

PFAS Global Trends, Regulations and Solutions



# **Our Speakers**



### **Dr. Philipp Brüning** Managing Director, QIMA Hamburg

- 23 yeas of experience in the testing industry
- Expertise in consumer products, food, contaminants and chemical analysis
- PhD in Food Chemistry from Hamburg University



### **Patrick Hoppe** Consultant Product Compliance, Munich Consultant Group (MCG)

- B.Sc. And M. Sc. In Business Administration and Engineering
- Master thesis focusing on evaluation of regulatory frameworks for the pharmaceutical industry
- Expertise in regulatory compliance for industrial products (material and chemical conformity)

# QIMA

# Where can we find PFAS?





# The Problem with PFAS

### PFAS exposure pathways

- > Direct exposure:
  - dermal (skin creams and cosmetics) or air (sprays and dust from PFAScoated textiles).
- > Indirect Exposure:
  - drinking water, food, consumer products and dust.
  - other routes such as household products (floor, wood, stone, and car polishing and cleaning products).







# How are PFAS regulated globally ?



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# How are PFAS regulated globally ?

#### **Europe**

EU/EEA establishes regulations under REACH and POPs regulations\* \* \*<u>France / Demark</u> established state level PFAS regulation prior on the EU PFAS restriction schedule, with tentative implementation date as Q1 2026 and Q3 2025 respectively.

### Canada

PFOS, PFOA and LC-PFCAs listed as toxic substances under CEPA

### **United States**

- reporting requirement under TSCA
- no federal PFAS ban
- individual states have introduced bans and restrictions



Global

The Stockholm Convention currently restricts **3** PFAS. Over **150** countries signed the convention and agreed to limit the use of these chemicals

### Asia

Mostly aligned with the Stockholm Convention

- Japan / China / Taiwan established requirement for PFAS control for specific product categories
- <u>Singapore</u> bans for PFAS usage in fire-fighting foam (effective date: Q1 2026)

# How are PFAS regulated globally ?







# **U.S. PFAS Regulations**

### Toxic Substances Control Act: TSCA Section 8(a)(7)

- > Requires submission of data on PFAS manufacturing and importing from 2011 to 2022
- > Substances and articles containing PFAS, including imported articles containing PFAS are included in the scope
- > Reporting time frames delay by 8 months, starting from 11 July 2025



# **U.S. PFAS Regulations**

#### 2024

California, Rhode Island, Minnesota
Ban PFAS in food packaging from 1 January 2024

#### • Maryland

Ban PFAS in food packaging and Carpets and rugs 1 January 2024

#### Colorado

Prohibits PFAS in several consumer products 1 January 2024

#### • Hawaii

Ban PFAS in food packaging 31 December 2024

#### 2025

 Maryland, California, Colorado, Minnesota, Oregon, New York and Washington
 Statewide ban PFAS in various consumer products from 1 January 2025

#### • EPA

Reporting PFAS under TSCA starts from 11 July 2025

#### 2026

• Maine

Ban PFAS in various consumer products from 1 January 2026

#### Colorado

Expand scope of PFAS ban on consumer products from 1 January 2026



# **U.S. PFAS Regulations**

### US States-level bills introduced in 2024

### Most frequently mentioned chemicals



- > Of those 529 bills related to chemicals:
  - 409 or 77% are still active/pending;
  - 51 or 9.6% have passed into law; and
  - The remainder have died through the legislative process
- > PFAS bills make up one third of all the introduced bills
  - 21 of the 51 bills that have passed into law
  - PFAS bills have a 12.7% passage rate

# US PFAS Regulations – Overview

	Food Packaging	Cookware	Children's products	Apparel	Textile furnishing	Cosmetics	Others
California (CA)	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$
Colorado (CO)	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$
Connecticut (CT)	$\checkmark$	Р	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$
Georgia (GA)						Р	Р
Hawaii (HI)	$\checkmark$	Р				Р	
Illinois (IL)	Р	Р	Р	Р	Р	Р	Р
Iowa (IA)	Р						
Maine (ME)	$\checkmark$		$\checkmark$		$\checkmark$	$\checkmark$	$\checkmark$
Maryland (MD)	$\checkmark$				$\checkmark$	$\checkmark$	$\checkmark$
Massachusetts (MA)	Р	Р	Р		Р	Р	
Michigan(MI)	Р						
Minnesota (MN)	$\checkmark$	$\checkmark$	Р		$\checkmark$	$\checkmark$	$\checkmark$

