AS 5049—2002
ISO 945:1975

Australian Standard™

Cast iron—Designation of microstructure of graphite

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 24 June 2002.

The following 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

Australian Foundry Institute

Bureau of Steel Manufacturers of Australia

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PREFACE

This Standard was prepared by the Australian members of the Joint Standards Australia/Standards New Zealand Committee MT-001. After consultation with stakeholders in both countries, Standards 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 945:1975, *Cast iron—Designation of microstructure of graphite.*

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 substitutes for a comma when referring to a decimal marker.

AUSTRALIAN STANDARD

Cast iron — Designation of microstructure of graphite

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies a method of designating the microstructure of graphite in cast iron. It is not intended as a basis for acceptance specifications.

2 GENERAL

2.1 When iron-carbon alloys are examined under a microscope, the graphite occurring in these alloys can be classified by

a) its form (designated by roman numerals, see figure 1);

b) its distribution (designated by capital letters, see figure 2);

c) its size (designated by arabic numerals, see figures 3 to 6).

2.2 The three series of reference diagrams included in this International Standard for evaluating the type of graphite form a basis for such a classification. The characteristic features of the graphite which occur are designated by letters and numerals. For this purpose, microstructures of graphite are arranged side by side in the series. Form, distribution and size of the graphite observed are determined by comparison with the diagrams and the allocation of the same classification as that of the diagrams that resemble them most closely. This method permits quick identification of the graphite, promotes mutual understanding between technicians in this field, permits clear representation of the findings, facilitates statistical analysis and saves a vast amount of photographic work.

2.3 The comparison of the graphite observed with the three series of reference diagrams in figures 1 to 6 does not give any information on the suitability of the iron-carbon alloys for any particular service.

3 SAMPLING AND PREPARATION OF SPECIMENS

3.1 When taking specimens from the casting, it is essential that attention be paid to the location, to the wall thickness, to the distance from the surface and to the presence of chills and the like. The location of the surface examined shall be carefully recorded in any report.

3.2 The area of polished surface shall be sufficient to give a true representation of the graphite distribution. Attention shall be paid to the careful grinding and polishing of the specimens in order that the graphite particles appear in their true form and size. The examination of the graphite under the microscope is usually carried out on the unetched polished section, though final etching is recommended in the case of some special alloy cast irons, for example those containing high silicon.

4 MICROSCOPIC EXAMINATION

4.1 The polished specimens shall be viewed under a microscope so that the entire polished area may be examined. A comparison shall first be made with the reference diagrams for the graphite form and distribution (see figures 1 and 2) and the microstructures observed shall then be identified from the corresponding reference diagrams. Following this, the size of the graphite particles shall be determined at a magnification of 100 diameters, by reference to figures 3 to 6 inclusive and/or the table.

4.2 Examination under the microscope can be carried out by direct observation or by projection on the ground glass of the microscope. The field of view shall have approximately the same size as the reference diagrams (about 80 mm diameter).

4.3 The measurement of the graphite particles can be facilitated by the use of suitable calibrated eye-pieces.

4.4 The method described above gives good results, but any other method of examination which gives good results may be used.

5 REFERENCE DIAGRAMS

A series of reference diagrams is provided for form, distribution and size of graphite. The reference diagrams show microstructures of an ideal character instead of actual photomicrographs, thus avoiding the minor effects which might interfere with the results of the observation.

5.1 Reference diagrams for graphite form

The reference diagrams for graphite form (figure 1) show six characteristic forms which are designated by the roman