INTERNATIONAL STANDARD

ISO 8989

Second edition
1995-12-15

Plastics — Liquid phenolic resins — Determination of water miscibility

Plastiques — Résines phénoliques liquides — Détermination de la tolérance à l'eau

Reference number
ISO 8989:1995(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 8989 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 12, *Thermosetting materials*.

This second edition cancels and replaces the first edition (ISO 8989:1988) which has been revised so that the test is carried out with grade 3 water as defined in ISO 3696 rather than distilled water.

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Printed in Switzerland

Plastics — Liquid phenolic resins — Determination of water miscibility

1 Scope

This International Standard specifies a method for the determination of the miscibility of water with liquid phenolic resins.

Water miscibility is dependent on the conditions and on the degree of condensation of the resin.

2 Normative references

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

ISO 385-1:1984, *Laboratory glassware — Burettes — Part 1: General requirements.*

ISO 385-2:1984, *Laboratory glassware — Burettes — Part 2: Burettes for which no waiting time is specified.*

ISO 654:1980, *Short solid-stem thermometers for precision use.*

ISO 3696:1987, *Water for analytical laboratory use — Specification and test methods.*

3 Principle

Determination of the percent by mass of water needed to obtain turbidity in the liquid phenolic resin.

The determination is performed at a temperature of 23 °C ± 0,1 °C.

Water is added to the resin until turbidity persists for a minimum of 30 s after agitation.

4 Reagent

Water, grade 3 as defined in ISO 3696.

5 Apparatus

5.1 Beaker, of capacity 100 ml, or a larger-capacity container, depending upon the degree of water miscibility (see 7.2, second paragraph).

5.2 Thermometer, short solid-stem type, range 19 °C to 31 °C, graduated in 0,1 °C divisions:

STC/0,1/19/31 in accordance with ISO 654

5.3 Magnetic stirrer.

5.4 Burette, nominal capacity 50 ml, graduated in 0,1 ml divisions, conforming with the requirements of class A of ISO 385-1 and ISO 385-2.

5.5 Analytical balance, accurate to 0,01 g.

6 Conditioning and test temperature

The determination shall be performed at 23 °C ± 0,1 °C. Prior to testing, the resin and grade 3 water (clause 4) shall be conditioned at that temperature.

7 Procedure

7.1 Preliminary test

When the water miscibility of the resin to be tested is unknown, a preliminary test shall be performed to determine its approximate value.

7.2 Actual test

Based on the result of the preliminary determination (7.1), a test portion of 10 g to 50 g is chosen for the actual test.

Weigh the test portion, to the nearest 0,01 g, into the 100 ml beaker (5.1). If the expected water miscibility (i.e. that determined in 7.1, if it was unknown) exceeds 900 % (*m*/*m*), use a container of larger volume.

Verify, using the thermometer (5.2), that the temperature of the resin is 23 °C ± 0,1 °C.

Place the beaker on the magnetic stirrer (5.3).

By means of the burette (5.4), add grade 3 water, also preconditioned at 23 °C ± 0,1 °C, in accordance with the following procedure:

— the first addition shall be approximately 50 % of the quantity expected to be required to reach the miscibility limit (i.e. approximately 50 % of that determined in the preliminary test if the miscibility was unknown);

— subsequent additions shall be approximately 10 % of the quantity expected to be required, until turbidity occurs and vanishes again upon stirring;

— verify with the thermometer that the temperature of the mixture is 23 °C ± 0,1 °C, then resume the addition of water dropwise until the turbidity persists for at least 30 s.

Record the volume (V ml) of water added.

NOTE 1 For some resins, it may be of interest to measure both the opalescent turbidity and the opaque turbidity. (In the latter case, the mixture becomes milky or precipitation occurs.) If the opaque turbidity is also measured, it will be necessary to record separately the volume V_1 of water required to produce opalescent turbidity and the volume V_2 required to produce opaque turbidity.

8 Expression of results

The miscibility of the resin with water WM, expressed as a percentage by mass, is given by the formula

$$\frac{V}{m} \times 100$$

where

V is the volume, in millilitres, of water added (i.e. V g if it is assumed that the density of water is 1 kg/l at 23 °C);

m is the mass, in grams, of the test portion.

NOTE 2 It is also possible to express the results as the ratio $1 : x$ where $x = WM/100$.

9 Test report

The test report shall include the following information:

a) a reference to this International Standard;

b) all details necessary for complete identification of the resin tested;

c) the test result, calculated in accordance with clause 8;

d) the date of the test.

NOTE 3 If both opalescent turbidity and opaque turbidity were determined, as discussed in 7.2, note 1, there will be two results.

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