

Transmitted by the chairperson of the informal group on electric safety (ELSA)

STATUS REPORT ON DEVELOPING “ELECTRIC SAFETY PROVISIONS” FOR
AMENDMENTS TO REGULATION No. 100 AND GTR FOR HYDROGEN FUEL-CELL
VEHICLES (HFCV)

Note: The text reproduced below was prepared by the secretary of ELSA and agreed in ELSA. Its purpose is to inform GRSP about the current status of the work in ELSA and to prepare a document for consideration by SGS-HFCV how to proceed with the work on the GTR.

A. SITUATION

The goal of the informal working group is to develop electric safety provisions for electric, hybrid and hydrogen/fuel cell-vehicles during “**in-use**” and “**post-crash**” as optional requirements. The scope of the electric safety provisions will be in accordance with the relevant documents identified in paragraphs 5 and 6 of the Terms of References.

During the last meeting of the group in Paris there was a good progress regarding the requirements for the in-use sub-section.

Also the requirements for the post-crash sub-section have been discussed in depth. There are different points of view regarding the criteria to be met after a crash. The discussed text propose that

at least one of the following criteria shall be met:

- Insulation Resistance
- Voltage
- Energy
- Physical Protection

(For detailed information please refer to the attached abstract out of the subsection post-crash)

The energy criterion is a new state of the art requirement. However the physical barrier criterion is mentioned in Japanese regulation. Both are not mentioned in FMVSS 305. As the subsection for post-crash will be incorporated into the Hydrogen Fuel-Cell Vehicle GTR also the contracting parties under 1998 agreement have to accept them.

B. Further steps

Until there is no decision whether ELSA go ahead with all four alternatives, ELSA will concentrate their work on the subsection “in-use”.

Abstract out of the proposal for the subsection “post-crash”

3.3. Electrical Safety

After each crash test, at least one of the following criteria specified in paragraph 3.3.1 through paragraph 3.3.4 shall be met. If the vehicle has an automatic disconnect function, the criteria shall be applied to each divided portion individually.

3.3.1. Insulation Resistance

If the electrical circuit divided by the disconnect function includes AC circuit, this part of the high voltage bus shall be considered as an AC high voltage bus.

If the electrical circuit divided by the disconnect function doesn't include AC circuit, this part of the high voltage bus shall be considered as a DC high voltage bus.

3.3.1.1. For AC high voltage buses, insulation resistance between the high voltage bus and the electrical chassis shall have minimum value of 500 ohms/volt of working voltage.

If the protection degree IPXXB is satisfied for AC portion of the high voltage buses after crash, insulation resistance between the high voltage bus and the electrical chassis shall have minimum value of 100 ohms/volt of working voltage.

3.3.1.2. For DC high voltage buses, insulation resistance between any high voltage bus and the electrical chassis shall have minimum value of 100 ohms/volt of working voltage.

3.3.2. Voltage

3.3.2.1. For AC high voltage buses, voltage of the bus shall be equal to or less than 30 VAC.

3.3.2.2. For DC high voltage buses, voltage of the bus shall be equal to or less than 60 VDC.

3.3.3. Energy

Energy on the high voltage bus shall be less than 0.2 Joules.

3.3.4. Physical Protection

3.3.4.1. For protection of live parts, the protection degree IPXXB shall be provided.

3.3.4.2. For protection against indirect contact with live parts, all exposed electroconductive components shall be securely connected to the electrical chassis such that no dangerous potentials are produced. The resistance between the electrical chassis and all exposed electroconductive components shall be less than 0.1 ohm, which is measured when there is a current flow of at least 0.2 amps.

The said resistance shall be regarded as lower than 0.1 ohm when it is clearly evident that the DC electrical connection has been established adequately and securely by welding.