BRITISH STANDARD

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Part 1 : 1997

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Specification for

The verification of sound level meters

Part 1. Comprehensive procedure

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Committees responsible for this British Standard

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British Hearing Aid Industry Association
British Medical Association
British Society of Audiology
British Telecommunications plc
Confederation of British Industry
Department of Health
Department of Trade and Industry (National Physical Laboratory)
Health and Safety Executive
Institute of Acoustics
Institute of Sound and Vibration Research
Institution of Electrical Engineers
Medical Research Council
Ministry of Defence
National Health Services
Royal Aeronautical Society
Royal National Institute for the Deaf
Society of Environmental Engineers
Society of Hearing Aid Audiologists Limited
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The following BSI references relate to the work on this standard:
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Foreword

This British Standard has been prepared by Technical Committee EPL/29 (formerly EEL/24). Amendment No. 1 : 1997 to BS 7580 : 1992 renumbered it as BS 7580 : Part 1 : 1997. Amendment No. 1 : 1997 also updated the references and broadened the requirements for the body carrying out the procedure. BS 7580 : 1992 was renumbered to take account of the publication of BS 7580 : Part 2 : 1997 which specifies an abbreviated verification procedure for Type 2 sound level meters.

The procedure for the verification of sound level meters specified herein is based upon the specifications for sound level meters given in BS EN 60651 : 1994 (which replaced BS 5969 : 1981) and BS EN 60804 : 1994 (formerly BS 6698 : 1986).

The draft international standard IEC 61672 *Sound level meters*, when published as a BS EN standard, will replace BS EN 60651 : 1994 and BS EN 60804 : 1994. IEC 61672 specifies wider tolerances to include measurement uncertainties which were not included in BS EN 60651 and BS EN 60804.

In preparing this British Standard, Technical Committee EPL/29 found it necessary to interpret certain parts of BS EN 60651 and BS EN 60804 which were considered ambiguous, although the test principles used in these standards have been preserved as far as possible.

The set of tests is based closely on the recommendations in OIML Recommendation 58 *Sound level meters* [1] and Recommendation 88 *Integrating-averaging sound level meters* [2], published by the International Organization for Legal Metrology (OIML).

BS 3539 : 1986 deals with the verification of sound level meters, but only for specific application to the measurement of motor vehicle noise. This British Standard specifies a generally applicable procedure for verification of instruments for a wide range of applications, but incorporates sufficient tests that an instrument conforming to **2.1** to **2.4** of BS 3539 : 1986 and conforming to this standard is deemed to conform fully to BS 3539 : 1986.

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Specification

0 Introduction

Detailed performance requirements for sound level meters and integrating-averaging sound level meters are specified in BS EN 60651 : 1994 and BS EN 60804 : 1994, respectively. Instruments conforming to these standards are used extensively for measuring noise, often to satisfy regulatory requirements. To ensure that these measurements are well-founded, it is important that the measuring instrument is operating in conformance to the standard to which it was manufactured. However, although BS EN 60651 : 1994 and BS EN 60804 : 1994 provide full specifications relevant to pattern evaluation, they do not deal explicitly with the periodic verification of conformance. The purpose of this standard is to specify a limited but sufficient range of tests, based on BS EN 60651 : 1994 and BS EN 60804 : 1994, to verify the accuracy of the instrument at regular intervals.

1 Scope

This British Standard specifies a procedure for the periodic verification of conformance of a sound level meter or integrating-averaging sound level meter to BS EN 60651 : 1994 or BS EN 60804 : 1994, respectively, including a series of tests and the information to be shown on the calibration certificate.

This standard is applicable to sound level meters originally manufactured in accordance with BS EN 60651 : 1994 and BS EN 60804 : 1994. The tests in this standard are therefore based on those in BS EN 60651 : 1994 and BS EN 60804 : 1994 and are intended simply to verify the correct operation of the instrument.

This standard is also applicable to sound level meters for the measurement of motor vehicle noise, in so far as an instrument which conforms both to this standard and to **2.1** to **2.4** of BS 3539 : 1986 is deemed also to conform fully to BS 3539 : 1986.

2 References

2.1 Normative references

This British Standard incorporates, by reference, provisions from specific editions of other publications. These normative references are cited at the appropriate points in the text and the publications are listed on the inside back cover. Subsequent amendments to, or revisions of, any of these publications apply to this British Standard only when incorporated in it by updating or revision.

