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TECHNICAL CORRIGENDUM 1

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Plastics — Phenolic resins — Determination of electrical conductivity of resin extracts

TECHNICAL CORRIGENDUM 1

Plastiques — Résines phénoliques — Détermination de la conductivité électrique des extraits de résine

RECTIFICATIF TECHNIQUE 1

Technical Corrigendum 1 to International Standard ISO 9944:1990 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 12, *Thermosetting materials.*

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Subclause 3.2

Change 20 μS/m to 2 μS/cm.

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Plastiques — Résines phénoliques — Détermination de la conductivité électrique des extraits de résine

Reference number
ISO 9944:1990(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 9944 was prepared by Technical Committee ISO/TC 61, *Plastics*.

International Organization for Standardization
Case Postale 56 • CH-1211 Genève 20 • Switzerland

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Plastics — Phenolic resins — Determination of electrical conductivity of resin extracts

1 Scope

This International Standard specifies a method for the determination of the electrical conductivity of phenolic resin extracts at 23 °C ± 2 °C.

The method is important for applications in which such resins are used as impregnating materials.

2 Principle

An acetone/water mixture is added to a solution of the resin. The precipitate thus produced is allowed to settle, and the conductance of the suspension remaining above the resin is measured. The conductivity is then calculated from the measured conductance.

3 Reagents

3.1 Acetone, reagent grade.

3.2 Water, deionized, conductivity less than or equal to 20 µS/m.

3.3 Acetone/deionized-water mixture, containing 8 volumes of acetone (3.1) and 4 volumes of deionized water (3.2).

4 Apparatus

4.1 Conductivity cell, with known cell constant k.

4.2 Conductance-measuring instrument, capable of measuring conductance to a minimum reading of 1 µS with a precision of 5 %, in the frequency range 50 Hz to 3 000 Hz. Alternatively, a resistance-measuring instrument with the same precision may be used.

4.3 Beaker, nominal capacity 250 ml.

4.4 Magnetic stirrer.

4.5 Balance, scale interval 1 mg.

5 Procedure

5.1 Preparation of test portion

In the case of resin solutions, weigh out 10 g ± 0,05 g of the solution into a 250 ,ml beaker (4.3). In the case of powdered solid resins, take 8 g of the resin and dissolve it in acetone (3.1) in a ratio by mass of 1:1. Weigh out 10 g ± 0,05 g of the resin solution thus obtained into a 250 ml beaker (4.3).

5.2 Determination

Add 10 g of acetone (3.1) to the test portion prepared in 5.1. Stir the mixture with a magnetic stirrer (4.4) until the liquid is homogeneous.

With vigorous stirring, add 100 ml of acetone/deionized-water mixture (3.3) in drops. Adjust the dropping rate so that the resin does not coagulate but initially forms an emulsion. When all the acetone/water mixture has been added, stir for a further 3 min and then allow to settle for 3 min. Pour off the milky-turbid suspension above the resin into the conductivity cell (4.1) and bring the temperature of the suspension to 23 °C ± 2 °C. Measure the conductance of the suspension, but not for longer than 3 min.

WARNING — When measurements are made, persistent contamination of the measuring cell may occur. For this reason, the cell shall be cleaned and recalibrated before each measurement. Cleaning may be done by boiling in concentrated acid or as described in *Anal. Chem.* Vol. 51, May 1978, page 741.

5.3 Alternative method

In special cases, the following method may be used.

Place 8,0 g of resin in a 100 ml polyethylene vessel. Add 80 ml of deionized water (3.2) and extract for 20 h at 95 °C in an oven. Cool the sample to room temperature and measure the conductance (see 5.2).

5.4 Blank test

Carry out a blank test under the same conditions with the same amounts of reagents, but omitting the resin.

6 Expression of results

6.1 Calculation

The conductivity γ of the phenolic resin solution, expessed in microsiemens per centimetre, is given by the equation

$$\gamma = k(G_1 - G_0)$$

where

k is the cell constant, expressed in reciprocal centimetres;

G_0 is the conductance, in microsiemens, of the blank test solution (5.4);

G_1 is the conductance, in microsiemens, of the resin suspension (see 5.2).

Report the conductivity in microsiemens per centimetre, rounded to one decimal place.

6.2 Precision

Repeatability (one operator, one apparatus): 10 %. Reproducibility (several operators, several sets of apparatus): 10 %.

7 Test report

The test report shall include the following information:

a) a reference to this International Standard;

b) the type, identification and date of manufacture of the phenolic resin tested;

c) the date of sampling;

d) the conductivity of the phenolic resin solution and the conductances of the resin suspension and the blank test solution;

e) any deviation, by agreement or otherwise, from the procedure specified;

f) the date of the test.

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