# Greener Chemistry:
## The Path to Protecting People and the Planet

HOHENSTEIN

NORTON ROSE FULBRIGHT

# Chemical compliance and risk update

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# Key chemical compliance risks

- State PFAS restrictions on juvenile products, apparel and footwear, textiles
- EPA Toxic Substances Control Act (TSCA) PFAS Reporting and Recordkeeping Rule
- Proposition 65
  - PFAS substances
  - BPA/BPS

# State PFAS laws and regulations—overview

**States in the lead**

- Juvenile products
- Apparell and footwear
- Textiles
- Furniture
- Carpets and rugs
- Fabric treatments
- Some states have future bans for PFAS in all products

**Types of restrictions:**

- Bans on “intentionally added PFAS”
- More than 100 parts per million total organic fluorine
- Manufacturer certificates of compliance
- Labeling, reporting or notification requirements
- Warnings

# Overview continued

**Scope:**

- Predominantly all PFAS substances, as broadly defined *OR* specific PFAS classes or individual substances
- New, not previously used products

**Effective date:**

- Predominantly applicable to sale, distribution, or manufacturer after effective date—no sell through
- Applicable to products manufactured after effective date

**Detection**

- Predominantly "intentional use," meaning added for technical or functional effect
- California juvenile products, apparel, and textile laws add detection of Total Organic Fluorine as proxy for intentional use—massively confusing—contamination/quality control issues can be considered intentional use

**Enforcement**

- Fines, civil penalties
- For legislation that is not specific about fines or penalties for non-compliance—presume enforcement, if any, will be via Attorneys General and district attorneys for unfair competition
- Private enforcement via class actions for false advertising or unfair competition

State PFAS risk

# Enforcement trends

- No signs of public enforcement of laws in effect (e.g., attorneys general, district attorneys)
- Significant private plaintiff activity—consumer class actions
  - Claims that products are illegal
  - Claims that products are unsafe
  - False advertising (e.g., “PFAS-free,” “sustainable”)
  - Breach of warranty/product liability

# Key developments

## Enforcement trends

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**Guidance**--Minnesota

## New state laws

- Connecticut
  - Reporting and labeling (2026), prohibition (2028)
  - Apparel, fabric treatments, juvenile products, outdoor apparel, upholstered furniture
- Vermont
  - Textiles (2026)

# Key developments--continued

**Amendments to state laws**

- ***Colorado***
  - Bans intentionally-added PFAS in apparel, textiles
- ***Maine***
  - Eliminated notification requirement for all products
  - Replaced with ban on intentionally-added PFAS in juvenile products, apparel, textiles, furniture
  - State-designated “unavoidable use” exemption—reporting required
- ***California Proposed AB 347***
  - Would designates DTSC as responsible for implementation of PFAS laws, including regulations
  - Would limit scope of juvenile products ban to sit/sleep/play products for children
  - Would require manufacturers of apparel, textiles, and juvenile products to report to the state
  - Would provide a number of procedural and administrative measures related to testing and enforcement

Federal PFAS risk

# US EPA TSCA PFAS Reporting and Recordkeeping Rule

**Covered substances**

- "All chemical substances and mixtures containing a chemical substance (**including articles**) that are a PFAS" as defined
- **Includes "articles"**

**Who must report?**

- Any entity that has "manufactured for commercial purposes a [covered] chemical substance … at any period from January 1, 2011, through November 13, 2023…."

- *Manufacture* means "to import …, produce, or manufacture….

**Reporting timeline**

- Report must include look back to January 1, 2011
- Final reporting deadline **January 11, 2026**, small businesses (those with less than $12M in annual sales) have an additional six months to report
- Reports will be submitted via TSCA online reporting portal (CDX)

**Recordkeeping**

- Must maintain records supporting report for five years from the last day of the submission period

California

# Proposition 65

**WARNING** This product can expose you to chemicals including [name of one or more chemicals], which is [are] known to the State of California to cause cancer, and [name of one or more chemicals], which is [are] known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

