

Transport Information - for Lithium Ion Polymer Batteries

1. IDENTIFICATION

This material safety data sheet covers all models of Tracer Power Lithium Ion Polymer batteries supplied by Applelec Sign Components (UK) Ltd. Tracer Power is a division of Deben Group Industries Ltd. Data sheet created February 2012, issue 3.

2. GENERAL

- The transport of Lithium ion batteries is subject to international regulation which can differ if the batteries are transported by air, sea or road. There are a range of fines for companies (including OEMs) who do not comply with these regulations.
- All Lithium ion batteries must undergo mechanical and electrical tests which simulate the effects of transportation.
- Lithium ion batteries which have been transportation tested but have a possible stored energy of >100Wh must be transported as class 9 dangerous goods which impose strict packaging, labelling and documentation requirements on those shipping the product. Special training and certification is required for those wishing to ship class 9 dangerous goods.
- Lithium ion batteries which have been transportation tested and have a possible stored energy of <100Wh are excepted from dangerous goods regulations but still have special packaging, labelling and document requirements.
- There are restrictions on the number and size of Lithium ion batteries which can be taken on board aircraft (as carry on or checked in luggage). In this document, any reference to Lithium Ion also includes Lithium Ion Polymer and Lithium Iron Phosphate.

3. SCOPE

This document has been written without reference to Lithium (rechargeable) cells or lithium (primary) cells or batteries. This has been done for the purposes of clarity.

This document has been written based on our understanding of the latest regulations. It should be noted that regulations are subject to constant review in the light of new technical developments and changing requirements of industry and transportation. States and operators may impose further restrictions to the regulations at any time.

4. INTERNATIONAL REGULATIONS

International transportation regulations require battery manufacturers or companies that ship equipment packed with or containing these batteries to meet UN testing, marking, packaging, labeling and shipping paper specifications.

The transport of dangerous goods is regulated in order to prevent, as far as possible, accidents involving people or property, damage to the environment, to the means of transport employed or to other goods being transported. Each mode of transport, air, sea and road has its own regulations:

- Safe transport of dangerous goods by air (ICAO/IATA)
- Dangerous goods by sea (IMDG)
- Dangerous goods by road within Europe (ADR)

Although separate, they are now largely harmonized with the Model Regulations, published by United Nations Economic and Social Council's Committee of Experts on the Transport of Dangerous Goods.

Dangerous goods in transport are identified both by a proper shipping name and a UN number. The Technical Instructions and the Dangerous Goods Regulations contain the same list of dangerous goods; this shows all the proper shipping names with their UN numbers. See table below:

Proper Shipping Name	UN Number
Lithium ion batteries	UN3480
Lithium ion batteries contained in equipment	
Lithium ion batteries packed with equipment	UN3481

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Based on Watt-hour rating (for Lithium ion batteries), the following international shipping regulations apply:

Lithium ion & Polymer Battery Max Watt-hours	Shipping Classification / Testing	Special Packaging / Markings
100Wh Maximum ⁽¹⁾	Excepted / T1-T8 ⁽¹⁾	Yes ⁽¹⁾
>100Wh ⁽²⁾	Class 9 / T1-T8 ⁽²⁾	Yes ⁽²⁾

Notes:

(1) Batteries must pass UN38.3 T1-T8 tests. Batteries that are <100Wh and pass UN tests are excepted from regulation. Correct packaging, labeling and paperwork requirements apply. Read the section of this document entitled "Shipping of Excepted Lithium ion batteries"

(2) Batteries must pass UN38.3 T1-T8 Tests and be shipped as Class 9 Dangerous Goods. Requires Class 9 markings, label, special packaging and shipping papers. Read the section of this document entitled "Shipping of Lithium ion Batteries as Class 9 Dangerous Goods"

5. WATT-HOUR RATING

Simply multiply the rated capacity (in Ah) by the nominal voltage (in V) to give a Wh rating. Note that all batteries must have the Wh rating clearly shown on the battery.

6. TRANSPORTATION TESTING

The UN Manual of Tests and Criteria, Fifth Revised Edition (ST/SG/AC.10/11/Rev.5 section 38.3 entitled "Lithium Metal and Lithium ion Batteries"), contain the UN T1-T8 Tests that batteries must be subjected to before they are allowed to be transported. Refer to the complete UN document for a full description of the tests and the purpose, procedure and requirement of each test. These tests must be conducted for each battery of a given design and must be completed prior to shipment. Lithium ion batteries which differ from a tested type by a change that would materially affect the test results shall be considered a new type and must be retested.

7. SHIPPING OF EXCEPTED LITHIUM ION BATTERIES

Lithium ion batteries may be offered for transport, as Excepted quantities, if they meet the following

- For Lithium ion batteries, the Watt-hour rating is not more than 100Wh.
- The Watt hour rating is marked on the outside of the battery case (except for those batteries manufactured prior to January 2009).
- Each battery is of the type proven to meet the requirements of each test in the UN Manual of Tests and Criteria, Part III, section 38.3. (currently the 5th revised edition).
- Batteries must be packed in strong outer packaging. The maximum gross weight of the packaged batteries is 10Kg for Passenger or Cargo aircraft and 30kg for road and sea.
- Batteries must be packed in inner packaging's that completely enclose the battery.
- Batteries must be protected as to prevent short circuits. This includes protection against contact with conductive materials within the same packaging that could lead to a short circuit.
- Each package must be capable of withstanding a 1.2m drop test in any orientation without
 - (a) damage to batteries contained therein; (b) shifting of the contents so as to allow battery to battery contact or (c) release of contents.
- Each consignment must be accompanied with a document such as an air waybill or packing slip with an indication that:(i) the package contains Lithium ion batteries (ii) the package must be handled with care and that a flammability hazard exists if the package is damaged (iii) special procedures should be followed in the event the package is damaged, to include inspection and repacking if necessary; and (iv) a telephone number for additional information. The words "Lithium ion batteries", "not restricted" and "PI965" must be placed on the airway bill, when an airway bill is used.