 $\checkmark$  = Adopted P = Proposed



# US PFAS Regulations – Overview

	Food Packaging	Cookware	Children's products	Apparel	Textile furnishing	Cosmetics	Others
Nevada (NV)	$\checkmark$	$\checkmark$	$\checkmark$		$\checkmark$		
New Hampshire (NH)	$\checkmark$	$\checkmark$	$\checkmark$		$\checkmark$	$\checkmark$	$\checkmark$
New Jersey (NJ)	Р	Р		Р	Р	Р	Р
New Mexico (NM)	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$
New York (NY)	$\checkmark$	Р	$\checkmark$	$\checkmark$	$\checkmark$	Р	Р
North Carolina (NC)	Р						
Oregon (OR)	$\checkmark$	$\checkmark$	$\checkmark$			$\checkmark$	
Pennsylvania (PA)	Р					Р	
Rhode Island (RI)	$\checkmark$	Р	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$
Tennessee (TN)	Р	Р	Р	Р	Р	Р	Р
Vermont (VT)	$\checkmark$	Р	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	Р
Washington (WA)	$\checkmark$		$\checkmark$			$\checkmark$	
Wisconsin (WS)			Р				

QIMA E MUNICH CONSULTING GROUP  $\checkmark$  = Adopted P = Proposed 13

# **EU PFAS Regulations**





# **EU PFAS Regulations**

PFAS are regulated under POPs Regulation, REACH Regulation, Cosmetic Products Regulation and Packaging and Packaging waste Regulation in EU

#### EU POPs Regulation (EU) 2019/1021

Substances, mixture	Perfluorooctane sulfonic acid (PFOS), its salts and PFOS-related compounds £ 10 mg/kg	
Semi-finished products and articles, or parts	< 0.1%	
Textile or other coated materials	< 1 µg/m²	
Substances mintures or	PFOA and its salts : £ 0.025 mg/kg	
articles	PFOA-related compounds : £ 1 mg/kg (sum)	
Substances mintures or	PFHxS and its salts £ 0.025 mg/kg	
articles	$\begin{array}{l} \textbf{PFHxS-related compounds} \pm 1 \\ \textbf{mg/kg (sum)} \end{array}$	
Concentrated firefighting foam mixtures that are to be used or are used in the manufacture of other firefighting foam mixtures	PFHxS, its salts and PFHxS-related compounds £ 0.1 mg/kg (to be reviewed within 3 years)	

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EU REACH Regulation (EC) No 1907/2006 SVHC				
Substances, mixtures or articles	Pentacosafluorotridecanoic acid: ≤ 0.1% Tricosafluorododecanoic acid: ≤ 0.1%			

Henicosafluoroundecanoic acid:  $\leq 0.1\%$ Heptacosafluorotetradecanoic acid:  $\leq 0.1\%$ **APFO:** ≤ 0.1% **PFOA:** ≤ 0.1% **PFNA** and its sodium and ammonium salts:  $\leq 0.1\%$ **PFDA** and its sodium and ammonium salts:  $\leq 0.1\%$ **PFHxS and its salts:**  $\leq 0.1\%$ **PFBS and its salts:**  $\leq 0.1\%$ 2,3,3,3-tetrafluoro-2-(heptafluoropropoxy)propionic acid, its salts and its acyl halides:  $\leq 0.1\%$ **PFHpA and its salts:**  $\leq 0.1\%$ **Perfluamine** :  $\leq 0.1\%$ 

#### **EU REACH Regulation (EC) No** 1907/2006 Annex XVII Entry 68

**C9-C14 PFCAs and their salts** ≤ 0.025 mg/kg Substances. C9-C14 PFCA-related substances < 0.26 mg/kg (sum) or articles

mixtures

#### EU REACH Regulation (EC) No 1907/2006 Annex XVII Entry 77

irefighting foams FFFs) and FFF	
oncentrates	
osmetic products	
ood contact paper nd cardboard	
ootwear	
Aixtures	
extiles, leather, furs	

PFHxA and its salts ≤ 0.025 mg/kg **PFHxA-related substances** < 1 mg/kg (sum)

