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

GB/T 45684-2025

Grey cast irons - Classification

灰铸铁 分类

(English Translation)

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents" Drafting.

This document is modified to adopt ISO 185:2020 "Classification of grey cast iron".

Compared with ISO 185:2020, this document has more structural adjustments. Appendix A lists the differences between this document and ISO 185:2020.

A comparison table of chapter and article numbers.

This document has many technical differences compared to ISO 185:2020.

A list of these technical differences and their causes is given in Appendix B.

Compared with ISO 185:2020, the following editorial changes have been made to this document.

- Modified the format of the notes in Table 3;
- Modified the dimensioning format of Figures 1, 2 and 3.

Introduction

The grey cast irons covered by this document are divided into two categories.

- Classification according to tensile strength;
- Classified according to hardness.

It can also be classified by tensile strength and hardness.

NOTE: This document does not include technical delivery conditions for grey cast iron.

The properties of grey cast iron depend on the shape and distribution of graphite and the matrix structure.

For many applications, casting designers are not only concerned with tensile strength and hardness. Other mechanical or physical properties may determine the Application of iron. For example.

- Thermal conductivity and thermal diffusivity of the brake disc;
- Damping performance of engine block and machine tool;
- Thermal cycle fatigue performance of exhaust manifold and ingot mold.

Therefore, Annex C gives additional information for the attention of casting designers. also.

- Appendix D gives additional information on the relationship between hardness and tensile strength;
- Appendix E gives additional information on the relationship between tensile strength, hardness and main wall thickness of grey iron castings;
- Appendix F provides a comparison table of gray cast iron grades in ISO 185 and other standards.

Gray cast iron classification

1 Scope

This document specifies the grades, ordering requirements, manufacturing, technical requirements, specimen preparation, inspection methods and re-inspection of grey cast iron.

This document applies to unalloyed and low-alloy grey cast iron for castings in sand moulds or moulds with thermal conductivity equivalent to that of sand moulds.

Grey cast iron for pipes, pipe fittings and continuous casting products. This document does not include the technical delivery conditions for grey iron castings.

2 Normative references

The contents of the following documents constitute essential clauses of this document through normative references in this document.

For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies to this document.

GB/T 228.1 Tensile tests on metallic materials - Part 1: Test methods at room temperature (GB/T 228.1-2021, ISO 6892-1.

2019,MOD)

GB/T 231.1 Metallic materials Brinell hardness test Part 1: Test method (GB/T 231.1-2018, ISO 6506-1.

2014,MOD)

GB/T 5612 Method for indicating cast iron grades GB/T 7216 Metallographic Examination of Grey Cast Iron (GB/T 7216-2023, ISO 945-1:2019, MOD)

3 Terms and definitions

The following terms and definitions apply to this document.

Grey cast iron

Cast iron with iron and carbon as basic elements, with carbon mainly in the form of flake graphite.

Note 1: Grey cast iron is also called flake graphite cast iron, and is less commonly referred to as lamellar graphite cast iron.

Note 2: Graphite morphology, distribution and size are specified in GB/T 7216.

Relevant wall thickness of castings the thickness of the casting section, which is agreed

upon by the supplier and the buyer, represents the mechanical properties of the casting material.

separately cast sample Test bars cast in a separate mould under casting conditions and materials representative of the casting 3.4 Side-by-side cast sample A test bar cast side by side with the casting and connected to the casting using the same gating system.