

ICS 25.220.40

CCS H 11



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

GB/T 24514-2009

Zinc and/or aluminium based coating on steel -- Determination of coating mass per unit area and chemical composition -- Gravimetry, inductively coupled plasma atomic emission spectrometry and flame atomic absorption spectrometry

钢表面锌基和（或）铝基镀层 单位面积镀层质量和化学成分测定 重量法、电感耦合等离子体原子发射光谱法和火焰原子吸收光谱法

(English Translation)

Issued on: October 30, 2009

Implemented on: May 1, 2010

Issued by: General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China

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Foreword

This Standard modified and adopted ISO 17925.2004 "Zinc and/or aluminium based coatings on steel - Determination of coating mass per unit area and chemical composition - Gravimetry, inductively coupled plasma atomic emission spectrometry and flame atomic absorption spectrometry" (English version).

For ease of use, the following modifications were made to this Standard.

- Deleted the foreword of ISO 17925.2004;
- Made structural and editorial changes to the "Scope" of ISO 17925.2004. Deleted all references to lead content determination in "Scope" and the corresponding sections that follow;
- Changed the normative references according to the corresponding Chinese national standards. Sorted by national standard number in Chapter 2;
- Edited the notes in 4.8, 4.9 and 7.2 of ISO 17925.2004 into the text of this Standard;

- Modified article 5.2.3 of ISO 17925.2004 that "the relative standard deviation shall not be greater than 0.4%" to "the relative standard deviation shall not be greater than 1.0%" in this Standard, according to the accuracy level of ICP instruments, metrological verification regulations and actual use requirements;
- Corrected "0.5% of the mean absorbance of the lowest calibration solution" in article 5.3.2 of ISO 17925.2004 to "0.5% of the average absorbance of the highest calibration solution" in this Standard;
- Made structural editorial changes to articles 7.3 and 7.4 of ISO 17925.2004;
- Corrected the editorial error "C-1 to C-4" in articles 7.3.5.1 and 7.3.6.1 of ISO

17925.2004 to "C-1 to C-3" in articles 7.3.5 and 7.4.5 of this Standard;

- Corrected the editorial error "4.15, 4.19, 4.22, 4.25" in Table 7 of ISO 17925.2004 to "4.14, 4.18, 4.21, 4.24" in Table 7 of this Standard;
- Corrected the editorial error "(7.3.2)" in article 7.3.7 of ISO 17925.2004 to "(7.3.1)" in article 7.3.6 of this Standard;
- Add Annex D as an informative annex of this Standard.

Annex A, Annex B, Annex C and Annex D of this Standard are all informative.

This Standard was proposed by China Iron and Steel Association.

This Standard shall be under the jurisdiction of the National Steel Standardization Technical Committee.

The drafting organizations of this Standard. Baoshan Iron and Steel Co., Ltd.

Main drafters of this Standard. Zhang Jiaqi, Fan Zhigang, Zhu Ziping, Li Lei, Tian Huiling, Wang Junxiang.

Zinc and/or aluminium based coating on steel -

Determination of coating mass per unit area and chemical composition - Gravimetry, inductively coupled plasma atomic emission spectrometry and flame atomic absorption spectrometry

1 Scope

This document specifies the method of gravimetry method to determine the coating mass per unit area, as well as the methods of inductively coupled plasma atomic emission spectrometry and flame atomic absorption spectrometry to determine chemical composition of zinc-based and/or aluminum-based single-sided coatings on steel surfaces.

2 Normative references

The provisions in following documents become the provisions of this Standard through reference in this Standard. For dated references, the subsequent amendments (excluding corrigendum) or revisions do not apply to this Standard, however, parties who reach an agreement based on this Standard are encouraged to study if the latest versions of these documents are applicable. For undated references, the latest edition of the referenced document applies.

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)

3 Principle

Use a hydrochloric acid solution containing a corrosion inhibitor to peel off the coating on one side of the steel surface (the role of the corrosion inhibitor is to prevent hydrochloric acid from corroding the steel substrate). Respectively determine the mass of the specimen before and after peeling of the coating. Divide the mass difference by the surface area of the specimen to obtain the coating mass per unit area.

4 Reagents and materials

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

5 Apparatus

The ICP-AES used shall be optimized for use in accordance with the manufacturer's instructions.

Calculate the bandwidth (width at half maximum) of the analytical line and the internal marker. The bandwidth shall be less than 0.030nm.

6 Sampling and specimen

Except for special provisions, the sampling of specimens used to determine the mass of the coating per unit area and the chemical composition of the coating shall be carried out in accordance with the provisions of GB/T 20066 and related product standards.

The specimen shall be a square, rectangle or circle with a surface area of 1900mm²~3500mm².

7 Determination steps

Use a caliper to measure the size of the specimen to the nearest of 0.05mm. Calculate the specimen area, to the nearest of 0.1mm².

When the square specimen is not a square, the formula for calculating the area of the specimen is $(a + b) \times d/2$. Where d is the length of the diagonal; a and b are the lengths of the perpendiculars from a corner to the diagonal (see Figure 1).

8 Representation of results

The precision test results are statistically processed in accordance with the provisions of GB/T 6379.1, GB/T 6379.2 and ISO 5725-3.

Calculate the content of the element to be tested in the coating according to formula (2), expressed in mass fraction (%).

9 Test report

The test report shall include the following.

Annex A

(informative)