

# Oil of juniper berry (*Juniperus communis* L.)

ICS 71.100.60

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The UK participation in its preparation was entrusted to Technical Committee AW/54, Essential oils.

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# INTERNATIONAL STANDARD

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## Oil of juniper berry (*Juniperus communis* L.)

*Huile essentielle de baies de genévrier (Juniperus communis L.)*



Reference number  
ISO 8897:2010(E)

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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 8897 was prepared by Technical Committee ISO/TC 54, *Essential oils*.

This second edition cancels and replaces the first edition (ISO 8897:1991), which has been technically revised.



# Oil of juniper berry (*Juniperus communis* L.)

## 1 Scope

This International Standard specifies certain characteristics of oil of juniper berry (*Juniperus communis* L.), with a view to facilitating the 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

#### **essential oil of juniper berry**

essential oil obtained by steam distillation of the fresh, dried or fermented berries of *Juniperus communis* L., of the Cupressaceae family

NOTE For information on CAS number, see ISO/TR 21092<sup>[2]</sup>.

## 4 Requirements

### 4.1 Appearance

Liquid.

### 4.2 Colour

Colourless, pale green, pale yellow.

### 4.3 Odour

Fresh, warm, balsamic, and sweet-woody.

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

Minimum: 0,850.

Maximum: 0,880.

### 4.5 Refractive index at 20 °C

Minimum: 1,470.

Maximum: 1,483.

### 4.6 Optical rotation at 20 °C

Between 0° and –16°.

### 4.7 Miscibility in 95 % (volume fraction) ethanol at 20 °C

It shall not be necessary to use more than 10 volumes of 95 % (volume fraction) ethanol to obtain a clear solution with 1 volume of essential oil.

### 4.8 Acid value

Maximum: 2.

### 4.9 Chromatographic profile

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

### 4.10 Flashpoint

Information on the flashpoint is given in Annex B.



Table 1 — Chromatographic profile

Component	Minimum %	Maximum %
$\alpha$ -Pinene	25,0	45,0
Sabinene	4,0	20
$\beta$ -Pinene	1,0	12
Myrcene	3,0	22,0
Limonene	2,0	8,0
1-Terpinen-4-ol	1,0	6,0
<i>n</i> -Bornyl acetate	n.d. <sup>a</sup>	0,6
$\beta$ -Caryophyllene	1,5	5,0
$\alpha$ -Humulene	1,0	4,0
Germacrene D	1,0	5,0
$\delta$ -Cadinene	1,0	3,5
NOTE The chromatographic profile is normative, contrary to typical chromatograms given for information in Annex A.		
<sup>a</sup> Not detectable.		

## 5 Sampling

See ISO 212.

Minimum volume of the final sample: 25 ml.

NOTE This volume allows each of the tests specified in this International Standard to be carried out 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 with 95 % (volume fraction) ethanol at 20 °C

See ISO 875.

## **6.5 Acid value**

See ISO 1242.

