



**NATIONAL STANDARD OF THE
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Seamless stainless steel pipes for oxygen pipeline

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1 Scope

This document specifies the classification and code, order content, size, shape, weight, technical requirements, test methods, inspection rules, packaging, marking and quality certificates of the stainless-steel seamless steel pipe for oxygen pipeline.

This document applies to stainless steel seamless steel pipes (hereinafter referred to as "steel pipes") for conveying oxygen and liquid oxygen.

2 Normative references

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document;

for the undated documents, only the latest version (including all the amendments) is applicable to this standard.

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 silicon content

GB/T 223.63 Methods for chemical analysis of iron, steel and alloy - The sodium (potassium) periodate photometric method for the determination of manganese content

GB/T 223.84 Steel and iron -- Determination of titanium content --Dianitropyrimethane spectrophotometric method

GB/T 223.85 Steel and iron -- Determination of sulfur content -- Infrared absorption method after combustion in an induction furnace

GB/T 223.86 Steel and iron -- Determination of total carbon content -- Infrared absorption method after combustion in an induction furnace

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

GB/T 229 Metallic materials -- Charpy pendulum impact test method

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

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

GB/T 246 Metallic materials -- Tube -- Flattening test

GB/T 1031 Geometrical Product Specifications (GPS) -- Surface texture: Profile method -- Surface roughness parameters and their values

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

GB/T 2975 Steel and steel products -- Location and preparation of samples and test pieces for mechanical testing

GB/T 5777-2019 Automated full peripheral ultrasonic testing of seamless and welded (except submerged arc-welded) steel tubes for the detection of longitudinal and/or transverse imperfections

GB/T 7735-2016 Automated eddy current testing of seamless and welded (except submerged arc-welded) steel tubes for detection of imperfections

GB/T 11170 Stainless steel -- Determination of multi-element contents -- 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)

- a) When the wall thickness is not greater than 15 mm, it is 1.5 mm/m;
- b) When the wall thickness is greater than 15 mm, it is 2.0 mm/m.

6.4 Terminal outline

6.4.1 The end faces of both ends of the steel pipe shall be perpendicular to the axis of the steel pipe, and the burrs shall be removed from the incision.

6.4.2 According to the requirements of the buyer, after negotiation between the supplier and the buyer, and indicated in the contract, the two ends of the steel pipe can be processed with grooves, and the groove type can be determined by negotiation between the supplier and the buyer.

6.5 Out of roundness and uneven wall thickness The out-of-roundness and uneven-wall-thickness of the steel pipe shall not exceed 80% of the outer diameter tolerance and wall thickness tolerance, respectively.

6.6 Weight

6.6.1 Steel pipes shall be delivered by actual weight. According to the requirements of the buyer, after negotiation between the supplier and the buyer, and indicated in the contract, the steel pipe can be delivered according to the theoretical weight.

6.6.2 The theoretical weight per meter of the steel pipe is calculated according to formula (1):

Where:

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

π --- Pi, to be taken as 3.1416;

ρ --- Density of steel, in kilograms per cubic decimeter (kg/dm³), see Table 4 for the density of steel;

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

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

6.6.3 For steel pipes delivered according to the nominal outer diameter and the minimum wall thickness, the theoretical weight shall be calculated by the average wall thickness; the average wall thickness shall be the average value of the maximum and minimum wall thickness calculated according to the wall thickness and the allowable deviation.

and the buyer, and indicated in the contract, other test pressure can be used for the hydraulic pressure test.

7.5.4 With the consent of the purchaser, the supplier can replace the hydraulic pressure test with eddy current inspection; the acceptance level of eddy current inspection shall comply with E4H or E4 regulations of GB/T 7735-2016.

7.6 Processing property

7.6.1 Flattening The steel pipe shall be subjected to a flattening test. During the flattening test, the sample shall be pressed to that the distance between the two plates reduces to H ; H is calculated according to formula (3). After flattened, there shall be no cracks or splits on the outside of the bend of the sample.

Where:

H --- The distance between the two plates, in millimeters (mm);

α --- Deformation coefficient per unit length, to be taken as 0.09;

S --- Wall thickness of the steel pipe, in millimeters (mm);

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

7.6.2 Flaring The flaring test shall be carried out for steel pipes with an outer diameter of not more than 150 mm and a wall thickness of not more than 10 mm. The taper of the top core for the flaring test shall be 60° , the expansion value of the outer diameter after flaring shall be 10%, and there shall be no cracks or cracks in the sample after flaring.

7.7 Degreasing The inner and outer surfaces of the steel pipe shall be degreased. The supplier can choose any one of the following methods for surface inspection, and the degreasing treatment shall meet the corresponding requirements:

- a) Use ultraviolet light with a wavelength of 320 nm~380 nm to inspect the surface of the steel pipe; if there is no fluorescence of grease, the treatment is qualified;
- b) Use clean and dry white filter paper or silk cloth to wipe the surface of the steel pipe; if there is no trace of grease, the treatment is qualified;
- c) Use oil-free steam to flush the steel pipe, take the condensate with a clean utensil, and put a piece of pure camphor with a diameter of less than 1 mm into the condensate; if the camphor pellet is continuously rotated, the treatment is qualified;
- d) Quantitative analysis of the oil content on the surface of the degreased steel pipe;