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Rubber latex — Determination of coagulum content (sieve residue)

[Revision of third edition (ISO 706:1985)]

Latex de caoutchouc — Détermination de la teneur en coagulum (refus sur tamis)

ICS 83.040.10

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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 3.

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 DIS 706 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 second/third/... edition cancels and replaces the first/second/... edition (ISO 706:1985), clauses 6 and 8 have been technically revised and an informative annex added.

Rubber latex — Determination of coagulum content (sieve residue)

SAFE PRACTICE

Persons using this 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 coagulum content (sieve residue) of natural rubber latex concentrate and the majority of synthetic rubber latices. It is not suitable for XSBR latices intended for use in paper coating.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of ISO 706. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on ISO 706 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 123 [1)], *Rubber latex - Sampling.*

ISO 3310 (Part 1) [2)], *Test sieves - Technical requirements and testing - Part 1 : Test sieves of metal wire cloth.*

ISO 4576, *Plastics – Polymer dispersions – Determination of sieve residue (gross particle and coagulum content)*

1) At present undergoing revision (FDIS 123, 2000)
2) At present undergoing revision (FDIS 3310, 2000)

3 Terms and definitions

For the purposes of ISO 706, the following definitions apply.

3.1
laboratory sample :
A quantity of latex intended for laboratory inspection and testing and that is representative of the lot. The laboratory sample shall exclude pieces of dried latex skin or gross pieces of coagulated rubber.
text of the definition

3.2
coagulum content/sieve residue:
The material comprising foreign matter and flocculated rubber, retained under the conditions of the test on a stainless steel wire cloth with an average aperture width of 180 µm ± 7,6 µm, complying with ISO 3310/1.

NOTE 1: In the context of examination of rubber shipments, bulk deliveries etc, this is what is generally understood by 'coagulum'. Pieces of latex skin and gross pieces of coagulated rubber do not constitute part of the laboratory sample and are removed by the initial straining

4 Principle

A portion of the laboratory sample taken from the bulk material is strained through a coarse filter then mixed with surfactant and strained through a wire cloth of defined mesh. The coagulum content is determined by drying the residue after washing free from latex.

5 Reagents

Use only reagents of recognised analytical grade and only distilled water or water of equivalent purity.

5.1 Anionic surfactant, a solution of potassium oleate or ammonium laurate, containing 50 g surfactant/dm^3 solution (for use with natural rubber latices).

5.2 Non-ionic surfactant, a solution of water-soluble ethoxylated alkylphenol, solution containing 50 g surfactant/dm^3 solution and having pH 7.0 ± 0.5 (for use with synthetic rubber latices).

5.3 pH Indicator paper

6 Apparatus

Standard laboratory apparatus and,

6.1 Filter, consisting of a sieve of stainless steel wire or synthetic fibre cloth, resistant to latex of nominal aperture width 710 µm ± 25 µm.

6.2 Test filter, consisting of a disk of stainless steel wire cloth with a nominal aperture width of 180 µm ± 10 µm, complying with ISO 3310/1.

NOTE 2: The use of other filters together with different drying conditions is described in ISO 4576.
NOTE 3: If the wire cloth requires cleaning (e.g. for re-use), immerse it in cold 5 % (v/v) nitric acid and bring to the boil for 30 min. Wash well with water before drying to constant mass. WARNING ! This cannot be done with cloths made of synthetic fibres.

6.3 Two stainless steel rings, of equal internal diameter between 25 and 50 mm

6.4 Beakers, of capacity 600 cm^3 and having a lip.

6.5 Oven, capable of being controlled at 100 ^oC ± 5 ^oC.

6.6 Desiccator

6.7 Balances, an analytical balance capable of weighing to an accuracy of not less than 0,001 g and a balance capable of weighing to an accuracy of not less that 1 g.

7 Sampling

A laboratory sample shall be prepared in accordance with one of the methods specified in ISO 123.

8 Procedure

The test shall be carried out in duplicate

8.1 Thoroughly stir the laboratory sample to ensure that it is homogeneous.

8.2 Strain an adequate quantity of the laboratory sample through the filter (6.1) into a clean dry beaker. Cover the beaker to ensure that there is no surface drying of the strained laboratory sample.

8.3 Dry the test filter (6.2) to constant mass in the oven (6.5) and record the mass to the nearest 0,001 g (m_1). Firmly clamp the test filter between the stainless steel rings (6.3).

8.4 Weigh to the nearest gram 200 g ± 1 g (m_0) of the strained laboratory sample (8.1) into a beaker (6.4). Mix thoroughly while adding 200 cm^3 of anionic surfactant solution (5.1) in the case of natural rubber latex concentrate or 200 cm^3 non-ionic surfactant solution (5.2) in the case of synthetic rubber latex.

8.5 Wet the clamped test filter (6.2) with the surfactant solution (5.1), then pour the latex surfactant mixture through it. Without delay, wash the residue on the wire cloth with the same surfactant solution using a small amount of the solution to rinse any residue out from the beaker, until the washings are free of latex and clear.

For natural rubber latex continue washing with water until the washings are neutral to litmus paper (5.3).

For synthetic rubber latex, wash with a further 200 cm^3 of water.

Carefully remove the wire cloth containing the wet coagulum from the clamp and blot the underside with filter paper.

Dry the wire cloth and coagulum for 30 min in the oven at 100 °C ± 5 °C (6.5), transfer to the desiccator and allow to cool before weighing to the nearest 0,001 g. Return to the oven at 100 °C ± 5 °C for a further period of 15 min, allow to cool in the desiccator and weigh as before. Repeat the drying for 15 min periods until the loss in mass between successive weighings is less than 0,001 g. Record the mass of the dried cloth and coagulum (m_2)

9 Expression of results

The coagulum content, expressed as a percentage by mass of the latex, is given by the formula:

$$\% \text{ coagulum content} = \frac{m_2 - m_1}{m_0} \times 100$$

where

m_0 is the mass, in grams, of the test portion;
m_1 is the mass, in grams, of the wire cloth;
m_2 is the mass, in grams, of the wire cloth plus the dried coagulum.

Report the mean of duplicate determinations. If the results differ by more than 0.005 units from the mean repeat the determination.

10 Test report

The test report shall include the following information:

a) reference to this International Standard;
b) all details necessary for the identification of the material being tested;
c) the results of duplicate determinations;

d) the date of the test
e) any unusual features noted during the test;
f) any operation not included in this International Standard or in the International Standards to which reference is made or regarded as optional.

11 Precision statement

The work to generate the precision data was initiated before the publication of ISO/TR 9272:1986, Rubber and rubber products – Determination of precision for test method standards. Consequently, the precision data are not expressed in the recommended format.

Reproducibility: 0.003 units

Repeatability: 0.002 units

12 Key Words

Rubber latex, coagulum, sieve residue