IS 3708 (Part 7) : 2005
ISO 506 : 1992

भारतीय मानक

प्राकृतिक रबड़ लैटेक्स की परीक्षण पद्धतियाँ

भाग 7 वाष्पशील वसा-अम्ल संख्या ज्ञात करना

(दूसरा पुनरीक्षण)

Indian Standard

METHODS OF TEST FOR NATURAL RUBBER LATEX

PART 7 DETERMINATION OF VOLATILE FATTY ACID NUMBER

(Second Revision)

ICS 83.040.10

468

BUREAU OF INDIAN STANDARDS
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NEW DELHI 110002

Indian Standard

METHODS OF TEST FOR NATURAL RUBBER LATEX

PART 7 DETERMINATION OF VOLATILE FATTY ACID NUMBER

(Second Revision)

1 Scope

This International Standard specifies a method for the determination of the volatile fatty acid number of natural rubber latex concentrate.

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

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 indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

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

ISO 124:1992, *Rubber latices — Determination of total solids content.*

ISO 126:1989, *Natural rubber latex concentrate — Determination of dry rubber content.*

3 Definition

For the purposes of this International Standard, the following definition applies.

3.1 volatile fatty acid (VFA) number of latex concentrate: The number of grams of potassium hydroxide equivalent to the volatile fatty acids in latex concentrate containing 100 g of total solids.

NOTE 1 If substances have been added to the latex which produce volatile acids on acidification with sulfuric acid, the volatile fatty acid number is high and does not represent the volatile fatty acid content without correction.

4 Principle

A test portion is coagulated with ammonium sulfate and a portion of the resultant serum is separated and acidified with sulfuric acid. The acidified serum is steam-distilled and the volatile acids present in the test portion are determined by titration of the distillate with a standard volumetric barium hydroxide solution.

5 Reagents

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

5.1 Ammonium sulfate, approximately 30 % (*m*/*m*) solution.

5.2 Sulfuric acid, approximately 50 % (*m*/*m*) solution.

5.3 Barium hydroxide, standard volumetric solution, $c[Ba(OH)_2] = 0{,}005$ mol/dm^3, standardized by titration with potassium hydrogen phthalate and stored in the absence of carbon dioxide.

5.4 Indicator solution: either bromothymol blue or phenolphthalein solution, 0,5 % (*m*/*m*) in a mixture of approximately equal volumes of ethanol and water.

6 Apparatus

Ordinary laboratory apparatus and

6.1 Steam-jacketed distillation apparatus (Markham still), conforming essentially to figure 1. As an alternative to the one-piece apparatus illustrated, a ground-glass joint may be inserted between the distillation vessel and the condenser.

6.2 Steam-bath, or

6.3 Water-bath, capable of being maintained at a nominal temperature of 70 °C.

6.4 Pipettes, of capacity 5 cm^3, 10 cm^3, 25 cm^3 and 50 cm^3.

6.5 Burette, of suitable capacity.

7 Sampling

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

8 Procedure

8.1 If the total solids content and dry rubber content of the latex concentrate are not known, determine them in accordance with ISO 124 and ISO 126, respectively.

8.2 Into a beaker weigh, to the nearest 0,1 g, about 50 g of latex concentrate. Accurately add 50 cm^3 of the ammonium sulfate solution (5.1) from a pipette (6.4), while stirring the latex concentrate. Either place the beaker on the steam-bath (6.2) or in the water-bath (6.3), maintained at 70 °C, and continue stirring the latex concentrate until it coagulates. Cover the beaker with a watch-glass and leave it on or in the bath for a total period of 15 min. Decant the serum which exudes through a dry filter paper. Transfer the coagulum to a mortar and press out more serum by kneading it with a pestle. Filter this serum through the same filter. Pipette 25 cm^3 of the filtered serum into a dry 50 cm^3 conical flask and acidify it by accurately adding 5 cm^3 of the sulfuric acid solution (5.2). Mix well by swirling the flask.

