



SLOVENSKI STANDARD SIST EN IEC 60942:2018

01-maj-2018

Nadomešča:
SIST EN 60942:2004

Elektroakustika - Kalibratorji za zvokomere (IEC 60942:2017)

Electroacoustics - Sound calibrators (IEC 60942:2017)

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Ta slovenski standard je istoveten z: EN IEC 60942:2018

<https://standards.iteh.ai/catalog/standards/sist/9e5c85e9-02ba-4300-983f-a71eb2d8ec61/sist-en-iec-60942-2018>

ICS:

17.140.50 Elektroakustika Electroacoustics

SIST EN IEC 60942:2018 **en**

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN IEC 60942:2018](#)

<https://standards.iteh.ai/catalog/standards/sist/9e5c85e9-02ba-4300-983f-a71cb2d8ee61/sist-en-iec-60942-2018>

EUROPEAN STANDARD

EN IEC 60942

NORME EUROPÉENNE

EUROPÄISCHE NORM

March 2018

ICS 17.140.50; 33.100.20

Supersedes EN 60942:2003

English Version

**Electroacoustics - Sound calibrators
(IEC 60942:2017)**Électroacoustique - Calibreurs acoustiques
(IEC 60942:2017)Elektroakustik - Schallkalibratoren
(IEC 60942:2017)

This European Standard was approved by CENELEC on 2018-01-03. 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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

<https://standards.iteh.ai/catalog/standards/sist/9e5c85e9-02ba-4300-983f-a71cb2d8ee61/sist-en-iec-60942-2018>



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

EN IEC 60942:2018 (E)**European foreword**

The text of document 29/962/FDIS, future edition 4 of IEC 60942, prepared by IEC/TC 29 "Electroacoustics" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 60942:2018.

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) 2018-10-03
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2021-01-03

This document supersedes EN 60942:2003.

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 60942:2017 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 60942:2003 | NOTE | Harmonized as EN 60942:2003 (not modified). |
| IEC 61094-2:2009 | NOTE | Harmonized as EN 61094-2:2009 (not modified). |

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 60050-801	1994	International Electrotechnical Vocabulary (IEV) -- Chapter 801: Acoustics and electroacoustics	-	-
IEC 61000-4-2	2008	Electromagnetic compatibility (EMC) -- Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test	EN 61000-4-2	2009
IEC 61000-4-3	2006	Electromagnetic compatibility (EMC) -- Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test	EN 61000-4-3	2006
IEC 61000-4-20	2010	Electromagnetic compatibility (EMC) -- Part 4-20: Testing and measurement techniques - Emission and immunity testing in transverse electromagnetic (TEM) waveguides	EN 61000-4-20	2010
IEC 61000-6-1	2005	Electromagnetic compatibility (EMC) -- Part 6-1: Generic standards - Immunity for residential, commercial and light-industrial environments	EN 61000-6-1	2007
IEC 61000-6-2	2005	Electromagnetic compatibility (EMC) -- Part 6-2: Generic standards - Immunity for industrial environments	EN 61000-6-2	2005
-	-		+ corrigendum Sep. 2005	
IEC 61000-6-3	2006	Electromagnetic compatibility (EMC) -- Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments	EN 61000-6-3	2007
+ A1	2010		+ A1	2011
-	-		+ AC	2012
IEC 61094-1	2000	Measurement microphones -- Part 1: Specifications for laboratory standard microphones	EN 61094-1	2000
IEC 61094-4	1995	Measurement microphones -- Part 4: Specifications for working standard microphones	EN 61094-4	1995

EN IEC 60942:2018 (E)

IEC 61094-5	-	Measurement microphones - Part 5: Methods for pressure calibration of working standard microphones by comparison	EN 61094-5	-
IEC 61672-1	-	Electroacoustics - Sound level meters -- Part 1: Specifications	EN 61672-1	-
CISPR 16-1-1	-	Specification for radio disturbance and immunity measuring apparatus and methods -- Part 1-1: Radio disturbance and immunity measuring apparatus - Measuring apparatus	EN 55016-1-1	-
CISPR 16-2-3	2016	Specification for radio disturbance and immunity measuring apparatus and methods - Part 2-3: Methods of measurement of disturbances and immunity - Radiated disturbance measurements	EN 55016-2-3	2017
CISPR 22	2008	Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement	EN 55022	2010
ISO/IEC Guide 98-3 2008		Uncertainty of measurement - Part 3: Guide to the expression of uncertainty in measurement (GUM:1995)	-	-
ISO 266	1997	Acoustics - Preferred frequencies	EN ISO 266	1997
ISO/IEC Guide 99	-	International vocabulary of metrology - Basic and general concepts and associated terms (VIM)	-	-

