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Grey cast irons — Classification

National foreword

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Contents

Page

Foreword ... **iv**
Introduction ... **v**
1 Scope ... **1**
2 Normative references ... **1**
3 Terms and definitions ... **1**
4 Designation ... **2**
5 Order information ... **2**
6 Manufacture ... **2**
7 Requirements ... **3**
7.1 Mechanical properties ... 3
7.2 Tensile properties ... 3
7.2.1 General ... 3
7.2.2 Test pieces machined from cast samples ... 3
7.2.3 Test pieces cut from a casting ... 3
7.3 Hardness properties ... 5
7.4 Graphite structure ... 6
8 Sampling ... **6**
8.1 General ... 6
8.2 Types of samples ... 7
8.3 Samples for tensile test ... 7
8.3.1 Size of cast samples ... 7
8.3.2 Frequency and number of test samples ... 7
8.3.3 Separately cast samples ... 7
8.3.4 Side-by-side cast samples ... 7
8.3.5 Cast-on samples ... 8
8.3.6 Samples cut from a casting ... 10
8.4 Samples for hardness test ... 11
9 Test methods ... **11**
9.1 Tensile test ... 11
9.2 Brinell hardness test ... 13
9.3 Graphite structure ... 13
9.4 Alternative test procedures ... 13
10 Retests ... **13**
10.1 Need for retests ... 13
10.2 Test validity ... 13
10.3 Nonconforming test results ... 14
10.4 Heat treatment of samples and castings ... 14
Annex A (informative) **Information on mechanical and physical properties in addition to that given in Tables 1 and 2** ... **15**
Annex B (informative) **Additional information on the relationship between hardness and tensile strength of grey cast irons** ... **17**
Annex C (informative) **Additional information on the relationship between tensile strength, hardness and wall thickness of grey iron castings** ... **20**
Annex D (informative) **Cross-references of ISO 185 grade designations to other standard grades of grey cast irons** ... **24**
Bibliography ... **26**

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 25, *Cast irons and pig irons*.

This third edition cancels and replaces the second edition (ISO 185:2005), which has been technically revised. The main changes compared with the previous edition are as follows:

— terms and definitions have been added for “separately cast sample”, “side-by-side cast sample” and “cast-on sample”;

— Table 1 has been revised to delete the column of anticipated minimum tensile strength values in castings; this information has been moved to Annex C;

— Table 1 has been revised to include side-by-side cast samples with the same tensile strength requirements as separately cast samples;

— Table 1 has been revised to add a maximum tensile strength for each grade for separately cast samples and side-by-side cast samples;

— Table 1 has been revised to revise minimum tensile strength values for some selected grades and relevant wall thicknesses of cast-on samples;

— Annex C has been revised to add Table C.1, which shows anticipated values for tensile strength in grey iron castings based on relevant wall thickness; some values are slightly changed from those in Table 1 of the previous edition;

— information in Annex D has been updated to include corresponding hardness grades from GB/T 9439;

— additional changes have been made for clarity of expression and improved consistency with ISO standards for other types of cast irons.

Any feedback or questions on this document should be directed to the user’s national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

This document deals with the classification of grey cast irons, subdivided into two groups:

— materials specified by their tensile strength;

— materials specified by their hardness.

It is also possible to specify grey cast irons by a combination of tensile strength and hardness.

NOTE This document does not cover technical delivery conditions for grey iron castings.

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

For many applications, tensile strength and hardness are not the only properties of interest to casting designers. Other mechanical or physical properties can be decisive for the use of grey iron. For example:

— the thermal capacity and the thermal diffusivity for disc brakes;

— the damping capacity for engine blocks or machine beds;

— the thermocycle fatigue for exhaust manifolds or ingot moulds.

Therefore, Annex A provides additional information of interest to casting designers.

Furthermore:

— Annex B contains additional information on the relationship between hardness and tensile strength;

— Annex C contains additional information on the relationship between tensile strength, hardness and wall thickness of grey iron castings;

— Annex D provides cross-references of ISO 185 grade designations to other standard grades of grey cast irons.

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Grey cast irons — Classification

1 Scope

This document specifies the properties of unalloyed and low-alloyed grey cast irons used for castings that have been manufactured in sand moulds or in moulds with comparable thermal behaviour.

This document specifies the characterizing properties of grey cast irons by any of the following:

a) the tensile strength of cast samples;

b) if agreed by the manufacturer and the purchaser, the tensile strength of samples cut from a casting;

c) if agreed between the manufacturer and the purchaser, the hardness of the material determined on castings or on a cast-on knob.

If agreed by the manufacturer and the purchaser, the combination of tensile strength from option a) or option b) and plus hardness from option c) can be specified. Information on specifying a combination of tensile strength and hardness is given in Annex B.

This document specifies eight grades of grey cast iron according to tensile strength (see Table 1) and six grades of grey cast iron according to Brinell hardness (see Table 2).

This document does not apply to grey cast irons used for pipes and pipe fittings and continuous cast products.

This document does not cover technical delivery conditions for grey iron castings.

NOTE General information on the engineering properties of grey cast irons is provided in ISO/TR 10809-1.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

ISO 945-1, *Microstructure of cast irons — Part 1: Graphite classification by visual analysis*

ISO 6506-1, *Metallic materials — Brinell hardness test — Part 1: Test method*

ISO 6892-1, *Metallic materials — Tensile testing — Part 1: Method of test at room temperature*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

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