AEBN DANGEROUS GOODS AND HAZARDOUS SUBSTANCES/CHEMICALS TRAINING

for

Corrections Victoria: H.M.Prison Langi Kal Kal
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Presented by

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Agenda

- Hazardous substances and dangerous goods
  - Legal compliance framework
- Hazardous Substances
  - Classification
  - Safety Data Sheets (SDS)
  - Hazardous substance register
- Dangerous Goods
  - Terminology
  - Classes, Divisions, Sub-Hazards
- Hazard and risk
- Fire Risk Dangerous Goods
- HAZCHEM Code

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Objectives

- To be able to identify and be aware of the hazards of Dangerous Goods
- To make the Storage and Handling of Dangerous Goods safer
- Understand the Regulations and the Dangerous Goods terminology
- Your responsibilities
- Packaging and Labeling
- Segregation

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Why it matters?

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Australia has separate Legislation covering

- Dangerous Goods
- Hazardous Substances
- Hazardous Chemicals

Today's focus

- Scheduled Poisons
- Security Sensitive Chemicals
- Pharmaceuticals
- Agricultural Chemicals

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Dangerous Goods vs. Hazardous Substances vs. Hazardous Chemicals

- The term “Dangerous Goods” applies to chemicals which present immediate hazards during transport, and in Victoria and Western Australia, during storage and handling.
  - In other States, “Dangerous Goods” in storage and handling are technically known as “Schedule 11 Hazardous Chemicals”
- “Hazardous Substances” are classified under GHS based on Health and Environmental hazards as well as Physical hazards, which are similar to Dangerous Goods.

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Hazardous Substances that are Dangerous Goods

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Hazardous Substances that are not Dangerous Goods

What are Dangerous Goods?

- Substances which can pose a threat to
  - Persons
  - Property
  - The environment
- From
  - Explosion
  - Fire
  - Poisoning
  - Corrosion

- They are identified by **Class Labels**

- In most cases they pose a short-term risk

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What are Hazardous Substances?

Can pose both short and long-term risks:

Physical hazards

- Explosion
- Fire
- Poisoning
- Radioactivity
- Corrosion

Health hazards

- Very toxic
- Toxic
- Harmful
- Corrosive
- Irritant

Environmental hazards

- To aquatic life
- To terrestrial vertebrates
- Ozone depleting

- Carcinogenic – cause cancer
- Mutagenic – cell mutation
- Sensitising – allergic reactions
- Teratogenic – birth defects

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White King bleach

- Dilute sodium hypochlorite (“pool chlorine”)
  - Is not a Dangerous Good
- Can cause eye damage and skin irritation
  - Is a Hazardous Substance

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Diesel fuel

- Has a high flashpoint – will not ignite easily
  - Is not a Dangerous Good
- Can cause dermatitis and will irritate the eyes
  - Is a Hazardous Substance

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Rexona deodorant

- Flammable Gas of Class 2.1, UN 1950 (Aerosol)
  - Is a Dangerous Good
  - Is a Hazardous Substance (Physical hazard only)

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Benzene

- Flammable Liquid of Class 3
  - Is a Dangerous Good
- Proven Carcinogenic Material
  - Is a Hazardous Substance

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Regulatory framework

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Regulation – Victoria

- Dangerous Goods Act 1985
  - Dangerous Goods (Storage & Handling) Regulations 2012
    - Code of practice for the storage and handling of dangerous goods 2013
  - Other Regulations apply to:
    - Road & Rail Transport
    - Explosives
    - “High Consequence” DGs
- Occupational Health & Safety Act 2004
  - Occupational Health & Safety Regulations 2017 PART 4.1—HAZARDOUS SUBSTANCES
    - Compliance code: Hazardous substances

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Classification of Hazardous Substances

- A substance is deemed to be hazardous if it meets criteria specified in:
- Globally Harmonised System of Classification and Labelling of Chemicals 7th Revised Edition (GHS)
  - (GHS 3rd Edition can still be used until 31/12/2022)
- The GHS is an internationally recognised system for the classification of chemicals
  - Developed by United Nations Economic Commission for Europe (UNECE)

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GHS classifies chemicals according to:

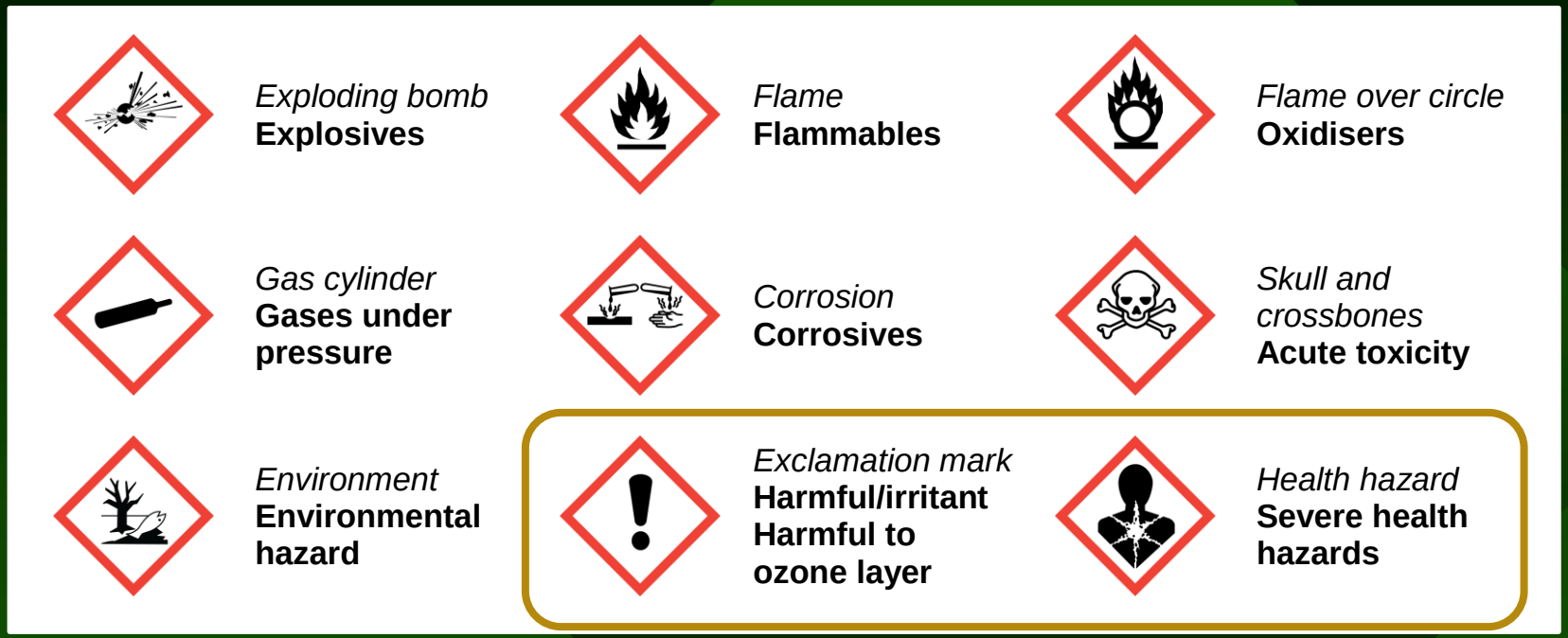
- Physical hazards
  - 9 classes, aligned to the dangerous goods classes
- Environmental hazards
  - Acute aquatic toxicity
  - Chronic aquatic toxicity
- Health hazards
  - Acute toxicity
  - Skin corrosion
  - Skin irritation
- Health hazards (cont.)
  - Serious eye damage
  - Eye irritation
  - Respiratory sensitizer
  - Skin sensitizer
  - Germ cell mutagenicity
  - Carcinogenicity
  - Reproductive toxicity
  - Specific target organ toxicity (STOT)
  - Aspiration hazard

Identifying hazards of chemicals

- Section 2 of the SDS
- Identifies hazardous substance chemical by:
  - Pictograms (similar to DG diamonds)
  - Signal Word – “WARNING” or “DANGER”
  - Hazard and Precaution statements
    - (Replaced Risk and Safety Phrases)

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

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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.

