INTERNATIONAL STANDARD

ISO 8130-8

Second edition
2021-06

Coating powders —

Part 8: Assessment of the storage stability of thermosetting powders

Poudres pour revêtement —

Partie 8: Estimation de la stabilité au stockage des poudres thermodurcissables

Reference number
ISO 8130-8:2021(E)

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Published in Switzerland

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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).

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).

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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 35, *Paints and varnishes*, Subcommittee SC 9, *General test methods for paints and vanishes*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 139, *Paints and varnishes*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 8130-8:1994), which has been technically revised. The main changes compared to the previous edition are as follows:

— Clause 3 on terms and definitions has been added;

— pretreated aluminium panels have been added in Clause 6 as another option for test panels;

— Table 1 describing four different ratings for the extent of compaction of agglomeration of the coating powder has been deleted;

— the required supplementary information (former Clause 4 and Annex A) has been incorporated in the test report;

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

A list of all 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.

Introduction

Coating powders are subject to two distinct ageing mechanisms, one involving the physical state of the powder and the other its chemical reactivity. Changes in the coating powder may lead to deterioration in the physical and chemical properties of the final coating.

This document describes the procedures to be adopted in assessing the tendency of a thermosetting coating powder to maintain its physical and chemical integrity after being subjected to defined storage conditions.

A correlation between changes in different properties is not to be expected. Similarly, there may be no correlation between the results obtained under different storage conditions.

The results of the procedures in this document give an indication of the ability of the coating powder to withstand the effects of storage prior to application.

Coating powders —

Part 8: Assessment of the storage stability of thermosetting powders

1 Scope

This document establishes a method for the estimation of the storage stability of thermosetting coating powders. It provides the procedures for determining the changes both in the physical state of a thermosetting coating powder and in its chemical reactivity, together with its capacity to form a satisfactory final coating.

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

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

ISO 2813, *Paints and varnishes — Determination of gloss value at 20°, 60° and 85°*

ISO 6272-1, *Paints and varnishes — Rapid-deformation (impact resistance) tests — Part 1: Falling-weight test, large-area indenter*

ISO 8130-6, *Coating powders — Part 6: Determination of gel time of thermosetting coating powders at a given temperature*

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 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

The thermosetting coating powder is subjected to artificial storage conditions for a specified period of time at a defined temperature. Subsequently, any change in the ability of the powder to flow freely and its tendency to agglomerate or to cake is noted. Any change in the ability of the powder to react chemically and to form a satisfactory final coating is then assessed.

Conditions at the bottom of the container may be simulated by placing a weight piece on the test portion to simulate compression.

5 Apparatus

Ordinary laboratory apparatus, together with the following.

5.1 Air-circulating oven, capable of being maintained at (30 ± 0,5) °C or (40 ± 0,5) °C.

A water bath may also be used, but the samples shall be carefully sealed to protect against the ingress of water.

5.2 Test tubes, of glass, nominally 200 mm long and 40 mm external diameter, or another suitable container, preferably made from glass.

5.3 Test-tube stoppers.

5.4 Test-tube stand, that does not impede air (or water) circulation.

5.5 Standard loads, of mass (100 ± 1) g.

NOTE A length of steel rod of diameter sufficient to fit closely within the test tubes (5.2) but without touching the sides is suitable.

5.6 Aluminium-foil discs, of diameter sufficient to fit closely within the test tubes (5.2) but without touching the sides.

5.7 Balance, capable of weighing 100 g to within 0,1 g.

6 Test panels

The test panels shall be agreed between the interested parties. In the absence of agreement, steel panels, solvent-degreased, as described in ISO 1514 or pretreated aluminium panels shall be used. Using the method specified by the manufacturer of the coating powder, apply the product under test or the product obtained in 8.3.2 to each test panel. The film thickness after stoving at the temperature and for the time specified shall be (50 ± 10) µm, or as agreed by the interested parties, when determined by one of the methods specified in ISO 2808.

Condition the coated test panels out of direct sunlight at (23 ± 2) °C and (50 ± 5) % relative humidity for 24 h or as agreed between the interested parties. After conditioning, visually examine the test panels.

7 Sampling

Take a representative sample of the product to be tested as described in ISO 15528.

8 Procedure

8.1 Preliminary examination

8.1.1 Determination of initial chemical reactivity of the powder

Determine the gel time of the sample in accordance with ISO 8130-6.

8.1.2 Determination of initial properties of the coating

Prepare and coat at least three test panels as described in Clause 6. Discard any test panels where the coating shows any defects. Retain one of the coated test panels as reference. Carry out the following test on two of the remaining panels:

— gloss, as specified in ISO 2813;

— deformation by falling weight, as specified in ISO 6272-1.

If agreed between the interested parties, other tests may be specified to establish the initial properties of the product under test.

8.2 Artificial-storage treatment

8.2.1 Unless otherwise agreed, the temperature and respective times at which the product is maintained prior to assessment of its storage stability shall be as follows:

a) (30 ± 1) °C for 7 days, 28 days and 2 months, or

b) (40 ± 1) °C for 24 h, 7 days and 28 days.

8.2.2 Check that the product under test is not agglomerated and, if necessary, pass it through a sieve of appropriate aperture to disperse the sample into its constituent particles.

8.2.3 For each artificial-storage condition (see 8.2.1) carry out the procedure in triplicate. Weigh (100 ± 1) g of the sample into a test tube (5.2). Holding the test tube vertically, gently tap the bottom on a firm surface to ensure that the powder is not loosely packed. The simulation of conditions at the bottom of a container, if agreed, shall be achieved by application of a standard load (5.5) on an aluminium-foil disc (5.6). If it is agreed not to carry out this procedure, this shall be noted in the test report. If appropriate, place the aluminium-foil disc carefully on the surface of the test portion and then gently place one of the standard loads on the disc. Stopper the test tube securely and place the tube in the test-tube stand (5.4).

Transfer the stand and tubes to the oven (5.1), previously set to the specified test temperature. Leave for the specified period of time. Remove the stand and tubes from the oven and allow to cool to (23 ± 2) °C for at least 2 h.

8.3 Final examination

8.3.1 General

If the characteristics of the powder have changed and it is unusable, then further tests are obsolete.

8.3.2 Change in appearance of the powder

Turn the first test tube into a horizontal position, remove the stopper, and gently tap the end containing the coating powder and note whether the coating powder flows freely.

Tip the coating powder on to a clean surface and note any evidence of compaction or agglomeration. If the powder shows an extensive compaction, so that it is not possible to disperse, the test shall be interrupted because the coating powder can no longer be used satisfactorily.

Repeat for the other two test tubes. Combine the three test portions and mix thoroughly.

8.3.3 Determination of chemical reactivity of the powder

Determine, in duplicate, the gel time on a test portion of the combined test sample as described in ISO 8130-6.

8.3.4 Determination of properties of the coating prepared from the coating powder after storage

Prepare and coat test panels as described in Clause 6 and carry out the tests as described in 8.1.2.

Compare the appearance of the coatings made from the treated coating powder with that of the coated reference panel (see 8.1.2).

If additional tests have been carried out on the initial sample (see 8.1.2, last paragraph), carry out equivalent tests on the artificially stored samples.

9 Expression of results

9.1 State if agglomerates have formed and if these agglomerates can be separated by sieving or by hand.

9.2 Calculate the change in reactivity (i.e. gel time), in seconds.

9.3 Report any difference in the appearance of the coating produced from the treated coating powder (see 8.3.2) when compared with the coating produced from the untreated coating powder (see 8.1.2).

9.4 Report any gloss difference and resistance to deformation by falling weight of the coating produced from the treated coating powder (see 8.3.2) when compared with that from the untreated coating powder (see 8.1.2).

9.5 Report any difference in the mean results of any other tests of the coating produced from the treated coating powder (see 8.3.2, last paragraph) when compared with that from the untreated coating powder (see 8.1.2, last paragraph).

10 Precision

Precision data are currently not available.

11 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 8130-8:2021;

c) material, thickness and surface preparation of the substrate (see Clause 6);

d) conditions of artificial storage (see 8.2.1);

e) whether a weight piece was applied to the coating powder under test (see 8.2.3);

f) any additional tests to be carried out on the final coating (see 8.1.2, last paragraph);

g) whether any pretreatment of the sample has been performed (i.e. sieving);

h) the results of the tests as indicated in Clause 9;

i) any deviation from the test method specified;

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

k) the date of the test.