2.2 Informative references

This British Standard refers to other publications that provide information or guidance. Editions of these publications current at the time of issue of this standard are listed on the inside back cover, but reference should be made to the latest editions.

3 Definitions

For the purposes of this British Standard the definitions given in BS EN 60651 : 1994 and BS EN 60804 : 1994 apply together with the following.

3.1 pattern evaluation[1)]

The examination of one or more measuring instruments of the same pattern which are submitted by a manufacturer to a national service of legal metrology; this examination includes the tests necessary for the approval of the pattern.

3.2 verification

The demonstration, by application of a limited series of tests, that a measuring instrument conforms to a set of key requirements based on the specifications for sound level meters in BS EN 60651 : 1994 and BS EN 60804 : 1994.

3.3 initial verification[1)]

The verification of a new measuring instrument which has not been verified previously.

3.4 periodic verification

The subsequent verification of a measuring instrument carried out at regular intervals.

4 Frequency of verification

4.1 General

Verification shall be performed at least every two years.

4.2 Verification after repair

Verification shall be performed on an instrument before further use if it has undergone a repair which is likely to have affected its performance.

NOTE. Repairs necessitated by the failure of electronic components or transducers are likely to affect the performance of the instrument, whereas replacement of switches or battery leads is unlikely to have an effect.

5 Verification procedure

5.1 General

The calibrations of the equipment used for the verification of the sound level meter and the calibration of the sound calibrator shall be traceable to national standards.

NOTE 1. In the UK acoustic calibration laboratories are National Accreditation of Measurement and Sampling (NAMAS) accredited through the United Kingdom Accreditation Service (UKAS); the relevant national metrology institute is the National Physical Laboratory (NPL).

[1)] Repeated from PD 6461 : Part 2 : 1980.

No test specified in **5.3** to **5.6** shall be omitted from the verification procedure unless the instrument does not possess the facility tested.

The tolerances given in this standard and in BS EN 60651 : 1994, BS EN 60804 : 1994 and BS EN 60942 : 1998 (which superseded BS 7189 : 1989) do not take into account any measurement uncertainty of the laboratory performing the verification. The measured values obtained during a verification shall not be extended by any measurement uncertainty when assessing whether an instrument conforms to this standard. Conformity is demonstrated when all measured values are within the specified tolerances.

NOTE 2. It is recommended that the calibration certificate states, if appropriate, that verification does not accommodate measurement uncertainty.

5.2 Submission for verification

The sound level meter shall be submitted for verification together with its instruction manual, if required by the calibration laboratory, and a sound calibrator. The sound calibrator shall conform to BS EN 60942 : 1998 or to BS 7189 : 1989, depending on the standard to which it was originally manufactured. The instruction manual shall contain the information required by **11.2** of BS EN 60651 : 1994 or of BS EN 60804 : 1994, as appropriate. Information shall also be provided on the corrections needed to perform the tests in **5.5.4** and **5.6**. The sound calibrator shall itself have been calibrated within the previous year, using equipment whose calibrations are traceable to national standards, and shall be supplied with a calibration certificate. The certificate shall state the sound pressure level, and frequency and either the total distortion (for sound calibrators originally manufactured in accordance with BS EN 60942 : 1998), or the total harmonic distortion (for calibrators originally manufactured in accordance with BS 7189 : 1989), generated by the sound calibrator when it is coupled to an appropriate model of microphone. The model of microphone shall be such that manufacturer's corrections are available to convert this level for free-field use with the model of microphone fitted to the sound level meter. These data shall be consistent with conformity to BS EN 60942 : 1998 or BS 7189 : 1989, as appropriate, for the sound calibrator class specified by the manufacturer.

5.3 Preliminary inspection

Prior to any measurements, the instrument, microphone and sound calibrator shall be visually inspected, and all controls operated to ensure that they are in working order. It shall be established that the instrument power supply is within the operating limits specified by the manufacturer.

5.4 Setting up

The sensitivity of the sound level meter shall be checked using the sound calibrator specified in **5.2** and if necessary adjusted according to the sound level meter manufacturer's instructions and the data in the calibration certificate for the sound calibrator.

5.5 Electrical tests

5.5.1 *General*

The electrical tests specified in **5.5.2** to **5.5.12** shall be performed using an electrical signal substituted for the microphone.

