
Acoustics — Procedure for the comparison of noise-emission data for machinery and equipment

*Acoustique — Procédure de comparaison des données d'émission sonore
des machines et équipements*



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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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.

International Standard ISO 11689 was prepared by Technical Committee ISO/TC 43, *Acoustics*, Subcommittee SC 1, *Noise*, on request by CEN/TC 211, *Acoustics*.

Annexes A to D of this International Standard are for information only.

Introduction

National and international regulations increasingly require the production and use of low-noise machinery and equipment. This implies that manufacturers, users of machinery and equipment and authorities are aware of the noise emission of a particular product in relation to the noise emission of the relevant machine family. This will only be possible if reliable information on the actual noise emission is available or can be determined.

Based on this information, any index of noise-control performance can be determined for a well-defined family, type or group of machinery or equipment available on the market at a stated time.

The comparison and evaluation of noise-emission data are of use to

- a) a designer requiring information about noise levels for a particular family, for example when specifying the desired properties of a new concept;
- b) a user and/or buyer of machinery or equipment belonging to a specific family, who wishes to compare similar machinery or equipment available on the market with regard to noise emission;
- c) working groups preparing machinery safety standards, noise test codes and/or noise guidelines relating to a particular family;
- d) authorities in charge of legislation, labour supervision and inspection, health and safety at work;
- e) manufacturers and potential users of noise-emission data bases;
- f) consultants in acoustics using appropriate techniques for performing a first evaluation of the noise level on a site.

In addition to knowledge about noise control at source by design, the evaluation procedure requires particular knowledge of the machine group in question.

Collecting noise-emission data and editing clusters of noise-emission data are the responsibility of a committee of the parties involved (e.g. manufacturers, authorities or consumer organisations).

Acoustics — Procedure for the comparison of noise-emission data for machinery and equipment

1 Scope

This International Standard specifies a method for establishing the noise-control performance for a family, type, group or sub-group of machinery or equipment on the basis of noise-emission data. It is, in principle, applicable to any kind of machinery or equipment for which a noise test code exists or comparable noise-emission data are available.

NOTE 1 The general procedure described in this International Standard is, in principle, applicable to other physical agents (e.g. vibration).

This International Standard specifies methods and requirements for comparison of noise-emission data so that they can be used for the determination of noise-control performance.

The methods presented allow evaluation of the noise emission of individual machines or of a single type of machine within a machine group, i.e. allow a comparison of the acoustical aspects of machines with comparable non-acoustical data and fields of application.

Annex B gives examples of how the evaluation of collected noise-emission data for a machine group can be carried out.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based

on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 12001:1996, *Acoustics — Noise emitted by machinery and equipment — Rules for the drafting and presentation of a noise test code*.

3 Definitions

For the purposes of this International Standard, the definitions given in ISO 12001 and the following definitions apply.

3.1 family of machinery or equipment: Machinery or equipment of similar design or type, intended to perform the same functions.

3.2 measured noise-emission value: Value of the time-averaged A-weighted sound power level L_{WA} , or the A-weighted emission sound pressure level L_{pA} , or the C-weighted peak emission sound pressure level $L_{pC,peak}$ determined from measurements.

3.3 declared noise-emission value: Value of the declared A-weighted sound power level $L_{WA,d}$, the declared A-weighted emission sound pressure level $L_{pA,d}$, or the declared C-weighted peak emission sound pressure level, $L_{pC,peak,d}$.

3.4 characteristic machine parameter: Non-acoustic quantity which characterizes a particular group of machines.

NOTE 2 Its value varies between the individual machines within the group (e.g. power, speed, load, dimension).

3.5 noise-control performance: Performance determined by the noise emission of all machines in a given set. (See classification in clause 4.) L-lines can be used for its description (see 3.7).

3.6 cumulative frequency of noise-emission values: Number of observations in a set, which have values equal to or less than a given value. (See clause 7.)

3.7 L-lines: Lines which are parallel to the regression line (see annex A) and below which a specified percentage of the noise-emission values lies (see clause 7).

4 Machine classification

Machines shall be classified according to their application. A standardized classification shall be used, when available.

Machines shall be classified into families and groups, based on the following criterion:

- the various families and groups of machines shall be defined precisely, so that it is possible to assign a machine unambiguously to a single family and a single group.

EXAMPLE

Woodworking machines

- a) Machine families belonging to woodworking machines, such as
 - planing machines,
 - circular sawing machines,
 - moulding machines,
 - bandsawing machines.
- b) Groups of circular sawing machines, such as
 - circular saw benches,
 - circular sawing machines for building sites.
- c) Sub-groups for different ranges of diameters, such as
 - up to 350 mm,
 - 350 mm to 500 mm.

5 Noise-emission data

5.1 Noise-emission quantities

The following types of noise-emission quantities are distinguished.

- a) Principal noise-emission quantities:
 - A-weighted sound power level L_{WA} ;
 - A-weighted emission sound pressure level L_{pA} at the work station (operator position) or at other specified positions;
 - C-weighted peak emission sound pressure level, $L_{pC,peak}$.
- b) Additional noise-emission quantities:
 - surface emission sound pressure level $\bar{L}_{pAf}$ at a distance d from the machine (sound pressure level averaged on an energy basis over a measurement surface at a distance d from the sound source);
 - other quantities laid down in International Standards and regulations.
- c) Additional noise-emission information:
 - emission sound pressure spectra (e.g. in octave bands or one-third-octave bands) at selected measuring points;
 - sound power spectra (e.g. in octave bands or one-third-octave bands);
 - impulsiveness;
 - directivity index.

NOTE 3 Definitions of these quantities are given in the ISO 3740 series, ISO 4871 and the ISO 11200 series.

5.2 Measurement methods

Noise-emission data shall be determined using standardized measurement methods such as machine-specific noise test codes or, if comparability can be ensured by defining all relevant parameters, by using basic noise-emission standards (e.g. the ISO 3740 series, ISO 9614-1 and ISO 11200 series).

The following additional information shall be provided when applying the basic standards:

- the classification of the object being measured;
- the measurement method and its grade of accuracy;
- operating conditions under which noise-emission measurements have been carried out.