

3

**FOCUS ON  
POLLUTANTS**

## Why do we have this session?

More legislation

Increased focus

Higher  
requirement from  
Brands

## What's in it for you?

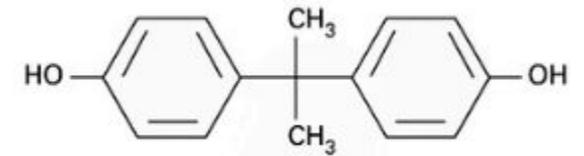
Knowledge  
sharing

Common goal

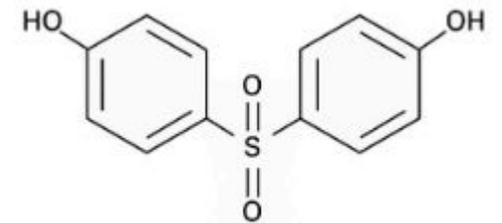
Ask questions!

# Bisphenols: What are Bisphenols of Concern?

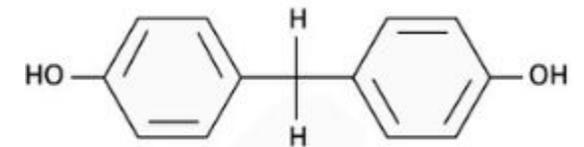
- Synthetic chemicals based on two (bis-)Hydroxyphenyl groups, mostly connected by a methylene bridge + various functional groups
- Hundreds of substances belong to the group of Bisphenols
- ECHA assess ~35 Bisphenols of Similar Concern (BoSC) due to their potential harm
- BPA, BPS, BPB and BPF are considered most relevant for AFIRM brands



Bisphenol A (BPA)



Bisphenol S (BPS)



Bisphenol F (BPF)

# Bisphenols: Where are they used? - and why?



# Bisphenols: Where are they used? - and why?

## TEXTILES



- Polyamide, Nylon
- Polyester
- Coatings

dye fixing agent to enhance color fastness and durability, water resistance, antioxidants to prevent fibre degradation

## LEATHER



- Synthetic tanning agents (Syntans) in pre-tanning / tanning / re-tanning

control and enhance e.g. softness, fullness, color uniformity, resistance to water and microbial growth

## POLYMERS



- Polycarbonate
- Epoxy and Vinyl Ester Resins
- Polyvinylchloride

precursor of not fully reacted polymerization prevent rust and corrosion in plasticizer or flame retardants

## OTHERS



- Adhesives, Binders
- Thermal receipt paper

plasticizers, flame retardants

act in heat-activated printing process for inkless printing

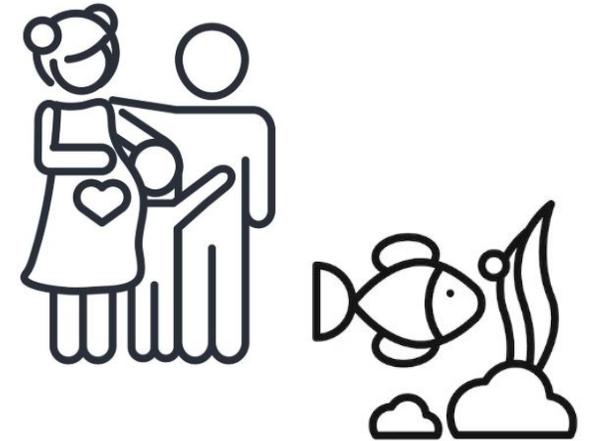
# Bisphenols: Why are they of concern?

## Health & Environmental concerns

Bisphenols can be:

- known endocrine disruptors (mimic hormone functions)
- reprotoxic properties
- skin sensitizers
- risk to aquatic life
- exposure risks through inhalative, oral and dermal routes
- 3 Bisphenols are SVHCs (BPA, BPB and BPS) (2 further currently assessed)

Effects of all Bisphenols have not been assessed equally yet and more research is needed.



# Bisphenols: Regulatory landscape

## United States, European Union, multiple Asian Countries, ...

- BPA bans in mouthable products for infants in e.g. EU, US and multiple Asian countries
- Extending restrictions on multiple Bisphenols in Food Contact Materials



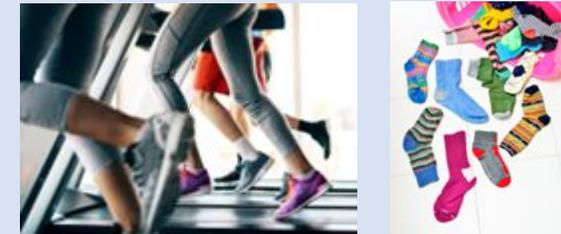
## European Union

- Bisphenols A, B and S are listed as SVHCs
- BPA restriction for thermal receipt paper
- Assessing the need of restricting all bisphenols as a group with one universal restriction



