

# SVENSK STANDARD

## SS-EN ISO 2151:2008

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**Akustik – Kompressorer och vacuumpumpar – Mätning av buller – Teknisk metod (Grad 2) (ISO 2151:2004)**

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

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Denna standard ersätter SS-EN ISO 2151:2004, utgåva 1 och SS-EN ISO 2151:2004/AC:2006, utgåva 1.

The European Standard EN ISO 2151:2008 has the status of a Swedish Standard. This document contains the official English version of EN ISO 2151:2008.

This standard supersedes the Swedish Standards SS-EN ISO 2151:2004, edition 1 and SS-EN ISO 2151:2004/AC:2006, edition 1.

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN ISO 2151**

August 2008

ICS 17.140.20; 23.140

Supersedes EN ISO 2151:2004

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)

Kompressoren und Vakuumpumpen - Bestimmung der  
Geräuschemission - Verfahren der Genauigkeitsklasse 2  
(ISO 2151:2004)

This European Standard was approved by CEN on 18 July 2008.

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 CEN Management Centre or to any CEN member.

This European Standard exists 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 CEN Management Centre has the same status as the official versions.

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**SS-EN ISO 2151:2008 (E)**

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## **Foreword**

The text of ISO 2151:2004 has been prepared by Technical Committee ISO/TC 118 “Compressors, pneumatic tools and pneumatic machines” of the International Organization for Standardization (ISO) and has been taken over as EN ISO 2151:2008 by Technical Committee CEN/TC 232 “Compressors - Safety” the secretariat of which is held by SIS.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 2009, and conflicting national standards shall be withdrawn at the latest by December 2009.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN ISO 2151:2004.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EC Directive(s).

For relationship with EC Directives, see informative Annex ZA and ZB, which are integral part of this document.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

### **Endorsement notice**

The text of ISO 2151:2004 has been approved by CEN as a EN ISO 2151:2008 without any modification.

## SS-EN ISO 2151:2008 (E)

### 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.



# Acoustics — Noise test code for compressors and vacuum pumps — Engineering method (Grade 2)

## 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 ( $\leq 2$  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.

## SS-EN ISO 2151:2008 (E)

### 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).

### 3.4 emission sound pressure

$p$

sound pressure, expressed in pascals, at a specified position near a noise source, when the source is in operation under specified operating and mounting conditions on a reflecting plane surface, corrected for background noise and reflections from room surfaces other than the plane over which the machine under test is placed

NOTE Adapted from ISO 11203:1995.

### 3.5 emission sound pressure level

$L_p$

ten times the logarithm to the base 10 of the ratio of the square of the emission sound pressure to the square of the reference sound pressure, expressed in decibels, and measured with a particular time weighting and a particular frequency weighting selected from those defined in IEC 61672-1:2002

EXAMPLE A-weighted emission sound pressure level,  $L_{pA}$ .

NOTE 1 The reference sound pressure is 20  $\mu$ Pa.

NOTE 2  $L_{pA}$  levels are established as  $L_{pAeqT}$  time-averaged sound pressure levels measured with an integrating-averaging sound level meter meeting the requirements of IEC 61672-1:2002.  $L_{pAeqT}$  is usually abbreviated to  $L_{pA}$ . For further details of  $L_{pAeqT}$  see ISO 3744:1994, 3.2.1.

NOTE 3 Adapted from ISO 11203:1995.

### 3.6 sound power

$W$

rate per unit time, expressed in watts, at which airborne sound energy is radiated by a source

[ISO 3744:1994]

### 3.7 sound power level

$L_W$

ten times the logarithm to the base 10 of the ratio of the sound power radiated by the source under test to the reference sound power, expressed in decibels

NOTE 1 The frequency weighting or the width of the frequency band must be indicated. For example, A-weighted sound power level  $L_{WA}$ .

NOTE 2 The reference sound power is 1 pW (1 pW =  $10^{-12}$  W).

NOTE 3 Adapted from ISO 3744:1994.

### 3.8 sound intensity

product of the sound pressure at a point and the associated particle velocity

NOTE 1 It is a vectorial quantity.

NOTE 2 See ISO 9614-1 and ISO 9614-2 for further guidance on sound intensity.