



The GHS

The Globally Harmonized System of Classification and Labelling of Chemicals

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Technical support

Introduction

The production and use of chemicals is fundamental in the economic development of all countries and, at the same time, it may pose a risk to the health and well-being of people and the environment if not managed in a responsible manner.



Introduction

The reality.....

“More than 23 million chemicals in the world”

“1.1 million people per year died by occupational accidents or diseases, one fourth of them caused by chemicals”

WHO - ILO



Bophal gas
tragedy 1984

Seveso, Italy, 1976



Introduction

- Protection of people: Governments developed laws or regulations. Information to be transmitted through SDS and labels



- However, the hazard classification was different for the same product

What is the GHS ?

- A **common and coherent** approach to defining and classifying chemical hazards, and communicating information on labels and safety data sheets.
- Provides the **underlying infrastructure** for establishment of comprehensive national chemical safety programmes.



For example...

- Prior to this harmonization effort (2008), one of the cut-offs the EU had for acute toxicity was 200 mg/kg (oral), while some systems in Canada used 500 mg/kg for the same cut-off.
- All chemicals between 200 and 500 mg/kg were therefore labelled differently as a result.

Scope of the GHS

- To **enhance the protection of human health** and the environment by providing an internationally recognised system for hazard communication
- To provide a **recognised framework** for countries without existing system
- To **reduce the need for testing** and evaluation of chemicals
- To **facilitate international trade** in chemicals whose hazards have been properly assessed and identified on an international basis

Why is the GHS needed?

- **Protection:** Users in countries that do not have specific requirements may see different label warnings or data sheet information for the same chemical.
- **Trade :** The need to comply with multiple regulations on hazard classification and labelling is costly and time-consuming with no HSE benefit.
- **Target audiences:** consumers, workers (including transport), emergency responders

Benefits of Harmonisation

- Enhance protection of humans and the environment
- Assist countries and international organizations in the sound management of chemicals
- Improved consistency and comprehensibility of information
- Reduce need for testing and evaluation.
- Enable chemicals management systems to be put in place - capacity building

GHS (Agreed principles)

- Level of **protection** offered should **not be reduced** as a result of harmonising
- Hazard classification based on **intrinsic properties** of chemicals
- **Harmonisation**: hazard classification + hazard communication
- **Involvement** of international organisations
- **Comprehension** of chemical hazard information

GHS

However: It is not intended to harmonise risk assessment procedures or risk management decisions (such as establishment of a permissible exposure limits for worker exposure), which require risk assessment in addition to hazard classification



History of GHS

- In 1989-90, ILO developed and adopted a convention (170) and recommendation (177) on Safety in the Use of Chemicals at Work.
- United Nations Conference on the Environment and Development (UNCED) took place in 1992 in Brazil.
- Established 6 programme areas in Chapter 19, Agenda 21, to strengthen national and international efforts related to the environmentally sound management of chemicals.

Specific international mandate

“A globally-harmonised hazard classification and compatible labelling system, including material safety data sheets and easily understandable symbols, should be available, if feasible, by the year 2000.”

Currently considered to be completed in 2020

Adopted at the 1992 United Nations Conference on Environment and Development (UNCED)

Process of harmonization

- Started with examination of existing systems:
 - In countries
 - In international/intergovernmental organisations and/or legislation
 - OECD chemicals programme
 - ILO chemical safety tools
 - UN recommendations for transport of dangerous goods
 - FAO recommendations on pesticides
 - European Union directives
 - ...

Process of harmonization

Major Existing Systems

- UN Transport Recommendations
- European Union (EU) Directives on Dangerous Substances and Preparations (later **REACH-CLP**)
- USA Requirements for Workplace, Consumers and Pesticides
- Canadian Requirements for Workplace, Consumers and Pesticides
- Other characteristics from other systems: Japan

Process of harmonisation

- Three focal points assigned for technical work:
 - UN Sub-Committee of experts on the transport of dangerous goods: physical hazards
 - OECD: for health and environmental hazards
 - ILO: for hazard communication (labels and SDSs)













The Elements of the GHS

Classification of hazardous substances & mixtures



GHS – Hazard Pictograms and correlated exemplary Hazard Classes


Physical Hazards				
				
Explosives	Flammable Liquids	Oxidizing Liquids	Compressed Gases	Corrosive to Metals
Health Hazards				Env. Hazards
				
Acute Toxicity	Skin Corrosion	Skin Irritation	CMR ¹⁾ , STOT ²⁾ , Aspiration Hazard	Hazardous to the Aquatic Environment

1) carcinogenic, germ cell mutagenic, toxic to reproduction / 2) specific target organ toxicity



Hazard communication:












CODE		
PRODUCT NAME	Danger	
COMPANY NAME	Keep out of the reach of children. Read label before use.	
Street Address City, State, Postal Code, Country Phone Number Emergency Phone Number	<p>Highly flammable liquid and vapour. Harmful if inhaled. May cause liver and kidney damage through prolonged or repeated exposure.</p> <p>Keep container tightly closed. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use only outdoors or in a well-ventilated area. Do not breathe dust/fume/gas/mist/vapour/spray. Wear protective gloves, protective clothing/eye protection/face protection [as specified...] Ground and bond container and receiving equipment.</p> <p>In case of fire: Use [as specified] to extinguish.</p> <p>FIRST AID IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor if you feel unwell.</p> <p>Store in a well-ventilated place. Keep cool.</p>	
<p>DIRECTIONS FOR USE: XXXXXXXXXXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXXXXXXXXXX</p> <p>Net weight: XXXX Lot Number: XXXX Gross weight: XXXX Fill Date: XXXX Expiration Date: XXXX</p>		









The Elements of the GHS

- **Hazard Classification**
 - Physical Hazards
 - Health and Environment Hazards
- **Working Definition**
 - Substance
 - Mixture
- **Hazard Communication**
 - Consideration
 - Labels
 - SDS
















GHS: Classification criteria

Physical hazards	Pictograms
Explosives	
Flammable gases	
Flammable aerosols	
Oxidising gases	
Gases under pressure	
Flammable liquids	
Flammable solids	
Self-reactive substances and mixtures	 

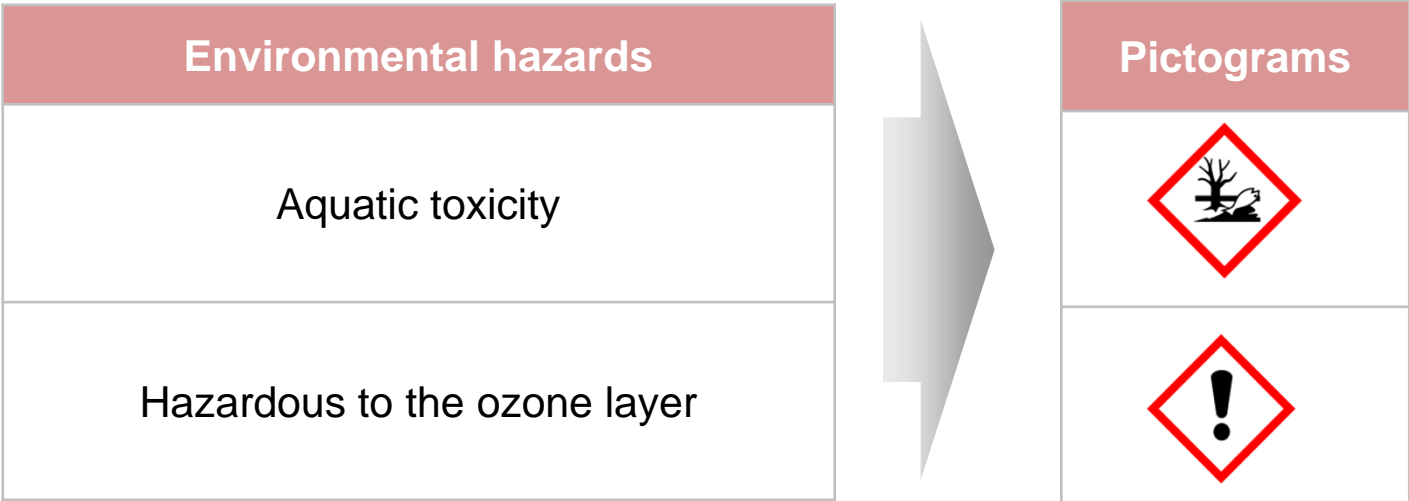
GHS: Classification criteria

Physical hazards	Pictograms
Pyrophoric liquids	
Pyrophoric solids	
Self-heating substances and mixtures	
Substances and mixtures which, in contact with water emit flammable gases	
Oxidizing liquids	
Oxidizing solids	
Organic peroxides	
Corrosive to metals	

GHS: Classification criteria

Health hazards	Pictograms
Acute toxicity	 
Skin corrosion and irritation	 
Eye damage and irritation	 
Sensitizers	 
Germ cell mutagenicity	
Carcinogenicity	
Reproductive toxicity	
Specific Target Organ Toxicity STOT	 
Specific Target Organ Toxicity STOT (repeated exposure)	
Aspiration hazard	



GHS: Classification criteria



The GHS: Hazard Communication

Hazard communication:





CODE		
PRODUCT NAME	Danger	
COMPANY NAME	Keep out of the reach of children. Read label before use.	
Street Address City, State, Postal Code, Country Phone Number Emergency Phone Number	Highly flammable liquid and vapour. Harmful if inhaled. May cause liver and kidney damage through prolonged or repeated exposure.	
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Fill weight: XXXX Lot Number: XXXX Gross weight: XXXX Fill Date: XXXX Expiration Date: XXXX	FIRST AID IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor if you feel unwell. Store in a well-ventilated place. Keep cool.	

Labels

GHS Hazard Communication: Label


- Product identifier
- Supplier identifier
- Chemical identity
- Hazard pictograms (shape and symbol)*
- Signal words*
- Hazard statements*
- Precautionary information

**Standardized*

CODE	 
PRODUCT NAME	
Danger Keep out of the reach of children. Read label before use.	
COMPANY NAME Street Address City, State, Postal Code, Country Phone Number Emergency Phone Number	Highly flammable liquid and vapour. Harmful if inhaled. May cause liver and kidney damage through prolonged or repeated exposure.
DIRECTIONS FOR USE: XXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXX	Keep container tightly closed. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use only outdoors or in a well-ventilated area. Do not breathe dust/fume/gas/mist/vapours/spray. Wear protective gloves, protective clothing/eye protection/face protection [as specified...] Ground and bond container and receiving equipment.
Fill weight: XXXX Lot Number: XXXX Gross weight: XXXX Fill Date: XXXX Expiration Date: XXXX	In case of fire: Use [as specified] to extinguish. FIRST AID IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor if you feel unwell. Store in a well-ventilated place. Keep cool

GHS Hazard Communication: Label

➤ Signal Words:
 “Danger” or “Warning”
 Used to emphasize hazard and discriminate between levels of hazard

CODE PRODUCT NAME	
COMPANY NAME Street Address City, State, Postal Code, Country Phone Number Emergency Phone Number	Danger Keep out of the reach of children. Read label before use.
DIRECTIONS FOR USE: XXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXX	Highly flammable liquid and vapour. Harmful if inhaled. May cause liver and kidney damage through prolonged or repeated exposure. Keep container tightly closed. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use only outdoors or in a well-ventilated area. Do not breathe dust/fume/gas/mist/vapours/spray. Wear protective gloves, protective clothing/eye protection/face protection [as specified...] Ground and bond container and receiving equipment. In case of fire: Use [as specified] to extinguish.
Fill weight: XXXX Lot Number: XXXX Gross weight: XXXX Fill Date: XXXX Expiration Date: XXXX	FIRST AID IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor if you feel unwell. Store in a well-ventilated place. Keep cool

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LiChrosolv®

Reag. Ph Eur

Methanol

gradient grade for liquid chromatography

Méthanol

Alcole metilico

Metanol



IMO: METHANOL
ICAO: METHANOL

Danger. Highly flammable. May cause severe damage to organs. Toxic if inhaled. Avoid contact with skin and eyes. Wash protective gear thoroughly with soap and water. If exposed, seek medical attention.

Gefahr. Flüssigkeit und Dämpfe sind sehr entzündlich. Schädigt die Organe. Kann bei Einatmen zu schweren Verletzungen führen. Behälter dicht verschlossen lagern. KEIN KONTAKT MIT DER HAUT. KEIN KONTAKT MIT DEN AUGEN. ZENTRUM oder AHT anrufen.

Danger. Liquid is highly flammable. May cause severe damage to organs. Toxic if inhaled. Avoid contact with skin and eyes. Wash protective gear thoroughly with soap and water. If exposed, seek medical attention. AVEC LA PEAU: Laver abondamment à l'eau. ANTIPOISON ou en dernier recours.

Pericolo. Liquido e vapori sono altamente infiammabili. Provoca danni agli organi. È tossico se inalato. Evitare il contatto con la pelle e gli occhi. CONTATTO CON LA PELLE: Lavare immediatamente con acqua sapone.

Peligro. Líquido y vapores son altamente inflamables. Provoca daños a los órganos. Es tóxico si se inhala. Evitar el contacto con la piel y los ojos. EN CASO DE CONTACTO CON LA PIEL: Lavar inmediatamente con agua y jabón. DE respiración: Lavar inmediatamente con agua.