## US California

- BPA and BPS added to California Proposition 65 List
- considers to restrict the entire class of p,p'-Bisphenols



# Bisphenols: What can you do about it?

## Test



CAS No.	Substance	Limits Component Materials in Finished Product	Suitable Test Method Sample Preparation & Measurement	Reporting Limit Limits above which test results should be reported
	<b>Bisphenols</b>			
80-05-7	Bisphenol A (BPA)	Textiles & Leather: 10 ppm Items intended to come in contact with the mouth: 1 ppm Other materials: 1000 ppm	Leather: EN ISO 11936:2023  All other materials:  Extraction: 1 g sample/20 ml THF, sonication for 60 minutes at 60 °C, then add methanol or acetonitrile for precipitation prior to analysis with LC/MS	Leather: 10 ppm each  All other materials:  0.1 ppm for individual samples 1 ppm for composite samples
80-09-1	Bisphenol S (BPS)	Textiles: 200 ppm each  Leather: 800 ppm each		
77-40-7	Bisphenol B (BPB)	Limits will likely be reduced further in future revisions of the AFIRM RSL based on the best available technology and feasibility within the supply chain.	Note for textiles: For precipitation, draw the extract to another container and add methanol or acetonitrile. This keeps the extraction process consistent.	
620-92-8	Bisphenol F (BPF)	Other materials: 1000 ppm each		



Receipt paper: BPA & BPS: 1 ppm  
Other packaging: 1000 ppm each

# Bisphenols: What can you do about it?

## Avoid



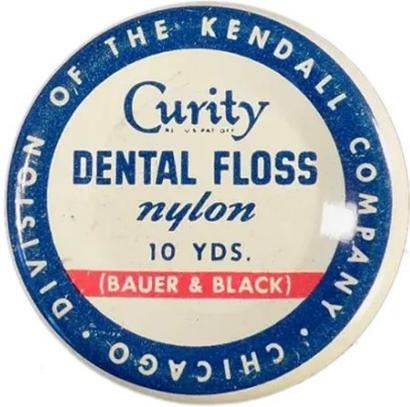
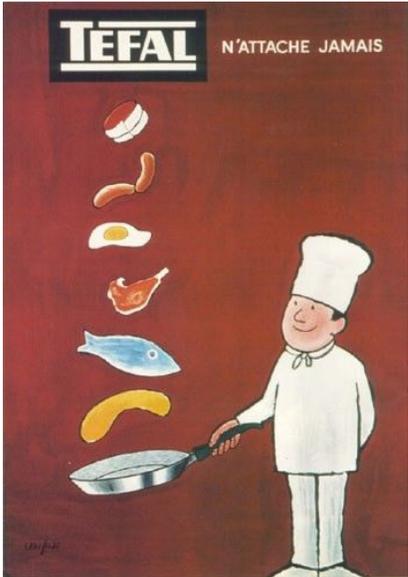
- Refer to MRSLs and make use of databases with approved chemical products (note: Bisphenol restrictions are not always harmonized)
- Communicate your requirements for Bisphenols to your suppliers
- Share AFIRM chemical information sheets with your supply chain  
new Bisphenol Management Guideline in the pipeline → **stay tuned** :)





# PFAS: Where **is**/was PFAS

## Food & Mouth



## Apparel & Footwear



## Ski and Firefighting

# PFAS: Why is PFAS a concern?

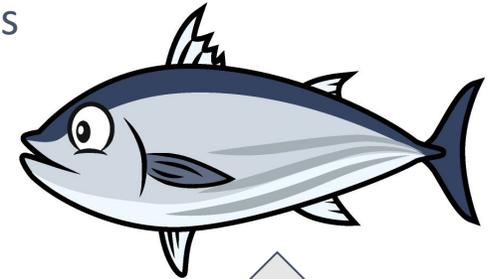
## Health Effects

- Some Cancers
- Reproductive harm
- Cholesterol increases
- Liver damage
- ...
- ...

