SLOVENSKI STANDARD
oSIST prEN ISO 21663:2020

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Trdna alternativna goriva - Metode za določevanje ogljika (C), vodika (H), dušika (N) in žvepla (S) z instrumentalno metodo (ISO/DIS 21663:2019)

Solid recovered fuels - Methods for the determination of carbon (C), hydrogen (H), nitrogen (N) and sulphur (S) by the instrumental method (ISO/DIS 21663:2019)

Feste Sekundärbrennstoffe - Verfahren zur instrumentellen Bestimmung des Gehaltes an Kohlenstoff (C), Wasserstoff (H), Stickstoff (N) und Schwefel (S) (ISO/DIS 21663:2019)

Combustibles solides de récupération - Méthodes de détermination de la teneur en carbone (C), hydrogène (H), azote (N) et soufre (S) par la méthode instrumentale (ISO/DIS 21663:2019)

Ta slovenski standard je istoveten z: **prEN ISO 21663**

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Solid recovered fuels — Methods for the determination of carbon (C), hydrogen (H), nitrogen (N) and sulphur (S) by the instrumental method

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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 300 *Solid recovered fuels*.

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

The determination of total content of carbon, hydrogen, nitrogen and sulfur is usually performed using instrumental methods. Depending on the amount of test portion used two different types of instrumental methods can be used: micro methods require few mg of sample; macro methods use grams of sample. Micro methods require a very careful preparation of the test sample for SRF analysis.

Solid recovered fuels — Methods for the determination of carbon (C), hydrogen (H), nitrogen (N) and sulphur (S) by the instrumental method

1 Scope

This document specifies a method for the determination of total content of carbon, hydrogen, nitrogen and sulfur in solid recovered fuels by instrumental method. Depending on the amount of test portion, micro or macro instrumental apparatus are used.

This method is applicable for concentrations on dry matter basis of C > 0,1 %, *N* > 0,1 %, H > 0,1 % and S > 0,05 %.

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/DIS 21637, *Solid recovered fuels — Terminology, definitions and descriptions*

ISO/DIS 21660-3, *Solid recovered fuels — Determination of moisture content using the oven dry method — Part 3: Moisture in general analysis sample*

EN 15413:2011, *Solid recovered fuels — Methods for the preparation of the test sample from the laboratory sample*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/DIS 21637 and the following 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 http://www.electropedia.org/

3.1
coefficient of variation
estimate of the standard deviation of a population from a sample of n results divided by the mean of that sample. Frequently stated as a percentage

3.2
dry basis
calculation basis in which the solid fuel is free from moisture

3.3
dry matter
material after removal of moisture under specific condition

3.4
general analysis sample
sub-sample of a laboratory sample having a nominal top size of 1 mm or less and used for a number of chemical and physical analyses

3.5
laboratory sample
part of the sample sent to or received by the laboratory

Note 1 to entry: When the laboratory sample is further prepared (reduced) by subdividing, mixing, grinding, or by combinations of these operations, the result is the test sample. When no preparation of the laboratory sample is required, the laboratory sample is the test sample. A test portion is removed from the test sample for the performance of the test or for analysis.

Note 2 to entry: The laboratory sample is the final sample from the point of view of sample collection, but it is the initial sample from the point of view of the laboratory.

Note 3 to entry: Several laboratory samples are prepared and sent to different laboratories or to the same laboratory for different purposes. When sent to the same laboratory, the set is generally considered as a single laboratory sample and is documented as a single sample.

3.6
moisture
water in a fuel

Note 1 to entry: See also total moisture and moisture analysis sample.

3.7
nominal top size
aperture size of the sieve used for determining the particle size distribution of solid fuels through which at least 95 % by mass of the material passes

3.8
particle size
size of the fuel particles as determined

Note 1 to entry: Different methods of determination can give different results.

Note 2 to entry: See also particle size distribution, and over size particles.

3.9
precision
closeness of agreement between independent test/measurement results obtained under stipulated conditions

3.10
sample
quantity of material, representative of a larger quantity for which the quality is to be determined

Note 1 to entry: See also combined sample, common sample, increment, laboratory sample, moisture analysis sample, size analysis sample, stratified sample, stratified random sample, stratified arbitrary sample, sub-sample and test sample.

3.11
test portion
sub-sample either of a laboratory sample or a test sample required for the specific measurement

3.12
test sample
laboratory sample after an appropriate preparation made by the laboratory

3.13
waste

Note 1 to entry: This term is defined in Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain directives.

4 Safety remarks

The safety in handling of potentially hazardous materials is dealt with relevant national and European regulations, which every laboratory should refer to.

In addition, the following information is given:

— only experienced personnel, following the safety instructions of the manufacturer, shall use instruments for carbon, hydrogen, nitrogen and sulfur determination.

5 Principle

A known mass of sample is treated with oxygen, or in an oxygen/carrier gas mixture, under conditions such that it is converted into gaseous products of combustion or decomposition. These consist mainly of carbon dioxide, water vapour, elemental nitrogen and/or nitrogen oxides, oxyacids and oxides of sulfur and hydrogen halides. The products are treated to ensure that any hydrogen associated with sulfur or halides are converted, through a catalytic process, into water vapour. Nitrogen oxides are reduced to nitrogen, and the products of combustion which can interfere with the subsequent gas-analysis procedures are properly removed. The carbon dioxide, water vapour and nitrogen mass fractions in the gas stream are then determined quantitatively by appropriate instrumental gas analysis procedures after separation on a suitable chromatographic column.

The samples are held in a suitable container (tin or other crucible) and then dropped inside the quartz tube furnace at about 1 250 °C in an oxygen stream for complete oxidation in the presence of a catalyst layer. Excess oxygen is removed by contact with copper, while nitrogen oxides are reduced to elemental nitrogen.

6 Reagents and calibration standards

All reagents shall be at least of analytical grade and suitable for their specific purposes.

6.1 Carrier gas: Helium, 99,99 % or other gases as specified by the instrument manufacturer.

6.2 Oxygen, free of combustion material, purity 99,95 %, or as specified by the instrument manufacturer.

6.3 Additional reagents: as specified by the instrument manufacturer.

6.4 Calibration standards

Examples of pure organic substances suitable for calibration are given in Table 1.

Examples of certified biomass sample with metrological traceability are given in Table 2.