

Australian/New Zealand Standard™

**The storage and handling of mixed  
classes of dangerous goods, in  
packages and intermediate bulk  
containers**



## **AS/NZS 3833:2007**

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee CH-009, Safe Handling of Chemicals. It was approved on behalf of the Council of Standards Australia on 8 March 2007 and on behalf of the Council of Standards New Zealand on 11 May 2007.

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The following are represented on Committee CH-009:

ACCORD Australia  
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Australasian Fire Authorities Council  
Australian Institute of Petroleum  
Australian Paint Manufacturers' Federation  
Consumers' Federation of Australia  
Department of the Premier and Cabinet, SA  
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## Australian/New Zealand Standard™

# **The storage and handling of mixed classes of dangerous goods, in packages and intermediate bulk containers**

Originated as AS/NZS 3833:1998.  
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## PREFACE

This Standard was prepared by Joint Standards Australia/Standards New Zealand Committee CH-009, Safe Handling of Chemicals, to supersede AS/NZS 3833:1998. Revision of this Standard was commenced following the committee's agreement that the series of Standards relating to the storage and handling of dangerous goods be reviewed and updated to reflect changed regulatory requirements and control philosophies that have been refined since the publication of the 1998 edition, taking into particular account the current (2004) edition of AS 1940, *The storage and handling of flammable and combustible liquids*.

The purpose of this Standard is to provide minimum acceptable safety requirements for installations where more than one class of dangerous goods is stored and handled, whether in packages or intermediate bulk containers (IBCs) of up to 1.6 m<sup>3</sup> capacity.

This Standard addresses the storage and handling of mixed classes of dangerous goods of Classes and Divisions 1.4S (as consumer commodities), 2 (as consumer commodities or aerosols of UN 1950), 3, 4.1, 4.3, 5.1, 5.2, 6.1, 8 and 9, and combustible liquids when stored with the dangerous goods, in packages and IBCs as described above.

The terms 'normative' and 'informative' have been used in this Standard to indicate the application of each appendix. A normative appendix is an integral part of the Standard, whereas an informative appendix provides information and guidance.

Statements expressed in mandatory terms in notes to tables and figures are requirements of this Standard. Notes that appear in the main text are intended to provide information and recommendations only.

Australian and New Zealand references are separated by a slash (/) or parentheses. Australian references apply in Australia, and New Zealand references apply in New Zealand. Joint Standards apply in both Australia and New Zealand.

The series of Standards covering the storage, handling and transport of dangerous goods currently comprises the following publications:

|       |                                                                                                   |
|-------|---------------------------------------------------------------------------------------------------|
| HB 76 | Dangerous goods—Initial emergency response guide                                                  |
| AS    |                                                                                                   |
| 1216  | Class labels for dangerous goods                                                                  |
| 1678  | Emergency procedure guide—Transport (series)                                                      |
| 1894  | The storage and handling of non-flammable cryogenic and refrigerated liquids                      |
| 1940  | The storage and handling of flammable and combustible liquids                                     |
| 2187  | Explosives—Storage, transport and use (series)                                                    |
| 2507  | The storage and handling of agricultural and veterinary chemicals                                 |
| 2508  | Safe storage and handling information card (series)                                               |
| 2714  | The storage and handling of hazardous chemical materials—Class 5.2 substances (organic peroxides) |
| 2809  | Road tank vehicles for dangerous goods (series)                                                   |
| 3780  | The storage and handling of corrosive substances                                                  |
| 3846  | The handling and transport of dangerous cargoes in port areas                                     |
| 4326  | The storage and handling of oxidizing agents                                                      |
| 4332  | The storage and handling of gases in cylinders                                                    |

## AS/NZS

- 1596 The storage and handling of LP Gas
- 2022 Anhydrous ammonia—Storage and handling
- 2927 The storage and handling of liquefied chlorine gas
- 4081 The storage and handling of liquid and liquefied polyfunctional isocyanates
- 4452 The storage and handling of toxic substances
- 4681 The storage and handling of Class 9 (miscellaneous) dangerous goods and articles

## NZS

- 5433 Transport of dangerous goods on land

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## FOREWORD

This Standard provides requirements and recommendations for the storage and handling of more than one class of dangerous goods within the same storage area, without the need for segregating walls. It may be applied where the dangerous goods are kept in packages and intermediate bulk containers (IBCs) of up to 1.6 m<sup>3</sup> capacity.

### Features of this Standard

This Standard is different from many of the other Australian or Joint Standards for the storage and handling of dangerous goods, in that it allows more than one class of dangerous goods to be stored together, without the need for segregating walls between the different classes. To achieve this storage, certain assumptions have been made and requirements added. These are outlined below, with further information given in the body of the Standard.

#### *Prohibition of certain dangerous goods*

This Standard prohibits certain types and classes of dangerous goods from the mixed class store because of their special requirements, their hazards, or the additional risk they could present. These dangerous goods are excluded from this Standard. The dangerous goods that may be included in the mixed class store, and those that are excluded, are described in Section 1, Scope and Application.

Where it is necessary to store any of the dangerous goods that are excluded from this Standard, the relevant Australian or Joint Standard for those dangerous goods needs to be used.

#### *Hazard assessment*

A written hazard assessment is necessary. This assessment needs to identify the dangerous goods that are to be stored, address all of the relevant requirements clause-by-clause, and record in detail how compliance with the requirements will be achieved.

The hazard assessment needs to identify the compatibility or otherwise of all of the dangerous goods that are to be stored. Some goods might react dangerously, and this also needs to be identified. If goods that are not dangerous goods are to be kept in the same store, their compatibility may also need to be investigated. This information is necessary so that the goods can be suitably segregated within the store.

The hazard assessment also needs to provide for ongoing store management and housekeeping.

It may be necessary to obtain expert advice when planning the store. It is usually best to contact the relevant regulatory authority for the storage and handling of dangerous goods at an early stage.

