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Hot-rolled quality carbon steel wire rods

优质碳素钢热轧盘条

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Foreword

This document was drafted in accordance with the rules provided in GB/T 1.1-2020 *Directives for standardization - Part 1: Rules for the structure and drafting of standardizing documents*.

This document replaces GB/T 4354-2008, *Hot rolled quality carbon steel wire rods* and GB/T 33165-2016, *Quantitative analysis method of centre segregation for high carbon wire rod*. Compared with GB/T 4354-2008 and GB/T 33165-2016, in addition to structural adjustments and editorial changes, the main technical changes are as follows:

- Change the smelting method (see 5.1; 5.2 of GB/T 4354-2008);
- Change the requirements for decarburized layer (see 6.2; 5.4 of GB/T 4354-2008);
- Add inspection requirements for sorbite content (see 6.3.1);
- Add inspection requirements for harmful structures such as grain boundary cementite and martensite (see 6.3.2);
- Add requirements for center segregation (see 6.4);
- Add specific requirements for mechanical properties (see 6.5);
- Change the surface quality requirements (see 6.6; 5.6 of GB/T 4354-2008);
- Add requirements for the allowable deviation of size and shape (see 6.7.1);
- Change the requirements for the weight of wire rods (see 6.7.2; 4.2 of GB/T 4354-2008);
- Change the requirements for numerical rounding (see 8.4; 7.5 of GB/T 4354-2008).

Please note that some of the contents of this document may involve patents. The issuing organization of this document is not responsible for identifying patents.

This document was proposed by China Iron and Steel Industry Association.

This document shall be under the jurisdiction of National Technical Committee 183 on Iron and Steel of Standardization Administration of China (SAC/TC 183).

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Hot-rolled quality carbon steel wire rods

1 Scope

This document specifies the order content, manufacturing process, technical requirements, test methods, inspection rules, packaging, marking and quality certificate of hot-rolled quality carbon steel wire rods.

This document applies to hot-rolled quality carbon steel wire rods with a nominal diameter of 5 mm ~ 52 mm (hereinafter referred to as "wire rods").

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the version corresponding to that date is applicable to this document; for undated references, the latest version (including all amendments) is applicable to this document.

GB/T 222, Permissible tolerances for chemical composition of steel products

GB/T 223.3, Methods for chemical analysis of iron, steel and alloy - The diantipyrylmethane phosphomolybdate gravimetric method for the determination of phosphorus content

GB/T 223.4, Alloyed steel - Determination of manganese content - Potentiometric or visual titration method

GB/T 223.5, Steel and iron - Determination of acid-soluble silicon and total silicon content - Reduced molybdosilicate spectrophotometric method

GB/T 223.12, Methods for chemical analysis of iron, steel and alloy - The sodium carbonate separation-diphenyl carbazide photometric method for the determination of chromium 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 223.58, Methods for chemical analysis of iron, steel and alloy - The sodium arsenite-sodium nitrite titrimetric method for the determination of manganese content

YB/T 4413, Metallographic determination of core segregation in high carbon steel wire rod

YB/T 5293, Metallic materials - Forging test

3 Terms and definitions

No terms and definitions need to be defined in this document.

4 Order content

The contract for placing an order based on this document shall include the following:

- a) a reference to this document;
- b) product name;
- c) designation;
- d) specifications;
- e) weight;
- f) decarburized layer group;
- g) special requirements.

5 Manufacturing process

5.1 Smelting method

Steel is smelted in a converter or an electric arc furnace, and can be refined outside the furnace if necessary. The smelting method is generally chosen by the supplier. Other smelting methods may also be used upon agreement between the supplier and the buyer, and shall be specified in the contract.

5.2 Delivery state

Wire rods are delivered in hot rolled state.

6 Technical requirements

6.1 Designation and chemical composition

7.2 Chemical analysis shall be carried out in accordance with GB/T 223.3, GB/T 223.4, GB/T 223.5, GB/T 223.12, GB/T 223.19, GB/T 223.23, GB/T 223.58, GB/T 223.59, GB/T 223.60, GB/T 223.61, GB/T 223.62, GB/T 223.63, GB/T 223.64, GB/T 223.68, GB/T 223.69, GB/T 223.71, GB/T 223.72, GB/T 223.85, GB/T 223.86, or other general methods such as GB/T 4336, GB/T 20066 and GB/T 20123.

Arbitration shall be carried out in accordance with GB/T 223.3, GB/T 223.4, GB/T 223.5, GB/T 223.12, GB/T 223.19, GB/T 223.23, GB/T 223.58, GB/T 223.59, GB/T 223.60, GB/T 223.61, GB/T 223.62, GB/T 223.63, GB/T 223.64, GB/T 223.68, GB/T 223.69, GB/T 223.71, GB/T 223.72, GB/T 223.85, GB/T 223.86.

8 Inspection rules

8.1 Inspection and acceptance

The quality inspection and acceptance of wire rods shall be carried out by the supplier's technical quality supervision department.

8.2 Batch rules

Wire rods shall be inspected and accepted in batches, and each batch shall consist of wire rods of the same designation, same furnace number and same specification.

8.3 Re-inspection

The re-inspection and judgment rules of wire rods shall be implemented in accordance with the provisions of GB/T 2101.

8.4 Numerical rounding

The numerical rounding of test results shall comply with the provisions of GB/T 8170.

9 Packaging, marking and quality certification

The packaging, marking and quality certificate of wire rods shall comply with the provisions of GB/T 2101.

Appendix A

(Normative)

Quantitative analysis method of centre segregation for high carbon wire rod

A.1 Principle of the method

For hot rolled high carbon steel wire rod with carbon content greater than 0.65%, a spectrometer can be used to perform quantitative analysis of centre carbon segregation.

In the low content range, the element characteristic X-ray intensity is proportional to the mass fraction. According to this principle, select a suitable set of standard samples to establish the relationship between the characteristic X-ray intensity of carbon element and its content, and obtain the working curve; then measure the carbon element line distribution on a diameter of the sample to obtain the element content of each point. Use the ratio of the maximum element content in the segregation area to the average element content on the entire line distribution to characterize the severity of centre segregation, which is the segregation ratio.

A.2 Instruments and auxiliary equipment

The testing laboratory shall comply with the requirements of GB/T 27025 and be provided with the following instruments and auxiliary equipment:

- a) Electron probe analyzer or scanning electron microscope equipped with spectrometer accessory;
- b) Metallographic sample preparation equipment, including sample mounting, grinding, polishing and etching equipment;
- c) Metallographic microscope;
- d) Ultrasonic cleaning device.

A.3 Standard samples

A.3.1 Selection of standard samples

It is recommended to use carbon element standard samples that comply with GB/T 4930. The number of standard samples shall be no less than 3, and the carbon element content range of the standard samples shall cover the carbon element content of the samples.

A.3.2 Processing of standard samples

Before use, re-polish the standard sample and use a metallographic microscope to inspect the surface, to confirm whether there is contamination or other defects that may affect the measurement. The surface of the standard sample is not sprayed with a

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Contact: Wayne Zheng, Sales@ChineseStandard.net

Linkin: <https://www.linkedin.com/in/waynezhengwenrui/>

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