1 2 3 4 5 6 8 9

Dangerous Goods Class

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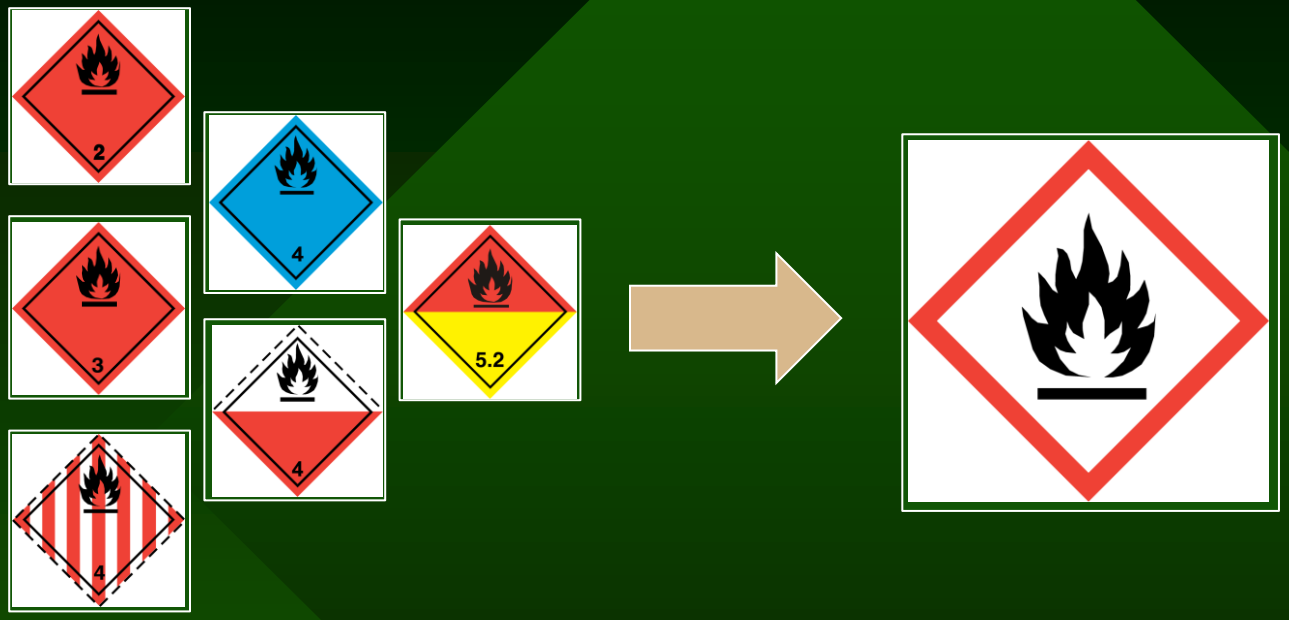
GHS Pictogram for Flammable chemicals



- 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

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Hazard & Precaution Statements

- H followed by 3 numbers
- Physical hazards
  - H225 Highly flammable liquid and vapour
- Health Hazards
  - H302: Harmful if swallowed
  - H350: May cause cancer
- Enviro hazards
  - H410: Very toxic to aquatic life with long-lasting effects
- Country-specific (Australia)
  - AUH014: Reacts violently with water

- P followed by 3 numbers
- General
  - P102: Keep out of reach of children
- Prevention
  - P233: Keep container tightly closed
- Response
  - P372: Explosion risk in case of fire
- Storage
  - P420: Store away from other materials
- Disposal
  - P501: Dispose of contents/container to …

Safety Data Sheets (SDS)

- A **Safety Data Sheet** (SDS) is a technical bulletin containing detailed information about a hazardous substance.
  - Formerly known as a **Material** Safety Data Sheet (MSDS)
- An SDS must comply with VIC OHS Regulation 145
- The hazard identification for the substance must be determined in accordance with the GHS.

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Safety Data Sheet *(Cont.)*

- Is an advisory document
- Provides information on particular substances
- However, producer of document picks up responsibility for:
  - Completeness
  - Accuracy
- Duty of care

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Safety Data Sheet *(Cont.)*

- The manufacturer or importing supplier of a hazardous substance must ensure an SDS is prepared
- Manufacturer or supplier must ensure a copy is provided
  - on or before the first occasion that the substance is supplied to a person,
  - after the SDS is reviewed
  - to any employer who intends to use that hazardous substance in a workplace, on request.

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Should a Safety Data Sheet be less than 5 years old?

- YES!
- VIC OHS Reg 146 Review and revision of safety data sheet
  - A **manufacturer** or an **importing supplier** of a hazardous substance must ensure that the safety data sheet for a substance is reviewed—

    a) as often as is necessary to ensure that the safety data sheet contains current and accurate information; and

    b) at least every 5 years.
  - **AND**
- An **employer** must ensure that a **current** safety data sheet is available (Reg 155 and 156).

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16 Header SDS – Sections

- Section 1 Identification of the material and supplier
- Section 2 Hazards identification
- Section 3 Composition/information on ingredients
- Section 4 First aid measures
- Section 5 Fire fighting measures

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16 Header SDS – Sections *(Cont.)*

- Section 6 Accidental release measures
- Section 7 Handling and Storage
- Section 8 Exposure Control / Personal Protection
- Section 9 Physical and chemical properties
- Section 10 Stability and reactivity

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16 Header SDS – Sections *(Cont.)*

- Section 11 Toxicological information
- Section 12 Ecological information
- Section 13 Disposal considerations
- Section 14 Transport information
- Section 15 Regulatory information
- Section 16 Other information

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SAFETY DATA SHEET

SECTION 1 IDENTIFICATION: PRODUCT IDENTIFIER AND CHEMICAL IDENTITY

Product Identifier	**METHYLATED SPIRITS**
Other Names	Ethanol, Ethyl Alcohol, IMS
Manufacturer's Product Code	15000
Recommended Use	Solvent, Fuel, Cleaning Solvent

Details of Supplier/Manufacturer

Company:	Recochem Inc. ABN: 69 010 485 999
Address:	1809 Lytton Road, Lytton, Queensland 4178
Phone:	(07) 3308 5200 Fax: (07) 3308 5201
Website:	www.recochem.com.au

Emergency Telephone Numbers

Business Hours:	(07) 3308 5200
After Hours:	1300 131 001
Poisons Information:	Australia: 13 11 26 New Zealand: 0800 764 766

SECTION 2 HAZARDS IDENTIFICATION

Hazardous chemical	*according to classification by Safe Work Australia*
Dangerous goods	*according to the Australian Code for the Transport of Dangerous Goods by Road and Rail*

Signal Word	DANGER

GHS Classification	Pictogram	Hazard statement
Flammable Liquids, Category 2	 FLAME	H225 Highly flammable liquid and vapour
Serious Eye Damage/Irritation, Category 2A	 EXCLAMATION MARK	H319 Causes serious eye irritation

Precautionary statements:

GENERAL	
P101	If medical advice is needed, have product container or label at hand
P102	Keep out of reach of children
P103	Read label before use
PREVENTATIVE	
P210	Keep away from heat/sparks/open flames/hot surfaces. - No smoking
P233	Keep container tightly closed
P240	Ground/bond container and receiving equipment
P241	Use explosion-proof electrical/ventilation/lighting equipment
P242	Use only non-sparking tools
P243	Take precautionary measures against static discharge
P264	Wash thoroughly after handling
P280	Wear protective gloves/eye protection/face protection
RESPONSE	
P303 + P361 + P353	IF ON SKIN (or hair): Take off contaminated clothing and wash before reuse. Rinse skin with water/shower
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P337 + P313	If eye irritation persists: Get medical advice/attention
P370 + P378	In case of fire: Use foam/water spray/fog for extinction
STORAGE	
P403 + P235	Store in a well-ventilated place. Keep cool
DISPOSAL	
P501	Dispose of contents/container in accordance with local regulations

SECTION 3 COMPOSITION AND INFORMATION ON INGREDIENTS

Ingredients Names and Proportions

Chemical Entity	CAS Number	Proportion (%)
Ethanol	64-17-5	>= 95
Demin. Water	7732-18-5	<= 5

SECTION 4 FIRST AID MEASURES

Description of necessary first aid measures

Inhalation:	Remove victim from exposure if safe to do so. If rapid recovery does not occur, transport to nearest medical facility for additional treatment. Remove contaminated clothing.
Skin Contact:	If skin contact occurs, remove contaminated clothing and wash skin thoroughly with water and follow by washing with soap if available.
Eye Contact:	If in eyes, hold eyes open, flood with water for at least 15 minutes. If symptoms persist transport to nearest medical facility for additional treatment.
Ingestion:	If swallowed, do NOT induce vomiting. Transport to nearest medical facility for additional treatment.

