

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

22 November 2013

Forty-fourth session

Geneva, 25 November – 4 December 2013

Item 3 (a) of the provisional agenda

Electric storage systems: Testing of lithium batteries

Information on the informal working group on testing large lithium batteries

Transmitted by the expert from France acting as Chairman of the informal working group

1. The informal working group meeting was held in Washington from October 2-4 2013. Participants from both the UN/SCETDG and WP29 were able to attend. A total of 35 participants attended the meeting.
2. The working group (WG) based its work on presentations explaining the origin and purpose of each test from T1 to T8.
3. Therefore, participants had to consider as a preliminary phase of the WG allowing experts from each side to exchange their view on the different tests.
4. Although very promising, the discussions did not allow time to draft proposals for the Sub-Committee to decide on at this time.
5. Therefore, the WG agreed to explore the possibility of scheduling the next meeting for the week of February 10, 2014 hosted by Recharge in Brussels. This would allow enough time to draft a formal paper for the June session of the Sub-Committee. The Sub-Committee may then comment on that basis. It is hoped that some proposal may be advanced enough after that to be adopted in December 2014.
6. However, below is a list of key issues the WG thought should be addressed for improving the UN tests. The Sub-Committee may wish to give some advice on these points to help the WG for future work.

T3 - vibration Test

7. At the next session the working group will consider results of any study available regarding the actual level of vibrations that is seen by a battery during transport

T4 – Shock Test

8. The WG felt that many issues related to the practicality of the test for large lithium batteries would be solved by defining a sliding scale for acceleration values applied during the test. In particular, instead of a single cut of value a continuous mass/acceleration relationship could be defined. Following this principle, the WG would:

- Propose possible force or energy values for relationship and consider time period of impact;
- Draft additional language that addresses the fail-safe designs and OCV requirement; and
- Consider language to solve the issue of large cells in small batteries if this is not solved by the mass/acceleration relationship.

T5 – Short Circuit Test

9. It was felt that some modifications would clarify the test procedure. In particular the interpretation of the text regarding the temperature was not the same between participants. Some considered that the test must be done with the battery in the oven so that it remains controlled, others thought that the battery could be removed from the oven and the short circuit test performed after.

10. The following text proposed by COSTHA was used as a basis for discussion:

38.3.4.5.2 Test Procedure

The cell or battery to be tested shall be temperature stabilized so that its external case temperature reaches 55 ± 2 °C and then the cell or battery shall be subjected to a short circuit condition with a total external resistance of less than 0.1 ohm at 55 ± 2 °C. This short circuit condition is continued for at least one hour after the cell or battery external case temperature has returned to 55 ± 2 ° C. The test is completed when any of the conditions exist:

- An open circuit condition is confirmed through direct measurement;
- The current flow as measured from the short circuit drops below [XXX];
- One hour after the temperature of the external case temperature case returns to 55 ± 2 ° C.

The WG could further:

- Define current flow for bullet #2
- Develop more detailed testing procedures; and
- Define procedures for conducting the test, both in a heating chamber and outside a heating chamber
- Reconsider the tolerance ± 2 °C to adapt to large batteries for which the time length to reach 55 °C will depend on the size of the battery because of heat conductivity constraints.

In addition the WG proposed to clarify the position that only a single test with a single value below 100 mohms is required under T5.

Testing Battery Assemblies

11. The WG felt it was appropriate to

- Review the conditions under which a battery assembly is impractical, impossible to test and determine the appropriate limiting factor (mass, rated capacity, etc.); and
- Consider design requirements which could be considered to meet an equivalent level of safety.