



Government of **Western Australia**
Department of **Mines, Industry Regulation and Safety**

Dangerous goods safety – guide

Requirements for consignors of dangerous goods packages below placard load quantity

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Foreword

This guide has been produced to assist consignors, especially those who engage a courier or transport company, to understand their responsibilities when transporting non-placard load quantities of dangerous goods in packages by road and rail in Australia.

The information contained within this guide is nationally uniform, notwithstanding that each state and territory has its own dangerous goods transport law that varies slightly. The various jurisdictional regulations, which are identical in most ways, are derived from the national *Model Subordinate Instrument on the Transport of Dangerous Goods by Road and Rail*, maintained by the National Transport Commission (NTC).

Western Australia is regulated under the Dangerous Goods Safety (Road and Rail Transport of Non-explosives) Regulations 2007 (the Regulations). These Regulations do not apply to explosives or radioactive and infectious substances or places and roads not open to the public.

The Regulations reference the *Australian Code for the Transport of Dangerous Goods by Road and Rail* (the Code) in full providing nationally uniform technical requirements. The current edition of the Code is 7.7, which was published in 2020. As of 1 October 2021, this is the sole mandatory edition following the end of the one-year transition period.

The Code is a large, complex document and the final word on the land transport of dangerous goods. This guide summarises the most important requirements of the Code and Regulations for a consignor transporting below placard load quantities of dangerous goods.

Terminology used in this guide

Combination packaging – packaging comprising of one or more inner packaging secured in an outer packaging.

Competent authority – the authority of a state or territory responsible for the transport of dangerous goods. For Western Australia, it is the Chief Dangerous Goods Officer.

Inner packaging – packaging for which an outer packaging is required for transport.

Label – refers to a diamond-shaped class or division label, a mixed class label or a limited quantities label illustrated in section 5.2.2.2 of the Code.

Limited quantities (LQ) – Dangerous goods are packed in limited quantities if:

- a) the goods are packed in accordance with Chapter 3.4 of the Code; and
- b) the quantity of dangerous goods in each inner packaging does not exceed the quantity specified in column 7a of the Dangerous Goods List for those goods.

Marking – includes all information, other than a label or a placard, required to be applied or affixed to packaging, a package or an overpack.

Overpack – an enclosure used to contain a number of packages to form a unit load for handling and stowage during transport. Examples of overpacks are a number of packages either:

- a) placed or stacked on to a pallet and secured by strapping, shrink wrapping, stretch wrapping or other suitable means; or
- b) placed in a protective outer box or crate.

Outer packaging – external packaging necessary to contain and protect articles, one or more inner packaging, or inner receptacles of composite packaging.

Package – the complete product of the packaging and the dangerous goods.

Packaging – the container and all its components necessary for the containment function. It does not include the dangerous goods.

Packing group – dangerous goods are grouped into three packing groups in accordance with the degree of danger they present:

- packing group I – substances presenting a high danger
- packing group II – substances presenting a medium danger
- packing group III – substances presenting a low danger.

Column 5 of Table 3.2.3 – Dangerous Goods List in the Code assigns a packing group to most dangerous goods except for the following dangerous goods that do not have a packing group: Classes 1, 2 and 7 and Divisions 5.2, 6.2 and self-reactive substances of Division 4.1.

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1 Introduction

1.1 What is a placard load quantity?

The *Australian Code for the Transport of Dangerous Goods by Road and Rail* defines a placard load as:

- a) the aggregate quantity of **250 kg (L)** or more for a mixed load of packaged dangerous goods that contains any dangerous goods of Division 2.1 (except aerosols), Division 2.3, or packing group I, or
- b) the aggregate quantity of **1000 kg (L)** or more for any other load of packaged dangerous goods (other than packages in limited quantities).

Paragraph 1.2.1.2.1 of the Code explains how to calculate the aggregate quantity.

The aggregate quantity of dangerous goods means the total of:

- a) the number of kilograms of:
 - i. solid dangerous goods; and
 - ii. articles (including aerosols); and
- b) the number of litres or kilograms, whichever is used in the transport document to describe the goods, of liquid dangerous goods; and
- c) the total capacity in litres of receptacles containing dangerous goods of Class 2 (except aerosols).

Non-placard load quantities are packages and cylinders, each with a capacity of 500 kg or less, or with a net mass of 500 L or less, that have an aggregate quantity less than 250 kg (L) or 1000 kg (L) depending on the types of dangerous goods.

1.2 Overview of the consignor's duties

The duties of consignors in the transport of non-placard load dangerous goods packaging can be summarised under the following headings:

- Transport document – Chapter 11.1 of the Code (see [section 2](#) of the guide)
- Marking and labelling of packaging – Chapter 5.2 of the Code (see [section 3](#) of the guide)
- Requirements for the design, construction and testing of packaging – Chapters 4.1 and 6.1 of the Code (see [section 4](#) of the guide).

The transport of non-placard loads **does not** require vehicle placarding or prescriptive Code requirements that accrue for placard load quantities, including segregation of incompatible dangerous goods, emergency information in the cabin, emergency plan, stowage and restraint requirements, safety equipment, fire extinguishers and personal protective equipment for the driver.

However, there is still a need to segregate food and food packaging from Division 2.3 and 6.1 and Class 8 dangerous goods.

1.3 Dangerous goods packed in limited quantities

As an alternative to the requirements of this guide, consignors should explore the advantages of transporting dangerous goods packaged as limited quantities (LQ) in accordance with Chapter 3.4 of the Code. Consignors may transport most dangerous goods

of packing group II and III as LQ in small inner packaging with a maximum quantity listed for each dangerous goods in column 7a of Table 3.2.3 – *Dangerous Goods List* of the Code.

The placard load limit is 8,000 kg (L) gross mass. Normal transport documents do not apply and instead the consignor simply informs the prime contractor of the total gross mass of each LQ consignment. If the goods include an aggregate quantity of 2000 kg (L) aggregate quantity or more of a single dangerous good, then the placard load drops to 2,000 kg (L) aggregate quantity and the consignor must provide the usual information required by a dangerous goods transport document to the prime contractor.

The marking of the outer package (maximum gross mass of either 20 or 30 kg (L) is simply an LQ diamond. LQ packaging has packaging design and construction requirements, but the inner and outer packaging does not need the usual performance testing and hence lack the usual requirement to have the packaging approved by a competent authority.

The NTC has comprehensive guidance on the transport of LQs on their [website](#).

1.4 Exemption from the Code for small consignments

Before discussing the consignor’s duties, it is important for consignors to understand that paragraph 1.1.1.2(3) of the Code gives an exemption from all requirements of the Code for the transport of very small consignments of dangerous goods. The maximum exempted aggregate quantities of dangerous goods are provided at Table 1.1.1.2 – *Quantity Limits for exempted small consignments* (reproduced as Table 1 below).

Table 1 Quantity limits for exempted small consignments – Table 1.1.1.2 of the Code

Table 1.1.1.2: Quantity limits for exempted small consignments													
Packing group	Class or Division												
	2.1	2.2	2.3	3	4.1	4.2	4.3	5.1	5.2	6.1	6.2	8	9
I				20 ml	20 g	20 g	20 g	20 g(ml)		20 g(ml)		20 g(ml)	–
II	50 ml	100 ml	50 ml	150 ml	2 kg	500 g	150 g	1 kg(L)	150 g(ml)	500 g(ml)		500 g(ml)	2 kg(L)
III				300 ml ^a									

Table notes: ^a 2 L if the Class 3, packing group III substance is Manufactured Product

2 Transport document

2.1 Introduction

Transport documents assist emergency services to deal effectively with a vehicle accident. A hard copy of the transport document must be placed in the vehicle cabin.

The transport document can be in any format, but must:

- contain the consignor’s name and contact telephone number
- be printed legibly in English
- describe the dangerous goods as detailed in Chapter 11.1 of the Code and summarised below

d) be completed and accompany each consignment of dangerous goods.

When dangerous goods are transported with non-dangerous goods, the dangerous goods must appear first on the transport document or be on a separate transport document.

An aggregate transport document may be used for multiple consignments from one consignor when they are carried on the same vehicle.

Chapter 11.1 of the Code details additional information requirements for substances that are stabilised by temperature control.

