

This document is a review generated by EVS

Electroacoustics - Sound calibrators

ESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN IEC 60942:2018 sisaldb Euroopa standardi EN IEC 60942:2018 ingliskeelset teksti.	This Estonian standard EVS-EN IEC 60942:2018 consists of the English text of the European standard EN IEC 60942:2018.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 09.03.2018.	Date of Availability of the European standard is 09.03.2018.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 17.140.50, 33.100.20

Standardite reproduutseerimise ja levitamise õigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardikeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardikeskusega:
Koduleht www.evs.ee; telefon 605 5050; e-post info@evs.ee

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation:

Homepage www.evs.ee; phone +372 605 5050; e-mail info@evs.ee

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN IEC 60942

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.



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 29/962/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) -- PartEN 61000-4-2 4-2: Testing and measurement techniques - Electrostatic discharge immunity test	PartEN 61000-4-2	2009
IEC 61000-4-3	2006	Electromagnetic compatibility (EMC) -- PartEN 61000-4-3 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test	PartEN 61000-4-3	2006
IEC 61000-4-20	2010	Electromagnetic compatibility (EMC) -- PartEN 61000-4-20 4-20: Testing and measurement techniques - Emission and immunity testing in transverse electromagnetic (TEM) waveguides	PartEN 61000-4-20	2010
IEC 61000-6-1	2005	Electromagnetic compatibility (EMC) -- PartEN 61000-6-1 6-1: Generic standards - Immunity for residential, commercial and light-industrial environments	PartEN 61000-6-1	2007
IEC 61000-6-2	2005	Electromagnetic compatibility (EMC) -- PartEN 61000-6-2 6-2: Generic standards - Immunity for industrial environments	PartEN 61000-6-2	2005
-	-		+ corrigendum Sep. 2005	
IEC 61000-6-3	2006	Electromagnetic compatibility (EMC) -- PartEN 61000-6-3 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments	PartEN 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

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)	-	-

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

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.