

## **Proposal for a new supplement to the 03, 04, 05 and 06 series of amendments to UN Regulation No. 78**

Proposal to adapt the deceleration threshold also to S-EPAC for the 03, 04, 05 and the new 06 series of amendments to UN Regulation No. 78.

### **I. Proposal**

*Paragraph 9.3.2.*, amend to read:

"9.3. Stops on a high friction surface

9.3.2. Performance requirements

When the brakes are tested in accordance with the test procedures referred to in paragraph 9.3.1.:

(a) The stopping distance (S) shall be:

(i) In general,  $S \leq 0.0063V^2$  (where V is the specified test speed in km/h and S is the required stopping distance in metres) or the MFDD shall be  $\geq 6,17 \text{ m/s}^2$ ; or

(ii) In case of pedal-driven vehicles of Category L<sub>1</sub> with auxiliary electric propulsion,  $S \leq 0.0056V^2/P$  (where V is the specified test speed in km/h, P is the peak braking coefficient and S is the required stopping distance in metres) or the MFDD shall be  $\geq 6.87 \times P$ , in  $\text{m/s}^2$ ; [and]

(b) There shall be no wheel lock and the vehicle wheels shall stay within the test lane."

### **II. Justification**

#### **A. Background**

1. In certain conditions, ABS can offer benefit in terms of cycling safety as it optimizes the trade-off between bicycle stability and deceleration.
2. ABS can work only within the physical limits of the bicycle (friction of tire & road, center of gravity of rider & bicycle, etc.)
3. ABS has, as all technical systems, a level of efficiency compared to rider's best performance (pro rider who knows when & how to brake).

#### **B. Applicable standards**

4. ABS is optionally available for both type-approved and non type-approved e-bikes (such as the S-EPAC, which is a vehicle of subcategory L1e-B according (EU) 168/2013)), hence UNECE R78 is applicable to S-EPAC.
5. Current design of the UN R78 targets ABS technology on powered two wheelers (PTWs) such as mopeds and motorcycles which have different physical limits (cf. slide 2 in informal document GRVA-18-39)

#### **C. Issue**

6. The center of gravity (CoG) of S-EPACs combined with the level of efficiency of every ABS does not fit to the braking test "Stops on high friction surface" (chapter 9.3) which includes a vehicle independent deceleration threshold of  $6.17 \text{ m/s}^2$  (cf. slide 2 in informal document GRVA-18-39)

## D. Proposal:

7. Changing the deceleration threshold definition from a vehicle independent one to a vehicle dependent one as in braking test “Stops on low friction surface” (chapter 9.4) enables a better fit of UN R78 to S-EPACs (cf. slide 3 in informal document GRVA-18-39)

8. The definition introduced in para. a.2. is based on the definition used in UN R63 (noise), para. 1. Scope

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E/ECE/324/Rev.1/Add.62/Rev.1/Amend.4  
E/ECE/TRANS/505/Rev.1/Add.62/Rev.1/Amend.4

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*Paragraph 1, amend to read:*

**"1. Scope**

This Regulation applies to vehicles of category L<sub>1</sub><sup>1</sup> with regard to sound emission. Pure electric vehicles, including vehicles with auxiliary electric propulsion, are not in the scope of this Regulation."

*Annex 3,*

*Paragraph 2.2.1., amend to read:*

"2.2.1. General condition

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