UNITED NATIONS **E**

Economic and Social Council

Distr.
GENERAL

ECE/TRANS/WP.29/GRRF/2006/20
6 July 2006

Original: ENGLISH
ENGLISH AND FRENCH ONLY

ECONOMIC COMMISSION FOR EUROPE

INLAND TRANSPORT COMMITTEE

World Forum for Harmonization of Vehicle Regulations (WP.29)

Working Party on Brakes and Running Gear (GRRF)

Sixtieth session
Geneva, 18–22 September 2006
Item 1.1.7. of the provisional agenda

PROPOSAL FOR DRAFT AMENDMENTS TO REGULATION No. 13 (Braking)

Submitted by the expert from the European Association of Automotive Suppliers (CLEPA)

Note: The text reproduced below was prepared by the expert from CLEPA to insert into the Regulation additional provisions for the bedding-in procedure. The modifications to the current text of the Regulation are marked in **bold** characters.

Note: This document is distributed to the Experts on Brakes and Running Gear only.

A. PROPOSAL

Annex 11

Appendix 2,

Insert a new paragraph 1.2.1., to read:

"**1.2.1. Tests carried out according to paragraph 3.5.1. of this appendix up to Supplement [12] to the 09 series of amendments or up to supplement [2] to the 10 series of amendments, which were positive, are deemed to fulfill the provisions of paragraph 3.5.1. of this appendix, as last amended. If use is made of this alternative procedure, the test report must make reference to the original test report from which the test results are taken for the new updated report. However, new tests have to be carried out to the requirements of the latest amended version of this Regulation**."

Paragraph 3.5.1., amend to read:

"3.5.1. Supplementary cold performance test

The preparation of the brake shall be in accordance with paragraph 4.4.2. of Annex 19 of this Regulation.

In the case, that the verification of the brake factor B_F and brake threshold torque has been carried out according to paragraph 4.4.3. of Annex 19 of this Regulation, the bedding in procedure for the supplementary cold performance test must be identical with the procedure used for the verification according to paragraph 4.4.3. of Annex 19.

It is permissible to carry out the cold performance tests after the verification for the brake factor B_F in accordance with paragraph 4. of Annex 19 of this Regulation.

It is also permissible to carry out the two fade tests, Type-I and Type- III, one after the other.

Some brake applications according to Annex 19, paragraph 4.4.2.6. may be done between each of the fade tests, and between the verification and the cold performance tests. The quantity of applications is to be declared by the brake manufacturer."

Paragraph 3.5.1.1., amend to read:

"3.5.1.1. … at the end of Type-I and Type-III tests. **The Type-I and/or Type-III fade test has/have to be done immediately after this cold performance tes**t."

Annex 19

Paragraph 4.4.2.7.1., amend to read:

"4.4.2.7.1. **Calculate** the input torque to produce ……"

Paragraph 4.4.2.8., amend to read:

"4.4.2.8. Repeat the procedures defined in paragraphs 4.4.2.6. and 4.4.2.7.3. above, **where paragraph 4.4.2.6. is optional,** until the performance of five consecutive non monotonic measurements at **the 0.5 TR/Test Mass constant input value has stabilized within a tolerance of minus 10 per cent of the maximum value**."

Insert a new paragraph 4.4.2.9., to read:

"**4.4.2.9. If the manufacturer can demonstrate by field test results, that the brake factor after this bedding in state is different from the brake factor which has developed on the road, additional conditioning is permissible.**

The maximum brake temperature, measured at the lining/drum or pad/disc interface, during this additional bedding in procedure shall not exceed 500°C in the case of drum brakes and 700°C in the case of disc brakes.

This field test shall be an endurance run with the same type and model of brake as that to be recorded in the Annex 11 Appendix 3 report. The results of at least 3 tests in accordance with paragraph 4.4.3.4. of Annex 19 conducted under the conditions of the laden Type-0 test, during the field test, shall be the basis for determining whether further conditioning is permissible. The brake tests shall be documented as prescribed in Appendix 8 of this annex.

