The United Nations Globally Harmonized System of Classification and Labelling of Chemicals (GHS)

Linkages with the Industrial Accidents Convention

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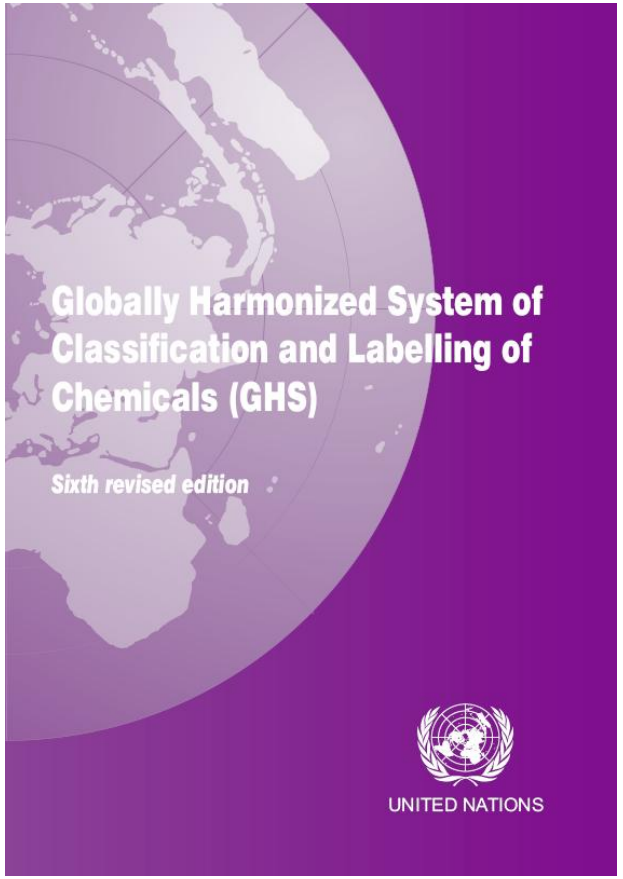
UNECE

Globally Harmonized System (GHS)

- International mandate
  - Agenda 21, Chapter 19 (Rio, 1992)
- Harmonises:
  - Classification (based on hazards)
  - Labelling
  - Safety Data Sheets (contents and format)
- Defines 3 types of hazard
  - Physico-chemical, health and environmental
- Identifies and quantifies hazards
  - Hazard classes
  - Hazard categories
- Scope
  - All chemicals
  - All sectors (workplace, transport, consumer products...)



Example of GHS classification

Sodium cyanide (CAS 143-33-9)

- Classification (as included in the SDS provided by the manufacturer)
  - Corrosive to metals (Category 1)
  - Acute toxicity, oral (Category 1)
  - Acute toxicity, inhalation (Category 1)
  - Acute toxicity, dermal (Category 1)
  - Specific target organ toxicity – repeated exposure (Category 1)
  - Acute aquatic toxicity (Category 1)
  - Chronic aquatic toxicity (Category 1)
- Signal word: Danger
- Hazard statement(s)
  - May be corrosive to metals
  - Fatal if swallowed, in contact with skin or if inhaled
  - Causes damages to organs through prolonged or repeated exposure
  - Very toxic to aquatic life with long lasting effects

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For the purposes of the Convention:

- Hazardous activity
  - Any activity in which one or more hazardous substances are present or may be present in quantities at or in excess of the threshold quantities listed in Annex I and which is capable of causing transboundary effects
- "Hazardous activities" are identified depending on:
  - Substance hazardous properties and threshold quantities
    - As defined in Annex I to the Convention (decision 2014/2)
  - Capability of causing transboundary effects (location criteria)
    - As defined in the Guidelines to facilitate the identification of hazardous activities for the purposes of the Convention (in accordance with article 4, paragraph 1, of the Convention):
      - decision 2000/3 as amended by decision 2004/2

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- Part I in Annex I : list of hazardous properties and threshold quantities

