SLOVENSKI STANDARD
SIST HD 443 S1:2004

01-julij-2004

Occluded-ear simulator for the measurement of earphones coupled to the ear by ear inserts

Occluded-ear simulator for the measurement of earphones coupled to the ear by ear inserts

Simulator für den abgeschlossenen Gehörgang zur Messung an Horern, die mit Ohreneinsätzen an das Ohr angekoppelt werden

Simulateur d'oreille occluse pour la mesure des écouteurs couplés à l'oreille par des embouts

Ta slovenski standard je istoveten z: **HD 443 S1:1983**

ICS:

13.140	Vpliv hrupa na ljudi	Noise with respect to human beings
17.140.50	Elektroakustika	Electroacoustics

SIST HD 443 S1:2004 **en**

HD 443 S1

ENGLISH VERSION

UDC: 621.395.623.66:620.1

KEY WORDS: Insert earphone; measurement; ear simulator; requirements; testing; properties; definitions

OCCLUDED-EAR SIMULATOR FOR THE MEASUREMENT OF EARPHONES COUPLED TO THE EAR BY EAR INSERTS

Simulateur d'oreille occluse pour la mesure des écouteurs couplés à l'oreille par des embouts.

Simulator für den abgeschlossenen Gehörgang zur Messung an Hörern, die mit Ohreneinsätzen an das Ohr angekoppelt werden

BODY OF THE HD

The Harmonization Document consists of:

- IEC 711 (1981) ed 1; IEC/TC 29, not appended

This Harmonization Document was approved by CENELEC on 1983-09-07.

The English and French versions of this Harmonization Document are provided by the text of the IEC publication and the German version is the official translation of the IEC text. The German translation is available.

According to the CENELEC Internal Regulations the CENELEC member National Committees are bound:

to announce the existence of this Harmonization Document at national level by or before 1984-01-01

to publish their new harmonized national standard by or before 1985-01-01

to withdraw all conflicting national standards by or before 1985-01-01.

Harmonized national standards are listed on the HD information sheet, which is available from the CENELEC National Committees or from the CENELEC Central Secretariat.

The CENELEC National Committees are the national electrotechnical committees of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxemburg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

NORME INTERNATIONALE
INTERNATIONAL STANDARD

CEI
IEC
711

Première édition
First edition
1981

Simulateur d'oreille occluse pour la mesure des écouteurs couplés à l'oreille par des embouts

Occluded-ear simulator for the measurement of earphones coupled to the ear by ear inserts

Bureau Central de la Commission Electrotechnique Internationale 3, rue de Varembé Genève, Suisse

Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

CODE PRIX
PRICE CODE M

Pour prix, voir catalogue en vigueur
For price, see current catalogue

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

OCCLUDED-EAR SIMULATOR FOR THE MEASUREMENT OF EARPHONES COUPLED TO THE EAR BY EAR INSERTS

FOREWORD

1) The formal decisions or agreements of the IEC on technical matters, prepared by Technical Committees on which all the National Committees having a special interest therein are represented, express, as nearly as possible, an international consensus of opinion on the subjects dealt with.

2) They have the form of recommendations for international use and they are accepted by the National Committees in that sense.

3) In order to promote international unification, the IEC expresses the wish that all National Committees should adopt the text of the IEC recommendation for their national rules in so far as national conditions will permit. Any divergence between the IEC recommendation and the corresponding national rules should, as far as possible, be clearly indicated in the latter.

PREFACE

This standard has been prepared by Sub-Committee 29C: Measuring Devices, of IEC Technical Committee No. 29: Electro-acoustics.

A first draft was discussed at the meeting held in Stockholm in 1979. As a result of this meeting, a draft, Document 29C(Central Office)42, was submitted to the National Committees for approval under the Six Months' Rule in October 1979.

