INTERNATIONAL STANDARD

ISO 125

Sixth edition
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Natural rubber latex concentrate — Determination of alkalinity

Latex concentré de caoutchouc naturel — Détermination de l'alcalinité

Reference number
ISO 125:2011(E)

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 125 was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*, Subcommittee SC 3, *Raw materials (including latex) for use in the rubber industry*.

This sixth edition cancels and replaces the fifth edition (ISO 125:2003), which has been technically revised. The main changes are the following:

— instructions have been included in Clause 4 for standardizing the HCl solution used;

— more detailed instructions have been included in Clause 7 for the titration using a visual indicator;

— the precision data have been moved to an informative annex.

Natural rubber latex concentrate — Determination of alkalinity

WARNING — Persons using this International Standard should be familiar with normal laboratory practice. This standard does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user to establish appropriate safety and health practices and to ensure compliance with any national regulatory conditions.

1 Scope

This International Standard specifies a method for the determination of the alkalinity of natural rubber latex concentrate.

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

NOTE A method for the determination of the alkalinity of polychloroprene latex is specified in ISO 13773 (see the Bibliography).

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 123, *Rubber latex — Sampling*

ISO 976, *Rubber and plastics — Polymer dispersions and rubber latices — Determination of pH*

3 Principle

A test portion of latex concentrate is titrated with acid to pH 6 in the presence of a stabilizer to prevent coagulation, either electrometrically or with methyl red as a visual indicator. The alkalinity is calculated from the quantity of acid required.

4 Reagents

Distilled water or water of equivalent purity shall be used wherever water is specified.

4.1 Stabilizer solution: 5 % (by mass) solution of a non-ionic stabilizer of the alkyl phenol polyethylene oxide condensate type. Before use, the pH of the solution shall be adjusted to a value of 6,0 ± 0,05.

The following reagents shall be of recognized analytical quality:

4.2 Sulfuric acid, $c(H_2SO_4) = 0{,}05$ mol/dm^3, or **hydrochloric acid**, $c(HCl) = 0{,}1$ mol/dm^3, standard volumetric solution.

Standardize the 0,1 mol/dm^3 HCl by pipetting 10 ml of 0,05 mol/dm^3 Na_2CO_3 solution (4.4) into a flask and titrating with the 0,1 mol/dm^3 HCl, using methyl orange (4.5) as indicator.

4.3 Methyl red, 0,1 % solution in ethanol of minimum purity 95 % (by volume).

4.4 Sodium carbonate solution, $c(Na_2CO_3) = 0{,}05$ mol/dm^3.

Dry the Na_2CO_3 used to prepare this solution at 120 °C ± 5 °C for 2 h before preparing the solution.

4.5 Methyl orange, 0,1 % solution in ethanol of minimum purity 95 % (by volume).

5 Apparatus

Standard laboratory equipment together with:

5.1 Electric stirrer, with earthed (grounded) motor and non-metallic propeller-type blade, or **magnetic stirrer**.

5.2 pH-meter, equipped with a combined electrode suitable for use in solutions up to pH 12, as specified in ISO 976, and capable of being read to 0,02 pH-units.

5.3 Balance, capable of being read to 0,01 g.

6 Sampling

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

7 Procedure

7.1 General

Carry out the determination in duplicate.

To about 200 cm^3 of water in a 400 cm^3 beaker add, while stirring, 10 cm^3 of stabilizer solution (4.1).

Weighing to the nearest 10 mg, add by difference from a weighing bottle between 5 g and 10 g of the latex concentrate and stir until thoroughly mixed.

Ensure that the latex is added so that none runs down the side of the beaker (which could result in loss of ammonia) or down the side of the weighing bottle.

Titrate the resulting mixture either by the method described in 7.2 or by that described in 7.3.

7.2 Potentiometric titration

Insert the electrode of the pH-meter and, with continual stirring, add from a burette sulfuric acid or hydrochloric acid solution (4.2), adding the acid drop by drop on approaching the end point of pH 6,0 ± 0,05.

7.3 Titration using a visual indicator

Add 2 or 3 drops of methyl red (4.3) to the mixture and titrate with 0,1 mol/dm^3 HCl (see 4.2), taking as the end point the colour change from yellow to pink.

