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## **RAW MATERIALS INC.**

### **BATTERY IDENTIFICATION SHIPPING AND RECEIVING REQUIREMENTS**

Raw Materials Company Inc. (RMC) is a facility that receives all types of waste batteries. To do this safely, RMC requires that battery shipments be in compliance with all applicable labeling, packaging and shipping laws, as well as RMC's additional requirements.

This guide explains RMC's requirements for how each type of battery must be labeled, packaged and shipped, as well as information required on a bill of lading or manifest. These are only guidelines and subject to your Provincial, State and Federal transportation and environmental regulations. If required RMC can provide appropriate means of containment, at a reasonable cost, or advice on what means of containment would be appropriate for specific situations.

In the event that a load is received that does not conform to these guidelines the generator will be notified. If non-conformance to these guidelines persists the loads may be subject to extra fees or rejection.

### **NOTIFICATION OF SHIPMENTS**

All batteries and miscellaneous shipments must be scheduled prior to shipment by contacting the RMC Freight Coordinator (FC) at 905-835-1203.

*Under the Ontario Batteries Regulation 30/20 beginning July 1, 2020 all single use and rechargeable Ontario generated batteries weighing less than 5kgs are program eligible and recycling costs are covered by the Battery Manufactures with the exception of embedded batteries.*

*Ontario companies must be eligible for the Batteries Regulation program, under the Resource Recovery and Circular Economy Act (RRCE). <https://www.ontario.ca/laws/regulation/r20030>*

*Ontario companies shipping batteries under Ontario Batteries Regulation 30/20 must clearly state so at the time of scheduling. It is the responsibility of the company shipping to clearly identify all waste batteries and waste materials being shipped.*

#### Attachments

Transport Canada-TP14850 Packing Instructions Standard (P801, 903, 908, 909) (EMS-ED-GC)

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## **GENERAL SHIPPING REQUIREMENTS**

### **Batteries Shipped in Oil**

Batteries received in oil are subject to an additional charge that will be added to your invoice.

### **Battery Taping**

Button cells, lithium batteries, sealed lead acid batteries, 6 volt batteries and batteries 9 volts or over are required to be taped or protected from short circuiting. A battery taping fee will appear on your invoice for unprotected batteries.

Batteries with loose terminals/leads must be taped prior to shipment to RMC to ensure they are secured and prevented from causing a short-circuit. The terminals must not be folded over (see image below). The terminals should be separated and taped to prevent contact with each other, the battery itself or other materials it may be packed with. Proper taping techniques are shown below.

#### **Improperly taped lithium ion battery terminals:**



Terminal folded over

#### **Properly taped terminals:**



### **Battery Protection of Short Circuiting - United States**

The regulations state that dry rechargeable and alkaline batteries with a marked rating of less than 9-volts do not have to be protected from short circuiting.

Batteries that are less than 9-volts can be left unsealed in recycling containers with batteries of the same chemistry, i.e., alkaline with alkaline, Ni-Cd with Ni-Cd, etc. Lithium metal and lithium ion batteries must be shipped in accordance with DOT requirements (prevention of short circuiting is required). The exception to this rule is 6 volt alkaline lantern batteries. Raw Materials Company Inc. requires these batteries to be taped to prevent short circuiting as well.

Button cells, lithium batteries, 6 volt or batteries 9-volts or over must be sealed in a way that prevents terminal exposure.

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### **Battery Protection of Short Circuiting – Canada**

*The Transportation of Dangerous Goods Regulations identifies Wet, Non-Spillable (UN 2800), subject to special provision 39, in addition to Lithium Batteries (UN3090/ UN3091), and Lithium Ion Batteries (UN3480/3481) subject to special provision 34. These provision's outline that "These dangerous goods may be handled, offered for transport or transported under this shipping name if the dangerous goods are...protected from short circuit".*

The above mentioned battery types require protection from short circuiting by taping any exposed terminals using transparent, scotch or masking tape or by placing individual batteries into a separate plastic bag. Refer to battery taping section above for more information. Note: do not cover entire battery in tape; just the exposed terminals (see photo's below).



