

**This presentation is intended for use by
trainers with a working knowledge of the GHS
and older labelling and classification systems
in Australia**



The Globally Harmonised System of Classification and Labelling of Chemicals



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Welcome and overview

Part 1: An Introduction to the GHS (45 minutes)

- Classification and hazard communication - “old” systems in use in Australia
- The GHS – what it is, why it was developed, what it aims to do, what are its benefits.
- The GHS and the WHS Regulations – Scope and Application
 - How does the GHS work
 - GHS Hazard Class and Categories
- Hazard communication
 - Labelling and Safety Data Sheets
 - Signal words, pictograms, hazard statements, precautionary statements
 - Example labelling and SDS
- Questions.
- Morning tea (20 minutes)



Part 2: Classifying chemicals according to the GHS (1 hour)

- What is classification?
- Where do I get information to help me classify
- Cut-off limits
- Practical Example classifications
 - Single chemical
 - Mixtures
- Questions (feel free to ask at any time).



Part 1:

An Introduction to the Globally Harmonised System of Classification and Labelling of Chemicals



Classification and hazard communication

- Prior to Work Health and Safety (WHS) Regulations, classification/hazard communication for workplace chemicals done to:
 - **Classification**
 - Approved Criteria for Classifying Hazardous Substances
 - ADG Code, 7th Edition
 - List of Designated Hazardous Substances
 - **Labelling**
 - National Code of Practice for the Labelling of Workplace Substances
 - ADG Code, 7th Edition
 - **(Material) Safety Data Sheets**
 - National Code of Practice for the Preparation of Material Safety Data Sheets
- The WHS Regulations introduce a new system of classifying chemicals.
 - The Globally Harmonised System of Classification and Labelling of Chemicals



What is the GHS?

- The GHS of Classifying and Labelling of Chemicals:
 - Comprehensive tool that harmonises chemical classification and hazard communication.
- Harmonised criteria for classification – physical, health and environmental
 - Applies criteria to classify chemicals based on **intrinsic** hazards
 - Covers single substances, solutions and mixtures.
- Communicates hazard information of hazardous chemicals on labelling and safety data sheets.
 - Hazard classes
 - Symbols, signal words and hazard and precautionary phrases
 - Standardised Safety Data Sheet format.
- Some changes to systems are required and will be obvious to end users.
 - Training for staff to understand GHS



Why was the GHS developed?

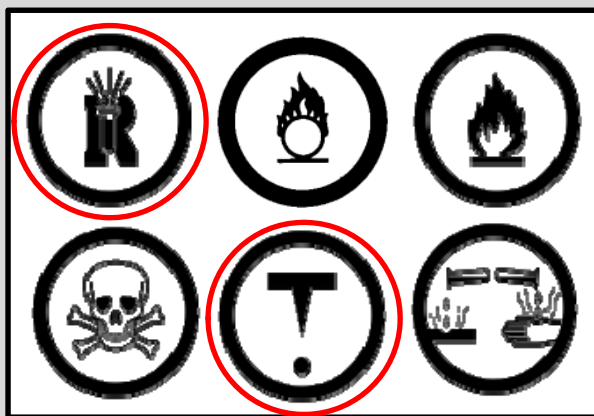
- Many different systems existed worldwide, with differing requirements:
 - Vary in hazards covered and classification criteria used
 - Information required on labels and SDS varied
 - Result = disparity in the information provided.
- Hazards are an intrinsic property of a chemical. Classification should be consistent!
- Often leads to conflicting and inconsistent classifications and safety information:
 - Chemicals are often classified differently (even in the same country).
 - Labelling and SDS requirements vary from country to country.
- Some countries have little or no requirements in force.
 - Often levels of literacy are low
 - Desire to improved the safety outcomes in these countries?



Why was the GHS developed?

- Hazard symbols / pictograms

What do all these symbols mean?



WHMIS (Canada)



European Union

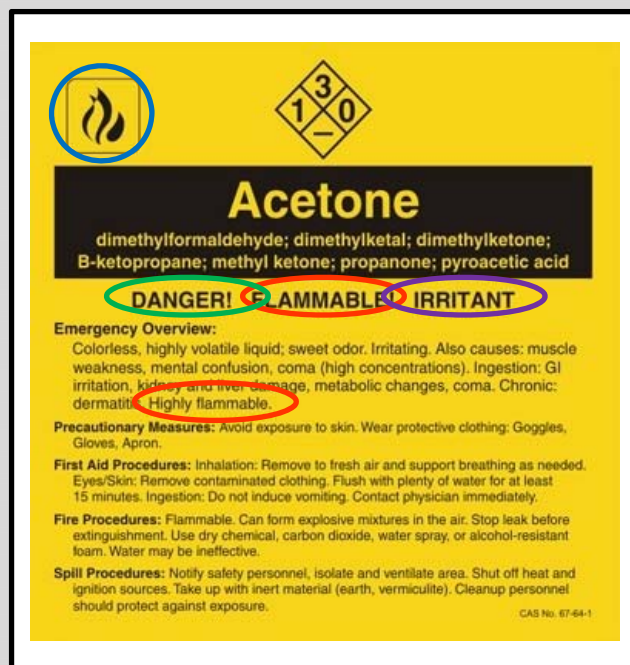


ADG Code

- The ADG Code has no symbol for chronic/severe health effects.
- The GHS standardises these symbols on labels/SDS

Why was the GHS developed?

- Labelling inconsistencies



How was the GHS developed?

- The GHS is based on considered best practices of chemical hazard communication.
 - USA and Canada for workplace, consumers and pesticides
 - EU directives for classification and labelling of substances and preparations
 - UN Recommendations on the Transport of Dangerous Goods
- Because the basis already existed, countries' systems would be maintained or improved by adopting the GHS.
 - In Australia
 - ADG Code (based on UNRTDG)
 - Approved criteria (based on EU directives)



The GHS – Fundamental approach

- The GHS would be based on the classification of **intrinsic properties** of chemicals on a hazard-based approach and would include:
 - Physical hazards
 - Health hazards
 - Environmental hazards
- One chemical, one classification.
- If validated data exists for a chemical, then it should be useable for classification.
- The GHS needed to be comprehensible
 - Need to make it easily understandable for everyone
 - Minimal training required



What are the potential benefits of the GHS?

The GHS provides many benefits to governments, industry and chemical users:

- Reduces need for duplicative testing and evaluation of chemicals.
 - Principles of animal welfare
 - Single approach to labels and safety data sheets.
 - Classification criteria are updated and maintained at an international level.
 - Increased efficiencies and reduced costs of compliance.
 - Easier trade of chemicals; no need to reclassify in every jurisdiction.
 - An increased understanding among the wider community of chemical hazards.
-
- Enhanced safety outcomes for protection of human health and environment through harmonised chemical safety and health information.



Implementation and Development of the GHS

Who is responsible for implementing and updating the GHS?

- The GHS is a non-mandatory, international legal instrument
 - Countries adopt the GHS into their legal frameworks
- Overseeing national implementation is the responsibility of the “competent authority”
 - For workplace health and safety - Safe Work Australia
 - Can be implemented by many sectors in each country
 - E.g. Consumer, Agrochemical, Transport, Environment and others
- The GHS is maintained internationally by a UN Sub-committee of Experts.
 - More than 30 countries are on this committee
 - Australia is represented by Safe Work Australia
 - Observer countries and other stakeholders also participate



Who has implemented the GHS?

- New Zealand was the first country to implement the GHS as part of HSNO.
- Australia implementing **3rd Revision** of the GHS as part of WHS Harmonisation
- Other jurisdictions Include:
 - Japan, China, Singapore, S. Korea (and other ASEAN)
 - EU adopted as part of REACH (finalised by 2015)
 - USA adopted in 2012 (finalised at same time as EU)
 - Canada, Brazil and many others currently preparing.
- The GHS is updated and revised every two years:
 - Future versions of the GHS will be taken up during reviews of the WHS legislation
 - Available free from UN's website



