Understand the situation at hand

INVENTORYING AND CLASSIFYING CHEMICALS BY HAZARD AND HAZARD BANDS




In this session…

- Documenting information collected so far
- Requirements as per ZDHC CMS
- Classify chemical hazards and hazard bands
- Exercise
- Analyse your inventory table




Chemical inventory and classification

References ZDHC CMS (Examples)

- 2.1 Systematically identify and document chemicals used and stored in Your organization
  - 2.1.4 Creating a Comprehensive Chemical List
  - 2.1.4.3 Chemicals as Discharge
  - 2.3.2 Identify Chemical suppliers
- 2.4 Chemical Risk Assessment
  - 2.4.2 Environmental - Process/Plan for Reducing Environmental Impacts
  - 2.4.3 Health and Safety - …identifying and controlling the potential health and safety impact from chemicals stored, used and discarded at your site.
- 2.5 Chemicals and Processes of Concern
  - 2.5.1 Identify Gaps and Losses in Current Processes - determine where there are potential chemical knowledge and safety gaps and chemical losses not accounted for in the mass balance
  - 2.5.2.1 Verification of Compliance with MRSL/RSL
- 2.6.1 MRSL Compliant Formulations
- 3.4 Document and Record Control
- Appendix C - Chemical Inventory

ZDHC audit questions

Example

- Are there SOPs that cover chemical management, such as an approved chemical list, chemical classification system, safe chemical handling procedures or chemical disposal? (CRS 1.1.2)
- Are hazardous chemicals categorised by their GHS classification as shown on its label and/or SDS? (CRR 1.1.4)

Adding value to your chemical inventory

- Answering questions
  - How hazardous are the chemicals?
  - Which are the most/least hazardous ones we use?
  - …
- Hazard banding tool
  - Simple and widely used approach
  - Concept: Categorise chemicals by bands of hazards using H-statements describing physical, health, environmental effects

What is/are chemical's hazard(s)?

- Use the label and /or consult the SDS to identify hazard(s).
- Check series of codes or phrases indicating hazardous properties of a chemical, the so called
  - Hazard (H) statements (in GHS)
- Verify information in SDS on health effects on humans, environment and risks of fire / explosion

Identify types of hazards – coding structure

- Physical hazard (P)
  - R phrases R1 - R19
  - Hazard statements H200 - H290
- 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




Hazard banding

Example - Acetone

- Chemical used in the printing area of a factory

Source of information

- Eco-mapping
- Flow diagram
- ….




Hazard banding

Example - Acetone

Area/ Section	Name	SDS yes/ no	H-statement	P	H	E	Hazard group/ band	….			
Printing	**Acetone**										

Source of information

- Eco-mapping
- Flow diagram
- ….




Hazard banding

Example - Acetone

- Chemical used in the printing area of a factory
- Question:
  - Is it a hazardous chemical?

Label is a first indicator, that it may be hazardous!




Hazard banding

Example - Acetone

Next:
Finding more details about the type of hazards

Information from SDS for Acetone

H-statements:

H225	-	Highly flammable liquid and vapor
H315	-	Causes skin irritation.
H319	-	Causes serious eye irritation.
H335 + H336	-	May cause respiratory irritation, and drowsiness, or dizziness
EUH066	-	Repeated exposure may cause skin dryness or cracking.




Hazard banding

Example - Acetone

Area/ Section	Name	SDS yes/ no	H-statement	P	H	E	Hazard group/ band	….			
Printing	Acetone	Yes	H225 H315 H319 H335 H336 EUH066	✓	 ✓ ✓ ✓ ✓ ✓						