#### Packaging and packaging waste Regulation (EU) 2025/40

Food Packaging

All PFAS : Prohibited

#### Regulation (EC) 1223/2009 Annex II

Cosmetics

PFOS, PFOA, PFNA and PFDA : Prohibited

# **EU PFAS Regulations - Update**

### ECHA Proposal for a Restriction, Per- and Polyfluoroalkyl Substances (PFASs)

	Product / Scope	Limit
ECHA Annex XV Restriction Report, February 7, 2023	RO1 Full ban	Prohibited
Proposal for a Restriction, Per- and Polyfluoroalkyl Substances (PFASs)	RO2 Substances on their own	Prohibited
	Constituent of another substance, mixtures or articles	Any target PFAS £ 25 ppb (polymeric PFASs are exempt) Sum of target PFAS £ 250 ppb (polymeric PFASs are exempt) Total fluroine £ 50 ppm, including polymeric PFASs (a proof of total fluorine measured as content of PFASs or non PFASs must be provided upon request by authority)



# **EU PFAS Regulations - Update**

### ECHA Proposal for a Restriction, Per- and Polyfluoroalkyl Substances (PFASs)

### > ECHA released its updated PFAS schedule and roadmap





# **EU PFAS Regulations - Update**

Country	Scope	Limit	Implementation Date
France	Cosmetics, Ski Waxes, footwear, clothing textile products	Ban	Tentative : 1 Jan 2026
(note 1)	All textiles (except protective clothing for safety and civil security professionals	Ban	Tentative : 2030
Denmark (note 2)	Clothing, footwear, waterproofing agents (consumer products only)	Total fluorine ≤ 50 mg/kg	1 July 2025 (order in force) 1 July 2026 (ban on import and sale) 1 July 2027 (sale or pre- imported stock ends)

Note 1 : adopted on 20 Feb 2025, now undergo constitutional review before President can sign it into law

Note 2 : The European Commission's standstill period for feedback ended on 28 February 2025. Pending approval, the Order will enter into force in mid-2025, setting a precedent for other Member States to address PFAS through national measures.



# Asia PFAS Regulations





# Asia-Pacific PFAS Regulations

### National Level regulations

China: List of new pollutants-2023

Prohibited:

Substances,	mixture	or
articles		

PFOS, its salts and PFOSF PFOA, its salts and related substances PFHxS, its salts and related substances

#### Taiwan: Toxic chemicals and their operational management

 
 Substances,
 PFOS, its salts and related substances: < 10 mg/kg</td>

 mixture or articles
 PFOA and its salts: < 0.025 mg/kg</td>

 PFOA related substances: < 1 mg/kg</td>

 PFHxS and its salts: < 0.025 mg/kg</td>

 PFHxS related substances: < 1 mg/kg</td>

#### Singapore: Protection and Management (Hazardous Substances) Regulation

ubstances,	Prohibited:
ixtures or	PFOS and its salts
ucies	PFOA, its salts and related substances
	PFHxS, its salts and related substances
	Longchain PFCAs (C9~C21)

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m

Australia/New Zealand: Industrial Chemicals Environmental Management (Register)-Amendment (2023 Measures No. 1) Instrument 2023

Substances,	mixtures
articles	

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or

PFOS and its salts: ≤ 0.025 mg/kg PFOS related substances: ≤ 1 mg/kg PFOA and its salts: ≤ 0.025 mg/kg PFOA related substances: ≤ 1 mg/kg PFHxS and its salts: ≤ 0.025 mg/kg PFHxS related substances: ≤ 1 mg/kg

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Sul miz Japan: Management of Chemicals on Class I Specified Substances

ostances,	Prohibited:
ctures or	PFOS and its salts
icies	PFOSF
	PFOA or its isomers, or their salts
	PFOA-related compounds (perfluorooctyl iodide (PFOI), 8:2 fluorotelomer alcohol (8:2 FTOH) and substances that degrade to PFOA)
	PFHxS or its isomers (limited to branched structures with 6 carbon atoms) or their salts

# **Challenges in Achieving Compliance**

### Definitions of "PFAS" are different

**G** Chemicals with <u>at</u> <u>least two adjacent</u> <u>carbon</u> atoms where one atom is fully fluorinated and the other is at least partially fluorinated."

- EPA



Substances that include any member of the class of fluorinated organic chemicals containing <u>at least one</u> fully fluorinated carbon atom."

- Maine

FAS

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

- EU/ORED

**Chemicals with (-CF2) that are not** (-CF3) are expected to degrade in the environment and most substances with only one terminal carbon (-CF3) are expected to degrade to trifluoroacetic acid, which is a well-studied non-PFAS".

