INTERNATIONAL STANDARD

ISO 279

Second edition
1998-12-15

Essential oils — Determination of relative density at 20 °C — Reference method

Huiles essentielles — Détermination de la densité relative à 20 °C — Méthode de référence

ISO 279:1998(E)

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 279 was prepared by Technical Committee ISO/TC 54, *Essential oils.*

This second edition cancels and replaces the first edition (ISO 279:1981), which has been technically revised.

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Essential oils — Determination of relative density at 20 °C — Reference method

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 0,000 7 to 0,000 8 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}^{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}^{20}, 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. 0,998 23 g/ml).

11 Test report

The test report shall state:

— the method used;

Bibliography

[1] ISO 212, *Essential oils — Sampling.*

[2] ISO 3507, *Laboratory glassware — Pyknometers.*

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ICS 71.100.60

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