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GB/T 42553-2023

Electroacoustics - Methods to determine corrections to obtain the free-field response of a sound level meter

电声学 确定声级计自由场响应修正值的方法

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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 identically adopts IEC 62585:2012 "Method for determining free-field response correction value of sound level meter by electroacoustics": Please note that some contents of this document may refer to patents: The issuing agency of this document assumes no responsibility for identifying patents: This document is proposed by the Ministry of Industry and Information Technology of the People's Republic of China: This document is under the jurisdiction of the National Electroacoustics Standardization Technical Committee (SAC/TC23): This document was drafted by: Shenzhen Tiansu Metrology and Testing Co:, Ltd:, Hunan Shengyi Measurement and Control Technology Co:, Ltd:, Hangzhou Aihuayi Instrument Co:, Ltd:, the Third Research Institute of China Electronics Technology Group Corporation, China Institute of Metrology, Jiaxing Branch of State-owned Hongsheng Equipment Factory, Beijing Prestige Acoustic Technology Co:, Ltd:, Shanghai Institute of Metrology and Testing Technology, and Shengonglian Acoustic Design Institute (Shenzhen) Co:, Ltd: The main drafters of this document: Zhang Guoqing, Liu Xiangheng, Zhang Shaodong, Wu Xin, Niu Feng, Shu Guohua, Wu Qunli, Deng Zheng, Cui Jian, Luo Peng, Shi Xia, Xu Liang, Zeng Hongxun, Guo Siming, Liu Honghua, Yuan Fang, Zhao Jing, Guo Wenrui, Qiao Jie:

The sound level meter performance standard GB/T 3785:1-2023 requires that at least one Model of sound calibrator to check and maintain correct indication of sound level meter display at calibration check frequency: optimized for the entire frequency range The manufacturer of the sound level meter specifies the adjustment value to obtain the required display on the display in response to the sound pressure level produced by the sound calibrator: instruct: In addition, in order to conduct periodic tests of sound level meters according to IEC 61672-3, it is necessary to obtain various correction values applicable to a certain frequency range, For example, any effect of accessories such as sound level meter housings or windshields on the equivalent free-field sound level needs to be corrected: Sound level meters and sound calibrators Users sometimes request information about these correction values: Similarly, in order to meet the GB/T 3785:1 specification, the manufacturer of the sound level meter may recommend the use of a sound calibrator, a comparative Couplers or electrostatic actuators to determine the sound field response of the sound level meter at various frequencies: In this case, the manufacturer is required to provide corresponding repair Positive values to obtain the response to a planar sinusoidal line incident from the reference direction under the reference environmental conditions and at each frequency used in the periodic test: Display of the wave equivalent sound level: These corrections may be given in the instructions for use, or where they can be obtained in the instructions for use: Electroacoustic Determination of Free Field of Sound Level Meter Method of Responding to Modified Values

1 Scope

GB/T 42553-2023 gives the methods for determining the corrections that convert a sound level meter's response into its free-field response. A microphone disturbs the field it measures: the instrument case reflects, the diaphragm loads the wave, and the effect depends on frequency and on the angle of incidence, so the reading a meter gives is not the sound pressure that would exist there without it. Every sound level meter specification is written in terms of the corrected free-field response, and the corrections have to be determined for the instrument as it is used - including with a windshield fitted, which changes them again. The standard sets the reference environmental conditions, the determination of the corrections including those for windshields and similar accessories, and the documentation, with a normative annex on the calibration check frequency and the determination of the adjustment value. It took effect on 1 December 2023.

This document provides relevant information on correction values within a certain frequency range required for periodic testing of sound level meters according to IEC 61672-3: information, these corrections include:

--- Correction values for the typical effects of reflections from the sound level meter housing and sound diffraction around the microphone;

--- When the actual microphone response cannot be measured, the correction value of the

deviation between the typical microphone frequency response and the uniform frequency response;

--- The windshield or any other accessories specified as part of the nominal use configuration of the specific sound level meter delivered for the test, for the microphone Correction for typical frequency response effects: This document includes a discussion of the measurement uncertainty of the required corrections, in some instances for the manufacturer or testing laboratory to give The maximum allowable extended measurement uncertainty: These maximum allowable expanded uncertainties do not include any or windshield) due to differences in different samples of the component: It should be noted that if each correction introduces a large measurement uncertainty, when considering When synthesized considering the configuration of the sound level meter under test, these large individual uncertainties can lead to non-compliance with Table A:1 in GB/T 3785:1-2023 Given the maximum allowable extended measurement uncertainty, so that the sound level meter does not comply with GB/T 3785:1: In addition, this document describes the method for determining these corrections in the frequency range of interest and explains the (also required by IEC 61672-3) calibration checks the adjustment value on frequency: When the manufacturer of the sound level meter recommends the use of a sound calibrator, comparison coupler or When using electrostatic actuators, this document describes the procedure for adjusting the indication of a sound level meter to the equivalent free-field level in all frequency ranges of interest: The method of measurement for the correction required: These correction values are consistent with the specified model of sound calibrator, comparison coupler or electrostatic actuator and microphone Related to sound level meters (also required by IEC 61672-3): The purpose of this document is to ensure that adjustments and all corrections at the calibration check frequency are determined using a consistent and appropriate method: fixed: This document is intended to be provided to the manufacturer when measuring the adjusted value and the corrected value, the laboratory shall carry out the type evaluation test according to IEC 61672-2, And it is used when the laboratory conducts periodic tests according to IEC 61672-3: The laboratory also needs to refer to the periodic test according to IEC 61672-

3 Check this document to ensure that the maximum permissible value is not exceeded when quoting the expanded measurement uncertainty of the correction value provided by the manufacturer: The corrected values obtained by the method given in this document are the results of measurements made using samples of these devices, for all production batches or These corrected values may not always be representative over time and it is recommended to repeat the measurements periodically to ensure that the values given in the instructions do not need to be modified: correction value: This document does not apply to sound level meters equipped with microphones designated for random incident sound fields, because IEC 61183 has given the relevant Information:

2 Normative references

The content in the following documents constitutes the essential provisions of this document through normative references in the text: where dated references For documents, only the version corresponding to the date applies to this document; for undated reference documents, the latest version (including all amendments) applies in this document:

GB/T 3785:1-2023 Electroacoustic sound level meters Part 1: Specifications (

IEC 61672-1:2013, IDT) ISO /IEC Guide98-

3 Measurement Uncertainty Part 3: Guidelines for the Expression of Measurement Uncertainty (GUM:1995)