
INTERNATIONAL STANDARD



3743

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

Acoustics — Determination of sound power levels of noise sources — Engineering methods for special reverberation test rooms

Acoustique — Détermination des niveaux de puissance acoustique émis par les sources de bruit — Méthodes d'expertise pour les salles d'essai réverbérantes spéciales

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FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO Member Bodies). The work of developing International Standards is carried out through ISO Technical Committees. Every Member Body interested in a subject for which a Technical Committee has been set up 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.

Draft International Standards adopted by the Technical Committees are circulated to the Member Bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 3743 was drawn up by Technical Committee ISO/TC 43, *Acoustics*, and was circulated to the Member Bodies in May 1975.

It has been approved by the Member Bodies of the following countries :

Australia	Ireland	South Africa, Rep. of
Austria	Israel	Sweden
Belgium	Italy	Switzerland
Brazil	Japan	Turkey
Czechoslovakia	Netherlands	United Kingdom
Denmark	New Zealand	U.S.A.
Finland	Norway	U.S.S.R.
France	Poland	
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The Member Body of the following country expressed disapproval of the document on technical grounds :

Canada



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AMENDMENT SLIP

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MODIFICATION TO FOREWORD *(Inside front cover)*

The following sentence is to be added at the end of the foreword :

“This International Standard cancels and replaces ISO Recommendation R 495-1966, of which it constitutes a technical revision.”

Acoustics – Determination of sound power levels of noise sources – Engineering methods for special reverberation test rooms

0.1 RELATED INTERNATIONAL STANDARDS

This International Standard is one of a series specifying various methods for determining the sound power levels of machines and equipment. These basic documents specify only the acoustical requirements for measurements appropriate for different test environments as shown in table 1.

When applying these basic documents, it is necessary to decide which one is most appropriate for the conditions

and purposes of the test. The operating and mounting conditions of the machine or equipment to be tested must be in accordance with the general principles stated in the basic documents.

Guidelines for making these decisions are provided in ISO 3740. If no sound test code is specified for a particular machine, the mounting and operating conditions shall be fully described in the test report.

TABLE 1 – International Standards specifying various methods for determining the sound power levels of machines and equipment

International Standard No.*	Classification of method	Test environment	Volume of source	Character of noise	Sound power levels obtainable	Optional information available
3741	Precision	Reverberation room meeting specified requirements	Preferably less than 1 % of test room volume	Steady, broad-band	In one-third octave or octave bands	A-weighted sound power level
3742				Steady, discrete-frequency or narrow-band		
3743	Engineering	Special reverberation test room		Steady, broad-band narrow-band, discrete-frequency	A-weighted and in octave bands	Other weighted sound power levels
3744	Engineering	Outdoors or in large room	No restrictions : limited only by available test environment	Any	A-weighted and in one-third octave or octave bands	Directivity information and sound pressure levels as a function of time; other weighted sound power levels
3745	Precision	Anechoic or semi-anechoic room	Preferably less than 0,5 % of test room volume	Any		
3746	Survey	No special test environment	No restrictions : limited only by available test environment	Steady, broad-band, narrow-band, discrete-frequency	A-weighted	Sound pressure levels as a function of time; other weighted sound power levels

* See clause 2.

0.2 SYNOPSIS OF ISO 3743

Applicability

Test environment

Reverberation room with prescribed volume and absorption. Guidelines for the design of reverberation rooms are given in annex A.

Type of source

Device, machine, component, subassembly.

Size of noise source

Volume of the source not greater than 1 % of the volume of the test room.

Character of noise radiated by the source

Steady (as defined in ISO 2204).

Accuracy

Engineering (standard deviation for determining A-weighted and/or octave band sound power levels for 1 kHz is about 2,0 dB).

Quantities to be measured

Sound pressure levels with A-weighting and in octave bands on prescribed paths or at several fixed positions.

Quantities to be determined

Weighted sound power level with A or other weighting sound power levels in octave bands.

Quantities which cannot be obtained

Directivity characteristics of the source.

0.3 INTRODUCTION

This International Standard specifies relatively simple engineering methods for determining the weighted and octave band sound power levels of small noise sources. These methods are applicable to small machines, devices and components which are sources of steady noise and can be installed for the purposes of the measurements in a special test room with prescribed acoustical characteristics. These methods are particularly suitable when the cost and labour involved in carrying out the measurements should be minimized and high precision is not necessary.

These methods are based on the premise that the mean-square sound pressure averaged in space and time in the test room can be used to determine the sound power emitted by the source. The properties of the test room are chosen so that the room's influence on the sound power output of the source under test is reasonably small. A simple method is given to determine the number of microphone positions and source locations required in the test room.

This International Standard, together with the others in this series (see table 1), supersedes ISO/R 495.

1 SCOPE AND FIELD OF APPLICATION

1.1 General

This International Standard specifies relatively simple engineering methods for determining the approximate sound power levels of small noise sources. The measurements are carried out when the source is installed in a specially designed room having a prescribed reverberation time over the frequency range of interest. The results of the measurements are given in terms of the A-weighted and/or octave band power levels of the source.

NOTE — Precision methods for the determination of octave band and one-third octave-band power levels of small noise sources are specified in ISO 3741 and ISO 3742.

1.2 Field of application

1.2.1 Types of noise

The methods specified in this International Standard are not suitable for measurements of noise sources which emit impulsive noise consisting of single noise bursts. The results obtained for sources of quasi-steady impulsive noise may be of limited value. For sources of impulsive noise, the free-field methods specified in ISO 3744 and ISO 3745 should be used. A classification of different types of noise (steady, impulsive, etc.) is given in ISO 2204.

1.2.2 Size of source

This International Standard applies to small noise sources producing steady noise within a specified frequency range. The maximum size of the source under test and the lower limit of the frequency range for which the methods are applicable depend upon the test room employed. The volume of the noise source shall not exceed 1 % of the volume of the test room. For the minimum test room volume of 70 m³, the maximum size of the source is 0,7 m³. Measurements on sources emitting discrete-frequency components below 200 Hz are frequently difficult to make in such small rooms.

1.3 Measurement uncertainty

Measurements made in conformity with this International Standard result in standard deviations which are equal to or less than those given in table 2. The standard deviations of table 2 reflect the cumulative effects of all causes of measurement uncertainty excluding variations in the sound power of the source from test to test. For a source which emits noise with a relatively "flat" spectrum in the 100 to