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

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**Acoustics - Frequency-weighting characteristic for infrasound
measurements**

声学 次声测量的频率计权特性

(English Translation)

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Foreword

This document conforms to GB/T 1.1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents".

Drafting is scheduled.

This document adopts ISO 7196:1995 "Frequency weighting characteristics of acoustic infrasound measurements".

The following minimal editorial changes have been made to this document.

--IEC 651:1979, which was only cited in the introduction and informative appendices, has been moved from Chapter 2 to the References section and replaced with the current version.

GB/T 3785.1;

--3.1 Added a note;

--In accordance with GB/T 1.1-2020, "References" in Annex B of ISO 7196:1995 has been replaced with "References".

Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents.

This document was proposed by the Chinese Academy of Sciences.

This document is under the jurisdiction of the National Acoustics Standardization Technical Committee (SAC/TC 17).

Introduction

Various noise sources that affect humans (such as hearing loss, annoyance response, loudness, subjective noise perception, and interference with verbal communication).

The description and evaluation methods have been standardized in GB/T 14259, and detailed descriptions are also available in other standardization documents.

The specifications include GB/T 3222.1, GB/T 4963, GB/T 9661, and GB/T 14366. In all these standards, the noise frequency band range...

The range is either limited to the traditional audible range of 20 Hz to 20,000 Hz, or to a specific and narrow frequency band (such as the perception of aircraft).

Noise, 45 Hz to 11,200 Hz. The frequency range specified for the sound level meter is 20 Hz to 20,000 Hz (see IEC 61672-1:2013).

In reality, some noise contains infrasound with frequencies below 20 Hz, but how to measure the sound pressure level of noise in this frequency band, and how to describe it...

There is currently a lack of standardized methods for assessing the impact of these noises on humans. Although research in this area is relatively limited, there is evidence...

It is understood that infrasound effects can be harmful or uncomfortable to humans, therefore some regulatory agencies hope to include infrasound sources in their noise emission management laws.

Therefore, standardization of infrasound measurement and description methods is essential, as it facilitates information exchange and avoids irregularities.

The increase in measurement methods.

Human responses are diverse and distinguishable; correspondingly, different descriptive methods are applicable in principle. The method described in this document applies to...

This corresponds to the direct perception of infrasound. Currently, this is the only human response with a well-researched basis. Some literature on the degree of infrasound annoyance...

It is clear that the degree of infrasound annoyance is likely closely related to its direct perception. Under this premise, the measurement results in this document will simultaneously reflect the degree of annoyance.

Annoyance and direct perception.

Although the perception of infrasound is clearly achieved through auditory mechanisms, it differs from conventional understanding of hearing in some aspects.

The normal perception threshold of the frequency band is significantly higher than that of

the audible frequency band (approximately 100 dB at 10 Hz, with a reference value of 20 μ Pa), while the tolerance to high sound pressure levels is...

However, the intensity did not increase accordingly, meaning the dynamic range was smaller, and the perceived intensity increase caused by the sound pressure level was significantly faster. According to the measurements in this document, at...

In the frequency range of 1 Hz to 20 Hz, the weighted sound pressure level of sound that is just perceived by an average listener is about 100 dB, while very loud noise...

The weighted sound pressure level (close to the upper limit of tolerance) is approximately 120 dB, only 20 dB higher. Infrasound with a weighted sound pressure level below 90 dB is generally not detected.

Humans can clearly perceive it.

It should be noted that due to individual differences in perception thresholds and the sharp increase in infrasound perception above the threshold, the same infrasound noise may...

It may seem loud and annoying to some, but others hardly notice it.

The publication of this document is not intended to restrict research on infrasound; other physical measurement methods besides those specified in this document are also permitted.

It is feasible, for example, through frequency analysis.

Appendix A of this document provides recommendations on the performance of instruments for measuring weighted sound pressure levels.

It should be emphasized that the measurements and descriptions of broadband sound containing infrasound components based on this document are considered independent of and supplementary to existing national standards.

The methods for measuring, describing, and evaluating this noise as defined in the standard.

Frequency weighting characteristics of acoustic infrasound measurements

1 Scope

This document specifies a frequency weighting characteristic, denoted as G, used to determine the frequency range of part or all of the spectrum within the 1 Hz to 20 Hz band.

The weighted sound pressure level of the sound or noise.

Note 1: For broadband sound covering both infrasound and audible frequency bands, the infrasound weighted sound pressure level measured in this document is a normalized version covering only the audible frequency band.

This method supplements the descriptive quantities of the noise (such as A-weighted sound pressure level). The results for these quantities typically differ from those for G-weighted methods, but this is not a concern.

The differences arise because the respective results involve different noise frequency ranges with almost no overlap.

Note 2: G-weighting can also be used to measure sound power level and sound intensity level, denoted by the symbols LWG and LIG, respectively.

2 Normative references

This document has no normative references.

3 Terms and Definitions

The following terms and definitions apply to this document.

Infrasound

Sounds or noise with frequencies mainly between 1 Hz and 20 Hz.

Note: This definition applies only to this document.

Audible sound - frequency sound Sounds or noise with frequencies mainly between 20 Hz and 20,000 Hz.

Wideband sound

Sound or noise consisting of some infrasound and some audible sound.

G-frequency weighting Frequency weighting of the signal is performed according to the frequency response characteristics specified in Chapter 4.

G-weighted sound pressure level the sound pressure level is given by formula (1).

$$L_{pG} = 10 \lg$$

$$p_{20}^2 (1)$$

In the formula. p_{20}^2 is the mean square value of the weighted sound pressure level;

p_0 -- Reference sound pressure (20 μ Pa).

Note 1: The unit of G-weighted sound pressure level is decibel (dB).

Note 2: When there is no possibility of misunderstanding (as stated in Note 2 of Chapter 1), L_{pG} is abbreviated as LG.