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GB/T 19412-2025

Replacing GB/T 19412-2003

Method of testing and evaluation of air conditioning systems with cold (heat) storage

蓄冷（热）空调系统的测试和评价方法

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part

1.Structure and Drafting Rules of Standardization Documents". Drafting. This document supersedes GB/T 19412-2003 "Test and Evaluation Methods for Cold Storage Air Conditioning Systems" and is consistent with GB/T 19412-2003. Compared to previous versions, aside from structural adjustments and editorial changes, the main technical changes are as follows:

a) Added relevant terminology and definitions for thermal storage air conditioning systems (see 3.1~3.18); (b) Added test and evaluation methods for refrigeration (thermal) storage (heat storage) systems using refrigerant as the cooling (heat) release fluid (see 5.1, 5.2.1,...). 6.1, 7.1)

c) Added a benefit evaluation method for the participation of cold (heat) storage systems in electricity demand response (see 5.3, 5.4, 7.2);

d) Added test methods for phase change thermal storage and multi-split air conditioning ice storage (see 8.1, A.4.3, A.4.4);

e) The two-part electricity billing table for the operating costs of cold (heat) storage systems has been revised (see Table D.3, Table D.3 of.2003). 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 China Machinery Industry Federation. This document is under the jurisdiction of the National Technical Committee on Standardization of Refrigeration and Air Conditioning Equipment (SAC/TC238). This document was drafted by: Guangdong Midea HVAC Equipment Co.,

Ltd., Hefei General Machinery & Electrical Products Testing Institute Co., Ltd., and Zhuhai Gree Electric Appliances. Joint-stock company, Qingdao Haier Air Conditioning Electronics Co., Ltd., China Machinery Engineering Corporation, Qingdao Hisense Hitachi Air Conditioning Systems Co., Ltd. Shenzhen Das Intelligent Technology Co., Ltd., State Grid Zhejiang Integrated Energy Service Co., Ltd., China National Institute of Standardization, Zhejiang Yingji Power Technology Limited Liability Company, South China University of Technology, Guangdong University of Technology, Tianjin University, China Northwest Architectural Design & Research Institute Co., Ltd., Shanghai Architectural Design Research Institute Co., Ltd., China National Machinery Industry Corporation (SINOMACH) General Machinery Technology Co., Ltd., and Hefei General Machinery Research Institute Co., Ltd. The main drafters of this document are: Zhao Bingchen, Peng Dawei, Lin Aige, Mao Shoubo, Wu Weilan, Zhang Wenqiang, Xie Huiyou, Zhang Xu, Cheng Jianhong, and Zhong Wei. Liu Jinping, Chen Ying, Li Minxia, Zhao Min, Zhu Xuejin, Zheng Chunyuan, Gao Biao, Shi Wei, Wang Rujin, Zhang Huan, Zhou Kun, Peng Fei, Zheng Qingwei. This document was first published in.2003, and this is its first revision.

Cold (heat) storage air conditioning systems generate and store extra cooling (heat) energy by consuming off-peak or low-priced electricity, and store it during peak or high-priced electricity periods. By releasing cooling capacity directly for cooling or improving the energy efficiency of refrigeration (heating) equipment, a significant reduction in cooling (heating) costs can be achieved. Currently, in the market... Various types of cold (heat) storage air conditioning systems have emerged, including dual-condition ice storage chillers, heat pump heat storage units, and multi-split ice storage chillers. The original.2003 version of the document only covered laboratory/field testing and economic evaluation methods for dual-condition ice storage chillers, which is no longer sufficient to meet current needs. There is a demand in the market for testing and economic evaluation of various types of cold (heat) storage air conditioning systems. Simultaneously, there is a need for testing and economic evaluation of cold (heat) storage air conditioning systems in relation to power systems. The coordinated economic evaluation of the system also urgently needs to be incorporated into the standardization system. This document proposes a cold (heat) storage air conditioning system by adding laboratory/field testing methods for heat pump thermal storage units and multi-split ice storage chiller units. The system, after practical application, establishes metering requirements for avoidable capacity, avoidable electricity consumption, and maximum peak load transfer, and correlates these parameters. The electricity metering method was added to the existing economic evaluation calculation of the cold (heat) storage air conditioning system. By comparing the cold (heat) storage air conditioning system under typical operating conditions, The operating costs of cold storage and non-cold (heat) air conditioning systems are discussed, and solutions for cold (heat) air conditioning systems are provided to design institutes, construction units, and power departments. The basis for case argumentation and evaluation.