- EPA

# Meeting the Evolving Demands of PFAS Regulation and Stakeholder Expectations





# **Possible Alternatives and Challenges**

### No regrettable substitution

> Do not choose replacement chemicals within PFAS group (long chain vs short chain)

- > Substitution shall not contain other harmful chemicals
  - SIN list
  - ECHA candidate list
  - AFIRM, AAFA, MRSL list

### Safe and Sustainable by Design (SSbD) criteria

- > Alternative chemicals
- > Alternative materials
- > Alternative technology
- > Process redesign





# **Examples for PFAS Alternatives**



- Chemicals: waxes, oils, polymers, siliconesChange base materials
- > Chemicals: Polymers, silicones> Process Change: increase density

> Change base material: decrease porosity

> Chemicals: Polymers, silicones> Process Change: increase density

# **Best Practices in Achieving Compliance**



**Transparency:** communicate with internal and external stakeholders and supply chain partners about the commitment to PFAS compliance



Training: to ensure consistency in the compliance approach and fosters a sense of accountability



Test and monitor raw materials and products



Monitor compliance: keep track changes in regulations and keep up-to-date on PFAS development



Look to the future: identify strategy to phase out PFAS containing materials and identify alternatives



# Best Practice: Early Warning System

### Early Warning System by Munich Consulting Group (MCG)

- Our expertise is based on the strategic collaboration of lawyers, engineers and project managers, enabling us to address the specific needs of our clients with precision.
- The Early Warning System (EWS) is the centerpiece of our comprehensive legal monitoring framework, tailored to the unique characteristics of each client.



practical measures to ensur regulatory compliance.

# Best Practice: Early Warning System

### Screening Process in Detail

The screening process at MCG follows a three-step, coordinated approach designed to ensure optimal alignment with the markets and products of the respective client.



#### 2. EXCHANGE OF INFORMATION



**3. COORDINATED COLLABORATION** 

# Best Practice: Early Warning System - Action Plan

### **Recommended Actions by MCG**

After "translation" of the specific requirements into practical measures, MCG can assist you with the implementation of a specific action plan and ad-hoc support.



Market support and ad hoc queries for import challenges



Coordination of stakeholder communication



Support with reporting obligations



Assistance with supply chain inquiries



# **Best Practice: Use Case - PFAS Regulation**

### **Proactive PFAS Compliance Management**



### Monitoring Global Legislation

- > Ongoing screening of PFAS-related regulatory developments worldwide
- > Early detection of upcoming restrictions (e.g., EU REACH, US EPA, etc.)
- > Tailored to the client's product portfolio and relevant target markets
- > In practice: Joint clarification of applicable product categories and target markets with the client



PFAS



- Assessment of PFAS presence in the client's products
- If data is unavailable: Support in engaging suppliers to obtain necessary information
- Structured coordination meetings for ongoing alignment
- Evaluation of collected data to determine regulatory relevance based on product and PFAS-specific criteria



# **Best Practice: Use Case - PFAS Regulation**

### **Proactive PFAS Compliance Management**



#### **Recommended Actions**

- > Derivation of concrete PFAS compliance obligations across product categories
- Strategic guidance for internal implementation (e.g., guidelines, documentation)
- Support in fulfilling specific reporting obligations (e.g., TSCA PFAS reporting)



PFAS



- > Rapid response to client-specific PFAS inquiries
- > Targeted guidance on market developments and stakeholder communication
- Up-to-date support on current and emerging PFAS legislation



# **PFAS** Testing

### Total fluorine screening

- > Reference to EN 14582 (combustion method)
- > A fast and economic approach for PFAS screening
- > Threshold level set for further confirmation
- > Aligned with US California PFAS requirement
- > Aligned with EU latest proposed universal PFAS ban

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### E TF vs TOF vs TIF?

- TF: Total Eluorine TOF: Total Organic Eluorine TIF: Total Inorganic Eluorine
- > TF = TOF + TIF
- > No harmonized test method for TOF / TIF
- TF is applied as market practice (e.g. AFIRM, as screening approach) to assess the risk of PFAS compliance in general consumer product.



# **PFAS** Testing

### Individual PFAS analysis

- Reference to standard methods (EN 17681-2 and CEN/TS 15968)
- > Currently > 90 PFAS can be identified
- > Continuously expanding the chemical coverage
- > High accuracy with low detection limit

### Ö- Principle of Individual PFAS analysis

- PFAS species (in sample) are extracted to the applied organic solvent
- Sample extract (organic solvent) is analyzed by LC-MS/MS and/or GC-MS/MS
- Specific PFAS species content (in sample) is evaluated from the LC-MS/MS and/or GC-MS/MS measurement.

# Thank You!

