The Zero Discharge of Hazardous Chemicals Programme
Chemical Management for the Textile Industry

Date May, 2017

Signatory Brands:

Value Chain Affiliates:

Associates:

Building a Global Centre of Excellence in Responsible Chemical Management
Disclaimer

PLEASE NOTE: The following presentation is being provided as an introduction to the general use of chemicals in textile manufacturing.

The presentation is not intended to define applicable requirements or prescribe means or methods in accordance with those requirements, but instead to inform training participants of the potential hazards and use of chemicals in today’s textile manufacturing industry.

The intent of the presentation is to provide awareness to these hazards, with a focus on textile manufacturing process improvement and chemical-use reduction in the future.

Country-specific regulatory requirements are not addressed in detail in this training session and each supplier is expected to become informed of these requirements for their specific operation and incorporate manufacturing practices to maintain regulatory compliance within their chemical management programs.
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Chemical Management Training Content

All training modules can be accessed at www.roadmaptozero.com

**MODULE 1** INTRODUCTION TO CHEMICAL MANAGEMENT

**MODULE 2** HAZARDS AND RISK ASSESSMENT
   RISK CONTROL HIERARCHY

**MODULE 3** ZDHC MRSL
   FUNCTIONS AND BEST PRACTICES OF SDS
   CHEMICAL LABELLING
   CHEMICAL RISKS COMMUNICATION

**MODULE 4** CHEMICAL USE AND STORAGE
   PPE SELECTION
   EMERGENCY RESPONSE

**MODULE 5** ENVIRONMENTAL IMPACT MITIGATION MEASURES
   WASTEWATER TREATMENT AND MONITORING
Module 3
ZDHC MRSL
Functions and Best Practices of SDS
Chemical Labelling
Chemical Risk Communication
ZDHC MANUFACTURING RESTRICTED SUBSTANCES LIST (MRSL)
In the ZDHC Joint Roadmap Version 2, ZDHC member brands committed to define and develop a Manufacturing Restricted Substances List (MRSL) for the apparel and footwear industry.

The MRSL addresses hazardous substances potentially used and discharged into the environment during manufacturing and related processes, not just those which could be present in finished products.

**NOTE:** The MRSL does not replace applicable national environmental or workplace safety restrictions. Worker exposure to the listed and other hazardous substances must not exceed occupational exposure limits, and chemical formulations must comply with all applicable legal restrictions, including any subsequent restrictions that establish stricter limits. The MRSL does not replace legal or brand specific restrictions on hazardous substances in finished products.
ZDHC MRSL

- The ZDHC MRSL is a list of chemical substances subject to a usage ban.
- The MRSL applies to chemicals used in facilities that process textile materials and trim parts for use in apparel and footwear.
- In 2015, ZDHC published the MRSL Version 1.1 (updated from 2014 to include Leather)
- **There should be no intentional use of the listed substances** in facilities that process materials used in the production of apparel and footwear.
- The MRSL limits apply to substances in commercially available chemical formulations and not earlier stages of chemical synthesis.
ZDHC MRSL

• Chemical Substances Subject to Usage Ban
  • These include relevant substances from the original 11 priority chemical groups in the Joint Roadmap along with additional substances discussed with qualified experts from the ZDHC Technical Advisory Committee:
    • Alkylphenols/Alkylphenol Ethoxylates (AP/APEOs)
    • Chlorobenzenes & Chlorotoluenes
    • Chlorophenols
    • Dyes, including Azo, Navy Blue Colourant, Carcinogenic and Disperse (Sensitising) Dyes
    • Flame retardants
    • Glycols
    • Halogenated Solvents
    • Organotin Compounds
    • Polycyclic Aromatic Hydrocarbons (PAHs)
    • Perfluorinated and Polyfluorinated Chemicals (PFCs)
    • Phthalates
    • Heavy Metals
    • Volatile Organic Compounds (VOCs)

The full ZDHC MRSL is available at www.roadmaptozero.com
ZDHC MRSL – How I Apply It?

