SRI LANKA STANDARD 1304: PART 14: 2017
(ISO 705: 2015)
UDC 678.032

METHODS OF TESTING OF NATURAL RUBBER LATICES

PART 14: DETERMINATION OF DENSITY

(First Revision)

SRI LANKA STANDARDS INSTITUTION

Sri Lanka Standard
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PART 14: DETERMINATION OF DENSITY
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SLS 1304: Part 14: 2017
(ISO 705: 2015)

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This Standard does not purport to include all the necessary provisions of a contract

Sri Lanka Standard
METHODS OF TESTING OF NATURAL RUBBER LATICES
PART 14: DETERMINATION OF DENSITY
(First Revision)

FOREWORD

This Sri Lanka Standard was approved by the Sectoral Committee on Chemical and Polymer Technology and was authorized for adoption and publication as a Sri Lanka Standard by the Council of the Sri Lanka Standards Institution on 2017-12-04.

This Sri Lanka Standard was first published in 2007 as an adoption of ISO 705: 1994. The International Standard ISO 705: 1994 has been technically revised in 2015. ISO 705 2015 has been accepted to adopt as the First revision to **SLS 1304 : Part 14**.

This Standard is identical with ISO 705:2015, Rubber latex — Determination of density between 5 degrees C and 40 degrees C, published by the International Organization for Standardization (ISO).

TERMINOLOGY AND CONVENTIONS :

The text of the International Standard has been accepted as suitable for publication, without deviation, as a Sri Lanka Standard. However, certain terminology and conventions are not identical with those used in Sri Lanka Standards. Attention is therefore drawn to the following :

a) Wherever the words 'International Standard' appear referring to a particular standard, they should be interpreted as "Sri Lanka Standard".

b) The comma has been used throughout as a decimal marker. In Sri Lanka Standards it is the current practice to use the full point at the base as the decimal marker.

c) Wherever page numbers are quoted, they are ISO page numbers.

Cross References

International Standard	Corresponding Sri Lanka Standard
ISO 123, Rubber latex — Sampling	SLS 1304 Methods of testing of natural rubber lattices Part 1 : Sampling of latex rubber

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SLS 1304-14: 2017

INTERNATIONAL STANDARD

ISO 705

Third edition
2015-11-01

Rubber latex — Determination of density between 5 °C and 40 °C

Latex de caoutchouc — Détermination de la masse volumique entre 5 °C et 40 °C

Reference number
ISO 705:2015(E)

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Contents

Page

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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 45, *Rubber and rubber products*, Subcommittee SC 3, *Raw materials (including latex) for use in the rubber industry*.

This third edition cancels and replaces the second edition (ISO 705:1994), which has been revised to

— update the normative references (in Clause 2 and throughout the text),

— move part of the scope into a new Clause 4 "Principle", and

— add a bibliography.

Rubber latex — Determination of density between 5 °C and 40 °C

1 Scope

This International Standard specifies a method for the determination of the density of natural rubber latex concentrate between the temperatures of 5 °C and 40 °C.

This International Standard is intended for use when density determinations are used to calculate the mass of a measured volume of latex in locations where it is not practical to weigh directly or to control the temperature of the laboratory.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
density
mass divided by volume at a stated temperature

Note 1 to entry: Density is measured in megagrams per cubic metre.

3.2
natural rubber latex concentrate
natural rubber latex containing ammonia and/or other preservatives and which has been subjected to some form of concentration

4 Principle

For the determination of the density of natural rubber latex concentrate between 5 °C and 40 °C, it is essential that the density be determined on a latex sample containing the same amount of air as contained when the volume was measured. Therefore, the latex bulk is allowed to stand for a minimum period of 24 h before sampling to ensure the removal of air bubbles. The density determination is preferably made at the same temperature as the volume measurement, otherwise a correction shall be applied.

This method is suitable for all latices from natural sources, for synthetic latex and for compounded or prevulcanized latex, as well as for artificial dispersions of rubber. However, the temperature correction given in 8.2 is not necessarily valid for all these.

For measurements made at standard temperatures, ISO 2811-1 and ISO 2811-3 should be used.

5 Apparatus

Ordinary laboratory equipment, plus the following.

5.1 Density bottle (pyknometer), capacity 50 cm^3 having a ground-glass stopper through which a capillary tube passes, and fitted with a ground-glass cap (see Figure 1).

