

© Copyright SEK Svensk Elstandard. Reproduction in any form without permission is prohibited.

Elektroakustik – Audiometrar – Del 3: Korta signaler för användning vid audiometri

*Electroacoustics –
Audiometric equipment –
Part 3: Test signals of short duration*

Som svensk standard gäller europastandarden EN IEC 60645-3:2020. Den svenska standarden innehåller den officiella engelska språkversionen av EN IEC 60645-3:2020.

Nationellt förord

Europastandarden EN IEC 60645-3:2020

består av:

- **europastandardens ikraftsättningsdokument**, utarbetat inom CENELEC
- **IEC 60645-3, Third edition, 2020 - Electroacoustics - Audiometric equipment - Part 3: Test signals of short duration**

utarbetad inom International Electrotechnical Commission, IEC.

Tidigare fastställd svensk standard SS-EN 60645-3, utgåva 2, 2008, gäller ej fr o m 2023-11-03.

Standarder underlättar utvecklingen och höjer elsäkerheten

Det finns många fördelar med att ha gemensamma tekniska regler för bl a mätning, säkerhet och provning och för utförande, skötsel och dokumentation av elprodukter och elanläggningar.

Genom att utforma sådana standarder blir säkerhetsfordringar tydliga och utvecklingskostnaderna rimliga samtidigt som marknadens acceptans för produkten eller tjänsten ökar.

Många standarder inom elområdet beskriver tekniska lösningar och metoder som åstadkommer den elsäkerhet som föreskrivs av svenska myndigheter och av EU.

SEK är Sveriges röst i standardiseringsarbetet inom elområdet

SEK Svensk Elstandard svarar för standardiseringen inom elområdet i Sverige och samordnar svensk medverkan i internationell och europeisk standardisering. SEK är en ideell organisation med frivilligt deltagande från svenska myndigheter, företag och organisationer som vill medverka till och påverka utformningen av tekniska regler inom elektrotekniken.

SEK samordnar svenska intressenters medverkan i SEKs tekniska kommittéer och stödjer svenska experters medverkan i internationella och europeiska projekt.

Stora delar av arbetet sker internationellt

Utformningen av standarder sker i allt väsentligt i internationellt och europeiskt samarbete. SEK är svensk nationalkommitté av International Electrotechnical Commission (IEC) och Comité Européen de Normalisation Electrotechnique (CENELEC).

Standardiseringsarbetet inom SEK är organiserat i referensgrupper bestående av ett antal tekniska kommittéer som speglar hur arbetet inom IEC och CENELEC är organiserat.

Arbetet i de tekniska kommittéerna är öppet för alla svenska organisationer, företag, institutioner, myndigheter och statliga verk. Den årliga avgiften för deltagandet och intäkter från försäljning finansierar SEKs standardiseringsverksamhet och medlemsavgift till IEC och CENELEC.

Var med och påverka!

Den som deltar i SEKs tekniska kommittéarbete har möjlighet att påverka framtida standarder och får tidig tillgång till information och dokumentation om utvecklingen inom sitt teknikområde. Arbetet och kontakterna med kollegor, kunder och konkurrenter kan gynnsamt påverka enskilda företags affärsutveckling och bidrar till deltagarnas egen kompetensutveckling.

Du som vill dra nytta av dessa möjligheter är välkommen att kontakta SEKs kansli för mer information.

SEK Svensk Elstandard

Box 1284
164 29 Kista
Tel 08-444 14 00
www.elstandard.se

English Version

**Electroacoustics - Audiometric equipment - Part 3: Test signals
of short duration
(IEC 60645-3:2020)**

Électroacoustique - Appareils audiométriques - Partie 3:
Signaux d'essai de courte durée
(IEC 60645-3:2020)

Akustik - Audiometer - Teil 3: Kurzzeit-Hörprüfsignale
(IEC 60645-3:2020)

This European Standard was approved by CENELEC on 2020-11-03. 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 CEN-CENELEC Management Centre or to any CENELEC member.

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

European foreword

The text of document 29/1066/FDIS, future edition 3 of IEC 60645-3, prepared by IEC/TC 29 "Electroacoustics" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 60645-3:2020.

The following dates are fixed:

- latest date by which the document has to be implemented at national (dop) 2021-08-03 level by publication of an identical national standard or by endorsement
- latest date by which the national standards conflicting with the (dow) 2023-11-03 document have to be withdrawn

This document supersedes EN 60645-3:2007 and all of its amendments and corrigenda (if any).

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.

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association.

