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High temperature bearing steel

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High temperature bearing steel

1 Scope

This standard specifies the order content, dimensions, shape, weight, technical requirements, test methods, inspection rules, packaging, marking and quality certificates of high temperature bearing steel.

This standard applies to the manufacture of hot-rolled or forged round steel, cold-drawn round steel and steel wire (hereinafter referred to as steel) for high-temperature bearings which have a temperature resistance of 300 °C ~ 550 °C.

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 standard.

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 - 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 223.13 Methods for chemical analysis of iron, steel and alloy - The ammonium ferrous sulfate titration method for the determination of vanadium content

GB/T 223.20 Methods for chemical analysis of iron steel and alloy - The Potentiometric titration method for the determination of cobalt 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 223.28 Methods for chemical analysis of iron, steel and alloy - The α -

GB/T 224 Determination of the depth of decarburization of steels

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

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 905-1994 Dimension, shape, weight and tolerance for cold-drawn round, square and hexagonal steels

GB/T 908-2019 Forged bars for dimensions, shape, weight and tolerances

GB/T 2101 General requirement of acceptance packaging marking and certification for section steel

GB/T 2103 General requirements for acceptance, packing, marking and quality certification of steel wire

GB/T 4162-2008 Forged and rolled steel bars - Method for ultrasonic testing

GB/T 4336 Carbon and low-alloy steel - Determination of multi-element contents - Spark discharge atomic emission spectrometric method (routine method)

GB/T 6394 Metal - Methods for estimating the average grain size

GB/T 10561-2005 Steel - Determination of content of nonmetallic inclusions - Micrographic method using standards diagrams

GB/T 11261 Steel and iron - Determination of oxygen content - The pulse heating inert gas fusion-infra-red absorption method

GB/T 14979-1994 Eutectic carbide of steel - Micrographic method using Standard diagrams

GB/T 15711 Inspection of non-metallic inclusions of steel - Etching test method of tower samples

GB/T 18579-2019 High-carbon chromium bearing steel wires

GB/T 20066 Steel and iron - Sampling and preparation of samples for the

5.11.6 The surface of peeled, polished or machine-polished steel shall not have harmful defects that affect the use of steel.

5.12 Special requirements

According to the requirements of the buyer, as negotiated between the supplier and the buyer and indicated in the contract, it may add the following special inspection items:

- a) It may provide steel with a sulfur content of 0.015% ~ 0.060%;
- b) Tower hairline;
- c) Other requirements.

6 Test method

6.1 Surface quality

The surface quality of steel shall be inspected visually or by other effective methods.

6.2 Dimensions and shape

Steel size measurement is carried out by a caliper or template that can ensure the necessary accuracy.

6.3 Chemical composition

6.3.1 Sampling for chemical analysis shall be carried out in accordance with GB/T 20066.

6.3.2 The chemical analysis method shall be carried out according to the general methods such as GB/T 4336 and GB/T 20123. The arbitration shall be carried out according to standards GB/T 223.5, GB/T 223.9, GB/T 223.11, GB/T 223.13, GB/T 223.20, GB/T 223.23, GB/T 223.26, GB/T 223.28, GB/T 223.29, GB/T 223.31, GB/T 223.43, GB/T 223.47, GB/T 223.50, GB/T 223.53, GB/T 223.62, GB/T 223.63, GB/T 223.65, GB/T 223.77, GB/T 223.84, GB/T 223.85, GB/T 223.86.

6.3.3 The specimen for oxygen content shall be inspected after fully removing the decarburized layer. Its analysis method shall be carried out according to GB/T 11261.

6.4 Mechanical properties

6.4.1 The test method of Brinell hardness shall be carried out in accordance

Where:

D - The maximum carbide size, in micrometers (μm);

α - The maximum length of carbide in any direction (major axis size), in micrometers (μm);

b - Indicate the maximum size of the carbide perpendicular to the α direction (minor axis size), in micrometers (μm).

6.9 Decarburization layer

The decarburization layer is carried out in accordance with the metallographic law in GB/T 224.

6.10 Ultrasonic testing

Ultrasonic testing is carried out in accordance with level A requirements in GB/T 4162-2008.

6.11 Tower hairline

Tower-shaped hairline is carried out according to the requirements of GB/T 15711.

7 Inspection rules

7.1 Inspection and acceptance

The inspection and acceptance of steel shall be carried out by the technical quality supervision department of the supplier. The purchaser has the right to carry out acceptance inspection according to the provisions of this standard.

7.2 Group-batching rules

Steel shall be inspected and accepted in batches. Each batch shall be composed of steels of the same designation, the same sub-heat number, the same size, the same heat treatment number.

7.3 Sampling location and sampling quantity

The sampling location and quantity of steel shall be as specified in Table 13.

7.4 Re-inspection and judgment rules

7.4.1 If any item in the inspection item is unqualified (except for white spots and non-metallic inclusions), it may take the same number of samples for reinspection of the unqualified item. If the re-inspection result is still unqualified,

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