Perigo. Líquido e vapores são altamente inflamáveis. Provoca danos aos órgãos. É tóxico se inalado. Evitar o contato com a pele e os olhos. ENTÃO EM CONTATO COM A PELLE: Lavar imediatamente com água e sabão.

Gevaar. Vloeistof en dampen zijn zeer ontstekingsgevoelig. Kan ernstige schade aan organen veroorzaken. Giftig bij inademing. Vermijd contact met de huid en de ogen. In geval van contact met de huid: grondig wassen met water en zeep. Bij ademhalingsproblemen: naar het ziekenhuis gaan.

Index No: 603-001-00-X
Merck KGaA

69111 Darmstadt, Germany
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www.merck-chemicals.com



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IMO: METHANOL
ICAO: METHANOL



Danger. Highly flammable liquid and vapour. Toxic if inhaled. Toxic in contact with skin. May cause damage to organs. Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Containers must be closed. Wear protective gloves/protective clothing/eye protection/face protection. IF ON SKIN: Wash with soap and water. IF exposed: Immediately call a POISON CENTER or doctor/physician.

Gefahr. Flüssigkeit und Dampf leicht entzündbar. Giftig bei Einatmen. Giftig bei Hautkontakt. Organe schädigen. Von Hitze/Funkens/offener Flamme/heißen Oberflächen fernhalten. Behälter dicht verschlossen halten. Schutzhandschuhe/Schutzkleidung/Augenschutz/Gesichtsschutz. KONTAKT MIT DER HAUT: Mit viel Wasser und Seife waschen. BEI Exposition: Sofort GIFTINFORMATIONSZENTRUM oder Arzt anrufen.



Danger. Liquide et vapeurs très inflammables. Toxique par inhalation. Toxique par contact avec la peau. Risque avéré d'effets graves pour les organes. Tenir à l'écart de la chaleur des surfaces nues/des surfaces chaudes. - Ne pas fumer. Maintenir le récipient fermé de manière étanche. Porter des gants de protection/des vêtements de protection/un équipement de protection des yeux/du visage. EN CAS D'EXPOSITION: Appeler le CENTRE ANTIPOISON ou un médecin.

Pericolo. Liquido e vapori facilmente infiammabili. Tossico se inalato. Tossico per contatto con la pelle. Rischio accertato di gravi effetti sugli organi. Tenere lontano da fonti di calore/scintille/fiamme. Non fumare. Tenere il recipiente ben chiuso. Indossare guanti/indumenti protettivi/Proteggere gli occhi. CONTATTO CON LA PELLE: lavare abbondantemente con acqua e sapone. IN CASO DI ESPOSIZIONE: chiamare immediatamente un CENTRO ANTIVELENI o un medico.

Peligro. Líquido y vapores muy inflamables. Tóxico en caso de inhalación. Tóxico en caso de ingestión. Provoca daños en los órganos. Mantener alejado de fuentes de calor, superficies calientes. - No fumar. Mantener el recipiente herméticamente cerrado. Lavar las manos. Usar guantes de protección/vestuario de protección/protector ocular/máscara de protección. EN CASO DE CONTACTO CON LA PIEL: Lavar con agua y jabón. EN CASO DE EXPOSICIÓN: Llamar inmediatamente a un CENTRO DE INFORMACIÓN TOXICOLÓGICA o un médico.







Perigo. Líquido e vapor facilmente inflamáveis. Tóxico por inalação. Tóxico em caso de ingestão. Afeta os órgãos. Manter afastado do calor/faixa/chama abertas/superfícies quentes. Recipiente bem fechado. Usar luvas de proteção/protetor ocular/máscara de proteção. ENTRAR EM CONTACTO COM A PELE: lavar com sabonete e água abundantemente. EM CASO DE EXPOSIÇÃO: chamar imediatamente um CENTRO DE INFORMAÇÃO ANTIVENENOS ou um médico.

Gevaar. Licht ontvlambare vloeistof en damp. Giftig bij inademing. Giftig bij contact met de huid. Veroorzaakt schade aan organen. Verwijderd houden van warmte/vonken/open vlammen/hetgevaar. In goed gesloten verpakking bewaren. Beschermende handschoenen/beschermende bril/gelaatsbescherming dragen. BIJ CONTACT MET DE HUID: met veel water en zeep wassen. onmiddellijk een ANTIGIFCENTRUM of een arts raadplegen.

