MALAYSIAN STANDARD

MS ISO 124:2007

LATEX, RUBBER – DETERMINATION OF TOTAL SOLID CONTENT (ISO 124:1997 AND ITS AMENDMENT 1:2006, IDT)

ISO 124:1997 is endorsed as Malaysian Standard with the reference number MS ISO 124:2007.

ICS: 83.040.10

Descriptors: rubber, natural rubber, synthetic rubber, latex, tests, determination of content, solids

DEPARTMENT OF STANDARDS MALAYSIA

DEVELOPMENT OF MALAYSIAN STANDARDS

The **Department of Standards Malaysia (STANDARDS MALAYSIA)** is the national standardisation and accreditation body.

The main function of the Department is to foster and promote standards, standardisation and accreditation as a means of advancing the national economy, promoting industrial efficiency and development, benefiting the health and safety of the public, protecting the consumers, facilitating domestic and international trade and furthering international cooperation in relation to standards and standardisation.

Malaysian Standards are developed through consensus by committees which comprise of balanced representation of producers, users, consumers and others with relevant interests, as may be appropriate to the subject in hand. These standards where appropriate are adoption of international standards. Approval of a standard as a Malaysian Standard is governed by the Standards of Malaysia Act 1996 (Act 549). Malaysian Standards are reviewed periodically. The use of Malaysian Standards is voluntary except in so far as they are made mandatory by regulatory authorities by means of regulations, local by-laws or any other similar ways.

The Department of Standards appoints **SIRIM Berhad** as the agent to develop Malaysian Standards. The Department also appoints SIRIM Berhad as the agent for distribution and sale of Malaysian Standards.

For further information on Malaysian Standards, please contact:

Department of Standards Malaysia
Century Square, Level 1 & 2
Blok 2300, Jalan Usahawan
63000 Cyberjaya
Selangor D.E.
MALAYSIA

Tel: 60 3 8318 0002
Fax: 60 3 8319 3131

http://www.standardsmalaysia.gov.my

OR

SIRIM Berhad
(Company No. 367474 - V)
1, Persiaran Dato' Menteri
P.O. Box 7035, Section 2
40911 Shah Alam
Selangor D.E.

Tel: 60 3 5544 6000
Fax: 60 3 5510 8095

http://www.sirim.my

E-mail: central@standardsmalaysia.gov.my

CONTENT

Committee representation

The Rubber and Rubber Products Industry Standards Committee (ISC N) under whose authority this Malaysian Standard was adopted, comprises representatives from the following organisations:

Association of Malaysian Medical Industries

Department of Standards Malaysia

Malaysian Association of Tyre Retreaders and Dealers Society

Malaysian Latex and Rubber Thread Manufacturers' Association

Malaysian Rubber Board

Malaysian Rubber Export Promotion Council

Malaysian Rubber Glove Manufacturers' Association

Malaysian Rubber Products Manufacturers' Association

Ministry of Health Malaysia

Ministry of International Trade and Industry

Plastic and Rubber Institute of Malaysia

Universiti Kebangsaan Malaysia

Universiti Sains Malaysia

The Technical Committee on Chemical Tests which recommends the adoption of the ISO Standard is managed by the Malaysian Rubber Board in its capacity as an authorised Standards-Writing Organisation and consists of representatives from the following organisations:

Golden Hope Plantation Bhd

Malaysian Rubber Board

Mardec Berhad

Revertex (M) Sdn Bhd

SIRIM Berhad

Universiti Teknologi MARA

NATIONAL FOREWORD

The adoption of the ISO Standard as a Malaysian Standard was recommended by the Technical Committee on Chemical Tests under the authority of the Rubber and Rubber Products Industry Standards Committee. Development of this standard was carried out by the Malaysian Rubber Board which is the Standards-Writing Organisation (SWO) appointed by SIRIM Berhad to develop standards for rubber and rubber products.

This Malaysian Standard is identical with ISO 124:1997, *Latex, rubber - Determination of total solid content* and its Amendment 1:2006, *Precision data*, published by the International Organization for Standardization (ISO). However, for the purposes of this Malaysian Standard, the following apply:

a) in the source text, “this International Standard” should read “this Malaysian Standard”; and

b) the comma which is used as a decimal sign (if any), to read as a point.

