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# Cycles - Audible warning devices - Technical specification and test methods

自行车 鸣号装置 技术规范和试验方法

(ISO 14878:2015, IDT)

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# Table of Contents

# Cycles - Audible warning devices - Technical specification and test methods

## 1 Scope

This document specifies the technical specifications for audible warning devices installed on cycles, such as sound pressure levels and durability performance. It also describes the corresponding test methods.

This document applies to various types of audible warning devices for cycles.

## 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 9227, *Corrosion test in artificial atmosphere - Salt spray tests*

NOTE: GB/T 10125-2021, *Corrosion tests in artificial atmospheres -- Salt spray tests* (ISO 9227:2017, MOD)

ISO 26101, *Acoustics - Test methods for qualification of free field environments*

NOTE: GB/T 34828-2017, *Acoustics -- Test methods for the qualification of free-field environments* (ISO 26101:2012, IDT)

IEC 60942, *Electroacoustics - Sound calibrators*

NOTE: GB/T 15173-2010, *Electroacoustics -- Sound calibrators* (IEC 60942:2003, IDT)

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

NOTE: GB/T 3785.1-2010, *Electroacoustics -- Sound level meters -- Part 1: Specifications* (IEC 61672-1:2002, IDT)

IEC 61672-3, *Electroacoustics - Sound level meters - Part 3: Periodic tests*

NOTE: GB/T 3785.3-2018, *Electroacoustics -- Sound level meters -- Part 3: Periodic tests* (IEC 61672-3:2013, IDT)

The entire measurement system shall be checked using a Class 1 acoustic calibrator complying with the requirements of IEC 60942.

When measuring, acoustic measuring instruments with "F" time weighting and "A" frequency weighting described in IEC 61672-1 shall be used. When using a system that monitors A-weighted sound pressure levels at periodic intervals, the interval between readings shall not be greater than 30 ms.

Instruments shall be maintained and calibrated in accordance with the instrument manufacturer's instructions.

When it is impossible to make an overall judgment or conclusion on whether the sound level meter complies with all the specifications of IEC 61672-1, the sound level meter or equivalent measurement system shall at least meet the requirements of Class 1 sound level meter in IEC 61672-3.

**NOTE:** The tests in IEC 61672-3 only cover part of the provisions of IEC 61672-1. IEC 61672-1 covers a large range (temperature range, frequency requirements up to 20 kHz, electromagnetic compatibility test), so from an economic perspective, it is impossible to verify each parameter of the computer data acquisition system one by one according to the requirements of IEC 61672-1.

### 5.1.2 Calibration

At the beginning and end of each measurement, the entire acoustic measurement system shall be checked with the acoustic calibrator described in 5.1.1. Without additional adjustments, the difference between readings shall not be greater than 0.5 dB. If this value is exceeded, measurements taken after the last satisfactory inspection shall be discarded.

### 5.1.3 Compliance requirements

The acoustic calibrator shall be calibrated once a year in accordance with the requirements of IEC 60942.

The instrument system shall be calibrated at least once every 2 years in accordance with the requirements of IEC 61672-3.

All compliance testing shall be performed by an authorized laboratory traceable to an appropriate reference.

### 5.1.4 Meteorological instrument

Meteorological instruments used to monitor environmental conditions during the test shall meet the following technical specifications:

a) Temperature measuring device ±1°C or less;

b) Wind speed measuring device ±1.0 m/s;

c) Air pressure measuring device ±5 hPa;

d) Relative humidity measuring device ±5%.

# 6 Acoustic environment, meteorological conditions and background noise

## 6.1 Test site

AWD shall be tested in an anechoic environment. It can also be conducted in a semi-anechoic room or an open field. When testing in an open field, precautions shall be taken (for example, erecting a set of sound-absorbing panels) to block the echo from the ground in the measurement area.

