

**Acoustics - Test code for the measurement
of airborne noise emitted by rotating
electrical machinery**

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airborne noise emitted by rotating electrical
machinery

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN ISO 1680:2000 sisaldab Euroopa standardi EN ISO 1680:1999 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 17.03.2000 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN ISO 1680:2000 consists of the English text of the European standard EN ISO 1680:1999.</p> <p>This document is endorsed on 17.03.2000 with the notification being published in the official publication of the Estonian national standardisation organisation.</p> <p>The standard is available from Estonian standardisation organisation.</p>
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<p>Käsitlusala:</p> <p>This standard specifies all the information necessary to carry out efficiently and under standardized conditions the determination, declaration and verification of the noise emission characteristics of rotating electrical machines. It specifies noise measurement methods that can be used, and specifies the operating and mounting conditions that shall be used for the test.</p>	<p>Scope:</p> <p>This standard specifies all the information necessary to carry out efficiently and under standardized conditions the determination, declaration and verification of the noise emission characteristics of rotating electrical machines. It specifies noise measurement methods that can be used, and specifies the operating and mounting conditions that shall be used for the test.</p>
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ICS 17.140.20, 29.160.01

Võtmesõnad: acoustic measurements, acoustic tests, acoustics, airborne sound, determination, engine noise, noise (sound), rotating electrical machines, sound power, sound pressure, tests

English version

Acoustics

**Test code for the measurement of airborne noise
emitted by rotating electrical machines
(ISO 1680 : 1999)**

Acoustique – Code d’essai pour le
mesurage du bruit aérien émis par les
machines électriques tournantes
(ISO 1680 : 1999)

Akustik – Verfahren zur Messung der
Luftschallemission von drehenden
elektrischen Maschinen
(ISO 1680 : 1999)

This European Standard was approved by CEN on 1999-08-22.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

The European Standards exist in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom.

CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart 36, B-1050 Brussels

Foreword

International Standard

ISO 1680 : 1999 Acoustics – Test code for the measurement of airborne noise emitted by rotating electrical machines,

which was prepared by ISO/TC 43 'Acoustics' of the International Organization for Standardization, has been adopted by Technical Committee CEN/TC 211 'Acoustics', the Secretariat of which is held by DS, as a European Standard.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, and conflicting national standards withdrawn, by April 2000 at the latest.

In accordance with the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard:

Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom.

Endorsement notice

The text of the International Standard ISO 1680 : 1999 was approved by CEN as a European Standard without any modification.

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Introduction

This International Standard is a noise test code giving methods for determining the airborne sound radiation of rotating electrical machines operating under steady-state conditions.

To characterize the airborne sound radiation, procedures are given to determine sound power levels and additionally emission sound pressure levels, if required. Furthermore, requirements are given for the declaration and verification of noise emission values.

Basic standards giving methods for determining sound power levels are as follows:

- a) using sound pressure:
 - grade 1 (precision): ISO 3741 and ISO 3745;
 - grade 2 (engineering): ISO 3743-1, ISO 3743-2, ISO 3744, ISO 3747;
 - grade 3 (survey): ISO 3746;
- b) using sound intensity:
 - all grades: ISO 9614-1;
 - grades 2 and 3: ISO 9614-2.

The emission sound pressure level is determined on the basis of ISO 11203. Declaration and verification of noise emission values follow ISO 4871.

This International Standard has been drafted in accordance with ISO 12001.

1 Scope

This International Standard specifies all the information necessary to carry out efficiently and under standardized conditions the determination, declaration and verification of the noise emission characteristics of rotating electrical machines. It specifies noise measurement methods that can be used, and specifies the operating and mounting conditions that shall be used for the test.

Noise emission characteristics include the sound power level and emission sound pressure level. The determination of these quantities is necessary

- for comparing the noise emitted by machines,
- to enable manufacturers to declare the noise emitted, and
- for the purposes of noise control.

The use of this International Standard as a noise test code ensures the reproducibility of the determination of the noise emission characteristics within specified limits determined by the grade of accuracy of the basic noise measurement method used. Noise measurement methods allowed by this International Standard are laboratory methods (grade 1), engineering methods (grade 2) and survey methods (grade 3). Methods of engineering grade (grade 2) are to be preferred.

This International Standard is applicable to rotating electrical machines of any length, width or height.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 3741, *Acoustics — Determination of sound power levels of noise sources using sound pressure — Precision methods for reverberation rooms*.¹⁾

ISO 3743-1, *Acoustics — Determination of sound power levels of noise sources — Engineering methods for small, movable sources in reverberant fields — Part 1: Comparison method for hard-walled test rooms*.

ISO 3743-2, *Acoustics — Determination of sound power levels of noise sources using sound pressure — Engineering methods for small, movable sources in reverberant fields — Part 2: Methods for special reverberation test rooms*.

¹⁾ Revision of ISO 3741:1988 and ISO 3742:1988.

ISO 3744, *Acoustics — Determination of sound power levels of noise sources using sound pressure — Engineering method in an essentially free-field over a reflecting plane.*

ISO 3745, *Acoustics — Determination of sound power levels of noise sources — Precision methods for anechoic and semi-anechoic rooms.*

ISO 3746, *Acoustics — Determination of sound power levels of noise sources using sound pressure — Survey method using an enveloping measurement surface over a reflecting plane.*

ISO 3747, *Acoustics — Determination of sound power levels of noise sources using sound pressure — Comparison method for use in situ.*

ISO 4871, *Acoustics — Declaration and verification of noise emission values of machinery and equipment.*

ISO 7574-1, *Acoustics — Statistical methods for determining and verifying stated noise emission values of machinery and equipment — Part 1: General considerations and definitions.*

ISO 7574-4, *Acoustics — Statistical methods for determining and verifying stated noise emission values of machinery and equipment — Part 4: Methods for stated values for batches of machines.*

ISO 7779:1999, *Acoustics — Measurement of airborne noise emitted by information technology and telecommunications equipment.*

ISO 9614-1, *Acoustics — Determination of sound power levels of noise sources using sound intensity — Part 1: Measurement at discrete points.*

ISO 9614-2, *Acoustics — Determination of sound power levels of noise sources using sound intensity — Part 2: Measurement by scanning.*

ISO 11203, *Acoustics — Noise emitted by machinery and equipment — Determination of emission sound pressure levels at a work station and at other specified positions from the sound power level.*

IEC 60034-1, *Rotating electrical machines — Part 1: Rating and performance.*

IEC 60651, *Sound level meters.*

3 Terms and definitions

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

3.1 sound pressure level

L_p
ten times the logarithm to the base 10 of the ratio of the time-averaged square of the sound pressure radiated by the sound source under test to the square of the reference sound pressure

NOTE 1 Sound pressure levels are expressed in decibels.

NOTE 2 The frequency weighting or the width of the frequency band used, and time weighting (S, F or I, see IEC 60651), should be indicated. The reference sound pressure is 20 μPa (2×10^{-5} Pa).

EXAMPLE The A-weighted sound pressure level with time weighting S is L_{pAS} .

3.2 measurement surface

hypothetical surface of area S , enveloping the source on which the measurement points are located

NOTE The measurement surface terminates on one or more reflecting planes.