This Malaysian Standard cancels and replaces MS 281: Part 2: 1998, *Natural rubber latex concentrate: Part 2: Determination of total solid contents (Third revision).*

Compliance with a Malaysian Standard does not of itself confer immunity from legal obligations.

NOTE. IDT on the front cover indicates an identical standard i.e. a standard where the technical content, structure, and wording (or is and identical translation) of a Malaysian Standard is exactly the same as in an International Standard or is identical in technical content and structure although it may contain the minimal editorial changes specified in clause 4.2 of ISO/IEC Guide 21-1.

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 124 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 fourth edition cancels and replaces the third edition (ISO 124:1992). The vacuum-drying procedure, omitted from the 1992 edition, has been re-instated.

Annex A of this International Standard is for information only.

International Organization for Standardization
Case postale 56 • CH-1211 Genève 20 • Switzerland
Internet central@iso.ch
X.400 c=ch; a=400net; p=iso; o=isocs; s=central

Printed in Switzerland

Latex, rubber – Determination of total solids content

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

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the edition indicated was 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 edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 123:1985, *Rubber latex — Sampling.*

3 Principle

A test portion is heated to constant mass in an oven under specified conditions, either at atmospheric pressure or under vacuum. The total solids content is determined by weighing before and after heating.

NOTE — The determination of the residue after drying for a specified period of time is the subject of ISO 1625, *Plastics — Polymer dispersions — Determination of non-volatile matter (residue) at specified temperatures* (to be published — revision of ISO 1625:1977).

4 Apparatus

Ordinary laboratory apparatus, plus the following:

4.1 Flat-bottomed dishes, lipless, of diameter approximately 60 mm.

4.2 Oven, capable of being maintained at 70 °C ± 2 °C or 105 °C ± 5 °C.

4.3 Vacuum oven, capable of being maintained at 125 °C ± 2 °C and at a pressure below 20 kPa[1].

4.4 Analytical balance, capable of being read to 0,1 mg.

---

1 1 kPa = 1 kN/m^2

5 Sampling

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

6 Procedure

For natural rubber latex concentrate, proceed in accordance with 6.1 and for synthetic rubber latex proceed in accordance with either 6.1 or 6.2. Perform the procedure in duplicate.

6.1 Heating at atmospheric pressure

Weigh, to the nearest 0,1 mg, a dish (4.1). Pour into the dish 2,0 g ± 0,5 g of latex and weigh to the nearest 0,1 mg. Gently swirl the contents of the dish to ensure that the latex covers the bottom. If desired, approximately 1 cm^3 of distilled water or water of equivalent purity may be added and mixed with the latex by swirling.

Place the dish in the oven (4.2) so that it is horizontal, and heat it at 70 °C ± 2 °C for 16 h or at 105 °C ± 5 °C for 2 h or until the test portion has lost its whiteness. Remove the dish from the oven and allow it to cool to ambient temperature in a desiccator. Remove the dish and weigh. Return the dish to the oven for 30 min if the drying temperature used is 70 °C ± 2 °C, or for 15 min if the drying temperature is 105 °C ± 5 °C. Remove and allow to cool to ambient temperature in the desiccator as before and reweigh. Repeat the drying procedure for periods of 30 min or 15 min, as appropriate, until the loss in mass between two successive weighings is less than 0,5 mg.

If, after heating at 105 °C ± 5 °C, the dried deposit becomes excessively sticky, repeat the determination either at 70 °C ± 2 °C or in accordance with 6.2.

NOTE — Stickiness is symptomatic of oxidation of some rubbers when exposed to air at too high a temperature.

6.2 Heating at reduced pressure

Weigh, to the nearest 0,1 mg, a dish (4.1). Pour into the dish 1,0 g ± 0,2 g of latex and weigh to the nearest 0,1 mg. Add approximately 1 cm^3 of distilled water or water of equivalent purity and mix by swirling, ensuring that the latex covers the bottom of the dish.

Place the dish in the vacuum oven (4.3) so that it is horizontal. Reduce the pressure slowly, to avoid foaming and splattering, and heat at 125 °C ± 2 °C for 45 min to 60 min at a pressure below 20 kPa. Release the vacuum slowly, remove the dish from the oven and allow to cool in a desiccator. Remove the dish and weigh. Repeat the above drying procedure for periods of 15 min until the loss in mass between two successive weighings is less than 0,5 mg.

