OVERVIEW OF LITHIUM TRANSPORTATION REGULATIONS
— OEM BATTERIES —

March 1, 2005

TABLE OF CONTENTS PG.

Lithium Transportation Recent Chronological History

The current effort to develop new regulations concerning the transportation of lithium and lithium ion batteries began on April 4, 1997, when the US Department of Transportation (DOT) wrote a letter to a battery manufacturer saying that their lithium ion batteries had to be transported as a lithium battery. This letter started a series of meetings with the DOT that resulted in the UN Committee of Experts on the Transport of Dangerous Goods (UN COE) adopting Model Regulations in December 1998 that includes the concept of "lithium equivalency" for lithium ion batteries. This concept was then adopted by the DOT in a Final Rule in October 2000. In the meantime, another battery manufacturer experienced a battery incident at LAX airport on April 28, 1999 when a pallet containing 120,000 CR-2 camera batteries burst into flame about 3 hours after receiving extremely rough handling while being unloaded from the cargo hold of a passenger aircraft. This incident resulted in a full National Transportation Safety Board (NTSB) investigation where the NTSB recommended that all lithium batteries, both as batteries and in equipment, be transported as a Class 9 hazardous material. On March 29, 2000, the DOT officially responded to the NTSB and disagreed with their recommendation. They did, however, agree to address the transportation of all lithium batteries before the UN COE.

In December 2000, the UN COE finalized its Model Regulations that, among other things, require the mandatory testing of all lithium cells and batteries, labeling, packing, shipping papers, drop tests and weight limits. On April 2, 2002, the DOT issued a lithium battery Proposed Rule to harmonize with the December 2000 UN Model Regulations. On December 3, 2002, the DOT then issued a general Proposed Rule to harmonize with the remaining provisions of the December 2000 UN Model Regulations. This second Proposed Rule was published as a Final Rule on July 31, 2003.

After pressure from the battery industry, on January 16, 2003, the DOT sent the April 2, 2002 Proposed Rule to the White House Office of Management and Budget (OMB) for their review and approval. On August 25, 2003, the OMB told the DOT it must perform an "Initial Regulatory Flexibility Analysis (IRFA)" and that it must reconsider the impact that the Rule will have on Small Businesses and better explain why lithium ion batteries must be regulated in an identical way to lithium batteries. The DOT retained the consulting firm Battelle to help them respond to OMB's concerns. DOT is expected to publish Batelle's report in the *Federal Register* in 2005 and request public comment. Depending on comments received, DOT may publish a new Proposed Rule or a Final Rule by late 2005.

Complicating this entire process is a June 2004 report by the Federal Aviation Administration (FAA) that highlights the flammability of primary lithium batteries and an August 9, 2004 incident at the FedEx sorting center in Memphis, TN where a "prototype" lithium-ion battery pack caught fire on-board an aircraft. This incident has again resulted in a full NTSB investigation.

As the result of past incidents and the FAA report on the flammability of primary lithium batteries, on December 15, 2004 the DOT issued an Interim Final Rule, that among other things, banned the shipment of primary lithium batteries from passenger aircraft effective December 29, 2004.

Promulgation of the April 2, 2002 Proposed Rule in 2005 would conclude an eight-year effort by the regulatory authorities to regulate the transport of lithium and lithium ion batteries. **The industry effort to work with the various regulatory entities in developing these new regulations have cost the battery industry over $1,100,000 in invoiced costs between 4/4/97 and 12/31/04. This does not include the time and travel of employees from the various industry companies. Panasonic serves as Chairman of the Industry Committee that is coordinating the worldwide industry effort to work with the various regulatory agencies.**

Guide to the Regulatory Alphabet

UN – United Nations Model Regulations Authority, Committee of Experts on the Transport of Dangerous Goods. – This committee consists of the Competent Authority of each country. They develop "Model" transportation regulations. These regulations have no enforcement authority. This committee meets every six months in Geneva, Switzerland and finalizes new regulations every two-years.

ICAO – International Civil Aviation Organization, Authority, Dangerous Goods Panel. - This UN committee consists of the Competent Authority of each country. They develop air regulations. These regulations are enforced by each country's Competent Authority. This committee meets every year in various locations around the world.

IATA – International Air Transport Association, Authority, Dangerous Goods Board. - This committee consists of representatives from various airline companies. They develop air regulations based on the ICAO regulations. These regulations are enforced by each airline company. This committee meets every year in Montreal, Canada.

ADR - "European Agreement Concerning the International Carriage of Dangerous Goods by Road" , Authority, European Regulations on the Transport of dangerous Goods by Road. – This UN committee consists of the Competent Authority of each country. They develop ground regulations for use in Europe and surrounding areas. These regulations are enforced by each country's Competent Authority. This committee meets every year in Brussels, Belgium.

IMO – International Maritime Organization, Authority, Dangerous Goods Panel. – This committee consists of the Competent Authority of each country. They develop ocean regulations based on the UN Model Regulations. These regulations are enforced by each country's Competent Authority. This committee meets every year in London, England.