## **6.6 Chromatographic profile**

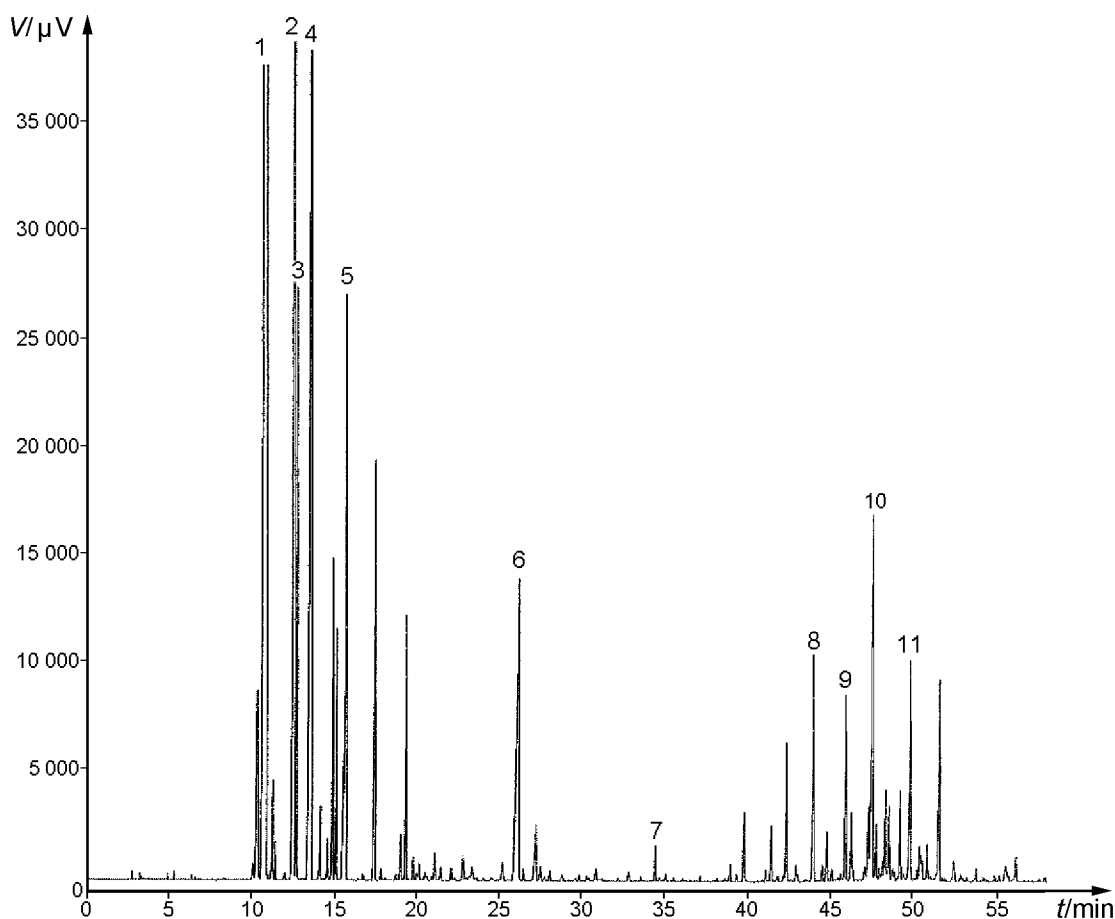
See ISO 11024-1 and ISO 11024-2.

## **7 Packaging, labelling and marking**

See ISO/TR 210 and ISO/TR 211.

## Annex A (informative)

### Typical chromatograms of the analysis by gas chromatography of the essential oil of juniper berry (*Juniperus communis* L.)



