
Commodity Chemicals Guide

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List of tables

Table 1	Supplier responsibilities
Table 2	Purchasing policy for commodity chemicals
Table 3	CC seller assessment framework
Table 4	Classification of CC seller
Table 5	Action plan for tracking of CC
Table 6	Methodology to evaluate CC sellers for criteria in Table 3
Table 7	Compatibility chart for commodity chemicals
Table 8	Examples of commodity chemicals with reference to compatibility chart
Table 9	Specific storage precautions
Table 10	Smart testing matrix for virgin and non-virgin commodity chemicals for guidance
Table 11	Corrective Action Plan following a Root Cause Analysis

List of figures

Figure 1	Challenges with commodity chemicals
Figure 2	Inorganic acids should not be stored with organic acids
Figure 3	Bases (alkalis) should not be stored with organic or inorganic acids
Figure 4	Oxidisers should not be stored with organic acids
Figure 5	Oxidisers should not be stored with water sensitives

List of terms/abbreviations

CC seller	Commodity chemical seller: A person or entity that sells the commodity chemical to a user. This may be a manufacturer, dealer, trader or reseller.
CC manufacturer	Commodity chemical manufacturer: An entity that manufactures a commodity chemical from starting raw materials and does not source its chemical as by-products from other industries.
Virgin commodity chemicals	Chemicals which are manufactured from their respective raw materials, intentionally to prepare the final product as desired in the chemical reaction. There are also certain commodity chemicals that are secondary products (co-products) from known processes which can be regarded as equivalent to virgin commodity chemicals (sodium sulphate, ammonium sulphate, ammonium chloride)
Non-virgin commodity chemicals	Chemical products which are either a by-product or co-product of other industries or recycled from industrial waste.
Trader or reseller	CC sellers that purchase the commodity chemicals as either a by-product or extracted from the waste of other industries. Usually, the sources of these traders/resellers are varied and usually not constant. They do not manufacture chemicals themselves.
Distributor or dealer	CC sellers that purchase the commodity chemicals in bulk directly from the manufacturer and mostly either resell it or repack into smaller amounts (without any other processing) in general. Sometimes, they may create dilutions but the main source is always manufactured chemicals.
CAP	Corrective Action Plan
CMS	Chemical Management System
MRS�	Manufacturing Restricted Substances List
RCA	Root Cause Analysis
RSL	Restricted Substances List
SDS	Safety Data Sheet
TDS	Technical Data Sheet

Contents

DISCLAIMERS. 2

List of tables 4

List of figures 4

List of terms/abbreviations 5

Collaborative process and acknowledgements 8

Connectivity with other ZDHC guidelines 8

Introduction. 9

 Background 9

 Objective 10

 Scope 11

Chapter 1 Commodity chemicals and ZDHC MRSL risks 12

 1.1 Challenges in commodity chemicals and engaging CC sellers for ZDHC MRSL conformance. 12

 1.2 Categorisation of commodity chemicals for ZDHC MRSL risks. 14

Chapter 2 Best practices for suppliers. 16

 2.1 Supplier responsibilities 16

 2.2. Purchasing policy for commodity chemicals 17

 2.2.1 Self-declaration from CC sellers 19

 2.2.2 Evaluation of CC seller 20

 2.2.2.1. Actions by suppliers on evaluation of CC sellers 22

 2.2.2.2 Methodology to evaluate CC sellers 24

Chapter 3 Storage and handling precautions for specific commodity chemicals 26

 3.1 Importance of compatibility for safe storage 27

 3.2 Storage precautions/conditions for specific commodity chemicals (as examples only) 30

Chapter 4 RCA/CAP for ZDHC MRSL non-conformities in wastewater 32

 4.1 Screening of commodity chemicals for ZDHC MRSL 32

 4.2 Corrective Action Plan following a Root Cause Analysis. 34

References 35

Acknowledgements (list of names). 36

Appendices 37

 Appendix A: Commodity chemicals in scope of the ZDHC MRSL 37

 Appendix B: Categorisation of ZDHC List of commodity chemicals 42

 Appendix C: Examples of RCA and CAP for ClearStream non-conformities . . . 46

 Example 1: Non-confrmy of flame retardants due to detection of total boron 46

 Example 2: Non-conformity of metals (nickel and lead). 46

 Example 3: Non-conformity of phthalates. 47

Collaborative process and acknowledgements

The fundamental principle of collaboration at ZDHC was followed in the development of this document. We put out a 'Call to Action' to our ZDHC Signatories and reached out to all ZDHC Signatories and other relevant industry experts. This resulted in the formation of an expert team to provide inputs and ideas on the document content based on the contribution that each focus group team member could provide from their experience and expertise. The ZDHC Sustainable Chemical Management Competence Centre and Roadmap to Zero (RtZ) Delivery Team co-ordinated with this focus group from 11th July 2023 through a series of calls, hackathons, e-mails and 1:1 calls to gather and collate inputs on this topic. A draft document was then prepared by the Sustainable Chemical Management Competence Centre and reviewed by the focus group team members. The suggestions and comments received from them were incorporated into the draft, which was then sent for review to all ZDHC Signatories and Advisory Groups over a four-week period to receive feedback.

We acknowledge and thank the contribution of the focus group team members and experts for their assistance in the development of this document. For a full list of acknowledgements, please see the end of this document.

Connectivity with other ZDHC guidelines

The Commodity Chemicals Guide V1.0 is part of a series of guides and solutions from ZDHC to drive positive change in the industry towards sustainable chemical management. The document should be read in conjunction with:

- [ZDHC MRSL V3.1](#)
- [ZDHC MRSL Conformance Guidance V2.1](#)
- [Performance InCheck Guidelines V1.0](#)
- [ZDHC CMS Framework V1.0](#)
- [ZDHC CMS Technical Industry Guide V1](#)
- [ZDHC Wastewater Guidelines V2.1](#)

Introduction

Background

Commodity chemicals are within the scope of the ZDHC MRSL, but are excluded from the Performance Incheck Report. This is due to the challenge of engaging the commodity chemicals industry in the ZDHC Gateway and populating these products in the ZDHC Gateway database of ZDHC MRSL conformant products.

Commodity chemicals are different from speciality chemicals used in production processes in that:

- Commodity chemicals tend to be low priced, and there is little difference in a chemical bought from one commodity chemical seller to the next. This means that a commodity chemical can be replaced with another, similar one without the need for any specific process changes.
- These chemicals are not intended to remain on the finished article but get completely washed out after the process and will be found in the wastewater and ETP sludge. Therefore, the ZDHC MRSL risks from commodity chemicals are for wastewater and sludge quality and they do not impact the RSL risks in the final articles.
- The intentional addition of ZDHC MRSL substances is not expected in commodity chemicals as they are sold in a pure form and the ZDHC MRSL risks would be in the form of impurities from unknown sources.