#### *Segregation within the dangerous goods store*

Any incompatible goods, and goods which might react dangerously, will need to be segregated within the store. Segregation is described in Section 6. It may also be necessary to segregate dangerous goods from any foodstuffs or food ingredients in the store.

#### *Retail storage*

Many dangerous goods are packed in small packages for retail sale. Requirements for such dangerous goods in retail shops and retail distribution centres is given in Section 3 of this Standard.

*Management and housekeeping*

The standard of management and housekeeping in the store needs to be consistently high. This is to ensure safe storage and effective management of any emergencies that could arise. It is important that the segregation of goods is maintained at all times.

## STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

**Australian/New Zealand Standard****The storage and handling of mixed classes of dangerous goods, in packages and intermediate bulk containers**

## SECTION 1 SCOPE AND GENERAL

**1.1 SCOPE AND OBJECTIVE****1.1.1 Scope**

This Standard sets out requirements and recommendations for the safe storage and handling of dangerous goods, in packages and intermediate bulk containers (IBCs) of up to 1.6 m<sup>3</sup> capacity, where dangerous goods of more than one class are kept within the same store, without the need for segregating walls.

## NOTES:

- 1 Dangerous goods are classified as such and listed in the *UN Recommendations on the Transport of Dangerous Goods—Model Regulations*. They are also listed in the *Australian Dangerous Goods Code* (ADG Code) and NZS 5433.
- 2 An outline of the classes and divisions of dangerous goods is provided in Appendix A.
- 3 To achieve storage conditions comparable in safety to those for individual class storages, the various Australian or Joint Standards for the storage and handling of individual classes of dangerous goods have been reviewed and additional requirements and recommendations introduced as necessary. The resulting conditions for mixed class storage are intended to provide an equivalent level of safety as that which would be achieved by applying the relevant Australian Standard for each individual class or division of dangerous goods being kept.

**1.1.2 Objective**

The objective of this Standard is to provide minimum acceptable safety requirements for storage areas, operating procedures, emergency planning and fire protection. It provides technical guidance that may assist in the storage and handling of dangerous goods in accordance with regulatory requirements.

## NOTES:

- 1 In Australia, this would be in accordance with the risk management requirements of NOHSC:1015 and regulations based on that document. In New Zealand, this would be with the HSNO Act.
- 2 AS/NZS 4360 should also be consulted regarding risk management.

**1.2 APPLICATION****1.2.1 Which Standard should be used?**

The various Australian or Joint Standards for the storage and handling of dangerous goods provide requirements and guidance in accordance with the risk management principles of NOHSC:1015 and regulations that draw upon that document. As a result, it may be necessary to consider several Standards:

- (a) The relevant Australian or Joint Standard for each class of dangerous goods being stored.
- (b) Any industry-specific Standard for the storage and handling of the dangerous goods being stored, e.g. AS 2507.

- (c) Any Australian or Joint Standard for a specific type of dangerous goods, e.g. AS/NZS 4081.
- (d) This Standard.

Once it has been determined that a particular Standard is to be used, that Standard needs to be applied in its entirety. It is not intended that various parts of several Standards are to be used selectively. However, the use of the relevant Australian or Joint Standard for each individual class being stored should be considered first.

### 1.2.2 Where this Standard applies

This Standard applies to the storage and handling of dangerous goods, in packages and IBCs, where more than one class of dangerous goods is kept in the one store, i.e. in 'mixed class' storage. It applies to the following Classes and Divisions of dangerous goods:

- (a) Dangerous goods of Classes 3, 8 and 9, and Divisions 4.1, 5.1 and 6.1.
- (b) Dangerous goods of Packing Group I where they are compatible with the other goods being stored.
- (c) Explosives of Division 1.4S in their original retail packagings.
- (d) Gases of Divisions 2.1 and 2.2 in aerosols or retail packages (e.g. non-refillable cartouches of camping gas).
- (e) Dangerous goods of Division 4.2 where the goods are PG III only.
- (f) Dangerous goods of Division 4.3 where they are kept in a separate fire cabinet.
- (g) Organic peroxides of Division 5.2 that are listed in Appendix 7 of the ADG Code as not requiring temperature control, or are in retail packages.  
NOTE: Isolated storage areas or cabinets, as described in AS 2714, would normally be used.
- (h) Class 7 (radioactive) dangerous goods in smoke detectors.

This Standard also applies to the storage and handling of any combustible liquids, in packages and IBCs, that are stored with the dangerous goods described above.

NOTE: There may not be any legal requirements to label combustible liquids as such, so it may be difficult to ascertain whether a liquid is a C1 or C2 combustible liquid. The actual classification may be determined from the liquid's flash point, which is usually found on the Material Safety Data Sheet (MSDS) for the liquid. Where the flash point is not given on the MSDS, it should be ascertained from the manufacturer or Australian supplier of the liquid.

This Standard applies in locations that are generally industrial, commercial or rural in nature. It also applies to transit storage of dangerous goods.

The requirements of this Standard apply in conjunction with, but do not take precedence over, any regulations that apply in any area.

#### NOTES:

- 1 Where dangerous goods of Division 1.4S are kept, the relevant explosives regulations need to be consulted.
- 2 An installation may come under the regulatory control of several authorities having different areas of responsibility, and agreement from one may not necessarily constitute agreement from others.

### 1.2.3 Where this Standard does not apply

#### 1.2.3.1 Locations and situations

This Standard does not apply to the following locations and situations:

- (a) Port areas.
- (b) Transport.

- (c) Bulk storage of any dangerous goods.
- (d) Laboratories.

### **1.2.3.2 Types of dangerous goods**

This Standard does not apply to the following types of dangerous goods:

- (a) Explosives, other than those described in Clause 1.2.1(c).
- (b) Gases in cylinders, in which case AS 4332 should be consulted.
- (c) Dangerous goods of Division 4.2, PG I and II.
- (d) Organic peroxides of Division 5.2 that are listed in the ADG Code as requiring temperature control. AS 2714 applies to the storage of dangerous goods of Division 5.2.
- (e) Any goods of Division 6.2 (infectious substances).
- (f) Class 7 (radioactive) dangerous goods, unless fitted in smoke detectors.

