

## 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

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Electric storage systems; waste or damaged/defective lithium batteries

### Comments on ST/SG/AC.10/C.3/2011/15 and Proposals on Transporting Waste Lithium Batteries

Transmitted by PRBA – The Rechargeable Battery Association and  
RECHARGE

#### Introduction

1. PRBA and RECHARGE generally agree with the comments expressed by the expert from Germany stated in ST/SG/AC.10/C.3/2011/15 regarding the need to develop regulations to address the transport of damaged lithium batteries. However, we do not support the proposed changes in ST/SG/AC.10/C.3/2011/15, which would create new entries and UN numbers for damaged lithium batteries in the UN Model Regulations. A more practical approach for developing these regulations is to incorporate appropriate Special Provisions and Packing Instructions under the existing entries for Lithium metal batteries (UN 3090) and Lithium ion batteries (UN 3480) as more fully explained below.

2. The issue of shipping waste lithium batteries and damaged lithium batteries was discussed during a workshop in August 2010 in Brussels. This is explained in more detail in UN/SCETDG/38/INF.22. A correspondence group was established after the working group and draft Special Provisions and Packing Instructions on waste lithium batteries and damaged lithium batteries were distributed for comment. As a result of those comments, PRBA and RECHARGE prepared proposals for Special Provisions and Packing Instructions for waste lithium batteries and damaged lithium batteries, which are included in the following pages for consideration by the Sub-Committee.

3. The proposals for new Special Provisions (SP XXX) and Packing Instructions (P903a & P903b) were developed based on the requirements in the ADR for transporting waste batteries. The applicable ADR requirements are found in Special Provision 636 and P 903a and P 903b. However, for incorporation into the UN Model Regulations, we are proposing several changes to the ADR Special Provisions and Packing Instructions based on recent industry experiences and shipping practices, comments from working group members and changes agreed to at the Joint Meeting in Bern (March 2011).

4. The following pages containing the proposed Special Provision (SP XXX) also include the existing provisions from the ADR for comparison. In addition, “EXPLANATIONS” are provided to help the Sub-Committee understand the intent behind the proposals. One note of particular importance is our preference for the term “waste” batteries instead of “used” batteries, which is used in the ADR. “Waste” batteries are transported for disposal or recycling. “Used” batteries may be shipped for purposes of repair or recovery (not disposal or recycling) and thus would be subject to existing Special Provisions and Packing Instructions for new lithium batteries. We are looking for

comments from the Sub-Committee to clearly indicate this distinction in the UN Model regulations.

5. Proposed Special Provision SP YYY contains provisions to address damaged lithium batteries and includes the option of using salvage packaging. Based on comments received by members of the working group, it was suggested that salvage packaging only would be appropriate for damaged lithium batteries (as “articles”) if the provisions found at Section 4.1.1.17 of the Model Regulations were amended by adding the word “article” or “battery”, as appropriate. We agree that such an amendment to Section 4.1.1.17 could address shipments of damaged batteries but that additional packaging provisions are needed for lithium batteries that may be too large for salvage packaging.

6. In addition to the provisions outlined in SP YYY for damaged lithium batteries, we recommend that a definition for “Damaged batteries” be incorporated into the Special Provision. Therefore, the following definition is provided for consideration by the Sub-Committee:

- *Damaged or Defective Lithium Battery* is a cell or a battery that has lost a part of its mechanical or electrical integrity (external or internal) that could lead to the leakage of electrolyte, venting or a dangerous evolution of heat or fire.

7. Based on comments and questions received during the discussions related to ST/SG/AC.10/C.3/2011/15 and the issues addressed in this Informal paper, a second working group meeting in August or in October will be organized by PRBA and RECHARGE. Members of the Sub-Committee are once again invited and welcome to attend.

