



SETTING UP A CHEMICAL INVENTORY

November 2017

LEARNING OUTCOMES & RESOURCES



Learning Outcome



- Learning what a chemical inventory should cover and putting this into practice.

Resources

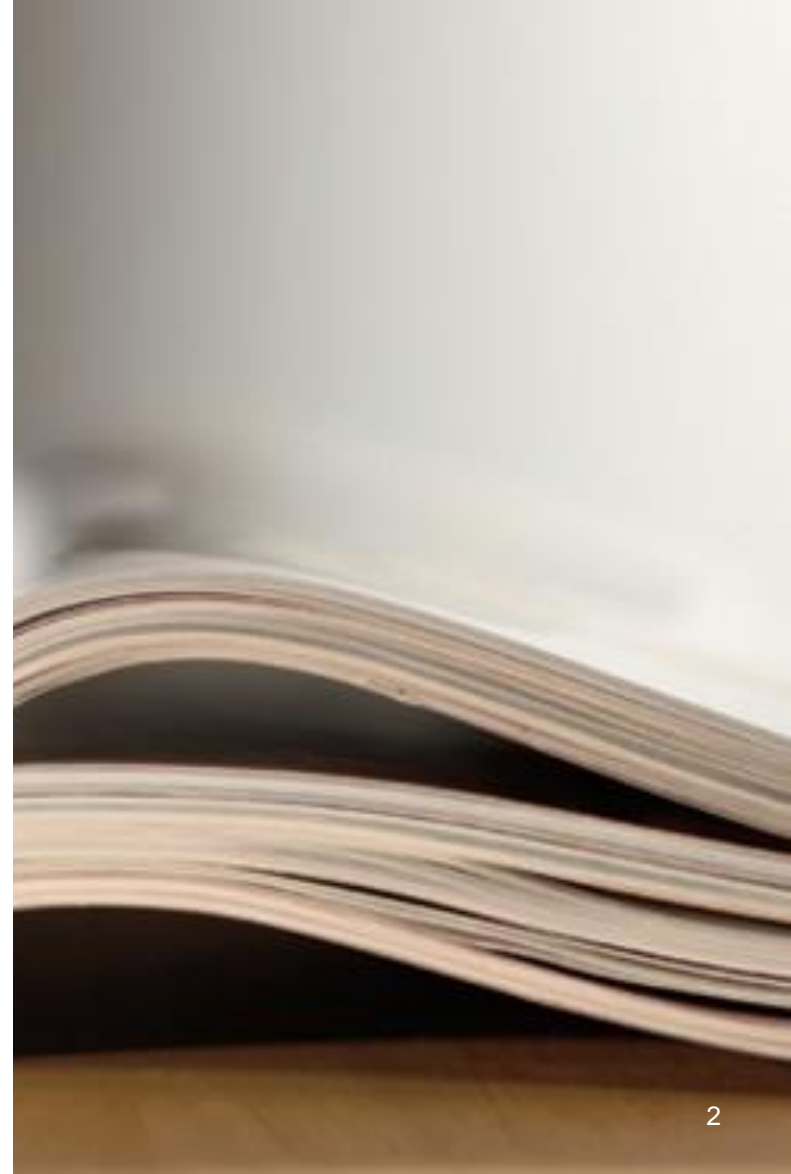


- REMC Company Handbook.
- ZDHC Chemical Management Systems Guidance Manual.

Workbook



Refer to complimentary excercises in your workbook.





ZDHC REQUIREMENTS

ZDHC CMS 2.1.4 - Creating a comprehensive chemical list

Identify all chemicals in the facility. Identify name of the chemical, hazard class, container size, locations of containers and dates on which solutions were prepared or expire. List chemicals of concern (if applicable).

ZDHC CMS 2.1.4.3 - Chemicals as discharge

Inventory of chemical discharges, identify those which are hazardous.

ZDHC CMS 2.3.2 - Identify chemical suppliers in inventory

Identify and document suppliers for each chemicals listed in the chemical inventory.

ZDHC CMS 2.4.1 - Hazard and risk assessment

Use chemical inventory to consider all persons who may come into contact or be exposed to the chemicals.

ZDHC CMS 2.4.2 - Environmental hazards and risk

Establish, document and implement a process for identifying and controlling the potential environmental impacts from use of chemicals listed in the chemical inventory.

ZDHC CMS 2.4.3 - Health and safety

Establish, document and implement a process for identifying and controlling the potential health and safety impact from chemicals stored, used and discarded at your site. The chemical inventory previously developed (Section 2.1.4) should be supplemented with this information.

ZDHC CMS 2.5.2.1 and 2.6.1 - Verification of compliance (RSL/MRSL)

Chemical inventory with column identifying ZDHC MRSL compliant formulations.



What problems can occur if you are missing one source of information for any chemical in your facility?



Brainstorm as a group and take notes in your workbook, exercise (6-1).

