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GB/Z 38251-2019

Acoustics - Calculation of sound attenuation during propagation for electrical converter station - Engineering method

声学 换流站声传播衰减计算 工程法

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Preview: page 1 of 5 shown, 32 in the full document. Complete English PDF, instant download:
https://chinastandards.org/standards/gb-z-38251-2019

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Table of Contents

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Foreword

This guiding technical document was drafted in accordance with the rules given in GB/T 1.1-2009. This instructional technical document is proposed by the Chinese Academy of Sciences. This instructional technical document is under the jurisdiction of the National Technical Committee for Acoustic Standardization (SAC/TC17). Drafting organization of this guiding technical document. Hefei University of Technology, China Southern Power Grid Co., Ltd., Shenzhen Zhongya Mechanical and Electrical Industry Co., Ltd. Company, Tongji University, Zhejiang University, Institute of Acoustics, Chinese Academy of Sciences, Shanghai Shenhua Acoustics Equipment Co., Ltd., State Grid Tianjin Electric Power Company Electric Power Research Institute, Shanghai Jiaotong University, Beijing Institute of Labor Protection Science, Zhejiang University of Science and Technology. The main drafters of this guiding technical document. Wei Haozheng, Huang Ying, Lu Yimin, Fang Qingchuan, Yu Wuzhou, Mao Dongxing, Zhai Guoqing, Cheng Mingkun, Lv Yadong, Li Xiaokuan, Zhang Mingfa, Yu Jinshan, Zhao Peng, Li Zhengguang, Jiang Weikang, Xu Xin, Zhang Zuan, Zheng Zhongyuan, Yin Song, Li Zhiyuan.

The converter station contains converter transformers, capacitors, reactors and other equipment.The noise radiated by these equipment contains multiple significant pure-tone components. The surrounding sound field is coherent, resulting in uneven spatial

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distribution of sound pressure on its propagation path, and the sound pressure levels in different directions vary widely, sometimes different More than 10dB. Therefore, coherence should be considered in the calculation of acoustic propagation attenuation in converter stations. The main basis for the calculation of outdoor sound propagation attenuation GB/T 17247, this standard is calculated based on the energy superposition of incoherent sound waves, without considering the coherence of the sound waves. Based on the principle of coherent and non-coherent superposition of sound waves, this instructional technical document gives a calculation method for attenuation of sound propagation in converter stations. Correct There are a large number of capacitors in the converter station, which are arranged in an array in space. The coherent sound of the capacitors in the converter station is established using the principle of acoustic coherent superposition. Field calculation model to calculate the propagation attenuation of the coherent sound; for other devices with insignificant and uncertain coherent sound in the converter station, the non-coherent sound is used. Perform equivalent calculations. The calculation results of the two are superimposed to calculate the noise source of the modulated noise with coherent characteristics in the noise propagation of the converter station. Environmental noise level around the plant boundary. In order to meet the applicability of engineering applications, this guidance technical document is equivalent to and related to the sound source model. The algorithm has been simplified accordingly. For other equipment with significant coherence in the converter station, the calculation of the sound attenuation of the capacitor can be performed with reference to the calculation method of the coherent sound of the capacitor. This guidance technical document provides a calculation method for sound propagation attenuation based on the coherence of the sound source of the converter station, which can regulate the sound transmission of the converter station Attenuation calculation, and provides a basis for optimizing the layout of the sound source of coherent equipment and the overall noise control of the converter station. Calculation method for acoustic propagation attenuation of acoustic converter stations

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1 Scope

GB/Z 38251-2019 is the Chinese national standard on acoustics - calculation of sound attenuation during propagation for electrical converter station - engineering method, in the field of metrology and measurement. The /Z suffix marks it as a guiding technical document: it does not prescribe requirements that can be certified against, but sets out the technique, the method or the state of the art that the standards bodies recommend following. It was issued on 18 October 2019 by the State Administration for Market Regulation; Standardization Administration of China. As a guiding technical document it carries no separate date of entry into force: it applies from publication. Classification: ICS 17.140, CCS A59. This page is published from the official record of the standard held by the Chinese standards administration: the identification, the dates, the classification and the issuing body are taken from there. The clause text, the tables and the numeric limits are in

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https://chinastandards.org/standards/gb-z-38251-2019

the document itself, which is delivered complete in English translation.

This instructional technical document proposes a calculation process for calculating the acoustic propagation attenuation of a converter station, and gives a method of expressing sound sources in a converter station (including (Including simplified method of incoherent sound, directivity calculation of single capacitor tower and three-phase capacitor tower group, and sound power correction method) and prediction Method for calculating the total contribution of point noise.

Note. This guidance technical document mainly provides the calculation method for the propagation attenuation of coherent sound sources.The propagation attenuation of non-coherent sound sources is calculated according to GB/T 17247. This instructional technical document is applicable to the calculation of sound propagation attenuation of converter stations with coherent sound sources. An area that is more than twice as large. For other coherent sound source propagation attenuation calculations, please refer to this guidance technical document.

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2 Normative references

The following documents are essential for the application of this document. For dated references, only the dated version applies to this article Pieces. For undated references, the latest version (including all amendments) applies to this document.

GB/T 3222.1 Description, measurement and evaluation of acoustic environmental noise-Part 1. Basic parameters and evaluation methods

GB/T 3222.2-2009 Description, measurement and evaluation of acoustic environmental noise-Part 2. Determination of environmental noise level

GB/T 3947 Acoustics terminology

GB/T 17247 (all parts) Acoustics Attenuation of outdoor sound propagation

GB/T 17247.2 Acoustics. Attenuation of outdoor sound propagation. Part 2. General calculation methods

GB/T 32524.1-2016 Acoustic sound pressure method for determination of sound power level and directivity characteristics of power capacitor units-Part 1. Half Anechoic Chamber Precision 3 terms, definitions and symbols

3.1 Terms and definitions The terms and definitions defined in

GB/T 3947 and the following apply to this document.

3.1.1 Noise People don't need, audible sound in the frequency range of 20Hz ~ 20,000Hz.

3.1.2 Pointsource A sound source with a wavelength longer than the radius of the sound

Preview: page 4 of 5 shown, 32 in the full document. Complete English PDF, instant download:
https://chinastandards.org/standards/gb-z-38251-2019

source.

3.1.3 Linesource The wavelength of the sound wave is much shorter than the length of the sound source.

3.1.4 Area source The wavelength of the sound wave is much smaller than that of the long and short sides of a planar sound source.

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