2.2 Description of dangerous goods

The description for each type of dangerous good in the transport document must include the following:

- a) UN number
- b) proper shipping name
- c) class or division of the goods
- d) Subsidiary Hazard (if any) for the goods
- e) packing group (if any) for the goods
- f) description of each type of packaging or article to be transported (e.g. cardboard box, drum, plastic container or type of article)
- g) number of packages or containers of each type to be transported
- h) aggregate net quantity of each substance.

The location and order in which the elements of the description appear is at the discretion of the consignor, providing the UN number, name, class and division, Subsidiary Hazard and packing group appear first.

Appendix 1 provides an example of an acceptable transport document.

2.3 Information to supplement the proper shipping name

The proper shipping name must be supplemented as follows:

- a) The technical or chemical names must follow “Not Otherwise Specified (N.O.S.)” generic names.
- b) Empty uncleaned packaging containing residues of dangerous goods require the words “Empty Uncleaned” or “Residue last contained” before or after the dangerous goods description in section 3.2 (a) to (e).
- c) For the transport of waste dangerous goods for the purpose of disposal, the word “Waste” must precede the proper shipping name.
- d) If the proper shipping name does not convey the elevated temperature condition of a liquid transported above 100 °C, or a solid transported above 240 °C, the word “Hot” must immediately precede the proper shipping name.

3 Marking and labelling of packages

3.1 General requirements

Except for dangerous goods packed in limited quantities, the outer packaging of every combination package and every sole package, overpack, article and cylinder must be accurately marked and labelled on the outside surface with the following standard marking and labelling. Unless marks and labels representative of all dangerous goods in the overpack are visible, the overpack must have the usual marking and labelling as for other outer packaging.

The requirement to mark and label inner packages has been removed in recent editions of the Code in lieu of The Globally Harmonized System of Classification and Labelling of Chemicals (GHS) labelling requirements.

The consignor must display on each package:

- a) the proper shipping name for the dangerous goods supplemented by the technical name for generic N.O.S. entries
- b) the UN number preceded by the letters "UN" in the following minimum sizes:
 - i. 12 mm high for packages of more than 30 L capacity or more than 30 kg net mass and for cylinders of more than 60 L water capacity
 - ii. 6 mm high for packages more than 5 L capacity or more than 5 kg net mass and for cylinders of 60 L water capacity or less
 - iii. An appropriate size must be used for packages of 5 L capacity or less, or of 5 kg net mass or less
- c) the name and address in Australia of the manufacturer or consignor of the dangerous goods; and
- d) the class or division label of the primary hazard and any subsidiary hazard that is listed against the proper shipping name in columns 3 and 4 of Table 3.2.3 – Dangerous Goods List.

The minimum dimension of labels must be in accordance with Table 5.2 of the Code. Primary and subsidiary hazard labels are identical.

Paragraph 5.2.2.2.2 of the Code displays the required specimen labels in full colour.

Choosing the correct colour for each label is important and colours are given in Figure 5.3.7 of the Code with their Australian Standards (AS 2700) reference name and the corresponding US Pantone Colour Reference number.

The required minimum label size must be in accordance with package dimensions as shown in Table 5.2 of the Code.

All marks and labels must be:

- a) readily visible and legible
- b) able to withstand open weather without substantial reduction in effectiveness; and
- c) displayed on a background with contrasting colour on the external surface of the package.

All marks should be in letters and numbers of at least the size specified for the package in Table 5.2 of the Code.

Table 2 Minimum dimensions of labels – Table 5.2 of the Code

Table 5.2: Minimum Dimensions of Labels			
Class or Article	Package, Packaging or Article	Minimum dimensions of labels (mm)	Recommended minimum size of lettering ^a (mm)
Class 2 (other than Aerosols)	Cylinder of outside diameter: < 75 mm	10 x 10	2.5
	≥ 75 mm < 180 mm	15 x 15	3
	≥ 180 mm	25 x 25	5
	Pressure drum or tube ≤ 500 L ^b	100 x 100	7
BATTERIES, WET, FILLED WITH ACID, electric storage (UN 2794)	Battery with a gross mass of 65 kg or less, but top surface only	20 x 20	3
All others	Package containing: ≤ 0.5 kg(L)	15 x 15	2.5
	> 0.5 kg(L) ≤ 5 kg(L)	20 x 20	3
	> 0.5 kg(L) ≤ 25 kg(L)	50 x 50	5
	> 25 kg(L)	100 x 100	7
	IBC ≤ 500 kg(L) ^b	100 x 100	7
	Large packaging, overpack, segregation device	100 x 100	12
Table notes:			
<p>a Where the space available on the package for labelling is limited and the Proper Shipping Name of the dangerous goods must be supplemented by a Technical Name (where special provision 274 is assigned to the particular entry in the Dangerous Goods List), the minimum height of the letters of the Technical Name or names may be reduced to not less than half the size stated in this table or 1.5 mm, whichever is the greater.</p> <p>b IBCs, pressure drums and tubes of capacity > 500 kg(L) are placardable units that must be placarded with emergency information panels in accordance with 5.3.3.</p>			

