

Informal document No. GRSP-47-19

(47th GRSP, 17 - 21 May 2010,
agenda item 17)

Informal adhoc EVPC Working Group

Geneva, may 18 th, 2010

**Proposal from FRANCE based
on EVPC informal group work**

PROPOSALS

- **ECE/TRANS/WP.29/GRSP/2010/19 – R12**
- **ECE/TRANS/WP.29/GRSP/2010/20 – R94**
- **ECE/TRANS/WP.29/GRSP/2010/21 – R95**

modified as:

- ECE/TRANS/WP.29/GRSP/47-01 – R12 *Rev1*
- ECE/TRANS/WP.29/GRSP/47-02 – R94 *Rev1*
- ECE/TRANS/WP.29/GRSP/47-03 – R95 *Rev1*

AIMS

- To have material to homologate electric vehicle regarding crash test requirements
 - To use R 94 as a basis for performing the crash test requirements - no modification of the existing R 94, only introduction of new prescriptions to take into account EV/HEV.
 - Idem for R 95 (similar modifications)
 - Idem for R 12, (similar modifications and update)

CONTENT

- No change for the scope of R 94, R 95, and introduction of EV for R 12.
- Definitions:
 - R 100 amendment (**ECE/TRANS/WP.29/GRSP/2010/52**)
 - EV vehicle type and vehicle information
 - Passenger compartment and Automatic disconnect
- Spillage requirements /cells locations
- Electrical safety requirements
- Method of measurement (annex)

EV vehicle type and information

Vehicle type

The locations of the RESS, in so far as they have a negative effect on the result of the impact test prescribed in this Regulation,

Information document

A general description of the RESS electrical power source type, and location and the electrical power train (e.g. hybrid, electric).”

Passenger compartment definition

- “2.7.2. “Passenger compartment for electric safety assessment” :

means the space for occupant accommodation, bounded by the roof, floor, side walls, doors, outside glazing, front bulkhead and rear bulkhead, or rear gate, as well as by the electrical protection barriers and enclosures provided for protecting the power train from direct contact with high voltage live parts.”

Electrical safety requirements after impact test

- **residual voltage (s)** lower than the high voltages values (if $> 60 \text{ V}$ and $\leq 1500 \text{ V}$ in DC or $> 30 \text{ V}$ and $\leq 1000 \text{ V}$ in AC (rms)).
- **Residual energy** on high voltage bus less than 0,2 j.
- **Physical Barrier protection** for live parts against direct contact and resistance between the electrical chassis and all exposed conductive parts shall be less than 0.1 ohm against indirect contact
- **Isolation resistance**: if not IPXXB :500 Ohm/V for AC and 100 Ohm/V for DC circuit (in between chassis and high voltage bus/portion

Modifications

- Isolation resistance **not applicable** if more than a single potential of a part of the high voltage bus is not protected under the conditions of protection IPXXB.
- Clarification for the possibility to calculate the residual energy for X and Y capacitors

Spillage

- 5.2.8.2. Electrolyte spillage
no electrolyte from the RESS shall spill into the passenger compartment, and no more than 7 per cent with a maximum of / 5.0 liters of electrolyte shall spill from the RESS outside the passenger compartment.

Cells and RESS locations

- RESS located inside the passenger compartment shall remain in the location in which they are installed and RESS components shall remain inside RESS boundaries.
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- No part of any RESS that is located outside the passenger compartment for electric safety assessment shall enter the passenger compartment during or after the impact test procedures.

- Test with all or part (s) of PT not energized, using Physical Protection (PT) or Isolation Resistance (IR) requirements
 - With additionnal evidence (to take into possible effects like short circuit on high voltage cables.
- Test possible with automatic disconnect triggered with additionnal information to proove the fonctionnality (trigger information, nominal current cut, etc.)

Annex 11 (9),(7)

- Deactivation of the on-board isolation resistance measuring system
- Clarification on the measurement of V_b at the right place
- Threshold limited to 60 VDC
- Additionnal formulas to calculate the energy for X and Y capacitors.

Test conditions

- *1.4.4.1. RESS be at any state of charge, which allows the normal operation of the power train as recommended by the manufacturer.*
- *1.4.4.2. The electrical power train shall be energized with or without the operation of the original electrical energy sources (e.g. engine-generator, RESS or electric energy conversion system)*

Annexes – test procedures

- **Test setup and equipment**
- **Bus voltage**
- **Isolation resistance measurement method (taken from R 100 amendments)**
- **Electrical Energy**
- **Physical Barrier**