BS 6057 : Part 3 : Section 3.12 : 1984
ISO 1802-1974

UDC 678.031 : 543.24 : 546.273–325

British Standard

Rubber latices

Part 3. Methods of test
Section 3.12 Determination of boric acid content of natural rubber latices

[ISO title: Natural rubber latex – Determination of boric acid]

Latex de caoutchouc
Partie 3. Méthodes d'essai
Section 3.12 Dosage de l'acide borique du latex de caoutchouc naturel

Kautschuklatex
Teil 3. Prüfverfahren
Abschnitt 3.12 Bestimmung des Borsäuregehalts in Naturkautschuklatex

NOTE. Attention is drawn to BS 6057 : Part 0 'General introduction', issued separately.

National foreword

This Section of BS 6057 is identical with ISO 1802-1974 'Natural rubber latex – Determination of boric acid' published by the International Organization for Standardization (ISO) and confirmed in 1979. It supersedes method 14 of BS 1672 : 1972 'Methods of testing natural rubber latices', to which it is technically equivalent.

Terminology and conventions. The text of the international standard has been approved as suitable for publication as a British Standard without deviation. Some terminology and certain conventions are not identical with those used in British Standards; attention is drawn especially to the following.

The comma has been used as a decimal marker. In British Standards it is current practice to use a full point on the baseline as the decimal marker.

Wherever the words 'International Standard' appear, referring to this standard, they should be read as 'British Standard'.

Additional information. Water complying with BS 3978 'Water for laboratory use' is suitable for use in this determination (see clause **3**).

A volumetric flask complying with BS 1792 'Specification for one-mark volumetric flasks' is recommended for use in the preparation of the boric acid solution (see **3.5**).

Compliance with a British Standard does not of itself confer immunity from legal obligations.

British Standards Institution

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.

Publications referred to

See national foreword.

BS 6057 : Part 3 : Section 3.12 : 1984
ISO 1802-1974

This British Standard, having been prepared under the direction of the Rubber Standards Committee, was published under the authority of the Board of BSI and comes into effect on
31 January 1984.

ISBN 0 580 13592 6

The Committees responsible for this British Standard are shown in Part 0.

The following BSI references relate to the work on this standard:
Committee reference RUC/38
Draft (ref. 81/55702) announced in *BSI News* October 1981

Amendments issued since publication

Amd. No.	Date of issue	Text affected

BS 6057 : Part 3 : Section 3.12 : 1984 ISO 1802-1974

British Standards Institution · 2 Park Street London W1A 2BS · Telephone 01-629 9000 · Telex 266933

8401–2–1.3k–B

RUC/38

Publications referred to

See national foreword.

BS 6057 : Part 3 : Section 3.12 : 1984
ISO 1802-1974

This British Standard, having been prepared under the direction of the Rubber Standards Committee, was published under the authority of the Board of BSI and comes into effect on
31 January 1984.

ISBN 0 580 13592 6

The Committees responsible for this British Standard are shown in Part 0.

The following BSI references relate to the work on this standard:
Committee reference RUC/38
Draft (ref. 81/55702) announced in *BSI News* October 1981

Amendments issued since publication

Amd. No.	Date of issue	Text affected

BS 6057 : Part 3 :
Section 3.12 : 1984
ISO 1802-1974

British Standards Institution · 2 Park Street London W1A 2BS · Telephone 01-629 9000 · Telex 266933

8401–2–1.3k–B

RUC/38