Dangerous Goods Storage and Handling Guidelines

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062.3	Jan-05	OHS Manager	• Document updated
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1. Introduction

Dangerous Goods (DG) are those substances or articles defined under the Australian Dangerous Goods (ADG) code as Class 2, 3, 4, 5, 6.1, 8 or 9, goods too dangerous to be transported or C1 combustible liquids. Licensing is required for specific substances in some of these classes.

Some common dangerous goods are petrol, LP gas, oxygen and acetylene cylinders, pool chlorine, some pesticides and weedicides, flammable solvents (ie methylated spirits, acetone and turps), kerosene, some paints and glues, combustible liquids (diesel) acids and caustic soda, explosives, including fireworks and security sensitive ammonium nitrate.

There are nine classes of dangerous goods:

Class 1	Explosives
Class 2	Gases (Flammable, Compressed/Non-Toxic, Poisonous)
Class 3	Flammable Liquids
Class 4	Flammable Solids
Class 5	Oxidisers & Organic Peroxides
Class 6	Toxic Substances
Class 7	Radioactive Substances
Class 8	Corrosive Substances
Class 9	Miscellaneous Dangerous Goods

It is possible for substances to display more than one characteristic, therefore these substances will display more than one class label. In those circumstances the substance will have a full primary class label and a subsidiary label which is less prominent that the primary.

To further assist with the identification of Dangerous goods and their particular hazards, those of class 3, 4, 5, 6 & 8 are assigned to a packing group which represents the "level of danger" to persons exposed.

Packing Groups: I = Great danger
II = Medium danger
III = Minor danger

The United Nations have allocated a four digit UN Number to substances and articles to assist in their identification, e.g. UN 1075 = LP Gas. To assist emergency services around the world a HAZCHEM Code has been developed which is a first response instruction which provides advice on dealing with issues such as a fire or an environmental contamination situation involving dangerous goods. For further details on UN Numbers and HAZCHEM Coding, reference should be made to the current edition of the Australian Dangerous Goods (ADG) Code.

2. Scope

This document provides guidelines on the storage and handling of dangerous goods including the requirement for notification to authorities when exceeding the threshold.

3. Responsibilities

Legislation requires a risk management approach to the storage and handling of dangerous goods, together with implementing specific control measures and emergency planning. This approach involves hazard identification, risk assessment, control, hazard communication and emergency preparedness.

This management process includes communications requirements, such as Material Safety Data Sheets, placarding, site registers, site manifests, training and the provision of information as required.

3.1 Deans and Directors of Units

Deans and directors of units have the responsibility to ensure that legislation relating to storage and handling of dangerous goods is implemented and that appropriate support strategies and management plans are adopted according to the University's dangerous goods program and practices.

3.2 Department Heads and Managers

Department heads and managers are responsible to implement legislation and dangerous goods guidelines within their area of responsibility, in accordance with UOW strategies.

3.3 Employees

All employees are required to cooperate with the University and, in relation to the tasks that effect them directly, contribute to the process of identification, assessment and control, and support implementation of the legislation by participation in:

- risk assessment processes;
- consultation, and;
- training.

4. Definitions

AS:	Australian Standard or Australian & New Zealand Standard (AS/NZS)
Bunding:	Containment device for liquid storage
Cabinet:	Approved internal storage cabinet for a particular Dangerous Goods class
Class:	Classification applied to Dangerous Goods
Cl:	Clause contained within the Dangerous Goods Regulation
Combustible:	C1 - substance having a flashpoint of >60.5^{o}C and <150^{o}C C2 - substance having a flashpoint of >150^{o}C
Dangerous Goods:	Substances or articles defined under the Australian Dangerous Goods (ADG) code as class 2, 3, 4, 5, 6.1, 8 or 9, goods too dangerous to be transported or C1 combustible liquids
EPA:	Environment Protection Authority
Flammable:	substance having a flashpoint of <60.5^{o}C
HAZCHEM:	Hazard Code for Dangerous Goods Emergencies
Keeping:	Storage of Dangerous Goods
Label:	Dangerous goods Class Label, often called a "Class Diamond"
PG:	Packing Groups I, II or III
PPE:	Personal Protective Equipment
S:	Section of the Dangerous Goods Act
SSDS:	Security sensitive dangerous substances (SSDS) are any goods prescribed by the regulation as security sensitive dangerous substances, also referred to as explosive precursors.
UN:	United Nations
UN Number:	The four digit number used to identify dangerous goods worldwide
WorkCover:	WorkCover Authority NSW

5. Management program

A five-step approach can be taken in the management of dangerous goods.

