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**Oil of lemongrass [*Cymbopogon flexuosus* (Nees ex Steudel) J.F. Watson]**

*Huile essentielle de lemongrass [Cymbopogon flexuosus (Nees ex Steudel) J.F. Watson]*

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Reference number  
ISO 4718:2004(E)

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Published in Switzerland

## Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

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 4718 was prepared by Technical Committee ISO/TC 54, *Essential oils*.

This second edition cancels and replaces the first edition (ISO 4718:1981), which has been technically revised.

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# Oil of lemongrass [*Cymbopogon flexuosus* (Nees ex Steudel) J.F. Watson]

## 1 Scope

This International Standard specifies certain characteristics of the oil of lemongrass [*Cymbopogon flexuosus* (Nees ex Steudel) J.F. Watson], 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 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 lemongrass

essential oil obtained by steam distillation of the fresh aerial parts of *Cymbopogon flexuosus* (Nees ex Steudel) J.F. Watson, of the Poaceae family.

NOTE For information on the CAS number, see ISO/TR 21092.

## 4 Requirements

### 4.1 Appearance

Clear, mobile liquid.

### 4.2 Colour

Pale yellow to yellowish brown.

### 4.3 Odour

Strong, green, resembling that of citral.

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

Minimum: 0,885

Maximum: 0,905

### 4.5 Refractive index at 20 °C

Minimum: 1,483

Maximum: 1,489

### 4.6 Optical rotation at 20 °C

Between  $-4^{\circ}$  and  $+1^{\circ}$ .

#### 4.7 Miscibility in ethanol, 70 % (volume fraction), at 20 °C

It shall not be necessary to use more than 3 volumes of ethanol, 70 % (volume fraction), to obtain a clear solution with 1 volume of essential oil.

#### 4.8 Chromatographic profile

Analysis of the essential oil shall be carried out by gas chromatography. In the chromatogram obtained, the representative and characteristics components shown in Table 1 shall be identified. 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

Component	Minimum %	Maximum %
Limonene	0,5	3,5
6-Methyl-5-heptene-2-one	0,1	2,0
Caryophyllene	0,2	3,5
Neral	25,0	35,0
Geranial	35,0	47,0
Geranyl acetate	0,5	6,0
Geraniol	1,5	8,0

NOTE The chromatographic profile is normative, contrary to typical chromatogram given for information in Annex A.

#### 4.9 Flashpoint

Information on the flashpoint is given in Annex B.

### 5 Sampling

See ISO 212.

Minimum volume of test 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 in ethanol, 70 % (volume fraction), at 20 °C

See ISO 875.

