International Standard 7574/2

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION•МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ•ORGANISATION INTERNATIONALE DE NORMALISATION

Acoustics — Statistical methods for determining and verifying stated noise emission values of machinery and equipment — Part 2 : Methods for stated values for individual machines

Acoustique — Méthodes statistiques pour la détermination et le contrôle des valeurs déclarées d'émission acoustique des machines et équipements — Partie 2 : Méthodes pour valeurs déclarées de machines individuelles

First edition — 1985-12-15

UDC 534.835.46 : 512.24 **Ref. No. ISO 7574/2-1985 (E)**

Descriptors : acoustics, machinery, noise (sound), statistical quality control, statistical analysis.

Price based on 2 pages

Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 7574/2 was prepared by Technical Committee ISO/TC 43, *Acoustics*.

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

Printed in Switzerland

Acoustics — Statistical methods for determining and verifying stated noise emission values of machinery and equipment — Part 2: Methods for stated values for individual machines

0 Introduction

A general introduction to the four-part series of ISO 7574 is given in ISO 7574/1.

For the purposes of this part of ISO 7574, the term "labelled value" stands for all kinds of stated values (e.g. information on a label, the upper noise limit set by an authority, the agreed contract value) for which the methods may be applied.

The methods described in this part of ISO 7574 are of a statistical nature only in a restricted sense. Statistical viewpoints are relevant mainly when estimating the value of K (see clause 5).

1 Scope and field of application

This part of ISO 7574 provides guidelines for determining the labelled values of the noise emissions of individually-labelled machinery and equipment, that is, in the situation in which each machine produced has its own individually-labelled value of its noise emission quantity. It also specifies a method for verifying compliance of the noise emission of an individual machine or item of equipment with its labelled value.

This part of ISO 7574 does not deal with the consequences that ensue if the stated value is not confirmed as verified for a single machine.

2 References

ISO 3741, *Acoustics — Determination of sound power levels of noise sources — Precision methods for broad-band sources in reverberation rooms.*

ISO 3742, *Acoustics — Determination of sound power levels of noise sources — Precision methods for discrete-frequency and narrow-band sources in reverberation rooms.*

ISO 3743, *Acoustics — Determination of sound power levels of noise sources — Engineering methods for special reverberation test rooms.*

ISO 3744, *Acoustics — Determination of sound power levels of noise sources — Engineering methods for free-field conditions 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 — Survey method.*

ISO 4871, *Acoustics — Noise labelling 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.*

3 Definitions

For the purposes of this part of ISO 7574, the definitions given in ISO 7574/1 apply.

4 General

When checking compliance of a machine with its individually-labelled value, this part of ISO 7574 works on the principle that the labelled value indicates the limit below which the noise emission value of the machine lies.

NOTE — In the application of this part of ISO 7574, it is assumed that all measurements will be performed by a testing laboratory which has appropriate test facilities and trained staff.

5 Guidelines for the determination of the labelled value, L_c, by the labeller

As the determination of the labelled value is the sole responsibility of the labeller, this clause is given for guidance only.

The measured value (or the mean of several measured values) for the individual machine is designated L^* and shall be determined in accordance with the specific measurement test code for the specific family of machines. (The asterisk in the symbol is used here to differentiate between measurements in conformity with this clause and those in conformity with clause 6.)

NOTES

1 If such a specific measurement test code does not exist, the methods specified in ISO 3741, ISO 3742, ISO 3743, ISO 3744 and ISO 3745[1] may be used if the installation and operating conditions typical for normal use are clearly stated or agreed.

2 If the specific measurement test code for the family of machines provides more than one mode of operation in normal use, the mode yielding the highest value of L^* or the mode agreed upon in the relevant machinery industry or in the contract should be used to determine L_c. The installation and operating conditions and the measurement test code used should be clearly stated.

The labelled value, L_c, for the machine may be determined by

$$L_c \geqslant L^* + K$$

The value of K in the above equation shall be chosen to account for the random measurement errors occurring under reproducibility conditions (see 3.17 of ISO 7574/1). An appropriate value may be determined by multiplying the standard deviation of reproducibility, σ_R, by the quantile, u_{P_a}, for the desired probability of acceptance, P_a, from table 7 in ISO 7574/4. A value of $K = 3$ dB is appropriate in many cases ($u_{P_a} = 1{,}645$ for $P_a = 95$ %; $\sigma_R \simeq 1{,}8$ dB) and is given for guidance.

NOTE — If the stated value is only relevant for one contract, for example, and is (according to this contract) to be verified in the testing laboratory/test site of the labeller, K may be chosen by the labeller to account only for the variability of the measurement values under repeatability conditions (see 3.16 in ISO 7574/1). If it is to be verified in a different laboratory, the variability of measurement values under reproducibility conditions has to be taken into account when determining K. Experience gained in the past with similar machines and with different testing laboratories/test sites will usually be helpful when determining K.

6 Verifying the labelled value for an individual machine

Compliance is checked with a measurement made in accordance with the specific measurement test code for the specific family of machines or, if no such code exists, in accordance with ISO 3741, ISO 3742, ISO 3743, ISO 3744 or ISO 3745 (see footnote to clause 5), using the same installation and operating conditions as specified in clause 5. The measured value L, obtained in accordance with the test code, and which shall not be rounded, is compared with the labelled value L_c.

The rules governing the decision shall be as follows:

if $L \leqslant L_c$, the labelled value is confirmed as verified for the single machine;

if $L > L_c$, the labelled value is not confirmed as verified for the single machine.

7 Information to be given

The specific measurement test code for the specific family of machines, or, if no such code exists, ISO 3741, ISO 3742, ISO 3743, ISO 3744 or ISO 3745, and the installation and operating conditions used shall be stated.

NOTE — For the purposes of this part of ISO 7574, it is not usually necessary to draw up a special noise labelling code for the specific family of machines (see ISO 4871 and ISO 7574/4).

1) This does not preclude the use of other International Standards, e.g. ISO 3746, which may form the basis of the special measurement test code.