

Translated English of Chinese Standard: GB/T5223.3-2017
www.ChineseStandard.net → Buy True-PDF → Auto-delivery.
Sales@ChineseStandard.net

GB

NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA

ICS 77.140.65
H 44

GB/T 5223.3-2017

Replacing GB/T 5223.3-2005

Steel bars for the prestressing of concrete

预应力混凝土用钢棒

(ISO 6934-3:1991, Steel for the prestressing of concrete –
Part 3: Quenched and tempered wire, NEQ)

Issued on: February 28, 2017

Implemented on: November 1, 2017

**Issued by: General Administration of Quality Supervision, Inspection and
Quarantine of the People's Republic of China;
Standardization Administration of the People's Republic of
China.**

Table of Contents

Foreword.....	3
1 Scope	5
2 Normative references	5
3 Terms and definitions	5
4 Classification, codes and designation	7
5 Ordering content.....	7
6 Dimensions, shapes, weights and tolerances	8
7 Technical requirements	13
8 Test methods	15
9 Inspection rules	18
10 Packaging, marking and quality certification.....	19

Foreword

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

This Part replaces GB/T 5223.3-2005, *Steel Bars for Prestressed Concrete*. Compared with GB/T 5223.3-2005, the major technical changes are as follows:

- it cancels the common relaxation varieties of prestressed steel bars;
- it adds the specifications of steel bars (see Clause 6);
- it cancels cross sectional area measurement for plain steel bars and adds the specifications for diameter tolerances (see 6.1);
- it changes the cross sectional area measurement of helical grooved steel bars and helical ribbed steel bars into the weight per m measurement, and adjusts the weight tolerances for helical ribbed steel bars (see 6.2 and 6.3);
- it increases the requirement for coil weight (see 6.6);
- it adds the dimensional measurement for steel bars (see 8.2.1);
- the test method is changed into as specified in GB/T 21839 (8.4.1).

This Standard was redrafted by referencing ISO 6934-3:1991, *Steel for the prestressing of concrete – Part 3: Quenched and tempered wire*. This Standard is not equivalent to ISO 6934-3:1991, the major technical changes are as follows:

- quenched and tempered steel wires are changed into steel bars for prestressed concrete;
- it adds helical ribbed steel bars;
- it adds strength levels;
- it adds the specifications of steel bars;
- it adds the indexes of elongation after fracture as a routine inspection item;
- it adds impact test for the helical ribbed steel bars for mine supporting projects.

This Standard was proposed by China Iron and Steel Association.

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

The drafting organizations of this Standard: Shenyang Super Steel Bar Co., Ltd.,

Steel bars for the prestressing of concrete

1 Scope

This Standard specifies the terms and definitions, classification, codes and designation, ordering content, dimensions, shapes, weights and tolerances, technical requirements, test methods, inspection rules, packaging, marking and quality certification for steel bars for the prestressing of concrete.

This Standard applies to plain, helical grooved, helical ribbed and ribbed round bars for the prestressing of concrete.

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 document.

GB/T 229, *Metallic materials - Charpy pendulum impact test method*

GB/T 2101-2008, *General requirement for acceptance, packaging, marking and certification for section steel*

GB/T 2103-2008, *General requirements for acceptance, packing, marking and quality certification of steel wire*

GB/T 14981-2009, *Dimension, shape, mass and tolerance for hot-rolled round wire rod*

GB/T 21839, *Steel for prestressed concrete – Test methods*

GB/T 24587, *Hot-rolled wire rods for prestressing steel bars of concrete*

YB/T 081, *Rule for rounding off of numerical values and judgement of testing values for technical standards of metallurgy*

3 Terms and definitions

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

6.7 Normally, the diameter of the inner ring of steel bars shall not be less than 2 000 mm. Products of other inner coil diameters can also be supplied as agreed by the purchaser and the supplier.

6.8 The product can be delivered in coil or straight strip; the length of straight strip and tolerances shall be as agreed on by the purchaser and the supplier.

7 Technical requirements

7.1 Raw material

7.1.1 The dimensions, shapes and tolerances of the wire rods for steel bars shall be as specified in accuracy grade B of GB/T 14981; the surface quality shall be as specified in GB/T 24587.

