



**SLOVENSKI STANDARD**  
**oSIST prEN ISO 18134-3:2022**  
**01-september-2022**

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**Trdna biogoriva - Določevanje vlage - Metoda sušenja v peči - 3. del: Vlaga v splošnem analiznem vzorcu (ISO/DIS 18134-3:2022)**

Solid biofuels - Determination of moisture content - Oven dry method - Part 3: Moisture in general analysis sample (ISO/DIS 18134-3:2022)

Biogene Festbrennstoffe – Bestimmung des Wassergehaltes – Ofentrocknung – Teil3: Wassergehalt in allgemeinen Analysenproben (ISO/DIS 18134-3:2022)

Biocombustibles solides - Dosage de la teneur en humidité - Méthode de séchage à l'étuve - Partie 3: Humidité de l'échantillon pour analyse générale (ISO/DIS 18134-3:2022)

**Ta slovenski standard je istoveten z: prEN ISO 18134-3**

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**ICS:**

75.160.40      Biogoriva                                      Biofuels

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# DRAFT INTERNATIONAL STANDARD

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## Solid biofuels — Determination of moisture content — Oven dry method —

### Part 3: Moisture in general analysis sample

*Biocombustibles solides — Méthode de détermination de la teneur en humidité — Méthode de séchage à l'étuve —*

*Partie 3: Humidité de l'échantillon pour analyse générale*

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ICS: 27.190; 75.160.40

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## ISO/DIS 18134-3:2022(E)

### 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](http://www.iso.org/directives)).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

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](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee [or Project Committee] ISO/TC 238.

This second edition cancels and replaces the first edition (ISO 18134-3:2015), which has been technically revised.

The main changes compared to the previous edition are as follows:

- The revision is required in order to add a cautionary statement to avoid gain or loss of moisture during sample preparation; to update references, and to make other minor editorial corrections.

A list of all parts in the ISO 18134 series can be found on the ISO website.

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](http://www.iso.org/members.html).

# Solid biofuels — Determination of moisture content — Oven dry method —

## Part 3: Moisture in general analysis sample

### 1 Scope

This part of ISO 18134 describes the method of determining the moisture in the analysis test sample by drying in an oven. It is intended to be used for general analysis samples in accordance with ISO 14780. The method described in this part of ISO 18134 is applicable to all solid biofuels. The moisture content of solid biofuels (as received) is always reported based on the total mass of the test sample (wet basis).

Since biofuels in small particle size are very hygroscopic, their moisture content will change with humidity in the atmosphere and therefore, the moisture of the test portion is determined simultaneously with determination of for example calorific value, carbon content, and nitrogen content.

NOTE The term moisture content when used with biomass materials can be misleading since untreated biomass frequently contains varying amounts of volatile compounds (extractives) which can evaporate when determining the moisture content by oven drying (see References<sup>[1]</sup> and<sup>[2]</sup>).

### 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 14780, *Solid biofuels — Sample preparation*

ISO 16559, *Solid biofuels — Vocabulary*

ISO 18135, *Solid Biofuels — Sampling*

ISO 21945, *Solid biofuels — Simplified sampling method for small scale applications*

ISO 11722, *Solid mineral fuels — Hard coal — Determination of moisture in the general analysis test sample by drying in nitrogen*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 16559 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 <https://www.electropedia.org/>

### 4 Principle

The test portion of solid biofuel is dried at a temperature of 105 °C in air atmosphere until constant mass is achieved and the percentage moisture is calculated from the loss in mass of the test portion.

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Automatic equipment such as gravimetric analyzers can be used when the method is validated with biomass reference test samples of selected biomass type. Analysis with such equipment shall fulfil all the requirements given in [Clause 7](#) regarding sample size, temperature, atmosphere, and weighing accuracy.

The analysis sample can be dried in air atmosphere or in nitrogen atmosphere. If the sample material is susceptible to oxidation (at 105 °C), drying in nitrogen atmosphere is preferred in accordance with ISO 11722. The used drying atmosphere should be reported in accordance with [Clause 10](#).

## 5 Apparatus

**5.1 Drying oven**, capable of being controlled at a temperature within a range of  $(105 \pm 2)$  °C and in which the air atmosphere changes between three and five times per hour.

**5.2 Drying oven**, capable of being controlled at a temperature within the range of  $(105 \pm 2)$  °C and in which the air atmosphere changes between three and five times per hour.

