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World Forum for Harmonization of Vehicle Regulations

Working Party on Noise

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Item 2.2.2. of the provisional agenda

PROPOSAL FOR DRAFT AMENDMENTS TO REGULATION No. 51

(Noise emissions)

Submitted by the expert from the International Organization for Standardization (ISO)

Note: The text reproduced below was prepared by the expert from ISO in order to align the current stationary vehicle noise emission measurement provisions of Annex 3 of the Regulation with those provided in the final draft international standard ISO/FDIS 5130. The proposal consolidates and supersedes ECE/TRANS/WP.29/GRB/2006/6 (ECE/TRANS/WP.29/GRB/42, para. 12). 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. BACKGROUND

As requested by GRB, ISO has revised ISO standard 5130:1982 to reflect on it the technical development of motor vehicles regarding the reduction of noise emissions. These changes reflect the development of engine protection systems, which require engine speed targets to be modified, and the development of additional exhaust tailpipe locations by manufacturers. The technical changes related to engine speed have been discussed by GRB. ISO expects to publish the final draft international standard (FDIS) ISO/FDIS 5130 in 2007.

B. PROPOSAL

Annex 3,

Paragraph 3.2.3., amend to read:

"3.2.3. Test site – local conditions (see **appendix, figures 2 and 3a to 3d**)"

Paragraphs 3.2.5.3.1. to 3.2.5.3.1.5., amend to read:

"3.2.5.3.1. **Microphone orientation**

3.2.5.3.1.1. **The microphone shall be located at a distance of 0.5 m ± 0.01 m from the reference point of the exhaust pipe defined in figure 2 and at an angle of 45 ° (± 5 °) to the vertical plane containing the flow axis of the pipe termination. The microphone shall be at the height of the reference point, but not less than 0.2 m from the ground surface. The reference axis of the microphone shall lie in a plane parallel to the ground surface and shall be directed towards the reference point on the exhaust outlet.**

If two microphone positions are possible, the location farthest laterally from the vehicle longitudinal centreline shall be used.

If the flow axis of the exhaust outlet pipe is at 90 ° to the vehicle longitudinal centreline, the microphone shall be located at the point, which is furthest from the engine.

3.2.5.3.1.2. **For vehicles having an exhaust provided with outlets spaced more than 0.3 m apart, one measurement is made for each outlet as if it were the only one, and the highest sound pressure level shall be noted.**

3.2.5.3.1.3. **If a vehicle has two or more exhaust outlets spaced less than 0.3 m apart and connected to a single silencer, only one measurement shall be made. The microphone shall be located relative to the outlet farthest from the vehicle longitudinal centreline, or when such outlet does not exist, to the outlet, which is highest above the ground.**

- 3.2.5.3.1.4. For vehicles with a vertical exhaust (e.g. commercial vehicles) the microphone shall be placed at the height of the exhaust outlet. Its axis shall be vertical and oriented upwards. It shall be placed at a distance of $0.5 \text{ m} \pm 0.01 \text{ m}$ from the exhaust pipe reference point as defined in figure 2, but never less than 0.2 m from the side of the vehicle nearest to the exhaust.
- 3.2.5.3.1.5. For vehicles, where the reference point of the exhaust pipe is not accessible, or located under the vehicle body, as shown in figures 3b and 3c, because of the presence of obstacles which form part of the vehicle (e.g. spare wheel, fuel tank, battery compartment), the microphone shall be located at least 0.2 m from the nearest obstacle, including the vehicle body, and its axis of maximum sensitivity shall face the exhaust outlet from the position least concealed by the above mentioned obstacles.

When several positions are possible, as shown in figure 3c, the microphone position giving the lowest value of d1 or d2 shall be used.

Note: Figures 3a to 3d show examples of the position of the microphone, depending on the location of the exhaust pipe."

Paragraph 3.2.5.3.1.6., should be deleted.

Paragraphs 3.2.5.3.2.1. and 3.2.5.3.2.2., amend to read:

"3.2.5.3.2.1. Target engine speed

The target engine speed is defined as:

- (a) 75 per cent of the engine speed S for vehicles with a rated engine speed $\leq 5,000 \text{ min}^{-1}$
- (b) $3,750 \text{ min}^{-1}$ for vehicles with a rated engine speed above $5,000 \text{ min}^{-1}$ and below $7,500 \text{ min}^{-1}$
- (c) 50 per cent of the engine speed S for vehicles with a rated engine speed $\geq 7,500 \text{ min}^{-1}$.

