INTERNATIONAL STANDARD

ISO 506

Third edition
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Rubber latex, natural, concentrate — Determination of volatile fatty acid number

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

Reference number
ISO 506:1992(E)

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. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 506 was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*, Sub-Committee SC 3, *Raw materials (including latex) for use in the rubber industry*.

This third edition cancels and replaces the second edition (ISO 506:1985), of which it constitutes a minor revision.

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Rubber latex, natural, concentrate — Determination of volatile fatty acid number

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

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

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;

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

— 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;

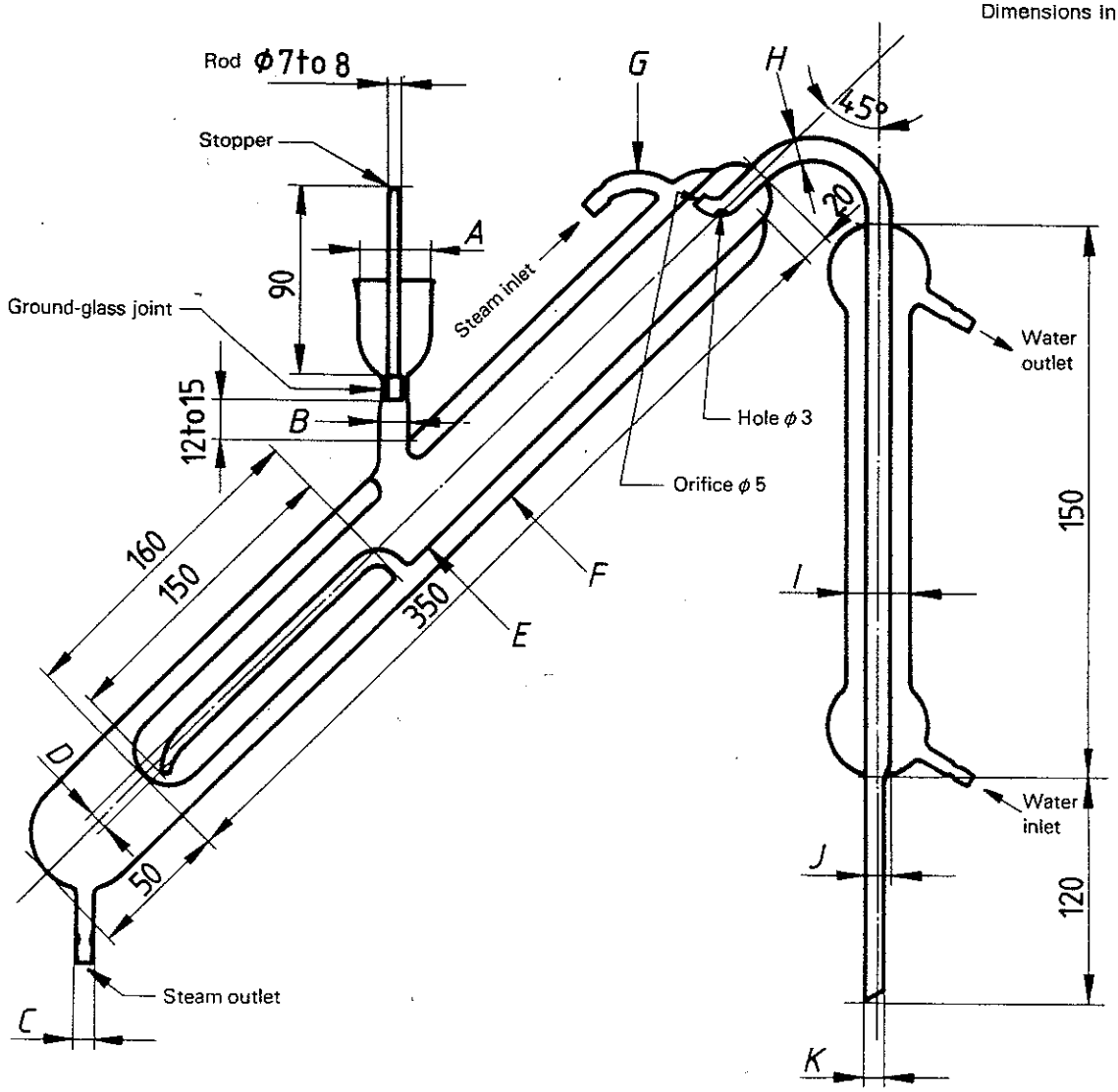
b) all details necessary for the identification of the test sample;

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)