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Item 7 (e) of the provisional agenda

Tyres: UN Regulation No. 124 (Replacement wheels for passenger cars)

Proposal for a Supplement to UN Regulation No. 124**Submitted by the expert from Russian Federation***

The text reproduced below was prepared by the expert from the Russian Federation in order to clarify certain provisions of UN Regulation No. 124. It is based on informal document GRBP-78-03 and takes into account comments made at the seventy-eighth session of the Working Party on Noise and Tyres (GRBP) as well as received in printed form after that session. The modifications to the current text of the UN Regulation are marked bold for added text and strikethrough for deleted text.

* In accordance with the programme of work of the Inland Transport Committee for 2024 as outlined in proposed programme budget for 2024 (A/78/6 (Sect. 20), table 20.5), the World Forum will develop, harmonize and update UN Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.



I. Proposal

Paragraph 2.2., amend to read:

- «2. "Wheel type" means a wheel which does not differ in the following essential characteristics:
- ...
- 2.2.3. ~~construction materials~~ **internal structure and properties of the material (chemical composition, mechanical properties, hardness);**
- 2.2.4. **Shape, size and number of wheel attachment holes;**
- ...
- 2.2.8. "*Styling*", the wheel's geometric shape, including basic contour and ratio between voids and material **in the wheel design, section profile of the rim and disc elements.**"

Add a new paragraph 3.1.2.13., to read:

- «**3.1.2.13. information about mechanical properties and hardness of the material, leakproofness testing with a tubeless tyre mounted, checking for internal and surface defects, including inspection by X-ray, radial and axial runout.**»

Add a new paragraph 5.1.6., to read:

- «**5.1.6. The optional marking can also be applied on the wheel for all or individual sub-paragraphs of paragraph 5.1.6.:**
- 5.1.6.1. marking in the form of the letter "G" about passing the leakproofness test for wheels that are used with tubeless tyres;**
- 5.1.6.2. marking in the form of the letter "R" about passing the X-ray inspection, for wheels made by casting;**
- 5.1.6.3. the maximum vertical static load on the wheel in kilograms, preceded by the inscription «Fb»;**
- 5.1.6.4. the pitch circle diameter of the mounting holes in millimeters, preceded by the inscription «PCD»;**
- 5.1.6.5. the centre hole diameter in millimeters, preceded by the inscription «DIA».»**

Annex 3, before the last paragraph, insert the following text:

«**Example of markings, which may be applied to a wheel according to paragraph 5.1.6.:**

G R Fb 560 PCD 114.3 DIA 61

This example of marking means the following:

- **the wheel intended for use with a tubeless tyre has passed the leakproofness test (G);**
- **the wheel made by casting has passed X-ray inspection (R);**
- **the maximum vertical static load on the wheel is 560 kg;**
- **the pitch circle diameter of the mounting holes is 114.3 mm;**
- **the centre hole diameter is 61 mm.»**

Annex 4,

Table, amend to read (to delete test (b) for the case of aluminum alloy and magnesium alloy wheels):

Material	Tests
Aluminium alloy	a, b , c, e
Magnesium alloy	a, b , c, e
Steel	a, b, d

Paragraphs (a) – (e), amend to read:

- «(a) Chemical analysis of the raw material, **which the wheels are made of.**
- (b) *(Remains unchanged)*
- (c) Check of the material characteristics ($R_{p0,2}$, R_m and A) of specimen taken from critical zones (~~such as the spoke, for example~~ **hub, inner and/or outer rim flange, if the wheel design allows the take-off of the appropriate specimen**), **designated by the manufacturer and/or specified by the technical service,** ~~as well as the inner and the outer rim flange.~~ The take-off points and position of the samples must be depicted in the drawing **and specified in the manufacturer's technical description.**
- (d) *(Remains unchanged)*
- (e) Analysis of the metallurgic defects and structure taken from the transition zone of the wheel disc and rim, **as well as other critical zones specified in the manufacturer's documentation or determined by the technical service and/or from the fracture zone, if applicable, for compliance with the acceptable defects specified by the manufacturer.»**

Annex 6,

Paragraph 3, table, the row “Acceptance limits”, amend to read:

“

Acceptance limits	Shaft displacement less than 10 per cent greater than the displacement measured after approximately 10,000 cycles.	
	Technical cracks are not accepted. Allowed by the manufacturer and specified in the manufacturer's technical documentation defects caused by the production process, which do not affect the formation and increase of cracks and are not centers of crack formation in this test, are not to be taken into consideration.	

“

Paragraph 4, at the end (before the picture), add a new indent to read:

«**Penetrating paints can be used to identify cracks occurred as a result of the test.**»

Annex 7, paragraph 3, table, the row “Limits of acceptance”, amend to read:

“

Limits of acceptance	<p>Technical cracks and/or air leakage are not accepted.</p> <p>Allowed by the manufacturer and specified in the manufacturer’s technical documentation defects caused by the production process, which do not affect the formation and increase of cracks and are not centers of crack formation in this test, are not to be taken into consideration.</p>
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Annex 8,

Paragraph 3, table, the row “Acceptance criteria”, amend to read:

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Acceptance criteria	<p>The test shall be considered satisfactory if there is not any visible fracture penetrating through the wheel surface and if there is not total loss of inflation pressure due to tyre depressurization within one minute of completing the test. Fractures and indentations caused by the direct contact with the falling weight are acceptable. Air leakage caused by the tyre damage during the test shall not be taken into consideration.</p> <p>In the case of wheels with demountable rims or other components that can be dismantled, if threaded fastenings that are close to the spoke or ventilation holes fail the wheel is to be considered as having failed the test.</p>
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Paragraph 5, amend to read:

"5. Failure criteria

The wheel will not pass the test if one of the following criteria applies:

- (a) visible incipient crack in a zone of the wheel disc of wheel assembly;
- (b) the centre member separates from the rim;
- (c) total loss of pressure within one minute.

