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

**GB/T 3767-2016**

Replacing GB/T 3767-1996

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**Acoustics -- Determination of sound power levels and sound energy  
levels of noise sources using sound pressure -- Engineering methods  
for an essentially free field over a reflecting plane**

声学 声压法测定噪声源声功率级和声能量级 反射面上方近似自由场的工程法

**(English Translation)**

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### Foreword

This standard is one of the series of standards for determining the sound power level of noise sources by sound pressure method.

This standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This standard replaces GB/T 3767-1996 "Acoustic sound pressure method to determine the approximate free field above the sound level of the noise source Chengfa.

This standard is compared with GB/T 3767-1996. The main changes are as follows.

- Added terms and definitions;
- Increased measurement of sound energy level;
- The content of measurement uncertainty has been greatly supplemented;
- Raise the "background noise standard" to "background noise criterion" and formulate relative value criteria and absolute value criteria respectively;
- Revised the expression of the definition of the directivity index;
- Increased cylindrical measuring surface; the position of the microphone of the hemispherical discrete pure sound source increased from 10 to 20.

This standard uses the translation method equivalent to ISO 3744:2010 "acoustic sound

pressure method to determine the noise source sound power level and sound energy level the Engineering Method for Approximating Free Field Above the Surface (English Version).

The documents of our country that have a consistent correspondence with the international documents referenced in this standard are as follows.

---GB/T 3241-2010 Electroacoustic octave and classification octave filter (IEC 61260:1995, MOD)

---GB/T 4129-2003 Acoustics Performance and calibration requirements for standard sound sources for sound power level determination (ISO 6926.

1999, IDT)

---GB/T 6379 (all parts) Accuracy (accuracy and precision) of measurement methods and results [ISO 5725 (all parts)]

---GB/T 6882-2016 Acoustic sound pressure method for the determination of noise source sound power level and sound energy level anechoic chamber and semi-anechoic chamber precision Law (ISO 3745:2012, IDT) this standard was proposed by the Chinese Academy of Sciences.

This standard is under the jurisdiction of the National Acoustic Standardization Technical Committee (SAC/TC17).

This standard was drafted. Institute of Acoustics, Chinese Academy of Sciences, Shenzhen Zhongya Electromechanical Industry Co., Ltd., Hefei University of Technology, Tongji University, Anhui Vocational and Technical College, Zhejiang University, Shanghai Academy of Environmental Sciences, China Institute of Metrology.

## Introduction

This standard corresponds to ISO 3741, ISO 3743 to ISO 3747 GB/T 6881.1, GB/T 6881.2, GB/T 6881.3, One of the GB/T 3767, GB/T 3768, GB/T 6882 and GB/T 16538 series standards.

This series of standards specifies various methods for determining the sound power level and sound energy level of noise sources such as machines, equipment and their accessories.

GB/T 14367 provides a general guide to the choice of method. The choice of measurement method depends on the available test facility environment and sound power the precision required for the level and acoustic energy levels. It may be necessary to establish a noise test specification for individual noise sources (see GB/T 19052) to Appropriately select the acoustic measuring surface and microphone array allowed by GB/T 6881.1 to GB/T 16538 series standard, and give the test unit the required installation, loading and operating conditions are obtained to obtain the sound power level and sound energy level under this

condition. A given sound source is emitted to the test loop the sound power of the environment is calculated from the mean square sound pressure and its surface area measured on the imaginary measuring surface surrounding the sound source. The acoustic energy of a single acoustic event is made up of it the sound power and its duration are calculated.

The method specified in this standard allows the determination of the sound power level and the acoustic energy level of the frequency band or A weight.

When the measurement requires higher accuracy, you can refer to GB/T 6882, or GB/T 6881.1 [2], GB/T 16404 [13-15] Line measurement. If the measurement environment related criteria specified in this standard are not met, you can refer to the other standards in this series, or refer to GB/T 16404 [13-15].

This standard describes the measurement of the level 2 accuracy specified in GB/T 19052 in the space near the free surface of the reflecting surface.

method. Such a measurement environment can be a specially designed test room, an industrial building or an outdoor. Ideally, the test source should be installed.

On the acoustic reflection plane of a large open space. For sound sources that are usually installed on the ground inside the building, you need to consider nearby objects, walls and ceilings.

The unwanted reflection of the board and the correction of residual background noise that occurs there.

Acoustic sound pressure method for determining noise source sound power level and Approximate free field above the acoustic energy level reflecting surface Engineering method

## 1.1 Overview

This standard specifies the use of an enclosed sound source (machine or equipment) in an approximately free sound field environment near one or more reflection planes.

A method of measuring the sound pressure level measured on a surface to determine the sound power level or sound energy level of the noise source. Use these measurements to calculate the noise source Band or A-weighted sound power level (or acoustic energy level in the case of impulse noise or transient noise).

**Note:** For a given noise source, different shapes of the measurement surface may get different sound power level estimates, and a noise test procedure is developed accordingly (see Details on the selection of the measuring surface are given in GB/T 19052).

## 1.2 Types of noise and noise sources

The methods specified in this standard apply to the various types of noise (steady state, unsteady state, undulation, creaking, etc.) defined in GB/T 19052.

This standard applies to sound sources of various types and sizes (such as fixed equipment or slow moving equipment, when the measurement conditions are met).

Devices, machines, components,, etc.).

**Note:** This standard may not be suitable for super high or long sound sources, such as chimneys, pipes, conveyors, multi-source industrial equipment. In this case, for Acoustic emission measurement of bulk noise sources, noise test procedure GB/T 19052 provides an alternative method.

## 1.3 Test environment

The test environment suitable for measurement according to this standard can be located indoors or outdoors, and the noise source to be tested is installed in one or more acoustic reflections.

On or near the surface. The ideal environment is a completely open space with no boundaries or no other than a reflective plane with noise sources installed.

A reflective surface (for example, a qualified semi-anechoic chamber), but in a less than ideal environment, a method of correction (within a specified range) is specified.

## 1.4 Measurement uncertainty

The uncertainty information of the specified frequency band and the A-weighted frequency sound power level and sound energy level measured according to this standard is given. uncertainty it meets the level 2 accuracy of GB/T 19052 (engineering level).

## 2 Normative references

The following documents are indispensable for the application of this document. For dated references, only dated versions apply to this article.

Pieces. For undated references, the latest edition (including all amendments) applies to this document.

GB/T 3785.1-2010 Electroacoustic sound level meters - Part 1. Specification (IEC 61672-1:2002, IDT) GB/T 15173-2010 Electroacoustic Acoustic Calibrator (IEC 60942:2003, IDT) GB/T 19052-2003 Guidelines for the drafting and presentation of noise and noise test specifications for acoustic machines and equipment (ISO 12001:1996, IDT) ISO 3382-2 Acoustic parameters for acoustic test rooms - Part 2. Res.