NOTE 1. **4.7** of BS EN 60651 : 1994 and **4.8** of BS EN 60804 : 1994 require the manufacturer to provide the means to substitute an electrical signal for the microphone for the purpose of performing tests on the complete instrument without the microphone. The actual method of substitution will vary depending on the construction and component parts of the instrument. The three most important situations are as follows.

a) Where the sound level meter is fitted with a detachable condenser or piezoelectric microphone, the microphone should be replaced by an equivalent capacitance within a tolerance of $\pm$20 %, unless a closer tolerance is specified by the manufacturer, in series with a low-impedance electrical signal source.

b) Where the preamplifier is an integral part of the microphone, the method of substitution specified by the manufacturer should be used, and corrections used to take account of the preamplifier performance.

c) Where access to the point of application of the electrical signal is restricted, for example when it is inside the case of the instrument, the manufacturer's instructions should be followed on how to gain access to this point.

NOTE 2. Except where stated otherwise these tests should, if possible, be carried out with the instrument set to frequency weighting A.

5.5.2 *Self-generated noise*

With the instrument set to the lowest measuring range, and with the electrical signal specified in **5.5.1** set to zero, the reading obtained shall be recorded for each of the frequency weightings provided.

NOTE 1. In carrying out this test care should be taken to ensure that the indication is not affected by external electrical or electromagnetic fields.

NOTE 2. It is recognized that with the passage of time the level of self-generated noise can exceed the maximum specified in **6.6** of BS EN 60651 : 1994, without adversely affecting the accuracy of measurements of higher sound pressure levels.

5.5.3 *Linearity*

The linearity of the sound level meter shall be tested relative to the reference sound pressure level, as indicated on the reference range, using a continuous sinusoidal signal of frequency 4000 Hz. Integrating sound level meters shall be set to L_{eq} for this test. Measurements shall be made on the reference range for indications at 5 dB intervals starting from the reference sound pressure level, except within 5 dB of the upper and lower limits of the reference range, where measurements shall be made at 1 dB intervals.

In addition, measurements shall be made for an indication of the reference sound pressure level on all other ranges which include it.

Measurements shall also be made on all level ranges for indications 2 dB below the upper limit and 2 dB above the lower limit of each range as specified by the manufacturer, except where the bottom of a range is less than 16 dB above the self-generated noise as measured for the appropriate frequency weighting in accordance with **5.5.2**, or less than 16 dB above the minimum indication of the instrument. In this case, measurements shall be

made for indications 2 dB below the top of the range and 16 dB above the self-generated noise or above the minimum indication of the instrument, whichever is the higher.

In the case of integrating sound level meters capable of operating in a non-integrating mode, the measurements shall be repeated on the reference range only with the instrument set to indicate sound pressure level.

When an analogue indicator is provided, measurements shall only be made for indications where **7.7** of BS EN 60651 : 1994 applies.

All errors relative to the reference sound pressure level, as indicated on the reference range, shall be within the tolerances on level linearity specified in table XII of BS EN 60651 : 1994 for sound level meters or within the tolerance on linearity range specified in table II of BS EN 60804 : 1994 for integrating sound level meters.

NOTE 1. For integrating sound level meters sufficient time should be allowed for the instrument to settle within 0.1 dB of its final reading.

NOTE 2. In instruments where range changing is accomplished other than by switching attenuators within the instrument, for example where the microphone polarizing voltage is changed, manufacturer's information will be required in addition to these tests to establish conformance of the sound level meter to these linearity requirements.

5.5.4 *Frequency weightings*

All weighting networks provided shall be tested at octave intervals over the frequency range 31.5 Hz to 8000 Hz. In addition, for Type 0 and Type 1 instruments, the weighting networks shall be tested at 12 500 Hz. The signal level at 1000 Hz shall be set to give an indication of the reference sound pressure level. Any corrections necessary for the frequency response of the microphone and, where appropriate, of the instrument case and the windshield shall be made to the indications. The response of the weighting networks shall be as specified in tables IV and V of BS EN 60651 : 1994 or table II of BS 5721 : 1979, as appropriate.

NOTE 1. Where possible, this test should be carried out with the instrument set to the reference range.

NOTE 2. At low frequencies it may be impossible to obtain an indication on some instruments, or the indication may be accompanied by overloading. In this case, testing should be restricted to those frequency ranges for which a valid indication is obtained.

5.5.5 *Time weightings F and S*

Time weighting F shall be tested on the reference range with a single sinusoidal burst of duration 200 ms at a frequency of 2000 Hz and an amplitude which produces an indication 4 dB below the upper limit of the primary indicator range when the signal is continuous.