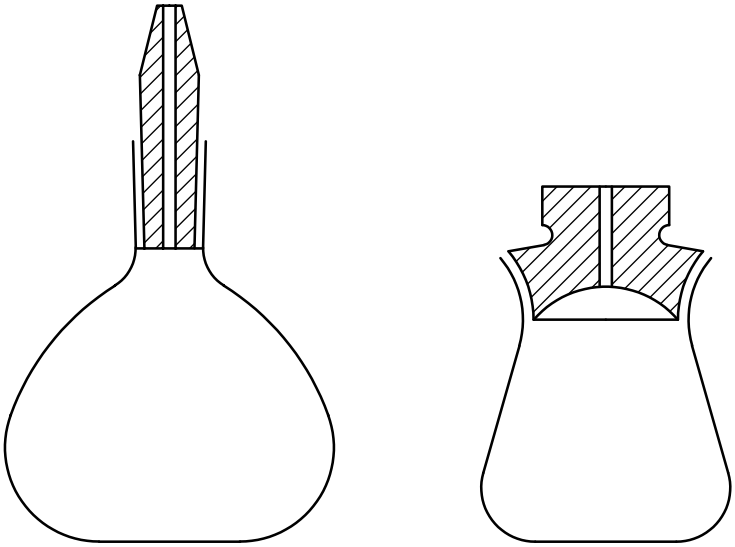

Figure 1 — Density bottles (pyknometers)

5.2 Constant-temperature bath, accurate to within ± 0,2 °C and adjustable to a temperature above or below ambient temperature. If a constant-temperature bath is not available, a water bath shall be used to ensure that the latex is at a known temperature.

5.3 Balance, accurate to 1 mg.

5.4 Two conical flasks, of at least 200 cm^3 capacity, each fitted with a rubber stopper holding a short glass inlet tube with a blowing ball at the external end and a glass tube at the inside end reaching nearly to the bottom of the flask.

6 Sampling

The latex to be sampled shall have stood for at least 24 h to ensure the removal of air bubbles.

Record the temperature θ of the bulk of the latex at the time of sampling. Carry out the sampling in accordance with one of the methods specified in ISO 123, taking care to avoid entrapment of air and ensuring that the bottle in which the sample is placed is completely filled.

7 Procedure

7.1 Carry out the determination as soon as possible after sampling. If an adjustable constant-temperature bath (5.2) is not available, proceed in accordance with 7.3. The procedure takes account of the difficulties of controlling the temperature at the point of sampling natural rubber latex concentrate and the consequent need for a temperature correction.

7.2 Adjust the temperature of the constant temperature bath to θ (see Clause 6). Stir the sample of the latex gently without introducing any air bubbles. Partly fill one of the conical flasks (5.4) with a suitable volume of latex and place in the bath. Likewise, partly fill the second conical flask with cool, freshly boiled, distilled water and place in the bath.

Weigh the clean and dry density bottle (5.1) with its stopper and cap to the nearest 1 mg. lmmerse the density bottle up to its neck in the bath, with the ground-glass stopper in place but not the cap.

Allow the density bottle and the two conical flasks containing the latex and the water to come to the temperature of the bath. This requires a minimum of 20 min.

Using the blowing ball, take a few cubic centimetres of latex from the conical flask containing the latex and discard. Then transfer a sufficient amount into the density bottle to fill it completely. Put the stopper in place and immediately wipe clean the top surface (tissue paper is recommended for this purpose), taking care not to remove any latex from the capillary tube. Remove the density bottle from the bath and immediately put in place the ground-glass cap. Dry the outside of the density bottle with the minimum of handling and then weigh the density bottle to the nearest 1 mg.

Empty the density bottle and wash free from latex with distilled water. lmmerse the density bottle up to its neck in the constant-temperature bath as before. Fill the density bottle with distilled water, transferring it by blowing from the second conical flask. Allow it to stand for 5 min in the bath. Empty the density bottle, put it back in the bath and refill by the same procedure. lmmediately insert the stopper and wipe dry the top surface (tissue paper is recommended for this purpose), taking care not to remove any water from the capillary tube. Remove the density bottle from the bath and immediately put in place the ground-glass cap. Dry the outside of the bottle with the minimum of handling and then weigh the bottle to the nearest 1 mg.

7.3 If a non-adjustable water bath is used, the temperature of the bath shall be such that it is not likely to fluctuate during the course of the determination and it shall be as close as is practical to the temperature θ of the bulk latex (see Clause 6).

Record the temperature θ_1 of the bath.

Proceed as described in 7.1. Recheck the temperature of the bath before filling the density bottle with latex and after filling it with water. If the temperature of the bath has altered by more than 1 °C, repeat the procedure.

