ICS 27.200
CCS J 73

NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 47620-2026

Test methods for the energy efficiency of central air-conditioning cooling and heating source unit systems

集中空调冷（热）源机组系统能效试验方法

Issued on: May 25, 2026 **Implemented on: December 1, 2026**

Issued by: State Administration for Market Regulation;
Standardization Administration of the PRC

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4 System Type

The types, composition, and functions of cold (heat) source systems are shown in Table 1.

5.1 General Rules

5.1.1 Energy efficiency testing of the cold (heat) source system should be conducted after the central air conditioning system [including the cold (heat) source system and air conditioning terminal equipment] has been put into normal operation. Perform after use.

5.1.2 Energy efficiency testing of cold (heat) source systems should select representative typical time periods, usually a complete cooling season, heating season, or... annual.

5.1.3 Cold (heat) source systems should preferably be equipped with an energy efficiency testing platform that complies with the requirements of 5.2.If no platform is available or the provided platform is non-compliant, the testing should be conducted by a qualified testing organization. Provide an energy efficiency testing platform that meets the requirements of 5.2.

5.2.1 Measurement point requirements

5.2.1.1 The arrangement of measuring points on the energy efficiency testing platform shall comply with the provisions of Table 2.

5.2.1.2 The installation of instruments at each measuring point shall comply with the

following regulations.

a) The temperature gauge should be inserted to a depth of 1/2 to 2/3 of the pipe diameter, or the average value should be taken from multiple evenly distributed points along the circumference of the pipe perpendicular to the water flow. Measured by value;

b) The straight pipe sections before and after the flow meter shall be no less than 5 times and 3 times the pipe diameter, respectively.

5.2.1.3 The hardware setup of the energy efficiency testing platform should facilitate the maintenance, repair, and replacement of instruments at each testing point. It is advisable to reserve space around the testing points for future upgrades. Necessary facilities for on-site verification later.

Note. If blind tubes for inserting and calibrating platinum resistance thermometers are reserved around the temperature measuring points.

5.2.2 Instrument and Meter Accuracy Requirements

5.2.2.1 The accuracy of the instruments and meters of the energy efficiency testing platform shall meet the requirements of Table 3.

5.2.2.2 Before the test, the accuracy of the instruments and meters should be verified on-site; during the test, at least one random on-site verification should also be conducted. Verification. The verification results should not exceed the maximum permissible error specified in Table 3.

5.2.3 Data Processing

5.2.3.1 Periodicity Requirements The data collection and recording interval should not exceed 1 minute.

5.2.3.2 Storage Requirements Data storage must meet the following requirements.

a) The data recorded by the energy efficiency testing platform should be able to be automatically stored and historical data exported;

b) The disk capacity of the energy efficiency testing platform should be able to store at least 2 years of data.

5.2.3.3 Data Security Requirements The energy efficiency testing platform should allow users to set protection levels and passwords, and the transmission and database should ensure data security, traceability, and immutability. tamper.

5.2.3.4 Data Validation Requirements The integrity of data records should not be less than 98% during the testing period. For water-cooled and water (ground) source cooling (heating) systems, the energy balance coefficient during normal system operation throughout the entire test cycle is... The percentage of time that (MEBC) exceeds 5%

should not exceed 15%.

5.2.3.5 Functional Requirements The energy efficiency testing platform's data processing has the following functions.

a) The data stored on the energy efficiency testing platform should be retrievable for any time period;

b) The energy efficiency testing platform should have the function of resuming interrupted data transmission. When the data is interrupted and resumed, it should be able to automatically re-enter the data from the time of interruption.

5.2.4 Parameter Calculation All test parameters and energy efficiency results calculations shall comply with the provisions of Chapter 6.

6.1 Overview

6.1.1 The cooling (heating) capacity of the cold (heating) source system shall be tested according to the liquid refrigerant method in GB/T 10870.Different system types shall be tested for different cooling seasons. The energy efficiency ratio or heating seasonality coefficient shall be calculated in accordance with the provisions of

6.1.2 If each chiller (heater) unit in the system is equipped with flow and temperature measurement points, then the system's chiller/heater capacity covered in this document is allowed to be calculated according to the ratio of flow and temperature measurement points. The calculation should be based on the cumulative value of the unit's cooling and heating capacity.

6.2 Water-cooled type The seasonal energy efficiency ratio of a water-cooled cold (heat) source system is calculated according to formula (2).

6.3 Evaporative Cooling Type

6.3.1 The seasonal energy efficiency ratio of evaporative cooling cold (heat) source system is calculated according to formula (3).

6.3.2 The seasonal energy coefficient of the heating season of the evaporative cooling cold (heat) source system is calculated according to formula (4).

6.4 Air-cooled type

6.4.1 The seasonal energy efficiency ratio of air-cooled cold (heat) source systems shall be calculated in accordance with the provisions of 6.3.1.

6.4.2 The seasonal energy efficiency coefficient for heating of air-cooled cold (heat) source systems shall be calculated in accordance with the provisions of 6.3.2.

6.5 Water (Ground) Source Type

6.5.1 The seasonal energy efficiency ratio of water (ground) source cold (heat) source system is calculated according to formula (5).

6.5.2 The seasonal energy coefficient of heating for water (ground) source cold (heat) source systems is calculated according to formula (6).

6.6 Water-cooled direct expansion type The seasonal energy efficiency ratio of a water-cooled direct expansion type cold (heat) source system is calculated according to formula (7).

7 Results Evaluation

7.1 The energy efficiency of the cold (heat) source system is evaluated based on the results output by the energy efficiency testing platform. This document uses a complete cooling system... Evaluations can be conducted seasonally, during the heating season, or throughout the year.

7.2 The energy efficiency classification of cold (heat) source systems is divided into leading level and high-efficiency level, where the leading level should simultaneously meet the energy efficiency limit requirements of

7.4 Requirements for all advanced evaluation content.

7.3 For the five types of cold (heat) source systems specified in this document-water-cooled, evaporative cooling, air-cooled, water (ground) source, and water-cooled direct expansion-their The system's energy efficiency ratio (EER) during the cooling season should not be lower than the limit specified in Table

4.For evaporative cooling, air-cooled, and water (ground) source systems, the heating season... The performance coefficient should not be lower than the limit specified in Table 5.

7.4 The evaluation criteria for advancement are shown in Table 6.