5.1 Step 1 - Conduct an Audit

Conduct an audit to establish what items are stored, the method of storage, transport, how it is handled and used, and who is in control. Establish that only compatible substances are stored together. A review of Material Safety Data Sheets will identify if there is a need to segregate substances according to DG Class.

Quantities above the "Manifest quantities" amount are to be in licensed stores, such as an approved storage cabinet, which is fitted with an internal bund to contain any spillage. Flammables are to be stored away from ignition sources, and wherever possible avoid the internal storage of flammable and poisonous gases. Externally relocate gas cylinders and pipe supplies to point of use, and always secure gas cylinders in an upright position.

5.2 Step 2 - Compile an inventory to establish what is stored, handled and used (Chem Alert)

The inventory should include:

- Product trade name & United Nations number;
- Dangerous Goods Class & Packing Group;
- Typical & maximum quantities held & the package sizes and supplier details, and;
- Location of storage and point of use.

5.3 Step 3 – Assess risks

A documented risk assessment should clearly outline the assessment of risks including likelihood and consequence. This may take into consideration elements such as:

- the extent of risk to people;
- the extent of risk to other substances, plant and buildings;
- factors contributing to the risk;
- types of controls required;
- priorities for implementing controls, and;
- identification of type of records required.

ChemAlert has the ability to provide this information once the manifest is up to date.

The risk assessment should reference the material safety data sheet to identify risks associated with each dangerous good and use the UOW Hazardous Substances risk assessment form.

The risk assessment process should also include;

A Site Map to indicate storage locations & quantities for licensing with WorkCover

Eg Underground tank = 45,000 l of diesel at Buildings & Grounds compound
Flammable liquids roofed package store = 8,000 kg at building 31
Corrosives Cabinet = 250 l & Toxic Substances Cabinet = 100 l in Room 5:34

Where a laboratory has a quantity of substances, but with no more than a few litres or kilos in any one class, it is not necessary to notify WorkCover NSW. However, it is recommended that the laboratory be marked on a map for internal use as being a facility that holds a quantity of substances. A hazard warning sign must be displayed upon the laboratory doors (order form available from OHS website, laboratory safety)

Other issues to consider might include;
- Spill response kits on hand, and PPE;
- Provision of appropriate fire protection and fighting equipment;
- Establish that containers are suitable and fully labelled;
- Establish location of the Material Safety Data Sheets;
- Establish if and when personal monitoring or health surveillance takes place, and;
- Establish whether training has been provided to staff.

5.4 Step 4 – Control risks

The controls are determined by the identification and risk assessment process. Consideration should be provided for the following;

Fire Protection, Spillage Controls and Ventilation
Fire protection may be required based upon the class of the goods in storage and the quantities held. Reference should be made to the appropriate legislation and Australian Standard. Ensure spillage controls are in place to prevent or limit environmental contamination, and that ventilation is adequate for storage, handling and use. This may require a ventilation survey.

Placarding/Signage
Ensure that all dangerous goods in quantities exceeding the "Placarding quantities' are placarded with the appropriate warning signage as required by the legislation and the Australian Standard appropriate to the class of goods being stored. A placarding report is available in Chem Alert.

Induction and Training
Adequate training should be provided to persons who handle dangerous goods. The Occupational Health and Safety Act also requires the provision of induction and training.

Storage Notification
Workcover NSW is required to be notified for quantities exceeding the 'Manifest quantities' as outlined in Section 9 of this document.

Other controls
Consideration should be given to minimising quantities of DG that are kept on site where possible e.g. purchase 2.5L winchester instead of 20L drum to minimise handling of DG.

