INTERNATIONAL STANDARD

ISO 8130-1

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Coating powders —

Part 1:
Determination of particle size distribution by sieving

Poudres pour revêtement —

Partie 1: Détermination de la distribution granulométrique par tamisage

Reference number
ISO 8130-1:1992(E)

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.

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.

International Standard ISO 8130-1 was prepared by Technical Committee ISO/TC 35, *Paints and varnishes*, Sub-Committee SC 9, *General test methods for paints and varnishes.*

ISO 8130 consists of the following parts, under the general title *Coating powders*:

— *Part 1: Determination of particle size distribution by sieving*

— *Part 2: Determination of density by gas comparison pyknometer (referee method)*

— *Part 3: Determination of density by liquid displacement pyknometer*

— *Part 4: Calculation of lower explosion limit*

— *Part 5: Determination of flow properties of a powder/air mixture*

— *Part 6: Determination of gel time of thermosetting coating powders at a given temperature*

— *Part 7: Determination of loss of mass on stoving*

— *Part 8: Assessment of the storage stability of thermosetting powders*

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— *Part 9: Sampling*

Annex A forms an integral part of this part of ISO 8130.

Coating powders —

Part 1:
Determination of particle size distribution by sieving

1 Scope

This part of ISO 8130 specifies a method for the determination of particle size distribution by sieving. It discriminates between particles in the size range from 32 µm to 300 µm.

The method can also be used as an abbreviated procedure, i.e. for the determination of the residue on one single sieve only ("go"/"no go" test).

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 8130. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 8130 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 565:1990, *Test sieves — Metal wire cloth, perforated metal plate and electroformed sheet — Nominal sizes of openings.*

ISO 842:1984, *Raw materials for paints and varnishes — Sampling.*

3 Apparatus

3.1 Test sieves, circular with a sieving area having a diameter of 200 mm. The frame and the mesh of the test sieves shall be of metal. The range of nominal mesh apertures shall be between 32 µm and 300 µm and shall comply with the requirements of ISO 565 for supplementary sizes (see annex A). The test sieve shall be covered with a transparent lid.

The choice of mesh apertures (see annex A) will depend on the circumstances. If the approximate particle size distribution of a sample is known, it is necessary to use only those test sieves that are appropriate to that particle size range. It is also permissible to restrict the choice of test sieves to those that give sufficient data for a specific purpose. Appropriate details shall be agreed on between the interested parties.

3.2 Air-jet sieve apparatus (see figure 1), consisting of a cylindrical casing which contains the test sieve (3.1). In the base of the casing shall be an outlet (to which an extractor fan is connected), and an air inlet to permit the injection of air.

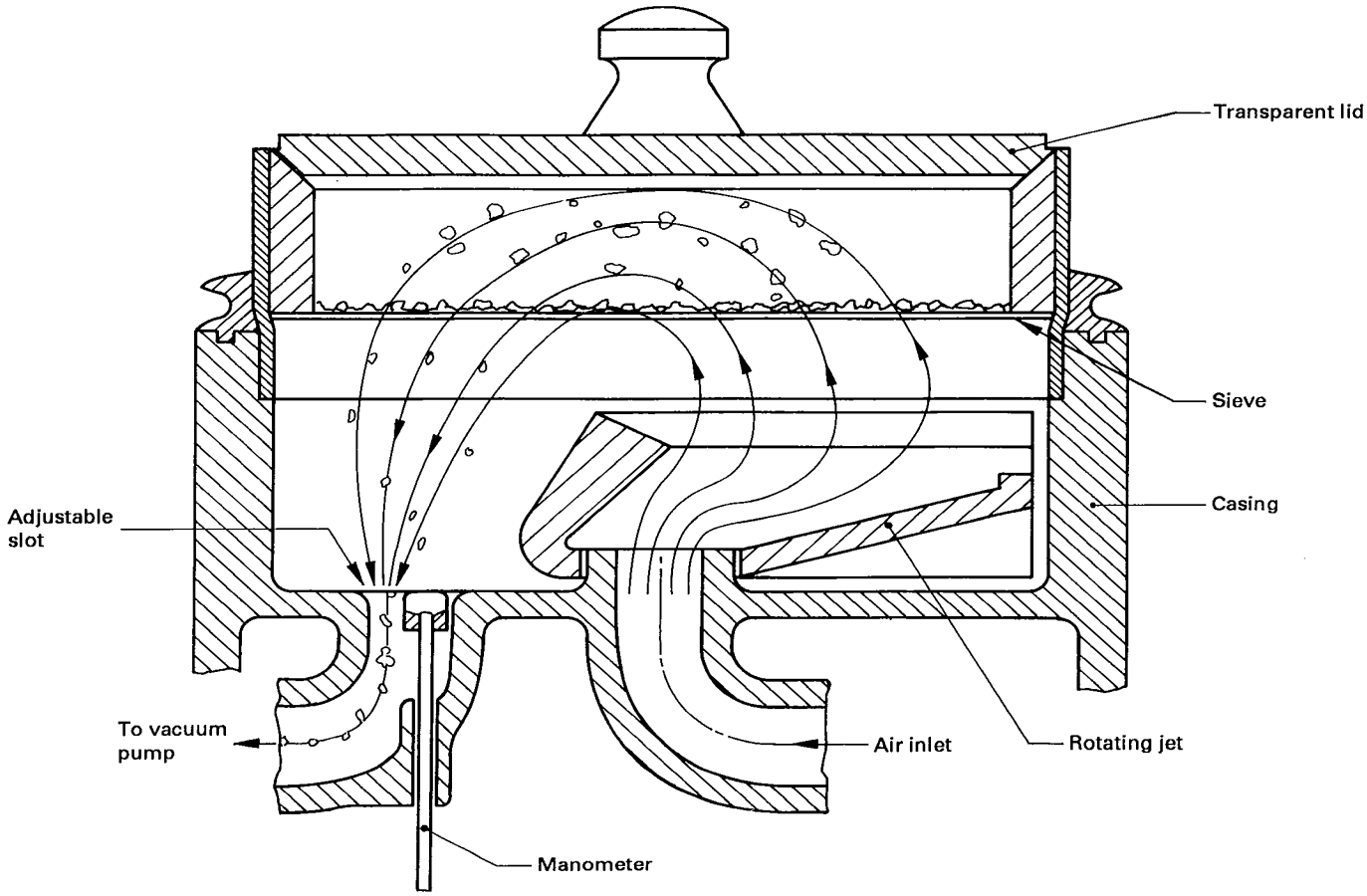
The air inlet is connected to a jet rotating at 20 r/min to 25 r/min and consisting of a slot-shaped nozzle arranged radially beneath and very close to the sieve mesh. When the jet rotates, it blows air continuously through the mesh, preventing the coating powder particles from blocking the test sieve. The air is extracted through the outlet, drawing the finer particles through the sieve.