The National Committees of the following countries voted explicitly in favour of publication:

Australia	Netherlands
Belgium	Norway
China	South Africa (Republic of)
Czechoslovakia	Spain
Denmark	Sweden
France	Turkey
Germany	Union of Soviet Socialist Republics
Italy	

Other IEC publication quoted in this standard:

Publication No. 126: IEC Reference Coupler for the Measurement of Hearing Aids Using Earphones Coupled to the Ear by Means of Ear Inserts.

OCCLUDED-EAR SIMULATOR FOR THE MEASUREMENT OF EARPHONES COUPLED TO THE EAR BY EAR INSERTS

1. Scope

This standard specifies an occluded-ear simulator intended for the calibration of insert earphones in the frequency range 100 Hz to 10 000 Hz in terms of the sound pressure at the eardrum.

The occluded-ear simulator is also designed as the basis for a later extension intended to simulate the complete ear canal for the calibration of earphones coupled to the ear by means of open mould fittings or similar devices. A document for such a device is under consideration.

2. Object

The occluded-ear simulator simulates the median values of relevant acoustical characteristics of adult normal human ears.

The occluded-ear simulator does not simulate the leakage between an earmould and a human ear canal; therefore, the results obtained with the simulator may deviate from the performance of an insert earphone on a real ear, especially at low frequencies.

Moreover, large performance variations among individual ears will occur and this should be borne in mind when employing results obtained with the simulator.

3. Definitions

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

3.1 *Ear insert*

An ear insert is a device used to provide the acoustic coupling between an earphone and the ear canal (e.g. an earmould or a similar device with or without a connecting tube).

3.2 *Insert earphone*

An insert earphone is a small earphone coupled to the ear canal by means of an ear insert or attached to a connecting element which is inserted into the ear canal. This ear insert may be a part of the insert earphone.

3.3 *Ear insert simulator*

An ear insert simulator (e.g. earmould simulator) is an insert which terminates the entrance of the ear simulator and provides for passage of sound into the occluded-ear simulator through an opening on its axis.

3.4 *Ear simulator*

An ear simulator is a device for measuring the output sound pressure of an earphone under well-defined loading conditions in a specified frequency range. It consists essentially of a principal cavity, acoustic load networks, and a calibrated microphone. The location of the microphone is chosen so that the sound pressure at the microphone corresponds approximately to the sound pressure existing at the human eardrum.

3.5 *Occluded-ear simulator*

An occluded-ear simulator is an ear simulator which simulates the inner part of the ear canal, from the tip of an ear insert to the eardrum.

3.6 *Reference plane*

The reference plane of the occluded-ear simulator is a plane perpendicular to the axis of the cavity of the simulator, chosen to pass through the position normally occupied by the tip of the earmould.

3.7 *Acoustic transfer impedance of the occluded-ear simulator*

The acoustic transfer impedance of the occluded-ear simulator is the quotient of the sound pressure at the diaphragm of its microphone by the volume velocity through the reference plane.

4. General requirements

4.1 *Material and external dimensions*

The occluded-ear simulator shall be constructed of non-magnetic and stable materials and shall have sufficient mass to minimize response to vibration. The external dimensions of the occluded-ear simulator shall be as small as possible to minimize the disturbance when the simulator is inserted into a sound field.

4.2 *Locating a calibrating transducer*

The construction of the occluded-ear simulator shall permit the location of a transducer at the reference plane for calibrating the simulator.

4.3 *Microphone*

The type of microphone shall be stated by the manufacturer of the occluded-ear simulator.

The pressure sensitivity level of the microphone shall be known within an accuracy of ±0.3 dB or better at 250 Hz. Relative to its value at 250 Hz, this level shall not vary by more than ±0.5 dB in the frequency range 100 Hz to 5 kHz, and +1.5 dB, −0.5 dB in the range 5 kHz to 10 kHz.

The acoustic impedance and the sensitivity of the microphone shall be stable.

Note. – The acoustic impedance of the microphone affects the overall acoustic impedance of the occluded-ear simulator.

4.4 *Pressure equalization*

A vent provided to equalize the static pressure in the cavity of the occluded-ear simulator shall have an acoustic resistance of 7 ± 5 GPa·s/m³.