
**Acoustics — Test methods for
the qualification of free-field
environments**

*Acoustique — Méthodes d'essai pour la qualification des
environnements en champ libre*



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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

The committee responsible for this document is ISO/TC 43, *Acoustics*.

This second edition cancels and replaces the first edition (ISO 26101:2012), which has been technically revised. The main changes are as follows:

- the term “acoustic centre” was replaced by “mathematical origin of the traverse” in several places in the document to provide clarification of terminology;
- the minimum traverse path length was reduced from 1/2 wavelength to 1/4 wavelength;
- [Figure B.1](#) has been added.

Introduction

This document describes the divergence loss method of measurement of performance of an environment designed to provide a free sound field or free sound field over a reflecting plane. An acoustical environment is a free sound field if it has bounding surfaces that absorb all sound energies incident upon them. This is normally achieved using specialized test environments, such as anechoic or hemi-anechoic chambers. In practice, these provide a controlled free sound field for acoustical measurements in a confined space within the facility.

The purpose of this document is to promote uniformity in the method and conditions of measurement when qualifying free sound field environments.

It is expected that the qualification procedures outlined in this document will be referred to by other International Standards and industry test codes. In such cases, these documents making reference to this document may specify qualification criteria appropriate for the test method and may require specific traverse paths.

Acoustics — Test methods for the qualification of free-field environments

1 Scope

This document specifies methodology for qualifying acoustic spaces as anechoic and hemi-anechoic spaces meeting the requirements of a free sound field.

This document specifies discrete-frequency and broad-band test methods for quantifying the performance of anechoic and hemi-anechoic spaces, defines the qualification procedure for an omnidirectional sound source suitable for free-field qualification, gives details of how to present the results and describes uncertainties of measurement.

This document has been developed for qualifying anechoic and hemi-anechoic spaces for a variety of acoustical measurement purposes. It is expected that, over time, various standards and test codes will refer to this document in order to qualify an anechoic or hemi-anechoic space for a particular measurement.

In the absence of specific requirements or criteria, [Annex A](#) provides qualification criteria and measurement requirements to qualify anechoic and hemi-anechoic spaces for general purpose acoustical measurements.

This document describes the divergence loss method for measuring the free sound field performance of an acoustic environment.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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/IEC Guide 98-3, *Uncertainty of measurement — Part 3: Guide to the expression of uncertainty in measurement (GUM:1995)*

IEC 61260-1, *Electroacoustics — Octave-band and fractional-octave-band filters — Part 1: Specifications*

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

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1

free sound field

sound field in a homogeneous, isotropic medium free of boundaries

[SOURCE: ISO/TR 25417:2007, 2.17]