

Proposal for Amendment 4 to Global Technical Regulation No. 3 (Motorcycle braking)

Submitted by the representative of Italy

The text reproduced below was submitted by the representative of Italy and prepared with the support of IMMA, with the aim to adapt UN Global Technical Regulation (GTR) No. 3 to technical and standardization progress, introducing provisions for the activation of the stop lamp under regenerative braking and updating the references to ASTM standards to enable the use of the new ASTM standard reference test tyre F2493 for the measurement of the Peak Braking Coefficient (PBC). This proposal aims to keep the global harmonization of motorcycle braking requirements in UN GTR No. 3 and the most recent version of UN Regulation No. 78, including the alignment with the latest proposed amendments to UN Regulation No. 78 submitted by IMMA to the 11th session of GRVA (GRVA/2021/26 and GRVA/2021/27).

I. Proposal

Insert new paragraphs 2.24. to 2.25., to read:

"2.24. "Braking Signal" means a logic signal indicating when illumination of the stop lamp is required or allowed as specified in paragraph 3.1.18. of this Regulation.

2.25. "Electric Regenerative Braking System" means a braking system which, during deceleration, provides for the conversion of vehicle kinetic energy into electrical energy and is not part of the service braking system."

Insert new paragraphs 3.1.18. to 3.1.18.3., to read:

"3.1.18. Generation and de-activation of the braking signal to illuminate stop lamp(s) shall only be under the following conditions:

3.1.18.1. Application of any service brake by the rider shall generate a braking signal that will be used to illuminate the stop lamp(s).

3.1.18.2. In addition, in case of vehicles equipped with electric regenerative braking systems which produces a retarding force upon release of the accelerator control, the braking signal shall be generated also according to the following provisions:

<i>Vehicle deceleration by regenerative braking</i>	<i>Signal generation</i>
$\leq 1.3 \text{ m/s}^2$	The signal may be generated
$> 1.3 \text{ m/s}^2$	The signal shall be generated

An appropriate measure (e.g. switch-of-hysteresis, averaging, time delay) shall be implemented in order to avoid fast changes of the signal resulting in flickering of the stop lamps.

3.1.18.3. Once generated, the signal shall be kept as long as a deceleration demand by the electric regenerative braking persists. However, the signal may be suppressed at standstill.

The signal shall not be generated when retardation is solely produced by the natural braking effect of the engine, air-/rolling resistance and/or road slope."

Paragraph 4.1.1.3., amend to read:

"4.1.1.3. Measurement of PBC:

The PBC is measured as specified in national or regional legislation using either:

- (a) The American Society for Testing and Materials (ASTM) E1136-19 (~~Re approved 2003~~) standard reference test tyre, in accordance with ASTM Method E1337-19-90 (~~Re approved 2008~~), at a speed of 40 mph without water delivery; or
- (b) **An ASTM International (ASTM) F2493-20 standard reference test tyre, in accordance with ASTM Method E1337-19, at a speed of 40 mph¹; or**
- (c) The method specified in paragraph 5."

¹ In this case, the obtained PBC shall be converted into the equivalent value corresponding to E1136-19 standard reference test tyre, according to the correlation equation described in ASTM E1337-19."

II. Justification

1. UN Global Technical Regulation (GTR) No. 3 contains the most advanced requirements for motorcycle brake systems. The implementation of UN GTR No. 3 is widely extended across the world and, in conjunction with UN Regulation No. 78, it provides a global framework to guarantee a safe motorcycle braking performance. It is therefore essential to keep UN GTR No. 3 continuously updated in terms of technological progress and standardization developments, as well as harmonized with UN Regulation No. 78.

2. This proposal aims to introduce two elements in UN GTR No. 3:

- Requirements for the activation of the stop lamp under regenerative braking.
- Additional reference to the new ASTM standard reference test tyre F2493.

3. The requirements for the activation of the stop lamp under regenerative braking for electric vehicles were introduced in UN Regulation No. 78 in January 2020, by means of Supplement 1 to the 04 series of amendments (ECE/TRANS/WP.29/2019/46). The deceleration thresholds for generating the braking signal are aligned with those in the current version of UN Regulation No. 13-H for passenger cars. This ensures a consistent stop lamp activation criteria across different vehicle categories, which avoids confusing road users driving behind a decelerating vehicle, regardless of its vehicle category.

4. In December 2020, GRVA adopted a proposal by OICA and CLEPA modifying the provisions for the generation of a braking signal to illuminate stop lamps in UN Regulation No. 13-H (ECE/TRANS/WP.29/GRVA/2020/31), to ensure that the stop lamp illumination reflects the intention to decelerate, independently from the type of propulsion. For that purpose, the requirement to deactivate the stop lamp signal when deceleration falls below 0.7 m/s^2 under regenerative braking was removed. For the sake of consistency, IMMA also submitted a formal proposal to 11th session of GRVA (GRVA/2021/26) to align the deceleration thresholds in UN Regulation No. 78 accordingly. This amendment to UN GTR No. 3 already reflects the latest deceleration thresholds.

5. UN GTR No. 3 currently requires to use ASTM standard reference test tyre (SRTT) E1136 when determining the Peak Braking Coefficient (PBC) of the test surface according to ASTM Method E1337. At the 71st session of GRBP in January 2020, ETRTO reported that the sales of ASTM SRTT E1136 would be discontinued approximately by the end of 2021, to be replaced by the new ASTM SRTT F2493. ASTM Method E1337 had been updated accordingly in 2019 to introduce the new ASTM SRTT F2493 and correlation equations to convert PBC values from SRTT F2493 into SRTT E1136 and vice-versa (GRBP-71-06).

6. It is necessary to introduce in UN GTR No. 3 a reference to the new ASTM SRTT F2493 and the conversion equation defined in the latest version of ASTM standard E1337, while keeping the existing PBC provisions unchanged, in line with IMMA proposal to amend UN Regulation No. 78 (GRVA/2021/27).