SIST EN IEC 60942:2018

<https://standards.iteh.ai/catalog/standards/sist/9e5c85e9-02ba-4300-983f-a71cb2d8ee61/sist-en-iec-60942-2018>



IEC 60942

Edition 4.0 2017-11

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Electroacoustics – Sound calibrators

Électroacoustique – Calibreurs acoustiques

STANDARD PREVIEW
(standards.iteh.ai)
SIST EN IEC 60942:2018
<https://standards.iteh.ai/catalog/standards/sist/9e5c85e9-02ba-4300-983f-a71cb2d8ee61/sist-en-iec-60942-2018>

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 17.140.50; 33.100.20

ISBN 978-2-8322-5049-5

**Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

CONTENTS

FOREWORD	5
INTRODUCTION	7
1 Scope	8
2 Normative references	8
3 Terms and definitions	10
4 Reference environmental conditions	12
5 Requirements	12
5.1 General	12
5.2 Adaptors	14
5.3 Sound pressure level	15
5.3.1 General	15
5.3.2 Generated sound pressure level	15
5.3.3 Short-term level fluctuation	15
5.3.4 Sound pressure level over range of supply voltage	16
5.4 Frequency	16
5.4.1 General	16
5.4.2 Frequency of sound generated by the sound calibrator	16
5.5 Influence of static pressure, air temperature and humidity	17
5.6 Total distortion + noise	18
5.7 Power supply requirements	19
5.8 Specification and calibration of microphones	19
5.8.1 Microphone models and adaptors	19
5.8.2 Microphone sensitivity level	19
5.9 Electromagnetic compatibility	20
5.9.1 General	20
5.9.2 Radio-frequency emissions	20
5.9.3 Electrostatic discharges	20
5.9.4 Immunity to power- and radio-frequency fields	20
6 Instrument marking and documentation	21
6.1 Marking of the sound calibrator	21
6.2 Individual calibration chart for a class LS sound calibrator	22
6.3 Instruction manual	22
Annex A (normative) Pattern evaluation tests	24
A.1 General	24
A.2 Submission for test	24
A.3 Principal values	25
A.4 Marking of the sound calibrator and supplied documentation	25
A.5 Performance tests at and around reference environmental conditions	25
A.5.1 General	25
A.5.2 Orientation	25
A.5.3 Ambient noise	25
A.5.4 Microphone specification	26
A.5.5 Sound pressure level	26
A.5.6 Sound pressure level stability – Short-term level fluctuation	27
A.5.7 Frequency	28

A.5.8	Total distortion + noise	29
A.6	Environmental tests	30
A.6.1	General	30
A.6.2	Influence of static pressure	30
A.6.3	Acclimatization requirements for tests of the influence of variations in air temperature and relative humidity	32
A.6.4	Abbreviated test of influence of air temperature and humidity combined	32
A.6.5	Influence of air temperature	35
A.6.6	Influence of relative humidity	36
A.6.7	Influence of air temperature and humidity combined	37
A.7	Electromagnetic compatibility	38
A.7.1	General	38
A.7.2	Radio-frequency emissions	38
A.7.3	Electrostatic discharges	39
A.7.4	Immunity to power- and radio-frequency fields	40
Annex B (normative)	Periodic tests	42
B.1	General	42
B.2	Submission for test	43
B.3	Preliminary inspection	43
B.4	Performance tests	43
B.4.1	Orientation	43
B.4.2	Ambient noise	43
B.4.3	Environmental conditions	43
B.4.4	Additional equipment	43
B.4.5	Microphone specification	44
B.4.6	Sound pressure level	44
B.4.7	Frequency	45
B.4.8	Total distortion + noise	45
B.5	Calibration of the sound calibrator with other models of microphone	46
B.6	Documentation	46
Annex C (normative)	Pattern evaluation report	48
C.1	General	48
C.2	Marking	48
C.3	Submission for test	48
C.4	Pattern evaluation report content	48
Annex D (informative)	Relationship between tolerance interval, corresponding acceptance interval and the maximum-permitted uncertainty of measurement	50
Annex E (informative)	Example assessments of conformance to specifications of this document	51
E.1	General	51
E.2	Conformance criteria	51
E.3	Example test results	51
Bibliography	54
Figure D.1	– Relationship between tolerance interval, corresponding acceptance interval and the maximum-permitted uncertainty of measurement	50
Figure E.1	– Examples of assessment of conformance	53

