

A Special briefing on PFAS

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12th International Chlor-Alkali Technology Conference & Exhibition

> 13-15 May 2025 Barcelona - Spain







Introduction



Restrictions under REACH



Emerging monitoring & reporting requirements



Take home messages







Introduction



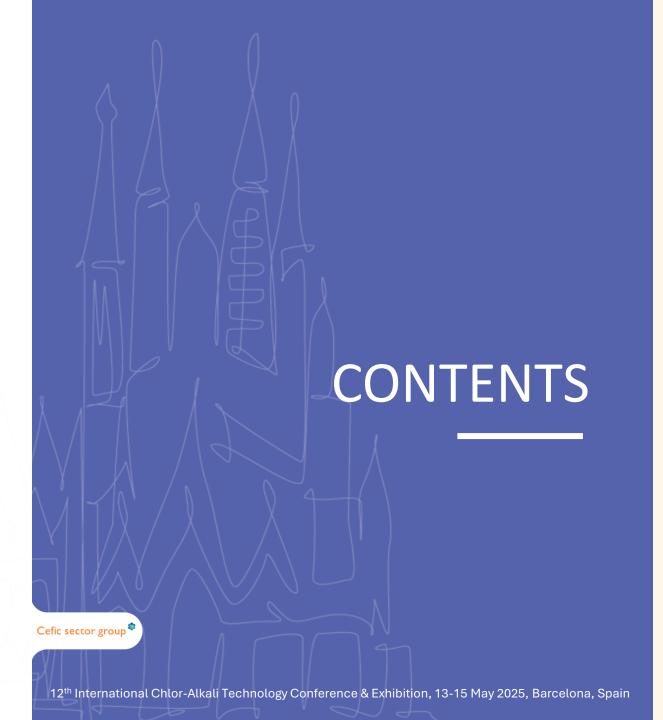
Restrictions under REACH



Emerging monitoring & reporting requirements



Take home messages

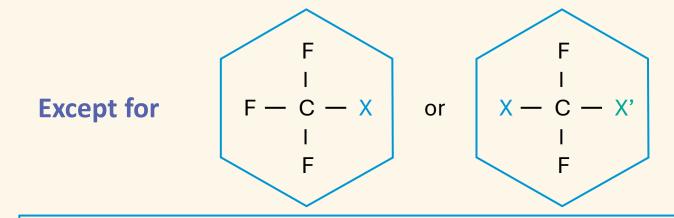


Per- and polyfluoroalkyl substances



PFAS definition according to the EU authorities

Any substance that contains at least one fully fluorinated methyl (-CF₃) or methylene (-CF₂-) carbon atom (without any H/Cl/Br/l attached to it)



X = -OR or -NRR'
X' = methyl (-CH₃), methylene (-CH₂-), an aromatic group,
a carbonyl group (-C(O)-), -OR", -SR" or -NR"R"

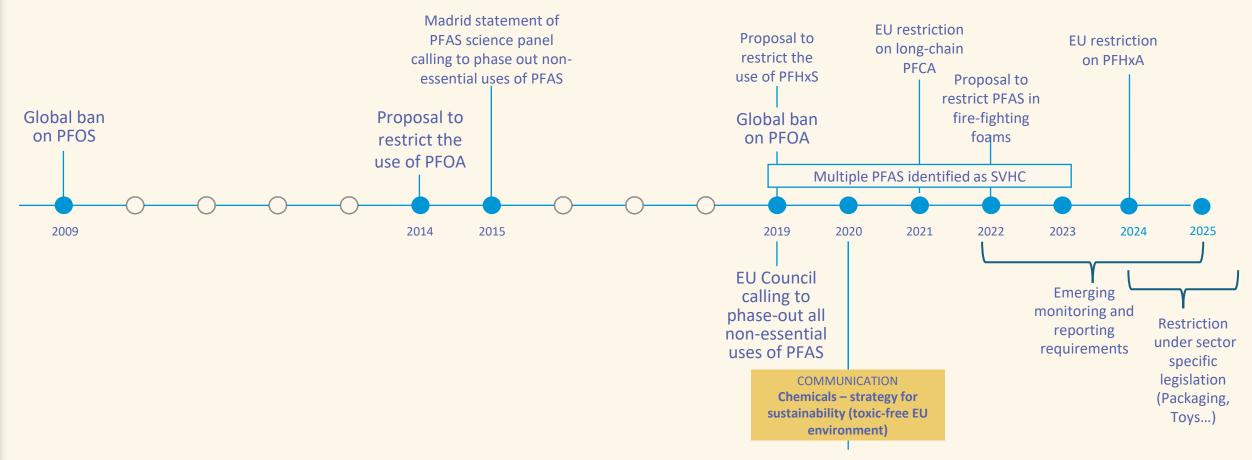
R/R'/R''' = hydrogen (-H), methyl (-CH₃), methylene (-CH₂-), an aromatic group or a carbonyl group (-C(O)-)