Chemical Inventory



**Which information can be derived
from a chemical inventory?**



CHEMICAL INVENTORY

A Chemical Inventory is a structured base of information to:

- Demonstrate compliance with existing regulations (legal, brands).
- Conduct risk assessment of each chemical and rank chemicals accordingly.
- Comprehensive chemical list to assess chemical hazards.
- Improved access to safety information.
- Selection of appropriate personal protective equipment (PPE) for workers.
- Eliminate duplication of chemicals ordered.
- Provide for surplus chemical used on-site.
- Correct storage of hazardous chemicals.
- Assess alternatives to hazardous chemicals in use.
- Basis to define training content.
- Decrease disposal cost.



WHAT A CHEMICAL INVENTORY SHOULD COVER

- A chemical inventory should contain all the information necessary to track and control all chemicals in the facility.
- The system should be able to log chemicals, assign an internal tracking ID or ability to identify every chemical in the facility.
- The system should capture: amount of chemical received, where these are stored and any special safety concerns.
- SDS sheets should be linked to each chemical on hand. Some systems allow this electronically.
- Information should be traceable from the container back to the chemical formulation supplier of the chemical.

Your system might look different to others – there is not “one system”.

ACCURATE CHEMICAL INVENTORY USING MASS BALANCE BASED ON ZDHC CMS



Mass Balance is an application of the law of conservation of mass that states that a system will remain constant over time if nothing is added or removed in the system.

By accounting for material entering and leaving a system, mass flow can be identified which may have been previously unknown or difficult to measure.

$$\text{Input} = \text{Output} + \text{Accumulation}$$

CHEMICAL INVENTORY FORMATS: EXAMPLE ZDHC TEMPLATE (1/4)



CHEMICAL INVENTORY*

Responsible for Area and Title
Person Completing Inventory and Title
Date Inventory Completed and Reviewed

Department	Building	Room #	Product name	Chemical Name	Chemical Supplier	CAS #	Quantity	Units	SDS on file?	Hazard Class	R Phrase	11 ZDHC Priority Chemical Classes	On Factory/ZDHC MRSL?	On Brand's RSL?	Shelf Life	Catalogue Order Number/Supplier Order Number
									Use drop down arrow to select	Use drop down arrow to select		Use drop down arrow to select	Use drop down arrow to select	Use drop down arrow to select		
Dye Weigh House	#1	12	Hydrochloric acid (37%)	Hydrochloric Acid	XYZ Chemical Company	7647-01-0	2	litres	YES	Class 8	R 35	N/A	No	No	Jun-15	xxx-xx-xx
Dyeing	#3	-	Glauber's salt	Sodium sulfate	ABC Chemical Company	7757-82-6	1000	kg	YES	Non-hazardous	N/A	N/A	No	No	Jun-15	xxx-xx-xx

* Draft version, not finalised yet.

CHEMICAL INVENTORY FORMATS: EXAMPLE ZDHC TEMPLATE (2/4)



Depart./ location/ building	Product name	Chemical name	Chemical supplier	CAS	Quantity	Units	SDS on file
Dye house 1	Hydrochloric acid (37%)	Hydrochloric acid	XYZ Company	7647-01-0	2	Litres	YES
Dye house 1	Glauber's salt	Sodium sulphate	ABC Cooperation	7757-82-6	1000	Kg	YES	
.....								



Chemicals that MUST be included:

Draft version, not finalised yet.

- Process chemicals, bulk chemicals, machine cleaning chemicals, maintenance chemicals, chemicals used in boilers, wastewater treatment plants with hazard indication or pictogram on container label.
- All chemical materials used in laboratory, pilot facilities and other locations.
- All compressed gases.
- Any flammable paints, solvents, glues, fuels and other petroleum product.
- Materials that create an explosive or toxic vapour, hazardous to unprotected personnel during fire emergencies.

CHEMICAL INVENTORY FORMATS: EXAMPLE ZDHC TEMPLATE (3/4)



Product name	Chemical name	...	SDS on file	Hazard class	R-phrases/ H-statements	11 ZDHC Priority Chemical Class	On factory/ ZDHC MRSL	On brand's RLS	Shelf life
Hydrochloric acid (37%)	Hydrochloric acid	...	Yes	Class 8	H290 H314 H335	N/A	No	No	May.xx	
Glauber's salt	Sodium sulphate	...	Yes	Non-hazardous	H317	N/A	No	No	Jun.xx	
		...								

