

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Analogue audio disk records and reproducing equipment

Disques audio analogiques et appareils de lecture





THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2020 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.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Central Office
3, rue de Varembe
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 corrigendum or an amendment might have been published.

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 It also gives information on projects, replaced and withdrawn publications.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 once a month by email.

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.

Electropedia - www.electropedia.org

The world's leading online dictionary on electrotechnology, containing more than 22 000 terminological entries 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.

A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Recherche de publications IEC - webstore.iec.ch/advsearchform

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études,...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et une fois par mois par email.

Service Clients - webstore.iec.ch/csc

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: sales@iec.ch.

Electropedia - www.electropedia.org

Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 000 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 16 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

Glossaire IEC - std.iec.ch/glossary

67 000 entrées terminologiques électrotechniques, en anglais et en français, extraites des articles Termes et Définitions des publications IEC parues depuis 2002. Plus certaines entrées antérieures extraites des publications des CE 37, 77, 86 et CISPR de l'IEC.

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Analogue audio disk records and reproducing equipment

Disques audio analogiques et appareils de lecture

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 33.160.30

ISBN 978-2-8322-8098-0

**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
1 Scope	7
2 Normative references	7
3 Terms and definitions	7
4 General	8
4.1 Scales for graphical presentation of data	8
4.2 Scales for frequency characteristics	8
5 The disk	8
5.1 Types of disk records	8
5.2 Dimensions of disks	9
5.3 Unbalance of disks	10
5.4 Direction of rotation	11
5.5 Direction of recording	11
5.6 Speed of rotation	11
6 The groove	11
6.1 Direction of groove modulation	11
6.2 Arrangement of stereophonic channels	12
6.2.1 Channel orientation	12
6.2.2 Channel phasing	12
6.2.3 Channel levels	12
6.2.4 Channel polarity	12
6.3 Groove dimensions	12
6.4 Lead-in groove	12
6.5 Outer diameter of recorded surface	12
6.6 Eccentricity of groove spiral	12
6.7 Marker space	13
6.8 Lead-out groove	13
6.9 Finishing groove	13
7 Label information	13
8 Recording and reproducing characteristics	13
8.1 Recording characteristic	13
8.1.1 Standard recording characteristic	13
8.1.2 Recording chain tolerances	14
8.2 Reproducing characteristic	15
8.2.1 Standard reproducing characteristic	15
8.2.2 Reproducing chain tolerances	15
9 Reproducing equipment	15
9.1 Speed of rotation	15
9.2 Automatic pickup lifting	15
9.3 Reproducing stylus	15
9.3.1 Clearances	15
9.3.2 Included angle (spherical styli only)	16
9.3.3 Stylus rake (non-spherical styli only)	16
9.4 Arrangement of stereophonic channels	16
9.4.1 Channel orientation	16

9.4.2	Channel phasing	16
9.4.3	Channel gain	16
9.4.4	Channel polarity	16
9.5	Interchangeability of pickup cartridges	16
9.5.1	Dimensions	16
9.5.2	Colour coding of connecting wires between pickup cartridge and pickup arm	17
9.5.3	Colour coding or marking of pickup cartridge terminals	17
10	Measurements	17
10.1	Standard measurement conditions	17
10.1.1	General	17
10.1.2	Environment	18
10.1.3	Electric power supply	18
10.1.4	Pickup operation	18
10.1.5	Test records	18
10.2	Methods of measurement	18
10.2.1	General	18
10.2.2	Maximum apparent power consumption	19
10.2.3	Mean deviation from rated speed	19
10.2.4	Wow and flutter	20
10.2.5	Maximum start time to reach actual or rated speed	20
10.2.6	Signal/rumble ratio	20
10.2.7	Signal/hum ratio	21
10.2.8	Channel sensitivity at 1 000 Hz	22
10.2.9	Channel unbalance at 1 000 Hz (stereo use only)	23
10.2.10	Separation at 1 000 Hz (stereo use only)	23
10.2.11	Frequency response	23
10.2.12	Tracking ability	24
11	Information required from manufacturers of record playing units	25
11.1	General	25
11.2	Identification	25
11.3	Structure	25
11.3.1	Pickup cartridge	25
11.3.2	Drive system	25
11.3.3	Space requirements for unmounted units	26
11.3.4	Operational modes	26
12	Performance claims	26
12.1	General	26
12.2	Maximum apparent power consumption of the unit	26
12.3	Speed of rotation	26
12.4	Signal/rumble ratio	27
12.5	Signal/hum ratio	27
12.6	Channel sensitivity at 1 000 Hz	27
12.7	Channel unbalance at 1 000 Hz (stereo use only)	27
12.8	Separation at 1 000 Hz (stereo use only)	27
12.9	Frequency response	27
12.10	Tracking ability	27
Annex A (informative)	Multipurpose test records	28
A.1	Available multi-purpose test record	28