The GHS and the WHS Regulations

Scope and Application

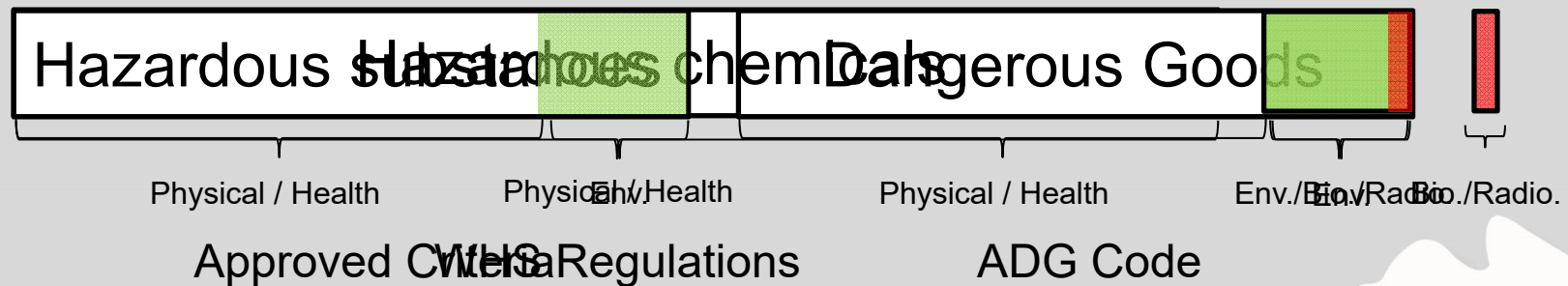
- The GHS now in jurisdictions who have implemented the WHS Regulations.
 - Transition period applies - 31 December 2016
 - By then, all workplace hazardous chemicals must be classified and labelled according to the GHS.
 - Until that time, classification can be done according to the older framework.
- All hazardous chemicals in the workplace are covered:
 - Substances, products, mixtures, preparations, formulations, etc.
 - GHS hazard classes and categories closely reflect existing coverage in Australia.
- The GHS **does not** replace the ADG Code.



The GHS and the WHS Regulations

Scope and Application

- Hazardous chemicals must be correctly classified by the manufacturer / importer.
- Hazardous chemical is a “new” term introduced by the WHS legislation.
 - Previously, classification existed under two systems, both with environmental criteria.
 - These definitions have been “merged” under the term “hazardous chemicals”.



- Environmental hazards are not mandated for classification.
 - Best practice is to include environment hazards where known.

The GHS – Scope and Application

How does it work?

- A chemical is classified against the criteria of each hazard class and category under:
 - Physical hazards
 - Health hazards
 - Environmental hazards (not mandatory)
- If it meets the criteria of the GHS in one or more class, it is a hazardous chemical.
 - Some hazard classes are excluded by the WHS Regulations.
 - Hazardous chemicals include a single substance, mixture or article.
- Each hazard class is split into:
 - Divisions (explosives only)
 - Categories
 - Types (applies to organic peroxides and self-reacting substances).



The GHS – Scope and Application

How does it work?

- Hazards information is prescribed to end users:
 - Symbols (pictograms)
 - Signal words
 - Hazard statements, and
 - Precautionary statements.

Flammable Liquids	Category 1	 GHS02	Danger	H224	Extremely flammable liquid and vapour
	Category 2			H225	Highly flammable liquid and vapour
	Category 3	No Pictogram	Warning	H226	Flammable liquid and vapour
	Category 4		Warning	H227	Combustible liquid

- These elements are then put onto:
 - Labels
 - Safety data sheets

The GHS – Hazard Classes and Categories

Physical Hazards

Hazard Class	Hazard Category						
Explosives	Unstable Explosives	Div 1.1	Div 1.2	Div 1.3	Div 1.4	Div 1.5	Div 1.6
Flammable Gases	1						
Flammable Aerosols	1	2					
Oxidising Gases	1						
Gases Under Pressure	1						
Compressed Gases							
Liquefied Gases							
Refrigerated Liquefied Gases							
Dissolved Gases							
Flammable Liquids	1	2	3	4			
Flammable Solids	1	2					
Self-reactive Substances	Type A	Type B	Type C	Type D	Type E	Type F	Type G
Pyrophoric Liquids	1						
Pyrophoric Solids	1						
Self-heating Substances and Mixtures	1	2					
Substances and mixtures which, in contact with water, emit flammable gases	1	2	3				
Oxidising Liquids	1	2	3				
Oxidising Solids	1	2	3				
Organic Peroxides	Type A	Type B	Type C	Type D	Type E	Type F	Type G
Corrosive to Metals	1						