*Lithium button cells should be wrapped in clear tape for identification purposes.*



Primary alkaline batteries (i.e. AA, AAA, C, D) transported within Canada are not regulated. Non-compliance with legislation can result in delays, service charges or rejection of the load at the generator's expense. Please refer to Transport Canada's The Transportation of Dangerous Goods Act for your batteries to ensure they are shipped in compliance with the Act.

### **Broken/Leaking Batteries or Light Tubes**

Carefully place broken/leaking batteries or light tubes into a separate baggie or UN approved container with protective gloves and eyewear. Small acid spills may be neutralized with baking soda and alkali spills with vinegar. Mark on the container if it contains broken light tubes, broken bulbs or batteries.

*Damaged or defective lithium metal and lithium ion cells/batteries must be transported under TDGR Special Provision 137, (also listed under Lithium Battery section). This provisions states packaging must be in accordance with Packing Instructions P908 or LP904 of the UN Recommendations, and in a means of containment marked Damaged/Defective Lithium Ion Batteries or Lithium Metal batteries.*

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### Shipping Documents

Intact waste batteries within Ontario are to be shipped on a bill of lading under Ontario Regulation 102/07 and in accordance with The Transportation of Dangerous Goods Act (TDGA). Customer and transporter must have an agreement letter on file from RMC.

Batteries are also shipped on a bill of lading within the United States may, where permitted by state regulations be managed in accordance with Universal Waste Regulations under the Universal Waste Rule, Part 273, when shipped to a recognized waste battery recycling facility.

Although certain batteries are exempted from manifesting (in some states), labels, placards and any other additional requirements are still necessary. It is the responsibility of the generator to handle in accordance with state, provincial and federal transportation and environmental laws.

### Labeling, Packaging and Transport

*Pallets must be in good condition and must be shrink-wrapped*, banded with plastic banding only and labeled on each side with the appropriate labels prior to transport. Means of containment must also be labeled on each side. Where required, appropriate placards must be placed on the means of transport as required by TDGA and USDOT. Batteries must be packaged according to the following guidelines to prevent short-circuits and spills.

If required please contact a RMC representative for further assistance.

### Shipping Containers

- Batteries regulated under TDGA that are shipped in a means of containment need to be shipped in a new or refurbished UN approved container. If the container is metal, it will need to be lined.
- Never use galvanized containers for batteries. This can result in an explosion.
- UN approved containers must be used for the appropriate waste type; the means of containment must meet TDGA/US DOT specifications for the material.
- It is essential that the means of containment be equipped with pressure relief mechanisms or is not airtight. This will allow any gasses that may be formed to dissipate.
- The means of containment will need to be palletized using shrink-wrap and plastic banding used to secure containers or large cell batteries to the shipping pallet. Steel banding should never be used due to the risk of short circuiting.
- The pallets should not be overloaded and the means of containment placed on the pallet in an approved manner.
- Wet filled batteries should not be packed in drums unless damaged or leaking. If battery is damaged and/or leaking, *a UN plastic drum or leak proof UN rated tote* should be used.

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### **Shipments With Out Containment**

- Larger cells are to be received on pallets (i.e. station glass batteries) with proper TDG labels in accordance with our Equivalency Certificate SU 6829.
- Cardboard must be placed between each layer of batteries as well as on top; this absorbs spills, prevents short-circuiting and cushions the load.
- A liberal amount of shrink-wrap and plastic banding with clips (not ties) must be used to secure the shipment to prevent shifting and spilling during transport. Ensure banding in both directions to prevent movement.
- Metal banding clips should be placed to the side of a battery, steel banding must never be used as it could cause a short circuit.

### **Certificate of Environmental Liability Release**

Certificates are issued approximately 90 days after we have received your shipment. If you have any questions about your waste certificates, please contact the Health, Safety and Environmental Department 905-835-1203 or [hse@rawmaterials.com](mailto:hse@rawmaterials.com).

