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Lithium Australia

Safer Battery Recycling Solutions

Battery Packaging & Shipping Guidelines for Recycling & Disposal

V02. April 2024

Packaging and transporting batteries in Australia, as well as globally, is subject to regulations due to their potential fire and safety risks. Compliance with these regulations is essential to ensure safety during transport. Outlined in this document are standards for Envirostream packaging, details on the Australian Dangerous Goods Codes, and what Envirostream do not accept.

This document is a guideline only and does not cover every aspect of ADG Guidelines relating to batteries. Ultimately, the shipper is responsible to comply with applicable regulations related to the transport of batteries. Readers should not rely solely on the information provided in this document and seek professional advice where required.

Envirostream Packaging
For small - medium Dry Cell, Lithium & Mixed batteries

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CC10 Transport Carton & Fire-Resistant Liner, 12kg capacity

Packing Instruction

1. Construct flatpack carton, taping the bottom of the box with quality packing tape.
2. Expand the fire liner and place in the carton with the Velcro flaps folded back, leave the liner handles out.
3. Fill the liner with end-of-life batteries.
    - **Isolate and protect battery terminals, by taping, or using small zip lock bags.**
4. Once full, check for any obvious contaminants like rubbish or wires and remove.
5. Ensure contents is packed securely to prevent excessive movement during transport.
6. Once full, close the inner liner bag by closing the velcro and clip, then tape the box shut with clear packaging tape.

Features

- Carton is pre-printed with UN3480
- Approved in accordance with Dangerous Goods (Transport by Road or Rail) Reg. 2018
- Velcro and clip closure fire-resistant liner
- Dimension: 215mm H x 215mm W x 325mm L – 12kg capacity
- For Damaged Batteries, separate from non-damaged and vermiculite should be used as additional packaging (see page 9 for more details). Maximum 10L of vermiculite
- ***No wet cell batteries e.g., NiCd and ULAB.***

Envirostream Packaging
For medium – large Dry Cell, Lithium batteries

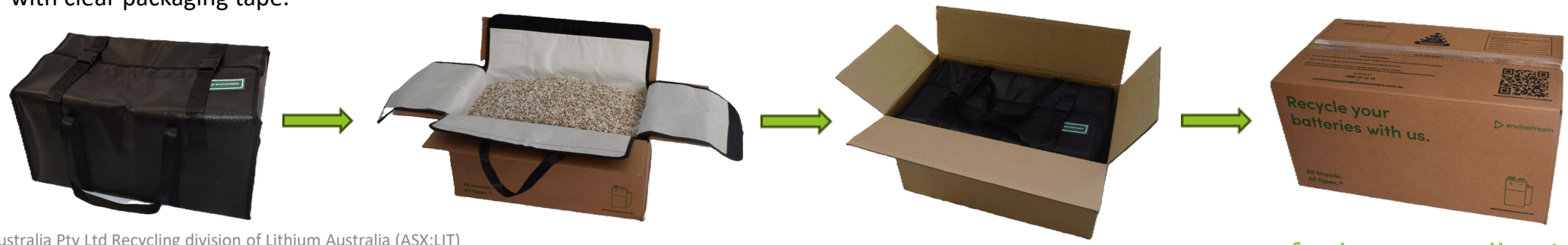
CC50 Transport Carton & Fire-Resistant Liner, 30-50kg capacity

Packing Instruction

1. Construct flatpack carton, taping the bottom of the box with quality packing tape.
2. Expand the fire liner and place in the carton with the Velcro flaps folded back, leave the liner handles out.
3. Fill the liner with end-of-life battery.
    - **Isolate and protect battery terminals from short circuit**
4. Once full, check for any obvious contaminants like rubbish or wires and remove.
5. Ensure contents packed securely to prevent excessive movement during transport – fill empty space with vermiculite.
6. Once full, close the inner liner bag by closing the velcro and clip, then tape the box shut with clear packaging tape.