The EU & global framework



A complex landscape







In focus today



Restrictions under REACH

Emerging
monitoring and
reporting
obligations on
companies











Restrictions under REACH







Different types of restrictions on PFAS under REACH



To address PFAS at source



Already adopted: targeting specific groups of PFAS (PFHxA, PFCAs)



In final stages: targeting all PFAS in firefighting foams



In preparation: universal restriction targeting all PFAS in all products



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The process on the U-PFAS restriction proposal

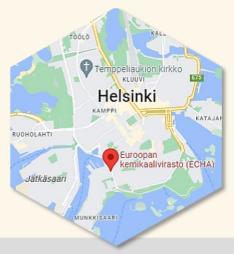


Five Competent Authorities





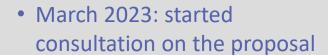
ECHA (RAC and SEAC)



European Commission



- December 2020: started preparation of proposal
- January 2023: submitted proposal to ECHA



 Since March 2023: working on an opinion for European Commission

- Will take final decision on the restriction
- Member States involved
- European Parliament & Council scrutiny to follow



The U-PFAS restriction proposal in a nutshell



Starting point is a BAN

- manufacturing, use and placing on the market of PFAS
- placing on the market of mixtures and articles containing PFAS at:
 - 25 ppb for one non-polymer PFAS
 - 250 ppb for the sum of non-polymer PFAS
 - 50 ppm for all polymeric PFAS

Except for

- use-specific, time-limited derogations:
 18-m transition period, plus additional 5-y or 12-y derogation period
- some time-unlimited, more general derogations



ANNEX XV RESTRICTION REPORT

PROPOSAL FOR A RESTRICTION

SUBSTANCE NAME(S): Per- and polyfluoroalkyl substances (PFASs)

IUPAC NAME(S): n.a.

EC NUMBER(S): n.a.

CAS NUMBER(S): n.a.

CONTACT DETAILS OF THE DOSSIER SUBMITTERS:

BAuA

Federal Institute for Occupational Safety and Health Division 5 - Federal Office for Chemicals Friedrich-Henkel-Weg 1-25 D-44149 Dortmund, Germany

Bureau REACH, National Institute for Public Health and the Environment (RIVM)
Antonie van Leeuwenhoeklaan 9
3721 MA Bilthoven, The Netherlands

Swedish Chemicals Agency (KEMI) PO Box 2, SE-172 13 Sundbyberg, Sweden

Norwegian Environment Agency P.O. Box 5672 Torgarden N-7485 Trondheim, Norway

The Danish Environmental Protection Agency Tolderlundsvej 5 5000 Odense C, Denmark

VERSION NUMBER: 2

DATE: 22.03.2023



O Box 400 E1.00131 Haldinki Einland I Tal. ±358 9 686180 I Eav. ±358 9 68618310 I orba arrona arr

Industrial equipment covered







accenture THE USE OF PFAS **IN CHEMICAL PLANT EQUIPMENT** AN INVENTORY STUDY **Final Report** September 2023

Process Unit's Equipment





Refrigeration **Systems**



Piping



Valves



Power Supply

Safety and Protection

PPE

Power and Utilities



Cables & Wirings

Firefighting

Foams



Heat Exchangers

Gaskets &

Sealings

Injectors

Steam



Vessels



Couplings (Motors)