Endorsement notice

The text of the International Standard IEC 60645-3:2020 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 61672-1	NOTE	Harmonized as EN 61672-1
ISO 8253-2	NOTE	Harmonized as EN ISO 8253-2
IEC 60645-1	NOTE	Harmonized as EN 60645-1
IEC 60645-6	NOTE	Harmonized as EN 60645-6
IEC 60645-7	NOTE	Harmonized as EN 60645-7

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.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60318-1	-	Electroacoustics - Simulators of human head and ear - Part 1: Ear simulator for the measurement of supra-aural and circumaural earphones	EN 60318-1	-
IEC 60318-3	-	Electroacoustics - Simulators of human head and ear - Part 3: Acoustic coupler for the calibration of supra-aural earphones used in audiometry	EN 60318-3	-
IEC 60318-4	-	Electroacoustics - Simulators of human head and ear - Part 4: Occluded-ear simulator for the measurement of earphones coupled to the ear by means of ear inserts	EN 60318-4	-
IEC 60318-5	-	Electroacoustics - Simulators of human head and ear - Part 5: 2 cm ³ coupler for the measurement of hearing aids and earphones coupled to the ear by means of ear inserts	EN 60318-5	-
IEC 60318-6	-	Electroacoustics - Simulators of human head and ear - Part 6: Mechanical coupler for the measurement on bone vibrators	EN 60318-6	-
IEC 61260-1	-	Electroacoustics - Octave-band and fractional-octave-band filters - Part 1: Specifications	EN 61260-1	-
ISO 389-6	-	Acoustics - Reference zero for the calibration of audiometric equipment - Part 6: Reference threshold of hearing for test signals of short duration	EN ISO 389-6	-

CONTENTS

FOREWORD	3
INTRODUCTION.....	5
1 Scope	6
2 Normative references	6
3 Terms and definitions	7
4 Reference signals.....	10
4.1 General.....	10
4.2 Reference click	11
4.3 Reference tone-burst	11
4.4 Reference broadband chirp.....	12
4.5 Reference octave-band chirps.....	12
5 Calibration and measurement of short-duration signals.....	13
Bibliography	14
Figure 1 – Basic specification of an electrical reference click	7
Figure 2 – Illustration of the method of measurement of peak-to-peak equivalent signal levels	8
Figure 3 – Temporal characteristics of an electrical reference tone-burst.....	8
Figure 4 – Time domain specification of the electrical reference click	11
Figure 5 – Temporal characteristics of the electrical reference broadband chirp.....	12

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTROACOUSTICS – AUDIOMETRIC EQUIPMENT –**Part 3: Test signals of short duration**

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.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with an IEC Publication.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60645-3 has been prepared by IEC technical committee 29: Electroacoustics.

This third edition cancels and replaces the second edition published in 2007. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) new figures of reference signals;
- b) changes in definitions.

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

FDIS	Report on voting
29/1066/FDIS	29/1070/RVD

Full information on the voting for the approval of this document 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 of IEC 60645 series, under the general title *Electroacoustics – Audiometric equipment*, can be found on the IEC website.

The committee has decided that the contents of this document 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 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

Developments in the field of hearing measurements for diagnostic, hearing conservation and rehabilitation purposes have resulted in the availability of a wide range of audiometric equipment. In addition, it is possible to consider audiometric equipment in terms of a set of functional units that can be specified independently. By specifying these functional units, it is then possible to specify the performance of other audiometric equipment that uses these units. The IEC 60645 series consists of a number of parts. IEC 60645-3 covers the requirements for reference and other test signals of short duration.

Examples of test methods, where such signals are commonly used, are the recording of auditory evoked potentials and evoked otoacoustic emissions. Reference signals are described in order to provide a basis for calibration and as a recommendation for use when there is no specific reason to have an alternative signal. Measurement methods for short duration acoustic and vibratory test signals are described.

ELECTROACOUSTICS – AUDIOMETRIC EQUIPMENT –

Part 3: Test signals of short duration

1 Scope

This part of IEC 60645 specifies a means of describing the physical characteristics, in terms of electrical waveforms, of audiometric reference and test signals of short duration and methods for their measurement.

The object of this document is to ensure that audiometric stimuli of short duration are specified and measured in the same way and that the calibration of equipment using such signals is carried out using defined methods.

This document does not describe the method of use of short-duration test signals.

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 60318-1, *Electroacoustics – Simulators of human head and ear – Part 1: Ear simulator for the measurement of supra-aural and circumaural earphones*

IEC 60318-3, *Electroacoustics – Simulators of human head and ear – Part 3: Acoustic coupler for the calibration of supra-aural earphones used in audiometry*

IEC 60318-4, *Electroacoustics – Simulators of human head and ear – Part 4: Occluded-ear simulator for the measurement of earphones coupled to the ear by means of ear inserts*

IEC 60318-5, *Electroacoustics – Simulators of human head and ear – Part 5: 2 cm³ coupler for the measurement of hearing aids and earphones coupled to the ear by means of ear inserts*

IEC 60318-6, *Electroacoustics – Simulators of human head and ear – Part 6: Mechanical coupler for the measurement on bone vibrators*

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

ISO 389-6, *Acoustics – Reference zero for the calibration of audiometric equipment – Part 6: Reference threshold of hearing for test signals of short duration*