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PROPOSAL FOR DRAFT AMENDMENTS TO REGULATION No. 51

(Noise emissions)

Submitted by the expert from the Russian Federation

Note: The text reproduced below was prepared by the expert from the Russian Federation proposing to improve the durability requirements for vehicle noise reduction systems. It is based on informal document No. GRB-44-1, distributed during the forty-fourth session of the Working Party on Noise (GRB) (ECE/TRANS/WP.29/GRB/42, para. 5). The modifications to the current text of the Regulation are marked in **bold** characters.

Note: This document is distributed to the Experts on Noise only.

A. PURPOSE OF THE PROPOSAL

This proposal is prepared with the purpose to achieve a real reduction of noise of the vehicles in service. It is based on the approach applied in Regulation No. 83, where the decrease of the overall performance of the catalytic converters of in-service vehicles is taken into account.

The experts of the Russian Federation propose GRB to consider the above-mentioned approach and suggest to insert into Regulation No. 51 the durability requirements for maintenance of the vehicle noise emission parameters. If GRB agrees with the proposed approach, the experts of the Russian Federation will continue their work on the elaboration of appropriate amendments to Regulation No. 51.

B. PROPOSAL

Paragraph 6.1.2., amend to read:

"6.1.2. The noise reduction system shall be so designed, constructed and assembled as to be able to reasonably resist the **corrosion and aging phenomena and the high temperatures** to which it is exposed having regard to the conditions of use of the vehicle."

Insert a new paragraph 6.1.3., to read:

"6.1.3. **The manufacturer shall apply such technical measures, which, in accordance with the Regulation, provide maintenance of the vehicle parameters related to the noise emissions of a vehicle under normal operating conditions during its usual service life. The provisions of paragraph 6.1.3. are considered to be met, if the provisions of paragraphs 6.3., 6.4. and 6.5. are fulfilled.**"

Paragraph 6.2.1.1., amend to read:

"6.2.1.1. The noise made by the vehicle only be measured in motion.

Vehicles having a maximum permissible mass is part of the vehicle.

For all test results (noise of a vehicle in motion, noise of a vehicle when stationary, compressed air noise) the final results of each test are obtained taking into account the adjusting correction, in accordance with paragraph 6.5. These results are compared to the sound level limit values prescribed in paragraph 6.2.2."

Insert new paragraphs 6.4. to 6.5.2., to read:

"6.4. **Specifications regarding noise reduction systems of compressed air venting during operation of pneumatic braking system**

6.4.1. **Requirements of Annex 6 shall be applied.**

6.5. Check of maintenance of vehicle parameters related to its noise emissions

6.5.1. Such check is carried out for all vehicle types. The vehicle test drive with a total mileage of [80,000] km can include driving on the test track, public roads, and dynamometric test bench. Approximately half of the test drive simulates motion in urban conditions and the remaining part of the test drive simulates motion at high speed.

The Technical Service carries out the noise emission measurement before the test drive is completed, and it calculates the test results to be recorded into the official communication form, taking into account the adjusting correction. In this case, the adjusting correction is defined as the difference between the results of the noise measurement obtained at the beginning of the test drive and those obtained at the end of the test drive.

6.5.2. Apart from the provisions of paragraph 6.5.1., the manufacturer can choose, as an alternative to the realization of the test drive, to use the adjusting corrections as provided in the table below.

Methods of measurement	Vehicle categories	Adjusting corrections, dB (A)
Noise of a vehicle in motion	[M, N]	[1-2]
Noise of a vehicle when stationary	[M, N]	[3-5]
Compressed air noise	[M, N]	[2-3]

Annex 6, insert a new paragraph 4., to read:

"4. Specifications regarding noise reduction systems of compressed air venting during operation of pneumatic braking system

The noise reduction systems of compressed air venting during operation of pneumatic braking system shall be prepared for the tests by operating not less than [1,000] times the device on which the noise silencers are installed, before the measurements of the sound level. The device shall operate at a pressure that is not less than [80 per cent] from the nominal level."

C. BACKGROUND

The deterioration of vehicle parameters related to its noise emissions can occur for several reasons:

- (a) destruction of parts ensuring low noise level;
- (b) occurrence of defects in a casing of the parts ensuring low noise level with preservation of integrity of the design;
- (c) occurrence of defects (deterioration of properties, reduction of volume of filling) of internal parts ensuring low noise level;
- (d) increase of intensity of the sources of noise and vibration owing to wear process of the related parts.

Let us consider these reasons in detail.

Destruction of parts ensuring low noise level: silencers of the exhaust system, compressed air silencers, shielding parts of the powertrain, as a rule, result in such a sharp increase of the noise level that the further operation without repair becomes impossible. And basically it occurs at an infringement of normal operating conditions. Thus, considering the maintenance of vehicle parameters related to its noise emissions, this reason can be neglected.

The occurrence of design defects results in an increase of noise, but not so strong to lead to the termination of operation.

The reasons why design defects may occur can include the following:

- (a) burn-out of parts of the exhaust system of the engine because of high temperatures of the exhaust gases;
- (b) appearance of cracks because of sharp changes of outside temperatures and due to the influence of moisture and aggressive road environment;
- (c) appearance of micro-apertures because of corrosive attacks;
- (d) damage of welded connections because of their initial poor quality;
- (e) aging of the materials used in the parts reducing the structural noise of powertrain.

It is possible to predict the preservation on the deterioration of properties of the system of reduction of noise of a vehicle due to the afore-mentioned reasons. Nevertheless, finding a correlation between the conditions of any accelerated test and the varying conditions in real operation still requires a serious and long research, including on separate construction materials, parts at thermal and cyclic thermal loading, and the influence of an aggressive environment, and of the force. It is rather difficult to examine the design as a whole.
