



SLOVENSKI STANDARD
oSIST prEN ISO 18122:2021
01-december-2021

Trdna biogoriva - Določevanje vsebnosti pepela (ISO/DIS 18122:2021)

Solid biofuels - Determination of ash content (ISO/DIS 18122:2021)

Biogene Festbrennstoffe - Bestimmung des Aschegehaltes (ISO/DIS 18122:2021)

Biocombustibles solides - Détermination de la teneur en cendres (ISO/DIS 18122:2021)

Ta slovenski standard je istoveten z: prEN ISO 18122

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ICS:

75.160.40 Biogoriva Biofuels

oSIST prEN ISO 18122:2021 **en,fr,de**

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DRAFT INTERNATIONAL STANDARD

ISO/DIS 18122

ISO/TC 238

Secretariat: SIS

Voting begins on:
2021-10-01Voting terminates on:
2021-12-24

Solid biofuels — Determination of ash content

Biocombustibles solides — Méthode de détermination de la teneur en cendres

ICS: 27.190; 75.160.40

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Reference number
ISO/DIS 18122:2021(E)

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Published in Switzerland

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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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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 238, Solid biofuels.

This second edition cancels and replaces the first edition (ISO 18122:2015), which has been technically revised.

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

- The revision is required in order to provide more detailed descriptions of the ashing furnace and ashing procedure, update the repeatability and reproducibility performance data, update several references, and make other minor editorial corrections.

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.

Introduction

Ash content is an important parameter for fuel deliveries since ash is a by-product of combustion and ends up as bottom ash or fly-ash and needs to be removed. Depending on the jurisdiction, ash may be deposited or used for production of other products and knowing how much ash comes with a fuel may have economic consequences. In addition, the chemical composition of ash contributes to slagging and corrosion in the combustion equipment and it is therefore important to know the amount of ash contained in a fuel. Other testing standards are used for determining the chemical composition of ash.

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Solid biofuels — Determination of ash content

1 Scope

This document specifies a method for the determination of ash content of all solid biofuels.

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 — Terminology, definitions and descriptions*

ISO 18134-3, *Solid Biofuels — Determination of moisture content — Oven dry method — Part 3: Moisture in general analysis sample*

ISO 18135, *Solid Biofuels — Sampling*

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

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 ash content is determined by calculating the mass of the residue remaining after the sample is heated in air under rigidly controlled conditions of time, sample weight and equipment specifications to a controlled final temperature. The final temperature of 550 ± 10 °C is considered standard, however other final temperatures can be used provided all other furnace conditions (e.g. air flows, temperature ramp rates, hold times, etc.) remain the same and the alternate final temperature is clearly referenced on the test report. Alternative final temperatures referenced in other test methods include 710 °C and 815 °C. The repeatability and reproducibility limits provided in [clause 9](#) are not applicable to alternate final temperatures.

Automatic equipment (such as gravimetric analysers) may be used when the method is validated with biomass reference samples of an adequate biomass type. The automatic equipment shall fulfil all the requirements given in [Clause 7](#) regarding sample size, heating procedure, atmosphere, temperature, and weighing accuracy.

NOTE Difference in the ash content if determined at a higher temperature, 815 °C, according to Reference [1] as compared to 550 °C, is explained by the decomposition of carbonates forming CO₂, by losses of volatile inorganic compounds and further oxidation of inorganic compounds (to higher oxidation states)

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5 Apparatus

5.1 Dish

A dish of inert material, such as porcelain, silica, or platinum and of such size that the test sample loading does not exceed 0,1 g/cm² of bottom area.

NOTE If the test sample loading exceeds 0,1 g/cm² of bottom area there is a risk of incomplete incineration (in the lower sample layer) or absorption of CO₂ in the ash layer at the top (as CaCO₃) of calcium rich samples (as e.g. pure wood).

5.2 Furnace

The furnace shall be capable of providing a zone of uniform heat at the temperatures required and reaching these temperatures within the specified times. The air exchange in the furnace shall be sufficient to remove the flue gasses SO₂ and CO₂ formed during decomposition of the biofuel before these gases react with the ash components during the heating procedure.

NOTE For preparation of coal ashes according to ISO 1171, 5 to 10 air exchanges/min are necessary to eliminate reaction of SO₂ and CO₂ with the ash. For biomass there is currently no scientific proof for the influence of air exchange in the ashing furnace although an influence is expected. Biomass usually has a lower ash content and ash is of light weight in comparison to coal ash. This property can cause the ash to be blown from the ashing crucible which can limit air exchange possibilities. A sensitivity analysis of variation of these parameters on the result of ashing can be valuable for a certain set-up.

5.3 Balance

The balance shall be capable of reading to the nearest 0,1 mg.

5.4 Desiccator and desiccant

A desiccator with appropriate desiccant is required to prevent absorption of moisture from the atmosphere by the test sample.

WARNING — Ash from solid biofuel is very hygroscopic and there is a risk that moisture bound in the desiccant can be absorbed in the sample. Therefore, the desiccant shall be controlled frequently and dried if necessary. In addition, lids shall be used to cover dishes while in the desiccator to prevent the absorption of moisture.

6 Sample preparation

A laboratory sample for the determination of ash content shall be obtained in accordance with ISO 18135 or ISO 21945. From the laboratory sample a general analysis sample is prepared in accordance with ISO 14780 and has a nominal particle top size of 1 mm or less.

6.1 Sample size

The general analysis sample shall include material sufficient for determination of ash content and moisture content.

6.2 Sample conditioning

The determination of ash content shall be done either

- a) directly on a test portion of the general analysis sample, including a concurrent determination of the moisture content of a similar test portion in accordance with ISO 18134-3, or