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EAST AFRICAN STANDARD

**Measurement of noise emitted by road vehicles when stationary —
Code of practice**

EAST AFRICAN COMMUNITY

Foreword

Development of the East African Standards has been necessitated by the need for harmonizing requirements governing quality of products and services in East Africa. It is envisaged that through harmonized standardization, trade barriers which are encountered when goods and services are exchanged within the Community will be removed.

In order to meet the above objectives, the EAC Partner States have enacted an East African Standardization, Quality Assurance, Metrology and Test Act, 2006 (EAC SQMT Act, 2006) to make provisions for ensuring standardization, quality assurance, metrology and testing of products produced or originating in a third country and traded in the Community in order to facilitate industrial development and trade as well as helping to protect the health and safety of society and the environment in the Community.

East African Standards are formulated in accordance with the procedures established by the East African Standards Committee. The East African Standards Committee is established under the provisions of Article 4 of the EAC SQMT Act, 2006. The Committee is composed of representatives of the National Standards Bodies in Partner States, together with the representatives from the private sectors and consumer organizations. Draft East African Standards are circulated to stakeholders through the National Standards Bodies in the Partner States. The comments received are discussed and incorporated before finalization of standards, in accordance with the procedures of the Community.

Article 15(1) of the EAC SQMT Act, 2006 provides that "Within six months of the declaration of an East African Standard, the Partner States shall adopt, without deviation from the approved text of the standard, the East African Standard as a national standard and withdraw any existing national standard with similar scope and purpose".

East African Standards are subject to review, to keep pace with technological advances. Users of the East African Standards are therefore expected to ensure that they always have the latest versions of the standards they are implementing.

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Measurement of noise emitted by road vehicles when stationary — Code of practice

1 Scope

This code of practice covers the measurement, at a readily available site, of noise produced by road vehicles when stationary, as a check on vehicles in service.

NOTE

- a) The standards referred to in the code of practice are listed in Annex A.
- b) The stationary sound level limits, i.e. the maximum permissible values when sound levels are measured in accordance with this code of practice, are given in ISO 1585.

2 Normative references

The following referenced documents are indispensable for the application of this East African Standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 61672-1, *Electroacoustics — Sound level meters — Part 1: Specifications*

IEC 61672-2, *Electroacoustics — Sound level meters — Part 2: Pattern evaluation tests*

SABS 10281, *Engine speed (S values), reference sound levels and permissible sound levels of stationary road vehicles*

ISO 1585, *Road vehicles — Engine test code — Net power*

3 Definitions

For the purposes of this code the following definitions shall apply:

3.1

background noise

Any noise at the test site (other than that emitted by the vehicle under test) that is recorded by the microphone at the time of testing.

3.2

engine brake

A device that, by modifying the valve opening times of the combustion engine, provides additional braking for the vehicle.

3.3

left side (of a vehicle)

The left-hand side with reference to the direction in which the vehicle is facing.

3.4

rated sound level

The maximum sound level of a vehicle determined by the manufacturer for a specified engine rotational frequency.

3.5

sound level (dB(A))

The reading in dB on a sound level meter complying with the requirements of IEC 61672-1 and IEC 61672-2, the "A"-weighting network being used.

3.6

Vehicle

Any road vehicle that is powered by fuel and that uses an internal combustion engine for propulsion.

3.7

rated engine speed, S

engine speed at which the engine develops its rated maximum net power as stated by the manufacturer

4 Test method

4.1 Measuring equipment

NOTE Automatic measuring systems and calibration assemblies may be used provided that the characteristics of the assemblies comply with all the relevant requirements of 4.1.1, 4.1.2, and 4.1.3.

4.1.1 Meter

Sound level measuring equipment of type 1 as specified in IEC 61672-1 and IEC 61672-2.

4.1.2 Calibration source

An acoustic source designed for use with the particular meter specified in 4.1.1 and having preferably a single frequency sound output, the amplitude of which (at the temperature and barometric pressure at which the calibration check is performed) is known to within 0.3 dB.

4.1.3 Revolution counter

A revolution counter external to the vehicle, having an accuracy of 3 % of the reading or better.

4.2 Calibration

4.2.1 Ensure that all items of equipment used are so calibrated (by a laboratory having the necessary facilities), at intervals not exceeding one year, that they comply with all the requirements of 4.1.

4.2.2 Using the calibration source, check the performance of the meter immediately before and after each series of sound measurements and discard the test results if the two checks do not coincide to within 1,0 dB.

4.3 Test site

4.3.1 To reduce the influence of the surroundings on the noise measurements, a test site having the following characteristics should be used:

An open space consisting of an area made of concrete, asphalt, or hard material having a high acoustical reflectivity and excluding other earth surfaces, in which a rectangle may be so traced that its sides are at least 3000 mm from the extremities of the vehicle under test. Inside this rectangle there should be no significant obstacle other than a kerbside or pavement edge, which should be at a distance from the vehicle of at least 1000 mm. No significant obstacle should be situated within 3 000 mm of the microphone.

