



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

GB/T 38810-2020

Seamless stainless steel pipes for liquefied natural gas

Issued on: June 2, 2020

Implemented on: January 1, 2021

Issued by: SAMR; SAC

Table of Contents

Foreword	3
1 Scope	4
2 Normative references	4
3 Ordering content	6
4 Size, shape and weight	6
5 Technical requirements	8
6 Test methods	13
7 Inspection rules	14
8 Packaging, marks and quality certificate	15

1 Scope

This Standard specifies ordering content, size, shape and weight, technical requirements, test methods, inspection rules, packaging, marks and quality certificate for seamless stainless steel pipes for liquefied natural gas.

This Standard is applicable to cold rolled (drawn) austenitic stainless steel seamless steel pipes for liquefied natural gas (hereinafter referred to steel pipes).

2 Normative references

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

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 223.25, Methods for chemical analysis of iron, steel and alloy. The dimethylglyoxime gravimetric method for the determination of nickel content

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

GB/T 223.40, Iron, Steel and Alloy - Determination of Niobium Content by the Sulphochlorophenol S Spectrophotometric Method

GB/T 223.59, Iron, Steel and Alloy - Determination of Phosphorus Content -Bismuth

Phosphomolybdate Blue Spectrophotometric Method and Antimony Phosphomolybdate Blue Spectrophotometric Method

GB/T 223.60, Methods for chemical analysis of iron, steel and alloy - The perchloric acid dehydration gravimetric method for the determination of Spark discharge atomic emission spectrometric method (Routine method)

GB/T 17395, Dimensions, shapes, masses and tolerances of seamless steel tubes

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)

3 Ordering content

The contract or order for ordering steel pipes according to this Standard shall include but not limited to the following:

- a) reference to this Standard;
- b) product name;
- c) steel designation;
- d) dimensions (nominal outer diameter x nominal wall thickness, in mm);
- e) quantity ordered (total weight or total length);
- f) optional requirements;
- g) other special requirements.

4.1.1 The nominal outer diameter (D) and nominal wall thickness (S) of steel

pipes shall meet the requirements of GB/T 17395. Required by the purchaser and agreed by the supplier and the purchaser, steel pipes of other sizes beyond those specified in GB/T 17395 can be supplied.

4.1.2 The allowable deviation of the nominal outer diameter and the nominal

wall thickness of steel pipes shall meet the requirements of Table 1.

4.1.3 When the purchaser does not specify the allowable deviation level of the

steel pipe size in the contract, the allowable deviation of the outer diameter and the wall thickness of steel pipes shall meet the requirements of ordinary a) The wall thickness is not more than 15mm, 1.5mm/m;

b) The wall thickness is greater than 15mm, 2.0mm/m.

4.4.2 Required by the purchaser, agreed by the supplier and the purchaser and

indicated in the contract, groove can be processed at both ends of steel pipe.

The groove type is determined by the supplier and the purchaser through negotiation.

4.5 Out-of-roundness and unevenness of wall thickness

Required by the purchaser, agreed by the supplier and the purchaser and indicated in the contract, the out-of-roundness of steel pipes shall not exceed 80% of the outer diameter tolerance. The unevenness of wall thickness of steel pipes shall not exceed 80% of the wall thickness tolerance.

4.6.1 Steel pipes are delivered according to actual weight. Required by the

purchaser, agreed by the supplier and the purchaser and indicated in the contract, steel pipes can also be delivered according to theoretical weight.

4.6.2 The theoretical weight per meter of steel pipes is calculated according to

formula (1):

Where, W - Theoretical weight of steel pipe, in kilograms per meter (kg/m);

π - 3.1416;

ρ - Density of steel, in kilograms per cubic decimeter (kg/dm³), see Table 3;

D - Nominal outer diameter of steel pipe, in millimeters (mm);

S - Nominal wall thickness of steel pipe, in millimeters (mm).

5.1 Designation and chemical composition

pressure test.

5.5.4 The supplier can use eddy current testing to replace hydraulic pressure

test. The artificial defects of the eddy current testing's comparison sample tube shall meet the requirements of the acceptance level E4H or E4 in GB/T 7735-2016.

5.6.1 Flattening

Steel pipes shall be subjected to flattening test. During the flattening test, the sample shall be pressed until the distance between the two plates is H. H is calculated according to formula (3). After flattening, there shall be no cracks or breaks on the outside of the sample bend.

Where, H - Distance between two plates, in millimeters (mm);

α - Deformation coefficient per unit length, taking 0.09;

S - Nominal wall thickness of steel pipe, in millimeters (mm);

D - Nominal outer diameter of steel pipe, in millimeters (mm).

5.6.2 Flaring

Required by the purchaser, agreed by the supplier and the purchaser and indicated in the contract, steel pipes of which the outer diameter is not greater than 168.3mm and the wall thickness is not greater than 10mm may be subjected to flaring test. The top core taper of the flaring test is 60°. The flaring rate of the outer diameter is 10%. After flaring, the sample shall not have visible cracks.

5.7 Intergranular corrosion

Required by the purchaser, agreed by the supplier and the purchaser and indicated in the contract, steel pipes can be tested for intergranular corrosion.

The intergranular corrosion test method shall meet the requirements of method E in GB/T 4334-2020. After the test, the sample shall not have the tendency of intergranular corrosion.

5.8.1 There shall be no cracks, folds, folds, delamination and scars on the inner

and outer surfaces of steel pipe. These defects shall be completely removed.

The removal depth shall not exceed 10% of the wall thickness. The actual wall thickness where the defect is removed shall not be less than the minimum allowable wall thickness.

5.8.2 The allowable depth of the straightway on the inner and outer surfaces of

steel pipe shall not be greater than 4% of the wall thickness, not greater than 0.3mm.

5.8.3 Other local defects that do not exceed the deviation of the wall thickness

are allowed to exist.

5.9 Ultrasonic testing

Steel pipes shall be ultrasonically tested. The artificial defects of the ultrasonic testing's comparison sample tube shall meet the requirements of the acceptance level U3 in GB/T 5777-2019.

6.1 The sampling for chemical composition analysis of steel pipes shall be

carried out according to the rules of GB/T 20066. Chemical composition analysis is usually