#### Peak identification

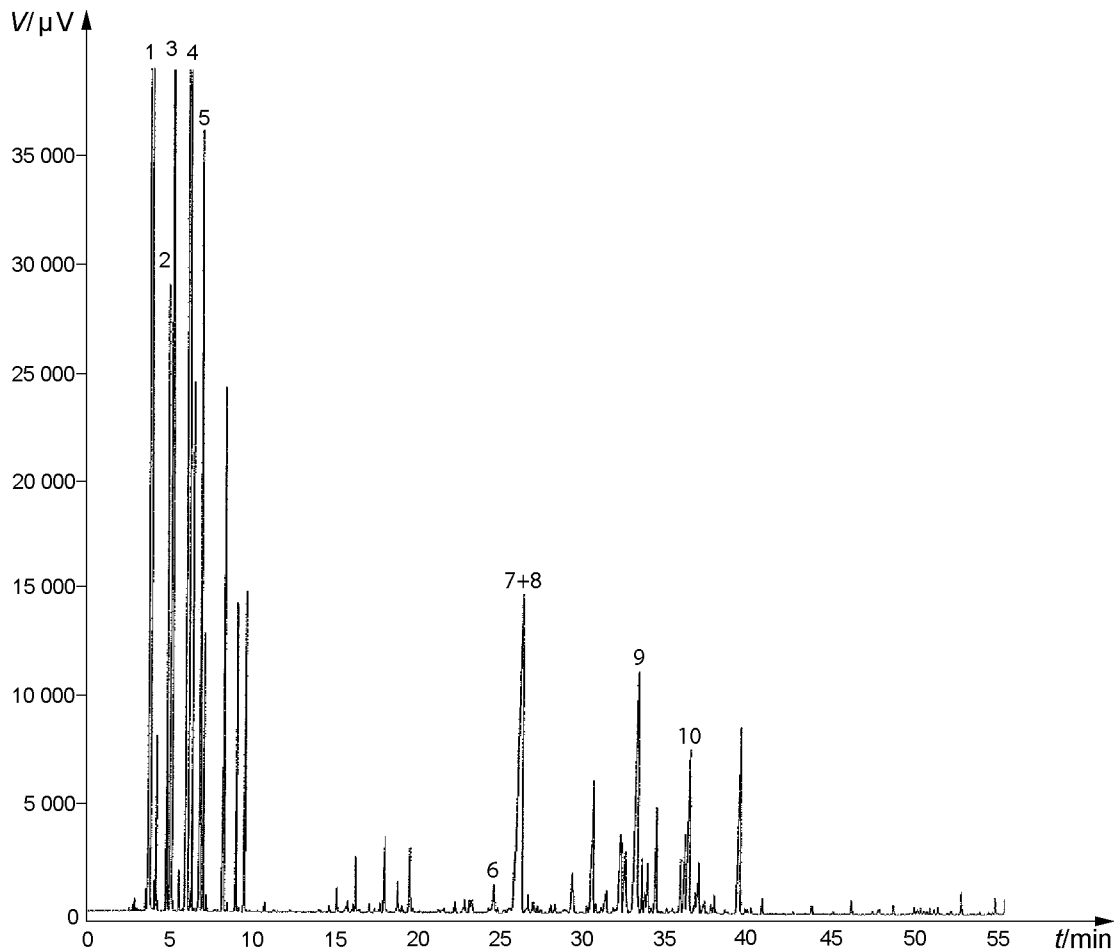
- 1  $\alpha$ -Pinene
- 2  $\beta$ -Pinene
- 3 Sabinene
- 4 Myrcene
- 5 Limonene
- 6 1-Terpinen-4-ol
- 7 *n*-Bornyl acetate
- 8  $\beta$ -Caryophyllene
- 9  $\alpha$ -Humulene
- 10 Germacrene D
- 11  $\delta$ -Cadinene
- t* time

#### Operating conditions

Column: silica capillary; length 50 m; internal diameter 0,20 mm  
 Stationary phase: polydimethylsiloxane  
 Film thickness: 0,25  $\mu$ m  
 Oven temperature: 65 °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: hydrogen  
 Volume injected: 0,2  $\mu$ l  
 Split ratio: 1:100

*V* response

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



**Peak identification**

- 1  $\alpha$ -Pinene
- 2  $\beta$ -Pinene
- 3 Sabinene
- 4 Myrcene
- 5 Limonene
- 6 *n*-Bornyl acetate
- 7 1-Terpinen-4-ol
- 8  $\beta$ -Caryophyllene
- 9 Germacrene D
- 10  $\delta$ -Cadinene

*t* time

**Operating conditions**

Column: silica capillary; length 50 m; internal diameter 0,20 mm  
 Stationary phase: polyethylene glycol  
 Film thickness: 0,25  $\mu$ m  
 Oven temperature: 65 °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: hydrogen  
 Volume injected: 0,2  $\mu$ l  
 Split ratio: 1:100  
 Carrier gas flow rate: 1 ml/min

*V* response

**Figure A.2 — Typical chromatogram taken on 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 flashpoints of essential oils, which in most cases are flammable products.

A comparative study on the relevant methods of analysis (see ISO/TR 11018<sup>[1]</sup>) 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 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<sup>[1]</sup>.

#### B.2 Flashpoint of the essential oil of juniper berry (*Juniperus communis* L.)

The mean value is +41 °C.

NOTE Obtained with "Setaflash"<sup>1)</sup> equipment.

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1) 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.

## Bibliography

- [1] ISO/TR 11018, *Essential oils — General guidance on the determination of flashpoint*
- [2] ISO/TR 21092, *Essential oils — Characterization*



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