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## **TYPES OF BATTERIES AND SPECIFIC SHIPPING REQUIREMENTS**

Appropriate methods for packaging all types of batteries are listed below, as well as all information that is needed on shipping documents. If you are not able to determine the type of battery or proper shipping procedures from this guide feel free to contact us. Many of the smaller batteries may be difficult to identify, in this case tape or cap the terminals or place each battery in a bag and include the battery in a mixed barrel.

### **Button cells**

Button cells present a high risk of short-circuiting because the terminals take up a large portion of the surface area of the battery. Button Cells must be taped using transparent scotch tape, regardless of their composition, prior to shipment (please see above for example). Button cells are usually lithium, alkaline or mercury oxide.



### **Lead Acid, Automotive**

Cells may be stacked to a maximum of three layers high on a skid with cardboard *on the bottom and top of each layer*. The cells must be secured using shrink-wrap and plastic banding. (UN No. 2794, Class 8, ERG #154, Ontario waste class code—Ontario Exempt, Approx. Weight is 35 lbs).



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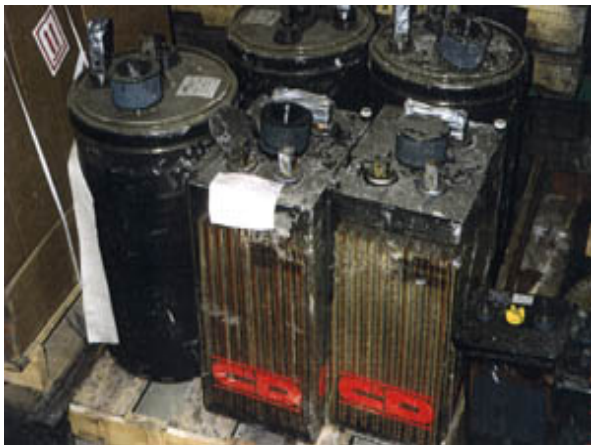
### **Lead Acid, Heavy Duty Equipment - Truck Cells**

Cells may be stacked to a maximum of two layers high on a skid with cardboard on *the bottom and top of each layer*. The cells must be secured using shrink-wrap and plastic banding. (UN #2794, Class 8, ERG #154, Ontario waste class code—Ontario Exempt, Approx. Weight 65-115 lbs).



### **Lead Acid – Station Glass**

Cells must be placed in a single layer on a skid. The cells must be secured using shrink-wrap and plastic banding. Cardboard is to be placed on top and bottom to prevent short-circuiting and absorb any loose acid (UN No. 2794, Class 8, ERG #154, Ontario waste class code—Ontario Exempt, Approx. Weight 25-350 lbs).





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### **Lead Acid, Steel Clad**

Cells may be placed in a single layer on a skid. The cells must be secured using shrink-wrap and plastic banding. Top of cells must be covered with cardboard as well as the bottom of the cell to prevent short-circuiting and absorb any loose acid. (UN No. 2794, Class 8, ERG #154, Ontario waste class code—Ontario Exempt, Approx. Weight 250-5,000 lbs).



### **Lead Acid, Steel Clad Cells**

Cells may be placed in a single layer on a skid. The cells must be secured using shrink-wrap and plastic banding. Top and bottom of cells must be covered with cardboard to prevent short-circuiting and absorb any loose acid. (UN No. 2794, Class 8, ERG #154, Ontario waste class code—Ontario Exempt, Approx. Weight 250-5,000 lbs).



