

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

16 June 2011

Thirty-ninth session

Geneva, 20–24 June 2011

Item 4 (a) of the provisional agenda

Electric storage systems: testing of lithium batteries

Comments on T6 test of UN 38.3

Transmitted by the expert from China

Introduction

1. At the thirty-eighth session of the Sub-Committee, the informal lithium battery working group submitted a paper (ST/SG/AC.10/C.3/2010/81) that proposed the amendments on UN38.3 test for lithium batteries and cells. Which proposed two tests for T6: impact and crush, and impact test applied for cylindrical cells not less than 20mm in diameter. Both tests simulate the mechanical abuse that may result in the internal short circuit to cells. Different test is fit for different shapes of cells.

2. Chinese experts have submitted the document UN/SCETDG/38/INF.35 at the thirty-eighth session, proposed to apply impact tests for all the cylindrical cells. Experts in the meeting thought it was not practice to apply impact test to the small cylindrical cells. According to the suggestions, we suggested to change the diameter from 20mm to 18mm (ST/SG/AC.10/C.3/76, para. 40-41).

3. We collected hundreds of test data on cylindrical cells. 215 groups of tests on 18650 lithium ion cells, 15 groups of tests on primary cells with a diameter of no less than 18mm(lithium-SOCl₂) and 26 groups of tests on primary cells with a diameter of less than 18mm(lithium-SOCl₂and Lithium-MnO₂). We found all the cells with the diameter of no less than 18mm could pass the impact test, and 65% of the primary cells with a diameter of less than 18mm also passed. Showed in following table:

Diameter of cell	14mm-17mm	18mm	33-34mm
Groups be tested	26	216	14
Passed groups	17	216	14
Passed rate	65%	100%	100%

4. The cylindrical cells with a diameter of 18mm are rigid. Crush test cannot induce the internal short circuit on the cells. The result of crush tests were no temperature rise, no voltage drop and slight deformed.

5. But the results of impact tests on cylindrical cells with a diameter of 18mm were: temperature rose to 85°C to 105°C and the voltage dropped to 0V. The cylindrical cells were internal shot circuited, which met the test purpose of T6 better than crush. So we would like to invite the sub-committee to consider the following proposal :

Proposal

6. We suggest to change the diameter limited in impact test scope, and read as below:
Impact (applicable to cylindrical cells not less than 18mm in diameter)
Crush (applicable to prismatic, pouch, coin/ button cells and the cylindrical cells less than 18mm in diameter).
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