INTERNATIONAL STANDARD 1802

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Natural rubber latex — Determination of boric acid

Latex de caoutchouc naturel — Dosage de l'acide borique

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FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO Member Bodies). The work of developing International Standards is carried out through ISO Technical Committees. Every Member Body interested in a subject for which a Technical Committee has been set up 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.

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.

Prior to 1972, the results of the work of the Technical Committees were published as ISO Recommendations; these documents are now in the process of being transformed into International Standards. As part of this process, Technical Committee ISO/TC 45 has reviewed ISO Recommendation R 1802 and found it suitable for transformation. International Standard ISO 1802 therefore replaces ISO Recommendation R 1802-1970.

ISO Recommendation R 1802 was approved by the Member Bodies of the following countries :

Australia	India	Sweden
Austria	Israel	Switzerland
Brazil	Italy	Turkey
Czechoslovakia	Netherlands	United Kingdom
Egypt, Arab Rep. of	New Zealand	U.S.A.
France	Poland	U.S.S.R.
Germany	South Africa, Rep. of	Yugoslavia
Greece	Spain	
Hungary	Sri Lanka	

No Member Body expressed disapproval of the Recommendation.

No Member Body disapproved the transformation of ISO/R 1802 into an International Standard.

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Natural rubber latex — Determination of boric acid

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies a procedure for the determination of boric acid in natural rubber latex which contains preservative agents and which has been submitted to 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 quantity of latex 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 latex to 7,5.

3 REAGENTS

All reagents shall be of recognized analytical reagent quality and distilled water or water of equivalent purity shall be used whenever water is specified.

3.1 Sodium hydroxide, approximately 0,05 N solution.

The solution shall be standardized by titration with boric acid solution using the following procedure :

Pipette 5 ml of the boric acid solution (3.5) into a 250 ml beaker. Add 2 ml of stabilizer solution (3.3) and 50 ml of water. If the pH of the solution, measured electrometrically, exceeds 5,5, add hydrochloric acid solution (3.2), 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 (3.1) from a burette, with constant stirring, until the pH is 7,50. Add 4 g of mannitol (3.4) 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.

The normality, T, of the sodium hydroxide solution is given by the formula :

$$T = 0{,}081 \frac{m}{V_1}$$

where

m is the mass, in grams, of boric acid in 1 000 ml of boric acid solution;

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

3.2 Hydrochloric acid, 2 % solution.

3.3 Stabilizer solution, containing 5 % of a suitable non-ionic stabilizer of the ethylene oxide condensate type.

3.4 Mannitol.

3.5 Boric acid solution.

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

4 PROCEDURE

Weigh about 10 g of latex to the nearest 0,1 g in a 250 ml beaker. Add 2 ml of stabilizer solution (3.3) and 50 ml of water. Add dilute hydrochloric acid (3.2) drop by drop, with constant stirring, until the pH of the latex, measured electrometrically, 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 (3.1) with constant stirring. Add 4 g of mannitol (3.4) with continued stirring. The pH falls. Again add sodium hydroxide and record the volume of solution required to restore the pH to 7,50.

5 EXPRESSION OF RESULTS

The boric acid (H_3BO_3) content of the latex is given, as a percentage by mass, by the formula :

$$\frac{6{,}18 \times T \times V_2}{m_0}$$

where

T is the normality of the sodium hydroxide solution;

V_2 is the volume, in millilitres, 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 sample.

A difference of 0,01 % boric acid between the results of duplicate determinations should not be considered significant.

NOTE – If the solutions are not of the exact normality stated, appropriate correction factors shall be used in the calculations.

6 TEST REPORT

The test report shall include the following particulars :

a) the reference of the method used;

b) the results and the method of expression used;

c) any unusual features noted during the determination;

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