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Working Party on the Construction of Vehicles

DRAFT SUPPLEMENT 3 TO THE 02 SERIES OF AMENDMENTS TO REGULATION No. 51 (Noise of M and N categories of vehicles)

Note: The text reproduced below was adopted by the Administrative Committee (AC.1) of the amended 1958 Agreement at its tenth session, following the recommendation by the Working Party at its one-hundred-and-sixteenth session. It is based on documents TRANS/WP.29/1998/37 and Add.1, not amended (TRANS/WP.29/640, para. 146).

Annex 3,

Paragraphs 1. and 1.1., amend to read:

"1. MEASURING INSTRUMENTS

1.1. Acoustic measurements

The sound level meter or the equivalent measuring system, including the windscreen recommended by the manufacturer shall at least meet the requirements of Type 1 instruments in accordance with IEC 651, second edition.

The measurements shall be made using the frequency weighting A, and the time weighting F.

When using a system that includes a periodic monitoring of the A-weighted sound level, a reading should be made at a time interval not greater than 30 ms."

Insert new paragraphs 1.1.1. and 1.1.2., to read:

"1.1.1. Calibration

At the beginning and at the end of every measurement session the entire measurement system shall be checked by means of a sound calibrator that fulfils the requirements for sound calibrators of at least precision Class 1 according to IEC 942:1988. Without any further adjustment the difference between the readings of two consecutive checks shall be less than or equal to 0.5 dB. If this value is exceeded the results of the measurements obtained after the previous satisfactory check shall be discarded.

1.1.2. Compliance with requirements

The compliance of the sound calibration device with the requirements of IEC 942:1988 shall be verified once a year and the compliance of the instrumentation system with the requirements of IEC 651, second edition shall be verified at least every two years, by a laboratory which is authorized to perform calibrations traceable to the appropriate standards."

Paragraph 1.2., amend to read:

"1.2. Speed measurements

The rotational speed of the engine and the vehicle speed shall be measured with instruments with an accuracy of ± 2 per cent or better."

Insert a new paragraph 1.3., to read:

"1.3. Meteorological instrumentation

The meteorological instrumentation used to monitor the environmental conditions shall include the following:

(i) A temperature measuring device which shall be accurate within ± 1°C;

(ii) a wind speed measuring device which shall be accurate within ± 1.0 m/s."

Insert a new paragraph 2.1.2.1., to read:

"2.1.2.1. The meteorological instrumentation should be positioned adjacent to the test area at a height of 1.2 ± 0.1 m.

The measurements shall be made when the ambient air temperature is within the range from 0°C to 40°C.

Tests shall not be carried out if the wind speed, including gusts, at microphone height exceeds 5 m/s, during the sound measurement interval and shall be recorded during each test run.

Values representative of temperature, wind speed and direction, relative humidity, and barometric pressure shall be recorded during the sound measurement interval."

Paragraph 2.1.3., amend to read:

"2.1.3. The A-weighted sound level of sound sources other than those of the vehicle to be tested and of wind effects must be at least 10 dB(A) below the sound level produced by the vehicle."

Paragraphs 2.2.2. and 2.2.3., amend to read:

“2.2.2. The tyres used for the test are selected by the vehicle manufacturer and shall comply with commercial practice and be available on the market; they shall correspond to one of the tyre sizes designated for the vehicle by the vehicle manufacturer and meet the minimum tread depth of 1.6 mm in the main grooves of the tread surface.

The tyres must be inflated to the pressure(s) appropriate to the test mass of the vehicle.

2.2.3. Before the measurements are started, the vehicle shall be brought to its normal operating conditions as regards:"

Paragraph 3.1.1.1., amend to read:

"3.1.1.1. At least two measurements shall be made on each side of the vehicle. Preliminary measurements may be made for adjustment purposes, but shall be disregarded."

Paragraph 3.1.2.3.1., amend to read:

"3.1.2.3.1. Approach speed

The vehicle shall approach the line AA' at a steady speed with a tolerance ± 1 km/h; except where the controlling factor is engine speed the tolerance shall be the larger of ± 2 per cent or ± 50 min^{-1}, such that:

"....."

Paragraph 3.1.2.3.2.2., amend to read (footnote 1/ not modified):

"3.1.2.3.2.2. Vehicles of categories M_1 and N_1 1/ fitted with a gearbox ... shall be calculated.

.....

If during the test in second gear .... no longer exceeds S.

If the engine speed S is still attained with an approach speed corresponding to the idle speed, then the test will be performed only in third gear and the relevant results have to be evaluated."