## **1.3 REFERENCED DOCUMENTS**

A list of documents referenced in this Standard is provided in Appendix B.

## **1.4 DEFINITIONS**

### **1.4.1 ADG Code**

The Australian Code for the Transport of Dangerous Goods, also known as the Australian Dangerous Goods Code, published by the Commonwealth Department of Transport and Regional Services.

### **1.4.2 Aerosol**

A non-refillable receptacle made of metal, glass, or plastics, containing gas which is compressed, liquefied or dissolved under pressure, and fitted with a relief valve which allows the contents to be ejected as a gas or as solid or liquid particles in suspension in a gas or liquid.

NOTE: This term includes aerosol dispensers.

### **1.4.3 BCA**

The Building Code of Australia.

### **1.4.4 Boundary**

The perimeter of the whole of the site under the same occupancy as the storage area.

### **1.4.5 Bulk**

Dangerous goods that are not in packages.

### **1.4.6 Bund**

An impervious embankment of earth, or a wall of brick, stone, concrete or other suitable material, which forms part or all of the perimeter of a compound.

### **1.4.7 Capacity**

The total internal volume of the container at a temperature of 15°C, expressed in litres or cubic metres.

### **1.4.8 Cartouche**

A non-refillable packaging that—

- (a) is designed to hold its contents under pressure; and
- (b) needs to be punctured for removal of its contents.

### 1.4.9 Class (of dangerous goods)

The number assigned to dangerous goods which exhibit a common single or most significant risk, determined from the criteria in the UN *Manual of Tests and Criteria* and listed in the ADG Code.

#### 1.4.10 Combustible liquid

Any liquid, other than a flammable liquid, that has a flash point, and a fire point less than its boiling point.

For the purpose of this Standard, combustible liquids are divided into two classes as follows:

- (a) *Class C1*—a combustible liquid having a flash point of 150°C or less.
- (b) *Class C2*—a combustible liquid having a flash point greater than 150°C.

#### NOTES:

- 1 As there is no legal requirement to label combustible liquids as such, it is often difficult to ascertain whether a liquid in a drum or other package is a C1 or C2 combustible liquid. Material safety data sheets (MSDS) rarely contain this information. The actual classification may be determined from the flash point (see Clause 1.4.21). If the flash point is not provided on the MSDS, it should be ascertained from the manufacturer or Australian/New Zealand supplier of the liquid.
- 2 The liquid's boiling point is the temperature at which it is no longer possible to achieve the rate of temperature rise required by ISO 2592 for the determination of flash point.
- 3 ISO 2592 and ASTM D92 are technically equivalent test methods for the determination of flash and fire points by the Cleveland open cup (COC) tester.

#### 1.4.11 Combustible materials

Materials deemed to be combustible when tested in accordance with AS 1530.1 (NZS/AS 1530.1).

#### 1.4.12 Compatible

In relation to dangerous goods, other goods, containers or equipment, those that—

- (a) are not incompatible (as defined in Clause 1.4.26); or
- (b) do not react dangerously (as defined in Clause 1.4.48).

#### 1.4.13 Compound

An area bounded by natural ground contours or by a bund, and sufficiently impervious to retain any fire water, spillage or leakage. This includes the floor of the compound.

NOTE: A containment vessel, pit or tank may be used for this purpose.

#### 1.4.14 Container

Anything in or by which dangerous goods are wholly or partly encased, covered, enclosed, contained or packed, whether such a thing is empty or partially or completely full, but does not include a vehicle or freight container.

#### 1.4.15 Corrosive substances

Substances that, by chemical action, will cause severe damage when in contact with living tissue, or in the case of leakage, will materially damage, or even destroy, other goods or the means of transport; they may also cause other hazards.

Such substances are listed as Class 8 corrosive materials in the ADG Code/NZS 5433, or meet the criteria for classification as corrosive substances.

#### 1.4.16 Dangerous goods

Substances and articles that—

- (a) satisfy the UN criteria for determining whether they are dangerous goods; or
- (b) are listed in the ADG Code/NZS 5433; or
- (c) are determined to be dangerous goods by the competent authority.

NOTE: UN tests and criteria are given in the UN *Manual of Tests and Criteria* and the UN *Recommendations on the Transport of Dangerous Goods—Model Regulations*.

#### 1.4.17 Desensitized explosives

Explosive substances that are dissolved or suspended in water or other liquids, or wetted with water or alcohols, or diluted with other substances, to form a homogeneous mixture to suppress their explosive properties.

#### 1.4.18 Environmentally sensitive area

The term includes, but is not limited to—

- (a) a water catchment area;
- (b) a reservoir for drinking water;
- (c) a freshwater or marine environment; or
- (d) a national park or equivalent.

#### 1.4.19 Fire resistance level (FRL)/Fire resistance rating (FRR)

The grading period, in minutes, determined in accordance with AS 1530.4 (NZS/ISO 834) for—

- (a) structural adequacy;
- (b) integrity; and
- (c) insulation

and expressed in that order (e.g. 60/60/30).

NOTE: Where an FRL/FRR is specified, reference should be made to the *Building Code of Australia* (BCA) or the *New Zealand Building Code* (NZBC) for guidance.

#### 1.4.20 Flammable liquid

In Australia, a liquid, or a mixture of liquids, or a liquid containing solids in solution or suspension (e.g. paints, varnishes, lacquers, etc., but not including substances otherwise classified on account of their dangerous characteristics) which gives off a flammable vapour at temperatures of not more than 60.5°C, closed cup test, or not more than 65.6°C, open cup test, normally referred to as the flash point.

In New Zealand, a liquid having a flash point equal to or less than 93°C.

#### 1.4.21 Flash point

The lowest temperature, corrected to a barometric temperature of 101.3 kPa, at which application of a test flame causes the vapour of the test portion to ignite under the specified conditions of test.

