SLOVENSKI STANDARD
SIST EN 14780:2011

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Nadomešča:
SIST-TS CEN/TS 14780:2005

Trdna biogoriva - Priprava vzorcev

Solid biofuels - Sample preparation

Feste Biobrennstoffe - Probenherstellung

Biocombustibles solides - Préparation des échantillons

Ta slovenski standard je istoveten z: EN 14780:2011

ICS:

75.160.10	Trda goriva	Solid fuels

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EUROPEAN STANDARD

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English Version

Solid biofuels - Sample preparation

Biocombustibles solides - Préparation des échantillons

Feste Biobrennstoffe - Probenherstellung

This European Standard was approved by CEN on 5 May 2011.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Contents

Foreword

This document (EN 14780:2011) has been prepared by Technical Committee CEN/TC 335 “Solid biofuels”, the secretariat of which is held by SIS.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by December 2011, and conflicting national standards shall be withdrawn at the latest by December 2011.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes CEN/TS 14780:2005.

This document differs from CEN/TS 14780:2005 mainly as follows:

a) results of interlaboratory tests are supplemented as informative annexes;

b) new definitions for sampling are introduced;

c) a method for determining the minimum number of increments for sampling is included;

d) the whole document is restructured and editorially revised;

e) decision schemes are updated;

f) updated normative references are included.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

Biofuels are a major source of renewable energy. European Standards are needed for production, trade and use of solid biofuels. For sampling and sample preparation of biofuels the following European Standards can be used:

EN 14778, *Solid biofuels – Sampling*

EN 14780, *Solid biofuels – Sample preparation*

This European Standard can be used in regard to production, controlling and analysis of solid biofuels in general.

1 Scope

This European Standard describes methods for reducing combined samples (or increments) to laboratory samples and laboratory samples to sub-samples and general analysis samples and is applicable to solid biofuels.

The methods described in this European Standard may be used for sample preparation, for example, when the samples are to be tested for calorific value, moisture content, ash content, bulk density, durability, particle size distribution, ash melting behaviour, chemical composition, and impurities. The methods are not intended to be applied to the very large samples required for the testing of bridging properties.

2 Normative references

The following referenced documents are indispensable for the application 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.

EN 14588:2010, *Solid biofuels — Terminology, definitions and descriptions*

EN 14774-1, *Solid biofuels — Determination of moisture content — Oven dry method — Part 1: Total moisture — Reference method*

EN 14774-2, *Solid biofuels — Determination of moisture content — Oven dry method — Part 2: Total moisture — Simplified procedure*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 14588:2010 and the following apply.

3.1
combined sample
sample consisting of all the increments taken from a sub-lot

NOTE The increments may be reduced by division before being added to the combined sample.

3.2
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

3.3
increment
portion of fuel extracted in a single operation of the sampling device

3.4
laboratory sample
combined sample or a sub-sample of a combined sample for use in a laboratory

3.5
lot
defined quantity of fuel for which the quality is to be determined

NOTE See also sub-lot.

3.6
moisture analysis sample
sample taken specifically for the purpose of determining total moisture according to EN 14774-1 and EN 14774-2

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

3.8
particle size-reduction
reduction of the nominal top size of a sample or sub-sample

3.9
sample
quantity of material, representative of a larger quantity for which the quality is to be determined

3.10
sample division
division of a sample or sub-sample to a appropriate size. This usually always leads to a mass reduction of a sample or sub-sample

3.11
size analysis sample
sample taken specifically for the purpose of determining particle size distribution

3.12
sub-lot
part of a lot for which a test result is required

3.13
sub-sample
portion of a sample

3.14
test portion
sub-sample either of a *laboratory sample* or a *test sample*

3.15
test-sample
laboratory sample after an appropriate preparation made by the laboratory

4 Symbols and abbreviations

M_p is the moisture loss, in percentage
$m_{sample,1}$ is the initial mass of the sample, g
$m_{sample,2}$ is the mass of the sample after pre-drying, g
W is the width and is at least 2,5 times the nominal top size of the material

5 Principles of correct sample reduction

The main purpose of sample preparation is that a sample is reduced to one or more test portions that are in general smaller than the original sample. The main principle for sample reduction is that the composition of the sample as taken on site shall not be changed during each stage of the sample preparation. Each sub sample shall be representative of the original sample. To reach this goal every particle in the sample before sample division shall have an equal probability of being included in the sub-sample following sample division. Two basic methods are used during the sample preparation. These methods are:

— sample division;

— particle size-reduction of the sample.

