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

GB/T 711-2017

**Hot-rolled quality carbon structural steel plates, sheets and
strips**

优质碳素结构钢热轧钢板和钢带

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Foreword

This Standard was drafted as per the rules specified in GB/T 1.1-2009. This Standard combined and modified the following standards like GB/T 710-2008 Hot- Rolled Quality Carbon Structural Steel Sheets and Strips, GB/T 711-2008 Hot-rolled Quality Carbon Structural Steel Plates, Sheets and Wide Strips. This Standard replaced GB/T 710-2008 Hot-Rolled Quality Carbon Structural Steel Sheets and Strips, GB/T 711-2008 Hot-rolled Quality Carbon Structural Steel Plates, Sheets and Wide Strips; compared with GB/T 710-2008 and GB/T 711-2008, this Standard has the major technical changes as follows:

- Cancel the relevant brand of boiling steel;
- Cancel the pull-edge level;
- Increase three brands of 35Mn, 55Mn, 70Mn (see Table 1, Table 2, Table 3);
- Tighten the control harmful elemental sulfur in steel (see Table 1);
- Adjust the delivery status of some brands (see Table 2). This Standard was proposed by China Iron and Steel Industry Association. This Standard shall be under the jurisdiction of National Technical Committee for Standardization of Steel (SAC/TC 183). Drafting organizations of this Standard. Chongqing Iron & Steel Company Limited, Angang Steel Company Limited, China Metallurgical Information and Standardization Institute, Shougang Co., Ltd., Xinyu Iron & Steel Co., Ltd., and Hebei Iron and Steel Co., Ltd. Tangshan Branch. Chief drafting staffs of this Standard. Du Dasong, Ye Guohua, Pu Zhimin, Zhang Weixu, Shi

Li, Liao Sangsang, Deng Cuiqing, Xie Caozhong, Guan Jichun, Yang Juanyu, Gao Yan, Wang Xin, Liu Xuyuan, Su Haolu. The historical editions replaced by this Standard are as follows:

--- GB/T 710-1998, GB/T 710-1991, GB/T 710-2008;

--- GB/T 711-1985, GB/T 711-1988, GB/T 711-2008. Hot-Rolled Quality Carbon Structural Steel Plates Sheets and Strips

1 Scope

China's national standard for hot-rolled quality carbon structural steel plates, sheets and strips. Quality carbon steel is distinguished from ordinary carbon structural steel by control rather than by composition: the carbon range is narrower, the sulfur and phosphorus limits are lower, and the composition is guaranteed rather than merely typical. That is what makes it usable for parts that will be heat treated or heavily formed, since a steel whose carbon varies from heat to heat cannot be quenched and tempered to a predictable hardness, and one carrying sulfur cracks when it is bent. The plate and strip covered here goes into machine components, pressed parts, drums and gas cylinders, and into everything subsequently hardened. The standard specifies the dimensions, appearance, weight, technical requirements, test methods, inspection rules, packaging, marking and quality certificate, and applies to such plates, sheets and strips of thickness up to 100 mm and width 600 mm and above.

This Standard specifies the dimension, appearance, weight, technical requirements, test methods, inspection rules, package, marking and quality certificate of the hot- rolled quality carbon structural steel plates sheets and strips. This Standard is only applicable to the hot-rolled quality carbon structural steel plates sheets and strips with thickness no greater than 100mm, width no less than 600mm (hereinafter referred to as steel sheets and strips).

2 Normative References

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document; for the undated documents, only the latest version (including all the amendments) are applicable to this document.

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 Molybdosilicate Spectrophotometric Method for The Determination of Acid-Soluble Silicon 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 223.19 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

3 Ordering Contents

Contracts or orders for purchasing products under this Standard shall include the following contents.

4 Dimension, Appearance, Weight

The dimension, appearance, weight and permissible deviation of steel sheet and strip shall conform to the provisions of GB/T 709.

5.1 Brand and chemical composition

5.1.1 Brand and chemical composition (smelting composition) of steel shall conform to the provisions of Table 1.

5.1.2 If the contents of residual elements in steel such as chromium, nickel, copper can be guaranteed by the supplier for compliance, then they shall not be analyzed.

5.1.4 The permissible deviation of the chemical composition of the finished steel plate and strip shall conform to the provisions of GB/T 222.

5.2 Smelting method The steel is smelted by oxygen converter or electronic furnace.

5.3 Delivery state

5.3.1 The steel strip and shear steel plate shall be delivered in the hot-rolled state; The delivery status of the single-rolled steel plate shall conform to the provisions of Table 2.

5.4 Mechanical properties

5.4.1 The mechanical properties of the steel plate and strip shall conform to the provisions of Table 3.

5.4.2 Through the agreement between the supplier and the purchaser, the mechanical properties with brand of 45, 45Mn and above shall be delivered by the actual value; the indexes in Table 3 can only be referred to.

5.4.3 For the steel plate delivered in the heat treatment state, when its elongation is more

than 2% (absolute value) higher than the specified value in Table 2; the allowable tensile strength is 40MPa lower than that specified in Table 2.

5.4.6 In addition to the temperatures listed in Table 4, V-shape impact absorption energy of other temperatures can be determined and agreed by the two parties.

5.4.7 Charpy (V-notch) impact absorption energy shall be calculated by the arithmetic average of the 3 samples; thereof, single value of one sample is allowed to be lower than the specified value in Table 4, however, it shall not be 70% lower than the specified value.

5.4.8 If the above conditions are not satisfied, another 3 specimens may be taken from the same sampling product, the average of 6 consecutive specimens shall be no less than the specified value; thereof 2 specimens are allowed to be less than the specified value; however, only one sample that falls below the specified value by 70% is allowed.

5.6 Decarburization layer Through the agreement between the two parties, 35 steel and steel plate and strip with higher carbon content can be tested for decarburization; the total decarburization depth on each surface shall be no greater than 2% actual thickness of the steel plate and strip.

5.7 Ultrasonic test Through the agreement between the two parties, steel plate can take ultrasonic test as per GB/T 2970; the test standards and compliance levels shall be indicated in the contract, respectively.

5.10 Surface quality

5.10.1 The steel plate and strip shall not have the visible stratification; while the surface of the steel plate and strip shall be free from the following defects like cracks, bubbles, folds, inclusions, scars, pressed oxide scale, etc.

5.10.3 The local defects on the surface of the steel plate and strip are allowed to be cleaned; while the clean-up area shall be smooth and edge-free; the allowable minimum thickness of steel plate and strip must be guaranteed.

5.10.4 During the continuous production of steel strips, local surface defects are not easily found and removed; so, delivery with defects is allowed; however, the defective part shall not exceed 6% total length of each roll of steel strip.

5.10.5 Steel plate with thickness greater than 30mm is allowed for flame trimming; however, the steel plate requires the heat treatment shall take flame trimming before heat treatment.

6 Test Methods

6.1 The analysis method for chemical compositions of steel shall be performed as per the provisions of GB/T 223.5, GB/T 223.12, GB/T 223.19, GB/T 223.23, GB/T 223.37, GB/T 223.59, GB/T 223.64, GB/T 223.68, GB/T 223.86, GB/T 4336, GB/T 20123, GB/T 20125,