Source of information

- Safety data sheet
- Internet database
- …




Hazard banding

Finding hazard bands

Example BAUA Column model

Risk/GHS H-statements	Health hazard						Environmental Hazards	Fire and explosions Hazards	Exposure potential	Hazards caused by procedures
	Inhalation	Skin	Eyes	Ingestion	Chronic	Gas release				
Very high risk (5)	H330, H350i	H310, H350, H340		H300	H350, H340, H350i	EUH032	With warning symbol and H400 WGK 3	H200, H201, H202, H203, H204, H205, H220, H221, H224, H240,H241,, H250, H260, H271	Gases Liquids with vap. Pressure >250 hPa (e.g. dichloro methane) Dust producing solids Aerosols Liquid with a vap. Pressure of 50…250 hPa (e.g. methanol)	Open processing Possibility of direct skin contact Application on large area
High risk (4)	H330, H331, H334, EUH071 Preparations containing respiratory tract sensitizing substances in a conc. > 1% (in case of gases >0.2%)	H311, H317, H360 Preparations containing skin sensitizing substances in a conc. > 1%	H318	H301	H351, EUH070, H360, H360F,H360D, H360FD, H360Fd, H360Df, H341, H372, H370	EUH029	H410, H411, EUH, 059	H222,H225, H228, H242, H251, H261, H270, H272, EUH001, EUH 006, EUH014, EUH019, EUH044		
Medium risk (3)	H332, Non toxic gases; may cause suffocation by air *displacement (e.g. n*itrogen)	H321, H314,		H302, H362	H361, H361d, H361f, H361fd, H371, H373		H412, WGK 2	H223, H226, H228, H242, H252, H261, H272, H280, H281, H290	Liquids with vap. Pressure 10…50 hPa, except water (e.g. toluene)	Closed processing but exposure possibilities e.g. when filling, sampling or cleaning
Low risk (2)	H335, H336	H315,	H319,	H304	EUH066 Otherwise chronically affecting substances (no R-Phrase, but nonetheless a hazardous substance		H413, WGK1	Hardly flammable substances/preparations (flashpoint 55-100°C)	Liquids with vap. Pressure 2…10 hPa, (e.g. xylene)	
Negligible risk (1)	Harmless substances by experience (e.g. water, sugar, paraffin, similar)						Not water polluting substances/preparations (NWG, formerly WGK 0)	Inflammable or very hardly flammable substances/preparations (for liquids flashpoints >100°C)	Liquids with vap. Pressure< 2 hPa, (e.g. glycol) Solids releasing no dust	Tightly closed equipment Closed equipment with exhaust facilities at points of emissions




Hazard banding

Finding hazard bands

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High risk (4/D)	H330, H331, H334, EUH071 Preparations containing respiratory tract sensitizing substances in a conc. > 1% (in case of gases >0.2%)	H311, H317, H360 Preparations containing skin sensitizing substances in a conc. > 1%	H318	H301	H351, EUH070, H360, H360F,H360D, H360FD, H360Fd, H360Df, H341, H372, H370	EUH029	H410, H411, EUH, 059	H222,H225, H228, H242, H251, H261, H270, H272, EUH001, EUH 006, EUH014, EUH019, EUH044	Aerosols Liquid with a vap. Pressure of 50…250 hPa (e.g. methanol)	
Medium risk (3/C)	H332, Non toxic gases; may cause suffocation by air *displacement (e.g. nit*rogen)	H321, H314,		H302, H362	H361, H361d, H361f, H361fd, H371, H373		H412, WGK 2	H223, H226, H228, H242, H252, H261, H272, H280, H281, H290	Liquids with vap. Pressure 10…50 hPa, except water (e.g. toluene)	Closed processing but exposure possibilities e.g. when filling, sampling or cleaning
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Negligible risk (1/A)	Harmless substances by experience (e.g. water, sugar, paraffin, similar)						Not water polluting substances/preparations (NWG, formerly WGK 0)	Inflammable or very hardly flammable substances/preparations (for liquids flashpoints >100°C)	Liquids with vap. Pressure< 2 hPa, (e.g. glycol) Solids releasing no dust	Tightly closed equipment Closed equipment with exhaust facilities at points of emissions




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Hazard banding

Example - Acetone

Area/ Section	Name	SDS yes/ no	H-statement	P	H	E	Hazard group/ band	….			
Printing	Acetone	Yes	H225 H315 H319 H335 H336 EUH066	✓	 ✓ ✓ ✓ ✓ ✓		4/D 2/B 2/B 2/B 2/B 2/B				

Source of information

- BAUA Column Model
- COSHH model
- …




Hazard banding

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Source of information

- BAUA Column Model
- COSHH model
- …

Exercise

You are back in „Beautiful Colours“ in order to help the company with establishing the chemcial inventory and assessing the hazards of the chemicals used.

Tasks:

- Identify the class of hazards (physical, human health, environment)
- Determine the hazard band of each chemical used in „Beautiful Colours“
- Discuss in your group what useful information you can already retrieve from the inventory table

Time: 45 min




Retrieving useful information from chemical inventory

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**						




Retrieving useful information from chemical inventory

- Where are the chemicals present?
- Are there redundant chemicals?
- Which one most hazardous chemicals?
- What (common) hazards are (most) prevalent?
- In which section are the most hazardous chemicals used?
- Is the hazard information complete (any missing SDS)?
- Are any banned/restricted substances in use? (eco-criteria, ZDHC, Oekotex 100,….)
- In which areas shall we already focus our efforts for any alternative substances / forms? (Substitution by less hazardous substances / forms?)
- …




Let‘s try this in your company!