NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 41160-2022

Cast tool steels

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Table of Contents

1 Scope

This Standard specifies technical requirements, test methods, inspection rules and marks, packaging and storage of cast tool steels.

This Standard applies to cast tool steels and their castings supplied or used in the annealed state.

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 223.4, Alloyed steel - Determination of manganese content - Potentiometric or visual titration method

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 223.11, Iron, Steel and Alloy - Determination of Chromium Content - Visual Titration

or Potentiometric Titration Method

GB/T 223.14, Methods for Chemical Analysis of Iron, Steel and Alloy - The N-Benzoy-N-Phenylhydroxylamine Extraction Photometric Method for the Determination of Vanadium Content

GB/T 223.20, Methods for chemical analysis of iron steel and alloy - The Potentiometric titration method for the determination of cobalt content

GB/T 223.21, Methods for chemical analysis of iron steel and alloy - The 5-CL-PADAB spectrophotometric method for the determination of cobalt content

GB/T 223.22, Methods for chemical analysis of iron, steel and alloy - The nitroso-R-salt spectrophotometric method for the determination of cobalt content

GB/T 223.23, Iron, Steel and Alloy-Determination of Nickel Content - The Dimethylglyoxime Spectrophotometric Method

GB/T 11351, Mass tolerances of casting

GB/T 14203, General rules for spark discharge atomic emission spectrometry

GB/T 15056, Casting surface roughness - Appraising method

GB/T 20066, Steel and Iron-Sampling and Preparation of Samples for the Determination of Chemical Composition

3 Terms and definitions

There are no terms and definitions that need to be defined in this document.

4.1.1 The smelting process usually adopts the method of electric arc furnace and

refining furnace refining, which can also be determined by the supplier.

4.2.1 The designation and chemical composition of cast tool steel shall comply with the

provisions of Table 1. The foreign designations corresponding to the famous designations are shown in Annex C.

inclusions, cold insulation, pores, porosity, shrinkage holes, and lack of meat that affect performance.

4.4.3 The surface roughness of castings is selected according to GB/T 6060.1. It is

specified in the drawing or order contract.

4.5 Dimensional, geometric and weight tolerances

The geometrical shape, dimensional tolerance, geometrical tolerance and weight tolerance of castings shall conform to the stipulations in the drawing or order contract.

If there is no corresponding stipulation in the drawing and order contract, the dimensional tolerance of castings shall be selected according to GB/T 6414; the weight tolerance of castings shall be selected according to GB/T 11351.

4.6.1 Casting defects allow weld repair. Defects shall be cleaned before welding. The

edges of the cleaned area shall be overly rounded. When necessary, magnetic particle or penetrant testing is required before and after welding repairs. Weld repairs shall not affect the use and appearance quality of the castings.

4.6.2 When the groove depth prepared for welding repair exceeds 40% of the wall

thickness of the welding repair part or 25mm (whichever is the smaller groove depth), it is a major welding repair. Special circumstances are negotiated by both parties.

4.6.3 Major welding repairs shall be approved by the purchaser. For major welding

repairs, the location and scope of welding repairs shall be recorded. Welding conditions are determined by both the supplier and the purchaser. If the purchaser has requirements for pre-welding preparation, electrode material, welding repair process, post-weld treatment and post-weld inspection, it shall negotiate with the supplier to decide.

4.6.4 After the casting is repaired by welding, it shall be treated with stress relief.

Special circumstances are negotiated by both parties.

5.1.1 The preparation method of the sample for chemical composition analysis shall be

carried out according to the provisions of GB/T 20066.

5.1.2 The analysis method of chemical composition can be according to GB/T 223.4,

GB/T 223.5, GB/T 223.11, GB/T 223.14, GB/T 223.20, GB/T 223.21, GB/T 223.22,

GB/T 223.23, GB/T 223.26, GB/T 223.43, GB/T 223.54, GB/T 223.59, GB/T 223.63,

GB/T 223.64, GB/T 223.67, GB/T 223.69.

5.1.3 Spectral multi-element analysis is carried out in accordance with the provisions

of GB/T 4336, GB/T 11170 and GB/T 14203.

5.2 Hardness test

Brinell hardness test is carried out according to the provisions of GB/T 231.1. In special cases, it can also be tested with a portable hardness tester and converted into a Brinell hardness (HBW) control.

5.3.1 Magnetic particle testing is carried out in accordance with the provisions of GB/T

9444.

5.3.4 Radiographic testing is performed in accordance with the provisions of GB/T

5677.

5.4 Surface roughness

The surface roughness shall be carried out according to the provisions of GB/T 6060.1 and GB/T 15056.

5.5 Geometry and dimensions

The inspection of casting geometry and dimensions shall be carried out by selecting inspection tools with corresponding precision and combining with the method of scribing.

6.1 Batching

Divide inspection batches in one of the following ways:

a) Batch by heat: Castings of the same designation, cast in the same heat and heat-treated in the same heat constitute an inspection batch;

b) Batch by quantity or weight: Under the condition of stable smelting or manufacturing process, a certain number or a certain weight of castings of the same designation that are cast in multiple heats or the same casting process and subjected to the same heat treatment process for multiple heats constitute an inspection batch;

c) Batch by piece: For some special casting process requirements, one or several pieces constitute an inspection batch.