

STN	Elektroakustika Sluchové protézy Časť 16: Definícia a overovanie vlastností sluchových protéz	STN EN IEC 60118-16 36 8860
------------	--	---

Electroacoustics - Hearing aids - Part 16: Definition and verification of hearing aid features

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. 07/22

Obsahuje: EN IEC 60118-16:2022, IEC 60118-16:2022

135207



EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN IEC 60118-16

April 2022

ICS 17.140.50

English Version

**Electroacoustics - Hearing aids - Part 16: Definition and
verification of hearing aid features
(IEC 60118-16:2022)**

Électroacoustique - Appareils de correction auditive - Partie
16: Définition et vérification des caractéristiques des
appareils de correction auditive
(IEC 60118-16:2022)

Elektroakustik - Hörgeräte - Teil 16: Begriffe und Verifikation
von Hörgeräteeigenschaften
(IEC 60118-16:2022)

This European Standard was approved by CENELEC on 2022-04-20. 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

EN IEC 60118-16:2022 (E)**European foreword**

The text of document 29/1110/FDIS, future edition 1 of IEC 60118-16, prepared by IEC/TC 29 "Electroacoustics" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 60118-16:2022.

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) 2023-01-20
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2025-04-20

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.

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

Endorsement notice

The text of the International Standard IEC 60118-16:2022 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 60318-5	NOTE Harmonized as EN 60318-5
IEC 60318-4	NOTE Harmonized as EN 60318-4
IEC 60318-6	NOTE Harmonized as EN 60318-6
IEC 60601-2-66:2019	NOTE Harmonized as EN IEC 60601-2-66:2020 (not modified)
IEC 60118-9	NOTE Harmonized as EN IEC 60118-9

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 60118-0	— ¹	Electroacoustics - Hearing aids - Part 0: Measurement of the performance characteristics of hearing aids	EN IEC 60118-0	— ²
IEC 60118-15	-	Electroacoustics - Hearing aids - Part 15: Methods for characterising signal processing in hearing aids with a speech-like signal	EN 60118-15	-
IEC 61260-1	-	Electroacoustics - Octave-band and fractional-octave-band filters - Part 1: Specifications	EN 61260-1	-
ISO 21748	-	Guidance for the use of repeatability, reproducibility and trueness estimates in measurement uncertainty estimation	-	-

¹ In preparation. Stage at time of publication: IEC FDIS 60118-0:2022.

² In preparation. Stage at time of publication: prEN IEC 60118-0:2021.



IEC 60118-16

Edition 1.0 2022-03

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Electroacoustics – Hearing aids –
Part 16: Definition and verification of hearing aid features**

**Électroacoustique – Appareils de correction auditive –
Partie 16: Définition et vérification des caractéristiques des appareils de
correction auditive**



THIS PUBLICATION IS COPYRIGHT PROTECTED
Copyright © 2022 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 Secretariat
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.

IEC Products & Services Portal - products.iec.ch

Discover our powerful search engine and read freely all the publications previews. With a subscription you will always have access to up to date content tailored to your needs.

Electropedia - www.electropedia.org

The world's leading online dictionary on electrotechnology, containing more than 22 300 terminological entries in English and French, with equivalent terms in 19 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

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.

IEC Products & Services Portal - products.iec.ch

Découvrez notre puissant moteur de recherche et consultez gratuitement tous les aperçus des publications. Avec un abonnement, vous aurez toujours accès à un contenu à jour adapté à vos besoins.

Electropedia - www.electropedia.org

Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 300 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 19 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.



IEC 60118-16

Edition 1.0 2022-03

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Electroacoustics – Hearing aids –
Part 16: Definition and verification of hearing aid features**

**Électroacoustique – Appareils de correction auditive –
Partie 16: Définition et vérification des caractéristiques des appareils de
correction auditive**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 17.140.50

