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**Oil of fir needle, Siberian (*Abies sibirica*
Ledeb.)**

Huile essentielle de pin, Sibérie (Abies sibirica Ledeb.)



Reference number
ISO 10869:2010(E)

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Foreword

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The main task of technical committees is to prepare International Standards. 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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 10869 was prepared by Technical Committee ISO/TC 54, *Essential oils*.

Oil of fir needle, Siberian (*Abies sibirica* Ledeb.)

1 Scope

This International Standard specifies certain characteristics of the oil of fir needle, Siberian (*Abies sibirica* Ledeb.) in order to facilitate assessment of its quality.

2 Normative references

The following referenced documents are indispensable for the application 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/TR 210, *Essential oils — General rules for packaging, conditioning and storage*

ISO/TR 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 °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 1242, *Essential oils — Determination of acid value*

ISO 11024-1, *Essential oils — General guidance on chromatographic profiles — Part 1: Preparation of chromatographic profiles for presentation in standards*

ISO 11024-2, *Essential oils — General guidance on chromatographic profiles — Part 2: Utilization of chromatographic profiles of samples of essential oils*

3 Terms and definitions

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

3.1

oil of fir needle, Siberian

essential oil obtained by steam distillation of the leaves (needles) and terminal branches of fir, Siberian (*Abies sibirica* Ledeb.) growing mainly in Siberia

NOTE For information on CAS number, see ISO/TR 21092^[3].

4 Specifications

4.1 Appearance

Liquid.

4.2 Colour

Colourless to pale yellow.

4.3 Odour

Fresh, woody, resinous.

4.4 Relative density at 20 °C, d_{20}^{20}

Minimum: 0,895

Maximum: 0,912

4.5 Refractive index at 20 °C

Minimum: 1,468

Maximum: 1,473

4.6 Optical rotation at 20 °C

Minimum: -25°

Maximum: -40°

4.7 Miscibility in 90 % (volume fraction) ethanol at 20 °C

It shall not be necessary to use more than 10 volumes of 90 % (volume fraction) ethanol to obtain a clear solution with 1 volume of essential oil.

4.8 Acid value

Maximum: 1,0.

4.9 Chromatographic profile

Carry out the analysis of the essential oil by gas chromatography. Identify in the chromatogram obtained, the representative and characteristic components shown in Table 1. The proportions of these components, indicated by the integrator, shall be as shown in Table 1. This constitutes the chromatographic profile of the essential oil.

Table 1 — Chromatographic profile

Components	Minimum (%)	Maximum (%)
Santene	1,5	3,5
Tricyclene	1,5	3,5
α -Pinene	10,0	22,0
Camphene	15,0	26,0
β -Pinene	1,0	3,5
δ -3-Carene	9,0	15,0
Limonene	4,0	10,0
β -Phellandrene	1,5	5,0
Bornyl acetate	20,0	35,0
β -Caryophyllene	0,5	2,0
Isobornyl acetate	n.d. ^a	0,1
Borneol	1,0	3,0
α -Humulene	0,3	0,9
NOTE The chromatographic profile is normative, contrary to the typical chromatograms given for information in Annex A.		
^a Not detectable.		

4.10 Flashpoint

Information concerning the flashpoint is given in Annex B.

5 Sampling

See ISO 212.

Minimum volume of test sample: 25 ml.

NOTE This volume is sufficient to carry out all the tests specified in this International Standard at least once.

6 Test methods

6.1 Relative density at 20 °C, d_{20}^{20}

See ISO 279.

6.2 Refractive index at 20 °C

See ISO 280.

6.3 Optical rotation at 20 °C

See ISO 592.

6.4 Miscibility in 90 % (volume fraction) ethanol at 20 °C

See ISO 875.

6.5 Acid value

See ISO 1242.

