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

GB/T 19447-2013

Replacing GB/T 19447-2004

**Copper and copper-alloys seamless tubes with integral fins for
heat exchanger**

热交换器用铜及铜合金无缝翅片管

(English Translation)

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Foreword

This standard is in accordance with GB/T 1.1-2009 given rules drafted.

This revised standard adopts ASTM B359/B359M.2002 (2006) "and condenser heat

exchangers with copper and copper alloy seamless fin tube".

The main technical aspects of this standard and ASTMB359/B359M.2002 (2006) "condensers and heat exchangers with copper and copper alloy non Finned tube seam" differences.

--- In ASTMB359/B359M.2002 (2006), based on the increase in the hard state requirements;

--- In ASTMB359/B359M.2002 (2006), based on the increase in the hardness test requirements;

--- In ASTMB359/B359M.2002 (2006), based on the increase in the cleanliness test requirements;

--- In ASTMB359/B359M.2002 (2006), based on the increase in the index requirements and test methods for thermal performance.

This standard replaces GB/T 19447-2004 "heat exchangers with finned copper and copper alloy seamless pipe," this standard and GB/T 19447-2004 compared to the following modifications.

--- Increase HSn72-1 (C44300) grades;

--- Thickness range from the "0.60mm ~ 2.0mm" changed to "0.60mm ~ 3.0mm";

--- Increase common specifications and parameters;

--- The pipe delivery status demanded a re-revised;

--- Size parameters required to increase the "outer wing fin number (FPI)" and "within the rack number (N)";

--- To increase the hardness (HV1) test project and requirements and hard state (H04) requirements in terms of mechanical properties;

--- Tightened the testing requirements of the standard hole (the hole standard 1.07mm to 0.8mm; 1.17mm to 1.1mm);

--- Grain size by the "0.025mm ~ 0.060mm" changed to "0.010mm ~ 0.050mm";

--- Increased cleanliness testing standards and requirements;

--- Each batch by weight of "2000kg" revised to 4500kg;

--- Provisions made for sampling revised;

--- Part of the test standard reference again revised.

This standard by the national non-ferrous metals Standardization Technical Committee (SAC/TC243) centralized.

1 Scope

This standard specifies the copper and copper alloy seamless pipe finned requirements, test methods, inspection rules and signs, packaging, transportation, storage, quality certificate Specification and contracts (or orders) and so on.

This standard applies to the heat exchanger with a fin height of not more than 4mm overall outer spiral fins and the inner ribs of copper and copper alloy seamless tube.

2 Normative references

The following documents for the application of this document is essential. For dated references, only the dated version suitable for use herein Member. For undated references, the latest edition (including any amendments) applies to this document.

GB/T 228.1-2010 metal material tensile test - Part 1. room temperature test methods (ISO 6892-1:2009, MOD) GB/T 241 metal pipe Hydrostatic pressure testing GB/T 242 Test Method metal tube expansion port (ISO 8493:1998, IDT) GB/T 246 metal pipe flattening test methods (ISO 8492:1998, IDT) Test Method. GB/T 4340.1 metallic materials - Vickers hardness test - Part 1 (ISO 6507-1:2005, MOD) GB/T 5121 (all parts) of copper and copper alloys -GB/T 5231 Wrought copper and copper alloy chemical composition and shape of the product GB/T 5248 copper and copper alloy seamless pipe eddy current testing method GB/T 8888 heavy non-ferrous metal processing products, packaging, labeling, transportation and storage GB/T 8890 copper alloy seamless pipe heat exchanger GB/T 10567.2 copper and copper alloy processing material residual stress - Ammonia test test method GB/T 16866 copper and copper alloy seamless pipe dimensions and tolerances GB/T 17791-2007 Air Conditioning & Refrigeration equipment brass GB/T 26303.1 copper and copper alloy processing material Dimensions test methods - Part 1. Pipes

347 Single YS/T-phase copper alloy grain size measurement method YS/T 482 copper and copper alloy analysis photoemission spectroscopy

3.1.1 Grade, before finning status, specifications

3.1.1.1

pipe grades, finning former state specifications shall comply with the requirements in Table 1.

Table 1 pipe grade, status, size

Grade former state code finning Specifications/mm Wingless segment (Outer diameter D x wall thickness T) Finning section (Fin fin height Hf x number FPI (/ Inch) x Bottom thickness Tf) TU00 TU1 TU2 TP1 TP2 C10100 T10150 T10180 C12000 C12200 Soft annealed state (O60) Gently pull the state (H55) Drawing state (H80) (7 ~ 30) x (0.6 ~ 3.0) BFe5-1.5-0.5

BFe10-1-1 BFe30-1-1 C70400 T70590 T71510 Soft annealed state (O60) (10 ~ 26) x (0.75 ~ 3.0) HA177-2 HSn72-1 HSn70-1 HAs85-0.05 C68700 C44300 T45000 T23030 Soft annealed state (O60) (10 ~ 26) x (0.75 ~ 3.0) (0.3 ~ 3.8) x (11 ~ 56) x (0.4 ~ 2.5)

Note 1: The supply, both sides need to negotiate, can supply other grades and specifications of the pipe.

Note 2: Pipes finning after annealing can be carried out according to customer requirements.

3.1.1.2

Recommended common specifications, the main parameters in Table 2. Names of parts finned tube is shown in Figure 1.

Table 2 Recommended common specifications, the main parameters

Nominal Specifications mm Wingless segment the outer diameter D mm Wall thickness T mm Finning section Diameter Df mm Outer fin height Hf mm Outer wing fin Number of FPI / Inch Inner tooth height Rh mm Internal teeth the number N Internal teeth Helix angle beta (°) Bottom thickness Tf mm 25.32 x 1.18 25.32 1.18 25.32 0.9 46 0.36 45 35 0.64 25.32 x 1.18 25.32 1.18 25.32 0.6 46 0.36 52 35 0.64 18.92 x 1.13 18.92 1.13 18.92 0.6 46 0.36 45 42 0.64 18.92 x 1.13 18.92 1.13 18.92 0.9 46 0.36 45 42 0.64 16 x 0.65 16 0.65 16 0.3 26 0.15 8 43 >=0.5 15.88 x 1.1 15.88 1.1 15.88 0.9 40 0.25 38 40 0.55 19.05 x 1.15 19.05 1.15 19.05 1.45 26 - - - >=0.55 15.88 x 0.6 15.88 0.6 15.88 - - 0.3 60 25 0.5 12.7 x 0.6 12.7 0.6 12.7 - - 0.25 60 42 0.4 23.4 x 2.5 23.4 2.5 26 2.8 12 - - - 1.5 23 x 2.6 23 2.6 26 3.0 11 - - - 1.5 22 x 2.45 22 2.45 27 3.5 11 - - - 0.95 17 x 2.8 17 2.8 19 2.5 12 - - - 1.5 Note. The supply, both sides need to negotiate, we can supply other specifications, the parameters of the pipe.

Explanation.

T --- wingless segment wall thickness;

B --- Transition cone length;

FPI --- outer wing fin number (/ inch);

Hf --- outer fin height;

D --- wingless segment outer diameter;

N --- within the rack number;

beta --- internal teeth helix angle;

Rh --- high internal teeth;

Tf --- finning in bottom wall thickness;

Df --- finning segment outer diameter.