
**Acoustics — Preferred reference values
for acoustical and vibratory levels**

*Acoustique — Valeurs de référence recommandées pour les niveaux
acoustiques et vibratoires*



Reference number
ISO 1683:2008(E)

© ISO 2008

PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.



COPYRIGHT PROTECTED DOCUMENT

© ISO 2008

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel: + 41 22 749 01 11
Fax: + 41 22 749 09 47
E-mail: copyright@iso.org
Web: www.iso.org

Published in Switzerland

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 1683 was prepared by Technical Committee ISO/TC 43, *Acoustics*.

This second edition cancels and replaces the first edition (ISO 1683:1983), which has been technically revised.

Introduction

Various kinds of acoustical and vibratory levels expressed in decibels are commonly used in acoustics. In order to establish a uniform basis for the expression of those levels, a set of agreed reference values is needed.

The reference value determines whether the level for a particular quantity is positive or negative. For general measurements and many engineering specifications, it is desirable that levels of a given kind be consistently positive (or consistently negative) rather than both positive and negative.

In general, a reference value is expressed as the number one and a derived SI unit formed by the use of an appropriate SI prefix.

The values specified in this International Standard represent the values internationally adopted for several decades.

For airborne sound, a special reference value for sound pressure is stated according to widespread use and legal implications.

Acoustics — Preferred reference values for acoustical and vibratory levels

1 Scope

This International Standard specifies reference values used in acoustics, in order to establish a uniform basis for the expression of acoustical and vibratory levels.

The reference values are mandatory for use in acoustics for airborne and structure-borne sound, but may also be used in other applications.

2 Normative references

The following referenced documents are indispensable for the application 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 2041:—¹⁾, *Mechanical vibration, shock and condition monitoring — Vocabulary*

ISO/TR 25417, *Acoustics — Definitions of basic quantities and terms*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 2041 and ISO/TR 25417 and the following apply.

3.1

reference value

quantity value used as a basis for comparison with values of quantities of the same kind

[ISO/IEC Guide 99:2007, 5.18]

NOTE For the purposes of this International Standard, a reference value is expressed in terms of a number and an appropriate unit of measurement used to form a ratio of dimension one when defining a logarithmic quantity.

4 Specifications

4.1 Reference values for airborne sound quantities

Reference values for various airborne sound quantities are given in Table 1.

1) To be published. (Revision of ISO 2041:1990)

Table 1 — Reference values for airborne sound quantities

Quantity	Reference value
Sound pressure	20 μPa
Sound exposure	$(20 \mu\text{Pa})^2 \text{ s}$
Sound power	1 pW
Sound energy	1 pJ
Sound intensity	1 pW/m^2

4.2 Reference values for vibratory quantities

Reference values for various vibratory quantities are given in Table 2.

Table 2 — Reference values for vibratory quantities

Quantity	Reference value ^a
Vibratory displacement	1 μm
Vibratory velocity ^b	1 nm/s
Vibratory acceleration ^c	1 $\mu\text{m/s}^2$
Vibratory force	1 μN

^a The reference value used to establish a level for a certain vibratory quantity should always be stated together with the respective level.

^b In connection with structure-borne sound, a reference value of 50 nm/s is also in use. In this event, the vibratory velocity level takes values close to the associated sound pressure and sound intensity levels.

^c In connection with structure-borne sound, a reference value of 10 $\mu\text{m/s}^2$ is also in use.

Bibliography

- [1] ISO 80000-8, *Quantities and units — Part 8: Acoustics*
- [2] ISO/IEC Guide 99:2007, *International vocabulary of metrology — Basic and general concepts and associated terms (VIM)*

ICS 17.140.01

Price based on 3 pages