3.2 Special marks

The following special marks are required for certain dangerous goods:

- a) **The orientation arrows mark** (Figures 5.2.3 and 5.2.4 of the Code – see Figure 1 below) is a requirement for certain liquid dangerous goods in packaging that needs to be kept upright to prevent leakage from the closure or vent of the container.
- b) **The lithium battery mark** (Figure 5.2.5 of the Code – see Figure 2 below) is required for packages containing lithium batteries prepared in accordance with special provision (SP) 188, (see Appendix 2). This only applies to lithium metal batteries if the aggregate lithium content is not more than 2 g and for lithium ion batteries with a rating of not more than 100 Whatt-hours (Wh).

- c) The lithium battery mark includes the appropriate UN number – UN 3090 for lithium metal batteries, or UN 3480 for lithium ion batteries. Where the lithium batteries are contained in, or packed with, equipment, the appropriate UN numbers are UN 3091 and UN 3481 respectively.
- d) SP 188 exempts the consignor from all other requirements of the Code if the consignor meets all the conditions of SP 188 (see Appendix 2). For instance, lithium ion batteries require the marking of the Watt-hour rating on the outside case of the battery.
- e) **The lithium battery Class 9 label** (see Figure 3 below) is required for packages containing lithium metal batteries with more than 2 g of lithium, and lithium ion batteries with a rating higher than 100 Wh. The Class 9 label (model No. 9A) is illustrated below.
- f) **The “OVERPACK” mark** is only required for overpacks transported by sea between Australian ports and not for land transport.

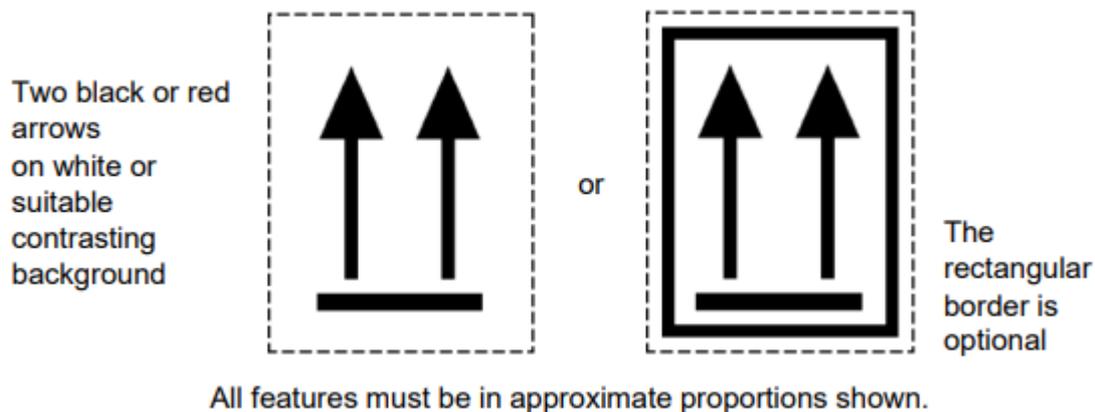
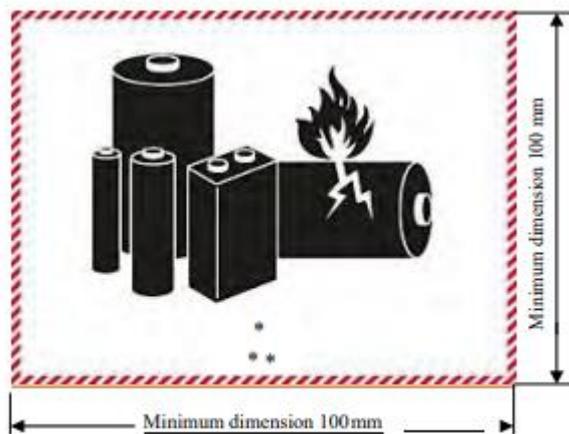