Features

- Suitable for multiple medium batteries up to 30kg or individual large batteries between 30-50kg (not to be used for multiple small batteries, please see CC10 page 1).
- Carton is pre-printed with UN3480
- Velcro and clip closure fire-resistant liner
- External carton dimensions: L 607mm x W 345mm x H 310mm
  Internal liner Dimensions: L 550mm x W 300mm x H 300mm
  30-50kg max weight holding capacity.
- For Damaged Batteries, separate from non-damaged and vermiculite should be used as additional packaging (see page 9 for more details). Maximum 50L of vermiculite.
- ***No wet cell batteries e.g., NiCd and ULAB***



Packing multiple boxes onto a pallet

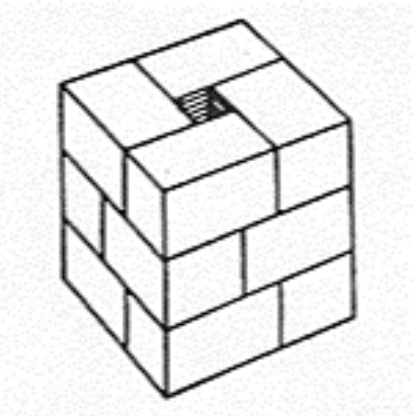
- Heaviest and large boxes to be stacked on the bottom.
- Cardboard corner protectors recommended to ensure boxes maintain their upright position, then strapping can be applied, minimising risk of crushing the cartons.
- Use pallet strapping horizontally around the load on each layer, vertically through pallet and over the top of boxes to secure to the pallet.
- Pallet stretch wrapping should be used additional to strapping.
- Pallets must be in good condition and appropriately rated for the load weight. Preference is maximum 1000kg.
- Example, EVS CC10s at 12kg each can be stacked 3 layers high, giving a total pallet weight of 900kg.

*How **To** Stack Cartons* ✓

*How **Not** to Stack Cartons* ✗

Packing multiple CC50 boxes onto a pallet

- EVS CC50s can be stacked 4x boxes per layer in a ‘pinwheel’ pattern, 3 layers high.
- Heaviest boxes to be stacked on the bottom.
- Cardboard corner protectors recommended to ensure boxes maintain their upright position, then strapping can be applied, minimising risk of crushing the cartons.
- Use pallet strapping horizontally around the load on each layer, vertically through pallet and over the top of boxes to secure to the pallet.
- Pallet stretch wrapping should be used additional to strapping.
- Pallets must be in good condition and appropriately rated for the load weight. Preference is maximum 650kg gross.
- Standard pallet size recommended: 1200 x 1200 mm



Envirostream Packaging

Storage Pallets (SP385, SP715)

Packing

- Fill pallets with closed and secured carton & liners.
- Not to be filled with loose batteries.
- Isolate and protect battery terminals from short circuit.
- Not to be used for wet cell batteries e.g., NiCd and ULAB.
- If storage pallet is to be used for transport, batteries must be packaged in EVS carton & liner or equivalent dangerous goods rated transport container.

Features

- Ideal for safer onsite storage of collected batteries
- Fully steel construction, powder coated, lockable, made from recyclable material
- Double walled for heat transfer protection in event of fire
- Standard pallet footprint, 2 sizes available:

  - SP385: 1080 x 1080 x 650mm - holds approx. 25 x 10L cartons or 300kg

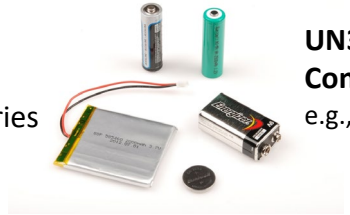
  - SP715: 1080 x 1080 x 1080mm - holds approx. 50 x 10L cartons or 600kg

If Not Using Envirostream Packaging

Small & Medium Lithium-Ion Cells & Batteries (Dangerous Goods Class 9)

