

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

29 November 2010

Thirty-seventh session

Geneva, 29 November – 7 December 2010

Item 5 of the provisional agenda

Electric storage systems

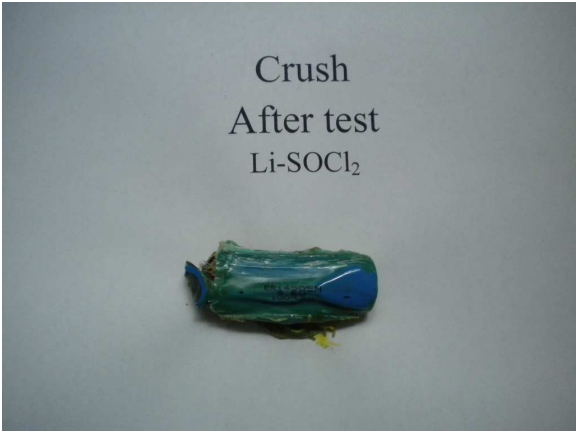
Comments on document ST/SG/AC.10/C.3/2010/81

Transmitted by the experts from P. R. China

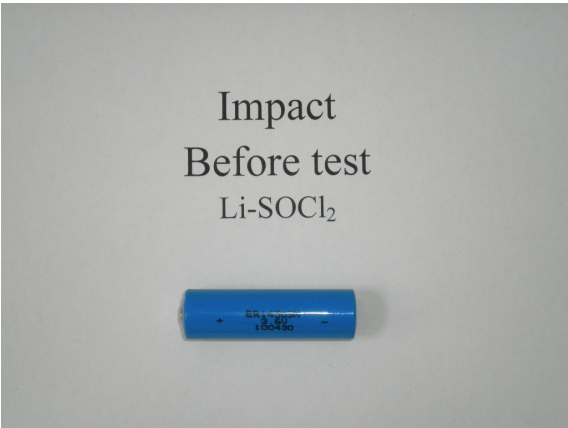
1. The working group on the testing of lithium batteries and cells begin to work from November 2008 and submit the proposal on Sub-section 38.3 of the UN Manual of Tests and Criteria (see ST/SG/AC.10/C.3/2010/81).
2. The proposal includes the amendment to T6 test. According to the work of the ad hoc group on T6 test, the working group agreed to amend crush test into T6. Both of the two tests: impact and crush simulate the mechanical abuse that may result in the internal short circuit to cells. Different test is fit for different shapes of cells.
3. In the last working group meeting, the working group decide to restrict the size of the tested cylindrical cells as follows: impact is supposed to be applicable to cylindrical cells greater than 20 mm in diameter. While crush is apply to cylindrical cells not more than 20 mm in diameter and other kinds of cells. In actual application, it seemed not so reasonable.
4. Actually crush is not so effective to make a real internal short circuit for many types of cylindrical cells. For example to crush the 18650 lithium ion cell, which is widely used for the laptop computer battery. The results generally are: slightly deformed, no temperature rise and no voltage drop. However, after the impact test on this cell, the temperature will rise up to approximate 110°C and voltage drop to 0V. The difference is very obviously and easily to see that impact is more effective for testing this kind of cell.
5. To appraise the two kinds of tests on cylindrical cells further, we choose a cylindrical lithium cell with a diameter of 14mm to conduct both impact and crush test. After impact, it caught heavy fire and failed the test. Then we run the crush test on it. There is no fire and no temperature rise (see attachment 1 for pictures and attachment 2 for videos). Again we could see the impact is more effective on this kind of cylindrical cell.
6. According to the test results, we do not support adoption the text on diameter scope (great than 20 mm for cylindrical cells in impact test and not more than 20 mm for cylindrical cells in crush test) in ST/SG/AC.10/C.3/2010/81.
7. We suggest the sub-committee to consider the proposal for scope of T6 test as below:
Impact (applicable to cylindrical cells)
Crush (applicable to prismatic, pouch, coin/ button cells).

Attachment 1: pictures for samples with diameter of 14mm

Sample comparison by crush:



Sample comparison by impact:



Attachment 2: Test videos for samples with diameter of 14mm



CrushTest-Section
.mp4



impact.mp4