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Zinc or Zinc Alloy Coating on Steel Sheets or Strips – Determination of Hexavalent Chromium Content – 1,5-Diphenylcarbohydrazide (Diphenylcarbazide) Spectrophotometric Method

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Foreword

This Standard was drafted as per the rules specified in GB/T 1.1-2009.

This Standard was proposed by China Iron and Steel Association.

This Standard shall be under the jurisdiction of National Technical Committee for Standardization of Steel (SAC/TC 183).

Drafting organizations of this Standard: Anshan Iron and Steel Group Corporation, SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd., Central Iron Steel Research Institute, and China Metallurgical Information and Standardization Institute.

Chief drafting staffs of this Standard: Chen Yiqing, Li Feng, Zhong Bin, Wang Yiling, Han Xiaodong, Wang Haidan, Hou Yanxia, Liao Xiaoquan, and Chen Zibin.

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Warning: personnel using this Standard shall have practical experience working in the formal laboratory. This Standard doesn't address all the possible safety issues. The users shall assume the responsibility to take appropriate safety and health measures, and ensure the compliance with the relevant national regulations.

1 Scope

This Standard specifies using Diphenylcarbazide Spectrophotometric Method to determine the hexavalent chromium content.

This Standard is applicable to the zinc and zinc alloy coating on steel sheets or strips, thereof including the determination of hexavalent chromium content on the pure zinc, zinc-iron alloy, zinc-aluminum and aluminum-zinc alloy coating surfaces. The measuring range is 2μg/g~100μg/g or 0.020μg/cm^2~10μg/cm^2.

2 Normative References

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document; for the undated documents, only the latest version (including all the amendments) are applicable to this document.

GB/T 1839 Test Method for Gravimetric Determination of the Mass per Unit Area of Galvanized Coatings on Steel Products

GB/T 6682 Water for Analytical Laboratory Use - Specification and Test Methods

GB/T 7729 Chemical Analysis of Metallurgical Products - General Rule for Spectrophotometric Methods

7.7.1 The hexavalent chromium content per unit area shall be expressed in μg/cm^2; the results shall retain two decimals, and be calculated as per Formula (1):

$$W_1 = \frac{G \times \frac{V}{V_1}}{A} \quad \text{..... (1)}$$

Where:

W_1 – Hexavalent chromium content per unit area (indicating single- or double-surface), in μg/cm^2;

G - Hexavalent chromium amount found on the calibration curve, in μg;

V – Total volume of the test solution, in mL;

V_1 – Volume of sub-specimen solution, in mL;

A – Specimen single-surface area, in cm^2.

7.7.2 Take the coating mass as the base, the hexavalent chromium content is expressed in μg/g; the result shall retain two decimals, and be calculated as per Formula (2):

$$W_2 = \frac{W_1}{W_3} \times 10\ 000 \quad \text{..... (2)}$$

Where:

W_2 – Hexavalent chromium content per unit area coating (indicating single- or double-surface), in μg/cm^2;

W_1 – Hexavalent chromium content per unit area (indicating single- or double-surface), in μg/cm^2;

W_3 – Coating mass per unit area (indicating single- or double-surface), in g/m^2.

8 Allowable Difference

The relative allowable difference between the two analytical results of the same sample shall be no greater than the provision stipulated in Table 3.

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