INTERNATIONAL STANDARD

ISO 1683

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Acoustics — Preferred reference values for acoustical and vibratory levels

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

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Foreword

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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	$(20\ \mu Pa)^2$ 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 pm
Vibratory velocity[b]	1 nm/s
Vibratory acceleration[c]	1 $\mu m/s^2$
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 $\mu m/s^2$ is also in use.