Figure 1 Orientation arrows – Figures 5.2.3 and 5.2.4 of the Code



* Place for UN number(s)

** Place for telephone number for additional information

Figure 2 Lithium battery mark – Figure 5.2.5 of the Code



Figure 3 Class 9 label, model 9A for lithium batteries

4 Requirements for the design, construction and testing of packagings

4.1 Introduction

The following information does not apply to packaging of dangerous goods in limited quantities, or excepted quantities as required for air transport (see Chapters 3.4 and 3.5 of the Code respectively).

To ascertain the correct packaging for a particular dangerous good, find the specific entry within the Dangerous Goods List in Chapter 3.2 of the Code. Note the associated codes for the Packing Instruction and the Special Packing Provision (if any) in columns 8 and 9 respectively.

Section 4.1.4 – *List of Packing Instructions* of the Code provides the details of the design and construction of the permitted packagings. Packagings that do not correspond to the codes of the particular Dangerous Goods List are not permitted for the particular dangerous goods in question.

Each newly manufactured or reconditioned packaging design type must successfully pass the performance tests prescribed in Chapter 6.1 of the Code before transport.

By definition, dangerous goods in *inner packaging* cannot be transported unless they are contained within an *outer package* to form a *combination package*. For this reason, the required performance testing applies to the entire package, as filled and assembled for transport, rather than to the inner packaging on its own.

Inner packagings must:

- a) be made of materials that won't be affected or weakened by the dangerous goods, or won't adversely react with them
- b) be free from faults of a nature liable to impair their strength. In particular, internal strains should have been suitably relieved
- c) be constructed and closed so as to prevent any loss of the dangerous goods; and
- d) if filled with liquids:
 - i. have an appropriate resistance to internal pressure that might develop under normal conditions of transport. One way to demonstrate this is to verify that the inner package is able to withstand a hydraulic pressure of 175 kPa for one minute without leakage

- ii. have sufficient ullage (airspace) to ensure there is no leakage or permanent distortion of the packaging, as a result of an expansion of the liquid caused by temperatures likely to occur during transport.

Packagings have a maximum lifespan as stipulated in the Code. Plastic drums and jerricans as well as combination packagings with plastic inner packagings have a life of five years. Plastic packaging used for nitric acid or hydrofluoric acid has a life span of two years.

4.2 Performance testing and competent authority approval of packagings

Packagings must be manufactured, reconditioned and tested under a quality assurance program in order to ensure that each packaging meets the requirements of Chapter 6.1 of the Code.

The performance testing regime involves drop tests, leakproofness tests, internal pressure tests and stacking tests and a detailed test report and test certificate. The testing is conducted in a facility registered by the National Association of Testing Authorities (NATA) to ensure packagings meet the requirements of Chapter 6.1 of the Code.

The test report and certificate are submitted to the local competent authority to issue a packaging approval. This approval details the type of inner and outer packaging and any intermediate packaging as presented for transport.

The combination package or sole package must be assembled exactly as tested and approved. Failure to assemble the package as per the approval or substituting any of the components will mean the packaging is no longer approved.

The approval confirms the necessary mark that needs to be applied to the outer packaging to show that the packaging is UN approved packaging and to demonstrate that the packaging is suitable for the particular dangerous goods it contains. The mark is a unique code, which starts with the circular United Nations packaging symbol, for example:



4G/Y 16/S/15/AUS/9022

In the above example, the UN code means:

- 4G – fibreboard box
- Y 16 – suitable for packing group II or III up to 16 kg gross mass
- S – for inner packagings, solids or articles
- 15/AUS/9022 – year of manufacture / country of issue / approval number.

4.3 Variations in inner packagings

In order to avoid unnecessary testing and approvals, certain variations in inner packagings are permitted without the need for testing. Once a combination package has been successfully tested with inner packagings, the following variations of inner packagings is permitted without testing if inner packaging of equivalent or smaller size, or a lesser number of such inner packagings, is used as follows:

- a) the inner packagings are of similar design to the tested inner packagings (e.g. shape – round, rectangular, etc.)

