

## Proposal for amendments to Regulations Nos. 13-H and 13

### I. Proposal

#### *Regulation No.13-H*

*Annex 3, Paragraph 1.4.1.2.3.*, amend to read (addition of a new sub-paragraph (d)):

"1.4.1.2.3. in the case of a vehicle equipped with an electric regenerative braking system, the requirements depend on the category of this system:

Category A. Any separate electric regenerative braking control which is provided, shall not be used during the Type-0 tests.

Category B. The contribution of the electric regenerative braking system to the braking force generated shall not exceed that minimum level guaranteed by the system design.

This condition is deemed to be satisfied if the state of charge of the batteries is in one of the following conditions:

- (a) at the maximum charge level recommended by the manufacturer, as listed in the vehicle specification,
- (b) at a level not less than 95 per cent of the full charge level, where the manufacturer has made no specific recommendation,
- (c) at a maximum level resulting from automatic charge control on the vehicle, **or**
- (d) **when the tests are conducted without regenerative braking component, as agreed between the Technical service and the vehicle manufacturer, regardless of the state of charge of the batteries."**

*Annex 3, Paragraph 1.5.2.4.*, amend to read:

"1.5.2.4. In the case of vehicles equipped with an electric regenerative braking system of category B, having carried out the heating cycles according to paragraph 1.5.1.6. of this annex, the hot performance test shall be carried out at the maximum speed which can be reached by the vehicle at the end of the brake heating cycles, unless the speed specified in paragraph 2.1.1. (A) of this annex can be reached.

For comparison, a later Type-0 test with cold brakes shall be repeated from this same speed and with a similar electric regenerative braking contribution, as set by an appropriate state of battery charge, as was available during the hot performance test.

Following the recovery process and test, further reconditioning of the linings shall be permitted before the test is made to compare this second cold performance with that achieved in the hot test, against the criteria of paragraphs 1.5.2.2. or 1.5.2.5. of this annex.

**The tests may be conducted without regenerative braking component, as agreed between the Technical service and the vehicle manufacturer. In this case, the above requirement on the state of charge of the batteries is not applicable.”**

*Annex 3, Paragraph 1.5.3.1., amend to read:*

“1.5.3.1. Vehicles equipped with an electrical regenerative braking system of category B may have their batteries re-charged or replaced by a charged set, in order to complete the recovery procedure.

**The procedures may be conducted without regenerative braking component, as agreed between the Technical service and the vehicle manufacturer.**

*Annex 3, Appendix, introductory paragraph, amend to read:*

“The procedure requires the use of a bi-directional DC Watt-hour meter **or a bi-directional DC Ampere-hour meter.**”

*Regulation No.13*

*Annex 4, paragraph 1.4.1.2.2., amend to read (addition of a sub-paragraph (d)):*

“1.4.1.2.2. Every test shall be repeated ...

...Regulation;

In the case of a vehicle equipped with an electric regenerative braking system, the requirements depend on the category of this system:

Category A: Any separate electric regenerative braking control which is provided, shall not be used during the Type-0 tests.

Category B.: The contribution of the electric regenerative braking system to the braking force generated shall not exceed that minimum level guaranteed by the system design.

This requirement is deemed to be satisfied if the batteries are at one of the following state of charge conditions where state of charge / is determined by the method set out in Appendix 1 to this annex:

- (a) at the maximum charge level as recommended by the manufacturer in the vehicle specification, or
- (b) at a level not less than 95 per cent of the full charge level, where the manufacturer has made no specific recommendation, or
- (c) at the maximum level which results from automatic charge control on the vehicle, **or**
- (d) **when the tests are conducted without regenerative braking component, as agreed between the Technical service and the vehicle manufacturer, regardless of the state of charge of the batteries.”**

*Annex 4, paragraph 1.5.3.1.3., amend to read:*

“1.5.3.1.3. In the case of vehicles equipped with an electric regenerative braking system of category B, having carried out the heating cycles according to paragraph 1.5.1.6. of this annex, the hot performance test shall be carried out at the maximum speed which can be reached by the vehicle at the end of the brake heating cycles, unless the speed specified in paragraph 1.4.2. of this annex can be reached.

For comparison, the Type-0 test ...

... against the criteria of paragraphs 1.5.3.1.1. and 1.5.3.2. of this annex.

**The tests may be conducted without regenerative braking component, as agreed between the Technical service and the vehicle manufacturer. In this case, the above requirement on the state of charge of the batteries is not applicable.”**

*Annex 4, Appendix, introductory paragraph, amend to read:*

“The procedure requires the use of a bi-directional DC Watt-hour meter **or a bi-directional DC Ampere-hour meter.**”

## **II. Justification**

1. At 46th GRRF in September of 1999, US proposed GRRF-46-03 to harmonize between R13H and FMVSS135 on electric vehicle requirement. After several following sessions, GRRF agreed to introduce some amendments into R13H and R13. For reference, in FMVSS135, SAE J227a-1976 is quoted for measurement of SOC.
  2. The purpose of the requirements in paragraph 1.4.1.2.3. of Annex 3 to Regulation N°13-H is to perform the test with the minimum possible assistance from the regenerative braking system (RBS). It is however uneasy to accurately adjust the state of charge of the battery in order to fulfil this provision. It appears therefore reasonable to allow performing the test with disabled RGB with the side effect that, in addition, such possibility makes the test easier to perform in practice. For these reasons, OICA proposes to add RBS disabling as an option to perform the Type-0 and Type-I tests.
  3. In addition to the above, OICA proposes to add the possibility to measure the state of charge (SOC) of the battery with the help of a DC Ampere-hour meter, in addition to the currently mandatory DC Watt-hour meter. The Ampere-hour meter is indeed a more convenient and more accurate tool for such measurement.
  4. The proposals above are copy-pasted in the relevant paragraphs of Regulation N°13 (braking of heavy vehicles).
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