

**Economic and Social Council**Distr.: General
4 July 2013

Original: English

Economic Commission for Europe**Inland Transport Committee****World Forum for Harmonization of Vehicle Regulations****Working Party on Brakes and Running Gear (GRRF)****Seventy-fifth session**

Geneva, 17-19 September 2013

Item 3(c) of the provisional agenda

Regulations Nos. 13 and 13-H (Braking) – Clarifications**Proposal for amendments to Regulation No. 13****Submitted by the experts from the International Organization of Motor Vehicle Manufacturers***

The text reproduced below was prepared by the experts from the International Organization of Motor Vehicle Manufacturers (OICA) and European Association of Automotive Suppliers (CLEPA). It is based on GRRF-74-31. The modifications to the current text of the Regulation are marked in bold for new or strikethrough for deleted characters.

* In accordance with the programme of work of the Inland Transport Committee for 2010–2014 (ECE/TRANS/208, para. 106 and ECE/TRANS/2010/8, programme activity 02.4), the World Forum will develop, harmonize and update Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.

I. Proposal

Annex 6, paragraph 3.4.1., amend to read:

"3.4.1. The simulator shall produce a digital demand signal in the electric control line according to ISO 11992-2:2003 ~~including ISO 11992-2:2003~~ and its Amd.1:2007 and shall provide the appropriate information to the trailer via pins 6 and 7 of the ISO 7638:2003 connector. For the purpose of response time measurement the simulator may at the manufacturer's request transmit to the trailer information that no pneumatic control line is present and that the electric control line demand signal is generated from two independent circuits (see paragraphs 6.4.2.2.24. and 6.4.2.2.25. of ISO 11992-2:2003 and its Amd.1:2007)."

Annex 10, paragraph 1.3.1., amend to read:

"1.3.1. At the time of type approval it shall be checked that the development of braking on an axle of each independent axle group shall be within the following pressure ranges:

(a) Laden vehicles:

At least one axle shall commence to develop a braking force when the pressure at the coupling head is within the pressure range 20 to 100 kPa.

At least one axle of every other axle group shall commence to develop a braking ~~pressure~~ **at force when** the coupling head is at a pressure ~~≤~~ 120 kPa.

(b) Unladen vehicles:

At least one axle shall commence to develop a braking force when the pressure at the coupling head is within the pressure range 20 to 100 kPa."

Annex 10, diagram 4B, explanatory note, amend to read:

"Explanatory note on the use of diagram 4B

1. Formula from which diagram 4B is derived:

$$K = \left[1.7 - \frac{0.7P_R}{P_{Rmax}} \right] \left[1.35 - \frac{0.96}{E_R} \left(1.0 + (h_R - 1.2) \frac{g \cdot P}{P_R} \right) \right] - \left[1.0 - \frac{P_R}{P_{Rmax}} \right] \left[\frac{h_R - 1.0}{2.5} \right]$$

2. Description of method of use with practical example."

Annex 11, Appendix 2, paragraph 4.2.1., amend to read:

"4.2.1. The brake forces (T) for each subject brake (for the same control line pressure pm) necessary to produce the drag force specified for both Type-I and Type-III test conditions shall not exceed the values T_e as stated in Annex 11 - Appendix 3, paragraphs ~~2.1.~~ **2.3.1.** and ~~2.2.~~ **2.3.2.**, which were taken as a basis for the test of the reference brake."

Annex 13, paragraph 4.5.2., amend to read:

"**4.5.2.** An optical warning signal shall inform the driver that the anti-lock system has been disconnected or the control mode changed; the yellow anti-lock failure warning signal specified in paragraph 5.2.1.29.1.2. may be used for this purpose.

The warning signal may be constant or flashing;"

Annex 13, paragraph 5.1.1.1., amend to read:

"**5.1.1.1.** The initial energy level in the energy storage device(s) shall be that specified by the manufacturer. This level shall be at least such as to ensure the efficiency prescribed for service braking when the vehicle is laden.

