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Item 7 (d) 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. 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 2023 as outlined in proposed programme budget for 2023 (A/77/6 (Sect.20), table 20.6), 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. **Reserved wheel attachment holes;**
- ...
- 2.2.8. "~~Styling~~", ~~the wheel's geometric shape, including basic contour and ratio between voids and material~~ **the wheel geometric shape, including ratio between voids and material in the wheel design, including section profile of the rim and disc elements, shape, size and number of mounting holes."**

Paragraph 2.9., amend to read:

- «2.9. "Technical crack" is a material separation with a propagation of more than 1 mm occurring during a dynamic test (**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**, are not to be taken into account). »

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, paragraphs (a) – (e), amend to read:

- «(a) Chemical analysis of the raw material, **which the wheels are made of.**
- (b) ~~Reserved~~ ~~Check of the following mechanical characteristics ($R_{p0,2}$, R_m , and A) relevant to the materials:~~
- (i) ~~percentage elongation after fracture (A): Permanent elongation of the gauge length after fracture ($L_u - L_o$), expressed as a percentage of the original length (L_o).~~
- ~~Where:~~
- ~~original gauge length (L_o): Gauge length before application of force.~~
- ~~final gauge length (L_u): Gauge length after rupture of the test piece.~~
- (ii) ~~proof strength, non proportional extension (R_p): Stress at which a non-proportional extension is equal to a specified percentage of the extensometer gauge length (L_e). The symbol used is followed by a suffix giving the prescribed percentage of the extensometer gauge length, for example: $R_{p0,2}$.~~
- (iii) ~~tensile strength (R_m): Stress corresponding to the maximum force (F_m).~~
- (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:**
- (i) **percentage elongation after fracture (A): Permanent elongation of the gauge length after fracture ($L_u - L_o$), expressed as a percentage of the original length (L_o).**
- Where:**
- original gauge length (L_o): Gauge length before application of force.**
- final gauge length (L_u): Gauge length after rupture of the test piece.**
- (ii) **proof strength, non-proportional extension (R_p): Stress at which a non-proportional extension is equal to a specified percentage of the extensometer gauge length (L_e). The symbol used is followed by a suffix giving the prescribed percentage of the extensometer gauge length, for example: $R_{p0,2}$.**
- (iii) **tensile strength (R_m): Stress corresponding to the maximum force (F_m).**
- (d) ~~Reserved~~ ~~Analysis of the defects and of the new material structure.~~
- (e) Analysis of the metallurgic defects and structure taken from the transition zone of the wheel disc and rim, **as well as other most loaded spots 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 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, after the table, add a new indent to read:

«**If a tyre pressure drop is found due to tyre damage, the tests are carried out anew using a new tyre.**»

Annex 8, paragraph 3, after the table, add a new indent to read:

«If a tyre pressure drop is found due to tyre damage, the tests are carried out anew using a new tyre.»

II. Justification

Paragraph 2.2.3.

1. Information related to construction materials is clarified.

Paragraph 2.2.4.

2. Deleted, since its content is covered by paragraph 2.2.8. in the proposed wording.

Paragraph 2.2.8.

3. The notion of the wheel geometric shape is clarified.

Paragraph 2.9.

4. The notion of defects caused by the production process is clarified. Only in the Russian language it is clarified that the crack propagation is actually a length and a depth of the crack. 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.

Paragraph 3.1.2.13.

5. The technical description of the wheel is supplemented with information describing the product quality control in the production process.

Paragraph 5.1.6. and Annex 3

6. 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 in case of providing with incomplete information on suitable vehicle types in accordance with paragraph 1.2. of Annex 10.

Annex 4, paragraph (a)

7. The language of the provision is clarified.

Annex 4, paragraphs (b) and (d)

8. Deleted, since the existing experience of testing confirms that the mechanical properties of the raw materials are not comparable with the mechanical properties of finished products (wheels). In this regard, there is no need to test the raw materials.

Annex 4, paragraph (c)

9. The list of critical zones on wheels where to take the material to check its characteristics is clarified. These critical zones shall be specified by the manufacturer in the application documentation, and they can also be specified by the technical service.

10. A description of the characteristics of the material taken from paragraph (b) is provided, since this paragraph is deleted. Only in the Russian language the terms concerning the measured values have been changed.

Annex 4, paragraph (e)

11. It is specified that the analysis of metallurgical defects is carried out in the most loaded spots of the wheels. These spots 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.

Annex 6

12. A recommendation is added to identify cracks occurred as a result of the test by using penetrating paints.

Annexes 7 and 8

13. The pressure drop in the tyre as a consequence of testing the wheel assembly with the tyre may not be due to damage to the wheel, but to damage to the tyre. To eliminate uncertainty in the interpretation of the test results, it is necessary to determine the cause of the tyre pressure drop. If the pressure drop in the tyre was caused by its damage, then it is necessary to carry out the tests again, using a new tyre.