Table 1 – Sound calibrator classes and designations	13
Table 2 – Acceptance limits for sound pressure level and short-term level fluctuation, at and around reference environmental conditions	16
Table 3 – Acceptance limits for the effect of supply voltage on sound pressure level, under reference environmental conditions	16
Table 4 – Acceptance limits for frequency, at and around reference environmental conditions	17
Table 5 – Acceptance limits for sound pressure level, over the specified range of environmental conditions	18
Table 6 – Acceptance limits for frequency, over the specified range of environmental conditions	18
Table 7 – Maximum total distortion + noise	19
Table A.1 – Maximum-permitted uncertainty of measurement for a coverage probability of 95 %, for sound pressure level and short-term level fluctuation at and around reference environmental conditions.....	28
Table A.2 – Maximum-permitted uncertainty of measurement for a coverage probability of 95 % for frequency, at and around reference environmental conditions	29
Table A.3 – Maximum-permitted uncertainty of measurement for a coverage probability of 95 % for total distortion + noise, over the appropriate range of environmental conditions	30
Table A.4 – Maximum-permitted uncertainty of measurement for a coverage probability of 95 %, for sound pressure level, over the specified range of environmental conditions	32
Table A.5 – Maximum-permitted uncertainty of measurement for a coverage probability of 95 % for frequency, over the specified range of environmental conditions	35
Table E.1 – Examples of assessment of conformance.....	52

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTROACOUSTICS – SOUND CALIBRATORS

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 60942 has been prepared by IEC technical committee 29: Electroacoustics, in cooperation with the International Organization of Legal Metrology (OIML).

This fourth edition cancels and replaces the third edition published in 2003, of which it constitutes a technical revision.

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

- a) deletion of the class designations, class LS/C, class 1/C and class 2/C;
- b) addition of two further class designations, class LS/M and class 1/M, specifically for pistonphones;
- c) addition of an amended criterion for assessing conformance to a specification: conformance is now demonstrated when (a) measured deviations from design goals do not exceed the applicable acceptance limits and (b) the uncertainty of measurement does not exceed the corresponding maximum-permitted uncertainty;

- d) modification to the short-term level fluctuation test of the sound pressure level stability;
- e) change to some environmental test conditions to avoid icing;
- f) addition of an alternative test for immunity to radio-frequency fields using transverse electromagnetic (TEM) waveguides.

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

FDIS	Report on voting
29/962/FDIS	29/969/RVD

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.

ITEH STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN IEC 60942:2018](#)

<https://standards.iteh.ai/catalog/standards/sist/9e5c85e9-02ba-4300-983f-a71cb2d8ee61/sist-en-iec-60942-2018>

INTRODUCTION

Sound calibrators are designed to produce one or more known sound pressure levels at one or more specified frequencies when coupled to specified models of microphone in specified configurations, for example, with or without protective grid. The sound pressure level generated by some sound calibrators depends on the static pressure.

Sound calibrators have two principal applications:

- a) the determination of the electroacoustical pressure sensitivity of specified models of microphone in specified configurations;
- b) checking or adjusting the overall sensitivity of acoustical measuring devices or systems.

iTeh STANDARD PREVIEW **(standards.iteh.ai)**

[SIST EN IEC 60942:2018](https://standards.iteh.ai/catalog/standards/sist/9e5c85e9-02ba-4300-983f-a71cb2d8ee61/sist-en-iec-60942-2018)

<https://standards.iteh.ai/catalog/standards/sist/9e5c85e9-02ba-4300-983f-a71cb2d8ee61/sist-en-iec-60942-2018>

ELECTROACOUSTICS – SOUND CALIBRATORS

1 Scope

This document specifies the performance requirements for three classes of sound calibrator: class LS (Laboratory Standard), class 1 and class 2. Acceptance limits are smallest for class LS and greatest for class 2 instruments. Class LS sound calibrators are normally used only in the laboratory; class 1 and class 2 are considered as sound calibrators for field use. A class 1 sound calibrator is primarily intended for use with a class 1 sound level meter and a class 2 sound calibrator primarily with a class 2 sound level meter, as specified in IEC 61672-1.

