Informal document No. **GRRF-56-7**
(56th GRRF, 20-22 September 2004,
agenda item1.1.)

PROPOSAL FOR DRAFT AMENDMENTS TO REGULATION No.13

(Braking)

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

A. PROPOSAL

Annex 19, amend the title to read: "P**erformance Testing of Trailer Braking Components"**

Annex 19, paragraph 2.3. Verification,

Delete existing paragraph 2.3.1 and insert new paragraphs 2.3.1. to 2.3.4., to read:

"2.3.1. With reference to appendix 1 of this Annex, paragraphs 3.1., 3.2., 3.3. and 3.4., a minimum of 6 samples are to be tested, with a verification report being issued providing the requirements of paragraphs 2.3.2., 2.3.3. and 2.3.4. are satisfied.

2.3.2. With respect to the verification of average thrust (Th_A) - f(p), a graph defining the acceptable performance variation shall be constructed following the model shown in diagram 1, which is based on the manufacturers declared thrust to pressure relationship. The manufacturer shall also define the category of trailer for which the brake chamber may be used and the corresponding tolerance band applied.

2.3.3 It shall be verified that the pressure (p_{15}) required to produce a pushrod stroke of 15 mm from the zero datum position with a tolerance of ± 0,1 bar by following one of the following test procedures:

2.3.3.1 Utilising the declared function of thrust (Th_A) - f(p) the brake chamber threshold pressure (p_{15}) shall be calculated when $Th_A = 0$. It shall then be verified that when this threshold pressure is applied a pushrod stroke as defined in 2.3.3. above is produced.

2.3.3.2 The manufacturer shall declare the brake chamber threshold pressure (p_{15}) and it shall be verified that when this pressure is applied the pushrod stroke defined in 2.3.3. above is produced.

2.3.4 With respect to the verification of effective stroke (sp) - f(p), the measured value must not be less than – 4% of the s_p characteristics at the manufacturer's declared pressure range. This value shall be recorded and specified in paragraph 3.3.1. of appendix 1 of this annex. Outside of this pressure range the tolerance may exceed - 4%.

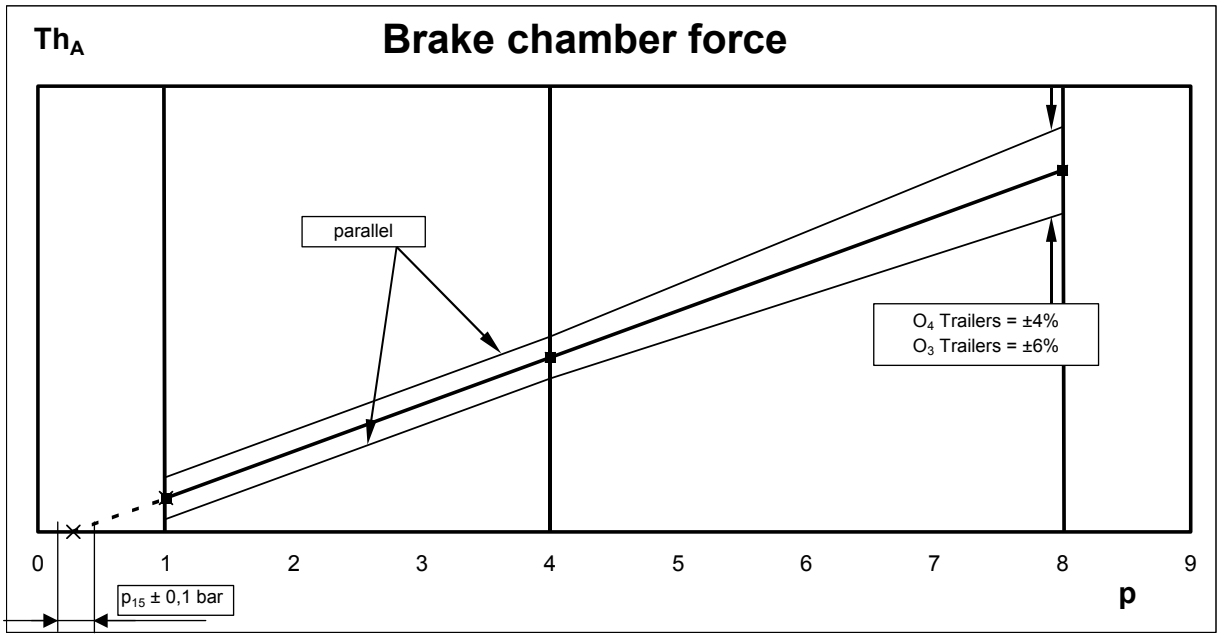

Diagram 1"

Renumber existing paragraph 2.3.2. as paragraph 2.3.5.

Renumber existing Diagram 1 as Diagram 2

Paragraph 4.4.1.1., amend to read:

4.4.1.1. "…following the model shown in Diagram 2, using the …"

Annex 19, Appendix 1

Paragraph 3.3.1., amend to read:

" 3.3.1. Pressure range over which the above effective stroke is valid: (see paragraph 2.3.4. of Annex 19)"

Add a new sub paragraph 3.4., to read:

" 3.4. Pressure required to produce a push rod stroke of 15 mm (p_{15}) based on Th_A – f(p) or declared value [2) 3)] "

Add a new paragraph 4., to read:

"4. Scope of application
The brake chamber may be used on trailers of category O_3 and O_4 …….. yes/no
The brake chamber may be used on trailers of category O_3 only …….. yes/no

Renumber existing paragraphs 4. to 8. as paragraphs 5. to 9.

Annex 19 – Appendix 7, add a new symbol and definition to read:

" p_{15} The pressure in the brake chamber required to produce a pushrod stroke of 15mm from the zero datum position."

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B JUSTIFICATION

At the 51st GRRF when the Annex 19 test procedures were adopted there is a note in paragraph 9 of the meeting report which states that the defined procedures were only applicable to trailers and not motor vehicles or parts of them. To prevent any misinterpretation of the application it is proposed that the title of Annex 19 be amended to refer to "Performance Testing of Trailer Braking Components"

Regardless of the size of the service brake diaphragm, e.g. from type 9 to type 30, the construction of the diaphragms remains basically unchanged – the reinforcement material, rubber specification and thickness are similar to ensure a high level of durability during operation on the vehicle. As the pushrod of the brake chamber extends the diaphragm will “roll” where the force required for this rolling action is independent of pressure. When pressure is applied to actuate the brakes the force is generated to cause the diaphragm to “roll” therefore when pressure is exhausted to release the brakes a force is required to return the diaphragm to its zero stroke position. This is realised by an internal spring, which must be capable of returning the diaphragm to the zero stroke position over the operating temperature range of the brake chamber. The force to achieve this operation is relatively constant irrespective of brake chamber size. However, when applying the brakes the pressure required to generate the force to overcome the rolling action of the diaphragm and internal return spring is a variable dependent on the size of the brake chamber. In consequence it is not possible to achieve the currently prescribed tolerance of +/- 4% in the low pressure range.

To overcome this problem it is proposed that the tolerance band applied to the manufacturers declared performance is constructed in a way that at pressures $\geq$4.0bar the current +/- 4% tolerance remains unchanged. The tolerance band from 4.0bar to 1bar would then be parallel based on the force difference determined at 4.0bar. This tolerance band would be applied to brake chambers that may be installed on trailers of category O_4 which generally utilise the larger size of brake chamber. In the case of O_3 trailers where the use of smaller brake chambers is common a larger tolerance is required, in this case it is proposed that the above defined tolerance band has a tolerance of +/- 6%.

It is well known that the 10 Series of amendments to Regulation 13 will introduce changes to the compatibility requirements of towing vehicles and trailers, one of which is a check that when a coupling head pressure of between 0.2 and 1.0bar is generated at the coupling head at least one brake must start to generate a braking force. To fulfil this requirement on a trailer equipped with a conventional pneumatic braking system (REV + LSV + ABS) there must be some control over

the thresholds of the components within the braking system which includes the brake chamber. As a result a new requirement has been added where it will be required to validate that the pressure required to produce a pushrod stroke of 15mm (typical value required to generate a braking force) is within defined limits. As with the validation of the validation of the Th_A characteristics different tolerances are necessary and again it is proposed to differentiate between O_3 and O_4 trailer applications

The final proposed change relates to the application of the +/- 4% tolerance on the effective stroke (**sp**). Having a positive (**sp**) tolerance offers no advantage as this will always result in a greater margin of safety when applied to the hot brake performance calculation. Therefore it is proposed to only define a lower limit of -4% for the verification requirement.