	<b>CURRENT ADR</b>		<b>PROPOSED NEW SP XXX FOR UN MODEL REGULATIONS</b>
SP 636	(a) Cells contained in equipment shall not be capable of being discharged during carriage to the extent that the open circuit voltage falls below 2 volts or two thirds of the voltage of the undischarged cell, whichever is the lower.	SP XXX Part 1	Except for leaking or severely damaged cells and batteries shipped under SP YYY (new), waste <sup>1</sup> lithium ion cells and batteries and waste lithium metal  cells and batteries being transported for disposal or recycling <b>may</b> <sup>2</sup> be packed in accordance with the following provisions:
	(b) Up to the intermediate processing facility, used lithium cells and batteries with a gross mass of not more than 500g each, whether or not contained in equipment, collected and handled over for carriage for disposal, together or without other non-lithium cells or batteries, are not subject to the other provisions of ADR if they meet the following conditions:  (i) The provisions of packing instruction <b>P903b</b> are complied with; (ii) A quality assurance system is in place to ensure that the total amount of lithium cells or batteries per transport unit does not exceed 333 kg; (iii) Packages shall bear the inscription: "USED LITHIUM CELLS".		(a) Up to the intermediate processing facility, waste lithium cells and batteries with a gross mass of not more than [5 kg], whether or not contained in equipment, transported together or without other waste non-lithium cells or batteries, are not subject to the other provisions of these Regulations if the following requirements are met:  (i) The provisions of packing instruction <b>P903b</b> ; (ii) A quality assurance system is in place to ensure that the total amount of lithium ion cells or batteries and lithium metal cells or batteries per transport unit does not exceed 333 kg; and (iii) Packages containing cells and batteries shall be marked "WASTE LITHIUM BATTERIES."  <b>EXPLANATION: GENERALLY CONSISTENT WITH REVISED ADR. ALLOWS FOR THE TRANSPORT OF WASTE BATTERIES BETWEEN RETAIL AND PROCESSING FACILITIES (BATTERY SORTERS). These</b>

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<sup>1</sup> Waste batteries = batteries shipped for disposal or recycling. Used batteries that may be shipped for repair have to be packed as new batteries

<sup>2</sup> « May » is used in order to allow shippers the option of shipping in accordance with SP XXX, SP 188 or PI 903, as appropriate.

		<p>cells and batteries are also transported without full class 9 dangerous goods requirements.</p>
		<p>(b) Waste lithium cells and batteries, together or without other waste non-lithium cells or batteries, are not subject to the other provisions of these Regulations if the following requirements are met:</p> <ul style="list-style-type: none"> <li>(i) Paragraphs (a) or (b) of Special Provision 188, as appropriate;</li> <li>(ii) Packing Instruction P903a; and</li> <li>(iii) Packages containing cells and batteries shall be marked "WASTE LITHIUM BATTERIES"</li> </ul> <p><b>EXPLANATION: ALLOWS FOR SMALL, CONSUMER-TYPE LITHIUM CELLS / BATTERIES (<math>\leq 1</math> g / 2 g Lithium metal) and (<math>\leq 20</math> Wh / 100 Wh Lithium-Ion) TO BE SHIPPED WITHOUT FULL CLASS 9 DANGEROUS GOODS REQUIREMENTS.</b></p>
		<p>(c) Waste lithium cells and batteries, together or without other waste non-lithium cells and batteries, shall comply with all relevant provisions except the requirements of Section 2.9.4 or Special Provision 188.</p> <p><b>EXPLANATION: PROVIDES THE OPTION OF SHIPPING ALL CELLS AND BATTERIES AS FULLY-REGULATED CLASS 9 DANGEROUS GOODS. SECTION 2.9.4 WAS ADOPTED AT THE DECEMBER 2010 SUBCOMMITTEE MEETING AND REPLACES THE EXISTING SP 230.</b></p>

	<b>PROPOSED SP YYY</b>
SP YYY	<p>Leaking or severely damaged lithium ion cells and batteries or lithium metal cells and batteries shall be packed in salvage packagings provided measures are taken to ensure there is no dangerous evolution of heat or fire during transport. This includes protection against contact with conductive materials within the salvage packagings that could lead to a dangerous evolution of heat or fire.</p> <p>Larger outer packaging of suitable material and of adequate strength also may be used provided it is designed, constructed, filled, closed, secured and maintained so that under normal conditions of transport, including handling, there will be no accidental release or excessive movement of the lithium ion cells or batteries or lithium metal cells or batteries that could lead to a dangerous evolution of heat or fire or leakage of electrolyte.</p> <p><b>EXPLANATION: PROVIDES PACKAGING FOR SMALL AND LARGE LITHIUM BATTERIES THAT ARE DAMAGED. See salvage packaging provisions in UN Model Regulations, Section 4.1.1.17, SP 654 and P003 for similar language.</b></p>

	<b>CURRENT ADR</b>		<b>PROPOSED P903a &amp; P903b FOR UN MODEL REGULATIONS</b>
P903a	This instruction applies to used cells and batteries of UN Nos. 3090, 3091, 3480 and 3481	P903a rev	This Instruction applies to waste lithium ion cells and batteries and waste lithium metal cells and batteries of UN Nos. UN3480, UN3481, UN3090 and UN3091.
	The following packagings are authorized, provided the general provisions of <b>4.1.1</b> and <b>4.1.3</b> are met.		The following packagings are authorized, provided that the general provisions of <b>4.1.1</b> and <b>4.1.3</b> , are met:
	Packagings conforming to the packing group II performance level.		(1) Packagings shall conform to the packing group II performance level.
	Non-approved packaging shall, however, be permitted provided that: <ul style="list-style-type: none"> <li>- they meet the general provisions of 4.1.1, except 4.1.1.3, and 4.1.3 are met;</li> <li>- the cells and batteries are packed and stowed so as to prevent any risk of short circuits;</li> <li>- the package weighs not more than 30 kg.</li> </ul>		(2) Strong outer packagings constructed of suitable material and of adequate strength and design in relation to the packagings capacity and its intended use. Packagings need not meet the requirements of 4.1.1.3. Except when batteries are contained in or packed with equipment, packages shall not exceed 30 kg gross weight.
			(3) In addition, for undamaged cells or batteries with a gross mass of 12 kg or more employing a strong, impact resistant outer casing, and assemblies of such cells or batteries, in strong outer packagings constructed of suitable material and of adequate strength and design in relation to the packagings capacity and its intended use.  Packagings need not meet the requirements of 4.1.1.3.
	<b>Additional requirement:</b>  Batteries shall be protected against short circuits.		<b>Additional requirement:</b>  Cells or batteries shall be packaged or designed so as to prevent short circuits that could lead to a dangerous evolution of heat or fire.
P903b	This instruction applies to used cells and batteries of UN Nos. 3090, 3091, 3480 and 3481	P903b rev	This Instruction applies to waste lithium ion cells and batteries and waste lithium metal cells and batteries of UN Nos. UN3480, UN3481, UN3090 and UN3091.  The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3, are met:
	Used lithium cells and batteries with a gross mass of not more than 500 g each, collected for disposal, may be carried together with other used non-lithium batteries or alone without being individually protected, under the following conditions:		The packagings listed below are authorized for cells and batteries collected for disposal or recycling together or without other waste non-lithium ion and lithium metal cells or batteries, or alone, and may be transported without being individually protected from short circuits, under the following conditions:
	1) In 1H2 drums or 4H2 boxes conforming to the packing group II performance level for solids;		(1) In 1H2 drums 4H2 boxes conforming to the Packing Group II performance level for solids.

	<p>2) In 1A2 drums or 4A boxes fitted with a polyethylene bag and conforming to the packing group II performance level for solids. The polyethylene bag</p> <ul style="list-style-type: none"> <li>- shall have an impact resistance of at least 480 grams in both parallel and perpendicular planes with respect to the length of the bag;</li> <li>- shall have a minimum of 500 microns of thickness with an electrical resistivity of more than 10 Mohms and a water absorption rate over 24 hours at 25 °C lower than 0.01%;</li> <li>- shall be closed and</li> <li>- may only be used once;</li> </ul>		<p>(2) In 1A2 drums 4A boxes fitted with a polyethylene bag and conforming to the Packing Group II performance level. The polyethylene bag shall</p> <ul style="list-style-type: none"> <li>- Have an impact resistance of at least 480 grams in both parallel and perpendicular planes with respect to the length of the bag;</li> <li>- Have a minimum of 500 microns of thickness with electrical resistivity of more than 10 M ohms and a water absorption rate over 24 hours at 25°C lower than 0.01 %; and</li> <li>- Be closed and shall be used only once.</li> </ul>
	<p>(3) In collecting trays with a gross mass of less than 30 kg made from non-conducting material meeting the general conditions of 4.1.1.1, 4.1.1.2 and 4.1.1.5 to 4.1.1.8.</p>		<p>(3) In drums or boxes with a gross mass of not more than 30 kg made of non-conducting material meeting the general conditions of 4.1.1.1., 4.1.1.2, 4.1.1.5. to 4.1.1.8.</p>
	<p><b>Additional requirements:</b> The empty space in the packaging shall be filled with cushioning material. The cushioning material may be dispensed with when the packaging is entirely fitted with a polyethylene bag and the bag is closed.</p> <p>Hermetically sealed packagings shall be fitted with a venting device according to 4.1.1.8. The venting device shall be so designed that an overpressure caused by gases does not exceed 10 kPa.</p>		<p><b>Additional requirements:</b> In absence of individual protection against short-circuit, the empty space in the packaging shall be filled with cushioning material. The cushioning is not required when the packaging is entirely fitted with a plastic bag and the bag is closed.</p> <p>Hermetically sealed packaging shall be fitted with a venting device according to 4.1.1.8. The venting device shall be so designed that where pressure may develop in a package the provisions of 4.4.1.8 shall be met.</p>