Instruments

Crushers

Pumps



Grinders



Membranes









Lubricants



Catalysts



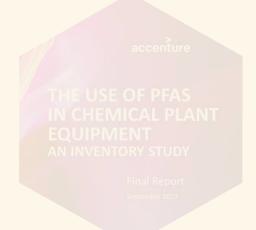
Refrigerants



Zoom on components

PFAS presen	ce in equipment	Seals (Gasket, O-ring)	Coating	Piping	Valves	Membranes
Process unit's equipment	Agitators	56%	16%		3%	
	Compressors	49%	2%		10%	
	Turbines	43%	7%		5%	
	Fans	41%	7%		4%	
	Conveyors	39%	8%		5%	2%
	Cooling towers	29%	7%	2%	2%	
	Process control devices	40%	18%	3%	18%	4%
	Grinders	39%	3%		6%	
	Crystallizers	43%	16%	11%	14%	
	Devices for process analysis	43%	14%	10%	15%	11%
	Instruments	38%	18%	3%	8%	11%
	Distillation towers	53%	22%	2%	2%	
	Absorbtion towers	58%	16%	2%	3%	
	Dryers	56%	8%	1%	4%	
	Evaporators	51%	10%		7%	
	Fired heaters	31%	6%		12%	
	Gaskets and Sealings	53%	3%	4%	6%	1%
	Gas purification units	45%	15%	4%	2%	6%
	Heat exchangers	57%	18%	8%	4%	
	Mechanical separators	48%	8%		5%	2%





PFAS presence in equipment		Seals (Gasket, O-ring)	Coating	Piping	Valves	Membranes
Process unit's	Motors and couplings	39%	6%		4%	
	Reactors	55%	23%	12%	10%	5%
equipment	Refrigeration systems	36%	3%	1%	4%	1%
	Piping	36%	37%	31%	7%	
	Pumps	59%	25%	1%	8%	13%
	Steam ejectors	31%	10%		2%	2%
	Vacuum pumps	55%	13%	1%	7%	5%
	Valves and Accessories	51%	23%	1%	34%	4%
	Vessels	42%	39%	4%	9%	
	Wastewater treatment	40%	12%	11%	11%	4%
Safety &	PPE	1%	4%			
protection	Plant Safety Equipment	8%	1%	2%	13%	
Power &	Power Supply Equipment	8%	1%		2%	
utilities	Plants Cable & Wiring Equipment	1%				
	Greases	5%		1%		
	Lubricants	4%				
Other products	Plants Catalysts					3%
	Refrigerants					
	Processing aids		4%	2%		4%





Findings around substitution

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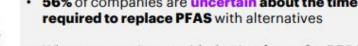
A timeframe of +10 years will be needed to substitute PFAS in equipment when alternatives are identified, according to companies

Timeframe for PFAS replacement

4%

22%

- 56% of companies are uncertain about the time that would be required to replace PFAS with alternatives



When companies provided a timeframe for PFAS replacement, they estimate that it would take more than 10 years for 54% of their equipment

Estimated time needed for equipment replacement (% of equipment) when companies provided a timeframe*

54%

Less than 3 years

More than 10 years

Uncertain about the timeframe

Between 3 to 5 years

Between 5 to 10 years

Possess timeframe details



^{*}The provided percentage for a substitution strategy per equipment X was calculated by taking the number of "yes" for an equipment X divided by the total of answer for the substitution strategy. Source: Accenture analysis of questionnaires

chlor 17.

Findings on expected impacts



For existing plants, after alternatives are identified:

- 6-24 months of shutdown
- 20-50% of new built CAPEX
- 6-12 months of client requalification process
- 2-3 times higher maintenance expenditure would be required



THE USE OF PFAS
IN CHEMICAL PLANT
EQUIPMENT
AN INVENTORY STUDY

Final Report



For **new investments**:

- 15-60% CAPEX increase
- 2-3 times higher maintenance expenditure
- Lower plant availability anticipated



Inventory data submitted



Together with 5642 responses from other stakeholders

- Uses not covered in the initial dossiers flagged by several industries
- 100,000 thousand pages of input to review!





5 Competent Authorities to consider new options



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Alternative options

- E.g. conditions allowing the continued manufacture, placing on the market or use instead of a ban
- For uses and sectors where bans could lead to disproportionate socio-economic impacts



Additional uses

Identified and incorporated in the proposal, e.g.

- Sealing applications
- Packaging and excipients for pharmaceuticals.