- PFOS and PFOA listed as reproductive (developmental) toxins 11/10/17
- PFOS and its salts and transformation and degradation precursors listed as carcinogen 12/24/21
- PFNA and its salts listed as male reproductive toxicant 12/31/21
- PFOA listed as carcinogen 2/25/22
- BPA listed as female reproductive toxin 5/11/2015 and developmental toxin (12/18/2020)
- BPS listed as female reproductive toxin 12/29/2023

NRF

# Hohenstein

**Take advantage of decades of experience for:**

- Quicker product launches
- Assured product safety
- Tested quality


# Hohenstein Worldwide Support

# Hohenstein Focuses on Interactions

# Sustainable Development

**Chemical Management**
RSL/MRSL conformity,
input control, audits

**Microfiber**
analysis using
dynamic image analysis
& filtration

**Wastewater Analysis**
to comply with ZDHC,
OEKO-TEX®, DETOX

**Biodegradation**
to evaluate environmental
compatibility

**GMO Testing**
with Hohenstein method,
OEKO-TEX®, ISO/IWA 32

# Textile Industry Scale

**~9 Billion**

People

**~200 Tons**

Water used/ton of fabric dyed

**27 Billion**

Articles/year (shirts + pants + jackets)

**20 Billion**

Footwear pairs/year

**$2.56 Trillion**

Textile, clothing, footwear (2010)

Adapted from treehugger.com

## Sustainable?

# ~ 4000 – 8000* Chemicals Used For Apparel & Footwear

Entering factories with countless formulations

* Not knowing this number should worry us

# Testing.
# Research.
# Education.

And that is just the beginning...


# Why Do We Test?

Quality

Safety

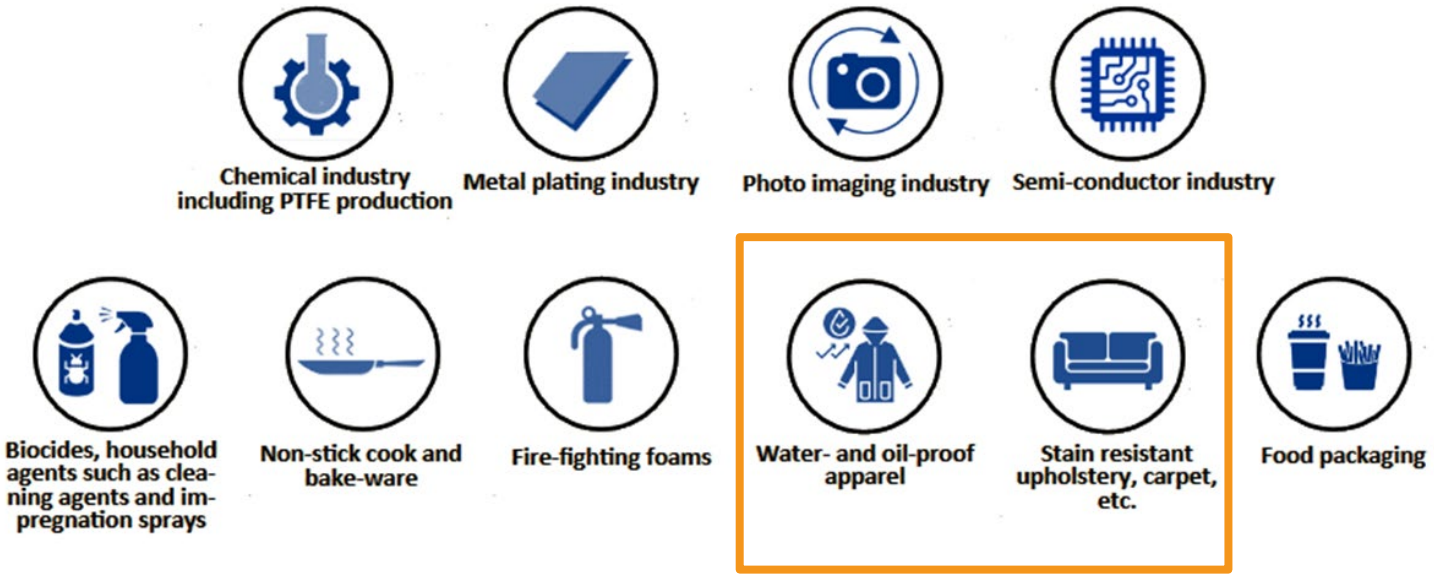
Prevent recalls

Reduce returns

Minimize complaints

Uphold brand image

# **PFAS**
## Properties & Use




Source: UN EP

- Heat / flame resistance
- Surface protection
- “Non-stick” properties
- Water, oil & stain repellants
- Lubrication / low friction
- El. Insulator