4.3.2 With the exception of the observer and the driver, no person whose presence may influence the meter readings should remain in the measuring area during the test.

4.3.3 The background noise (including wind noise) at the test site should be at least 10 dB below the levels measured during the test.

4.4 Measuring procedure

4.4.1 Locate the vehicle in the centre of the test rectangle (see 4.3.1) with the transmission in neutral, where relevant with the clutch engaged. With automatic transmissions set the selector to NEUTRAL or PARK.

4.4.2 In the case of a two- or three-wheeled vehicle with no neutral transmission selection, measure the sound level with the drive wheel(s) raised off the ground.

NOTE

- a) In such cases the transmission ratio need not be considered.
- b) Before each series of measurements, bring the engine to within its normal operating temperature range.

4.4.3 Set the meter to indicate "A"-weighted sound levels with the dynamic characteristic "FAST".

4.4.4 Operate the equipment in accordance with the manufacturer's instructions.

4.4.5 Use a windscreen of a type specified by the manufacturer as being suitable for the particular microphone and that does not influence the accuracy of the meter detectably under the ambient conditions of test.

4.4.6 Carry out at least three measurements in each measuring position. Consider the measurements valid if the range of three measurements made immediately one after the other is not greater than 2 dB. Use the lowest of these measurements as the result.

4.4.7 Position the microphone as indicated in figure 1 under the following conditions:

- a) Position the microphone so that its height above the ground is equal to that of the exhaust outlet under test, but in any event at a height of not less than 200 mm.
- b) Locate the microphone at a distance of 500 ± 10 mm from the exhaust outlet pointing it towards the outlet as shown in the diagrams in Figure 1.
- c) Ensure that the axis of maximum sensitivity is parallel to the ground, unless otherwise indicated by the manufacturer of the microphone, and makes an angle of $45 \pm 10^\circ$ with the vertical plane containing the direction of the gas flow. Place the microphone towards the side of the vehicle containing the exhaust outlet, as indicated in Figure 1. If the exhaust outlet or outlets are symmetrically positioned about the longitudinal median plane of the vehicle, place the microphone towards the left side of the vehicle.
- d) For vehicles provided with two or more exhaust outlets spaced less than 300 mm apart, and connected to a single silencer, make one measurement, and relate the microphone position towards the outlet furthest from the longitudinal mean, or when such outlets are in the same vertical plane, to the outlet that is the highest above the ground.
- e) For vehicles with a vertical exhaust (for example commercial vehicles), place the microphone at the height of the exhaust outlet, orientated upwards and with its axis of maximum sensitivity vertical. Place it at a distance of 500 ± 10 mm from the side of the vehicle nearest to the exhaust.
- f) For vehicles provided with exhaust outlets spaced at 300 mm or more apart, make one measurement for each outlet as if it were the only one, and note only the highest level.
- g) When the vehicle design is such that the microphone cannot be placed as shown in Figure 1, because of the presence of obstacles that are part of the vehicle (for example spare wheel, fuel tank, or battery), draw a diagram clearly showing the place chosen for the microphone. As far as possible place the microphone at a distance greater than 500 mm from the nearest obstacle and orientate its axis of maximum sensitivity towards the outlet of the exhaust system in a position which is the least masked by the above-mentioned obstacles.

4.4.8 Stabilize the rotational frequency of the engine at one of the following values:

- a) For vehicles with spark ignition engines: $\frac{3}{4} S$;
- b) for vehicles with compression ignition (diesel) engines: The actual governed no-load rotational frequency;

- c) for two- or three-wheeled vehicles: $\frac{1}{2} S$ if $S > 5\,000$ r/min or $\frac{3}{4} S$ if $S \leq 5\,000$ r/min. (S denotes the approximate rotational frequency of the engine at which it produces its maximum power.)
- d) for vehicles with compression ignition (diesel) engines and equipped with engine brakes: The actual governed no-load rotational frequency with the engine brake switched off and with the engine brake switched on.

NOTE 1 When not indicated on the data plate, values of S may be obtained from ISO 1585 or from the manufacturer or estimated by suitable means.

NOTE 2 Where relevant, the engine compartment cover should be kept as near to being completely closed as is possible during the sound level measurements without damaging equipment cables.

4.4.9 Close the throttle rapidly and measure the noise during the whole deceleration period. Note the highest level only.

5 Records

5.1 The testing authority should keep a full record of every vehicle tested. The record should include the following information:

- a) a reference to this code of practice;
- b) the vehicle type tested, with a description of any abnormal conditions;
- c) the test site, ground conditions, and weather conditions;
- d) the type of measuring equipment;
- e) the location and orientation of the microphone;
- f) for spark ignition engines, the engine speed used for the test;
- g) the "A"-weighted sound levels determined by the tests;
- h) the "A"-weighted sound level of the background noise at the test site;
- i) the name of the person responsible for the tests and present at the test site.

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