6.6 Chromatographic profile

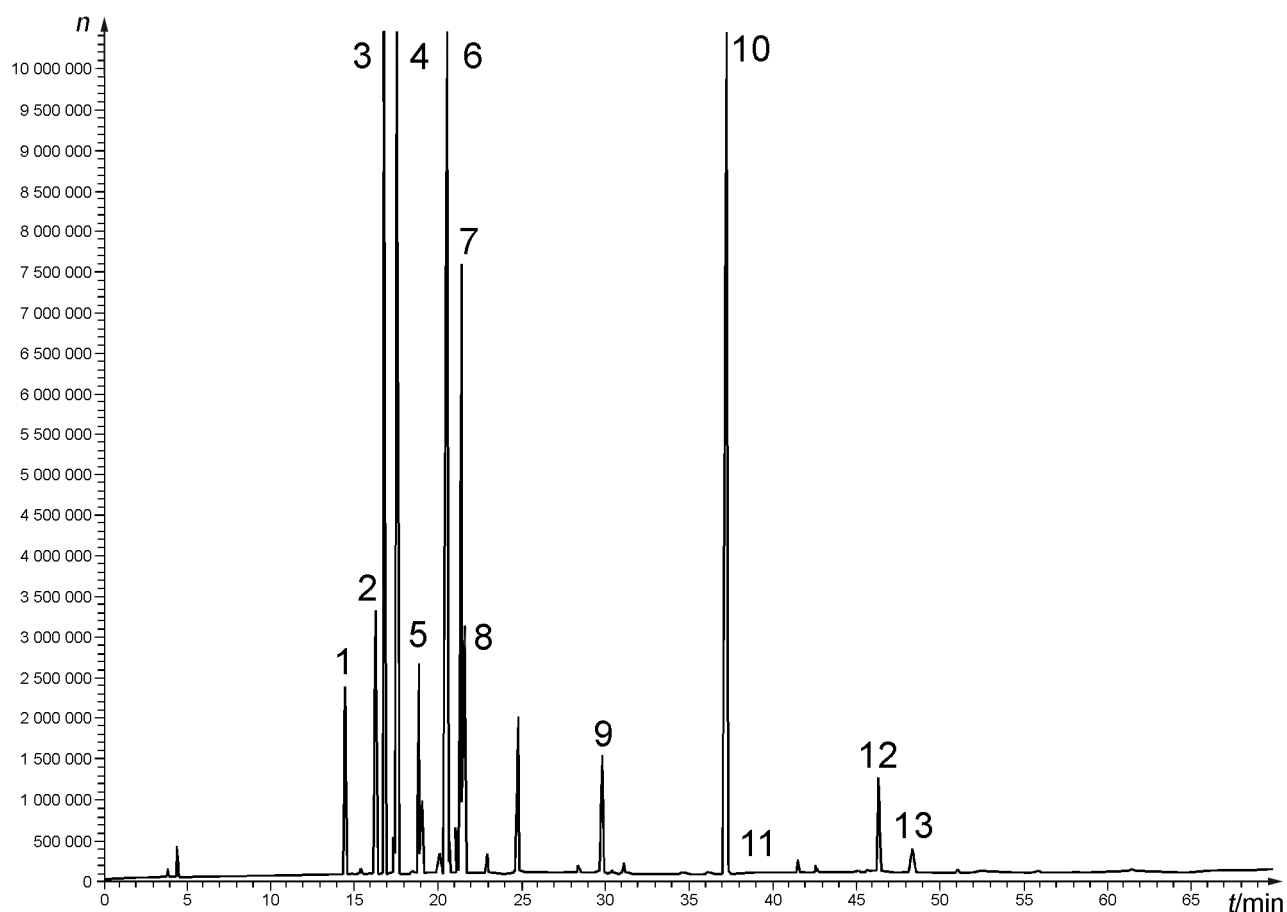
See ISO 11024-1 and ISO 11024-2.

7 Packaging, labelling, marking and storage

See ISO/TR 210 and ISO/TR 211.

Annex A (informative)

Typical chromatograms of the analysis by gas chromatography of the essential oil of fir needle, Siberian (*Abies sibirica* Ledeb.)



Peak identification

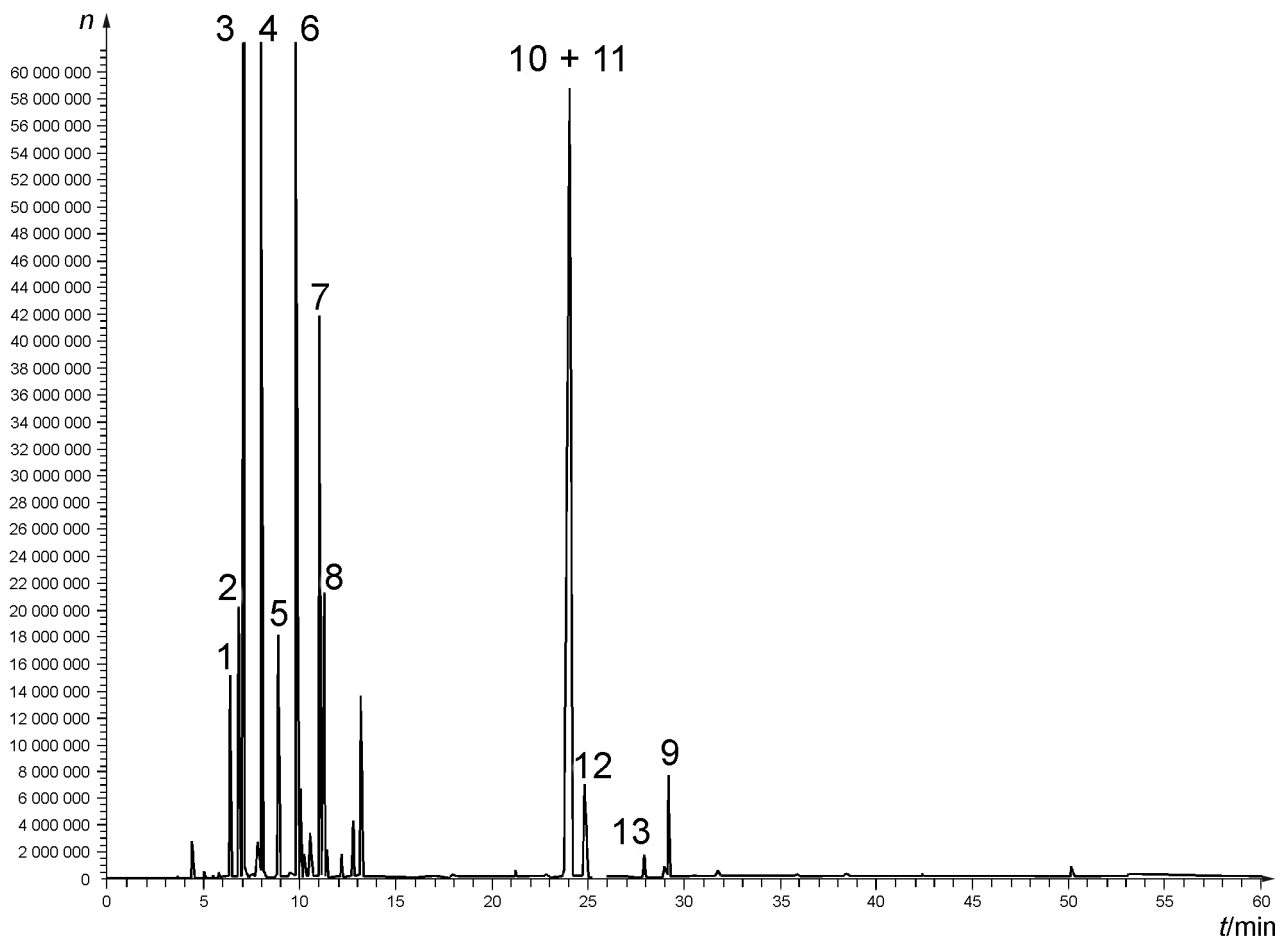
- 1 Santene
- 2 Tricyclene
- 3 α -Pinene
- 4 Camphene
- 5 β -Pinene
- 6 δ -3-Carene
- 7 Limonene
- 8 β -Phellandrene
- 9 Borneol
- 10 Bornyl acetate
- 11 Isobornyl acetate
- 12 β -Caryophyllene
- 13 α -Humulene

Operating conditions

Column: capillary, fused silica, 30 m length, 0,25 mm internal diameter
 Stationary phase: polydimethylsiloxane
 Film thickness: 0,25 μ m
 Oven temperature: temperature programming from 50 °C to 230 °C, at a rate of 2 °C/min
 Injector temperature: 230 °C
 Detector temperature: 250 °C
 Detector: flame ionization type
 Carrier gas: helium
 Volume injected: 0,1 μ l
 Carrier gas flow rate: 1 ml/min
 Split ratio: 1/90

n counts
 t time

Figure A.1 — Typical chromatogram taken on an apolar column



Peak identification

- 1 Santene
- 2 Tricyclene
- 3 α -Pinene
- 4 Camphene
- 5 β -Pinene
- 6 δ -3-Carene
- 7 Limonene
- 8 β -Phellandrene
- 9 Borneol
- 10 Bornyl acetate
- 11 Isobornyl acetate
- 12 β -Caryophyllene
- 13 α -Humulene

Operating conditions

Column: capillary, 30 m long and 0,25 mm internal diameter
 Stationary phase: polyethylene glycol [Carbowax BP20¹⁾]
 Film thickness: 0,25 μ m
 Oven temperature: temperature programming from 50 °C to 230 °C, at a rate of 2 °C/min
 Injector temperature: 230 °C
 Detector temperature: 250 °C
 Detector: flame ionization type
 Carrier gas: helium
 Volume injected: 0,1 μ l
 Carrier gas flow rate: 1 ml/min
 Split ratio: 1/90
n counts
t time

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

1) Carbowax BP20 is an example of a suitable product available commercially. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by ISO of this product.

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 flashpoints of essential oils, which in most cases are flammable products.

A comparative study on the relevant methods of analysis (see ISO/TR 11018^[2]) 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 for certain equipment is incompatible with the high price of 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^[2].

B.2 Flashpoint of the essential oil of fir needle, Siberian (*Abies sibirica* Ledeb.)

The mean value is 43 °C.

NOTE Obtained with Grabner Instruments²⁾ equipment.

2) Equipment available commercially. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by ISO of this product.

Bibliography

- [1] ISO 3960, *Animal and vegetable fats and oils — Determination of peroxide value — Iodometric (visual) endpoint determination*
- [2] ISO/TR 11018:1997, *Essential oils — General guidance on the determination of flashpoint*
- [3] ISO/TR 21092, *Essential oils — Characterization*

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