
Compacted (vermicular) graphite cast irons — Classification

Fontes à graphite vermiculaire (compacté) — Classification





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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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Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on 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 the following URL: www.iso.org/iso/foreword.html.

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

This second edition cancels and replaces the first edition (ISO 16112:2006), which has been technically revised with the following changes:

- Brinell hardness values have been moved from [Table 1](#) and [Table 2](#) to [Table A.1](#);
- property values for cast-on samples with relevant wall thickness $t \leq 12,5$ mm have been removed from [Table 2](#) because all data entries for $t \leq 12,5$ mm were the same as the values for relevant wall thickness $12,5 \text{ mm} < t \leq 30 \text{ mm}$;
- [Annex B](#) has been expanded to provide a more comprehensive explanation of the nodularity evaluation technique;
- [Annex C](#) has been deleted and replaced because the series production experience gained since the first publication of ISO 16112 in 2006 has surpassed the scope of the annex.

Introduction

This document deals with the classification of compacted (vermicular) graphite cast irons (CGI) in accordance with the mechanical properties of the material.

The properties of compacted (vermicular) graphite cast irons depend on their graphite and matrix microstructure.

The mechanical properties of the material can be evaluated on machined test pieces prepared from

- separately cast samples,
- samples cast in the mould alongside the casting, with a joint running system, hereafter called side-by-side samples, or
- samples cast onto either the casting or the running system, hereafter referred to as cast-on samples, or
- samples cut from a casting (only when an agreement is made between the manufacturer and the purchaser).

The material grade is defined by mechanical properties measured on machined test pieces prepared from separately cast samples, cast-on samples, or samples cut from the casting by agreement between the manufacturer and the purchaser.

[Annex A](#) provides typical properties for compacted (vermicular) graphite cast irons obtained in separately cast test bars.

[Annex B](#) provides information on a procedure to determine the graphite nodularity of the microstructure.

[Annex C](#) provides information on properties and examples for typical applications of compacted (vermicular) graphite cast irons.

[Annex D](#) provides cross-references of ISO 16112 grade designations to other national and international standard grades of compacted (vermicular) graphite cast iron.

References used in the preparation of this document are listed in the Bibliography.

Compacted (vermicular) graphite cast irons — Classification

1 Scope

This document specifies five grades of compacted (vermicular) graphite cast irons.

This document specifies five grades based on the minimum mechanical properties measured on machined test pieces prepared from

- separately cast samples,
- side-by-side cast samples,
- cast-on samples, or
- samples cut from a casting.

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*

ISO/TR 15931, *Designation system for cast irons and pig irons*

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:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1

compacted (vermicular) graphite cast iron

cast material, iron and carbon based, the carbon being present mainly in the form of compacted (vermicular) graphite particles that appear vermicular on a two-dimensional plane of polish, the graphite particles being embedded in a matrix consisting of ferrite, ferrite/pearlite, or pearlite

Note 1 to entry: Reference micrographs are provided in [Annex B](#).

3.2

graphite modification treatment

process that brings the liquid iron into contact with a substance to produce graphite in the predominantly compacted (vermicular) form during solidification