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**Acoustics - Procedures for assessment and prediction of noise  
annoyance**

声学 噪声烦恼度的评价和预测方法

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## Foreword

This document is in accordance with the provisions of GB/T 1:1-2020 "Guidelines for Standardization Work Part 1: Structure and Drafting Rules for Standardization Documents" drafting: Please note that some contents of this document may refer to patents: The issuing agency 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 Acoustic Standardization Technical Committee (SAC/TC17): This document was drafted by: Zhejiang University, Zhejiang University of Science and Technology, Tongji University, Institute of Acoustics, Chinese Academy of Sciences, Hangzhou Aihua Intelligent Technology Co., Ltd., Northwestern Polytechnical University, Tianjin University, Shanghai Academy of Environmental Sciences, Harbin Institute of Technology, South China University of Technology, Chongqing University Science, Institute of Urban Safety and Environmental Science, Beijing Academy of Science and Technology, State Grid Shaanxi Electric Power Co., Ltd., Guangzhou Qijing Environmental Protection Technology Co., Ltd., Shanghai Shenhua Acoustic Equipment Co., Ltd., Zhejiang Lixin Zhongzhi Acoustic Technology Co., Ltd., Anhui Weiwei Shock and Noise Reduction Technology Research and Development Academy: The main drafters of this document: Zhai Guoqing, Li Zhengguang, Mao Dongxing, Yu Wuzhou, Lu Yadong, Li Xiaodong, Cheng Xiaobin, Xiong Wenbo, Chen Kean, Kang Jian, Zhu Wenying, Meng Qi, Peng Jianxin, Xie Hui, Hu Wencheng, Li Xiaokuan, Wu Jian, Yan Liang, Zhou Jinli, He Jinlong, He Jianlong, Li Zhiyuan, Xu Xin:

Noise annoyance is people's direct perception of noise, and noise annoyance is a measure to determine the acceptability of environmental noise exposure and formulate environmental noise levels: An important basis for the standard can be determined through social acoustic surveys or laboratory listening experiments: Socio-acoustic survey on noise annoyance, my country The corresponding guiding technical document GB /Z 21233-2007 "Social Survey of Acoustic Application and Social Acoustic Survey Evaluation of Noise Trouble" has been released: Annoyance": However, in the auditory experiment of the noise annoyance laboratory, different personnel use different methods (such as sound sample

playback, questionnaire design, etc.): measurement, quantification of annoyance, data processing, etc.), especially the lack of reference sound samples in the experimental sample group, and the experimental participants in the evaluation of noise annoyance (by The evaluation grade is often given according to the relative size of the annoyance of the sound samples in each experimental sample group: In the case of calibration, the annoyance evaluation results of different experimental sample groups are not comparable: Therefore, it is necessary for laboratory evaluation of noise annoyance A unified standard for pricing methods: In order to meet statistical requirements, when determining noise annoyance through social acoustic surveys or laboratory listening experiments, it is necessary to investigate a large number of respondents or Recruiting a large number of subjects requires a lot of manpower, material resources and time: Using the annoyance prediction model, the annoyance of the sound samples can be predicted: The noise annoyance prediction model can be divided into a perceptual annoyance model and a psychoacoustic annoyance model: The two have different value ranges and cannot be directly compared: Compare: The perceptual annoyance model is generally established separately for different types of noise, and is only applicable to the noise type, while the psychoacoustic annoyance model is Has a certain versatility: The psychoacoustic annoyance of noise samples can be determined directly by calculation: To determine the perceptual annoyance, it is necessary to establish a conversion model between perceptual annoyance and psychoacoustic annoyance for different types of noise: Therefore, it is necessary to The noise annoyance prediction model and its establishment method are formulated as a unified standard: Evaluation and Prediction Method of Acoustic Noise Annoyance

## 1 Scope

GB/T 42473-2023 addresses the gap between how loud a noise is and how much it bothers people. Noise regulation works in decibels, and decibels predict annoyance only roughly: two sounds at the same A-weighted level can be experienced completely differently depending on their tonality, their roughness, their sharpness and whether they fluctuate - which is why a distant motorway is tolerated and a neighbour's heat pump at a lower level is not. Since complaints, planning objections and product acceptance all turn on annoyance rather than on level, and since annoyance had no standard way of being measured or predicted, the argument has usually been between a measurement that says compliant and a resident who says otherwise. This document describes the assessment of noise annoyance based on listening experiments, the prediction models for perceptual annoyance and for psychoacoustic annoyance, and the method for building the conversion between them - the psychoacoustic model being what allows annoyance to be estimated from a recording without assembling a panel of listeners. Under ICS 13.140 and CCS A59, it is written for acoustic consultants, environmental noise authorities, and product sound quality engineers.

This document describes the evaluation method of noise annoyance based on auditory experiments and the prediction model of perceptual annoyance and psychoacoustic annoyance and its Conversion model building method: This document is applicable to the evaluation and prediction of outdoor environmental noise annoyance, indoor environmental noise and other noises affected by outdoor environmental noise: The evaluation and prediction of sound annoyance can refer to this document: NOTE: Certain provisions in this document may not be consistent with specific requirements or protocols for auditory experiments in other fields, and this document does not deny their value and validity:

## 2 Normative references

The contents of the following documents constitute the essential provisions of this document through normative references in the text: Among them, dated references For documents, only the version corresponding to the date is applicable to this document; for undated reference documents, the latest version (including all amendments) is applicable to this document:

GB/T 3947-1996 Acoustic Terminology

## 3 Terms and Definitions

The following terms and definitions defined in GB/T 3947-1996 apply to this document: 3:1 noise annoyance noise-induced annoyance Human individual adverse reactions to noise:

Note: Adverse reactions include various conditions such as "dissatisfaction", "disturbance", "annoyance" and "disturbance" caused by noise: 3:2 noise annoyance Quantitative expression of the degree of noise annoyance:

Note: Noise annoyance is divided into perceptual annoyance and psychoacoustic annoyance: 3:

3 Socio-acoustic survey socio-acoustic survey Related to the evaluation of noise annoyance, a social survey that relates the calculated or measured noise level to the living environment of the surveyed object:

Note: Although many general social surveys on environmental factors include noise factors, they are not included in this report because they do not have associated noise data: The document refers to the Socio-Acoustic Survey: [Source: GB /Z 21233-2007, 3:2, modified] 3:

4 Subject [person] subject; participant Subject [person] Experimental participants who rated noise sample annoyance: