Dangerous Goods Regulations and Shipping Used Lithium Batteries

Workshop on Shipping Used Lithium Batteries

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UN Model Regulations and IMDG Code

- No distinction between shipping new and used lithium batteries

- Three options for shipping:
  1) Special Provision 188 for “small” excepted cells and batteries”
  2) Special Provision 230 and Packing Instruction 903 for “large” cells and batteries as Class 9 dangerous goods
  3) Special Provision 310 for prototype and low production cells and batteries as Class 9 dangerous goods
1) Small Lithium Cells/Batteries and Special Provision 188

- **Packaging**: Cells or batteries must be –
  - Packed in inner packagings that completely enclose cell/battery;
  - Protected to prevent short circuits; and
  - Packed in strong outer packagings which conform to the provisions of 4.1.1.1, 4.1.1.2 and 4.1.1.5

- **Marking**: Package must be marked to indicate -
  - presence of “lithium metal” or “lithium ion” batteries;
  - handle with care and flammability hazard exists if package is damaged;
  - special procedures should be followed in the event package is damaged; and
  - a telephone number for additional information
1) Small Lithium Cells/Batteries and Special Provision 188

- **Shipping papers:**
  - Package must be accompanied with a document that contains the same information as required on marking

- **UN testing**
  - Required for cells and batteries

- **Weight restrictions:**
  - Package may not exceed 30 kg
1) **Summary - Small Lithium Cells/Batteries and Special Provision 188**

- Lithium battery handling label
- Pack in inner packaging that completely enclose cell or battery
- Shipping document
- Strong outer packaging
- 30 kg weight limit
- Lithium metal batteries shipped from or to U.S. require additional marking
- Waste designation?
2) Large Lithium Cells/Batteries and SP 230

- Requires each cell and battery –
  - Meet UN testing requirements;
  - Incorporate safety venting device or is designed to preclude a violent rupture under conditions normally incident to transport; and
  - Be equipped with an effective means of preventing external short circuits.

- Batteries containing cells or series of cells connected in parallel must be equipped with effective means as necessary to prevent dangerous reverse current flow (e.g., diodes, fuses, etc.).
2) Large Lithium Cells/Batteries and PI 903

- Packing Group II packaging
- Batteries must be protected against short circuit
- Batteries with impact resistant outer casing of a gross mass of 12 kg or more, and assemblies of such batteries, may be packed in strong outer packagings, in protective enclosures (e.g., in fully enclosed or wooden slatted crates) unpackaged or on pallets
2) **Summary - Large Lithium Cells/Batteries**

- Shipper’s declaration
- Class 9 label
- Proper shipping name
- UN number
- Protect from short circuits
- UN packaging (except for batteries > 12 kg with impact resistant outer casing)
- No weight limit
- DG training required
- Lithium metal batteries shipped from or to U.S. require additional marking
- Waste designation?
3) Prototype and Low Production Lithium Cells/Batteries and SP 310

- Low production runs consisting of not more than 100 cells and batteries and prototypes
  - Packing Group I outer packaging that is a metal, plastics or plywood drum or a metal, plastics or wooden box
  - Each cell and must be individually packed in an inner packaging inside an outer packaging and is surrounded by cushioning material that is non-combustible, and non-conductive
- Same requirements (except for packaging) as large lithium cells/batteries
IATA Dangerous Goods Regulations / ICAO Technical Instructions

- **New Special Provision A183**
  - Prohibits transport of batteries shipped for disposal or recycling unless approved by national authority of the State of origin and State of Operator
  - Effective 1 January 2011

- **Packing Instructions 965 – 970**
  - “Cells and batteries identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport (e.g. those being returned to the manufacturer for safety reasons).”
4.1.1.1 Dangerous goods shall be packed in good quality packagings, including IBCs and large packagings, which shall be strong enough to withstand the shocks and loadings normally encountered during transport, including trans-shipment between transport units and between transport units and warehouses as well as any removal from a pallet or overpack for subsequent manual or mechanical handling. Packagings, including IBCs and large packagings, shall be constructed and closed so as to prevent any loss of contents when prepared for transport which may be caused under normal conditions of transport, by vibration, or by changes in temperature, humidity or pressure (resulting from altitude, for example). Packagings, including IBCs and large packagings, shall be closed in accordance with the information provided by the manufacturer. No dangerous residue shall adhere to the outside of packages, IBCs and large packagings during transport. These provisions apply, as appropriate, to new, reused, reconditioned or remanufactured packagings, and to new, reused, repaired or remanufactured IBCs, and to new or reused large packagings.

4.1.1.2 Parts of packagings, including IBCs and large packagings, which are in direct contact with dangerous goods:
   (a) Shall not be affected or significantly weakened by those dangerous goods; and
   (b) Shall not cause a dangerous effect e.g. catalysing a reaction or reacting with the dangerous goods. Where necessary, they shall be provided with a suitable inner coating or treatment.

4.1.1.5 Inner packagings shall be packed in an outer packaging in such a way that, under normal conditions of transport, they cannot break, be punctured or leak their contents into the outer packaging. Inner packagings containing liquids shall be packed with their closures upward and placed within outer packagings consistent with the orientation markings prescribed in 5.2.1.7 of these Regulations. Inner packagings that are liable to break or be punctured easily, such as those made of glass, porcelain or stoneware or of certain plastics materials, etc., shall be secured in outer packagings with suitable cushioning material. Any leakage of the contents shall not substantially impair the protective properties of the cushioning material or of the outer packaging.