NOTE: Closed-cup flash point test methods are given in the AS 2106 series.

#### 1.4.22 Freight container

A re-usable container of the type specified in AS/NZS 3711.4, and designed for repeated use for the transport of goods by one or more means of transport.

#### 1.4.23 Hazardous area

An area in which an explosive atmosphere is present, or may be expected to be present, in quantities such as to require special precautions for the construction, installation and use of potential ignition sources.

NOTE: A classification system for hazardous areas is given in the AS/NZS 2430 series.

#### 1.4.24 Hot work

The use or operation of any of the following:

- (a) Welding or flame cutting equipment.
- (b) Grinders, electric drills, or other non-flameproof electrical equipment.
- (c) Hot tapping equipment.
- (d) Spark ignition equipment.
- (e) Spark ignition engines or non-approved compression ignition engines.
- (f) Matches, naked lights, cigarettes, cigarette lighters, flames or sparks.
- (g) Hand tools that might create a spark.
- (h) Non-flameproof electrical cables, cords, switches, lights, connectors or fittings.
- (i) Any other thing that is likely to produce a source of ignition or be an ignition source.

#### 1.4.25 Ignition source

A source of energy sufficient to ignite a flammable or explosive atmosphere. Examples of ignition sources include naked flames, hot surfaces, exposed incandescent material, electrical wiring arcs, mechanical or static sparks, hot particles, electrical discharge, and electrical or mechanical equipment not suitable for use in hazardous locations.

#### 1.4.26 Incompatible

In relation to dangerous goods or other goods, goods that are—

- (a) likely to interact with the dangerous goods so as to increase the risk when mixed or otherwise brought into contact with the dangerous goods;
- (b) listed in the ADG Code/NZS 5433 as being incompatible; or
- (c) declared by the regulatory authority as being incompatible.

In relation to packaging or transfer equipment, a container or item of equipment that is constructed of material likely to interact with the dangerous goods such that it is weakened or damaged to the extent that risk increases.

NOTE: This definition should be read in conjunction with Clause 1.4.48.

#### 1.4.27 Installation

All of the facilities on a site that are used for storing or handling dangerous goods.

#### 1.4.28 Intermediate bulk container (IBC)

A rigid or flexible portable packaging for the transport of dangerous goods that—

- (a) has a capacity of not more than—
  - (i) for solids or liquids of Packing Groups II and III, 3 m<sup>3</sup> or 3000 L;
  - (ii) for solids of Packing Group I in a composite, fibreboard, plastics or wooden container, 1.5 m<sup>3</sup>; and
  - (iii) for solids of Packing Group I in a metal container, 3 m<sup>3</sup>.
- (b) is designed for mechanical handling;

- (c) is resistant to the stresses produced in usual handling and transport; and
- (d) complies with the UN *Recommendations on the Transport of Dangerous Goods—Model Regulations*.

## NOTES:

- 1 *Specifications for Intermediate Bulk Containers for the Transport of Dangerous Goods* is published as a supplement to the ADG Code.
- 2 The maximum capacity of IBC covered by this Standard is 1.6 m<sup>3</sup>.

**1.4.29 Manufactured product**

Dangerous goods of Class 3 Packing Group II or III—

- (a) that are a suspension or solution of at least 10% non-volatile materials as determined by AS 1580.301.1 (NZS/AS 1580.301.1);
- (b) of which less than 3% of the mobile solvent layer separates in a solvent separation test specified in the UN *Manual of Tests and Criteria*; and
- (c) the viscosity of which meets the criteria specified in the ADG Code.

## NOTES:

- 1 The term includes most solvent-based paints, lacquers and polishes.
- 2 Reference should be made to the current edition of the ADG Code/NZS 5433.

**1.4.30 Marking**

Includes—

- (a) a label fixed to a package or unit load; and
- (b) stencilled or printed information on a package or unit load.

**1.4.31 Material safety data sheet (MSDS)/ Safety data sheet (SDS)**

A document which provides information on the identification, health hazards, precautions for use and safe handling of a specific chemical product, and which complies with, in Australia, NOHSC:2011, and in New Zealand, the HSNO Approved Code of Practice 'Preparation of Safety Data Sheets' (NZCIC September 2006).

**1.4.32 May**

Indicates the existence of an option.

**1.4.33 Minor storage**

The storage of dangerous goods of mixed classes, in one or more locations, in quantities conforming to the criteria set out in Section 2 of this Standard.

**1.4.34 NZBC**

The New Zealand Building Code.

**1.4.35 Non-combustible**

Material that does not support combustion or is deemed to be non-combustible when tested in accordance with AS 1530.1 (NZS/AS 1530.1).

**1.4.36 On-site protected place**

A building where people are employed within the property boundary of the installation, including warehouses, manufacturing or processing areas, amenities or other dangerous goods stores where quantities exceed minor storage.

**1.4.37 Organic peroxides**

Organic substances that contain the bivalent -O-O- structure and are listed as Division 5.2 in the ADG Code/NZS 5433, or that meet the criteria for such classification.

#### 1.4.38 Oxidizing agents

Substances that are listed as Division 5.1 oxidizing agents in the ADG Code/NZS 5433 or that meet the classification criteria specified in that Code for oxidizing agents. Such substances, although not necessarily combustible, may readily liberate oxygen or be the cause of oxidation processes and as a result, may start a fire in other materials or stimulate the combustion of other materials, and therefore increase the violence of a fire.

#### 1.4.39 Package

The complete product of the packaging operation, consisting of the packaging and its contents, prepared for transport.

#### 1.4.40 Packaged dangerous goods

Dangerous goods that are—

- (a) in relation to dangerous goods of Class 2, in a container with a capacity of not more than 500 L; or
- (b) in relation to dangerous goods of other classes, in a container with—
  - (i) a capacity of not more than 450 L; and
  - (ii) a net mass of not more than 400 kg.

