



Packaging guidelines for used handheld batteries

May 2013

CONTENTS

1. INTRODUCTION	1
2. COMPLIANCE WITH THE AUSTRALIAN DANGEROUS GOODS CODE	1
3. EXEMPTION FROM CERTAIN ASPECTS OF THE AUSTRALIAN DANGEROUS GOODS CODE	1
4. PACKAGING	2
4.1. STEEL DRUMS	2
4.2. PLASTIC DRUMS	3
4.3. STEEL OR PLASTIC BOXES	3
4.4. GENERAL PACKING AND TRANSPORT REQUIREMENTS	4
5. GENERAL TRANSPORT REQUIREMENT	4
5.1. PALLETS	4
5.2. LABELLING	5
5.3. HOW TO HANDLE DAMAGED OR LEAKING BATTERIES	5
5.4. TRANSPORT BY AIR AND SEA	5
5.5. TRANSPORT APPROVAL AND DOCUMENTATION	5
ATTACHMENT 1: DANGEROUS GOODS (ROAD AND RAIL TRANSPORT) ACT 2008 EXEMPTION ORDER 010/12	6
ATTACHMENT 2: DETERMINATION: TRANSPORT OF WASTE BATTERIES	7
ATTACHMENT 3: EXTRACTS FROM THE EUROPEAN DANGEROUS GOODS CODE	8

1. Introduction

Used handheld batteries must be packed and transported in accordance with hazardous waste and dangerous goods regulations in each state and territory.

The following guidelines provide an overview of the packaging and transport requirements for transporting a load of used (waste) handheld batteries with a mix of different chemistries. Batteries collected from retail stores and offices will generally contain a mix of alkaline, nickel cadmium, nickel metal hydride and lithium batteries.

The guidelines do not apply to used batteries that have already been sorted by chemistry, for example a load of sorted lithium ion batteries. These need to be transported in full compliance with the Australian Dangerous Goods Code, 7th Edition (ADG 7).

These guidelines should be read in conjunction with ADG 7 and any relevant waste management legislation.

Note: The Australian Battery Recycling Initiative does not accept liability to any person or organisation for the advice provided in the document or incorporated into it by reference. Readers need to seek their own independent legal advice.

2. Compliance with the Australian Dangerous Goods Code

The Australian Dangerous Goods Code requires all dangerous goods, including batteries, to be carried in a secure, safe and environmentally controlled manner. The carrier has the right to refuse carriage if dangerous goods are not packed in accordance with the regulations. ADG 7 applies to all battery chemistries (see Table 1). There is a minimum quantity of 2kg for those classified as UN code 3028 (called a 'limited quantity' in ADG 7). There is no minimum for batteries classified as UN codes 3090 and 3480.

Table 1: UN codes for batteries*

UN Code	Type of batteries
3028	Alkaline, Carbon zinc, Nickel metal hydride (NiMH) and Nickel cadmium (NiCd) batteries
3090	Lithium metal batteries
3480	Lithium ion batteries

*Note: codes are different for sea transport (see section 5.4)

3. Exemption from certain aspects of the Australian Dangerous Goods Code

In 2012 ABRI received a national exemption from certain aspects of ADG 7 for the transport of waste handheld batteries.

This exemption applies to the transport by road of waste lithium batteries (classified as UN 3090 or UN 3480), together with non-lithium batteries (UN 3028), from the first collection point to the intermediate processing centre for the purposes of disposal or recycling. It applies to companies that collect used batteries from collection points in retail stores, waste management centres and other organisations, and transport them to:

- facilities where they are aggregated and re-packed for transport to a recycler
- companies that recycle them on-site, or
- companies that sort and re-pack them for transport to recyclers.

The exemption means that the battery types in Table 1 do not need to be individually protected against short circuit (for example by taping over the terminals) as long as the packaging and transport requirements in the exemption are met.

A full copy of the exemption is provided in **Attachment 1** and the associated transport determination in **Attachment 2**. The exemption is based on the packaging requirements in the equivalent European code (**Attachment 3**).

Note: The exemption has been endorsed by the Competent Authorities Panel so it has effect in all Australian jurisdictions.

The exemption applies to Alkaline, Carbon zinc, Nickel metal hydride (NiMH), Lithium ion, Lithium metal and Nickel cadmium (NiCd) batteries with the UN numbers in Table 1. It does not apply to lead acid batteries, which must be transported in full compliance with ADG 7. Used lead acid batteries must not be mixed with other batteries due to the risk of acid electrolyte leaking and reacting with alkaline electrolytes.

Batteries that have been physically damaged are not permitted to be packed under this exemption (see section 5.3).

A copy of the exemption must be carried by the driver and produced on request by an authorised officer of the emergency services.