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### Lead Absolyte Battery

Cells must be placed in a single layer on a skid. The cells must be secured using shrink-wrap and plastic banding. Top and bottom of cells must be covered with cardboard to prevent short-circuiting and absorb any loose acid. (Follow special provision 39 of the TDGA, Approx. Weight 500 lbs). UN 2800, Class 8, *ERG # 154*



### Lead "Gates" Sealed Cell

Cells should be placed into their original cartons and then stacked to a maximum of five layers high on a skid with cardboard on top of each layer. The cells must be secured using shrink-wrap and loose wipes, terminals must also be taped or covered to prevent short circuiting. (Follow special provision 39 of the TDGA, Approx. Weight 23 lbs). UN 2800, Class 8, ERG # 154



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### **Lead Sealed Cell**

These cells are smaller and of a variable size, therefore they may be stacked to a maximum of one and a half feet from the top of the skid. Cardboard must on top of each layer. The cells must be shrink-wrapped and secured to the pallet with plastic banding. These cells may also be shipped in a means of containment layered in cardboard or otherwise protected from short-circuiting by covering terminals with tape or rubberized coating spray removing the terminals. (Follow special provision 39 of the TDGA, Approx. Weight 1-15 lbs).

### **Industrial Lead Sealed Cell**

Cells may be stacked to a maximum of two layers high on a skid with cardboard on top of each layer. The cells must be secured to the pallet using shrink-wrap and plastic banding and cardboard placed at the bottom of the cells. (Follow special provision 39 of the TDGA, Weight 30-125 lbs). UN2800, Class 8, ERG # 154



### **Lead Acid “Submarine” or “07” Tank Cells**

Cells are top heavy; therefore it is only acceptable to put one cell on each pallet. The cell must be secured to the pallet with plastic banding; it is advised that blocking is used during transport to prevent any movement. Blocking is a filler material used to keep cells from tipping. Exposed terminals should be covered with cardboard, tape, caps or sprayed to prevent short-circuiting. (UN No. 2794, Class 8, ERG # 154, Ontario waste class code—Ontario Exempt, Approx. Weight 1,500 lbs).



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### **Lead Acid Monoblock Cell**

Cells must be placed in a single layer on a skid. The Batteries must be secured using shrink-wrap and plastic banding. The top and bottom of the cells must be covered with cardboard to prevent short-circuiting. (UN No. 2794, Class 8, ERG #154, Ontario waste class code—Ontario Exempt, Approx. Weight 400 lbs).



### **Alkaline Sealed Cell - Flashlight**

Cells are to be shipped in a safe and secure means of containment such as a pail, drum, waste wrangler, cubic yard cardboard box. Not regulated by TDG. Approx. Weight 1 lb. 9 volt and 6 volt alkaline lantern batteries must be taped with clear scotch tape to prevent the terminals from short-circuiting. Refer to taping guidelines on page 2.



### **Alkaline Zinc Air**

Cells are to be shipped in a safe and secure means of containment such as a pail, drum, waste wrangler, cubic yard cardboard box. Not regulated by TDG. Approx. Weight <1 lb. 6 volt and 9 volt versions of these batteries should be taped to prevent short circuiting by covering the terminals with tape or bagging individual batteries.



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### **Zinc Chloride, Zinc Carbon Lantern Battery**

Cells are to be shipped in a safe and secure means of containment such as a pail, drum, waste wrangler, cubic yard cardboard box. Not regulated by TDG. Approx. Weight 3 lbs. lantern version should be taped to prevent short circuiting.



### **Nickel Cadmium Sealed Cell**

Cells are to be shipped in UN approved means of containment, if the terminals are exposed these cells must be taped, capped or individually bagged prior to shipment, to prevent short circuiting. Exposed terminals or batteries 9 volts or greater should be taped to prevent short circuiting by covering the terminals with tape. (UN No. 3077, Class 9, Packing Group III, ERG #171, Ontario waste class code—Ontario Exempt, Approx. Weight <1 lb.).

When handling or transporting less than 450 kg (992lb) of this material, UN 3077 is not required to be applied as per TDGA special provision 99. Cells are to be shipped in a safe and secure means of containment such as a pail, drum, waste wrangler, cubic yard cardboard box.





