

## **Proposals to introduce indoor testing in Regulation No. 51, Revision 3**

The proposed amendments to the current Regulation are incorporated into the consolidated text and marked in bold for new or strikethrough for deleted characters

### **I. Proposal**

*Paragraph 1. amend to read:*

#### 1. Measuring instruments

##### 1.1. Acoustic measurements

The apparatus used for measuring the sound level shall be a precision sound-level meter or equivalent measurement system meeting the requirements of Class 1 instruments (inclusive of the recommended windscreen, if used). These requirements are described in "IEC 61672- 1:2002: Precision sound level meters", second edition, of the International Electrotechnical Commission (IEC).

**When no general statement or conclusion can be made about conformance of the sound level meter by each channel of the array conformance (e.g. when pass-by noise level simulation algorithms do not compute the overall level but spectrum or temporal to recompose it), a simulated pass-by run shall be performed at a constant speed of 50 km/h while a constant tone signal is supplied to all channels of the arrays. The simulated A-weighted sound level is processed and the deviation from a reference tone signal shall be checked in accordance to IEC 61672-3.**

[...]

*Paragraph 2.1 amend to read:*

#### 2.1. Test Site and ambient conditions

**The specifications for the test site provide the necessary acoustic environment to carry out the vehicle tests documented in this regulation. Outdoor and indoor test environments that meet the specifications of this regulation provide equivalent acoustic environments and produce results that are equally valid.**

### **2.1.1 Test Site Outdoor**

The surface of the test track and the dimensions of the test site shall be in accordance with ISO 10844:2014.

### **2.1.2 Test Site indoor**

**The test facility shall meet requirements of ISO 26101:2012 with qualification criteria and measurement requirements appropriate to this test method as described in ISO 362-3.**

### **2.1.3 Ambient conditions**

[...]

*Paragraph 2.2.1. amend to read:*

[...]

Measurements shall be made on vehicles at the test mass  $m_t$  specified according to the following table.

**When testing indoors using ISO362-3, test mass,  $m_t$  shall be utilized by the control system of the dyno roller according to ISO 362-3. Actual mass of the vehicle, when tested according to ISO 362-3, has no effect on results and it is permitted to load the vehicle as necessary to prevent slip between the tires and the dyno rolls.**

[...]

*Paragraph 2.2.2. amend to read:*

[...]

**When indoor testing, tyre/road noise is evaluated independently on the test track with the tyres to be used, according to this paragraph. Propulsion noise is also independently evaluated on the rollers with a very low tyre noise according to ISO 362-3.**

*Paragraph 3. amend to read:*

### **3. Methods of testing**

**For each specific test conditions for vehicles, the vehicle can be tested either indoor or outdoor.**

**For outdoor, tests shall be performed according to paragraph 3.1.**

**For indoor, tests shall be performed according to paragraph 3.1. with additional specifications of ISO 362-3 variant A such as Test room requirements, Dynamometer requirements, Microphone array, Vehicle fixing system.**

**Variant A is a combination of indoor testing (power train noise) and outdoor testing (tyre/road noise).[...]**

## **II. Justification**

See Report of the Working Party on Noise on its 64<sup>th</sup> session, ECE/TRANS/WP.29/GRB/62, Agenda item no 17.

The expert from OICA stressed the importance of including indoor testing as an alternative to type approval tests of Annex 3 to Regulation No. 51, in particular for vehicle manufacturers in countries where the local weather conditions allow the use of outdoor test tracks only for a limited period per year.

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