AS 5052—2007
ISO 16112:2006

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Australian Standard®

Compacted (vermicular) graphite cast irons—Classification

This Australian Standard® was prepared by Committee MT-001, Iron and Steel. It was approved on behalf of the Council of Standards Australia on 8 December 2006.
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The following are represented on Committee MT-001:

- Australian Railway Association
- Australian Building Codes Board
- Australian Foundry Institute
- Australian Industry Group
- Australian Steel Industry
- Bureau of Steel Manufacturers of Australia
- Institute of Materials Engineering Research Association
- New Zealand Heavy Engineering Research Association

This Standard was issued in draft form for comment as DR 06610.

Standards Australia wishes to acknowledge the participation of the expert individuals that contributed to the development of this Standard through their representation on the Committee and through public comment period.

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PREFACE

This Standard was prepared by the Australian members of the Joint Standards Australia/Standards New Zealand Committee MT-001, Iron and Steel.

After consultation with stakeholders in both countries, Standard Australia and Standards New Zealand decided to develop this Standard as an Australian, rather than an Australian/New Zealand Standard.

This Standard is identical with, and has been reproduced from ISO 16112:2006, *Compacted (vermicular) graphite cast irons—Classification*.

The objective of this Standard is to specify five grades of compacted (vermicular) graphite cast irons which have been classified by mechanical properties.

This Standard is one of a series of Standards covering the range of tensile testing methods. The series comprises the following:

AS

1830 Grey cast iron

1831 Ductile cast iron

1832 Malleable cast iron

1833 Austenitic cast iron

1982 Methods for the measurement of case depth in steels

2027 Abrasive-resistant cast irons

2074 Cast steels

4314 Founding—Patterns, pattern equipment and coreboxes for the production of sand moulds and sand cores

4738 Metal castings

4738.1 Part 1: Ferrous sand moulded

5049 Cast iron—Designation of microstructure of graphite

5052 Compacted (vermicular) graphite cast irons—Classification (this Standard)

5054 Ausferritic spheroidal graphite graphite cast irons—Classification

5080 Ferrous materials—Heat treatment—Glossary of terms

As this Standard is reproduced from an international standard, the following applies:

(a) Its number appears on the cover and title page while the international standard number appears only on the cover.

(b) In the source text 'this International Standard' should read 'this Australian Standard'.

(c) A full point substitutes for a comma when referring to a decimal marker.

(d) Where the ISO Standard number is shown (i.e. ISO 16112) in a compacted (vermicular) graphite cast iron specification, it should be read as 'AS 5052'.

References to International Standards should be replaced by references to Australian Standards, as follows:

Reference to International Standard		*Australian Standard*	
ISO		AS	
945	Cast iron—Designation of microstructure of graphite	5049	Cast iron—Designation of microstructure of graphite
6506	Metallic materials—Brinell hardness test	1816	Metallic materials—Brinell hardness test
6506-1	Part 1: Test method	1816.1	Part 1: Test method (ISO 6506-1:1997, MOD)
6892	Metallic materials—Tensile testing at ambient temperature	1391	Metallic materials—Tensile testing at ambient temperature
TR 15931	Designation systems for cast irons and pig irons	4738	Metal castings
		4738.1	Part 1: Ferrous sand moulded

The term ‘informative’ has been used in this Standard to define the application of the annex to which it applies. An ‘informative’ annex is only for information and guidance.

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INTRODUCTION

This International Standard 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 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.

Some material grades may be suitable for pressure applications.

Annex A (informative) gives typical properties for compacted (vermicular) graphite cast irons obtained in separately cast test bars.

Annex B (informative) gives information on a procedure to determine the graphite nodularity of the microstructure.

Annex C (informative) gives information on the influence of metallurgical variables on the machinability in compacted (vermicular) graphite cast irons.

Annex D (informative) provides information on properties and examples for typical applications of compacted (vermicular) graphite cast irons.

Annex E (informative) provides cross-references of ISO 16112 grade designations to other standard grades of compacted (vermicular) graphite cast iron

Documents used in the preparation of this International Standard are listed in the Bibliography for reference purposes.

NOTES

AUSTRALIAN STANDARD

Compacted (vermicular) graphite cast irons—Classification

1 Scope

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

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

— separately cast samples,

— cast-on samples, or

— samples cut from a casting.

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.

ISO 945, *Cast iron — Designation of microstructure of graphite*

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

ISO 6892, *Metallic materials — Tensile testing at ambient 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.

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

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

3.3
relevant wall thickness
section of the casting, agreed between the manufacturer and the purchaser, to which the determined mechanical properties shall apply

4 Designation

The material shall be designated according to ISO/TR 15931. The relevant designations are given in Tables 1 and 2.