AS 1831—1985

Australian Standard®

Iron castings—Spheroidal or nodular graphite cast iron

This Australian standard was prepared by Committee MT/1, Iron and Steel. It was approved on behalf of the Council of the Standards Association of Australia on 27 November 1984 and published on 4 March 1985.

The following interests are represented on Committee MT/1:

Australasian Institute of Metals
Australian Foundry Institute
Bureau of Steel Manufacturers of Australia
Confederation of Australian Industry
Department of Defence
Department of Defence Support
Metal Trades Industry Association of Australia
Railways of Australia Committee
Society of Automotive Engineers, Australasia

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PREFACE

This edition of this standard was prepared under the direction of the Association's Committee on Iron and Steel by its subcommittee on iron castings, to supersede AS 1831—1976. It provides for the supply of six grades of spheroidal or nodular graphite iron castings to mechanical property requirements.

The standard is technically equivalent to ISO 1083, Spheroidal Graphite or Nodular Graphite Cast Iron.

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STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard
for
IRON CASTINGS—SPHEROIDAL OR NODULAR GRAPHITE CAST IRON

1 SCOPE. This standard specifies requirements for six grades of spheroidal or nodular graphite iron castings in terms of mechanical properties.

NOTES:
1. Pipes centrifugally cast in metal moulds are not covered by this standard (see AS 2280, Centrifugally Cast Ductile Iron Pressure Pipes).
2. Alternative names for this material are 'SG Iron' and 'Ductile Iron'.
3. Guidelines to purchasers on requirements that must be specified by the purchaser and those that must be agreed at the time of enquiry and/or order are given in Appendix A.

2 REFERENCED DOCUMENTS. The following standards are referred to in this standard:

AS 1391 Methods for Tensile Testing of Metals.

AS 1544 Methods for Impact Tests on Metals
Part 1—Izod
Part 2—Charpy V-notch

AS 1816 Method for Brinell Hardness Test
Part 1—Testing of Metals

AS 2706 Numerical Values—Rounding and Interpretation of Limiting Values

AS B8 Methods for the Colouring and Marking of Foundry Patterns.

3 DESIGNATION. The cast iron designation, as given in Table 1, shall include the number of this Australian standard, i.e. AS 1831, together with the following:

(a) A number representing the minimum tensile strength, in megapascals (MPa).

(b) A number representing the minimum percentage elongation on a gauge length equal to 5 times the diameter of the test piece.

Example of Designation: Grade AS 1831/600-3.

4 DEFINITION. For the purpose of this standard, the following definition applies:

Spheroidal or nodular graphite cast iron—a casting material, iron and carbon based, the latter element being present principally as graphite in spherical or nodular form.

5 FREEDOM FROM DEFECTS. The castings shall be clean and free from harmful defects.

NOTE: If the purchaser rejects castings on the basis of machinability, he must be able to prove non-conformity with this standard.

Notwithstanding the fact that castings have been passed as complying with this standard, if significant faults in manufacture are revealed in subsequent processing of the castings, they may then be deemed not to comply.

6 CASTING DIMENSIONS. The shape and dimensions of the castings shall agree with the purchaser's drawings after pattern draft, foundry requirements, machining allowances and permissible variations on untoleranced dimensions have been taken into account.

7 MICROSTRUCTURE.

7.1 Graphite. The graphite present in the microstructure of spheroidal graphite cast iron shall be predominantly Form V and Form VI in accordance with Appendix B.

NOTES:
1. The proportion of Form V and Form VI present is negotiable (see Paragraph A7.2 of Appendix A).
2. The method of preparing the sample for microstructural examination is negotiable (see Paragraph A7.1 of Appendix A).

7.2 Matrix. The matrix microstructure shall be pearlite or ferrite or a mixture of both, and shall be substantially free from primary carbides.

NOTES:
1. Alternative matrices may be provided (see Paragraph A7.3 of Appendix A).
2. The method of preparing the sample for microstructural examination is negotiable (see Paragraph A7.1 of Appendix A).

8 MECHANICAL PROPERTIES.

8.1 General. Mechanical properties shall be determined on test pieces prepared from samples as specified in Clause 9 and tested in accordance with Clause 10.

NOTES:
1. Hardness and impact requirements are negotiable (see Paragraph A2 of Appendix A).
2. In order to meet impact requirements, grade AS 1831/370-17 should have a silicon content not greater than 2.75 percent, phosphorus not greater than 0.08 percent, and requires a full ferritizing anneal.

8.2 Tensile properties. Tensile strength and elongation shall comply with Table 1.

NOTE: When required, 0.2% proof stress may be determined (see Appendix A).

TABLE 1
TENSILE REQUIREMENTS

Grade AS 1831	Tensile strength MPa min.	Elongation on $5.65\sqrt{So}$* percent min.
800-2	800	2
700-2	700	2
600-3	600	3
500-7	500	7
400-12	400	12
370-17	370	17

* $5.65\sqrt{So} = 5d$ for test pieces of circular cross-section.

9 PROVISION AND PREPARATION OF TEST BARS FOR MECHANICAL TESTS.

9.1 General. Castings shall be grouped in batches in accordance with the following, and sufficient test bars shall be provided by the manufacturer on a