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**Paints and varnishes — Drying tests —**

**Part 6:  
Print-free test**

*Peintures et vernis — Essais de séchage —*

*Partie 6: Essai de séchage apparent complet*

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 9117-6 was prepared by Technical Committee ISO/TC 35, *Paints and varnishes*, Subcommittee SC 9, *General test methods for paints and varnishes*.

It cancels and replaces ISO 3678:1976, which has been technically revised.

ISO 9117 consists of the following parts, under the general title *Paints and varnishes — Drying tests*:

- *Part 1: Determination of through-dry state and through-dry time*
- *Part 2: Pressure test for stackability*
- *Part 3: Surface-drying test using ballotini*
- *Part 4: Test using a mechanical recorder*
- *Part 5: Modified Bandow-Wolff test*
- *Part 6: Print-free test*

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# Paints and varnishes — Drying tests —

## Part 6: Print-free test

### 1 Scope

This part of ISO 9117 specifies a method for assessing, by means of a simple empirical test, the resistance of a coat of paint, varnish or related product to imprinting by a nylon gauze under a specified force applied for a specified time.

The method may be carried out

- either as a “pass/fail” test by determining whether the print-free state has been reached after a specified period of drying or, in the case of stoving coatings, after stoving and ageing under specified conditions,
- or by repeating the print-free test at suitable intervals until the print-free time is obtained.

### 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 1513, *Paints and varnishes — Examination and preparation of test samples*

ISO 1514, *Paints and varnishes — Standard panels for testing*

ISO 2808, *Paints and varnishes — Determination of film thickness*

ISO 15528, *Paints, varnishes and raw materials for paints and varnishes — Sampling*

### 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

#### 3.1

##### **print-free**

state of a coating of paint or varnish when gauze of a specified grade under a specified force during a specified time does not leave on the surface an imprint, visible under normal corrected vision

#### 3.2

##### **print-free time**

period of time elapsing between the moment at which a coating is applied to a prepared test panel and that at which the coating is assessed as just print-free, using the test procedure specified

### 4 Apparatus

#### 4.1 **Squares** of woven monofilament polyamide gauze, minimum size 25 mm × 25 mm.

Unless otherwise specified, the gauze shall be of 0,120 mm thread diameter and of approximately 0,2 mm aperture. Depending upon the type of coating under test, other grades of similar construction may be used if necessary, subject to agreement between the interested parties.

**4.2 Rubber discs**, of diameter 22 mm, thickness 5 mm and hardness 50 IRHD  $\pm$  3 IRHD<sup>1)</sup> (see ISO 48).

**4.3 Cylindrical weights**, of mass 200 g, 500 g and 1 000 g and diameter not less than 22 mm.

The diameter of the rubber discs and the mass of the weights may vary slightly from those specified in 4.2 and 4.3. The pressures on the coatings, however, shall be equal to those obtained using discs and weights of the dimensions specified in 4.2 and 4.3, i.e. 5,2 kPa (200 g), 13,2 kPa (500 g) and 26,3 kPa (1 000 g).

**4.4 Stopwatch or stopclock.**

## 5 Sampling

Take a representative sample of the product to be tested (or of each product in the case of a multi-coat system), in accordance with ISO 15528.

Examine and prepare each sample for testing, in accordance with ISO 1513.

## 6 Test panels

### 6.1 Substrate

The test panels shall be of glass, burnished steel, burnished tinplate or burnished aluminium, complying with the requirements of ISO 1514.

### 6.2 Preparation and coating of the panels

Prepare the panels in accordance with ISO 1514 unless otherwise required. The test panel shall be coated by the specified method with the appropriate primer and/or undercoat and allowed to dry for the specified period. In the case of multi-coat stoving products, the primer and/or undercoat shall be stoved under the agreed stoving conditions before applying the product under test by the specified method.

### 6.3 Thickness of coating

Determine the thickness, in micrometres, of the dry coating by the method specified, using one of the procedures specified in ISO 2808.

## 7 Procedure

### 7.1 Drying the test panel

Allow the coated panel to dry in a vertical position in the standard atmosphere specified in ISO 3270,  $(23 \pm 2)$  °C and relative humidity of  $(50 \pm 5)$  %, unless otherwise agreed. The panel shall be dried with free circulation of air but shielded from draughts and direct sunlight.

Stoving products shall be stoved and aged under the specified or agreed conditions.

### 7.2 Assessment of print-free state

**7.2.1** After the completion of the specified drying time, place the test panel in a horizontal position.

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1) International rubber hardness degrees.

**7.2.2** Place a square of polyamide gauze (4.1) on the surface of the coating and place a rubber disc (4.2) centrally on the square.

Place the appropriate weight (4.3) carefully on the disc so that the axes of the disc and weight are coincident and start the stopwatch or stopclock (4.4).

**7.2.3** Unless otherwise specified or agreed, remove the weight, rubber disc and gauze square after 10 min.

**7.2.4** Examine the surface of the coating immediately in the test area, using normal corrected vision.

The surface is "print-free" if no imprint can be seen. Record the result as "print-free" or "not print-free".

### **7.3 Determination of print-free time**

Take a number of coated test panels. At appropriate intervals, starting shortly before the coating is expected to be print-free and using an untouched area of the same panel for each test (or a different panel as necessary), carry out the test as specified in 7.2, until the test shows the coating to be print-free.

Record the time taken for the coating to become just print-free.

## **8 Test report**

The test report shall include the following information:

- a) all details necessary to identify the product under test;
- b) a reference to this part of ISO 9117 (ISO 9117-6);
- c) details of the preparation of the test panels, including:
  - 1) the material, the thickness and the surface preparation of the substrate (see 6.1),
  - 2) the method of application of the test coating to the substrate, including the duration and conditions of drying between coats in the case of a multi-coat system (see 6.2),
  - 3) the dry-film thickness, in micrometres, of the coating and method of measurement from ISO 2808 (see 6.3);
- d) the duration and conditions of drying (or stoving) the coat and the conditions of ageing, if applicable, before testing (see 7.1);
- e) the intervals between tests where the print-free time is required;
- f) details of the grade of polyamide gauze used and the force applied in carrying out the test;
- g) the result of the test as required:
  - 1) either whether or not the coating was print-free after the specified time (pass/fail test),
  - 2) or the print-free time;
- h) any deviation, by agreement or otherwise, from the procedure specified, such as the duration of application of the gauze;
- i) any unusual features (anomalies) observed during the test;
- j) the date of the test.

## Bibliography

- [1] ISO 48, *Rubber, vulcanized or thermoplastic — Determination of hardness (hardness between 10 IRHD and 100 IRHD)*
- [2] ISO 3270, *Paints and varnishes and their raw materials — Temperatures and humidities for conditioning and testing*

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