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**Measurement of DC magnetic, AC magnetic and AC electric fields from 1 Hz to 100 kHz with regard to exposure of human beings - Part 1: Requirements for measuring instruments (IEC 61786-1:2013 + IEC 61786-1:2013/AMD1:2024)**

**EESTI STANDARDI EESSÕNA****NATIONAL FOREWORD**

See Eesti standard EVS-EN 61786-1:2014+A1:2024 sisaldab Euroopa standardi EN 61786-1:2014 ja selle muudatuse A1:2024 ingliskeelset teksti.	This Estonian standard EVS-EN 61786-1:2014+A1:2024 consists of the English text of the European standard EN 61786-1:2014 and its amendment A1:2024.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.  Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 28.03.2014, muudatus A1 13.09.2024.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation and Accreditation.  Date of Availability of the European standard is 28.03.2014, for A1 13.09.2024.
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Measurement of DC magnetic, AC magnetic and AC electric fields from 1 Hz to 100 kHz with regard to exposure of human beings - Part 1: Requirements for measuring instruments  
(IEC 61786-1:2013 + IEC 61786-1:2013/AMD1:2024)

Mesure de champs magnétiques continus et de champs magnétiques et électriques alternatifs dans la plage de fréquences de 1 Hz à 100 kHz dans leur rapport à l'exposition humaine - Partie 1: Exigences applicables aux instruments de mesure  
(CEI 61786-1:2013 + IEC 61786-1:2013/AMD1:2024)

Messung von magnetischen Gleichfeldern und von elektrischen und magnetischen Wechselfeldern von 1 Hz bis 100 kHz im Hinblick auf die Exposition von Personen - Teil 1: Anforderungen an Messgeräte  
(IEC 61786-1:2013 + IEC 61786-1:2013/AMD1:2024)

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## Foreword

The text of document 106/292/FDIS, future edition 1 of IEC 61786-1, prepared by IEC TC 106, Methods for the assessment of electric, magnetic and electromagnetic fields associated with human exposure" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61786-1:2014.

The following dates are fixed:

- latest date by which the document has (dop) 2014-10-16  
to be implemented at national level by  
publication of an identical national  
standard or by endorsement
- latest date by which the national (dow) 2017-01-16  
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IEC 62110:2009	NOTE	Harmonised as EN 62110:2009 (not modified).
ISO 80000-1:2009	NOTE	Harmonised as EN ISO 80000-1:2013 (not modified).
ISO/IEC 17025:2005	NOTE	Harmonised as EN ISO/IEC 17025:2005 (not modified).

## **A1** Amendment A1 European foreword

The text of document 106/647/FDIS, future edition 1 of IEC 61786-1/AMD1, prepared by TC 106 "Methods for the assessment of electric, magnetic and electromagnetic fields associated with human exposure" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61786-1:2014/A1:2024.

The following dates are fixed:

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IEC 61000-6-2      NOTE      Approved as EN IEC 61000-6-2



# INTERNATIONAL STANDARD



HORIZONTAL PUBLICATION

**Measurement of DC magnetic, AC magnetic and AC electric fields from 1 Hz to 100 kHz with regard to exposure of human beings –  
Part 1: Requirements for measuring instruments**



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IEC Secretariat  
3, rue de Varembe  
CH-1211 Geneva 20  
Switzerland

Tel.: +41 22 919 02 11  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://www.iec.ch)

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# INTERNATIONAL STANDARD



HORIZONTAL PUBLICATION

**Measurement of DC magnetic, AC magnetic and AC electric fields from 1 Hz to 100 kHz with regard to exposure of human beings –  
Part 1: Requirements for measuring instruments**

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**MEASUREMENT OF DC MAGNETIC,  
AC MAGNETIC AND AC ELECTRIC FIELDS FROM 1 Hz TO 100 kHz  
WITH REGARD TO EXPOSURE OF HUMAN BEINGS –****Part 1: Requirements for measuring instruments**

## FOREWORD

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International Standard IEC 61786-1 has been prepared by IEC technical committee 106: Methods for the assessment of electric, magnetic and electromagnetic fields associated with human exposure.

The first editions of IEC 61786-1 and IEC 61786-2 replace IEC 61786:1998. Part 1 deals with measuring instruments, and Part 2 deals with measurement procedures. The content of the standard was revised in order to give up-to-date and practical information to the user.