# **PFAS in Textiles**
## Challenges

- Understanding Intentional use versus contamination
- Maintaining performance while removing hazards
- Knowing where PFAS are used within complicated supply chains
- Keeping up with:
  - Rapidly changing state, federal & international regulations
  - Industry initiatives & innovations
  - Customer RSLs & consumer demands
- Communicating with customers & suppliers

# PFAS Product Testing

| | | |
|---|---|---|
| TOF | **TOTAL** ORGANIC Fluorine | From **all PFAS** & precursors |
| EOF | **EXTRACTABLE** ORGANIC Fluorine | **Fraction of fluorine** from PFAS & precursors<br>Conventional solvent & adsorbent systems<br>Efficiency is **limited by variability** PFAS composition |
| AOF | **ADSORBABLE** ORGANIC Fluorine | |
| TF | **TOTAL** Fluorine | From **all fluorine compounds** not just PFAS/organic |

# Targeting Organic Fluorine

## What We're Measuring

Adapted from "Analytical Methods for PFAS in Products and the Environment" by Nordic Council of Ministers http://dx.doi.org/10.6027/temanord2022-510

| | | | |
|---|---|---|---|
| TOF | X-ray Photoelectron spectroscopy (XPS) | • Confirm PFAS presence<br>• Quantitative: TOF as %F | • Expose sample to x-ray under vacuum<br>• Limit: surface only (0.01 mm) |
| EOF + AOF | Combustion Ion Chromatography | Estimate | Underestimation possible |
| EOF + AOF | Instrumental Neutron Activation Analysis (INAA) | Qualitative & quantitative | • Sample bombarded w/ neutrons -> radioactive isotopes<br>• Non-destructive<br>• Aluminum causes interference |
| TF | Instrumental Neutron Activation Analysis (INAA) | Qualitative & quantitative | • High throughput & non-selective<br>• Liquid & solid samples |
| TF | Particle Induced Gamma-ray Emission Spectroscopy (PIGE) | Quantitative | • Proton ion beam -> gamma-ray emittance<br>• Limit: surface only (250 µm)<br>• Highly specialized operators & instrument |

# **Targeting Organic Fluorine**
Methods

# Product Testing FLUORINE
# 1. Total Organic Fluorine (TOF):
EN 14582:2016 or ASTM D7359:2018

## Method

- Screening method - indicates presence of any fluorine
- Scope = “Characterization of waste”
- Total combustion of test sample

## Does NOT/Is NOT

- No differentiation - inorganic vs organic fluorine
- No info on specific fluorine compounds present
- Not PFAS content – includes non-PFAS fluorinated compounds
- Not demonstration of legal compliance

## Testing

Typical, globally adopted “reporting limit” for textile method = 20 mg/kg

# Product Testing TARGETED PFAS

# 2. Analysis of Targeted PFAS:

EN 17681 (Textiles); EN ISO 23702-1 (Leather)

## Method

- Quantitative analysis for **limited list** of specific PFAS substances
- Lists = very **selective** - cover typical EU requirements (+ voluntarily restricted PFAS)

## Does NOT/Is NOT

- Not comprehensive - PFAS not specifically analyzed may be present
- Not a guarantee
  - No PFAS used in **production**
  - PFAS not present on sample as **contamination**

## Testing

Low reporting limits (lower ppb (µg/kg) levels) are achievable

## 1. Check Total Organic Fluorine:

- If < 20 mg/kg (reporting limit), sample is PASS
- If > 20 mg/kg and < 100 mg/kg sample is PASS, PFAS considered “Acceptable Contamination”

