International Standard 35

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Rubber latex, natural — Determination of mechanical stability

Latex de caoutchouc — Détermination de la stabilité mécanique

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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 35 was developed by Technical Committee ISO/TC 45, *Rubber and rubber products*, and was circulated to the member bodies in June 1980.

It has been approved by the member bodies of the following countries :

Austria	Ireland	Spain
Belgium	Italy	Sri Lanka
Canada	Korea, Rep. of	Sweden
Czechoslovakia	Malaysia	Thailand
Denmark	Mexico	Turkey
Egypt, Arab Rep. of	Netherlands	United Kingdom
France	Poland	USA
Germany, F.R.	Portugal	USSR
Hungary	Romania	
India	South Africa, Rep. of	

No member body expressed disapproval of the document.

This second edition cancels and replaces the first edition (i.e. ISO 35-1972).

Rubber latex, natural — Determination of mechanical stability

1 Scope and field of application

This International Standard specifies a method for the determination of the mechanical stability of natural rubber latex which contains preservative agents and which has been submitted to some type of concentration process. It also applicable to vulcanized natural rubber latex.

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

2 References

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

ISO 125, *Rubber — Natural latex — Determination of alkalinity.*

3 Principle

Dilution of a sample of the latex to 55 % total solids content and stirring at high speed. Recording of the time required to initiate visible flocculation, this being regarded as a measure of the mechanical stability.

NOTE — The mechanical stability of latex may be adversely affected by lowering its temperature. Care should therefore be taken to ensure that the sample is not cooled significantly between sampling and testing. This effect is most marked on fresh latex.

4 Reagents

The ammonia solutions (4.1 and 4.2) shall be prepared from ammonium hydroxide of recognized analytical reagent quality and shall be stored in closed containers.

Carbonate-free distilled water or water of equivalent purity shall be used wherever water is specified.

4.1 Ammonia solution, containing 1,6 % (*m*/*m*) of ammonia (NH_3), for use with latex having an alkalinity of at least 0,30 % (calculated relative to the latex).

4.2 Ammonia solution containing 0,6 % (*m*/*m*) of ammonia (NH_3), for use with latex having an alkalinity of less than 0,30 % (calculated relative to the latex).

5 Apparatus

5.1 Mechanical stability measuring apparatus[1], consisting of the following items :

5.1.1 Latex container, flat-bottomed, cylindrical, at least 90 mm high, with an internal diameter of 58 ± 1 mm and a wall thickness of approximately 2,5 mm. The inner surface shall be smooth.

A poly(methyl methacrylate) or glass container is suitable.

5.1.2 Stirring apparatus, consisting of a vertical stainless steel shaft of sufficient length to reach to the bottom of the latex container (5.1.1) and tapering to approximately 6,3 mm in diameter at its lower end where an exactly centered, horizontal, smooth, stainless steel disk, 20,83 ± 0,03 mm in diameter and 1,57 ± 0,05 mm thick, is attached. The apparatus shall maintain stirring at a rotational frequency of 14 000 ± 200 min^{-1} (233 ± 3 s^{-1})[2] throughout a test, at which frequency the shaft shall not run out of true by more than 0,25 mm.

5.1.3 Holder, for the latex container (5.1.1). The holding arrangement shall ensure that the axis of the rotating shaft is concentric with that of the latex container and that the bottom of the stirring disk is 13 ± 1 mm from the inner surface of the bottom of the latex container.

1) Suitable instruments are available commercially. Details may be obtained from the Secretariat of ISO/TC 45 (BSI).

2) 1 s^{-1} = 1 Hz [= 1 revolution per second (r/s)].

5.2 Means of heating.

Use either

— a water bath, capable of maintaining a temperature of 60 to 80 °C, or

— a glass tube, bent to a shape suitable for insertion in the latex, together with a means of circulating water at a temperature of 60 to 80 °C through the tube.

5.3 Wire cloth, stainless steel, with an average aperture width of 180 ± 15 µm.

6 Procedure

Carry out the determination in duplicate and within 24 h of first opening the sample bottle. If the total solids content and alkalinity of the latex are not known, determine them in accordance with ISO 124 and ISO 125, respectively.

NOTE — If the concentration of the carbon dioxide in the atmosphere in the vicinity of the mechanical stability measuring apparatus (5.1) is above normal [about 0,03 % (*V*/*V*)], the mechanical stability time of the latex will be reduced. This effect may be pronounced at carbon dioxide concentrations as low as 0,05 % (*V*/*V*). High carbon dioxide concentrations in the atmosphere may be caused by the proximity of any apparatus which generates carbon dioxide, such as certain gas heaters or oil heaters.

Dilute 100 g of latex, in a glass beaker, to 55,0 ± 0,2 % total solids content with the appropriate ammonia solution (4.1 or 4.2). Without delay, warm the diluted latex with gentle stirring to 36 to 37 °C by one of the means of heating (5.2). Immediately filter the diluted and warmed latex through the wire cloth (5.3) and weigh 80,0 ± 0,5 g of the filtered latex into the container (5.1.1). Check that the temperature of the latex is 35 ± 1 °C. Place the container in position and stir the latex, ensuring that the rotational frequency of the stirrer is 14 000 ± 200 min^{-1} (233 ± 3 s^{-1}) throughout the test, until the end-point is passed.

The arrival of the end-point is preceded by a marked decrease in the depth of the vortex around the stirring shaft.

Determine the end-point by sampling the latex at intervals of 15 s and spreading the sample gently on a suitable surface, for example the palm of the hand, the surface of water or the stainless steel wire cloth (5.3). Take the end-point as the first appearance of flocculum. Confirm the end-point by the presence of an increased amount of flocculum in a sample taken after stirring the latex for an additional 15 s.

7 Expression of results

Express the mechanical stability time of the latex as the number of seconds between the beginning of stirring and the end-point.

The results of duplicate determinations shall agree within 5 % of their mean value.

8 Test report

The test report shall include the following particulars :

a) identification and type of latex tested;

b) the reference of the method used;

c) the mechanical stability time of the latex, quoted to the nearest 15 s;

d) the method used to detect the end-point (i.e. palm, water or wire cloth);

e) any unusual features noted during the determination;

f) any operation not included in this International Standard or in the International Standards to which reference is made.