

**Akustika. Kompressorite ja
vaakumpumpade mürakatsekoodeks.
Inseneritehniline meetod (kategooria 2)**

Acoustics - Noise test code for compressors and
vacuum pumps Engineering method (grade 2)

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN ISO 2151:2004 sisaldab Euroopa standardi EN ISO 2151:2004 + AC:2006 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 18.05.2004 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 2151:2004 consists of the English text of the European standard EN ISO 2151:2004 + AC:2006.</p> <p>This document is endorsed on 18.05.2004 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>
--	---

<p>Käsitlusala:</p> <p>This International Standard specifies methods for the measurement, determination and declaration of the noise emission from portable and stationary compressors and vacuum pumps. It prescribes the mounting, loading and working conditions under which measurements are to be made, and includes measurement or determination of the noise emission expressed as - the sound power level under specified load conditions, - the emission sound pressure level at the work station under specified load conditions.</p>	<p>Scope:</p> <p>This International Standard specifies methods for the measurement, determination and declaration of the noise emission from portable and stationary compressors and vacuum pumps. It prescribes the mounting, loading and working conditions under which measurements are to be made, and includes measurement or determination of the noise emission expressed as - the sound power level under specified load conditions, - the emission sound pressure level at the work station under specified load conditions.</p>
--	--

ICS 17.140.20, 23.140

Võtmesõnad:

ICS 17.140.20; 23.140

English version

Acoustics

Noise test code for compressors and vacuum pumps

Engineering method (grade 2)
(ISO 2151 : 2004)

Acoustique – Code d’essai acoustique pour les compresseurs et les pompes à vide – Méthode d’expertise (classe de précision 2)
(ISO 2151 : 2004)

Akustik – Kompressoren und Vakuumpumpen, Bestimmung der Geräuschemission – Verfahren der Genauigkeitsklasse 2 (ISO 2151 : 2004)

This European Standard was approved by CEN on 2004-01-16.

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 Management Centre 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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, and the United Kingdom.

CEN

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

Management Centre: rue de Stassart 36, B-1050 Brussels

Foreword

International Standard

ISO 2151 : 2004 Acoustics – Noise test code for compressors and vacuum pumps – Engineering method (grade 2),

which was prepared by ISO/TC 118 'Compressors, pneumatic tools and pneumatic machines' of the International Organization for Standardization, has been adopted by Technical Committee CEN/TC 232 'Compressors – Safety', the Secretariat of which is held by SIS, as a European Standard.

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association and supports essential requirements of the relevant EU Directive. For relationship with this directive, see Annex ZA.

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 August 2004 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, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, and the United Kingdom.

Endorsement notice

The text of the International Standard ISO 2151 : 2004 was approved by CEN as a European Standard without any modification.

NOTE: Normative references to international publications are listed in Annex ZA (normative).

Contents

Page

Foreword	2
Introduction	3
1 Scope	4
2 Normative references	5
3 Terms and definitions	5
4 Sound power level determination	8
4.1 General	8
4.2 Uncertainty	9
4.3 Test arrangement	9
5 Emission sound pressure level determination at the work station	10
5.1 Work station	10
5.2 Determination of L_{pWSA} from L_{WA}	11
5.3 Method for determination of L_{pWSA} when L_{WA} is not to be determined	12
6 Mounting, loading and operating conditions of compressor or vacuum pump during noise tests	12
6.1 General	12
6.2 Mounting	12
6.3 Loading and operating conditions	12
7 Test report	13
8 Declaration and verification of noise emission values	13
Annex A (informative) Example test reports	14
Annex B (informative) Model form for declared noise emission values	20
Annex C (normative) Parallelepiped measurement surface	21
Annex D (normative) Hemispherical measurement surface	23
Annex E (informative) Examples of reference box for different machines	25
Bibliography	27

Introduction

The noise test code presented by this International Standard describes methods for determining and presenting the acoustical characteristics of compressors and vacuum pumps, i.e. the total noise level from the compressor or vacuum pump expressed as sound power level, or the emission sound pressure level at the work station or other specified positions.

Based on current industry practice, this noise test code requires the compressor or vacuum pump under test to be run under conditions representing the noisiest operation in typical usage — full-load for compressors and off-load for vacuum pumps.

It needs to be noted that operators' exposure to noise depends upon the characteristics of individual applications and environmental factors beyond the control of the manufacturers of compressors and vacuum pumps.

This International Standard does not give requirements for octave band analysis, however, where there is an interest this can be undertaken.

1 Scope

This International Standard specifies methods for the measurement, determination and declaration of the noise emission from portable and stationary compressors and vacuum pumps. It prescribes the mounting, loading and working conditions under which measurements are to be made, and includes measurement or determination of the noise emission expressed as

- the sound power level under specified load conditions,
- the emission sound pressure level at the work station under specified load conditions.

It is applicable to

- compressors for various types of gases,
- oil-lubricated air compressors,
- oil-flooded air compressors,
- water injected air compressors,
- oil-free air compressors,
- compressors for handling hazardous gases (gas compressors),
- compressors for handling oxygen,
- compressors for handling acetylene,
- high-pressure compressors [over 4 Mpa (40 bar)],
- compressors for application at low inlet temperatures, i.e. below 0 °C,
- large compressors (over 1 000 kW input power),
- portable and skid-mounted air compressors, and
- rotary positive displacement blowers and centrifugal blowers and exhausters in applications $\leq 0,2$ MPa (≤ 2 bar).

It is not applicable to

- compressors for gases other than acetylene having a maximum allowable working pressure of less than 0,5 bar/0,05 MPa,
- refrigerant compressors used in refrigerating systems or heat pumps,
- hand-held portable compressors.

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 3744:1994, *Acoustics — Determination of sound power levels of noise sources using sound pressure — Engineering method in an essentially free field over a reflecting plane*

ISO 4871:1996, *Acoustics — Declaration and verification of noise emission values of machinery and equipment*

ISO 9614-1:1993, *Acoustics — Determination of sound power levels of noise sources using sound intensity — Part 1: Measurement at discrete points*

ISO 9614-2:1996, *Acoustics — Determination of sound power levels of noise sources using sound intensity — Part 2: Measurement by scanning*

ISO 11201:1995, *Acoustics — Noise emitted by machinery and equipment — Measurement of emission sound pressure levels at a work station and at other specified positions — Engineering method in an essentially free field over a reflecting plane*

ISO 11202:1995, *Acoustics — Noise emitted by machinery and equipment — Measurement of emission sound pressure levels at a work station and at other specified positions — Survey method in situ*

ISO 11203:1995, *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 61672-1:2002, *Electroacoustics — Sound level meters — Specifications*

3 Terms and definitions

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

3.1

compressor

machine which compresses air, gases or vapours to a pressure higher than the inlet pressure

NOTE A compressor comprises the bare compressor itself, the prime mover and any component or device supplied with the compressor.

3.2

vacuum pump

device for creating, improving and/or maintaining vacuum

NOTE A vacuum pump comprises the bare pump, the prime mover and any component or device supplied with the vacuum pump.

3.3

emission

airborne sound radiated by a well-defined noise source (e.g. the machine under test) under specified operating and mounting conditions

NOTE 1 Adapted from ISO 11203:1995.

NOTE 2 Noise emission values can be incorporated in a product label and/or published in a product specification. The basic noise emission descriptors are the sound power level of the product itself and the emission sound pressure levels at the work station and at other specified positions in the vicinity of the product (if any).