



**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****Sixty-fifth session**

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Item 4 (a) of the provisional agenda

Electric storage systems:**Testing of lithium batteries****Clarification of the installing and fixing methods for lithium
battery testing according to 38.3 of the Manual of Tests and
Criteria****Transmitted by the expert from the Republic of Korea*****I. Introduction**

1. In 38.3.4 of the *Manual of Tests and Criteria*, the test conditions for each test item (T.1 to T.8) in the lithium battery testing procedure are mentioned. However, the installation and fixing methods for cells and batteries during these tests are not specified, which can lead to potential uncertainty and confusion.
2. This document contains a proposal for amendments to 38.3.4 of the *Manual of Tests and Criteria* to clarify installation methods, referencing relevant text from the international standard IEC 62660-3 concerning lithium battery safety testing¹.

II. Explanation

3. When conducting tests T.1 to T.8 according to 38.3.4 of the *Manual of Tests and Criteria*, it is an important factor in the test procedure how cells and batteries are installed and fixed in the test equipment. These installation conditions should be controlled carefully to minimize any influence on the test results. However, the current provision of the *Manual of Tests and Criteria* does not specify the installation methods that account for the unique characteristics of lithium batteries.
4. Although there are no specific regulations on the installing and fixing methods of cells and batteries for test, it is a common practice to use a pressing jig to secure lithium-ion cells during T.2 (Thermal Test) and T.5 (External Short Circuit Test) to ensure that the test results

* A/78/6 (Sect. 20), table 20.5.

¹ SECONDARY LITHIUM-ION CELLS FOR THE PROPULSION OF ELECTRIC ROAD VEHICLES – Part 3: Safety requirement.



are not affected. For the T.3 (Vibration Test) and T.4 (Shock Test), separate jigs that fit the size of the lithium-ion cells are manufactured and fixed to the testing equipment.

5. Lithium batteries may undergo some deformation due to anode expansion, electrolyte vaporization, and other factors during charging and exposure to high temperatures. To mitigate these deformations, various methods, such as battery packs or cases, are applied during transport. Considering the strength of the battery packs and cases used, they are secured with a testing jig to conduct performance and safety tests.

6. In this regard, the international standard IEC 62660-3 specifies that during safety tests on lithium-ion cells (see text box shown below) the cells can be fixed to prevent deformation during testing, as long as the method used complies with the purpose of the test.

6 Safety tests

6.1 General

For all the tests specified in this Clause 6, the test installation shall be reported, including the method used for fixing and wiring of the cell. If necessary, to prevent deformation, the cell may be maintained during the test in a manner that complies with the test purpose.

7. In this respect, the Republic of Korea proposes clarifying the installation methods in 38.3.4 of the *Manual of Tests and Criteria* to prevent confusion and allow the use of cell and battery fixing methods currently employed in the industry, by referencing the relevant text from international standards.

III. Proposal

8. Add a new text in 38.3.4 of the *Manual of Tests and Criteria* as follows (new text is **bold and underlined**):

“38.3.4 Procedure

Tests T.1 to T.5 shall be conducted in sequence on the same cell or battery. Tests T.6 and T.8 shall be conducted using not otherwise tested cells or batteries. Test T.7 may be conducted using undamaged batteries previously used in Tests T.1 to T.5 for purposes of testing on cycled batteries. **The test installation includes the method used for fixing and wiring of cells or batteries. If necessary, to prevent deformation, cells or batteries may be maintained during the test in a manner that complies with the test purpose.**”
