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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 3785.1-2023

Replacing GB/T 3785.1-2010

Electroacoustics - Sound level meters - Part 1: Specifications

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foreword

This document is in accordance with the provisions of GB/T 1:1-2020 "Guidelines for Standardization Work Part 1: Structure and Drafting Rules for Standardization Documents" drafting:

This document is the first part of GB/T 3785 "Electroacoustic Sound Level Meter": GB/T 3785 has issued the following parts:

- Part 1: Specifications;
- Part 2: Type evaluation test;
- Part 3: Periodic test:

This document replaces GB/T 3785:1-2010 "Electroacoustic Sound Level Meter Part 1: Specification": Compatible with GB/T 3785:1-2010

In addition to structural adjustments and editorial changes, the main technical changes are as follows:

- a) Change the criteria for judging conformity (see Introduction and 5:1:21, 5:1:19 of the:2010 edition);
 - b) Added relative directional response, directivity factor, directivity index, relative frequency weighted free field response, relative frequency weighted random
- Terms and definitions such as acoustic incident response, inclusion probability and acceptance limit (see 3:17~3:21, 3:32 and 3:33);
- c) Added the requirement that Class 1 sound level meters should also have C frequency weighting and not limited to type evaluation tests (see 5:1:10);

- d) Added the acceptance limit for the difference between the measured windshield correction value and the corresponding correction value given in the instruction manual (see 5:3:3:5);
- e) Deleted the optional FLAT (flat) frequency response requirements (see 5:4:13 of the:2010 edition);
- f) Changed the design target of the decay rate corresponding to the time-weighted sound level (see 5:8:1, 5:7:2 of the:2010 edition);
- g) The requirements for stability during continuous operation are added (see 5:14);
- h) Added the requirement for high sound level stability (see 5:15);
- i) Changed the test frequency range for immunity to the effects of exposure to radio frequency fields (see 6:6:4 and 6:6:5, 6:6:4 of the:2010 edition);
- j) Increased mechanical vibration requirements (see 6:7);
- k) An explanation of the relationship between the tolerance interval, the corresponding acceptance interval and the maximum allowable measurement uncertainty has been added (see Appendix A);
- l) Deleted the content of AU weighting (see Appendix B of the:2010 edition);
- m) Delete the specification of time weighting I (impulse) (see Appendix C of the:2010 edition);
- n) Added the content of fractional octave interval frequency (see Appendix D):

This document is equivalent to IEC 61672-1:2013 "Electroacoustic Sound Level Meter Part 1: Specification":

Please note that some contents of this document may refer to patents: The issuing agency of this document assumes no responsibility for identifying patents:

Introduction

GB/T 3785 "Electroacoustic Sound Level Meter" aims to specify the performance specification of the sound level meter and the verification method for its compliance: It consists of three parts

constitute:

--- Part 1: Specifications: The purpose is to standardize the electroacoustic performance of sound level meters:

--- Part 2: Type evaluation test: The aim is to ensure that all laboratories perform type evaluation of sound level meters in a consistent manner:

price test:

--- Part 3: Periodic test: The aim is to ensure that all laboratories perform periodic testing of sound level meters in a consistent manner:

In order to verify compliance with the performance specification, this document uses different criteria from the:2010 edition:

The national standards for sound level meters published during 1983-1997 do not provide any information on the uncertainty of measurement when verifying compliance with the specification:

requests and suggestions:

Due to the lack of requirements and recommendations on measurement uncertainty, when the measured deviation from the design target is close to the allowable deviation limit, the specification

Conformity becomes blurred: If compliance is based on whether the measurement deviation exceeds or does not exceed the limit value, the end user of the sound level meter will

Risk of being exposed to actual deviations from design goals exceeding limits:

In order to eliminate this ambiguity, GB/T 3785-2010 adopts the principle of taking into account the uncertainty of measurement when evaluating conformity in international standards:

It provides two clear criteria for determining compliance with the specification: The two judging criteria are:

- a) The measured deviation from the design target plus the expanded measurement uncertainty does not exceed the applicable tolerance limit;
- b) The expanded measurement uncertainty does not exceed the specified maximum value:

For most performance specifications, GB/T 3785-1983 and GB/T 3785-1983 and

The design and manufacturing tolerances in GB/T 17181-1997 are used to calculate the tolerance limits: The tolerance limit is used to express the true deviation from the design target

The limit value contains a probability of 95%:

This document uses the Modified Code Conformity Assessment Criteria: Conformity is confirmed when the following conditions are met simultaneously:

- a) the measured deviation from the design target does not exceed the applicable acceptance limit;
- b) The measurement uncertainty does not exceed the corresponding maximum allowable

uncertainty:

Acceptance limits are similar to the design and manufacturing tolerances implied in GB/T 3785-2010:

The actual uncertainty and the maximum allowable uncertainty are determined according to the inclusion probability of 95%. Improved conformity assessment criteria, not required for compliance with this

make any changes to the sound level meter design:

The maximum permissible measurement uncertainty is not equal to the uncertainty associated with sound level measurements: The uncertainty of measuring sound level is determined by the electroacoustic

Performance is assessed against expected deviations from the relevant design goals, and uncertainties associated with specific measurement conditions are also assessed: Unless more specific letters

If the information is available, the contribution of the specific sound level meter to the total measurement uncertainty can be based on the acceptance limits and the maximum allowable uncertainty specified in this document:

Make an evaluation:

Electroacoustic Sound Level Meter

Part 1: Specification

1 Scope

This document gives the electroacoustic performance specifications for the following three types of acoustic measuring instruments:

- Time-weighted sound level meters for measuring exponential time-weighted and frequency-weighted sound levels;
- Integral average sound level meter for measuring time-averaged and frequency-weighted sound levels;
- Integrating sound level meter for measuring frequency-weighted sound exposure level:

Sound level meters complying with the requirements of this document, when the sound is incident on the microphone from a main direction in a free sound field or continuously from random directions

, it should have the specified frequency response:

The sound level meter specified in this document is used to measure sound in the range of normal hearing of the human ear: