

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

Mikrohögtalare

Microspeakers

Som svensk standard gäller europastandarden EN IEC 63034:2020. Den svenska standarden innehåller den officiella engelska språkversionen av EN IEC 63034:2020.

Nationellt förord

Europastandarden EN IEC 63034:2020

består av:

- **europastandardens ikraftsättningsdokument**, utarbetat inom CENELEC
- **IEC 63034, First edition, 2020 - Microspeakers**

utarbetad inom International Electrotechnical Commission, IEC.

ICS 33.160.50

Denna standard är fastställd av SEK Svensk Elstandard,
som också kan lämna upplysningar om **sakinnehållet** i standarden.
Postadress: Box 1284, 164 29 KISTA
Telefon: 08 - 444 14 00.
E-post: sek@elstandard.se. Internet: www.elstandard.se

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

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN IEC 63034

August 2020

ICS 33.160.50

English Version

Microspeakers
(IEC 63034:2020)

Micro-haut-parleurs
(IEC 63034:2020)

Mikrolautsprecher
(IEC 63034:2020)

This European Standard was approved by CENELEC on 2020-07-29. 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.

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

© 2020 CENELEC All rights of exploitation in any form and by any means reserved worldwide for CENELEC Members.

Ref. No. EN IEC 63034:2020 E

European foreword

The text of document 100/3107/CDV, future edition 1 of IEC 63034, 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 63034:2020.

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) 2021-04-29
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2023-07-29

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 63034:2020 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 60068-2-1:2007	NOTE	Harmonized as EN 60068-2-1:2007 (not modified)
IEC 60068-2-2:2007	NOTE	Harmonized as EN 60068-2-2:2007 (not modified)
IEC 60068-2-14:2009	NOTE	Harmonized as EN 60068-2-14:2009 (not modified)
IEC 60068-2-30:2005	NOTE	Harmonized as EN 60068-2-30:2005 (not modified)
IEC 60068-2-78:2012	NOTE	Harmonized as EN 60068-2-78:2013 (not modified)
IEC 60268-3	NOTE	Harmonized as EN IEC 60268-3
IEC 60268-5	NOTE	Harmonized as EN 60268-5

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 60268-1	-	Sound system equipment. Part 1: General	HD 483.1 S2	-
IEC 60268-2	-	Sound system equipment. Part 2: Explanation of general terms and calculation methods	HD 483.2 S2	-
IEC 60268-21	2018	Sound system equipment - Part 21: Acoustical (output-based) measurements	EN IEC 60268-21	2018
IEC 60268-22	2020	Sound system equipment - Electrical and mechanical measurements (TA 20)	EN IEC 60268-22	— ¹
IEC 61260-1	-	Electroacoustics - Octave-band and fractional-octave-band filters - Part 1: Specifications	EN 61260-1	-

¹ To be published. Stage at the time of publication: prEN IEC 60268-22:2019.

CONTENTS

FOREWORD	6
1 Scope	8
2 Normative references	8
3 Terms, definitions and abbreviated terms	8
3.1 Terms and definitions.....	8
3.2 Abbreviated terms.....	8
4 Conditions of measurement	9
4.1 Rated measuring conditions	9
4.2 Climatic conditions.....	9
4.3 Normal measuring conditions	9
5 Acoustical environment.....	10
5.1 General.....	10
5.2 Free-field conditions	10
5.3 Half-space free-field conditions	10
5.4 Simulated free-field conditions	10
5.5 Half-space simulated free-field conditions	10
6 Mounting of the microspeaker	10
6.1 Mounting and acoustic loading of microspeaker units	10
6.2 Mounting and acoustic loading of microspeaker systems	11
6.3 Standard micro-baffle.....	11
6.4 Measuring plane wave tube.....	12
7 Positioning of microspeaker and measuring microphone	13
7.1 Positioning of the microspeaker	13
7.1.1 Rated geometrical condition	13
7.1.2 Reference plane	13
7.1.3 Reference point	13
7.1.4 Normal vector	13
7.1.5 Polar vector	14
7.2 Measuring distance under free-field and half-space free-field conditions.....	14
7.2.1 Far-field condition.....	14
7.2.2 Single microspeaker unit (transducer).....	14
7.2.3 Multi-unit microspeaker systems	14
7.3 Positioning of microspeaker and microphone in simulated free-field and half-space free-field conditions	14
8 Measuring equipment	15
9 Accuracy of the measurement.....	15
9.1 General.....	15
9.2 Unwanted acoustic and electrical noise.....	15
9.3 Accuracy of the mounting.....	15
9.4 Accuracy of the measuring equipment.....	15
9.5 Accuracy of acoustic environment	15
10 Marking of terminals and controls	15
10.1 General.....	15
10.2 Positive terminal	16
10.2.1 Characteristic to be specified.....	16
10.2.2 Marking	16

10.2.3	Method of testing	16
11	Test signals	16
11.1	General.....	16
11.2	Steady-state sinusoidal signal.....	16
11.3	Sinusoidal chirp signal	16
11.4	Discrete multi-tone sinusoidal signal	17
11.5	Broadband noise signal.....	18
11.6	Narrow-band noise signal	18
12	Preconditioning.....	18
12.1	Acclimatization.....	18
12.2	Pre-loading	18
13	Electrical input impedance.....	19
13.1	Electrical input impedance curve.....	19
13.1.1	Characteristics to be specified	19
13.1.2	Method of measurement	19
13.2	Rated impedance.....	19
14	Small signal parameters of the microspeaker.....	19
14.1	General.....	19
14.2	Characteristics to be specified	20
14.2.1	Resonance frequency f_s	20
14.2.2	DC resistance of driver voice coil R_{dc}	20
14.2.3	Voice coil inductance L_e	20
14.2.4	Total Q-factor Q_{ts}	20
14.2.5	Electrical Q-factor Q_{es}	20
14.2.6	Mechanical Q-factor Q_{ms}	20
14.2.7	Mechanical compliance C_{ms}	20
14.2.8	Moving mass M_{ms}	21
14.2.9	Mechanical resistance R_{ms}	21
14.2.10	Force factor Bl	21
14.2.11	Equivalent air volume of a microspeaker unit compliance V_{as}	21
14.2.12	Effective radiation area S_D	21
14.3	Method of measurement	21
14.3.1	General	21
14.3.2	Laser ranging method	21
14.3.3	Added volume method	23
14.3.4	Added mass method	25
15	Displacement.....	25
15.1	Displacement curve	25
15.1.1	Characteristics to be specified	25
15.1.2	Method of measurement	25
15.2	DC component X_{dc}	26
15.2.1	Characteristics to be specified	26
15.2.2	Method of measurement	27
15.3	Distortion limited peak displacement X_d	27
15.3.1	Characteristics to be specified	27
15.3.2	Method of measurement	27

