

9 November 2015

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*

(Revision 2, including the amendments which entered into force on 16 October 1995)

Addendum 77 – Regulation No. 78

Revision 1 - Amendment 2

Supplement 2 to the 03 series of amendments – Date of entry into force: 8 October 2015

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.29/2015/9 (as amended by paragraph 57 of the report ECE/TRANS/WP.29/1114).



UNITED NATIONS

* Former title 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.

Paragraph 5.1.4., amend to read:

"5.1.4. Parking brake system

If a parking brake system is fitted, it shall hold the vehicle stationary on the slope prescribed in paragraph 1.1.4. of Annex 3.

The parking brake system shall:

- (a) Have a control which is separate from the service brake system controls; and
- (b) Be held in the locked position by solely mechanical means.

Vehicles shall have configurations that enable a rider to be able to actuate the parking brake system while seated in the normal driving position.

For L₂, L₄ and L₅, the parking brake system shall be tested in accordance with paragraph 8. of Annex 3."

Paragraph 5.1.9., amend to read:

"5.1.9. In cases where two separate service brake systems are installed, the systems may share a common brake, a common transmission, or both if the requirements of Annex 3, paragraph 12. are met."

Annex 3,

Paragraphs 1.1.3. and 1.1.4., amend to read:

"1.1.3. Measurement of PBC

The PBC is measured as determined by the approval authority using either:

- (a) An ASTM International (ASTM) E1136-93 (Re-approved 2003) standard reference test tyre, in accordance with ASTM Method E1337-90 (Re-approved 2008), at a speed of 40 mph; or
- (b) The method specified in the Appendix 1 to this annex:

1.1.4. Parking brake system tests

The specified test slope shall have a test surface gradient of 18 per cent and shall have a clean and dry surface that does not deform under the mass of the vehicle."

Paragraphs 4.2.(c) and 5.2.(c), amend to read:

"(c) Brake application:

Simultaneous actuation of both brake controls, in the case of a vehicle with two service brake systems or actuation of the single brake control in the case of a vehicle with one service brake system."

Paragraphs 9. to 9.7.1., amend to read:

"9. ABS tests

9.1. General:

- (a) The tests are only applicable to the ABS fitted on vehicle categories L₁ and L₃;
- (b) The tests are to confirm the performance of brake systems equipped with ABS and their performance in the event of ABS electrical failure;

- (c) "Fully cycling" means that the anti-lock system is repeatedly or continuously modulating the brake force to prevent the directly controlled wheels from locking;
- ...
- 9.3. Stops on a high friction surface:
- 9.3.1. Test conditions and procedure:
 - ...
 - (c) Brake application:

Simultaneous actuation of both brake controls, in the case of a vehicle with two service brake systems or actuation of the single brake control in the case of a vehicle with one service brake system.
 - (d) Brake actuation force:

The force applied is that which is necessary to ensure that the ABS will be fully cycling throughout each stop, down to 10 km/h;
 - ...
- 9.5. Wheel lock checks on high and low friction surfaces:
- 9.5.1. Test conditions and procedure:
 - ...
 - (e) Brake actuation force:

The force applied is that which is necessary to ensure that the ABS will be fully cycling throughout each stop, down to 10 km/h;
 - (f) Brake application rate:

The brake control actuation force is applied in 0.1 – 0.5 seconds;
 - ...
- 9.6. Wheel lock check - high to low friction surface transition:
- 9.6.1. Test conditions and procedure:
 - ...
 - (e) Brake actuation force:

The force applied is that which is necessary to ensure that the ABS will be fully cycling throughout each stop, down to 10 km/h;
 - ...
- 9.7. Wheel lock check - low to high friction surface transition:
- 9.7.1. Test conditions and procedure:
 - ...
 - (e) Brake actuation force:

The force applied is that which is necessary to ensure that the ABS will be fully cycling throughout each stop, down to 10 km/h;
 - ..."

Add new paragraphs 12. to 12.3., to read:

- "12. CBS failure test
- 12.1. General information:
- (a) This test will only apply to vehicles fitted with CBS of which the separate service brake systems share a common hydraulic or common mechanical transmission;
 - (b) The test is to confirm the performance of the service brake systems in the event of a transmission failure. This can be demonstrated by a common hydraulic hose or mechanical cable failure.
- 12.2. Test conditions and procedure:
- (a) Alter the brake system to produce a failure causing a complete loss of braking in the portion of the system which is shared;
 - (b) Perform the dry stop test specified in section 3. in the laden condition. Other conditions to be observed are sections 3.1.(c) and 3.2.(a), (b), (d), (e) and (f). Instead of the provisions in section 3.2.(c), only apply the control for the brake not affected by the simulated failure.
- 12.3. Performance requirements

When the brakes are tested in accordance with the test procedure set out in paragraph 12.2., the stopping distance shall be as specified in column 2 or the MFDD shall be as specified in column 3 of the following table:

Column 1	Column 2	Column 3
Vehicle category	STOPPING DISTANCE (S) (Where V is the specified test speed in km/h and S is the required stopping distance in metres)	MFDD
Front wheel(s) braking only		
L ₁	$S \leq 0.1 V + 0.0111 V^2$	$\geq 3.4 \text{ m/s}^2$
L ₂	$S \leq 0.1 V + 0.0143 V^2$	$\geq 2.7 \text{ m/s}^2$
L ₃	$S \leq 0.1 V + 0.0087 V^2$	$\geq 4.4 \text{ m/s}^2$
L ₄	$S \leq 0.1 V + 0.0105 V^2$	$\geq 3.6 \text{ m/s}^2$
L ₅	$S \leq 0.1 V + 0.0117 V^2$	$\geq 3.3 \text{ m/s}^2$
Rear wheel(s) braking only		
L ₁	$S \leq 0.1 V + 0.0143 V^2$	$\geq 2.7 \text{ m/s}^2$
L ₂	$S \leq 0.1 V + 0.0143 V^2$	$\geq 2.7 \text{ m/s}^2$
L ₃	$S \leq 0.1 V + 0.0133 V^2$	$\geq 2.9 \text{ m/s}^2$
L ₄	$S \leq 0.1 V + 0.0105 V^2$	$\geq 3.6 \text{ m/s}^2$
L ₅	$S \leq 0.1 V + 0.0117 V^2$	$\geq 3.3 \text{ m/s}^2$

The appendix,

Paragraphs 1.1. to 1.2., amend to read:

- "1.1. General:
- ...
- (e) The value of PBC shall be rounded to two decimal places.

- 1.2. Vehicle condition:
- (a) The test is applicable to vehicle categories L₁ and L₃.
 - (b) The anti-lock system shall be either disconnected or inoperative (ABS function disabled), between 40 km/h and 20 km/h.
 - (c) Lightly loaded.
 - (d) Engine disconnected."
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