DOT – US Department of Transportation, Authority, Research Special Programs Administration (RSPA). They establish and enforce transportation regulations for hazardous materials in all forms of transportation in the US. They serve as the Competent Authority for the US and enforce US and international regulations. They modify their regulations through a public Rule Making process as necessary.

DOT has the authority to issue fines up to $32,500 per infraction. If you transport a lithium battery improperly you can easily be in violation of many regulations. Examples: Class 9 labeling, packaging, paperwork, markings, emergency number, employee training, etc… The fine per package could possibly be up to $250,000.

Scope of Lithium Battery Regulations

Regulation	Scope
UN	Multi-modal Worldwide
ICAO/IATA	Aircraft Worldwide
ADR	Ground in Europe and Eastern Europe
IMO	Ocean Worldwide
DOT	Multi-modal inside the US

All of these regulations:

1) Classify lithium cells and batteries as Class 9 hazardous materials
2) Except for DOT, require all lithium cells and batteries to pass the UN T1 –T8 tests.
3) Provide limited exceptions from shipping as Class 9 hazardous materials for "small" cells and batteries.
4) Place strict limitations on shipping prototypes.
5) Limit the carry-on of lithium batteries by consumers on passenger aircraft.

Overview of U.S. Department of Transportation (DOT)
Proposed Rule on the Transport of Lithium Batteries

On April 2, 2002, the US Department of Transportation (DOT) published a Proposed Rule on the transportation of lithium batteries. The new transportation regulations would remove the long-time exception from UN testing requirements for "small" Lithium and Lithium ion cells and batteries. While these cells and batteries will all be classified as Class 9 hazardous materials, there are still exceptions in the proposed rule that cover our consumer batteries, except for the BR-C.

49 CFR 173.185 Lithium cells and batteries

Under DOT's Proposed Rule, a lithium or lithium ion cell or battery, including a cell or battery packed with or contained in equipment, is not subject to any other requirements of the Hazardous Material Regulations if it meets the following requirements:

- For a lithium metal or lithium alloy cell or battery, the lithium content is not more than 1.0 gram per cell or 2.0 grams per battery.
- For a lithium ion cell or battery, the lithium content is not more than 1.5 grams of equivalent lithium per cell or 8.0 grams of equivalent lithium per battery.
- All lithium, lithium ion and lithium polymer cells and batteries must be tested in accordance with the UN Manual of Tests and Criteria, Part III, Subsection 38.3, (Tests T1 –T8).
- Cells and batteries are separated so as to prevent short circuits and are packed in strong outer packaging or are contained in equipment.
- Except for batteries contained in equipment, each package containing more than 24 cells or 12 batteries must:
  - **Be marked to indicate that it contains lithium batteries, and that special procedures should be followed in the event that the package is damaged.**
  - **Be accompanied by a document indicating that the package contains lithium batteries and that special procedures must be followed in the event that the package is damaged.**
  - **Be capable of withstanding a 1.2-meter drop test in any orientation without shifting of the contents that would allow short-circuiting or damage, and without release of the package contents.**
  - **Except for batteries packed with equipment, weigh less than 30 kilograms (gross weight)**

Both IATA and ICAO Special Provision A45 and IMO Special Provision 188, which are currently in effect, are identical to the requirements contained in DOT's Proposed Rule. (See following page.)

Important Notes:

1. The DOT regulations outlined in this document are "proposed" and are subject to change.
2. Equivalent Lithium Content (ELC) – means the mass of lithium in the anode of the lithium metal or lithium alloy cell, which for a primary cell is measured when the cell is in an undischarged state and for a rechargeable cell is measured when the cell is fully charged, except that in the case of a lithium ion cell the lithium content is measured in terms of equivalent lithium content, which in grams is calculated to be 0.3 times the rated capacity in ampere-hours.
3. Panasonic submits individual cells for UN testing. All Panasonic OEM customers, distributors or pack assemblers will be responsible for obtaining a new UN Test certification when they combine, refigure or assemble the cells so they differ from the tested cell (e.g, build a battery pack). New tests must be performed on a cell or battery if they differ from the tested type by: a) A change of more than 0.1 g or 20% by mass, whichever is greater, to the cathode, to the anode or to the electrolyte; or b) A change that would materially affect the test results.

SHIPPING REQUIREMENTS UNDER IATA / ICAO
SPECIAL PROVISION A45 AND IMDG CODE SPECIAL PROVISION 188

Except for our BR-C, these regulations apply to all of our lithium and lithium-ion batteries shipped internationally.

No more than 24 cells or 12 batteries in a single package

a) Packaging must be strong enough to survive the rigors of transportation.

b) Batteries must be packaged in such a way to prevent short-circuits.

