STN	Elektroakustické zariadenia Časť 3: Zosilňovače	STN EN IEC 60268-3
DIM		36 8305

Sound system equipment - Part 3: Amplifiers

Táto norma obsahuje anglickú verziu európskej normy. This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 09/18

Obsahuje: EN IEC 60268-3:2018, IEC 60268-3:2018

Oznámením tejto normy sa od 30.05.2021 ruší STN EN 60268-3 (36 8305) z novembra 2013

STN EN IEC 60268-3: 2018

EUROPEAN STANDARD NORME EUROPÉENNE EUROPÄISCHE NORM

EN IEC 60268-3

June 2018

ICS 33.160.10

Supersedes EN 60268-3:2013

English Version

Sound system equipment - Part 3: Amplifiers (IEC 60268-3:2018)

Equipements pour systèmes électroacoustiques - Partie 3: amplificateurs (IEC 60268-3:2018)

Elektroakustische Geräte - Teil 3: Verstärker (IEC 60268-3:2018)

This European Standard was approved by CENELEC on 2018-05-30. 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

EN IEC 60268-3:2018 (E)

European foreword

The text of document 100/2960/CDV, future edition 5 of IEC 60268-3, 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 60268-3:2018.

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)	2019-02-28
•	latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2021-05-30

This document supersedes EN 60268-3:2013.

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 60268-3:2018 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 61606 series	NOTE	Harmonized as EN 61606 series.
IEC 60268-5:2003	NOTE	Harmonized as EN 60268-5:2003.

IEC 60268-5:2003/A1:2007 NOTE Harmonized as EN 60268-5:2003/A1:2009.

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.

Publication (man d)	<u>Year</u>	Title	EN/HD	<u>Year</u>
IEC 60065 (mod)	2014	Audio, video and similar electronic apparatus - Safety requirements	EN 60065	2014
_	_	apparatus - Garety requirements	+ A11	2017
IEC 60268-1	1985	Sound system equipment Part 1:	HD 483.1 S2	1989
		General		
+ A1	1988		-	-
+ A2	1988	Cound oustons on time ant. Don't O.	- LID 402 2 C2	4000
IEC 60268-2	1987	Sound system equipment - Part 2: Explanation of general terms and calculation methods	HD 483.2 S2	1993
+ A1	1991	calculation methods	-	_
IEC 60417	2002	Graphical symbols for use on equipment	-	-
IEC 60958	series	Digital audio interface	EN 60958	series
IEC 61000-4-13	2002	Electromagnetic compatibility (EMC) Pa	rtEN 61000-4-13	2002
		4-13: Testing and measurement techniques - Harmonics and		
		interharmonics including mains signaling a	at	
		a.c. power port, low frequency immunity		
		tests		
+ A1	2009		+ A1	2009
+ A2	2015	Floring and the second (In 1914 of FMO)	+ A2	2016
IEC 61000-4-17	1999	Electromagnetic compatibility (EMC) Pa 4-17: Testing and measurement	ITEN 61000-4-17	1999
		techniques - Ripple on d.c. input power		
		port immunity test		
+ A1	2001	•	+ A1	2004
+ A2	2008		+ A2	2009
IEC 61000-4-29	2000	Electromagnetic compatibility (EMC) Pa	rtEN 61000-4-29	2000
		4-29: Testing and measurement techniques - Voltage dips, short		
		interruptions and voltage variations on d.c		
		input power port immunity tests		
IEC 61606-1	2009	Audio and audiovisual equipment - Digital		2009
		audio parts - Basic measurement methods	3	
IEC 61883-6	2014	of audio characteristics Part 1: General Consumer audio/video equipment - Digita	I EN 61993 6	2014
IEC 01003-0	2014	interface - Part 6: Audio and music data	I EN 01003-0	2014
		transmission protocol		
IEC 61938	2013	Multimedia systems - Guide to the	EN 61938	2013
		recommended characteristics of analogue	!	
		interfaces to achieve interoperability		



IEC 60268-3

Edition 5.0 2018-04

INTERNATIONAL STANDARD

Sound system equipment – Part 3: Amplifiers





THIS PUBLICATION IS COPYRIGHT PROTECTED Copyright © 2018 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Central Office 3, rue de Varembé CH-1211 Geneva 20 Switzerland Tel.: +41 22 919 02 11

info@iec.ch www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

IEC Catalogue - webstore.iec.ch/catalogue

The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

IEC publications search - webstore. iec.ch/advsearchform

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and also once a month by email.

Electropedia - www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing 21 000 terms and definitions in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary

67 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.



IEC 60268-3

Edition 5.0 2018-04

INTERNATIONAL STANDARD

Sound system equipment – Part 3: Amplifiers

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ICS 33.160.10 ISBN 978-2-8322-5587-2

Warning! Make sure that you obtained this publication from an authorized distributor.