## 2. If Total Fluorine > 100 mg/kg:

- Sample is FAIL if PFAS have been applied for finishing

## 3. If no PFAS-based finishing has been applied:

- Provide evidence by certificates from chemical suppliers (e.g., SDS or similar)
- Provide evidence by “analysis of targeted fluorinated compounds” that
  - No restricted PFAS have been applied
  - The source of total organic fluorine is not from banned PFAS

# PRODUCT TESTING HOW TO CONTROL THE PRODUCTS

# Hohenstein Smart Testing

# Customize Testing Intensity

Testing programs should:

- ✓ Ensure quality aligns with stakeholder expectations
- ✓ Fit budget AND appetite for risk
- ✓ Fulfill legal requirements

# OEKO-TEX®

## Ensuring trust & sustainability in textiles & leather.

# OEKO-TEX® Global Network

**17**

**Independent**
textile & leather research
& **test institutes**

**70**

**Countries**

**21,000**

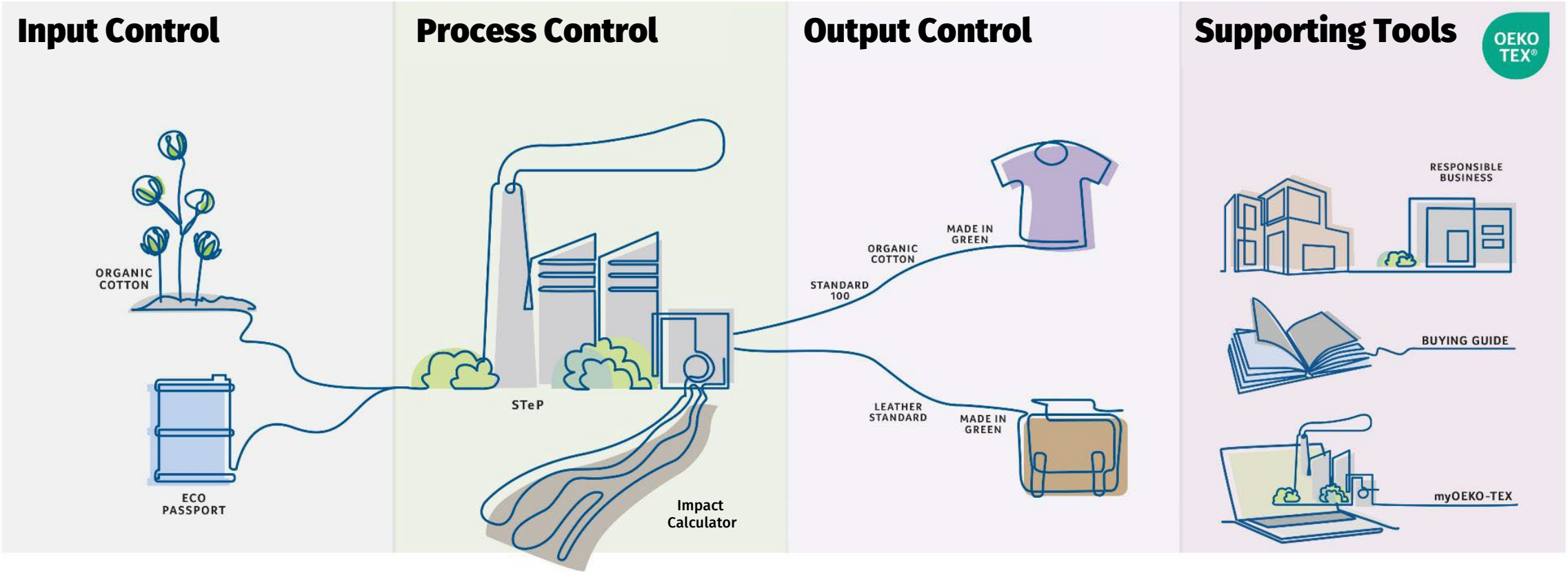
**Companies**
working with OEKO-TEX®

**235,000**

**Certificates**
(new & renewal)

# OEKO-TEX® System

The highest standards for textiles & leather
- driven by sustainability & grounded in proven science.



