The ZDHC Tools and Risk based testing

How sustainable chemistry is shaping textile manufacturing

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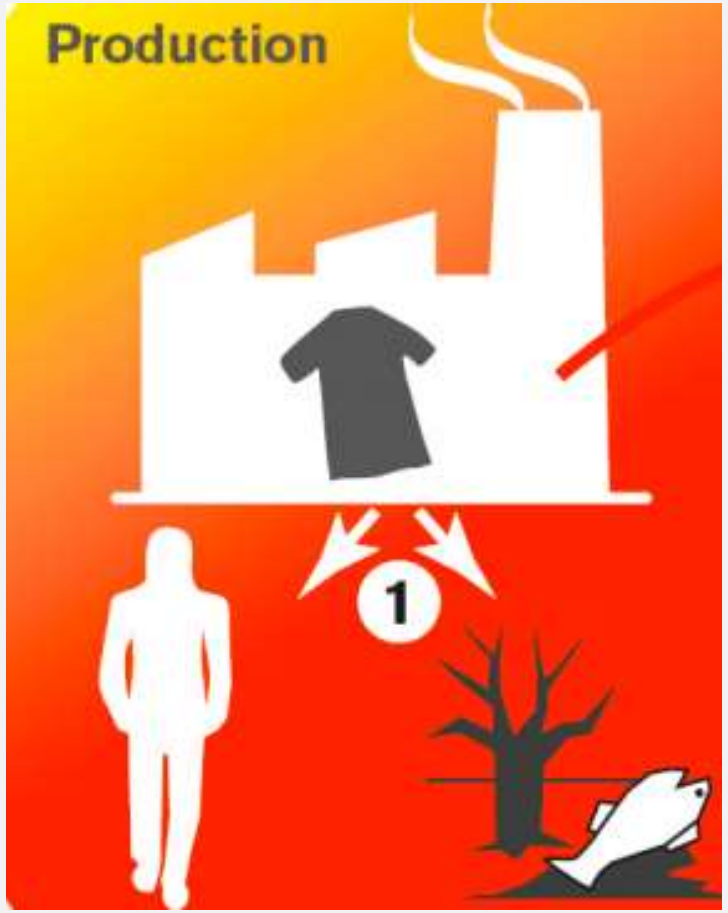
ZDHC

The need for Sustainable Chemical Management



To make 1 Kg of garment, 2.5 to 6.9 kgs of chemicals are used in the production process (*Olsson et al, 2009)*

Control of chemicals in garment =>

Brand RSLs and Eco- Labels

But what about the chemicals that go into

Wastewater

Sludge

Air ?

The need for sustainable chemistry

Chemicals impact on HUMAN HEALTH

- Oral and Dermal Toxicity
- Skin/Eye Irritation and sensitization
- Carcinogenic
- Mutagenic
- Reprotoxic
- Endocrine Disruptors
- Developmental Toxicity
- Neurotoxicity
- Teratogenicity
- Specific Target Organ Toxicity (STOT)
- Respiratory Sensitization

Chemicals impact on the ENVIRONMENT

- Persistent
- Bio accumulative
- Toxic to aquatic life
- Ozone depletion
- Global warming/ GHG emission
- Eutrophication
- COD & BOD
- Soil contamination
- Groundwater contamination
- Bio magnification

HAZARDOUS CHEMICALS IN TEXTILES

There are > 600 substances used in textile manufacturing that are harmful

CHEMICAL GROUP	USE/APPLICATION	HARMFUL EFFECT
AP/APEOs	Wetting, Detergency, Emulsification	Endocrine Disruptor, Aquatic Toxicity
Phthalates	Softeners, Plasticizers	CMR
Formaldehyde	Wrinkle- free, dye –fixing	Carcinogenic, Dermatitis, Respiratory sensitizer
PFCs	Oil & Water Repellants	vPvB, Brain tumors
Isocyanates	PU Coatings	Carcinogen, Toxic
Amines in azo dyes	Dyes and Pigments	Bladder Cancer
Heavy Metals	Dyes and Pigments	STOT, Toxic
Chlorinated Solvents	Spot cleaning, Adhesives	CNS, Carcinogenic, Ozone Depletion

Some challenges are too big to be faced alone

ZDHC is an initiative for widespread implementation of sustainable chemistry and environmental best practices in the textile, apparel, leather and footwear supply chain through:

1. **Collaborative engagement**
2. **Standard Setting**
3. **Implementation and Innovation projects**

Image: Greenpeace

Signatory Brands

Value Chain Affiliates

Associates

The ZDHC Programme
A holistic approach to Sustainable Chemicals Management

The Programme is divided into 3 FOCUS AREAS:.

