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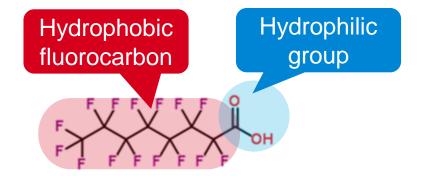
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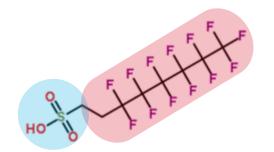


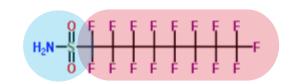


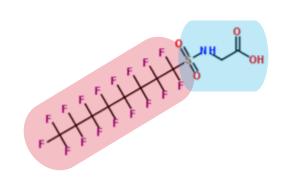
# PFAS (Per/Polyfluoroalkyl Substances)

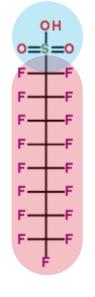
## Examples of compound classes

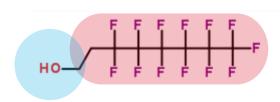












Estimation: > 4000 PFAS compounds have been produced<sup>1)</sup>

1) https://pubs.acs.org/doi/full/10.1021/acs.est.6b04806



# PFAS related products

## Common household products and industrial uses

Non-stick surfaces

Grease-proof food packaging

Surfactants and lubricants









Fire-fighting foams

Stain guards

Water repellents

# PFAS related products

## Common laboratory materials

Solvent caps, filters and tubing

Caps on samples vials

Pump seals, frits, degasser materials



Air conditioning filters

Gloves/Coats

Sample preparation consumables

## **PFAS** Regulations

United Nations: Stockholm Convention<sup>1) 2)</sup>
Ban of PFOA and PFOS<sup>1)</sup>



he Convention > The POPs

#### What are POPs?

Persistent Organic Pollutants (POPs) are organic chemical substances, that is, they are carbon-based. They possess a particular combination of physical and chemical properties such that, once released into the environment, they:

- · remain intact for exceptionally long periods of time (many years);
- become widely distributed throughout the environment as a result of natural processes involving soil, water and, most notably, air;
- accumulate in the living organisms including humans, and are found at higher concentrations at higher levels in the food chain; and
- are toxic to both humans and wildlife.



- 1) <a href="https://www.pops.int/TheConvention/ThePOPs/AllPOPs/tabid/2509/Default.aspx">https://www.pops.int/TheConvention/ThePOPs/AllPOPs/tabid/2509/Default.aspx</a>
- 2) https://www.pops.int/TheConvention/ThePOPs/tabid/673/Default.aspx



# **PFAS** Regulations

**Examples: European Union** 

### Universal restriction proposal 1)

All news

Next steps for PFAS restriction proposal

The European Chemicals Agency (ECHA) outlines how its two scientific comp proposal to restrict per- and polyfluoroalkyl substances (PFAS) in Europe.

Helsinki, 13 March 2024 - Following the screening of a large number of comments

The Agency's scientific committees for Risk Assessment (RAC) and for Socio-Econol restriction together with the comments from the consultation in batches, focusing

In tandem, the five national authorities who prepared the proposal, are updating th comments. This updated report will be assessed by the committees and will serve a

The sectors and elements that will be discussed in the next three committee meeting

- March 2024 meetings
- Consumer mixtures, cosmetics and ski wax
- Hazards of DEAS (only by RAC): and
- General approach (only by SEAC).
- . June 2024 montings



### Drinking water directive<sup>2)</sup>

DIRECTIVE (EU) 2020/2184 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

of 16 December 2020

on the quality of water intended for human consumption

The following substances shall be analysed based on the technical guidelines developed in accordance with Article 13(7):

- Perfluorobutanoic acid (PFBA)

Perfluoropentanoic acid (PFPA)

- Perfluoroho - Perfluoroh

Perfluoro

- Perfluorot

— Perfluoro

- Perfluoro

- Perfluoros

- Perfluoro

Parametric Value: 100 ng/L

20 compounds

Per compound:

 Perfluorob - Perfluorop

100 ng/L : 20 = 5 ng/L- Perfluoro

**LOQ** < 30 % of parametric value

~ 1.5 ng/L

abstraction points carried out in accordance with Article 8 conclude that those substances are likely to be present in a

### Regulation for PFAS in certain foodstuffs<sup>4)</sup>

#### COMMISSION REGULATION (EU) 2022/2388

of 7 December 2022

amending Regulation (EC) No 1881/2006 as regards maximum levels of perfluoroalkyl substances in

		Maximum Levels μg/kg wet weight						
	Foodstuffs (9)		PFOA *	PFNA *	PFHxS *	Sum of PFOS, PFOA, PFNA and PFHxS * **		
10.1	Eggs	1,0	0,30	0,70	0,30	1,7		
10.2	Fishery products 26 and bivalve molluscs 26							
10.2.1	Fish meat <sup>24,25</sup>							
10.2.1.1	Muscle meat of fish, except those listed	2,0	0,20	0,50	0,20	2,0		

under 10.2.1.2 and 10.2.1.3. Muscle meat of fish listed in 10.2 and 10.2.1.3, in case they are in the production of food for infant: children.

