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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

中华人民共和国国家标准

GB/T 9441-2009

Replacing GB/T 9441-1988

Metallographic test for spheroidal graphite cast iron

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(ISO 945-1: 2008, Microstructure of cast irons-Part 1: Graphite classification by visual analysis, MOD)

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Foreword

This standard is modified in relation to ISO 945-1:2008 Microstructure of Cast Irons-Part 1: Graphite Classification by Visual Analysis) (English version).

The main technical differences between this standard and ISO 945-1:2008 are as follows:

- This standard is modified in relation to IV~VI graphite in ISO 945-1:2008, and makes some editorial changes in the structure;
- This standard is modified in relation to IV~VI graphite dimensions and the calculation of the number of VI and V graphite nodules;
- This standard integrates graphite form classification diagrams, annex A, and annex C to be informative annex A;
- This standard adds the methods of assessing the number of pearlite, ferrite in dispersed distribution, carbide, and iron phosphide eutectic, and corresponding standard diagrams.

This standard will replace GB/T 9441-1988 *Metallographic Test for Spheroidal Graphite Cast Iron*.

There have been significant changes in this standard over GB/T 9441-1988 in the following technical aspects:

- This standard alters the part of 4.1 spheroidizing grade and assessment in original standard, adopts the proportion of spheroidal (VI type) and bulk (V type) graphite particles to the number of graphite in ISO 945 as the spheroidization rate, and changes the spheroidizing grade diagrams in original standard;
- The computation rule in original annex A is incorporated in 4.1.2;
- Image analysis methods of the spheroidization rate are added;
- The result representation in chapter 5 and the test report in chapter 6 are added;
- The “test rules” are deleted, and are incorporated into corresponding test items;
- The test item of “pearlite fineness” is deleted;
- Cementite is changed into carbide;
- Annex A is changed, and the graphite classification and typical pictures in ISO 945 are made to be Annex A.

Annex A of this standard is informative.

This standard was proposed by China Machinery Industry Federation.

This standard is under the jurisdiction of the National Technical Committee on Casting of Standardization Administration of China (SAC/TC 54).

Unit responsible for drafting this standard: Shanghai Research Institute of Materials

Units participating in drafting this standard: Southeast University, Foshan Shunde Zhongtian Chong Chin Spheroidal Graphite Cast Iron Co., Ltd, Wuxi FAW Foundry Co., Ltd, Shenyang Research Institute of Foundry, Technology Institute of Dongfeng Motor Company Limited, FAW Foundry Co., LTD, Anhui Shenjian Technology & Science Co., LTD.

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The historical versions replaced by this standard are as follows:

- GB/T 9441-1998.

Metallographic Test for Spheroidal Graphite Cast Iron

1 Scope

This standard specifies the method for assessing the microstructure of spheroidal graphite cast iron in optical microscopes.

This standard specifies the methods for assessing spheroidizing grade, graphite size, number of nodular graphite, number of pearlite, number of ferrite in dispersed distribution, number of iron phosphide eutectic, and number of carbide, and lists corresponding standard figures.

This standard is applicable to assessing the metallographic structure of as-cast, as-normalized, and as-annealed ordinary and low-alloy spheroidal graphite cast iron.

2 Normative references

The articles contained in the following documents have become this document when they are quoted herein. For the dated documents so quoted, all subsequent modifications (Including all corrections) or revisions made thereafter do not apply to this standard. However, the parties that reach an agreement according to this standard are encouraged to study whether the latest versions of these documents may be used. For the undated documents so quoted, the latest versions (including all modification sheets) apply to this document.

GB/T 13298 Inspection methods of microstructure for metals

3 Sample preparation

3.1 Metallographic samples shall be cut out of the test blocks or castings poured at the same time and heat treated in the same heat as the castings.

3.2 Preparing metallographic samples shall conform to GB/T 13298. Extracting and preparing metallographic samples shall prevent structural change, graphite scaling-off, and graphite tailing. The surface of a sample shall be smooth, and free of wide scratches.

4 Test item and standard diagram

4.1 Spheroidizing grade and assessment

4.1.1 The percentage of the number of spheroidal (VI type) and bulk (V type) graphite to the total number of graphite in Annex A is considered spheroidization rate, which is divided into six grades, as shown in Table 1 and Figures 1~6.

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