AS 1830—2002
ISO 185:1988

Australian Standard™

Grey cast iron

[ISO title: Grey cast iron—Classification]

Standards Australia

This Australian Standard was prepared by Committee MT-001, Iron and Steel. It was approved on behalf of the Council of Standards Australia on 17 May 2002 and published on 4 June 2002.

The following interests are represented on Committee MT-001:

Australian Institute of Steel Construction

Australian Chamber of Commerce and Industry

Australian Industry Group

Australasian Railway Association

Australian Building Codes Board

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Australian Standard™

Grey cast iron

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PREFACE

This Standard was prepared by Standards Australia Committee MT-001, Iron and Steel to supersede AS 1830—1986, *Iron castings—Grey cast iron*.

The Standard is identical with and has been reproduced from ISO 185:1988, *Grey cast iron—Classification*.

This Standard is one of a series of Standards covering the range of cast irons. The series comprises the following:

AS	
1830	Grey cast iron
1831	Ductile cast iron
1832	Malleable cast iron
1833	Austenitic cast iron
2027	Wear resistant white cast iron
5049	Cast iron—Designation of microstructure of graphite

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

(a) Its number does not appear on each page of text and its identity is shown only on the cover and title page.

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

(c) A full point should be substituted for a comma when referring to a decimal marker.

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

Reference to International Standard		*Australian Standard*	
ISO		AS	
945	Cast iron—Designation of microstructure of graphite	—	
6892	Metallic materials—Tensile testing	1391	Methods for tensile testing of metals

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.

INTRODUCTION

Grey cast iron is a casting material, mainly iron and carbon based, the latter element being present as flake graphite corresponding to form I of ISO 945.

Grey iron castings are used extensively throughout industry. The mass of a casting may vary from a few grams to over 100 t. The casting section thickness may also vary greatly.

The properties of grey cast iron depend on its structure, i.e. the amount of graphite present, the form in which the graphite is present, and the structure of the iron matrix. The structure may be controlled by varying the production conditions, the chemical composition, solidification time, and the cooling rate in the solid state. Castings may be produced with properties appropriate to meet requirements for machinability and operating stresses.

This International Standard deals with the classification of grey cast iron according to the tensile properties of the material in test pieces machined from separately cast or cast-on test samples. The results of a tensile test give an indication of the quality of the material and an indication of the properties of the material in the casting.

NOTES

AUSTRALIAN STANDARD

Grey cast iron

1 Scope

This International Standard establishes a classification for grey cast iron. The classification comprises six grades based on the tensile properties of test pieces machined from separately cast test samples.

NOTES

1 In cases where the casting thickness is greater than 20 mm and the mass is more than 200 kg, the testing may also be carried out using cast-on test samples. The properties of the test pieces machined from cast-on test samples are normally more similar to the properties of the material in the casting than those of separately cast test samples due to differences in the cooling conditions.

2 By agreement between the manufacturer and the purchaser the material may also be tested using test pieces machined from test samples cut from the casting.

Where the hardness of the material in the casting is of main interest to the purchaser, reference should be made to annex A, which is not a mandatory part of this International Standard.

This standard applies only to grey cast iron, cast in sand moulds or moulds of comparable thermal diffusivity.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 945: 1975, *Cast iron — Designation of microstructure of graphite.*

ISO 6892: 1984, *Metallic materials — Tensile testing.*

3 Production

The method of producing the grey cast iron and its composition are left to the discretion of the manufacturer, who shall ensure that the property requirements defined in this International Standard are complied with for the grade of material specified in the order.

However, for grey cast iron to be used in special applications, the chemical composition and heat treatment may be the subject of an agreement between the manufacturer and the purchaser.

4 Tensile properties

4.1 Tensile properties of test pieces machined from separately cast test samples

The tensile properties of the six grades of grey cast iron when measured in accordance with clause 5 using test pieces machined from separately cast test samples shall be as given in table 1.

Table 1 — Tensile properties of test pieces machined from separately cast test samples

Grade	Tensile strength*) of test pieces machined from separately cast test samples $R_{m,\ min.}$ N/mm²**)
100	100
150	150
200	200
250	250
300	300
350	350

*) For the purpose of acceptance, cast iron of grade n shall have a tensile strength between n and $(n + 100)$ N/mm².

**) 1 N/mm² = 1 MPa

As a guide for design purposes, the anticipated tensile properties of the material in the castings are given in table 2, for information only. By agreement between the manufacturer and the purchaser, the R_m values in table 2 may be made mandatory.

4.2 Tensile properties of test pieces machined from cast-on test samples

The tensile properties of test pieces machined from cast-on test samples shall be as given in table 3.