5.5 Step 5 – Document control measures

In order to ensure control measures are implemented, the process should be documented. This will also assist in providing evidence as required during an audit or investigation.

6. Operations of storage and handling in small quantities

Packages should be;
- closed when not in use;
- stored on surfaces which will not deteriorate if the package is damaged resulting in a spill;
- stored in such a way to minimise the risk of falling, and;
- positioned in such a way so that leakage will not affect other DG.

Transfer
- An appropriate area should be set aside for the purposes of transfer or decanting of DG products;
- Spill containment should be provided to hold the spill of the largest package i.e. bunding;

- Vapour or dust generation during transfer should be minimised, and;
- Consideration should be given to minimising the generation of static electricity and for sources of heat or ignition.

Segregation
- Incompatible substances should be segregated such as;
    - Solids/liquids - 1.5m
    - Gases – 3m

Separation
- DG should be separated from people or property. Where barriers are used these should be impervious.

Ventilation
- The generation of flammable or harmful atmospheric levels should be kept to a minimum using adequate ventilation. The minimum vent area should be 1m2 for every 50m2 of floor area.

7. Transport of dangerous goods

Dangerous goods during transport are subject to the regulations for road, rail, sea and air transport. DG transported by air must be packaged by a licences DG handler. Minor transport of DG for purposes such as fieldwork, must comply with the relevant guidelines and MSDS including segregation from food stuffs, and as appropriate labelling and signage. DG should not be transported with the cabin of the vehicle.

8. Dangerous goods classes

Dangerous goods are divided into nine classes according to their dangerous properties. Classes 1, 2, 4, 5 and 6 are further subdivided into sub-classes (eg 5.1, 5.2). In addition, goods in Classes 3, 4, 5, 6 and 8 are also organised into Packing Groups (PG) which indicate the degree of danger (PG I - great danger, PG II - medium danger, PG III - minor danger).

Dangerous goods in any quantity must be stored safely and in compliance with the OHS Act and associated regulations. Dangerous goods above certain quantities must be notified to Workcover.

9. Notification quantities

The OHS Unit must be notified where quantities of DG exceed those listed in table 1. These quantities are also required to be notified to Workcover NSW.

Table 1 Quantities

Item	Description of dangerous goods	Packing group	Placard quantity	Manifest quantity
1	Class 2 Class 2.1	na	5,00 L	5,000 L
	Class 2.2, Subsidiary risk 5.1	na	2,000 L	10,000 L
	Class 2.3	na	50 L	500 L
	Aerosols	na	5,000 L	10,000 L
	Cryogenic fluids	na	1,000 L	10,000 L
2	Class, 3, 4.1, 4.2, 4.3, 5.1,	I	50 kg or L	500 kg or L

	5.2, 6.1 or 8	II	2,50 kg or L	2,500 kg or L
		III	1,000 kg or L	10,000 kg or L
		Mixed packing groups in a single class with the quantity of each packing group below the specified quantity for the packing group	1,000 kg or L	10,000 kg or L
3	Class 9	II	1,000 kg or L	10,000 kg or L
		III	5,000 kg or L	10,000 kg or L
		Mixed packing groups in class 9 with the quantity of each packing group below the specified quantity for the packing group.	5,000 kg or L	10,000 kg or L
4	Mixed classes of dangerous goods where none of the classes, types of Packing Groups present exceeds the quantities specified for the relevant quantity in item, 1, 2, 3 of this table	na	5,000 kg or L (applies if the placard quantity of individual class is 5,000 kg/L) 2,000 kg or l (applies if placrd quantity for all classes is 2,000 kg or L	10,000 kg or L
5	C1 combustible liquids stored or handled with fire risk dangerous goods where none of the classes, types or Packing Groups present exceeds the quantities in items 1, 2, or 3 of this table.	na	1,000 kg or L	10,000 kg or L
6	Goods too dangerous to be transported that are not kept in a laboratory	na	Any quantity	Any quantity
7	C1 combustible liquids in bulk stored and handled separately from other dangerous goods C1 combustible liquids stored and handled in packages separately from other dangerous goods. C1 combustible liquids in bulk and in packages stored and handled separately from other dangerous goods provided the quantity in bulk is 10,000 L or less.	na	10,000 L 50,000 L 50,000 L	100,000 L 100,000 L 100,000 L

For further information regarding the notification of storage and handling of dangerous goods please refer to the 'NSW Code of Practice, Storage and handling of dangerous goods, 2005'.

