

Methodologies and Tools for Chemicals Management

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The use of chemicals is one of the key factors in the sustainability and has a particular relevance in the textile and clothing sector, due not only to the legislation related with chemicals used (specially REACH, CLP and BPR Regulations) but also to clients RSL (restricted substance list) and campaigns from non-governmental organizations, such as the Detox campaign and ZDHC programme.

As response to this challenges some methodologies and tools are available:

- ZDHC tools
- OEKO-TEX® products: STANDARD 100 (appendix 6) and DETOX TO ZERO
- GM SUB tool

ZDHC tools

The ZDHC (Zero Zero Discharge of Hazardous Chemicals) Programme main objective is to eliminate the use of priority chemicals (11 category of chemicals) and for that has developed some tools that the companies can use, including:

- Manufacturing Restricted Substances List (version 1.1, from 2015) provides a list of priority chemicals and specifies the maximum concentration limit of each substance

within commercial chemical formulations. It has 2 chapters, one for textiles and synthetic leather processing and the other for natural leather processing. And 2 groups, group A for raw material and finished product (substances that are banned from intentional use in facilities that process raw materials and manufacture finished products), and group B for chemical supplier (substances are restricted to concentration limits in chemical formulations commercially available from chemical suppliers)

- Interim MRSL Conformance Guidance, help brands and suppliers judge their confidence in whether a perceived MRSL compliant formulation from a supplier actually meets the requirements of the ZDHC MRSL standard
- MRSL Supplier Acknowledgement Letter (template letter)
- Chemical Guidance Sheets (substance use, reason for restriction, and safer alternatives), for chlorobenzenes, chlorophenols, halogenated solvents, organotins, polycyclic aromatic hydrocarbons/ naphthalene, toluene, long-chain perfluoroalkyl acids (LCPFAAs), nonylphenol (NP), nonylphenol ethoxylates (NPEOs), phthalates and short-chain chlorinated paraffins
- Chemical Management Systems (CMS) Guidance Manual (from 2015), focuses on the approach, structure and documentation needed to create and support a ZDHC Programme. The CMS is structured in five sections that follow the plan-do-check-act: commitment to CMS (plan phase), assessment, planning and prioritisation (plan phase), chemicals management (do phase), monitoring (check phase) and management review (act phase)
- Right to Know Disclosure Methodology Research (2014), present the ZDHC team research results on chemical compliance and disclosure methodologies
- ZDHC Academy provides brands and manufacturers with ZDHC certified training to improve their knowledge and practice of responsible chemical management

STANDARD 100 by OEKO-TEX® (appendix 6)

STANDARD 100 by OEKO-TEX® is a worldwide consistent, independent testing and certification system for raw, semi-finished, and finished textile products at all processing levels, as well as accessory materials used. The certified textile products are tested for harmful substances, legally banned and controlled substances, chemicals known to be harmful to the health (but not yet legally controlled) and parameters for health protection.

Appendix 6 of STANDARD 100 by OEKO-TEX® was specially developed for companies focused in Detox campaign. The limits in this annex does not take from human ecological point of view but considering special environmental friendly production conditions, therefore the limit values are stricter (than in appendix 4)

DETOX TO ZERO by OEKO-TEX®

DETOX TO ZERO by OEKO-TEX® is a comprehensive verification and reporting system that prepares facilities along the textile chain for the requirements requested by the Detox campaign of Greenpeace. The DETOX TO ZERO by OEKO-TEX® service is focused on:

- the establishment of a transparent chemical management system
- a continuous improvement plan to reduce hazardous substances in the production process, e.g. comprehensive MRSL examination
- wastewater and sludge measurements
- improvement of protective measures for the protection of the environment

DETOX TO ZERO provides an annual status report about chemicals used, evaluation of waste and wastewater treatment analysis and environmental protection measures so the facility and its buyers have a continuous monitoring tool focused on achieving Detox campaign alignment. In addition, OEKO-TEX® pays particular attention to the following:

- Elimination:
Eliminating all release of toxic chemicals and recognising that there are no environmentally safe levels for hazardous substances according to Greenpeace's priority list of 11 hazardous chemicals/chemical groups.
- Prevention and precaution:
Review and analysis of processes and measures for continuous improvement regarding preventive measures for the handling and the use of hazardous substances.
- Right to know:
Documentation of the company's operations including training, environmental reporting, internal and external communications. One of the targets is a publicly available register on the OEKO-TEX website.

Within the scope of DETOX TO ZERO by OEKO-TEX®, tests are conducted to check against the requirements of the Detox campaign, but OEKO-TEX® has added incremental elements such as, for example, resource efficiency, health protection, environmental protection and prevention of water pollution, and occupational safety.

