



SLOVENSKI STANDARD SIST EN 60118-4:2008

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Electroacoustics - Hearing aids - Part 4: Induction loop systems for hearing aid purposes
- Magnetic field strength (IEC 60118-4:2006)

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Akustik - Hörgeräte - Teil 4: Induktionsschleifen für Hörgeräte - Magnetische Feldstärke
(IEC 60118-4:2006)

SIST EN 60118-4:2008

Electroacoustique - Appareils de correction auditive - Partie 4: Systemes de boucles
d'induction utilisées a des fins de correction auditive - Intensité du champ magnétique
(IEC 60118-4:2006)

Ta slovenski standard je istoveten z: EN 60118-4:2006

ICS:

11.180.15 Úiā [{ [\ Á æ Á] @ Á • ^ à ^ Á Aids for deaf and hearing
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SIST EN 60118-4:2008 en,fr,de

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English version

**Electroacoustics -
Hearing aids
Part 4: Induction loop systems for hearing aid purposes -
Magnetic field strength
(IEC 60118-4:2006)**

Electroacoustique -
Appareils de correction auditive
Partie 4: Systèmes de boucles d'induction
utilisées à des fins de correction auditive -
Intensité du champ magnétique
(CEI 60118-4:2006)

Akustik -
Hörgeräte
Teil 4: Induktionsschleifen
für Hörgeräte -
Magnetische Feldstärke
(IEC 60118-4:2006)

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SIST EN 60118-4:2008

This European Standard was approved by CENELEC on 2006-11-01. CENELEC 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 CENELEC member.

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of document 29/604/FDIS, future edition 2 of IEC 60118-4, prepared by IEC TC 29, Electroacoustics, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60118-4 on 2006-11-01.

This European Standard supersedes EN 60118-4:1998 + A1:1998.

The purpose of this revision is to provide more information about practical considerations and methods of measurement. In addition, the requirements for magnetic field strength have been clarified and modified in the light of practical experience since EN 60118-4:1998 was published. Requirements for the provision to the end-user of information about the system have been introduced, intended to help to keep systems working once they have been correctly set up.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2007-08-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2009-11-01

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Endorsement notice

The text of the International Standard IEC 60118-4:2006 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60118-1 A1	NOTE Harmonized as EN 60118:1995 + A1:1998 (not modified).
IEC 60268-1	NOTE Harmonized as HD 483.1.S1:1998 (not modified).
IEC 60268-3	NOTE Harmonized as EN 60268-3:2003 (not modified).
IEC 60268-10	NOTE Harmonized as HD 483.10.S1:1993 (not modified).
IEC 61260	NOTE Harmonized as EN 61260:1995 (not modified).
IEC 61672-1	NOTE Harmonized as EN 61672-1:2003 (not modified).
IEC 61938	NOTE Harmonized as EN 61938:1997 (not modified).

NORME
INTERNATIONALE
INTERNATIONAL
STANDARD

CEI
IEC

60118-4

Deuxième édition
Second edition
2006-10

Électroacoustique –
Appareils de correction auditive –

Partie 4:
Systèmes de boucles d'induction
utilisées à des fins de correction auditive –
Intensité du champ magnétique
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Electroacoustics –
Hearing aids –

Part 4:
Induction loop systems
for hearing aid purposes –
Magnetic field strength

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International Electrotechnical Commission, 3, rue de Varembé, PO Box 131, CH-1211 Geneva 20, Switzerland
Telephone: +41 22 919 02 11 Telefax: +41 22 919 03 00 E-mail: inmail@iec.ch Web: www.iec.ch



Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

CODE PRIX
PRICE CODE

X

Pour prix, voir catalogue en vigueur
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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTROACOUSTICS – HEARING AIDS –**Part 4: Induction loop systems for hearing aid purposes –
Magnetic field strength**

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 60118-4 has been prepared by IEC technical committee 29: Electroacoustics.

This second edition cancels and replaces the first edition published in 1981 and its Amendment 1 (1998), and constitutes a technical revision. The purpose of this revision is to provide more information about practical considerations and methods of measurement. In addition, the requirements for magnetic field strength have been clarified and modified in the light of practical experience since the first edition was published. Requirements for the provision to the end-user of information about the system have been introduced, intended to help to keep systems working once they have been correctly set up.

The text of this standard is based on the following documents:

FDIS	Report on voting
29/604/FDIS	29/613/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts of the IEC 60118 series, published under the general title *Electroacoustics – Hearing aids*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

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INTRODUCTION

Audio-frequency induction loop systems are widely used to provide a means for hearing aid users, whose hearing aids are fitted with induction pick up coils, to minimise the problems of listening when at a distance from a source of sound, shielded from the person speaking by a protective window, and/or in a background noise. Background noise and distance are two of the main causes of hearing aid users being unable to hear satisfactorily in other than face-to-face quiet conditions. Induction loop systems have been widely installed in churches, theatres and cinemas, for the benefit of hearing-impaired people. The use of induction loop systems has been extended to many transient communication situations such as ticket offices, bank counters, drive-in/drive-through service locations, lifts/elevators etc. The widespread provision of telephone handsets that provide inductive coupling to hearing aids is another significant application, where ITU-T Recommendation P370 "Coupling hearing aids to telephone sets" applies.

Transmission of an audio-frequency signal via an induction loop system can often establish an acceptable signal-to-noise ratio in conditions where a purely acoustical transmission would be significantly degraded by reverberation and background noise.