10. Security sensitive dangerous substances

As per the NSW legislation, a licence is required to possess and store explosives and/or security sensitive dangerous goods (SSDG). Under the new legislation, fertilizers and other ammonium nitrate products that contain more than 45 per cent ammonium nitrate are designated SSDS, and their access and use is restricted. Those wishing to obtain a licence must satisfy a police and commonwealth agencies national probity assessment.

It is now illegal to possess Security Sensitive Ammonium Nitrate (SSAN, includes any emulsion, gel, suspension or mixture with greater than 45% ammonium nitrate) without a licence. Exemptions are made for quantities less than 3kg which are being used for educational or research purposes at a school, university or research institution.

There are a number of controls to be implemented for these types of substances. Further detail can be found in the 'Security plan for storage and handling of explosives' from Workcover NSW.

11. Related documents

- Risk management
- Hazardous substances
- Purchasing
- Consultation

12. References

- AS1596 Storage & Handling of Liquefied Petroleum Gas
- AS1894 Storage & handling of non-flammable cryogenic & refrigerated liquids
- AS1940 Storage & Handling of Flammable & Combustible Liquids
- AS2022 SAA Anhydrous Ammonia Code
- AS2030 The approval, filling, inspection, testing & maintenance of cylinders for the storage & transport of compressed gases
- AS2187 Explosives - Storage, Transport & Use (Parts 1 & 2)
- AS2243 Safety in Laboratories (Parts 1 - 10 inclusive)
- AS2381 Electrical Equipment for Explosive Atmospheres
- AS2430 Classification of Hazardous Areas
- AS2507 Storage & handling of pesticides
- AS2714 Storage & handling of hazardous chemical materials - Class 5.2 (organic peroxides)
- AS2927 Storage & handling of liquefied chlorine gas
- AS3000 SAA Wiring Rules
- AS3780 Storage & handling of Corrosive Substances
- AS3961 Liquefied Natural Gas
- AS4081 Storage, handling & transport of liquid & liquefied poly-functional isocyanates
- AS4289 Oxygen & Acetylene gas reticulation systems
- AS4326 Storage & handling of gases in cylinders
- AS4452 Storage & handling of Toxic Substances
- ADG Code, Australian Code for the Transport of Dangerous Goods
- Dangerous Goods (Gas Installation) Regulation 1998, NSW Publishing Service
- Storage and handling of dangerous goods code of practice, 2005, NSW Workcover
- Explosives Act 2003, NSW Publishing service
- Explosives Regulation 2005, NSW Publishing service
- OHS Amendment (Dangerous Goods) Act 2003, NSW Publishing service
- OHS Amendment (Dangerous Goods) Regulation 2005, NSW Publishing service
- Storage and handling of dangerous goods, Code of Practice, 2005, NSW Workcover
- Explosives Act 2003, NSW Publishing service
- Explosives Regulation 2005, NSW Publishing service

- OHS Amendment (Dangerous Goods) Act 2003, NSW Publishing service
- OHS Amendment (Dangerous Goods) Regulation 2005, NSW Publishing service
- Security plan for storage and handling of explosives guide 2005, NSW Workcover.
- The Australian Code for the Transport of Dangerous goods by Road and Rail (ADG Code), current edition (Australian Government Publishing Service);

13. Program evaluation

In order to ensure that these guidelines continue to be effective and applicable to the University, the program will be reviewed regularly by the OH&S Unit and relevant stakeholders. Conditions which might warrant a review of the guidelines on a more frequent basis would include:

- An injury or near miss resulting from storage and handling of dangerous goods;
- Incidents related to storage and handling of dangerous goods;
- Changes to legislation and associated standards;
- Employee or Employer concern.

Following completion of any review, the program will be revised and, if necessary, updated in order to correct any deficiencies.