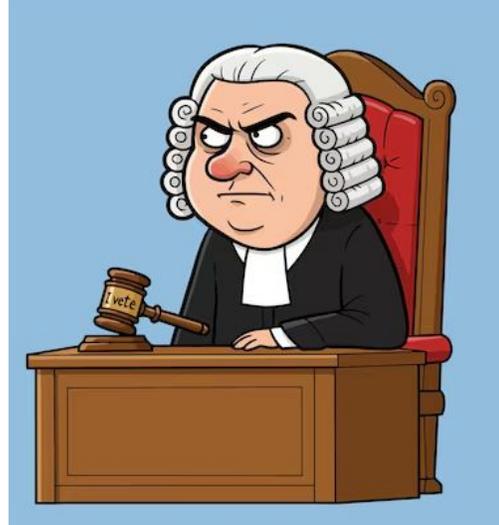
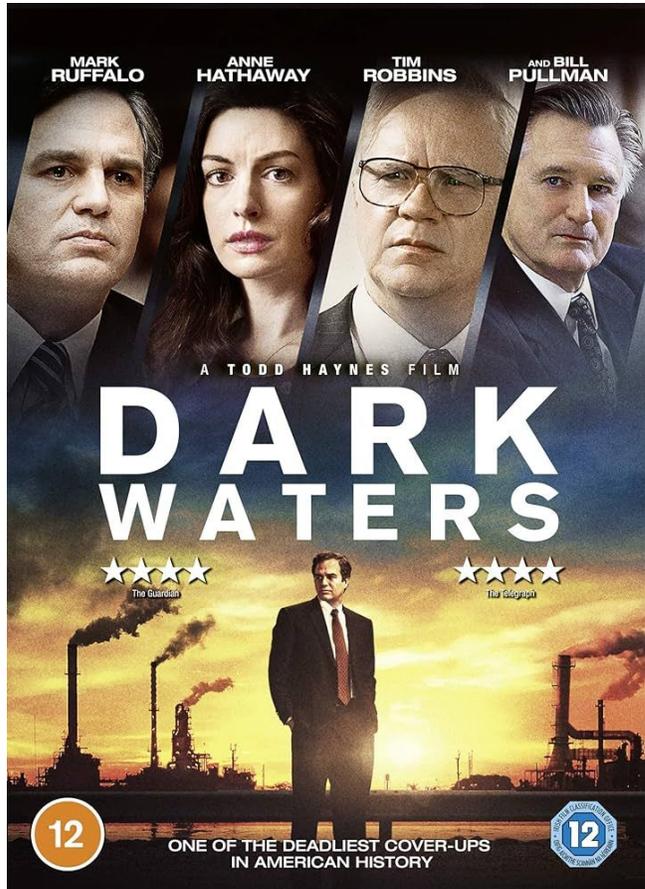


## Environmental concerns

- Contaminations: Water, Air, Soil
- Water concerns: Rivers, ponds, lakes, oceans
- Wildlife, Fish, Animals



# PFAS: Public Outcry, Lawsuits & Legislation



2005	\$235 Million
2017	\$670 Million
2018	\$850 Million
2023	<b>\$10 Billion</b>

## POPs

- PFOA, PFHxS, PFCA, PFHxA: **25 ppb**



## French PFAS Law No. 2025-188

- Individual PFAS (not polymers): 25 ppb
- Total PFAS (excluding polymers): 250 ppb
- All PFAS (including polymers): 50 ppm

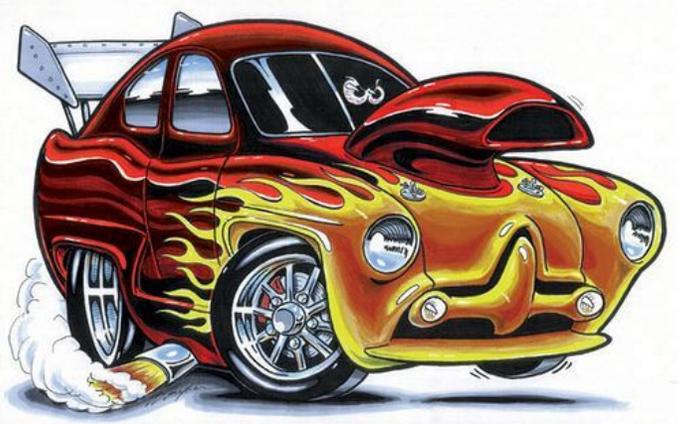


## Denmark and California AB 1817

- 2025 - All PFAS 100 ppm (TOF)
- 2027 - All PFAS 50 ppm (TOF)



# PFAS: Legislation Cartoon



VS



# PFAS: What can you do about PFAS?



## Information & Education

- Ask your suppliers to provide a DWR or stain/oil-repellent/resistant finish that is not based on PFAS
- Collect SDSs and TDSs for all chemicals used in your manufacturing facility\*

\* Sometimes these do not list the PFAS so check with suppliers!!!