More than 24 cells or 12 batteries in a single package

Except for batteries contained in equipment, each package must:

- Be marked to indicate that it contains lithium batteries, and that special procedures should be followed in the event that the package is damaged.
- Be accompanied by a document indicating that the package contains lithium batteries and that special procedures must be followed in the event that the package is damaged.
- Be capable of withstanding a 1.2-meter drop test in any orientation without shifting of the contents that would allow short-circuiting or damage, and without release of the package contents.
- Except for batteries packed with equipment, weigh less than 30 kilograms (gross weight)

Important Notes:

1) All Panasonic batteries are shipped in full compliance with all transportation requirements. If you reship our batteries you must assure that you ship in full compliance will all regulations. **Failure to follow all regulations could expose you to federal DOT fines of up to $250,000 per package.**
2) Example: Inclusion of two, 12-pack Inner Packages in an outer package would be considered a package of 24 batteries. Two 12-pack Packages shrink-wrapped (overpacked) on a pallet would be considered to be two separate packages.
3) When Non-Specification packaging is authorized, packaging weighing no more than 20 lbs must meet or exceed minimum 200 lb burst strength or 32 ECT rating, and packages weighting 21 to 70 lbs must 275 lb burst strength or 44 ECT.

UN Manual of Tests and Criteria, Part III, Subsection 38.3

The United Nations Committee of Experts on the Transport of Dangerous Goods finalized these test requirements at their Twenty First Session Meeting in Geneva, Switzerland from December 4-13, 2000.

These applicable tests must be performed on all primary lithium or secondary lithium ion cells or batteries. These tests can be summarized as follows:

T1 — **Altitude Simulation** – Store at 11.6 kPa or less for 6 hours at 20ºC.

T2 — **Thermal Test** – Perform 10 cycles between 75ºC and -40ºC, 6 hours per cycle with no more than 30 minutes between cycles, then observe for 24 hours.

T3 — **Vibration** – Sinusoidal waveform with a logarithmic sweep between 7 Hz and 200 Hz and back to 7 Hz in 15 minutes. This cycle must be repeated 12 times for a total of 3 hours for each of three mutually perpendicular mounting positions of the cell.

T4 — **Shock** – Half-sine shock of peak acceleration of 150 gn and pulse duration of 6 milliseconds. Each must be subject to 3 shocks in the positive direction and 3 shocks in the negative direction of three mutually perpendicular mounting positions for a total of 18 shocks.

T5 — **External Short Circuit** – After stabilizing at 55ºC, apply an external resistance of less than 0.1 ohm for 1 hour and then observe for 6 hours.

T6 — **Impact** – Place a 15.8 mm diameter bar across the sample and then drop a 9.1 kg mass from a height of 61 cm on to the bar, then observe 6 hours.

T7 — **Overcharge** – Charge at twice the manufacturer's recommended maximum continuous charge current for 24 hours and then observe for 7 days.

T8 — **Forced Discharge** – Force discharge at an initial current equal to the maximum discharge current specified by the manufacturer, then observe for 7 days.

	Cells or Batteries to be tested
T1	Primary and Rechargeable cells and batteries
T2	Primary and Rechargeable cells and batteries
T3	Primary and Rechargeable cells and batteries
T4	Primary and Rechargeable cells and batteries
T5	Primary and Rechargeable cells and batteries
T6	Primary cells and Rechargeable cells
T7	Rechargeable batteries
T8	Primary and Rechargeable cells

	Cells and Batteries Required
T1 – T5	20 Primary Cells and 8 Primary Batteries 20 Rechargeable Cells and 16 Rechargeable Batteries
T6	10 or 20 (Prismatic) Primary Cells and 10 or 20 (Prismatic) Rechargeable Cells
T7	8 Rechargeable Batteries
T8	10 Primary Cells and 20 Rechargeable Cells
TOTAL	40 Primary Cylindrical Cells and 50 Primary Prismatic Cells 8 Primary Batteries 50 Rechargeable Cylindrical Cells and 60 Rechargeable Prismatic Cells 24 Rechargeable Batteries

Examples of Labels

CAUTION

IF DAMAGED

LITHIUM BATTERIES INSIDE

Do not damage or mishandle this package.
If package is damaged, batteries must be quarantined, inspected and repacked.

For emergency information, call CHEMTREC at 800-424-9300.

IF DAMAGED

CAUTION

Lithium ion rechargeable batteries inside.

(No lithium metal)

Do not damage or mishandle this package.

If package is damaged, batteries must be quarantined, inspected, and repacked.

For emergency information, call CHEMTREC at 800/424-9300.

IMPORTANT NOTES:

- Panasonic will not provide additional CAUTION labels. If you require additional labels, we suggest you contact a local label vendor and provide them a sample of our label as reference guide. The regulations do not specify size, color or font.

- Use of the CHEMTREC phone number is not required except for shipping Class 9 batteries. This number can only be used by registered CHEMTREC companies. Panasonic has chosen to voluntary add this 24/7 phone number to provide an extra level of safety.

Shipping Document Requirements

Under the ICAO/IATA (Special Provision A45) and IMDG (Special Provision 188) regulations any package that contains more than 24 cells or 12 lithium batteries requires that it be: "Accompanied by a document indicating that the package contains lithium batteries and that special procedures should be followed in the event that the package is damaged." The following statement meets these requirements and can be added to any existing document that accompanies the shipment, or this statement can appear on a stand alone document that accompanies the shipment.

"LITHIUM BATTERIES - Do not damage or mishandle this package.
If package is damaged, batteries must be quarantined, inspected and repacked.
For emergency information, call CHEMTREC at 800-424-9300."