Time weighting S shall be tested on the reference range with a single sinusoidal burst of duration 500 ms at a frequency of 2000 Hz and an amplitude which produces an indication 4 dB below the upper limit of the primary indicator range when the signal is continuous.

The sinusoidal burst shall be measured with the instrument set to 'maximum hold' where this facility is available.

In each case the maximum response to the test tone burst relative to the response to the continuous signal shall be as specified in table VIII of BS EN 60651 : 1994.

5.5.6 *Peak response*

The onset time of the peak detector shall be tested on the reference range by comparing the response to a 100 μs rectangular test pulse (50 μs for Type 0 instruments) with the response to a 10 ms reference pulse of the same amplitude. The amplitude of the 10 ms reference pulse shall be such as to produce an indication 1 dB below the upper limit of the primary indicator range. For all types of instrument the test pulse shall produce an indication no more than 2 dB below the indication for the reference pulse. The test shall be carried out using pulses with both positive and negative polarities.

Because this test is mandatory in BS EN 60651 : 1994 for Type 0 instruments but only recommended for Types 1, 2 and 3 instruments, non-conformance to this requirement alone in the case of a Type 1, 2 or 3 instrument shall not constitute failure of the instrument to conform to this standard. However, failure in this test of a Type 1, 2 or 3 instrument shall be recorded on the calibration certificate by use of the following sentence.

> 'The sound level meter *failed* the test of *peak response* as specified in **5.5.6** of BS 7580 : Part 1 : 1997. However as this test is not mandated by BS EN 60651 : 1994 for Types 1, 2 and 3 instruments, this does not constitute a failure to conform to BS 7580 : Part 1 : 1997.'

NOTE 1. This test is specified in order to maintain consistency with BS EN 60651 : 1994, although it is recognized that it does not fully test the peak response.

NOTE 2. Where possible, this test should be carried out with the instrument switched to frequency weighting Lin or C.

5.5.7 *R.M.S. accuracy*

The r.m.s. accuracy shall be tested on the reference range for a crest factor of 3 by comparing the indication for a sequence of tone bursts with that for a continuous sinusoidal signal. The frequency of the continuous signal shall be 2000 Hz, at an amplitude which produces an indication 2 dB below the upper limit of the primary indicator range. The tone burst signal shall consist of 11 cycles of a sine wave of frequency 2000 Hz, starting and ending at zero crossing, with a repetition frequency of 40 Hz, and having an r.m.s. level which is identical to that of the continuous sine wave signal. The indication for the tone burst signal compared with that for the continuous signal shall be within the tolerance specified in table VII of BS EN 60651 : 1994.

NOTE 1. The r.m.s level of each burst in the tone burst signal is 6.6 dB higher than the r.m.s. level of the continuous signal.

NOTE 2. The test may be carried out with the instrument switched to time weighting F or S.

5.5.8 ***Time weighting I***

Time weighting I shall be tested on the reference range with a single sinusoidal burst of duration 5 ms at a frequency of 2000 Hz and an amplitude which produces an indication at the upper limit of the primary indicator range when the signal is continuous. The maximum response to the burst relative to the response to the continuous signal shall be as specified in table X of BS EN 60651 : 1994.

In addition, a test shall be performed using a signal consisting of this tone burst repeated at a frequency of 100 Hz. The maximum response to the tone burst sequence relative to the response to the continuous signal shall be as specified in table XI of BS EN 60651 : 1994.

5.5.9 ***Time averaging***

With the integrating sound level meter set to frequency weighting A and L_{eq}, time averaging shall be tested on the reference range by comparing the indication for a continuous sinusoidal signal with that for a sequence of tone bursts having the same equivalent continuous level. A continuous signal at a frequency of 4000 Hz and an amplitude 30 dB below the upper limit of the linearity range shall be applied to the meter. A sequence of 1 ms tone bursts of the same frequency, burst duty factor $1/10^3$, and calculated equivalent continuous level identical to that for the continuous signal, shall then be applied (see table III of BS EN 60804 : 1994). Using an integration time of 60 s, the indication on the meter shall be the same for the tone burst signal as for the continous signal within the tolerances given in table III of BS EN 60804 : 1994. The test shall be repeated for Type 0 and Type 1 instruments with the continuous level 40 dB below the upper limit of the linearity range and using a burst duty factor of $1/10^4$ and an integration time of 6 min, and further repeated for Type 0 instruments with the continuous level 50 dB below the upper limit of the linearity range and using a burst duty factor of $1/10^5$ and an integration time of 1 h.