Paragraph 3.1.2.3.2.3., amend to read (footnotes 2/ and 3/ not modified):

"3.1.2.3.2.3 Vehicles of categories other than M_1 and N_1, in which the total number of forward gear ratios is x (including those obtained by way of an auxiliary transmission or a multi-gear axle) will be tested sequentially, using the ratio equal to or higher than x/n. 2/ 3/

Initial testing will be carried out using the ratio which is gear (x/n) or the next higher gear ratio if (x/n) is not an integer. The testing shall continue from the gear (x/n) to the next higher gear.

Shifting up gear ratios from (x/n) shall be terminating when in the gear X in which the rated engine speed is reached just before the rear of the vehicle has passed the line BB'.

Sample Calculation for Testing: There are 16 forward ratios for drive train having a transmission with 8 gears and an auxiliary transmission with 2 gears. If the engine has 230 kW then (x/n) = (8 x 2)/3 = 16/3 = 5 1/3. The initial test gear ratio is 6th (includes the gears from both the main transmission and auxiliary which is 6th out of the 16 total gear ratios), with the next gear ratio is 7th up to ratio X.

In the case of vehicles having different overall gear ratios the representative of the vehicle type by the test vehicle is determined as follows:

if the highest sound level is obtained between the ratio x/n and ratio X the vehicle shall be deemed representative of its type;

if the highest sound level is obtained at ratio x/n the vehicle selected shall be deemed representative of its type only for those vehicles which have a lower overall gear ratio at x/n;

if the highest sound level is obtained at ratio X the vehicle selected shall be deemed representative of its type only for those vehicles which have a higher overall gear ratio than the gear ratio X.

However the vehicle is deemed representative of its type also, if at the applicant's request the tests are extended over more ratios than foreseen, and the highest sound level is obtained between the extreme ratios tested."

Paragraph 3.1.2.4.1.1., amend to read:

"3.1.2.4.1.1. Approach speed

The vehicle shall approach the line AA' at various uniform speeds of 30, 40, 50 km/h or at 3/4 of the maximum on-road speed if this value is lower.

If the vehicle is equipped with an automatic transmission which cannot be tested with the procedure outlined in the subsequent sections, it shall be tested at different approach speeds, namely 30 km/h, 40 km/h, and 50 km/h, or at three quarters of maximum vehicle speed as specified by the manufacturer if this value is lower. The condition giving the highest noise level shall be retained."

Paragraph 3.1.2.4.2.1., amend to read:

"3.1.2.4.2.1. Approach speed

The vehicle shall approach the line AA' at a steady speed corresponding to the lower of the following velocities with a tolerance ± 1 km/h; except where the controlling factor is engine speed the tolerance shall be the larger of ± 2 per cent or ± 50 rpm:
....."

Insert a new paragraph 3.1.2.4.2.4., to read:

"3.1.2.4.2.4. Prevention of downshift

Some vehicles equipped with an automatic transmission (two or more discrete ratios) may downshift to a gear ratio not normally used in urban driving, as defined by the manufacturer. A gear ratio not used for urban driving includes a gear ratio intended for slow movement, parking or braking. In these cases the operator may select any of the following modifications:

a) increase the vehicle speed v to a maximum of 60 km/h in order to avoid such a change down;

b) maintain the vehicle speed v at 50 km/h and limit the fuel supply to the engine to 95 per cent of the supply necessary for full load; this condition is considered to be satisfied;

- in the case of a spark-ignition engine, when the angle of the throttle opening is 90 per cent of the full angle,

- in the case of a compression-ignition engine, when the fuel supply to the injection pump is limited to 90 per cent of its maximum supply;

c) establish and use an electronic control that will prevent a downshift to gears lower than those used in normal urban driving as defined by the manufacturer."

Paragraph 3.1.3., amend to read:

"3.1.3. Interpretation of results

The measurement of noise emitted by the vehicle in motion shall be considered valid if the difference between the two consecutive measurements on the same side of the vehicle is not more than 2 dB(A). */

The figure recorded shall be that corresponding to the highest sound level. Should that figure exceed by more than 1 dB(A) the maximum sound level authorized for the category of vehicle tested, a second series of two measurements at the corresponding microphone position shall be made. Three out of the four results so obtained in this second position must fall within the prescribed limits.

To allow for lack of precision in the measuring instrument the figures read from it during measurement shall each be reduced by 1 dB(a).

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*/ The spread of results between runs may be reduced if there is a 1 min. wait between runs, at idle in neutral, which stabilizes the vehicle operating temperature."

Paragraph 3.2.3.2., correct the word "metre reading" to read "meter reading".

Annex 8, paragraph 4.3., correct to read:

"..... See ISO 10844:1994 for the description of the procedure."