IMPORTANT NOTE:
1) Use of the CHEMTREC phone number is not required except when shipping our "BR-C" as a Class 9 Hazardous Material. This number can only be used by registered CHEMTREC companies. Panasonic has chosen to voluntarily add this 24/7 phone number on all on of our lithium battery packages to provide an extra level of safety.

Primary Lithium Battery Passenger Aircraft Ban

Effective December 29, 2004, all primary lithium cells and batteries are banned as cargo on passenger aircraft when shipped from, to, or within the U.S.

In addition to the ban, this rule requires the outside of each package that contains primary lithium cells or batteries, regardless of size or number of cells or batteries, be marked with the following statement: "**PRIMARY LITHIUM BATTERIES- FORBIDDEN FOR TRANSPORT ABOARD PASSENGER AIRCRAFT**". The marking requirement covers shipments via highway, rail, vessel or cargo-only aircraft and covers all shipments from, to, or within the US. The mark must be in contrasting color and the letters must be 12 mm (0.5 in) in height for packages weighing more than 30 Kg and 6 mm (0.25 in) in height for packages weighting less than 30 Kg.

The ban does not cover the shipment of equipment that contains batteries as long as the package contains no more than the number of batteries necessary to power the intended piece of equipment; the batteries are of the type intended to provide power for that equipment; and the total net weight of the batteries in the package does not exceed 5 Kg. For the shipment of equipment packed with batteries, the gross weight of the package can not exceed 5 Kg. If these packages do exceed the 5 Kg weight limitations, they are banned from passenger aircraft and must be marked in accordance with the statement referenced above.

The DOT has confirmed that they will recognize the use of Overpacks for equipment packed with or containing primary lithium batteries. An Overpack means an enclosure that is used by a single consignor to provide protection or convenience in handling of a package or to consolidate two or more packages. Example: It you have flashlights that are packed with batteries and the gross weight of the box containing these flashlights and batteries meets the requirement for transportation, i.e. strong packaging, prevent short circuiting, <5 Kg), you can have multiple boxes in an Overpack and still transport this larger box by passenger air. The 5 Kg gross weight limit is for the individual package that contains the flashlights, batteries, etc…, not the gross weight of the Overpack.

Prototype: Lithium and Lithium ion Battery Transport Requirements

Any cell or battery subject to UN Testing requirements that has not been tested is considered a "prototype". Because these batteries are untested, the shipping requirements are more stringent.

Prototype Battery Shipping Requirements

U.S. Special Provision A55 / IATA and ICAO Special Provision A88 - Prototype lithium batteries and cells that are packed with not more than 24 cells or 12 batteries per package may be transported by cargo aircraft if approved by the Competent Authority in the country or origin (i.e., U.S. DOT) and providing the following requirements are met:

a) The cells and batteries must be shipped as Class 9 hazardous materials and packed in rigid outer packaging that conforms to the requirements of Part 178 of this subchapter at the Packing Group I performance level; and
b) Each cell and battery must be protected against short circuiting, surrounded by cushioning material that is non-combustive and non-conductive, and be individually packed in an inner packaging that is placed inside an outer specification packaging.

Ground

In the U.S., a prototype lithium cell or battery can be transported via motor vehicle for purposes of testing. It must be packed in inner packaging, placed in Packing Group II outer packaging, and shipped as a Class 9 hazardous material. Prototypes moving via motor vehicle do not require DOT Associate Administrator Approval. The DOT has interpreted "Testing" as both UN T1-T8 testing and performance/evaluation, etc… testing by an OEM.

Air

Any Portable Rechargeable Battery Association (PRBA) member can ship under the following Approval as long as you follow all of the listed requirements. Non-PRBA members must obtain their own individual Approval prior to shipping prototypes.

U.S. DOT Approval (CA2003030003) for PRBA Members

A prototype and low production (production run lass than 100) lithium cell or battery can be transported via air if:

1) Cells and batteries consisting of prototype cells are held for 48 hours before testing. Prototype batteries consisting of UN tested cells do not have to be held for 48 hours.
2) At least 3 cells and 1 battery must pass an External Short Circuit Test with no disassembly or fire. Prototype cells and batteries consisting of prototype cells must be tested at 55 degrees C. Batteries consisting of tested cells can be tested at 23 degrees C.
3) Cells and batteries must be individually packed in an inner packaging and surrounded by cushioning materials that is non-conductive and non-combustible. Cells and batteries must be prevented from short-circuiting.
4) Cells and batteries must be shipped in a metal drum meeting PG I requirements.
5) You cannot exceed 24 cells or 12 batteries per package or less for large cells and batteries.
6) Each package, and overpack if used, must be marked with the Approval Number (CA2003030003).
7) A current copy of the Approval must be available from where the package is shipped.
8) Shipments by air are limited to cargo aircraft only and must be offered as Class 9 hazardous materials.
9) Cargo Aircraft Only label also must be used.