4. Packaging

Mixed batteries may be transported in any of the following packaging formats as long as it is approved for dangerous goods (DG) to the packing group II performance level for solids:

- 1H2 drum – plastic drum with an open (removable) head (see the definition of a ‘drum’ below)
- 1A2 drum – steel drum with an open (removable) head and fitted with a polyethylene bag
- 4H2 box – a plastic box (see the definition of a ‘box’ below)
- 4A – a steel box fitted with a polyethylene bag.

ADG 7 describes drums as ‘flat-ended or convex-ended cylindrical packagings made of metal, fibreboard, plastics, plywood or other suitable materials’. Their definition also includes other shapes e.g. round taper-necked packaging, or pails. Wooden barrels or Jerri cans are not covered by this definition.

Packaging for dangerous goods is required to meet specific performance requirements. These requirements depend on the risks associated with the products being transported. For example, packaging classified as suitable for ‘packing group II’ is intended for ‘substances presenting medium danger’.

4.1. Steel drums

If using steel drums they need to be open head drums with a polyethylene liner. The lids need to have an approved venting device installed in the lid. This can be a vent installed in a bung hole in the lid. The vent allows gas to escape if there is a build-up of pressure in the drum but prevents fluid getting into the drum. It is not acceptable to only put a hole in the lid. For more detail on venting see ADG 7 section 4.1.1.8.

The lid must be held in place by a closure band using a nut and bolt. It is not acceptable to use a spring loaded closure band.

The polyethylene liner for the drum:

- must have an impact resistance of at least 480 grams
- has to be a minimum of 500 microns thick
- must be closed
- may only be used once.

For more detail on liner requirements see Attachment 2.



Example of a vent that has been retro-fitted to a steel drum

4.2. Plastic drums

If using a plastic open head drum with a plastic lid, the drum must be vented. This is usually integral to the design, i.e. the container is designed to be moisture proof but not airtight. For more detail on venting see ADG 7 section 4.1.1.8.

It is important to note that if plastic drums are over 5 years old they cannot be used to transport waste (clause 4.1.1.15 in ADG 7). To determine their age you will need to look at the UN markings stamped on the drum (usually the bottom). An example of how to read the UN markings is provided below.

The UN markings 1H2/Y27/S/11/CN/12000128 for a 14.5 litre pail stand for:

1H2	Plastic Drum, removable head
Y	Suitable for packing groups II and III
27	Maximum gross weight in kilograms
S	Designed for solids
11	The year the packaging was manufactured
CN	Country of manufacture
12000128	Marking required by approving authority

4.3. Steel or plastic boxes

The ADG Code defines boxes as 'packagings with complete rectangular or polygonal faces. Small holes for purposes such as ease of handling or opening, or to meet classification requirements, are permitted as long as they do not compromise the integrity of the packaging during transport.'

Under the ADG exemption any box used to transport used batteries must be vented.

A solid plastic box must be manufactured from a suitable plastics material and be of adequate strength in relation to its capacity and intended use. The box must be adequately resistant to ageing and to degradation caused either by the substance contained or by ultra-violet radiation.

Solid plastic boxes must have closure devices made of a suitable material of adequate strength and designed to prevent the box from unintentional opening.

For steel boxes, the strength of the metal and the construction of the box must be appropriate to the capacity of the box and to its intended use. Steel boxes must be lined with a polyethylene bag that conforms to the packing group II performance level for solids.

The liner:

- must have an impact resistance of at least 480 grams
- has to be a minimum of 500 microns thick
- must be closed
- may only be used once.

For more detail on liner requirements see Attachment 2.

Steel box closures must remain secured under normal conditions of transport.



Examples of DG approved plastic drums

4.4. General packing and transport requirements

There are a number of other general requirements referred to in the Dangerous Goods exemption:

1. Lithium batteries weighing more than 500g cannot be transported under the exemption (they must be transported in full compliance with ADG 7).
2. The drum or box must be approved to a minimum standard of packing group II.
3. Batteries must be packed in a way to prevent short circuiting and movement within the packaging. This can be done by:
 - ensuring that steel drums and steel boxes have a plastic liner, and
 - ensuring that there is no movement in the container, either because
 - the packaging is entirely fitted with a polyethylene bag and the bag is closed, or
 - any empty space has been filled with a cushioning material, such as a vermiculite, to prevent movement during transport.
4. Each container must not hold more than 400kg of batteries.
5. A quality system must be in place to ensure that the total amount of lithium batteries per transport unit (vehicle) does not exceed 333 kg.

6. When transporting mixed waste batteries a copy of the CAP Dangerous Goods Exemption Order 010/12 (Attachment 1) must also be carried by the driver and be able to be produced on request by an authorised officer or emergency services.

