



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 24242.1-2020

**Non-alloy steel wire rod for conversion to wire - Part 1: General
requirements**

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1 Scope

This Part of GB/T 24242 specifies the dimensions, shapes, weights and allowable deviations, order content, technical requirements, test methods, inspection rules, packaging, marking and quality certificate of non-alloy steel wire rod for drawn or cold-rolled steel wire.

This Part is applicable to non-alloy hot-rolled steel wire rod for drawn or cold-rolled steel wire (hereinafter referred to as wire rod).

This Part is not applicable to the following parts:

- Free-cutting steel wire rod;
- Wire rod for cold heading and cold extrusion;
- Steel wire rod for welding;
- Wire rod for welded steel mesh for concrete;
- Ball and roller bearing steel;

---Wire rod for mechanical spring with a high fatigue strength, for example, wire rod for valve spring.

2 Normative References

The following documents are indispensable to the application of this document. In terms of references with a specified date, only versions with a specified date are applicable to this document. In terms of references without a specified date, the latest version (including all the modifications) is applicable to this document.

GB/T 223.5 Steel and Iron - Determination of Acid-soluble Silicon and Total Silicon Content - Reduced Molybdsilicate Spectrophotometric Method (GB/T 223.5-2008,

ISO 4829-1:1986, ISO 4829-2:1988, MOD)

GB/T 223.9 Iron Steel and Alloy - Determination of Aluminum Content - Chrome Azurol S Photometric 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 for Section Steel

GB/T 2975 Steel and Steel Products - Location and Preparation of Samples and Test Pieces for Mechanical Testing (GB/T 2975-2018, ISO 377:2017, MOD)

GB/T 4336 Carbon and Low-alloy Steel - Determination of Multi-element Contents -Spark Discharge Atomic Emission Spectrometric Method (routine method)

GB/T 10561 Steel - Determination of Content of Nonmetallic Inclusions - Micrographic Method Using Standards Diagrams (GB/T 10561-2005, ISO 4967:1998, IDT)

GB/T 14981 Dimension, Shape, Mass and Tolerance for Hot-rolled Round Wire Rod (GB/T 14981-2009, ISO 16124:2004, MOD)

GB/T 20066 Steel and Iron - Sampling and Preparation of Samples for the Determination of Chemical Composition (GB/T 20066-2006, ISO 14284:1996, IDT)

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 20123-2006, ISO 15350:2000, IDT)

GB/T 20124 Crystalline Layered Sodium Disilicate (GB/T 20124-2006, ISO 15351:1999, IDT)

GB/T 24242.2 Non-alloy Steel Wire Rod for Conversion to Wire - Part 2: Specific Requirements for General Purpose Wire Rod (GB/T 24242.2-2020, ISO 16120-2:2017, MOD)

GB/T 24242.3 Non-alloy Steel Wire Rod for Conversion to Wire - Part 3: Specific

Requirements for Rimmed and Rimmed Substitute Low Carbon Steel Wire Rod (GB/T 24242.3-2014, ISO 16120-3:2011, MOD)

GB/T 24242.4 Non-alloy Steel Wire Rod for Conversion to Wire - Part 4: Specific Requirements for Special Purpose Wire Rod (GB/T 24242.4-2020, ISO 16120-4:2017, MOD)

YB/T 081 Rule for Rounding off of Numerical Values and Judgement of Testing Values for Technical Standards of Metallurgy YB/T 169 Metallographic Test Method of Sorbite in High Carbon Steel Wire Rod YB/T 4411 Determination of Central Martensite in High Carbon Steel Wire Rod YB/T 4413 Metallographic Determination of Core Segregation in High Carbon Steel Wire Rod Steel shall be smelted by oxygen converter or electric arc furnace, and external refining if necessary.

5.3 Delivery State Wire rod shall be delivered in the hot-rolled state.

5.4 Surface State The surface of wire rod usually does not require any surface treatment; it shall be delivered in the natural surface state under the hot-rolled state. When the demand-side has demands, it may also be delivered with the surface state of removal of oxide scale.

5.5 Mechanical Properties The mechanical properties of wire rod shall comply with the requirements of GB/T 24242.2, GB/T 24242.3 and GB/T 24242.4.

5.6 Decarburized Layer The decarburized layer of wire rod shall comply with the requirements of GB/T 24242.2 and GB/T 24242.4.

5.7 Microstructure

5.7.1 Sorbite content The sorbite content of wire rod shall comply with the requirements of GB/T 24242.2 and GB/T 24242.4.

5.7.2 Reticulated cementite The reticulated cementite of wire rod shall comply with the requirements of GB/T 24242.2 and GB/T 24242.4.

5.7.3 Central martensite The central martensite of wire rod shall comply with the requirements of GB/T 24242.2 and GB/T 24242.4.

5.8 Central Segregation The central segregation of wire rod shall comply with the requirements of GB/T 24242.2 and GB/T 24242.4.

5.9 Non-metallic Inclusions The non-metallic inclusions of wire rod shall comply with the requirements of GB/T For the inspections of tensile test, decarburized layer, microstructure and non-metallic inclusions, the required specimens shall be cut from the end of wire rod with the head or tail already removed.

6.2 Chemical Analysis The method of chemical analysis shall comply with GB/T 223.5, GB/T 223.9, GB/T 223.12, GB/T 223.19, GB/T 223.23, GB/T 223.26, GB/T 223.37, GB/T

223.50, GB/T 223.59, GB/T 223.62, GB/T 223.63, GB/T 223.68, GB/T 223.69, GB/T 223.74, GB/T 4336, GB/T 20123, GB/T 20124.

The arbitration shall comply with GB/T 223.5, GB/T 223.9, GB/T 223.12, GB/T 223.19, GB/T 223.23, GB/T 223.26, GB/T 223.37, GB/T 223.50, GB/T 223.59, GB/T 223.62, GB/T 223.63, GB/T 223.68, GB/T 223.69, GB/T 223.74.

7 Inspection Rules

7.1 Inspection and Acceptance Inspection The quality of wire rod shall be inspected by the supply-side's quality supervision department. If necessary, the demand-side is entitled to conduct inspection and acceptance inspection in accordance with the stipulations of this Part.

7.2 Batch Rules Wire rods shall be accepted in batches. Each batch shall be constituted of wire rods with the same heat number, the same designation, the same dimensions and the same rolling system.

7.3 Re-inspection The re-inspection and determination rules of wire rods shall comply with the stipulations of GB/T 2101.

7.4 Rounding-off of Test Result The various inspection and measurement values of wire rod shall be rounded off in accordance with the rounding-off and comparison method. The rounding-off rule shall comply with the stipulations of YB/T 081.

8 Packaging, Marking and Quality Certificate

8.1 The packaging, marking and quality certificate of wire rod shall comply with the stipulations of GB/T 2101. Through the negotiation between the demand-side and the supply-side, and statement in the contract, other special requirements for packaging and protection may also be adopted.

Appendix C (normative) Determination of Reticulated Cementite of High Carbon Steel Wire Rod

C.1 Overview This Appendix is applicable to wire rods made of non-alloy continuous cast steel with a carbon content greater than 0.65%.

In wire rods with strong segregation (carbon content greater than 0.8%) and a slow cooling rate, carbon segregates as secondary cementite at the grain boundary. In accordance with the segregation level and the cooling rate, cementite forms a more or less closed network along the grain boundary.

C.2 Principle Use an appropriate etchant to conduct chemical etching on the polished cross-section of the wire rod, so as to reveal the reticulated cementite.