SLOVENSKI STANDARD
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01-maj-2020

Trdna alternativna goriva - Metode za vzorčenje (ISO/DIS 21645:2020)

Solid recovered fuels - Methods for sampling (ISO/DIS 21645:2020)

Feste Sekundärbrennstoffe - Verfahren zur Probenahme (ISO/DIS 21645:2020)

Combustibles solides de récupération - Méthodes d'échantillonnage (ISO/DIS 21645:2020)

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ICS:

75.160.10	Trda goriva	Solid fuels

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DRAFT INTERNATIONAL STANDARD

ISO/DIS 21645

ISO/TC **300**

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Solid recovered fuels — Methods for sampling

ICS: 75.160.10

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This document was prepared by Technical Committee ISO/TC 300, *Solid recovered fuels*.

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Introduction

The testing of solid recovered fuel enables informed decisions about their subsequent handling and use. In order to carry out a test on a solid recovered fuel a sample of the material is required. Before any sampling operation is devised it is important that the objectives for sampling are clearly identified and subsequently well executed to ensure that the expectations of any involved parties are recognized and satisfied. The identification of objectives helps to define the level of testing required, e.g. thorough examination or routine testing and in addition desired reliability of testing / assessment and frequency of testing. The sampling objectives, along with the sequence of operations required to fulfil them are detailed in an overall sampling plan. After a sampling plan has been prepared the sampling of solid recovered fuels (SRF's) itself can be implemented.

This document is largely based on the work already done by CEN/TC 292 "*Characterization of waste*" and in particular EN 14899[1] and CEN/TR 15310-1[2].

The main characteristic that makes SRF samples significantly different from other kinds of waste is that very often SRFs are solid, but neither "granular" nor monolithic; it often happens that SRF samples are fibrous-like materials. This typical characteristic of SRF implies that the statistical formula for sampling of EN 14899[1] and CEN/TR 15310-1 Annex D[2] are not applicable without amendment. One more term in the statistical equation is needed, namely the "shape factor" (f).

Figure 1 shows the links between the essential elements of a testing program.

Sampling procedures are provided for a range of process streams and common storage conditions. The sampling technique adopted depends on a combination of different characteristics of the material and circumstances encountered at the sampling location. The determining factors are:

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— the type of solid recovered fuel;

— the situation at the sampling location / the way in which the material occurs (e.g. in a stockpile, on a conveyor belt, in a lorry);

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— the (expected) degree of heterogeneity (e.g. monostreams, mixed fuels, blended fuels).

This document is primarily geared toward laboratories, producers, suppliers and purchasers of solid recovered fuels, but is also useful for the authorities and inspection organizations.

Standard for sampling of solid biofuels, see ISO 18135[25].

