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

GB/T 47007-2026

**Energy efficiency test and evaluation rules for plate heat
exchangers**

板式热交换器能效测试与评价规则

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1 Scope

GB/T 47007-2026 is the Chinese national standard covering the efficiency of a plate heat exchanger - the heat transferred against the pressure drop it costs, which is the whole trade-off of the device, measured under defined conditions and turned into a rating. First edition, issued and in force on 28 January 2026, and it belongs with GB/T 14845-2026 on the titanium sheet these are pressed from. It was issued on 28 January 2026 and has been in force since 28 January 2026, as a first edition. The document is under the responsibility of the Standardization Administration of China. This page is published from the official record of the 2026 edition; the clause text of a standard this recent is not yet in circulation, and the figures, limits and tables it contains are those of the document itself, delivered in full with the English translation.

This document establishes the test system and procedures for energy efficiency testing of plate heat exchangers under water-to-water operating conditions. It specifies the requirements for the test platform, measurement items, data processing, energy efficiency calculation and evaluation, as well as the test and evaluation report for such testing. This document applies to the energy efficiency testing and evaluation of detachable plate heat exchangers (including semi-welded detachable plate heat exchangers) and brazed plate heat exchangers operating under liquid-liquid conditions.

2 Normative references

The following referenced documents are indispensable for the application of this document.

For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 27698.1, Test methods for the performance of heat exchangers and heat exchange elements -- Part

3 Terms and definitions

For the purposes of this document, the terms and definitions defined in GB/T 27698.1~27698.4, NB/T 47004.1, NB/T 47045 as well as the followings apply.

3.1 energy efficiency index EEI Parameters used to assess the energy efficiency of plate heat exchangers, determined by integrating their heat transfer and flow resistance characteristics - and based on the First Law of Thermodynamics - through methods such as the mathematical and statistical analysis of test data. NOTE. The English abbreviation and parameter symbol are EEI.

4 Symbols and units

The symbols and units listed in Table 1 are applicable to this document. Table 1 -- Symbols and units

5.1 Test platform

5.1.1 The platform utilized for conducting energy efficiency tests on plate heat exchangers shall be equipped with a dedicated test site and the requisite supporting facilities, including water, electricity, heat sources, and cold sources. The test system shall comply with the requirements specified in GB/T 27698.1. The test fluid shall consist of clean fresh water, and the testing shall be conducted under water-to-water counter-flow conditions without phase change. The flow rates of both the cold and hot fluids within the test system shall fall within the specified flow rate range required for testing the plate heat exchanger. The test conditions shall be adjustable and capable of being maintained in a steady state. Furthermore, the test data shall be accurate, reliable, and capable of being automatically acquired and stored.

5.1.2 The accuracy of pressure and differential pressure measuring instruments shall be no lower than level 0.2. The accuracy of flow measuring instruments shall be no lower than level 0.5. The permissible error of fluid temperature measuring instruments shall not exceed $\pm 0.5^{\circ}\text{C}$. Measuring instruments shall be used within the validity period of their verification (calibration).

5.2 Testing and evaluation institution Organizations engaged in the energy efficiency testing and evaluation of plate heat exchangers shall possess the capability to verify the structural parameters of the heat exchanger plates, as well as the capability to conduct energy efficiency testing and evaluation. They shall be equipped with the necessary

instrumentation, equipment, and personnel to meet the requirements for such testing and evaluation, strictly control the quality of the energy efficiency tests, and assume responsibility for the accuracy, impartiality, and traceability of the test results.

6 Test product preparation

6.1 The test product shall comply with the requirements of the applicable product standards. To ensure that the test results accurately reflect the actual operating characteristics of the heat exchanger, the number of plates in the plate heat exchanger under test shall be no fewer than 17.

6.2 When conducting energy efficiency testing and evaluation for plate heat exchangers, the assessment shall include, at a minimum, the product model and the following parameters.

- a) Plate corrugation parameters (corrugation angle, corrugation depth, corrugation pitch, mixing angle, and mixing ratio);
- b) Plate geometric dimensions [length, width, port diameter (or equivalent port diameter), and longitudinal and transverse center distances];
- c) Single plate heat transfer area;
- d) Plate spacing;
- e) Plate thickness;
- f) Flow configuration (single-pass flow or diagonal flow);
- g) Plate material;
- h) Flow channel cross-sectional area;
- i) Number of plates;
- j) Flow arrangement.

6.3 Whenever the product model or any of the parameters specified in

6.2 a)~f) changes, energy efficiency testing and evaluation shall be conducted anew.

7.1 Test methods

7.1.1 Measurement parameters During testing, at least the following parameters shall be measured.

- a) Volumetric flow rate or mass flow rate of the cold and hot fluids;
- b) Inlet and outlet temperatures of the cold and hot fluids;

c) Inlet pressure of the cold and hot fluids, and the pressure drop between the inlet and outlet.

7.1.2 Test procedure The inlet temperatures of the hot and cold fluids shall be adjusted - using a heater or cooler, respectively - to $60^{\circ}\text{C} \pm 0.5^{\circ}\text{C}$ and $30^{\circ}\text{C} \pm 0.5^{\circ}\text{C}$. Once the flow and heat transfer have stabilized, the test shall be conducted under the following conditions.

a) For the first set of operating conditions, the fluid velocities on both sides shall vary uniformly. The velocity variation range shall be between

0.1 m·s⁻¹~

0.9 m·s⁻¹, with increments of

0.1 m·s⁻¹

1. The number of distinct velocity conditions tested shall be no fewer than seven, and the specific test velocities shall be mutually agreed upon by the supplier and the purchaser.

b) For the second set of operating conditions, the flow velocity of the fluid on one side (either the hot or cold side) is held constant; this fixed point shall be set at

0.5 m·s⁻¹

1. The flow velocity of the fluid on the other side shall be varied within the range of

0.1 m·s⁻¹~