The GHS – Hazard Classes and Categories

Health Hazards

Hazard Class	Hazard Category				
Acute Toxicity Acute Toxicity: Oral Acute Toxicity: Dermal Acute Toxicity: Inhalation	1	2	3	4	
Skin Corrosion/Irritation	1A	1B	1C	2	
Serious Eye Damage/Eye Irritation	1	2A			
Respiratory or Skin Sensitisation	1				
Germ Cell Mutagenicity	1A	1B	2		
Carcinogenicity	1A	1B	2		
Reproductive Toxicity - Fertility	1A	1B	2	Lactation	
Specific Target Organ Toxicity - Single Exposure	1	2	3		
Specific Target Organ Toxicity - Repeated Exposure	1	2			
Aspiration hazard	1				



The GHS – Hazard Classes and Categories

Environmental Hazards				
Hazard Class	Hazard Category			
Aquatic toxicity, acute	1	2	3	
Aquatic toxicity, chronic	1	2	3	4
Hazardous to the ozone layer	1			

- Not compulsory under WHS Regulations.
- Environmental classification may still be required for transportation.



Non-GHS Hazard Statements

- There are several additional classifications which are not in the GHS.
- Mandated through Codes of Practice.

AUH001 – Explosive when dry

AUH006 – Explosive with or without contact with air

AUH014 – Reacts violently with water

AUH018 – In use may form flammable/explosive vapour/air mixture

AUH029 – Contact with water liberates toxic gas

AUH031 – Contact with acid liberates toxic gas

AUH032 – Contact with acid liberates very toxic gas

AUH044 – Risk of explosion if heated under confinement


AUH066 – Repeated exposure may cause skin dryness and cracking

AUH070 – Toxic by eye contact

AUH071 – Corrosive to the respiratory tract



Hazard communication – Labels

- A label is the written, printed, or graphical information that is affixed to, printed on or attached to the container of a hazardous chemical.
- Harmonised elements under the GHS
 - **Signal words**
Indicate the relative severity of the intrinsic hazards
 - **Pictograms**
Symbols signifying hazards of chemical, e.g. 
 - **Hazard statements**
Phrase describing the nature of the hazards a chemical possesses
 - **Precautionary statements**
A phrase describing measures to be taken to minimise adverse effects of exposure to, or improper handling of, a hazardous chemical (*Prevention, Response, Storage, Disposal*).

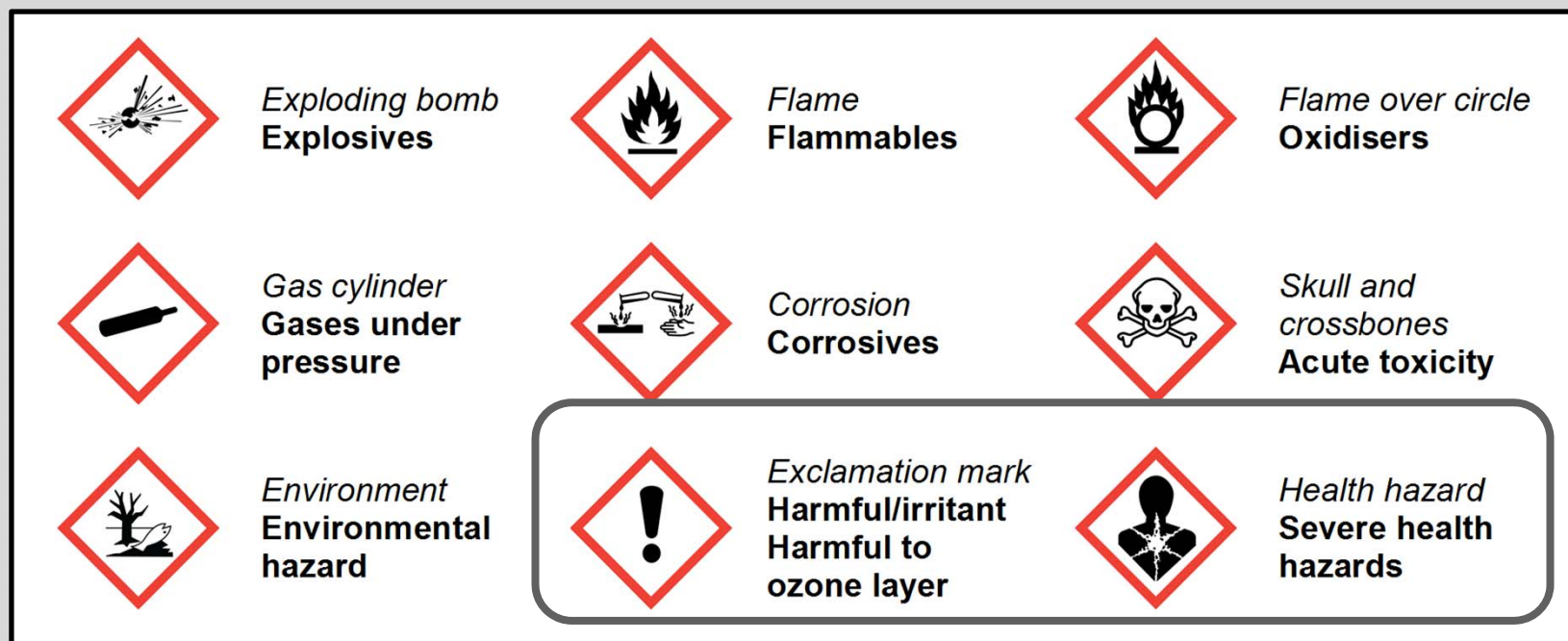
The GHS – Signal words

- Signal words are prominently displayed words on labelling to:
 - Alert the label reader to a potential hazard, and
 - Indicate the relative severity of the hazard
- There are two signal words used on label in the GHS. These are:
 - **DANGER**
 - **WARNING**
- **DANGER** indicates a higher severity of hazard compared to **WARNING**
 - Under the previous systems, signal words included:
 - Danger, Warning, Hazardous, Poison, Dangerous Poison



The GHS – Pictograms

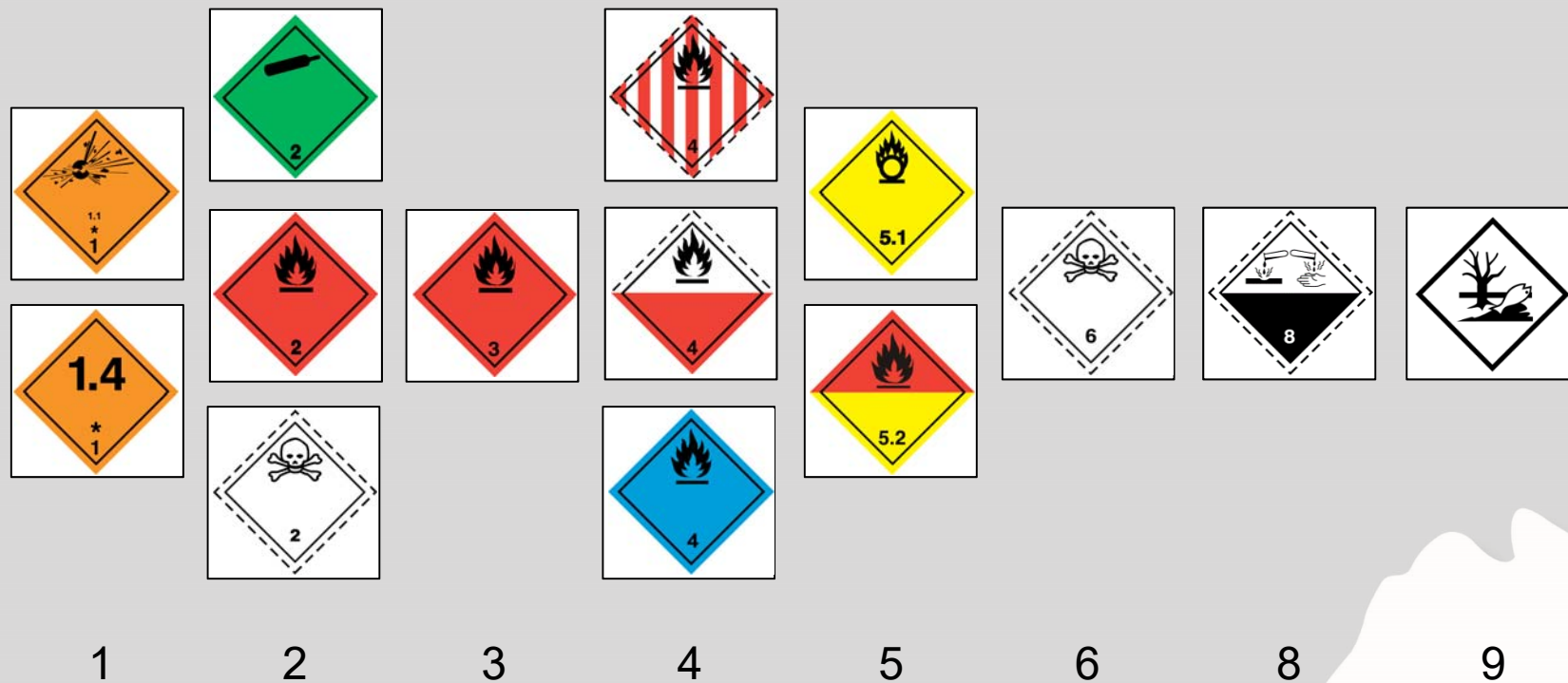
- The GHS prescribes 9 pictograms to convey the hazards of chemicals