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MECK

Example of label elements

EPICHLOROHYDRIN	Epichlorhydrin 1-Chloro-2,3-epoxypropane CAS No. 106-89-8 UN No. 2023
   	
DANGER	
Hazard statements: <ul style="list-style-type: none"> • Toxic if swallowed • Toxic in contact with skin • Fatal if inhaled • May cause an allergic skin reaction. • May cause genetic defects. • May cause cancer • Cause severe skin burns and eye damage • Cause serious eye irritation • Toxic to aquatic life 	
Precautionary statements: <ul style="list-style-type: none"> • Keep out of reach of children. • Keep container tightly closed. • Do not handle until all safety precautions have been read and understood. • Wear eye/face protection. • Wear protective gloves/clothing. • Wear respiratory protection, as specified by the manufacturer. • Do not breathe dust/fume/gas/mist/vapours/spray. • Use appropriate ventilation. • Wash thoroughly after handling. 	
United Nations Co., Ltd. 1-1, Peace Ave., Geneva Switzerland Tel. 41 22 917 00 00 Fax. 41 22 917 00 00	

GHS Hazard Communication: Label

Label Elements, hazard Statements

- A single harmonized hazard statement for each category of hazard within each hazard class
 - Example: Flammable liquids
 - Category 1: Extremely flammable liquid and vapour
 - Category 2: Highly flammable liquid and vapour
 - Category 3: Flammable liquid and vapour
 - Category 4: Combustible liquid



GHS: Hazard communication, SDS

- To provide **comprehensive information** about a chemical substance or mixture
- To use as a source of information about hazards and to obtain **advice on safety** precautions and risk management measures
- To enable the employer to develop an active programme of **worker protection** measures and environment too
- To use in the **transport of dangerous goods** and by emergency responders



The GHS: SDS 16 sections

1. Identification
2. Hazard(s) identification (NB new order)
3. Composition/information on ingredients
4. First-aid measures
5. Fire-fighting measures
6. Accidental release measures
7. Handling and storage
8. Exposure control/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



GHS-IMPLEMENTATION

World Summit on Sustainable Development



Plan of implementation
Adopted Johannesburg (2002)



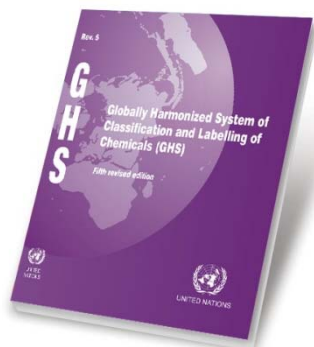
Encourage countries to implement



“All countries are encouraged to implement the GHS as soon as possible with a view to have the system fully operational by 2008.”

Countries: US, Canada, New Zealand, Brazil, China, the Philippines, Russia, Japan, Mexico, South Africa and various other African countries, European Union

GHS-IMPLEMENTATION



Governments



Regional Institutions



International Organizations

- UN Committee of Experts for TDG and GHS adopted the GHS document in December 2002.
- ECOSOC adopted the GHS in early 2003.

Monitoring the Status of implementation through collection of information from:

- Member GHS-SubCommittee
- NGO s
- UN Organs and Agencies: UNECE, UNITAR, IMO, ICAO, UNEP, WHO, ILO
- Intergovernmental organisations: EU, APEC
- Non-governmental organisations

GHS-IMPLEMENTATION

International organizations and agencies implementing GHS:

(By developing, amending or revising their relevant international instruments)

Chemical safety in the field of:

- Transport safety
- Environment
- Workplace safety
- Pesticide management
- Consumer protection
- Prevention and treatment of poisoning

GHS-IMPLEMENTATION

Implementation through International legal instruments, recommendations, code, guidelines:

1. Pesticides management FAO codes and guidelines
2. Prevention and treatment of poisoning: WHO Classification of pesticides
3. Transport of Dangerous Goods: UN Recommendations on the transport of Dangerous Goods
4. Environment: Basel Convention on the control of transboundary movements of hazardous wastes and their disposal

GHS-IMPLEMENTATION



Food and Agriculture Organization
of the United Nations

1. Pesticides management:

- The integration of the **hazard classification** principles of the GHS into the next revision of the FAO *Guidelines on Pesticide Registration*;
- The integration of the **labelling principles** of the GHS into the next revision of the FAO *Guidelines on Good Labelling Practice for Pesticides*;
- **Awareness building** and training of pesticide regulators, pesticide manufacturers and distributors, and pesticide users on the GHS, through FAO pesticide management programmes and in cooperation with others.

GHS-IMPLEMENTATION



2. Prevention and treatment of poisoning. WHO identified three relevant instruments to GHS implementation:

- WHO Recommended classification of pesticides by hazard
- ICSC: International Chemical Safety Cards
- WHO Chemicals publications: [Concise International Chemical Assessment Documents](#) (CICADs) and [Environmental Health Criteria](#) (EHCs).




What information is provided in ICSC?

- 1 Identity of the chemical
- 2 Fire and explosion hazards
- 3 Acute health hazards
- 4 Spillage disposal, storage and packaging
- 5 Preventive measures
- 6 Fire fighting
- 7 First aid
- 8 Classification and labelling

1	NITRIC ACID Concentrated Nitric Acid (>70%) ICSC: 0183 Date of Peer Review: October 2012		
	CAS # 7597-37-2 UN # 2031 EINECS/ELINCS 231-714-2 EC Annex 1 Index # 027-004-09-1	HNO ₃ Molecular mass: 63.0	
2	ACUTE HAZARDS Not combustible but enhances combustion of other substances. Gives off irritating or toxic fumes (or gases) in a fire. Heating will cause rise in pressure with risk of bursting. Risk of fire and explosion on contact with many common organic compounds.	5	6
	PREVENTION NO contact with flammable substances. NO contact with combustibles or organic chemicals.	FIRE FIGHTING In case of fire in the surroundings: NO foam. In case of fire: keep drums, etc., cool by spraying with water.	
3	AVOID ALL CONTACT IN ALL CASES CONSULT A DOCTOR!		
	SYMPTOMS Burning sensation. Cough. Laboured breathing. Shortness of breath. Sore throat. Symptoms may be delayed (see Notes).	PREVENTION Ventilation, local exhaust, or breathing protection.	FIRST AID Fresh air, rest. Half-spright position. Artificial respiration may be needed. Refer immediately for medical attention.
	INHALATION Serious skin burns. Pain. Yellow discoloration.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse skin with plenty of water or shower. Refer for medical attention.
	Redness. Pain. Burns.	Face shield or eye protection in combination with breathing protection.	First rinse with plenty of water (prolonged contact lenses if easily possible). Refer immediately for medical attention.
	Sore throat. Abdominal pain. Burning sensation in the throat and chest. Shock or collapse. Vomiting.	Do not eat, drink, or smoke during work.	DO NOT induce vomiting. Give one or two glasses of water to drink. Rest. Refer for medical attention.
4	SPILLAGE DISPOSAL Enclose danger area! Consult an expert! Personal protection: complete protective clothing including self-contained breathing apparatus. Ventilation. Collect leaking liquid in sealed containers. Carefully neutralise remainder with sodium carbonate. Then wash away with plenty of water. Do NOT absorb in saw-dust or other combustible absorbents.	CLASSIFICATION & LABELLING According to UN GHS Criteria  DANGER May be corrosive to metals Fatal if swallowed Causes severe skin burns and eye damage Causes damage to respiratory tract if inhaled Causes damage to digestive tract if swallowed Causes damage to respiratory tract and teeth through prolonged or repeated exposure if inhaled Transportation UN Classification UN Hazard Class: 8 UN Subcategory: 8.1 UN Pack Group: I	
	STORAGE Separated from combustibles and reducing substances, bases, organics, food and feedstuffs. Cool. Dry. Keep in a well-ventilated room.		
	PACKAGING Unbreakable packaging, put breakable packaging into closed unbreakable container. Do not transport with food and feedstuffs.		
	IPCS International Programme on Chemical Safety 	Prepared in the context of cooperation between the International Programme on Chemical Safety and the Commission of the European Communities © IPCS, CEC 2005 SEE IMPORTANT INFORMATION ON BACK	

ICSC are a support tool for the implementation of the ILO Chemicals Convention

- 9 Physical and chemical properties and dangers
- 10 Short-term and long-term health effects
- 11 Regulatory information
- 12 Environmental data