IEC 60268-3:2018 © IEC 2018

CONTENTS

FΟ	REWORD	5
1	Scope	7
2	Normative references	7
3	Terms, definitions and rated values	8
	3.1 Terms and definitions	8
	3.2 Rated values	
4	Conditions	9
	4.1 Rated conditions and standard measuring conditions	9
	4.1.1 Overview	
	4.1.2 Rated conditions	10
	4.1.3 Standard measuring conditions	11
	4.2 Other conditions	11
5	Classes of operation	11
6	Interchangeable parts	11
7	Automatic controls	11
8	Power supply	12
9	Position of the volume controls	12
10	Pre-conditioning for measurements	12
11	Series of measurements	
12	Variable consumption apparatus	
13	Marking	
	-	
14	Operating environment	
15	Characteristics to be specified, and their methods of measurement	
	15.1 Power supply characteristics	
	15.1.1 Characteristics to be specified	
	15.1.2 Method of measurement	
	15.2 Tolerance of (long-term) power supply voltage variations	
	15.2.2 Methods of measurement	
	15.3 Tolerance of power supply frequency variations	
	15.3.1 Characteristics to be specified	
	15.3.2 Methods of measurement	
	15.4 Tolerance of power supply harmonics and ripple	
	15.4.1 Characteristics to be specified	
	15.4.2 Methods of measurement	
	15.5 Input characteristics	
	15.5.1 Rated source impedance, characteristic to be specified	17
	15.5.2 Input impedance	17
	15.5.3 Rated source e.m.f., characteristic to be specified	19
	15.5.4 Minimum source e.m.f. for rated distortion-limited output voltage	19
	15.6 Output characteristics	
	15.6.1 Rated load impedance, characteristic to be specified	
	15.6.2 Output source impedance	
	15.6.3 Output voltage and power (distortion-limited)	
	15.6.4 Maximum effective output power (distortion-limited at 10 %)	22

15.6.5	Regulation	23
15.6.6	Overload restoring time	24
15.7 Lim	iting characteristics	24
15.7.1	Overload source e.m.f.	24
15.7.2	Short-term maximum output voltage and power	25
15.7.3	Long-term maximum output voltage and power	25
15.7.4	Temperature-limited output power	26
15.8 Cha	aracteristics of protection circuits	27
15.8.1	General	27
15.8.2	Protection against potentially damaging combinations of output voltage and current	28
15.8.3	Characteristics of d.c. offset protection circuits	29
15.9 Sus	taining-time for rated (distortion-limited) output voltage or power	30
15.9.1	General	30
15.9.2	Characteristic to be specified	31
15.9.3	Method of measurement	31
15.10 Gai	n	31
15.10.1	Voltage gain and e.m.f. gain	31
15.10.2	Maximum e.m.f. gain	32
15.10.3	Attenuation characteristic of the volume control	32
15.10.4	Attenuation characteristic of balance controls for multi-channel	
	equipment	
15.11 Res	sponse	
15.11.1	Gain-frequency response	
15.11.2	Gain-limited effective frequency range	34
15.11.3	Distortion-limited effective frequency range	34
15.11.4	Phase-frequency response	34
15.12 Am	plitude non-linearity	
15.12.1	General	
15.12.2	Rated total harmonic distortion, characteristic to be specified	
15.12.3	Total harmonic distortion under standard measuring conditions	
15.12.4	Total harmonic distortion as a function of amplitude and frequency	36
15.12.5	Harmonic distortion of the n th order under standard measuring conditions	36
15.12.6	Harmonic distortion of the n th order as a function of amplitude and frequency	37
15.12.7	Modulation distortion of the n th order (where $n = 2$ or $n = 3$)	38
15.12.8	Difference-frequency distortion of the n th order (where $n = 2$ or $n = 3$)	40
15.12.9	Dynamic intermodulation distortion (DIM)	41
15.12.10	Total difference frequency distortion	
15.12.11	Weighted total harmonic distortion	44
15.13 Noi	se	45
15.13.1	Characteristic to be specified	45
15.13.2	Method of measurement	45
15.14 Hur	n	
15.14.1	General	
15.14.2	Characteristics to be specified	46
15.14.3	Method of measurement	46
	anced inputs and outputs	47
15 15 1	Polones of the input	17