Commodity chemical manufacturers supply multiple industries, not just to the textile, apparel, leather and footwear industry. This creates a complex supply chain which is difficult to trace or map. Purchasing decisions for commodity chemicals are generally made with price and local availability as the sole criteria. Due to this, switching between commodity chemical sellers is common practice.

Given the challenges to engage the commodity chemicals industry in ZDHC MRSL implementation as well as developing a suitable business model on the ZDHC Gateway, this guide has been developed to support textile, apparel, leather, and footwear suppliers to responsibly manage commodity chemicals at their facilities as part of their ZDHC Chemical Management System. The demonstration of this responsible management is expected to be monitored in the future through the ZDHC Supplier to Zero Programme.

Objective

The ZDHC Commodity Chemical Guide V1.0 has been developed to provide a holistic approach for manufacturers of textile, apparel, leather, and footwear products to responsibly manage their commodity chemicals.

The guide provides:

- 1) A list of commodity chemicals that should be responsibly managed as part of the ZDHC input chemical management implementation.
- 2) Classification of the ZDHC list of commodity chemicals into 'virgin' and 'non-virgin' chemicals for assessing ZDHC MRSL risks.
- 3) Best practices to evaluate commodity chemical sellers for ZDHC MRSL risks as part of purchasing decisions by suppliers.
- 4) Storage, handling, and transportation precautions for specific commodity chemicals.
- 5) Root Cause Analysis (RCA) for ZDHC MRSL non-conformities in wastewater test reports as per the ZDHC Wastewater Guidelines.

Scope

To correctly understand the scope, it is necessary to define what are commodity chemicals. For this guide, the definition is as follows:

Commodity chemicals are single substances or chemical compounds whose chemical structure is well-known, have a single CAS number and their use is to create conditions or act as an aid in a process. Two commodity chemicals produced by different manufacturers can be the same and can be interchangeable. Commodity chemicals usually do not stay on the final article.

Based on the above definition, the list of commodity chemicals that are in the scope of this guide is listed in Appendix A.

This guide applies to all suppliers purchasing and using commodity chemicals including:

- Textile dye houses, printers, and finishing units
- Garment washing units
- Leather tanneries and beamhouse operations
- Footwear assembling facilities

Commodity chemicals used in effluent treatment operations are also included in the scope.

The guide does not apply to MMCF manufacturing facilities or the chemical industry in general.

Commodity chemicals and ZDHC MRSL risks

1.1 Challenges in commodity chemicals and engaging CC sellers for ZDHC MRSL conformance

As stated in the background and scope, it would be a challenge to engage commodity chemical sellers (hereinafter “CC sellers”) in the ZDHC Gateway in line with the [ZDHC MRSL Conformance Guidance](#) requirements. Figure 1 breaks down this challenge into its component parts for a more detailed understanding of the problem.

Figure 1: Challenges with commodity chemicals








	Additional testing for ZDHC MRSL requirements can be a financial burden to CC sellers or suppliers. Due to this, implementing ZDHC testing requirements with CC sellers would be a challenge.
	Commodity chemicals manufactured in pure form do not intentionally include ZDHC MRSL substances. There is risk of ZDHC MRSL substance contaminates when the commodity chemicals are by-products or from other industries.
	Commodity chemicals are intended to be washed off and not stay on the finished product. Therefore the contamination is likely to be reflected in the wastewater testing, rather than in the finished product.
	ZDHC MRSL substances detection in commodity chemicals is expected to be at very low values. However, since commodity chemicals are used in bulk quantities, even minor amounts of contaminants may impact the wastewater quality.

Figure 1: Challenges with commodity chemicals

	CC sellers cater to other industries, which may not require ZDHC MRSL conformance. This could make it challenging to engage commodity chemical suppliers in ZDHC MRSL conformance requirements.
	Commodity chemicals are not in scope of Chemicals to Zero-Progressive (correlation of ZDHC MRSL and RSL). Therefore including them in the ZDHC Performance Incheck Report is a challenge.
	It would be a challenge to get CC sellers to implement Corrective Action Plans, as MRSL substances are not intentionally added.

Suppliers can proactively take action towards managing ZDHC MRSL risks in commodity chemicals by evaluating the practices used by their CC sellers to control ZDHC MRSL risks in their products.

They should also incorporate responsible purchasing practices for commodity chemicals and check commodity chemicals for ZDHC MRSL risks as part of a Root Cause Analysis in case of non-conformities during the testing of wastewater to the ZDHC Wastewater Guidelines.

To support suppliers in responsibly managing commodity chemicals for ZDHC MRSL, this document provides guidance on steps that suppliers can undertake on:

- Evaluation of CC sellers
- Purchasing practices for commodity chemicals
- Best practices for storage and handling specific to commodity chemicals
- Due diligence of commodity chemicals as part of Root Cause Analysis for non-conformities in wastewater testing to the ZDHC Wastewater Guidelines.

1.2 Categorisation of commodity chemicals for ZDHC MRSL risks

As stated earlier, ZDHC MRSL substances are not expected to be intentionally added in commodity chemicals as they are usually manufactured in the pure form. The risk of contamination comes mainly through unintentional impurities from packaging or transportation or if it has been sourced as a recycled product or a by-product from other industries*. Based on this principle, the Commodity Chemicals Focus Group experts discussed the potential ZDHC MRSL risks in the ZDHC List of Commodity Chemicals can be categorised into two groups:

- Virgin commodity chemicals - those which have low (or no) ZDHC MRSL risks.
- Non-virgin commodity chemicals - those that have higher ZDHC MRSL risks.

Segregating commodity chemicals into these two groups will help suppliers in making informed purchasing decisions. It will also support them when preparing a due diligence risk matrix for testing/screening of commodity chemicals as part of a Root Cause Analysis for wastewater non-conformities.

Virgin commodity chemicals (V):

- Manufactured/synthesised from raw materials and sold in a pure state, with proper quality checks by the manufacturer.
- Cannot be obtained as recycled or by-products from other industries or diluted from concentrated solutions obtained from other industrial sources.
- It is also not possible to recycle them in textile, apparel, leather, and footwear production with the same efficiency or performance.
- The risk of ZDHC MRSL substances in virgin commodity chemicals is low or negligible.

* ZDHC plans to conduct a study to gather more data on the ZDHC MRSL risks in commodity chemicals. This will support development of a business model for CC sellers to demonstrate ZDHC MRSL conformance.

Non-virgin commodity chemicals (NV):

- Can be manufactured/synthesised but are mostly obtained or sourced from other industries as concentrated products or by-products/waste products/recycled products. These are then diluted or standardised to offer cheaper products to price-sensitive industries, such as textile and leather.
- The source of this type of commodity chemical is not exactly known and may not always be the same. As such, the potential ZDHC MRSL contamination in them cannot be predicted.
- The risk of ZDHC MRSL substances in non-virgin commodity chemicals is higher and unknown in comparison to virgin commodity chemicals.

The ZDHC List of Commodity Chemicals in Appendix B is categorised into both virgin and non-virgin categories.

Suppliers are advised to check if the non-virgin commodity chemicals used at their facility are being sold to them by traders or resellers. In those cases, they should make an effort to purchase these from manufacturers or their distributors/dealers. In case this is difficult due to commercial or logistical issues, the supplier should adopt the best practices of evaluation of CC sellers, as described in Chapter 2 in this document, as part of their purchasing policy.

Best practices for suppliers

2.1 Supplier responsibilities

Due to the challenges in engaging CC sellers in ZDHC MRSL conformance and the fact that ZDHC MRSL risks mainly relate to contaminations in commodity chemicals, the supplier should adopt responsible practices in the procurement of these chemicals to reduce possible ZDHC MRSL risks from these inputs. These include the following:

Table 1: Supplier responsibilities


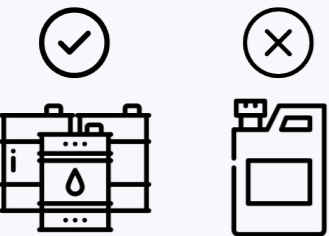
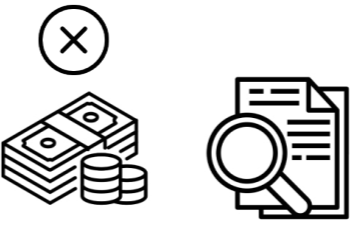
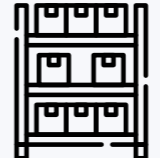

	<p>Establish continuity in CC sellers</p>	<p>Since commodity chemicals are often purchased only with consideration of price, there is a tendency to switch CC sellers frequently and purchase a commodity chemical from the cheapest CC seller at any given time. It would be beneficial for the supplier to establish long-term relationships with CC sellers (after a thorough evaluation) rather than frequently hopping from one CC seller to another.</p>
	<p>Purchase bulk single lot quantities</p>	<p>Since most commodity chemicals are used in bulk quantities, it is advisable to purchase the required quantity in bulk from a single lot to ensure consistency and reduce ZDHC MRSL risks.</p>

Table 1: Supplier responsibilities



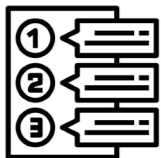





	<p>Check other criteria, rather than just price</p>	<p>Usually, commodity chemicals are purchased only with price and availability as the purchasing criteria. Suppliers should evaluate the CC seller and secure a self-declaration from the CC seller. <i>(more description in Chapter 2, Section 2.2)</i></p>
	<p>Ensure safe storage and handling of commodity chemicals</p>	<p>Some commodity chemicals can exhibit physical, health, and environmental hazards such as flammable liquids or solids, corrosive to metal and skin, self-reacting substances or mixtures or oxidising liquids and solids, toxic to aquatic life. These commodity chemicals should be stored, handled, and transported with safety precautions to prevent accidents and protect worker health. Storage conditions should account for any non-compatibility. <i>(More description in Chapter 3)</i></p>
	<p>Conduct root cause analysis for ZDHC MRSL non-conformities in wastewater</p>	<p>ZDHC MRSL contaminations in commodity chemicals are expected to go only into the wastewater and sludge. Therefore, it is important that if there are non-conformities detected for ZDHC MRSL substances in the wastewater and sludge testing to the ZDHC Wastewater Guidelines, the supplier should conduct a RCA and CAP of their commodity chemicals to identify the potential root cause and take corrective action. <i>(More description in Chapter 4)</i></p>

2.2. Purchasing policy for commodity chemicals

Textile, apparel, leather, and footwear suppliers should have a chemical purchasing policy as outlined in the [ZDHC Chemical Management System, Technical Industry Guide \(CMS-TIG\)](#) document (pages 13-17).

With reference to commodity chemicals, the following additional requirements are suggested to be included in this policy:

Table 2: Purchasing policy for commodity chemicals

	CC sellers (existing and new) are evaluated as per criteria listed in Table 3 and classified as per Table 4 on an annual basis (see Chapter 2, Section 2.2.2) These guidelines need to be incorporated in the company purchasing policy.
	Set quality control requirements and an internal approval process.
	Set specifications and requirements for commodity chemicals and communicate these requirements to the CC seller.
	Estimate the monthly requirements for commodity chemicals and plan to purchase this quantity in a minimum number of batches from the CC sellers.
	Collect a self-declaration from the CC seller. (See Chapter 2 Section 2.2.1)
	Ensure that all documentation relevant to the commodity chemical is obtained from the CC seller. This can include Safety Data Sheets (SDS), test reports, Technical Data Sheet (TDS), etc.
	Establish a relationship with the CC sellers on a long-term basis, once a thorough evaluation has been concluded.
	Prepare and track required actions as per Table 3 in Chapter 2 Section 2.2.2.

2.2.1 Self-declaration from CC sellers

As a starting point to assess the CC seller for ZDHC MRSL risks, it is recommended to collect a self-declaration from the CC seller that confirms if the CC seller is aware of ZDHC MRSL; they are competent to supply commodity chemicals with lower ZDHC MRSL risks and will provide the required documentation.

Below is a self-declaration template that can be used by suppliers. (Suppliers are free to amend or modify this template to suit their specific needs.)

Self-declaration template

(To be obtained on the letterhead of the CC seller company)

We, (name of CC seller), hereby declare that for the commodity chemicals (list attached) that we are supplying to (name of the supplier facility purchasing the commodity chemicals), We confirm the following:

- *Are aware about the latest ZDHC MRSL.*
- *Assess our products for ZDHC MRSL risks through in-house systems or third-party laboratories.*
- *Have a quality control procedure in place.*
- *Have not intentionally added any ZDHC MRSL-listed chemicals.*

We also confirm that we can provide you with the required documentation for our products, such as Safety Data Sheets, Technical Data Sheets and Certificate of Analysis.

Authorised Signatory

Actions by suppliers on self-declaration by CC sellers:

- 1) CC sellers who can give the above self-declaration should be preferred when making purchasing decisions, wherever possible.
- 2) In case a commodity chemical is purchased from multiple CC sellers, the CC sellers who can provide the self-declaration should be preferred over price considerations.
- 3) In case a purchase from a new CC seller is contemplated, the self-declaration should be an important criteria to finalise the purchasing decision.

Please note that the self-declaration is only an initial step to screening commodity chemicals for ZDHC MRSL risks from CC sellers. It should be implemented wherever

a detailed evaluation (as described in Chapter 2, Section 2.2.2) is not possible. Suppliers should preferably do the evaluation of CC sellers as described in Chapter 2, Section 2.2.2.

