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JIS T 1201-2 : 2000

**Audiometers—Part 2 : Equipment for
speech audiometry**

ICS 17.140.50

Descriptors : audiometers, hearing (auditory perception), speech, testing, test equipment

Reference number : JIS T 1201-2 : 1999 (E)

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Foreword

This translation has been made based on the original Japanese Industrial Standard established by the Minister of International Trade and Industry and the Minister of Health and Welfare through deliberations at the Japanese Industrial Standards Committee in accordance with the Industrial Standardization Law.

In order to conform to the International Standard, this Standard has been prepared based on **IEC 60645-2** : 1993 without modifying the technical contents. However, some parts (**8.1**, **9** and **13.2**) of the provisions have been modified and prepared as the Japanese Industrial Standard.

JIS T 1201 consists of the following 2 parts under the general title "*Audiometers*":

Part 1 : Pure-tone audiometers

Part 2 : Equipment for speech audiometry

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Audiometers— Part 2 : Equipment for speech audiometry

Introduction This Japanese Industrial Standard has been prepared based on the first edition of **IEC 60645-2 Audiometers—Part 2 : Equipment for speech audiometry** published in 1993 without modifying the technical contents. However, some parts (**8.1, 9** and **13.2**) of the provisions have been modified and prepared as the Japanese Industrial Standard.

Portions underlined with dots are the matters not stated in the original International Standard.

1 Scope This part of **JIS T 1201** specifies requirements for audiometers or parts thereof designed to provide a means of presenting speech sounds to a subject in a standardized manner, for example for the measurement of speech recognition.

Audiometers are classified into four types: type A instruments provide a wide range of facilities, while type B provides only basic facilities. For both types, the audiometer may be calibrated in terms of a free-field equivalent output level of the earphones and then be designated as type A-E or B-E.

This Standard excludes the requirements for speech audiometers provided with frequency response adjustments intended to determine an optimal intelligibility frequency response curve for each subject.

The purpose of this Standard is to ensure that tests of hearing using speech as the test stimulus, on a given human ear performed with different audiometers which comply with this Standard, shall give substantially the same results for a given calibration method. Two methods of specification, calibration and testing are given for the output levels generated by the earphones and the bone vibrator:

- a) a free-field equivalent output level method with audiometers of types A-E and B-E;
- b) an uncorrected coupler output level method with audiometers of types A and B.

NOTES 1 The results will also depend on factors other than the audiometer for example test material, test room, speakers, etc.

2 The International Standard corresponding to this Standard is as follows.

IEC 60645-2 *Audiometers—Part 2 : Equipment for speech audiometry*

2 Normative references The following standards contain provisions which, through reference in this Standard, constitute provisions of this Standard. If the indication of the year of coming into effect or the year of publication is given to these referred standards, only the edition of indicated year constitutes the provision of this Standard but the revision and amendment made thereafter do not apply. The normative references without the indication of the year of coming into effect or the year of publication apply only to the most recent edition.

JIS C 1505 *Precision sound level meters*

NOTE : Type 1 of **IEC 60651** : 1979 *Sound level meters* is equivalent to the said standard.

JIS T 1201-1 *Audiometers—Part 1 : Pure-tone audiometers*

NOTE : **IEC 60645-1** : 1992 *Audiometers—Part 1 : Pure-tone audiometers* is identical with the text of the said standard.

and

IEC 60303 : 1970 *IEC provisional reference coupler for the calibration of earphones used in audiometry* is identical with annex 4 of the said standard.

IEC 60318 : 1970 *An IEC artificial ear, of the wide band type, for the calibration of earphones used in audiometry* is identical with annex 5 of the said standard.

IEC 60373 : 1990 *Mechanical coupler for measurements on bone vibrators* is identical with annex 6 of the said standard.

IEC 60268-7 : 1996 *Sound system equipment—Part 7 : Headphones and earphones*

IEC 60268-17 : 1990 *Sound system equipment—Part 17 : Standard volume indicators*

IEC 61260 : 1995 *Electroacoustics—Octave-band and fractional-octave band filters*

Information : The IEC Standard number is based on the new numbering system of IEC Standards put in force on January 1st 1997, and the Standard published before the said date is numbered by adding 60 000 to the former number. This is only the change in the numbering system and the contents remain unchanged.

ISO 266 : 1975 *Acoustics—Preferred frequencies for measurements*

3 Definitions For the purpose of this part of **JIS T 1201** the following definitions apply in addition to those given in clause 3 of **JIS T 1201-1**.

