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Steel Plate for Building Structure

建筑结构用钢板

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Steel Plate for Building Structure

1 Scope

This Document specifies the designation expression method, ordering content, size, shape, weight, technical requirements, test methods, inspection rules, packaging, marking and quality certificates of steel plate for building structure.

This Document is applicable to the manufacture of high-performance hot-rolled steel plate (hereinafter referred to as steel plate) with a thickness of 6mm~200mm for building structures, long-span structures and other steel structures. Hot-rolled steel strips can also be implemented with reference to this Document.

2 Normative References

The provisions in following documents become the essential provisions of this Document through reference in 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 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 223.9 Iron steel and alloy - Determination of aluminum content - Chrom azurol S photometric method

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

GB/T 223.14 Methods for Chemical Analysis of Iron, Steel and Alloy - The N-Benzoyl-N-Phenylhydroxylamine Extraction Photometric Method for the Determination of Vanadium 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 223.26 Iron, Steel and Alloy - Determination of Molybdenum Content - The Thiocyanate Spectrophotometric Method

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

GB/T 223.58 Methods for chemical analysis of iron, steel and alloy - The sodium arsenite-sodium nitrite titrimetric method for the determination of manganese content

GB/T 223.62 Methods for chemical analysis of iron, steel and alloy - The butyl acetate extraction photometric method for the determination of phosphorus content

GB/T 223.78 Methods for Chemical Analysis of Iron, Steel and Alloy - Curcumin Spectrophotometric Method for the Determination of Boron Content

GB/T 223.79 Iron and steel—Determination of multi-element contents—X-ray fluorescence spectrometry (Routine method)

GB/T 223.81 Iron steel and alloy - Determination of total aluminum and total boron contents -Microwave digestion-inductively coupled plasma mass spectrometric method

GB/T 223.82 Steel and iron—Determination of hydrogen content—Thermal conductivity/infrared method after fusion under inert gas

GB/T 223.84 Steel and iron - Determination of titanium content - Diantiprylmethane 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 232 Metallic materials – Bend test method

GB/T 247 General rule of package, mark and certification for steel plates (sheets) and strips

GB/T 709-2019 Dimension, shape, weight and tolerance for hot-rolled steel strip, plate and sheet

GB/T 2970 Thicker steel plate - Method for ultrasonic inspection

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

GB/T 4336 Carbon and low-alloy steel - Determination of multi-element contents - Spark

discharge atomic emission spectrometric method (routine method)

GB/T 5313 Steel plate with through-thickness characteristics

GB/T 8170 Rules of rounding off for numerical values & expression and judgement of limiting values

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

3 Terms and Definitions

For the purposes of this Document, there are no terms and definition apply.

4 Designation Expression Method

The designation of steel consists of four parts, namely, the first letter "Q" in Chinese Pinyin for "Qu" of yield strength, the specified minimum yield strength value, the first letter "GJ" in Chinese Pinyin for "Gao Jian" of steel for high-performance building structures, and the quality grade symbol (B, C, D, E).

EXAMPLE: Q355GJC

Q - The first letter "Q" in Chinese Pinyin for "Qu" of yield strength;

355 – The specified minimum yield strength value;

GJ - The first letter "GJ" in Chinese Pinyin for "Gao Jian" of steel for high-performance building structures;

C - Quality grade symbol.

For steel plates with thickness direction performance, the thickness direction performance level (Z15, Z25 or Z35) shall also be added after the designation.

When there are thickness direction performance requirements for steel plates with a thickness of no less than 15mm, the section shrinkage corresponding to the thickness direction performance level shall comply with the provisions of GB/T 5313.

7.5 Surface quality

7.5.1 There shall be no cracks, bubbles, scars, folds, inclusions and pressed-in iron oxide scale on the surface of the steel plate. Steel plates shall not have visible delamination.

7.5.2 The surface of the steel plate is allowed to have thin layers of iron oxide scale, rust, inconspicuous surface roughness, scratches, indentations and other local defects caused by the peeling off of pressed iron oxide scale that do not hinder the inspection of surface defects, but their depth shall be no greater than half of the thickness tolerance, and the minimum thickness of the steel plate shall be guaranteed.

7.5.3 Surface defects of the steel plate are allowed to be ground and cleaned. The ground and cleaned areas shall be smooth and without edges; and the minimum thickness of the steel plate shall be ensured. Welding repair of steel plates is not allowed.

7.6 Ultrasonic testing

Steel plates with thickness direction performance shall be ultrasonic tested one by one in accordance with GB/T 2970, and the qualification level is Level-III. Other steel plates can also be ultrasonic tested one by one according to the requirements of the buyer and the provisions of GB/T 2970, and the qualification level shall be specified in the contract. Upon agreement between the two parties, other documents may be used for ultrasonic testing, and the testing documents and qualification levels shall be noted in the contract.

7.7 Other requirements

According to the requirements of the purchaser and upon agreement between the two parties, the purchaser may put forward other requirements for the steel plate and indicate them in the contract.

8 Test Methods

8.1 The inspection items, sampling quantity, specimen direction, sampling method, and test method of each batch of steel plates shall comply with the provisions of Table 7.

8.2 The chemical composition test of steel is generally conducted in accordance with GB/T 4336, GB/T 20123, GB/T 20124, GB/T 20125 or general chemical analysis methods. During arbitration, the provisions of the following standards shall be followed, such as GB/T 223.5, GB/T 223.9, GB/T 223.11, GB /T 223.14, GB/T 223.19, GB/T 223.23, GB/T 223.26, GB/T 223.40, GB/T 223.58, GB/T 223.62, GB/T 223.78, GB/T 223.79, GB/T 223.81, GB/T 223.82, GB/T 223.84, GB/T 223.85, and GB/T 223.86.

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