

Progress report to the GRSP on the work of the Informal Group on Electrical Vehicle Safety in the context of the 1998 Agreement

May 18, 2015

This report reflects the state of play and progress in key areas of work of the IWG and its nine task forces. Most recent developments pertain to the conclusions of the 7th informal working group meeting that took place in Paris in March 2015.

1. Objectives, scope and the mandate

The GTR will cover high voltage electrical safety, electrical components such as electric inlets, and REESS-- in particular those containing flammable electrolyte. The provisions will address the safety of electric vehicles, both in-use and post-crash.

Informal working group may consider other topics, insofar as these topics prove to be relevant for the technical requirements to be developed.

Under the current mandate (end of 2015), the adoption of the GTR is expected in November 2016, during the 170th session of WP29.

2. Working set-up

The format of the IWG meetings has been modified in 2015, adding an additional, a third IWG meeting on the annual basis. In addition, with a view to intensify the work of experts discussing technical procedures and requirements, but equally to rationalise travel cost and associated organisational expenses for the participants, the task forces that have been set up in October 2013, began to meet prior to the meetings of the IWG. In case relevant, task forces continue to meet outside the margins of the official IWG meetings, as it is the case of TFs on REESS in use, on thermal propagation, on electrolyte leakage and on the state of charge.

3. Update on on-going and planned research

There are, with the exception of issues of venting/gas management and short circuit protection, no

major research activities in the EU's and Japan's pipeline for 2015, and they provide parts of the current draft GTR text largely based on the UNECE Regulation 100.02. On the other hand, United States, NHTSA continues to be engaged in an important number of research activities, and it is expected, as the research is now being gradually completed (in particular in relation to REESS safety), that the US will begin to engage more actively in the work of various Task Forces as from the Washington DC June 2015 meeting onwards. However, NHTSA estimates that another 12 months are needed to complete their research, particularly in relation to BMS functionality and single cell initiation/propagation testing.

Both Korea and Canada respectively are finalising fire resistance tests that were due early 2015.

China has stressed the importance of further battery research and further tests are expected.

4. Reports from Task Forces and key issues

Task Force 1 – protection against water

- TF has a broad agreement on the contents and draft test procedures. However, there is still a need to address detailed test protocols in particular in relation to heavy rainstorm test, and automatic or manual turn-off of the propulsion.

Task Force 2 – low electricity energy option

- TF so far assembled all the relevant material and reviewed the inputs of the involved experts.
- A critical issue of the TF is a consideration of the “barrier” option, the effectiveness of further discussion pending NHTSA's review of a petition submitted by Auto industries proposing, which amongst others is essential for the certification of fuel-cell vehicles.

Task Force 3 – electrolyte leakage

- Non-aqueous leakage, observation times, and whether evaporative emissions are the key controversial issues of this task force. TF has agreed to step up the requirement for non-aqueous batteries in the post-crash situation, where no leakage is allowed.
- JRC presented the results of the experiment measuring electrolyte leakage volume from the opened cells of different types of batteries. While NHTSA recognized the importance of the work of the JRC, OICA challenged the relevance of the experiment as it has not been performed at the system level and the result would not be representative of real conditions.
- The Chairman's suggestion to expand the scope of TF3 to include venting, in addition to evaporative emission, was met with resistance. Japan, in charge of drafting of the gas management text proposal, clarified that venting should be done under the gas management area of the GTR draft. As much as the purpose of venting, preventing likely rupture or

explosion of REESS remains incontestable, the EU is of the opinion that venting should not occur in the first place, and should as such for the purposes of testing and type approval be considered as a failure. Finally, it has been agreed that a dedicated small group would be set up and should come back with a (new) proposal for gas management including technical justification by the next IWG in June.

Task Force 4 – REESS in-use testing

- TF has agreed, pending the US June 2015 input, on three (overcharge, over-discharge and over-temperature protection) out of seven applicable test procedures. Technical details are under discussion for the remaining four tests (i.e. vibration profile, thermal cycling stabilisation time, mechanical integrity underneath impact, hard/soft external short circuit).
- It is expected that the proposals for isolation resistance (measurements components vs. system level), in particular in relation to soft-short, and the 48V system will be consolidated into the GTR draft by June 2015 IWG meeting. The industry questions the relevance of SAE J2464 single cell tests and maintains that the test procedure cannot be appropriately applied for various designs and configurations of REESS.

