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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 27698.4-2023

Replacing GB/T 27698.7-2011

Test methods for the performance of heat exchangers and heat exchange elements - Part 4: Measurement of noise from air-cooled heat exchangers

热交换器及传热元件性能测试方法 第4部分：空冷器噪声测定

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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 for Standardization Documents" drafting: This document is part 4 of GB/T 27698 "Test Methods for Performance of Heat Exchangers and Heat Transfer Elements": GB/T 27698 has been issued the following sections:

--- Part 1: General requirements;

--- Part 2: Heat exchangers;

--- Part 3: Heat transfer elements;

--- Part 4: Determination of air cooler noise: This document replaces GB/T 27698:7-2011 "Test methods for performance of heat exchangers and heat transfer elements - Part 7: Noise measurement of air coolers Certainly": Compared with GB/T 27698:7-2011, except for structural adjustment and editorial changes, the main technical changes are as follows:

a) The terms and definitions of "background noise", "background noise correction", "environmental correction" and "power correction" have been added (see Chapter 3);

b) Added symbols (see Chapter 4);

c) Changed the background noise correction method (see 6:2, 5:2 of GB/T 27698:7-2011);

d) Increased fan power correction factor K3 (see 6:3);

e) Changed the requirements for special measuring points at specified locations (see 8:1:3:3, 8:2:3:2, 7:1:3:3 of GB/T 27698:7-2011, 7:2:3:2);

f) Added fan power correction when calculating sound power (see 8:1:5:6 and 8:2:5:1): Please note that some contents of this document may refer to patents: The issuing agency

of this document assumes no responsibility for identifying patents: This document is proposed and managed by the National Standardization Technical Committee of Boilers and Pressure Vessels (SAC/TC262): This document is drafted by: Shanghai Lanbin Petrochemical Equipment Co:, Ltd:, Gansu Lanke Petrochemical High-tech Equipment Co:, Ltd:, Sinopec Chemical Engineering Construction Co:, Ltd:, Baoding Hangji Fan Manufacturing Co:, Ltd:, Shanghai Lanhai Technology Innovation Testing Co:, Ltd:, Harbin Air Conditioning Co:, Ltd: Company, Hubei Changjiang Petrochemical Equipment Co:, Ltd:, Shanghai Customs Industrial Products and Raw Materials Testing Technology Center, Machinery Industry Lanzhou Petrochemical Equipment Equipment Testing Institute Co:, Ltd: The main drafters of this document: Jiang Chen, Han Zhuo, Zhou Feng, Zhang Yingkai, Yu Yanwen, Yin Jiying, Zhao Tianbo, Zhang Xiangnan, Chen Zhanyang, Bi Guosheng, Gao Liping, Zhan Xuefeng, Cao Jinjun, Zhou Wenxue, Zhang Yanfeng: The previous versions of the documents replaced by this document are as follows:

---GB/T 27698:7, first released in:2011:

Performance testing is the most accurate method of determining the flow and heat transfer characteristics of heat exchangers and heat transfer elements: In order to ensure that the performance test is carried out in an orderly manner GB/T 27698 aims to establish the test system, test conditions and data processing generally applicable to the performance test of heat exchangers and heat transfer elements: The method and test report requirements are proposed to be composed of 4 parts:

--- Part 1: General requirements: The purpose is to establish a test system and test system suitable for performance testing of various heat exchangers and heat transfer elements: General requirements for measuring instruments, measuring methods, data processing methods and test reports:

1 Scope

China's national standard for measuring the noise emitted by air-cooled heat exchangers. It is Part 4 of GB/T 27698 and specifies the measurement methods, the measurement conditions and positions, the instrumentation, the data processing and the report for the noise of air coolers. An air-cooled heat exchanger rejects heat to the atmosphere instead of to cooling water, which is why refineries, petrochemical plants, gas compression stations and power plants use them wherever water is scarce or expensive to treat. The price of that is a bank of large low-speed fans running continuously, and noise is the constraint that most often decides where such a unit can be installed and how it must be built. A plant near a residential boundary is designed around its noise limit, and the difference between meeting it and not is the difference between a project and a planning refusal. Measuring the noise honestly is harder than it appears. An air cooler is a large distributed source rather than a point source, it is usually mounted high on a structure, it is frequently one of several running together, and the sound it produces is not uniform around it: the fan is directional, the

bundle radiates differently from the plenum, and the ground and adjacent structures reflect. So the standard fixes the measurement surface and the positions on it, the distance from the unit, the correction for background noise and for the environment, the instrumentation and its calibration, the operating condition of the unit during the measurement, and the way the measured sound pressure levels are converted into the sound power level that can be compared between units. Issued and in force since 23 May 2023, it replaces GB/T 27698.7-2011.

This document describes the measurement parameters, test environment, test instruments, test methods and test methods for noise determination of air coolers (air-cooled heat exchangers): set reporting requirements: This document is applicable to the outlet of induced draft air coolers and blast air coolers of dry type, wet type and wet-dry mixed type with horizontal or inclined tube bundles: Noise measurement in factory or on site:

Note 1: The noise measurement at the factory refers to the noise measurement of a single span by the manufacturer before the product leaves the factory:

Note 2: On-site noise measurement refers to the noise measurement of a unit on the installation site device:

2 Normative references

The contents of the following documents constitute the essential provisions of this document through normative references in the text: Among them, dated references For documents, only the version corresponding to the date is applicable to this document; for undated reference documents, the latest version (including all amendments) is applicable to this document: GB/T 3102:

3 Terms and Definitions

GB/T 3102:7, GB/T 27698:1, NB/T 47007 and the following terms and definitions apply to this document: 3:1 cross bay It consists of one or more tube bundles, equipped with one or more fans, and also includes a frame, bellows and other accessories: 3:2 unit unit A bundle of one or more tubes for a single purpose: 3:3 induced-draughtexchanger The tube bundle is placed on the air cooler on the suction side of the fan:

7 Acoustic quantities and units

GB/T 3241 Electroacoustic octave and fractional octave filters

GB/T 3767-2016 Acoustic sound pressure method Determination of sound power level of noise source and sound energy level Approximate free field above the reflecting surface Process method GB/T 3785: