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

**GB/T 18049-2017**

Replacing GB/T 18049-2000

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**Ergonomics of the thermal environment -- Analytical determination and interpretation of thermal comfort using calculation of the PMV and PPD indices and local thermal comfort criteria**

热环境的人类工效学 通过计算PMV和PPD指数与局部热舒适准则对热舒适进行分析测定与解释

**(English Translation)**

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## Foreword

This standard is drafted in accordance with the rules given in GB/T 1.1-2009.

This standard replaces GB/T 18049-2000 "Medium thermal environment PMV and PPD index determination and thermal comfort conditions." versus GB/T 18049-2000, in addition to editorial changes, the main technical changes are as follows.

- increase the "local heat discomfort" factors, namely the vertical air temperature difference, hot and cold floor and radiation asymmetry, given the (See 6.3, 6.4 and 6.5);
- Added "unsteady thermal environment" chapter, given the transient (temperature step), periodic temperature or temperature gradient and other non-steady state of the assessment

Price method (see Chapter 8);

- a long-term evaluation method that adds overall thermal comfort (see Chapter 9);
- Added advice on how to consider human adaptability when evaluating and designing buildings and systems (see Chapter 10).

This standard uses the translation method equivalent to ISO 7730.:2005 "ergonomics of the thermal environment by calculating the PMV and PPD indices and local thermal comfort criteria for thermal comfort analysis and interpretation. " this standard is nationalized by the National Commission on Standardization of Ergonomics (SAC/TC7).

The standard drafting unit. China Standardization Research Institute, Qingdao Haier air conditioner limited company, the successful energy efficiency technology (Beijing) Co., Ltd., Beijing University of Aeronautics and Astronautics, Tsinghua University, China Academy of Building Research, China Astronaut Training Center.

## Introduction

Human thermal sensation is mainly related to its body heat balance. This balance is not only affected by air temperature, average radiation temperature, wind speed and air humidity Degree and other environmental parameters, but also by the impact of human activities and dress. After estimating or measuring these parameters, the overall thermal sensation of the person can pass Calculate the expected mean thermal sensory index (PMV) for prediction, see Chapter 4.

The expected dissatisfaction percentage (PPD) index is provided by predicting the percentage of people who may feel overheated or undercook in a given environment Information about heat discomfort or heat dissatisfaction. PPD can be derived from PMV, see Chapter 5.

Heat discomfort may also be caused by local cooling or heating that is not required by the body. The most common factors that cause local discomfort include asymmetric radiation Temperature (cold or hot surface), blowing sensation (provided for local cooling caused by air flow), vertical air temperature difference, cold or hot floor.

Chapter 6 specifies how to predict unsatisfactory percentages caused by local discomfort.

The overall heat or cold discomfort of the body can lead to dissatisfaction, and the comfort limits in this case can be expressed by the PMV and PPD indices, but the local heat discomfort also affects the thermal dissatisfaction rate, Chapter 7 describes the acceptable comfortable thermal environment.

The methods of Chapters 6 and 7 are mainly based on steady state conditions. Chapter 8 describes the transient (temperature step), periodic temperature, or temperature Degree of grading and other non-steady state of the evaluation method. The thermal environment of a

building or workplace will change over time and can not always be maintained , Chapter 9 gives a long-term evaluation method for thermal comfort.

Chapter 10 gives recommendations on how to consider human adaptability when evaluating and designing buildings and systems.

The ergonomics of the thermal environment is calculated by calculating PMV and PPD index with local thermal comfort criterion for hot shu Suitable for analysis and analysis

## 1 Scope

This standard gives a prediction method for the overall thermal sensation and discomfort (thermal dissatisfaction) of a person in a medium thermal environment. Standard given Considering acceptable overall thermal comfort and local uncomfortable environmental conditions, by calculating PMV and PPD indices, as well as local thermal comfort the thermal comfort is analyzed and interpreted.

This standard applies to healthy men and women in an ideal thermal environment, but in designing new environments and evaluating existing environments , The thermal comfort is slightly deviated. Although this standard is developed for the indoor work environment, but also applies to other environments. When considering There are physical needs such as physical disability and other people, can be used with ISO/T S14415..2005 4.2 use this standard. When considering non-air conditioning rings the national, regional and geographical differences need to be considered.

## 2 Normative reference documents

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

ISO 13731 Ergonomics of thermal environment - Vocabulary and symbols  
(Ergonomics of the thermal environment - Vocabulary and symbols ISO/T S13732-2  
Ergonomics of thermal environment - Assessment of human body reactions on contact surfaces - Part 2. Moderate temperature of the human body contact surface  
(Ergonomics of the thermal environment - Methods for the assessment of human response to contact with surface - Part 2. Human contact with surfaces at moderate temperature ISO/T S14415..2005 Human Efficacy of Thermal Environments International Standards for Special Demand for Population Applications (Ergonomics of the thermal environment - Application of International Standards to people with special requirements)

### 3 Terms and definitions

ISO 13731 and the following terms and definitions apply to this document.

Temperature periodic fluctuation in a certain range and frequency within the temperature changes.

Temperature drift drifttemperature the passive, monotonic, steady and non-circulating operating temperature changes in enclosed spaces.

Temperature gradient ramptemperature Active control of monotonic, steady and non - cyclic operating temperature changes in closed spaces.