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**Methods of thickness measurement
for sprayed coatings**

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Foreword

This translation has been made based on the original Japanese Industrial Standard revised by the Minister of International Trade and Industry through deliberations at the Japanese Industrial Standards Committee in accordance with the Industrial Standardization Law. Consequently, **JIS H 8401 : 1990** is replaced with this Standard.

The purpose of this revision is to make conformity with the International Standard.

Attention shall be drawn to the possibility that some parts of this Standard may conflict with a patent right, application for a patent after opening to the public, utility model right or application for registration of utility model after opening to the public which have technical properties. The relevant Minister and the Japanese Industrial Standards Committee are not responsible for identifying the patent right, application for a patent after opening to the public, utility model right or application for registration of utility model after opening to the public which have the said technical properties.

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Methods of thickness measurement for sprayed coatings

Introduction This Japanese Industrial Standard has been prepared based on the second edition of *ISO 2063 Metallic and other inorganic coatings—Thermal spraying—Zinc, aluminium and their alloys*, without any modification in technical contents of the corresponding contents in the International standard, however, the provision (Test method by micrometer), which is not listed in the corresponding International Standard, has been supplemented as Japanese Industrial Standard.

The “passages” underlined with dots are the items which are not mentioned in the corresponding International Standard.

1 Scope This Japanese Industrial Standard specifies the method to measure the thickness of sprayed coating on significant surface⁽¹⁾ of sprayed products (hereafter referred to as “products”).

Note (1) This refers to the important surface for service.

Remarks : The International Standard corresponding to this Standard is as follows.

ISO 2063 : 1991 *Metallic and other inorganic coatings—Thermal spraying—Zinc, aluminium and their alloys*

2 Normative references The following standards contain provisions which, through reference in this Standard, constitute provisions of this Standard. The most recent editions of the standards indicated below shall be applied.

JIS B 7502 *Micrometer callipers*

JIS B 7503 *Dial gauges*

JIS B 7506 *Gauge blocks*

JIS B 7507 *Vernier, dial and digital callipers*

JIS B 7515 *Cylinder gauges*

JIS B 7520 *Indicating micrometers*

JIS B 7533 *Dial test indicators (lever type)*

JIS B 7536 *Electrical comparators*

JIS H 3130 *Copper beryllium alloy, phosphor bronze and nickel silver sheets, plates and strips for springs*

3 Kinds of test methods The kinds of test methods shall be as follows.

a) Test method by micrometer

1) Direct method

2) Masking method

b) Test method by microscopical examination of cross section

- c) Test method by magnetic force
- d) Test method by Eddy current
- e) Test method by scanning by profilometer

4 Sample Sample shall be the significant surface of the product. However, if the measurement on the product is impossible, instead, a test piece⁽²⁾ shall be used.

Note (2) The test piece shall represent the significant surface of product, and the substrate of the test piece shall be the same as that of the product or similar one, and the conditions of spraying must be the same as those of the product.

5 Measuring method by micrometer

5.1 Direct method

5.1.1 Summary Employing a micrometer, measure the thickness of substrate before spraying, again measure the thickness of the same spot of the sample after spraying, and obtain the thickness of sprayed coating from the difference between both measurements.

5.1.2 Type of micrometer The micrometers to be used for this measurement are shown in Table 1. Choose a type of micrometer depending on the shape of the sample, kind of sprayed coating, and so on.

Table 1 Type of micrometer

Standard number	Title of standard
JIS B 7502	Micrometer callipers
JIS B 7503	Dial gauges
JIS B 7507	Vernier, dial and digital callipers
JIS B 7515	Cylinder gauges
JIS B 7520	Indicating micrometers
JIS B 7533	Dial test indicators (lever type)
JIS B 7536	Electrical comparators

5.1.3 Procedures Procedures shall be as follows.

- a) Micrometers shall be operated as shown in the instruction manual of each micrometer.
- b) Before spraying, clean the surface of the substrate, decide the spot to be measured, and measure the thickness of the substrate vertically by means of a micrometer. After spraying, measure the thickness of the substrate at the same spot as before, take the absolute value of the difference between both measurements as the thickness of the sprayed coating on the spot.

- c) The number of measuring spots shall be at least 3 spots for the typical significant surface, and their averaged value shall be considered the thickness of sprayed coating of the product.

5.2 Masking method

5.2.1 Summary Carry out the shielding treatment (also referred to as masking) from spraying on the part of substrate adjacent to the spot to be measured. After spraying, measure the difference in level between the coated surface and substrate surface to obtain the thickness of sprayed coating.

5.2.2 Type of micrometer For these procedures, employ a micrometer shown in Table 1, and choose an adequate one depending on the shape of the sample, kind of sprayed coating, and so on.

5.2.3 Procedures Procedures shall be as follows.

- a) Micrometers shall be operated as shown in the instruction manual of each micrometer.
- b) Decide a measuring spot, then take measures to shield the part adjacent to the spot from spraying with adequate shielding agent.

After spraying, remove the shielding agent, and measure the thickness or height of the sprayed surface and substrate treated with shielding agent respectively with a micrometer. Take the absolute value of the difference between both measurements as the thickness of the sprayed coating on the spot.

- c) The number of measuring spots shall be at least 3 spots for the typical significant surface, and their averaged value shall be considered the thickness of sprayed coating of the product.

6 Test method by microscopic examination of cross section

6.1 Summary Observe the vertical cross section of the sprayed coating with a microscope to measure the thickness of sprayed coating.

6.2 Apparatus and instrument For this test, the following apparatus and instrument shall be used.

- a) Micrometer microscope or metallographic microscope
- b) Photographic apparatus for microphotograph (unnecessary, when micrometer microscope is used)
- c) Slicing machine
- d) Material for embedding
- e) Polisher for test piece

6.3 Procedures

6.3.1 Preparation of test piece for microscopic observation The preparation of test piece for microscopic observation shall be as follows.