NOTE. The manufacturer may require that the instrument be set to a specific time weighting switch position to meet the requirements on time-averaging in BS EN 60804 : 1994.

5.5.10 ***Pulse range***

With the integrating sound level meter set to frequency weighting A and L_{eq}, pulse handling shall be tested on the reference range by applying a single 10 ms tone burst at a frequency of 4000 Hz during an integration period of 10 s, superimposed on a low level continuous signal corresponding to the lower limit of the linearity range. The low level continuous signal shall either be in phase with the tone burst or shall be a non-harmonically related signal in the frequency range 1000 Hz to 6300 Hz. The peak level of the tone burst signal shall exceed the r.m.s. level of the continuous signal by 2 dB less than the number of decibels specified in table II of BS EN 60804 : 1994 for the pulse range. The indication of the instrument shall not differ from the theoretical value of the equivalent continuous level of the test signal by more than the tolerances for the pulse range specified in table II of BS EN 60804 : 1994.

For an instrument whose linearity range is greater than its pulse range, the test shall be repeated at a level for the continuous signal equal to the upper limit of the linearity range minus the minimum value for the pulse range given in table II of BS EN 60804 : 1994.

NOTE 1. The theoretical equivalent continuous level of the test signal is −33 dB relative to the peak amplitude of the tone burst.

NOTE 2. The manufacturer may require that the instrument be set to a specific time weighting switch position to conform to requirements on pulse handling in BS EN 60804 : 1994.

5.5.11 ***Sound exposure level***

The pulse range test specified in **5.5.10** shall be repeated with the integrating sound level meter set to SEL. The indication of the instrument shall be equal to the theoretical sound exposure level of the signal within the tolerance specified for the pulse range in table II of BS EN 60804 : 1994.

NOTE 1. The theoretical sound exposure level of the tone burst signal used in the test is −23 dB relative to the peak amplitude of the tone burst.

NOTE 2. See note 2 to **5.5.10**.

5.5.12 ***Overload indication***

For sound level meters capable of operating in a non-integrating mode, with the instrument set to the reference range, the amplitude of the tone burst signal specified in **5.5.7** shall be increased until an overload indication occurs. The level shall then be reduced by 1 dB so that no overload indication occurs. If the instrument then displays an on-scale indication, the indication shall be recorded. If not, the burst duty factor of the signal shall be decreased by subtracting whole cycles from the tone burst until an on-scale indication is obtained, and the indication shall be recorded. In either case, the level of the signal shall then be further reduced by 3 dB and the indication of the instrument shall again be recorded. The difference between the indications shall be 3 dB, within the tolerance specified in table XIII of BS EN 60651 : 1994.

NOTE. This test is different from the test of overload indication specified in BS EN 60651 : 1994 but is regarded as simpler and more practical.

As this test is different from the test for overload indication specified in BS EN 60651 : 1994, if an instrument fails this test, this alone shall not constitute failure to conform to this standard. However the failure shall be recorded on the calibration certificate by use of the following sentence.

> 'The sound level meter *failed* the test of *overload indication* as specified in **5.5.12** of BS 7580 : Part 1 : 1997. However as this test is not mandated by BS EN 60651 : 1994, this does not constitute a failure to conform to BS 7580 : Part 1 : 1997.'

For integrating sound level meters, with the instrument indicating L_{eq} and set to the reference range, a single sinusoidal burst of duration 1 ms at a frequency of 4000 Hz shall be applied superimposed on the low level continuous signal specified in **5.5.10**. The level of the tone burst signal shall be increased to the level at which an overload indication occurs. The level shall then be reduced by 1 dB. The tone burst shall be applied during an integration period of 10 s. The indication of the instrument shall not differ from the theoretical value of the equivalent continuous level of the test signal by more than the tolerance for the pulse range specified in table II of BS EN 60804 : 1994.

NOTE. The manufacturer's recommended maximum electrical input signal level should not be exceeded.

5.6 Acoustic tests

NOTE. The tests specified in **5.6.1** to **5.6.3** should preferably be carried out with the instrument set to frequency weighting A.

5.6.1 *Calibration at* 1000 Hz

The complete instrument shall first be calibrated on the reference range using a continuous acoustic signal of frequency 1000 Hz at a sound pressure level in the range 73 dB to 125 dB. The sensitivity of the instrument shall be adjusted if necessary so that the instrument reads correctly at this frequency.