- Share the MRSL with raw material vendors and chemical suppliers
- Develop an internal procedure to assure that purchased chemical formulations meet established limits

Use the results to classify your supplier as:
- Suppliers implementing MRSL
- Suppliers not implementing MRSL

MRSL adoption may be checked through auditing and chemical and water testing by individual brands. ZDHC audits will check whether the chemical inventory is aligned with the ZDHC MRSL.
HOW TO ALIGN AGAINST MRSL

• MRSL alignment requires a comprehensive review of all SDSs
Review Safety Data Sheet

Safety Data Sheet (SDS):

• Provided by chemical manufactures, distributors or importers

• Intended to provide workers and emergency personnel with instructions for safe handling of chemicals

• Includes information such as:
  – Chemical properties
  – Toxicity/hazards
  – Environmental impact
  – Information for safe handling/transportation
  – Leakage/emergency response
  – Major physical and chemical parameters
  – Relevant rules and regulations
Multiple functions of a SDS

- A guidance document for chemical safety management
- A technical guide for emergency response
- Provides technical information for chemical SOP*
- Basis of chemical registration and management
- An important piece of enterprise safety education

* SOP: Standard Operation Procedures
Regulations related to SDS

• SDS formats can vary depending on national requirements
• Some examples of regulations/guidance:
  – **CHINA**: Safety data sheet for chemical products – Part 2: detailed rules for drafting (GB/T 17519-2013); Safety data sheet for chemical products – content and order of sections (GB/T 16483-2008)
  – **USA**: ANSI Z400.1-2004
  – **OTHERS**: ISO 11014-1
SDS General Structure

A SDS contains four parts:

• Part I: What is the substance? What is the hazard?
• Part II: How to react if there is danger.
• Part III: How to prevent and control the risk.
• Part IV: Other information about toxicity and hazards.

*SDS may not identify the 11 chemical groups that ZDHC is primarily focusing on due to composition and proprietary business information.
Globally Harmonized System of Classification and Labelling of Chemicals

- Many countries are adopting the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) which addresses classification of chemicals by types of hazard and proposes harmonised hazard communication elements, including labels and SDS.

- The 5th edition was published in July 2013.
Globally Harmonized System

- The GHS covers all hazardous chemicals including substances, products, mixtures, preparation or any other forms.

- There are no complete exemptions from the scope of the GHS for a particular type of chemical or product.

- The goal of the GHS is to identify the intrinsic hazards of chemical substances and mixtures and to convey risk information about these hazards.

- The GHS is **not** intended to harmonise risk assessment procedures or risk management decisions.
## GHS Classification

<table>
<thead>
<tr>
<th>Classes</th>
<th>Category</th>
<th>Classes</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical hazard (16 classes)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Explosive</td>
<td>7</td>
<td>Spontaneously-combusting liquid</td>
<td>2</td>
</tr>
<tr>
<td>Flammable gas</td>
<td>2</td>
<td>Spontaneously-combusting solid</td>
<td>1</td>
</tr>
<tr>
<td>Flammable aerosol</td>
<td>2</td>
<td>Self-heating substances and mixtures</td>
<td>1</td>
</tr>
<tr>
<td>Oxidising gas</td>
<td>1</td>
<td>Substances emitting flammable gases when wet</td>
<td>3</td>
</tr>
<tr>
<td>Compressed gas</td>
<td>4</td>
<td>Organic peroxides</td>
<td>7</td>
</tr>
<tr>
<td>Flammable liquid</td>
<td>4</td>
<td>Oxidising liquid</td>
<td>3</td>
</tr>
<tr>
<td>Flammable solid</td>
<td>2</td>
<td>Oxidising solid</td>
<td>3</td>
</tr>
<tr>
<td>Self-reactive substance</td>
<td>7</td>
<td>Corrosives</td>
<td>1</td>
</tr>
</tbody>
</table>
## GHS Classification

<table>
<thead>
<tr>
<th>Category</th>
<th>Class</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health hazard (10 classes)</td>
<td>Acute toxicity</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Skin Irritation/corrosion</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Serious eye damage or Irritation</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Respiratory or skin sensitisation</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Germ cell mutagenicity</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Carcinogenicity</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Reproductive toxicity</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Target organ system toxicity (one-time exposure)</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Target organ toxicity (repeated exposure)</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Aspiration toxicity</td>
<td>2</td>
</tr>
<tr>
<td>Environmental hazard (2 classes)</td>
<td>Hazardous to aquatic environment</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Hazardous to ozone layer</td>
<td>1</td>
</tr>
</tbody>
</table>
### GHS Pictograms -1