3.1 equipment for speech audiometry (speech audiometer) equipment for the measurement of hearing using speech test material

3.2 speech signal a test signal generated by a natural human or synthetic voice

3.3 hearing level for speech for a specified speech signal and a specified manner of signal presentation, the speech level minus the appropriate reference speech recognition threshold level

3.4 speech level the sound-pressure level or the vibratory force level of the speech signal as measured in an appropriate coupler, ear simulator or in a sound field with specified frequency weighting and specified time weighting

- NOTES 1 For example, the speech level may be expressed as the equivalent continuous sound-pressure level or vibratory force level determined by integration over the duration of the speech signal with frequency weighting C. For speech test lists based on single test items separated by silent intervals, the integration should not include these intervals. For test lists based on single test items with carrier phrase, the integration should include the test items only.
- 2 For lists of single test items the equivalent continuous sound-pressure level may be estimated by subtracting 5 dB from the average of the maximum measured sound-pressure levels using frequency weighting C and time weighting I (see the explanatory note of **JIS C 1505**).

3.5 speech recognition threshold level for a given listener, a specified speech signal and a specified manner of signal presentation, the lowest speech level at which the speech recognition score is equal to 50 %

NOTE : Speech recognition threshold has been called speech reception threshold.

Information : The speech recognition threshold level is often used by converting to the hearing level for speech.

3.6 reference speech recognition threshold level for a specified speech signal and a specified manner of signal presentation, the median value of the speech recognition threshold levels of a sufficiently large number of otologically normal test persons, of both sexes, aged between 18 and 25 years inclusive and for whom the test material is appropriate

3.7 coupler sensitivity, coupler sensitivity level of an earphone

3.7.1 coupler sensitivity at a given frequency, the quotient of the sound-pressure generated by the earphone in an acoustic coupler or ear simulator and the voltage applied to the terminals of the earphone

3.7.2 coupler sensitivity level twenty times the logarithm to the base ten of the ratio of the coupler sensitivity to the reference sensitivity, 1 Pa/V

NOTE : Coupler sensitivity and coupler sensitivity level of a bone vibrator are defined in a corresponding way.

3.8 free-field sensitivity, free-field sensitivity level of an earphone

3.8.1 free-field sensitivity at a given frequency and for at least 10 otologically normal subjects, the quotient of the sound-pressure of a frontally incident plane progressive sound wave (0° sound incident) and of that voltage of equal frequency which is applied to the terminals of the earphone in order that the subjects, on average, judge the sound wave and the sound produced by the earphone as equally loud; both sounds being received in the same ear

NOTE : Test methods are described in **IEC 60268-7**. Though the loudness comparison may be performed binaurally, the resulting sensitivity is that of a single earphone.

3.8.2 free-field sensitivity level twenty times the logarithm to the base ten of the ratio of the free-field sensitivity to the reference sensitivity, 1 Pa/V

NOTE : Free-field sensitivity and free-field sensitivity level of a bone vibrator are defined in a corresponding way.

3.9 free-field equivalent earphone output level for a speech audiometer, the sound-pressure level generated by an earphone in items of equivalent free-field sound-pressure level. At a given frequency, this level is derived from the sound-pressure level generated by the earphone in an acoustic coupler or ear simulator by adding a correction figure representing the difference between the free-field sensitivity level and the coupler sensitivity level for the type of earphone used at the given frequency.

NOTE : Calibration of a speech audiometer in terms of free-field equivalent output level makes the results of listening tests using different kinds of transducers, i.e. earphones, bone vibrators and loudspeakers, directly comparable to each other.

3.10 free-field equivalent bone vibrator output level for a speech audiometer, the vibratory force level generated by the bone vibrator in terms of free-field equivalent sound-pressure level. At a given frequency, this level is derived from the vibratory force level generated by the bone vibrator on a mechanical coupler by adding a correction figure representing the difference between the free-field sensitivity level and the coupler sensitivity level for the type of bone vibrator used at the given frequency.

NOTE : See note to 3.9.

3.11 effective masking level for speech the level of a specified masking sound which is numerically equal to that hearing level for speech to which the speech recognition threshold level for a specified speech signal for a notional normal person would be raised by the presence of that masking sound. The notional normal person is one whose hearing conforms to the standards for threshold and for masking efficiency (annex 1 and annex 3 on **JIS T 1201-1**).

4 General requirements The following subclauses of **JIS T 1201-1** are also requirements of this Standard:

- 5.1 Safety requirements
- 5.3 Warm-up time
- 5.4 Supply variation and environmental conditions
- 5.5 Unwanted sound (with exception of 5.5.3)
- 5.6 Testing of automatic recording and computer-controlled audiometers
- 7.3 Accuracy of sound-pressure level and vibratory force level (2nd paragraph only)
- 7.4 Hearing level control (7.4.4 only)
- 7.5.3 Accuracy of masking level (2nd paragraph only)