This procedure for this OEKO-TEX® service is the following:

- Online-application or contact an OEKO-TEX® institute
- User accesses an online questionnaire (DETOX assessment tool) to gather information about the Chemical Management System, inventory of chemicals used including CAS number, MSDS information as well as main ingredients, components additives and, if possible, information about impurities, wastewater and sludge information
- On-site visit from an OEKO-TEX® specialist to verify the stated company data and process information.
- Final status report including improvements and compliance level. This validity of the report is one year. A renewal can be applied for up to three months before the end of the validity period

GM SUB

GM SUB is a software tool for SDS (safety data sheets) and chemical management, developed by CITEVE and MACWIN company. The information is based on the chemicals used in a company, considering their SDS, places where they are used, legislation and chemical incompatibilities.

Based on that information, GM-SUB automatically creates communication documents in a quick and effective manner, such as:

- Safety data sheet (on paper or in digital format), the complete version or a summary of the most relevant information (to be available in the places where chemicals are stored or used)
- Labels (for instance when the original recipient loses the label or for new recipients, when collecting samples for laboratory use, for example, or for repackaging)
- Awareness posters, like posters with safety alerts/ hazard and precautionary statements, like storage incompatibilities and good practice for handling and storing chemical substances

It also allows the user to search specific substances and/or mixtures used in the company (indicating the workplaces where they are used), based on:

- CAS Number, EC Number or REACH registration number,
- Hazard classes or R-, S-, H- and P-phrases

Risk assessment of chemicals is a key issue in companies, and one of the biggest difficulties is related to determining chemical incompatibility. So GM SUB permits to check for compatibility between chemical substances used in a company, based on the hazard class and CAS number.

As the protection of workers when handling chemical substances is very important, GM-SUB allows the identification of the necessary personal protective equipment, by chemical and/or by workplace, within a given workplace, when handling a particular chemical, moreover, it permits to identify the personal protective equipment for each worker.

GM-SUB is continuously updated in accordance with the latest [SVHC](#) list (Substances of Very High Concern). This way at any time the user can access information on whether a substance used in the company has been placed on the candidate list or a new substance the company intend to use is already on the candidate list.

These methodologies and tools are essential to the new sustainable chemistry, including

reduction of hazardous chemicals (hazardous for humans or for the environment), specially to answer the challenges of the chemicals used in textile sector, namely the legislation related with chemicals specially [REACH](#), [CLP](#) and [BPR Regulations](#)) but also to clients RSL (restricted substance list) and campaigns from non-governmental organizations, such as the Detox campaign and ZDHC programme.

Since 2006, with the publication of the [REACH](#) (Registration, Evaluation, Authorisation and Restriction of Chemicals) Regulation (Regulation CE 1907/2006), the chemicals start to be analysed in a more comprehensive way, which means, this Regulation was adopted to improve the protection of human health and the environment from the risks that can be posed by chemicals, so the legislation includes the articles, beside the chemical substances and the mixtures. The application of the REACH Regulation in textile articles (from fibres to final products) has three possible levels of application:

- The registration of substances in articles (when the substance, in quantity superior to 1 ton/year, is intended to be released from articles to provide added value)
- The authorization, including the candidate list of substances of very high concern ([SVHC](#)) for authorization (if an article has a substance in the [SVHC](#) list in quantity superior to 0,1%, the supplier has to provide to the client enough information to allow the safe use of the article, as a minimum the name of the substance in question has to be communicated. And if that [SVHC](#) is present in these articles in quantities totaling over 1 ton/year, the company have to notify ECHA, no later than six months after the inclusion of the substance in the candidate list), and the annex XIV - list of substances subject to authorization (these substances cannot be placed on the market or used after a given date, unless an authorisation is granted for their specific use, or the use is exempted from authorization)
- The restriction defined in annex XVII (includes specific restriction for textile articles and some general restriction that are relevant to textile articles)

The [BPR](#) (Biocidal Product Regulation), Regulation EU 528/2012, concerns the placing on the market and use of biocidal products, which are used to protect humans, animals, materials or articles against harmful organisms, like pests or bacteria, by the action of the active substances contained in the biocidal product. This regulation defines that biocidal products need an authorization before they can be placed on the market, and the active substances contained in that biocidal product must be previously approved. There rules applies to several types of products (PT), including two that are relevant to textile articles, the PT2: Disinfectants and algaecides not intended for direct application to humans or animals, used to be incorporated in textiles, tissues, masks, paints and other articles or materials with the purpose of producing treated articles with disinfecting properties, and PT9: Fibre, leather, rubber and polymerized materials preservatives, used for the preservation of fibrous or polymerised materials, such as leather, rubber or paper or textile products by the control of microbiological deterioration. This product-type includes biocidal products which antagonise the settlement of micro-organisms on the surface of materials and therefore hamper or prevent the development of odour and/or offer other kinds of benefits.

