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

GB/T 21832.2-2018

Replacing GB/T 21832-2008

**Welded austenitic-ferritic duplex stainless steel tubes and
pipes - Part 2: Pipes for fluid transport**

奥氏体-铁素体型双相不锈钢焊接钢管 第2部分：流体输送用管

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Foreword

GB/T 21832, Welded austenitic-ferritic (duplex) grade stainless steel tubes and pipes, comprises two parts. -- Part 1. Tubes for heat exchanger; -- Part 2. Pipes for fluid transport. This Part is Part 2 of GB/T 21832. This Part was drafted in accordance with the rules given in GB/T 1.1-2009. This Part of GB/T 21832 partly replaces GB/T 21832-2008, Austenitic-ferritic (duplex) grade stainless steel welded tubes and pipes; and the content not replaced is Tubes for heat exchanger, which is incorporated into Part 1 of GB/T 21832.

Compared with GB/T 21832-2008, the major technical changes of this Part are as follows: -- it changes the standard title; -- it changes the normative references (see Clause 2; Clause 2 of edition 2008); -- it deletes the classification and codes (see Clause 3 of edition 2008); -- it changes the allowable deviations of nominal outer diameter (see 4.1.2;

5.1.2 of edition 2008); -- it adds full-length deflection (see 4.2); -- it changes the smelting method of steels (see 5.2.1;

6.2.1 of edition 2008); -- it changes the manufacturing method of steel tubes and pipes (see 5.2.2;

6.2.2 of edition 2008); -- it deletes the polished delivery condition (see

6.3.2 of edition 2008); -- it changes the tensile test requirements for welded joints (see

5.4.2;

6.4.2 of edition 2008); -- it changes the nondestructive testing requirements for welds (see 5.8;

6.8 of edition 2008); -- it changes the requirements for weld reinforcements (see 5.9.3;

6.9.3 of edition 2008); Welded austenitic-ferritic (duplex) stainless steel tubes and pipes -- Part 2. Pipes for fluid transport

1 Scope

China's national standard for welded duplex stainless steel pipe for fluid transport. It is Part 2 of GB/T 21832 and specifies the order content, the dimensions, shape and weight, the technical requirements, the test methods, the inspection rules, and the packaging, marking and quality certification. Part 1 covers the thin-walled tube of a heat exchanger; this part covers the pipe that carries the fluid, and the difference in duty changes what is required. A transport pipe is larger in diameter and thicker in wall, it is a pressure-retaining component designed to a piping code, it is welded in the field into a system, and it is expected to last the life of a plant. Duplex is chosen for it in seawater and brine service, in offshore process and utility lines, in chemical and desalination plants, and in flue gas desulfurisation, where austenitic stainless steel would crack and a nickel alloy would cost several times more. The strength advantage is worth more here than in a heat exchanger, because a pipe designed on yield strength can use a thinner wall for the same pressure, and on a long line that is a large saving in weight and in welding. What the standard has to fix is what the piping designer and the site welder need: the grades and their composition, the mechanical properties in the delivery condition, the impact toughness including at low temperature, the intergranular and pitting corrosion tests, the hydrostatic test and the non-destructive examination of the weld, the dimensional and straightness tolerances, and the marking that keeps the grade identifiable after the pipe leaves the mill. Issued on 14 May 2018 and in force since 1 February 2019, it replaces GB/T 21832-2008.

This Part of GB/T 21832 specifies the ordering content, dimensions, shape, weight, technical requirements, test methods, inspection rules, packaging, marking and quality certification for welded austenitic-ferritic (duplex) stainless steel pipes for fluid transport. This Part applies to welded austenitic-ferritic (duplex) stainless steel pipes for fluid transport (hereinafter referred to as steel pipes).

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition dated applies to this document. For undated references, the latest edition of the referenced documents (including all amendments) applies to this document.

