

ICS 27.020



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 1859.1-2026

**Reciprocating internal combustion engines-Measurement of
sound power level using sound pressure-Part 1:Engineering
method**

往复式内燃机 声压法声功率级的测定 第1部分：工程法

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Foreword

GB/T 1859 "Reciprocating internal combustion engines - Measurement of sound power level using sound pressure" is divided into 4 parts.

- Part 1. Engineering method;
- Part 2. Survey method;
- Part 3. Precision methods for hemi-anechoic rooms;
- Part 4. Survey method using a reference sound source.

This Part is Part 1 of GB/T 1859.

This Part is drafted in accordance with the rules given in GB/T 1.1-2009.

This Part replaces the engineering method in GB/T 1859-2000 "Reciprocating internal combustion engines - Measurement of emitted airborne noise -Engineering method and survey method".

As compared with GB/T 1859-2000, the main technical changes of this Part are as follows.

- DELETE relevant content of "survey method";
- ADD the clause of "Terms and definitions";
- MODIFY the provisions on "Acoustic environment";
- ADD provisions on "Measuring instruments";
- MODIFY and ADD the provisions on "Installation and working conditions";
- MODIFY and ADD the provisions on "Measurement";
- ADD the provisions on "Calculation";
- ADD the clause of "Recording content";
- MODIFY the provisions on "Report";
- DELETE Appendix A and Appendix B in GB/T 1859-2000;
- ADD Appendix A (Normative) "Methods for appraisal of acoustic environment", Appendix B "Calculation of A-weighted sound power level from band sound power level", and Appendix C "Sound power level of

Introduction

This Part of GB/T 1859 is one of a series of standards for the measurement of sound power level of reciprocating internal combustion engines using sound pressure. This series of standards gives a method for measuring the sound pressure level on the measurement

surface enveloping sound source to calculate the sound power level.

The measurement result of sound power level is basically irrelevant to the test environment and the installation conditions of sound source. This is an important reason for the use of sound power level to characterize the noise radiation of various types of machines and equipment.

The sound power level has the following uses.

- Marking of machine radiation noise under specified conditions;
- Verification of noise marking values;
- Comparison of radiation noise of machines of various models and dimensions;
- Comparison with the noise limits specified in the purchase contract or specification;
- Development of engineering measures to reduce machine radiation noise (Generally, the band sound power level shall also be provided);
- Prediction of noise sound pressure level at specified position.

Table 1 shows the measurement methods of sound power level of three accuracy classes to which the envelope surface method of this series of standards applies. The measurement results are accurate to 0.1 dB. The methods given in this Part allow the determination of A-weighted sound power level and band sound power level; the accuracy class is Class 2. A-weighted sound power level can also be calculated from band sound power level, but it is not exactly the same as the sound power level determined by measuring A-weighted sound pressure level.

Reciprocating internal combustion engines -Measurement of sound power level using sound pressure - Part 1. Engineering method

1 Scope

This Part of GB/T 1859 specifies the measurement method for sound power level of reciprocating internal combustion engines - engineering method.

This Part is applicable to reciprocating internal combustion engines (unless otherwise specified, hereafter known as engines for short) in the scope of application of GB/T 6072.1, and other internal combustion engines to which no suitable standards apply.

2 Normative references

The following documents are indispensable for the application of this document.

For the dated references, only the versions with the dates indicated are applicable to this document. For the undated references, the latest version (including all the amendments)

are applicable to this document.

GB/T 3241 Electroacoustics - Octave-band and fractional-octave-band filters GB/T 3785.1 Electroacoustics - Sound level meters - Part 1. Specifications GB/T 4129 Acoustics - Requirements for the performance and calibration of reference sound sources used for determination of sound power levels GB/T 6072.1 Reciprocating internal combustion engines - Performance -Part 1. Declarations of power, fuel and lubricating oil consumptions and test methods - Additional requirements for engines for general use GB/T 6072.3 Reciprocating internal combustion engines - Performance -Part 3. Test measurements GB/T 15173 Electroacoustics - Sound calibrators

3.5 Measurement time interval; T

One or more operating period or operating cycle of the sound source being measured used to determine the time-averaged sound pressure level, in seconds (s).

3.6 Acoustic free field

An acoustic field where edge effect is negligible in homogeneous, isotropic media.

Note: The actual acoustic free field is an acoustic field where the reflection of edge or other objects within the frequency range of interest is negligible.

3.7 Reflecting plane

A flat surface for sound reflection on which the sound source being measured is located.

3.8 Acoustic free field over a reflecting plane

The acoustic free field in the half space over an infinitely large reflecting plane, without any other obstacles.

3.9 Frequency range of interest

The frequency range covered by the octave-band with a center frequency of 63 Hz~8000 Hz (1/3 octave-band of 50 Hz~10000 Hz).

3.10 Reference box

The smallest hypothetical rectangular hexahedron which envelops the sound source exactly and terminates on a reflecting plane (ground).

3.11 Measurement distance; d

The vertical distance between reference box and measurement surface of hypothetical rectangular hexahedron.