The flow of air is controlled by adjusting a slot at the outlet.

3.3 Timer (e.g. stopwatch), recording to the nearest 1 s or better. It may be with a switch for disconnecting the motor from the sieve apparatus (3.2).

3.4 Balance, capable of weighing to 0,01 g.

3.5 Mallet, of light construction, with plastics head, suitable for tapping the apparatus to dislodge deposited powder.



NOTE — This diagram illustrates the functioning of the apparatus and is schematic only.

Figure 1 — Air-jet sieve apparatus

3.6 Magnifying glass, of magnification at least × 5.

3.7 Ultrasonic cleaning bath.

4 Sampling

Take a representative sample of the product to be tested, as described in ISO 842.

5 Preparation of the test sieves

5.1 Using the magnifying glass (3.6), check that the test sieve is clean and undamaged and is not blocked by material used in a previous determination.

5.2 If it is necessary to clean the test sieve, clean it using the ultrasonic system (3.7).

6 Procedure

Carry out the determination in duplicate.

6.1 Weigh, to the nearest 0,01 g, the test sieve (3.1) with its transparent lid.

6.2 Weigh, to the nearest 0,01 g, a 20 g test portion of the sample, except when using a test sieve of mesh aperture less than 90 µm where a 10 g test portion is taken.

6.3 Secure the selected test sieve in position in the sieve apparatus (3.2) and transfer the test portion to the test sieve. Secure the transparent lid, reduce the

pressure in the apparatus by (2 ± 0,3) kPa[1)] and initiate the rotation of the nozzle. Unless otherwise specified, operate the apparatus for (300 ± 15) s.

If it can be demonstrated that all the sub-size powder passes through the test sieve within (180 ± 15) s, then it is permissible to use this shorter sieving time, ensuring that the alternative time is noted in the test report. If any material becomes attached to the frame and/or the transparent lid, lightly tap either or both with the mallet (3.5) to dislodge the attached powder.

NOTE 1 Difficulties may be experienced in sieving extremely fine materials. The addition of a suitable, extremely fine sieving aid (pyrogenic silica or pyrogenic alumina may be suitable) to the sample at the level of 0,2 % (based on the initial mass of the test portion) should aid the process. No correction is required for the mass of this additional material as it will pass through the sieve.

6.4 At the end of the test period, allow the air pressure to slowly equalize with that of the room. Remove the lid and the test sieve together with the retained material and weigh to the nearest 0,01 g.

6.5 To determine the particle size distribution by mass determine the mass retained on the test sieve of the smallest aperture chosen as described in the introduction. Repeat the procedure described in 6.1 to 6.4 using a fresh test portion for each size of test sieve, in ascending order, in the range (see 3.1) to be reported.

7 Expression of results

7.1 Calculation

For each test sieve used, calculate the percentage of material retained, R, expressed as a percentage by mass using the equation:

$$R = \frac{m_2 - m_0}{m_1} \times 100$$

where

m_0 is the mass, in grams, of the test sieve and transparent lid;

m_1 is the mass, in grams, of the test portion;

m_2 is the mass, in grams, of the test sieve and transparent lid plus the retained material after the sieving operation.

If the two determinations differ by more than 3 % (absolute), repeat the procedure described in clause 6.

Calculate the mean of two valid determinations and report the result to the nearest integer. Report results from a series of determinations using test sieves of different aperture sizes either in tabular form or graphically.

NOTE 2 For the graphical representation of results, plotting the data as a Rosin-Rammler-Sperling-Bennett diagram (RRSB diagram) is recommended. Extrapolation of data to lower or higher particle sizes may lead to doubtful results. (The RRSB method is one of several ways of representing particle size distribution. Further information may be found in various technical papers related to particle size analysis.)

7.2 Precision

No precision data are currently available.

8 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 part of ISO 8130 (ISO 8130-1);

c) the result for each test sieve as indicated in clause 7;

d) any deviation from the test method specified;

e) the date of the test.

1) 100 kPa = 1 bar

Annex A
(normative)

Nominal sizes of test sieves

(Extracted from ISO 565:1990, table 2)

Table A.1

Supplementary sizes (μm)
Series R 40/3
300
250
212
180
150
125
106
90
75
63
53
45
38
32

UDC 667.62-492.2:667.612:539.215

Descriptors: coatings, powdery materials, paints, tests, grain size analysis, determination, particle size, sieve analysis.

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