	Category in accordance with the United Nations Globally Harmonized System (GHS) of Classification and Labelling of Chemicals	*Threshold quantity (metric tons)*
1.	Acute toxic, Category 1, all exposure routes[2]	20
2.	Acute toxic: Category 2, all exposure routes[3] Category 3, inhalation exposure route[4]	200
3.	Specific Target Organ Toxicity (STOT) — Single Exposure (SE) STOT, Category 1[5]	200
4.	Explosives — unstable explosives or explosives, where the substance, mixture or article falls under division 1.1, 1.2, 1.3, 1.5 or 1.6 of chapter 2.1.2 of the GHS criteria or substances or mixtures having explosive properties according to Test series 2 of Part I of the United Nations *Recommendations on the Transport of Dangerous Goods: Manual of Tests and Criteria* (Manual of Tests and Criteria) and do not belong to the hazard classes Organic peroxides or Self-reactive substances and mixtures[6,7]	50

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- Part II in Annex I: List of named substances and threshold quantities

Substance		*Threshold quantity (metric tons)*
1a.	Ammonium nitrate[22]	10 000
1b.	Ammonium nitrate[23]	5 000
1c.	Ammonium nitrate[24]	2 500
1d.	Ammonium nitrate[25]	50
2a.	Potassium nitrate[26]	10 000
2b.	Potassium nitrate[27]	5 000
3.	Arsenic pentoxide, arsenic (V) acid and/or salts	2
4.	Arsenic trioxide, arsenious (III) acid and/or salts	0.1
5.	Bromine	100
6.	Chlorine	25
7.	Nickel compounds in inhalable powder form: nickel monoxide, nickel dioxide, nickel sulphide, trinickel disulphide, dinickel trioxide	1
8.	Ethyleneimine	20
9.	Fluorine	20

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Hazard class	Hazard category							
Explosivos	Unstable explosives		Div. 1.1		Div. 1.2	Div. 1.3	Div. 1.4	Div. 1.5	Div. 1.6
Flammable gases	1		2						
	1A	1B	2A	2B					
Aerosols	1		2		3				
Oxidizing gases	1								
Gases under pressure	Compressed Liquefied Refrigerated liquefied Dissolved								
Flammable liquids	1		2		3	4			
Flammable solids	1		2						
Self-reactive Subs/Mixt.	Type A		Type B		Type C	Type D	Type E	Type F	Type G
Pyrophoric liquids	1								
Pyrophoric solids	1								
Self-heating Subs/Mixt.	1		2						
Subst/Mix which in contact with water emit flammable gases	1		2		3				
Oxidizing liquids	1		2		3				
Oxidizing solids	1		2		3				
Organic peroxides	Type A		Type B		Type C	Type D	Type E	Type F	Type G
Corrosive to metals	1								
Desensitized explosives Solid/liquid	1		2		3	4			

GHS health hazards/categories covered by Annex I to the Convention

GHS health hazards/categories not covered by Annex I to the Convention

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Hazard class	Hazard category				
Acute toxicity (oral/dermal/inhalation)	1 all routes	2 all routes	3 inhalation	4	5
Skin corrosion/irritation	1 1A 1B 1C	2	3		
Serious eye damage/eye irritation	1	2 2A 2B			
Respiratory or skin sensitization	1 1A 1B				
Germ cell mutagenicity	1 1A 1B	2			
Carcinogenicity	1 1A 1B	2			
Reproductive toxicity	1 1A 1B	2	Effects on or via lactation		
Specific target organ toxicity – single exposure	1	2	3		
Specific target organ toxicity – repeated exposure	1	2			
Aspiration hazard	1	2			

GHS health hazards/categories covered by Annex I to the Convention

GHS health hazards/categories not covered by Annex I to the Convention

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Hazard class	Hazard category			
Hazardous to the aquatic environment	Acute 1	Acute 2	Acute 3	
	Chronic 1	Chronic 2	Chronic 3	Chronic 4
Hazardous to the ozone layer	1			

GHS health hazards/categories covered by Annex I to the Convention

GHS health hazards/categories not covered by Annex I to the Convention

Additional hazards covered by Annex I to the Convention:

- Substances and mixtures which react violently with water (e.g. acetyl chloride, titanium tetrachloride)
- Substances and mixtures which in contact with water liberate toxic gas (substances and mixtures which in contact with water or damp air evolve gases classified for acute toxicity in category 1, 2 or 3, such as aluminium phosphide or phosphorus pentasulphide)

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- Location criteria (decision 2000/3 as amended by decision 2004/2)

  The following two location criteria shall apply for the purpose of identifying hazardous activities capable of causing transboundary effects under the Convention:

  (a) Within 15 kilometres from the border, for activities involving substances that may cause a fire or explosion or involving toxic substances that may be released into the air in the event of an accident;

  (b) Along or within catchment areas 2/ of transboundary and border rivers, transboundary or international lakes, or within the catchment areas of transboundary groundwaters, for activities involving substances that fall under category 3, 4, 5 or 8 of part I of annex I to the Convention and that may be released into watercourses in the event of an accident. Whether or not such an activity is capable of causing a transboundary effect in such an event should be decided by the competent authority of the Party of origin, preferably in consultation with joint bodies. 3/ The decision should depend, among other things, on the existence of river warning and alarm systems and the distance 4/ between the location of the hazardous activity and the border.

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- Location criteria (decision 2000/3 as amended by decision 2004/2)
  - Refers to categories of substances in Annex I to the Convention, prior to its alignment with GHS

Part I.
Categories of substances and preparations not specifically named in Part II

Category		*Threshold quantity (metric tons)*
1.	Flammable[2]	50 000
2a.	Highly flammable[3 (a), (b)]	200
2b.	Highly flammable[3 (c)]	50 000
3.	Extremely flammable[4]	50
4.	Toxic[5]	200
5.	Very toxic[6]	20
6.	Oxidizing[7]	200
7a.	Explosive, where the substance, preparation or article falls under Division 1.4 of the GHS criteria[8]	200
7b.	Explosive, where the substance, preparation or article falls under Division 1.1, 1.2, 1.3, 1.5 or 1.6 of the GHS criteria[8]	50
8a.	Dangerous for the environment — "Toxic to aquatic organisms"[9]	500
8b.	Dangerous to the environment — "Very toxic to aquatic organisms"[10]	200

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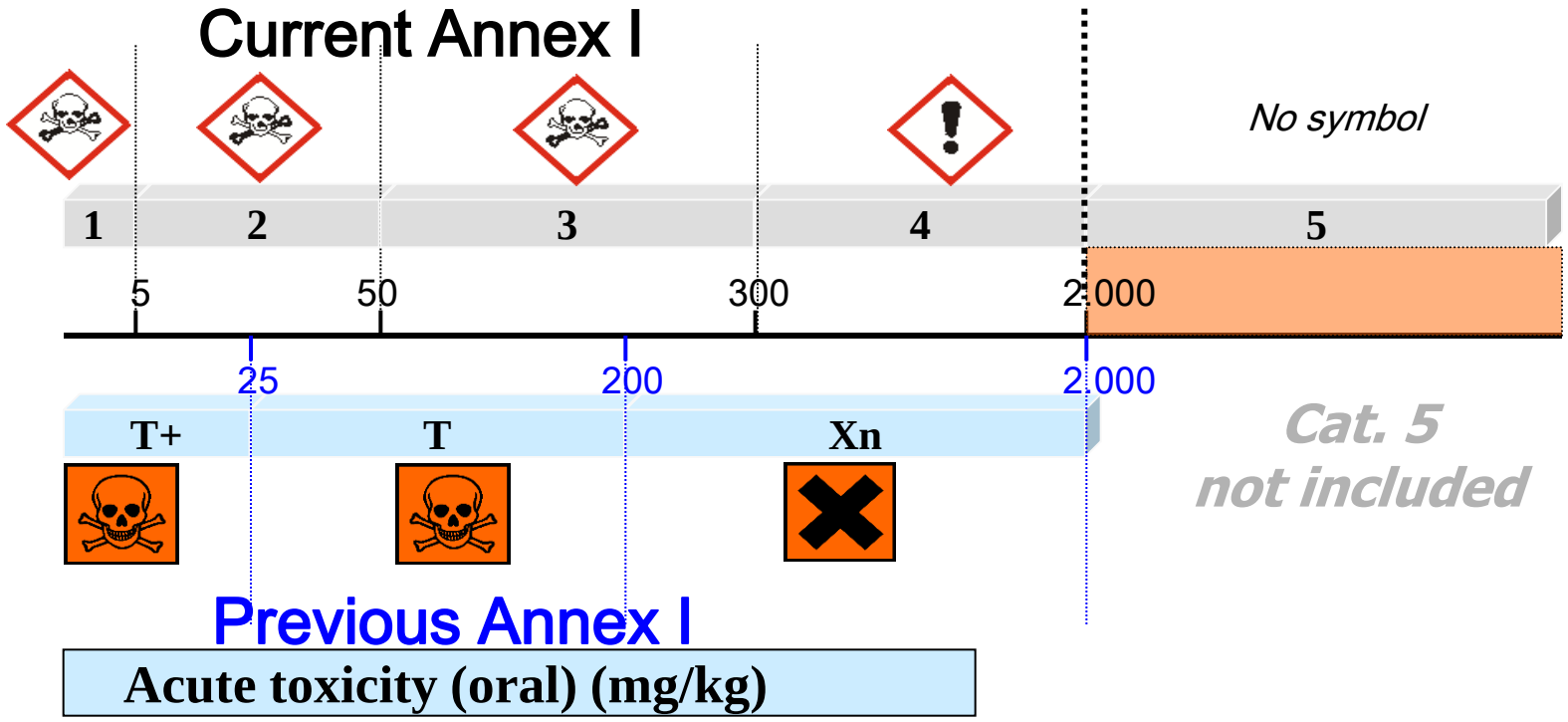
Previous and current Annex I



