

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

30 November 2015

Forty-eighth session

Geneva, 30 November-9 December 2015

Item 4 (a) of the provisional agenda

Electric storage systems: testing of lithium batteries

Report on the Second Meeting of the Informal Working Group on Lithium Batteries

**Transmitted by the expert from France (in his capacity as Chairman of
the Informal Working Group), RECHARGE, PRBA and COSTHA**

1. The Second meeting of the informal working group (IWG) on Lithium Batteries was held in Washington, on August 26 – 28, 2015. It was co-organized by PRBA, RECHARGE and COSTHA. A total of 40 participants from both the Sub-Committee of Experts and industry attended the meeting. The expert from France, Mr Claude Pfauvadel, chaired the meeting.

2. This document summarizes the main points where some guidance is needed from the Sub-committee. Information supporting this summary may be found in a detailed report of the discussions, proposals and list of participants are available on PRBA's website:

<http://www.prba.org/laws-regulations/un-wg-meeting-on-lithium-batteries-august-2015/>

3. A review of definition related issues identified during the first IWG was made. As several discussions were concluded with the need to receive some guidance from the Sub-Committee, these issues are listed in the Table 1 presented below. In addition, the IWG came to a consensus on several items tabled at the agenda and is proposing the text below for review of the Subcommittee:

3.1: List of tests requirements according to the type of cell and battery.

The IWG agreed to present the draft form of the tables to the Subcommittee for review and comment, with the intention that feedback will be used to develop a formal proposal at the next WG Session, including a replacement of the text from both paragraphs 38.3.2.1 and 38.3.3. These tables are presented in Appendix 1.

3.2: Definition of hybrid batteries (combined Li-metal and Li-ion cells and batteries).

The following recommendation is made by the IWG.

Enter a new Special Provision referring to UN Numbers 3090 and 3091:

A lithium battery containing primary lithium metal cells and rechargeable lithium ion cells shall be carried as a lithium metal battery if it meets the following:

- (a) it is not designed to be externally recharged; and
- (b) the rechargeable cells are only charged from the primary cells; and
- (c) overcharge of the rechargeable cells is precluded by design; and
- (d) the battery has been tested as a lithium primary battery; and
- (e) its component cells are of a type proved to meet the respective testing requirements of the Manual of Tests and Criteria, part III, sub-section 38.3; and
- (f) it meets the provisions of 2.9.4. (b) to (e).

3.3 Definition of equipment.

The following recommendation is made by the IWG.

Add a sentence to the end of SP188 [and SP230 or a new SP]:

For the purpose of this special provision, equipment are devices intended to be powered by or used in the operation associated with the lithium ion or lithium metal cells or batteries packaged with or installed in the devices. Examples of such equipment include, but are not limited to, notebook computers, tablets, cellular phones, e-readers, medical devices, power tools, flashlights, [battery chargers,] circuit boards and toys.

4. The IWG reviewed the proposal for a Lithium Battery Test Report. General support was given for the draft document presented at the IWG and the IWG recommended the draft version be presented to the Subcommittee for additional comment. The list of items to be supplied by the Test Facility in the Report is presented in Table 2.

5. The next IWG Meeting will be organised by RECHARGE in Bordeaux, France, on March 28-30, 2016. Delegates interested in participating in the IWG are invited to contact RECHARGE, PRBA, or COSTHA, at the following e-mail addresses.

Claude Chanson / RECHARGE: cchanson@rechargebatteries.org

CC should be addressed to the following addresses:

George Kerchner / PRBA gkerchner@wileyrein.com

Tom Fergusson / COSTHA: tom@costha.com

Table 1

List of items where guidance is requested from the SCETDG
Follow-up of the 2nd Informal Working Group Meeting on UN Lithium Battery Tests

	Discussion Items	SCETDG's Comments Requested
1.	Question of standardisation of the definitions , used in the Manual of test and Criteria, with the Model regulation and IEC standard.	The IWG proposes to consider the table of test as an important mean of clarification (drafts presented in appendix). The IWG request clarification as to whether the definitions will have to take in account their usage in the Model regulation.
2.	Reference to the use of "wire mesh" in the definition of disassembly . It is recognized that the use of a wire mesh for large batteries is not practical. A proposal is made to refer to the energy of projection, like for the explosive (test series 6c).	The IWG to consider a methodology and examples to support a new definition.
3.	Reference is made to SP188 (b) . There are different interpretations on whether cells can exceed 20 Wh in a battery with a Watt-hour rating of not more than 100 Wh.	The IWG to ask for more data for clarification of the difference between the cells and batteries for what concerns the risk of propagation in case of thermal runaway.
4.	Information was presented on rechargeable lithium metal polymer battery in order to harmonize the description of rechargeable batteries while using Wh units, instead of grams of lithium.	The IWG to ask for additional technical information justifying the change. This information is presented to the Sub-committee in a separate informal paper UN/SCETDG/48/INF.10 - (RECHARGE, PRBA) Harmonization of the energy rating under SP188 for rechargeable lithium metal polymer and lithium-Ion batteries .
5.	Request was made to transfer the Cycling requirements before testing of batteries to the testing of cells.	The IWG did not agree as to whether the cycling should be applied to the cell or to the battery. The IWG was supportive of reviewing the number of cycles but requested additional technical data..
6.	Accounting for activation of CID or fail safe mechanism in the success criteria of the testing After a lengthy discussion, the WG supported the need to take into account this type of device into the testing regime.	The IWG voiced doubt on how to deal with non-resettable devices and whether tests should be continued after a CID was activated. More information and example are required to make a decision.
7.	About SP 376 and PI 908. Proposal to add a solution allowing for transport of hazardous Damaged and Defective batteries (last paragraph of SP376), with a packaging solution corresponding to an approval of the authorities.	According the IWG suggestion, the proposal is presented in a separate working document: ST/SG/AC.10/C.3/2015/51 - (OICA) Transport of damaged/defective lithium batteries
8.	Proposals to improve SP 376 , with a list of criteria and a protocol to determine if the battery is damaged and defective.	The WG concluded future work would include developing a list of criteria to consider and simple instructions on how to evaluate the criteria.
9.	it is proposed that testing batteries integral to equipment , such as power packs, should be applicable to the battery within the equipment.	No final language was agreed but the IWG agreed to continue discussion at the next session.

Table 2. List of items to be supplied by the Test Facility in the Testing Report.

Proposed Lithium Battery Test Report

1. Name of cell or battery manufacturer or brand name on battery
2. Name of third party test lab (if applicable)
3. A unique test report identification
4. Date of test report
5. Description of cells or batteries (e.g., Li ion or Li metal cell or battery, voltage, net weight, Watt-hour rating, grams of lithium metal content, model number)
6. List of tests conducted and results (i.e., pass/fail)
7. Reference to assembled battery testing requirements, if applicable (i.e., 38.3.3(f) and 38.3.3(g))
8. Test report shall be signed with name and status of signatory
9. Contact information to include phone number, email address or website for more information

Appendix 1

List of tests requirements according to the type of cell and battery.

RECHARGEABLE CELLS AND BATTERIES

Tests	Cycles and Discharge State	Cells ^a	Batteries and Their Component Cells			Assembled Batteries ^b
			Component Cells	Batteries		
				Small	Large	
Tests T-1 to T-5	At first cycle, fully charged	10	X	4	2	1
	After 25 cycles, fully charged	X	X	X	2	X
	After 50 cycles, fully charged	X	X	4	X	X
Test T-6	At first cycle, at 50 % DOD	5	5	X	X	X
Test T-7 ^c	At first cycle, fully charged	X	X	4	2	1
	After 25 cycles, fully charged	X	X	X	2	X
	After 50 cycles, fully charged	X	X	4	X	X
Test T-8	At first cycle, fully discharged	10	10	X	X	X
	After 50 cycles, fully discharged	10	10	X	X	X
TOTALS		25	35	16	8	1

^a Except for the T7 Overcharge test, a single cell battery containing one tested cell does not require testing unless a change in cell design could result in a failure of any tests. When conducting T7 test on single cell battery, follow testing requirements for batteries.

^b Only T3, T4, T5 and T7 required for one assembled battery with not more than 500 g lithium content or 6,200 Watt-hours, as applicable, that is assembled from batteries that have passed all applicable tests. See 38.3.3(f).

When batteries that have passed all applicable tests are electrically connected to form a battery with more than 500 g lithium content or 6,200 Watt-hours, as applicable, it does not need to be tested if the assembled battery is of a type that has been verified as preventing (i) Overcharge; (ii) Short circuits; and (iii) Over discharge between the batteries. See 38.3.3(g).

^c Batteries or single cell batteries not equipped with battery overcharge protection that are designed for use only as a component in another battery or in equipment, which affords such protection, are not subject to the requirements of this test. See 38.3.3(d), last paragraph.

PRIMARY CELLS AND BATTERIES

Tests	Discharge state	Cells ^a	Batteries and Their Component Cells			Assembled Batteries ^b
			Component Cells	Batteries		
				Small	Large	
Tests T-1 to T-5	Undischarged	10	X	4	2	1
	Fully discharged	10	X	4	2	X
Test T-6	Undischarged	5	5	X	X	X
	Fully discharged	5	5	X	X	X
Test T-8	Fully discharged	10	10	X	X	X
TOTALS		20	40	8	4	1

^a A single cell battery containing one tested cell does not require testing unless a change in cell design could result in a failure of any tests.

^b Only T3, T4 and T5 are required for one assembled battery with not more than 500 g lithium content or 6,200 Watt-hours, as applicable, that is assembled from batteries that have passed all applicable tests. See 38.3.3(f).

When batteries that have passed all applicable tests are electrically connected to form a battery with more than 500 g lithium content or 6,200 Watt-hours, as applicable, it does not need to be tested if the assembled battery is of a type that has been verified as preventing (i) Overcharge; (ii) Short circuits; and (iii) Over discharge between the batteries. See 38.3.3(g).