CCS P

NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 51091-2015

Technical code for listening test room engineering

试听室工程技术规范

Issued on: March 8, 2015 **Implemented on: November 1, 2015**

Issued by: State Administration for Market Regulation;
Standardization Administration of the PRC

Table of Contents

2 Terms

2.0.1 listening test room - room used for listening tests on electroacoustic products, equipment and systems.

2.0.2 acoustical design - measures taken during the architectural design process to secure, from the acoustic point of view, that the building meets the requirements.

2.0.3 reverberation time - time needed for the average sound energy density to decay from

its original value to one millionth of it (60 dB) after the sound has reached a steady state and the source has been stopped.

2.0.4 background noise - noise from all other sources than the sound source under test; also called the noise floor.

2.0.5 sound coloration - phenomenon in which the original timbre is altered under the influence of the indoor frequency response and other factors.

2.0.6 NR noise rating curve - family of curves by which permissible noise values are rated by octave band sound pressure level, the rating value of each curve being the octave band sound pressure level figure at 1000 Hz, also called the NR value. In rating, the NR value of the curve reached by the highest limit among the octave bands governs.

2.0.7 sound absorption material - material that absorbs incident sound.

2.0.8 sound absorption coefficient - ratio, at a given frequency and under given conditions, of the sum of the sound power absorbed by the boundary surface or medium and the sound power transmitted through the boundary (a wall or a partition, for instance) to the incident sound power. The measurement conditions and the frequency are to be stated.

2.0.9 sound diffuser - component that increases the diffusion of the sound field through the nature, shape, dimensions or special construction of the material.

2.0.10 sound absorber - component made mainly for sound absorption, using the space inside the room.

2.0.11 sound insulation door - door whose sound insulation capacity is raised by a special construction and manufacturing process.

2.0.12 sound insulation window - window whose sound insulation capacity is raised by a special construction and manufacturing process.

2.0.13 nominal area - area formed to a particular length-to-width ratio for the process requirements of a listening test room; it usually differs from the floor area in figure by 5 %.

2.0.14 sound lock - building construction in which two sound insulation doors are provided at the entrance of a room in order to increase the sound insulation performance, with a sound absorbing space left between the two doors.

2.0.15 air-borne sound - sound propagated around with air as the medium.

2.0.16 structure-borne sound - noise propagated from mechanical vibration through the building structure.

2.0.17 single-number quantity - single sound insulation parameter settled by the method laid down in the current national standard GB/T 50121-2005 Standard for rating of sound insulation in buildings, taking as a whole the sound insulation performance of the test specimen in the one-third octave bands from 100 Hz to 3150 Hz (or in the one-one octave

bands within the range 125 Hz to 2000 Hz); its unit is the decibel (dB).

2.0.18 weighted sound reduction index - single-number quantity that characterises the air-borne sound insulation performance of a building component.

2.0.19 weighted standardized level difference - single-number quantity of the air-borne sound insulation performance between two rooms, obtained with the reverberation time of the receiving room as the correction parameter.

2.0.20 weighted normalized impact sound pressure level - single-number quantity of the impact sound insulation performance of a floor or floor construction, obtained with the sound absorption of the receiving room as the correction parameter.

2.0.21 weighted standardized impact sound pressure level - single-number quantity of the impact sound insulation performance of a floor or floor construction, obtained with the reverberation time of the receiving room as the correction parameter.

2.0.22 spectrum adaptation term - correction value that has to be added to the air-borne sound insulation single-number quantity because the sound insulation spectrum differs and because the noise spectrum of the source space differs. When the noise of the source space has a pink noise frequency characteristic, the correction obtained by calculation is called the pink noise spectrum adaptation term; when it has a traffic noise frequency characteristic, the correction obtained is called the traffic noise spectrum adaptation term.

2.0.23 impact sound pressure level - average one-third octave band sound pressure level (SPL) in the receiving room, expressed in dB, when the floor under test is excited with a standard tapping machine.

3 Site selection and plan design

3.1.1 The environmental noise of the main building housing the listening test room should comply with the provisions for sound function zones of category 2 and above in the current national standard GB 3096 Environmental quality standard for noise.

3.1.2 Air conditioning machine rooms, fan rooms, cooling towers and refrigerating machine rooms should be placed in a building separate from the one that houses the listening test room; when they are inside the same building, they should be far from the listening test room.

3.1.3 The plan arrangement of the building shall be laid out reasonably according to the spatial dimensions, shape, environmental requirements and running conditions of the listening test room, the control room and the ancillary rooms.

3.1.4 The listening test room shall keep clear of sources of strong electromagnetic field radiation; where that cannot be avoided, effective electromagnetic shielding measures shall be taken.

3.2.1 The listening test room shall be located in the area of the site where noise and vibration interference is smaller.

3.2.2 The control room and the ancillary rooms should adjoin the listening test room.

3.2.3 The control room should adjoin the rear wall of the listening test room.

3.2.4 The entrance door should be positioned on a side wall of the listening test room and towards the rear wall.

3.2.5 The arrangement of the loudspeakers shall comply with the relevant provisions of the current national standard GB/T 12060.13 Sound system equipment - Part 13: Listening tests on loudspeakers.

3.2.6 The arrangement of the listeners' positions shall satisfy the following requirements: (1) for two-channel stereo reproduction, the minimum listening distance should be 1.0 to 0.8 times the spacing between the loudspeakers; (2) each listener shall be at least 0.6 m from the side wall and at least 1.5 m from the rear wall; (3) the seats of the front row and of the rear row shall be staggered, and the gap between the two rows of seats shall be such that the listeners are comfortable.

4 Acoustical design

4.1.1 The room acoustic quality of the listening test room shall meet the requirements of subjective sound quality assessment of electroacoustic products, equipment and systems.

4.1.2 The acoustical design shall cover the room dimensions, the reverberation time and the sound absorption and diffusion treatment.

4.1.3 The transmission frequency response within the listening area of the listening test room should be flat, there shall be no perceptible sound coloration, and acoustic defects such as echo, flutter echo, sound focusing and resonance shall not appear.

4.2.1 The floor area of the listening test room shall be settled according to the category and nature of the sample or system under assessment and the number of listeners.

4.2.2 Listening test rooms may be divided into three types, small, medium and large, and the nominal room area, room height and room proportions corresponding to each type should comply with Table 4.2.2. The table gives, for the small type, a nominal area of 25 m2 to 80 m2 and a room height of 2.7 m to 3.0 m; for the medium type, 80 m2 to 200 m2 and 3.1 m to 4.9 m; for the large type, 200 m2 to 500 m2 and 5.0 m to 8.0 m. The height (H) to width (W) to length (L) proportions for the small type are 1:1.6:2.5, 1:1.5:2.39 and 1:1.96:2.59. The proportion column of the medium and large types is a single merged cell holding three values, 1:2.5:3.2, 1:2.27:3.14 to be chosen when H is 4.1 m or more, and 1:1.96:2.59 to be chosen when H is 4.6 m or more.

4.3.1 At a frequency of 500 Hz the reverberation time of small and medium listening test