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Plastics — Liquid phenolic resins — Conventional determination of non-volatile matter

Plastiques — Résines phénoliques liquides — Détermination de l'extrait sec conventionnel

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Foreword

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International Standard ISO 8618 was prepared by Technical Committee ISO/TC 61, *Plastics.*

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Plastics — Liquid phenolic resins — Conventional determination of non-volatile matter

1 Scope and field of application

This International Standard specifies a method for the conventional determination of the non-volatile matter of liquid phenolic resins (resols, novolak solutions, etc.). It can be used for commercial products or for resins in their various stages of manufacture.

NOTE — For phenolic resins, the term "non-volatile matter" is based upon arbitrary test conditions (see 4.2, note 1). Results obtained by this method may not agree with the results obtained in industrial applications of these resins.

2 Definition

For the purpose of this International Standard, the following definition is applicable.

non-volatile matter: The percentage residue obtained when the volatile components of a specific mass of a liquid phenolic resin are evaporated under specified conditions of temperature and time.

3 Apparatus

3.1 Small disposable dishes made of aluminium, nickel, stainless steel, tinplate or galvanized sheet metal, with a flat base, an inner diameter at the base of 75 mm and a height of approximately 25 mm.

NOTE — Dishes of different diameters may be used if the mass of the test portion m_1, in grams, is calculated according to the following relation:

$$\frac{m_1}{A} = \frac{3}{4\,412} = 0{,}000\,68\ \text{g/mm}^2$$

where A is the area, in square millimetres, of the dish base.

3.2 Precision balance, accurate to 1 mg.

3.3 Static convection oven with natural ventilation, and with a perforated metal shelf placed at one-third of the height of the oven, and capable of being controlled at the test temperature (see 4.2).

3.4 Desiccator, containing dehydrated calcium chloride or other suitable drying agent.

4 Procedure

4.1 Degrease a small dish (3.1), dry it in the oven (3.3), controlled at 135 °C (or the selected test temperature, see 4.2), and store it in the desiccator (3.4) until used.

Determine the mass (m_0) of the clean dry dish to the nearest 1 mg. Transfer 3,0 ± 0,5 g of completely homogenized resin into the dish and record the mass (m_1), to the nearest 1 mg, of the test portion of resin therein (see the note in 3.1).

4.2 Place the dish at the centre of the shelf in the oven, heated to the preferred test temperature of 135 ± 1 °C. An alternative test temperature (see note 1) may be used and shall be recorded in the test report. Recommended alternative temperatures are 120 ± 1 °C and 150 ± 1 °C (see note 2 and annex).

NOTES

1 The test temperature must be such that the volatile components evaporate without decomposition of the resin. When selecting the temperature, possible reactions between the individual components and polycondensation should also be considered.

2 When testing is performed at 150 °C, a slightly different procedure may be used (dissolving the resin test portion in a solvent). (See the annex.)

4.3 After 1 h ± 5 min at the selected test temperature, remove the dish from the oven, allow it to cool for at least 1 h in the desiccator and determine the mass (m_2), to the nearest 1 mg, of the dish plus the non-volatile matter of the test portion of the resin.

4.4 Make a duplicate determination simultaneously.

NOTE — As the temperature is not the same in all parts of the oven at all times, the two dishes should be placed at the same height and next to one another.

5 Expression of results

5.1 Calculate the non-volatile matter NV, as a percentage by mass, using the equation

$$\text{NV}_{\theta\,^\circ\text{C},\,1\,\text{h}} = \frac{m_2 - m_0}{m_1} \times 100$$

where

m_0 is the mass, in grams, of the dish (see 4.1);

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