<table>
<thead>
<tr>
<th>Oxidisers</th>
<th>Flammables</th>
<th>Explosives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxidisers</td>
<td>Self Reactives</td>
<td>Self Reactives</td>
</tr>
<tr>
<td>Flammables</td>
<td>Pyrophorics</td>
<td>Organic Peroxides</td>
</tr>
<tr>
<td>Self-Heating</td>
<td>Emits Flammable Gas</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Organic Peroxides</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Acute Toxicity (severs)</th>
<th>Corrosives</th>
<th>Gases Under Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
GHS Pictograms -2

- Carcinogen
- Respiratory Sensitiser
- Reproductive Toxicity
- Target Organ Toxicity
- Mutagenicity
- Aspiration Toxicity

- Environmental Toxicity

- Irritant
- Dermal Sensitiser
- Acute Toxicity (harmful)
- Narcotic Effects
- Respiratory Tract
- Irritation
Typical SDS Content

1. Chemical and Enterprise Identity
2. Hazard Identification
3. Composition
4. First Aid Measures
5. Fire Protection
6. Accidental Release Measures
7. Handling and Storage
8. Exposure Control and Personal Protection
9. Physicochemical Property
10. Stability and Reactivity
11. Toxicological Information
12. Ecological Information
13. Waste Disposal
14. Transport Information
15. Rules and Regulations
16. Other Information

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## SDS Content: Part I

1. **Identification of substance or mixture and the supplier**
   - GHS product identifier, other means of identification
   - Recommended use of the chemical and restrictions on use
   - Supplier's details (e.g., name, address, phone number)
   - Emergency phone number

2. **Hazards identification**
   - GHS classification of the substance/mixture and any national/regional information
   - GHS label elements, including precautionary statements (Hazard symbols may be provided)
   - Other hazards which do not result in classification (e.g., dust explosion hazard) or not covered by GHS

3. **Composition/information on ingredients**

   **Substance**
   - Chemical identity
   - Common name, synonyms
   - CAS number, EC number
   - Impurities and stabilising additives which are themselves classified and contribute to classification of the substance

   **Mixture**
   - The chemical identity and concentration or concentration ranges of all ingredients that are hazardous within the meaning of the GHS and are present above their cutoff levels
4. First aid measures
   • Description of necessary measures, subdivided according to the different routes of exposure (i.e., inhalation, skin and eye contact and ingestion)
   • Most important symptoms/effects, acute and delayed
   • Indication of immediate medical attention and special treatment needed, if necessary

5. Firefighting measures
   • Suitable (and unsuitable) extinguishing media
   • Specific hazards arising from the chemical (e.g., nature of any hazardous combustion products)
   • Special protective equipment and precautions for firefighters

6. Accidental release measures
   • Personal precautions, protective equipment and emergency procedures
   • Environmental precautions
   • Methods and materials for containment and clean up
# SDS Content: Part III

## 7. Handling and storage
- Precautions for safe handling
- Conditions for safe storage, including any incompatibilities

## 8. Exposure controls/personal protection.
- Control parameters, (e.g., occupational exposure limit values or biological limit values)
- Appropriate engineering controls
- Individual protection measures, such as personal protective equipment

## 9. Physical and chemical properties
- Appearance (e.g., physical state, color)
- Odor, odor threshold
- pH
- Melting point/freezing point
- Initial boiling point and boiling range
- Evaporation rate
- Flammability (solid, gas)
- Vapor pressure
- Vapor density
- Relative density
- Solubility(ies)
- Partition coefficient: n-octanol/water
- Autoignition temperature, decomposition temperature

## 10. Stability and reactivity
- Chemical stability
- Possibility of hazardous reactions
- Conditions to avoid (i.e., static discharge, shock or vibration)
- Incompatible materials
- Hazardous decomposition products
### SDS Content: Part IV

