

ICS 23.040.10

CCS H 48



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

GB/T 28713.1-2012

Replacing GB/T 28713.1-2012, GB/T 28713.2-2012, GB/T 28713.3-2012

**Enhanced heat transfer tubes used in heat exchanger
(English Translation)**

Issued on: September 7, 2023

Implemented on: September 7, 2023

**Issued by: State Administration for Market Regulation, China National
Standardization Administration**

Table of Contents

Preface
Introduction
1 Scope
2 Normative reference documents
3 Terms and Definitions
4 Type and basic parameters
5 Make
6 Inspection and Acceptance
7 Inspection Rules
8 Quality certification documents, packaging and marking
Appendix A (informative) Strengthening the quality of heat transfer tubes and heat transfer area
Appendix B (Normative) Maximum allowable working pressure of bellows

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 replaces GB/T 28713.1-2012 "Enhanced heat transfer elements for shell and tube heat exchangers - Part 1: Threaded pipes", GB/T 28713.2-2012 "Enhanced heat transfer elements for shell and tube heat exchangers Part 2: Stainless steel bellows", GB/T 28713.3-2012 "Enhanced heat transfer elements for shell and tube heat exchangers - Part 3: corrugated tubes", consistent with GB/T 28713.1~28713.3-2012 in addition to structural adjustments and editorial changes, the main technical changes are as follows.

- a) Added sintered surface porous tubes, T-shaped tubes, spiral flat tubes, and longitudinal grooved tubes (see Chapter 1);
- b) Increased the scope of application of enhanced heat transfer tubes (see Chapter 1);
- c) Added two specifications of threaded pipes, DN16 and DN32 (see 4.2.2);
- d) Added examples of enhanced heat transfer tube markings (see 4.10);
- e) Added types of titanium, copper and nickel materials for threaded pipes (see 5.1);
- f) Added requirements for the allowable deviation of the threaded pipe end (see 5.2);

g) Modified the requirements for the allowable deviation of bellows joints (see 5.2.6, 4.2 of GB/T 28713.2-2012);

h) Modified the inspection requirements for threaded pipes (see Chapter 6, Chapter 6 of GB/T 28713.1-2012);

i) Modified the inspection requirements for corrugated tubes (see Chapter 6, Chapter 7 of GB/T 28713.3-2012);

j) The inspection rules for bellows have been modified (see Chapter 7, 5.8 of GB/T 28713.2-2012).

Please note that some content in this document may be subject to patents. The publisher of this document assumes no responsibility for identifying patents.

Introduction

With the development needs of energy saving, consumption reduction and large-scale equipment, the types and applications of heat transfer tubes are strengthened by changing the shape or surface properties of the tubes.

The occasion expanded accordingly. The application of enhanced heat transfer elements can reduce equipment volume, reduce metal consumption, improve process heat transfer efficiency, and save energy consumption.

In recent years, the advancement of manufacturing technology and the continuous development of enhanced heat transfer components have made great progress in the research of new high-efficiency shell and tube heat exchangers.

According to the development of the industry, different structural types of enhanced heat transfer tubes have been designed and developed according to different process conditions and heat exchange conditions, and have been used in various industrial devices.

Promotion and application.

This revision is based on the actual engineering application of enhanced heat transfer tubes for heat exchangers. The "Enhanced Heat Transfer Elements for Shell and Tube Heat Exchangers" Part 1: Threaded pipes" (GB/T 28713.1-2012), "Enhanced heat transfer elements for shell and tube heat exchangers Part 2: Stainless steel corrugations Tubes" (GB/T 28713.2-2012), "Enhanced heat transfer elements for shell and tube heat exchangers - Part 3: Node tubes" (GB/T 28713.3-

2012) three parts were merged into one document "Enhanced Heat Transfer Tubes for Heat Exchangers", and the standard name was changed from "Enhanced Heat Transfer Elements for Shell and Tube Heat Exchangers" "Parts" was changed to "Enhanced heat transfer tubes for heat exchangers". On the basis of the original standard threaded pipe, stainless steel bellows and corrugated pipe, the sintered type table has been expanded.

surface porous tubes, T-shaped tubes, spiral flat tubes, and longitudinal grooved tubes. The applicable scope of enhanced heat transfer tubes has been changed, and the applicable media for all enhanced heat transfer tubes have been added.

Description of the qualitative situation. This revision leads and standardizes the development of the industry and plays a positive role in promoting the technological progress of the industry.

Enhanced heat transfer tubes for heat exchangers

1 Scope

This document specifies the type and basic parameters, manufacturing, inspection and acceptance, quality certification documents, packaging and Marking requirements.

This document is applicable to enhanced heat transfer tubes such as sintered surface porous tubes, threaded tubes, T-shaped tubes, spiral flat tubes, longitudinal grooved tubes, corrugated tubes, corrugated tubes, etc.

of ordering.

2 Normative reference documents

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

GB/T 151 heat exchanger GB/T 241 Hydraulic test method for metal pipes GB/T 1804 General tolerances Tolerances for linear and angular dimensions without tolerances noted GB/T 4436 Dimensions and allowable deviations of aluminum and aluminum alloy pipes GB/T 6893 Aluminum and aluminum alloy drawn (rolled) pipes NB/T 47013.5 Non-destructive testing of pressure equipment Part 5: Penetration testing NB/T 47014 Welding process qualification for pressure equipment NB/T 47019 (all parts) Technical conditions for ordering tubes for boilers and heat exchangers

3 Terms and definitions

The terms and definitions defined in GB/T 151 and the following apply to this document.

The heat exchange tube with a large number of porous layers is prepared on the metal surface by powder sintering.

porosityvoidcontent

The percentage of the pore volume of the porous layer to the total volume of the material in

its natural state.

threadedtubes

On the outer surface of the seamless steel pipe, an integral low-finned tube is made by circumferential spiral rolling.

finratio

Strengthen the ratio of the total surface area of the heat transfer tube after processing to the surface area of the base tube before processing.

T-shaped tubes

The outer wall of the base pipe is cold-processed into a special pipe with a spiral T-shaped groove.