NATIONAL STANDARD OF THE

PEOPLE'S REPUBLIC OF CHINA

GB/T 37792-2019

General specification for welded corrosion resistant alloy pipes and tubes

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1 Scope

This Standard specifies the dimensions, shape, weight, technical requirements, test methods, inspection rules, packing, marking, and quality certification document of welded corrosion resistant alloy pipes and tubes.

This Standard applies to general requirements of welded corrosion resistant alloy pipes and tubes.

2 Normative references

The following documents are indispensable for the application of this document.

For the dated references, only the editions with the dates indicated are applicable to this document. For the undated references, the latest edition (including all the amendments) are applicable to this document.

GB/T 223 (all parts) Methods for chemical analysis of iron, steel and alloy

GB/T 228.1 Metallic materials - Tensile testing - Part 1: Method of test at room temperature

GB/T 230.1 Metallic materials - Rockwell hardness test - Part 1: Test method

GB/T 231.1 Metallic materials - Brinell hardness test - Part 1: Test method

GB/T 241 Metal materials - Tube - Hydrostatic pressure test

GB/T 242 Metal materials - Tube - Drift-expanding test

GB/T 246 Metal materials - Tube - Flattening test

GB/T 2102 Acceptance, packing, marking and quality certification of steel pipe

GB/T 2651 Tensile test method on welded joints

GB/T 2653 Bend test methods on welded joints

GB/T 2975 Steel and Steel Products - Location and Preparation of Test Pieces for Mechanical Testing

GB/T 4340.1 Metallic materials - Vickers hardness test - Part 1: Test method

GB/T 6394 Determination of estimating the average grain size of metal

GB/T 7735 Automated eddy current testing of seamless and welded (except submerged arc-welded) steel tubes for detection of imperfections

GB/T 8647 (all parts) The methods for chemical analysis of nickel

GB/T 10561-2005 Steel - Determination of content of nonmetallic inclusions - Micrographic method using standards diagrams

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

GB/T 15007 Designations of corrosion-resistant alloy

GB/T 15260 Corrosion of metals and alloys - Test methods for intergranular corrosion of nickel alloys

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 20125 Low-alloy steel - Determination of multi-element contents -Inductively coupled plasma atomic emission spectrometric method

GB/T 21835 Dimensions and masses per unit length of welded steel pipes

NB/T 47013.2-2015 Nondestructive testing of pressure equipment - Part 2:

Radiographic testing

NB/T 47013.5-2015 Nondestructive testing of pressure equipment - Part 5:

Penetrant testing

NB/T 47013.11-2015 Nondestructive testing of pressure equipment - Part 11:

Standard practice for X-ray digital radiography

3.1.1 The nominal outer diameter (D) and nominal wall thickness (S) of the

welded pipes and tubes shall comply with the provisions of GB/T 21835.

D - The nominal outer diameter of the welded pipe and tube, in millimeters (mm).

4.1.1 The designation and chemical composition of the corrosion resistant alloy

shall comply with the requirements of the corresponding product standard.

4.1.2 The permissible tolerances for chemical composition of welded pipe and

tube products shall comply with the provisions of GB/T 15007.

4.2.1 Smelting method

The alloy shall be smelted by means of electric arc furnace plus external refining plus electroslag remelting, or other smelting methods which meet the requirements of this Standard. The smelting method shall be indicated in the quality certification.

4.2.2.1 The welded pipes and tubes shall be manufactured by single-sided or

double-sided automatic welding method without adding or adding filler metal.

4.2.2.2 When filler metal is added during the manufacturing process of the

welded pipes and tubes, a matching filler metal shall be selected, or a filler metal with a higher alloy content may be selected.

4.2.2.3 Through negotiation between the supplier and the purchaser, and

indicated in the contract, welded pipes and tubes with a nominal outer diameter of not less than 508 mm allow for double longitudinal welds or circumferential weld joints of the same quality as longitudinal welds.

4.2.2.4 Two-time repair welding is not allowed at the same position of the weld

of the welded pipes and tubes. The defect of the base metal does not allow for repair welding.

4.2.3 Delivery state

The welded pipes and tubes shall be delivered in a heat-treated plus pickled state. The recommended heat treatment system shall be specified in the corresponding product standard or contract. Welded pipes and tubes which are overall polished, buffed, or heat treated in protective atmosphere may be not subjected to pickling. If delivered in other

states, it shall be determined by D - The nominal outer diameter of the welded pipe and tube, in millimeters (mm).

4.4.2 Drift-expanding

The drift-expanding test has a center taper of 60°. The drift-expanding rate of outer diameter is not less than 15%. After drift-expanding, the sample shall not have cracks or gaps.

4.4.3.1 The bend sample shall be taken from the welded pipe and tube or

welded test plate. The welded test plate shall be the same designation, the same heat number, the same welding process, and the same heat treatment system as the welded pipe and tube. A set of bend tests shall include a positive bend and a back bend (i.e., the outer weld and the inner weld of the welded pipe and tube are respectively at the maximum curved surface). For welded pipes and tubes with a nominal wall thickness greater than 10 mm, a set of two side bends may be adopted instead of a positive bend and a back bend.

4.4.3.2 In the bend test, the bend core diameter is 4 times the sample thickness;

the bend angle is 180°. After bending, in the weld area, there shall be no cracks or gaps.

4.5 Grain size

The average grain size of base metal of the welded pipes and tubes shall be determined in accordance with product standards or contract requirements.

4.6 Intergranular corrosion

The intergranular corrosion test results of the welded pipes and tubes shall be judged according to product standards or contract requirements. The samples shall include the weld, the heat-affected zone, and the base metal.

4.7 Nonmetallic inclusions

Nonmetallic inclusions of base metal of the welded pipes and tubes shall comply with product standards or contract requirements.

4.8.1 Hydrostatic pressure test

When the welded pipes and tubes are subjected to a hydrostatic pressure test, the test pressure is calculated according to formula (3). The maximum test pressure is 20 MPa. Under the test pressure, the pressure holding time shall be no less than 5 s. The welded pipe and tube shall not leak.

the minimum wall thickness are allowed.