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
</tr>
</thead>
</table>
| 11. Toxicological information | Concise but complete, comprehensible description of the various toxicological (health) effects including:  
  - Information on likely routes of exposure (e.g., inhalation, ingestion, skin and eye contact)  
  - Symptoms related to the physical, chemical and toxicological characteristics  
  - Delayed, immediate and chronic effects from short- and long-term exposure  
  - Numerical measures of toxicity (such as acute toxicity estimates) |
| 12. Ecological information |  
  - Ecotoxicity (aquatic and terrestrial, where available)  
  - Persistence and degradability  
  - Bioaccumulative potential  
  - Mobility in soil  
  - Other adverse effects |
| 13. Disposal considerations | Description of waste residues and information on their safe handling and methods of disposal, including the disposal of any contaminated packaging |
| 14. Transport information |  
  - UN number  
  - UN proper shipping name  
  - Transport hazard class(es)  
  - Packing group, if applicable  
  - Marine pollutant (Yes/No)  
  - Special precautions that a user needs to be aware of or needs to comply with in connection with transport or conveyance within or outside their premises |
| 15. Regulatory information | Safety, health and environmental regulations specific for the product in question |
**SDS Best Practices**

- All employees who may come into contact with a chemical/chemicals must have access to review the SDS.
- Employee training should include review of SDS sheets that pertain to their role(s).
Safety Label for Chemicals

A safety label is:

- The label provided by marketing and attached to the chemicals’ package during market circulation
- A carrier that rapidly brings safety information to the workers using simple and understandable words and images to describe the hazardous characteristics of chemicals and their safe handling
- A warning label to remind employees to operate safely
## Safety Label for Chemicals

Safety labels should contain the following information:

<table>
<thead>
<tr>
<th>HARMONISED SIGNAL WORD</th>
<th>Indicates the relative level of severity of hazard and alert the reader. It goes from “DANGER” to “WARNING” (from more severe to less severe hazards respectively).</th>
</tr>
</thead>
<tbody>
<tr>
<td>GHS PICTOGRAM</td>
<td>A symbol to convey specific information about the hazards of a chemical.</td>
</tr>
<tr>
<td>HAZARD STATEMENT</td>
<td>Describes the nature of the hazard(s) of the chemical including, where appropriate, the degree of the hazard.</td>
</tr>
<tr>
<td>PRECAUTIONARY STATEMENT</td>
<td>Describes the recommended measures to minimise or prevent adverse effects resulting from exposure to or improper storage or handling of a hazardous chemical.</td>
</tr>
</tbody>
</table>
SAMPLE LABEL

PRODUCT IDENTIFIER

CODE ____________________________
Product Name ___________________

SUPPLIER IDENTIFICATION

Company Name ___________________
Street Address ____________________
City ____________________________ State
Postal Code _______________________ Country
Emergency Phone Number ____________

PRECAUTIONARY STATEMENTS

Keep container tightly closed. Store in cool, well ventilated place that is locked.
Keep away from heat/sparks/open flame. No smoking.
Only use non-sparking tools.
Use explosion-proof electrical equipment.
Take precautionary measure against static discharge.
Ground and bond container and receiving equipment.
Do not breathe vapors.
Wear Protective gloves.
Do not eat, drink or smoke when using this product.
Wash hands thoroughly after handling.
Dispose of in accordance with local, regional, national, international regulations as specified.

In Case of Fire: use dry chemical (BC) or Carbon dioxide (CO₂) fire extinguisher to extinguish.

First Aid
If exposed call Poison Center.
If on skin (on hair): Take off immediately any contaminated clothing. Rinse skin with water.

HAZARD PICTOGRAMS

SIGNAL WORD

Danger

HAZARD STATEMENT

Highly flammable liquid and vapor. May cause liver and kidney damage.