Consumer: Lithium and Lithium Ion Battery Carry-on Limitations

The U.S. DOT proposed the following carry-on regulations that cover lithium and lithium ion batteries carried on board aircraft by crews and passengers. See 49 CFR 175.10. *(These requirements currently are in effect under the ICAO / IATA regulations.)*

Consumer electronic devices (watches, calculating machines, cameras, cellular phones, lap-top computers, camcorders, etc.) containing lithium or lithium ion cells or batteries when carried by passengers or crew member for personal use. Each spare battery must be individually protected so as to prevent short circuits and carried in carry-on baggage only. In addition, each spare battery must not exceed the following:

(i) For a lithium metal or lithium alloy battery, a lithium content of not more than 2 grams per battery; or

(ii) For a lithium ion battery, an aggregate equivalent lithium content of not more than 8 grams per battery, except that up to two batteries with an aggregate equivalent lithium content of more than 8 grams but not more than 25 grams may be carried.

Battery Testing Guidelines

Panasonic Batteries
Panasonic Industrial Company
A Division of Panasonic
Corporation of North America

Two Panasonic Way
Secaucus, NJ 07094

Toll Free: 877-726-2228
Fax: 847-468-5750
e-mail: oembatteries@us.panasonic.com
Internet: www.panasonic.com/batteries

Product: Lithium Primary and Rechargeable Cells

Applicable Product Classes:
CR Series Coin Cells, CR Series Cylindrical Cells
BR Series Coin Cells, BR Series Cylindrical Cells,
BR Series Pin Cells, ML, VL, MT and NBL Series
Rechargeable Cells, CGP & CGA Li-Ion Prismatic,
CGL Li-Ion Coin, CGR Li-Ion Cylindrical

Date of Notice: July 1, 2004

LITHIUM BATTERY TESTING

Panasonic certifies that all of its lithium and lithium-ion batteries meet the requirements of the UN Manual of Tests and Criteria, Part III subsection 38.3 (T1 to T8). If you build/assemble these batteries into a larger battery pack you must assure that they continue to meet these requirements before they can be transported.

Primary and Rechargeable Coin Cell Batteries

If you plan on building a battery pack out of coin cells contact your Panasonic Sales Representative for additional information.

Primary Lithium Batteries

If you build a battery pack that contains **more** cells than are listed below you will exceed 2.0 grams of lithium in the battery pack. Battery packs containing more than 2.0 grams of lithium that are shipped internationally must be transported as Class 9 hazardous materials.

	Number of Cells per pack
BR-C[1]	1
BR-AG	2
BR-AH	2
BR-A	3
BR-2/3AG	4
BR-2/3AH	4
BR-2/3A	4
CR-123A	3
CR-2	6

Note 1: In addition, a single BR-C cell must be shipped as a Class 9 hazardous material under the current ICAO and IATA regulations because it contains more than 1.0 gram of lithium content.

If you plan on building a battery pack out of any other Panasonic battery, contact your Panasonic Sales Representative for information on the amount of lithium contained in our batteries.

These above "Number of cells per pack" should only be used to determine if the battery pack exceeds the 2.0 grams of lithium. This should not be interpreted that Panasonic considers these multi-cell packs as safe.

Rechargeable Lithium-ion Batteries

To determine the status of lithium-ion batteries you must calculate the Equivalent Lithium Content using the formula provided in the regulations. Battery packs that contain more than 8.0 grams of equivalent lithium must be transported as a Class 9 hazardous material under the current ICAO and IATA regulations.