Readers should refer to the most current ABRI guidelines and ADG requirements to ensure compliance with the ADG Code. National transport commission: current ADG Code – https://www.ntc.gov.au/codes-and-guidelines/australian-dangerous-goods-code. ABRI - https://batteryrecycling.org.au/our-guidelines/

UN3480, Lithium-Ion & Mixed Batteries
e.g., loose/standalone batteries



UN3481, Lithium-Ion Batteries Contained in *or* Packed with Equipment
e.g., power tools

UN3090, Lithium Metal Batteries
UN3091, Lithium Metal Batteries Contained in *or* Packed with Equipment

Packaging

1. **Isolate battery terminals** to protect from short circuiting, by taping with clear tape, or using small zip lock bags.
2. Batteries must be placed in **inner lining/packaging made of non-conductive material** (e.g., plastic)
3. Cells and batteries must be **packed to prevent excessive movement** during transport. Where movement could occur, **pack empty space with fire retardant filler** e.g., vermiculite.
4. Inner packaging must be placed in **DG rated strong rigid outer packaging** with a **max of 30 kg** of small-medium cells/batteries. Packaging from new batteries replacing the spent battery can be utilised if in good condition, not suitable for damaged/defective batteries.
5. Packages must be appropriately placarded and labelled in accordance with the ADG guidelines.

Large Lithium-Ion Batteries
Electric Vehicle (EV) & Energy Storage System Batteries (ESS)

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Packaging

- A single large lithium battery that has a strong, impact-resistant outer casing and assemblies of such batteries, may be packed in any of the following ways:
    - In strong outer packaging.
    - In protective enclosures (e.g., in fully enclosed or wooden slatted crates).
    - On pallets or other handling devices.
    - Packaging from new batteries replacing the spent battery can be utilised if in good condition, not suitable for damaged/defective batteries.
- Must be **secured** to prevent inadvertent movement.
- **Terminals must be disconnected** from the battery or capped/covered to prevent short circuit.
- Packages must be appropriately placarded and labelled in accordance with the ADG guidelines.

Damaged or Defective Batteries

1. **Protect from short circuit**, ensure terminals are covered.
2. Place the cell or battery in **individual, non-metallic inner packaging** that completely encloses the cell or battery (e.g., fire blanket, plastic bag).
3. Place inner packaging in **strong rigid outer packaging** (must be DG rated).
4. Surround the inner packaging with **non-combustible, electrically non-conductive, and absorbent cushioning/insulation material** (e.g., vermiculite).
5. **Label** package as ‘Damaged/Defective Lithium-Ion Battery/ies’.

Batteries such as damaged powered mobility devices may require submerging in salt water prior to packaging, please contact Envirostream regarding sending damaged batteries.

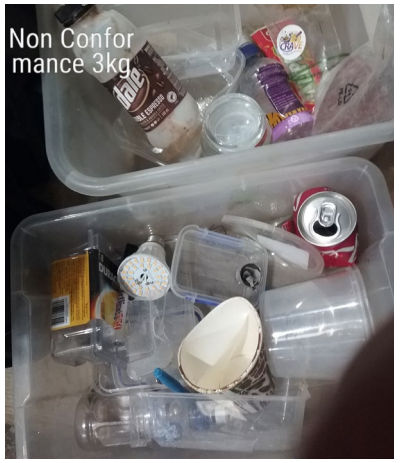
It is the shipper’s responsibility to comply with regulations related to the transport of lithium batteries and ensure that all the shipping requirements have been fulfilled prior to offering the package for transportation.

