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Urea Grade Austenitic Stainless-Steel Bars

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Urea Grade Austenitic Stainless-Steel Bars

1 Scope

This Standard specifies the classification and code, ordering contents, size, shape, weight, technical requirements, test methods, inspection rules, package, marking and quality certificate of urea grade austenitic stainless-steel bars.

This Standard is applicable to the rolled or wrought urea grade austenitic stainless-steel bars (hereinafter referred to as steel bar) with nominal size no greater than 400mm. The stainless-steel bars with nominal size greater than 400mm can be used as reference.

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) are applicable to this document.

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

GB/T 223.5 Steel and Iron – Determination of Acid-Soluble Silicon and Total Silicon Content - Reduced Molybdosilicate Spectrophotometric Method

GB/T 223.11 Iron, Steel and Alloy - Determination of Chromium Content - Visual Titration or Potentiometric Titration Method

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 223.28 Methods for Chemical Analysis of Iron, Steel and Alloy - The a-Benzoinoxime Gravimetric Method for the Determination of Molybdenum Content

GB/T 223.36 Methods for Chemical Analysis of Iron, Steel and Alloy - The Neutral Titration Method for the Determination of Nitrogen Content after Distillation Separation

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 223.64 Iron, Steel and Alloy - Determination of Manganese Content - Flame Atomic Absorption Spectrometric Method

GB/T 223.79 Iron and Steel - Determination of Multi-Element Contents - X-Ray Fluorescence Spectrometry (Routine 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 226 Test Method for Macrostructure and Defect of Steel by Etching

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 (Scales A, B, C, D, E, F, G, H, K, N, T)

GB/T 231.1 Metallic Materials - Brinell Hardness Test - Part 1: Test Method

GB/T 702-2017 Hot-Rolled Steel Bars - Dimensions, Shape, Weight and Tolerances

GB/T 908-2008 Forged Bars - Dimensions, Shape, Weight and Tolerances

GB/T 1979 Standard Diagrams for Macrostructure and Defect of Structural Steels

GB/T 2101 General Requirement of Acceptance Packaging Marking and Certification for Section Steel

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

GB/T 4162 Forged and Rolled Steel Bars - Method for Ultrasonic Examination

GB/T 7736 Ultrasonic Inspecting Method for Macro-structure and Imperfection of Steel

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 13305 Micrographic Method for Determining Area Content of the α-phases in Stainless Steels

GB/T 15711 Steel Products - Method for Etch Test of Tower Sample

GB/T 17505 Steel and Steel Products - General Technical Delivery Requirements

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 25151.3 Fabrication and Inspection Method for High Pressure Urea Equipment - Part 3: Intergranular Corrosion Tendency Test for Ultra Low-Carbon Chromated Nickel Molybdenum Austenitic Stainless Steel of Urea Grade

GB/T 25151.4 Fabrication and Inspection Method for High Pressure Urea Equipment - Part 4: Intergranular Corrosion Tendency Test Specimen Preparation for Ultra Low-Carbon Chromated Nickel Molybdenum Austenitic Stainless Steel of Urea Grade

YB/T 4395 Steel Determination of Molybdenum, Niobium and Tungsten Contents - Inductively Coupled Plasma Atomic Emission Spectrometric Method

YB/T 5293 Metallic Materials-Forging Test

3 Terms and Definitions

For the purposes of this document, the following terms and definitions apply.

3.1 Urea grade austenitic stainless steel

Ultra-low carbon chromium nickel molybdenum austenitic stainless steel for critical equipment in urea production.

4 Classification and Code

4.1 Steel bars are divided into the following categories according to the use and

6.3 The steel bars usually have a delivery length of 2000mm~12000mm. After the consultation between the supplier and the purchaser, indicated in the contract, it can also be delivered as per specified length or multiple length. The allowable deviation for the length of the rolled steel bar is $^{+50}_{0}$ mm, while the allowable deviation for the length of the forged steel bar is $^{+80}_{0}$ mm.

6.4 Steel bars are usually delivered at the actual weight.

7 Technical Requirements

7.1 Grade and chemical composition

7.1.1 The grade and chemical composition (smelting analysis) of steel shall conform to the provisions of Table 1.

7.1.2 The allowable deviation for the chemical composition of steel bar shall conform to the provisions of GB/T 222.

7.2 Smelting method

Steel shall be refined and smelted outside the furnace. After the consultation between the supplier and the purchaser, indicated in the contract, other smelting methods that meet the requirements of this Standard shall also be used.

7.3 Delivery state

Generally, the pressure processing steel bar is delivered in the hot-rolled or forged state; while the cutting processing steel bar is generally delivered in the solid solution treatment state.

7.4 Mechanical properties

7.4.1 The cutting processing steel bar or sample blank after heat treatment shall be tested for mechanical properties; their mechanical properties shall conform to the provisions of Table 2.

7.4.2 According to the requirements of the purchaser, indicated in the contract, the pressure processing steel bar can be tested for mechanical properties. The sample blank, after the heat treatment solid solution treatment recommended in Table 2, the mechanical properties shall conform to the provisions of Table 2.

10	Tower shape	2	Different steel bars equivalent to the head of the steel ingot; continuous casting steel in any different steel bars	GB/T 15711
11	Size and shape	Piece by piece	The whole steel bar	Caliper, micrometer, model, etc.
12	Surface quality	Piece by piece	The whole steel bar	Visual examination
[a] When the electroslag steel is batched according to the sub-furnace number, in addition to the inspection items required for sampling one by one; the sampling quantity for other inspection items is 1. When it is batched according to the mother furnace number, except for the chemical composition, for which each electroslag furnace number shall be sampled 1; the sampling quantity for other inspection items shall be specified in the table.				

9 Inspection Rules

9.1 Inspection and acceptance

The inspection and acceptance of steel bars shall be carried out as per the supplier's technical quality supervision department.

9.2 Batching rules

Steel bars shall be inspected and accepted in batches. Each batch consists of the steel bars with the same grade, the same furnace number, the same processing method, the same size, the same delivery state (the same heat treatment furnace number). The steel smelted by electroslag re-melting is allowed to be delivered by smelting mother furnace number in batches under the conditions that the process is stable, and guarantee the technical requirements of this Standard.

9.3 Sampling locations and sampling quantities

The sampling locations and sampling quantities of each batch of steel bars shall conform to the provisions of Table 7.

9.4 Reinspection and judgement rules

9.4.1 The reinspection and judgement rules shall be as stipulated in GB/T 17505.

9.4.2 If the supplier can ensure the qualification of the steel bar, the inspection items against the steel bars with the same furnace number, such as mechanical properties, α phase, macrostructure, non-metallic inclusions, etc. are allowed to replace the material by blank, and replace the small by the large.

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