- Two new symbols are introduced
- All relevant pictograms will appear on label (according to the prioritisation rules).
 - In practice more than 4 pictograms is very rare

The GHS – Pictograms

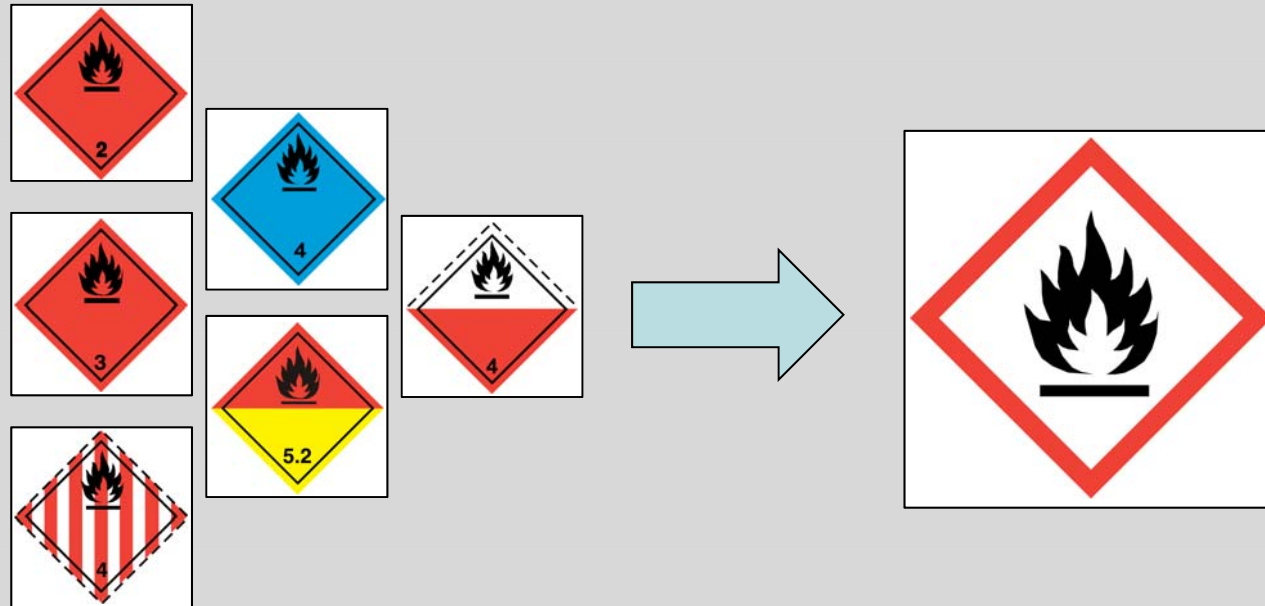
- The GHS also allows dangerous goods class labels to be displayed on labelling and safety data sheets.
- There are no equivalents to the “exclamation mark” and “health hazard” pictograms.



