

Proposal for amendments to ECE/TRANS/WP.29/GRVA/2021/22

The following text is submitted as an amendment to the OICA proposal for Supplement to the original text of UN R152, to UN R152.01 and to UN R152.02.

The red text shows the changes compared to GRVA/2021/22.

The red **bold** text shows the text added to the proposal GRVA/2021/22

The red ~~striketrough~~ text shows the text removed from the proposal GRVA/2021/22

I. Proposal

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 nominal² peak braking coefficient (PBC)** ~~of 0.9~~ **that would permit**
- **a mean fully developed deceleration of at least 9m/s², or**
 - **the design maximum deceleration of the relevant vehicle**
- whichever is lower.**

Footnote 2: renumber as Footnote 3

Footnote 3: renumber as Footnote 2

Paragraph 2.14., ~~delete~~ amend to read:

- “2.14. “**Sufficient Peak braking coefficient (PBC)**”: means **a road surface friction coefficient of** ~~the measure of tyre to road surface friction based on the maximum deceleration of a rolling tyre.~~
- **0.9, when measured using the American Society for Testing and Materials (ASTM) of E1136 standard reference test tyre in accordance with ASTM Method E1337 90 at a speed of 40 mph**
 - **1.017, when measured using either:**
 - a) **The American Society for Testing and Materials (ASTM) of F2493 standard reference test tyre in accordance with ASTM Method E1337-90 at a speed of 40 mph; or**
 - b) **The k-test method specified in Appendix 2 to Annex 6 of Regulation No. 13-H.”**

Insert a new paragraph 2.18., to read:

- “2.18. “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 ± 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 ± 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., amend to read (including the ~~deletion~~ **re-numbering** of the footnote 3)

6. Test procedure

“6.1. Test Conditions

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

~~6.1.1.1. The road test surface shall have a nominal³ peak braking coefficient (PBC) of 0.9, unless otherwise specified, when measured using either:~~

~~6.1.1.2. The American Society for Testing and Materials (ASTM) E1136 standard reference test tyre, in accordance with ASTM Method E1337-90, at a speed of 40 mph; or~~

~~6.1.1.3. The k test method specified in Appendix 2 to Annex 6 of Regulation No. 13 H.~~

~~6.1.1.4. The test surface has 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 M1 ~~AA-saloon~~ or alternatively a "soft target" representative of ~~such~~ a **passenger** vehicle in terms of its identification characteristics applicable to the sensor system of the AEBS under test according to ~~ISO 19206-3:2020~~ **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.”

II. Justifications

1. The aim of the PBC reference in this Regulation is to ensure that the adhesion of the road surface will not limit AEBS performance during test.

2. For AEBS for M₁/N₁ vehicles, the theoretical calculations performed to derive the achievable speed reduction assumed a deceleration of the AEBS vehicle of 9 m/s².

3. If the road surface permits the vehicle to reach this deceleration, then the adhesion of the road surface will not be the limiting factor.

4. The currently included PBC reference would not ensure that this required level of deceleration can be reached.

5. The proposal therefore aims to clarify the text to express that the adhesion of the road surface must permit the vehicle to achieve this minimum level of deceleration, which then no longer requires to include a specific PBC value.

6. In order to avoid confusion with other regulations that might refer to a “dry road” in a different context, this proposal additionally aims to consistently use the term “dry road affording good adhesion” throughout this regulation, as was previously introduced in paragraph 6.1.1.

7. The proposed amendments to paragraph 2.12. are further improved.

- Addition of “sufficient” to align with the new proposed definition in paragraph 2.14.
- Addition of a new footnote, to make the understanding of “nominal” appear at the first occurrence of the word.
- Re-instate of PBC as a reference to the definition in paragraph 2.14, yet with no value. The value of 0.9 is indeed unnecessary since the key criterion for meeting the performance requirements is the capacity of reaching a certain deceleration (see item 3 above).

- That deceleration must be at least 0.9m/s² or, should the vehicle be unable to reach that value, its maximum technically reachable deceleration.
8. The footnotes 2 and 3 must be re-numbered due to the transfer of the text of current Footnote 3 to the new Footnote 2
9. The definition of “PBC” needs further improvements:
- Transfer of the surface characteristics from the test conditions into the definition of PBC. This clarifies the definition and the rest of the regulation
 - Upgrade of the reference to the standard tyre
 - Keep the reference to the “old” standard tyre to make an overlap during the time the Technical Services and the manufacturers are getting equipped with the new standard tyre
 - Keep the alternative of the K-test method for the manufacturers/contracting parties that need it.
10. Paragraph 6.1.1.: wording is adapted to the rest of the proposal, in particular the definition of “dry road affording good adhesion” per paragraph 2.12.
11. Paragraph 6.3.1.:
- The correct name for the ISO standard is “ISO 19206-3:2021”, as it was published this year
 - Vehicle targets specified in ISO 19206-3 reflect “passenger cars and, in particular, the smaller and more common B and C segment cars”. Particularly, the shape of the target defined there resembles more a Category M1 AB Hatchback than an M1 AA Saloon. Therefore, the word “such” creates an incorrect connection and should be deleted.
 - In addition, “AA saloon” reduces the field of possible targets and can be deleted. The word “passenger” is then added to ensure that the Technical Service will indeed use a target representative of a passenger car.
12. For best convenience, here are the texts of the current footnotes 2 and 3:
- ² The "nominal" value is understood as being the theoretical target value.
- ³ The distinguishing numbers of the Contracting Parties to the 1958 Agreement are reproduced in Annex 3 to the Consolidated Resolution on the Construction of Vehicles (R.E.3), document ECE/TRANS/WP.29/78/Rev.6, Annex 3 - www.unece.org/trans/main/wp29/wp29wgs/wp29gen/wp29resolutions.html