ISBN 978-2-8322-1088-7

**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.....	4
1 Scope.....	6
2 Normative references	6
3 Terms and definitions	6
4 Application to non-air-conduction hearing aids.....	10
5 Test equipment.....	10
5.1 Acoustical requirements.....	10
5.2 Examples of test signals for common listening situations	11
6 Verification of noise reduction.....	11
6.1 Noise reduction for speech enhancement.....	11
6.2 Gain reduction for noise	12
7 Strategies of hearing aid programs and their verification.....	13
7.1 General.....	13
7.2 User-selected hearing aid programs.....	13
7.2.1 Description	13
7.2.2 Verification	13
7.3 Automatically-selected hearing aid programs depending on listening situation	14
7.3.1 Description	14
7.3.2 Verification by setting a marker.....	15
7.3.3 Verification using a linear gain configuration.....	15
8 Verification of feedback reduction.....	16
8.1 General.....	16
8.2 Coupling of the hearing aid	16
8.3 Measurement procedure	16
8.4 Post processing	17
9 Verification of the number of hearing aid channels.....	18
9.1 Visualization of the effect of multichannel signal processing	18
9.2 Evaluation of the number of independent channels	19
10 Verification of an output limiter	20
Annex A (informative) Coupling of the hearing aid to the measurement coupler in order to provoke feedback	21
A.1 Simplified coupling of air-conduction hearing aids to the 2 cm ³ acoustic coupler	21
A.2 Head and torso simulator with vented ear canal extension	22
Annex B (informative) Particular guidance	24
B.1 Verification of user selected hearing aid programs	24
B.2 Automatically-selected hearing aid programs depending on listening situation	25
B.2.1 Verification by setting a marker.....	25
B.2.2 Verification by using a linear gain configuration	27
Bibliography.....	29
Figure 1 – Visualization of user selected HAPs	13
Figure 2 – Visualization of automatically-selected HAPs depending on listening situation.....	14

Figure 3 – Example of the plot of the results of the feedback reduction measurement.....	18
Figure A.1 – Simplified coupling of air-conduction hearing aids with one microphone to the 2 cm ³ acoustic coupler to provoke feedback	21
Figure A.2 – Simplified coupling of air-conduction hearing aids with two microphones to the 2 cm ³ acoustic coupler to provoke feedback	22
Figure A.3 – Head and torso simulator for the measurement of air-conduction hearing aids according to IEC/TS 60318-7 together with an ear simulator according to IEC 60318-4 and a vented ear canal extension	22
Figure A.4 – Example for a vented ear canal extension with medium flow (left) and high flow (right)	23
Figure B.1 – Visualization of the verification of user-selected hearing aid programs.....	24
Figure B.2 – Visualization of the measurement of the reference data for the verification of automatically-selected hearing aid programs by setting a marker.....	25
Figure B.3 – Visualization of the measurement for the verification of automatically-selected hearing aid programs by setting a marker where a marker is set to the hearing aid program 1	26
Figure B.4 – Visualization of the measurement for the verification of automatically-selected hearing aid programs by using a linear gain configuration	28
Table 1 – Examples of test signals for different listening situations	11
Table 2 – Symbols used for the evaluation and results of the feedback reduction measurement.....	17
Table 3 – Example results of the procedure for the verification of multichannel signal processing	19
Table B.1 – Example results for the verification of user selected hearing aid programs.....	24
Table B.2 – Example results for the verification of automatically-selected hearing aid programs by setting a marker.....	27
Table B.3 – Example for the evaluation of the results for the verification of automatically-selected hearing aid programs by setting a marker.....	27

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTROACOUSTICS – HEARING AIDS –**Part 16: Definition and verification of hearing aid features**

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.

IEC 60118-16 has been prepared by technical committee 29: Electroacoustics. It is an International Standard.

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

Draft	Report on voting
29/1110/FDIS	29/1116/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at <http://www.iec.ch/standardsdev/publications>.

A list of all parts in the IEC 60118 series, published under the general title *Electroacoustics – Hearing aids*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under 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 document 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.

ELECTROACOUSTICS – HEARING AIDS –

Part 16: Definition and verification of hearing aid features

1 Scope

This part of IEC 60118 gives definitions for common hearing aid features such as noise reduction or feedback reduction, etc. Only acoustical inputs are considered. Binaural features are currently not covered in this document. In addition, measurement procedures are described to verify hearing aid features. The objective is not to evaluate the performance of features but to verify their existence and functionality.

Furthermore, definitions and procedures are kept as general as possible so that this document can be applied to various types of hearing aids, for example, air-conduction hearing aids or bone conduction hearing aids. To this end, the general definition for the term "hearing aid" given in IEC 60118-0 is adopted, and this document does not refer to any specific ear simulator or acoustic coupler but uses a general definition of a coupler. However, if a general view is not applicable or leads to unclear or complex wording, the situation for an air-conduction hearing aid only is considered. Nevertheless, an explanation is given on how this document can be applied to hearing aids which do not use air conduction.

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 60118-0:—¹, *Electroacoustics – Hearing aids – Part 0: Measurement of the performance characteristics of hearing aids*

IEC 60118-15, *Electroacoustics – Hearing aids – Part 15: Methods for characterising signal processing in hearing aids with a speech-like signal*

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

ISO 21748, *Guidance for the use of repeatability, reproducibility and trueness estimates in measurement uncertainty evaluation*

koniec náhľadu – text ďalej pokračuje v platenej verzii STN

¹ Fourth edition under preparation. Stage at the time of publication: IEC FDIS 60118-0:2022