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**Acoustics — Determination and  
application of measurement  
uncertainties in building acoustics —**

**Part 1:  
Sound insulation**

*Acoustique — Détermination et application des incertitudes de  
mesure dans l'acoustique des bâtiments —*

*Partie 1: Isolation acoustique*



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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](http://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](http://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 of the voluntary nature of standards, 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 [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 43, *Acoustics*, Subcommittee SC 2, *Building acoustics* in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 126, *Acoustic properties of building elements and of buildings*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 12999-1:2014), which has been technically revised.

The main changes compared to the previous edition are as follows:

- the quantity  $\sigma_{R95}$  was removed from [Table 2](#);
- the text in [Clause 7](#) referring to this quantity was removed and the wording adapted;
- a new [Annex D](#) was drafted with a new table containing  $\sigma_{R95}$  and text explaining what it is;
- new references were added.

A list of all parts in the ISO 12999 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

## Introduction

An assessment of uncertainties that is comprehensible and close to reality is indispensable for many questions in building acoustics. Whether a requirement is met, a laboratory delivers correct results or the acoustic properties of a product are better than the same properties of some other product can be decided only by adequately assessing the uncertainties associated with the quantities under consideration.

Uncertainties should preferably be determined following the principles of ISO/IEC Guide 98-3. This Guide specifies a detailed procedure for the uncertainty evaluation that is based upon a complete mathematical model of the measurement procedure. At the current knowledge, it seems to be impossible to formulate these models for the different quantities in building acoustics. Therefore, only the principles of such an uncertainty assessment are explained.

To come to uncertainties all the same, the concept of reproducibility and repeatability is incorporated which is the traditional approach for uncertainty determination in building acoustics. This concept offers the possibility to state the uncertainty of a method and of measurements carried out according to the method, based on the results of inter-laboratory measurements.

**NOTE** Whenever applicable, the terms and definitions used in this document are equivalent to those given in ISO 5725-1<sup>[2]</sup>, in ISO/IEC Guide 98-3<sup>[7]</sup> and in ISO/IEC Guide 99<sup>[8]</sup>.



# Acoustics — Determination and application of measurement uncertainties in building acoustics —

## Part 1: Sound insulation

### 1 Scope

This document specifies procedures for assessing the measurement uncertainty of sound insulation in building acoustics. It provides for

- a detailed uncertainty assessment;
- a determination of uncertainties by inter-laboratory tests;
- an application of uncertainties.

Furthermore, typical uncertainties are given for quantities determined according to ISO 10140 (all parts), ISO 16283 (all parts) and ISO 717 (all parts).

### 2 Normative references

There are no normative references in this document.

### 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:

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

#### 3.1

##### **measurand**

particular quantity subject to measurement

EXAMPLE 1 The airborne sound insulation of a particular window pane determined in accordance with ISO 10140 (all parts).

EXAMPLE 2 The standardized level difference of a particular facade according to ISO 16283-3.

#### 3.2

##### **measurement result**

value attributed to a *measurand* (3.1), obtained by following the complete set of instructions given in a measurement procedure

Note 1 to entry: The measurement result may be a frequency band level or a single number value determined according to the rating procedures of ISO 717 (all parts).