Using the following evaluation criteria and measurement requirements that are close to those recommended by ISO 26101, the test facilities shall be able to meet the requirements of ISO 26101.

a) The site considered as anechoic shall be at least a hemispheric space with a radius of 5 m.

b) The test sound source shall be placed in the center of the area considered anechoic, i.e., on the ground.

c) The horizontal axis of the microphone shall be on the line connecting the center of the sound source to the position of the microphone.

d) The maximum spacing between measuring points shall depend on the size of the anechoic site. The spatial resolution of the measurements is at least 10 points.

e) The evaluation bandwidth shall be selected to cover the frequency range of the typical spectral characteristics of the sound source under test. If there is no other information, it is recommended to be 100 Hz~10000 Hz.

f) The test sound source shall be broadband noise. A 1/3 octave band filter is used during measurement.

For indoor test sites, the cutoff frequency of the test facility shall be lower than the frequency of the lowest component of sound emitted during the AWD test.

There shall be no obstacles near the microphone that may affect the sound field. There shall be no people between the microphone and the sound source. The instrument observer shall be positioned so as not to affect instrument readings.

**NOTE:** Users of this document are aware that measurements are only valid if the cutoff frequency

ground.

The reference direction under free field conditions (see IEC 61672-1) shall be horizontal and pointed vertically towards the center of the AWD.

The microphone shall be located 2 m ± 0.01 m from the center of the AWD.

# 7 Measurement of sound pressure level

## 7.1 AWD operation

The AWD being tested shall be sounded by the operator operating (pushing, pulling, pressing) the controls in accordance with the manufacturer's requirements. The position of the operator shall not have a significant impact on the test results.

One measurement sequence group is completely and continuously operated 10 times within 4 s ± 0.5 s.

Five measurement sequence groups shall be performed. There shall be gaps between each set of operations.

The above operation shall be repeated 5 times.

## 7.2 Measurement readings and reported values

### 7.2.1 General

Take $2\times10^{-5}$ Pa($N/m^2$) as the reference sound pressure level. During each sequence group of 10 operational measurements, the maximum A-weighted sound pressure level $L_{AFmax}$ relative to the reference sound pressure level shall be recorded. Valid values are 1 decimal place (e.g., xx.x). If the measured sound pressure level obviously does not meet the peak value of the general sound pressure level, the measurement shall be invalid.

Five measurement results with a difference of no more than 2.0 dB shall be regarded as one set of measurement values.

### 7.2.2 Data processing

The final value reported as a measurement result is the average of the 5th result in each of these 5 groups.

## 7.3 Sound pressure requirements

Measured under the conditions specified above, for AWD class I, the final value of the

measured sound pressure level is 3 out of 4:

- Shall be greater than or equal to 85 dB(A);

- Shall not be greater than 95 dB(A).

Measured under the conditions specified above, for AWD class II, the final value of the measured sound pressure level is 3 out of 4:

- Shall be greater than or equal to 75 dB(A);

- Shall not be greater than 85 dB(A).

**NOTE 1:** AWD with 2 gears: 1 gear for normal use and 1 gear for Class II defined quiet areas.

**NOTE 2:** For electronic AWD that sounds like a bell, it is usually a single tone signal with a frequency of 1900 Hz ~ 4600 Hz and attenuation within 1 s or 2 s, so as to produce acoustic characteristics equivalent to the knocking sound of mechanical AWD.

### 7.4 Low battery indication

Battery powered AWD systems shall include a low battery indicator. This indicator shall be located on the AWD, clear and easy to see. The indicator shall be activated at the latest when the requirements given in 7.3 are no longer met.

## 8 Durability test

### 8.1 Test steps

#### 8.1.1 Mechanical stability test

AWDs with different structures are subjected to mechanical stability tests according to the method described in a) or b).

a) Mechanical AWD

4 AWDs shall be operated 30,000 times at a speed of (100±5) times/min during the operating stroke of the joystick.

b) Electric or electronic AWD

The product is securely installed. Apply a cyclic force of 0 ~ (13±1) N (or larger, enough to trigger sound). Last 30,000 times.

The contact time from 0~13 and 13~0 shall be 1 s. The pause time shall be 1 s. Force shall be applied gradually to avoid any shock. The force shall be applied at the center

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