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Metallic coatings — Hot dip galvanized coatings on ferrous materials — Gravimetric determination of the mass per unit area

Revêtements métalliques — Revêtements de galvanisation à chaud sur métaux ferreux — Détermination gravimétrique de la masse par unité de surface

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 107, *Metallic and other inorganic coatings*, Subcommittee SC 4, *Hot dip coatings (galvanized, etc.)*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 262, *Metallic and other inorganic coatings, including for corrosion protection and corrosion testing of metals and alloys*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This third edition cancels and replaces the second edition (ISO 1460:1992), which has been technically revised. The main changes compared with the previous edition are as follows:

— the density of concentrated hydrochloric acid in Clause 5 has been modified from ρ = 1,19 g/ml to $\rho \geq$ 1,18 g/ml.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Metallic coatings — Hot dip galvanized coatings on ferrous materials — Gravimetric determination of the mass per unit area

1 Scope

This document specifies a method of determining the mass per unit area of hot dip galvanized coatings on ferrous materials.

Since an exact knowledge of the area of the surface is essential, this document is mainly applicable to shapes whose areas are easy to determine. If, with heavy samples, the specifications of Clause 7 cannot be met, then the hot dip galvanized coating mass is determined by another method.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

4 Principle

The hot dip galvanized coating on a surface of known area is dissolved in inhibited acid and the resultant loss in mass is determined by weighing the sample before and after the coating is dissolved.

5 Stripping solution

Dissolve 3,5 g of hexamethylenetetramine in 500 ml of concentrated hydrochloric acid ($\rho \geq 1{,}18$ g/ml). Dilute this solution to 1 000 ml with distilled water.

6 Sampling

The method of sampling shall be agreed between the interested parties.

7 Procedure

Where necessary, the sample shall be degreased with an organic solvent that does not attack the hot dip galvanized coating and then dried.

Before stripping, the sample shall be weighed to an accuracy better than 1 % of the presumed coating mass.

The quantity of solution shall be measured so that at least 10 ml of solution are available for each square centimetre of the surface of the sample. The sample shall be completely immersed in the solution

at room temperature and left until the coating has completely dissolved. The end of the dissolution process can be recognized by the cessation of the originally brisk evolution of hydrogen. The sample shall then be rinsed in running water and, if necessary, brushed to remove any loose substance which may be adhering to the surface, dipped in alcohol, quickly dried and again weighed to the accuracy indicated in the previous paragraph.

After weighing, the surface area A of the exposed surface shall be determined to an accuracy of 1 %.

8 Expression of results

8.1 Method of calculation

Calculate the mass per unit area ρ_A, of the hot dip galvanized coating, expressed in grams per square metre, from Formula (1):

$$\rho_A = \frac{m_1 - m_2}{A} \times 10^6 \tag{1}$$

where

m_1 is the mass, in grams, of the sample before stripping;

m_2 is the mass, in grams, of the sample after stripping;

A is the area, in square millimetres, of the exposed surface of the sample.

NOTE With steel wire, it is often advantageous to calculate the mass per unit area, ρ_A, of a hot dip galvanized coating, expressed in grams per square metre, using the following formula:

$$\rho_A = \frac{7{,}84 \times 10^3}{4} \times D \times \frac{m_1 - m_2}{m_2}$$

where D is the diameter, in millimetres, of the wire after stripping and the density of steel is taken as 7,84 g/cm^3.

In this way, it is not necessary to know the length of the wire.

8.2 Reproducibility

The reproducibility (different observers, different apparatus and operating conditions) is about ±5 % of the mean value.

9 Test report

The test report shall contain the following information:

a) a reference to this document, i.e. ISO 1460;

b) type and dimensions of the sample;

c) the method of calculating the surface area for shaped samples;

d) the mass per unit area of coating, in grams per square metre or, if agreed between the interested parties, the thickness of the coating, in micrometres;

NOTE The approximate thickness, d, of the hot dip galvanized coating, in micrometres, can be calculated from the formula $d = \frac{\rho_A}{7{,}2}$, which assumes that the density of the coating is 7,2 g/cm^3.

e) any deviations from the procedure;

f) any unusual features observed;

g) the date of the test.

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