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Essential oil of *Eucalyptus*, Australian type

Huile essentielle d'Eucalyptus, type Australie

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

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

This third edition cancels and replaces the second edition (ISO 3065:2011), which has been technically revised.

The main changes to the previous edition are as follows:

- the title has been changed;
- the Scope has been extended;
- the structure of the standard has been revised;
- [3.1](#) has been reworded to include essential oil containing a volume fraction above 80 % of 1,8-cineole, obtained by steam distillation of foliage of eucalyptus;
- in [4.1](#), minor changes with refractive index (formerly 4.5) and optical rotation (formerly 4.6) have been included;
- in [4.2](#), more substantial changes to some components have been included, mainly a higher upper limit for 1,8-cineole and the omission of camphene, β -pinene, α -terpineol and camphor;
- in [Annex A](#), camphene and camphor have been omitted from peak identification in [Figures A.1](#) and [A.2](#).

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Essential oil of *Eucalyptus*, Australian type

1 Scope

This document specifies certain characteristics of the essential oil of *Eucalyptus*, Australian type, with a view to facilitating the assessment of its quality.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/TS 210, *Essential oils — General rules for packaging, conditioning and storage*

ISO/TS 211, *Essential oils — General rules for labelling and marking of containers*

ISO 212, *Essential oils — Sampling*

ISO 279, *Essential oils — Determination of relative density at 20 degrees C — Reference method*

ISO 280, *Essential oils — Determination of refractive index*

ISO 592, *Essential oils — Determination of optical rotation*

ISO 875, *Essential oils — Evaluation of miscibility in ethanol*

ISO 11024 (all parts), *Essential oils — General guidance on chromatographic profiles*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at <https://www.iso.org/obp>

— IEC Electropedia: available at <http://www.electropedia.org/>

3.1

essential oil of *Eucalyptus*, Australian type

essential oil containing a volume fraction in the range above 80 % of 1,8-cineole, obtained by steam distillation of foliage of eucalyptus

Note 1 to entry: The foliage of eucalyptus is from primarily *Eucalyptus polybractea* R. Baker, *E. radiata* Sieber ex DC. ssp. *radiata*, *E. smithii* R. Baker, *E. plenissima* (C. Gardner) Brooker, *E. kochii* Maiden and Blakely and other eucalyptus species rich in 1,8-cineole.

Note 2 to entry: For information on the CAS number, see ISO/TR 21092.

4 Requirements

4.1 General requirements

Essential oil of *Eucalyptus*, Australian type, shall meet the requirements given in [Table 1](#).

Table 1 — Requirements for the essential oil of *Eucalyptus*, Australian type

Characteristic	Requirements	ISO test method
Appearance	Clear, mobile liquid	—
Colour	Colourless to pale yellow	—
Odour	Fresh, aromatic and characteristic of 1,8-cineole	—
Relative density at 20 °C d_{20}^{20}	0,906 to 0,928	ISO 279
Refractive index at 20 °C	1,455 to 1,470	ISO 280
Optical rotation at 20 °C	Between - 1° and + 6°	ISO 592
Miscibility in ethanol 70 % (volume fraction), at 20 °C	One volume of the essential oil of <i>Eucalyptus</i> , Australian type, shall completely dissolve in three volumes of ethanol 70 % (volume fraction), at 20 °C	ISO 875

4.2 Chromatographic profile

Carry out the analysis of the essential oil by gas chromatography. Determine the chromatographic profile in accordance with ISO 11024 (all parts). Identify in the chromatogram obtained the representative and characteristic components shown in [Table 2](#). The proportions of these components, indicated by the integrator, shall be as shown in [Table 2](#). This constitutes the chromatographic profile of the essential oil.

Table 2 — Chromatographic profile

Component	Minimum %	Maximum %
α -Pinene	0,1	5,0
Sabinene	n.d.	2,0
α -Phellandrene	n.d.	1,5
Limonene	0,1	10,0
1,8-Cineole	80,0	95,0
<i>p</i> -Cymene	0,5	4,0

n.d. Not detected.

NOTE The chromatographic profile is normative, contrary to typical chromatograms given for information in [Annex A](#), see [Figures A.1](#) and [A.2](#).

5 Flash point

Information on the flash point is given in [Annex B](#).

6 Sampling

Sampling shall be performed in accordance with ISO 212. The minimum volume of the test sample is 50 ml.