The energy storage device(s) for pneumatic auxiliary equipment shall be isolated."

Annex 13, Appendix 1, amend to read:

| <i>Symbols and definitions</i> | |
|--------------------------------|---|
| <i>Symbol</i> | <i>Notes</i> |
| E | Wheelbase |
| ER | Distance between king-pin and centre of axle or axles of semi-trailer (or distance between drawbar coupling and centre of axle or axles of centre-axle trailer) |
| ϵ | the adhesion utilized of the vehicle: quotient of the maximum braking rate with the anti-lock system operative (z_{AL}) and the coefficient of adhesion (k) |
| ... | |
| F_{WM}^{-1} | $0.01 F_{Mnd} + 0.015 F_{Md}$ |
| $\mathbf{G} \mathbf{g}$ | Acceleration due to gravity (9.81 m/s^2) |
| $\mathbf{H} \mathbf{h}$ | Height of centre of gravity specified by the manufacturer and agreed by the Technical Service conducting the approval test |
| h_D | Height of drawbar (hinge point on trailer) |
| h_K | Height of fifth wheel coupling (king pin) |
| h_R | Height of centre of gravity of the trailer |
| $\mathbf{K} \mathbf{k}$ | Coefficient of adhesion between tyre and road |
| k_f | k-factor of one front axle |
| ... | |
| z_{Rmax} | Maximum value of z_R |

Annex 13, Appendix 2, paragraph 2.2.4., amend to read:

"2.2.4. Measurement of z_{RAL} (with the anti-lock system operative)

$$z_{RAL} = \frac{z_{CAL} \cdot (F_M + F_R) - 0.01 F_{Cnd} - 0.015 F_{Cd}}{F_R}$$

z_{RAL} is to be determined on a surface with a high coefficient of adhesion and, for vehicles with a category A anti-lock system, also on a surface with a low coefficient of adhesion."

Annex 13, Appendix 2, paragraph 2.3.1., amend to read:

"2.3.1. The measurement of k (with the anti-lock system being disconnected or inoperative, between 40 km/h and 20 km/h) shall be carried out with wheels fitted only on one axle, the wheels of the other axle(s) are removed.

$$F_{bRmax} = z_{Cmax} \cdot (F_M + F_R) - F_{WM}$$

$$F_{Rdyn} = F_R - \frac{F_{bRmax} \cdot h_K + z_{Cmax} \cdot g \cdot P \cdot (h_R - h_K)}{E_R}$$

$$k = \frac{F_{bRmax}}{F_{Rdyn}}$$

Annex 13, Appendix 2, paragraph 2.3.2., amend to read:

"2.3.2. The measurement of z_{RAL} (with the anti-lock system operative) shall be carried out with all wheels fitted.

$$F_{bRAL} = z_{CAL} \cdot (F_M + F_R) - F_{WM}$$

$$F_{Rdyn} = F_R - \frac{F_{bRAL} \cdot h_K + z_{CAL} \cdot g \cdot P \cdot (h_R - h_K)}{E_R}$$

$$z_{RAL} = \frac{F_{bRAL}}{F_{Rdyn}}$$

z_{RAL} is to be determined on a surface with a high coefficient of adhesion and, for vehicles with a category A anti-lock system, also on a surface with a low coefficient of adhesion."

Annex 14, paragraph 1.6., amend to read:

"1.6. The electrical connection of the electrical braking system to the towing vehicle shall be effected by means of a special plug and socket connection corresponding to ...¹, the plug of which shall not be compatible with the sockets of the lighting equipment of the vehicle. The plug together with the cable shall be situated on the trailer."

Annex 16, paragraph 2.1.2., amend to read:

"2.1.2. Messages transmitted from the trailer to the towing vehicle:

| Function / Parameter | ISO 11992-2:2003 Reference | Regulation No. 13 Reference |
|--|----------------------------|--|
| VDC Active / passive ¹ | EBS21 Byte 2 Bit 1-2 | Annex 21, paragraph 2.1.6. |
| ... | ... | ... |
| Vehicle pneumatic supply sufficient / insufficient | EBS23 Byte 1 Bit 7-8 | Regulation No. 13, paragraph 5.2.2.16. |

Annex 17, paragraph 4.2.2.1.1., amend to read:

"4.2.2.1.1. The trailer response to the parameters defined in EBS 11 of ISO 11992-2:2003 ~~including ISO 11992-2:2003~~ and its Amd.1:2007 shall be checked as follows:

The pressure in the supply line at the start of each test shall be ≥ 700 kPa and the vehicle shall be laden (the loading condition may be simulated for the purpose of this check)."

Annex 19, paragraph 4.6.1., insert diagram 2 under this paragraph.

Annex 21, paragraph 2.1.1., amend to read:

"2.1.1. Where a vehicle is equipped with a vehicle stability function as defined in paragraph 2.4. of this Regulation, the following shall apply:

In the case of directional control the function shall have the ability to automatically control individually the speed of the left and right wheels on each axle or an axle of each axle group by selective braking based on the evaluation of actual vehicle behaviour in comparison with a determination of vehicle behaviour demanded by the driver¹.

In the case of roll-over control the function shall have the ability to automatically control the wheel speeds on at least two wheels of each axle or axle group by selective braking or automatically commanded braking based on the evaluation of actual vehicle behaviour that may lead to vehicle roll-over¹.

In both cases, ..."

II. Justification

Annex 6, paragraph 3:

1. ISO 11992-2:2003 is already referenced therefore the second reference is not necessary.

Annex 10, paragraph 1.3.1:

2. The existing text is inappropriate as the objective is to generate a braking force at a given coupling head pressure as defined in the previous paragraph and section (b). This text was added as part of the 10 Series of amendments (see ECE/TRANS/WP.29/2004/39). In the second paragraph of item (a), the pressure is defined as " ≤ 6.120 kPa" when it should be " ≤ 120 kPa".

Annex 10, explanatory note on the use of diagram 4B:

3. The formula is currently positioned under paragraph 2 but is associated with paragraph 1.

Annex 11, Appendix 2, paragraph 4.2.1.:

4. The references to paragraphs 2.1. and 2.2. are incorrect as the values of T_e are defined in the tables of paragraphs 2.3.1. and 2.3.2.

Annex 13, paragraphs 4.5.2. and 5.1.1.1.:

5. Paragraph numbers are missing.

Annex 13, Appendix 1:

6. The symbols used to defined acceleration due to gravity (g), height of centre of gravity (h) and coefficient of adhesion (k) all use upper case when they should be lower case.

Annex 13, Appendix 2, paragraph 2.2.4.:

7. Z in the formula is upper case – in all cases z should be lower case irrespective of the following subscript.

Annex 13, Appendix 2, paragraph 2.3.1.:

8. The first formula is missing from the official text.

Annex 13, Appendix 2, paragraph 2.3.2.:

9. Reposition the calculation for z_{RAL} below the other formulae to form a logical progression.

10. z in the first and third formula is a mix of upper and lower case, in all cases z should be lower case irrespective of the following subscript.

Annex 14, paragraph 1.6.:

11. The actual footnote is defined as ¹.

Annex 16, paragraph 2.1.2.:

12. Add a reference to footnote ¹ to VDC Active/Passive as this is already applied to the same text in paragraph 2.2.

Annex 17, paragraph 4.2.2.1.1.:

13. ISO 11992-2:2003 is already referenced, therefore the second reference is not necessary.

Annex 19, diagram 2:

14. Diagram 2 is currently positioned at the end of section 5 which is associated with anti-lock testing but the diagram is associated with section 4 and should be positioned after paragraph 4.6.1.

Annex 21, paragraph 2.1.1.:

15. The bold text is missing.