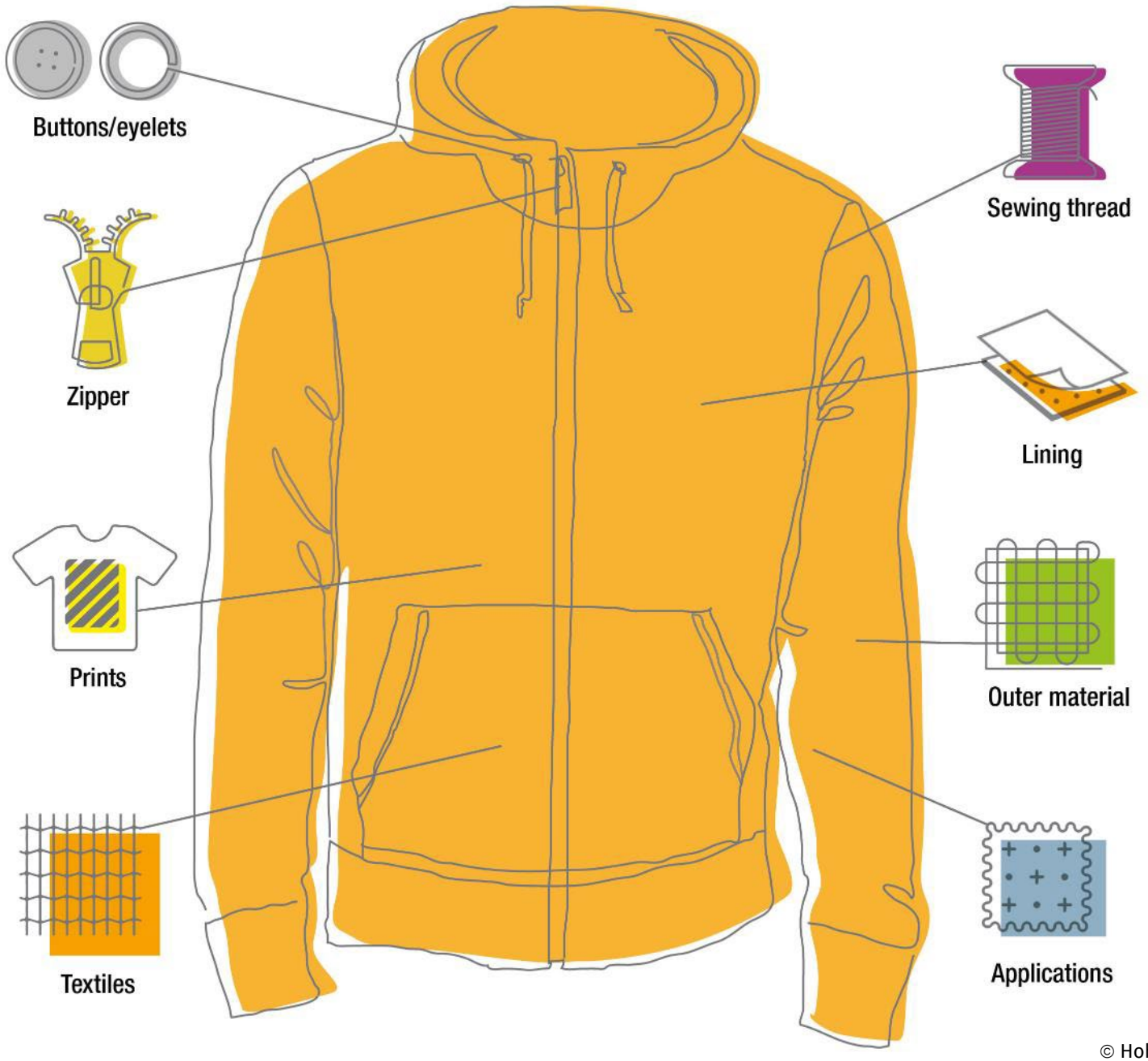
# What can be certified?