European Commission to bring "clarity"





EUROPE'S CHOICE

POLITICAL GUIDELINES FOR THE NEXT EUROPEAN COMMISSION 2024–2029

Ursula von der Leyen
Candidate for the European Commission President

"We will put forward a new chemicals industry package, aiming to simplify REACH and provide clarity on "forever chemicals", or PFAS".



"Clarity on PFAS: As indicated in my mission letter, if confirmed, I commit to provide timely clarity on the REACH restriction process of PFAS [...] "I will seek to ban the use of PFAS in consumer uses, like cosmetics, food contact materials and outdoor clothing. Where adequate alternatives in terms of performance and safety are not available, I would support the continued use of PFAS in industrial applications, in particular critical ones, under strictly controlled conditions until acceptable substitutes are found, accompanied by strict emission and disposal rules to limit their release into the environment, and clear incentives to innovate and develop sustainable substitutes."



New study by Cefic

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Inventory update

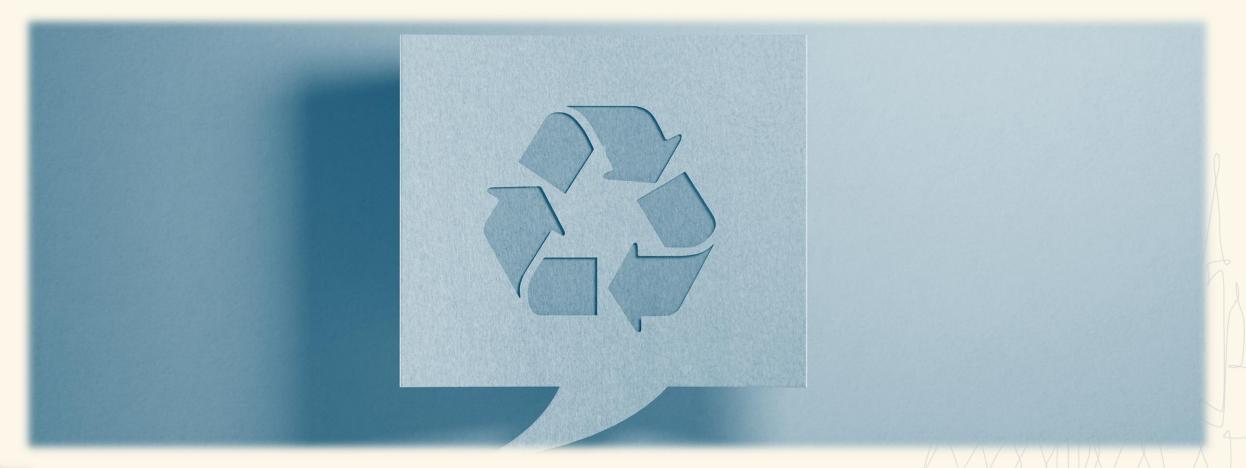




New project by Cefic

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Existing waste practices









Introduction



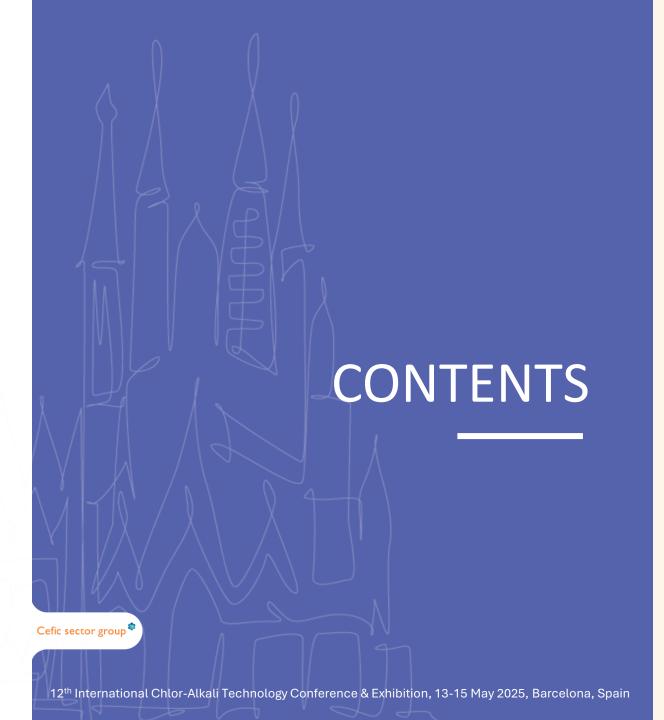
Restrictions under REACH



Emerging monitoring & reporting requirements



Take home messages



Deriving from different legislation





Environmental
Quality Standards
Directive
(2008/105/EC)

