

24 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 6 March 2020)

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#### **Addendum 151 – UN Regulation No. 152**

#### **Revision 1 - Amendment 5**

Supplement 4 to the 01 series of amendments – Date of entry into force 8 October 2022.

#### **Uniform provisions concerning the approval of motor vehicles with regard to the Advanced Emergency Braking System (AEBS) for M<sub>1</sub> and N<sub>1</sub> vehicles**

This document is meant purely as documentation tool. The authentic and legal binding text is: ECE/TRANS/WP.29/2022/19 (as amended by paragraph 81 of the report ECE/TRANS/WP.29/1164) .



**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).



Paragraph 2.12., amend to read (including re-numbering of former Footnote 3):

"2.12. "Dry road affording good adhesion" means a road with a sufficient nominal<sup>2</sup> Peak Braking Coefficient (PBC) that would permit:

- (a) A mean fully developed deceleration of at least 9 m/s<sup>2</sup> ; or
- (b) The design maximum deceleration of the relevant vehicle;

Whichever is lower."

Footnote 2, renumber as Footnote 3

Footnote 3, renumber as Footnote 2

Paragraph 2.13., amend to read:

"2.13. "Sufficient nominal Peak Braking Coefficient (PBC)": means a road surface friction coefficient of:

(a) 0.9, when measured using the American Society for Testing and Materials (ASTM) of E1136-19 standard reference test tyre in accordance with ASTM Method E1337-19 at a speed of 40 mph;

(b) 1.017, when measured using either:

(i) The American Society for Testing and Materials (ASTM) of F2493-20 standard reference test tyre in accordance with ASTM Method E1337-19 at a speed of 40 mph; or

(ii) The k-test method specified in Appendix 2 to Annex 6 of UN Regulation No. 13-H."

Insert a new paragraph 2.17., to read:

"2.17. "The mean fully developed deceleration ( $d_m$ )" shall be calculated as the deceleration averaged with respect to distance over the interval  $v_b$  to  $v_e$ , according to the following formula:

$$d_m = \frac{v_b^2 - v_e^2}{25.92(s_e - s_b)}$$

Where:

$v_o$  = initial vehicle speed in km/h,

$v_b$  = vehicle speed at 0.8  $v_o$  in km/h,

$v_e$  = vehicle speed at 0.1  $v_o$  in km/h,

$s_b$  = distance travelled between  $v_o$  and  $v_b$  in metres,

$s_e$  = distance travelled between  $v_o$  and  $v_e$  in metres.

The speed and distance shall be determined using instrumentation having an accuracy of  $\pm 1$  per cent at the prescribed speed for the test. The  $d_m$  may be determined by other methods than the measurement of speed and distance; in this case, the accuracy of the  $d_m$  shall be within  $\pm 3$  per cent."

Paragraph 5.2.1.4, amend to read:

"5.2.1.4. Speed reduction by braking demand

In absence of driver's input which would lead to interruption according to paragraph 5.3.2., the AEBS shall be able to achieve a relative impact speed that is less or equal to the maximum relative impact speed as shown in the following table:

- (a) For collisions with unobstructed and constantly travelling or stationary targets;
- (b) On flat, horizontal and dry roads affording good adhesion;

- (c) In maximum mass and mass in running order conditions;
- (d) In situations where the vehicle longitudinal centre planes are displaced by not more than 0.2 m;
- (e) In ambient illumination conditions of at least 1000 Lux without blinding of the sensors (e.g. direct blinding sunlight);
- (f) In absence of weather conditions affecting the dynamic performance of the vehicle (e.g. no storm, not below 0°C); and
- (g) When driving straight with no curve, and not turning at an intersection.

It is recognised that ..."

*Paragraph 5.2.2.4, amend to read:*

"5.2.2.4. Speed reduction by braking demand

In absence of driver's input which would lead to interruption according to paragraph 5.3.2., the AEBS shall be able to achieve an impact speed that is less or equal to the maximum relative impact speed as shown in the following table:

- (a) With unobstructed perpendicularly crossing pedestrians with a lateral speed component of not more than 5 km/h;
- (b) In unambiguous situations (e.g. not multiple pedestrians);
- (c) On flat, horizontal and dry roads affording good adhesion;
- (d) In maximum mass and mass in running order conditions;
- (e) In situations where the anticipated impact point is displaced by not more than 0.2 m compared to the vehicle longitudinal centre plane;
- (f) In ambient illumination conditions of at least 2000 Lux without blinding of the sensors (e.g. direct blinding sunlight).
- (g) In absence of weather conditions affecting the dynamic performance of the vehicle (e.g. no storm, not below 0°C) and
- (h) When driving straight with no curve, and not turning at an intersection.

It is recognised that ..."

*Paragraph 6.1.1. and subparagraphs, amend to read:*

6.1.1. Test surface

6.1.1.1. The test shall be performed on a flat, dry, concrete or asphalt, road affording good adhesion.

6.1.1.2. The test surface shall have a consistent slope between level and 1 per cent.

*Paragraph 6.3.1., amend to read:*

"6.3.1. The target used for the vehicle detection tests shall be a regular high-volume series production passenger car of Category M<sub>1</sub> or alternatively a "soft target" representative of a passenger vehicle in terms of its identification characteristics applicable to the sensor system of the AEBS under test according to ISO 19206-3:2021. The reference point for the location of the vehicle shall be the most rearward point on the centreline of the vehicle."