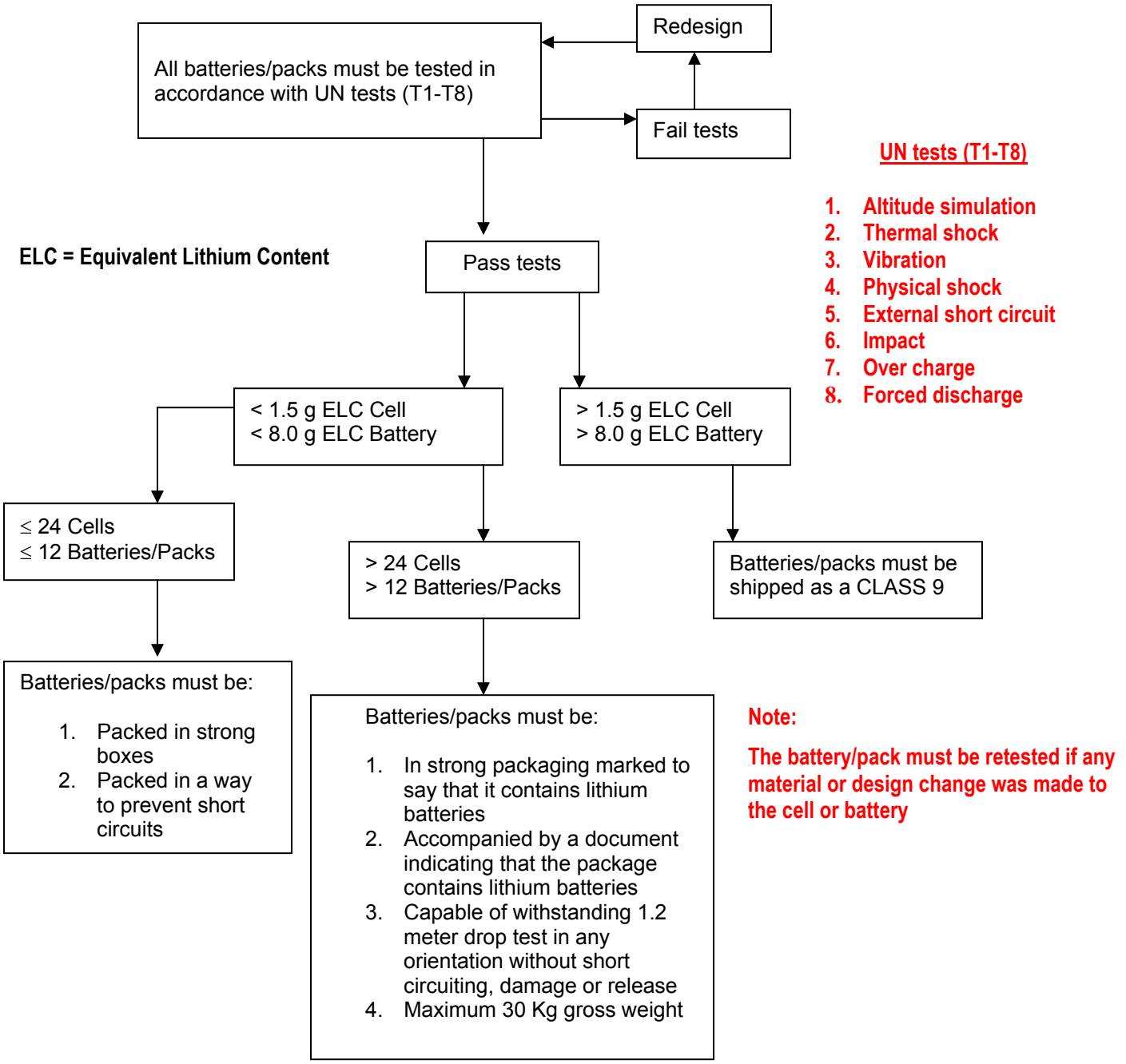
Equivalent Lithium Content is measured as 0.3 times the rated capacity (ampere hour (Ah)) of the cell in ampere-hours, with the results expressed in grams. The lithium-equivalent content of the battery equals the sum of the grams of lithium-equivalent content contained in the component cells of the battery. (Example: a 18650 Li-Ion cell with 1.8Ah of rated capacity would contain 0.54 grams of lithium (1.8 x 0.3) and 6 of these cells in a pack would equal 3.24 grams)

***NOTICE TO CUSTOMERS*:** Prior to building any battery pack you should contact your Panasonic Sales Representative. It is the responsibility of each user to ensure that each battery application system is adequately designed safe and compatible with all conditions encountered during use, in conformance with existing standards and requirements.

CELL AND BATTERY TRANSPORTATION REQUIREMENTS

UNDER IATA / ICAO AND IMDG REGULATIONS

Lithium Coin Type Cells (VL, ML, MT, NBL Series)
Lithium Ion (CGR, CGP, CGA, CGL Series)

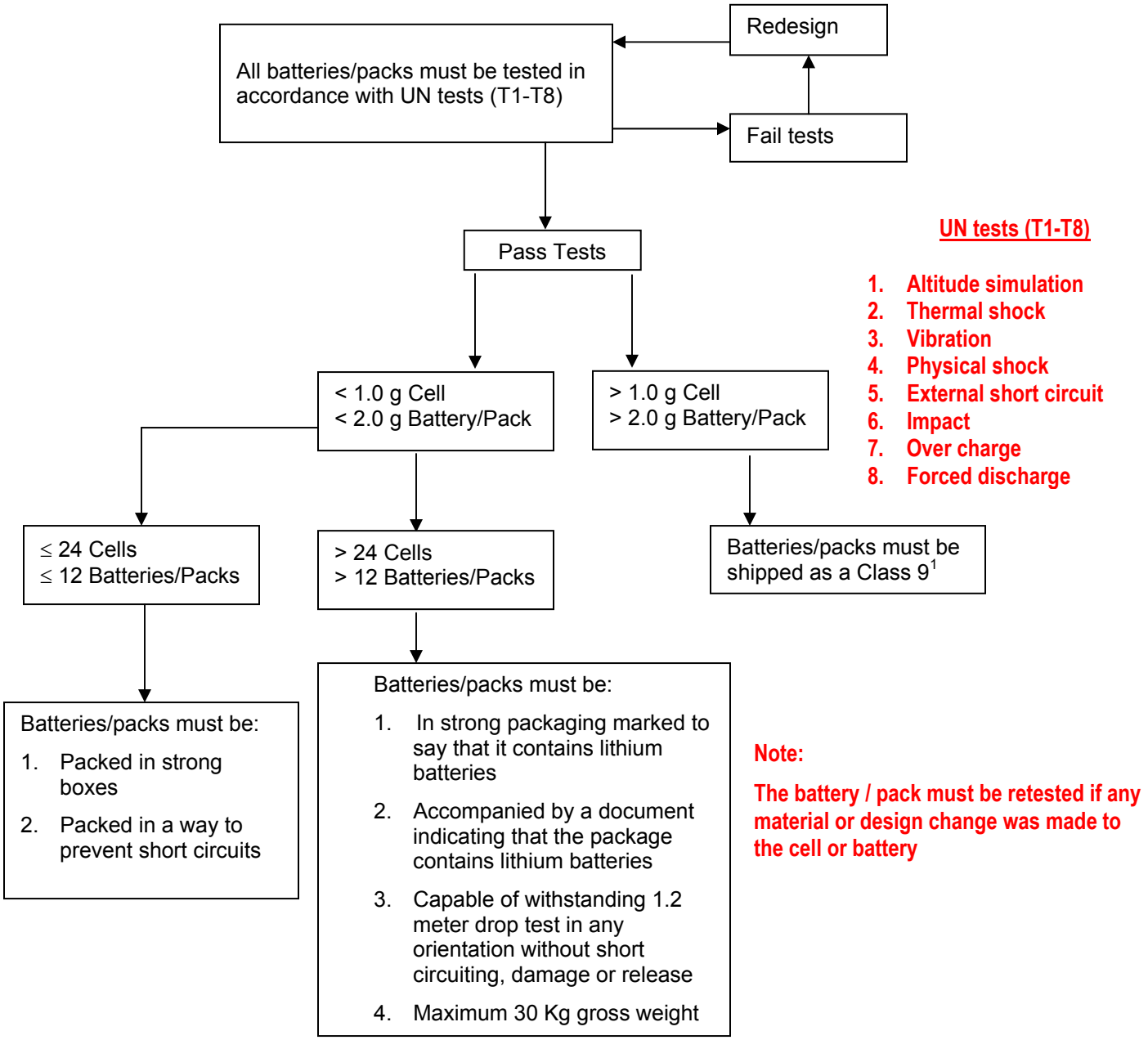


NOTE:
1. CLASS 9: Refer to Appendix A

CELL AND BATTERY TRANSPORTATION REQUIREMENTS

UNDER IATA / ICAO AND IMDG REGULATIONS

Cylindrical and Coin Type Cells (BR, CR Series)



UN tests (T1-T8)

1. **Altitude simulation**
2. **Thermal shock**
3. **Vibration**
4. **Physical shock**
5. **External short circuit**
6. **Impact**
7. **Over charge**
8. **Forced discharge**

Note:

The battery / pack must be retested if any material or design change was made to the cell or battery

NOTE:
1. CLASS 9: Refer to Appendix A

APPENDIX A

The following are the requirements for transporting lithium or lithium ion batteries as Class 9 hazardous materials. Different requirements apply to batteries packed with or contained in equipment.

1. **PACKAGING** - Use only packaging that meets "Packing Group II" performance standards. Refer to the appropriate hazardous materials or dangerous goods transportation regulations for the list of approved Packing Group II packaging and Performance - Oriented packaging standards.
   - Packaging for lithium ion must not exceed 5 kg (gross weight) for passenger aircraft. Primary lithium is banned from passenger aircraft.
   - Packaging for lithium ion and primary lithium must not exceed 35 kg (gross weight) for cargo aircraft
2. **MARKING** – The following markings must be applied to the packaging:
   - Shipping name: *Lithium batteries*
   - Identification number: *UN 3090*
   - Shippers name and address
   - Name and address of company or individual receiving batteries (also known as the "consignee")
   - UN Specification Certification – Example: "4G/Y.20.6/S/01/USA/M5032-56"
3. **LABELING** – The Class 9 label shown below must be used.

Note: Effective December 29, 2004, a "CARGO AIRCRAFT ONLY" label will be required on packages containing Class 9 primary lithium batteries shipped by air. See Appendix A&B.

4. **SHIPPING PAPERS** – The following information must be included on shipping papers:
   - Proper identification number, shipping name, hazard class, and packing group in the following order (Example: *Lithium batteries, 9, UN 3090, PG II)*
   - Number of packages
   - Weight
   - Page number and total number of pages (Example: *Page 1 of 2 Pages*)
   - Emergency telephone number – Example: CHEMTREC
   - Shipper's certification (Example: *This is to certify that the above-named materials are properly classified, described, packaged, marked, and labeled, and are in proper condition for transportation* ***(by air, if applicable)*** *according to the applicable international and national governmental regulations.)*
   - Signature of shipper