A.2	Multi-purpose test record no longer available new but which may still be used	28
Annex B	(normative) Test records for wow and flutter	30
Annex C	(normative) Measurement of signal/rumble ratio	31
C.1	Measuring instrument.....	31
C.2	Test record	31
C.3	Attenuation curve	31
Annex D	(informative) Examples of test records for the measurement of channel sensitivity, channel unbalance, separation, signal response, and separation response	33
Annex E	(informative) Tracking ability	35
E.1	Test records for tracking ability	35
E.2	Examples of test records no longer available new but which may still be used	35
Figure 1	– Dimensions for record types 30xx and 25xx	9
Figure 2	– Dimensions for record type 17xx	10
Figure 3	– Groove	11
Figure 4	– Recording and reproducing characteristics	14
Figure 5	– Pickup cartridge	17
Figure C.1	– Attenuation curve for rumble meter	32
Table 1	– Standard types of disk	8
Table 2	– Colour coding of connecting wires	17
Table 3	– Rated and measured speeds	19
Table 4	– Relation of time t to actual speed	20
Table 5	– Identification	25
Table 6	– Pickup cartridge data	25
Table 7	– Drive system data	26
Table 8	– Operational modes	26
Table B.1	– Examples of test records that may be used.....	30
Table C.1	– Test records for measuring signal/rumble ratio.....	31
Table D.1	– Examples of test records that may be used.....	33
Table E.1	– Low-frequency tracking ability – Method A in 10.2.12.....	35
Table E.2	– Low to middle frequency sweep tracking ability	35
Table E.3	– High-frequency tracking ability	35

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ANALOGUE AUDIO DISK RECORDS AND REPRODUCING EQUIPMENT

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 60098 has been prepared by IEC technical committee 100: Audio, video and multimedia systems and equipment.

This fourth edition cancels and replaces the third edition published in 1987. This edition constitutes a full revision.

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

- a) addition of a tolerance on groove width.

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

CDV	Report on voting
100/3261/CDV	100/3331/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.

Currently in preview, click buy full version

ANALOGUE AUDIO DISK RECORDS AND REPRODUCING EQUIPMENT

1 Scope

This document applies to analogue audio disk records and the corresponding professional and domestic reproducing equipment. It excludes amplifiers and loudspeakers, methods of measurement for which can be found in IEC 60268-3, IEC 60268-5, IEC 60268-21 and IEC 60268-22¹.

This document specifies the characteristics that are necessary to ensure compatibility between analogue audio disk records and the corresponding reproducing equipment.

It also lists and defines the most important characteristics affecting the performance of reproducing equipment, and establishes agreed methods of measurement for these characteristics.

2 Normative references

The following documents are referred to in the text in such a way that none 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 60050-806:1996, *International Electrotechnical Vocabulary (IEV) – Part 806: Recording and reproduction of audio and video*
IEC 60050-806:1996/AMD1:2001
IEC 60050-806:1996/AMD2:2018

IEC 60263:1982, *Scales and sizes for plotting frequency characteristics and polar diagrams*

IEC 60386:1972, *Method of measurement of speed fluctuations in sound recording and reproducing equipment*

IEC 60417, *Graphical symbols for use on equipment* (available at <http://www.graphical-symbols.info/equipment>)

IEC 61672-1:2013, *Electroacoustics – Sound level meters – Part 1: Specifications*

IEC 62368-1:2018, *Audio/video, information and communication technology equipment – Part 1: Safety requirements*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-806 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

¹ Under preparation. Stage at the time of publication: IEC CDV 60268-22:2019.