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### **Nickel Metal Hydride**

Cells are to be shipped in UN approved means of containment, if the terminals are exposed these cells must be taped, capped or individually bagged prior to shipment, to prevent short circuiting. Exposed terminal or batteries 9 volts or greater should be protected from short circuiting by covering the terminals with tap. (UN No. 3496, Class 9, PG N/A, ERG #171, Ontario waste class code—Ontario Exempt, Approx. Weight <1 lb.).



### **Nickel Cadmium / Nickel Iron / Nickel Zinc Vented Cell**

Cells may be stacked to a maximum of three layers high on a skid with cardboard on top of each layer. The cells must be secured using shrink-wrap and plastic banding. (UN No. 2795, Class 8, ERG #154, Ontario waste class code—Ontario Exempt, Approx. Weight 2-70 lbs).





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### **Air Depolarized Zinc -Non-Toxic**

Cells may be stacked a maximum of three layers high on a skid with cardboard on top and bottom of each layer. The Batteries must be secured using shrink-wrap and plastic banding. Non-toxic types have NT, Mercury Free or Non Toxic stamped on the label of the battery. (UN No. 2795, Class 8, ERG #154, Ontario waste class code—Ontario Exempt, Approx. Weight 35 lbs).



### **Air Depolarized Zinc - Toxic with Mercury**

Cells may be stacked to a maximum of three layers high on a skid with cardboard dividing on top and bottom of each layer. The batteries must be secured using shrink-wrap and banding. Grey polypropylene case or black ebonite case with black or gray top indicates toxic type, or any ADZ not clearly labeled Non Toxic or Mercury Free is considered to contain mercury. (UN No. 2795, Class 8, ERG #154, Ontario waste class code—Ontario Exempt, Approx. Weight 35 lbs).



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### **Mercury Oxide Sealed Cells**

Cells are to be shipped in UN approved means of containment, if the terminals are exposed these cells must be taped, capped or individually bagged prior to shipment, to prevent short circuiting. (UN No. 3077, Packing Group III, Class 9, ERG #171, Ontario waste class code—Ontario Exempt, Approx. Weight <1 lb).

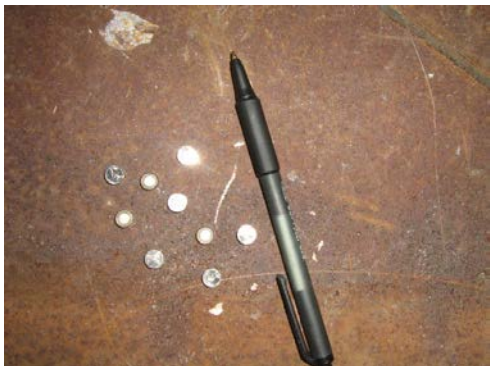
When handling or transporting less than 450 kg (992lb) of this material, UN 3077 is not required to be applied as per TDGA special provision 99. Cells are to be shipped in a safe and secure means of containment such as a pail, drum, waste wrangler, cubic yard cardboard box.



### **Silver Oxide (Silver-Zinc) Cells**

Cells are to be shipped in UN approved means of containment, if the terminals are exposed these cells must be taped, capped or individually bagged prior to shipment, to prevent short circuiting. (UN No. 3077, Class 9, Packing Group III, ERG #171, Ontario waste class code—Ontario Exempt, Approx. Weight <1 lb.).

When handling or transporting less than 450 kg (992lb) of this material, UN 3077 is not required to be applied as per TDGA special provision 99. Cells are to be shipped in a safe and secure means of containment such as a pail, drum, waste wrangler, cubic yard cardboard box.



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## **Lithium Batteries**

In Canada, the shipping and importing of lithium batteries are subject to the Transportation of Dangerous Good Act, 1992 and its regulations. Lithium batteries are used in many electronics. When you ship or import lithium batteries, including those contained in or packed with devices and equipment, you must meet shipping requirements and declare the package contents to postal carriers, couriers or transport companies.