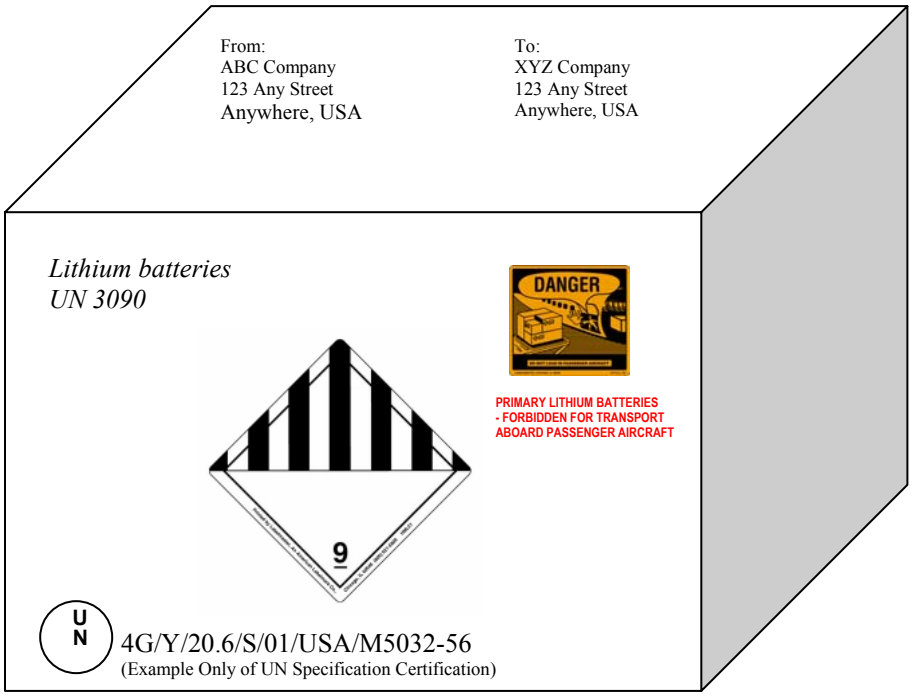
   NOTE: If SHIPPING BY AIR, the following additional information is required:
   - Air Waybill Number
   - Identify that it's allowed on "Cargo Aircraft Only"
   - Airport of Departure
   - Airport of Destination
   - Shipment Type: Example: *Non-radioactive*
   - Type of package (Example: *Fiberboard box*)
   - Place and date of signing of shippers certification

Note: Both IATA / ICAO and Transport Canada have color requirements for their Shipping Papers. The Shipping Papers must have red hatchings or red stripes on the edge of the document. The details are found in IATA under 8.1.1.2 Color or in the Canadian TDG under 12.2 Shipping Document.

APPENDIX A

(continued)

Sample Class 9 Outer Package



NOTES:

1) Outer packagings must conform to the UN packaging specification and performance requirements at the Packing Group II performance level. Cells and batteries must be packed in such a manner as to effectively prevent short circuits through the use of inner packagings, dividers, or other suitable means. (See 49 CFR 173.185(e)(4).) These boxes have to pass a 1.2-meter drop test (49 CFR 178.603), stacking test (49 CFR 178.606), and a vibration test (49 CFR 178.608). The box manufacturer must mark every package that is represented as manufactured to meet a UNH standard with the marks specified in this section (178.503).
2) All markings must be durably marked in English, must be displayed on a background of sharply contrasting color, and must be away from other markings, such as advertising, that could reduce its effectiveness.
3) Packages containing primary lithium cells or batteries should include both the "Cargo Only Aircraft" label and the "PRIMARY LITHIUM BATTERIES- FORBIDDEN FOR TRANSPORT ABOARD PASSENGER AIRCRAFT" label.
4) Packages containing Class 9 lithium ion batteries that weigh more than 5 kg also should include Cargo Aircraft Only label.

Training Requirements (49 CFR 172.700)

All "haz mat employees" who ship Class 9 lithium batteries must receive Hazardous Materials Training. This training consists of general awareness training, function-specific training, and safety training to respond to an incident. These requirements are designed to assure that employees are familiar with the general provisions of the hazardous materials regulations and have knowledge of specific requirements applicable to their job responsibilities. These include knowledge of emergency response information, self-protection measures and accident prevention methods and procedures.

1) Training must take place before the employee can work with hazardous materials. Exceptions: The employee works under the direct supervision of a trained employee and the training is completed within 90 days of their hire or transfer into the job.
2) In the U.S., training must be done at least every three years for all employees. Training done by another employer can be used to meet this requirement.
3) Training records must be maintained for each employee for at least the past three years and for at least 90 days after the end of the employee's employment. This record must include: a) The employees name, b) The most recent training completion date. c) A description, copy or location of the training materials. d) The name and address of the person providing the training. e) Certification that employee has been trained and tested.

APPENDIX B

CARGO AIRCRAFT ONLY LABEL

Class 9 DOT Labeling Requirements – Effective December 29, 2004

Effective December 29,2004, Class 9 primary lithium batteries (model #BR-C or lithium battery packs containing over 2 g of lithium) labeling requirements will include the mandatory use the "CARGO AIRCRAFT ONLY" label that is found at 49 CFR 172.488. This label must be identical to what is in the regulations, including the black picture and text on an orange background. The label dimensions are 120 mm x 110 mm.

Labels can be purchased from Labelmaster*:

This Danger-Do Not Load In Passenger Aircraft label meets the requirements in International Air Transport, ICAO and 49CFR for containers accepted by cargo air only. They are printed on heavyweight coated paper and shipped in rolls of 100 or 500 and measure 4-3/4" (120 mm) x 4-5/16" (110 mm).

***Labelmaster**
Website: http://www.labelmaster.com/index.cfm?section=51

Ref: 067-05