Symptoms caused by exposure

Inhalation:	May cause irritation to the respiratory system. Inhalation of the vapour may result in drunkenness (as per effects of ingestion). Early symptoms may occur at airborne levels of 1000 to 5000ppm.
Skin:	May include burning sensation and/or a dried/cracked appearance. Prolonged contact may cause defatting of skin which can lead to dermatitis.

Safety Data Sheet Exercise

1. What is the issue date of the SDS?
2. What is the Product Name and name of the supplier?
   - Section 1
3. Is the material Hazardous? If yes, write down one (1) Hazard Statement.
   - Section 2
4. Is it a Dangerous Good? If so, what is the UN Number and Proper Shipping Name?
   - Section 14
5. Which section describes physical and chemical properties of the material? Write down two (2) of its physical or chemical properties.

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Hazardous Substances & Dangerous Goods Register

- Legal requirement
  - OHS Regulation 162
  - DG (S&H) Regulation 60
- List of product names of all Hazardous Substances in the workplace, including Dangerous Goods and combustible liquids
- Accompanied by the current SDS
- Can (should!) be combined with Dangerous Goods Register

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DG & Hazardous Substance Register

Supplier	Product	Issue Date	Expiry Date	Eye Hazard	Skin Hazard	Inhalation	Ingestion	DG Class
BOC Gases	Argoshield Light	31/01/2020	31/01/2025	No	No	No	No	2.2 Non-Flammable Non-Toxic Gas
Bostik	PLUMBFIX KITCHEN & BATH NC TRANSPARENT	23/02/2021	23/02/2026	Yes	Yes	Yes	Yes	No
Bostik	Plumbweld Pipe Cement Type N	12/08/2016	12/08/2021	Yes	Yes	Yes	Yes	3 Flammable Liquid
Castrol	Spheerol EPL 2 Grease	16/01/2019	16/01/2024	No	No	No	No	No
Dulux	381-Line Super Enamel High Gloss	29/02/2016	28/02/2021	Yes	Yes	Yes	Yes	3 Flammable Liquid
Dymark	Spray & Mark	01/11/2019	01/11/2024	Yes	Yes	Yes	No	2.1 Flammable Gas
Dymark	Spray Ink	01/11/2019	01/11/2024	Yes	Yes	Yes	No	2.1 Flammable Gas
Agar	All Fresh Toilet and Bathroom Cleaner	01/07/2016	01/07/2021	Yes	Yes	No	Yes	No

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Dangerous Goods

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Australian Code for the Transport of Dangerous Goods by Road & Rail (ADG Code)

- Issued by National Transport Commission (NTC)
- ADG7.7
  - Mandatory from 1 October 2021
  - Derived from UN Recommendations on the Transport of Dangerous Goods 21st Edition (UN21)
- Reviewed 2-yearly – draft ADG 7.8 to be adopted from 1 October 2022 with 12 month transition
- Other codes
  - IMDG Code (sea transport)
  - IATA Regulations (air transport)

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ADG Code

- Australian Code for the Transport of Dangerous Goods by Road & Rail (ADG Code)
- Maintained by the National Transport Commission (NTC).
- Mainly intended for transport, but applies to manufacture and storage in relation to classification, labelling and packaging.

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Structure of the ADG Code

- The Code consists of:
  - 13 Parts
  - 4 Appendices

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Structure of the ADG Code *(Cont…)*

1. General Provisions, Definitions and Interpretation
2. Classification
3. Dangerous Goods Lists, Special Provisions and Limited Quantities Exceptions
4. Packing, Tank, Container, Vehicle and Equipment Provisions
5. Consignment Procedures – Including Labelling, Marking and Placarding
6. Requirements for the Construction and Testing of Packagings, IBCs, Large Packagings, Portable Tanks, MEGCs, Bulk Containers, Tank Vehicles, Freight Containers & Segregation Devices

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Structure of the ADG Code *(Cont…)*

7. Provisions Concerning Transport Operations
8. Stowage and Restraint
9. Segregation
10. Bulk Transfer of Dangerous Goods
11. Documentation
12. Safety Equipment for Road Vehicles
13. Procedures during Road Transport

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Structure of the ADG Code *(Cont…)*

Four Appendices:

A. Goods too dangerous to be transported

B. Forms

C. Hazchem codes

D. Code of practice for reprocessing steel drums

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Classification of Dangerous Goods

- CLASS
  - DIVISION
- SUBSIDIARY HAZARD
- PACKING GROUP
- UN NUMBER
- PROPER SHIPPING NAME

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DG Class, Division & Subsidiary Hazard

- CLASS means the Class of Dangerous Goods as shown in the ADG Code
- Within the Classes, there are DIVISIONS
- Substances can be classified within 2 or more Classes, with secondary Class(es) referred to as SUBSIDIARY HAZARDS

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Class 1: Explosives

Some Explosive Articles

Ammunition	Flash Powder	Smokeless Powder	Sounding Devices
Black Powder	Fuse	Primer	Torpedoes
Bombs	Fuse (Ammo)	Projectiles	Warheads
Charges	Igniters	Propellants	
Fireworks	Mines	Rocket Motors	
Flares	Powder cake	Signals	

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Division 2.1 Flammable Gases

- Gases which ignite on contact with a source of ignition, however:
- They only ignite in a certain range of concentrations with air
- Above the upper limit – too rich to burn
- Below the lower limit – too lean to burn
    - Heavier-than-air gas leaks may flow and accumulate in low points
        - e.g. propane, butane (LPG)

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Aerosols

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Division 2.2 Non-Flammable Non-Toxic Gases

- Not Flammable when exposed to a source of ignition
- Not Toxic, but can cause death by asphyxiation
- Most are heavier than air, many 6 or 7 times heavier
- Some are stored in cryogenic form, i.e. below minus 150^{O}C
- Oxygen has sub-hazard 5.1

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Oxidising Gas

- Division 2.5
- This class diamond can be used for road and rail transport in Australia in place of class 2.2 and sub-hazard 5.1
- It is not used internationally and cannot be used for sea freight (IMDG)

- Examples:
  - Oxygen gas
  - Nitrous oxide

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Division 2.3 – Toxic Gas

Most toxic gases are heavier than air and many have a subsidiary hazard

- Ammonia, Anhydrous Sub-Hazard 8
- Arsine SH 2.1
- Bromine Chloride SH 5.1 & 8
- Chlorine SH 5.1 & 8

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Class 3: Flammable Liquids

- The UN defines a flammable liquid as:
  - Any liquid having a flash point not more than 60^{o} C
- A C1 combustible liquid has a flash point above 60^{o} C and below 93^{o} C

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Class 4: Flammable Solids

Class 4 includes 3 Divisions with different diamonds:

- 4.1 Flammable solids
- 4.2 Spontaneously combustible
- 4.3 Dangerous when wet

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Division 4.1 Flammable Solids

- Can be easily ignited by flames, sparks etc and are readily combustible
- Danger may also come from toxic combustion products

Examples:
sulphur
red phosphorus
magnesium
matches
firelighters

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Division 4.1 Flammable Solids

- Includes
  - Readily Combustible Solids
  - Desensitized Explosives
  - Self-Reactive Materials
    - Classified into Types A, B, C, D, E, F and G

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Division 4.2 - Spontaneously Combustible

Can burst into flames without an external source of ignition being applied

Two types:

1. Pyrophoric materials
2. Self-heating materials

Examples:

- White phosphorous (kept under water)
- Activated carbon
- Iron swarf

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Division 4.3 - Substances which in contact with water emit flammable gases

When they react with water, these substances are liable to become spontaneously flammable due to the heat liberated by the reaction.

