# INTERNATIONAL STANDARD 280

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# Essential oils — Determination of refractive index

*Huiles essentielles — Détermination de l'indice de réfraction*

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## FOREWORD

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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 280 was drawn up by Technical Committee ISO/TC 54, *Essential oils*. It was submitted directly to the ISO Council, in accordance with clause 6.12.1 of the Directives for the technical work of ISO.



This International Standard cancels and replaces ISO Recommendation R 280-1962, which had been approved by the Member Bodies of the following countries :



| | | |
|---|---|---|
| Australia | Greece | Portugal |
| Austria | Israel | Romania |
| Belgium | Italy | Spain |
| Canada | Japan | Sweden |
| Chile | Mexico | United Kingdom |
| Czechoslovakia | Netherlands | U.S.S.R. |
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The Member Body of the following country had expressed disapproval of the document on technical grounds :

India



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# Essential oils – Determination of refractive index



## 1 SCOPE AND FIELD OF APPLICATION



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

## 2 REFERENCES

ISO 212, *Essential oils – Sampling.*

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

## 3 DEFINITION

**refractive index of an essential oil** : The 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.

The wavelength is 589,3 ± 0,3 mm corresponding with the $D_1$ and $D_2$ lines of the sodium spectrum.

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.

## 4 PRINCIPLE

According to the type of instrument used, either direct measurement of the angle of refraction or observation of the limit of total reflection, the oil being maintained under conditions of isotropism and transparency.

## 5 APPARATUS

### 5.1 Refractometer

A recognized type of refractometer shall be used, allowing direct readings of refractive indices between 1,300 0 and 1,700 0 to be made with an accuracy of ± 0,000 2.

Adjust the apparatus so as to give at 20 °C the following refractive indices :

1,333 0 for distilled water,
1,490 6 for *p*-cymene,
1,568 5 for benzyl benzoate,
1,658 5 for 1-bromonaphthalene.

The products used for standards must be of refractometric grade.

Some instruments may also be adjusted by means of a plate of glass of known refractive index, according to the directions supplied by the manufacturer of the instrument.

### 5.2 Apparatus for temperature maintenance

Any apparatus may be used (for example a thermostat) which ensures a circulation of water through the refractometer, thus keeping the instrument at the necessary temperature to within ± 0,2 °C.

### 5.3 Light source

The determinations are made using sodium light. Diffused daylight or light from an electric lamp may be used for refractometers fitted with an achromatic compensator.

## 6 SAMPLING

See ISO 212.

## 7 PROCEDURE

### 7.1 Preparation of test sample

See ISO 356.

### 7.2 Determination

Pass a stream of water through the refractometer (5.1) so as to keep the instrument at the temperature at which the readings must be made (see clause 3). This temperature shall not differ from the reference temperature by more than ± 2 °C and shall be maintained within a tolerance of ± 0,2 °C.

Before placing the essential oil in the instrument, bring the test sample to a temperature similar to that at which the measurement must be made.

Make readings only when the temperature is stable.

## 8 EXPRESSION OF RESULTS

### 8.1 Calculation

The refractive index $n_D^t$, at the specified temperature $t$, is given by the formula

$$n_D^t = n_D^{t'} + 0{,}000\,4\,(t' - t)$$

where $n_D^{t'}$ is the reading taken at the working temperature $t'$.

Express the result to four decimal places.

### 8.2 Accuracy

The accuracy of the determination shall be ± 0,000 2.

## 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 result.

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