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**Coating powders —**  
**Part 11:**  
**Inclined-plane flow test**

*Poudres pour revêtement —*

*Partie 11: Essai d'écoulement sur plan incliné*

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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](http://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](http://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](http://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 8130-11:1997), which has been technically revised.

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

- a “Terms and definitions” clause has been added;
- the procedure has been revised;
- information on the results of a round robin test has been added;
- 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](http://www.iso.org/members.html).

# Coating powders —

## Part 11: Inclined-plane flow test

### 1 Scope

This document specifies a comparative method for determining the flow characteristic of a fused thermosetting coating powder down a plane inclined at a set angle to the horizontal.

The aim of the test method described in this document gives an indication of the degree of melt flow that can occur during the curing of the coating powder. This characteristic contributes to the surface appearance and to the degree of coverage over sharp edges.

The test is a comparative method for checking for batch to batch variation in the behaviour of a given coating powder. Correlation between the results from coating powders of differing composition is not to be expected.

This method is not suitable for coating powders which have gel times of less than 1 min at the test temperature when characterised according to ISO 8130-6. This method is also not suitable for textured powders.

### 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 8130-2, *Coating powders — Part 2: Determination of density by gas comparison pyknometer (referee method)*

ISO 8130-3, *Coating powders — Part 3: Determination of density by liquid displacement pyknometer*

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

The thermosetting coating powder is pressed in to a pellet of standard size which is allowed to melt and flow down a heated inclined plate. The extent of flow is measured from the initial position of the pellet for a given time.

## 5 Apparatus

Ordinary laboratory apparatus, together with the following:

**5.1 Fan-assisted air circulation oven**, capable of maintaining temperatures up to 250 °C. The circulation fan shall be capable of being turned on and off as required.

**5.2 Plates** with different thicknesses may be used; to compare the same coating powder, then the same plate thickness and substrate shall be used, (see also [Annex A](#)).

Glass plates or metal plates may be used. If metal plates are used, these should be defined with respect to their composition and surface finish. The plates shall be sufficiently rigid so as not to flex during the test. The details of the plates shall be included in the test report. Powder pellet flow shall be in a rolling direction. The tests shall always be performed on an identical substrate and under identical test conditions.

**5.3 Plate assembly**, of suitable metal, that fits inside the oven ([5.1](#)). The assembly shall be capable of carrying one or more of the plates ([5.2](#)) in a horizontal position and at an angle of  $(65 \pm 1)^\circ$  to the horizontal. The plate assembly can be moved to the set angle either by a lever projecting through the side of the oven or manually by accessing via the oven door.

**5.4 Balance**, capable of weighing to 10 mg.

**5.5 Steel pellet-moulding press**, together with a knockout rod, to make pellets of  $(12,5 \pm 0,05)$  mm in diameter and  $(6,5 \pm 0,2)$  mm thick.

**5.6 Ruler**, graduated in millimetres.

## 6 Sampling

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

## 7 Number of determinations

Carry out the determination in duplicate, whereby two consecutive analyses have a variation of less than 5 %.

## 8 Procedure

**8.1** Weigh between 0,5 g and 0,75 g of the sample in the balance ([5.4](#)) to an accuracy of 10 mg. The weighed range shall be the equivalent in grams of half of the coating powder density as specified in ISO 8130-2 or ISO 8130-3.

**8.2** By means of the pellet moulding press ([5.5](#)) compact the pellet into a disc and push the pellet out of the mould with the knockout rod. Weigh the pellet to confirm that its mass is correct to 10 mg.

If there is a delay between the commencement of the test and the preparation of the pellet, protect the sample against moisture absorption by storage in a desiccator or a sealed bag.

**8.3** Unless otherwise agreed, the temperature of the test shall be the recommended stoving temperature. In the absence of this information a temperature of  $(180 \pm 2)^\circ\text{C}$  should be used.

**8.4** Place the plate assembly and plate(s) into the oven set at the appropriate temperature (see [8.3](#)) and allow the assembly to preheat for a minimum period of 15 min with the fan on.

NOTE It can be more convenient to maintain the plate assembly in the oven and carefully load the plate(s) in situ.

**8.5** At the end of the preheating period open the door of the oven. Place the pellet(s) with the concave side facing upwards on the upper end of the plate(s), when the plate(s) and assembly are slightly inclined.

Close the door and switch on the fan again. The oven should not be open for longer than 5 s.

**8.6** Switch the fan off and re-open the door of the oven after 15 s. Incline the plate assembly by  $(65 \pm 1)^\circ$  to the horizontal. Close the door and switch on the fan again. The oven should not be open longer than 5 s. Keep the plate(s) in this position for 15 min. At the end of this period, take the plate(s) from the oven and let them cool down in a horizontal position.

**8.7** Using the ruler (5.6) measure the total length of the pellet flow in millimetres. This is more conveniently undertaken with glass plates by viewing from the reverse side. Record the measurement to the nearest 0,5 mm.

## 9 Precision

No precision data are currently available. Additional information is given in [Annex A](#).

## 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 8130-11:2019;
- c) the substrate used; <https://standards.iteh.ai/catalog/standards/sist/d9c8ab46-330f-4ad3-8170-d2eadb3b2c70/iso-8130-11-2019>
- d) if a metal plate was used, a description of its surface finish and composition (see 5.2);
- e) the test temperature;
- f) the mass of the test sample;
- g) the results of the test (see 8.7);
- h) any deviation from the test method specified;
- i) any unusual features (anomalies) observed during the test;
- j) the date of the test.

## Annex A (informative)

### Information about the precision

A small round robin test was conducted on two coating powders, which showed variability for the same substrate and different substrates with the same thickness – see [Table A.1](#). The reproducibility was not tested.

**Table A.1 — Results of round robin test**

Substrate	Thickness mm	Pellet flow mm			
		Powder A		Powder B	
Glass	1	52	53	37	38
	2	55	55	40	41
	3	63	61	44	44
Aluminium	1	62	64	44	44
	3	61	56	46	46
	10	64	64	44	47
Steel	1	63	68	44	43
	3	66	60	44	44
	4	68	65	43	44



## Bibliography

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

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