7.1.2 The designation and chemical composition of steel for steel bars shall be as specified in GB/T 24587; steel bars can also be manufactured using other designations of steel, but the content of sulfur shall not exceed 0.025 and the content of copper shall not exceed 0.20%.

7.2 Manufacturing method

7.2.1 Quench and temper: steel bars are normally manufactured using hot-rolled wire rods as the material and then processed before quenching and tempering. The material of ribbed steel bars shall be as agreed on by the purchaser and the supplier.

7.2.2 Finished steel bars shall be free of welded joints; the welded joints for continuous operation during production shall be cut off.

7.3 Mechanical properties

7.3.1 Steel bars shall be subjected to tensile test. Their tensile strength and specified plastic elongation shall be as specified in Table 6; the elongation properties (including ductility level and corresponding elongation) shall be as specified in Table 7.

7.3.2 Steel bars shall be subjected to bending test (except helical grooved steel bars) and their properties shall be as specified in Table 6.

7.3.3 Steel bars shall be subjected to the relaxation test for 1 000 h at initial stress of 70% of the nominal tensile strength. If requested by the purchaser, the relaxation at 1 000 h shall also be determined at initial stresses of 60% and 80% of the nominal tensile strength, which shall be as specified in Table 6.

0.5%.

8.4.5 Elasticity modulus

The elasticity modulus shall be determined as specified in GB/T 21839.

8.4.6 Test failure

If the sample fractures in the chuck or within $2D_n$ of the jaw, failing to meet the specifications of this Standard, then the test is invalid.

8.5 Repeated bending test

The repeated bending test for the steel bars of nominal diameter not greater than 10 mm (except helical grooved steel bars) shall be carried out as specified in GB/T 21839. The bending radius shall be as specified in Table 6 of this Standard.

8.6 Bending test

The bending test for the steel bars of nominal diameter greater than 10 mm (except helical grooved steel bars) shall be carried out as specified in GB/T 21839. The bending angle and bending pressure head diameter shall be as specified in Table 6 of this Standard.

8.7 Stress relaxation property test

8.7.1 The stress relaxation test for steel bars shall be carried out as specified in GB/T 21839.

8.7.2 The environmental temperature of the sample during the test shall be maintained within the range of $20^{\circ}\text{C} \pm 2^{\circ}\text{C}$.

8.7.3 The gauge length of the sample shall not be less than 60 times of the nominal diameter.

8.7.4 The sample shall not be subjected to any heat treatment or cold working after preparation.

8.7.5 During the whole test, force shall be applied stably; the initial load shall be applied evenly within 3 min ~ 5 min; start recording the relaxation value after maintaining the load for 1 min.

8.7.6 It is allowed to reckon the 1 000 h relaxation value using the test data of not less than 120 h.

8.8 Fatigue test

8.8.1 The sample for fatigue test shall be cut out directly from finished steel bars; the

length of the sample shall ensure the distance between two clamps is not less than 140 mm.

8.8.2 Steel bars shall withstand, without failure, 2×10^6 cycles of $0.7F_m \sim (0.7F_m - F_r)$ pulsating load.

Plain steel bars: $F_r/S_n = 200$ MPa

Helical grooved, helical ribbed steel bars and ribbed steel bars: $F_r/S_n = 180$ MPa

where,

F_m – nominal breaking load of steel bar, in N;

F_r – equivalent load value of stress range, in N;

S_n – nominal cross sectional area of steel bar, in mm^2 .

8.8.3 The stress frequency for the fatigue test shall not be greater than 120 Hz, which shall be as specified in GB/T 21839.

8.9 Impact test

The impact test for prestressed steel bars for mine supporting projects shall be carried out as specified in GB/T 229. The impact absorbed energy shall be as specified in 7.3.4.

8.10 Value rounding off

The rounding off of numerical value and judgement of test results shall be as specified in YB/T 081.

9 Inspection rules

9.1 Inspection and acceptance

The factory inspection of products shall be carried out by the quality inspection department of the supplier in accordance with Table 8; the purchaser can carry out inspection and acceptance in accordance with this Standard.

9.2 Group-batch rules

Steel bars shall be inspected and accepted in batches; each batch of steel bars shall comprise steel bars of the same designation, specification and processing condition; the weight of each batch shall not be greater than 60 t.