Every component of the product

+

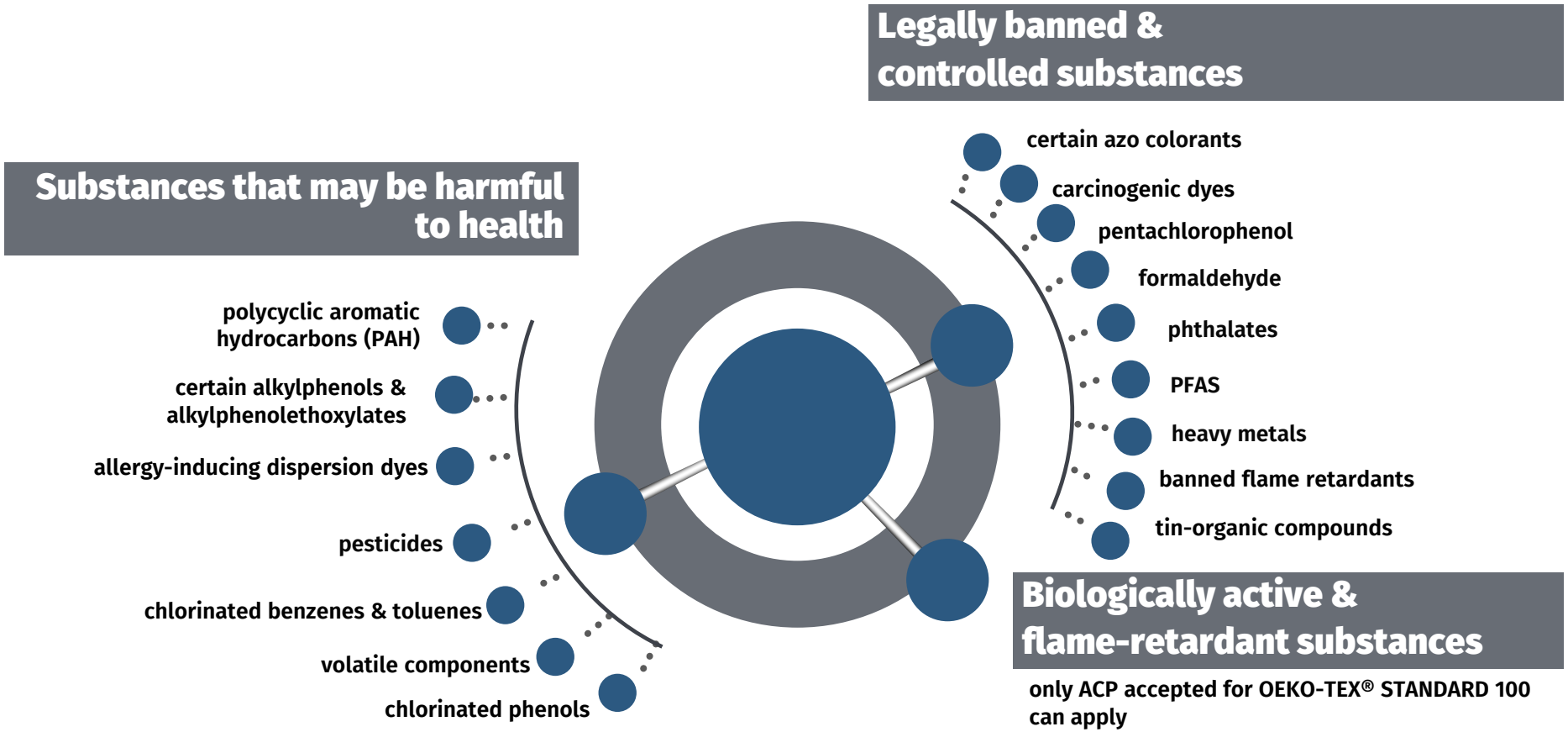
Finished product

(if all components are tested)



# OEKO-TEX® Test Criteria

## Globally Harmonized Chemical Management



# Leverage Existing Certifications

OEKO TEX®

STANDARD 100

**Product Certification**

Manage risk with third-party verification

+

**RSL Testing**

Ensure quality with product-based spot check

=

**Assurance**

Compliance with legal & brand-specific requirements

# Contact

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SCAN FOR
CONTACT DETAILS

Hohenstein.US/Sustainability

*See you next year!*

# EMERGING TECHNOLOGIES CONFERENCE at Advanced Textiles EXPO®

Nov. 4–7, 2025 | Indianapolis, IN USA