8 Expression of results

8.1 Calculate the density ρ of the latex at the temperature of the bath, in megagrams per cubic meter, using the following equation:

$$\rho = \frac{m_L \times \rho_W}{m_W}$$

where

m_L is the mass, in grams, of the latex in the density bottle;

m_W is the mass, in grams, of the water in the density bottle;

ρ_W is the density, in megagrams per cubic meter (Mg/m^3), of water at the bath temperature as given in Table 1.

The results of duplicate determinations shall be within 0,001 Mg/m^3.

Table 1 — Density of water at various temperatures

Temperature °C	Density Mg/m^3
5	1,000 0
6	0,999 9
7	0,999 9
8	0,999 8
9	0,999 8
10	0,999 7
11	0,999 6
12	0,999 5
13	0,999 4
14	0,999 2
15	0,999 1
16	0,998 9
17	0,998 8
18	0,998 6
19	0,998 4
20	0,998 2
21	0,998 0
22	0,997 8
23	0,997 5
24	0,997 3
25	0,997 0
26	0,996 8
27	0,996 5
28	0,996 2
29	0,995 9
30	0,995 6
31	0,995 3
32	0,995 0
33	0,994 7
34	0,994 4
35	0,994 0
36	0,993 7
37	0,993 3
38	0,993 0
39	0,992 6
40	0,992 2

8.2 In the case of natural rubber latex concentrate of 55 % to 75 % total solids content, when the temperature of the density determination θ_1 (see 7.3) differs from that of the bulk latex, the corrected density shall be calculated using the following equation (correct over the range 5 °C to 40 °C):

$$\rho_c = \rho_1 \left[1 - 0{,}000\ 5 \left(\theta - \theta_1\right)\right]$$

where

ρ_c is the corrected density at temperature θ;

ρ_1 is the density determined at temperature θ_1.

9 Test report

The test report shall include the following information:

a) a reference to this International Standard;

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

c) the results and the units in which they have been expressed;

d) the temperatures of the bulk latex and the bath;

e) any unusual features noted during the determination;

f) the date of the test;

g) any operation not included in the International Standard or regarded as optional.

Bibliography

[1] ISO 2811-1, *Paints and varnishes — Determination of density — Part 1: Pyknometer method*

[2] ISO 2811-3, *Paints and varnishes — Determination of density — Part 3: Oscillation method*

ICS 83.040.10
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The Sri Lanka Standards Institution is the owner of the registered certification mark shown below. Beneath the mark, the number of the Sri Lanka Standard relevant to the product is indicated. This mark may be used only by those who have obtained permits under the SLS certification marks scheme. The presence of this mark on or in relation to a product conveys the assurance that they have been produced to comply with the requirements of the relevant Sri Lanka Standard under a well designed system of quality control inspection and testing operated by the manufacturer and supervised by the SLSI *which includes surveillance inspection of the factory, testing of both factory and market samples.*

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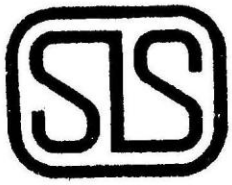

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SRI LANKA STANDARDS INSTITUTION

The Sri Lanka Standards Institution (SLSI) is the National Standards Organization of Sri Lanka established under the Sri Lanka Standards Institution Act No. 6 of 1984 which repealed and replaced the Bureau of Ceylon Standards Act No. 38 of 1964. The Institution functions under the Ministry of Science & Technology.

The principal objects of the Institution as set out in the Act are to prepare standards and promote their adoption, to provide facilities for examination and testing of products, to operate a Certification Marks Scheme, to certify the quality of products meant for local consumption or exports and to promote standardization and quality control by educational, consultancy and research activity.

The Institution is financed by Government grants, and by the income from the sale of its publications and other services offered for Industry and Business Sector. Financial and administrative control is vested in a Council appointed in accordance with the provisions of the Act.

The development and formulation of National Standards is carried out by Technical Experts and representatives of other interest groups, assisted by the permanent officers of the Institution. These Technical Committees are appointed under the purview of the Sectoral Committees which in turn are appointed by the Council. The Sectoral Committees give the final Technical approval for the Draft National Standards prior to the approval by the Council of the SLSI.

All members of the Technical and Sectoral Committees render their services in an honorary capacity. In this process the Institution endeavours to ensure adequate representation of all view points.

In the International field the Institution represents Sri Lanka in the International Organization for Standardization (ISO), and participates in such fields of standardization as are of special interest to Sri Lanka.

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