CAUTION — Avoid loss of moisture and fine particles during milling and other operations.

Because of the risk of changes in the moisture content (loss of moisture), a sub-sample (moisture analysis sample) shall be separated at the earliest possible stage of the sample preparation procedure. As an alternative, a separate moisture analysis sample may be taken. The sample reduction shall be carried out by a procedure that does not conflict with requirements of EN 14774-1 or EN 14774-2.

For materials that have to be examined for moisture content, care shall be taken to avoid any significant heat build-up and risk of drying.

6 Apparatus

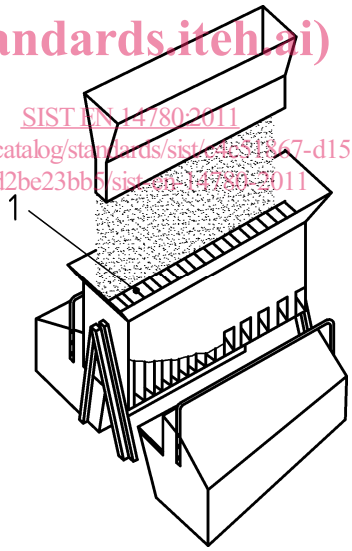
6.1 Apparatus for sample division

6.1.1 General

Sample division is the process of reducing the mass of the sample without reducing the size of the particles. This subclause gives some suitable apparatus for this purpose. To determine the correct use of each apparatus for different purposes refer to Clause 8.

6.1.2 Riffle boxes

A riffle box shall have an equal number of slots and at least 6 at each side (preferably more if possible), with adjacent slots directing material into different sub-samples, and the width of the slots shall be at least 2,5 times the nominal top size of the material to be riffled (see Figure 1).

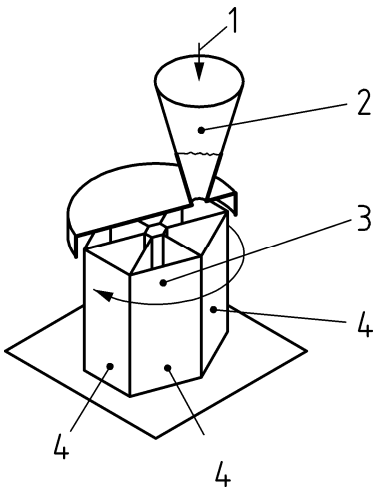


Key
1 W - slot width is at least 2,5 times the nominal top size of the material

Figure 1 — Example of a riffle box

6.1.3 Rotary sample dividers

The inner dimensions of the equipment where the sample is fed shall be at least 2,5 times as wide as the nominal top size of the material to be processed. The rotary sample divider shall have a feeder device adjusted, so that the number of compartments multiplied by the number of rotations shall not be less than 120 while the sample is being divided. See Figure 2 for an example of a rotating divider.



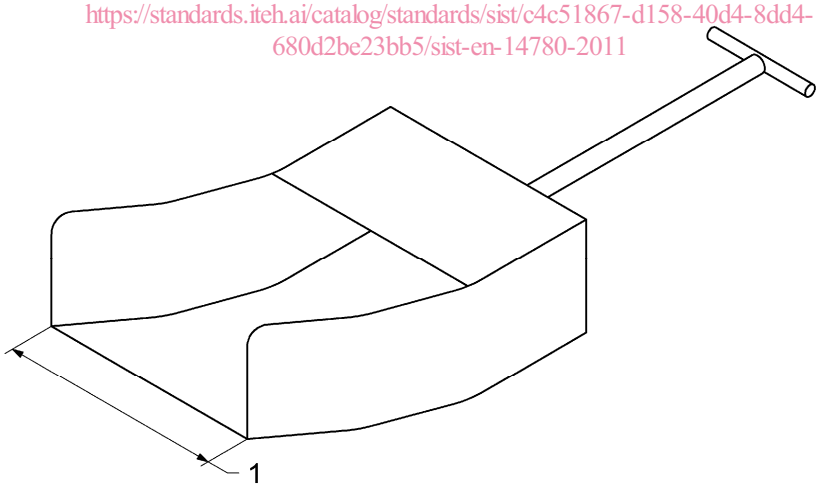
Key

1 feeder
2 funnel
3 rotating receivers
4 divided sample

Figure 2 — Example of a rotary sample divider

6.1.4 Shovels and scoops

A shovel or scoop are tools used for manual sample division. They shall have a flat bottom, with edges raised high enough to prevent particles rolling off, and be at least 2,5 times as wide as the nominal top size of the material to be processed. See Figures 3 and 4 for examples of a scoop and a shovel respectively.