2.2.2 Evaluation of CC seller

In addition to collecting a self-declaration from the CC seller (as outlined in Chapter 2, Section 2.2.1), the supplier should conduct an objective evaluation of the CC seller. This is not only to evaluate them for quality and supply parameters but also to check their awareness about the ZDHC MRSL and their capability to manage these risks. This evaluation is especially important for CC sellers of non-virgin commodity chemicals listed in Appendix B.

An assessment framework that includes an objective assessment scoring system is described in Table 3. This framework can be implemented to evaluate the CC sellers and make informed purchasing decisions.

Table 3: CC seller assessment framework

Criteria	Info Required	Purpose	Points Scored
Type of CC seller	Check if the CC seller has a manufacturing site through review of the website or supporting documents.	Identify the CC seller as a manufacturer or a trader/reseller. In case of a distributor, get the information of their manufacturer.	+2 if manufacturer/distributor +1 if trader/reseller 0 if no concrete information is obtained
Technical capability of the CC seller	Check if the CC seller has a quality dept./ technical person/ QC Head/suitable commercial person by obtaining details on these employees.	Evaluation of potential technical capability of the CC seller.	+2 if Tech person/QC head name is known +1 if only commercial person is known 0 if no proper person is known

Table 3: CC seller assessment framework

Criteria	Info Required	Purpose	Points Scored
Knowledge of ZDHC MRSL or eco-certifications	Check if the CC seller is aware of/ has accessed the ZDHC MRSL or has applied for third-party eco-certifications (such as GOTS, OEKO-TEX® ECO PASSPORT, etc).	Evaluation of implemented chemical management systems and product stewardship capability of the CC seller.	+2 if CC seller is aware of ZDHC MRSL and has any third-party eco-certification +1 if CC seller is aware of ZDHC MRSL but has no third-party eco-certification 0 if CC seller has no knowledge of ZDHC MRSL or eco-certificates
Ability to provide globally acceptable SDS	Check if the CC seller can provide SDS compliant with local laws or GHS or other global standards.	Evaluation of potential product stewardship capability of the CC seller.	+2 if CC seller provides compliant SDS +1 if CC seller provides non-compliant SDS 0 if CC seller is unable to provide an SDS
Implementation of environment management systems (EMS) (such as ISO 14001, 20400) Occupational Health and Safety 45001	Check if the CC seller follows best practices to ensure quality and environmental norms.	Evaluation of environmental management capability and occupational health and safety management systems.	+2 if CC seller has multiple EMS and OHSMS certifications +1 if CC seller has at least 1 EMS or OHSMS certification 0 if the CC seller has no EMS or OHSMS certification
Products are assessed for ZDHC MRSL by the CC seller	Check if the CC seller has a system to assess their products for ZDHC MRSL risks.	Confirm the ability of the CC seller to manage ZDHC MRSL risks in their products.	+2 if CC seller regularly assesses risks through an in-house lab/third-party +1 if the CC seller randomly assesses risks through in-house/third-party labs 0 if there is no assessment done by the CC seller
Ability to supply ordered quantities	Check if the CC seller has the capacity to supply supplier requirements in a minimum number of batches.	Evaluation of production capability to ensure seamless supply in a single/ less number of batches.	+2 if CC seller can supply ordered quantity from one lot +1 if CC seller supplies ordered quantity from multiple lots 0 if CC seller is unable to meet supplier requirement on consistent basis

Please see useable version of this table [here](#) and make a copy to be able to edit.

2.2.2.1. Actions by suppliers on evaluation of CC sellers

Based on the above evaluation of the criteria in Table 3 for each CC seller, the supplier should take the following actions:

- 1) Classify the CC seller into category A, B and C as per below table.

Table 4: Classification of CC seller

Class	Score (points)	Interpretation	Action To Be Taken
A	10-14	High level of trust and therefore low level of ZDHC MRSL risk.	Continue to purchase from these CC sellers.
B	5-9	Medium level of trust and medium level of ZDHC MRSL risk.	Review these CC sellers and initiate actions with them to improve their score in identified low-scored criteria.
C	0-4	Low level of trust and therefore high level of ZDHC MRSL risks.	Explore the possibility of discontinuing purchases from these CC sellers and shifting to Category A or B commodity chemical sellers.

- 2) Track the CC sellers for follow-up actions.

Once the classification exercise is completed for all CC sellers to the supplier, the purchasing department of the supplier should prepare a list and track their commodity chemicals as follows:

Table 5: Action plan for tracking of CC sellers

Date:					
Commodity Chemical Name	CC Seller Name	Category of CC Seller (based on evaluation)	Follow-up Action Required	Timeline to Complete Follow Up Action	Person Responsible
Sodium sulphate	Y Chemicals	B	Discuss with the seller to provide the SDS. This will improve the score.	June 2024	Mr Smith

Please see useable version [here](#) and make a copy to be able to edit.

2.2.2.2 Methodology to evaluate CC sellers

The best possible methodology would be to visit the CC seller's production site(s) wherever it is possible to do so, and physically check the criteria mentioned in Table 3 through observation, discussion with employees and a review of records.

In cases where this is not possible, then the following approaches can be used:

Table 6: Methodology to evaluate CC sellers for criteria in Table 3

Class	Score (points)
Type of CC seller	Check if the CC seller is a manufacturer with a proper manufacturing site(s) or is trading/reselling products obtained as by-products from other industries (refer to the non-virgin list of commodity chemicals).
Methodology	<ul style="list-style-type: none"> Check the website of the CC seller and gather more information through "company profile", "about us", "who we are", "corporate information" or such relevant sections as well as photos displayed on the website about their manufacturing plant. Examples of commodity chemical manufacturers in the world (provided to aid understanding of CC manufacturer profiles, not as ZDHC recommendations): National Peroxide Ltd, GHCL Chemicals, Transpek Silox, Mitsubishi Chemical, Dow, BASF, Tata Chemicals, Solvay, Genesis Alkali, Hubei Yihua, Nirma Chemicals, Nippon Chemical Industrial Co, etc. Interview the representative (management) of the CC seller to confirm that the product supplied is manufactured from starting raw materials or prepared from spent waste of other industries. Conduct a document review (company brochures, policy, promotional materials, etc) of the CC seller to confirm their status.
Technical capability of CC seller	Check if the CC seller has a quality dept./technical person/QC Head that helps to build trust and confidence in the CC seller.
Methodology	<ul style="list-style-type: none"> Check if the CC seller can provide and review quality-related documents (e.g. ISO 9001 certificate, CoA, internal test reports) etc. Interview the representative of the CC seller to confirm their quality assurance policies and set-up (such as QC lab & personnel). Check your own internal records for any rejections due to quality issues.