7 Expression of results

Calculate the total solids content TSC, expressed as a percentage by mass, using the equation

$$TSC = \frac{m_1}{m_0} \times 100$$

where

m_0 is the mass, in grams, of the test portion;

m_1 is the mass, in grams, of the dried material.

The results of the duplicate determinations shall not differ by more than 0,2 % (*m/m*).

NOTE — Over a large number of determinations, the vacuum method (6.2) tends to give marginally lower values but does not differ by more than 0,1 % (*m/m*).

8 Test report

The test report shall include the following particulars:

a) a reference to this International Standard;

b) details of the drying method and temperature employed;

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

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

e) details of any unusual features noted during the determination;

f) details of any operation not included in this International Standard or in the International Standard to which reference is made, as well as any operation regarded as optional.

Annex A
(informative)

Precision of the test method

With accurate operation and control, it is possible to attain the following precision data:

A.1 Repeatability

Within the range ± 0,2 % (*m/m*).

A.2 Reproducibility

Within the range ± 0,4 % (*m/m*).

NOTE — The work carried out 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 data are not expressed in the format recommended by this Technical Report.

This page intentionally left blank

ICS 83.040.10

Descriptors: rubber, natural rubber, synthetic rubber, latex, tests, determination of content, solids.

Price based on 4 pages

INTERNATIONAL STANDARD

ISO 124

Fourth edition
1997-06-15

AMENDMENT 1
2006-02-01

Latex, rubber — Determination of total solids content

AMENDMENT 1: Precision data

Latex de caoutchouc — Détermination des matières solides totales

AMENDEMENT 1: Données de fidélité

Reference number
ISO 124:1997/Amd.1:2006(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

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.

Amendment 1 to ISO 124:1997 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*.

Latex, rubber — Determination of total solids content

AMENDMENT 1: Precision data

Page 1, Clause 2

Update the year of publication of ISO 123 to 2001.

Add the following reference:

ISO/TR 9272, *Rubber and rubber products — Determination of precision for test method standards*

Page 3

Add the following new clause, renumbering the test report as Clause 9:

8 Precision statement

8.1 The precision of this method was determined in accordance with ISO/TR 9272. Refer to this document for terminology and explanations of statistical concepts.

8.2 The precision details in this precision statement give an estimate of the precision of this test method with the materials used in the particular interlaboratory programme as described below. The precision parameters should not be used for acceptance/rejection testing of any group of materials without documentation that the parameters are applicable to those particular materials and the specific test protocol of this test method.

8.3 The precision results are given in Table 1. The precision is expressed on the basis of a 95 % confidence level for the values established for repeatability r and reproducibility R.

8.4 The results contained in Table 1 are mean values and give an estimate of the precision of this test method as determined in an interlaboratory test programme (ITP) conducted in 2001. Thirteen laboratories performed triplicate analyses on two samples, A and B, which were prepared from highly ammoniated latex. The bulk latex was strained and then homogenized by thorough blending and stirring prior to being sub-sampled into 1-litre bottles labelled A and B. 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 which had been given to the participants in the ITP.

8.5 A type 1 precision was determined, based on the sampling method used for the latex samples in the ITP.

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

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

8.8 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, therefore, cannot be determined for this particular test method.

Table 1 — Estimate of precision of determination of total solids content

Mean	**Within laboratory**		**Between laboratories**	
% (m/m)	s_r	r	s_R	R
61,68	0,04	0,11	0,08	0,23
$r = 2{,}83 \times s_r$ 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.				

Page 4, Annex A

Delete the annex.

ICS 83.040.10

Price based on 2 pages

Acknowledgements

Dr Norhayati Moris (Chairman)	Malaysian Rubber Board
Dr Faridah Hanim Ab Hanan (Secretary)	Malaysian Rubber Board
Mr Jaya Kumar a/l Veelu	Golden Hope Plantation Berhad
Ms Nur Salwanie Ahmad Resali	Malaysian Rubber Board
Mr Norul Huda A Tamin	Mardec Berhad
Ms Zuridah Manas	Revertex (M) Sdn Bhd
Ms Masrina Mansor	SIRIM Berhad
Assoc Prof Asiah Abdullah	Universiti Teknologi MARA