



**SLOVENSKI STANDARD**  
**oSIST prEN ISO 1683:2013**  
**01-december-2013**

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**Akustika - Prednostne referenčne vrednosti akustičnih ravni in ravni vibracij  
(ISO/DIS 1683:2013)**

Acoustics - Preferred reference values for acoustical and vibratory levels (ISO/DIS 1683:2013)

Akustik - Bevorzugte Bezugswerte für Pegel in der Akustik und Schwingungstechnik  
(ISO/DIS 1683:2013)

Acoustique - Valeurs de référence recommandées pour les niveaux acoustiques et  
vibratoires (ISO/DIS 1683:2013)

**Ta slovenski standard je istoveten z: prEN ISO 1683 rev**

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**ICS:**

|           |  |   |
|-----------|--|---|
| 17.140.01 | Akustična merjenja in<br>blaženje hrupa na splošno | Acoustic measurements and<br>noise abatement in general |
|-----------|--|---|

**oSIST prEN ISO 1683:2013**

**en**



# DRAFT INTERNATIONAL STANDARD

## ISO/DIS 1683

ISO/TC 43

Secretariat: DS

Voting begins on:  
2013-10-03Voting terminates on:  
2014-03-03

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

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

[Revision of second edition (ISO 1683:2008)]

ICS: 17.140.01

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### ISO/CEN PARALLEL PROCESSING

This draft has been developed within the International Organization for Standardization (ISO), and processed under the **ISO lead** mode of collaboration as defined in the Vienna Agreement.

This draft is hereby submitted to the ISO member bodies and to the CEN member bodies for a parallel five month enquiry.

Should this draft be accepted, a final draft, established on the basis of comments received, will be submitted to a parallel two-month approval vote in ISO and formal vote in CEN.

To expedite distribution, this document is circulated as received from the committee secretariat. ISO Central Secretariat work of editing and text composition will be undertaken at publication stage.

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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 third edition cancels and replaces the second edition (ISO 1683:2008), which has been technically revised.

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**ISO/DIS 1683****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.

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# 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 sounds in air and other gases, sounds in water and other liquids, and for 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, *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 1 to entry: 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 sound quantities in air and other gases are given in Table 1.

Table 1 — Reference values for sound quantities in air and gases

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

## 4.2 Reference values for sound quantities in liquids

Reference values for various sound quantities in water and other liquids are given in Table 2.

NOTE 1 A sound pressure level with a reference value of 1  $\mu\text{Pa}$  is numerically  $10 \lg(20^2/1^2) \approx 26,0$  dB greater than the sound pressure level for the same sound pressure but with a reference value of 20  $\mu\text{Pa}$ .

NOTE 2 The reference value for distance is used to form reference values for compound quantities such as the product of sound pressure and distance (for which the reference value is 1  $\mu\text{Pa m}$ ) or sound exposure and squared distance (for which the reference value is 1  $\mu\text{Pa}^2 \text{ m}^2 \text{ s}$ ).

NOTE 3 Ratios of these compound quantities to other sound quantities lead to further compound quantities with dimensions of distance (with reference value 1 m) or area (with reference value 1  $\text{m}^2$ ).

Table 2 — Reference values for sound quantities in water and other liquids

| Quantity                    | Reference value              |
|-----------------------------|------------------------------|
| Sound pressure              | 1 $\mu\text{Pa}$             |
| Sound exposure              | 1 $\mu\text{Pa}^2 \text{ s}$ |
| Sound power                 | 1 $\text{pW}$                |
| Sound energy                | 1 $\mu\text{J}$              |
| Sound intensity             | 1 $\text{pW/m}^2$            |
| Sound particle displacement | 1 $\mu\text{m}$              |
| Sound particle velocity     | 1 $\text{nm/s}$              |
| Sound particle acceleration | 1 $\mu\text{m/s}^2$          |
| Distance                    | 1 m                          |



### 4.3 Reference values for vibratory quantities

Reference values for various vibratory quantities are given in Table 3.

**Table 3 — Reference values for vibratory quantities**

| Quantity                            | Reference value <sup>a</sup> |
|-------------------------------------|------------------------------|
| Vibratory displacement              | 1 µm                         |
| Vibratory velocity <sup>b</sup>     | 1 nm/s                       |
| Vibratory acceleration <sup>c</sup> | 1 µm/s <sup>2</sup>          |
| Vibratory force                     | 1 µN                         |

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

<sup>b</sup> 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.

<sup>c</sup> In connection with structure-borne sound, a reference value of 10 µm/s<sup>2</sup> is also in use.

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## 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)*

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