#### 1.4.41 Packaging

(Australia) A receptacle and any other components or materials necessary for the receptacle to perform its containment function, and—

- (a) in relation to dangerous goods of Class 2, a container having a capacity not exceeding 500 L; and
- (b) in relation to dangerous goods of any other class, a container having a capacity not exceeding 450 L and having a net mass of not more than 400 kg.

(New Zealand) A receptacle and any other components or materials necessary for the receptacle to perform its containment function, and—

- (a) in relation to hazardous substances of Class 2, a container having a capacity not exceeding 500 L;
- (b) in relation to hazardous substances of other than Class 2 which are liquid, a container having a capacity not exceeding 250 L; and
- (c) in relation to solid hazardous substances, a container holding or capable of holding not more than 250 kg of those substances in an individual quantity.

The term ‘packaging’ includes, as the context may require, the receptacle, or any components, materials, wrappings etc. associated with the receptacle for the purpose of enabling it to perform its containment function.

#### 1.4.42 Packing Group (PG)

One of three hazard groups to which dangerous goods (of Classes other than 1, 2, 6.2, and 7) are assigned in the ADG Code, in decreasing order of hazard, by the Roman numerals ‘I’ (high danger), ‘II’ (medium danger) and ‘III’ (low danger).

NOTE: The UN *Recommendations on the Transport of Dangerous Goods—Model Regulations* provides criteria for the assignment of Packing Groups. A list of those already assigned, and criteria for assigning packing groups, are also given in the ADG Code/NZS 5433.

#### 1.4.43 Polymerizable material

Any liquid, solid, or gaseous material that might polymerize (combine or react with itself) so as to expand or cause dangerous evolution of gas or heat.

#### 1.4.44 Port area

The land and sea area established by legislation and controlled by the relevant port authority.

NOTE: Some port areas may overlap and legal requirements should take account of this possibility.

#### 1.4.45 Premises

The area under the control of the occupier.

#### 1.4.46 Protected place

Any of the following:

- (a) A dwelling, residential building, place of worship, public building, school or college, hospital, theatre, and any building or open area in which persons are accustomed to assemble, whether it is within or outside the property boundary of the installation.
- (b) A factory, workshop, office, store, warehouse, shop, or building where persons are employed, that is outside the boundary of the installation.
- (c) A ship lying at permanent berthing facilities.
- (d) Any storage facility for dangerous goods, other than minor storage, outside the property boundary of the installation.
- (e) An environmentally sensitive area.

#### 1.4.47 Public place

Any place, other than private property, open to the public, which the public has a right to use and which includes a public road.

NOTES:

- 1 Commercial building car parking areas are not considered to be public places.
- 2 In New Zealand, a 'public road' is a 'road'.

#### 1.4.48 React dangerously

In relation to the reaction of substances, to react in a manner that directly creates a hazard due to the reaction—

- (a) being violent;
- (b) producing an explosion;
- (c) producing a potentially explosive combination of products;
- (d) producing fire or rapid evolution of heat; or
- (e) producing toxic vapour or toxic gas.

NOTES:

- 1 Examples of substances that react dangerously are—
  - (a) calcium hypochlorite (pool chlorine) and oil or petrol;
  - (b) sodium hypochlorite or calcium hypochlorite and acids; and
  - (c) hydrogen peroxide and organic substances.
- 2 This definition should be read in conjunction with Clause 1.4.25.

#### 1.4.49 Regulatory authority

The authority responsible for administration of control of the storage, transport and use of dangerous goods.

NOTE: More than one authority may be involved in relation to such matters.

**1.4.50 Restricted area**

An area to which access is available only to persons authorized by the occupier. For the purposes of this Standard, a dangerous goods store is regarded as a restricted area.

**1.4.51 Retail distribution centre**

A warehouse or storage area used for the making up of deliveries to retail outlets, where goods are stored. Goods within a retail distribution centre are normally contained within outer packagings. Public access to such a centre is restricted.

**1.4.52 Retail shop**

Either of the following:

- (a) An area at premises where goods are displayed for sale to the general public or end user.
- (b) An area behind a sales counter where goods are kept for the purpose of selling them to the general public or end user.

The term includes an area where goods are received at the premises and stored prior to being displayed for sale or placed on the shelves.

**1.4.53 Retail package**

A package containing goods for individual sale, predominantly through retail shops.

NOTE: The term 'retail package' includes pre-packed articles and consumer commodities.

**1.4.54 Retailer of agricultural chemicals**

A retail shop selling agricultural chemicals, predominantly to non-domestic end users.

**1.4.55 Screen wall**

A structurally sound wall that—

- (a) is impervious to liquid and vapour;
- (b) is constructed of materials that are substantially resistant to attack by the dangerous goods being stored; and
- (c) may act as a shield or deflection barrier.

**1.4.56 Segregated**

Isolated from each other within the store.

**1.4.57 Segregation**

The isolation of incompatible goods from each other within the store.

**1.4.58 Separated**

Isolated from the storage by a given minimum distance.

**1.4.59 Separation**

The isolation of dangerous goods from protected places, on-site protected places, boundaries and other dangerous goods stores.

**1.4.60 Shall**

Indicates that a statement is mandatory.

**1.4.61 Should**

Indicates a recommendation.

#### 1.4.62 Subsidiary Risk (Subrisk)

A reference to any additional hazard that the dangerous goods might have, indicated by the Subsidiary Risk number to which the dangerous goods are assigned. Dangerous goods are assigned a Subsidiary Risk if they—

- (a) satisfy the criteria specified in the UN *Manual of Tests and Criteria* for their assignment to a Subsidiary Risk;
- (b) are assigned a Subsidiary Risk in the ADG Code/NZS 5433; or
- (c) are assigned a Subsidiary Risk by the regulatory authority.

#### 1.4.63 Supplier

An importer, manufacturer, wholesaler or distributor, but not a retail distribution centre or retail outlet.

#### 1.4.64 Toxic substances

Substances liable either to cause death or serious injury, or to harm human health, if swallowed or inhaled, or following eye or skin contact.