With certain latex concentrates, in particular those preserved with potassium hydroxide, a fine precipitate may form during the acidification step. This precipitate shall be removed by filtration through a fresh dry filter paper before proceeding with the distillation process.

Pass steam through the apparatus (6.1) for at least 15 min. With steam passing through the outer jacket of the apparatus (steam outlet open), introduce into the inner tube 10 cm^3 of the acidified serum by pipette (6.4). If foaming is a difficulty, 1 drop of a suitable antifoaming agent may be added. Place a 100 cm^3 graduated cylinder under the tip of the condenser to receive the distillate. Partially close the steam outlet to divert steam into the inner tube. Pass steam gently at first, then fully close the steam outlet and continue distilling at a rate of 3 cm^3/min to 5 cm^3/min until 100 cm^3 of distillate has been collected.

Transfer the distillate to a 250 cm^3 conical flask and eliminate any dissolved carbon dioxide from the distillate by passing through it a stream of air free from carbon dioxide at a rate of 200 cm^3/min to 300 cm^3/min for approximately 3 min. Titrate with the barium hydroxide solution (5.3), using one of the indicators specified (5.4).

8.3 Carry out a duplicate determination (see 8.2) with a fresh 50 g test portion of latex concentrate.

9 Expression of results

Calculate the volatile fatty acid (VFA) number using the formula

$$\left[\frac{134{,}64cV}{m\,TSC}\right] \times \left[50 + \frac{m(100 - DRC)}{100\rho}\right]$$

where

c is the actual concentration, expressed in moles per cubic decimetre, of the barium hydroxide solution (5.3);

V is the volume, in cubic centimetres, of barium hydroxide solution required to neutralize the distillate;

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

DRC is the dry rubber content, expressed as a percentage by mass, of the latex concentrate;

TSC is the total solids content, expressed as a percentage by mass, of the latex concentrate;

ρ is the density, in megagrams per cubic metre, of the serum[1];

134,64 is a factor derived from the relative molecular mass of potassium hydroxide, its equivalence to barium hydroxide and those parts of the serum acidified and distilled.

Repeat the test if the results of the duplicate determinations do not agree to

— within 0,01 units when the actual VFA number is 0,10 units or less;

— within 10 % when the actual VFA number is greater than 0,10 units.

10 Test report

The test report shall include the following particulars:

a) a reference to this International Standard;

