International Standard 1802

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION•МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ•ORGANISATION INTERNATIONALE DE NORMALISATION

Natural rubber latex concentrate — Determination of boric acid content

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

Second edition — 1985-11-15

UDC 678.031 : 543.852 : 546.273-325 **Ref. No. ISO 1802-1985 (E)**

Descriptors : rubber, natural rubber, latex, chemical analysis, determination of content, boric acid.

Price based on 2 pages

Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 1802 was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*.

ISO 1802 was first published in 1974. This second edition cancels and replaces the first edition, of which it constitutes a minor revision.

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

Printed in Switzerland

Natural rubber latex concentrate — Determination of boric acid content

1 Scope and field of application

This International Standard specifies a procedure for the determination of boric acid in natural rubber latex concentrate which contains preservative agents and which has been prepared by some type of concentration process.

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 Principle

The pH of a test portion containing about 0,02 g of boric acid is adjusted to 7,5 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 7,5.

3 Reagents

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

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

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

3.3 Mannitol.

3.4 Boric acid solution.

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

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

3.5.1 Standardization of the solution

Using a pipette (4.2), introduce 5 cm^3 of the boric acid solution (3.4) into a 250 cm^3 beaker. Add 2 cm^3 of the stabilizer solution (3.2) and 50 cm^3 of water. If the pH of the solution, measured using the pH-meter (4.1), exceeds 5,5, add the hydrochloric acid solution (3.1), 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 the sodium hydroxide solution (3.5) from a burette (4.3), with constant stirring, until the pH is 7,50. Add 4 g of the mannitol (3.3) with continued stirring. The pH falls. Again add sodium hydroxide from the burette and record the volume of solution required to restore the pH to 7,50.

3.5.2 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 (3.4);

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

4 Apparatus

Ordinary laboratory apparatus and

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

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

4.3 Burettes, of suitable capacity.

5 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 (3.2) and 50 cm^3 of water. Add the hydrochloric acid solution (3.1), drop by drop, with constant stirring, until the pH of the latex concentrate, measured using the pH-meter (4.1), is below 5,5 and above 2,5. Allow to stand for 15 min. Adjust the pH to 7,50 by adding the sodium hydroxide solution (3.5) with constant stirring. Add 4 g of the mannitol (3.3) with continued stirring. The pH falls. Again add the sodium hydroxide and record the volume of solution required to restore the pH to 7,50.

6 Expression of results

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

$$\frac{6{,}18\ c\ V_2}{m_0}$$

where

c is the actual concentration, expressed in moles per cubic decimetre, of the sodium hydroxide solution (3.5), calculated in accordance with 3.5.2;

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 sample.

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

7 Test report

The test report shall include the following particulars:

a) reference to this International Standard;

b) identification of the test sample;

c) the results and the method of expression used;

d) any unusual features noted during the determination;

e) any operation not included in this International Standard, or regarded as optional.