The acceptance limits for class LS sound calibrators are based on the use of a laboratory standard microphone, as specified in IEC 61094-1, for demonstrations of conformance to the requirements of this document. The acceptance limits for class 1 and class 2 sound calibrators are based on the use of a working standard microphone, as specified in IEC 61094-4, for demonstrations of conformance to the requirements of this document.

To promote consistency of testing of sound calibrators and ease of use, this document contains three normative annexes – Annex A "Pattern evaluation tests", Annex B "Periodic tests", Annex C "Pattern evaluation report", and two informative Annexes – Annex D "Relationship between tolerance interval, corresponding acceptance interval and the maximum-permitted uncertainty of measurement" and Annex E "Example assessments of conformance to specifications of this document".

This document does not include requirements for equivalent free-field or random-incidence sound pressure levels, such as can be used in the overall sensitivity adjustment of a sound level meter.

A sound calibrator can provide other functions, for example, tonebursts. Requirements for these other functions are not included in this document.

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 60050-801:1994, *International Electrotechnical Vocabulary – Chapter 801: Acoustics and electroacoustics*

IEC 61000-4-2:2008, *Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test*

IEC 61000-4-3:2006, *Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test*

IEC 61000-4-20:2010, *Electromagnetic compatibility (EMC) – Part 4-20: Testing and measurement techniques – Emission and immunity testing in transverse electromagnetic (TEM) waveguides*

IEC 61000-6-1:2005, *Electromagnetic compatibility (EMC) – Part 6-1: Generic standards – Immunity for residential, commercial and light-industrial environments*¹

IEC 61000-6-2:2005, *Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity for industrial environments*²

IEC 61000-6-3:2006, *Electromagnetic compatibility (EMC) – Part 6-3: Generic standards – Emission standard for residential, commercial and light-industrial environment*
IEC 61000-6-3:2006/AMD1:2010

IEC 61094-1:2000, *Measurement microphones – Part 1: Specifications for laboratory standard microphones*

IEC 61094-4:1995, *Measurement microphones – Part 4: Specifications for working standard microphones*

IEC 61094-5, *Electroacoustics – Measurement microphones – Part 5: Methods for pressure calibration of working standard microphones by comparison*

IEC 61672-1, *Electroacoustics – Sound level meters – Part 1: Specifications*

CISPR 16-1-1, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-1: Radio disturbance and immunity measuring apparatus – Measuring apparatus*

CISPR 16-2-3:2016, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 2-3: Methods of measurement of disturbances and immunity – Radiated disturbance measurements*

[SIST EN IEC 60942:2018](https://standards.iteh.ai/catalog/standards/sist/9e5c85e9-02ba-4300-983f-18c660000000/iec-60942-2017)

<https://standards.iteh.ai/catalog/standards/sist/9e5c85e9-02ba-4300-983f-18c660000000/iec-60942-2017>

CISPR 22:2008, *Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement*³

ISO/IEC Guide 98-3:2008, *Uncertainty of measurement – Part 3: Guide to the expression of uncertainty in measurement (GUM:1995)*

ISO 266:1997, *Acoustics – Preferred frequencies*

ISO/IEC Guide 99, *International vocabulary of metrology – Basic and general concepts and associated terms (VIM)*

¹ 2nd edition (2005). This 2nd edition has been replaced in 2016 by a 3rd edition IEC 61000-6-1:2016, *Electromagnetic compatibility (EMC) – Part 6-1: Generic standards – Immunity standard for residential, commercial and light-industrial environments*, but to ensure consistency with other TC 29 standards this 3rd edition has not been used or referenced in this document, but will be considered prior to the next revision of this document.

² 2nd edition (2005). This 2nd edition has been replaced in 2016 by a 3rd edition IEC 61000-6-2:2016, *Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity for industrial environments*, but to ensure consistency with other TC 29 standards this 3rd edition has not been used or referenced in this document, but will be considered prior to the next revision of this document.

³ 6th edition (2008). This 6th edition has been replaced in 2015 by CISPR 32:2015, *Electromagnetic compatibility of multimedia equipment – Emission requirements*, but to ensure consistency with other TC 29 standards CISPR 32:2015 has not been used or referenced in this document, but will be considered prior to the next revision of this document.