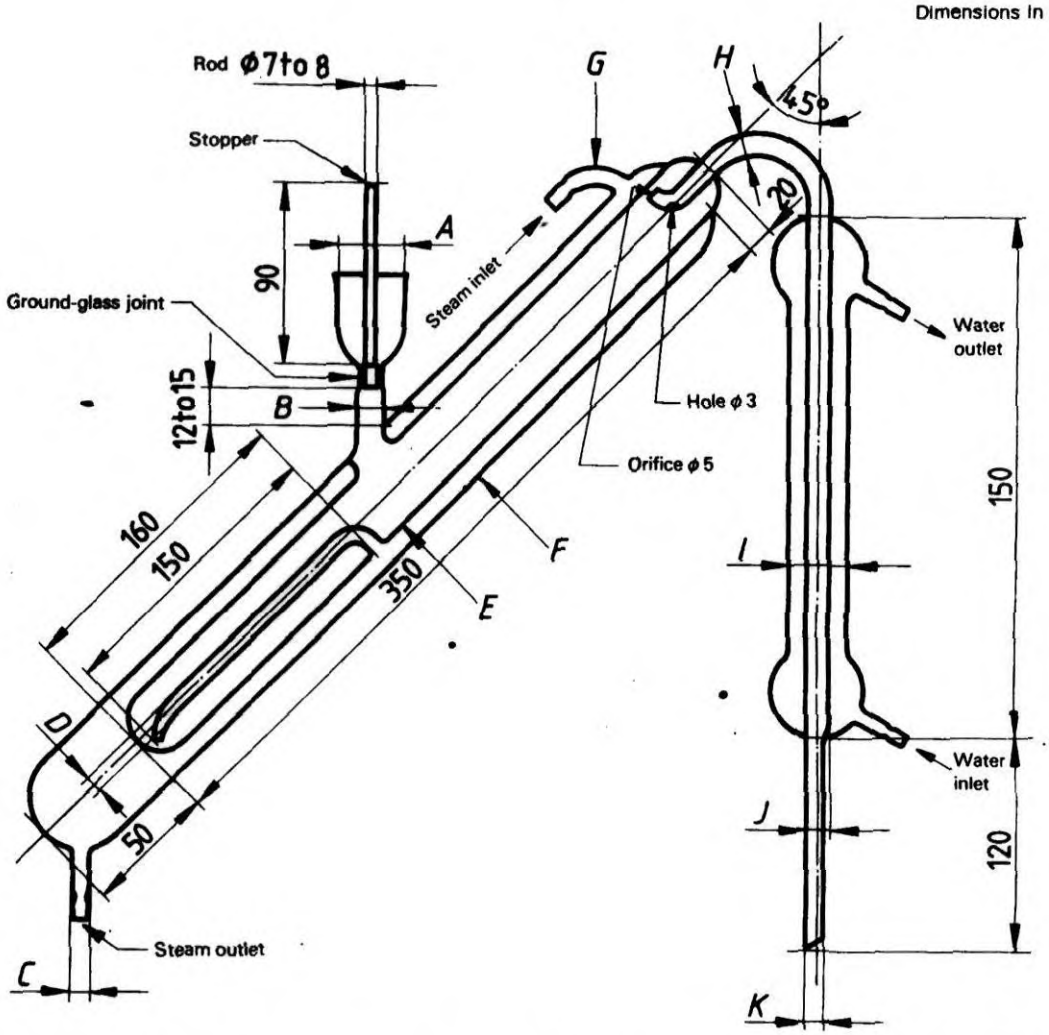
b) all details necessary for the identification of the test sample;

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

d) any unusual features noted during the determination;

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

Dimensions in millimetres



Symbol	*A*	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*	*K*
External diameter	29 to 32	13 to 14	9 to 10	5 to 6	25 to 27	44 to 48	9 to 10	15 to 17	20 to 22	11 to 12	9 to 10
Wall thickness	1 to 1,5	1 to 1,5	0,75 to 1,25	0,75 to 1,25	1 to 1,5	1 to 2	0,75 to 1,25	1,5 to 2	1 to 1,5	0,75 to 1,25	0,75 to 1,25

Figure 1 — Steam-jacketed distillation apparatus (Markham still)

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This Indian Standard has been developed from Doc: No. **PCD 13 (2172).**

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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NATIONAL FOREWORD

This Indian Standard (Part 7) (Second Revision) which is identical with ISO 506 : 1992 'Rubber latex, natural, concentrate — Determination of volatile fatty acid number' issued by the International Organization for Standardization (ISO) was adopted by the Bureau of Indian Standards on the recommendations of the Rubber and Rubber Products Sectional Committee and approval of the Petroleum, Coal and Related Products Division Council.

The text of ISO Standard has been proposed to be approved as suitable for publication as an Indian Standard without deviations. Certain conventions are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

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

b) Comma (,) has been used as a decimal marker while in Indian Standards, the current practice is to use a point (.) as the decimal marker.

The Technical Committee responsible for the preparation of this standard has reviewed the provisions of the following International Standards and has decided that they are acceptable for use in conjunction with this standard:

International Standard	*Title*
ISO 123 : 1985	Rubber latex — Sampling
ISO 124 : 1992	Rubber latices — Determination of total solids content
ISO 126 : 1989	Natural rubber latex concentrate — Determination of dry rubber content

In reporting the results of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'.