



MS 133: PART A12:2008

MALAYSIAN STANDARD

**PAINTS AND VARNISHES - DETERMINATION
OF DENSITY - PART A12: PYKNOMETER
METHOD
(SECOND REVISION)
(ISO 2811-1:1997, MOD)**

ICS: 87.040

Descriptors: paints, varnishes, procedure, density, specific gravity, pyknometer

© Copyright 2008

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. To the greatest extent possible, Malaysian Standards are aligned to or 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>

E-mail: central@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>

CONTENTS

	Page
Committee representation.....	ii
National foreword.....	iii
Foreword.....	iv
1 Scope.....	1
2 Normative references.....	1
3 Definition.....	1
4 Principle.....	1
5 Temperature.....	2
6 Apparatus.....	2
7 Sampling.....	2
8 Procedure.....	2
9 Calculation.....	4
10 Precision.....	4
11 Test report.....	5
Tables	
A.1 Density of pure, air-free water.....	7
B.1 Coefficient of thermal expansion γ_p of materials used for pyknometers.....	8
Figures	
1 Metal pyknometer.....	3
2a) Gay-Lussac pyknometer.....	3
2b) Hubbard pyknometer.....	3
Annexes	
A Calibration of pyknometer.....	6
B Temperature variation.....	8

MS 133: PART A12:2008

Committee representation

The Industry Standards Committee on Chemical and Materials (ISC B) under whose authority this Malaysian Standard was adopted, comprises representatives from the following organisations:

Department of Agriculture Malaysia
Department of Chemistry, Malaysia
Department of Standards Malaysia
Malaysian Association of Standards Users
Malaysian Ceramic Industry Group
Malaysian Institute of Chemistry
Malaysian Paint Manufacturers Association
Malaysian Pulp and Paper Manufacturers Association
Minerals and Geoscience Department Malaysia
Ministry of International Trade and Industry
Science and Technology Research Institute for Defence
Universiti Malaya
Universiti Sains Malaysia

The Technical Committee on Paints and Varnishes which recommended the adoption of the ISO Standard consists of representatives from the following organisations:

ICI Paints (Malaysia) Sdn Bhd
IKRAM QA Services Sdn Bhd
Malaysian Paint Manufacturers Association
Revertex (M) Sdn Bhd
Science and Technology Research Institute for Defence
Seamaster Paint (Mfg) Berhad
SIRIM Berhad (Secretariat)
SIRIM QAS International Sdn Bhd
Universiti Kebangsaan Malaysia
Universiti Teknologi Malaysia
Universiti Teknologi MARA
Co-opted member:
Jotun (M) Sdn Bhd

NATIONAL FOREWORD

The adoption of the ISO Standard as a Malaysian Standard was recommended by the Technical Committee on Paints and Varnishes under the authority of the Industry Standards Committee on Chemical and Materials.

This standard is the second revision of MS 133: Part A12, *Methods of test for paints - Part A12: Determination of density and specific gravity (First Revision)*.

This standard is a modified adoption of ISO 2811-1:1997, *Paints and varnishes - Determination of density - Part 1: Pycnometer method*, published by the International Organization for Standardization (ISO) with the following modifications:

- a) in the source text, "this International Standard" should read "this Malaysian Standard";
- b) the comma which is used as a decimal sign (if any), to read as a point;

c) Clause/Subclause	Modifications
5	Replace "(23 ± 0.5) °C with "(27 ± 0.5) °C

Explanation: This standard modifies the requirements for temperature and relative humidity to reflect better the local weather conditions of high temperatures and humidity.

- d) reference to International Standards should be replaced by equivalent Malaysian Standards as follows:

<u>Referenced International Standards</u>	<u>Corresponding Malaysian Standards</u>
ISO 1512:1991, <i>Paints and varnishes - Sampling of products in liquid or paste form</i>	MS 133: Part A1, <i>Paints, varnishes and raw materials for paints and varnishes - Sampling</i>
ISO 1513:1992, <i>Paints and varnishes - Examination and preparation of samples for testing</i>	MS 133: Part A2, <i>Methods of test for paints and varnishes - Part A2: Examination and preparation of samples for testing</i>

This Malaysian Standard cancels and replaces MS 133: Part A12:1994.

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

NOTE. MOD on the front cover indicates a modified standard i.e. a standard adapted from an International Standard with permitted technical deviations, which are clearly identified and explained. The changes in structure are permitted provided that the altered structure permits easy comparison of the content of the two standards. Modified standards also include the changes permitted under identical correspondence.

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 2811-1 was prepared by Technical Committee ISO/TC 35, *Paints and varnishes*, Subcommittee SC 9, *General test methods for paints and varnishes*.

Together with the other parts, this part of ISO 2811 cancels and replaces ISO 2811:1974, which has been technically revised.

ISO 2811 consists of the following parts, under the general title *Paints and varnishes — Determination of density*:

- Part 1: *Pyknometer method*
- Part 2: *Immersed body (plummet) method*
- Part 3: *Oscillation method*
- Part 4: *Pressure cup method*

Annex A forms an integral part of this part of ISO 2811. Annex B is for information only.

© ISO 1997

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

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