SUPPLEMENTAL INFORMATION

Directions for use

Fill weight: ______________ Lot Number
Gross weight: ______________ Fill Date:
Expiration Date: ______________

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Dos and Don’ts of Chemical Labelling

Ideally, the mill should:

• Identify auxiliaries and dyestuffs by: original labeling, lot number, product and supplier name(s)

• Update labels for containers when refilled

• Avoid repackaging and relabeling; only to be carried out when strictly necessary
Dos and Don’ts of Chemical Labelling
Importance of Communicating Chemical Risks
Chemical Hazard Communication

Your Right To Know

- Make sure employers and employees know the hazards of the chemicals used onsite and how to protect themselves.
- Help reduce the incidence of illness and injuries caused by exposure to hazardous chemicals.
- Help avoid the negative environmental effects caused by hazardous chemicals.
Communicating with Employees

Chemical hazard information needs to be communicated to any employee who may come into contact with chemicals, including:

• Staff who are exposed to chemicals through use
• Staff who work in any chemical storage area
• Staff who handle hazardous waste
• Maintenance staff and key purchasing personnel
• Contractors and Suppliers

Follow each chemical from storage through use to disposal. Determine which employees are or could be exposed to it.
What should be communicated

- Internal chemical management procedures
- Relevant standard operating procedures (SOPs)
- Internal chemical hazard categorisation
- Information on identifying chemical hazard: chemical labels
- Additional hazard information: SDS
- Safe handling of chemicals
- Safe storage and transport of chemicals
- Use of personal protective equipment
- Management of waste chemicals
- Emergency response procedures
- Chemical accident management (e.g., leakage, fire, personal injury)
How to communicate

- Training
- Chemical labels
- Onsite SDS
- Hazard signage
- Written program
- Written procedures
Communication Channels: Label

A label can tell you:

- The chemical’s identity (its name or trade name)
- Physical hazards (if the chemical is explosive, corrosive, etc.)
- The degree of risk; a signal word such as CAUTION! WARNING! or DANGER!
Communication Channels: SDS

A SDS should tell you:

• What is the substance and its associated hazards
• How to react if there is danger
• How to prevent and control the risk
Communication Channels: Hazard Signage

Discussion: What kinds of hazard signs should be posted on the door of the chemical storage room?

- Warning
- Forbiddance
- Suggestion
Chemical Hazard Communication Program Checklist

- Are employees trained about proper work practices and personal protective equipment in relation to the hazardous chemicals in their work areas?
- Does our training program provide information on appropriate first aid, emergency procedures and the likely symptoms of overexposure?
- Does our training program include an explanation of labels and warnings that are used in each work area?
- Does the training describe where to obtain data sheets and how employees may use them?
- Have we worked out a system to ensure that we train new employees before beginning work?
- Have we developed a system to identify new hazardous chemicals before we introduce them in a work area?
- Do we have a system for informing employees when we learn of new hazards associated with a chemical we use?
- Do we have a records retention system that will retain the SDSs or the alternative record for a minimum of 30 years?

- This checklist is drawn from the Washington State Department of Labor and Industries
Communication Channels: **Training**

- Training is essential for new workers.
- Existing workers should periodically receive refresher courses, as well as updated training if moving to a new position.
Chemical Hazard Communication Program Checklist

- Have we prepared a list of all the hazardous chemicals in our workplace?
- Do we update our hazardous chemical list regularly?
- Have we obtained or developed a Safety Data Sheet (SDS) for each hazardous chemical we use?
- Do we have a system to ensure that we check all incoming hazardous chemicals for proper labels and data sheets?
- Do we have procedures to ensure proper labeling or warning signs for containers that hold hazardous chemicals?
- Are our employees aware of the specific information and training requirements of our Chemical Hazard Communication program?
- Are our employees familiar with the different types of chemicals and the hazards associated with them?
- Have our employees been informed of the hazards associated with performing non-routine tasks?
- Do our employees understand how to detect the presence or release of hazardous chemicals in the workplace?

* This checklist is drawn from the Washington State Department of Labor and Industries*
Next training Modules

The following aspects of chemical management are reviewed in subsequent training modules available at www.roadmaptozero.com:

• Safe use of chemicals, root cause analysis and emergency response
• Environmental impacts mitigation measures, wastewater treatment and monitoring
MAKE CHANGE, TOGETHER!

QUESTIONS OR COMMENTS, EMAIL US: contribute@zdhc.org

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