15.15.2 Over	load (distortion-limited) peak-to-peak common-mode input voltage	48
15.15.3 Balaı	nce of the output	49
15.16 Cross-tall	k and separation in multi-channel amplifiers	50
15.16.1 Char	racteristics to be specified	50
15.16.2 Meth	nod of measurement	50
	phase differences between channels in multi-channel amplifiers	
15.17.1 Gain	difference	51
	se difference	
15.18 Dimension	ns and mass, characteristics to be specified	52
Annex A (informativ	e) Balanced interfaces	59
Annex B (informativ	re) Specification of a multi-channel amplifier	60
B.1 General		60
B.2 Example	specification of a 5.1 channel amplifier	60
B.3 Example	specification of a 5 channel amplifier	60
Bibliography		62
Figure 1 – Example	block diagram for multi-channel amplifier	53
	on diagram of equipment for digital input	
=	nents for the Class D amplifier	
	nents for measuring input impedance	
•	- , , ,	
_	am when measuring overload restoring time	55
	n against potentially damaging combinations of output voltage and	56
-	ment for combining two input signals	5 <i>1</i>
	cy spectrum below 30 kHz of the signal for measuring dynamic ortion	57
	ment for measuring the balance of a balanced input	58
	ement for measuring the internal impedance balance of a balanced	EC
•		
	ement for measuring the voltage symmetry of a balanced output	
Figure B.1 – Block o	diagram for a 5.1 channel surround amplifier	60
Figure B.2 – Block o	diagram for a 5 channel surround amplifier	61
Table 1 – Different r	rated total harmonic distortion and rated distortion-limited output	
	s for the same amplifier	30
	components due to dynamic intermodulation distortion falling in	
the frequency range	aun to 20 kHz	41

IEC 60268-3:2018 © IEC 2018

- 5 -

INTERNATIONAL ELECTROTECHNICAL COMMISSION

SOUND SYSTEM EQUIPMENT -

Part 3: Amplifiers

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 60268-3 has been prepared by IEC technical committee 100: Audio, video and multimedia systems and equipment.

This fifth edition cancels and replaces the fourth edition published in 2013. This edition constitutes a technical revision.

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

- a) rated condition of digital input is newly specified;
- b) tolerance of rated power supply is changed;
- c) maximum effective output power is appended to output characteristics list;
- d) "Terms, definitions and rated values" clause is complemented.

-6-

IEC 60268-3:2018 © IEC 2018

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

CDV	Report on voting
100/2960/CDV	100/3069/RVC

Full information on the voting for the approval of this 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 60268 series, published under the general title *Sound system* equipment, can be found on the IEC website.

This part of IEC 60268 shall be used in conjunction with IEC 60268-1:1985 and IEC 60268-2:1987.

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.

IEC 60268-3:2018 © IEC 2018

-7-

SOUND SYSTEM EQUIPMENT -

Part 3: Amplifiers

1 Scope

This part of IEC 60268 applies to analogue amplifiers, and the analogue parts of analogue/digital amplifiers, which form part of a sound system for professional or household applications. It specifies the characteristics that should be included in specifications of amplifiers and the corresponding methods of measurement.

NOTE The methods of measurement for digital amplifiers and similar equipment are given in IEC 61606 [1] 1.

In general, the specified methods of measurement are those which are seen to be most directly related to the characteristics. This does not exclude the use of other methods that give equivalent results.

In general, the methods are based on the simplest measuring equipment which can provide useful results. This does not exclude the use of more complex equipment that can give higher accuracy and/or allow automatic measurement and recording of results.

Rated conditions and standard measuring conditions are specified in order to allow measurements to be reliably repeated.

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 60065:2014, Audio, video and similar electronic apparatus - Safety requirements

IEC 60268-1:1985, Sound system equipment – Part 1: General

IEC 60268-1:1985/AMD1:1988 IEC 60268-1:1985/AMD2:1988

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

Amendment 1:1991

IEC 60417:2002, Graphical symbols for use on equipment – 12-month subscription to regularly updated online database comprising all graphical symbols published in IEC 60417

IEC 60958:2016 (all parts), Series, Digital audio interface

¹ Numbers in square brackets refer to the Bibliography.

- 8 - IEC 60268-3:2018 © IEC 2018

IEC 61000-4-13:2002, Electromagnetic compatibility (EMC) – Part 4-13: Testing and measurement techniques – Harmonics and interharmonics including mains signalling at a.c. power port, low frequency immunity tests

IEC 61000-4-13:2002/AMD1:2009 IEC 61000-4-13:2002/AMD2:2015

IEC 61000-4-17:1999, Electromagnetic Compatibility (EMC) – Part 4-17: Testing and measurement techniques – Ripple on d.c. input power port immunity test

IEC 61000-4-17:1999/AMD1:2001 IEC 61000-4-17:1999/AMD2:2008

IEC 61000-4-29:2000, Electromagnetic Compatibility (EMC) – Part 4-29: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations on d.c. input power ports immunity tests

IEC 61606-1:2009, Audio and audiovisual equipment – Digital audio parts – Basic measurement methods of audio characteristics – Part 1: General

IEC 61883-6:2014, Consumer audio/video equipment – Digital interface – Part 6: Audio and music data transmission protocol

IEC 61938:2013, Multimedia systems – Guide to the recommended characteristics of analogue interfaces to achieve interoperability

koniec náhľadu – text ďalej pokračuje v platenej verzii STN