
**Plastics — Phenolic resin powder —
Determination of flow distance on a
heated glass plate**

*Plastiques — Résines phénoliques en poudre — Détermination de la
distance d'écoulement sur une plaque de verre chauffée*

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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 8619 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 12, *Thermosetting materials*.

This third edition cancels and replaces the second edition (ISO 8619:1995), which had been revised so that the test device may also be tilted by opening the oven.

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Plastics — Phenolic resin powder — Determination of flow distance on a heated glass plate

1 Scope

1.1 This International Standard specifies a method for the determination of the flow distance of powdered heat-setting phenolic resins for production and control. With reference to tablet formation, test temperature and angle of inclination of the glass plate, measurement of the flow distance involves arbitrarily defined conditions.

1.2 The flow distance is dependent on the reactivity and melt viscosity of the resins. Rapid solidification and high melt viscosity shorten the flow distance.

2 Principle

Tablets are first produced under defined conditions and are placed on a glass plate which has been heated to $(125 \pm 1)^\circ\text{C}$ in a naturally ventilated oven. The plate, with the tablets on it, is kept in the oven for 3 min in the horizontal position and then for 20 min in a tilted position. The flow distance is then measured.

3 Apparatus

3.1 Oven with natural ventilation, capable of maintaining a temperature of $(125 \pm 1)^\circ\text{C}$. Use a spirit level to check that it is perfectly horizontal. The temperature shall be measured in the immediate vicinity of the test tablets.

3.2 Cylindrical tablet press, for producing tablets $(12,5 \pm 0,3)$ mm in diameter and $(4,8 \pm 0,2)$ mm thick.

3.3 Balance, accurate to 1 mg.

3.4 Tilting device, made of metal, which can be manipulated from outside or after opening the oven, to position the glass plate (3.5) either horizontally or at an angle of $60^\circ \pm 1^\circ$ (see Figure 1).

3.5 Glass plate, of a suitable size to fit in the oven, for example length 100 mm to 150 mm, width 60 mm to 120 mm, thickness 2,7 mm to 3 mm. The glass plate shall be absolutely clean, smooth and without scratches. To make sure that the tablets have not become displaced during the experiment, a starting line may be drawn on the plate.

NOTE The starting line is scored on the plate using a glass cutter. It has no influence on the result, and is simply used for precise positioning of the tablets and for measuring the flow distance.

4 Procedure

4.1 In cases of dispute, dry the sample until constant mass is obtained, for example by storing the powdered resin in a desiccator for at least 48 h over phosphorus pentoxide.

NOTE The water content of the sample has a marked influence on the flow distance.

4.2 Weigh, to the nearest 1 mg, 0,500 g of the powdered resin, and pour into the tablet press (3.2) [see Figure 2a)]. Close the press and compress the powder [see Figure 2b)] either using a rubber hammer or a lever handle. Eject the tablet from the mould by removing parts C and D [see Figure 2b)] and by pushing the shaft of part B into part A [see Figure 2c)]. Make two tablets in this way.

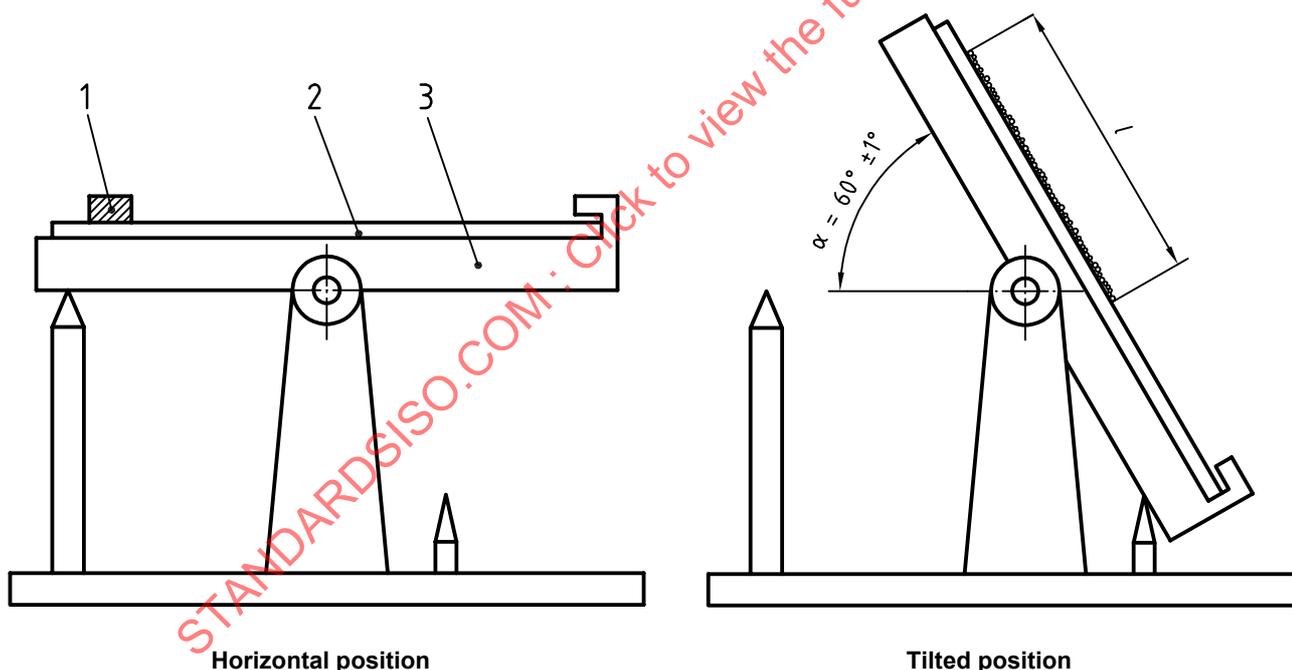
NOTE With resin powders having a high apparent density (those containing inorganic additives, for example), more than 0,500 g of powder may be taken in order to produce a tablet with the required thickness ($4,8 \pm 0,2$ mm).

4.3 Lay the glass plate (3.5) on the tilting device (3.4) in the horizontal position in the oven (3.1), maintained at a temperature of $(125 \pm 1) ^\circ\text{C}$, and heat for at least 60 min. Open the door of the oven and, within 5 s and without removing the plate from the oven, lay the two tablets (see 4.2) flat on the glass, at least 1 cm apart and at least 1 cm away from the side edges and what will be the upper edge when the plate is tilted.

Keep the glass plate with the tablets on it for $3 \text{ min} \pm 3 \text{ s}$ in the horizontal position. Then tilt the device quickly but without jolting the plate, from outside or by opening the oven, within a maximum of 3 s, to an angle of $60^\circ \pm 1^\circ$ (see Figure 1).

4.4 After 20 min in the inclined position, remove the glass plate from the oven and allow it to cool. Then measure for each tablet the flow distance, including the distance corresponding to the tablet diameter, to the nearest 1 mm.

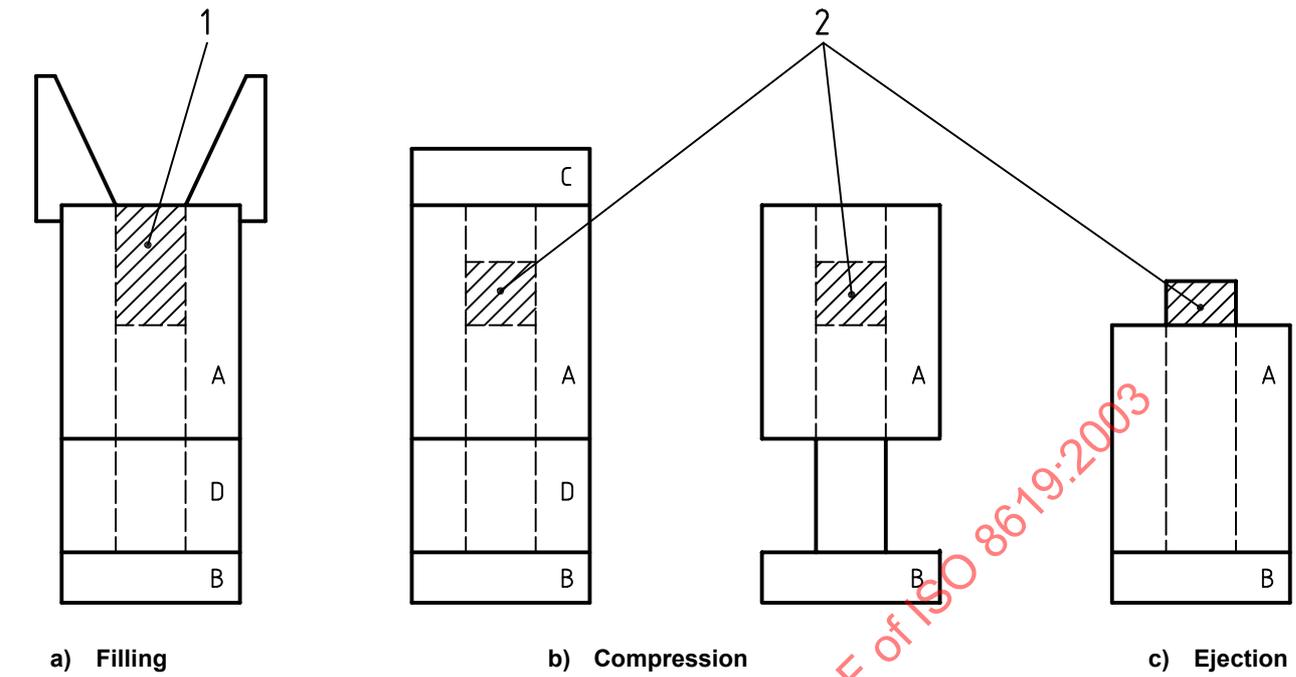
Should a tablet slip after the plate has been tilted to 60° , measure the distance from the point where it started to flow, including tablet diameter. Calculate the arithmetic mean of the two distances. If the measurements differ by more than 5 %, repeat the test.



Key

- 1 resin tablet
- 2 glass plate
- 3 metal support
- l flow distance

Figure 1 — Example of tilting device

**Key**

- 1 powder
2 tablet

Figure 2 — Diagrammatic representation of tablet production

5 Expression of results

Express the result as the arithmetic mean of the two flow distances, in millimetres.

EXAMPLE Flow distance = 43 mm

When the measured distance is 12,5 mm (i.e. the diameter of the tablet) but the pellet has melted, the test result shall be reported as "melt and no flow".

6 Precision

Flow distance > 20 mm:	repeatability	10 %
	reproducibility	10 %
Flow distance ≤ 20 mm:	repeatability	2 mm
	reproducibility	2 mm

7 Test report

The test report shall include the following particulars:

- a) a reference to this International Standard;
- b) all details necessary for complete identification of the sample tested;
- c) whether tilting was carried out from outside or by opening the oven;
- d) the individual test results and their arithmetic mean, as indicated in Clause 5;
- e) a description of any slippage of the tablets.

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