8 Expression of results

8.1 Depending on whether the latex concentrate has been preserved with ammonia or potassium hydroxide, calculate the alkalinity as specified in 8.2 or 8.3, respectively.

8.2 If the latex concentrate is preserved with ammonia, calculate the alkalinity as the percentage (by mass) of ammonia (NH_3) in the latex concentrate, as follows:

$$\text{Alkalinity (as } NH_3) = \frac{F_1 c V}{m}$$

where

F_1 is a factor: 1,7 for hydrochloric acid or 3,4 for sulfuric acid;

c is the actual concentration, expressed in moles of HCl or H_2SO_4 per cubic decimetre of acid used;

V is the volume, in cubic centimetres, of acid used;

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

Report the result as the mean of the duplicate determinations. If the individual results differ by more than 0,01 units from the mean where the actual alkalinity is above 0,5 units, or by more than 0,005 units from the mean where the actual alkalinity is 0,5 units or less, repeat the determination.

8.3 If the latex is preserved with potassium hydroxide, calculate the alkalinity as the percentage (by mass) of potassium hydroxide in the latex concentrate, as follows:

$$\text{Alkalinity (as KOH)} = \frac{F_1 c V}{m}$$

where

F_1 is a factor: 5,61 for hydrochloric acid or 11,22 for sulfuric acid;

c, V and m are as defined in 8.2.

Report the result as the mean of the duplicate determinations. If the individual results differ by more than 0,015 units from the mean, repeat the determination.

9 Precision

See Annex A.

10 Test report

The test report shall include the following information:

a) a reference to this International Standard;

b) all details necessary to identify the test sample;

c) the mean of the determinations, and the units in which it is expressed;

d) full details of any incident likely to have affected the result;

e) full details of any operation not included in this International Standard or in any of the International Standards to which reference is made, together with details of any operation regarded as optional;

f) the date of the test.

Annex A
(informative)

Precision statement

A.1 The precision of this method has been determined in accordance with ISO/TR 9272. Refer to ISO/TR 9272 for terminology and other statistical details.

A.2 The precision data are given in Table A.1. The precision parameters shall not be used for acceptance or rejection of any group of materials without documentation stating that the parameters are applicable to those particular materials and specific test protocols that include these test methods. The precision is expressed on the basis of a 95 % confidence level for the values established for repeatability r and reproducibility R.

A.3 The results contained in Table A.1 are average values and give an estimate of the precision of this test method as determined in an interlaboratory test programme carried out in 2001 and including 13 laboratories performing triplicate analyses on two samples A and B which were prepared from high-ammonia latex. Before the bulk was subsampled into 1 l bottles labelled A and B, it was filtered and homogenized by thorough stirring. Thus, essentially, samples A and B were the same and were treated as such in the statistical computations. Each participating laboratory was required to carry out the test, using these two samples, on the dates given to them.

A.4 A Type 1 precision was evaluated based on the method of preparation of the latex samples used for the interlaboratory test programme.

A.5 **Repeatability:** The repeatability r (in measurement units) of the test method has been established as the appropriate value tabulated in Table A.1. Two single test results, obtained in the same laboratory under normal test method procedures, that differ by more than the tabulated r (for any given level) shall be considered to have come from different, or non-identical, sample populations.

A.6 **Reproducibility:** The reproducibility R (in measurement units) of the test method has been established as the appropriate value tabulated in Table A.1. Two single test results, obtained in different laboratories under normal test method procedures, that differ by more than the tabulated R (for any given level) shall be considered to have come from different, or non-identical, sample populations.

A.7 **Bias:** In test method terminology, bias is the difference between an average test value and the reference (or true) test property value.

Reference values do not exist for this test method since the value (of the test property) is exclusively defined by the test method. Bias cannot therefore be determined for this particular method.

Table A.1 — Precision data

Average results	Within-laboratory		Between laboratories	
	s_r	r	s_R	R
0,64	0,007	0,02	0,013	0,04
$r = 2{,}83 \times s_r$ where r is the repeatability (in measurement units) and s_r is the within-laboratory standard deviation. $R = 2{,}83 \times s_R$ where R is the reproducibility (in measurement units) and s_R is the between-laboratory standard deviation.				