Such substances—

- (a) are listed as Division 6.1 substance in the ADG Code/NZS 5433; or
- (b) meet the classification criteria set out in the UN *Manual of Tests and Criteria*/NZS 5433; or
- (c) in New Zealand, meet the criteria of the Hazardous Substances (Classification) Regulations 2001.

#### 1.4.65 Transit storage

The storage of dangerous goods for at least 12 h and less than five normal working days, in accordance with the requirements of Section 4 of this Standard, where such dangerous goods are intended for further transport to another location.

NOTE: It is the dangerous goods storage that is transient in nature (i.e. greater than 12 h and less than five normal working days), not the storage of the individual item(s) of dangerous goods within the storage area.

#### 1.4.66 Work permit

A written document that specifies the conditions under which work in a restricted area may be carried out.

## SECTION 2 MINOR STORAGE

### 2.1 SCOPE OF SECTION

This Section specifies the criteria for ‘minor storage’ of packaged dangerous goods of mixed classes and the requirements for such storage.

For retail storage of any quantity of dangerous goods, Section 3 applies.

#### NOTES:

- 1 The underlying concept of this Section is that quantities below a certain level are so small, or are so scattered and separated, that they present little real hazard, add little to a building's fire load, and are generally unlikely to play a significant part in spreading a fire from place to place. The firefighting facilities required under normal building regulations are expected to cope adequately.
- 2 Workplace safety regulations and guidelines may apply even to quantities defined as ‘minor storage’ in this Standard.

### 2.2 CRITERIA FOR CLASSIFICATION AS MINOR STORAGE

Storage of dangerous goods of mixed classes in commercial or industrial premises, in packages and IBCs, in quantities less than or equal to those given in Table 2.1, is classified as minor storage.

A minor store may be regarded as separate if it is more than 10 m from any other dangerous goods store, except where a regulation or Standard applying to the other store stipulates a greater distance.

The total amount of dangerous goods kept shall not exceed one minor store per 500 m<sup>2</sup> of floor or ground area. Where the floor or ground area exceeds 500 m<sup>2</sup>, minor stores shall be at least 10 m apart. Any arrangement resulting in an undue concentration of minor stores shall be avoided.

**TABLE 2.1**  
**MAXIMUM MINOR STORAGE QUANTITIES**

| Description                           | Quantity, kg or L |       |        |                     |
|---------------------------------------|-------------------|-------|--------|---------------------|
|                                       | PG I              | PG II | PG III | Combustible liquids |
| Total quantity of all dangerous goods | 25                | 250   | 1000   | 1500                |

#### NOTES:

- 1 It is permissible to store, at the same time and in the same area, the maximum allowance for each of all of the Packing Groups.
- 2 Where manufactured product is stored, the quantities of manufactured product may be doubled.
- 3 The maximum quantity of Division 5.2 dangerous goods allowable as minor storage is 10 kg or 10 L.
- 4 For the purpose of determining minor storage quantities, —
  - (a) Class 2 dangerous goods in retail packages (e.g. non-refillable lighters, butane lighters, barbecue gas in disposable containers), aerosols, and substances and articles of Class 9, are regarded as PG III; and
  - (b) dangerous goods of Classification Code 1.4S, in their original packagings, are regarded as PG II.

### 2.3 PRECAUTIONS APPLYING TO MINOR STORAGE

The following requirements and recommendations apply to minor storage:

- (a) Any materials that are incompatible, or might react dangerously if mixed, shall be segregated so that the possibility of reaction is minimized.  
NOTE: Section 6 provides information on segregation.
- (b) The storage area shall be away from any heating or ignition sources.
- (c) The storage area shall be provided with adequate natural or mechanical ventilation, depending on the nature of the substances and the circumstances of their use.
- (d) Packages shall be kept closed when not in use. Packages should only be opened in a well-ventilated area, and, if their contents are flammable, away from any potential ignition sources.
- (e) Packages should be stored in such a manner that leaks cannot affect other substances in the store. Liquids should not be stored above powders and solids. Liquids in glass bottles should be stored at lower levels.
- (f) Appropriate spill control measures shall be provided where packages are opened and their contents transferred.
- (g) Any spills or leaks shall be cleaned up immediately and disposed of in accordance with Section 10. Contaminated, spilled or leaked material shall not be returned to its original packaging, except for disposal where it is known that this will not increase the risk.
- (h) The transfer of dangerous goods from the store to the point of use shall be carried out in a manner that minimizes the possibility of spillage or fire.
- (i) Dangerous goods shall not be stored or handled where they could hinder escape from a building in the event of fire.
- (j) Persons who handle any dangerous goods shall be informed and aware of the hazards involved.
- (k) Packages shall be kept in such a manner as to avoid spillage.
- (l) Stores shall be kept clear of combustible matter and refuse.
- (m) Packages shall be kept on surfaces that are resistant to attack by their contents if spilt.
- (n) Appropriate personal protective equipment shall be worn by personnel involved in product transfer or clean-up operations (see Clause 7.9).
- (o) A fire extinguisher of suitable type shall be installed in each minor store. It shall be located so that it is immediately accessible in an emergency, along an exit route.
- (p) A supply of water shall be available at a nearby location, for personal hygiene.

NOTE: Sections 6, 7 and 8 of this Standard deal with safety matters that may be pertinent to minor storage but which, for the purposes of such, may be regarded as advisory.

### 2.4 ADDITIONAL PRECAUTIONS FOR OUTDOOR MINOR STORAGE

The following additional requirements apply to outdoor minor storage.

- (a) The ground around the storage area shall be kept clear of combustible vegetation and refuse by at least 3 m.
- (b) Any potential flow of spillage shall be prevented from reaching any protected place, watercourse or boundary by such means as the use of natural ground slope, or the provision of a diversion channel, kerb or bund.
- (c) The store shall be separated from any protected place or property boundary by at least 3 m.