### ***Packing Instructions:***

TDG regulations require lithium ion batteries and lithium metal batteries to be packed in the following manner, as required under Special Provision 138:

- Must be packed in accordance with Packing Instructions P909 or LP904 of the UN Recommendations, as applicable, when packed with or without non-lithium cells or batteries or equipment containing batteries.
- Must be in a means of containment or an overpack that is marked legibly and visibly on a contrasting background with the words **“Lithium Batteries for Recycling”**.
- The container label must include the Class 9, Lithium Batteries image cited by Special Provision 159 of the TDGR, and the relevant UN number.
- Damaged or defective cells and batteries must be transported under TDGR Special Provision 137, stating:
- Must be packed in accordance with Packing Instructions P908 or LP904 of the UN Recommendations, as applicable, when lithium ion batteries and/or lithium metal batteries are damaged or defective.
- Must be in a means of containment or overpack that is marked legible and visibly on a contrasting background with the words “Damaged/Defective Lithium Ion Batteries” or “Damaged/Defective Lithium Metal Batteries”
- The container label must include the Class 9, Lithium Batteries image cited by Special Provision 159 of the TDGR, and the relevant UN number.



### **Lithium Ion/Lithium Polymer Cells**

Cells are to be shipped in UN approved means of containment with a liner. Store these cells and batteries in a dry place. Exposed battery terminals must be taped in accordance with instructions on page 1 and 2 of this guide, capped or individually bagged prior to shipment; Failure to do this may cause a short circuit that may result in a fire. If the terminal is recessed there is no further requirement to tape, cap or bag the cell. (UN 3480: Lithium Ion Batteries, UN 3481: Lithium Ion Batteries Contained In Equipment or Lithium Ion Batteries Packed with Equipment, ERG #147) Follow special provision 34 of the TDGA, Approx. Weight < 1-45 lbs).

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### **Lithium Cells and Batteries**

Cells are to be shipped in UN approved means of containment; this means of containment must be lined. Store these cells and batteries in a dry place. These batteries must be taped with transparent, scotch or masking tape over terminals or individually bagged prior to shipment. **This is extremely important and is done to prevent the terminals from touching and short-circuiting; a short circuit may result in a lithium fire.** (UN 3090, Lithium Metal Batteries, UN 3091 Lithium Metal Batteries Contained in Equipment or Lithium Metal Batteries Packed with Equipment, ERG #138.). Follow special provision 34 of the TDGA, Approx. Weight < 1-20 lbs).



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### **Electric Vehicle (EV) and Large Size Lithium Ion Batteries**

Cells may be placed in a single layer in a wooden crate. Cells or batteries must be secured to prevent inadvertent movement, damage and shorting. Arrange terminals to ensure not support the weight of other superimposed elements. If terminals are not recessed, the batteries must be protected from shorting (UN No. 3480: Lithium Ion Batteries, Class 9, ERG #147, Ontario waste class code—Ontario Exempt, Approx.)



### **6 Volt 9 Volt Primary and Rechargeable Batteries**

Cells are to be shipped in a safe and secure means of containment such as a pail, drum, waste wrangler, cubic yard collection box. The terminals of these batteries must be taped with clear scotch tape to prevent short circuiting.



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### **Spills and Leaks**

An acid spill can be neutralized by using baking soda (i.e. lead acid battery spill). An alkaline based spill (Nickel Cadmium batteries) can be neutralized by applying vinegar on the spill. In the event of a major spill or emergency, consult the TDGA/49 CFR referencing the ERG No. provided for that particular battery type and contact emergency services.

Once the spill is neutralized, the damaged/leaking batteries should be separated and loaded into a UN approved means of containment capable of holding the exposed electrolyte. No other battery types are to be loaded into the means of containment; the means of containment will need to be clearly labeled to indicate that it contains damaged/leaking batteries.