Dangerous Goods Class

Possible issue with flammable chemicals?

- Did anyone spot a possible issue with flammable symbols?



- 6 different “flammable” symbols become one – intrinsic hazard not always obvious at a glance.
 - Read label e.g. **In contact with water releases flammable gas**
 - NO CHANGE TO PLACARDS** - DG symbol still required

Placarding

FLAMMAZENE	
UN No. 9999	<p>The hazard diamond consists of two sections. The top section is white with a black flame symbol and a black number '4'. The bottom section is red with a white number '4'. To the right of the diamond is a smaller, tilted hazard diamond with a black border and a white number '8'.</p>
HAZCHEM 4YE	

The GHS – Hazard statements

- Describe the nature of the hazards covered by the GHS and the degree of severity.
 - Examples include:
 - **Extremely flammable liquid and vapour** (Cat. 1)
 - **Highly flammable liquid and vapour** (Cat. 2)
 - **Flammable liquid and vapour** (Cat. 3)
 - **Combustible liquid** (Cat. 4)
 - **May cause cancer** (Cat. 1)
 - **Suspected of causing cancer** (Cat. 2)
- Hazard statements are equivalent to Risk Phrases under the Approved Criteria.
 - Extremely flammable (R12)
 - Highly flammable (R11)
 - Flammable (R10)
 - May cause cancer (R45)
 - Limited evidence of a carcinogenic effect (R40)



The GHS – Precautionary statements

- Describe measures recommended to prevent or minimise:
 - The adverse effects of exposure to a hazardous chemical, or
 - Improper handling of a hazardous chemical.
- Each hazard class / category has several associated precautionary phrases.
 - *Prevention, Response, Storage, Disposal.*
- For example, for a flammable liquid, the following statements may apply:
 - Keep away from sparks and open flames. No smoking. (*Prevention*)
 - In case of fire: Use powder for extinction (*Response*)
 - Store in a well-ventilated place. Keep cool. (*Storage*)
 - Dispose of contents/container in accordance with local regulations. (*Disposal*)

The GHS – Other information on labels

- *Product identifier* (and ingredient proportions)
- *Supplier / manufacturer details*
- *Supplementary information* , where applicable, such as:
 - hazard classes and hazard statements not specifically covered by the GHS
 - expiry or retest date.
 - UN number



Examples of GHS labels

Product identifier

Ingredient proportions

Hazard pictograms

Signal word

Hazard statements

Precautionary statements

Supplier information

Aromasol

Refer to Safety Data Sheet before use.

2.5 L

Contains:
Aromatic hydrocarbons 95 %v/v
Toxicole 5 %v/v

DANGER

Highly flammable liquid and vapour
Toxic if swallowed
Causes skin irritation
May cause cancer
May be fatal if swallowed and enters airways

IF ON SKIN (or hair): Take off contaminated clothing and wash before re-use.
Rinse skin using plenty of soap and water.
IF exposed or concerned : Get medical advice/attention.
IF SWALLOWED: Immediately call a POISON CENTRE or doctor/physician.
Do NOT induce vomiting
Store locked up in a well-ventilated place.
Keep cool.
Dispose of contents/container in accordance with local regulations.

In case of fire: Use powder for extinction.
Keep away from sparks and open flames – No smoking.
Keep container tightly closed.
Ground/bond container and receiving equipment.
Take precautionary measures against static discharge.
Wear protective gloves and eye and face protection.
Wash hands thoroughly after handling.
Do not eat, drink or smoke when using this product.

Madeup Chemical Company Pty Ltd, 999 Chemical Street, Chemical Town, My State 1234; Tel: 1300 000 000
www.madeup-chemicalcompany.com.au




Examples of GHS labels

Label suitable for transport

DG Class Labels

Aromasol

Contains:
Aromatic hydrocarbons 95 %v/v
Toxicole 5 %v/v



IF ON SKIN (or hair): Take off contaminated clothing and wash before re-use.
Rinse skin using plenty of soap and water.
IF exposed or concerned : Get medical advice/attention.
IF SWALLOWED: Immediately call a POISON CENTRE or doctor/physician.
Do NOT induce vomiting
Store locked up in a well-ventilated place.
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Madeup Chemical Company Pty Ltd, 999 Chemical Street, Chemical Town, My State 1234; Tel: 1300 000 000
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Refer to Safety Data Sheet before use.

2.5 L

DANGER

Highly flammable liquid and vapour
Toxic if swallowed
Causes skin irritation
May cause cancer
May be fatal if swallowed and enters airways

In case of fire: Use powder for extinction.
Keep away from sparks and open flames – No smoking.
Keep container tightly closed.
Ground/bond container and receiving equipment.
Take precautionary measures against static discharge.
Wear protective gloves and eye and face protection.
Wash hands thoroughly after handling.
Do not eat, drink or smoke when using this product.

Examples of GHS labels

Label for small container



Refer to SDS

- When the label does not have enough space, some label elements can be omitted.
- The Safety Data Sheet contains more detailed information

The GHS – Safety Data Sheets

The GHS also provides a minimum standard for the formatting and content for communicating a chemical's hazard through Safety Data Sheets (SDS).

A Safety Data Sheet is a document that provides detailed information about a hazardous chemical, including:

- Its identity and its ingredients
 - Its physical, health and environmental hazards
 - Workplace exposure standards
 - Safe handling and storage procedures
 - First aid procedures
 - Transport information
 - and other useful information.
-
- Sections of the SDS are aimed at a particular audience.



The GHS – Safety Data Sheets

- There are very few changes to SDS by moving to the GHS.
- The majority of changes to Australian SDS will relate to sections where GHS information is required.
- For example:
 - Section 2 contains classification information
 - Including pictograms, hazard statements, etc.
 - Section 3 contains information on ingredients in mixtures.
- Most other sections and information contained in the SDS remain unchanged.



The GHS – Safety Data Sheets

- The information in an SDS is provided in 16 sections.
- These sections are the same as the current requirements and in the same order.

- | | |
|---|-------------------------------------|
| 1. Identification | 9. Physical and chemical properties |
| 2. Hazard(s) identification | 10. Stability and reactivity |
| 3. Composition and ingredient information | 11. Toxicological information |
| 4. First aid measures | 12. Ecological information |
| 5. Fire-fighting measures | 13. Disposal considerations |
| 6. Accidental release measure | 14. Transport information |
| 7. Handling and storage | 15. Regulatory information |
| 8. Exposure controls and PPE | 16. Any other relevant information |



The GHS – Safety Data Sheets

SECTION 2: HAZARD(S) IDENTIFICATION

Classification of the substance or mixture

Flammable liquids (Category 2); Acute toxicity – Oral (Category 3)

Skin irritation (Category 2); Carcinogenicity (Category 1A)

Aspiration toxicity (Category 1)

Label elements

Pictograms:



Flame



Skull and
crossbones



Health
hazard

Signal word: **DANGER**

Hazard statement(s):

H225 **Highly flammable liquid and vapour**

H301 **Toxic if swallowed**

H315 **Causes skin irritation**

H350 **May cause cancer**

H304 **May be fatal if swallowed and enter airways**

Precautionary statements:

P210 **Keep away from sparks and open flames. No smoking**

P233 **Keep container tightly closed**

Further reading on GHS under WHS Regulations

- **Codes of practice**
 - Labelling of Workplace Hazardous Chemicals
 - Preparation of Safety Data Sheets for Hazardous Chemicals
 - Managing the Risks of Hazardous Chemicals in the Workplace
- **Guidance material**
 - Classification of Hazardous Chemicals under the WHS Regulations
- **Fact sheets**
 - Classifications and Labelling for Workplace Hazardous Chemicals (poster)
 - Understanding Safety Data Sheets for Hazardous Chemicals
 - Understanding Hazardous Chemical Labels

See: www.swa.gov.au for these publications and more



Thank you for your attention

Any questions?

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