5. General transport requirement

5.1. Pallets

When transporting the batteries in the larger 205L drums, it is important to place them on a sturdy wooden pallet (hardwood or structural pine). The drums should be strapped together and then strapped to the pallet. Strapping may be either steel or plastic. It is acceptable to ship a number of drums on a pallet weighing more than 400 kg in total. The DG exemption specifies that the maximum weight for each individual drum is 400 kg.

5.2. Labelling

All containers must have the appropriate Dangerous Goods label on them to clearly identify what the product is. This would include a Dangerous Goods Class 9 Diamond and the product description 'Used lithium cells'. The relevant UN numbers (3028, 3090 and 3048) and proper shipping names must also be displayed on the label (see example below). The diamond should be the minimum size shown in Table 1.

The label must also contain the name and address in Australia of the consigner of the batteries, or their agent. More information on labelling is available in Section 5.2.2 of the ADG Code.

	<p>CONTAINS USED LITHIUM CELLS Mixed batteries including: UN 3028 Batteries, dry, containing potassium hydroxide solid, electric, storage UN 3090 Lithium metal batteries (including lithium alloy batteries) UN 3480 Lithium ion batteries (including lithium ion polymer batteries)</p>
---	---

Table 1: Minimum dimensions of Dangerous Goods labels for batteries

Package or inner packaging containing:	Minimum dimension of labels (mm)	Recommended minimum size of lettering (mm)
≤ 0.5 kg (L)	15 x 15	2.5
> 0.5 kg(L) ≤ 5kg(L)	20 x 20	3
> 5 kg(L) ≤ 25kg(L)	50 x 50	5
> 25 kg(L)	100 x 100	7
Large packaging, overpack, segregation device	100 x 100	7

5.3. How to handle damaged or leaking batteries

Batteries that have been physically damaged are not permitted to be packaged under the ADG 7 exemption. Damaged batteries should be encapsulated in concrete and transported to landfill.

5.4. Transport by air and sea

The DG exemption only applies to the transport of mixed waste batteries within Australia by road. It does not cover the transport of batteries by air or sea.

Used mixed batteries are not permitted to be transported by air due to the possible presence of lithium batteries. It must be assumed that used batteries collected for recycling will include some lithium batteries.

Any sea freight must also comply with international DG conventions, which vary from these instructions. More information on sea freight regulations is available from the Australian Maritime Safety Authority (www.amsa.gov.au) and the International Maritime Dangerous Goods (IMDG) Code.

5.5. Transport approval and documentation

Batteries must be carried in transport units that are ventilated to prevent the build-up of vapours.

The interstate movement of batteries must be undertaken with appropriate regulatory approval and documentation. Batteries are a hazardous waste and the supplier must obtain an approved Consignment Authorisation issued by the destination state Environment Protection Authority prior to transportation. The Waste Transport Certificate must accompany the battery load in transit and be presented at the receiving facility upon delivery.

The exemption and determination cover only packing and labelling of the waste batteries. Transport of the batteries must still comply with all of the relevant dangerous goods transport controls set out in the ADG Code and legislation. Different levels of control apply depending on the quantity being carried, e.g.:

- A load of batteries up to 1,000 kg is less than a 'placard load' and would require a DG transport document to be carried. There is also a general requirement in the legislation that persons involved in the transport of dangerous goods (including consigning, loading, transporting etc.) receive 'appropriate instruction and training, or supervision'.
- A load of batteries >1,000 kg is a 'placard load' and a number of additional DG transport requirements must be complied with. These include placarding of the vehicle, emergency information, safety equipment, stowage and restraint provisions etc.

A copy of the exemption and determination must be carried in any vehicle transporting the waste batteries. It is not a regulatory requirement to carry Materials Safety Data Sheets (MSDS).

Further information on dangerous goods transport controls (including a blank transport document that can be downloaded) can be obtained from the NSW EPA website at: www.environment.nsw.gov.au/dangerousgoods/fs1summary.htm.



Australian Battery Recycling Initiative
info@batteryrecycling.org.au
www.batteryrecycling.org.au

Australian Battery Recycling Initiative Incorporated
Registration No: A0052208D

ATTACHMENT 1: DANGEROUS GOODS (ROAD AND RAIL TRANSPORT) ACT 2008 EXEMPTION ORDER 010/12



WorkCover NSW
92-100 Donnison Street, Gosford, NSW 2250
Locked Bag 2906, Lisarow, NSW 2252
t 02 4321 5000 f 02 4325 4145
WorkCover Assistance Service **13 10 50**
DX 731 Sydney **workcover.nsw.gov.au**

DANGEROUS GOODS (ROAD AND RAIL TRANSPORT) ACT 2008

EXEMPTION ORDER 010/12

In accordance with Section 42 of the NSW Dangerous Goods (Road & Rail Transport) Act 2008, an exemption is hereby granted from certain clauses of the NSW Dangerous Goods (Road & Rail Transport) Regulation 2009 as set out below.