If the vehicle cannot reach the engine speed as stated above, the target engine speed shall be 5 per cent below the maximum possible engine speed for that stationary test.

3.2.5.3.2.2. Test procedure

The engine speed shall be gradually increased from idle to the target engine speed, not exceeding the tolerance band of ± 5 per cent of the target engine speed, and held constant. Then the throttle control shall be rapidly released and the engine speed shall be returned to idle. The sound pressure level shall be measured during a period consisting of constant engine speed of at least

one second and throughout the entire deceleration period. The maximum sound level meter reading shall be taken as the test value."

Insert a new paragraph 3.2.5.3.2.3., to read:

"3.2.5.3.2.3. Test validation

The measurement shall be regarded as valid if the test engine speed does not deviate from the target engine speed by more than ± 5 per cent for at least one second."

Paragraphs 3.2.6. to 3.2.6.2., amend to read:

"3.2.6. Results

3.2.6.1. Measurements shall be made according to the microphone location(s) described in paragraph 3.2.5.3.1.

3.2.6.2. The maximum A-weighted sound pressure level indicated during the test shall be noted, mathematically rounded to the first significant figure before the decimal place."

Insert new paragraphs 3.2.6.3. to 3.2.6.5., to read:

"3.2.6.3. The test shall be repeated until three consecutive measurements at each outlet are obtained, which are within 2 dB of each other, allowing for deletion of non valid results.

3.2.6.4. The result for a given outlet is the arithmetic average of the three valid measurements, mathematically rounded as given above and shall be reported as the A-weighted sound pressure level L_{Arep} .

3.2.6.5. For vehicles equipped with multiple gas outlets, the sound pressure level reported L_{Arep} shall be for the outlet having the highest average sound pressure level."

Annex 3 - Appendix, insert a new figure 2 to read:

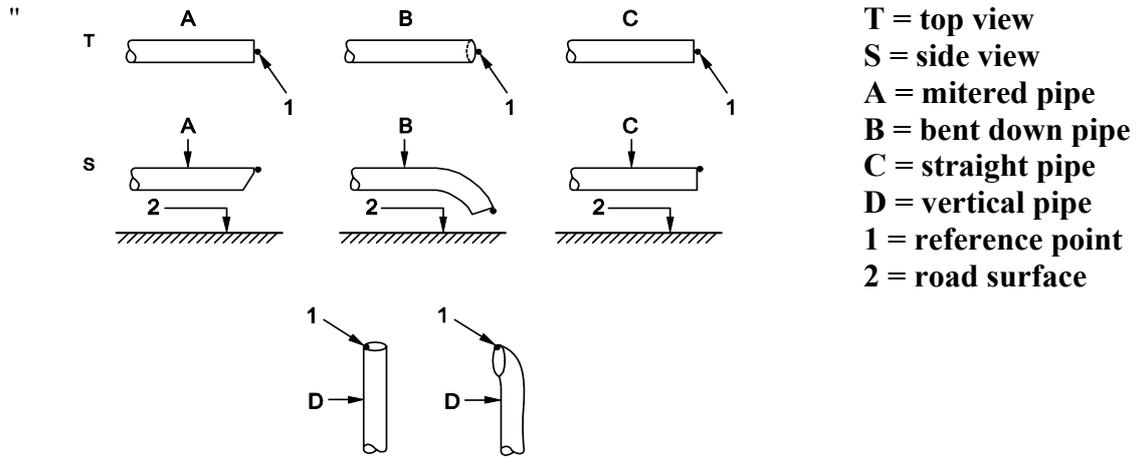


Figure 2: Reference point"

Annex 3 - Appendix, figure 2 (former), renumber as figures 3a to 3d and amend to read:

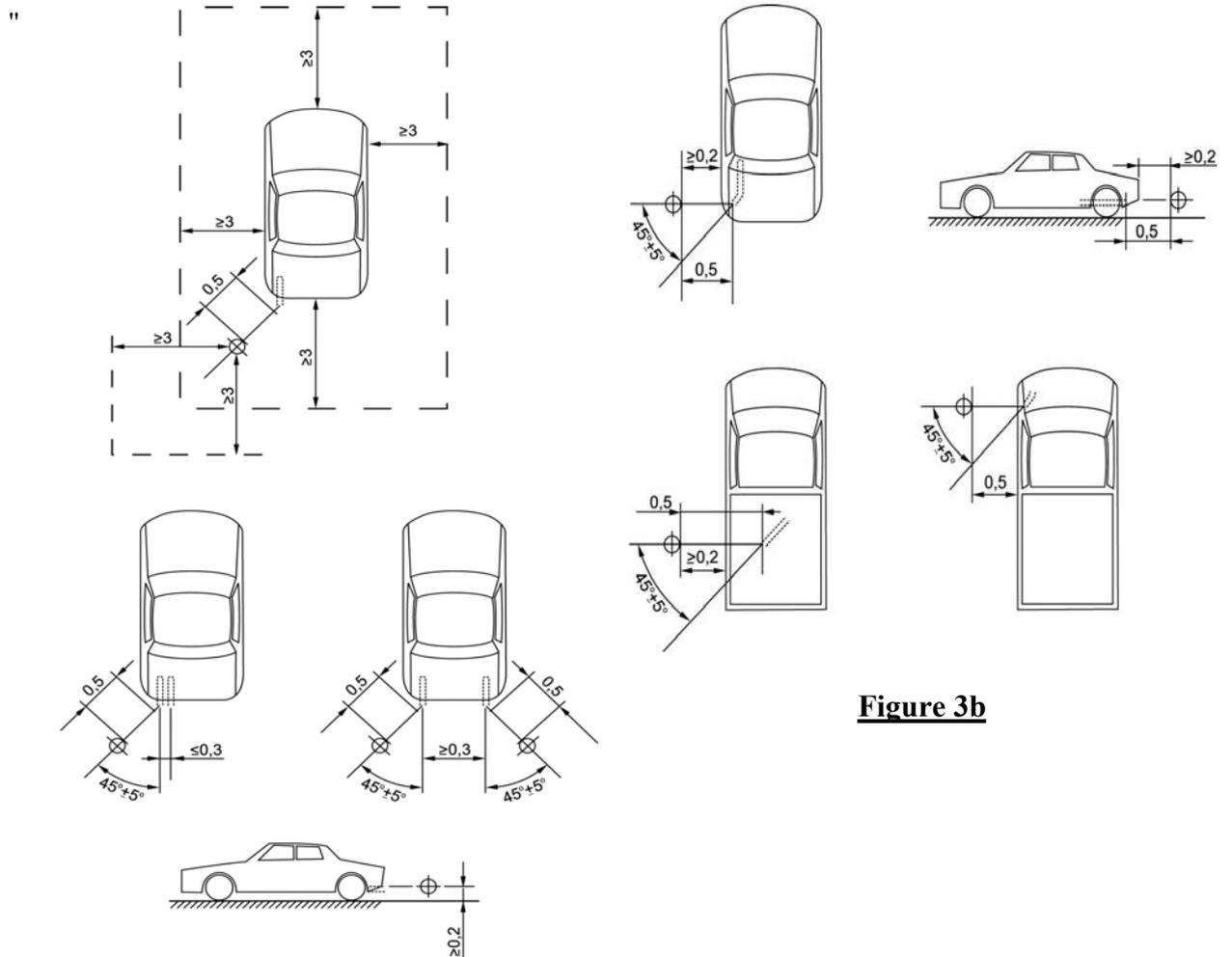


Figure 3a

Figure 3b

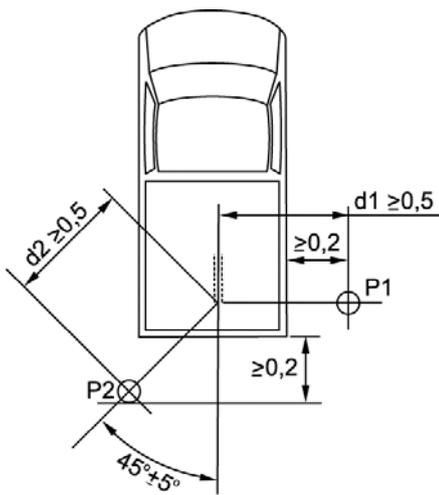


Figure 3c

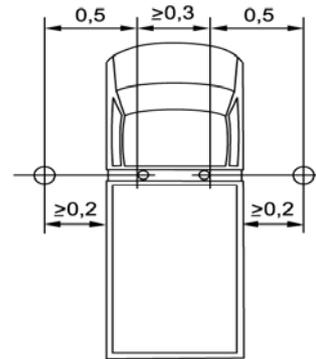
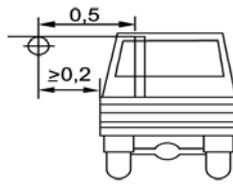


Figure 3d

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