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**Road vehicles — Sound signalling  
devices — Tests after mounting on  
vehicle**

*Véhicules routiers — Avertisseurs sonores — Essais après montage  
sur le véhicule*

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 6969 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 3, *Electrical and electronic equipment*.

This third edition cancels and replaces the second edition (ISO 6969:1999), which has been technically revised.

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# Road vehicles — Sound signalling devices — Tests after mounting on vehicle

## 1 Scope

This International Standard specifies the testing of sound signalling devices in accordance with ISO 512, to be carried out after mounting on the vehicle.

## 2 Normative references

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

ISO 512:1979, *Road vehicles — Sound signalling devices — Technical specifications*

IEC 61672 (all parts), *Electroacoustics — Sound level meters*<sup>1)</sup>

## 3 Measuring apparatus

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The measurement of sound pressure levels shall be made using a sound level meter in accordance with IEC 61672.

When a device for protection of the sound level meter against wind is used, its effect on the measuring accuracy shall be taken into account according to the indications of the manufacturer.

The electrical measurements shall be made using instruments of the class 0,5 as specified in IEC 61672.

The measurements of lengths shall be made with a tolerance of  $\pm 0,05$  m.

## 4 Expression of results

The results of the measurements of the sound pressure levels shall be in relation to  $2 \times 10^{-5}$  Pa (N/m<sup>2</sup>), weighted in accordance with curve A as specified in IEC 61672, with the A-weighted results expressed in decibels.

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1) Replaces IEC 60651.

## 5 Test conditions

### 5.1 Test site

The vehicle shall be placed on an open site, such as an open space of at least 50 m radius, the central part of which, intended for the execution of the measurements, shall be practically horizontal over at least 20 m radius, covered with concrete, asphalt or any similar material, and free from long grass, loose soil or ashes.

No person other than the observer taking the readings on the sound level meter shall be in the vicinity of the sound signalling device or of the microphone (the presence of bystanders could have an appreciable influence on the meter readings).

### 5.2 Ambient conditions

Measurements shall not be affected by weather conditions (wind, rain, humidity, etc.). No measurements shall be carried out when the wind speed is greater than 5 m/s. The ambient temperature during the measurements shall be within the temperature range specified for the measuring equipment.

The ambient noise level within the entire range covered by frequencies of the sound components emitted by the sound signalling device shall be at least 10 dB lower than the sound level of each of the components. However, this requirement is not applicable to components with a measured sound pressure level lower than 70 dB (A-weighted).

### 5.3 Time constant

Measurements shall be carried out with the fast time constant of the sound measuring device.

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### 5.4 Positioning of the microphone

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#### 5.4.1 Direction

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The axis of maximum sensitivity of the microphone shall be horizontal and parallel to the vertical longitudinal zero plane of the vehicle and directed towards the front of the vehicle.

#### 5.4.2 Position

The microphone shall be placed  $(7 \pm 0,1)$  m from the foremost point of the vehicle within a circle of 0,5 m radius, whose plane is vertical and perpendicular to the longitudinal zero plane of the vehicle and whose centre is 1,0 m above the ground, (see Figure 1).

### 5.5 Supply conditions

#### 5.5.1 Supply with alternating current

For sound signalling devices supplied by alternating current, the measurements shall be made with the engine running at three speeds corresponding to 50 %, 75 % and 100 % of the maximum engine speed specified by the manufacturer.

When the measurements are being made there shall be no other electrical load supplied by the generator.

