



National Standard of the People's Republic of China

GB/T 5216—2014
Replace GB/T 5216—2004

Structural steels with specified hardenability bands

保证淬透性结构钢

(English Translation)

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Foreword

SAC/TC 183 is in charge of this English translation. In case of any doubt about the contents of English translation, the Chinese original shall be considered authoritative.

This standard is drafted in accordance with the rules given in the GB/T 1.1—2009 *Directives for standardization—Part 1: Structure and drafting of standards*.

This standard replaces the GB/T 5216—2004 *Structural steels subject to end-quench hardenability requirements* in whole.

In addition to a number of editorial changes, the following technical deviations have been made with respect to the GB/T 5216—2004 *Structural steels subject to end-quench hardenability requirements*.

- Deleted requirement for dimension “diameter or thickness not less than 30 mm” in scope;
- Deleted classification of steels “steels are classified into quality steels and advanced quality steels” in classification and designation;
- Added number of steel grades from 24 to 32 (Sulfur containing grades are not counted), namely 25CrH, 28CrH, 35CrMoH, 17Cr2Ni2H, 22CrNiMoH, 27CrNiMoH, 40CrNi2MoH, 18Cr2Ni2MoH and related technical requirements;
- Adjusted upper and lower limits of some steel grades listed in Table 1: lower limit of Boron in Boron containing grades were adjusted to 0.0008%, and upper limit to 0.003 5%; upper limit of Manganese for 17CrMnBH was adjusted from 1.30% to 1.40%; upper limit of Manganese and chromium for 20CrMnTiH were adjusted from 1.15% to 1.20% and 1.35% to 1.45%, respectively; lower limit of sulfur for sulfur containing grade was adjusted from 0.020% to 0.015%; carbon content of 15CrMoH was adjusted to 0.12%~0.18%;
- Unified content requirements of impurity elements sulfur and phosphorous, and residual elements copper, chromium and nickel;
- Added requirement of oxygen content not more than 0.002 0%;
- Added hardness requirements for 16CrMnH and 20CrMnH after annealing or high temperature tempering;
- Added a provision in 6.5.1 “sampling can be done on the intermediate billet for the steel bars with a nominal diameter or thickness of less than 30 mm”;

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- Changed method of designation for hardenability band;
- Divided the requirements of macrostructure into 2 classes in Table 3, and added requirement of central segregation for continuously cast steels;
- Divided the requirements of non-metallic inclusions into 2 classes in Table 4;
- Name of Annex A was changed from “Calculation method of hardenability of steels” to “Calculation method of ideal critical diameter D_I value of steels”.

This standard was proposed by China Iron and Steel Association.

This standard was prepared by SAC/TC 183 Technical Committee on Steel of Standardization Committee of China.

The previous editions of this standard are as follows:

- GB 5216—1985;
- GB/T 5216—2004.

Structural steels with specified hardenability bands

1 Scope

This standard specifies the technical delivery requirements for bars of structural steels subject to hardenability requirements in terms of order information, classification and designation, dimensions, shape, mass and tolerances, technical requirements, test methods, inspection rules, package, marking, and certificate of quality.

This standard is applicable to hot-rolled and/or hot-forged structural steel bars with specified hardenability bands for the manufacture of machinery components. Hardenability can be either measured by the end-quench method or calculated by formula.

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.

GB/T 222, *Permissible tolerances for chemical composition of steel products*

GB/T 223.3, *Methods for chemical analysis of iron, steel and alloy—The dianthipyryl methane phosphomolybdate gravimetric method for the determination of phosphorus content*

GB/T 223.5, *Steel and iron—Determination of acid-soluble silicon and total silicon content—Reduced molybdosilicate spectrophotometric method*

GB/T 223.11, *Iron, steel and alloy—Determination of chromium content—Visual titration or potentiometric titration method*

GB/T 223.13, *Methods for chemical analysis of iron, steel and alloy—The ammonium ferrous sulfate titration method for the determination of vanadium 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 photo-*

metric method for the determination of titanium 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 223.18, *Methods for chemical analysis of iron, steel and alloy—The sodium thiosulfate separation iodimetric method for the determination of copper 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 223.25, *Methods for chemical analysis of iron, steel and alloy—The dimethylglyoxime gravimetric method for the determination of nickel content*

GB/T 223.26, *Iron, steel and alloy—Determination of molybdenum content—The thiocyanate spectrophotometric method*

GB/T 223.53, *Methods for chemical analysis of iron, steel and alloy—The flame atomic absorption spectrophotometric method for the determination of copper content*

GB/T 223.54, *Methods for chemical analysis of iron, steel and alloy—The flame atomic absorption spectrophotometric method for the determination of nickel content*

GB/T 223.58, *Methods for chemical analysis of iron, steel and alloy—The sodium arsenite-sodium nitrite titrimetric method for the determination of manganese content*

GB/T 223.59, *Iron, steel and alloy—Determination of phosphorus content—Bismuth phosphomolybdate spectrophotometric method and antimony phosphomolybdate blue spectrophotometric method*

GB/T 223.60, *Methods for chemical analysis of iron, steel and alloy—The perchloric acid dehydration gravimetric method for the determination of silicon content*

GB/T 223.61, *Methods for chemical analysis of iron, steel and alloy—The ammonium phosphomolybdate volumetric method for the determination of phosphorus content*

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*