Date of Peer Review: October 2012	
PHYSICAL & CHEMICAL INFORMATION	
PHYSICAL STATE; APPEARANCE: COLOURLESS TO YELLOW LIQUID, WITH PUNGENT ODOUR.	Boiling point: 121°C Melting point: -41.6°C Relative density (water = 1): 1.4 Solubility in water: miscible Vapour pressure, kPa at 20°C: 6.4 Relative vapour density (air = 1): 2.2 Relative density of the vapour/mixture at 20°C (air = 1): 1.07 Octanol/water partition coefficient as log Pow: -0.21
CHEMICAL DANGERS: The substance decomposes on warming producing nitrogen oxides. The substance is a strong oxidant and reacts violently with combustible and reducing materials, e.g., turpentine, charcoal, alcohol. The substance is a strong acid, it reacts violently with bases and is corrosive to metals forming flammable/explosive gas (hydrogen - see ICS0000). Reacts violently with organic compounds.	
EXPOSURE & HEALTH EFFECTS	
ROUTES OF EXPOSURE: Serious local effects by all routes of exposure.	INHALATION RISK: A harmful concentration of the air can be reached very quickly on evaporation of this substance at 20°C.
EFFECTS OF SHORT-TERM EXPOSURE: The substance is corrosive to the eyes, the skin and the respiratory tract. Corrosive on ingestion. Inhalation may cause lung oedema (see Notes). The effects may be delayed (See Notes).	EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: Lungs may be affected by repeated or prolonged exposure to the vapour. The substance may have effects on the teeth, resulting in teeth erosion.
OCCUPATIONAL EXPOSURE LIMITS	
TLV: 2 ppm as TWA, 4 ppm as STEL (ACGIH 2006) MAK: 10 (not established but data is available) (DFG 2006)	
ENVIRONMENT	
NOTES	
Depending on the degree of exposure, periodic medical examination is suggested. The symptoms of lung oedema do not become manifest until a few hours or even a few days have passed and they are aggravated by physical effort.	
ADDITIONAL INFORMATION	
EU Classification & Labelling 	Symbol: C, O R: 035 S: (10)-103-20-20-45 Note: 0
LEGAL NOTICE	Neither the CEC nor the IPCS nor any person acting on behalf of the CEC or the IPCS is responsible for the use which might be made of this information. © IPCS, CEC 2005

GHS-IMPLEMENTATION

3. Transport of dangerous goods: the GHS is implemented through the "[UN Recommendations on the Transport of Dangerous Goods. Model Regulations](#)" and the following transport legal international instruments

- (a) International Maritime Dangerous Goods Code (IMDG Code);
- (b) ICAO Technical Instructions for the Safe Transport of Dangerous Goods by Air (ICAO TI);
- (c) European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR);
- (d) Regulations concerning the International Transport of Dangerous Goods by Rail (RID);
- (e) European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways (ADN);

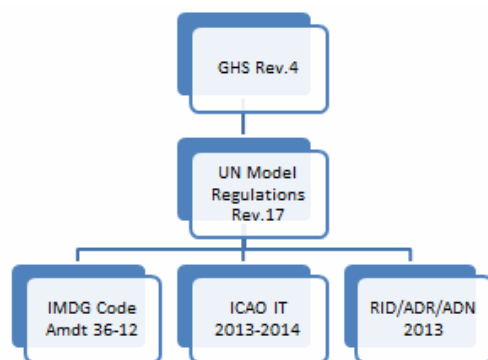


Figure 1: Implementation of the GHS (Rev.4) through transport of dangerous goods regulations for 2013-2014

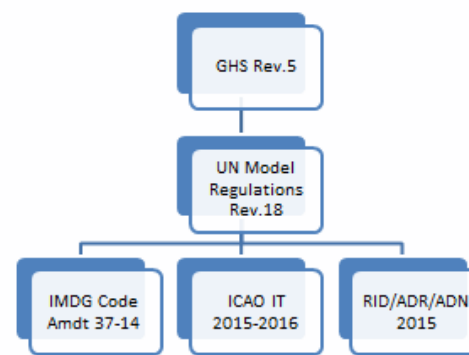


Figure 2: Expected implementation of the GHS (Rev.5) through transport of dangerous goods regulations for 2015-2016

GHS-IMPLEMENTATION

4. Environment: Basel Convention on the control of transboundary movements of hazardous wastes and their disposal

A joint correspondence working group between the Open-Ended working group of the Basel Convention on hazard characteristics and the Sub-Committee of experts on the GHS was established in 2005.

The Secretariat of the Basel Convention reports regularly on the progress of the work of the joint correspondence group to the Sub-Committee of experts on the GHS.



Maintenance of the GHS

- [ECOSOC](#) has international responsibility and oversight of the GHS.
- UN Committee of Experts for [TDG](#) and GHS is responsible for strategic issues
- UNSEGHS (Subcommittee of Experts on the GHS) is responsible to implement, update, promote understanding and use of the GHS and to encourage feedback, make the GHS available for worldwide use and application, etc.