One form of audio frequency induction loop system comprises a cable installed in the form of a loop usually around the perimeter of a room or area in which a group of hearing impaired persons wish to listen. The cable is connected via an amplifier to a microphone system or other source of audio signal, such as a radio receiver, CD player etc. The amplifier produces an audio-frequency electric current in the induction loop cable, causing a magnetic field to be produced inside the loop. The design and implementation of the induction loop is determined by the construction of the building in which it is installed, particularly by the presence of large amounts of iron, steel or aluminium in the structure. In addition the layout and position of electrical cables and equipment may generate high levels of background audio frequency magnetic fields that may interfere with the reception of the loop signal.

Another form of induction loop system employs a small loop, intended for communication with a hearing-aid user in its immediate vicinity. Examples are: neck loops, ticket-counter systems, self-contained 'portable' systems and chairs incorporating induction loops. (See Annex A)

The pick-up device for an audio-frequency induction loop system is usually a personal hearing aid, of a type fitted with a pick-up coil; however, special induction loop receivers may be used in certain applications.

The use of personal hearing aids as loop system receivers enables the wearers of these aids to take advantage of induction loop signal transmission wherever such loops are provided, particularly in public places. For this advantage to be most effective it is necessary for a standard value of magnetic field strength to be adopted, thus allowing a corresponding adjustment of the sensitivity of the pick-up coil in the hearing aid. The magnetic field strength has been chosen so that:

- it is high enough to produce an acceptable signal-to-noise ratio over background magnetic noise from power installations etc.;
- it is not so high as to cause overloading of the hearing aid.

The lower limit of magnetic field strength is governed by the expected level of background magnetic noise, measurements of which have been made in a number of homes, churches, schools, theatres, etc., in order to determine typical values. Measurements have also been made on hearing aids, to determine an acceptable range of input levels and on which the higher limit is based. See IEC 60118-1:1995, amendment 1:1998.

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ELECTROACOUSTICS – HEARING AIDS –

Part 4: Induction loop systems for hearing aid purposes – Magnetic field strength

1 Scope

This international standard is applicable to audio-frequency induction loop systems producing an alternating magnetic field at audio frequencies and intended to provide an input signal for hearing aids operating with an induction pick-up coil.

The standard specifies requirements for the field strength in audio-frequency induction loops for hearing aid purposes, which will give adequate signal-to-noise ratio without overloading the hearing aid. The standard also specifies the minimum frequency response requirements for acceptable intelligibility.

Methods for measuring the magnetic field strength are specified, and information is given on appropriate measuring equipment (see Annex B), information that should be provided to the operator and users of the system (see Annex C), and other important considerations.

The standard does not specify requirements for loop driver amplifiers or associated microphone or audio signal sources, or for the field strength produced by equipment, such as telephone handsets, within the scope of ITU-T P.370.

2 Normative references

[SIST EN 60118-4:2008](https://standards.iteh.ai/catalog/standards/sist/7cb51511-ddc3-4b43-8db6-a2ef8694cbd1/sist-en-60118-4-2008)

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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.

None.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

reference magnetic field strength level

the 0 dB reference for magnetic field strength levels is 400 mA/m

NOTE This is measured as specified in 6.3.1 and 6.3.6.

3.2

long-term average magnetic field strength level

long-term average level of the magnetic field strength produced by the system

NOTE 1 In the previous edition of this standard, this term was used to define the reference for magnetic field strength level measurements, but it is difficult to measure, so the maximum short-term magnetic field strength (see 6.3.1) is used in this edition for that purpose. This does NOT represent a technical change to the requirements for field strength. See also Annex D.

NOTE 2 'Long term' is not equivalent to 'S' time weighting as defined in IEC 61672-1. The $L_{eq,60s}$ is a good indication for the long-term average for some speech signals.

NOTE 3 An acoustic input sound pressure level of 70 dB and long-term average field strength of 100 mA/m in a hearing aid are assumed to give the same acoustic output level. See IEC 60118-1:1999, Clause 6.

3.3

useful magnetic field volume

volume within which the system provides hearing-aid users with a signal of acceptable quality (see 6.7).

NOTE 1 In the previous edition of this standard, the concept of 'specified magnetic field area' was defined, because that edition did not consider the very important 'height' dimension (the perpendicular distance between the hearing aid pick-up coil and the plane of the loop). See Annex E.

NOTE 2 The base area of the useful magnetic field volume is often different from the plan area of the induction loop.

4 Suitability of the site for the installation of an audio-frequency induction-loop system

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4.1 General

NOTE 1 This clause is included at this place in the text because it should be considered before a system is installed and its text has to precede 6.4 for clarity.

It may not be possible to obtain acceptable conditions for an induction loop system in all places where it is desirable. It is therefore necessary *in the planning stage* to examine a proposed location with respect to the following conditions:

- the magnetic noise level from electric installations, e.g. heating systems in the floor or roof, the electrical control of lighting systems (especially in theatres);
- the influence of magnetic and electrically-conducting materials in the structure in which the loop is intended to be installed;
- the presence of other induction loop systems in the neighbourhood, the signals of which may interfere with that of the planned loop system.

NOTE 2 Techniques exist to reduce radiation outside an induction loop, but previously-installed systems may not be so designed.

4.2 Measurement of magnetic background noise level

4.2.1 Method of measurement

Measurements of magnetic noise levels shall be performed by using an A-weighting network in the measuring instrument. The measured values, expressed as the maximum average short-term (0,125 s averaging time) of the r.m.s. values of the magnetic field strength, measured with a pick-up coil whose magnetic axis is vertical (unless otherwise specified, see 6.1), shall be expressed as levels in dB referred to the reference magnetic field strength level (see 3.1).