**PACKING INSTRUCTION 801**

This instruction applies to new and used batteries assigned to **UN 2794, UN 2795, UN 3028**

1. The dangerous goods must be handled, offered for transport or transported in a rigid outer packaging, wooden slatted crate, or on a pallet provided the following provisions are met:
  - a. batteries stacked must be adequately secured in tiers separated by a layer of electrically non-conductive material;
  - b. battery terminals must not support the weight of other superimposed elements;
  - c. batteries must be packaged or secured to prevent inadvertent movement;
  - d. batteries must not leak in any position and inclination expected in normal conditions of transport or must be made leakproof by individually packaging or by any other equally effective method to prevent the potential release of electrolyte; and
  - e. batteries must be protected against short circuits.
2. In addition, used batteries may also be transported in metal or solid plastic bins, provided the following provisions are met:
  - a. the bins must be resistant to the electrolyte that was contained in the batteries;
  - b. the bins must not be filled to a height greater than the height of their sides;
  - c. the outside of the bins must be free of residues of electrolyte contained in the batteries;
  - d. under normal conditions of transport, no electrolyte must leak from the bins;
  - e. measures must be taken to ensure that filled bins cannot lose their content; and
  - f. measures must be taken to prevent short circuits, for example by discharging the batteries or by individually protecting the battery terminals.

**PACKING INSTRUCTION 902**

This packing instruction applies to UN 3268

1. The dangerous goods must be handled, offered for transport or transported in:
  - a. a code 1A2, 1B2, 1N2, 1H2, 1D, 1G, 3A2, 3B2, 3H2, 4A, 4B, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2, 4N, outer packaging that meets the packing group III performance level.
2. The dangerous goods must be packaged or secured to prevent movement and inadvertent operation during normal conditions of transport.
3. Unpackaged articles may also be handled, offered for transport or transported in a dedicated handling device, vehicle or closed cargo transport unit.

**PACKING INSTRUCTION 903**

This instruction applies to **UN 3090, UN 3091, UN 3480, UN 3481**

1. The dangerous goods must be handled, offered for transport or transported in:
  - a. for cells and batteries:
    - i. a code 1A2, 1B2, 1H2, 1D, 1G, 1N2, 3A2, 3B2, 3H2, 4A, 4B, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2, 4N outer packaging that meets the packing group II performance level;
  - b. for cells or batteries with a strong, impact resistant outer casing that have a gross mass of 12 kg or more:
    - i. a strong outer packaging;
    - ii. a protective enclosure (e.g., fully enclosed or slatted wooden crates); or
    - iii. a pallet or other handling device.
  - c. for cells or batteries packed with equipment (i.e. apparatus requiring the lithium metal or, lithium ion cells or batteries with which it is packed for its operation):
    - i. a UN standardized packaging conforming to the requirements in 1a which is then placed with the equipment in an outer packaging; or
    - ii. a packaging completely enclosing the cells or batteries which is then placed in a UN standardized packaging conforming to the requirements in 1a.
  - d. for cells and batteries contained in equipment:
    - i. a strong outer packaging constructed in such a manner as to prevent accidental operation during transport.
    - ii. cells and batteries contained in large equipment may be transported unpackaged or on pallets if afforded equivalent protection by the equipment in which they are contained.
    - iii. devices that are intentionally active during transport such as radio frequency identification transmitters, watches and temperature loggers, and that are not capable of generating a dangerous evolution of heat may be transported in strong outer packaging.
2. Cells or batteries must be secured to prevent inadvertent movement and protected against damage and protected against short circuit.
3. The terminals must not support the weight of other superimposed elements.

**PACKING INSTRUCTION 907**

This instruction applies to UN 3363

1. The dangerous goods must be handled, offered for transport or transported in an outer packaging designed, manufactured, loaded, unloaded, secured, closed and maintained so that during transport, including handling, no condition or release of dangerous goods from the container that could endanger public safety.
2. The machinery or apparatus may be transported unpackaged if it is constructed and designed with a receptacle for dangerous goods that:
  - a. is designed, manufactured, loaded, unloaded, secured, closed and maintained so that during transport, including handling, no condition or release of dangerous goods from the receptacle that could endanger public safety.
  - b. is sufficiently protected from damage that may occur during normal conditions of transport.
  - c. in the event of damage to the receptacle, no leakage of the dangerous goods may occur from the machinery or apparatus.
  - d. is installed, secured or cushioned to prevent movement within the machinery or apparatus during normal conditions of transport. Cushioning material must not react dangerously with the content of the receptacle. Any leakage of the contents must not substantially impair the protective properties of the cushioning material.

