

## Proposal for Supplement 5 to the 02 Series of Amendments to UN Regulation No. 100 (Electric power trained vehicles)

The text reproduced below was prepared by the expert from France to clarify the direction of impact in the mechanical integrity test. The modifications to the existing text of the UN Regulation by document ECE/TRANS/WP.29/GRSP/2023/23 are marked in "bold black" for new or strikethrough for deleted characters. The modifications made by this document are marked in "(bold blue)" for new or strikethrough for deleted characters.

### I. Proposal

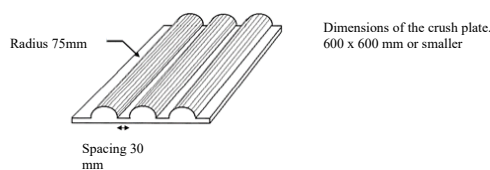
*Insert new paragraphs 12.7. to read:*

**"12.7. Supplement 5 to the 02 series of amendments to this Regulation shall not apply to approvals originally granted prior to the official date of entry into force of Supplement 5, nor to their extensions."**

*Annex 89D, paragraphs 3.2.1., amend to read:*

"3.2.1. Crush force

The ~~t~~Tested-Device shall be crushed between a resistance and a crush plate as described in figure 1 with a force of at least 100 kN, but not exceeding 105 kN, unless otherwise specified in accordance with Paragraph 6.4.2 of this Regulation, with an onset time less than 3 minutes and a hold time of at least 100 ms but not exceeding 10s.



A higher crush force, a longer onset time, a longer hold time, or a combination of these, may be applied at the request of the manufacturer.

The application of the force shall be decided by the manufacturer **together with the technical service** having consideration to the direction of travel of the REESS relative to its installation in the vehicle. The application force being applied; **(a) horizontally and in the direction of travel of the REESS, and (b) horizontally and perpendicular to the direction of travel of the REESS. For each of the test directions specified, a separate test-device may be used.**

The test shall end with an observation period of 1 h at the ambient temperature conditions of the test environment."

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## II. Justification

1. In UN Regulation N°100, 02 series of amendments, mechanical integrity requirements were introduced for REESS intended for installation in vehicles of categories M<sub>1</sub> and N<sub>1</sub>. At the manufacturer's choice, the test may be performed as, either vehicle-based tests or component-based tests.

In case of vehicle-based tests, Rechargeable Electric Energy Storage System(s) REESS(s) installed in vehicles are subjected to vehicle crash tests in accordance with UN Regulation No. 12, Annex 3 or UN Regulation No. 94, Annex 3 for frontal impact, and Regulation No. 95, Annex 4 for side impact. The REESS(s) will therefore be loaded in two directions: frontal and lateral.

In case of vehicle specific component test, the crush force replacing the prescribed force specified in paragraph 3.2.1. of Annex 8D shall be determined by the vehicle manufacturer using the data obtained from either actual crash tests or its simulation as specified in Annex 3 to UN Regulation No. 12 or 94 in the direction of travel and according to Annex 4 to UN Regulation No. 95 in the direction horizontally perpendicular to the direction of travel. These forces shall be agreed by the Technical Service.

Therefore, forces must be applied in both directions: frontal (in the direction of travel) and lateral (perpendicular to the direction of travel).

As an alternative, a generic component-based integrity test for the REESS is possible to allow REESS manufacturers to achieve a generic vehicle independent component approval for the REESS. The test shall be conducted in accordance with Annex 8D to the UN Regulation N°100, 02 series of amendments.

In the working document of UN Regulation N°100, 02 series of amendments presented during the fifty-first session of the Working Party on Passive Safety (GRSP) (ECE/TRANS/WP29/GRSP/2012/10), the justifications of the mechanical integrity test were detailed.

Paragraph 31 of part II explains that the loads used in the integrity tests for component tests were derived from REESS contact loads which have been observed on vehicle crash tests according to UN Regulations Nos. 12, 94 and 95, using electric and hybrid-electric vehicles which were available on the market at that time. Considering this, a REESS charged with the maximum observed contact load in the direction of travel and horizontal perpendicular to this direction can be assumed as save in the event of a vehicle crash (Paragraph 38). As consequence paragraph 38 of part II prescribes explicitly two directions.

Therefore, REESS tested with a generic component-based integrity test should be loaded in two different directions: one test in the direction of travel of the vehicle and one test perpendicular to the direction of travel of the vehicle, and the text was modified to clarify this point.

- ~~2. The transitional provision in paragraph 12.7 specifies that the proposed supplement will not affect existing approvals of REESS which have been crushed in one direction according to Annex 8D (mechanical integrity), nor their extension.~~