#### 6.5 Chromatographic profile

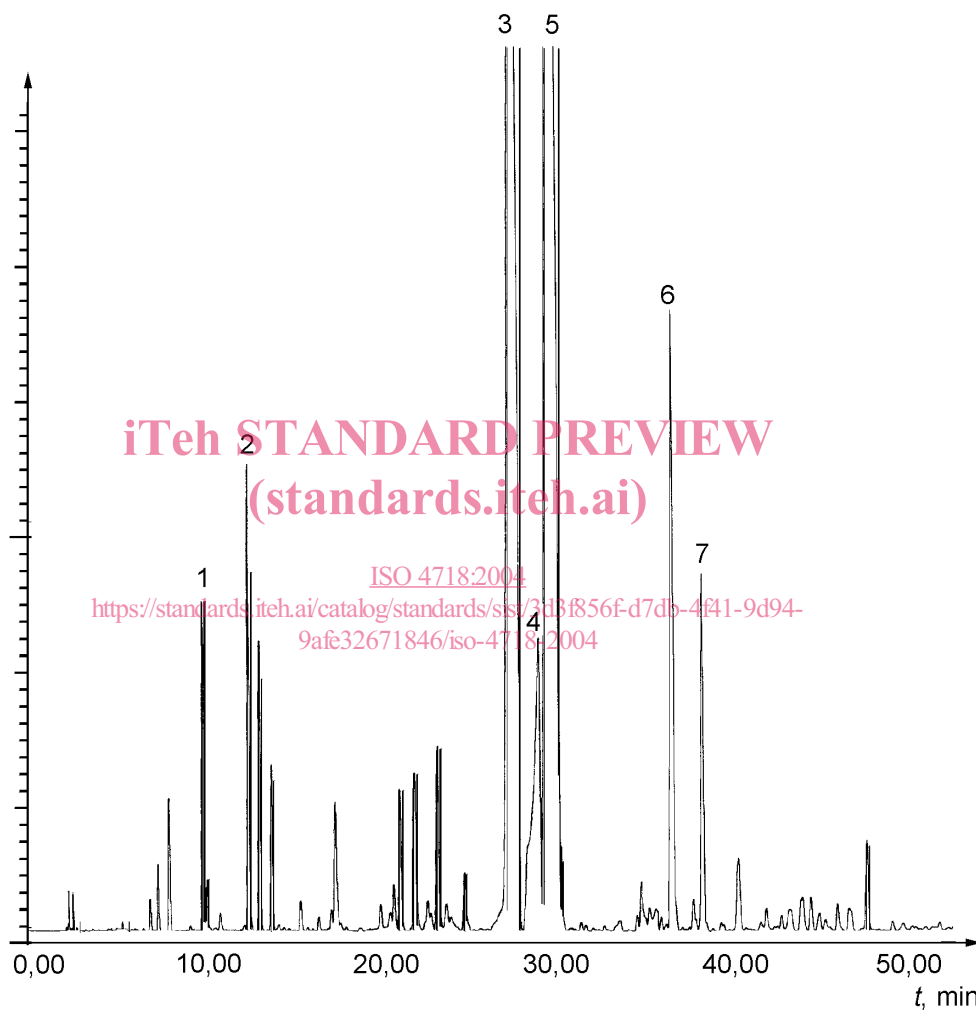
See ISO 11024-1 and ISO 11024-2.

### 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 lemongrass [*Cymbopogon flexuosus* (Nees ex Steudel) J.F. Watson]



