INTERNATIONAL STANDARD 506

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

Natural rubber latex — Determination of volatile fatty acid number

Latex de caoutchouc naturel — Détermination de l'indice d'acide gras volatil

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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.

International Standard ISO 506 was drawn up by Technical Committee ISO/TC 45, *Rubber and rubber products*, and circulated to the Member Bodies in July 1972.

It has been approved by the Member Bodies of the following countries :

Australia	Ireland	Spain
Austria	Israel	Sri Lanka
Belgium	Italy	Sweden
Czechoslovakia	Malaysia	Switzerland
Egypt, Arab Rep. of	Netherlands	Thailand
France	New Zealand	Turkey
Germany	Poland	United Kingdom
Hungary	Romania	U.S.A.
India	South Africa, Rep. of	

No Member Body expressed disapproval of the document.

This International Standard cancels and replaces ISO Recommendation R 506-1966.

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Natural rubber latex — Determination of volatile fatty acid number

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies a method for the determination of the volatile fatty acid number of natural rubber latex which contains preservative agents and which has been submitted to some type of concentration process.

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 REFERENCES

ISO 123, *Rubber latices — Sampling.*

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

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

3 DEFINITION

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

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

4 PRINCIPLE

The latex is coagulated with ammonium sulphate and the resultant serum is separated and acidified with sulphuric acid. The serum is steam-distilled and the volatile acids (mainly acetic acid) present in the latex are determined by acidimetric titration of the distillate.

5 REAGENTS

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

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

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

5.3 Barium hydroxide, 0,01 N solution, 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 % in a mixture of approximately equal volumes of ethanol and water.

6 APPARATUS

Ordinary laboratory apparatus and

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

7 SAMPLING

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

8 PROCEDURE

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

Into a beaker weigh, to the nearest 0,1 g, about 50 g of latex. Accurately add 50 ml of the ammonium sulphate solution (5.1) while stirring the latex. Either place the beaker on a steam bath or immerse the beaker in a 70 °C water bath, and continue stirring the latex until it coagulates. Cover the beaker with a watch-glass and leave it in the bath for a total period of 15 min. Decant the serum which exudes through a dry filter. 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 ml of the filtered serum into a dry 50 ml conical flask and acidify it by accurately adding 5 ml of the sulphuric acid solution (5.2). Mix well by swirling the flask.

NOTE — With certain latices, 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 before proceeding with the distillation process.

Pass steam through the apparatus for at least 15 min. With steam passing through the outer jacket of the apparatus (steam outlet open), introduce into the inner tube 10 ml of the acidified serum by pipette. If foaming is a difficulty, 1 drop of a suitable antifoaming agent may be added. Place a 100 ml 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 to 5 ml/min until 100 ml of distillate has been collected.

Transfer the distillate to a 250 ml conical flask and aerate the distillate by passing through it a stream of air free from carbon dioxide at a rate of 200 to 300 ml/min for approximately 3 min. Titrate with the 0,01 N barium hydroxide solution (5.3) using one of the indicators specified (5.4).

9 EXPRESSION OF RESULTS

Calculate the volatile fatty acid (VFA) number from the formula :

$$\text{VFA} = \left[\frac{67{,}32 \times N \times V}{m \times \text{TSC}}\right] \times \left[50 + \frac{m\,(100 - \text{DRC})}{100\,\rho}\right]$$

where

N is the normality of the barium hydroxide solution;

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

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

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

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

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

The results of duplicate determinations shall agree

— within 0,01 unit where the actual VFA number is 0,10 unit, or less;

— within 10 % where the actual VFA number is greater than 0,10 unit.

