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## Economic Commission for Europe

### Inland Transport Committee

### World Forum for Harmonization of Vehicle Regulations

#### 178th session

Geneva, 25-28 June 2019

Item 4.8.2 of the provisional agenda

#### 1958 Agreement:

**Consideration of draft amendments to  
existing UN Regulations submitted by GRVA**

### **Proposal for Supplement 5 to the 02 series of amendments to UN Regulation No. 90 (Replacement brake parts)**

#### **Submitted by the Working Party on Automated/Autonomous and Connected Vehicles\***

The text reproduced below was adopted by the Working Party on Working Party on Automated/Autonomous and Connected Vehicles (GRVA) at its second session (ECE/TRANS/WP.29/GRVA/2, para. 58). It is based on ECE/TRANS/WP.29/GRVA/2018/12. It is submitted to the World Forum for Harmonization of Vehicle Regulations (WP.29) and to the Administrative Committee AC.1 for consideration at their June 2019 sessions.

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\* In accordance with the programme of work of the Inland Transport Committee for 2018–2019 (ECE/TRANS/274, para. 123 and ECE/TRANS/2018/21/Add.1, Cluster 3.1), the World Forum will develop, harmonize and update UN regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.

## **Supplement 5 to the 02 series of amendments to UN Regulation No. 90 (Replacement brake parts)**

*Annex 7*, amend to read:

### **"Annex 7**

#### **Requirements for replacement brake lining assemblies for vehicles of category L**

##### **1. Test conditions**

- 1.1. A vehicle which is representative of the type(s) for which the replacement brake lining assembly approval is required shall be equipped with the brake lining assemblies of the type for which approval is requested and instrumented for brake testing as required by UN Regulation No. 78.
- 1.2. Brake lining assemblies submitted for the test shall be fitted to the relevant brakes and, until a fixed burnishing procedure is established, shall be burnished to the manufacturer's instructions in agreement with the technical service.
- 1.3. In the case of brake lining assemblies for vehicles with a combined braking system in the meaning of paragraph 2.6. of UN Regulation No. 78 the combination(s) of brake lining assemblies for the front and the rear axle to which the approval shall be directed must be tested.

The combination may consist of replacement brake lining assemblies for both axles and/or a replacement brake lining assembly on one and an original brake lining assembly on the other axle.

##### **2. Tests and requirements**

- 2.1. Conformance with Regulation No. 78
  - 2.1.1. The braking system of the vehicle shall be tested according to the requirements for the vehicle category in question (L<sub>1</sub>, L<sub>2</sub>, L<sub>3</sub>, L<sub>4</sub>, L<sub>5</sub>, L<sub>6</sub>, L<sub>7</sub>) in Regulation No. 78, Annex 3, paragraph 1. The applicable requirements or tests are:
    - 2.1.1.1. Dry stop test - single brake control actuated

The test is to be carried out only in the laden condition. Make one brake application according to Annex 3, paragraphs 3.1. and 3.2., in UN Regulation No. 78 up to wheel lock, or up to the deceleration under performance requirements defined in Annex 3, paragraph 3.3. of UN Regulation No. 78 or up to the maximum allowed control force.

Where brake lining assembly approval is required for front axle brakes the test is to be carried out on the front brakes only.

Where brake lining assembly approval is required for rear axle brakes the test is to be carried out on the rear brakes only.
    - 2.1.1.2. Dry stop test – all service brake controls actuated

- Test is to be carried out under Annex 3, paragraph 4., UN Regulation No. 78 requirements.
- 2.1.1.3. High speed test  
Only applicable for vehicles of categories L<sub>3</sub>, L<sub>4</sub>, L<sub>5</sub> and L<sub>7</sub>.  
Test is to be carried out under Annex 3, paragraph 5., UN Regulation No. 78 requirements.
- 2.1.1.4. Wet brake test  
The test shall be carried out according to the requirements in Annex 3, paragraph 6. of UN Regulation No. 78.
- 2.1.1.5. Heat fade test  
The test shall be carried out according to the requirements in Annex 3, paragraph 7. of UN Regulation No. 78.
- 2.1.2. The vehicle must satisfy all the relevant requirements stated in Regulation No. 78, Annex 3, paragraph 2. for that category of vehicles.
- 2.2. Additional requirements
- 2.2.1. Cold performance equivalence test  
A comparison of the cold performance of the replacement brake lining assembly and the original brake lining assembly shall be made by comparing the test results.
- 2.2.1.1. Make a minimum of six brake applications at spaced increments of pedal effort or line pressure up to wheel lock or, alternatively, up to a mean fully developed deceleration according to the minimum requirements in Annex 3, paragraph 3.3., UN Regulation No. 78 or up to the allowed maximum pedal force for the category of vehicle in question from an initial speed as given in Annex 3, paragraph 3.2., UN Regulation No. 78.
- 2.2.1.2. Note and plot pedal force or line pressure and mean fully developed deceleration for each application.
- 2.2.1.3. The replacement brake lining assembly shall be considered to show similar performance characteristics to the original brake lining assembly if the achieved mean fully developed decelerations at the same line pressure in the upper two thirds of the generated curve are within 15 per cent of those obtained with the original brake lining assembly.
- 2.2.2. Speed sensitivity test  
This test is only applicable for vehicles of categories L<sub>3</sub>, L<sub>4</sub>, L<sub>5</sub>, and L<sub>7</sub> and shall be carried out with the laden vehicle under the test conditions defined in Annex 3, paragraph 3.1. and 3.2. of UN Regulation No. 78. However, the test speeds are different.
- 2.2.2.1. From the results of the cold performance test as described in paragraph 2.2.1.1. determine the control force or line pressure corresponding to the minimum required mean fully developed deceleration for that category of vehicle as described in Annex 3, paragraph 3.3 of UN Regulation No. 78.
- 2.2.2.2. Using the control force or line pressure determined in paragraph 2.2.2.1., make three brake applications from each of the following speeds:  
40 km/h, 80 km/h and 120 km/h (if  $v_{\max} \geq 130$  km/h).

- 2.2.2.3. Average the results for each group of three applications and plot speed against corresponding mean fully developed deceleration.
  - 2.2.2.4. Mean fully developed decelerations recorded for the higher speeds shall lie within 15 per cent of that recorded for the lowest speed.
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