The Detox campaign was launched in 2011, by Greenpeace, with the main objective of remove from the textile supply chain a group of 11 categories of chemicals, until 2020. A company commitment with this campaign represent the adoption of measures to phase out the use and release of some chemicals from their global supply chain and products. The commitment is based in three fundamental principles:

- Zero discharge of all hazardous chemicals: this means really eliminating all releases: whether via waste water pipe discharges, other production emissions (e.g. air and solid wastes) or later life "losses" from the final product -- recognising that there are no environmentally safe levels for hazardous substances
- Prevention and Precaution: this means taking preventative action towards the elimination of hazardous chemicals in the face of scientific uncertainty. This should be focused on elimination at source through substitution with sustainable alternatives or even product redesign
- Right to know. this means that brands and their supply chains need to be fully transparent and that they need to publicly disclose information about the hazardous chemicals used and discharged when making their products

Until now the Detox campaign has been public adopted by nineteen brands, namely, [Nike](#), [Adidas](#), [Puma](#), [H&M](#), [M&S](#), [C&A](#), [Li-Ning](#), [Zara](#), [Mango](#), [Esprit](#), [Levi's](#), [Uniqlo](#), [Benetton](#), [Victoria's Secret](#), [G-Star Raw](#), [Valentino](#), [Coop](#), [Canepa](#), [Burberry](#) and [Primark](#).

The group of 11 categories of chemicals that must be eliminated are [alkylphenols](#), [phthalates](#), [brominated and chlorinated flame retardants](#), [azo dyes](#), [organotin compounds](#), [perfluorinated chemicals](#), [chlorobenzenes](#), [chlorinated solvents](#), [chlorophenols](#), [short-chain chlorinated paraffins](#) and [heavy metals: cadmium, lead, mercury and chromium \(VI\)](#).

The ZDHC (Zero Zero Discharge of Hazardous Chemicals) Programme, developed by ZDHC Foundation, takes a holistic approach to tackling the issue of hazardous chemicals in the global textile and footwear value chain. The objective is to eliminate the use of priority chemicals by focussing on the following areas:

- Manufacturing Restricted Substances List (MRSL): is a list of chemical substances banned from intentional use in facilities that process textile materials and trim parts in apparel and footwear. It establishes acceptable concentration limits for these substances as impurities or by-products in chemical formulations used within manufacturing facilities. It is supported by the document [ZDHC MRSL V1.1](#), from 2015.
- Wastewater Quality: Well-designed, properly functioning wastewater treatment plants, good process controls and effective chemicals management are key to minimizing chemical, physical and biological pollutants discharged into the environment
- Audit Protocol: was developed to ensure consistency in environmental auditing across the supply chain and sharing of audit findings. The Audit Protocol is supported by the ZDHC Chemical Management System (CMS) Guidance Manual, released in 2015

- Research: Research List is a list of prioritized chemical substances for which there are no safer alternatives in the market today. It lists priority chemical substances that require additional research or substitution
- Data and Disclosure: While implementing the Joint Roadmap, the need for integrated data management became apparent. The ZDHC Programme and its value chain participants including mills, tanneries, chemical companies and third-party service providers began exploring the challenges in data capture, reporting and global synchronization
- Training: is designed to support implementation of ZDHC standards throughout the value chain. Training is aimed at all parts of the value chain, including, brands, chemical suppliers, manufacturers and other intermediaries to adopt ambitious chemical management standards

Due to this new challenges the textile sector must implement a chemical management system that, in a first step, identify the problematic chemicals and in a second phase, look for safer alternatives. Considering that the textile wet or chemical processes (like dyeing, printing, coating, etc.), uses a huge quantity of chemicals, the management of those chemicals can only be effective if supported by tools and structured methodologies that help the chemical textile user to move for a sustainable chemistry.

Relevant links:

REACH Regulation:

<https://echa.europa.eu/regulations/reach/>

SVHC candidate list:

<https://echa.europa.eu/candidate-list-table>

Authorization list:

<https://echa.europa.eu/addressing-chemicals-of-concern/authorisation/recommendation-for-inclusion-in-the-authorisation-list/authorisation-list>

Restrictions:

<https://echa.europa.eu/addressing-chemicals-of-concern/restrictions/substances-restricted-under-reach>

CLP Regulation:

<https://echa.europa.eu/regulations/clp>

BPR regulation:

<https://echa.europa.eu/regulations/biocidal-products-regulation>

List of authorised biocidal products:

<https://echa.europa.eu/information-on-chemicals/biocidal-products>

Detox campaign:

<http://www.greenpeace.org/international/en/campaigns/detox/water/detox/intro/>

ZDHC programme

<http://www.roadmapzero.com/programme/>

OEKO-TEX® Products:

https://www.oeko-tex.com/en/business/business_home/business_home.xhtml