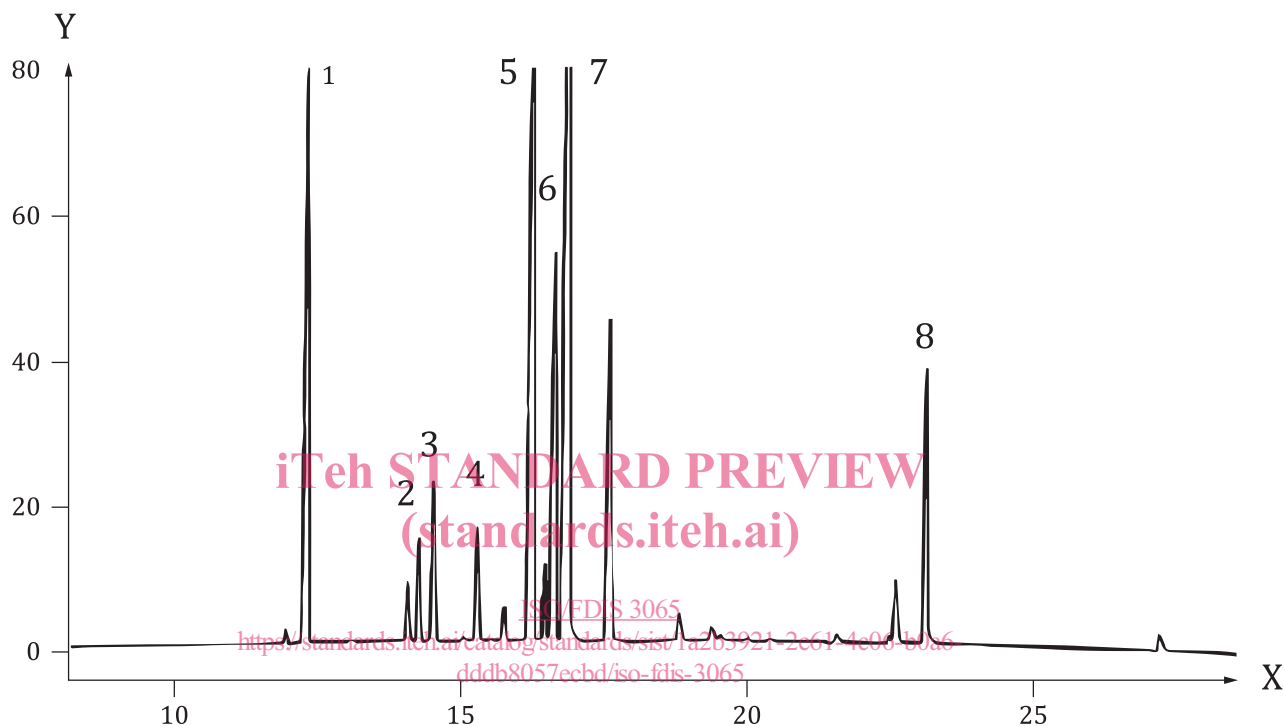
NOTE The volume allows each of the tests specified in this document to be carried out at least once.

7 Packaging labelling, marking and storage

These items shall be in accordance with ISO/TS 210 and ISO/TS 211.

Annex A (informative)

Typical chromatograms of the analysis by gas chromatography of the essential oil of *Eucalyptus*, Australian type



Peak identification

- | | |
|---|------------------------|
| 1 | α -pinene |
| 2 | sabinene |
| 3 | β -pinene |
| 4 | α -phellandrene |
| 5 | limonene |
| 6 | <i>p</i> -cymene |
| 7 | 1,8-cineole |
| 8 | α -terpineol |

Key

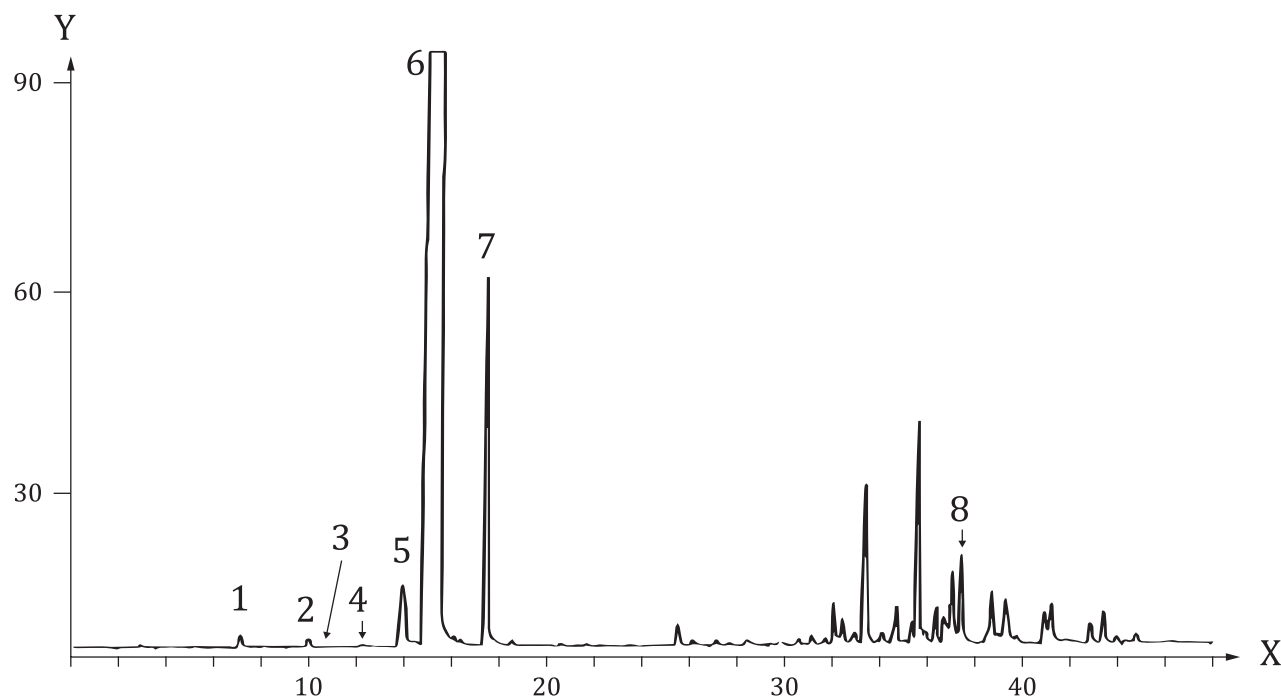
- | | |
|---|------------------------|
| Y | detector response (pA) |
| X | time (min) |