Examples:

- sodium (gives off hydrogen)
- calcium carbide (gives off acetylene)

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Division 5.1 – Oxidizing Agents

Not necessarily combustible but can liberate oxygen and therefore increase ferocity of a fire

Examples:

- Sodium Nitrate
- Hydrogen Peroxide

Division 5.2 – Organic Peroxides

Can react with organic materials to cause fire

Example:

– Epoxy adhesive hardener, MEKP (Methyl Ethyl Ketone Peroxide)

This DG Class Diamond is no longer used (discontinued as of 2011)

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Division 6.1 - Toxic Substances

Liable to cause death or serious injury or be harmful to health if swallowed, inhaled or by skin contact

Examples:

- Sodium cyanide
- N,N-dimethylaniline
- Alkaloids, solid, N.O.S.
- Trichlorethylene
- Methylene chloride

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Division 6.2 Infectious Substances

An infectious substance is a viable microorganism or its toxin that causes or can cause disease in humans or animals.

Potentially infectious substances include:

- Blood and blood products
- Skin, tissue, cell cultures
- Pathogens
  - –(viruses, bacteria, parasites, etc.)

This placard is used for transport but is not required for storage areas.

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Class 7: Radioactive Materials

Radioactive White-I, Yellow-II, and Yellow-III alerts emergency response workers to increasing radioactivity.

White-I is the least radioactive and Yellow-III is the most radioactive.

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Class 8 - Corrosives

A corrosive material is either of the following:

1. Liquid or solid that causes visible destruction or irreversible alterations in skin tissue at the site of contact.

2. Liquid that has a severe corrosion rate on steel or aluminum, as measured in accordance with certain prescribed UN testing procedures.

Examples:

- Solids sodium hydroxide pellets
- Liquids hydrochloric acid

Class 8 - Corrosives

Most corrosives are either Acidic or Alkaline

- Acids – pH LESS THAN 7
  - Hydrochloric
  - Sulphuric
- Alkalis – pH GREATER THAN 7
  - Sodium hydroxide
  - Potassium hydroxide

- Class 8 Acids and Alkalis must be segregated
  - Check pH in the SDS: SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

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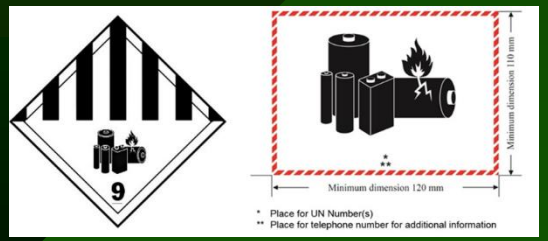
Class 9: Miscellaneous Hazardous Materials

- Materials that present a hazard during transportation but not included in any other hazard class.
- Examples
  - materials with anesthetic or noxious properties
  - elevated-temperature substances – e.g. hot bitumen
  - hazardous wastes
  - marine pollutants
  - magnetized materials,
  - lithium batteries (risk of fire if damaged)



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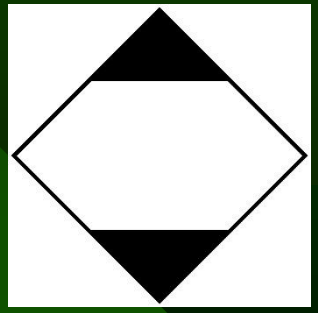
Other Dangerous Goods marks

Multi Class diamond

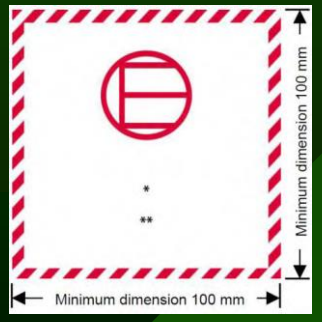
Environmentally Hazardous mark

Goods too dangerous to be transported

Elevated temperature substance



Limited Quantity



Excepted Quantity

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Subsidiary Hazard

- A secondary hazard (or risk) that meets the UN criteria

- e.g. Hydrogen peroxide
  - Class 5.1
  - Subsidiary hazard 8

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Packing Group

- Packing Group I
  - Great Danger
- Packing Group II
  - Medium Danger
- Packing Group III
  - Minor Danger

- Used for packing purposes, to classify common DGs
- NOT used for explosives, gases, radioactives, organic peroxides, infectious substances and some class 4 substances

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DG Packing Group vs. GHS Category

- GHS refers to “Categories” which are aligned to DG Packing Groups
  - e.g. DG Class 3 Flammable Liquids

DG PG	GHS Category	Criteria	Hazard Statement
I	1	Flash point < 23°C and initial boiling point ≤ 35°C	H224 Extremely flammable liquid and vapour
II	2	Flash point < 23°C and initial boiling point >35°C	H225 Highly flammable liquid and vapour
III	3	Flash point ≥ 23°C and ≤ 60°C	H226 Flammable liquid and vapour
	4	Flash point > 60°C and ≤ 93°C	H227 Combustible liquid

UN Number and Proper Shipping Name

- Each Dangerous Good is assigned an internationally recognized 4-digit UN Number, which provides information on the hazard, (mainly for transport).
- The UN Number is associated with a PROPER SHIPPING NAME (in UPPER CASE)
- Examples:
  - UN 2790 ACETIC ACID SOLUTION more than 10% but not less than 80% acid by mass
  - UN 1114 BENZENE
  - UN 1950 AEROSOLS
  - UN 2921 CORROSIVE SOLID, FLAMMABLE, N.O.S. *("Not Otherwise Specified")*
  - UN 3480 LITHIUM ION BATTERIES (including lithium ion polymer batteries)
- (Lower-case text provides extra information)

AUSTRALIAN ENVIRONMENT BUSINESS NETWORK

Special Classifications

- Materials transported at or above their flash point are classified as flammable liquids
  - UN 3256 ELEVATED TEMPERATURE LIQUID, FLAMMABLE, N.O.S.
    - Example is hot bitumen
- Liquids transported above 100^{o}C, and solids transported above 240^{o}C are Class 9
  - UN 3257 ELEVATED TEMPERATURE LIQUID, N.O.S.
  - UN 3258 ELEVATED TEMPERATURE SOLID, N.O.S.

AUSTRALIAN ENVIRONMENT BUSINESS NETWORK

ELEVATED TEMPERATURE LIQUID FLAMMABLE

UN No.

3256

HAZCHEM **2Y**

IN EMERGENCY, DIAL
000, POLICE OR FIRE BRIGADE

SPECIALIST ADVICE
131 700

AUSTRALIAN ENVIRONMENT BUSINESS NETWORK

Fire Risk Dangerous Goods

- Goods which burn readily or support combustion
- Classes 2.1, 3, 4 or 5, or products with a 2.1, 3, 4 or 5 sub-hazard

AUSTRALIAN ENVIRONMENT BUSINESS NETWORK

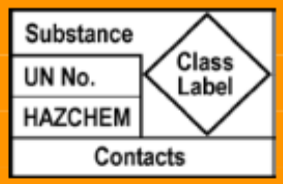
HAZCHEM Code

- 2- or 3-character code to give fire fighters and information in an emergency.
  - See Appendix C of the ADG

AUSTRALIAN ENVIRONMENT BUSINESS NETWORK

HAZCHEM Emergency Action Code

FOR FIRE OR SPILLAGE



1	COARSE SPRAY
2	FINE SPRAY
3	FOAM
4	DRY AGENT
●	ALCOHOL RESISTANT FOAM

P	V	LTS	DILUTE
R			
S	V	BA & FIRE KIT	
T			
W	V	LTS	CONTAIN
X			
Y	V	BA & FIRE KIT	
Z			

E	PUBLIC SAFETY HAZARD

Additional Information

DRY AGENT

Water **must not** be allowed to come into contact with the substance at risk.

ALCOHOL RESISTANT FOAM ●2 or ●3

Alcohol resistant foam is the preferred medium. If not available:

- If **●2** – use Fine Spray or Water Fog
- If **●3** – use Normal Protein Foam

V

Substance can be violently or even explosively reactive, including combustion.

