

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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LISTING, CLASSIFICATION AND PACKING

Comments on ST/SG/AC.10/C.3/2008/86

Submitted by the Portable Rechargeable Battery Association (PRBA)

1. In PRBA's document ST/SG/AC.10/C.3/2008/86, there are several proposed changes to the UN Manual of Tests and Criteria specific to lithium batteries. Many of the issues addressed in ST/SG/AC.10/C.3/2008/86 were discussed at length during the recent UN informal working group meeting on lithium batteries held in Washington, DC as more fully explained in the Chairman's report UN/SCETDG/34/INF.35. One issue that remains problematic for manufacturers of large lithium batteries is how to properly define a "Large battery" in the context of the UN Manual of Tests and Criteria and for testing purposes. Based on discussions at the UN informal working group meeting, there was a consensus that the gross mass of a battery is a more appropriate criteria for defining "Large" and "Small" lithium batteries instead of Watt-hours and lithium metal content as originally proposed in PRBA's document ST/SG/AC.10/C.3/2008/86.
2. A presentation made during the UN informal working group meeting showed that batteries designed for hybrid-electric vehicles (HEV) and electric vehicles (EV) can be large and complicated structures comprised of not only lithium ion cells but also electronic controllers, sensors, air flow ducts, cabling, cell mounting fixtures, cells, trays, covers and attachment brackets. HEV lithium ion batteries can range from 12 kg to 80 kg with EV batteries often exceeding 400 kg. The capacity of HEV batteries typically ranges from 300 Watt-hours to 2,500 Watt-hours and for EV batteries in excess of 6,000 Watt-hours. Therefore, the current HEV lithium ion battery designs do not meet the definition of a "Large battery" (i.e., > 6,200 Watt-hours) under the current UN Manual and must be tested pursuant to the Small battery test procedures.
3. As discussed in more detail at the November working group (see paragraph 10 of the working group report), the current Shock test (Test 4) requirements for these batteries results in the application of unrealistic shock forces. For example, for a medium size HEV battery, the shock force would exceed 40,000N. Such a shock force is not representative of shock forces

that could be encountered under normal conditions of transport and far exceed the shock test requirements for automotive applications. Continued application of this excessive shock test requirement would mean that batteries suitable for use in automotive applications would have to be redesigned to withstand transport requirements, resulting in batteries less effective in providing increased fuel economy.

4. The current Shock test in the UN Manual authorizes a reduced half-sine shock peak acceleration of 50 gn for Large batteries instead of the 150 gn required for Small batteries. It can be assumed that such a reduced shock peak acceleration was provided for Large batteries by the UN Sub-committee out of concern that such batteries could not reasonably be expected to pass a 150 gn shock due to the gross mass of the battery. The same can be said for the Vibration test (Test 3). That is, large batteries like those being designed for use in a HEV cannot reasonable be expected to pass the same vibration testing requirements that notebook or cellular phone batteries must pass. Amending the Vibration testing requirements for Large batteries is addressed in a separate Informal document prepared by COSTHA.

5. Packing Instruction 903 of the UN Model Regulations contains a provision that authorizes batteries employing a strong, impact-resistant outer casing with a gross mass of 12 kg or more, and assemblies of such batteries, to be packed in strong outer packagings, in protective enclosures (e.g., in fully enclosed or wooden slatted crates) unpackaged or on pallets as an alternative to UN specification packaging. When this provision was adopted in 1999-2000, the UN Sub-committee agreed that this packaging alternative only apply to batteries with a gross mass of more than 12 kg. Therefore, there is precedent in the UN Model regulations for distinguishing between small and large batteries based on the gross mass for purposes of shipping and packaging.

6. PRBA's document ST/SG/AC.10/C.3/2008/86 contains a proposed change to the definition for Large battery as one containing more than 600 Watt-hours for lithium ion batteries and 80 g lithium metal content for lithium metal batteries. Based on information and data presented at the UN working group meeting, the unanimous view of the working group, and the issues addressed in this paper PRBA proposes changes to the Large battery and Small battery definitions in section 38.3.2.2 of the 4th revised edition of Manual of Tests and Criteria as provided below.

Proposal

7. PRBA proposes to replace proposed revisions to the Large and Small battery definitions in the Manual of Test and Criteria, Part III, paragraph 38.3.2.2 as provided in ST/SG/AC.10/C.3/2008/86 as follows:

“Large battery means a lithium metal battery or lithium ion battery with a gross mass of more than 12 kg.”

“Small battery means a lithium metal battery or lithium ion battery with a gross mass of not more than 12 kg.”