Operating conditions

- | | |
|------------------------|--|
| Column: | capillary, length 60 m, internal diameter 0,25 mm |
| Stationary phase: | 35 %-phenyl-65 %-methylpolysiloxane [AT-35 ^a] |
| Film thickness: | 0,25 μ m |
| Oven temperature: | Isothermal at 50 °C for 1 min, then temperature programming from 50 °C to 120 °C at 4 °C/min, then temperature programming from 120 °C to 250 °C at 8 °C/min, then isothermal at 250 °C for 10 min |
| Injector temperature: | 270 °C |
| Detector temperature: | 300 °C |
| Detector: | flame ionization type |
| Carrier gas: | hydrogen |
| Volume injected: | 0,06 μ l |
| Carrier gas flow rate: | 1 ml/min |
| Split: | 1/80 |

^a AT-35 is an example of a suitable product available commercially. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO of this product.

Figure A.1 — Typical chromatogram taken using a medium polarity column

**Peak identification**

- 1 α -pinene
- 2 β -pinene
- 3 sabinene
- 4 α -phellandrene
- 5 limonene
- 6 1,8-cineole
- 7 *p*-cymene
- 8 α -terpineol

Key

- Y detector response (pA)
- X time (min)

Operating conditions

- Column: fused silica capillary, length 60 m, internal diameter 0,25 mm
- Stationary phase: polyethylene glycol [DB-WAX^a]
- Film thickness: 0,25 μ m
- Oven temperature: Isothermal at 35 °C for 10 min, then temperature programming from 35 °C to 65 °C at 5 °C/min, then isothermal at 240 °C for 5 min
- Injector temperature: 280 °C
- Detector temperature: 250 °C
- Detector: flame ionization type
- Carrier gas: helium
- Volume injected: 0,1 μ l
- Lineal rate: 4 ml/min
- Split: 1/100

^a DB-WAX is an example of a suitable product available commercially. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO of this product.

Figure A.2 — Typical chromatogram taken using a polar column

Annex B (informative)

Flashpoint

B.1 General information

For safety reasons, transport companies, insurance companies and people in charge of safety services require information on the flash points of essential oils, which in most cases are flammable products.

A comparative study on the relevant methods of analysis (see ISO/TR 11018) concluded that it was difficult to recommend a single apparatus for standardization purposes, given that:

- there is a wide variation in the chemical composition of essential oils;
- the volume of the sample needed in certain requirements would be too costly for high-priced essential oils;
- as there are several different types of equipment which can be used for the determination, users cannot be expected to use one specified type only.

Consequently, it was decided to give a mean value for the flashpoint annexed to each International Standard, for information, in order to meet the requirements of the interested parties.

The equipment with which this value was obtained has to be specified.

For further information see [ISO/TR 11018](https://standards.iso.org/standards/sist/1a2b3921-2e61-4c06-b0a6-dddb8057ecbd/iso-fdis-3065) [ISO/FDIS 3065](https://standards.iso.org/standards/sist/1a2b3921-2e61-4c06-b0a6-dddb8057ecbd/iso-fdis-3065)

B.2 Flashpoint of the essential oil *Eucalyptus*, Australian type

The mean value is + 48 °C.

NOTE Obtained with Pensky-Martens equipment.

Bibliography

- [1] ISO 3218, *Essential oils — Principles of nomenclature*
- [2] ISO 4720, *Essential oils — Nomenclature*
- [3] ISO/TR 11018, *Essential oils — General guidance on the determination of flashpoint*
- [4] ISO/TR 21092, *Essential oils — Characterization*

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