45

International Standard 506

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

Natural rubber latex concentrate — Determination of volatile fatty acid number

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

Second edition — 1985-11-15

UDC 678.031 : 543.852.1 **Ref. No. ISO 506-1985 (E)**

Descriptors : rubber, natural rubber, latex, concentrates, chemical analysis, determination of content, fatty acids, volumetric analysis.

Price based on 3 pages

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established 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. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 506 was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*.

ISO 506 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 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 concentrate which contains preservative agents and which has been prepared by 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 latex — Sampling.*

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

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

3 Definition

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 — 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 (mainly acetic acid) 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, 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 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.

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, 10 and 25 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

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.

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) while stirring the latex concentrate. Either place the beaker on the steam-bath (6.2) or place the beaker in the water-bath (6.3), controlled at 70 °C, and continue stirring the latex concentrate 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 caogulum 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.

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

Pass steam through the apparatus (clause 6) 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. 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 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 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).

9 Expression of results

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

$$\left[\frac{134{,}62\,cV}{m\,\mathrm{TSC}}\right] \times \left[50 + \frac{m\,(100 - \mathrm{DRC})}{100\,\varrho}\right]$$

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;

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

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, expressed as a percentage by mass, of the latex concentrate;

134,62 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.

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) identification of the test sample;

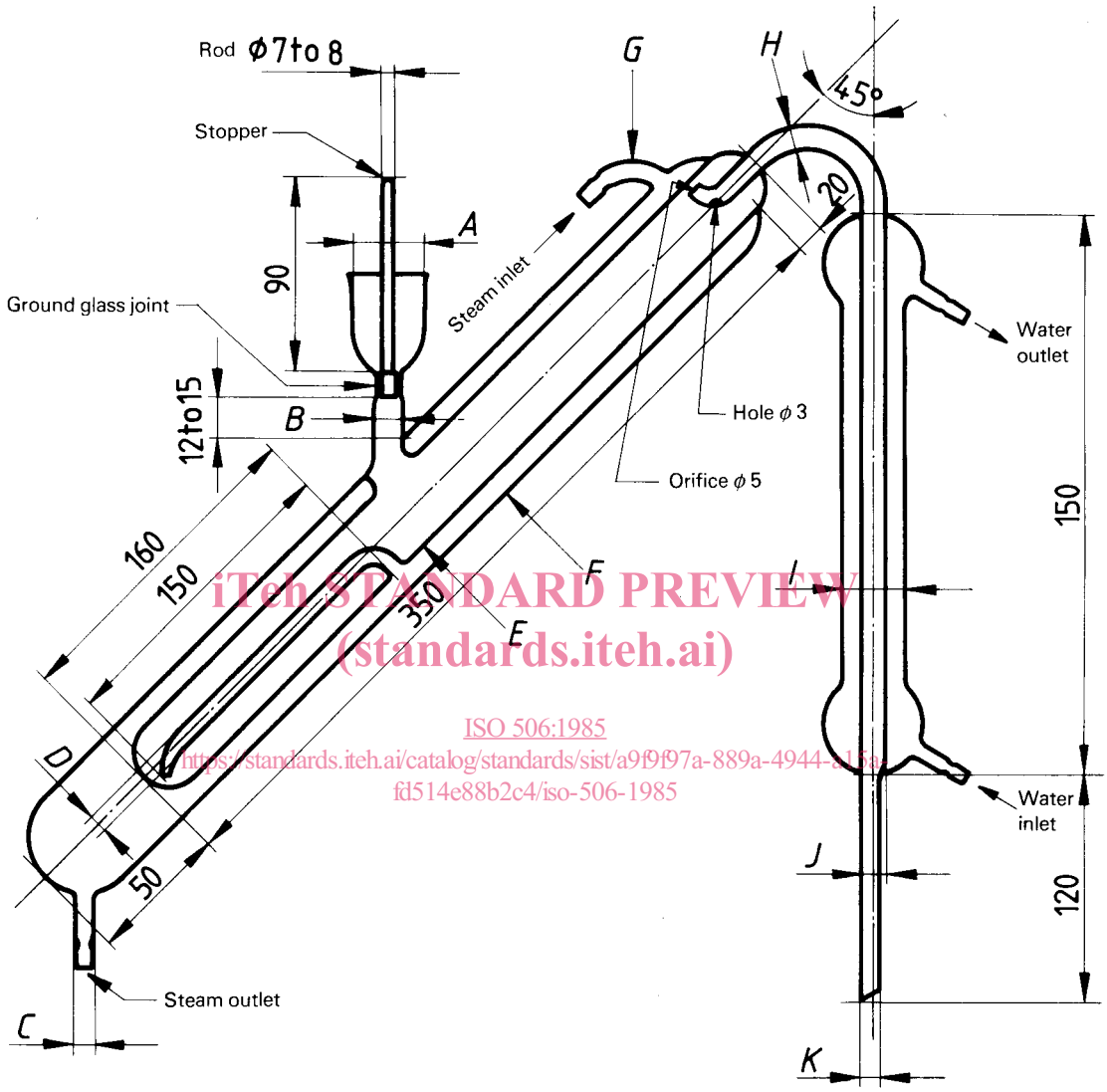
c) the results, and the form in which they are expressed;

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, or regarded as optional.

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

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)