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

GB/T 699-2015

Replacing GB/T 699-1999

Quality carbon structure steels

优质碳素结构钢

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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 699-1999 Quality Carbon Structural Steels.

Compared with GB/T 699-1999, the main technical changes are as follows:

- Deleted steel bar classification according to metallurgical quality; added classification according to surface type (see Clause 3 of this Standard; Clause 4, Table 2 & Table 4 in GB/T 699-1999);
 - Deleted rimmed steel and semi-killed steel (see Table 1 of this Standard;
 - Modified chemical composition of the Steel 08Al (see footnote c in Table
 - Specified “yield point” as “lower yield strength R_{el} or specific plastic extension strength $R_{p0.2}$ ” (see Table 2 of this Standard; Table 3 in GB/T 699-1999);
 - Increased allowable adjustment range of heat treatment temperature (see footnote c in Table 2 of this Standard);
 - wrought (rolled) (see setting in Table 2 of this Standard; Sub-clause 6.4.2 in GB/T 699-1999);
 - Specified requirements for forging steel (see Sub-clause 6.5.1 of this
 - Increased macrostructure requirements for continuously cast steel (see Table 3 of this Standard);
 - Subdivided surface imperfection into imperfection and defect (see Sub-
 - Added that surface quality shall comply with provisions of GB/T 28300 (see Sub-clause 6.8.4 of this Standard).
 - Modified sampling number of impact test, microstructure inspection, etc.
- (see Table 7 of this Standard);
- Added requirements that steel bar test results use numerical rounding rules (see Sub-clause 8.4.3 of this Standard).

This Standard was proposed by China Iron and Steel Association.

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

The main drafting organizations of this Standard: Information Standard Institute of the Ministry of Metallurgical Industry, Shijiazhuang Iron and Steel Co., Ltd., Fujian Province Sanming Steel (Group) Co., Ltd., Tianjin Iron and Steel Group Co., Ltd., Daye Special Steel Co., Ltd., Shougang Group, Qingdao Iron and Steel Co., Ltd.

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1 Scope

This Standard specifies classification and code, order information, size, appearance and weight, technical requirements, test methods, inspection rules, packaging, marks and quality certificate of quality carbon structural steel bars.

This Standard is applicable to hot-rolled or forged quality carbon structural steel bars of which nominal diameter or thickness is not greater than 250 mm. Hotrolled or forged quality carbon structural steel bars of which nominal diameter or thickness is greater than 250 mm shall also be supplied, as agreed between the buyer and the supplier (hereinafter referred to as steel bars) The designations and chemical composition specified in this Standard are also applicable to steel ingots, steel billets, steels and its products of other crosssections.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

3 Classifications and Code

3.1 Steel bar is classified into two categories according to the processing method used:

3.2 Steel bar is classified into five categories according to the type of surface:

4 Order Information

The contracts or purchase orders ordered according to this Standard shall contain the following contents:

- c) Designations or unified numerical code;
- e) Dimension, appearance and allowance (see Clause 5);
- g) Heat treatment delivery or special surface state delivery (see 6.3.2 and h) Impact test (if required, see 6.4.2);
- i) Upsetting (if required, see 6.5);
- j) Decarburized layer (if required, see 6.7);
- k) Special requirements (if required, see 6.9).

5 Size, Appearance and Weight

6 Technical Requirements

6.1 Designations and Chemical Composition 6.1.1

Designations, unified numerical code and chemical composition (smelting analysis) of steels shall comply with Table 1.

Elements not in the table cannot be added without buyer's agreement. Measures shall be taken to prevent elements of scrap steel or other raw materials from being brought in to affect the performance of steel.

a Copper content in thermal pressure processing steel shall not exceed 0.20%; b For killed steel deoxidized by aluminum, there is no lower limit for the content of carbon and manganese; the upper limit of manganese content is 0.45%; silicon content is not more than 0.03%; aluminum content is 0.020%~0.070%; the designation is 08Al.

6.1.3 The manganese content of 35~85 steels for lead-bath quenched steel wires shall be 0.30%~0.60%; the manganese content of 65 Mn and 70 Mn shall be 0.70%~1.00%; the chromium content shall not be higher than 0.10%, the nickel content shall not be higher than 0.15%, the copper content shall not be higher than 0.20%; the sulfur and phosphorus contents shall comply with the requirements of steel wire standards, but shall not be higher than the indexes in Table 1.

6.2 Smelting Method

Unless otherwise specified in the contract, the smelting method shall be chosen by the manufacturer.

6.3 State of Delivery

6.3.1 Steel bars are normally delivered in the hot-rolled or hot-forged state. 6.3.

6.4 Mechanical Properties 6.4.1

For test sample made of heat-treated (normalized) billet, the longitudinal tensile properties of steel bar shall comply with the provisions in Table 2. If the supplier can guarantee the conformance of tensile properties, the tests may be exempted. As required by the buyer, for test sample that is made of heat-treated (quenched + tempered) billet, the longitudinal impact absorption energy of 25~50 and 25 Mn~50 Mn steel bars shall comply with the provisions in Table 2. Round-steel with diameter smaller than 16mm AND square-steel or flat-steel with thickness not greater than 12 mm shall not be subject to the impact test. 6.4.3 The delivery state's hardness of steel bar for cutting work or for cold drawn material shall comply with the provisions in Table 2. For the hardness of non-thermal treated steel, if the supplier can guarantee the conformance, the test may be exempted.