LTS

Liquid-Tight Chemical Protective Suit with BA. Full **FIRE KIT** should also be worn for thermal protection if the substance is:

Liquid Oxygen
or Liquefied Toxic Gas (Division 2.3)
or Toxic Gas with sub-risk 2.1 or 5.1
or Class or sub-risk 3
or Division 5.1 PGI with sub-risk 6.1 or 8
or carried at temperature > 100 °C

DILUTE

May be washed to drain with large quantities of water.

CONTAIN

Prevent, by any means available, spillage from entering drains or water course.

E

People should be warned to stay indoors with all doors and windows closed, –but evacuation may need to be considered. Consult Control, Police and product expert.

SUSMP (Poisons Schedule)

Standard for the Uniform Scheduling of Medicines and Poisons

Schedule	Description
Schedule 2.	Pharmacy Medicine
Schedule 3.	Pharmacist Only Medicine
Schedule 4.	Prescription Only Medicine, or Prescription Animal Remedy
Schedule 5.	**Caution**
Schedule 6.	**Poison**
Schedule 7.	**Dangerous Poison**
Schedule 8.	Controlled Drug
Schedule 9.	Prohibited Substance
Schedule 10	Substances of such danger to health as to warrant prohibition of sale, supply and use

A Health Department Poisons License may be required to manufacture, store, supply or use certain Schedule 7 poisons

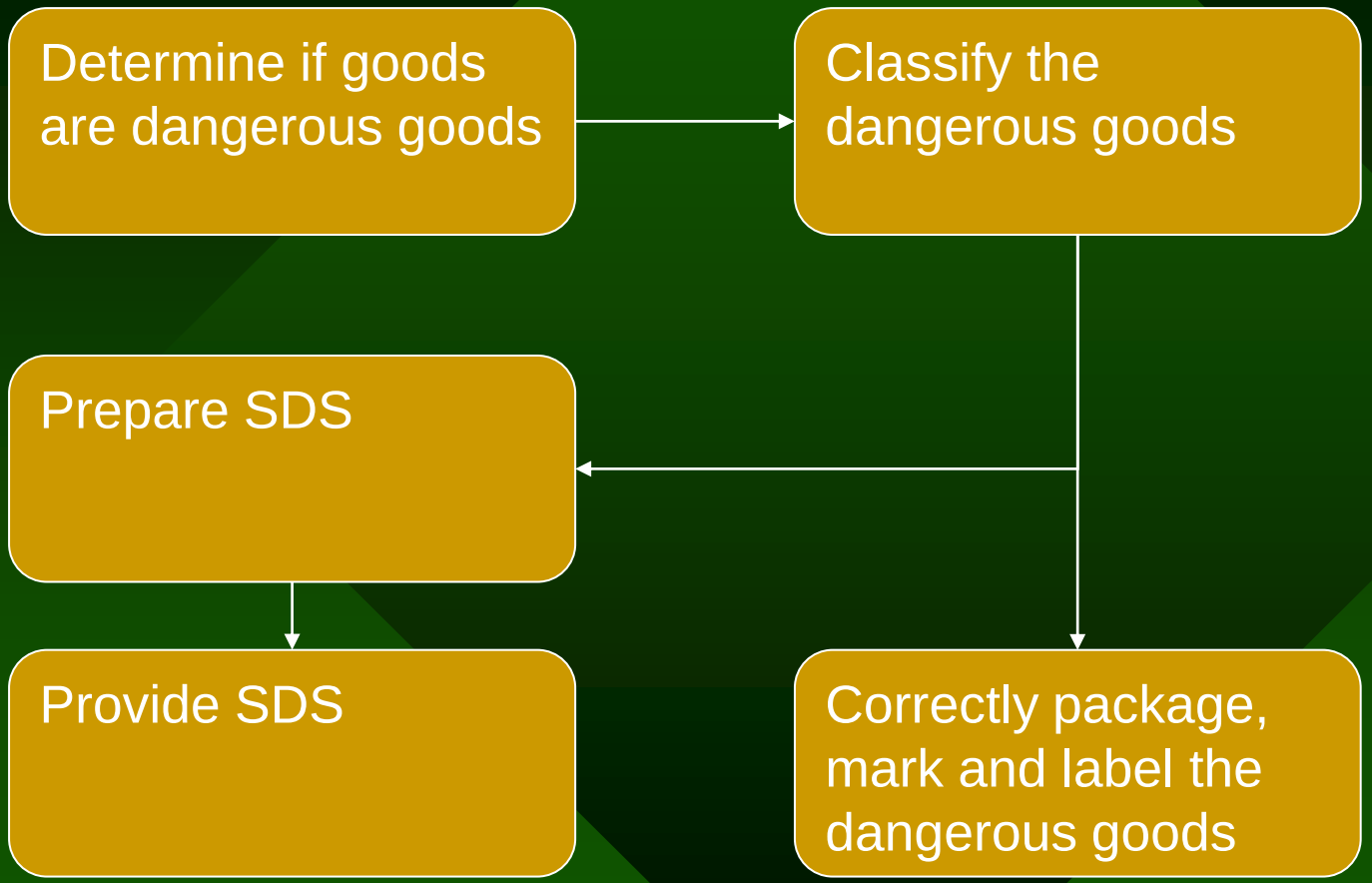
AUSTRALIAN ENVIRONMENT BUSINESS NETWORK

AUSTRALIAN
ENVIRONMENT
BUSINESS
NETWORK

Dangerous Goods in the Workplace

AUSTRALIAN ENVIRONMENT BUSINESS NETWORK

Duties of manufacturers and suppliers



AUSTRALIAN ENVIRONMENT BUSINESS NETWORK

Duties of Occupier (or PCBU)

- Consultation
- Induction & training
- Obtain SDSs
- DG Register
- Safety signage / placarding
- Packaging & marking
- Hazard identification & risk control
- Stability
- Isolation / Segregation
- Bunding
- Transfer
- Ignition sources
- Security
- Emergency planning / Incident response
- Fire protection

AUSTRALIAN ENVIRONMENT BUSINESS NETWORK

Threshold Quantities (Victoria)

- Three thresholds are defined in the Dangerous Goods (Storage and Handling) Regulations 2012
  - Placarding Quantity
  - Manifest Quantity
  - Fire Protection Quantity
- The quantities are given in Schedule 2 of the Regulations

AUSTRALIAN ENVIRONMENT BUSINESS NETWORK

Schedule 2 (extract)

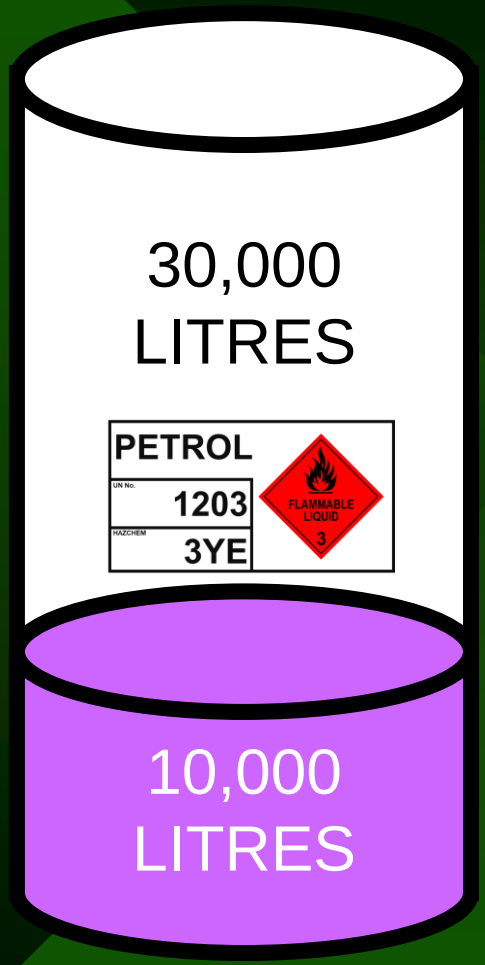
Item	*Description of Dangerous Goods*	*Packing Group*	*Placarding Quantity*	*Manifest Quantity*	*Fire Protection Quantity*
2	UN Class 3, 4.1, 4.2, 4.3, 5.1, 5.2, 6.1 or 8	I	50 kg or L	500 kg or L	2000 kg or L
		II	250 kg or L	2500 kg or L	10 000 kg or L
		III	1000 kg or L	10 000 kg or L	20 000 kg or L
		Mixed Packing Groups in a single UN Class with the quantity of each Packing Group below the specified quantity for the Packing Group.	1000 kg or L	10 000 kg or L	20 000 kg or L

