



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 223.54-2022

**Iron, steel and alloy - Determination of nickel content - Flame
atomic absorption spectrometric method**

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Foreword

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

for Standardization - Part 1: Rules for the Structure and Drafting of Standardizing Documents.

This document is Part 54 of GB/T 223. The parts of GB/T 223 that have been issued are shown

in Appendix A.

This document serves as a replacement of GB/T 223.54-1987 Methods for Chemical Analysis

of Iron, Steel and Alloy - The Flame Atomic Absorption Spectrophotometric Method for the Determination of Nickel Content. In comparison with GB/T 223.54-1987, apart from structural

adjustments and editorial modifications, the main technical changes are as follows:

- The scope of determination is modified (see Chapter 1; the Scope of Version 1987);
- Normative References is added (see Chapter 2);
- The amount of specimen is modified (see 8.1; 4.1 of Version 1987);
- The amount of acid used when the specimen is decomposed is reduced (see 8.3.1; 4.3.1 of Version 1987);
- The preparation of the calibration solution is modified (see 8.3.2; 4.4 of Version 1987);
- The stipulations on the determination of wavelength by the atomic absorption spectrometer are modified (see 8.3.3 and 8.3.4; 4.4.3 of Version 1987);
- The adjustment of the atomic absorption spectrometer is added (see 8.3.3);
- The optimization of the atomic absorption device is added (see 8.3.4);
- Spectral measurement is added (see 8.3.5);
- The drawing of calibration curve is added (see 8.4);
- The calculation formula of nickel content is modified (see 9.1; Chapter 5 of Version 1987);
- The precision requirements of the method are modified (see 9.2; Chapter 6 of Version 1987);
- Appendix B is added.

This document modifies and adopts ISO 4940-1985 Steel and Cast Iron - Determination of Nickel Content - Flame Atomic Absorption Spectrometric Method.

In comparison with ISO 4940-1985, this document makes the following structural adjustments:

- The Chapter "Terms and Definitions" is added (see Chapter 3);
- Chapter 4 corresponds to Chapter 3 of ISO 4940-1985;
- Chapter 5 corresponds to Chapter 4 of ISO 4940-1985, in which, 5.1 ~ 5.3, and 5.6 respectively correspond to 4.1 ~ 4.3 and 4.4 of ISO 4940-1985, 5.4 corresponds to 7.3.2 of ISO 4940-1985, and 5.5 is added;
- Chapter 6 corresponds to Chapter 5 of ISO 4940-1985;
- Chapter 7 corresponds to Chapter 6 of ISO 4940-1985;

- Chapter 8 corresponds to Chapter 7 of ISO 4940-1985;
- Chapter 9 corresponds to Chapter 8 of ISO 4940-1985;
- Chapter 10 corresponds to Chapter 9 of ISO 4940-1985;
- Appendix A and Appendix B are added, Appendix C corresponds to Appendix A of ISO 4940-1985, and Appendix D corresponds to Appendix B of ISO 4940-1985.

The technical differences between this document and ISO 4940-1985 are marked with a vertical

single line (?) in the outer margin of the clauses involved. These technical differences and the

reasons for these differences are as follows:

- The scope of determination is expanded (see Chapter 1), so as to enhance the applicability of this document;
- Normative References is modified (see Chapter 2), so as to adapt to the technical documents of China;
- Iron solutions of two concentrations are used (see 5.4 and 5.5), so as to adapt to the requirements of different amounts of specimen;
- The detection limit (see 6.1.3) is modified, so as to be compatible with the determination range of this document;
- The amount of specimen is modified (see 8.1), so as to simplify the operating process;
- The amount of acid used when the specimen is decomposed is reduced (see 8.3.1), so as to satisfy the demands of environmental protection;
- The preparation of the calibration solution is modified (see 8.3.2.3), so as to satisfy the demands of the expansion of the detection range;
- The description of instrument optimization in the high concentration section is added (see 8.3.4), so as to satisfy the accuracy requirements for the measurement;

Iron, Steel and Alloy - Determination of Nickel Content -

Flame Atomic Absorption Spectrometric Method

WARNING---the personnel using this document shall have practical experience in formal

laboratory work. This document does not point out all possible safety issues. It is the user's responsibility to take appropriate safety and health measures and ensure the compliance with the conditions stipulated in the relevant national laws and regulations.

1 Scope

This document specifies the method for the determination of nickel content in steel and cast iron by the flame atomic absorption spectrometric method.

This document is applicable to the determination of nickel content with a mass fraction of 0.002% ~ 5.0%.

2 Normative References

The contents of the following documents constitute indispensable clauses of this document through the normative references in the text. In terms of references with a specified date, only

versions with a specified date are applicable to this document. In terms of references without a

specified date, the latest version (including all the modifications) is applicable to this document.

GB/T 6379.1 Accuracy (trueness and precision) of Measurement Methods and Results - Part 1:

General Principles and Definitions (GB/T 6379.1-2004, ISO 5725-1:1994, IDT)

GB/T 6379.2 Accuracy (trueness and precision) of Measurement Methods and Results - Part 2:

Basic Method for the Determination of Repeatability and Reproducibility of a Standard Measurement Method (GB/T 6379.2-2004, ISO 5725-2:1994, IDT)

GB/T 12805 Laboratory Glassware - Burettes (GB/T 12805-2011, ISO 385:2005, NEQ)

GB/T 12806 Laboratory Glassware - One-mark Volumetric Flasks (GB/T 12806-2011, ISO 1042:1998, NEQ)

GB/T 12808 Laboratory Glassware - One-mark Pipettes

GB/T 20066 Sample and Iron - Sampling and Preparation of Samples for the Determination of