Table 6: Methodology to evaluate CC sellers for criteria in Table 3

Class	Score (points)
Knowledge of ZDHC MRSL or eco-certifications	Confirm capability of the CC seller to manage ZDHC MRSL risks in their products.
Methodology	<ul style="list-style-type: none"> Ask for documents from the CC seller such as third-party eco-certifications (such as ZDHC MRSL V3.1, GOTS, OEKO-TEX® ECO PASSPORT, etc.) or test reports for ZDHC MRSL substances. Interview the CC seller representative to get confirmation about awareness of ZDHC MRSL or if the CC seller has accessed the ZDHC MRSL on the ZDHC website.
Products are assessed for ZDHC MRSL by CC seller	Check if the CC seller has a system to assess their products for ZDHC MRSL risks.
Methodology	<ul style="list-style-type: none"> Ask for a test report for ZDHC MRSL evaluation. Review any other document on any system that the CC seller has to evaluate ZDHC MRSL risks in their products.
Ability to provide globally acceptable SDS	Confirm capability of the CC seller to provide GHS or other regulatory compliant SDS.
Methodology	<ul style="list-style-type: none"> Request the CC seller to provide an SDS. Check if the SDS has 16 sections, the version number and date. Check the SDS for the appropriate SDS standard (GHS, ANSI, IS, EU). Interview the CC seller representative to confirm the company's system to generate an SDS.
Implementation of environment management systems	Check if the CC seller follows best practices to ensure environmental norms.
Methodology	Request certificates for any environment management system such as ISO 14001, 20400, or 45001.
Ability to supply ordered quantities	Check if the CC seller has capacity to supply supplier requirements in a minimum number of batches.
Methodology	<ul style="list-style-type: none"> Check your own history of receipt of supplies from the CC seller to see if products ordered are supplied in multiple lots or in a single lot. Confirm production capacity through an interview with the CC seller's representative or a website check.

CHAPTER 3

Storage and handling precautions for specific commodity chemicals

[ZDHC Chemical Management System Technical Industry Guide V1.0 \(ZDHC CMS TIG\)](#)

(Section 6) gives a detailed description of the best practices for storage and handling.

Suppliers are expected to follow this guidance, which includes the following:

- 1) Chemical labelling
- 2) Chemical handling
- 3) Safety considerations during chemical storage
- 4) Checklist to properly store and handle chemicals in general

Suppliers are expected to read, understand, and follow these suggestions when storing and handling commodity chemicals. However, concerning commodity chemicals, a few additional storage and handling care requirements may be needed. This is due to:

- 1) Physical, health, and environmental hazards of some of these chemicals
- 2) High volume of these chemicals
- 3) Incompatibility of certain commodity chemicals with other chemicals

When using any commodity chemicals, it is important to read and interpret the information provided in the following sections of an SDS:

- Section 2: Hazard classification, Hazard and Precautionary statements, Hazard pictograms
- Section 3: Composition/information on ingredients
- Section 5: Fire-fighting measures
- Section 7: Handling and storage
- Section 8: Exposure controls/personal protection

- Section 9: Physical and chemical properties
- Section 10: Stability and reactivity

Note: It is advisable to use new packaging/storage containers however this may not always be possible. When reusing chemical containers ensure proper cleaning is undertaken in order to reduce contamination in the chemical stored.

CC sellers often allocate specific containers for clients ensuing a closed-loop system. This can also prevent cross contamination from other clients.

3.1 Importance of compatibility for safe storage

Chemical compatibility is roughly defined as how stable two chemicals are when either mixed or stored together in the near vicinity. Chemicals are not compatible with each other if they react to give one or more effects from below:

- 1) Form new substances
- 2) Generate heat/change temperature
- 3) Generate vapours (these vapours could be toxic)
- 4) Change the colour of the reacting chemicals
- 5) Change in the phase/state of the reacting substances
- 6) Generate flame on its own (pyrophoric) and thus cause a blast

It is important to understand the incompatibilities of commodity chemicals when planning their storage. To know more about incompatible chemicals, check Section 7 in an SDS. The following compatibility chart (Table 7) can also be used for safe storage:

Table 7: Compatibility chart for commodity chemicals

	Inorganic acids	Organic acids	Bases (alkalis)	Oxidisers	Water sensitive (hygroscopic)
Inorganic acids		✗	✗	✗	✗
Organic acids	✗		✗	✗	✗
Bases (alkalis)	✗	✗			
Oxidisers	✗	✗			
Water sensitive (hygroscopic)	✗	✗			

Source: [UCLA Environment, Health and Safety](#)

Figure 2: Inorganic acids should not be stored with organic acids

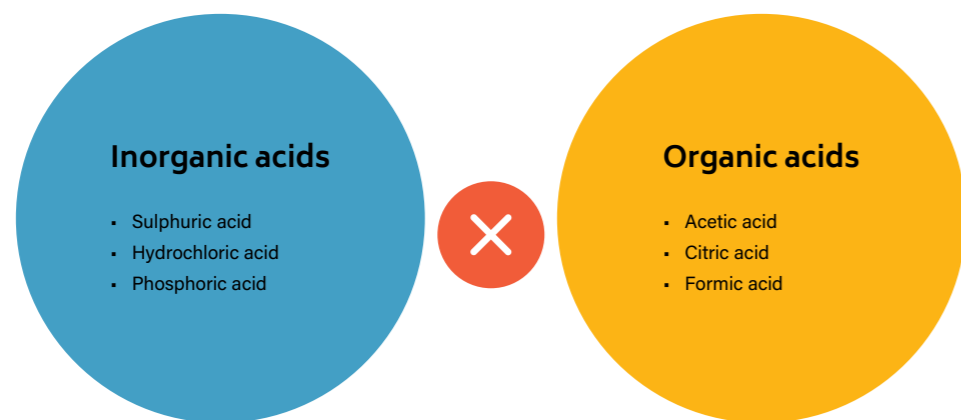


Figure 3: Bases (alkalis) should not be stored with organic or inorganic acids

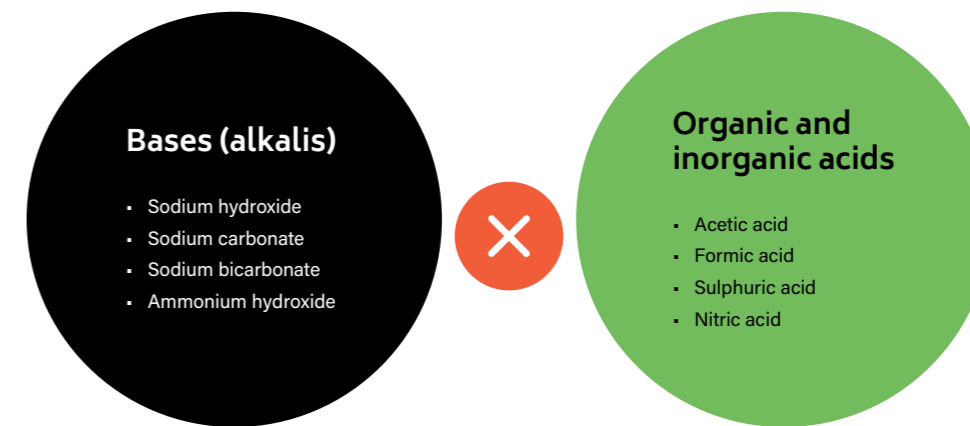


Figure 4: Oxidisers should not be stored with water sensitives



Figure 5: Oxidisers should not be stored with organic acids



Examples of commodity chemicals based on the above compatibility chart are listed below. (Please note that not all ZDHC listed commodity chemicals are included here)

