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**Economic Commission for Europe****Inland Transport Committee****World Forum for Harmonization of Vehicle Regulations****Working Party on Brakes and Running Gear****Eighty-first session**

Geneva, 1-5 February 2016

Item 6 of the provisional agenda

**Regulation No. 90 (Replacement brake linings)****Proposal for an amendment to Regulation No. 90  
(Replacement brake linings)****Submitted by the experts from European Association of Automotive  
Suppliers\***

The text reproduced below was prepared by the expert from the European Association of Automotive Suppliers (CLEPA). It is based on informal document GRRF-80-12. The modifications to the existing text of the Regulation are marked in bold for new or strikethrough for deleted characters.

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\* In accordance with the programme of work of the Inland Transport Committee for 2014–2018 (ECE/TRANS/240, para. 105 and ECE/TRANS/2014/26, 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

Paragraph 5.3.3., amend to read,

"5.3.3. Equivalent replacement discs or drums

5.3.3.1. Geometric requirements

The brake discs or drums shall be identical to the original brake disc or drum in respect to all dimensions, geometric features and basic design.

5.3.3.1.1. For discs the following maximum values shall be met:

	$M_{2r}, N_{2r}, O_{2r}, O_{2s}$	$M_{2s}, M_{3s}, N_{2s}, N_{3s}, O_{2s}, O_{3s}$
Thickness variation	0.015 mm	0.030 mm
Cheek thickness variation (for ventilated disc only)	1.5 mm	2.0 mm
Lateral run-out friction surface	0.050 mm <sup>*</sup>	0.15 mm <sup>*</sup>
Location bore variation	H9	H9
"Top hat" parallelism	0.100 mm	0.100 mm
Location face flatness	0.050 mm	0.050 mm
Friction surface roughness <sup>**</sup>	3.2 µm	3.2 µm

<sup>\*</sup> n / a in the case of a floating disc

<sup>\*\*</sup> Ra value according to ISO 1302:2002

5.3.3.1.2. For drums the following maximum values shall be met:

	$M_{2r}, N_{2r}, O_{2r}, O_{2s}$	$M_{2s}, M_{3s}, N_{2s}, N_{3s}, O_{2s}, O_{3s}$
Radial run-out friction surface	0.050 mm	0.100 mm
Location bore variation	H9	H9
Ovality	0.040 mm	0.150 mm
Location face flatness	0.050 mm	0.050 mm
Friction surface roughness <sup>*</sup>	3.5 µm	3.5 µm

<sup>\*</sup> Ra value according to ISO 1302:2002

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Paragraph 5.3.4., amend to read:

"5.3.4. Interchangeable replacement discs or drums

5.3.4.1. Geometric requirements

As paragraphs 5.3.3.1.1, 5.3.4.1.1, and 5.3.3.1.2, 5.3.4.1.2, plus the same interface dimensions.

An interchangeable replacement disc or drum may differ from the original part disc in design features such as:

- (a) Type and geometry of ventilation (for vented discs);
- (b) Integral or composite disc or drum;
- (c) Surface finish (e.g. holes, slots etc.).

~~5.3.3.1.1.~~ **5.3.4.1.1** For discs the following maximum values shall be met:

	$M_1, N_1, O_1, O_2$	$M_2, M_3, N_2, N_3, O_3, O_4$
Thickness variation	0.015 mm	<del>0.030 mm</del> <b>0.050mm</b>
Cheek thickness variation (for ventilated disc only)	1.5 mm	2.0 mm
Lateral run-out friction surface	0.050 mm*	0.15 mm*
Location bore variation	H9	H9
"Top hat" parallelism	0.100 mm	0.100 mm
Location face flatness	0.050 mm	0.050 mm
Friction surface roughness**	3.2 $\mu\text{m}$	3.2 $\mu\text{m}$

\* n / a in the case of a floating disc

\*\* Ra-value according to ISO 1302:2002

~~5.3.3.1.2.~~ **5.3.4.1.2** For drums the following maximum values shall be met:

	$M_1, N_1, O_1, O_2$	$M_2, M_3, N_2, N_3, O_3, O_4$
Radial run-out friction surface	0.050 mm	0.100 mm
Location bore variation	H9	H9
Ovality	0.040 mm	0.150 mm
Location face flatness	0.050 mm	0.050 mm
Friction surface roughness*	3.5 $\mu\text{m}$	3.5 $\mu\text{m}$

\* Ra-value according to ISO 1302:2002

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## II. Justification

1. By definition (2.3.3.4) equivalent brake discs and drums are identical to the original in all dimensional and geometric respects hence tables 5.3.3.1.1. and 5.3.3.1.2. which contain *general* values cannot comply with the prescribed requirement of being *identical* to the values of the original part since their values will differ from original part to original part. Consequently the requirement for compliance to these general tables has been removed for this category of brake disc & drum. It still applies to interchangeable brake discs and drums and hence the tables have been moved and renumbered.

2. Currently the majority of replacement brake discs for vehicles of category M<sub>2</sub> / N<sub>2</sub> / M<sub>3</sub> / N<sub>3</sub> / O<sub>3</sub> / O<sub>4</sub> are produced with a maximum permitted disc thickness variation of ~ 0.080 mm. Many millions of brake discs have been produced at this level and entered service without issue.
  3. The current requirement for a maximum permitted thickness variation of 0.030 mm for vehicles of category M<sub>2</sub> / N<sub>2</sub> / M<sub>3</sub> / N<sub>3</sub> / O<sub>3</sub> / O<sub>4</sub> is thus far more demanding than is generally applied by the replacement brake disc manufacturers and the 0.050 mm required by brake system manufacturers for the Original Equipment (OE) parts they produce.
  4. It is therefore not surprising that 0.030 mm is proving very difficult for producing companies to maintain consistently in economic volume production. It is therefore proposed to bring the value in line with the common OE specification of 0.050 mm
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