15.4	Sinusoidal peak displacement X_s	27
16	Amplitude frequency response.....	28
16.1	Rated frequency range.....	28
16.2	Frequency response	28
16.2.1	Characteristic to be specified.....	28
16.2.2	Method of measurement	28
16.3	Mean sound pressure in a stated frequency band	28
16.3.1	Characteristics to be specified.....	28
16.3.2	Method of measurement	28
16.4	Effective frequency range	29
16.4.1	Characteristics to be specified.....	29
16.4.2	Method of measurement	29
17	Amplitude non-linearity	29
17.1	Total harmonic distortion (THD)	29
17.1.1	Characteristic to be specified.....	29
17.1.2	Method of measurement for input voltages up to the rated sinusoidal voltage	29
17.2	Harmonic distortion of the n^{th} order.....	30
17.2.1	Characteristic to be specified.....	30
17.2.2	Method of measurement for input voltages up to the rated sinusoidal voltage	30
17.3	Total higher-order harmonic distortion components (HOHD)	30
17.3.1	Characteristic to be specified.....	30
17.3.2	Method of measurement for input voltages up to the rated sinusoidal voltage	30
17.4	Modulation distortion of the n^{th} order (where $n = 2$ or $n = 3$)	31
17.4.1	Characteristic to be specified.....	31
17.4.2	Method of measurement	31
18	Listening test.....	32
18.1	Listening test for normal operation	32
18.2	Listening test for irregular distortion	32
19	Input voltage/Electrical power	33
19.1	Rated noise voltage/power.....	33
19.1.1	Characteristic to be specified.....	33
19.1.2	Method of measurement	33
19.2	Short-term maximum input voltage/power	34
19.2.1	Characteristic to be specified.....	34
19.2.2	Method of measurement	34
19.2.3	Protective devices	34
19.3	Long-term maximum input voltage/power	35
19.3.1	Characteristic to be specified.....	35
19.3.2	Method of measurement	35
19.3.3	Protective devices	35
19.4	Rated sinusoidal voltage/power	35
19.4.1	Characteristic to be specified.....	35
19.4.2	Method of measurement	35
20	Environmental testing	36
20.1	Temperature ranges.....	36
20.1.1	Performance-limited temperature range – Characteristic to be specified	36

20.1.2	Damage-limited temperature range – Characteristic to be specified	36
20.2	Humidity ranges	36
20.2.1	Relative humidity range – Characteristic to be specified	36
20.2.2	Damage-limited humidity range – Characteristic to be specified	36
20.3	Cold storage	36
20.3.1	Characteristic to be specified	36
20.3.2	Method of measurement	36
20.4	Cold usage	36
20.4.1	Characteristic to be specified	36
20.4.2	Method of measurement	36
20.5	Dry heat storage	37
20.5.1	Characteristic to be specified	37
20.5.2	Method of measurement	37
20.6	Dry heat usage	37
20.6.1	Characteristic to be specified	37
20.6.2	Method of measurement	37
20.7	Thermal shock (rapid change of temperature with prescribed time of transition)	38
20.7.1	Characteristic to be specified	38
20.7.2	Method of measurement	38
20.8	Steady damp heat	38
20.8.1	Characteristic to be specified	38
20.8.2	Method of measurement	38
21	Stray magnetic fields	39
21.1	General	39
21.2	Static components	39
21.2.1	Characteristic to be specified	39
21.2.2	Method of measurement	39
21.3	Dynamic components	40
21.3.1	Characteristic to be specified	40
21.3.2	Method of measurement	40
22	Physical characteristics	41
22.1	Dimensions	41
22.2	Weight	41
23	Design data	41
	Bibliography	42
	Figure 1 – Standard micro-baffle	11
	Figure 2 – Standard micro-baffle with sub-baffle	12
	Figure 3 – Plane wave tube	12
	Figure 4 – Rated geometrical conditions of the microspeaker	13
	Figure 5 – Electrical input impedance curve of the microspeaker	23
	Figure 6 – Peak and bottom values of displacement	26
	Figure 7 – Displacement curve	26
	Figure 8 – DC component of displacement	27
	Figure 9 – Block diagram of test setup	33
	Figure 10 – Measuring apparatus for stray magnetic field	39

INTERNATIONAL ELECTROTECHNICAL COMMISSION

MICROSPEAKERS

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 itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 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 63034 has been prepared by 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
100/3107/CDV	100/3211/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.

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.

MICROSPEAKERS

1 Scope

This document specifies the characteristics of microspeakers as well as the relevant test methods on microspeakers using steady-state sinusoidal signals, sinusoidal chirp, multi-tone or noise. The main characteristics include, but are not limited to, impedance, displacement, amplitude frequency response, distortion, and power handling.

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

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

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

IEC 60268-22:2020, *Sound system equipment – Electrical and mechanical measurements on transducers*

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