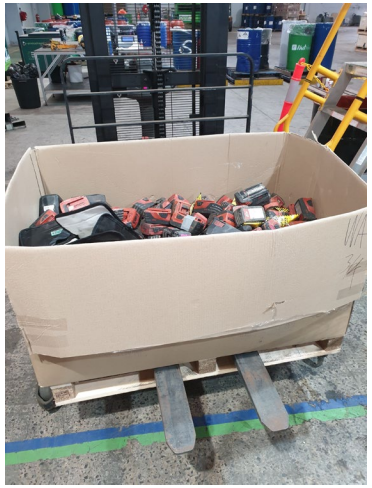
Wet Cell, NiCd, & Lead Acid Batteries (ULAB)

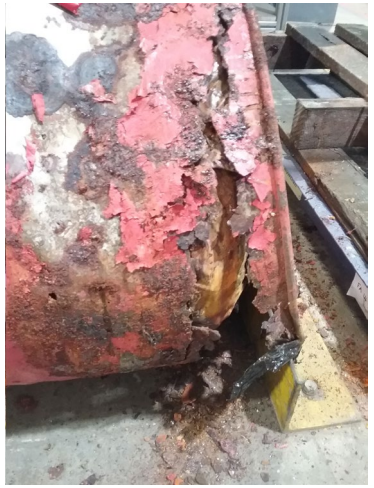
- Wet-Cell batteries (DG8) must not be packaged with mixed batteries (DG9).
- Separate from all other batteries and package on a separate wooden shipping pallet that is in good condition and of heavy-duty construction.
- **Stack** - Store upright on a pallet, no more than 2 layers of batteries, and to prevent short circuit and to distribute weight, place a sheet of non-conductive material (separators) between each layer of batteries.
- **Strap** - Secure pallet with non-conductive strapping for transport. Use pallet strapping horizontally around each layer, vertically through pallet and over the top to secure the pallet. Strapping must be tight enough to prevent battery movement in transit. Vertical strapping alone is not acceptable.
- **Wrap** - Pallet stretch wrapping may be used in addition to strapping but should not be the only source of securing the load.
- Must have all vent caps firmly in place prior to strapping and wrapping, to prevent acid spills.
- Refer to ABRI Guidelines: Packaging and safe transport of used lead acid batteries (ULAB) - https://https://www.batteryrecycling.org.au/our-guidelines

Envirostream DO NOT ACCEPT

- IBC Containers
- Broken/Damaged Pallets
- Damaged/Rusted Drums
- Wet Sand
- Liquid Contamination
- Metal Strapping
- Jumbo cardboard boxes
- Excessive general waste
- Non-battery items
- Sharps







Non-Conformance Fees

Non-conformance to this guideline can incur additional fees.

- **Minor Infringement**
  - A non-conformance that has the potential to cause a problem, or that results in increased labour and time to address.
  - Examples:
    - Broken/damaged boxes or pallets
    - Documentation not accompanying the load
    - General waste.
- **Major Infringement**
  - A non-conformance that poses a serious risk to people or assets, or results in an incident, injury, or operational shutdown and downtime.
  - Examples:
    - Contamination with medical waste
    - Unidentified dangerous goods or hazardous materials
    - Unidentified damaged battery or damaged battery not packaged correctly
    - Fire/ignition event due battery not protected from short circuit.

State Of Charge Management

- Knowledge of the state of charge of batteries helps us to assess risks associated with storage, transport, handling, and dismantling practises.

- If a battery module or pack is 20kg or more, Envirostream will ask upon booking, if the state of charge of the battery is known.

- **Envirostream preference is for state of charge to be below 30%**

- Discharging is not a requirement, but if you have the means to, please do so.

- Currently state of charge does not affect Envirostream acceptance of batteries, this is purely for safety and risk mitigation.

Other References

National transport commission

Link to current ADG Code – https://www.ntc.gov.au/codes-and-guidelines/australian-dangerous-goods-code

ABRI

ABRI provide a range of other resources relating to battery handling, storage, packaging and transport -

https://batteryrecycling.org.au/

https://batteryrecycling.org.au/our-guidelines

EPA

Other authorities, such as state-based EPA, have additional guidelines for batteries.

- Refer EPA Victoria: https://www.epa.vic.gov.au/about-epa/publications/2018

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BATTERY RECYCLING SOLUTIONS