**PACKING INSTRUCTION 908**

This instruction applies to **damaged or defective lithium ion cells and batteries and damaged or defective lithium metal cells and batteries, including those contained in equipment, of UN 3090, UN 3091, UN 3480, UN 3481.**

1. The dangerous goods must be handled, offered for transport or transported in combination packaging comprising of one or more inner packaging(s) in a code 1A2, 1B2, 1H2, 1D, 1G, 1N2, 3A2, 3B2, 3H2, 4A, 4B, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2, 4N outer packaging that meets the packing group II performance level.
2. Each damaged or defective cell or battery or equipment containing cells or batteries must be individually packed in an inner packaging and placed inside of an outer packaging. The inner packaging or outer packaging must be leakproof to prevent the potential release of electrolyte.
3. Each inner packaging must be surrounded by sufficient non-combustible and electrically non-conductive thermal insulation material to protect against a dangerous evolution of heat.
4. Sealed packagings must be fitted with a venting device when appropriate.
5. Appropriate measures must be taken to minimize the effects of vibrations and shocks and prevent movement of the cells and or batteries within the container that may lead to further damage and a dangerous condition during transport. Cushioning material that is non-combustible and electrically non-conductive may also be used to meet this requirement.
6. Sufficient inert absorbent material must be added to the inner or outer packaging when they contain leaking cells or batteries to absorb any release of electrolyte.
7. A cell or battery with a net mass of more than 30 kg must be limited to one cell or battery per outer packaging.
8. Cells or batteries must be protected against short circuit.

### PACKING INSTRUCTION 909

This instruction applies to UN 3090, UN 3091, UN 3480, UN 3481 transported for disposal or recycling, either packed together with or packed without non-lithium batteries.

1. The dangerous goods must be handled, offered for transport or transported in:
  - a. for cells or batteries:
    - i. a code 1A2, 1B2, 1H2, 1D, 1G, 1N2, 3A2, 3B2, 3H2, 4A, 4B, 4C1, 4C2, 4D, 4F, 4G, 4H2, 4N outer packaging that meets the packing group II performance level.
  - b. for lithium-ion cells with a watt-hour (Wh) rating not more than 20 Wh, lithium-ion batteries with a watt-hour rating not more than 100 Wh, lithium metal cells with a lithium content not more than 1 g and lithium metal batteries with an aggregate lithium content not more than 2 g:
    - i. a strong outer packaging up to 30 kg.
  - c. for cells or batteries contained in equipment:
    - i. a strong outer packaging; or
    - ii. unpackaged or on pallets if the cells or batteries are protected by the equipment in which they are contained.
  - d. for cells or batteries with a strong, impact resistant outer casing that have a gross mass of 12 kg or more:
    - i. a strong outer packaging.
2. If metal outer packagings are used, they must be fitted with an electrically non-conductive lining material (e.g., plastic).
3. Cells or batteries must be protected against short circuit and the dangerous evolution of heat by various means, including, but not limited to:
  - a. individual protection of the battery terminals,
  - b. the use of inner packaging to prevent contact between cells and batteries,
  - c. batteries with recessed terminals designed to protect against short circuit,
  - d. the use of electrically non-conductive and non-combustible cushioning material to fill empty space between the cells or batteries in the packaging.
4. Cells or batteries must be secured in the outer packaging to prevent inadvertent movement during transport (e.g., by using a non-combustible and electrically non-conductive cushioning material or through the use of a tightly closes plastic bag).