The details of any additional conditioning shall be recorded and appended to the brake factor B_F in paragraph 2.3.1. of Annex 11, Appendix 3, by specifying for instance the following test parameters:

(a) Brake actuator pressure, the brake input torque or the brake torque of the brake application;

(b) Speed at the beginning and the end of the brake application;

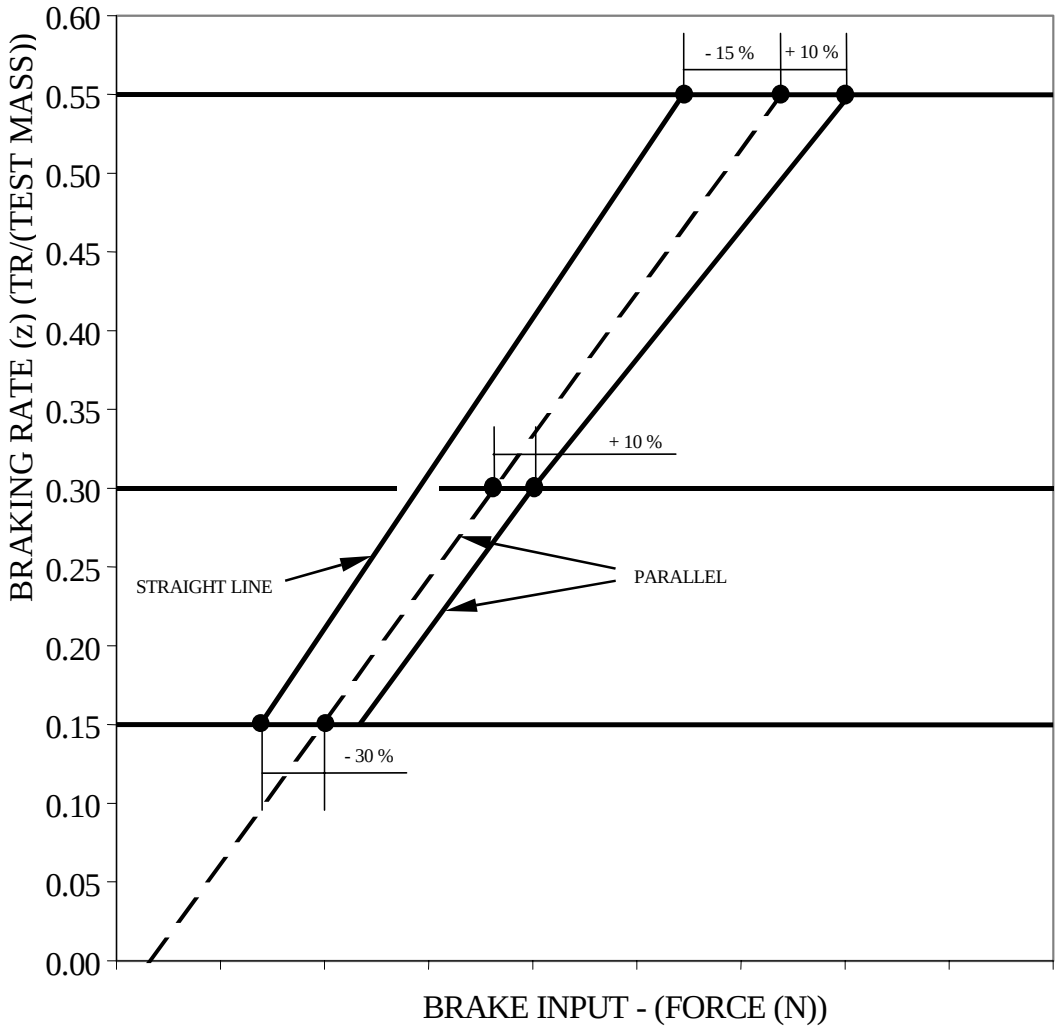
(c) Time in the case of a constant speed;

(d) Temperature at the beginning and the end of the brake application or the duration of the brake cycle."

Paragraph 4.4.2.9. (former), renumber as paragraph 4.4.2.10.

Diagram 1, amend to read:

"DIAGRAM 1



"

Insert a new Appendix 8, to read:

"**Annex 19 - Appendix 8**

FIELD TEST DOCUMENTATION
FORM AS PRESCRIBED IN PARAGRAPH 4.4.2.9. TO THIS ANNEX

1. IDENTIFICATION

1.1. Brake:
Manufacturer .....
Make .....
Type .....
Model .....
Drum brake or disc brake 1/
Data to identify the tested item .....

Technically permissible brake input torque C_{max} .....
Automatic brake adjustment device: integrated/non-integrated 1/

1.2. Brake drum or brake disc:
Internal diameter of drum or outside diameter of disc .....
Effective radius 2/ .....
Thickness .....
Mass .....
Material .....
Data to identify the tested item .....

1.3. Brake lining or pad:
Manufacturer .....
Type .....
Identification .....
Width .....
Thickness .....
Surface area .....
Method of attachment .....
Data to identify the tested item .....

