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GB/T 20065-2016

Replacing GB/T 20065-2006

Screw-thread Steel Bars for the Prestressing of Concrete

预应力混凝土用螺纹钢筋

(ISO 6934-5:1991, Steel for the Prestressing of Concrete – Part 5:

Hot-rolled Steel Bars with or without Subsequent Processing,

NEQ)

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Foreword

This Standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This Standard replaces GB/T 20065-2006, *Screw-thread Steel Bars for the Prestressing of Concrete*. Compared with GB/T 20065-2006, the main technical changes of this Standard are as follows:

- it adds nominal diameters;
- it adds the requirements for chemical elements;
- it adds strength grades;
- it unifies the methods for relaxation test; and
- it gives detailed description for fatigue test.

This Standard was redrafted by reference to ISO 6934-5:1991, *Steel for the Prestressing of Concrete – Part 5: Hot-rolled Steel Bars with or without Subsequent Processing*. It is non-equivalent to ISO 6934-5:1991.

The main differences between this Standard and ISO 6934-5:1991 are as follows:

- the surface of steel bar in this Standard is threaded and the surface in the international standard can be plain or ribbed;
- the classifications of strength grades are different and steel bar of yield strength grade 785 and grade 1150 are added in this Standard; and
- the ranges of nominal diameters are different: it is 15 mm to 75 mm in This Standard and 15 mm to 40 mm in the international standard.

This Standard was proposed by China Machinery Industry Federation.

This Standard shall be under the jurisdiction of the National Standardization Technical Committee on Steels (SAC/TC 183).

The drafting organizations of this Standard: Central Research Institute of Building and Construction Co., Ltd., Tianjin Tiantie Zhaer Steel Production Co., Ltd., Shandong Shiheng Special Steel Group Co., Ltd., Fujian Sangang (Group) Co., Ltd., Wuhu Xinxing Ductile Iron Pipes Co., Ltd., Shougang Group and China Metallurgical Information and Standardization Institute.

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Screw-thread Steel Bars

for the Prestressing of Concrete

1 Application Scope

This Standard specifies the terms and definitions, strength grade codes, dimensions, shapes, weights and permissible deviations, technical requirements, test methods, inspection rules, packaging, designation and quality certification of screw-thread steel bars for the prestressing of concrete (also called finish-rolled screw-thread steel bars, hereinafter referred to as steel bars).

This Standard applies to screw-thread steel bars for the prestressing of concrete which is produced by hot rolling, remained heat treatment or heat treatment after rolling.

2 Normative References

The following referenced documents are indispensable for the application of this document. For dated references, only the edition dated applies to this document. For undated references, the latest edition of the referenced documents (including all amendments) applies 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 223.11, *Iron, Steel and Alloy – Determination of Chromium Content – Visual Titration or Potentiometric Titration 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 223.14, *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 223.16, *Methods for Chemical Analysis of Iron, Steel and Alloy – The Chromotropic Acid Photometric Method for the Determination of Titanium 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 223.37, *Methods for Chemical Analysis of Iron, Steel and Alloy – the Indophenol Blue Photometric Method for the Determination of Nitrogen Content after Distillation Separation*

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

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 223.63, *Methods for Chemical Analysis of Iron, Steel and Alloy – The Sodium (Potassium) Periodate Photometric Method for the Determination of Manganese Content*

GB/T 223.68, *Methods for Chemical Analysis of Iron, Steel and Alloy – The Potassium Iodate Titration Method after Combustion in the Pipe Furnace for the Determination of Sulfur Content*

GB/T 223.69, *Iron, Steel and Alloy – Determination of Carbon Contents – Gas-volumetric Method after Combustion in the Pipe Furnace*

GB/T 223.83, *Iron, Steel and Alloy – Determination of High Sulfur Content – Infrared Absorption Method after Combustion in an Induction Furnace*

GB/T 223.86, *Iron, Steel and Alloy – Determination of Total Carbon Content – Infrared Absorption Method after Combustion in an Induction Furnace*

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

GB/T 3075, *Metallic Materials – Fatigue Testing – Axial-Force-Controlled Method*

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 14370, *Anchorage, Grip and Coupler for Prestressing Tendons*

GB/T 17505, *Steel and Steel Products – General Technical Delivery Requirements*

indicates steel bar with the minimum yield strength 830 MPa.

5 Order Content

Purchase order in accordance with this Standard shall include the following content at least:

- a) a reference to this Standard;
- b) product name;
- c) product strength grade code;
- d) specification and weight (or quantity); and
- e) special requirements.

6 Dimensions, Shapes, Weights and Permissible Deviations

6.1 Range of nominal diameters and recommended diameters

The range of nominal diameters of steel bars is 15 mm to 75 mm; the nominal diameters of steel bars recommended in this Standard are 25 mm and 32 mm. Steel bars of other specifications can be supplied in accordance with the requirements of users.

6.2 Nominal sectional area and theoretical weight

See Table 1 for the nominal sectional areas and theoretical weights of steel bars.

6.6.2 The end of steel bars shall be well trimmed, which shall not impair the passage of a coupler.

6.7 Weight and permissible deviation

6.7.1 Steel bars are delivered in actual weight or theoretical weight.

6.7.2 The permissible deviation of actual weight and theoretical weight of steel bars shall not be greater than $\pm 4\%$ of theoretical weight specified in Table 1.

7 Technical Requirements

7.1 Chemical composition

7.1.1 The content of sulphur and phosphorus shall not be greater than 0.035% in the chemical composition of steels; the manufacturer shall select chemical compositions and alloy elements in order to ensure that the finished steel bars manufactured with different methods conform to the mechanical property requirements specified in Table 3.

7.1.2 The permissible deviations of chemical compositions of finished steel bars are specified in GB/T 222.

7.2 Smelting method

Steels are smelted in an oxygen converter or electric furnace.

7.3 Conditions of delivery

Steel bars are delivered as straight bars in the condition of hot rolling, remained heat treatment or heat treatment after rolling.

7.4 Mechanical properties

7.4.1 The mechanical properties of steel bars are specified in Table 3.

9.5 Rounding-off for numerical values

The rounding-off for numerical values and determination of test results are specified in YB/T 081.

9.6 Mechanical connection

Spiral couplers can be used to connect steel bars; the manufacturer of finished steel bars shall prove that the steel bar cut from any point along the length of steel bar can be connected with steel bar of any other length. Couplers and anchorages can be supplied by the manufacturer of finished steel bars. Couplers and anchorages are specified in GB/T 14370.

10 Packaging, Designation and Quality Certification

10.1 Designation of steel bars shall conform to the following requirements:

a) steel bars are painted at the end in accordance with strength grades: PSB785 not painted, PSB830 painted white, PSB930 painted yellow, PSB1080 painted red and PSB 1200 painted blue;

b) designation of steel bars can be provided by labeling. Steel bars are expressed by PSB785, PSB830, PSB930, PSB1080 and PSB1200 in accordance with strength grades. The diameters in millimetres are expressed with Arabic numerals; and

c) plates shall be clear and strapped securely.

10.2 In addition to the requirements above, the packaging, designation and quality certification of steel bars are specified in GB/T 2101.

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