Source: Dangerous Goods (Storage And Handling) Regulations 2012 (VIC), Schedule 2—Quantities of dangerous goods

AUSTRALIAN ENVIRONMENT BUSINESS NETWORK

Quantity Measurement Bulk

- Non liquid – the mass (kgs) the container is designed to hold
- Liquid – the design capacity of the container in litres
  - In example: 30,000 litres
- Gas – total capacity of the container
- Solids not in container – undivided mass in kgs



AUSTRALIAN ENVIRONMENT BUSINESS NETWORK

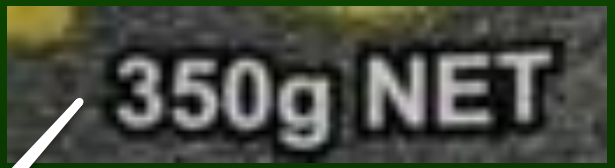
Quantity Measurement Packaged

- Non liquid – net mass (kgs) in container
- Liquid – net capacity of the container
- Gas – Total capacity of the container

AUSTRALIAN ENVIRONMENT BUSINESS NETWORK

Quantity Measurement - Articles

- The net quantity of that part of the article that is Dangerous Goods



12 x 350 g
= 4,200 g
= 4.2 Kg

AUSTRALIAN ENVIRONMENT BUSINESS NETWORK

Minor Storage – Requirements

- Quantities less than the placarding quantity
  - Note: There may be several minor quantity stores on a site.
- Ensure containers are properly labelled
- Maintain Register and SDSs
- Provide suitable PPE
- Ensure adequate segregation
- Ensure suitable spill management
- Provide training
- Provide security
- Manage waste disposal

AUSTRALIAN ENVIRONMENT BUSINESS NETWORK

Placard Quantity – Requirements

- Placard site and storage facilities
- Identify hazards
- Perform risk assessment
- Take risk control measures
  - Storage and handling
  - Transfer
  - Segregation
  - Ignition sources
  - Spill control
  - Ventilation

AUSTRALIAN ENVIRONMENT BUSINESS NETWORK

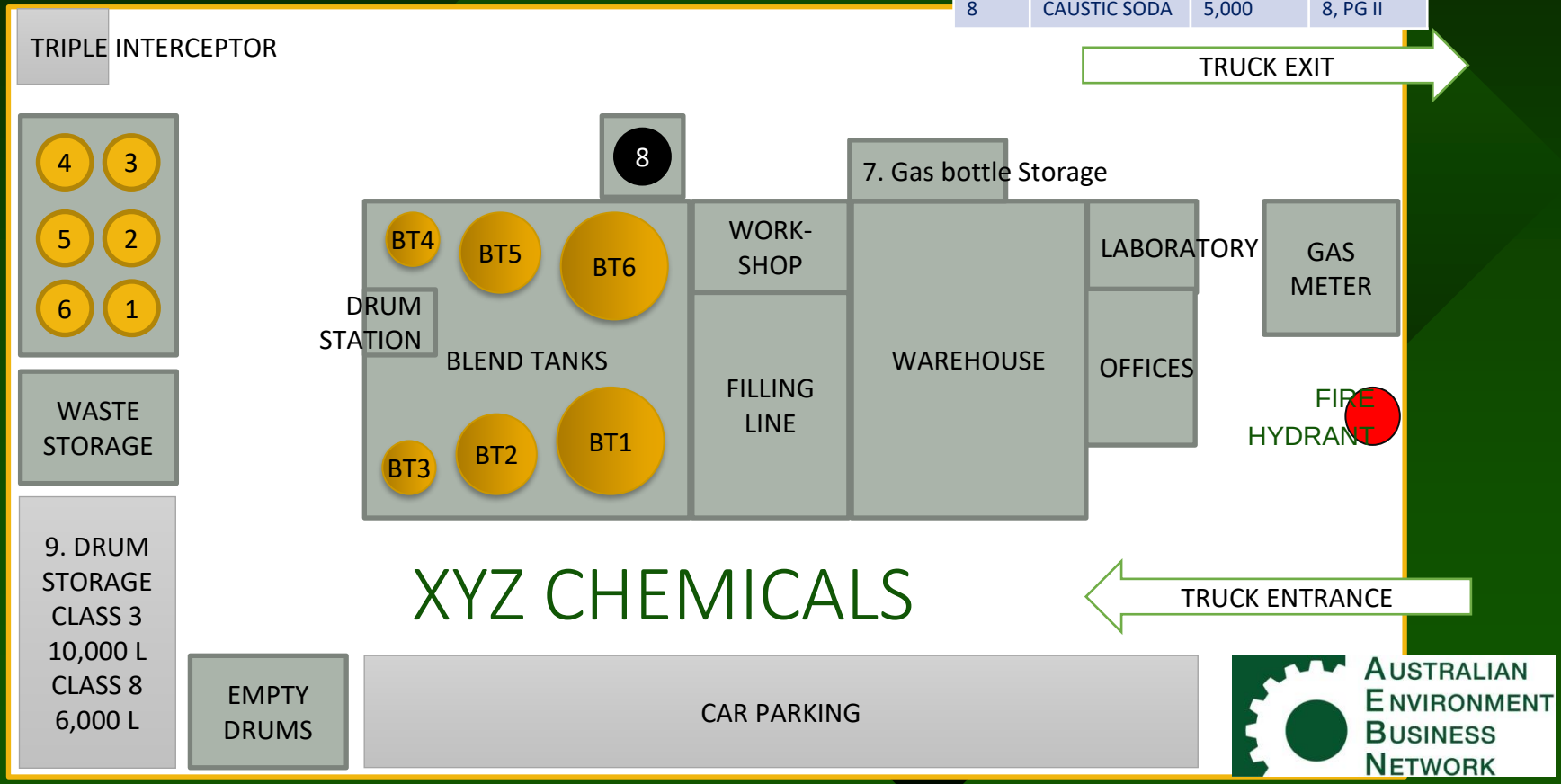
Manifest Quantity – Requirements

1. Notification to workplace safety regulator
   - VIC requires 2-yearly update to WorkSafe (changed to 5-yearly on 1 July 2021)
   - Licence required in SA, WA
   - See regulator websites in other States
2. Prepare Manifest
   – Shows location of storage facilities and quantities in each store
3. Prepare written Emergency Plan
   – (Approved by Fire Authority – VIC)

AUSTRALIAN ENVIRONMENT BUSINESS NETWORK

Dangerous Goods Manifest

TANK	PRODUCT	VOL. (L)	DG CLASS
1	MEK	10,000	3, PG II
2	WHITE SPIRIT	20,000	3, PG III
3	WASTE OIL	20,000	C2
4	HEATING OIL	30,000	C1
5	BASE OIL 150	55,000	C2
6	BASE OIL 460	55,000	C2`
8	CAUSTIC SODA	5,000	8, PG II



Fire Protection Quantity – Requirements

- Obtain written report from Fire Brigade re adequacy of fire protection services

AUSTRALIAN ENVIRONMENT BUSINESS NETWORK

Segregation

- Segregation of chemicals in a warehouse, is of critical importance to the manager and the operator.
- Principally achieved by Class
- Sub-hazards must also be considered when determining segregation

AUSTRALIAN ENVIRONMENT BUSINESS NETWORK

- **Some interactions can be violent.**
  Nitric Acid (Class 8 - Corrosive/Class 5.1 Oxidising Agent) + Ethanol (Class 3 - Flammable Liquid)
  will lead to an *explosion* with the liberation of fumes of nitrous oxide, acetaldehyde and formaldehyde.

- **Some interactions can liberate very poisonous gases.**
  Hydrochloric Acid (Class 8 - Corrosive) +
  Sodium Cyanide (Class 6.1 - Poison)
  will liberate extremely poisonous Hydrogen Cyanide.

- **Some interactions can liberate heat and acid fumes.**
  Sulphuric Acid (Class 8 - Corrosive) +
  Sodium Hydroxide (Class 8 - Corrosive)
  will liberate much heat and fumes.

