INTERNATIONAL STANDARD

ISO 1802

Third edition
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Natural rubber latex concentrate — Determination of boric acid content

Latex concentré de caoutchouc naturel — Dosage de l'acide borique

Reference number
ISO 1802:1992(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 1802 was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*, Sub-Committee SC 3, *Raw materials (including latex) for use in the rubber industry*.

This third edition cancels and replaces the second edition (ISO 1802:1985), of which it constitutes a minor revision.

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Natural rubber latex concentrate — Determination of boric acid content

1 Scope

This International Standard specifies a procedure for the determination of boric acid in natural rubber latex concentrate.

The procedure is not necessarily suitable for latices from natural sources other than *Hevea brasiliensis* or for latices of synthetic rubber, compounded latex, vulcanized latex or artificial dispersions of rubber.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the edition indicated was 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 edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 123:1985, *Rubber latex — Sampling*.

3 Principle

The pH of a test portion containing about 0,02 g of boric acid is adjusted to 7,50, at which value boric acid exists substantially in the undissociated form. Mannitol is then added in excess to form the strongly acidic boric-acid/mannitol complex. Hydrogen ions equivalent to the boric acid present in the latex are thus liberated and the pH falls. Boric acid is determined from the amount of alkali required to restore the pH of the test portion to 7,50.

4 Reagents

During the analysis, use only reagents of recognized analytical quality and only distilled water or water of equivalent purity.

4.1 Hydrochloric acid, 2 % solution (m/m).

4.2 Stabilizer solution, containing 5 % (m/m) of a suitable non-ionic stabilizer of the ethylene oxide condensate type.

4.3 Mannitol.

4.4 Boric acid solution.

Weigh, to the nearest 1 mg, about 5 g of boric acid (H_3BO_3), dissolve in water and dilute to 1 000 cm^3 in a volumetric flask.

4.5 Sodium hydroxide, standard solution, $c(NaOH) \approx 0{,}05$ mol/dm^3.

4.5.1 Standardization of the solution

Using a pipette (5.2), introduce 5 cm^3 of the boric acid solution (4.4) into a 250 cm^3 beaker. Add 2 cm^3 of the stabilizer solution (4.2) and 50 cm^3 of water. If the pH of the solution, measured using the pH-meter (5.1), exceeds 5,5, add hydrochloric acid solution (4.1), drop by drop, with constant stirring, to reduce the pH to a value between 5,5 and 2,5. Allow the solution to stand for 15 min. Add sodium hydroxide solution (4.5) from a burette (5.3), with constant stirring, until the pH is 7,50. Add 4 g of the mannitol (4.3) with continued stirring. The pH falls. Titrate accurately with sodium hydroxide solution from the burette (5.3) and record the volume of solution required to restore the pH to 7,50.

4.5.2 Calculation of the concentration

Calculate the concentration c, expressed in moles per cubic decimetre, of the sodium hydroxide solution using the formula

$$0{,}081 \times \frac{m}{V_1}$$

where

m is the mass, in grams, of boric acid in 1 000 cm^3 of boric acid solution (4.4);

V_1 is the volume, in cubic centimetres, of sodium hydroxide solution required to restore the pH to 7,50.

5 Apparatus

Ordinary laboratory apparatus and

5.1 pH-meter, capable of measuring the pH found during the test to the nearest 0,01 units.

5.2 Pipettes, of capacity 2 cm^3, 5 cm^3 and 50 cm^3.

5.3 Burettes, of suitable capacity.

6 Sampling

Carry out sampling in accordance with one of the methods specified in ISO 123.

7 Procedure

Weigh, to the nearest 0,1 g, about 10 g of latex concentrate into a 250 cm^3 beaker. Add 2 cm^3 of the stabilizer solution (4.2) and 50 cm^3 of water. Add hydrochloric acid solution (4.1), drop by drop, with constant stirring, until the pH of the latex concentrate, measured using the pH-meter (5.1), is below 5,5 and above 2,5. Allow to stand for 15 min. Adjust the pH to 7,50 by adding sodium hydroxide solution (4.5) from a burette (5.3), with constant stirring. Add 4 g of the mannitol (4.3) with continued stirring. The pH falls. Titrate accurately with sodium hydroxide solution from the burette (5.3), and record the volume of solution required to restore the pH to 7,50.

NOTE 1 The pH falls gradually as the mannitol dissolves.

8 Expression of results

Calculate the boric acid (H_3BO_3) content of the latex concentrate, expressed as a percentage by mass, using the formula.

$$\frac{6{,}18\ cV_2}{m_0}$$

where

c is the actual concentration, expressed in moles per cubic decimetre, of the sodium hydroxide solution (4.5), calculated in accordance with 4.5.2;

V_2 is the volume, in cubic centimetres, of sodium hydroxide solution required to restore the pH of the latex to 7,50;

m_0 is the mass, in grams, of the latex concentrate test portion.

A difference of 0,01 % (m/m) boric acid between the results of duplicate determinations shall not be considered significant.

9 Test report

The test report shall include the following particulars:

a) a reference to this International Standard;

b) all details necessary for identification of the test sample;

c) the results, and the units in which they have been expressed;

d) any unusual features noted during the determination;

e) any operation not included in this International Standard or in the International Standard to which reference is made, as well as any operation regarded as optional.

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