



Secretariat

Distr.
GENERAL

ST/SG/AC.10/C.3/2005/45
13 September 2005

Original: ENGLISH

**COMMITTEE OF EXPERTS ON THE TRANSPORT OF
DANGEROUS GOODS AND ON THE GLOBALLY
HARMONIZED SYSTEM OF CLASSIFICATION
AND LABELLING OF CHEMICALS**

Sub-Committee of Experts on the
Transport of Dangerous Goods

Twenty-eighth session, 28 November-7 December 2005
Item 5 of the provisional agenda

LISTING, CLASSIFICATION AND PACKING

New entries for lithium ion batteries

Transmitted by the Portable Rechargeable Battery Association (PRBA)

1. At its twenty-seventh session, the Sub-Committee considered three proposals from PRBA in document ST/SG/AC.10/2005/13. To facilitate discussion, PRBA has chosen to resubmit revised versions of the proposals in three separate documents. This document restates the proposal that lithium ion cells and batteries be assigned distinct UN numbers, provides the supporting justifications for this proposed change, and responds to related questions from the twenty-seventh session. In addition, a separate PRBA document (ST/SG/AC.10/C.3/2005/43) provides detailed information describing lithium ion cells and batteries and information relevant to their transport.

Background

2. Rechargeable lithium ion cells and batteries (hereafter referred to as lithium ion batteries) became commercially viable for consumer use in the mid 1990s. At that time, the Subcommittee found it expedient to authorize their transport under the existing entries for lithium primary batteries. Currently lithium ion batteries are transported under the following proper shipping names:

UN 3090 LITHIUM BATTERIES and
UN 3091 LITHIUM BATTERIES CONTAINED IN EQUIPMENT or
UN 3091 LITHIUM BATTERIES PACKED WITH EQUIPMENT.

3. In adapting its existing requirements for lithium primary batteries to take account of lithium ion batteries, the Subcommittee at the time recognized the differences in the two battery technologies. Namely, lithium primary batteries contain metallic lithium whereas lithium ion batteries do not. This is

clearly conveyed in the Manual of Test and Criteria definition of *lithium ion cell or battery* which recognizes that they contain no metallic lithium (see para. 38.3.3.2 of the Manual).

Justification for new UN numbers and proper shipping names for lithium ion batteries

4. Large numbers of lithium ion batteries are now in use and consequently in transport. This stems largely from their having become the battery of choice for a wide array of portable electronic equipment ranging from notebook computers, cell phones, portable DVD players to cordless power tools. It is estimated that approximately 1.5 billion lithium ion cells will be manufactured in 2005. Virtually all of these cells will be placed in transport at least once. Many will be transported multiple times. With such a large number of lithium ion cells and batteries in transport, it is understandable that even slight delays or difficulties can amount to significant costs over time if they occur repeatedly.

5. This is best illustrated by the example of the air mode where airlines, out of particularly keen concern for safety, exercise rigorous acceptance check procedures before accepting shipments of all goods offered for transportation. Currently, when receiving a shipment consigned under UN 3090, airline personnel responsible for accepting the shipment must first ascertain whether the shipment contains lithium primary or lithium ion batteries before deciding whether the relevant requirements (e.g., relevant battery size under SP 188) have been met. This is not always immediately obvious and deciding the battery type consumes valuable time and can lead to delays and frustrations of shipments. When this seemingly minor difficulty takes place numerous times, the costs can be significant. Incorrect decisions on the type of battery at hand could also result in a reduced level of safety. To facilitate transport and enhance safety, PRBA recommends that lithium ion cells and batteries be assigned a new distinct UN number.

Relevant comments or questions from the twenty-seventh session

6. The question was raised as to whether lithium polymer batteries should be transported as lithium or lithium ion batteries. PRBA considers lithium polymer batteries to be a type of lithium ion battery and has accounted for this in the proposal. Rechargeable lithium metal batteries, which are not widely used, would be required to be transported under UN 3090.

