e.g., airbags & seatbelts), flares, fireworks, ammunition.

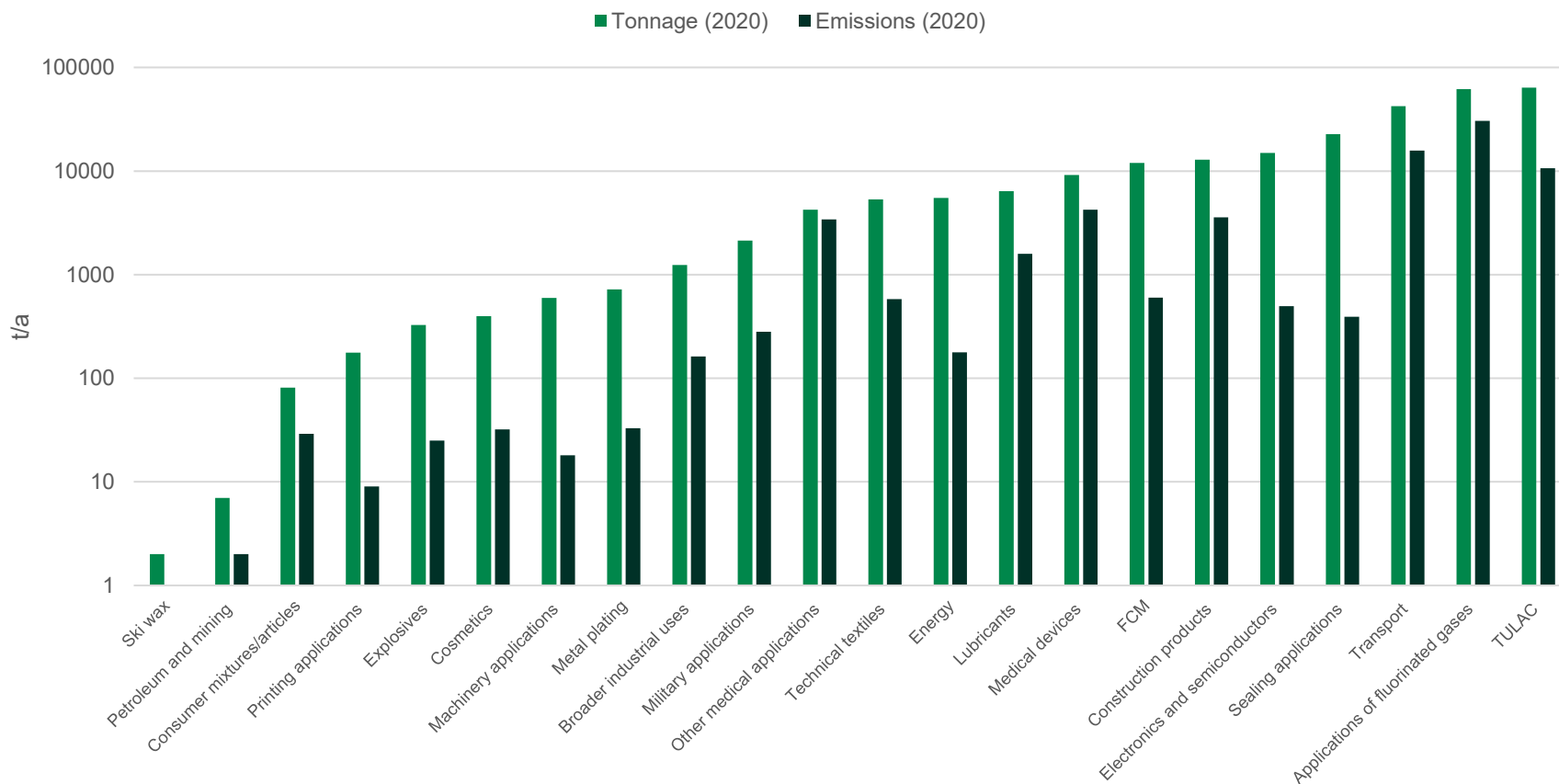


Military*

- **In scope:** Military vehicles, military equipment
- **Related uses in other sectors:** military explosives, non-military HVACR, military textiles, military PPE, uniforms and protective apparel.