- b) the material of construction of the inner packagings (glass, plastics, metal, etc.) offers resistance to impact and stacking forces equal to or greater than that of the originally tested inner packagings
- c) the inner packagings have the same or smaller openings and the closure is of similar design (e.g. screw cap, friction lid, etc.)
- d) sufficient additional cushioning material is used to take up void spaces and to prevent significant movement of the inner packagings; and
- e) inner packagings are oriented within the outer packagings in the same manner as in the tested package.

4.4 Special outer packagings marked with “V”

The use of “V” type packaging is another way to avoid unnecessary testing and approval of combination packagings containing a variety of inner packages.

Clause 6.1.5.1.12 of the Code permits articles and inner packagings of any type for solids and liquids to be used for transport without testing in an outer package if they are assembled and transported in superior UN approved “V” type outer packagings. This type of outer packaging, among other things, has been successfully tested with fragile inner packagings containing liquids using the packing group I drop test.

Eligible inner packagings must comply with the following conditions:

- a) The total combined gross mass of the inner packagings does not exceed 50% of the gross mass of the inner packagings shown in the test certificate.
- b) If the outer packaging is intended to contain inner packagings for liquids and is not leakproof, or is intended to contain inner packagings for solids and is not siftproof, it must be provided with a leakproof liner, plastics bag or other equally efficient means of containment.
- c) Any inner packagings containing liquids are completely surrounded with enough absorbent material to absorb the entire liquid contents of the inner packagings. If a leakproof liner is required, the absorbent material must be placed inside the liner.
- d) The thickness of cushioning material between inner packagings and between inner packagings and the outside of the packaging is at least equal to the corresponding thicknesses in the originally tested packaging.
- e) If fewer or smaller inner packagings are used (as compared to the inner packagings used in the drop test), additional cushioning material must be added to fill any void spaces.

Example of “V” type packaging UN approval mark



4GV/X 16/S/19/AUS/3014

Appendix 1 – Example of a dangerous goods transport document

Consignor: ABC Company

950 Smith Street, Kwinana WA 6168

Telephone: 1800 999 999

Consignee: Jim Jones

30 Main Street, Albany WA 6330

Proper shipping name of dangerous goods	Class / Division	Subsidiary-Hazard	UN number	Packing Group	Type of package or receptacle	Number of packages or receptacles	Quantity (kg or litres)
Petrol	3	N/A	1203	II	20L Plastic container	1	20L
Chloropicrin	6.1	N/A	1580	I	10L steel drum	1	10L
Pesticides, liquid, toxic, flammable, N.O.S. (Beta-Cyfluthrin)	6.1	3	2903	III	20L plastic drum	2	40L

Prepared by: John Smith Received by: _____ Date: _____

Appendix 2 – Special provision 188 regarding conditions, which provide an exemption from the Code requirements for small lithium batteries

The following is an excerpt of special provision 188 from Edition 7.7 of the Code.

Cells and batteries offered for transport are not subject to other provisions of this Code if they meet the following:

- a) For a lithium metal or lithium alloy cell, the lithium content is not more than 1 g, and for a lithium ion cell, the Watt-hour rating is not more than 20 Wh; and
- b) For a lithium metal or lithium alloy battery, the aggregate lithium content is not more than 2 g, and for a lithium ion battery, the Watt-hour rating is not more than 100 Wh. Lithium ion batteries subject to this provision must be marked with the Watt-hour rating on the outside case, except those manufactured before 1 January 2009;

and

- c) Each cell or battery meets the provisions of 2.9.4 (a), (e), (f) if applicable and (g); and
- d) Cells and batteries, except when installed in equipment, must be packed in inner packagings that completely enclose the cell or battery. Cells and batteries must be protected so as to prevent short circuits. This includes protection against contact with electrically conductive material within the same packaging that could lead to a short circuit. The inner packagings must be packed in strong outer packagings which conform to the provisions of 4.1.1.1, 4.1.1.2 and 4.1.1.5; and
- e) Cells and batteries when installed in equipment must be protected from damage and short circuit, and the equipment must be equipped with an effective means of preventing accidental activation.