

17 November 2022

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## **Agreement**

### **Concerning the Adoption of Harmonized Technical United Nations Regulations for Wheeled Vehicles, Equipment and Parts which can be Fitted and/or be Used on Wheeled Vehicles and the Conditions for Reciprocal Recognition of Approvals Granted on the Basis of these United Nations Regulations\***

(Revision 3, including the amendments which entered into force on 14 September 2017)

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#### **Addendum 77 – UN Regulation No. 78**

#### **Revision 3 - Amendment 1**

Supplement 1 to the 05 series of amendments – Date of entry into force: 8 October 2022

#### **Uniform provisions concerning the approval of vehicles of categories L1, L2, L3, L4 and L5 with regard to braking**

This document is meant purely as documentation tool. The authentic and legal binding text is: ECE/TRANS/WP.29/2022/13.



**UNITED NATIONS**

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\* Former titles of the Agreement:

Agreement concerning the Adoption of Uniform Conditions of Approval and Reciprocal Recognition of Approval for Motor Vehicle Equipment and Parts, done at Geneva on 20 March 1958 (original version); Agreement concerning the Adoption of Uniform Technical Prescriptions for Wheeled Vehicles, Equipment and Parts which can be Fitted and/or be Used on Wheeled Vehicles and the Conditions for Reciprocal Recognition of Approvals Granted on the Basis of these Prescriptions, done at Geneva on 5 October 1995 (Revision 2).



Paragraphs 2.31. to 2.32., renumber to read:

- "2.31. "Braking Signal" means a logic signal indicating when illumination of the stop lamp is required or allowed as specified in paragraph 5.1.17. of this Regulation.
- 2.32. "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.
- 2.33. "Disable the antilock brake system" means to put the system into a state where it will no longer fulfil the technical requirements in paragraph 9 of Annex 3 to this Regulation."

Paragraph 5.1.17.2., amend to read:

- "5.1.17.2. 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 <sup>4</sup>:

Vehicle deceleration by regenerative braking	Signal generation
$\leq 1.3 \text{ m/s}^2$	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.

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<sup>4</sup> At the time of type approval, compliance with this requirement shall be confirmed by the vehicle manufacturer."

Insert new paragraph 5.1.17.3., to read:

- "5.1.17.3. 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."

Annex 3, paragraph 1.1.3., amend to read:

- "1.1.3. Measurement of PBC:

The PBC is measured as determined by the Type Approval Authority using either:

- (a) An ASTM International (ASTM) E1136-19-standard reference test tyre, in accordance with ASTM Method E1337-19, at a speed of 40 mph; or
- (b) An ASTM International (ASTM) F2493-20 standard reference test tyre, in accordance with ASTM Method E1337-19, at a speed of 40 mph<sup>1</sup>; or
- (c) The method specified in the Appendix 1 to this annex.

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