SLOVENSKI STANDARD
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Trdna biogoriva - Določevanje sorpcije vode in njenega vpliva na trajnost toplotno obdelanih goriv iz biomase - 1. del: Peleti (ISO/DIS 23343-1:2020)

Solid biofuels - Determination of water sorption and its effect on durability of thermally treated biomass fuels - Part 1: Pellets (ISO/DIS 23343-1:2020)

Biogene Festbrennstoffe - Bestimmung der Sorption und deren Auswirkung auf die Dauerhaftigkeit von thermisch behandelten Brennstoffen aus Biomasse - Teil 1: Pellets (ISO/DIS 23343-1:2020)

Biocombustibles solides - Détermination de la sorption d'eau et de son influence sur la durabilité des combustibles de biomasse traités thermiquement - Partie 1: Granulés (ISO/DIS 23343-1:2020)

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Solid biofuels — Determination of water sorption and its effect on durability of thermally treated biomass fuels —

Part 1:
Pellets

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

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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).

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).

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.

This document was prepared by Technical Committee ISO/TC 238, *Solid biofuels*.

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

Thermally treated biomass fuels, particularly in compressed form, are increasingly considered as a replacement of fossil coal or for co-firing in large energy plants for production of heat and/or power. Compressed biomass fuels which are not thermally treated easily absorb moisture; this compromises the durability and generates fines. Thermally treated biomass fuels vary in their affinity to absorb moisture (absorption and/or adsorption – here collectively called sorption) depending on the extent and/or type of thermal treatment, feedstock used to make the product, compression, potential additives used, etc. For this purpose, it is important to understand the degree to which thermally treated compressed solid biofuels are resistant to moisture uptake and the degree to which they maintain durability when exposed to moisture, primarily in the form of rain during outdoor storage.

Thermally treated biomass fuel pellets may be classified based on these characteristics as suitable or unsuitable to be handled and stored under conditions with limited or no weather protection. It should be noted that in large-scale handling and storage of biofuels not all layers of the material are necessarily exposed to severe wetting.

Solid biofuels — Determination of water sorption and its effect on durability of thermally treated biomass fuels —

Part 1: Pellets

1 Scope

This method allows for the determination of water sorption in a laboratory setting and provides a measure for how the durability is impacted as a result of immersion in water. Post-immersion durability reduction is calculated as the difference between the durability of the as-received sample and the durability of the wetted product.

A post-immersion durability reduction of 0 means there was no change to the durability of the thermally treated pelletized fuel as a result of wetting, whereas a post-immersion durability reduction of 3 indicate that the durability dropped by three percentage points as a result of wetting.

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 18134-1, *Solid biofuels — Determination of moisture content — Oven dry method — Part 1: Total moisture — Reference method*

ISO 18134-2, *Solid biofuels — Determination of moisture content — Oven dry method — Part 2: Total moisture — Simplified method*

ISO 17831-1, *Solid biofuels — Determination of mechanical durability of pellets and briquettes — Part 1: Pellets*

ISO 18135, *Solid Biofuels — Sampling*

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

ISO 18846-2, *Solid biofuels — Determination of fines content in samples of pellets – Part 2: Simplified Method*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 16559 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
post-immersion
pi
a basis of measurement whereby the material tested has been immersed in water in accordance with ISO 23343 prior to the test being conducted. Examples include moisture content post-immersion (M_{pi}) and durability post-immersion (DU_{pi})

3.2
post-immersion durability reduction
DUR_{pi}
measure of the drop in the durability of thermally treated biomass fuel pellets after immersion in water using this test procedure

3.3
water sorption
W_{sorp}
gain or loss of water/moisture by solid biofuels through absorption and/or adsorption when exposed to water or varying levels of humidity

4 Principle

For this test method, the as-received sample is initially tested for moisture content and durability. Fines are then removed from two separate sub-samples by screening, and then each sub-sample is immersed in water for 24 hours. After immersion the excess water is drained and the wetted material is again tested for moisture content and an air-dried portion is tested for durability. Water sorption and post-immersion durability reduction are then calculated.

5 Apparatus

5.1 Sieve

The sieve shall have round holes with a diameter of 3,15 mm and aperture geometry in accordance with ISO 3310-2.

A sieve with a diameter of 400 mm is recommended. The frame of the sieve shall have a height that enables the sieve to contain a sample and allow a free movement of the sample during the sieving process. Other sizes of sieves may be used for practical reasons, but it is important to make sure the sieve is not overloaded which may result in insufficient agitation of the test sample which may impact the flow of fines through the apertures of the sieve.

5.2 Collecting pan

For the collection of material passing through the sieve.

5.3 Water bath

The water bath can be any container large enough to hold a single immersion container (in which case multiple water baths will be required) or to hold multiple immersion containers within it and a high enough water level to fully submerge the sub-sample(s).

5.4 Immersion container(s) and Immersion container cover(s)

For the purposes of this test method, two 1,0 mm wire mesh sieves of 400 mm diameter are recommended to be used as immersion containers. Other sieve diameters can be used or a specially made wire mesh basket(s). If an alternate immersion container(s) is used the screen size shall be 1.0 mm wire mesh and the alternate container shall provide the same level of loading as is achieved when using the 400 mm diameter sieve (e.g. a 300 mm diameter sieve has a sieve area that is 44% smaller than the