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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 12771-2019

Replacing GB/T 12771-2008

Welded stainless steel pipes for fluid transport

流体输送用不锈钢焊接钢管

Issued on: October 18, 2019 **Implemented on: September 1, 2020**

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1 Scope

China's national standard for welded stainless steel pipe for fluid transport - the pipe used in food and beverage plant, pharmaceutical and chemical process lines, water treatment, and the service pipework of buildings and ships. It is welded rather than seamless, which is what makes it economic: the pipe is formed from strip and closed with a longitudinal weld, and for most fluid duties that is entirely adequate and considerably cheaper than a seamless pipe of the same grade. It specifies the classification, the code, the content of the order, the dimensions, the appearance and weight, the technical requirements, the test methods, the inspection rules, and the packaging, marking and quality certificate for welded stainless steel pipes for fluid transport. The weld is what the standard is really about, because it is the only part of the pipe that is not simply the parent strip. The requirements therefore cover the welding process and whether the weld is left as welded or is heat treated afterwards, the mechanical properties across the weld, the flattening and flaring or expansion tests that open the weld up if it is unsound, the non-destructive testing of the seam - eddy current or hydrostatic, which every length must pass - and the internal weld

bead condition, which matters greatly in a hygienic or a high purity line, where a protruding or rough bead is where product lodges and where cleaning fails. Around them sit the steel grade and composition, the dimensional tolerances and straightness, the surface finish inside and out, and the intergranular corrosion test where the service requires it. The clause on the content of the order is the practical one: grade, dimensions, wall, surface, weld condition and any supplementary tests all have to be stated. Issued on 18 October 2019 and in force since 1 September 2020, it replaces GB/T 12771-2008.

This Standard stipulates the classification, code, order content, dimensions, appearance and weight, technical requirements, test methods, inspection rules, packaging, marking and quality certificate of welded stainless steel pipes for fluid transport. This Standard is applicable to welded stainless steel pipes for fluid transport (hereinafter referred to as steel pipes).

2 Normative References

The following documents are indispensable to the application of this document. In terms of references with a specified date, only versions with a specified date are applicable to this document. In terms of references without a specified date, the latest version (including all the modifications) is applicable to this document.

GB/T 222 Permissible Tolerances for Chemical Composition of Steel Products;

GB/T 223.9 Iron, Steel and Alloy - Determination of Aluminum Content - Chrome Azurol S Photometric Method;

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 223.23 Iron, Steel and Alloy - Determination of Nickel Content - The Dimethylglyoxime Spectrophotometric Method;

GB/T 223.25 Methods for Chemical Analysis of Iron, Steel and Alloy - The Dimethylglyoxime Gravimetric Method for the Determination of Nickel Content;

3 Classification and Code

3.1 In accordance with manufacturing method and radiographic testing, the classification and code of steel pipes are as follows:

3.2 In accordance with delivery status, the classification and code of steel pipes are as

follows:

4 Order Content

Contract or order form that purchase steel pipes in accordance with this Standard shall include the following content.

5 Dimensions, Appearance and Weight

5.1 External Diameter and Wall Thickness Nominal external diameter (D) and nominal wall thickness (S) of steel pipes shall comply with the stipulations in GB/T 21835.In accordance with the demand-side's demands, through the negotiation between the demand-side and the supply-side, steel pipes of other external diameters and wall thicknesses may also be provided.

5.3 Length

5.3.1 Generally speaking, the length of steel pipes is 3,000 mm ~ 12,000 mm.

5.3.2 In accordance with the demand-side's demands, through the negotiation between the demand-side and the supply-side, and statement in the contract, steel pipes may be delivered in accordance with specified length or multiple length. The specified length of total multiple length of steel pipes shall be within a general range; the full-length allowable deviation is. In terms of steel pipes which are delivered in accordance with multiple length, each incision shall retain a margin of 5 mm ~ 10 mm.

5.4 Out-of-roundness Out-of-roundness of steel pipes shall not exceed the allowable tolerance of external diameter. The difference between the maximum value and the minimum value of external diameter actually measured on any cross section of thin-wall steel pipes shall not exceed 1% of nominal external diameter.

5.5 Curvature Curvature of steel pipes shall be not more than

1.5 mm/m; full-length curvature shall be not more than 0.2% of the total length of steel pipes.

5.7 Weight Steel pipes may be delivered in accordance with the theoretical weight, or, the actual weight. When steel pipes are delivered in accordance with the theoretical weight, theoretical weight shall be calculated in accordance with Formula (1).

6.1 Designation and Chemical Composition of Steel

6.1.1 Designation and chemical composition (smelting analysis) of steel shall comply Designation Formula (1) after Conversion Density /(kg/dm3) No. Type Uniform Digital Code

6.1.2 When the demand-side requests for analysis of finished products, it shall be indicated

in the contract. The allowable deviation of chemical composition of finished steel pipes shall comply with the stipulations in GB/T 222.

6.2 Manufacturing Methods

6.2.1 Smelting methods of steel Steel shall adopt the smelting method of converter plus secondary furnace refining, or, electric-arc furnace plus secondary furnace refining. Through the negotiation between the demand-side and the supply-side, and statement in the contract, other smelting methods with more rigorous requirements may also be adopted.

6.3 Delivery Status

6.3.1 Steel pipes shall be delivered under the status of thermal treatment and acid pickling. Through the negotiation between the demand-side and the supply-side, and statement in the contract, steel pipes may also be delivered under the status of welding. Please refer to Table 4 for the recommended thermal treatment systems of steel pipes.

6.3.2 Steel pipes that go through overall polishing, boring or thermal treatment with protective atmosphere may be delivered without acid pickling.

6.4 Mechanical Properties

6.4.1 Tensile Steel pipes shall receive tensile test on base metals. The room-temperature longitudinal tensile performance of base metals shall comply with the stipulations in Table 4.

6.5 Process Performance

6.5.1 Flattening Steel pipes whose external diameter is not more than 168 mm shall receive flattening test. During the test, welding seam shall be located in a location that is 90 of the force- bearing direction. In terms of steel pipes which receive thermal treatment, samples shall be flattened to 1/3 of the external diameter of steel pipes. In terms of steel pipes which do not receive thermal treatment, samples shall be flattened to 2/3 of the external diameter of steel pipes. After flattening, samples shall not manifest any cracks or breakages.

6.6 Intergranular Corrosion Except from designations, the remaining Austenitic stainless steel pipes shall receive intergranular corrosion test in accordance with the stipulations of Method E in GB/T 4334-2008.After the test,

7 Test Methods

7.1 The analysis and sampling for the chemical composition test of steel pipes shall be conducted in accordance with the rules in GB/T 20066.Generally speaking, the analysis of chemical composition shall be conducted in accordance with GB/T 11170, GB/T 20123, GB/T 20124, or other universal methods. The arbitration shall comply with the stipulations in