Proposal for amendments to UN Regulation No. 90

I. Proposal

*Paragraph 3.4.3.1*., amend to read:

"3.4.3.1.A minimum number of disc or drum samples – of the design for which approval is requested – shall be provided, as shown in the following table.

The table also shows the recommended use of the samples.

| *Item No.* | *Check/Test* | *Sample number* ***for brake discs for vehicles of categories M, N and O*** | | | | | | *Remarks* |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | *1* | *2* | *3* | *4* | *5* | *6* |  |
| 1 | Geometric check Paragraphs 5.3.3.1., 5.3.4.1. | x | x | x | x | x | x |  |
| 2 | Material check Paragraphs 5.3.3.2 | x | x |  |  |  |  |  |
| 3 | Balancing provisions check Paragraph 5.3.7.2. |  |  | x | x | x | x |  |
| 4 | Wear condition marking check Paragraph 5.3.7.3. |  |  | x | x | x | x |  |
| 5 | Integrity test − thermal fatigue Paragraphs 4.1.1., 4.2.1. of Annex 11, 4.1.1., 4.2.1. of Annex 12 |  |  |  | x | x |  |  |
| 6 | Integrity test − high load test  Paragraphs 4.1.2., 4.2.2. of Annex 11, and paragraphs 4.1.2., 4.2.2. of Annex 12 |  |  | x |  |  |  |  |
| 7 | Service brake vehicle performance test  Paragraph 2.2. of Annex 11, Paragraph 2.2. of Annex 12 |  |  |  |  |  | Pair of discs | Either front or rear axle |
| 8 | Parking brake vehicle performance test Paragraph 2.3. of Annex 11, Paragraph 2.3. of Annex 12 |  |  |  |  |  | Pair of discs | If applicable |
| 9 | Service brake dynamometer performance test Paragraph 3.3. of Annex 11, paragraph 3.3. of Annex 12 |  |  |  |  |  | x | Alternative to vehicle test |

| *Item No.* | *Check / Test* | *Sample number for brake discs for vehicles of categories L1, L2, L3, L4 and L5* | | | | | *Remarks* |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 |
| 1 | Geometric check  Paragraphs 5.3.3.1., 5.3.4.1. | x | x | x | x | x |  |
| 2 | Wear condition marking check  Paragraph 5.3.7.3. | x | x | x | x | x |  |
| 3 | Material and hardness braking surface  Paragraphs 5.3.3.2. | x |  |  |  |  |  |
| 4 | Bell and fasteners material check  Paragraphs 2.4. and 2.5. of Annex 15 | x |  |  |  |  |  |
| 5 | Resistance to static torque test  Paragraph 2. of Annex 14 |  | x | x |  |  |  |
| 6 | Service brake vehicle performance  Paragraphs 3.2. of Annex 14 |  |  |  | x |  |  |
| 7 | Thermal fatigue  Paragraph 5.1. of annex 14 |  |  |  |  | x |  |
| 8 | Service brake dynamometer performance  Paragraph 4.3. of Annex 14 |  |  |  |  |  | Alternative to vehicle test |

|  | ***Resistance to static torque (only for vehicle categories L1, L2, L3, L4 and L5)*** | ***Performance tests according to UN Regulations Nos. 13/13-H/78 (Type 0, I, II, etc.)*** | | ***Comparison test with dynamic frictional properties of the original part*** | ***Integrity tests (high load and thermal fatigue)*** |
| --- | --- | --- | --- | --- | --- |
| **Original replacement parts** | **Disc not subjected to this regulation** | | | | |
| **Identical parts** | **No** | **No** | **No** | | **No** |
| **Equivalent parts** | **No** | **No** | **No** | | **Dynamometer test** |
| **Interchangeable parts** | **Static bench test** | **Vehicle test or alternative dynamometer test** | **Vehicle test or alternative dynamometer test** | | **Dynamometer test** |

The test requirements for brake discs and drums for vehicles of categories M and N are detailed in Annex 11.

The test requirements for brake discs and drums for vehicles of category O are detailed in Annex 12.

**The test requirements for brake discs for vehicles of categories L1, L2, L3, L4 and L5 are detailed in Annex 14.**"

*Paragraph 5.3.,* sall be deleted

*Paragraph 5.3.3.1.1*., renumber and amend to read:

"5.3.**4**.1.1For discs the following maximum values shall be met:

|  | *M1, N1, O1, O2* | *M2, N2,* | *M3, N3, O3, O4* | ***L1, L2, L3, L4 , L5*** |
| --- | --- | --- | --- | --- |
| Thickness variation | 0.015 mm | 0.030 mm | 0.040 mm | **0.020 mm** |
| Cheek thickness variation (for ventilated disc only) | 1.5 mm | 2.0 mm | 2.0 mm | **(\*\*\*\*)** |
| Lateral run-out friction surface | 0.050 mm\* | 0.150 mm\* | 0.150 mm | **0.150 mm\*\*\*** |
| Location bore variation | H9 | H9 | H9 | **D10 or H11 \*\*\*\*\*** |
| "Top hat" parallelism | 0.100 mm | 0.100 mm | 0.100 mm | **--**- |
| Location face flatness | 0.050 mm | 0.050 mm | 0.050 mm | **0.100 mm** |
| Friction surface roughness\*\* | 3.2 µm | 3.2 µm | 3.2 µm | **1.6 µm** |

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

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

**\*\*\* 0.100 mm for maximum straightness for "full floating" disc (without elastic constraints between bell and braking ring)**

**\*\*\*\*  n/a for vehicles categories L1, L2, L3, L4 and L5**

**\*\*\*\*\* Location bore variation where applicable, related to manufacturing process.**"

5.3.3.2. Material and metallurgical requirements

*Insert a new paragraph 5.3.3.2.1*., to read:

"5.3.3.2.1. For vehicles of category M, N, O, in order to be considered "Equivalent" the replacement brake disc or drum shall be from the same material sub-group as the original brake disc or drum. Four original part material sub-groups are defined.

|  | ***Test standard*** | ***Sub-group 1 Base cast iron DIN EN 1561 EN-GJL-200*** | ***Sub-group 2 Base high carbon EN-GJL-150*** | ***Sub-group 3 Alloyed high carbon*** | ***Sub-group 4 Unalloyed high carbon*** |
| --- | --- | --- | --- | --- | --- |
| **Carbon Content (per cent)** |  | **3.20 – 3.60** | **3.60 – 3.90** | **3.55 – 3.90** | **3.60 – 3.90** |
| **Silicon Content (per cent)** |  | **1.70 – 2.30** | **1.60 – 2.20** | **1.60 – 2.20** | **1.60 – 2.20** |
| **Manganese Content(per cent)** |  | **Min 0.40** | **Min 0.40** | **Min 0.40** | **Min 0.40** |
| **Chromium Content (per cent)** |  | **Max 0.35** | **Max 0.35** | **0.30 – 0.60** | **Max 0.25** |
| **Copper Content(per cent)** |  | **-** | **0.30 – 0.70** | **0.30 – 0.70** | **Max 0.40** |
| **Hardness HBW** | **ISO 6506-1 :2005** | **190 – 248** | **160 - 210** | **180 - 230** | **160 – 200** |
| **Tensile strength(N/mm2)** | **ISO 6892:1998** | **Min 220** | **Min 160** | **Min 170** | **Min 150** |

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