GB/T 222, Permissible tolerances for chemical composition of steel products

GB/T 223.11, Iron, steel and alloy -- Determination of chromium content -- Visual titration or potentiometric titration method

GB/T 223.18, Methods for chemical analysis of iron, steel and alloy -- The sodium thiosulfate separation iodimetric method for the determination of copper content

GB/T 223.19, Methods for Chemical Analysis of Iron Steel and Alloy -- the Neocuproine-Chloroform Extraction Photometric Method for the Determination of Copper Content

GB/T 223.25, Methods for chemical analysis of iron, steel and alloy -- The dimethylglyoxime gravimetric method for the determination of nickel content

GB/T 223.26, Iron, steel and alloy -- Determination of molybdenum content -- The thiocyanate spectrophotometric method

GB/T 223.28, Methods for chemical analysis of iron steel and alloy -- The alpha-denzoinoxime gravimetric method for the determination of molybdenum content

GB/T 11170, Stainless steel -- Determination of multi-element contents -- Spark discharge atomic emission spectrometric method (Routine method)

GB/T 13305, Micrographic method for determining area content of the alpha-phases in stainless steels

GB/T 20066, Steel and iron-sampling and preparation of samples for the determination of chemical composition

GB/T 20123, Steel and iron -- Determination of total carbon and sulfur content Infrared absorption method after combustion in an induction furnace (routine method)

GB/T 20124, Steel and iron -- Determination of nitrogen content - Thermal conductimetric method after fusion in a current of inert gas

GB/T 21835, Dimensions and masses per unit length of welded steel pipes NB/T 47013.2, Nondestructive testing of pressure equipment - Part 2. Radiographic testing NB/T 47013.11, Nondestructive testing of pressure equipment - Part 11. Standard practice for X-ray digital radiography

3 Ordering content

Contracts or orders for purchase of steel pipes based on this Part shall include the following content.

- a) a reference to this Part;
- b) product name;

- c) steel designation;
- d) dimensions (outer diameter x wall thickness, in mm);
- e) quantity ordered;
- f) special requirements.

5.4.3 Hardness

5.4.3.1 Rockwell hardness or Brinell hardness test for based metals can be carried out for steel pipes of wall thickness not less than

1.7 mm in accordance with the requirements of the purchaser, which shall be as agreed on by the purchaser and the supplier and stated in contracts. When hardness test is specified in contracts, their hardness number shall be as specified in Table 3.

5.4.3.2 Vickers hardness test can be carried out for steel pipes in accordance with the requirements of the purchaser, which shall be as agreed on by the purchaser and the supplier and stated in contracts. Their hardness number shall be as agreed on by the supplier and the purchaser.

5.5 Processing properties

5.5.1 Flattening Flattening test shall be carried out for steel pipes of outer diameter not greater than 219 mm. During the flattening test, welds shall be located at a location forming an angle 90° to the force application direction. Sample shall be pressed until the distance between two plates is H. H is calculated in accordance with Formula (2). After the flattening test, sample shall be free from cracks and gaps. where. H -- the distance between parallel pressing plates after flattening, in mm; α -- the deformation coefficient per unit length, taking 0.07; S -- the nominal wall thickness of steel pipes, in mm; D -- the nominal outer diameter of steel pipes, in mm.

5.5.2 Bend of welded joints

5.5.2.1 Bend test of welded joints shall be carried out for steel pipes of outer diameter greater than 219 mm. Bend samples shall be cut along the lateral direction of steel pipes or from test pieces for welding. Test pieces for welding and steel pipes shall be of the same designation, heat number, welding process and heat treatment system.

5.5.2.2 A bend test shall include one face bend test and one back bend test (i.e. the outer weld and inner weld of steel pipes are located at the maximum bend surface respectively). For steel pipes of wall thickness greater than 10 mm, one group of two side bend tests can be used to replace face bend test and back bend test.

5.8.2 Radiographic testing can be carried out before heat treatment.