The air velocity shall be such that the test portion particles are not dislodged from their tray.

The use of nitrogen atmosphere is detailed in ISO 11722.

NOTE It is important that drying ovens maintain a consistent temperature throughout the heated chamber.

The temperature tolerance provided is intended for all locations within the oven.

**5.3 Dishes and trays**, of non-corrodible and heat-resistant material and of such dimension that they will hold the total test portion in a layer not exceeding 0,2 g of material per cm<sup>2</sup> and covered by a well fitted lid. The surface of the trays shall be such that the possibility to adsorption/absorption is minimized (very clean and even surface).

**5.4 Balance**, capable of reading to the nearest 0,1 mg.

**5.5 Desiccator with desiccant** to minimize absorption by the test portion of moisture from the atmosphere.

## 6 Sample preparation

### 6.1 General

Test samples for the determination of total moisture content shall be obtained in accordance with ISO 18135 or ISO 21945 and shall be received in the laboratory in sealed air-tight containers or bags. A test portion shall be prepared in accordance with ISO 14780 and the nominal top size reduced to below 1 mm.

**WARNING — Dried solid biofuels are hygroscopic. Precautions shall be taken to ensure that moisture is not lost during preparation of the test portion. Significant losses of moisture from test portion will occur after a few minutes in room atmosphere.**

Before commencing the determination, mix the analysis sample in its container, preferably by mechanical means, to ensure a well-mixed sample.

### 6.2 Size of test portion

The mass of the test portion shall have a minimum mass of 1 g.



## 7 Procedure

Dry an empty weighing dish with its lid at  $(105 \pm 2)$  °C until constant in mass and cool it to room temperature in a desiccator (5.4).

NOTE Several dishes can be handled at the same time.

Weigh the weighing dish with its lid to the nearest 0,1 mg.

Add minimum 1 g of the test portion into the weighing dish in an even layer and weigh the weighing dish with its lid plus the test portion to the nearest 0,1 mg.

Heat the uncovered dish and its lid with the test portion at  $(105 \pm 2)$  °C in the temperature controlled oven until constant mass has been achieved. Constant mass is defined as a change not exceeding 1 mg in mass during a heating period of 60 min. The drying time required will depend on the particle size of the material, the rate of atmospheric change in the oven, and the thickness of the layer of material. Allow for up to 3 h.

Replace the lid immediately upon removal from the oven. Transfer the dish and its contents to a desiccator. Let it cool in the desiccator to room temperature.

Remove the dish and its lid with the test portion from the desiccator and weigh to the nearest 0,1 mg. Since small particle size biofuels are very hygroscopic, it is important to weigh rapidly once the test portion taken out of the desiccator.

The moisture content determination shall be conducted in duplicate.

## 8 Calculation

The moisture content,  $M_{ad}$ , of the test portion, *as analysed*, expressed as a percentage by mass, shall be calculated in accordance with [Formula \(1\)](#):

$$M_{ad} = \frac{(m_2 - m_3)}{(m_2 - m_1)} \times 100 \quad (1)$$

where

$m_1$  is the mass in grams of the empty dish plus lid;

$m_2$  is the mass in grams of the dish plus lid plus test portion before drying;

$m_3$  is the mass in grams of the dish plus lid plus test portion after drying.

The result shall be calculated to two decimal places and the mean value of both determinations shall be rounded to the nearest 0,1 % for reporting.

## 9 Performance characteristics

### 9.1 Repeatability

The result of duplicate determinations, carried out in the same laboratory, by the same operator, with the same apparatus on representative portions weighed out at the same time from the analysis sample, shall not differ more than 0,2 % absolute.

### 9.2 Reproducibility

Since the humidity of the atmosphere and other factors in different laboratories may vary, it is not practical to quote a value regarding reproducibility.

**ISO/DIS 18134-3:2022(E)****10 Test report**

The test report shall include at least the following information:

- a) identification of the laboratory performing the test and the date of the test;
- b) identification of product (or sample) tested;
- c) a reference to this part of ISO 18134, i.e. ISO 18134-3;
- d) results of the test *on wet basis* (alternatively for all standards: results of the test including the basis in which they are expressed, as indicated in [Clause 8](#));
- e) any unusual features noted during the determination, which can affect the result;
- f) any deviation from this part of ISO 18134, or operations regarded as optional.

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