Table 8: Examples of commodity chemicals with reference to compatibility chart

Inorganic Acids	Organic Acids	Bases (Alkalis)	Oxidisers	Water Sensitive (Hygroscopic)
Hydrochloric acid	Acetic acid	Calcium hydroxide	Calcium hypochlorite	Potassium hydroxide
Sulfuric acid	Citric acid	Magnesium hydroxide	Hydrogen peroxide	Sodium hydrosulfite
Nitric acid	DTPA	Magnesium carbonate	Potassium permanganate	Sodium carbonate
Boric acid	EDTA	Potassium hydroxide	Sodium dichromate	Sodium nitrite
Phosphoric acid	Formic acid	Sodium carbonate	Bis peroxide	
		Sodium bicarbonate	Sodium perborate	

3.2 Storage precautions/conditions for specific commodity chemicals (as examples only)

Certain commodity chemicals are more hazardous due to their reactive nature and require specific conditions for storage. The table below highlights the storage conditions required for some of the commodity chemicals. For a full list, see Appendix A:

Table 9: Specific storage precautions

Name of CC	Specific Storage Conditions
Acetic acid	Avoid ammonia exposure, metal contact.
Ammonia solution	Avoid loose lids, leakages, acid contact and storage temperatures more than 25°C.
Boric acid	Avoid moist environment and water leakages nearby storage.

Table 9: Specific storage precautions

Name of CC	Specific Storage Conditions
Hypochlorites (sodium and calcium)	Store at temperatures lower than 20°C. Avoid metal contacts.
Hydrochloric acid (in any dilution)	Avoid any type of leakages (including gas leakages through loose lids/damaged store tanks etc.). Avoid metal contacts.
Peroxides (hydrogen and others)	Avoid direct sunlight and store in a cool and dry place.
Carbonates (of sodium, potassium, magnesium, etc) and hydroxides (sodium, potassium, and others) when used in solid conditions	Avoid high moisture areas and keep a dry environment as much as possible.
Nitric acid (in pure form)	Avoid metal contacts and any form of leakages (liquid as well as gaseous). Avoid closed rooms and make sure the area is well-ventilated.
Sodium hydrosulphide	Avoid any acidic environment.
Sodium hydrosulphite	Avoid storing with peroxides, or direct contact with acid. Always store away from water and in a dry place.

Please note that the table above is only a recommendation. It should be used in conjunction with the storage conditions described in Section 7 of the SDS of the commodity chemical.

RCA/CAP for ZDHC MRSL non-conformities in wastewater

Commodity chemicals (as discussed in Chapter 1, Section 1.1) are not intended to stay on the final article but are completely discharged in the wastewater from the process. Therefore, any ZDHC MRSL contamination present in the commodity chemicals will contribute to the quality of the wastewater. Due to the sheer volume of some commodity chemicals used, even minuscule amounts of ZDHC MRSL contamination can be sufficient to cause wastewater non-conformities.

Where the ClearStream Report indicates non-conformities, suppliers are expected to conduct an RCA and upload a CAP in their ZDHC Gateway account to ensure these ZDHC MRSL non-conformities are not repeated. This RCA should also include an evaluation of commodity chemicals, along with other specialty input chemicals used in the production processes.

4.1 Screening of commodity chemicals for ZDHC MRSL

The RCA for commodity chemicals can be done through a screening process by a ZDHC Approved Testing Laboratory. It is recommended that the non-virgin commodity chemicals used in the facility (refer to Appendix B) are screened as the first priority. This is because commodity chemicals categorised as non-virgin have higher chances of contamination than those categorised as a virgin. The virgin commodity chemicals should then be screened after the non-virgin commodity chemicals are ruled out for ZDHC MRSL contamination.

For the purpose of screening the commodity chemicals, it is recommended that all the ZDHC MRSL listed substances are screened. However, the following Table 5 "Smart testing matrix" can be used as a guidance to reduce the cost of testing and quickly identify the root cause.

Table 10: Smart testing matrix for virgin and non-virgin commodity chemicals for guidance

Type of CC	AP / APEO	Phthalates	CBs & CTs	Halogenated Solvents	CPs	Heavy Metals	Glycols	Perboric Acid (as Boron)
Virgin	x	x	—	—	—	—	—	—
Non-Virgin	x	x	x	x	(x)	x	x	x

"—" No major concern

"x" Major concern, often found to be present. Test parameters

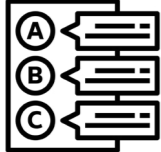



"(x)" Sometimes present under certain cases. If observed in ClearStream testing should be carried out.

Note: For the full form of the above groups mentioned, please refer to the [ZDHC MRSL V3.1](#).

4.2 Corrective Action Plan following a Root Cause Analysis

If a RCA indicates that the ZDHC MRSL non-conformity is due to contamination from a commodity chemical used by the supplier, the following actions can be implemented by suppliers as part of their CAP:

Table 11: Corrective Action Plan following a Root Cause Analysis

	<p>Check the possibility of purchasing the commodity chemicals from a Class A commodity chemical seller rather than from Class B or C. (Refer to Table 2- classification of CC seller)</p>
	<p>Suppliers should communicate the screening test findings with the CC seller and try to work with them to provide a solution and resolve the issue (see Appendix C for examples). This should be done in those cases where it is difficult to replace the CC seller with an alternative.</p>
	<p>Suppliers can request different batches from the CC seller to be screened for ZDHC MRSL substances as per the smart testing matrix (Table 5) before the commodity chemical is purchased.</p>
	<p>Communicate and educate the CC seller about ZDHC MRSL and motivate the CC seller to undergo training through the ZDHC Academy.</p>

References

- <https://downloads.roadmapzero.com/process/ZDHC-CMS-TIG>
- [UCLA Environment, Health and Safety](#)

