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**Seamless hot-rolled square and  
rectangular steel tubes for structure**

结构用方形和矩形热轧无缝钢管

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# Seamless hot-rolled square and rectangular steel tubes for structure

## 1 Scope

This Standard specifies the ordering content, dimension, shape and weight, technical requirements, inspection and test methods, inspection rules, package, marking, and quality certificate of seamless hot-rolled square and rectangular steel tubes for structure.

This Standard is applicable to the seamless hot-rolled square and rectangular steel tubes for structure.

## 2 Normative references

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

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 223.9 *Iron steel and alloy -- Determination of aluminium content -- Chrom azurol S photometric 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 223.17 *Methods for chemical analysis of iron, steel and alloy -- The diantipyrylmethane 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 223.62 Methods for chemical analysis of iron, steel and alloy -- The butyl acetate extraction 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 223.72 Iron, steel and alloy -- Determination of sulfur content -- Gravimetric method*

*GB/T 223.81 Iron steel and alloy -- Determination of total aluminum and total boron contents -- Microwave digestion-inductively coupled plasma mass spectrometric method*

*GB/T 223.86 Iron steel and alloy -- Determination of total carbon content -- Infrared absorption method after combustion in an induction furnace*

*GB/T 226 Test method for macrostructure and defect of steel by etching*

*GB/T 228.1 Metallic materials -- Tensile testing -- Part 1: Method of test at room temperature*

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

*GB/T 699 Quality carbon structure steels*

*GB/T 700 Carbon structural steels*

*GB/T 1979 Diagram of a low magnification texture blemish grading of structural steel*

*GB/T 2102 Acceptance, packing, marking and quality certification of steel pipe*

GB/T 2975 *Steel and steel products -- Location and preparation of test pieces for mechanical testing*

GB/T 3077 *Alloy structure steels*

GB/T 4336 *Carbon and low-alloy steel -- Determination of multi-element contents -- Spark discharge atomic emission spectrometric method (routine method)*

GB/T 10561-2005 *Steel -- Determination of content of nonmetallic inclusions -- Micrographic method using standards diagrams*

GB/T 20066 *Steel and iron -- Sampling and preparation of samples for the determination of chemical composition*

GB/T 20123 *Steel and iron -- Determination of total carbon and sulfur content -- Infrared absorption method after combustion in an induction furnace*

GB/T 20124 *Steel and iron -- Determination of nitrogen content -- Thermal conductimetric method after fusion in a current of inert gas*

GB/T 20125 *Low-alloy steel -- Determination of multi-element contents -- Inductively coupled plasma atomic emission spectrometric method*

YB/T 4149 *Continuously cast round billet for seamless steel tube rolling*

YB/T 5221 *Alloy structure steel round tube blank hot rolled and forged for making seamless tube*

YB/T 5222 *Quality hot rolled and forged carbon structural steel round tube blank*

### **3 Ordering content**

Contracts or orders for ordering steel tubes in accordance with this Standard shall include the following:

- a) standard number;
- b) product name;
- c) designation and quality grade of steel (if applicable);
- d) quantity ordered (total weight or total length);
- e) dimensions (side length × side length × wall thickness, in millimeters);
- f) delivery status;
- g) special requirements.

shall be specified in the contract. The permissible tolerances for chemical compositions of finished steel tubes shall meet the requirements of GB/T 222.

## **5.2 Manufacturing method**

### **5.2.1 Steel smelting method**

Steel shall be smelted using the method of electric arc furnace plus external refining or oxygen converter plus external refining. After negotiation between the supplier and the demander, steel can also be smelted using other methods with higher requirements. When the demander specifies a certain smelting method, it shall be specified in the contract.

### **5.2.2 Billet manufacturing method**

Billets shall be manufactured using the method of continuous casting or hot rolling (forging). Ingots can also be used directly as the billets. Continuously cast round billets shall comply with the provisions of YB/T 4149, but other higher quality requirements approved by related parties may also be adopted. Hot-rolled (forged) round billets shall comply with the requirements of YB/T 5221 and YB/T 5222, respectively.

### **5.2.3 Steel tube manufacturing method**

Steel tubes shall be manufactured using the method of hot rolling (expanding) for making seamless tube. When the demander specifies a certain manufacturing method, it shall be specified in the contract.

## **5.3 Delivery status**

Steel tubes shall be delivered under hot rolling (expanding) or heat treatment.

## **5.4 Mechanical properties**

**5.4.1** Longitudinal mechanical properties of high-quality carbon structural steels, carbon structural steels, and low-alloy high-strength structural steels shall comply with the provisions of Table 3. The steel tube specimen blank made of 20Mn2 alloy structural steel is heat-treated according to the heat treatment system recommended in GB/T 3077 and made into a specimen. The measured longitudinal mechanical properties shall comply with the requirements of Table 3.

**5.4.2** The impact absorbed energy in Table 3 is the required value for the Charpy V-notch impact absorbed energy of the standard-sized specimen. When a small-sized impact specimen is used, the required value for the Charpy V-notch impact absorbed energy of the small-sized specimen shall be the required value for the impact absorbed energy of the standard-sized specimen multiplied by the decline factor in Table 4. The width of the impact specimen