

ICS 17.180.30

CCS N 33



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

GB/T 15247-2008

Replacing GB/T 15247-1994

**Microbeam analysis -- Electron probe microanalysis --
Guidelines for determining the carbon content of steels using
calibration curve method**

微束分析 电子探针显微分析 测定钢中碳含量的校正曲线法

(English Translation)

Issued on: August 20, 2008

Implemented on: April 1, 2009

Issued by: Standardization Administration of China

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Foreword

This standard is equivalent to international standard ISO 16592:2006 "micro-beam analysis measured electron probe microanalysis --- calibration curve method Steel carbon content "(in English).

The standard ISO 16592:2006, made the following editorial changes.

--- Appendix B CS = 0.44 to CS = 0.444, more reserved one decimal place, with the u (CS) Reserved bits consistent.

This standard replaces GB/T 15247-1994 "carbon steel and low alloy steel EPMA quantitative analysis method sensitivity curve (Detection limit method). " this standard and GB/T 15247-1994 The main difference is.

--- Standard changed its name to "micro-beam analysis electron probe microanalysis determination of carbon content in steel calibration curve method";

--- In Chapter 1, more clearly defines the scope of this standard;

--- In order to analyze the principles set forth in the 3.4 to add a "relationship of the electron beam energy and carbon intensity of K α peak" and "carbon K α peak Composition" Two charts;

--- Added "Appendix Uncertainty Evaluation Method A calibration curve method to calculate values" and "Appendix B mass fraction of carbon steel Measurement and Evaluation of Uncertainty Example "in Appendix A and Appendix B is an informative annex.;

--- Added "3 detects Uncertainty Assessment" content, delete the content of the original standard Chapter 10, "analytical accuracy" of.

The Standard Appendix A, Appendix B is an informative annex.

This standard by the National Standardization Technical Committee microbeam analysis made.

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This standard was drafted. Iron and Steel Institute.

1 Scope

This standard specifies the determination of carbon and low alloy steel by electron probe (other alloying elements mass fraction of less than 2%) carbon content correction Curve method. This standard includes sample preparation, X- ray detector, a calibration curve to establish and assess the carbon content detection uncertainty. This standard Suitable for the determination of carbon content less than 1% of the carbon content of the steel, when the carbon content of more than 1% detection accuracy will be greatly affected, Does not apply to this standard.

This standard applies to vertical manner and the incident wave spectrometer, NA spectrometer.

2.1 Overview

Determination of steel carbon content using a calibration curve, first prepare a suitable reference material. Accurate analysis particular attention to prevent detection test Like surface carbon contamination, to avoid pollution on the carbon content of the test results.

Samples and reference materials detected Kalpha line intensity of carbon required under the same experimental conditions and steps that sample preparation, speed Voltage, beam, beam spot size, count mode point analysis, line analysis steps and methods of backing deductions and so requires the same.

2.2 Reference Materials

For detection of the carbon content of the calibration curve, or the need for a set of suitable reference material. For example, the following reference materials.

--- Quenched from the austenite zone temperature of Fe-C solid solution. Series reference material should include a range of different carbon contents, and each parameter Test substance requires uniform composition;

--- Fe-C compound Fe₃C [1].

Reference material and the sample under test carbon Kalpha peak shape will also not reduce the accuracy of quantitative analysis, and therefore can not be used.

2.3.1 Description

When the samples were prepared, and a carbon compound contamination largely formed in the sample surface affect the accuracy of the carbon content analysis. therefore when the sample preparation requires special attention to prevent such contamination. Reference materials and preparation of samples to be tested (mosaic, grinding and polishing) to protect Holding the same.

2.3.2 Mosaic

Typically the sample without mosaic, but in the analysis of small samples or irregular shape, the need for mosaic. We must recognize mosaic Materials will also become a source of carbon pollution. Many common mosaic material, such as phenolics, doped with copper, aluminum, graphite or resins, the choice to advance its assessment inlay material, to avoid sample contamination caused.

When the sample was analyzed mosaic, should try to choose a region near the center of the sample to detect the edges in order to avoid contamination by the inlay material Impact.

2.3.3 Polishing and cleaning

Prepared sample surface should be smooth, clean and dry. Metallographic samples were prepared in accordance with the requirements of standard sampling methods, such as the use of SiC sand Abrasive paper, the choice of a suitable size polishing paste polishing. The final polishing using a polishing agent with a non-carbonaceous material requirements, such as alumina powder Wait. After polishing, use ultrasonic cleaning to completely remove the sample preparation process may sample surface residual contaminants.

2.4.1 Electron beam energy and beam

Because carbon characteristic X- ray yield is low, and almost all of the base material of carbon Kalpha line has a strong absorption, so the carbon X- ray GB/T 15247-2008/ISO 16592:2006