Proposal

7. By distinguishing between lithium primary and lithium ion batteries, the type of battery will be obvious from its UN number and proper shipping name. On this basis PRBA proposes:

- .1 that new UN numbers and shipping names for lithium ion batteries be provided in the Dangerous Goods List as follows:

UN XXXX LITHIUM ION BATTERIES (including lithium ion polymer batteries) and
UN YYYY LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT or
UN YYYY LITHIUM ION BATTERIES PACKED WITH EQUIPMENT.

The column entries in the Chapter 3.2 Dangerous Goods list would be the same as for UN 3090.

- .2 that consequential amendments to Special Provision 188 be made as follows:

188 ~~Lithium~~ Cells and batteries offered for transport are not subject to other provisions of these Regulations if they meet the following:

- (a) For a lithium metal or lithium alloy cell, the lithium content is not more than 1 g, and for a lithium ion cell, the lithium-equivalent content is not more than 1.5 g;
- (b) For a lithium metal or lithium alloy battery the aggregate lithium content is not more than 2 g, and for a lithium ion battery, the aggregate lithium-equivalent content is not more than 8 g;
- (c) Each cell or battery is of the type proved to meet the requirements of each test in the Manual of Tests and Criteria, Part III, sub section 38.3;
- (d) Cells and batteries are separated so as to prevent short circuits and are packed in strong packagings, except when installed in equipment; and
- (e) Except when installed in equipment, each package containing more than 24 ~~lithium~~ cells or 12 ~~lithium~~ batteries shall in addition meet the following requirements:
 - (i) Each package shall be marked indicating that it contains lithium batteries *or lithium ion batteries, as appropriate*, and that special procedures should be followed in the event that the package is damaged;
 - (ii) Each shipment shall be accompanied with a document indicating that packages contain lithium batteries *or lithium ion batteries, as appropriate*, and that special procedures should be followed in the event a package is damaged;
 - (iii) Each package is capable of withstanding a 1.2 m drop test in any orientation without damage to cells or batteries contained therein, without shifting of the contents so as to allow battery to battery (or cell to cell) contact and without release of contents; and
 - (iv) Except in the case of lithium batteries *or lithium ion batteries* packed with equipment, packages may not exceed 30 kg gross mass.

As used above and elsewhere in these Regulations, "lithium content" means the mass of lithium in the anode of a lithium metal or lithium alloy cell, except in the case of a lithium ion cell the "lithium-equivalent content" in grams is calculated to be 0.3 times the rated capacity in ampere hours.

.3 that consequential amendments be made to the introduction to SP 310 as follows:

310 The testing requirements in Chapter 38.3 of the Manual of Tests and Criteria do not apply to production runs consisting of not more than 100 ~~lithium~~ cells and batteries, or to pre-production prototypes of ~~lithium~~ cells and batteries when these prototypes are transported for testing, if:

.4 that consequential amendments be made to packing instruction P903 as follows:

P903	PACKING INSTRUCTION	P903
This instruction applies to UN Nos. 3090, and 3091, <i>XXXX and YYYY</i> .		
<p>The following packagings are authorized, provided the general provisions of 4.1.1 and 4.1.3 are met:</p> <p>Packaging conforming to the packing group II performance level. In addition, batteries employing a strong, 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. Batteries shall be secured to prevent inadvertent movement, and the terminals shall not support the weight of other superimposed elements.</p> <p>When lithium cells and batteries are packed with equipment, they shall be packed in inner fibreboard packagings that meet the requirements for packing group II. When lithium cells and batteries included in Class 9 are contained in equipment, the equipment shall be packed in strong outer packagings in such a manner as to prevent accidental operation during transport.</p>		
<p>Additional requirement:</p> <p>Batteries shall be protected against short circuit.</p> <p><i>Except when installed in or packed with equipment and for small lithium ion cells or batteries of 100 mAh or less, lithium ion cells and batteries shall be offered for transport at no more than 50% state of charge.</i></p>		
