



U.S. Department
of Transportation

**Pipeline and Hazardous
Materials Safety Administration**

OCT 25 2006

400 Seventh Street, S.W.
Washington, D.C. 20590

Hyeong-Jin Kim, Ph.D.
General Manager
LG Chem/Mobile Energy Company
20445 SH249, Suite 250
Houston, TX 77070

Ref. No.: 06-0141

Dear Dr. Kim:

This is in response to your letter requesting clarification of the requirements for Test T.7 overcharge procedures and conditions applicable to lithium-ion batteries in accordance with 38.3.4.7.2 of the UN Manual of Tests and Criteria, which is referenced in the Hazardous Materials Regulations (HMR; CFR parts 171-180). Specifically, you ask whether your procedures are correct in accordance with Test T.7 of the UN Manual of Tests Criteria.

According to your letter, your lithium-ion battery has a nominal capacity of 650 mAh(1C) and a maximum voltage charge of 4.2 V. During testing of your lithium-ion batteries, they are charged continuously at 1.3 A for a period of 24 hours with a select voltage range between 8.4 and 22 volts.

Section 38.3.4.7.2 reads: "The charge current shall be twice the manufacturer's recommended maximum continuous current." Therefore, your choice of 1,300 milliamp-hours (1.3 amp-hours) for the maximum charge current of the T.7 Test is correct.

Section 38.3.4.7.2 continues: "The minimum voltage of the test shall be as follows: a) when the manufacturer's recommended charge voltage is not more than 18V, the minimum voltage of the test shall be the lesser of two times the maximum charge voltage of the battery or 22V." It is your understanding, based on 38.3.4.7.2, that you may use an arbitrary number between 8.4V and 22V with which to conduct the T.7 Test the batteries described above. The language of Section 38.3.4.7.2 would not appear to allow the person testing a battery an arbitrary choice between the two voltages (8.4V and 22V). However, it is our



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conclusion that testing the battery at a higher voltage than is actually required will not invalidate the test.

I hope this information is helpful. If you have further questions, please do not hesitate to contact this office.

Sincerely,

A handwritten signature in black ink, appearing to read 'John A. Gale', written in a cursive style.

John A. Gale
Chief, Standards Development
Office of Hazardous Materials Standards



LG Chem

Referford
§173.185
Lithium Batteries
06-0141

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June 26th, 2006

Mr. Edward T. Mazzullo
Director, Office of Hazardous Materials Standards
U.S. DOT/PHMSA (PHH-10)
400 7th Street S.W.
Washington, D.C. 20590-0001

Dear Mr. Edward T. Mazzullo

This is Hyeong-Jin Kim in LG Chem., one of lithium ion battery manufactures.

I am writing this mail for clear understanding for the UN testing Manual of Test and Criteria, a requirement transport of dangerous goods (HMR; 49 CFR Part 173.185 - Li ion batteries section, Manual of tests and criteria, Ch 38.3).

Questions are about the UN DOT test procedure and condition for Test T.7, overcharge test item regarding Lithium batteries..

First, here is general information for battery.

- Max. charge voltage: 4.2 V, Nominal capacity: 650 mAh(1C).
- Two times the maximum voltage: 8.4V, twice maximum continuous charge current: 1.3A
(according to the UN overcharging test procedure, 38.3.4.7)

In accordance with the test procedure for T7(38.3.4.7.2), the minimum voltage is two times of the maximum charge voltage of the battery or 22 V. In my understanding for the sentence, a tester can choose an arbitrary number between 8.4 V and 22 V for the supplying voltage.

For example, we do the test like this. One of voltages between 8.4 V and 22 V (i.e. 22 V) is set up and then batteries are charged continuously with 1.3 A for 24 hours.

Currently, we are testing the batteries according to UN DOT test manual and T.7 test method has some unclear points to us. Your clarification is urgently needed for the further progressing.

If you possible, we'd like to have the answer thru express mail or fax machine directly.

I am look forward to obtaining your confirmation for our overcharge test procedure as soon as possible.

Thank you for your cooperation.

Sincerely yours,

Hyeong-Jin Kim, Ph.D.

General Manager

Battery C/S team, Mobile Energy Company