## SECTION 3 RETAIL STORAGE

### 3.1 SCOPE OF SECTION

This Section sets out requirements and recommendations for the storage and handling of dangerous goods in the retail sector, where such goods are in retail packages of the volumes allowed by Table 3.1.

NOTES:

- 1 Appendix C provides examples of retail packages that are classified as dangerous goods.
- 2 Sections 6, 7 and 8 of this Standard deal with safety matters that may be pertinent to retail storage but which may be regarded as advisory.

### 3.2 APPLICATION OF SECTION

This Section applies to the retail storage of dangerous goods in retail packages, in quantities up to those listed in Table 3.2. The only dangerous goods in retail stores to which this Section applies are retail packages complying with Clause 3.3.

Where exchange cylinders of LP Gas are kept, AS/NZS 1596 applies.

Where the dangerous goods being kept at retail premises are in packages whose sizes exceed those allowed in Table 3.1, Section 5 shall apply.

Clause 3.4 specifies general requirements for all types of retail storage. Clause 3.5 provides additional requirements for retail distribution centres in which the quantities of retail packages containing dangerous goods being stored exceed those given in Table 3.2. Clauses 3.6 and 3.7 provide additional requirements for the retail storage of pool chemicals and agricultural chemicals respectively.

### 3.3 RETAIL PACKAGES

Dangerous goods in retail packages shall be packed in accordance with the ADG Code/NZS 5433, and the SUSDP, as appropriate.

The maximum sizes of the inner or sole packages kept as retail packages shall not exceed those given in Table 3.1.

In the case of dangerous goods of Class 1, the goods shall be Class 1.4S toy fireworks or safety cartridges only. In such cases, relevant explosives regulations apply.

Only Class 7 dangerous goods in domestic smoke detectors shall be stored in retail storage complying with this Section. No other dangerous goods of Class 7 shall be stored in retail storage.

**TABLE 3.1**  
**MAXIMUM SIZES OF RETAIL PACKAGES FOR DANGEROUS GOODS**

| Class or Division                                                | Maximum package size                      | Examples and requirements                                                                                          |
|------------------------------------------------------------------|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| 2.1                                                              | 1 L                                       | Butane lighters, cartouches of camping gas                                                                         |
| 2.2                                                              | 120 mL                                    | Soda bulbs, beverage gases                                                                                         |
| Aerosols (UN 1950) and other non-refillable pressure containers* | 1 L                                       | No Division 2.3 or 6.1 subsidiary risk                                                                             |
| 3                                                                | 20 L                                      | Acetone, mineral turpentine (turps), kerosene                                                                      |
| 3 Manufactured product                                           | 20 L                                      | Oil-based paint, primers, sealants and adhesives                                                                   |
| Combustible liquids C1 and C2                                    | 20 L                                      | Cooking oils, motor oils                                                                                           |
| 4.1                                                              | 500 g<br>3 kg**                           | **Only if firelighters                                                                                             |
| 4.3                                                              | 500 g or mL<br>1 kg**                     | **Only in solid form<br>Zinc dust for two-pack metal primers                                                       |
| 5.1                                                              | 20 kg or 20 L<br>10 kg**                  | **Only if pool chlorine in granulated or tablet form (NOT powdered form)                                           |
| 5.2 Not requiring temperature control                            | 125 mL (liquid)<br>500 g**                | **Only if in solid or paste form<br>Automotive filling compounds, two-part epoxy or polyester resins and adhesives |
| 6.1                                                              | 20 kg or L                                | Some pesticides, paint stripper                                                                                    |
| 8                                                                | PG II—5 kg or 5 L<br>PG III—20 kg or 20 L | Liquid sodium hypochlorite (pool chlorine)                                                                         |
| 9                                                                | 20 kg or 20 L                             | Lithium batteries                                                                                                  |

\* This requirement does not apply to fire extinguishers (UN 1044).

**TABLE 3.2**  
**MAXIMUM STORAGE QUANTITIES OF RETAIL PACKAGES**

| Class, division and description                                                  | Maximum storage quantity<br>kg or L                                                                                                                                           | Separation requirements                                                                                                                                                                                                                                               |
|----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2.1 in non-refillable containers                                                 | 100 L                                                                                                                                                                         | Class 2 and aerosols (UN 1950) shall be separated from flammable liquids by 1.5 m                                                                                                                                                                                     |
| 2.2                                                                              | 100 L                                                                                                                                                                         |                                                                                                                                                                                                                                                                       |
| Aerosols (UN 1950) and other non-refillable pressure containers, e.g. cartouches | 2000 L                                                                                                                                                                        |                                                                                                                                                                                                                                                                       |
| 3                                                                                | PG II—Up to 3×250 L, separated from each other by at least 20 m<br>PG III—Up to 3×500 L, separated from each other by at least 20 m<br>Not more than 200 L in 20 L containers | Flammable liquids shall be separated from Class 2 and aerosols (UN 1950) by 1.5 m and from Class 5.1 goods by 3 m                                                                                                                                                     |
| 3 Manufactured product                                                           | 10 000 L                                                                                                                                                                      |                                                                                                                                                                                                                                                                       |
| C1 Combustible liquids                                                           | 2000 L                                                                                                                                                                        | —                                                                                                                                                                                                                                                                     |
| C2 Combustible liquids                                                           | 2500 L                                                                                                                                                                        | —                                                                                                                                                                                                                                                                     |
| 4.1                                                                              | 1000 kg or L                                                                                                                                                                  | Goods shall be separated from Class 2 and aerosols (UN 1950) by 1.5 m and from Class 5.1 goods by 3 m                                                                                                                                                                 |
| 4.3                                                                              | 20 kg                                                                                                                                                                         | Goods shall not be stored beneath any water-based products, and shall be separated from any water-based products by at least 1.5 m                                                                                                                                    |
| 5.1 Granulated pool chlorine                                                     | 250 kg at a service station<br>2000 kg at a general retail shop<br>4000 kg or L at swimming pool supply shops                                                                 | Class 5.1 shall be separated from Class 3 or combustible liquids by 3 m and from foodstuffs by 5 m<br><br>Different types of pool chemicals shall be separated by at least 1 m or by a solid metal partition<br><br>See Clause 3.6 for separation from pool chemicals |
| 5.1 Other than granulated pool chlorine                                          | 1200 kg                                                                                                                                                                       |                                                                                                                                                                                                                                                                       |
| 5.2                                                                              | 100 kg                                                                                                                                                                        | Goods shall be separated from other dangerous goods by at least 3 m                                                                                                                                                                                                   |
| 6.1                                                                              | 250 kg or L at a general retail shop<br>2500 kg or L at an agricultural chemical supplier                                                                                     | Goods shall be separated by 3 m from other dangerous goods or foodstuffs                                                                                                                                                                                              |
| 8                                                                                | Sodium hypochlorite—2000 L<br>Other—1200 kg or L                                                                                                                              | —                                                                                                                                                                                                                                                                     |
| 9                                                                                | 4000 kg or L                                                                                                                                                                  | —                                                                                                                                                                                                                                                                     |

