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

GB/T 4959-2026

Replacing GB/T 4959-2011

**Methods of measurement for the sound reinforcement
characteristics of auditoria**

厅堂扩声特性测量方法

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1 Scope

GB/T 4959-2026 is the Chinese national standard covering measuring a sound system in a hall - the sound pressure level and its uniformity across the seats, the frequency response, the speech transmission index and the feedback margin, which together decide whether the audience at the back can understand anything. It replaces GB/T 4959-2011 and has been in force since 1 October 2026. It was issued on 31 March 2026 and takes effect on 1 October 2026, replacing GB/T 4959-2011. This page is published from the official record of the 2026 edition; the clause text of a standard this recent is not yet in circulation, and the figures, limits and tables it contains are those of the document itself, delivered in full with the English translation.

This document describes the method for measuring the acoustic characteristics of halls equipped with sound reinforcement systems. This document applies to all types of halls equipped with sound reinforcement systems (such as theaters, multi-purpose halls, conference rooms, gymnasiums, and other similar venues). Acoustic property measurement. This document refers to the measurement of acoustic properties in stadiums.

4.1 Environment

4.1.1 Building Decoration Prior to the measurement, the hall's architectural decoration was already completed, meaning that the seating, doors and windows, curtains, lighting fixtures, dimming equipment, and air conditioning system, etc., were installed according to the

original specifications. The building design requires that the installation be completed and the hall be in use or ready for use.

4.1.2 Conditions of the sound control room The voice control room should meet the following requirements.

- a) The equipment in the sound control room has been installed and is ready for use;
- b) The power supply and grounding of the sound reinforcement system equipment meet the design requirements.

4.2 Public address system The sound reinforcement system should meet the following requirements.

- a) Before the measurement, the sound reinforcement equipment was installed in the hall according to the design requirements and was ready for use;
- b) Adjust the sound reinforcement system to ensure it is in normal working order;
- c) During measurement, the digital signal processor in the sound reinforcement system is adjusted according to functional requirements.

Note. "Functional requirements" refers to the system's gain, signal distribution, equalization, compression, limiting, frequency division, feedback suppression, delay, noise reduction, filtering, and other functions. The specific requirements vary depending on the hall's layout. The actual functions need to be set by the designer and adjusted in the digital signal processor to make them in the best design and use state.

4.3 Signal-to-noise ratio The signal-to-noise ratio should meet the following requirements.

- a) During measurement, the sound pressure level at each measurement point in the hall must be at least 15 dB higher than the total noise level of the hall;
- b) The signal-to-noise ratio during reverberation time and regeneration reverberation time measurements shall not be less than 35 dB;
- c) The signal-to-noise ratio should not be less than 45dB when measuring the acoustic energy ratio in the early and late stages.

4.4 Measurement Site The measurement site must meet the following requirements.

4.5.1 Requirements for the layout of measurement points

4.5.1.1 Measurement point height The measurement point is 1.2m above the ground (reverberation time and regeneration reverberation time are measured from 1.2m to 1.6m).

4.5.1.2 Selection of Measurement Point Area The area selected for measurement points must meet the following requirements.

- a) All measurement points should be at least 1.5m away from the wall.

- b) For halls with balconies, the measurement points should include the balconies area.
- c) For venues with a stage or stage for sound reinforcement, the measurement points should also include the stage area or stage area, but the measurement results should be recorded separately. deal with.
- d) If the hall is axially symmetrical, the measurement point can be selected within the seating area on one side of the center line (including the vicinity of the center line).
- e) For large venues (such as large stadiums), if the plan is fully symmetrical both longitudinally and transversely, only 1/4 of the area needs to be measured; however, the measurement points should include the area itself. Representativeness of each seating area in the audience area.
- f) At least half of the venue area should be measured. The venue measurement data should be recorded and processed separately, and not averaged with the spectator seating measurement data.

4.5.2 Number of measurement points selected The number of measurement points selected is shown in Table 1.

5 Measuring Instruments

5.1 General Provisions This document does not exclude the use of other instruments or software that have been certified by the metrology department and achieve equivalent accuracy.

5.2 Audio Signal Generator The audio signal generator should meet the following requirements.

- a) Frequency response. 20Hz~20kHz $\leq \pm 0.3\text{dB}$ (reference frequency 1kHz);
- b) Frequency indication accuracy. $1\% \pm 1\text{ Hz}$ of the indicated value;
- c) Frequency stability. After a 30-minute warm-up, the drift at the 1kHz frequency point is no more than 6Hz per hour;
- d) Total Harmonic Distortion. Attenuation output not greater than 0.5%, power output not greater than 1.0%;
- e) Voltmeter accuracy. better than 2.5%;
- f) Attenuator accuracy. better than 0.2dB;
- g) Signal-to-noise ratio. not less than 65dB;
- h) Maximum compression. not less than 60dB (input compression voltage not greater than 1V).

5.3 Digital Audio Signal Analyzer Digital audio signal analyzers should meet the following requirements.

- a) System performance requirements. Total harmonic distortion plus noise (THD+N) 1kHz. -112dB, 1.0μV.
- b) Generator performance requirements. 1) Frequency range. 10Hz~204kHz; 2) Intermodulation Distortion (IMD) Test Signals. SMPTE, CCIF, DFD, DIM, TIM, DIN; 3) Flatness (20Hz~20kHz). ±0.008dB (typical value < 0.003dB).

5.17 Test sound source

5.17.1 Motorized loudspeaker sound source The electric loudspeaker sound source should meet the following requirements.

- a) Frequency response. 50Hz~10kHz;
- b) The difference between two adjacent 1/3 octave band sound power levels should not exceed 3 dB;
- c) Sound power level. The sound power level in all 1/3 octave bands should be greater than 70 dB;
- d) Sound power output stability. less than ±0.5dB;
- e) Directivity index. less than 9dB.

5.17.2 Pulse Sound Source A pulse sound source with stable performance that meets certain duration and waveform requirements, such as a spark sound generator.

5.17.3 Pulse Signal Generator An instrument or device that can generate pulse characteristic signals.

5.18 Analog program signal It should comply with the provisions of GB/T 6278.

5.19 Voice Transmission Index Instrument The voice transmission index meter should meet the following requirements.

- a) Test signal. pseudorandom pink noise (its envelope conforms to the typical speech spectrum of IEC 60268-16).
- b) Octave filters. 125Hz, 250Hz, 500Hz, 1kHz, 2kHz, 4kHz and 8kHz.
- c) Modulation frequency. - STI method. 0.63Hz, 0.8Hz, 1.0Hz, 1.25Hz, 1.6Hz, 2.0Hz, 2.5Hz, 3.15Hz, 4.0Hz, 5.0Hz, 6.3Hz, 8.0Hz, 10Hz, and 12.5Hz; - RASTI method. 500Hz. 1.02Hz, 2.03Hz, 4.07Hz, 8.14Hz; 2000Hz. 0.73Hz, 1.45Hz, 2.90Hz, 5.81Hz, 11.63Hz; - STIPA method. Same as STI method (excluding 1.6Hz and 8.0Hz).
- d) Input sensitivity. 94dB is generated by a 30mV input.