The wheel is not considered to have failed the test by deformation of the wheel assembly or by fractures in the area of a rim section struck by the face plate of the striker **and when the air leakage was caused by the tyre damage during the test.**"

II. Justification

Paragraph 2.2.3.

1. The change proposed in paragraph 2.2.3. discloses the meaning of the term “construction materials” as, to the opinion of the experts from the Russian Federation, it is not clear enough, what is mentioned under this term. The intention for disclosure of the meaning was caused by different interpretation of what does stand behind this term by the compliance assessment applicants (wheel manufacturers and importers).

Paragraphs 2.2.4. and 2.2.8.

2. The intention for clarification and disclosure of the meaning of the wording in these paragraphs was caused by its different interpretation by the compliance assessment applicants (wheel manufacturers and importers).

Paragraph 3.1.2.13.

3. The technical description of the wheel is supplemented with information describing the product quality control in the production process. The addition of this paragraph would require the wheel manufacturer or importer to provide at the type approval process the

information about the manufacturer's internal product verification to ensure proper assessment of the conformity of production element of type approval.

Paragraph 5.1.6. and Annex 3

4. The proposed additional marking is considered optional and may be added by the manufacturer in favor of consumers. The application of optional marking is aimed at providing the consumers with information on the quality control of the manufactured wheel, as well as facilitating the selection of wheels with the required characteristics by consumers. This marking would be based on the internal tests performed by the wheel manufacturer. This additional marking would help consumers in proper selection of the wheels suitable for their vehicles. The intention of this marking is partial substitution of the information to be provided by the wheel manufacturers according to paragraph 1.2. of Annex 10 to UN Regulation No. 124, as such information may not be fully available for the wheel manufacturers on some markets. In addition, this marking would bring to the consumers the information about product quality control by the wheel manufacturer. This proposal would ensure the uniform use of such additional marking.

Annex 4, Table

5. Deleted test (b) for the case of aluminum-alloy and magnesium-alloy wheels, since the existing experience of testing confirms that the mechanical properties of the raw materials are not comparable with the mechanical properties of the end product (wheels). In this regard, it is proposed not to verify the raw material mechanical characteristics per subparagraph (b) for aluminum-alloy and magnesium-alloy wheels. Verification of such characteristics of the end product is considered to be sufficient, as the light-alloy raw material requirements are not necessarily the objective of UN Regulation No. 124.

Annex 4, paragraph (a)

6. The language of the provision is clarified.

Annex 4, paragraph (c)

7. The list of critical zones on wheels where to take the material to check its characteristics is clarified. The proposal intends to clarify the places where the specimens shall be taken from and ensure uniform application of the provisions of this paragraph. The proposal clarifies that the manufacturer shall be aware of and specify in the documentation the critical zones on the product, where the specimens shall be taken off. These critical zones can also be specified by technical services. The proposal aims to ensure robustness of the compliance assessment process.

Annex 4, paragraph (e)

8. It is specified that the analysis of metallurgical defects is carried out in the critical zones of the wheels. These zones shall be specified by the manufacturer in the application documentation, and they can also be specified by the technical service. The analysis shall be carried out in comparison with the permissible defects specified by the manufacturer. The intention of this proposal is to clarify that the manufacturer shall be aware of and specify in the documentation the critical zones on the product. The proposal aims to ensure robustness of the compliance assessment process.

Annex 6, paragraph 3, table and Annex 7, paragraph 3, table

9. The clarification is added that the manufacturer may specify in the documentation possible defects caused by the production process and not affecting the appearance of cracks during this test. This clarification intends to help the technical service in identifying cracks caused by the test loads. The proposed text makes it possible to distinguish between a crack that occurred during testing and a scratch, which may be an acceptable manufacturing defect.

Annex 6, paragraph 4

10. A recommendation is added to identify cracks occurred as a result of the test by using penetrating paints. The use of penetrating paints allows for identifying small technical cracks (1-5 mm), which could not be seen at visual inspection. Since in UN Regulation No. 124, there is no indication for the use of uniform methods for detecting cracks, there is a risk of

admittance of non-relevant products to the market. Thus, the indication of a specific detection method would add clarity, although any available flaw detection method applicable to the wheel and having the appropriate sensitivity can be applied and documented in the test report.

Annex 7, paragraph 3, table and Annex 8, paragraph 3, table and paragraph 5

11. As the air leakage is indicated in the tables of Annex 7 and Annex 8 as the acceptance criteria, the intention of the proposal is to clarify that the air leakage caused by the tyre damage during the test shall not be taken into consideration when assessing the test results for the wheel. The proposal is intended to eliminate uncertainty in the interpretation of the test results. For that, it is necessary to determine the cause of the tyre pressure drop. If the pressure drop in the tyre was caused by its damage, this shall not affect the acceptance of the wheel.
