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PEOPLE'S REPUBLIC OF CHINA**

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**Iron, steel and alloy - Determination of silicon content -
Gravimetric method
(English Translation)**

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Foreword

This document was drafted in accordance with the rules given in GB/T 1.1-2020

"Directives for standardization - Part 1.Rules for the structure and drafting of standardizing documents".

This document is Part 60 of GB/T 223.The published parts of GB/T 223 are listed in Annex A.

This document replaces GB/T 223.60-1997 "Iron, steel and alloy - Determination of silicon content - Gravimetric method". Compared with GB/T 223.60-1997, in addition to structural adjustments and editorial changes, the main technical changes are as follows.

a) The test material quantity has been changed (see 8.1 of this Edition; 7.1 of Edition 1997);

b) The amount of acid used for test material decomposition has been changed (see

8.3.1 of this Edition; 7.3.1 of Edition 1997);

c) The use volume of perchloric acid with different densities has been added (see

8.3.1 of this Edition);

d) The recommendation of chromium volatilization operation for specimens with chromium content greater than 1% has been added (see 8.3.1 of this Edition);

e) The ignition temperature and time after volatilization of silicon dioxide has been changed (see 8.3.4 of this Edition; 7.3.4 of Edition 1997);

f) The precision of the method has been changed (see 9.2 of this Edition; Chapter 9 of Edition 1997).

The modification of this document adopted ISO 439.2020 "Steel and cast iron - Determination of silicon content - Gravimetric method".

Compared with ISO 439.2020, this document has made the following structural adjustments.

- Add Annex A. Annex B corresponds to Annex A in ISO 439.2020, and Annex C corresponds to Annex B in ISO 439.2020.

The technical differences between this document and ISO 439.2020 and their reasons are as follows.

- The determination range (see Chapter 1) has been changed to increase the applicability of this document;
- The reagent preparation was changed and related reagents were added (see Chapter 5) to adapt to the changes in the operating process;
- ISO 3696 (see Chapter 5) was replaced by the normative reference GB/T 6682 to adapt to the national conditions of China;
- ISO 14284 (see Chapter 7) was replaced by the normative reference GB/T 20066 to adapt to the national conditions of China;
- The weighing mass of test material with high silicon content has been added (see 8.1), which is consistent with the determination range of this document;

- The volume of perchloric acid used when the test material mass is 0.5 g (see 8.3.1) has been added to match the determination range of this document;
- The boron removal operation for boron-containing specimens (see 8.3.1) has been added to meet the needs of different measurement objects;
- The precision of silicon content is added by 6.0% (see Table 2), which is consistent with the measurement range of this document.

The following editorial changes were made to this document.

- To coordinate with the existing standards, the name of the standard is changed to "Iron, steel and alloy - Determination of silicon content - Gravimetric method";
- Add notes to the determination section (see 8.3.1, 8.3.2, 8.3.4) to increase operability and facilitate the application of this document;
- Add Annex A (informative) "Parts of GB/T 223".

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. The issuing authority shall not be held responsible for identifying any or all such patent rights.

This document was proposed by China Iron and Steel Association.

This document shall be under the jurisdiction of National Technical Committee on Steel of Standardization Administration of China (SAC/TC 183).

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Versions of standard substituted by this document are.

- It was first published in 1981 as GB 223.5(I)-81. It was first revised in 1987 as GB 223.60-87. The second revised was in 1997;

- This is the third revision.

1 Scope

This document describes a method for the gravimetric determination of the silicon content in iron, steel, high-temperature alloys and precision alloys.

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.

GB/T 6682, Water for analytical laboratory use -- Specification and test methods (GB/T 6682-2008, ISO 3696:1987, MOD)

3 Terms and definitions

There are no terms or definitions that require definition in this document.

4 Principle

The test material is dissolved in hydrochloric acid and nitric acid. The acid-soluble silicon compound is converted into hydrated silicon dioxide by evaporating perchloric acid until white smoke is emitted.

5 Reagents

Unless otherwise specified, only reagents confirmed to be analytically pure and grade two water specified in GB/T 6682 are used in the analysis.

6 Equipment

Commonly used laboratory equipment and the following equipment.

Adjustable temperature range is 800°C~1100°C.

Medium-speed quantitative filter paper, with known low ash content.