LIST OF NAMES

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Appendices

Appendix A: Commodity chemicals in scope of the ZDHC MRSL

SR No.	Name of Commodity Chemical	CAS No	Potential Usage
1	Acetic acid	64-19-7	For neutralisation purposes
2	Ammonia solution	1336-21-6	pH adjustment
3	Aluminium chloride hydroxide	1327-41-9	Buffering agent, complexing agent
4	Aluminium sulphate (Alum)	10043-01-03	Tanning, water treatment chemical
5	Ammonium bicarbonate	1066-33-7	Neutralisation (leather processing)
6	Ammonium carbonate	506-87-6	Mordant in textile dyeing, detergent in wool dyeing and in tanneries
7	Ammonium chloride	12125-02-09	Deliming (leather processing)
8	Ammonium sulphate	7783-20-2	Levelling, after-treatment agents for fastness improvement, additive in all-over-printing
9	Bis peroxide	25155-25-3	Footwear-rubber
10	Boric acid	10043-35-3	Deliming (leather processing)
11	Calcium carbonate	471-34-1	Accessory & gear
12	Calcium hydroxide	12177-67-2	Hair removal/liming (leather processing), ETP
13	Calcium hypochlorite	7778-54-3	Bleaching, ETP, disinfecting chemicals

SR No.	Name of Commodity Chemical	CAS No	Potential Usage
14	Carboxymethyl cellulose (CMC)	9004-32-4	Weaving-sizing agent
15	Chrome alum	10141-00-1	Tanning
16	Chromium sulphate	10101-53-8 15244-38-9 (decahydrate) 10031-37-5 (penta decahydrate) 13520-66-6 (octa-decahydrate)	Chrome tanning
17	Citric acid anhydrous	77-92-9	For neutralisation as substitute of acetic acid & buffering agent
18	Citric acid monohydrate	5949-29-1	For neutralisation as substitute of acetic acid & buffering agent
19	Diammonium phosphate	7783-28-0	Buffering agent in ETP
20	Disodium phosphate	7558-79-4	Catalyst in pigment printing
21	Dolomite	16389-88-1	Neutralisation (leather processing)
22	DTPA Diethylenetriaminepenta-acetic acid (Pentetic acid)	67-43-6	Chelating agent
23	EDTA Ethylenedi-aminetetraacetic acid (edetac acid)	60-00-4	Chelating agent
24	Ferric chloride	7705-08-0	ETP chemical
25	Ferrous sulphate	17375-41-6	ETP chemical
26	Formic acid	64-18-6	For neutralisation as substitute of acetic acid
27	Glucose	50-99-7	Reducing agent
28	Glycerine	56-81-5	Lab reagent, additive use in all-over printing
29	Hydrochloric acid	7647-01-0	For neutralisation as substitute of acetic acid
30	Hydrogen peroxide	7722-84-1	Bleaching agent, oxidising agent

SR No.	Name of Commodity Chemical	CAS No	Potential Usage
31	Hydroxylamine sulphate	10039-54-0	Buffering agent, hair removal
32	Isopropyl palmitate	142-91-6	Textile processing
33	Sodium 3-nitrobenzenesul-fonate (Ludigol)	127-68-4	As antioxidant in dyeing and printing recipes
34	Magnesium carbonate	546-93-0	Neutralisation (leather processing)
35	Magnesium chloride	7786-30-3	ETP and textile complexing agent, bleaching agent
36	Magnesium hydroxide	1309-42-8	Neutralisation (leather processing)
37	Magnesium sulphate (MgSO ₄) solution	7487-88-9	Textile dyeing and leather tanning
38	Nitric acid	7697-37-2	Deionization ETP
39	Oxalic acid	114-62-7	Neutraliser for polyester dyeing and printing
40	Phosphoric acid	7664-38-2	Buffering agent, neutralisation
41	Polyaluminium chloride	1327-41-9	Water and effluent treatment chemicals
42	Polyethylene glycol	25322-68-3	Humectant, anti-foaming
43	Potassium alum	10043-67-1	Water treatment
44	Potassium dichromate	7778-50-9	After chroming agent in dyeing, tanning
45	Potassium dihydrogen phosphate	7778-77-0	Buffering
46	Potassium hydroxide	1310-58-3	Lab reagent
47	Potassium permanganate	7722-64-7	Denim manufacturing to fading colour of fabric, oxidising agent
48	Silicon dioxide	112926-00-8	Footwear-rubber
49	Sodium acetate	0127-09-03	Used as a buffer in dyeing
50	Sodium acetate trihydrate	6131-90-4	Used as a buffer in dyeing
51	Sodium alginate	9005-38-3	Anti-migration in dyeing

SR No.	Name of Commodity Chemical	CAS No	Potential Usage
52	Sodium bicarbonate	144-55-8	Printing, neutralisation, buffer
53	Sodium carbonate	497-19-8	Printing, neutralisation, buffer
54	Sodium carbonate monohydrate	06/11/68	Neutralisation, buffering agent, dyeing agent for regulating pH
55	Sodium carbonate decahydrate	01/02/32	Dyeing agent for regulating pH
56	Sodium chloride	7647-14-5	Dyeing, bleaching, whitening
57	Sodium citrate	03/04/32	WTP membrane cleaning, exhaustion agent
58	Sodium dichromate	7789-12-0	After chroming agent in dyeing
59	Sodium formate	141-53-7	Pickling (leather processing)
60	Sodium hydrosulfite solid	7775-14-6	Discharge printing, ETP
61	Sodium hydrosulfite (Sodium dithionite) solution	7775-14-6	Dyeing, denim dyeing
62	Sodium hydrosulphide	16721-80-5	Hair removal (leather processing)
63	Sodium hydroxide pellets	1310-73-2	Pre treatment & fixation
64	Sodium hydroxide solution	1310-73-3	Pre treatment & fixation, mercerising auxiliaries
65	Sodium hypochlorite	7681-52-9	Oxidising agent to removal of colour, cleaning agent
66	Sodium lauryl sulphate	151-21-3	Washing
67	Sodium metabisulfite	7681-57-4	Anti oxidant
68	Sodium metasilicate	6834-92-0	Part of commercial sodium silicate which is used as alkali in cpb dyeing
69	Sodium nitrate	7631-99-4	Textile enamel agent, dyeing help
70	Sodium nitrite	7632-00-0	Neutraliser and buffer in tanning
71	Sodium perborate	10486-00-7	Oxidising agent, filler
72	Sodium percarbonate	15630-89-4	Oxidising agent and dye fixing agent bleaching agents

