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Solid Biofuels — Sampling

Biocarburants solides — Échantillonnage

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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 on the voluntary nature of the 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 the following URL: www.iso.org/iso/foreword.html.

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

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Introduction

The objective of this document is to provide unambiguous and clear principles for sampling solid biofuels. It also aims to serve as a tool to enable efficient trading of biofuels and a good understanding between seller and buyer, as well as a tool for communication with equipment manufacturers. It will also facilitate authority permission procedures and reporting.

This document is made for all stakeholders.

Solid biomass is defined in ISO 16559 and according to the specification in ISO 17225-1 covers organic, non-fossil material of biological origin which may be used as fuel for heat and electrical generation.

This document was developed with significant content from EN 14778:2011.

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Solid Biofuels — Sampling

1 Scope

This document describes methods for preparing sampling plans and certificates, as well as taking samples of solid biofuels, for example, from the place where the raw materials grow, from production plant, from deliveries, e.g. lorry loads, or from stock. It includes both manual and mechanical methods, and is applicable to solid biofuels that are either:

— fine (particle sizes up to about 10 mm) and regularly shaped particulate materials that can be sampled using a scoop or pipe, for example, sawdust, olive stones and wood pellets;

— coarse or irregularly shaped particulate materials (particle sizes up to about 200 mm) that can be sampled using a fork or shovel, for example, wood chips and nut shells, forest residue chips, and straw;

— baled materials, for example, baled straw or grass;

— large pieces (particle sizes above 200 mm) that are either picked manually or automatically;

— vegetable waste, fibrous waste from virgin pulp production and from production of paper from pulp that has been dewatered;

— thermally treated and densified biomass materials;

— roundwood.

This document is not applicable to airborne dust from solid biofuels. It may be possible to use this document for other solid biofuels.

The methods described in this document may be used, for example, when the samples are to be tested for moisture content, ash content, calorific value, bulk density, durability, particle size distribution, ash melting behaviour and chemical composition.

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 13909-8, *Hard coal and coke — Mechanical sampling — Part 8: Methods of testing for bias*

ISO 14780, *Solid biofuels — Sample preparation*

ISO 16559, *Solid biofuels — Terminology, definitions and descriptions*

ISO 21398, *Hard coal and coke — Guidance to the inspection of mechanical sampling systems*

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:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

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3.1
bias
systematic error that leads to the average value of a series of results being persistently higher or persistently lower than those that are obtained using a reference sampling method

3.2
large stockpile
stockpile with a capacity >40 t

3.3
nominal top size
aperture size of the sieve through which at least 95 % by mass of the material passes

Note 1 to entry: For pellets the diameter is used to determine the nominal top size.

Note 2 to entry: Includes additional information not found in ISO 16559.

3.4
overall precision
closeness of agreement between independent test results obtained under stipulated conditions; including sample preparation and sample analysis

Note 1 to entry: A determination might be made with great precision and the standard deviation of a number of determinations on the same sub-lot might, therefore, be low; but such results are accurate only if they are free from bias.

4 Symbols

d_{95}	nominal top size biofuel, in mm
d_i	difference between individual pair members
m_{lot}	mass of the lot or sub-lot, tonne
n	number of increments per (sub-) lot
n_{min}	minimum number of increments per (sub-) lot
n_P	number of pairs (for estimating V_{PT})
n_{mp}	maximum practicable number of increments per sub-lot
N_L, N_{SL}	number of lots/sub-lots
P_L	overall precision for the sampling, sample preparation and testing for the whole biofuel lot at 95 % confidence level
P_{SL}	similar to P_L but then for the sub-lot
S	sample estimate of the population standard deviation
V_{SPT}	total variance of the results for replicate samples
$Vol_{Combined\ Sample}$	volume for the combined sample, l
Vol_{incr}	volume of an increment, l
Vol_{min}	minimum volume of increment, l
V_i	primary increment variance

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