INTERNATIONAL STANDARD

ISO 280

Second edition
1998-11-15

Essential oils — Determination of refractive index

Huiles essentielles — Détermination de l'indice de réfraction

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

This second edition cancels and replaces the first edition (ISO 280:1976), which has been technically revised.

International Organization for Standardization
Case postale 56 • CH-1211 Genève 20 • Switzerland
Internet iso@iso.ch

Printed in Switzerland

Essential oils — Determination of refractive index

1 Scope

This International Standard specifies a method for the determination of the refractive index of essential oils.

2 Normative reference

The 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, any of these publications 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 ISO and IEC maintain registers of currently valid International Standards.

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

3 Term and definition

For the purposes of this International Standard, the following term and definition apply.

3.1
refractive index, n_D^t
ratio of the sine of the angle of incidence to the sine of the angle of refraction, when a ray of light of defined wavelength passes from air into the essential oil kept at a constant temperature

NOTE The wavelength specified is 589,3 nm ± 0,3 nm corresponding to the D_1 and D_2 lines of the sodium spectrum.

4 Principle

According to the type of instrument used, either the angle of refraction is directly measured or the limit of total reflection is observed, the oil being maintained under conditions of isotropism and transparency.

5 Reagents

5.1 **Standard products**, of refractometry grade, to adjust the refractometer, as follows.

5.1.1 **Distilled water**, of refractive index 1,33 0 at 20 °C.

5.1.2 ***p*-Cymene**, of refractive index 1,490 6 at 20 °C.

5.1.3 **Benzyl benzoate**, of refractive index 1,568 5 at 20 °C.

5.1.4 **1-Bromonaphthalene**, of refractive index 1,658 5 at 20 °C.

6 Apparatus

6.1 **Refractometer**, allowing direct readings of refractive indices between 1,300 0 and 1,700 0 to be made with an accuracy of ± 0,000 2.

6.2 **Thermostat** or **apparatus for temperature maintenance**, which ensures a circulation of water through the refractometer, thus keeping the instrument at the reference temperature to within ± 0,2 °C.

6.3 **Light source**, sodium light.

NOTE Diffused daylight or light from an electric lamp may be used for refractometers fitted with an achromatic compensator.

6.4 **Plate of glass** (optional), of known refractive index.

7 Sampling

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

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

8 Procedure

8.1 Preparation of test sample

Prepare the test sample in accordance with ISO 356. Bring the test sample to the temperature at which the measurements shall be made.

8.2 Regulation of the refractometer

8.2.1 Regulate the refractometer (6.1) by measuring the refractive index of the standard products described in 5.1.1 to 5.1.4.

NOTE Some instruments may be adjusted by means of a plate of glass (6.4), according to the directions supplied by the manufacturer of the instrument.

1) ISO 212, *Essential oils — Sampling.*

8.2.2 Verify that the refractometer (6.1) is maintained at the temperature at which the readings shall be made.

This temperature shall not differ from the reference temperature by more than ± 0,2 °C during the test.

The reference temperature is 20 °C, except for those oils which are not liquid at this temperature, in which case a temperature of 25 °C or 30 °C, depending on the melting point of these essential oils, shall be used.

9 Determination

Place the test sample, prepared according to 8.1, in the refractometer. Wait until the temperature is stable and make the measurements.

10 Calculation

The refractive index n_D^t, at the specified temperature t, is given by the equation:

$$n_D^t = n_D^{t'} + 0{,}0004(t' - t)$$

where $n_D^{t'}$ is the reading taken at the working temperature t' at which the determination was actually made.

Express the result to four decimal places.

11 Repeatability

The absolute difference between two independent single test results, obtained using the same method on an identical essential oil in the same laboratory by the same operator using the same equipment within a short interval of time, will in not more than 5 % of cases be greater than ± 0,000 2.

12 Test report

The test report shall state:

— all details necessary for the complete identification of the sample;

— the sampling method used, if known;

— the test method used, with reference to this International Standard;

— all operating details not specified in this International Standard, or regarded as optional, together with details of any incidents which may have influenced the test result;

— the test result obtained;

— if repeatability has been checked, the final quoted result obtained.

ICS 71.100.60

Descriptors: oils, essential oils, tests, optical tests, determination, refractivity.

Price based on 3 pages