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- Each package must be labeled with a Lithium Ion battery handling label (see example in figure 1). The minimum dimensions of this label for air shipments is 120mm x 110mm. Smaller labels can be used for shipments by motor vehicle, cargo vessel or rail. Colour required for international air shipments is black text/graphics on a white background and red hatching around perimeter. Black hatching can be used for shipments by motor vehicle, cargo vessel and rail.

Figure1



- Any person preparing or offering batteries for transport must receive adequate instruction on these requirements commensurate with their responsibilities.

8. SHIPPING OF LITHIUM ION BATTERIES AS CLASS 9 DANGEROUS GOODS

These are as follows:

- Lithium ion batteries which have not been transportation tested.
- Lithium ion batteries which have been transportation tested but are capable of storing >100Wh.

When shipping internationally under 'Safe Transport of Dangerous Goods by Air' (ICAO/IATA), 'Dangerous Goods by Sea' (IMDG) or 'Dangerous Goods by Road to Europe' (ADR), the following apply:

Marking on Packages:

Packages are always marked to indicate what they contain:

- Proper shipping name
- UN number
- Shippers name and address
- Consignee name and address
- UN packaging specification

Packaging:

Dangerous goods must be packed for transport according to a specific Packing Instruction. Packaging must be of good quality, be compatible with their contents and be able to withstand the normal conditions of transport. They must meet general packing requirements and, in addition, most of them are required to meet prescribed specifications and performance tests for the design type of the packaging. These types of packaging display a packaging specification marking. The maximum gross weight of the packaged batteries is 5kg for Passenger aircraft, 35kg for Cargo aircraft and 30kg for road and sea.

Labeling:

Packages are labeled to indicate the hazard(s) the contents present in transport. In addition, other labels may specify handling conditions. Each package must be labeled with a Lithium ion battery handling label (see example in figure 1). The minimum dimension of this label for air shipments is 120mm x 110mm.

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Shipping documents:

Dangerous goods must be accompanied by a Dangerous Goods Transport Document (Shipper's Declaration for Dangerous Goods). The document is prepared by the shipper; it gives the operator details about the dangerous goods and declares they comply with all applicable requirements. The information on the Shipper's Declaration includes:

- Proper shipping name
- Class
- UN number
- Packing group
- Net quantity
- Type of packaging
- Number of packages
- Telephone number
- Signature of shipper

Note if shipping by Air the following additional information is required:

- Air waybill number
- Proper certification (I declare that all of the applicable air transport requirements have been met).
- Whether for passenger and cargo aircraft or cargo aircraft only
- Airport of departure
- Airport of destination
- Shipment type: non-radioactive or radioactive
- Place, date of signing of shippers certification

Any person preparing or offering batteries for transport must receive adequate instruction on these requirements commensurate with their responsibilities.

9. LITHIUM ION BATTERIES AS 'CARRY-ON' OR 'CHECKED-IN' LUGGAGE ON AIRCRAFT

Portable electronic devices (watches, calculating machines, cameras, cellular phones, laptop computers, camcorders, etc.) containing Lithium ion batteries when carried by passengers or crew for personal use can be carried as carry-on baggage. Spare batteries must be individually protected so as to prevent short circuits (by placement in original retail packaging or by otherwise insulating terminals, e.g. by taping over exposed terminals or by placing each battery in a separate plastic bag or protective pouch) and carried in carry-on baggage only. In addition, each installed or spare Lithium ion battery must not exceed a watt-hour rating of more than 100Wh.

With the approval of the operator, Lithium ion batteries exceeding a watt hour rating of 100Wh but not exceeding 160Wh may be carried as spare batteries in carry-on baggage or in equipment in either checked or carry-on baggage. No more than two individually protected spare batteries per person may be carried.

Unless approved by the operator, spare Lithium ion batteries are not allowed in checked baggage.

10. RETURNING LITHIUM ION BATTERIES TO TRACER POWER

Anyone offering Lithium ion batteries for transport must follow the regulations. Note that Lithium Ion batteries being shipped for recycling or disposal are prohibited from air transport unless approved by the appropriate national authority of the State of Origin and the State of the Operator.

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11. OTHER INFORMATION

Disclaimer

Important: This document contains information which only relates to secondary (rechargeable) Lithium ion batteries (including Lithium ion polymer & Lithium Iron Phosphate). It does NOT cover primary (non rechargeable) Lithium cells or Lithium batteries. Information has been provided based on our understanding International regulations. Domestic regulations for individual counties or states can and does vary. While every attempt has been made to ensure the accuracy of the advice in this document, no claim or guarantee is made by Tracer Power for accuracy, completeness, applicability or compliance to the regulations which are subject to change. Tracer Power shall not be liable for any inclusions, omissions, errors or outdated information. This document does not constitute, and should not be considered legal advice. In all cases we recommend that you fully research the topic and seek appropriate advice from regulatory authorities to ensure your compliance with all applicable regulations.