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Sound system equipment –
Part 21: Acoustical (output-based) measurement

IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

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Part 21: Acoustical (output-based) measurements

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SOUND SYSTEM EQUIPMENT –

Part 21: Acoustical (output-based) measurements

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International Standard IEC 60268-21 has been prepared by IEC technical committee 100: Audio, video and multimedia systems and equipment.

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

CDV	Report on voting
100/2957/CDV	100/3019/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 60628, 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- withdrawn,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.

A bilingual version of this publication may be issued at a later date.

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INTRODUCTION

Loudspeakers, headphones and other actuators have become more versatile and, as a result, new measurement techniques are required to evaluate these systems. The following is a list of examples where new measurement techniques are required:

- Limited access to the electrical terminals of the transducer

  The higher integration of electrical, acoustical and mechanical elements limit the access to the electrical terminals of the transducer.

- Analogue or digital audio input signals

  Audio inputs can accept analogue or digital signals in various formats.

- Latency and other kinds of distortion associated with digital signal processing

  Digital signal processing is used to correct the transfer behaviour of the passive system and to generate a desired sound output and as a result, latency and other kinds of distortion not found in analogue equipment can be generated.

- Excessive equalization

  Excessive equalization can force the transducer to operate in the large signal domain causing thermal and nonlinear effects.

- Active protection

  Active protection attenuates the input signal to prevent a mechanical and thermal overload of the transducer and other components.

- Other transducer principles

  Although most loudspeaker systems use a moving coil in an electro-dynamical transducer, there is a need to expand the application to electro-static, electro-magnetic or any other transduction principles.

- Other mechanical and acoustical elements

  To improve sound radiation, vented enclosures, sealed enclosures, passive radiators, horns, wave guides, flat panels, and other mechanical and acoustical elements are implemented.

- Impulsive distortions

  Defects in manufacturing (e.g. voice coil rubbing) or operating under overload conditions can create impulsive distortions, which have a high impact on perceived sound quality but cannot be detected by conventional measurements (e.g. total harmonic distortion).

- Directional characteristics and complex near field properties

  The comprehensive evaluation of professional equipment, including directional characteristics, can be realized by considering the complex near-field properties as a supplement to the existing far-field measurement techniques. In addition, devices intended for use in the near field, such as hand-held personal audio devices (e.g. laptops, tablets, smart phones) and other portable sound systems, need to be evaluated in a manner appropriate to their intended use.

SOUND SYSTEM EQUIPMENT –

Part 21: Acoustical (output-based) measurements

1 Scope

This part of IEC 60268 specifies an acoustical measurement method that applies to electro-acoustical transducers and passive and active sound systems, such as loudspeakers, TV-sets, multi-media devices, personal portable audio devices, automotive sound systems and professional equipment. The device under test (DUT) can be comprised of electrical components performing analogue and digital signal processing prior to the passive actuators performing a transduction of the electrical input into an acoustical output signal. This document describes only physical measurements that assess the transfer behaviour of the DUT between an arbitrary analogue or digital input signal and the acoustical output at any point in the near and far field of the system. This includes operating the DUT in both the small and large signal domains. The influence of the acoustical boundary conditions of the target application (e.g. car interior) can also be considered in the physical evaluation of the sound system. This document does not assess the perception and cognitive evaluation of the reproduced sound and the impact of perceived sound quality.

NOTE Some measurement methods defined in this document can be applied to headphones, headsets, earphones and earsets in accordance with [1][1]. This document does not apply to microphones and other sensors. This document does not require access to the state variables (voltage, current) at the electrical terminals of the transducer. Sensitivity, electric input power and other characteristics based on the electrical impedance will be described in a separate future standard document, IEC 60268-22, dedicated to electrical and mechanical measurements.

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, *Scales and sizes for plotting frequency characteristics and polar diagrams*

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

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

IEC 61094-4, *Measurement microphones – Part 4: Specifications for working standard microphones*

IEC 61260-1, *Electroacoustics – Octave-band and fractional-octave-band filters – Part 1: Specifications*

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

ISO 3741:2010, *Acoustics – Determination of sound power levels and sound energy levels of noise sources using sound pressure – Precision methods for reverberation test rooms*

[1] Numbers in square brackets refer to the Bibliography.