Tools for Implementation



- GHS document
- UNITAR (UN Institute training & Research) guidance document
- Documentation from countries with an existing system
- Experience from other countries implementing the GHS
- Other technical assistance tools to be developed

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(Acts adopted under the EC Treaty/Euratom Treaty whose publication is obligatory)

REGULATIONS

REGULATION (EC) No 1272/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

of 16 December 2008

on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006

(Text with EEA relevance)

GHS

Globally Harmonised System of Classification and Labelling of Chemicals

This poster is only a simplified and exemplary view on GHS. A direct conversion from GHS to the former EU classification and labelling is not possible.

The European Approach

PHYSICAL HAZARDS

Hazard classes and hazard categories*	Label elements NEW**	Label elements OLD
Explosives • Unstable explosives • explosives, divisions 1.1 to 1.3 Self-reactive substances, mixtures, types A, B Organic peroxides, types A, B	H200 H201, H202, H203 H240, H241 H240, H241	(R2, R3)
Explosives, division 1.4	H204	No classification
Flammable gases, category 1 Flammable aerosols, category 1 Flammable liquids, category 1	H220 H222 H224	(R12) (R12) R12
Flammable liquids, category 2 Flammable solids, category 1 Flammable solids, category 2	H225 H228 H228	R11 (R11) (R11)
Flammable aerosols, category 2 Flammable liquids, category 3	H223 H226	No symbol (R10) R10 Flammable
Pyrophoric liquids, category 1 Pyrophoric solids, category 1 Substances, mixtures which in contact with water emit flammable gases, categories 1, 2 and category 3	H250 H250 H260 H261 H261	R17 (R17) (R15) (R15) (R15)
Self-reactive substances, mixtures, type B Self-reactive substances, mixtures, types C, D and types E, F Self-heating substances, mixtures, category 1 and category 2	H241 H242 H242 H251 H252	R12 R12
Organic peroxides, type B Organic peroxides, types C, D Organic peroxides, types E, F	H241 H242 H242	R7 R7
Oxidising gases, category 1 Oxidising liquids, categories 1, 2 and category 3 Oxidising solids, categories 1, 2 and category 3	H270 H271, H272 H272 H271, H272 H272	R8 R8, R9 R8, R9
Gases under pressure – Compressed gases – Liquefied gases – Refrigerated liquefied gases – Dissolved gases	H280 H280 H281 H280	No classification
Corrosive to metals, category 1	H290	No classification

*Based on Annex I Regulation (EC) No 1272/2008 for all hazard categories with GHS pictograms

**Based on the translation table of Annex VII Regulation (EC) No 1272/2008

***Specific Target Organ Toxicity

HEALTH HAZARDS

Hazard classes and hazard categories*	Label elements NEW**	Label elements OLD
Acute toxicity, categories 1, 2 • Oral • Dermal • Inhalation	H300 H310 H330	R28 R27 R26
Acute toxicity, category 3 • Oral • Dermal • Inhalation	H301 H311 H331	R25 R24 R23
Germ cell mutagenicity, categories 1A, 1B Carcinogenicity, categories 1A, 1B Reproductive toxicity, categories 1A, 1B STOT***, single exposure, category 1 STOT***, repeated exposure, category 1	H340 H350 H360 H370 H372	R46 R46, R49 R60, R61 R39 R48
Respiratory sensitisation, category 1 Aspiration hazard, category 1	H334 H304	R42 R65
Germ cell mutagenicity, category 2 Carcinogenicity, category 2 Reproductive toxicity, category 2 STOT***, single exposure, category 2 STOT***, repeated exposure, category 2	H341 H351 H361 H371 H373	R68 R40 R62, R63 R68 R48
Acute toxicity, category 4 • Oral • Dermal • Inhalation	H302 H312 H332	R22 R21 R20
Skin corrosion, categories 1A, 1B, 1C	H314	R34, R35
Serious eye damage, category 1	H318	R41
Skin irritation, category 2 Eye irritation, category 2 Skin sensitisation, category 1 STOT*** after single exposure, category 3 • Respiratory tract irritation • Narcotic effects	H315 H319 H317 H335 H336	R38 R36 R43 R37 No symbol R67
Hazardous to the aquatic environment, acute, category 1	H400	R50
Hazardous to the aquatic environment, chronic, category 1	H410	R50/R53
Hazardous to the aquatic environment, chronic, category 2	H411	R51/R53



Thank you for your attention!

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