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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 is made reference to the International Standard ISO 6934-5:1991 "Steel for the Prestressing of Concrete - Part 5: Hot-rolled Steel Bars with or without Subsequent Processing". This Standard is not equivalent to ISO 6934-5:1991.

Main differences between this standard and ISO 6934-5:1991 are as follow:

- This Standard is applicable to screw-thread steel bar only; International Standard is also applicable to plane surface or ribbed steel bar;
- Different strength grade of steel bar; PSB 785 steel bar had been added in this Standard;
- Different range of nominal diameter, which is 18 mm~50 mm in this Standard, and 15 mm~40 mm in International Standard.

Annex A of this Standard is normative.

This Standard was proposed by the China Iron and Steel Association.

This Standard is under the jurisdiction of the National Technical Committee on Iron and Steel of Standardization Administration of China.

Drafting organizations of this Standard: China National Construction Steel Quality Supervision and Test Centre, Tianjin Tiantie Zhaer Steel Production Co., Ltd, Anshan Iron and Steel Group Corporation, Tianjin Yasan Metal Material Technology Co., Ltd, Central Institute of Building and Construction of China Metallurgical Group Corp, Product Quality Supervision and Inspection Center of Jiangsu Province, Metallurgical Information and Standardization Institute.

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Screw-thread Steel Bars for the Prestressing of Concrete

1 Scope

This Standard specifies the terms and definitions, strength grade, code mark, dimensions, shape, weight and permissible tolerances, technical specifications, test methods, inspection rules, package, mark and quality certificate of screw-thread steel bars for the prestressing of concrete also referred to as fine rolling screw-thread steel bar (hereinafter referred to as "steel bar").

This Standard is applicable to the screw-thread steel bars for the prestressing of concrete may be supplied either hot-rolled or in a hot-rolled and processed condition.

2 Normative references

The provisions in following documents become the provisions of this Standard through reference in this Standard. For dated references, the subsequent amendments (excluding corrigendum) or revisions do not apply to this Standard, however, parties who reach an agreement based on this Standard are encouraged to study if the latest versions of these documents are applicable. For undated references, the latest edition of the referenced document applies.

GB/T 222 Permissible Tolerances for Chemical Composition of Steel Products

GB/T 223.5 Methods for Chemical Analysis of Iron, Steel and Alloy - The Reduced Molybdsilicate Spectrophotometric Method for the Determination of Acid-soluble Silicon Content

GB/T 223.11 Methods for Chemical Analysis of Iron, Steel and Alloy - The Ammonium Persulfate Oxidation Volumetric Method for the Determination of Chromium Content

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 Methods for Chemical Analysis of Iron, Steel and Alloy - The Dimethylglyoxime spectrophotometric Method for the Determination of Nickel Content

GB/T 223.26 Methods for Chemical Analysis of Iron, Steel and Alloy - The Thiocyanate Direct Photometric Method for the Determination of Molybdenum Content

GB/T 223.27 Methods for Chemical Analysis of Iron, Steel and Alloy - The Thiocyanate-butyl Acetate Extraction Spectrophotometric Method for the Determination of Molybdenum Content

GB/T 223.37 Methods for Chemical Analysis of Iron, Steel and Alloy - The Indophenol Blue Photometric Methods for the Determination of Nitrogen Content after Distillation Separation

GB/T 223.40 Methods for Chemical Analysis of Iron, Steel and Alloy - The Anion-exchange Separation-sulphochlorophenol S Photometric Method for the Determination of Niobium Content

GB/T 223.59 Methods for Chemical Analysis of Iron, Steel and Alloy - The Reduced Molybdoantimonyl Phosphoric Acid Photometric Method for the Determination of Phosphorus Content

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 Methods for Chemical Analysis of Iron, Steel and Alloy - The Gas-Volumetric Method after Combustion in the Pipe Furnace for the Determination of Carbon Content

GB/T 4336 Standard Test Method for Spark Discharge Atomic Emission Spectrometric Analysis of Carbon and Low-Alloy Steel (Routine Method)

GB/T 228 Metallic Materials - Tensile Testing at Ambient Temperature (GB/T 228-2002, eqv ISO 6892:1998 (E))

GB/T 232 Metallic Materials - Bend Test (GB/T 232-1999, eqv ISO 7438:1985 (E))

GB/T 3075 Method of Axial Force Controlled Fatigue Testing of Metals

GB/T 10120 Metallic materials - Stress relaxation test

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

GB/T 17505 Steel and Steel Products General Technical Delivery Requirements (GB/T 17505-1998, eqv ISO 404:1992(E))

GB/T 14370 Anchorage Grip and Coupler for Prestressing Tendons

GB/T 20066 Steel and Iron - Sampling and Preparation of Samples for the Determination of Chemical Composition

3 Terms and Definitions

For the purposes of this Standard, the following terms and definitions apply.

