

Specification for

An artificial ear of the wide band type for the calibration of earphones used in audiometry

Co-operating organizations

The telecommunication Industry Standards Committee under whose supervision this British Standard was prepared consists of representatives from the following Government departments and scientific and industrial organizations:

British Broadcasting Corporation*	Electronic Valve and Semi-conductor
British Electrical & Allied Manufacturers' Association	Manufacturers' Association
British Radio Equipment Manufacturers' Association*	Institution of Electrical Engineers
British Radio Valve Manufacturers' Association	Institution of Electronic & Radio Engineers*
British Railways Board	Institution of Production Engineers
Cable & Wireless Limited	Ministry of Defence
Crown Agents for Oversea Governments and Administrations	Ministry of Defence, Army Department
Department of Employment and Productivity (H.M. Factory Inspectorate)	Ministry of Defence, Navy Department
Electrical Contractors Association (Incorporated)	Ministry of Technology
Electrical Research Association	Post Office*
Electricity Supply Industry in England and Wales	Radio & Electronic Component Manufacturers' Federation
Electronic Engineering Association	Relay Services Association of Great Britain
	Science Research Council — Radio & Space Research Station
	Scientific Instrument Manufacturers' Association
	Society of British Aerospace Companies
	Telecommunication Engineering and Manufacturing Association

The organizations marked with an asterisk in the above list, together with the following, were directly represented on the committee entrusted with the preparation of this British Standard:

British Association of Otolaryngologists	Ministry of Technology — National Physical Laboratory
British Medical Association	Medical Research Council
British Society of Audiology	Royal National Institute for the Deaf
Department of Health & Social Security	Royal Society of Medicine
Hearing Aid Industry Association	Society of Hearing Aid Audiologists
Institute of Physics & The Physical Society	

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Foreword

This British Standard has been prepared under the, authority of the Telecommunication Industry Standards Committee TLE/-.

The standard specifies the basic features of an artificial ear for use in the objective calibration of earphones used in audiometry. BS 2042 “*An artificial ear for the calibration of earphones of the external type*” describes an ear that was formerly used for both telephonometric and audiometric purposes. This artificial ear however is not currently used for the calibration of earphones used in audiometry, but is maintained for reference purposes.

Technical Committee 29 Electro-acoustics, of the International Electrotechnical Committee has had a task of specifying five types of artificial ear.

Type 1. Simple conventional type (reference acoustic coupler).

Type 2. Type for use in telephonometric applications.

Type 3. Wide band type for audiometric applications.

Type 4. Special type for calibrating insert earphones.

Type 5. A type which faithfully reproduces the characteristics of the mean human ear for use in the laboratory.

The primary difference between an artificial ear and an acoustic coupler is that the latter presents an acoustic impedance to the earphone not directly related to the mean acoustic impedance of the human ear, whilst the artificial ear is designed to simulate the mean acoustic impedance of the human ear as measured through a specified earcap.

Type 1 above has led to the recommendation of the 9A acoustic coupler originally designed by the National Bureau of Standards, Washington, D.C. and now known as the Interim IEC Reference Acoustic Coupler; this is described in BS 4668 “*An acoustic coupler (IEC reference type) for calibration of earphones used in audiometry*”.

Type 2 artificial ear has not been specified by IEC Technical Committee 29 Electro-acoustics, as in their opinion Type 3 should be used for the objective calibration of earphones for telephonometric purpose where no acoustic leakage is present.

NOTE IEC Technical Committee 29 recognizes that calibration made in this manner takes no account of the acoustic leak that may occur between the earphone and the real ear in normal telephone use.

Type 3 artificial ear for wide band audiometric applications evolved from agreement on the mean impedance of the human ear.

Type 4 artificial ear for calibrating insert earphones is under consideration but in the meanwhile use should be made of the insert acoustic coupler described in BS 3171 “*Methods of test of air conduction hearing aids*”.

Type 5 artificial ear should be the ideal measuring device but at the present time no work is being carried out on the development of this type of artificial ear.

This British Standard specifies the design and construction of an artificial ear Type 3 which may be used directly for the comparison of super-aural earphones used in audiometry. The standard is technically identical with IEC Publication 318 Recommendation “An IEC artificial ear, of the wide band type, for the calibration of earphones used in audiometry”.

This artificial ear should allow one set of values for audiometric zero to be specified in place of the different values associated with the acoustic coupler in BS 4668.

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Summary of pages

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This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.