Ban with time-limited derogations



=> Tonnages and Emissions updated based on consultation input

190,000 – 340,000 tonnes of PFASs newly introduced to market annually

4.7 mio tonnes of emissions over 30 year period (2025 – 2055)

Restriction options (RO) assessed

RO1: Full ban after 18 months transition period

- **Not proportionate for many sectors**

RO2: Ban with use-specific and time-limited derogations (6.5 or 13.5 years) for uses with low substitution potential

=> Additional restriction option assessed in BD for certain sectors

- **RO3:** Continued use of PFASs with strict emission limits, or additional emission controls to increase the effectiveness of an RO2
 - **Sectors:** Transport, Electronics and Semiconductors, Energy, Sealing Applications, Machinery Applications, Technical Textiles, PFAS Manufacturing



Limit values and additional requirements



Ban on manufacture, use and placing on the market

- As substances on their own
 - As a constituent
 - A mixture
 - An article
- } ≥ 25 ppb for any PFASs
 ≥ 250 ppb for sum of PFASs
 ≥ 50 ppm* for PFASs

* If total fluorine exceeds 50 mg F/kg the manufacturer, importer or downstream user shall upon request provide to the enforcement authorities a proof for the fluorine measured as content of either PFASs or non-PFASs.



Derogated uses

- Reporting obligations for 13.5 year derogation and fluorinated gases – identity and quantity of PFAS
- Management plan for polymeric PFAS – Identity, justification and conditions for safe use and disposal

Derogations proposed by the Dossier Submitters

Examples of proposed derogations

All PFAS

- PPE (Regulation (EU) 2016/425, Annex I + armed forces, law enforcement and emergency response workers, – 13.5 years
- Hard chrome plating – 6.5 years
- Several applications of refrigerants (Fluorinated gases) – 6.5 to 13.5 years
- Coatings and film of electronics – 6.5 to 13.5 years
- Industrial and professional use of lubricants or lubricant additives for – 13.5 years

Fluoropolymers and Perfluoropolyethers

- Sealing applications in industrial uses – 13.5 years
- Machinery applications in industrial uses – 13.5 years
- Implantable medical devices – 13.5 years
- Anti-drip agents – 13.5 years
- Front- and backsheets of photovoltaic cells – 6.5 years

Cross cutting > 13.5 years

- Second-hand articles
- Spare parts
- Recycling of plastics, paper and cardboard, and textiles



Proportionality

Proportionality matrix added for each sector (example: Electronics & Semiconductors)

Effectiveness: emission reduction [%]	Economic costs or other impacts of a restriction option				
	Very low	Low	Moderate	High	Very high
Very Low (<70%)					
Low (70 – 79%)			RO2 (79%) RO3 (72%)		
Moderate (80 –89%)					
High (90 - 98%)					RO1 (97%)
Very high (≥99%)					

Not effective enough	Likely proportionate	Not proportionate
Proportionate	Likely not proportionate	Very effective, very high costs

Consultation on the SEAC-draft opinion and final steps

Consultation on the SEAC draft opinion

Started in March 2026 and ended in May 2026

SEAC sector evaluation - specific questions (14 Sectors and PFAS manufacturing)

- Numerical questions
- Multi/single-choice questions
- Free text questions (character limit)

- Availability of alternatives
- Non-use scenario
- Impact estimates (costs)
- ...

Use-specific*

Sections of SEAC draft opinion - general questions

Free text questions
(character limit)

- Justification EU action required
- Socio-economic analysis
- Practicality
- ...

SEAC draft opinion section-specific

Results of the consultation

3511 consultation answers

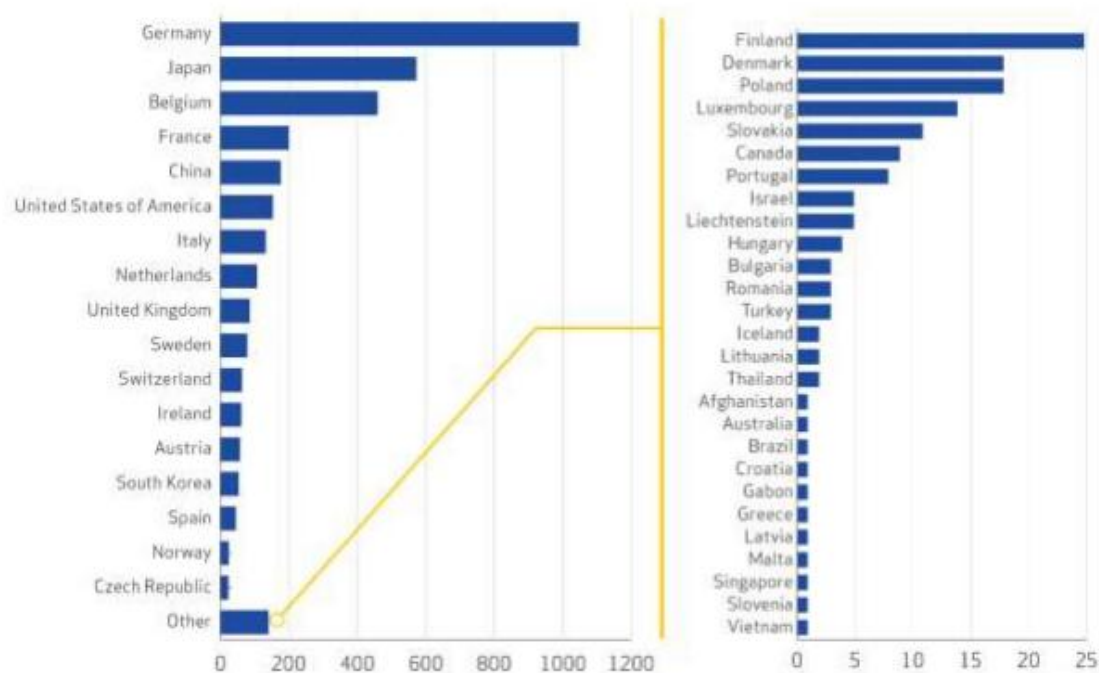


Figure – Count of comments per country

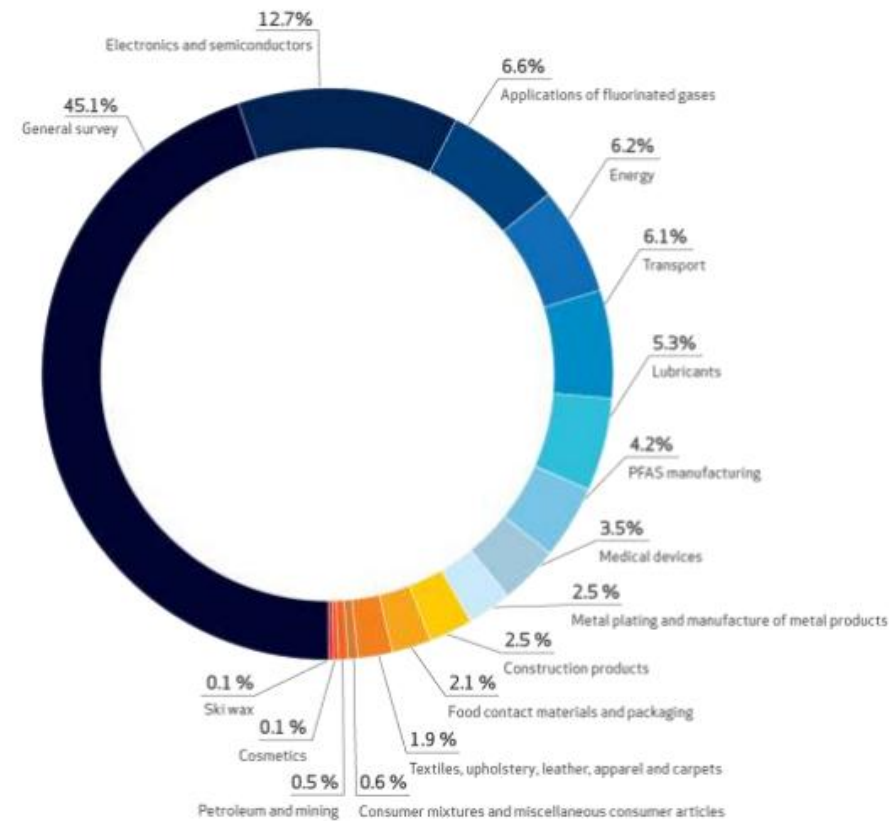


Figure – Comments by survey/sector (share in %)

Final steps of the restriction

End of year 2026 – expected adoption of opinion and submission of RAC and SEAC opinion

The Commission will propose a uPFAS restriction based on the dossier submitters restriction proposal and the opinion of RAC and SEAC

The proposal is submitted for a vote at EU-member states along with the EU council and parliament. When adopted the proposal will be published in the official Journal

Key documents

Background Document updated based on Annex XV consultation comments published (3300 pages):

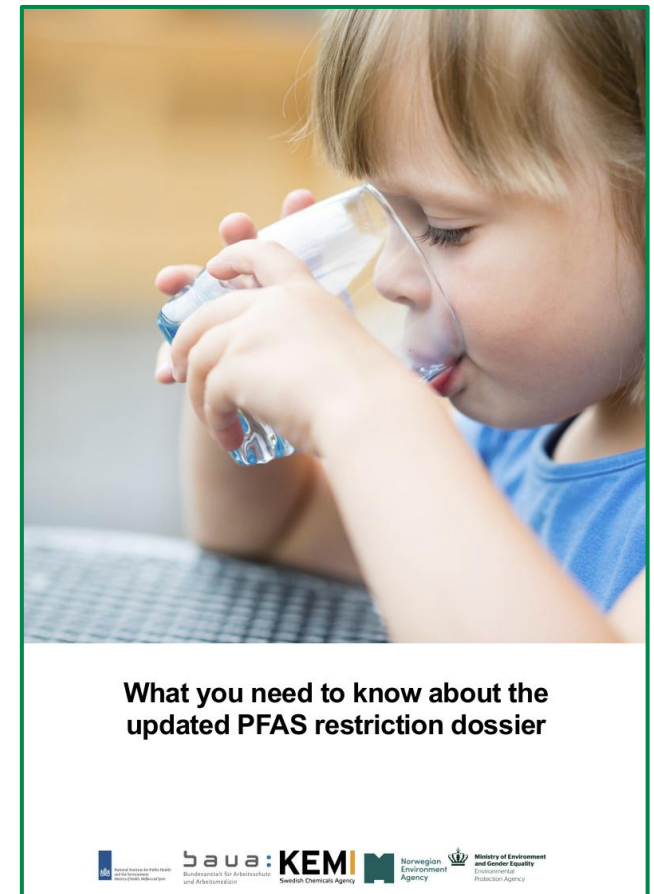
- See «Draft Background Document» and appendices on link
- See «RAC opinion» and «SEAC draft opinion»

Summary of Background Document (20 pages):

- Including list of all proposed derogations in Annex 2

ECHA use mapping

<https://echa.europa.eu/restrictions-under-consideration/-/substance-rev/72301/term>
<https://mst.dk/media/hkqbbyyd/upfas-summary-of-bd-2.pdf>



Questions?