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Coating powders —

Part 7: Determination of loss of mass on stoving

Poudres pour revêtement —

Partie 7: Détermination de la perte de masse à la cuisson

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

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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.

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).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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 35, *Paints and varnishes*, Subcommittee SC 9, *General test methods for paints and varnishes*.

This second edition cancels and replaces the first edition (ISO 8130-7:1992), which has been technically revised.

The main changes compared to the previous edition are as follows:

— a “Terms and definitions” clause has been added;

— a “Principle” clause has been added;

— the designation of masses has been significantly changed, where m_0 is now ($m_1 - m_0$) and m_1 is now ($m_2 - m_0$);

— a table containing data for time, temperature and sample mass of different classes of coating powders has been added to Annex A;

— the former Annex A, "Required supplementary information" has been deleted;

— the text has been editorially revised and the normative references have been updated.

A list of all the parts in the ISO 8130 series can be found on the ISO website.

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.

Coating powders —

Part 7:
Determination of loss of mass on stoving

1 Scope

This document specifies a method for the determination of loss of mass on stoving of coating powders that are to be applied by electrostatic spraying or flock spraying or fluidized bed.

The method described in this document is a simple, practical test which provides sufficiently accurate results for coating powders that lose approximately 2 % (by mass) on stoving (heating). Above 2 %, accuracy decreases with an increasing loss in mass.

This method determines the amount of all volatile matter, including water.

Thermogravimetric testing as described in the ISO 11358 series can be used as a comparative method.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 8130-14, *Coating powders — Part 14: Vocabulary*

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

3 Terms and definitions

For the purposes of this document, the specific terms and definitions given in ISO 8130-14 apply.

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

A test portion of the powder is placed on a dish and then stoved (heated). The loss of mass on stoving is calculated from weighings before and after stoving.

5 Apparatus

Ordinary laboratory apparatus, together with the following:

5.1 Flat-bottomed dish of tinplate or aluminium, approximately 75 mm in diameter.

The dimensions of the dish are not critical, but the base shall be flat to ensure good thermal contact and to permit the test portion of the coating powder to be spread to a thin, even layer. The thickness of powder can have a significant influence on the test result.

The thickness of the coating powder in the dish should be in the same range as the end use application.

5.2 Air-circulation oven, capable of maintaining temperatures up to 250 °C. The type of oven shall be stated in the test report, as the design of the oven can influence the test result.

5.3 Analytical balance, capable of weighing to 0,1 mg.

5.4 Desiccator, containing a desiccant such as dried silica gel impregnated with cobalt chloride. The drying agent shall not interact with the coating powder.

6 Sampling

Take a representative sample of the product under test as specified in ISO 15528.

7 Procedure

7.1 Number of determinations

Carry out the determination in duplicate.

7.2 Test portion

Dry the dish (5.1) in the oven (5.2) at the specified or agreed test temperature (see Annex A) for 15 min and allow it to cool to room temperature in the desiccator (5.4). Weigh the dish to the nearest 0,1 mg. Then weigh into the dish, to the same accuracy, a test portion of powder (0,5 ± 0,05) g. By gentle movement of the dish, holding the dish with tweezers, spread the test portion evenly over the bottom of the dish.

As a guide, a test portion of 0,5 g of coating powder in a dish of 75 mm diameter shall be evenly spread to cover the base of the dish. The thickness of the coating layer should be in the range of the end use application.

7.3 Determination

Carry out the stoving at the temperature and for the time specified or as agreed (see Annex A).

Place the dish with the powder test portion (see 7.2) in the oven (5.2), previously adjusted to the appropriate temperature, and leave it for the specified or agreed period. For rapid heat transfer, place the dish on a metal plate, at the specified oven temperature, in the oven.

NOTE There is a possibility that, with forced air circulation, the powder will be displaced by the fan of the oven. It is therefore recommended that the fan be switched off for a short time at the beginning of the determination or the sample can be covered with a perforated aluminium foil.

When the period of heating is complete, transfer the dish to a desiccator and allow the dish to cool to room temperature. Weigh the dish and stoved test portion to the nearest 0,1 mg and determine the mass of the stoved material.

Any water present in the product under test is included in the test result.

Report the ambient temperature and the humidity during the test.

8 Expression of results

Calculate the loss of mass on stoving, L, expressed as percentage by mass, using Formula (1):

$$L = \frac{(m_1 - m_0) - (m_2 - m_0)}{m_1 - m_0} \times 100 \quad (1)$$

where

m_0 is the mass, in grams, of the empty dish;

m_1 is the mass, in grams, of the dish with the test portion before stoving;

m_2 is the mass, in grams of the dish with the residue after stoving.

If the two results (duplicates) differ by more than 0,2 % (absolute), repeat the procedure described in Clause 7.

Calculate the mean of two valid results (replicates) and report the result to the nearest 0,01 % (by mass).

9 Precision

No precision data is currently available.

10 Test report

The test report shall contain at least the following information:

a) all details necessary to identify the product tested;

b) a reference to this document, i.e. ISO 8130-7:2019;

c) the type of oven used;

d) the ambient temperature and humidity during the test;

e) the test parameters, see Annex A;

f) the result of the test (individual values and mean value);

g) any deviation from the test method specified;

h) any unusual features (anomalies) observed during the test;

i) the date of the test.

Annex A
(informative)

Test parameters

To enable the method to be carried out, the following test parameters shall be specified, as appropriate:

a) the period of heating;

b) the test temperature;

c) the mass of the test portion.

Examples of commonly used test parameters are given in Table A.1.

Table A.1 — Examples for test parameters commonly used for powder coatings

Period of heating[a] Time	**Temperature**[a] °C	**Mass of test portion** g	**Coating Powder** Type
4 h to 24 h	50	0,5 ± 0,05	Thermoplastic powder
20 min to 30 min	<180	0,5 ± 0,05	Thermosetting powder (low cure)
20 min to 30 min	180 to 200	0,5 ± 0,05	Thermosetting powder (standard cure)
20 min to 30 min	>200	0,5 ± 0,05	Thermosetting powder (high cure)

[a] The conditions should be in accordance with the specifications of the coating powder manufacture or as agreed between the interested parties.