It has the status of a horizontal standard in accordance with IEC Guide 108.

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

FDIS	Report on voting
106/292/FDIS	106/298/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 61786 series, published under the general title *Measurement of DC magnetic fields and AC magnetic and electric fields from 1 Hz to 100 kHz with regard to exposure of human beings*, can be found on the IEC website.

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Amendment 1 to IEC 61786-1:2013 has been prepared by IEC technical committee 106: Methods for the assessment of electric, magnetic and electromagnetic fields associated with human exposure.

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

Draft	Report on voting
106/647/FDIS	106/655/RVD

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

The language used for the development of this Amendment is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at [www.iec.ch/members\\_experts/refdocs](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/publications/](http://www.iec.ch/publications/).

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# MEASUREMENT OF DC MAGNETIC, AC MAGNETIC AND AC ELECTRIC FIELDS FROM 1 Hz TO 100 kHz WITH REGARD TO EXPOSURE OF HUMAN BEINGS –

## Part 1: Requirements for measuring instruments

### 1 Scope

This part of IEC 61786 provides guidance for measuring instruments used to measure the field strength of quasi-static magnetic and electric fields that have a frequency content in the range 1 Hz to 100 kHz and with DC magnetic fields to evaluate the exposure levels of the human body to these fields.

Sources of fields include devices that operate at power frequencies and produce power frequency and power frequency harmonic fields, as well as devices that produce fields within the frequency range of this document, including devices that produce static fields, and the earth's static magnetic field. The magnitude ranges covered by this standard are 0,1  $\mu\text{T}$  to 200 mT in AC (1  $\mu\text{T}$  to 10 T in DC) and 1 V/m to 50 kV/m for magnetic fields and electric fields, respectively.

When measurements outside this range are performed, most of the provisions of this standard will still apply, but special attention should be paid to specified uncertainty and calibration procedures.

Specifically, this standard

- defines terminology;
- identifies requirements on field meter specifications;
- indicates methods of calibration;
- defines requirements on instrumentation uncertainty;
- describes general characteristics of fields;
- describes operational principles of instrumentation.

NOTE Measurement methods that achieve defined goals pertaining to assessment of human exposure are described in IEC 61786-2

Sources of uncertainty during calibration are also identified. In regard to electric field measurements, this standard considers only the measurement of the unperturbed electric field strength at a point in free space (i.e. the electric field prior to the introduction of the field meter and operator) or above conducting surfaces.

This horizontal standard is primarily intended for use by technical committees in the preparation of standards in accordance with the principles laid down in IEC Guide 108.

One of the responsibilities of a technical committee is, wherever applicable, to make use of horizontal standards in the preparation of its publications. The contents of this horizontal standard will not apply unless specifically referred to or included in the relevant publications.

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 61000-3-2, *Electromagnetic compatibility (EMC) – Part 3-2: Limits – Limits for harmonic current emissions (equipment input current  $\leq 16$  A per phase)*

IEC 61000-4-2, *Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test*

IEC 61000-4-3, *Electromagnetic compatibility (EMC) - Part 4-3 : Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test*

IEC 61000-4-4, *Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test*

IEC 61000-4-6, *Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields*

IEC 61000-4-8, *Electromagnetic compatibility (EMC) – Part 4-8: Testing and measurement techniques – Power frequency magnetic field immunity test*

IEC 61000-6-1:2016, *Electromagnetic compatibility (EMC) – Part 6-1: Generic standards – Immunity standard for residential, commercial and light-industrial environments*

CISPR 11, *Industrial, scientific and medical equipment – Radio-frequency disturbance characteristics – Limits and methods of measurement*

ISO/IEC Guide 98-3, *Uncertainty of measurement – Part 3: Guide to the expression of uncertainty in measurement (GUM:1995)*

Guide 108, *Guidelines for ensuring the coherency of IEC publications – Application of horizontal standards*

## 3 Terms and definitions

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

NOTE 1 Internationally accepted SI-units are used throughout the standard.

NOTE 2 For other units, see Annex G.

NOTE 3 Throughout this standard, the words "magnetic flux density" and "magnetic field" will be considered synonymous.

### 3.1 Meters

#### 3.1.1 measuring instrument

device intended to be used to make measurements, alone or in conjunction with supplementary devices

[SOURCE: IEC 60050-300:2001, 311-03-01]