Task Force 5 – thermal propagation:

- TF is gearing to propose an action plan including the scope and timeline as well as the first proposal of the test method (cell or/and system level) at the next IWG in June 2015, however the industry remains suspicious whether the TF will be able to develop reasonable test procedures within the given mandate.,

Task Force 6 – State of Charge

- The work is almost complete and the TF most recently agreed on how to adjust the state of charge and how to maintain the state of charge prior to the test, with some details, such as the temperature range and the maintenance of 90% of SOC by the start of test, still to be agreed. US will provide its recommendation at the next GTR meeting.

Task Force 7 – fire resistance

- The TF discussed component based short duration fire resistance test procedure proposed by Korea as an alternative to the vehicle-based, gasoline pool fire, draft GTR test, as proposed originally by OICA. TF will clarify by June meeting I whether testing authorities would be able to perform the alternative component based test using LPG burner that may not necessary ensure the reproducibility of results. Important question remains "who will choose the alternatives", which is an element of uncertainty for the industry.

- The US and Canadian delegation suggested to come back by June 2015 with a revised working plan and timeline with clear purpose of the justification of extended fire exposure time.

Task Force 8 – Bus and Truck Scope study

- The agreement has been reached to expand the scope to include commercial vehicles and TF8 will cross examine the applicability of various technical requirements agreed by other Task Forces. TF8 should be able to have a clear idea on how to proceed until the end of the IWG meeting by June.
- The most controversial test items, such as appropriate lower GVW limit, the treatment of customized vehicle, and the equivalency of component test etc., will be raised as the key point for the next task force meeting in June in Washington DC.

Task Force 9 – REESS Communication

- TF's responsibility is to consider inputs from other TFs to determine when and how warnings need to be communicated depending on the level of safety.
- TF9 has developed an action plan. The group will begin its work starting with a current proposal from Japan regarding warning in the event of BMS failure, China's charge level indicator.
- The TF9 leader asked all TF members to develop a list of safety related warning issues and boundary conditions among TFs and contracting parties.

5. Drafting of the GTR and the timeline

The IWG requested all task force leaders to proceed with the drafting of the GTR text to the extent possible, and submit their drafts (including the rationale for Part A) to the IWG by 15th of May. This would permit the IWG to review the text prior to the 8th meeting in Washington DC.

Japan showed its strong intention that the draft of the GTR has to be submitted as soon as possible, possibly by the next EVS IWG, with a view of respect the given GTR mandate.

The US delegation reminded of the importance of ongoing technical research and discussions that would contribute to the improvement of the GTR text. The US cannot subscribe to technical requirements which are largely based on R100.02. More data is still required and as such the timing of the IWG should be of a secondary importance to delivering a robust GTR that would be acceptable to all contracting parties.

The EU responded that it is essential to begin with the drafting of the GTR, even though further research is still required in some areas. These can be always addressed at a later stage.

China had commented that they also need to set final goal as soon as possible to make future directions for the rule-making in China.

Canada mentioned that they have a difficulty to meet the mandate because of the budgetary restraints permitting more extensive research.

Korea remained neutral in the discussion provided they have national regulation in place and they are ready to wait until the EVS GTR is agreed.

OICA suggested that this EVS IWG should set concrete targets for drafting/editing to permit completion by the end of 2015. OICA expressed its concern that the timeline of EVS IWG is uncertain.

The IWG is expected to evaluate its progress, issues and, as needed, update the timeline at the next GTR meeting.

6. Future meetings (in 2015)

- 8th IWG meeting: week of June 1st in United States, Washington D.C
 - 9th IWG meeting: week of September 14th in China, Changchun
 - 10th IWG meeting: timing and venue to be decided in June IWG meeting according to the GTR drafting status
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