Substance with LD_{50} (oral) between 5 and 25 mg/kg

Previous Annex I => Very toxic, threshold = 20

Current Annex I (aligned with GHS) = Category 2, threshold = 200

GHS criteria - EU criteria (CLP regulation)

- Conversion table old EU criteria to CLP Regulations
  - Annex VII, CLP Regulation

Translation between classification in accordance with Directive 67/548/EEC and this Regulation

Classification under Directive 67/548/EEC	Physical state of the substance when relevant	Classification under this Regulation		Note
		Hazard Class-and-Category	Hazard statement	
E; R2		No direct translation possible.		
E; R3		No direct translation possible.		
O; R7		Org. Perox. CD	H242	
		Org. Perox. EF	H242	
O; R8	gas	Ox. Gas 1	H270	
O; R8	liquid, solid	No direct translation possible.		
O; R9	liquid	Ox. Liq. 1	H271	
O; R9	solid	Ox. Sol. 1	H271	
R10	liquid	No direct translation possible. Correct translation of R10, liquid is: — Flam. Liq. 1, H224 if flashpoint < 23 °C and initial boiling point ≤ 35 °C — Flam. Liq. 2, H225 if flashpoint < 23 °C and initial boiling point > 35 °C — Flam. Liq. 3, H226 if flashpoint ≥ 23 °C		

GHS criteria - EU criteria (CLP regulation)

Classification under Directive 67/548/EEC	Physical state of the substance when relevant	Classification under this Regulation		Note
		Hazard Class-and-Category	Hazard statement	
Xn; R20	gas	Acute Tox. 4	H332	(1)
Xn; R20	vapours	Acute Tox. 4	H332	(1)
Xn; R20	dust/mist	Acute Tox. 4	H332	
Xn; R21		Acute Tox. 4	H312	(1)
Xn; R22		Acute Tox. 4	H302	(1)
T; R23	gas	Acute Tox. 3	H331	(1)
T; R23	vapour	Acute Tox. 2	H330	
T; R23	dust/mist	Acute Tox. 3	H331	(1)
T; R24		Acute Tox. 3	H311	(1)
T; R25		Acute Tox. 3	H301	(1)
T+; R26	gas	Acute Tox. 2	H330	(1)
T+; R26	vapour	Acute Tox. 1	H330	
T+; R26	dust/mist	Acute Tox. 2	H330	(1)
T+; R27		Acute Tox. 1	H310	
T+; R28		Acute Tox. 2	H300	(1)

GHS hazard communication: SDS

harmonized content and format (16 sections, in the following order)

1. Identification (subst/mixt. and supplier)
2. Hazard(s) identification
3. Composition/information on ingredients
4. First-aid measures
5. Fire-fighting measures
6. Accidental release measures
7. Handling and storage
8. Exposure controls/personal protection
9. Physical and chemical properties
10. Stability and reactivity
11. Toxicological information
12. Ecological information
13. Disposal considerations
14. Transport information
15. Regulatory information
16. Other information (including on preparation and revision of the SDS)

For detailed guidance on the preparation of SDS, see Annex 4 of the GHS

Thank you!

http://www.unece.org/trans/danger/danger.htm

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