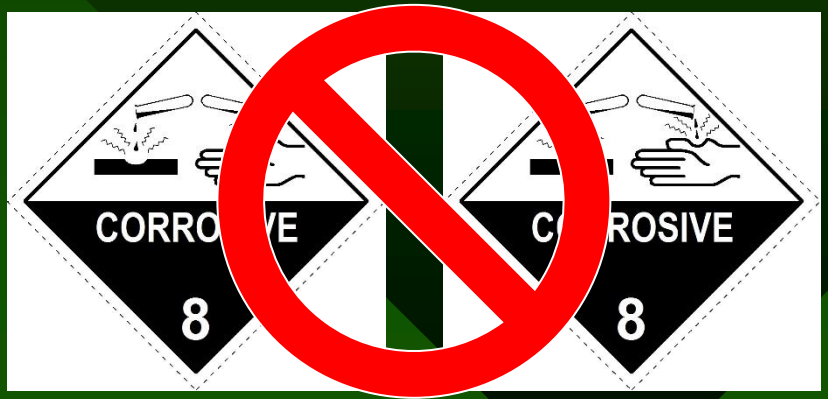
AUSTRALIAN ENVIRONMENT BUSINESS NETWORK

Segregation

- Flammables

- Oxidisers

- Corrosives – Acids



- Corrosives – Alkalis

AUSTRALIAN ENVIRONMENT BUSINESS NETWORK

Segregation

- See Appendix 2 of the Code of practice for the storage and handling of dangerous goods (VIC)

CLASS	2.1	2.2	2.3	3	4.1	4.2	4.3	5.1	5.2	6.1	8	9
2.1	A	E	C	B	B	D	B	D	D	C	B	B
2.2	E	A	B	E	E	E	E	B	E	B	B	B
2.3	C	B	A	C	C	C	C	C	C	B	B	B
3	B	E	C	A	B	D	B	D	D	C	B	B
4.1	B	E	C	B	A	D	B	D	D	C	B	B
4.2	D	E	C	D	D	A	B	D	D	C	B	B
4.3	B	E	C	B	B	B	A	D	D	C	D	B

AUSTRALIAN ENVIRONMENT BUSINESS NETWORK

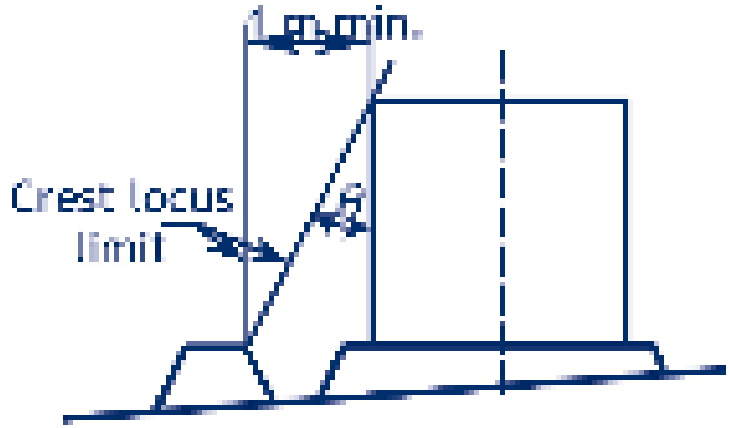
Bunding – Package Storage

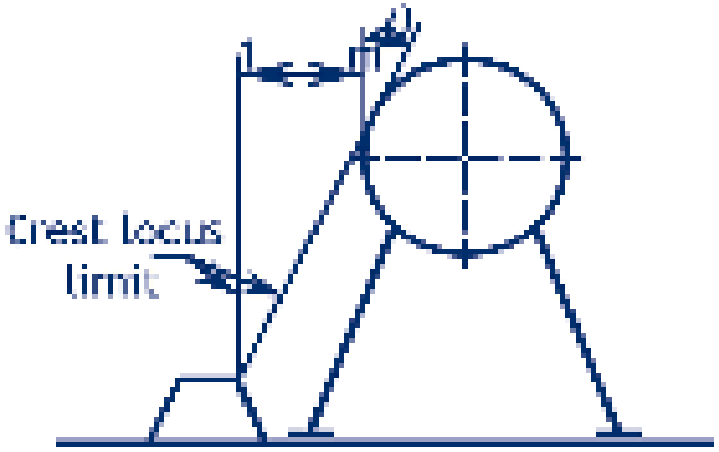
- The capacity of the spillage containment compound shall be at least 100% of the volume of the largest package plus 25% of the storage capacity up to 10 000 L, together with 10% of the storage capacity between 10 000 L and 100 000 L, and 5% above 100 000 L.

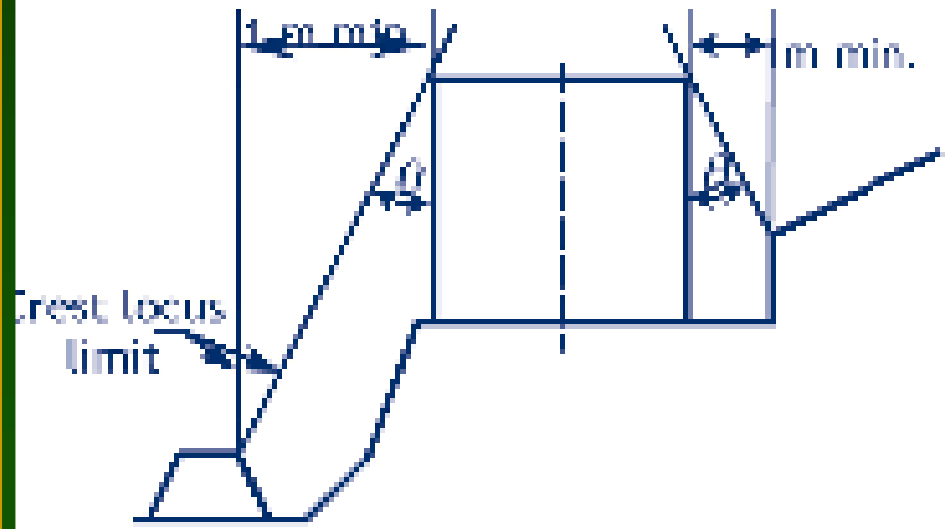
NOTE: Allowance must also be made for fire and storm water if appropriate