### 3.4 GENERAL REQUIREMENTS FOR RETAIL STORAGE

#### 3.4.1 Design and construction of retail stores

Retail stores in which dangerous goods are kept shall be constructed in accordance with the BCA/NZBC and the following requirements:

- (a) The store shall be provided with adequate natural or mechanical ventilation, in order to disperse any dusts, mists or vapours.  
NOTE: Adequate ventilation is dependent on the nature of the substance and the circumstances of its use.
- (b) Racks and shelves shall be structurally sound and designed for the maximum load to which they are to be subjected. They shall be constructed of materials that are—
  - (i) unable to absorb liquids; and
  - (ii) compatible with the dangerous goods being kept.
- (c) The design and installation of racking and shelving shall permit ready access to all stock, and allow clear access for personnel. Dangerous goods shall be located so as to ensure that there are safe passages to exits and that exits are not blocked.
- (d) Lighting shall be provided in accordance with Clause 5.4.4(d).

### 3.4.2 Security and access

Security and clear access shall be provided in accordance with Clauses 5.6 and 7.2.3 respectively.

### 3.4.3 Housekeeping

The following housekeeping procedures need to be established and maintained:

- (a) The aisles of the store shall be kept clear.
- (b) In order to prevent accumulation of old material that could deteriorate and become a chemical hazard, stock integrity shall be monitored.
- (c) Liquids should not be stored above powders and solids. Liquids in glass bottles should be stored at lower levels.
- (d) Packages shall be stored in such a manner that leaks cannot affect other substances in the store.
- (e) All packages shall be handled with care so that the possibility of leaks is minimized.
- (f) Packages shall be regularly inspected and, when any signs of spill, leak or deterioration are observed, the suspect package shall be examined and rendered safe.
- (g) Minor spills or leaks of any dangerous goods shall be dealt with in accordance with Clause 3.4.9.2.
- (h) Packages that are not of a reusable type, and whose contents have been fully used, shall be treated in accordance with Section 10.
- (i) Labels shall be retained on emptied containers until the containers have been decontaminated, at which time the labels shall be removed or obscured.
- (j) Packages should not be kept in direct contact with the floor.  
NOTE: Pallets or low shelves may be used.

### 3.4.4 Segregation of retail packages

Incompatible goods should not be stored together on the same shelf. This applies to both horizontal and vertical storage on shelving.

Packaged dangerous goods of Divisions 6.1 or 8 shall be prevented from contaminating any foodstuffs, foodstuff containers, or articles for direct human application that are not in liquid-tight containers, by keeping them apart by a lateral distance of at least 1 m, a liquid-tight partition or on separate shelves.

### 3.4.5 Tinting of flammable paints

The tinting of flammable paints, or any other opening of the container, shall be carried out in a well-ventilated area away from any potential ignition sources (see also AS 1940).

### 3.4.6 Training

Personnel handling the dangerous goods shall be trained in safe handling procedures and shall be fully informed of the hazards involved.

### 3.4.7 Inspection of stock

Individual items shall be inspected when they are put on display. Any damaged stock shall be disposed of safely.

NOTE: Section 10 provides advice on the storage and disposal of wastes.

### 3.4.8 Fire protection

All retail stores shall be provided with fire protection in accordance with Section 9 of this Standard.

### 3.4.9 Emergency procedures

#### 3.4.9.1 General

Emergency procedures, appropriate to the size of the store, shall be prepared and recorded. All personnel shall be trained in appropriate emergency procedures at the commencement of their employment and re-trained at least annually. Appropriate personal protective equipment shall be provided.

NOTE: Clauses 7.8 and 7.9 provide further requirements.

#### 3.4.9.2 Leaks and spills

Any leaks or spills shall be isolated immediately and cleaned up as soon as practicable.

The following equipment and materials shall be readily available on the premises:

- (a) Absorbent material, e.g. proprietary absorbent, vermiculite or sand, to soak up liquid spills.
- (b) Mop, bucket and adequate supply of water.
- (c) Broom, brush, dustpan or bin, for sweeping up solid spills and used absorbent.
- (d) Safety lines or other equipment for cordoning off an area.
- (e) Protective gloves and other appropriate personal protective equipment.
- (f) Warning signs.

When there is a leak or spill, the following procedure should be carried out without delay.

- (i) Identify any hazard and ensure that customers and other personnel are warned, whilst materials and equipment are collected. Notify emergency services if appropriate.
- (ii) Cordon off the area and display warning signs.
- (iii) Check the label on an undamaged container to identify any special safety precautions.  
NOTE: The MSDS, if available should also be consulted.
- (iv) Clean up the spillage thoroughly.
- (v) Dispose of the resulting material safely.
- (vi) Do not return spilt material to its original packaging, except where it is known that this will not increase the risk.

NOTE: Section 10 provides advice on the storage and disposal of wastes.