



SLOVENSKI STANDARD
SIST EN 12549:2000

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Acoustics - Noise test code for fastener driving tools - Engineering method

Acoustics - Noise test code for fastener driving tools - Engineering method

Akustik - Geräuschmeßverfahren für Eintreibgeräte - Verfahren der Genauigkeitsklasse 2

iTeh STANDARD PREVIEW

Acoustique - Code d'essai acoustique pour les machines à enfoncer les fixations -
Méthode d'expertise

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Ta slovenski standard je istoveten z: EN 12549:1999

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ICS:

17.140.20	Emisija hrupa naprav in opreme	Noise emitted by machines and equipment
25.140.99	Öi * æ[} æ[i åæ	Other hand-held tools

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en

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EUROPEAN STANDARD
NORME EUROPÉENNE
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ICS 17.140.20; 25.140.99

English version

Acoustics - Noise test code for fastener driving tools - Engineering method

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Verfahren der Genauigkeitsklasse 2

This European Standard was approved by CEN on 30 October 1998.

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.

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 Central Secretariat has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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FOREWORD

This European Standard has been prepared by Technical Committee CEN/TC 255 "Hand-held, non-electric power tools - 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of an identical text or by endorsement, at the latest by January 2000, and conflicting national standards shall be withdrawn at the latest by January 2000.

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 EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this standard.

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

INTRODUCTION

This noise test code describes methods for determining and presenting the acoustical characteristics of fastener driving tools.

The EC Machinery Directive prescribes that noise emission values for the machines in a defined process shall be stated. The manufacturer of fastener driving tools must indicate the operating conditions during the noise measurement and what methods have been used for the measurement.

1 SCOPE

This standard applies to fastener driving tools. The noise created by fastener driving tools directly affecting the surrounding environment (noise emission) should be calculated in a uniform procedure enabling comparison of the final results. This standard contains provisions concerning the execution of the measurement of airborne noise in the vicinity of fastener driving tools and the measurement of emission sound pressure levels at the work station under defined operating conditions.

The determination of the noise emission levels of fastener driving tools in accordance with this standard is valid for all actuating systems in accordance with EN 792-13.

The results can be used to compare the noise emissions of different fastener driving tools.

NOTE: The special conditions at the work place (e.g. shape and foundation of the workpiece, quantity and frequency of the driving processes) can influence the noise emission to an important degree.

2 NORMATIVE REFERENCES

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 292-2	Safety of machinery - Basic concepts, general principles for design Part 2: Technical principles and specifications
EN 792-13	Handheld non-electric power tools - Safety requirements - Part 13: Fastener driving tools
EN 60651	Sound level meters
EN 60804	Integrating-averaging sound level meters
EN 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
EN ISO 4871	Acoustics - Declaration and verification of noise emission values of machinery and equipment
EN ISO 11201	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

3 DEFINITIONS

For the purposes of this standard, the following definitions apply:

3.1 A-weighted single-event emission sound pressure level, $L_{pA,1s}$ in dB:

A-weighted and time-integrated emission sound pressure level of an isolated single sound event of specified duration T (or specified measurement time T), related to $T_0 = 1$ s; it is given by the following equation:

$$L_{pA,1s} = 10 \lg \left[\frac{1}{T_0} \int_0^T \frac{p^2(t)}{p_0^2} dt \right] \text{ dB} = L_{pAeq,T} + 10 \lg \left(\frac{T}{T_0} \right) \text{ dB} \quad \dots(1)$$

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The reference sound pressure is $p_0 = 20 \mu\text{Pa}$.

3.2 A-weighted single-event sound power level, $L_{WA,1s}$ in dB:

A-weighted sound power level determined from measurements of the single-event sound pressure level.

3.3 C-weighted peak emission sound pressure level, $L_{pC,peak}$ in dB:

The C-weighted peak emission sound pressure level of a test object, determined in accordance with EN ISO 11201 at the work station.

3.4 Fastener driving tool

See EN 792-13.

