

ICS 27.200

CCS J 73



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

GB/T 41872-2022

**Heat exchangers for refrigerating systems and heat pumps -
Performance test and evaluation method based on the third
fluid**

制冷系统及热泵用换热器 温度、压力和速度三场协同的性能测试和评价方法

Issued on: October 14, 2022

Implemented on: February 1, 2023

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

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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 of Standardization Documents" drafted. Please note that some content of this document may be patented. The issuing agency of this document assumes no responsibility for identifying patents. This document is proposed by China Machinery Industry Federation. This document is under the jurisdiction of the National Technical Committee for Standardization of Refrigeration and Air-conditioning Equipment (SAC/TC238). This document was drafted by: Xi'an Jiaotong University, Hefei General Machinery Research Institute Co., Ltd., Guangdong Midea HVAC Equipment Co., Ltd., Zhejiang Intel Technology Co., Ltd., Guangdong Fenix Energy Saving Equipment Co., Ltd., Shanghai University of Science and Technology, South China University of Technology, Shanghai Refrigeration and Air Conditioning Industry Association, Ningbo Aux Electric Co., Ltd., Guangdong New Energy Technology Development Co., Ltd., Binglun Environmental Technology Co., Ltd. Co., Ltd., Hefei General Electromechanical Products Testing Institute Co., Ltd., Hefei General Environmental Control Technology Co., Ltd. The main drafters of this document. He Yaling, Tao Wenquan, Zhang Xiuping, Zhang Mingsheng, Zhang Kai, Luo Bin, Fang Zhenjian, Liu Yuanhui, Zhang Hua, Liu Jinping, Shao Naiyu, Du Wenchao, Zhao Misheng, Zhang Chao, Li Zhiliang, Wang Rujin, Fan Jufang, Li Mingjia, Tang Songzhen, Tong Zixiang. Heat exchangers for refrigeration systems and heat pumps The three fields of temperature, pressure and velocity are synergistic Performance testing and evaluation methods

1 Scope

China's national performance test and evaluation method for refrigeration and heat pump heat exchangers using a third fluid. The difficulty this addresses is real and awkward. Testing an evaporator or a condenser conventionally means running it with its refrigerant in a working circuit, which requires a compressor, a full charge, and instrumentation of a two-phase flow whose quality is hard to measure - and the result depends on the rest of the system rather than on the exchanger alone. The third fluid method replaces the refrigerant

with a single-phase liquid whose properties are known and easily measured, so the exchanger's thermal and hydraulic performance can be determined by itself, on a bench, without a refrigeration circuit at all. The results are then transferred to the refrigerant duty by calculation. It makes comparative testing of exchangers practical, which is what a manufacturer selecting one from several suppliers needs.

This document specifies the performance test and performance test of the temperature field, pressure field and velocity field of the fluid in the refrigeration system and heat pump heat exchanger. Evaluation method. This document is applicable to the evaluation of the overall performance of flow resistance and heat transfer of heat exchangers used in refrigeration systems and heat pumps, where at least one side is single-phase heat exchange.

2 Normative references

The contents of the following documents constitute essential provisions of this document through normative references in the text. Among them, dated citations documents, only the version corresponding to that date applies to this document; for undated references, the latest edition (including all amendments) applies to this document.

GB/T 10870-2014 Performance test method for vapor compression circulating chilled water (heat pump) units

GB/T 23130-2008 Heat Exchangers for Room Air Conditioners

GB/T 25862-2010 Coaxial casing heat exchanger for refrigeration and air conditioning

JB/T 7249 Refrigeration Equipment Terminology

3 Terms and Definitions

The terms and definitions defined in JB/T 7249 and the following terms and definitions apply to this document.

3.1 Minimum cross-sectional area A_c Along the flow direction, the area of the fluid in the heat exchanger at the minimum flow cross-section.

Note. The unit is square meter (m^2).

3.2 u_c The flow velocity used to calculate the Reynolds number is taken as the average flow velocity of the fluid at the smallest cross-sectional area in the heat exchanger.

Note. The unit is meters per second (m/s).

3.3 The overall length of the fluid flow direction of the compared side within the heat exchanger.

Note. The unit is meters (m).