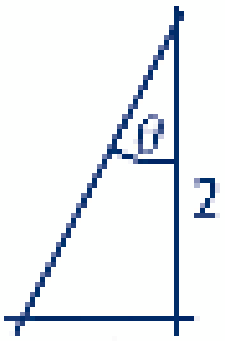
AUSTRALIAN ENVIRONMENT BUSINESS NETWORK

Bunding – Bulk Storage









Tan θ = 0.5

Determination of angle θ

Other matters to consider

- Transit storage
- Site plan
- Hazmat box and its location

AUSTRALIAN ENVIRONMENT BUSINESS NETWORK

Segregation Exercise

AUSTRALIAN ENVIRONMENT BUSINESS NETWORK

Placarding for Storage

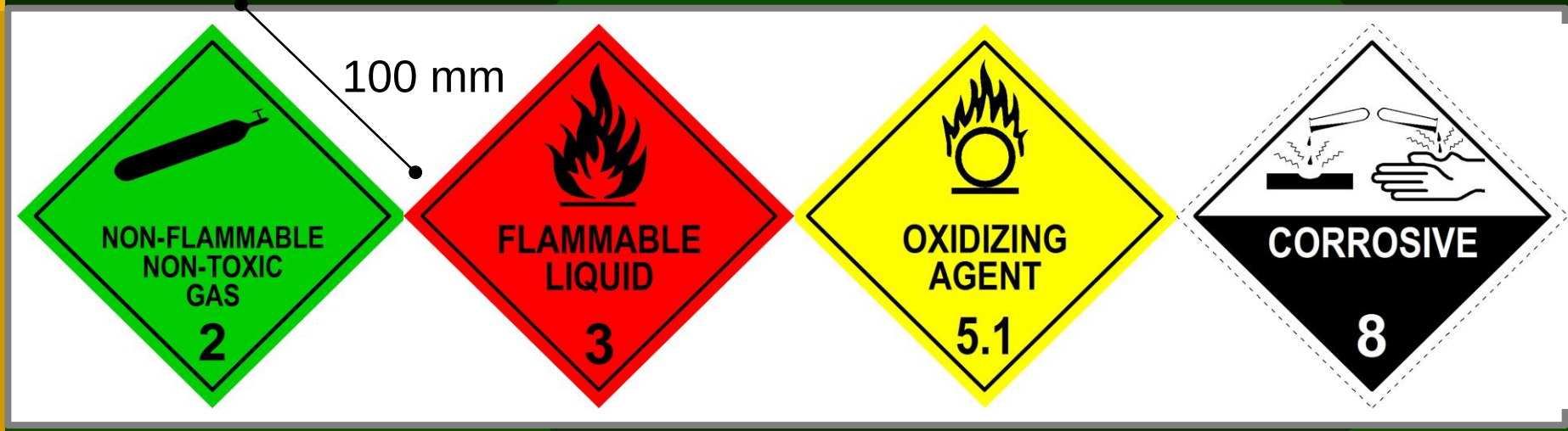
- There are four ‘types’ of placard under the Dangerous Good Regulations – these are:
  - Outer warning placards
  - Information placards for stated Dangerous Goods in tanks
  - Information placards for stated Dangerous Goods in Packages; and
  - Information placards for stated combustible liquids in tanks or packages

AUSTRALIAN ENVIRONMENT BUSINESS NETWORK

Outer Warning Placard

AUSTRALIAN ENVIRONMENT BUSINESS NETWORK

Package Store Placard



AUSTRALIAN ENVIRONMENT BUSINESS NETWORK

Bulk Tank Placard

AMMONIA, ANHYDROUS

50 mm

50 mm

UN No.

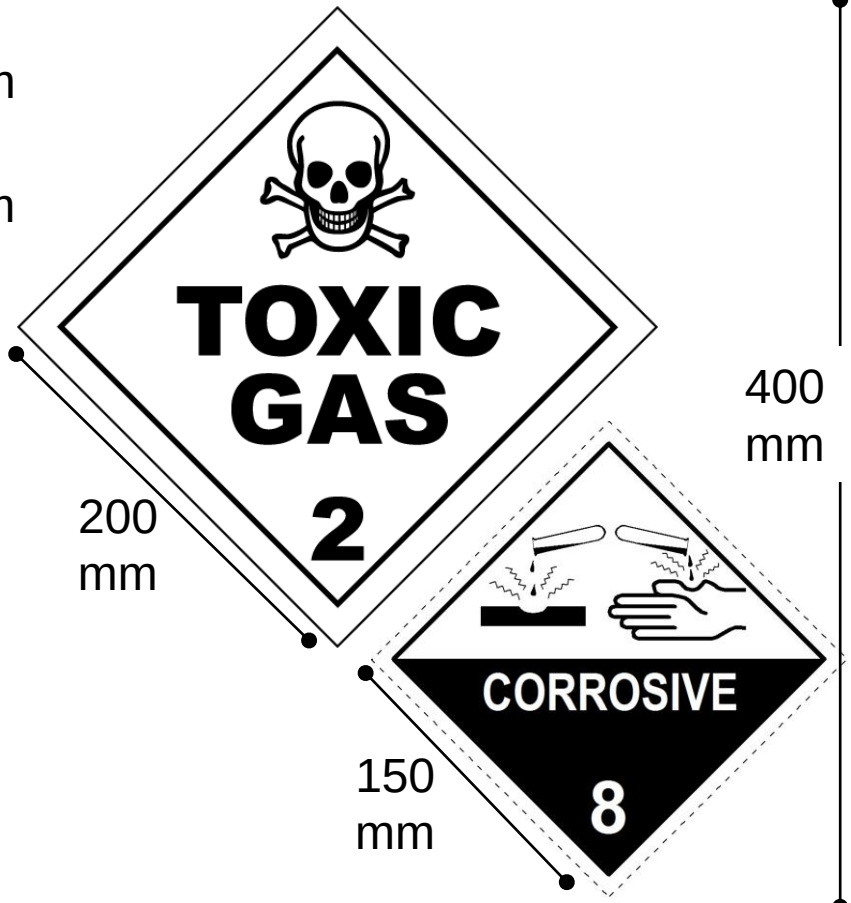
100 mm

1005

HAZCHEM

100 mm

2RE



400 mm

200 mm

150 mm

800 mm

Combustible Liquid Placard
(GHS: Flammable Liquid Category 4)

- Placard quantity is 10,000 litres
- Applies to diesel fuel storage (above-ground only)

AUSTRALIAN ENVIRONMENT BUSINESS NETWORK

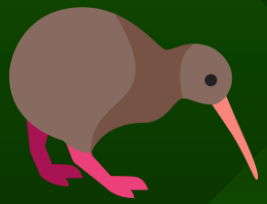
URL - additional information

- Australian Dangerous Goods Code (ADG)
  - http://www.ntc.gov.au/heavy-vehicles/safety/australian-dangerous-goods-code/
- Safe Work Australia
  - www.safeworkaustralia.gov.au
- Dangerous Goods (Storage and Handling) Regulations 2012 (VIC)
  - www.legislation.vic.gov.au/
- UN Model Regulations for the Transport of Dangerous Goods
  - https://www.unece.org/index.php?id=52653
- Global Harmonisation System (GHS) – UNECE
  - https://www.unece.org/trans/danger/publi/ghs/ghs_welcome_e.html
- Labelling of Agricultural and Veterinary chemicals
  - https://apvma.gov.au/registrations-and-permits/labelling-codes
- Poisons Schedule (SUSMP)
  - https://www.tga.gov.au/publication/poisons-standard-susmp

AUSTRALIAN ENVIRONMENT BUSINESS NETWORK

URL - additional information

- EPA NZ – Hazardous substances classification
  - https://www.epa.govt.nz/industry-areas/hazardous-substances/new-zealands-new-hazard-classification-system/
- WorkSafe New Zealand – Hazardous Substances
  - https://www.worksafe.govt.nz/topic-and-industry/hazardous-substances/
- Hazardous Substances Toolbox
  - https://www.hazardoussubstances.govt.nz/
- NZ Land Transport Agency
  - https://nzta.govt.nz/resources/rules/dangerous-goods-2005-index/
- NZ Health and Safety at Work (Hazardous Substances) Regulations
  - https://www.legislation.govt.nz/



AUSTRALIAN ENVIRONMENT BUSINESS NETWORK

Australian & New Zealand Standards

- AS 1940–2017 The storage and handling of flammable and combustible liquids
- AS/NZS 2243.10:2004 Safety in laboratories—Storage of chemicals
- AS 3780–2008 The storage and handling of corrosive substances
- AS/NZS 3833:2007 The storage and handling of mixed classes of dangerous goods, in packages and intermediate bulk containers
- AS 4332–2004 (R2016) The storage and handling of gases in cylinders
- AS/NZS 4452:1997 The storage and handling of toxic substances
- AS/NZS 4681:2000 The storage and handling of Class 9 (miscellaneous) dangerous goods and articles
- AS/NZS 5026:2012 The storage and handling of Class 4 dangerous goods
- NZS 5433:2020 Transport of dangerous goods on land
- SNZ HB 5433:2021 UN dangerous goods list

AUSTRALIAN ENVIRONMENT BUSINESS NETWORK

Sources of information

- Physical inspection
- Internal and external audits
- Employee knowledge and expertise
- Trade journals
- WorkSafe alerts and publications
- Incident / injury records
- Industry associations

AUSTRALIAN ENVIRONMENT BUSINESS NETWORK

Sources of information *(Cont…)*

- Product information
- Technical data sheets
- Manufacturers instruction manuals
- Personal contacts
- By asking ‘What if?’
- Brainstorming

AUSTRALIAN ENVIRONMENT BUSINESS NETWORK

AEBN DANGEROUS GOODS AND HAZARDOUS SUBSTANCES/CHEMICALS TRAINING

for

Corrections Victoria: H.M.Prison Langi Kal Kal
194 Langi Kal Kal Road Trawalla VIC 3352

19 May 2022

Presented by

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www.aebn.com.au