This acoustic calibration shall be performed using one of the following methods.

a) By calibration in a plane progressive sound field. The sound shall be incident on the sound level meter in the reference direction and the response of the instrument shall be compared with that of a reference microphone substituted at the same position in the sound field.

b) By application of a standard sound calibrator. In this case, corrections shall be applied for the difference between the free-field and pressure responses of the instrument, appropriate to the configuration in which the instrument is used.

5.6.2 *Test at* 125 Hz *and* 8000 Hz

The complete instrument shall then be tested using continuous acoustic signals of frequencies 125 Hz and 8000 Hz at a sound pressure level in the range 73 dB to 125 dB. The responses of the instrument to the 125 Hz and 8000 Hz signals, relative to the response to the 1000 Hz signal applied in **5.6.1**, shall be as specified in tables IV and V of BS EN 60651 : 1994, with the reference frequency defined as 1000 Hz.

This acoustic test shall be performed using the method specified in **5.6.1**a or that in **5.6.1**b or by a method using simulated acoustic inputs from an electrostatic actuator. In this latter case, corrections shall be applied for the difference between the free-field and actuator responses of the instrument appropriate to the configuration in which the instrument is used.

If this test is performed using test signals applied at different levels from the level of the 1000 Hz signal used in **5.6.1**, corrections shall be applied for any non-linearity or differences in range control settings.

5.6.3 *Response to associated sound calibrator*

After completion of the tests, the sound calibrator supplied with the instrument shall be reapplied to the instrument and the indication recorded. This indication, corrected where appropriate for ambient environmental conditions, shall be used henceforth to set up the sound level meter for field use.

6 Information to be provided on the calibration certificate

A calibration certificate shall be issued giving the following information:

a) details of the laboratory performing the tests;

b) the name of the manufacturer, the model number and the serial number of the sound level meter;

c) the name of the manufacturer, the model number and the serial number of the microphone;

d) the name of the manufacturer, the model number and the serial number of the preamplifier, if appropriate;

e) identification of any connecting cables and/or any other accessories;

f) the name of the manufacturer, the model number and the serial number of the associated sound calibrator, together with details of any adaptors used;

g) the reference number of the calibration certificate relating to the sound calibrator;

h) the method of acoustic calibration employed for the tests specified in **5.6.1** and **5.6.2**;

i) the indication of the sound level meter in response to the sound calibrator, obtained in the test specified in **5.6.3**;

j) the levels of self-generated noise recorded in the test specified in **5.5.2**;

k) a statement that the sound level meter has been calibrated as specified in BS 7580 : Part 1 : 1997;

l) a statement that the sound level meter conforms to BS 7580 : Part 1 : 1997;

m) the date of the calibration;

n) the sentence referring to peak response given in **5.5.6**, if applicable;

o) the sentence referring to overload indication given in **5.5.12**, if applicable.

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List of references

Normative references

BSI standards publications

BRITISH STANDARDS INSTITUTION, London

BS 3539 : 1986	*Specification for sound level meters for the measurement of noise emitted by motor vehicles*
BS 5721 : 1979	*Specification for frequency weighting for the measurement of aircraft noise (D-weighting)*
BS 7189 : 1989	*Specification for sound calibrators*
BS EN 60651 : 1994[1)]	*Specification for sound level meters*
BS EN 60804 : 1994[2)]	*Specification for integrating-averaging sound level meters*
BS EN 60942 : 1998	*Electroacoustics — Sound calibrators*

Informative references

BSI standards publication

BRITISH STANDARDS INSTITUTION, London

BS 7580 :	*Specification for the verification of sound level meters*
BS 7580 : Part 2 : 1997	*Shortened procedure for type 2 sound level meters*
PD 6461 :	*Vocabulary of metrology*
PD 6461 : Part 2 : 1980	*Vocabulary of legal metrology — fundamental terms*

Other references

[1] OIML R58, 1st edition: 1984[3)] *Sound level meters*. International Organization of Legal Metrology

[2] OIML R88, 1st edition: 1989[3)] *Integrating-averaging sound level meters*. International Organization of Legal Metrology

[1)] BS EN 60651 : 1994 replaced BS 5969 : 1981.
[2)] Formerly BS 6698 : 1986.
[3)] Obtainable from: International Bureau of Legal Metrology (BIML), 11 Rue Turgot, 75009 Paris, France.

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