SR No.	Name of Commodity Chemical	CAS No	Potential Usage
73	Sodium persulfate	7775-27-1	Bleaching agent
74	Sodium polyphosphates	68915-31-1	As buffer and alkali releasing agent in reactive dyeing
75	Sodium silicate	1344-09-08	Silicate dyeing and printing, fixing agent, lab reagent
76	Sodium sulphate	7757-82-6	Dyeing, ETP
77	Sodium sulphide	1313-82-2	Sulphur dyeing
78	Sodium sulphite	7757-83-7	Anti oxidant
79	Sodium thiosulfate anhydrous	7772-98-7	Lab reagent and in developing the print film
80	Sodium thiosulfate solution	10102-17-7	Lab reagent and in developing the print film
81	Starch	65996-63-6	Finishing
82	Steric acid	57-11-4	Textile, footwear-rubber
83	Sulphuric acid	7664-93-9	ETP, carbonising (wool) 1:1 pre-made dyes
84	Thio urea dioxide	1758-73-2	Reducing agent for dyeing and printing
85	Trisodium phosphate	7601-54-9	Dyeing
86	Urea	57-13-6	Printing as humectant
87	Zinc sulphate	7446-20-0	Mordant in printing
88	Zinc carbonate	51839-25-9	Footwear-rubber
89	Zinc oxide	1314-13-2	Footwear-rubber

Appendix B: Categorisation of ZDHC List of commodity chemicals

Virgin

- 1) Ammonia solution
- 2) Aluminium sulphate (alum)
- 3) Ammonium bicarbonate
- 4) Ammonium carbonate
- 5) Ammonium chloride
- 6) Ammonium sulphate
- 7) Boric acid
- 8) Calcium hypochlorite
- 9) Calcium hypochlorite
- 10) Carboxymethylcellulose (CMC)
- 11) Citric acid
- 12) Diammonium phosphate
- 13) Disodium phosphate
- 14) Dolomite
- 15) DTPA Diethylenetriaminepentaacetic acid (pentetic acid)
- 16) EDTA Ethylenediaminetetraacetic acid (edetac acid)
- 17) Glucose
- 18) Glycerine
- 19) Hydrogen peroxide
- 20) Hydroxylamine sulphate
- 21) Sodium 3-nitrobenzene sulphonate (Ludigol)
- 22) Oxalic acid

- 23) Phosphoric acid
- 24) Polyethylene glycol
- 25) Potassium alum
- 26) Potassium dichromate
- 27) Potassium hydroxide
- 28) Potassium permanganate
- 29) Sodium acetate trihydrate
- 30) Sodium alginate
- 31) Sodium bicarbonate
- 32) Sodium carbonate
- 33) Sodium carbonate
- 34) Sodium dichromate
- 35) Sodium formate
- 36) Sodium hydrosulfite flakes
- 37) Sodium hydrosulphide powder
- 38) Sodium hypochlorite
- 39) Sodium lauryl sulphate
- 40) Sodium metabisulfite
- 41) Sodium metasilicate
- 42) Sodium perborate
- 43) Sodium percarbonate
- 44) Sodium persulfate
- 45) Sodium polyphosphates
- 46) Sodium silicate
- 47) Sodium thiosulfate
- 48) Sodium thiosulfate decahydrate
- 49) Starch

- 50) Thio urea dioxide
- 51) Thiourea dioxide
- 52) Bis peroxide
- 53) Isopropyl palmitate
- 54) Silicon dioxide
- 55) sodium nitrate

Non-virgin

- 1) Acetic acid
- 2) Aluminium chloride hydroxide
- 3) Calcium carbonate
- 4) Calcium hydroxide
- 5) Chrome alum
- 6) Chromium sulphate
- 7) Citric acid
- 8) Ferric chloride
- 9) Ferrous sulphate
- 10) Formic acid
- 11) Hydrochloric acid
- 12) Magnesium carbonate
- 13) Magnesium chloride
- 14) Magnesium hydroxide
- 15) Magnesium sulphate (MGSO₄) solution
- 16) Nitric acid
- 17) Polyaluminium chloride

- 18) Polyvinyl acetate
- 19) Polyvinyl alcohol
- 20) Potassium dihydrogen phosphate
- 21) Sodium acetate
- 22) Sodium chloride
- 23) Sodium citrate
- 24) Sodium hydrosulfite (sodium dithionite) solution mostly coming by scrubbing H₂S in NaOH)
- 25) Sodium hydroxide
- 26) Sodium sulphate
- 27) Sodium sulphide
- 28) Sodium sulfite
- 29) Sulphuric acid
- 30) Trisodium phosphate
- 31) Zinc carbonate
- 32) Zinc oxide
- 33) Zinc sulphate

Appendix C: Examples of RCA and CAP for ClearStream non-conformities

Example 1: Non-conformity of flame retardants due to detection of total boron

A supplier's ClearStream Report showed non-conformity of four specific flame retardants due to the detection of total boron (see ZDHC MRSL V3.1 1H Flame Retardants, General techniques for analysing)**. Since the supplier did not use any flame retardants, a Root Cause Analysis (RCA) exercise was conducted for testing of all specialty input chemicals through a ZDHC Approved Testing Laboratory.

However, none of the specialty chemicals tested positive for the boron element. When the commodity chemicals used on-site were tested for total boron, it was found that sodium bicarbonate contained about 1.5% boric acid contamination. On further discussion with the CC seller, it was found by the supplier that the sodium bicarbonate supplied by the CC seller was actually a by-product obtained from the mining industry, where boric acid was also processed, thus contaminating the sodium bicarbonate.

Based on this RCA, the supplier changed their CC seller of the sodium bicarbonate to a Class A type and the ZDHC MRSL non-conformity was resolved.

Example 2: Non-conformity of metals (nickel and lead)

During a wastewater testing cycle, a supplier detected nickel and lead above the ZDHC MRSL parameter limits in the ZDHC Wastewater Guidelines.

The root cause of nickel and lead is generally printing activity at a manufacturing facility. Since the supplier did not carry out any printing, it was decided to screen the non-virgin commodity chemicals used at the facility through a ZDHC Approved Testing Laboratory. It was found that the acetic acid used at the facility contained traces of nickel and lead.

After an investigation by the supplier, it was found that the CC seller was sourcing the product as a by-product from the electronic industry, where these metal contaminations can occur.

The supplier changed their CC seller from a reseller to a manufacturer of acetic acid and the issue was resolved.

Example 3: Non-conformity of phthalates

A supplier detected phthalates in their wastewater testing. A Root Cause Analysis (RCA) of commodity chemicals indicated that the caustic lye that was used contained trace amounts of phthalates. The caustic lye was supplied by the CC seller in 50kg plastic drums which had a rubber gasket lining in the lids. There was a possibility of the phthalates leaching from this rubber gasket into the caustic lye during storage and transportation.

To resolve the issue, the supplier started receiving the caustic lye from the CC seller by tankers and then storing it in a bulk HDPE storage tank, where it was supplied through pipelines to the production machines. Through this corrective action, the non-conformity of phthalates in the ClearStream Report was resolved.

** Find out more information on analysis and interpretation of boron derivatives in our [Knowledge Base article](#).