10 TEST REPORT

The test report shall include the following particulars :

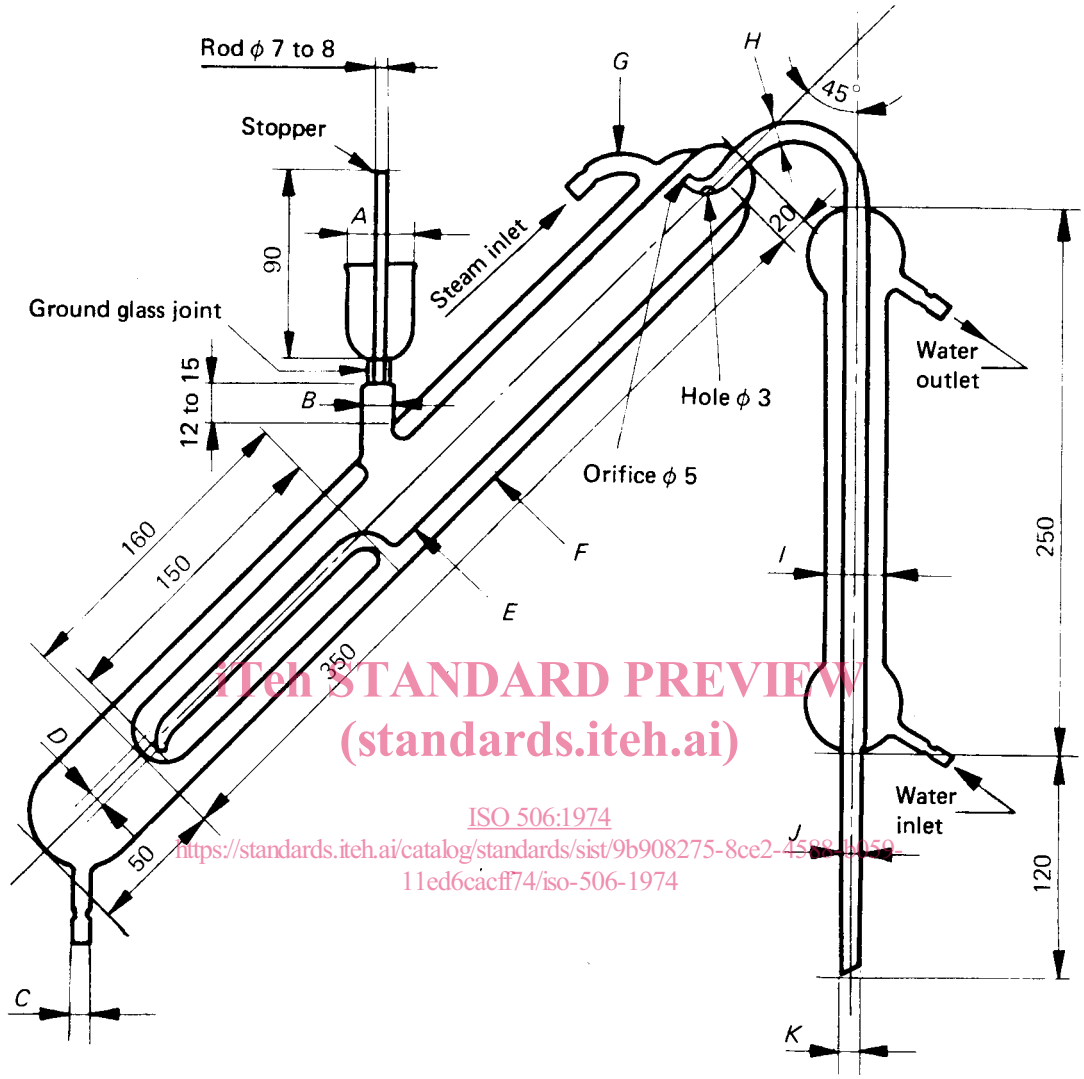
a) reference to this International Standard;

b) the results, and the form in which they are expressed;

c) any operations not included in this International Standard or regarded as optional.

1) ρ = 1,02 Mg/m^3 for centrifuged or creamed latices.

Dimensions in millimetres



	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 – **Steam-jacketed distillation apparatus (Markham still)**