Key

1 W width of the scoop

Figure 3 — Example of a scoop

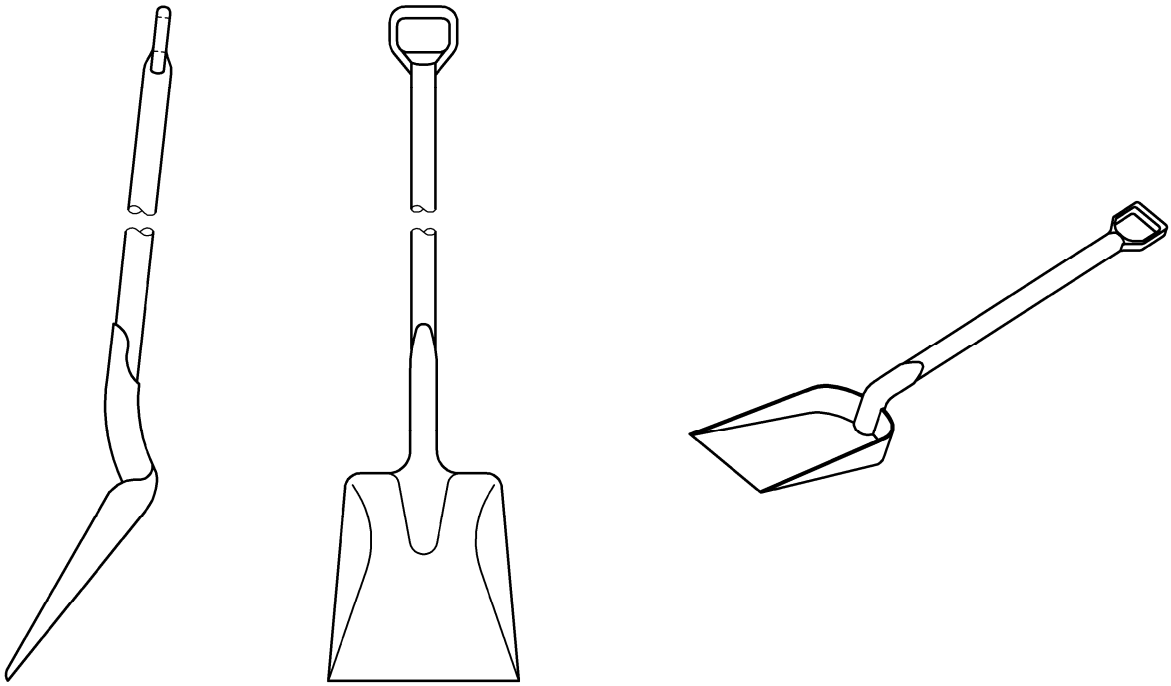


Figure 4 — Example of a shovel

NOTE For very large sample sizes, it is more practical to use a push dozer or bulldozer or any other heavy machinery that has a large "scoop" with raised edges.

6.2 Apparatus for particle size-reduction

CAUTION — When analysing metals, take care that there is no contamination from the sample preparation or reduction equipment.

6.2.1 Coarse cutting mill or wood crusher

Coarse cutting mills are used for cutting materials into lengths of about 10 mm to 30 mm (depending on the biofuel and the analyses to be performed). Drying of the material during coarse cutting should be avoided, by limiting heat production and air flow through the material. The equipment shall be designed so that it does not lose dust or contaminate the material with pieces of metal, and shall be easy to clean.

NOTE To prevent losses of moisture during particle size reduction a grinder with as low a grinding speed as possible is preferred.

6.2.2 Cutting mill

Cutting mills are used for reducing the nominal top size of materials used as biofuels from about 10 mm to 30 mm down to about 1 mm or less (depending on the biofuel and the analyses to be performed). The mill shall be provided with screens of various aperture sizes covering this range, including an appropriate sieve to control the nominal top size of the material produced. Other apparatus may be used provided that they are designed so that they do not get blocked with the material that is being processed. Avoid the use of cutting mills whose cutting faces contain significant quantities of an element that is to be determined in the analysis.

NOTE Cross beater mills can be used without any excessive dusting, when fitted with dust filters (like a filter sock) between the mill and the receiving container. They are suitable for final grinding of hard, wood type materials after the pre-grinding with cutting type mills.