IN EACH FOCUS AREA, ZDHC HAS ESTABLISHED INDUSTRY STANDARDS AND TOOLS FOR IMPLEMENTATION

INPUT management : The ZDHC MRSL

ZDHC MRSL Version 1.1

Industry standard for input chemical formulations

What is the ZDHC MRSL?

- List of substances banned from intentional use in a manufacturing facility
- Establishes concentrations limits (at ppm level) for unintentional contaminations in commercial chemical formulations
- Covers: textile, synthetic leather, leather
- Alternatives already available for the ZDHC MRSL substances

ZDHC MRSL Version 1.1

Concentration Limit Values in commercial formulations

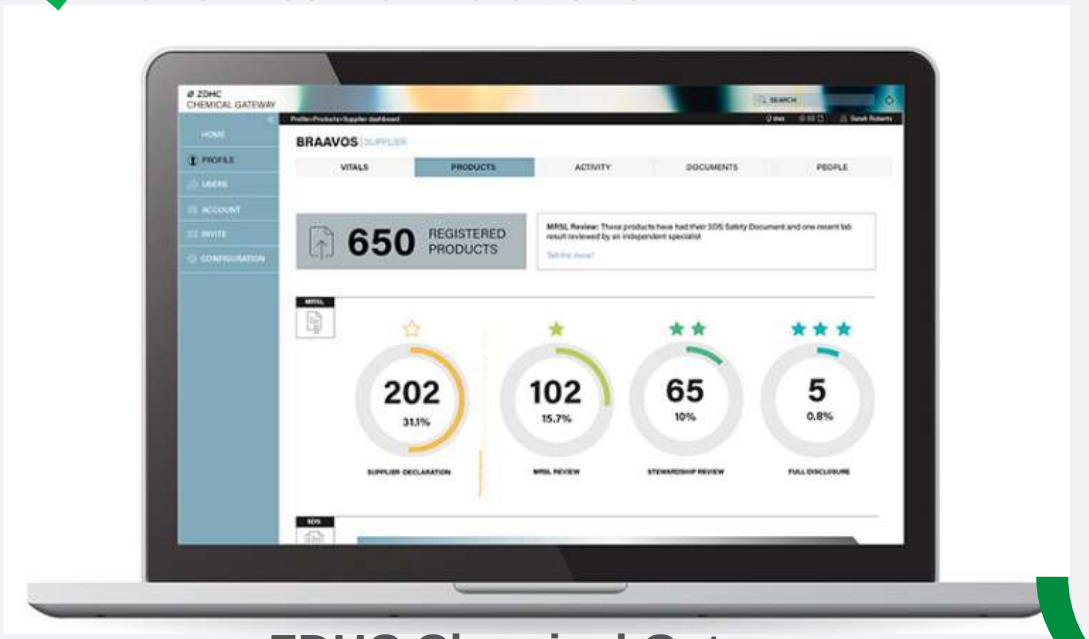
CHAPTER 1: MRSL for Textiles and Synthetic Leather Processing

CAS No.	Substance	Group A: Raw Material and Finished Product Supplier Guidance	Group B: Chemical Supplier Commercial Formulation Limit	Potential Uses in Apparel and Footwear Textile Processing	General Techniques for Analysing Chemicals
Alkylphenol (AP) and Alkylphenol Ethoxylates (APEOs): including all isomers					
104-40-5 11066-49-2 25154-52-3 84852-15-3	Nonylphenol (NP), mixed isomers	No intentional use	250 ppm	APEOs can be used as or found in: detergents, scouring agents, spinning oils, wetting agents, softeners, emulsifier/dispersing agents for dyes and prints, impregnating agents, de-gumming for silk production, dyes and pigment preparations, polyester padding and down/feather fillings.	Liquid chromatography-mass spectrometry (LC-MS), gas chromatography-mass spectrometry (GC-MS)
140-66-9 1806-26-4 27193-28-8	Octylphenol (OP), mixed isomers		250 ppm		
9002-93-1 9036-19-5 68987-90-6	Octylphenol ethoxylates (OPEO)		500 ppm		
9016-45-9 26027-38-3 37205-87-1 68412-54-4 127087-87-0	Nonylphenol ethoxylates (NPEO)		500 ppm		
Chlorobenzenes and Chlorotoluenes					
95-50-1	1,2-dichlorobenzene	No intentional use	1000 ppm	Chlorobenzenes and chlorotoluenes (chlorinated aromatic hydrocarbons) can be used as carriers in the dyeing process of polyester or wool/polyester fibres. They can also be used as solvents.	GC-MS
Other isomers of mono-, di-, tri-, tetra-, penta- and hexa-chlorobenzene and mono-, di-, tri-, tetra- and penta- chlorotoluene			Sum = 200 ppm		

INPUT management : ZDHC Gateway- Chemical Module

Chemical Formulator

Uploads MRSL compliant chemical formulations



ZDHC Chemical Gateway

Database of MRSL conformant chemical formulations

Brand Supplier

Searches and makes informed purchase decisions

The ZDHC Gateway- Chemical Module
Current Status (17/5/2018)

455*
Formulator Accounts

*Active/Enrolled/Pending

23
ZDHC Brand Accounts

1490*
Supplier Accounts

*Active/Enrolled/Pending

10960
Active Products

MRSL Conformance Levels and ZDHC accepted 3rd party certifications

Level 1:

- Ecopassport by OekoTex Program
- Global Organic Textile Standard (GOTS)
- NimkarTek Detox Lab Test Report
- ToxFMD Full Materials Disclosure
- GreenScreen Certified Standard for textile chemicals by CPA
- Scivera LENS
- NSF International Level 1 Indicator
- BLC Chem-MAP

Level 2:

Control Union Letter of Conformance for Level 2 ZDHC

Level 3:

- Control Union Letter of Conformance for Level 3 ZDHC
- Bluesign system partner

4 'Confidence Levels' to the ZDHC MRSL:
Higher conformance level means more extensive review of the chemical formulation and its producer.

Gateway- Chemical Module: Features

ZDHC MRSL Conformance Certificate that can be downloaded by Chemical Manufacturer and communicated to their customers

ZDHC ChemCheck™

Review of Supplier chemical inventory for MRSL conformance

ZDHC InCheck™

Risk based testing….. A ‘Smart’ approach

ZDHC MRSL Conformance Guidance

Table 1. Recommended Tests Per Formulation Type ("smart testing")

CHEMICAL FORMULATION TYPE	SUBSTANCE GROUPS AND SUBSTANCES MENTIONED IN MRSL															
Use Code	AP & APEO	Chlorobenzenes + Toluenes	Chlorophenols	Carc. Aromatic Amines	Navy BlueDyes	Dye-Carc.Or Equiv.	Dye-Disperse	Flame Retardants	Glycols	Solvents, Halo.	Organotins	PAH	PFC	Phthalates	Heavy Metals (As, Hg, Cd, Pb, CrVI)	VOC
1.1 Auxiliaries and finishing agents for fibres and yarns																
1.1.1 Spinning solution additives	X															X
1.1.2 Spinning									(x)							
									(x)							
1.1.5 Lubricants	X								X							
1.1.6 Coning oils, warping and twisting oils	X											X				X
1.1.7 Conditioning and stabilizing agents	X															

X = Substances associated with this formulation type.

(x) Substances might occur, additional information necessary to determine whether testing needed.

E. Annex A – Quality Control Guidance for Analytical Test Data Supporting ZDHC MRSL Conformance

Risks in Chemicals

Chemical formulation	Applicable restricted chemical groups										
	Banned Amines	Chlorobenzenes and Chlorotoluenes	Glycols	Heavy metals	APEOs	Phthalates	SCCPs	PFCs	Chlorophenols	Organotins	Formaldehyde
Desizing											
Wetting agents			✔		✔						
Pre-treatment											
Wetting agents, Scouring agents, dispersants			✔	✔	✔						
Spotting agents/ Cleaning agents		✔			✔		✔				
Dyeing											
Dyes and pigments	✔	✔	✔		✔	✔					✔
Levelling, dispersing agents					✔	✔					
Dye-fixing agents											✔
Printing											
Plastisol print paste			✔	✔		✔					
Thickeners					✔					✔	
Binders and Fixers			✔	✔						✔	✔
Finishing											
Silicone and Polyethylene softeners			✔	✔	✔						
PU Coatings			✔							✔	
Oil and water-repellent finish								✔			
Flame retardant finish							✔				

Risks in textiles

Griege Fabrics

- Pesticides
- Chlorophenols
- Heavy metals
- APEOs

Printed Cellulosics

- Chlorophenols
- Heavy metals
- APEOs
- Phthalates
- Glycols
- Banned amines

Dyed Cellulosics

- Chlorophenols
- Heavy metals
- APEOs
- Carcinogenic Dyes
- Banned amines
- Formaldehyde

Polyester

- Chlorophenols
- Heavy metals
- APEOs
- Allergenic Disperse Dyes
- Chlorobenzenes

Special finishes

- *OWR* - PFCs
- *PU Coating* - Organotin
- *Resin Finishing* - Formaldehyde
- *Flame retardant* - SCCPs/Brominated FRs

Important points in testing

False Positive result for banned amines:

- Release of an amine from chemicals other than an azo dye
- Release of an amine due to high temperature conditions in the GC –MS

- Test Methods for chemical formulations are not standardized
- Sampling is a critical criteria for chemical testing
- Understanding of chemistry is required to interpret the test result by a laboratory

For any queries on the ZDHC Programme

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Learn more at www.roadmaptozero.com