4 DESCRIPTION OF FASTENER DRIVING TOOLS

Fastener driving tools are handheld power tools in which energy is applied in a linear movement to inserted fasteners for the purpose of driving. The design of these fastener driving tools is such that in normal circumstances they may be carried by one person and are handheld during the driving process.

NOTE: Fastener driving tools are named e. g. nailers, staplers, tackers, pinners.

The energy required for the driving process can be drawn e.g. from compressed air, electrical current, combustible gases, tension springs. Fasteners may be e.g. nails, staples, pins, brads, corrugated fasteners and screws used as nails.

The frequency of the driving processes with a fastener driving tool varies in time according to the operation purpose (e. g. 500 driving processes per day may be carried out with a big fastener driving tool against 20 per second with a small one).

The time duration of one driving process is normally in a range of 0,1 s or shorter.

5 SOUND POWER LEVEL DETERMINATION

5.1 Basic International Standards to be used

If it is required to determine the sound power level, basic sound power measurement standards shall be used, such as EN ISO 3744.

The sound power level shall be given as A-weighted sound power level in dB. The reference sound power is 1 pW ($1 \text{ pW} = 10^{-12} \text{ W}$).

5.2 Measurement procedure

5.2.1 Measurement surface

The measurement surface is a hypothetical cube on which the measurement positions are located and which envelops the fastener driving tool (see figure 1).

Exception: Position O for measuring the A-weighted single-event emission sound pressure level at work station.

The measurement surface ends at floor level, which is to be regarded as a sound reflecting periphery. The height of the centre point of the fastener driving tool above the ground shall be $(1,00 \pm 0,10)$ m. The centre point is located on the driving axis at half of the height of the fastener driving tool.

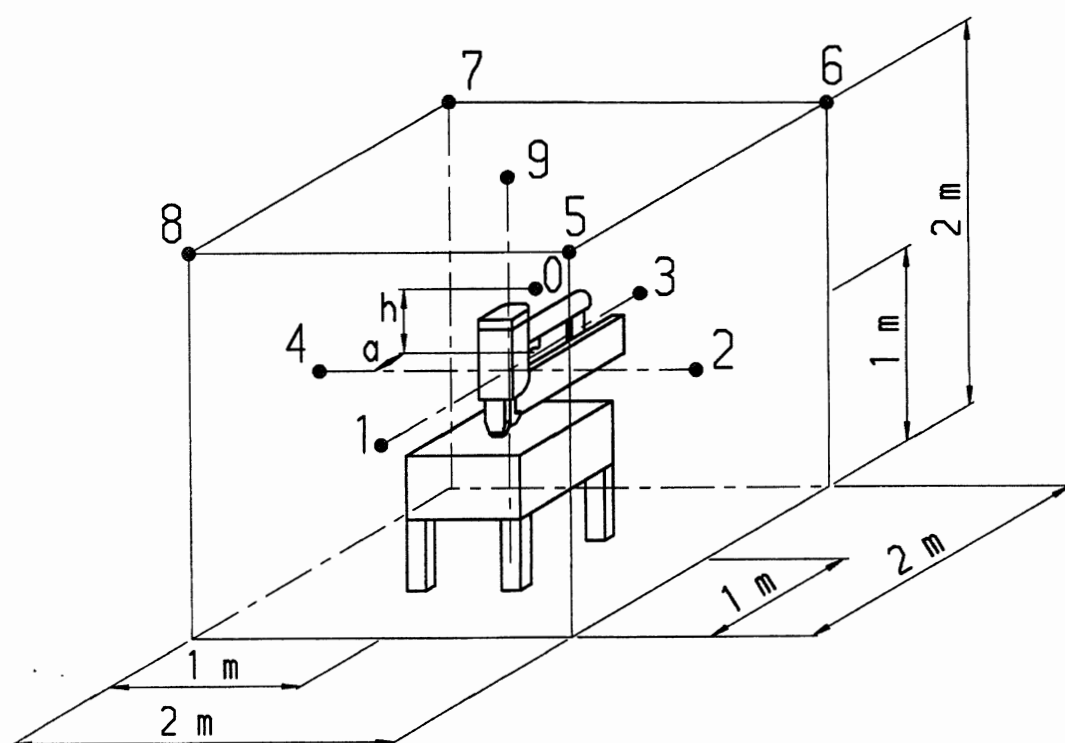
NOTE: Because a fastener driving tool is of small size the centre point of a fastener driving tool is used instead of the surface.

5.2.2 Measurement distance

The measurement distance shall be 1,00 m from the centre point of the fastener driving tool (see figure 1).

5.2.3 Measurement positions

The location of the nine measurement positions $i = 1, 2, \dots, 9$ shall be that of figure 1.



- Measurement positions
- 0 Measurement position at the work station (near the operator's ear)

Figure 1 - Location of the measurement positions for fastener driving tools

5.2.4 Measurement of the A-weighted single-event sound pressure level

The A-weighted single-event sound pressure level of **one** driving process $L'_{pA,1s}$ shall be measured five times at each measurement position i . The arithmetic mean of the five values shall be determined for each measurement position i and is denoted $L'_{pA,1s, i}$ (with $i = 1, 2, \dots, 9$).

NOTE: In the case of fastener driving tools which can be actuated only by continuous actuation of the driving process, the A-weighted sound pressure level $L'_{pA, i}$ should be measured five times for the same time duration (e.g. 5 s) and the number of driving processes should be recorded for the calculation of the A-weighted single-event sound pressure level.

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5.3 Calculation

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5.3.1 Calculation of the area S and the superficial measure L_S of the enveloping measurement surface

The area of the enveloping measurement surface S according to the dimensions given in figure 1 is 20 m².

The value of the superficial measure is:

$$L_s = 10 \lg \frac{S}{S_0} \text{ dB} = 13 \text{ dB} \quad (2)$$

where $S_0 = 1 \text{ m}^2$.

5.3.2 Calculation of the A-weighted single-event sound pressure level on the measurement surface

The A-weighted single-event sound pressure level on the measurement surface is calculated from the sound pressure levels measured at the nine measuring positions on the enveloping measurement surface in accordance with 5.2.1:

$$\bar{L}_{pA,1s,1m} = 10 \lg \left[\frac{1}{9} \sum_{i=1}^9 10^{0,1 L'_{pA,1s,i}} \right] \text{ dB} - K_{1A} - K_{2A} \quad (3)$$

It is recommended to carry out measurements in an anechoic test room over a reflecting plane. In this situation the background noise correction K_{7A} and the environmental correction K_{2A} are negligible.

5.3.3 Calculation of the A-weighted single-event sound power level

The A-weighted single-event sound power level is calculated from the A-weighted single-event sound pressure level on the measurement surface as stated in 5.3.2, and the superficial measure L_S of the measurement surface as stated in 5.3.1:

$$L_{WA,1s} = \bar{L}_{pA,1s,1m} + L_S \quad (4)$$

5.4 Measurement uncertainty

The accuracy shall be of grade 2. The measurement uncertainty shall be stated in accordance with EN ISO 3744.

6 EMISSION SOUND PRESSURE LEVEL DETERMINATION

6.1 Basic International Standards to be used

EN ISO 11201 shall be used.

6.2 Selection of relevant work station

The measurement position, O, for the determination of the A-weighted single-event emission sound pressure level at work station shall be at the distances $a = 0,3 \text{ m}$ and $h = 0,5 \text{ m}$ from the centre point of the fastener driving tool on the handle side (see 5.2.1). The value measured at position O is not to be taken into account for calculating the A-weighted single-event sound pressure level on the surface (see figure 1 and 5.3.2).

6.3 Measurement procedure

At position O (operator's position) five corresponding measurements of an A-weighted single-event emission sound pressure level of driving processes are to be taken and the arithmetic mean is to be calculated. The resulting sound pressure level is taken to be the A-weighted single-event emission sound pressure level at the work station $L_{pA,1s}$.

For comparison with the value given in annex A, 1.7.4 (f) of EN 292-2:1991 the determination of the A-weighted emission sound pressure level at the work station, L_{pAeq} , shall be calculated from