1 Scope

GB/T 19412-2025 is the Chinese national standard covering judging a thermal storage plant - the storage and release capacities measured over a full cycle, the losses while charged, the shift of load off the peak hours that is the whole reason for building it, and the efficiency of the system rather than of the chiller. It replaces GB/T 19412-2003, a standard twenty-two years old. In force from 1 May 2026. Issued on 31 October 2025, it has been in force since 1 May 2026, replacing GB/T 19412-2003.

This document describes the technical performance testing and benefit evaluation methods for cold (heat) storage air conditioning systems. This document applies to cold storage (heat storage) air conditioning systems consisting of a refrigeration (heat storage) system and a cooling (heat supply) system. This document is applicable to... This method is applicable to the testing and evaluation of existing cold (heat) storage air conditioning systems, and is also suitable for design institutes, construction units, and power departments to conduct cold (heat) storage air conditioning system testing and evaluation. Overall scheme demonstration and evaluation. This document does not apply to refrigeration (heat) storage systems with a nominal cold (heat) storage capacity of less than or equal to 10 kW·h.

The following symbols apply to this document. The ZA refrigeration (heating) storage system represents the total electrical energy input to the system during one design cycle under nominal operating conditions, expressed in units of... In kilowatt-hours (kW.h) EA represents the total electrical input to the refrigeration (heat) storage system when calculating the coefficient of performance (COP). The unit is kilowatt-hours. (kW.h). N represents the input power of each operating device in the refrigeration (heat) release and storage (heat) cycle test. Rate, unit is kilowatt (kW); N; During the cold (heat) release and cold (heat) storage cycle test, the refrigeration (heat) storage system operates in various ways during the cold (heat) storage process. The input power of the line device is expressed in kilowatts (kW). Ti refers to the equipment uptime, expressed in hours (h). A yw refers to the total annual electricity input of a refrigeration (heating) system without cold (heat) storage function during peak grid load periods, expressed in kilowatt-hours. (kW.h); Ay represents the total annual electricity input to the cooling (heating) storage system during peak grid load periods, expressed in kilowatt-hours (kW·h). N represents the installed capacity of the computer room for a refrigeration (heating) system without cold (heat) storage function, expressed in kilowatts (kW). N represents the installed capacity of the computer room for the refrigeration (heat) storage system, in kilowatts (kW). N y represents the capacity of each component in the refrigeration (heating) storage system, expressed in kilowatts (kW). Nw represents the capacity of each component in a refrigeration (heating) system without cold (heat) storage function, expressed in kilowatts (kW).

5.1 Basic Provisions

5.1.1 General Rules Cooling (heating) storage systems can be entirely assembled in the factory, or assembled on-site using factory-supplied components, or follow a pre-determined process. The design drawings were installed on site. The nominal cooling (heating) capacity, total input power, and coefficient of performance (COP) of the chiller (heater) unit are provided by the refrigeration (heating) equipment manufacturer and should be... Meets the requirements of GB/T 18430.1-2024.Nominal cooling (heating) capacity, total input power, and cooling (heating) performance of multi-split air conditioning units. The coefficient is provided by the refrigeration (heating) equipment manufacturer and should comply with the requirements of GB/T 18837-2015. The tests are divided into two forms. laboratory tests and field tests.

5.1.2 Laboratory Testing According to the method specified in 6.1, determine the technical performance indicators of the refrigeration (heat) storage system [nominal cold (heat) storage capacity, cold (heat) storage performance]. coefficient].

5.1.3 Field Testing The following on-site test items shall be determined according to the method specified in 6.1.

a) Determine the technical performance indicators (nominal cold (heat) storage capacity and cold (heat) storage performance coefficient) of the refrigeration (heat) storage system, and determine the refrigeration... Economic evaluation indicators for (thermal) cold (thermal) storage systems (annual peak transfer power, annual peak transfer rate, peak transfer volume, peak transfer rate, etc.) Maximum peak load transfer);

b) Determine the economic evaluation indicators for the cold (heat) storage air conditioning system (total annual power input and static differential investment payback period);

c) Determine the social benefit evaluation indicators (avoidable capacity, avoidable electricity consumption) of the cold (heat) storage air conditioning system.

5.2.2 Total power input to the refrigeration (heating) storage system The total power input to the refrigeration (heating) storage system is the total power consumed during the cold (heat) release cycle test and the cold (heat) storage cycle test. The sum of electrical charges. Test according to the methods specified in Appendix A, Appendix B and Appendix C, and calculate according to formula (1) and formula (2).

5.2.3 Cold (Heat) Storage Performance Coefficient During the nominal cold (heat) storage capacity test, the ratio of the measured nominal cold (heat) storage capacity of the refrigeration (heat) storage system to the total input electricity is calculated according to the formula... Calculate using equation (3).

5.3.1 Annual peak transfer power