Groundwater Directive (2006/118/EC)

Industrial Emissions Directive (2010/75/EU)

Industrial
Emission Portal
Regulation
(2024/1244)



Water policy



Water
Framework
Directive
(2000/60/EC)

Environmental
Quality Standards
Directive
(2008/105/EC)

Groundwater Directive (2006/118/EC)

Limits for PFAS under discussion.

Once adopted might have operational impacts.

- Starting from 2028*, potential request to monitor 24 (or more) PFAS emissions from plants
- Possible revision of permits with new limits for PFAS

* Depending on the final text



Industrial Emission Directive



Industrial Emissions Directive (2010/75/EU)

- BREFs= Best Available Techniques Reference Documents
 - → key docs for Member States when they grant permits at national level
- BREFs are periodically reviewed and revised
- In the most recent reviews, authorities requested information on uses of PFAS and emissions into water



Industrial Emission Portal



Industrial Emission Portal Regulation (2024/1244)

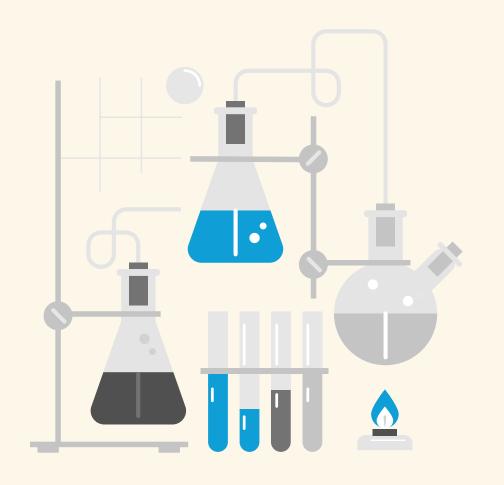
- Requires Member States to report certain (emission) data collected from companies in their territories
- From 2028: reporting obligation for PFOA and PFHXs releases into air, water and soil above 1 kg/year
- List of PFAS to monitor expected to be expanded in the future triggering new monitoring obligations
- Possible new requirements in permits depending on outcome of the measurements



Cefic studies on analytical methods



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Take home messages

Knowledge is key

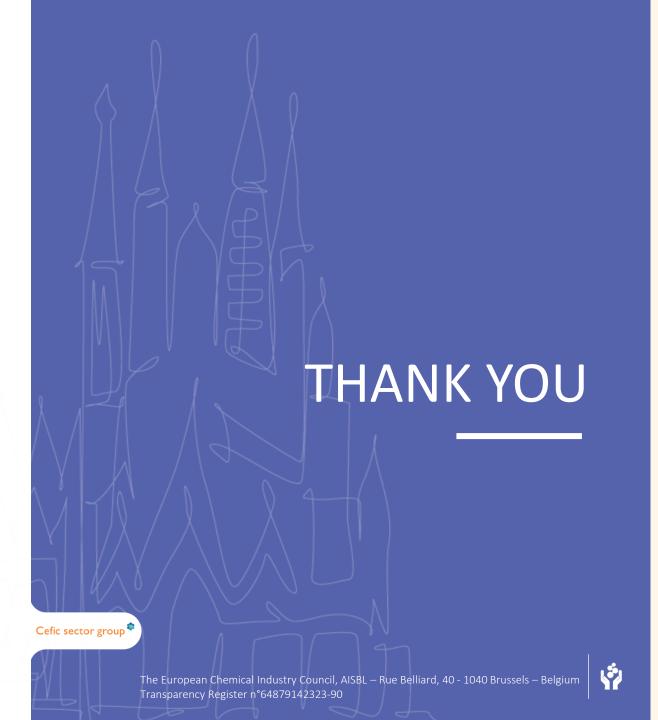


Continue increase knowledge base on PFAS uses in your operations

Continue assessing alternatives

Consider all aspects: use phase and waste phase







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Chlor-alkali: achieving climate neutrality