### PHASEOUT GUIDANCE

Version 02 | 2025



## PER- & POLYFLUOROALKYL SUBSTANCES (PFAS)

Table 3. Test Methods Available at Scale

#### Method 1 : Total Fluorine

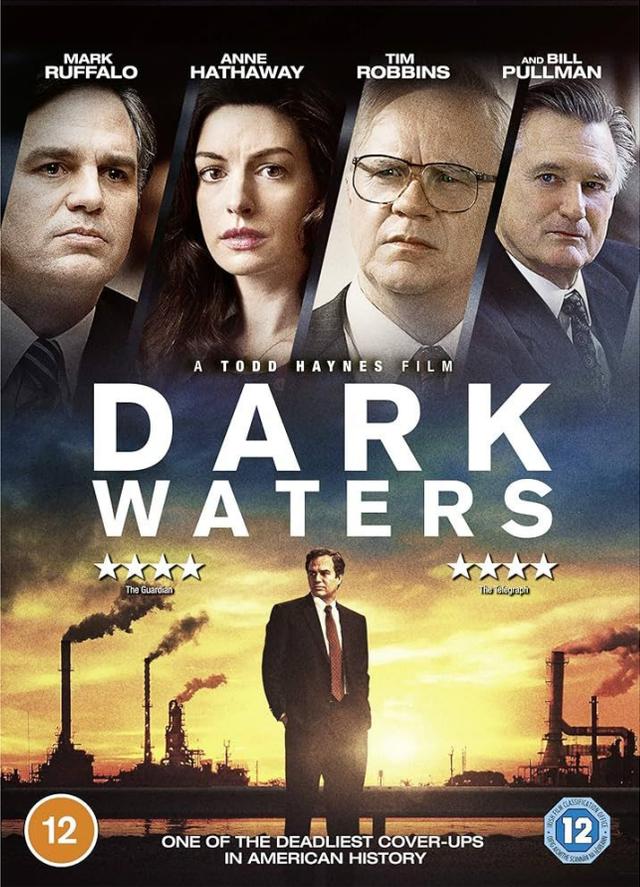
EN 14582:2016 or ASTM D7359:2018 or EN 17813:2023

#### Method 2 : Organic Solvent Extraction

Textiles and other materials: EN 17681-1:2025  
Leather: EN ISO 23702-1  
Polymers: EN ISO 23702-1:2023 using THF extraction followed by methanol precipitation (1:1)



# PFAS to Chromium VI



# Where is Chromium used - textiles & leather

## LEATHER INDUSTRY



- Chromium sulphate used in tanning to dye hides
- Process involves acid, salt, and other chemicals
- Hides turn light blue after soaking in acid salt



- Chromium is present in dyestuff and paints
- Risk is lower compared to leather due to thinner substrates

## TEXTILE INDUSTRY

# Why is Chromium VI a concern?



Risks arise when Chromium III (Cr III) oxidises into Chromium VI (Cr VI)

*+3 oxidation state = trivalent*

*+6 oxidation state = hexavalent*



**Health & Environmental concerns**

# Why is Chromium VI a concern?



Risks arise when Chromium III (Cr III) oxidises into Chromium VI (Cr VI)

*+3 oxidation state = trivalent*

*+6 oxidation state = hexavalent*

## Health concerns

- Skin contact (e.g. when not wearing gloves) can lead to allergic reactions and dermatitis
- Prolonged exposure can cause respiratory issues e.g. asthma, lung cancer
- Ingestion of Cr VI contaminated water can damage liver and kidneys

## Environmental concerns

- Cr VI contamination in water bodies can harm aquatic life
- Soil contamination can affect plant growth and food safety
- Improper disposal of Cr VI-containing waste can leach into groundwater, posing risks to communities

# How and when can Chromium VI occur?

## RISK FACTORS

1

### OXIDISERS

Using decolouring agents, bleach, or other oxidisers can promote the formation of Cr VI

2

### pH INCREASE

High pH values (pH > 6) provide an environment for oxidation into Cr VI

3

### ENVIRONMENT

Exposure to sunlight, storage and transport in humid and hot environment can trigger oxidation reactions into Cr VI

# What can you do about it?

## PREVENTIVE MEASURES

- Avoid UV light, high temperatures, too low or too high humidity
- Reduce exposure to oxidising agents (bleaches, etc)
- Use alternative tanning agents (1-3%) to limit Cr VI formation, e.g. vegetable
- Use “scavenger” chemicals during retanning due to their reductive potential
- Finish tanning and re-tanning at pH < 3.8 (4.5 starts to be risky)
- Avoid using chromium-containing pigments (e.g. Yellow 34, Red 104)



# What can you do about it?

## TESTING RECOMMENDATIONS

- **ISO 17075-2** (Chromatography) to limit false positive that can occur with ISO 17075-1 (Colorimetric method)
- **Ageing** according to ISO 10195 2018 Method A2 recommended before testing



# Final comments



Why?

Where?

How?

Thank you for listening