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coatings

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In the event of any doubts arising as to the contents,
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Foreword

This Japanese Industrial Standard has been revised by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee as the result of proposal for revision of Japanese Industrial Standard submitted by Japan Galvanizers Association Inc. (JGA)/Japanese Standards Association (JSA) with a draft being attached, based on the provision of Article 12, paragraph (1) of the Industrial Standardization Act applied mutatis mutandis pursuant to the provision of Article 16 of the said Act. This edition replaces the previous edition (**JIS H 0401** : 2013), which has been technically revised.

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Test methods for hot dip galvanized coatings

Introduction

This Japanese Industrial Standard has been prepared based on **ISO 1460** : 1992, Edition 2, with some modifications of the technical contents.

The vertical lines on both sides and dotted underlines indicate changes from the corresponding International Standard. A list of modifications with the explanations is given in Annex JB.

1 Scope

This Standard specifies the test methods for hot dip galvanized coatings (hereafter referred to as coatings) applied on steel products, steel work pieces, steel castings and forgings and iron castings (hereafter referred to as substrates).

NOTE The International Standard corresponding to this Standard and the symbol of degree of correspondence are as follows.

ISO 1460 : 1992 *Metallic coatings — Hot dip galvanized coatings on ferrous materials — Gravimetric determination of the mass per unit area (MOD)*

In addition, symbols which denote the degree of correspondence in the contents between the relevant International Standard and **JIS** are IDT (identical), MOD (modified), and NEQ (not equivalent) according to **ISO/IEC Guide 21-1**.

WARNING Persons carrying out tests based on this Standard should be familiar with normal laboratory practice. This Standard does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user of this Standard to establish appropriate safety and health practices.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

JIS B 7507 *Vernier, dial and digital callipers*

JIS H 1111 *Methods for chemical analysis of zinc metal*

JIS H 1113 *Method for photoelectric emission spectrochemical analysis of zinc metal*

JIS H 8641 *Hot dip galvanized coatings*

JIS K 8847 *Hexamethylenetetramine (Reagent)*

JIS Z 0103 *Glossary of terms used in rust and corrosion preventive technology*

JIS Z 8401 *Rounding of numbers*

3 Terms and definitions

For the purpose of this Standard, the terms and definitions given in **JIS H 8641** and **JIS Z 0103** apply.

4 Analysis of galvanizing bath composition

Analysis of galvanizing bath composition shall be as follows.

- a) **Sampling** The sample for analysis shall be taken near the centre of the galvanizing bath and at a depth of about 100 mm in the condition where coating process is possible. One sample shall be taken, and the frequency of sampling shall be left to the discretion of the processor.
- b) **Chemical analysis** The chemical analysis shall be in accordance with **JIS H 1111** or **JIS H 1113**. The chemical analysis of elements intentionally added and those other than specified in **JIS H 1111** and **JIS H 1113** shall be as agreed between the purchaser and the supplier.

5 Coating thickness test

5.1 Principle

The coating thickness shall be obtained, by means of an electromagnetic coating thickness meter (hereafter referred to as coating thickness meter), by measuring the magnetic resistance of a magnetic flux passing through the coating film and the substrate metal, which changes according to the difference of coating thickness on a substrate made of magnetic metal. However, this method does not apply if the substrate is already magnetized.

5.2 Coating thickness meter

The coating thickness meter used for coating thickness tests shall be adjusted as follows prior to the measurements.

- a) The indication of the coating thickness meter shall be adjusted using a reference sample prior to use of the meter.
- b) The reference sample used for the adjustment shall be a foil of a known and uniform thickness. The foil and the substrate shall be brought into close contact.
- c) The coating thickness meter shall be adjusted so that when the reference sample thickness is not more than 50 μm and more than 50 μm , the indicated thickness is within $\pm 1.5 \mu\text{m}$ and $\pm 3 \%$, respectively, of the reference sample thickness.

5.3 Operation

The coating thickness meter shall be operated in accordance with its instruction manual.

5.4 Test piece

The product as it is shall be used as a test piece. If this is impracticable, a test piece shall be taken in accordance with 6.2.2 a) 2) or 3), and the sampling position and size of the test piece shall be in accordance with 6.2.2 b).

5.5 Measuring positions

The positions of the coating thickness measurement shall be within a significant surface excluding the cut section and edges so that the measurement results represent the coating thickness of the test piece. Annex JA shows examples of the measuring positions which give the results representing the coating thickness. The positions may be determined based on the agreement between the purchaser and the supplier.

In the case where the test piece is composed of two or more substrates of different thickness, the significant surface of the main substrate shall be used for the measurements. When the significant surface of the test piece is narrow or the shape is intricate, the positions shall be as agreed between the purchaser and the supplier.

The Number of measuring positions shall be in accordance with Table 1.

Table 1 Number of coating thickness measuring positions

Test piece length	Number of measuring positions	
	Significant surface area of a test piece	
	2 m ² or less	Over 2 m ²
2 m or shorter	1 or more	3 or more
Longer than 2 m	3 or more	3 or more

5.6 Number of measurements

The number of measurements shall be five per one measuring position. When the significant surface of the test piece is narrow or the shape is intricate, one measurement at one respective measuring position in five test pieces may be regarded as five measurements (see Annex JA), or the case may be handled based on the agreement between the purchaser and the supplier.

5.7 Coating thickness per measuring position

The coating thickness per measuring position shall be the average value of five measurements. The average value shall be an integer rounded off at the first decimal place in accordance with Rule B of JIS Z 8401, and expressed in micrometres (μm).

6 Coating mass test

6.1 General

The coating mass shall be measured by either indirect method or direct method. In either method, since it is important to determine the surface area, it is applied to substrates having a shape such that the coating area can be calculated.