International Standard 279

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

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

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up 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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 279 was developed by Technical Committee ISO/TC 54, *Essential oils*, and was circulated to the member bodies in December 1979.

It has been approved by the member bodies of the following countries :

Australia	Egypt, Arab Rep. of	Philippines
Austria	France	Portugal
Brazil	India	South Africa, Rep. of
Bulgaria	Italy	Sri Lanka
Canada	Korea, Rep. of	USSR
Chile	Netherlands	

No member body expressed disapproval of the document.

This International Standard cancels and replaces ISO Recommendation R 279-1962, of which it constitutes a technical revision.

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

1 Scope and field of application

This International Standard specifies the reference method for the determination of the relative density of essential oils at 20 °C.[1)]

2 References

ISO 212, *Essential oils — Sampling.*

ISO 356, *Essential oils — Preparation of test sample.*

ISO 3507, *Pyknometers.*

3 Definition

relative density at 20 °C of an essential oil : The 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.[2)]

This quantity is dimensionless and its symbol is d_{20}^{20}.

4 Principle

Successive weighing, in a pyknometer, of equal volumes of the essential oil and water, at 20 °C.

5 Apparatus

Ordinary laboratory apparatus, and

5.1 Glass pyknometer, of capacity according to the volume of essential oil available, conforming to ISO 3507.

5.2 Water bath, capable of being controlled at 20 ± 0,2 °C.

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

5.4 Analytical balance.

6 Sampling

See ISO 212.

7 Procedure

7.1 Preparation of the test sample

See ISO 356.

7.2 Preparation of pyknometer

Carefully clean the pyknometer (5.1) and then rinse it successively with, for example, ethanol and acetone and 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.

7.3 Weighing of distilled water

Fill the pyknometer with water, freshly boiled and cooled to approximately 20 °C.

Immerse the pyknometer in the water bath (5.2). 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.

7.4 Weighing of essential oil

Empty the pyknometer, wash it and dry it as specified in 7.2.

Proceed as specified in 7.3, replacing the water by the test sample (7.1).

1) If it is necessary to perform the test at a different temperature on account of the nature of the essential oil, the temperature shall 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) The apparent density at 20 °C of an essential oil is the ratio of the mass of a given volume of the oil at 20 °C to this volume.

8 Expression of results

The relative density d_{20}^{20} is given by the formula[1)]

$$\frac{m_2 - m_0}{m_1 - m_0}$$

where

m_0 is the mass, in grams, of the empty pyknometer (7.2);

m_1 is the mass, in grams, of the pyknometer filled with water (7.3);

m_2 is the mass, in grams, of the pyknometer filled with the essential oil (7.4).

Express the result to three decimal places.

NOTE — If the apparent density of the essential oil is required, multiply the relative density by the apparent density of water at 20 °C (i.e. 0,998 23 g/ml).

9 Test report

The test report shall state the method used and the 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.

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