Physical hazard (P) 

- *R phrases* R1 - R19
- **Hazard statements H200 - H290**

Outdated →

Health hazard (H)

- *R phrases* R20 - R49 and R 60 - R68
- *R 60 - R 64 specific for human reproduction*
- *R 68 and its combinations specific for irreversible processes*
- **Hazard statements H300 – H373**

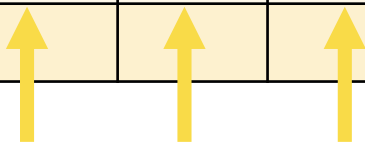
Environmental Hazard (E)

- *R phrases* R50 – R59
- **Hazard statements H400 – H413**

CHEMICAL INVENTORY FORMATS: EXAMPLE ZDHC TEMPLATE (4/4)



Product name	Chemical name	...	SDS on file	Hazard class	R-phrases/ H-statements	11 ZDHC Priority Chemical Class	On factory/ ZDHC MRSL	On brand's RLS	Shelf life
Hydrochloric acid (37%)	Hydrochloric acid	...	Yes	Class 8	H290 H314 H335	N/A	No	No	May.xx	
Glauber's salt	Sodium sulphate	...	Yes	Non-hazardous	H317	N/A	No	No	Jun.xx	
		...								



Change or add columns depending on which lists Your Facility is referring to e.g. REACH Substance of very High Concern or High Concern, ZDHC MRSL and RSL, bluesign, Oekotex 100, etc.

CHEMICAL INVENTORY FORMATS: EXAMPLE GIZ REMC TOOLKIT TEMPLATE



Company Beautiful Colours Prepared by _____ Group _____ Date _____

Area/ Process	Name	SDS Yes/No	R-phrases/ Hazard statements	Hazard type			Hazard group/ band				Amount	...				
				P	H	E	Health	Environment	Fire explosion	Other physical						
Dye kitchen	Acetic acid	Yes	H226 H314	x	x		3/C			3/C						
Dye kitchen	Basic Yellow	Yes	H301 H318 H410		x	x	4/D 4/D	4D- 5/E								Ref. ECHA
Dye kitchen	Reactive Black	Yes	H317 H334		x		4/D 4/D									
Printing	2-Naphthol	Yes	H302 H332 H400		x	x	3/C 3/C	5/E								
Printing	Sodium hydroxide	Yes	H290 H314		x		3/C			3/C						
Printing	Unknown 1	No	H228	x						3/C						
Storage	Citric acid	Yes	H319		x		2/B									
Storage	Unknown 2	No														
Yard	Acetone	Yes	H225 H315 H319 H335 H336 EUH066	x	x		2/B 2/B 2/B 2/B 2/B			4/D						
Yard	Aniline	Yes	H301 H311 H331 H317 H318 H341 H351 H372 H400		x	x	4/D 4/D 4/D 4/D 4/D 4/D 4/D 4/D	5/E								

Example: Set up a chemical inventory

Responsible person : **Stephen Chui**

Last updated : **16-4-2018**

No.	Commercial Name	Chemical supplier		MSDS available			Ingredient	Concentration of Substances (%)	CAS No	RSL compliance
		Name	Contact info (add., phone, email)	Chinese	English	Others				
1	(N/A)	(N/A)	(N/A)		✓		<ul style="list-style-type: none"> Diethylene glycol Methanol Formaldehyde 	5-7.5% 1-2.5% <0.5 %	<ul style="list-style-type: none"> 111-46-6 67-56-1 50-00-0 	Yes

Example: Set up a chemical inventory

Nature	Substances use	Chemical hazard							Container	
		Flammable	Explosive	Corrosive	Oxidizing	Toxic	Irritant	Environment	Label	Type
Auxiliary	Dyeing	x	x	x	x	x	✓	x	Yes	Barrier

Example: Set up a chemical inventory

Quality Regular Check		Average Consumption kg/month	PPE required
Date	By		
14/4/2018	Kit Li	1,000	-Tightly fitting safety goggles -Chemical resistant protective gloves

Group exercise: Set up a chemical inventory

Chemical: Sodium Hydroxide NaOH

Responsible person : **Stephen Chui**

Last updated **16-4-2018**

No.	Commercial Name	Chemical supplier		MSDS available			Ingredient	Concentration of Substances (%)	CAS No	RSL compliance
		Name	Contact info (add., phone, email)	Chinese	English	Others				
1	Sodium Hydroxide (NaOH)	Chem-supply Pty Ltd	Address: 38-50 Bedford Street GILLMAN SA 5013 Australia Tel: (08) 8440-2000		✓		• Sodium hydroxide	100%	• 1310-73-2	Yes

Group exercise: Set up a chemical inventory

Nature	Substances use	Chemical hazard							Container	
		Flammable	Explosive	Corrosive	Oxidizing	Toxic	Irritant	Environment	Label	Type
Auxiliary	Dyeing	x	x	✓	x	✓	x	x	Yes	Barrier

Group exercise: Set up a chemical inventory

Quality Regular Check		Average Consumption kg/month	PPE required
Date	By		
14/4/2018	Kit Li	1,000	-Face shield, chemical goggle or safety glasses with side shield. -Rubber or plastic gloves



CASE STUDY

Follow instructions.
Workbook, exercise
(6-2).

Assist the company Beautiful Colours to develop a complete inventory of all chemicals used and present your results to the group.

Open To Questions

SUMMARY



Every participant to feedback one key learning from this session.



Take notes in your workbook, exercise (6-3).