1.4. Actuator:
Manufacturer .....
Make .....
Size .....
Type .....
Data to identify the tested item .....

1.5. Automatic brake adjustment device: 3/
Manufacturer .....
Make .....
Type .....
Version .....
Data to identify the tested item .....

1.6. Test vehicle data
Towing vehicle:
Identification – No. .....
Load on each axle .....
Trailer:
Identification – No. .....
Category: O_2 / O_3 / O_4 1/
full trailer / semi trailer / central axle trailer 1/
Number of axles .....
Tyres/rims:
.....
Twin / single 1/
Dynamic rolling radius R laden .....

Load on each axle .....

2. TEST DATA AND RESULTS

2.1. Field test:
General description covering: distance traveled, time duration and location
.....

2.2. Braking test:
2.2.1. Test track information .....
2.2.2. Test procedure .....

2.3. Test results:
Brake factor
Test 1 .....
Date of test 1 .....
Test 2 .....
Date of test 2 .....
Test 3 .....
Date of test 3 .....

Diagrams

_____

1/ Strike out what does not apply
2/ Applies only to disc brakes
3/ Not applicable in the case of integrated automatic brake adjustment device"

B. JUSTIFICATION

Since Supplement 7 came into force, a lot of experience with the bedding-in procedure and the brake factor verification test according to paragraph 4.4. of Annex 19 has been gained by industry and the technical services.

The brake factor which is developed in Annex 19 - on an inertia dynamometer - is often higher than that obtained under normal conditions when driving on the road. If the brake equipment of a vehicle is defined theoretically with this higher brake factor according to Annex 11 Appendix 2, the braking performance on the road is too low. This vehicle will then have brake performance problems at the periodic technical inspection even if the brakes are in an "as new" condition – for example the calculated reference values cannot be achieved.

Therefore, it is proposed that additional conditioning is allowed, with the existing bedding-in process being retained to maintain a minimum standard. The details of any additional conditioning are required to be appended to the test report so that they are available for future reference. Without the flexibility of additional conditioning being allowed, the development of new linings/pads is restricted and existing materials which are proven via vehicle homologation

and in-service experience would require further extensive testing and possibility re-engineering to take advantage of Annex 20, which was initiated to simplify the type approval procedure.

In light of the above, the amendment to Annex 19 paragraph 4.4.2.8. and the addition of the new paragraph 4.4.2.9. to Annex 19 are proposed. In paragraph 4.4.2.8. the cleaning requirement of paragraph 4.4.2.6. is made optional. In paragraph 4.4.2.9. the results of, at least, 3 type O test conducted during an endurance field test are allowed to justify further conditioning. This field test is conducted with a reference brake which is identical to that described in the related test report. The conditions of the field test shall be as agreed with the technical service and documented as prescribed in a separate appendix.

The new proposed requirements do not justify that from a certain date all test reports with their test results become obsolete. The current test requirements are in some aspects more stringent than the new proposed ones (especially with regard to the smaller tolerance band). It is therefore seen as justified that test results which were obtained under slightly different testing conditions (bedding-in procedure) are also regarded as equivalent to the new requirements. By the wording of the new paragraph 2.1. of Appendix 2 it is guaranteed that all new tests have to be carried out according to the new amended test requirements.

The proposed amendments to Annex 11, Appendix 2 paragraph 3.5.1. are to provide clarification on how Annex 19 and Annex 11 interface, thereby enabling the total amount of testing to be reduced. Paragraphs 3.5.1.1. and 3.5.1.2. remain unchanged.

The brake factor characteristic is typically curved. Therefore, it is proposed to modify the upper boundary line in diagram 1 of Annex 19 to take into account this fact. The two-slope line is replaced by a single slope.

Furthermore the relative tolerance of this section is increased from 10 to 15 per cent at 0.55 braking rate relative to the brake input, and from 20 to 30 per cent at 0.15 braking rate relative to the brake input. These changes are not opposed to the 10 series of amendments to ECE Regulation No. 13. The focus of series 10 refers to the area beneath 1bar. The proposed changes on the other hand touch the area above a deceleration of 15 per cent.

The lower boundary line remains unchanged, thereby maintaining the same minimum standard, but the method of dimensioning is changed from braking rate to brake input. This change in dimensioning is to have the same dimensioning method throughout the diagram.

In Annex 19 paragraph 4.4.2.7.1. the word "Determine" should be changed to "Calculate" for clarification of what is meant.

- - - - -