Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

"जानने का अधिकार, जीने का अधिकार"
Mazdoor Kisan Shakti Sangathan
"The Right to Information, The Right to Live"

“पुराने को छोड़ नये के तरफ”
Jawaharlal Nehru
“Step Out From the Old to the New”

Indian Standard

METHODS OF SAMPLING AND TEST FOR NATURAL AND SYNTHETIC PERFUMERY MATERIALS

PART 3 DETERMINATION OF RELATIVE DENSITY

(Third Revision)
NATIONAL FOREWORD

This Indian Standard (Part 3) (Third Revision) which is identical with ISO 279:1998 'Essential oils — Determination of relative density at 20 °C — Reference method' issued by the International Organization for Standardization (ISO) was adopted by the Bureau of Indian Standards on the recommendation of the Natural and Synthetic Fragrance Materials Sectional Committee and approval of the Petroleum, Coal and Related Products Division Council.

The text of the ISO Standard has been approved as suitable for publication as an Indian Standard without deviations. Certain terminology and conventions are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

a) Wherever the words 'International Standard' appear referring to this standard, they should be read as 'Indian Standard'.

b) Comma (,) has been used as a decimal marker while in Indian Standards, the current practice is to use a point (.) as the decimal marker.

The technical committee responsible for the preparation of this standard has reviewed the provisions of ISO 356 'Essential oils — Preparation of test samples' and decided that it is acceptable for use in conjunction with this standard.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2:1960 'Rules for rounding off numerical values (revised)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.
Indian Standard

METHODS OF SAMPLING AND TEST FOR
NATURAL AND SYNTHETIC PERFUMERY
MATERIALS

PART 3 DETERMINATION OF RELATIVE DENSITY
(Third Revision)

1 Scope

This International Standard specifies the reference method for the determination of the relative density of essential oils at 20 °C.

NOTE If it is necessary to perform the test at a different temperature on account of the nature of the essential oil, the temperature should be mentioned in the International Standard appropriate to the essential oil concerned. The average correction in the region of 20 °C is from 0.0007 to 0.0008 per degree Celsius.

2 Normative reference

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

ISO 356, Essential oils — Preparation of test samples.

3 Terms and definitions

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

3.1 relative density at 20 °C
ratio of the mass of a given volume of the oil at 20 °C to the mass of an equal volume of distilled water at 20 °C

NOTE This quantity is dimensionless and its symbol is \( d_{20} \).

3.2 absolute density at 20 °C of an essential oil
ratio of the mass of a given volume of the oil at 20 °C to the same volume

NOTE This quantity is expressed in grams per millilitre.

4 Principle

Equal volumes of the essential oil and water, at 20 °C, are weighed successively in a pyknometer.
5 Reagents

5.1 Distilled water, freshly boiled and subsequently cooled to approximately 20 °C.

6 Apparatus

Ordinary laboratory apparatus and the following.

6.1 Glass pyknometer, of minimum nominal capacity of 5 ml.

NOTE 1 There are available on the market automatic electronic instruments for the accurate measurement of the relative density. Such instruments may be used for routine controls, but in cases of dispute the reference method is the pyknometric method.

NOTE 2 Appropriate pyknometers are described in ISO 3507 [2].

6.2 Water bath, capable of being maintained at 20 °C ± 0,2 °C.

6.3 Standardized thermometer, graduated from 10 °C to 30 °C, with 0,2 °C or 0,1 °C divisions.

6.4 Analytical balance, accurate to 0,001 g.

7 Sampling

It is important that the laboratory receive a representative sample which has not been damaged or modified during transportation or storage.

Sampling is not part of the method specified in this International Standard. A recommended sampling method is given in ISO 212 [1].

8 Special

Prepare the test sample in accordance with ISO 356.

9 Procedure

9.1 Preparation of pyknometer

Carefully clean the pyknometer (6.1) and then rinse it successively with, for example, ethanol and acetone, then dry the interior by means of a current of dry air.

If necessary, wipe the outside with a dry cloth or a filter paper.

When temperature equilibrium is reached between the balance case and the pyknometer, weigh the latter with its stopper, if any, to the nearest 1 mg.

9.2 Weighing of distilled water

Fill the pyknometer with distilled water (5.1).

Immerse the pyknometer in the water bath (6.2). After 30 min, adjust the water to the mark, if necessary. Insert the stopper, if any, and dry the outside as before with a dry cloth or a filter paper.

When temperature equilibrium is reached between the balance room and the pyknometer, weigh the latter and its stopper, if any, to the nearest 1 mg.
9.3 Weighing of essential oil

Empty the pyknometer, then wash it and dry it as specified in 9.1.

Proceed as specified in 9.2, replacing the water by the test sample prepared according to clause 8.

10 Expression of results

The relative density, \( d_{20}^{\text{rel}} \), is given by the following equation:

\[
\frac{m_2 - m_0}{m_1 - m_0}
\]

where

- \( m_0 \) is the mass, in grams, of the empty pyknometer determined in 9.1;
- \( m_1 \) is the mass, in grams, of the pyknometer filled with water, determined according to 9.2;
- \( m_2 \) is the mass, in grams, of the pyknometer filled with the essential oil, determined according to 9.3.

Express the result to three decimal places.

NOTE 1 In practice, no correction is made for the upthrust due to air.

NOTE 2 Electronic instruments often register higher accuracy levels.

If the absolute density of the essential oil is required, multiply the value obtained for the relative density by the absolute density of water at 20 °C (i.e. 0.99823 g/ml).

11 Test report

The test report shall state:

- the method used;
- the result obtained; and
- if repeatability has been verified, the final result obtained.

It shall also mention any operating conditions not specified in this International Standard, or regarded as optional, as well as any circumstances that might have influenced the results.

The test report shall include all details required for the complete identification of the sample.
Bibliography


Bureau of Indian Standards

BIS is a statutory institution established under the Bureau of Indian Standards Act, 1986 to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Copyright

BIS has the copyright of all its publications. No part of these publications may be reproduced in any form without the prior permission in writing of BIS. This does not preclude the free use, in the course of implementing the standard, of necessary details, such as symbols and sizes, type or grade designations. Enquiries relating to copyright be addressed to the Director (Publications), BIS.

Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of ‘BIS Catalogue’ and ‘Standards: Monthly Additions’.

This Indian Standard has been developed from Doc: No. PCD 18 (2354).

Amendments Issued Since Publication

<table>
<thead>
<tr>
<th>Amend No.</th>
<th>Date of Issue</th>
<th>Text Affected</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

BUREAU OF INDIAN STANDARDS

Headquarters:
Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones: 2323 0131, 2323 3375, 2323 9402  website: www.bis.org.in

Regional Offices:

Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg
NEW DELHI 110002

Eastern : 1/14 C.I.T. Scheme VII M, V.I.P. Road, Kankurgachi
KOLKATA 700054

Northern : SCO 335-336, Sector 34-A, CHANDIGARH 160022

Southern : C.I.T. Campus, IV Cross Road, CHENNAI 600113

Western : Manakalaya, E9 MIDC, Marol, Andheri (East)
MUMBAI 400093

Branches: AHMEDABAD, BANGALORE. BHOPAL. BHUBANESHWAR. COIMBATORE. FARIDABAD. GHAZIABAD. GUWAHATI. HYDERABAD. JAIPUR. KANPUR. LUCKNOW. NAGPUR. NALAGARH. PATNA. PUNE. RAJKOT. THIRUVANANTHAPURAM. VISAKHAPATNAM.

Printed at Simco Printing Press, Delhi