NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 9439-2023

Grey iron castings

Issued on: September 7, 2023 **Implemented on: September 7, 2023**

Issued by: SAMR; SAC

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1 Scope

This document stipulates the designations, production methods and chemical composition, technical requirements, specimen preparation, test methods, inspection rules and markings, quality certificates, protection, packaging, storage and transportation of gray iron casting.

This document is applicable to ordinary gray iron castings, which are cast in sand molds or molds with thermal conductivity equivalent to that of sand molds. Gray iron castings which are cast in other molds can be used with reference to it.

2 Normative references

The contents of the following documents constitute essential provisions of this document through normative references in the text. Among them, for dated reference documents, only the version corresponding to the date applies to this document; for undated reference documents, the latest version (including all amendments) applies to this document.

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

GB/T 223.4 Methods for chemical analysis of iron, steel and alloy - The volumetric method for determination of manganese content by ammonium nitrate oxidation

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 223.72 Methods for chemical analysis of iron, steel and alloy - The alumina chromatographic separation-barium sulfate gravimetric method for the determination of sulphur content

GB/T 223.86 Steel and iron - Determination of total carbon content - Infrared absorption method after combustion in an induction furnace

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

3 Terms and definitions

The terms and definitions defined in GB/T 5611, as well as the following terms and definitions, apply to this document.

3.1 Relevant wall thickness The thickness of the casting section, which represents the mechanical properties of the casting material.

3.2 Side-by-side cast sample The test samples which are placed side by side with the castings, in the same mold using the same pouring system.

4.1 The method of expressing gray iron casting material designation shall comply with

the provisions of GB/T 5612.

4.2 For the designation of gray iron casting material, based on the minimum tensile

strength value measured on a tensile specimen processed from a single-cast sample, which has a diameter of dia. 30 mm, the gray iron casting is divided into 8 designations.

HT100, HT150, HT200, HT225, HT250, HT275, HT300, HT350, see Table 1.

5.1 The production method and chemical composition of gray iron castings are

determined by the supplier. The chemical composition is not used as a basis for acceptance of castings; however, the selection of chemical compositions shall ensure the mechanical properties and metallographic structure of the castings.

5.2 If the technical conditions of the buyer include acceptance requirements for

chemical components, they shall be implemented in accordance with the requirements Material designation Relevant wall thickness t

6.1.1.1 The tensile strength value of the tensile specimen shall comply with the

requirements in Table 1.The mechanical properties and physical properties of single-cast

samples are as shown in Appendix A.

6.1.1.2 The tensile strength in Table 1 is related to the relevant wall thickness. Usually

dia. 30 mm single-cast sample is used to test the tensile strength.

6.1.1.3 The relationship between the tensile strength and Brinell hardness of gray iron

casting is as shown in Appendix B.

6.1.1.4 If the acceptance items are not clearly specified in the order agreement, the

supplier shall use tensile strength as the main basis for acceptance.

6.1.2.1 If tensile specimens are cut out and processed from the casting body, the supplier

and the buyer shall agree on.

- Sampling location;

- The minimum tensile strength value or allowable range value of the bulk specimen.

Note 1.The physical performance values of castings cannot be unified, because they are closely related to factors such as the complexity of the casting, the wall thickness of the casting, the cooling rate.

Note 2.The tensile properties of casting body specimens are not only affected by material properties, but also by defects in the sampling location.

6.1.2.2 The relationship between the tensile strength, Brinell hardness and wall

thickness of the casting body is shown in Appendix C. The expected value of the tensile strength of the casting body is shown in Table C.1.

6.1.3.1 Gray iron casting, which is classified according to hardness, is mainly applicable

to gray iron casting parts, which have cutting performance or wear resistance as the main evaluation index. The hardness value of gray iron castings shall comply with the requirements in Table 2.

6.1.3.2 Castings with main wall thickness t > 80 mm are not classified according to

hardness.

6.1.3.3 Unless otherwise specified, HBW represents the Brinell hardness, which is

measured under the test condition of 10/3000.

6.1.3.4 If hardness is used as an acceptance item, the supplier and the buyer shall agree

on the location of the relevant wall thickness and hardness testing; clearly specify it in the order agreement. Hardness can also be tested on the specimen. Figure C.2 gives the relationship between the average hardness and the relevant wall thickness in simple shapes.

6.2.1 The graphite form of gray iron castings is mainly A-type graphite, wherein the A-

type graphite accounts for more than 90%. The total amount of carbide and phosphorus eutectic in the matrix structure shall be less than 1%.

6.2.2 When the purchaser has clear requirements on the matrix structure and graphite

shape, quantity, distribution size, grade, phosphorus eutectic content, carbide content in the metallographic structure, the purchaser's technical requirements shall be met.

6.3 Machining allowances, dimensions, dimensional tolerances, geometric shapes, geometric tolerances If the buyer has no special requirements, the machining allowance, dimensional tolerance, geometric tolerance of castings shall be selected according to the provisions of GB/T 6414.

6.4 Weight tolerance

If the buyer has no special requirements, the weight tolerance of castings shall be selected according to the provisions of GB/T 11351.

6.5.1 If the buyer has no special requirements, the surface roughness value of the casting

shall be within the range specified in GB/T 6060.1.

6.5.2 The castings shall be cleaned; the excess parts shall be trimmed; the residue of the