MRL PFOA: 200 ng/kg

### Proposal for water framework directive<sup>3)</sup>

		pesticides	1			
(6	Per- and poly-fluorinated alkyl substances (PFAS) – sum of 24 ( <sup>27</sup> )		not applicable	applicable	PFOA equivalents	Sum of PFOA equivalents 0,0044 ( <sup>28</sup> )

Sum of PFOA Equivalents: 4.4 ng/L

24 compounds

**Per compound** (toxicity not taken into account):

~ 0.18 ng/L

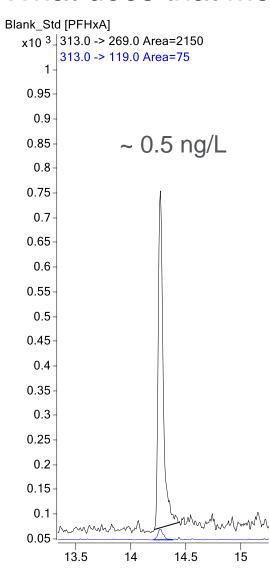
<sup>1)</sup> https://echa.europa.eu/hot-topics/perfluoroalkyl-chemicals-pfas

<sup>2)</sup> https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32020L2184

<sup>3)</sup> https://eur-lex.europa.eu/resource.html?uri=cellar:d0c11ba6-55f8-11ed-92ed-01aa75ed71a1.0001.02/DOC 2&format=PDF

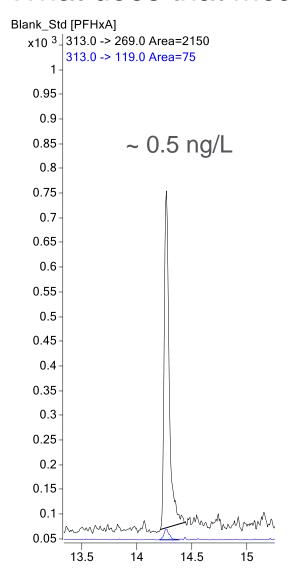
<sup>4)</sup> https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32022R2388

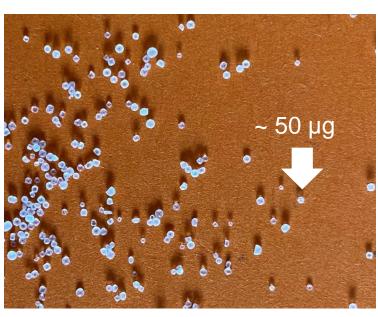
# Sub ppt (ng/L) detection limits



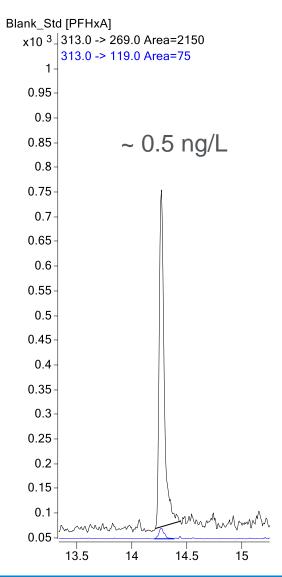
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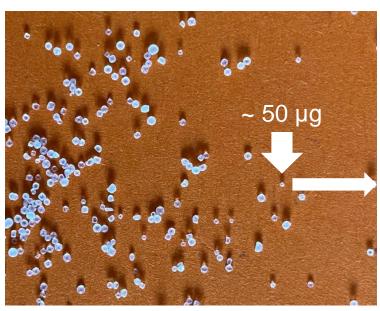


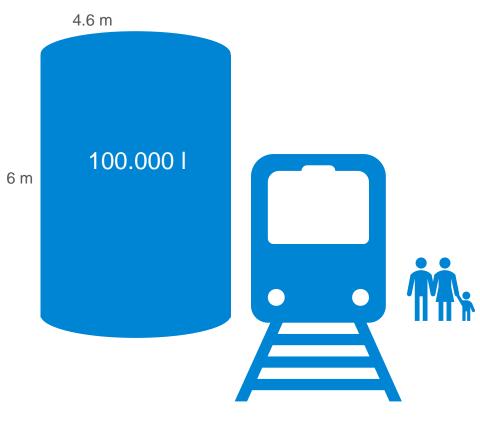


# Blank values - where do they come from?



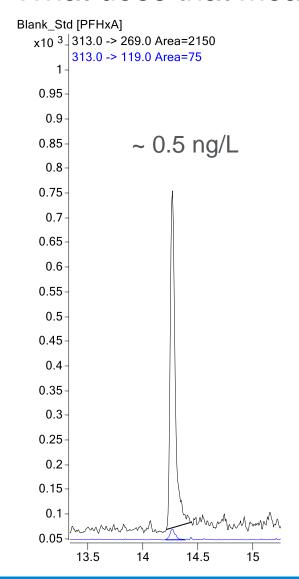


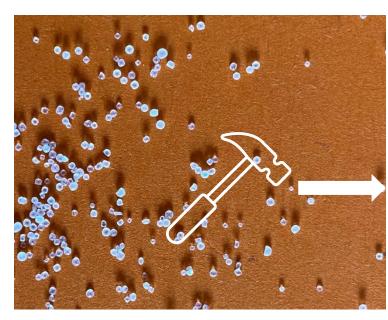




# Sub ppt (ng/L) detection limits









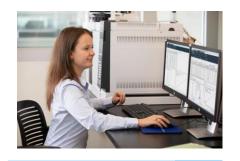


# PFAS testing, Analytical Workflow









Sampling

Sample Preparation

Sample Analysis

Data analysis, Reporting









Agilent PFAS-free consumables and kits

# Future of testing for PFAS



### **Targeted Analysis:**

Analyze more compounds in more matrices with lower detection limits



#### Food

- More commodities
- Food contact materials



#### Consumer goods

- Toys, Textiles
- Cosmetics



#### Pharma

- contaminants
- leachables



#### Environmental

- Water, Soil,
- Air, indoor dust



#### Advanced materials

- Waste water,
- workplace safety

## **Untargeted Analysis:**

Find and identify unknown PFAS













Many thanks!