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INTERNATIONAL STANDARD

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Electroacoustics – Hearing aids – Part 9: Methods of measurement of the performance characteristics of bone conduction hearing aids

Électroacoustique – Appareils de correction auditive – Partie 9: Méthodes de mesure des caractéristiques fonctionnelles des appareils de correction auditive à conduction osseuse

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ELECTROACOUSTICS – HEARING AIDS –

Part 9: Methods of measurement of the performance characteristics of bone conduction hearing aids

FOREWORD

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International Standard IEC 60118-9 has been prepared by IEC technical committee 29: Electroacoustics.

This second edition cancels and replaces the first edition published in 1985. This edition constitutes a technical revision.

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

a) includes bone coupled devices measured on a skull simulator;
b) measurement frequency range increased to 8 000 Hz for bone coupled devices.

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

FDIS	Report on voting
29/1025/FDIS	29/1029/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.

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 "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
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- amended.

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INTRODUCTION

IEC 60118-0 gives information on methods of measurement for air conduction hearing aids. The majority of hearing aids in use are of this type, but a small percentage use a bone vibrator instead of an earphone. The use of a bone vibrator requires a different method of measuring the output from the hearing aid and also makes it impractical to measure amplification directly in terms of acoustic gain.

Amplification in the case of an air conduction hearing aid is expressed as the difference between the output sound pressure level in an acoustic coupler or ear simulator and the input sound pressure level measured in a specified manner. However, with bone conduction hearing aids, the input is in terms of sound pressure level, but the output will be in terms of mechanical vibration measured as a vibratory force or force level.

By means of information provided in this document, the performance of hearing aids with bone vibrator outputs which do not form an integral part of the hearing aid, for example body-worn, behind-the-ear hearing aids, or bone conduction implant systems with an external bone vibrator, can be measured in a similar manner to aids with air conduction outputs as described in IEC 60118-0.

Where the bone vibrator forms an integral part of the hearing aid, or where it is attached in some fixed manner to the hearing aid, for example a bone coupled (bone anchored) hearing aid, its performance cannot be measured in the same way as for body-worn aids, due to the large dimensions of the mechanical coupler. This document recommends a pressure method of controlling the input sound pressure level to the hearing aid microphone. As an alternative to the pressure method, storage of a test enclosure frequency response correction curve can be used. This method is referred to as the "substitution method".

ELECTROACOUSTICS – HEARING AIDS –

Part 9: Methods of measurement of the performance characteristics of bone conduction hearing aids

1 Scope

This part of IEC 60118 specifies methods for the measurement of bone conduction hearing aid characteristics.

The methods described will produce a suitable basis for the exchange of information or for direct comparison of the electroacoustical characteristics of bone conduction hearing aids. These methods are chosen to be practical and reproducible and are based on selected fixed parameters.

The results obtained by the methods specified in this document express the performance under the conditions of measurement; however, the performance of the hearing aid under practical conditions of use will depend upon a number of factors (e.g. effective load impedance, environmental conditions, acoustical environment, etc.).

This document defines methods of measurement of characteristics of bone conduction hearing aids both for

- transcutaneously coupled devices measured on a mechanical coupler, meeting the requirements of IEC 60318-6, and
- bone coupled/bone anchored devices measured on a skull simulator.

NOTE 1 A skull simulator is a mechanical coupler designed to present a specific mechanical impedance to mechanically coupled vibrator.

NOTE 2 Throughout this document, all sound pressure levels specified are referred to 20 µPa. When appropriate, sound pressure level will be abbreviated to SPL.

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, *Electroacoustics – Hearing aids – Part 0: Measurement of the performance characteristics of hearing aids*

IEC 60318-6, *Electroacoustics – Simulators of human head and ear – Part 6: Mechanical coupler for the measurement on bone vibrators*

ISO 3, *Preferred numbers – Series of preferred numbers*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.