3.1 Screw-thread steel bars

Definition of screw-thread steel bar in this Standard is a sort of vertical steel bar supplied by hot rolled and with discontinuous external screw thread. Any section of this steel bar may be connected or anchored to connector or anchorages which with suited internal screw thread.

3.2 Nominal circle area

The cross-sectional area equivalent to the area of circular plain bar of nominal diameter.

3.3 Coefficient of efficiency section

The ratio between nominal circle area and theoretical sectional area (including the sectional area of screw thread) of steel bar.

4 Strength Grade Code

6.5 Length and permissible deviation

6.5.1 Steel bars usually delivered in specified lengths, specific delivery length shall be indicated in the order contract. The length of steel bars may be re-machined according to the requirements of purchasers.

6.5.2 If steel bar delivered in specified length or multiple lengths, permissible length deviation is 0 ~20 mm.

6.6 Bending and end of steel bar

6.6.1 The bending of steel bar shall not have effect on normal use, the bending degree shall not exceed 4 mm/m, and the total bending shall not exceed 0.4 % of total length of steel bar.

6.6.2 The end of steel bar shall be parallel and level, have no influence on the passing of connector.

6.7 Weight and permissible deviation

6.7.1 Steel bars shall be delivered in actual weight or theoretical weight.

6.7.2 Permissible deviation between actual weight and theoretical weight of steel bars shall not be greater than ± 4 % of theoretical weight (as shown in Table 1).

7 Technical Specifications

7.1 Designation and chemical composition

7.1.1 For the heat analysis of concrete steel, sulfur and phosphorus content shall not be greater than 0.035% . In order to ensure the finished steel bars processed by different methods can meet the mechanical property requirements specified in Table 3, manufactures shall carry out selection on chemical composition and alloying element.

7.1.2 The permissible deviation for the chemical compositions analyses of finished steel bars shall meet those specified in GB/T 222.

7.2 Smelting process

Steel shall be for oxygen converter or electro-smelting.

7.3 Delivery state

Steel bar shall be delivered in vertical stripe of hot rolled, hot rolled and residual heat

8.3.6 Relaxation rate value of 1000 h estimated by at least 100 h test data is permissible.

8.4 Dimensional measurement

Not only dimension measurement inspection carried out on the appearance of steel bars, but also connectors with suited shape shall be adopted to check the precession condition of steel bars.

9 Inspection Rules

9.1 Inspection and acceptance

Inspection and acceptance of steel bars shall be performed by the supplier, and the purchaser is entitled to checkout.

9.2 Batching rules

Steel bars shall be inspected and accepted in batches, and each batch shall be composed of such steel bars of same furnace number, specification and delivery state.

9.3 Sampling quantity

Sampling quantity of inspection items of steel bars shall be in accordance with those specified in Table 4.

9.4 Re-inspection and judgment

Re-inspection and judgment of steel bars shall comply with those specified in GB/T 17505.

9.5 Mechanical Connection

Steel bars connected by spiral connector is permissible, and the manufacturing plants of finished steel bars shall be responsible for the certification of "steel bars cut at any position along the steel bar length are able to connect with other steel bars". Connectors and anchorages may be supplied by finished steel bars manufacturing plants as accessories. Connectors and anchorages shall meet the relevant requirements of GB/T 14370.

10 Package, Marking and Quality Certificate

10.1 Marking of steel bars shall meet the following requirements.

Annex A

(Normative)

Determination Method of Overall Elongation Rate of Steel Bars under Maximum Stress

A.1 Test specimen

A.1.1 Length

The minimum free length between specimen holders shall be in accordance with those specified in Table A.1:

Table A.1

In millimeter

Nominal diameter of steel bars	Minimum free length between specimen
$d \leq 25$	350
$25 < d \leq 32$	400
$32 < d \leq 50$	500

A.1.2 Marks and measurement of original gauge length

Within the free length range of specimen, the specimen shall be divide uniformly into 10 mm or 5 mm equal interval marks, division and measurement of marks shall meet the provisions specified in GB/T 228.

A.2 Elongation test

Perform elongation test according to the provisions specified in GB/T 228, until the specimen fracture.

A.3 Measurement after fracture

Choose two marks Y and V, the distance between these marks before elongation test shall be 100 mm at least. Both marks shall be located in the side of holder where is farthest from fracture point. Distance between both marks and holders shall not be less than 20 mm or steel bars' nominal diameter d (whichever is the greater); distance between both marks and fracture point shall not be less than 50 mm or $2d$ (whichever is the greater). See Figure A.1.

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