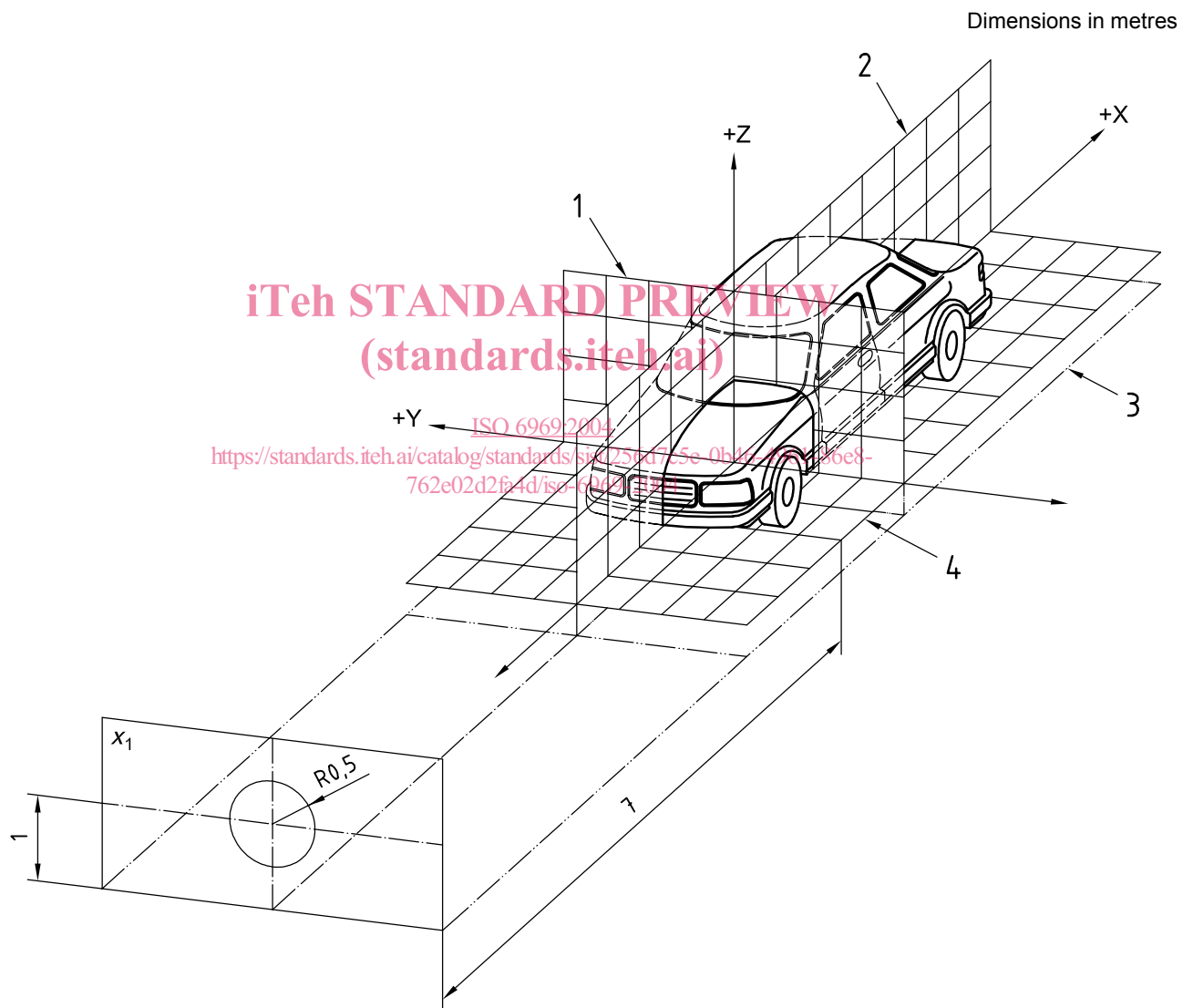
#### 5.5.2 Supply with direct current

The sound signalling devices shall be operated at the applicable test voltage specified in Table 1 for the different nominal on-board supply voltages. Measure the voltage during the operation of the sound signalling device at the terminals of the energy source.

**Table 1 — Nominal supply voltage and test voltage**

Nominal supply voltage, $U_N$ V	6	12	24
Test voltage, $U_T$ V	6,5	13	26

If a rectified a.c. supply is used for the test, the alternating voltage components measured peak-to-peak at the terminals of the energy source during the operation of the sound signalling device shall not exceed 0,1 V. For electro-pneumatic sound signalling devices, the connections between the sound source and the compressor shall be made according to the instructions of the manufacturer.

**Key**

- 1 zero X plane (vertical transverse zero plane)
- 2 zero Y plane (vertical longitudinal zero plane)
- 3 ground
- 4 zero Z plane (horizontal zero plane)

**Figure 1 — Positioning of the microphone**

### 5.5.3 Supply with compressed air

Pneumatic sound signalling devices shall be supplied in accordance with the indications of the manufacturer.

### 5.6 Measurements

Select appropriate positions for the microphone within the test circle specified in 5.4.2 and measure the sound pressure level at each of these positions. Continue until the position of the maximum sound pressure level is found.

The time of operation of the device under test shall be as short as possible. In no case shall the test time exceed 30 consecutive seconds, after which it is necessary to allow the sound signalling device under test to cool down for at least 20 min.

In the case where a vehicle is equipped with several sound signalling devices which operate simultaneously, the measurements shall be made with all the devices operating at the same time.

Any peaks in the readings which are apparently unrelated to the characteristics of the general sound level shall not be taken into account.

## 6 Requirements

In accordance with ISO 512, sound signalling devices shall emit a continuous uniform sound; their acoustic spectra shall not vary significantly during operation. For sound signalling devices operated by an a.c. supply, the requirements apply only at a constant engine speed as specified in 5.5.1.

Measured under the conditions specified in Clause 5, the value of the sound pressure level of the device under test shall be not greater than 112 dB (A-weighted)<sup>2)</sup>, but shall be at least

- a) 70 dB (A-weighted)<sup>3)</sup> for sound signalling devices installed on mopeds with a maximum speed of 30 km/h,
- b) 73 dB (A-weighted)<sup>3)</sup> for sound signalling devices installed on mopeds with a maximum speed greater than 30 km/h,
- c) 83 dB (A-weighted)<sup>4)</sup> for sound signalling devices installed on motorcycles of up to and including 7 kW power output of the engine, and
- d) 93 dB (A-weighted)<sup>4)</sup> for sound signalling devices installed on vehicles having at least four wheels and for motorcycles with power output of the engine exceeding 7 kW.

NOTE The values given here could differ from legal requirements (e.g. 93/30/EEC) in some countries.

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2) Value taken from ECE Regulation 28, Part II, and 93/30/EEC.

3) Value based on ECE Regulation 63, Annex 4.

4) Value taken from ECE Regulation 28, Part II.



## Bibliography

- [1] ECE-R 28, *Uniform provisions concerning the approval of audible warning devices and of motor vehicles with regard to their audible signals*
- [2] ECE-R 63, *Uniform provisions concerning the approval of mopeds with regard to noise*
- [3] 93/30/EEC, *Council Directive of 14 June 1993 on sound signalling devices for two- or three-wheeled power driven vehicles*
- [4] IEC 60051 (all parts), *Direct acting indicating analogue electrical measuring instruments and their accessories*
- [5] IEC 61260:1995, *Electroacoustics — Octave-band and fractional-octave-band filters*

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