

UN TRANSPORTATION OF DANGEROUS GOODS

Testing criteria for lithium cells and batteries - July 2011

1. Lithium Cell and Battery Safety Testing

- A. The United Nations publishes a book titled "Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria". This book contains the recommendations for tests required on lithium cells and batteries before they can be transported safely in commerce.
- B. The Manual of Tests and Criteria is enforceable when a country, state or organization references the book in regulations. The United States Department of Transportation (DOT) regulations and International Air Transport Association (IATA) Dangerous Goods Regulations (DGR) does reference the Manual of Tests and Criteria.
- C. Section 38.3 of the Manual of Tests and Criteria contains the testing requirements, along with definitions, for lithium cells and batteries. All primary (lithium metal) and secondary (lithium ion, rechargeable) cells and batteries must pass the all applicable tests.
- **Cell** - A single encased electrochemical unit (one positive and one negative electrode), which exhibits a voltage differential across its two terminals. To the extent the encased electrochemical unit meets the definition of cell; it is a cell, regardless if it is referred to as a battery or single cell battery outside of this procedure.
 - **Battery** - One or more cells which are electrically connected together by a permanent means, including case, terminals, and markings. Units commonly referred to as battery packs are considered batteries for purposes of this procedure.
- D. The table below summarizes the tests:

Test #	Test Name	Purpose	Applies to:
T1	Altitude Simulation	Low pressure during transport	Primary and Secondary cells and batteries
T2	Thermal Test	Seal and internal electrical connections	Primary and Secondary cells and batteries
T3	Vibration	Vibration during transport	Primary and Secondary cells and batteries
T4	Shock	Potential impacts	Primary and Secondary cells and batteries
T5	Short Circuit	External short	Primary and Secondary cells and batteries
T6	Impact	Ability to handle impact	Primary and Secondary cells only
T7	Overcharge	Ability to handle overcharge	Secondary cells and batteries
T8	Forced discharge	Ability to handle forced discharge	Primary and Secondary cells only

- E. As of the date of this document, the current version of the Manual of Tests and Criteria is revision 5, published in 2009. A link to Manual of Tests and Criteria is found below:
- <http://live.unece.org/fileadmin/DAM/trans/danger/publi/manual/Rev5/English/ST-SG-AC10-11-Rev5-EN.pdf>

2. Testing Certificates

- A. Certificates are available that indicate that Greatbatch or Electrochem products, in the original configuration as manufactured and transported from a Greatbatch or Electrochem facility, have been tested and pass the test requirements. This certification remains valid as long as no changes, modifications, or additions are made to the product.

3. Questions

- A. Contact the Environmental, Health, and Safety Department at 716-937-5100.