SLOVENSKI STANDARD
SIST EN IEC 60268-22:2021

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Oprema zvokovnega sistema - 22. del: Električne in mehanske meritve na pretvornikih (IEC 60268-22: 2020)

Sound system equipment - Part 22: Electrical and mechanical measurements on transducers (IEC 60268-22:2020)

Elektroakustische Geräte - Teil 22: Elektrische und mechanische Messungen an Wandlern (IEC 60268-22:2020)

Équipements pour systèmes électroacoustiques - Partie 22: Mesurages électriques et mécaniques sur transducteurs (IEC 60268-22:2020)

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33.160.30	Avdio sistemi	Audio systems

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN IEC 60268-22

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English Version

Sound system equipment - Part 22: Electrical and mechanical measurements on transducers (IEC 60268-22:2020)

Équipements pour systèmes électroacoustiques - Partie 22: Mesurages électriques et mécaniques sur transducteurs (IEC 60268-22:2020)

Elektroakustische Geräte - Teil 22: Elektrische und mechanische Messungen an Wandlern (IEC 60268-22:2020)

This European Standard was approved by CENELEC on 2020-10-29. 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.

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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 CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Ref. No. EN IEC 60268-22:2020 E

European foreword

The text of document 100/3311/CDV, future edition 1 of IEC 60268-22, prepared by IEC/TC 100 "Audio, video and multimedia systems and equipment" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 60268-22:2020.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2021-07-29
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2023-10-29

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

Endorsement notice

The text of the International Standard IEC 60268-22:2020 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following note has to be added for the standard indicated:

IEC 60068-2 (series) NOTE Harmonized as EN IEC 60068-2 (series)

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC 60263	1982	Scales and sizes for plotting frequency characteristics and polar diagrams	-	-
IEC 60268-1	1985	Sound system equipment. Part 1: General	HD 483.1 S2	1989
IEC 60268-2	1987	Sound system equipment. Part 2: Explanation of general terms and calculation methods	HD 483.2 S2	1993
IEC 60268-11	1987	Sound system equipment. Part 11: Application of connectors for the interconnection of sound system components	HD 483.11 S3	1993
IEC 60268-12	1987	Sound system equipment. Part 12: Application of connectors for broadcast and similar use	EN 60268-12	1995
IEC 60268-21	2018	Sound system equipment - Part 21: Acoustical (output-based) measurements	EN IEC 60268-21	2018
IEC 62458	2010	Sound system equipment - Electroacoustical transducers - Measurement of large signal parameters	EN 62458	2011
IEC 62459	2010	Sound system equipment - Electroacoustical transducers - Measurement of suspension parts	EN 62459	2011
ISO 3	1973	Preferred numbers - Series of preferred numbers	-	-
ISO/IEC GUM	1995	Guide to the expression of uncertainty in measurement (GUM)	-	-

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INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Sound system equipment –
Part 22: Electrical and mechanical measurements on transducers

Équipements pour systèmes électroacoustiques –
Partie 22: Mesurages électriques et mécaniques sur transducteurs

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SOUND SYSTEM EQUIPMENT –

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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 60628-22 has been prepared by technical area 20: Analogue and digital audio, of IEC technical committee 100: Audio, video and multimedia systems and equipment.

The text of this International Standard is based on the following documents:

CDV	Report on voting
100/3311/CDV	100/3424/RVC

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

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

A list of all parts in the IEC 60268 series, published under the general title *Sound system equipment*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

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

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

Measurements of the electrical and mechanical state variables have become increasingly important for the following reasons:

- Maximum sound pressure output is limited by voice coil heating and transducer nonlinearities. The large signal behaviour of loudspeakers can be described by nonlinear and thermal models using lumped parameters. These physical characteristics are important for transducer design and system integration.
- Mechanical vibration of the diaphragm determines the radiated sound. The modal vibration of the radiator's surface can be predicted by numerical simulations (FEA) and directly measured by laser vibrometry. This data represents important transducer characteristics that can be used to design the desired directivity into the system's acoustical output.
- DSP plays an important role in active systems. Digital pre-processing of the audio stream requires reliable transducer property information to protect the transducer against thermal and mechanical overload and to actively compensate for linear and nonlinear distortion generated in the output signal.

SOUND SYSTEM EQUIPMENT –

Part 22: Electrical and mechanical measurements on transducers

1 Scope

This part of IEC 60268 applies to transducers converting an electrical input signal into a mechanical or acoustical output signal. However, if the electrical input terminals and the surface of the radiator are accessible, this document can also apply to passive and active sound systems such as loudspeakers, headphones, TV-sets, multi-media devices, personal portable audio devices, automotive sound systems and professional equipment. This document describes only electrical and mechanical measurements that help assess the transfer behaviour of the device under test (DUT). This includes operating the DUT in both the small- and large-signal domains. The influence of the target application's acoustical boundary conditions (e.g. car interior) can also be considered in the physical evaluation of the sound system. Perception and cognitive evaluations of the reproduced sound and the impact of perceived sound quality are outside the scope of this document.

NOTE This document does not apply to microphones and other sensors. Implementation of this document does not require access to the sound pressures generated in the near or far fields of the radiator. Directivity and other characteristics describing the electro-acoustical transfer properties are described in IEC 60268-21, which covers acoustical measurements. The practical application of the measurements for research and development (R&D), end-of-line testing (QC) and evaluation in the final target application (TA) is discussed in Annex A.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

IEC 60263:1982, *Scales and sizes for plotting frequency characteristics and polar diagrams*

IEC 60268-1:1985, *Sound system equipment – Part 1: General*

IEC 60268-2:1987, *Sound system equipment – Part 2: Explanation of general terms and calculation methods*

IEC 60268-11:1987, *Sound system equipment – Part 11: Application of connectors for the interconnection of sound system components*

IEC 60268-12:1987, *Sound system equipment – Part 12: Application of connectors for broadcast and similar use*
IEC 60268-12:1987/AMD1:1991

IEC 60268-21:2018, *Sound system equipment – Part 21: Acoustical (output-based) measurements*

IEC 62458:2010, *Sound system equipment – Electroacoustical transducers – Measurement of large signal parameters*

IEC 62459:2010, *Sound system equipment – Electroacoustical transducers – Measurement of suspension parts*

ISO 3:1973, *Preferred numbers – Series of preferred numbers*

ISO/IEC GUM:1995, *Guide to the expression of uncertainty in measurement (GUM)*

3 Terms, definitions and abbreviated terms

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1 Terms and definitions

3.1.1
linear behaviour
behaviour of the DUT at small amplitudes where the relationship between input and output signal can be modelled by a linear system and described by a linear transfer function

3.1.2
reference unit
DUT having measured properties representative of units in the sample lot passing the end-of-line test

3.2 Abbreviated terms

DUT device under test
SPL sound pressure level
FEA finite element analysis
FT Fourier transform

4 Type description

The type description shall be provided by the manufacturer, including the following information:

- transduction principle (e.g. electro-dynamical, capacitive, electro-magnetic transducer);
- system description including operation principle (e.g. the number of the transducers used in the loudspeaker system;
- acoustical loading (e.g. horn loading and enclosure types, such as bass reflex, column, line array, ...);
- power amplification (e.g. maximum output power, class type, minimum load impedance, ...);
- DSP processing (e.g. equalizer, active protection), if any.

5 Marking of terminals and controls

The terminals and controls shall be marked in accordance with IEC 60268-1 and IEC 60268-2.

6 Physical characteristics

6.1 Dimensions

The outer dimensions of the DUT shall be specified.