1. This exemption is an exemption from the following clauses of the Regulation:
 - clause 56 as it applies to consignors
 - clause 57 as it applies to packers
2. This exemption applies to the transport of waste batteries classified as UN 3028, UN 3090 or UN 3480 by road from the first collection point to the intermediate processing centre for the purposes of disposal or recycling.
3. Waste batteries must be packed according to SP 636 (b) and P903b (with the exception of subclause (3)) as documented in the 2011 version of the European Agreement concerning the International Carriage of Dangerous Goods by Road, commonly known as ADR 2011.
4. Batteries that have been physically damaged are not permitted to be packed under this exemption.
5. All single and outer packagings used for waste batteries must be vented in accordance with clause 4.1.1.8 of the ADG Code, 7th Edition.
6. The maximum permitted gross mass for each package containing waste batteries is 400 kg.
7. This exemption is valid until the 7th edition of the ADG Code ceases to have effect in NSW, or until the exemption is varied or revoked by WorkCover NSW.
8. A copy of this exemption must be carried by the driver and produced upon request by an authorised officer or an officer of the emergency services.

Note that this exemption does not affect any requirements of relevant waste management legislation. The CAP reference number for this exemption is CA2012/21.

Ron Keelty
Acting Director, Specialist Services Group
Work Health and Safety Division
WorkCover Authority of NSW
Date:

ATTACHMENT 2: DETERMINATION: TRANSPORT OF WASTE BATTERIES



DETERMINATION: TRANSPORT OF WASTE BATTERIES

In accordance with Clauses 25 and 27 of the NSW Dangerous Goods (Road & Rail Transport) Regulation 2009, a determination is hereby made as set out below:

This determination:

- 1 Applies to waste batteries transported in accordance with NSW Workcover exemption 010/12 granted to the Australian Battery Recycling Initiative (the *particular dangerous goods* – clause 25).
- 2 Requires that such batteries must only be transported in a transport unit which is ventilated to produce a flow of air through the transport unit in order to prevent the build up of vapours (the *specified kind of vehicle* – clause 25 (a)).
- 3 Is subject to a copy of this determination being carried in each vehicle transporting such batteries.
- 4 Is valid while the NSW Workcover exemption remains in force.

The reference number for this determination is NSWDG1374.

A handwritten signature in black ink, appearing to read 'Andy Hawkins'.

ANDY HAWKINS
Manager Chemicals Regulation
Incidents and Environmental Health

by delegation

Date: 10 April 2013

ATTACHMENT 3: EXTRACTS FROM THE EUROPEAN DANGEROUS GOODS CODE

Exemption Order 010/12 refers to the Special Provisions and Packaging Instructions for used batteries in the 2011 version of the European Agreement concerning the International carriage of Dangerous Goods by Road, commonly known as ADR 2011. These are reproduced below.

SP 636(b)

Used lithium cells and batteries with a gross mass of not more than 500g each collected and presented for carriage for disposal between the consumer collecting point and the intermediate processing facility, together with other non-lithium cells or batteries, are not subject to the other provisions of ADR if they meet the following conditions:

- (i) The provisions of packaging instruction P903b are complied with;
- (ii) A quality assurance system is in place to ensure that the total amount of lithium cells or batteries per transport unit does not exceed 333 kg;
- (iii) Packages shall bear the inscription 'USED LITHIUM CELLS'.

Packing Instruction P903b

This instruction applies to used batteries of UN Nos. 3090, 3091, 3480 and 3481.

Used lithium cells and batteries with a gross mass of not more than 500g each, collected for disposal, may be carried together with other used non-lithium batteries or alone without being individually protected, under the following conditions:

- (1) In 1H2 drums or 4H2 boxes conforming to the packing group II performance level for solids;
- (2) In 1A2 drums or 4A boxes fitted with a polyethylene bag and conforming to the packing group II performance level for solids. The polyethylene bag:
 - shall have an impact resistance of at least 480 grams in both parallel and perpendicular planes with respect to the length of the bag;
 - shall have a minimum of 500 microns of thickness with an electrical resistivity of more than 10 Mohms and a water absorption rate over 24 hours at 25°C lower than 0.01%;
 - shall be closed; and
 - may only be used once.

Additional requirements:

The empty space in the packaging shall be fitted with cushioning material. The cushioning material may be dispensed with when the packaging is entirely fitted with a polyethylene bag and the bag is closed.

Hermetically sealed packagings shall be fitted with a vented device according to 4.1.1.8. The venting device shall be so designed that an overpressure caused by gases does not exceed 10 kPa.