



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

GB/T 3222.1-2022

**Acoustics - Description, measurement and assessment of
environmental noise - Part 1: Basic quantities and assessment
procedures**

Issued on: March 9, 2022

Implemented on: October 1, 2022

Issued by: SAMR; SAC

Table of Contents

Foreword...	4
Introduction...	6
1 Scope...	7
2 Normative References...	8
3 Terms and Definitions...	8
3.1 Expression of Levels...	8
3.2 Time Intervals...	10
3.3 Ratings...	11
3.4 Sound Designations...	11
3.5 Impulsive Sound Sources...	13
3.6 Day, Evening, Night Sound Levels...	14
4 Symbols...	16
5 Descriptors for Environmental Noise(s)...	16
5.1 Single Events...	16
5.2 Repetitive Single Events...	17
5.3 Continuous Sound...	17
6 Noise Annoyance...	17
6.1 Descriptors for Community Noise...	17
6.2 Frequency Weightings...	18
6.3 Adjusted Levels...	18
6.4 Rating Levels...	19
6.5 Composite Whole-day Rating Levels...	20
7 Noise Limit Requirements...	21
7.1 General...	21
7.2 Specifications...	21

Foreword

This document was drafted in accordance with the rules provided in GB/T 1.1-2020 Directives for Standardization - Part 1: Rules for the Structure and Drafting of Standardizing Documents.

This document is Part 1 of GB/T 3222 Acoustics - Description, Measurement and Assessment

of Environmental Noise. GB/T 3222 has issued the following parts:

---Part 1: Basic Quantities and Assessment Procedures;

---Part 2: Determination of Sound Pressure Levels.

This document serves as a replacement of GB/T 3222.1-2006 Acoustics - Description, Measurement and Assessment of Environmental Noise - Part 1: Basic Quantities and Assessment Procedures. In comparison with GB/T 3222.1-2006, the main technical changes are

as follows:

---The community tolerance level L_{ct} is added (see 3.6.6);

---The contents of "adjusted levels" and "composite whole-day rating levels" are modified (see 6.3 and 6.5; 6.3 and 6.5 of Version 2006);

---The relevant contents of the estimation of long-term annoyance response of communities are modified [see 8.1 and 8.2.1 i); 8.1 and 8.2.1 i) of Version 2006].

This document equivalently adopts ISO 1996-1:2016 Acoustics - Description, Measurement and Assessment of Environmental Noise - Part 1: Basic Quantities and Assessment Procedures.

Please be noted that certain content of this document may involve patents. The institution issuing this document does not undertake the responsibility of identifying these patents.

This document was proposed by Chinese Academy of Sciences.

This document shall be under the jurisdiction of National Technical Committee 17 on Acoustics

of Standardization Administration of China (SAC/TC 17).

The drafting organizations of this document: Institute of Acoustics, Chinese Academy of Sciences; Shenzhen Zhongya Mechanic & Electric Industry Co., Ltd.; Hangzhou AHA Intelligent Technology Co., Ltd.; Tongji University; Zhejiang University of Science and Technology; Research Institute of Highway Ministry of Transport; Nanjing University; Anhui Weiwei Shock and Noise Reduction Technology Research Institute; Beijing Municipal Institute

of Labor Protection; Shanghai Academy of Environmental Sciences; Northwestern Polytechnical University; Changsha Aobang Environmental Protection Industry Co., Ltd.; Shanghai Jiao Tong University; Zhejiang University; Harbin Engineering University.

1 Scope

This document defines the basic quantities to be used for the description of noise in community

environments and describes basic assessment procedures. It also specifies methods to assess

environmental noise and gives guidance on predicting the potential annoyance response of a

community to long-term exposure from various types of environmental noises. The sound sources can be separate or in various combinations. Application of the method to predict annoyance response is limited to areas where people reside and to related long-term land uses.

Community response to noise can vary differently among sound sources that are observed to

have the same acoustic levels. This document describes adjustments for sounds that have different characteristics. The term "rating level" is used to describe physical sound predictions

or measurements to which one or more adjustments have been added. On the basis of these

rating levels, the long-term community response can be estimated.

The sounds are assessed either singly or in combination, allowing for consideration, when deemed necessary by responsible authorities, of the special characteristics of their impulsiveness, tonality, and low-frequency content, and for the different characteristics of road-

traffic noise, other forms of transportation noise (such as aircraft noise), and industrial noise.

This document does not specify limits for environmental noise.

NOTE 1: In acoustics, several different physical measures describing sound can have their level

expressed in decibels (e.g. sound pressure, maximum sound pressure, and equivalent continuous sound pressure). The levels corresponding to these physical measures normally will differ for the same sound. This often leads to confusion. Therefore, it is necessary to specify the underlying physical quantity (e.g. sound pressure level, maximum sound pressure level, and equivalent continuous sound pressure level).

NOTE 2: In this document, quantities are expressed as levels in decibels. However, some countries

validly express the underlying physical quantity, such as maximum sound pressure, in pascal or sound exposure in pascal-squared seconds.

NOTE 3: ISO 1996-2 deals with the determination of sound pressure levels.

Event duration shall be specified relative to some characteristic of the sound, such as the number

of times that some fixed level was exceeded.

EXAMPLE: The duration of a sound event can be defined as the total time that the sound pressure

level is within 10 dB of its maximum sound pressure level.

NOTE: While the sound exposure level combines sound level and duration, the concept of event

duration can be useful to differentiate events. For example, an aircraft pass-by can have a duration of 10 s to 20 s, while the duration of a gunshot is less than 1 s.

5.2 Repetitive Single Events

Repetitive single-event environmental sounds are typically re-occurrences of single-event sounds. For example, aircraft noise, railway noise, or road-traffic noise with a low traffic volume, can be considered as the sum of the sound from multiple individual events. Also, the

sound from gunfire is the sum of the sound from multiple individual gunshot sounds. In this document, the description of all repetitive single-event sound sources utilizes the sound exposure levels of the single-event sounds and the corresponding number of events to determine

the rating equivalent continuous sound pressure levels.