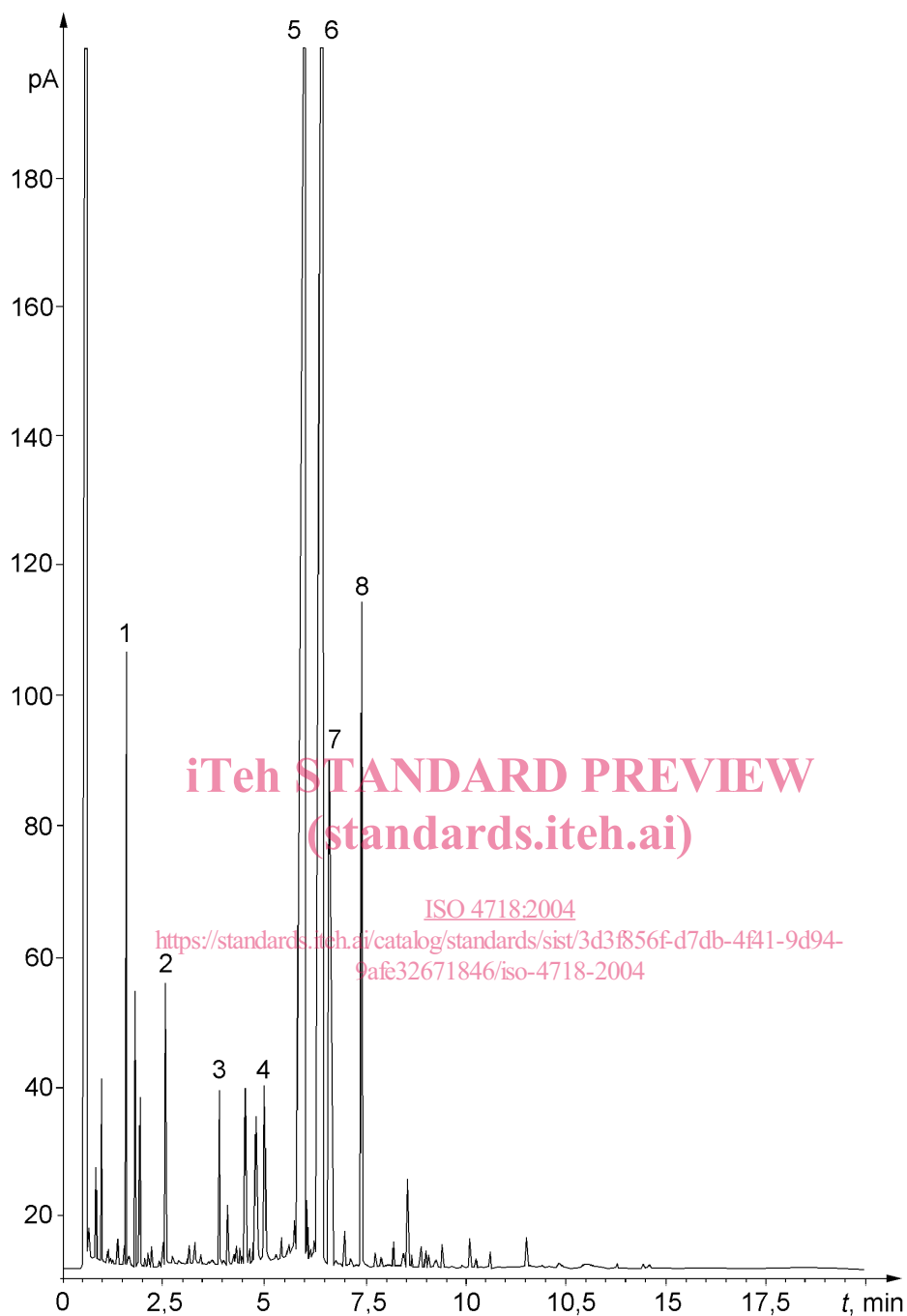
#### Peak identification

- 1 6-Methyl-5-hepten-2-one
- 2 Limonene
- 3 Neral
- 4 Geraniol
- 5 Geranial
- 6 Geranyl acetate
- 7 Caryophyllene

#### Operating conditions

Column: capillary; length 30 m; internal diameter 320  $\mu$ m  
 Stationary phase: poly(dimethyl siloxane)  
 Film thickness: 0,25  $\mu$ m  
 Oven temperature: isothermal at 70 °C for 10 min, then temperature programming  
 from 70 °C to 220 °C at a rate of 2 °C/min  
 Injector temperature: 250 °C  
 Detector temperature: 250 °C  
 Detector: flame ionization type  
 Carrier gas: hydrogen  
 Volume injected: 0,2  $\mu$ l  
 Carrier gas flow rate: 0,3 ml/min

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



#### Peak identification

- 1 Limonene
- 2 6-Methyl-5-hepten-2-one
- 3 Citronellal
- 4 Caryophyllene
- 5 Neral
- 6 Geranial
- 7 Geranyl acetate
- 8 Geraniol

#### Operating conditions

Column: capillary; length 10 m; internal diameter 0,100 mm  
 Stationary phase: poly(ethylene glycol) (Supercowax-10®)  
 Film thickness: 0,1 µm  
 Oven temperature: 60 °C to 240 °C at a rate of 12 °C/min, then 240 °C for 18 min  
 Injector temperature: 250 °C  
 Detector temperature: 250 °C  
 Detector: flame ionization type  
 Carrier gas: hydrogen  
 Volume injected: 1 µl  
 Carrier gas flow rate: 0,7 ml/min  
 Split ratio: 150/1

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) 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 in an informative annex to each International Standard, in order to meet the requirements of the interested parties.

The equipment with which this value was obtained should be specified.

For further information, see ISO/TR 11018.

#### B.2 Flashpoint of the essential oil of lemongrass

The mean value is +89 °C.

NOTE Obtained with Pensky Martens equipment.

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