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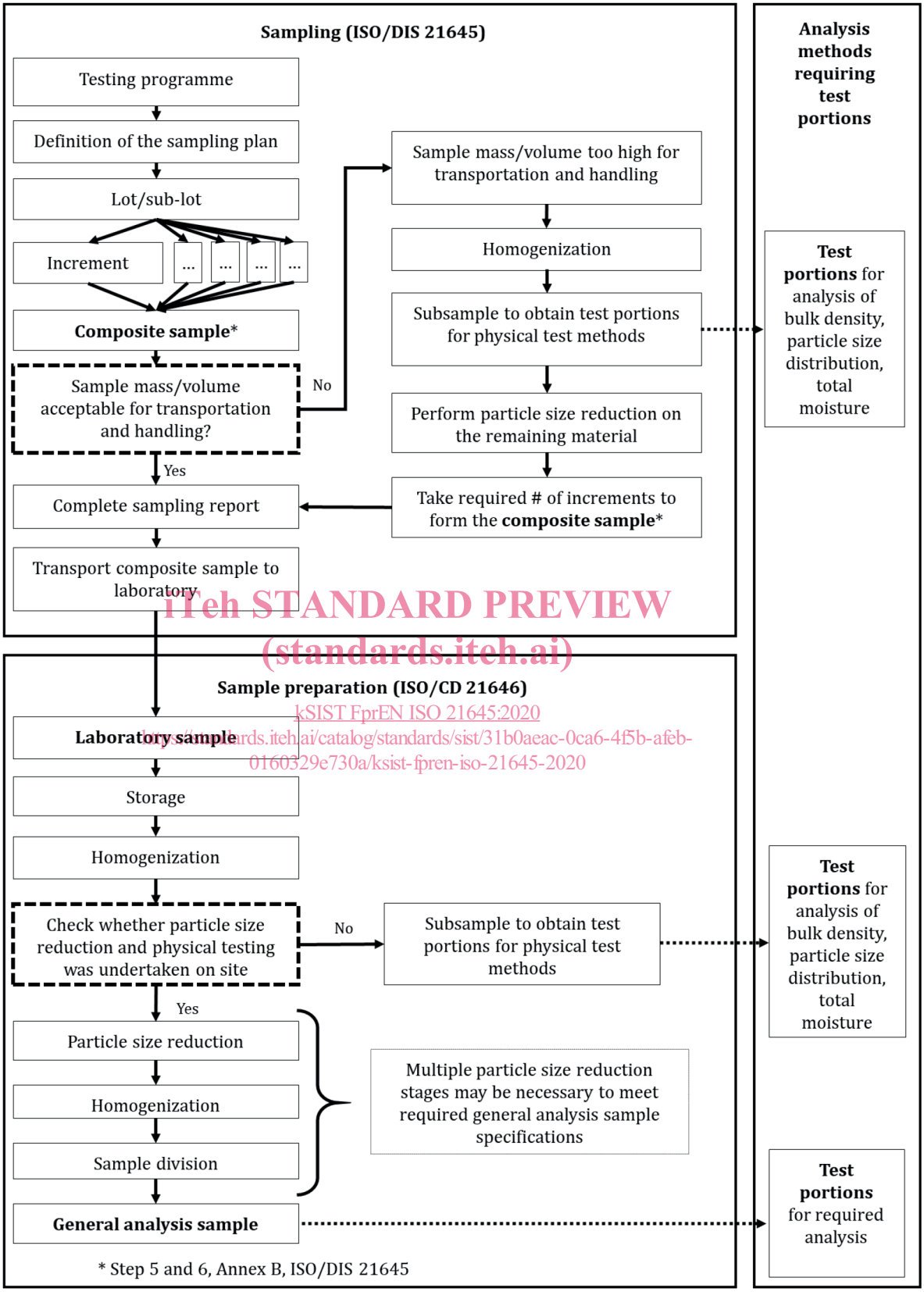

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Figure 1 — Links between the essential elements of a testing program

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Solid recovered fuels — Methods for sampling

1 Scope

This document specifies methods for taking samples of solid recovered fuels for example from production plants, from deliveries or from stock. It includes manual and mechanical methods.

It is not applicable to solid recovered fuels that are formed by liquid or sludge, but it includes dewatered sludge.

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/CD 21640, *Solid recovered fuels - Specifications and classes*[1)]

ISO/CD 21646, *Solid recovered fuels – Sample preparation*[2)]

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EN 15415-1, *Solid recovered fuels — Determination of particle size distribution — Part 1: Screen method for small dimension particles*

CEN/TS 15401, *Solid recovered fuels — Determination of bulk density*

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3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/DIS 21637 and the following apply.

3.1
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

3.2
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

Note 1 to entry: Adapted from Eurachem/Citac Guide CG 4[23].

3.3
distribution factor
correction factor for the particle size distribution of the material to be sampled

3.4
drop flow
material flow falling over an overflow point or a drop point in a transport system

1) DIS expected 03/2020.

2) DIS expected during 2020.

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3.5
duplicate sample
two samples taken under comparable conditions, whereby this selection can be accomplished by taking units adjacent in time or space

Note 1 to entry: Although the replicate samples are expected to be identical, often the only thing replicated is the act of taking the physical sample.

Note 2 to entry: A duplicate sample is a replicate sample consisting of two portions.

Note 3 to entry: The replicate sample is usually used to estimate sample variability.

3.6
heterogeneity
degree to which a property or type of particle of a solid recovered fuel component is not uniformly distributed throughout a quantity of material

3.7
homogeneity
degree to which a property or a type of particle of a solid recovered fuel component is uniformly distributed throughout a quantity of material

3.8
increment
portion of fuel extracted from a lot or sub-lot in a single operation of the sampling device

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3.9
laboratory sample
composite sample received by the laboratory on which sample preparation procedures for analysis are undertaken

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Note 1 to entry: When the laboratory sample is further prepared by mixing, subdividing, particle size reduction or by combinations of these operations, the result is the general analysis sample. A test portion is removed from the general analysis sample for the performance of the test or for analysis. When no preparation of the laboratory sample is required, the test portion may be taken directly from the laboratory sample.

3.10
lot
defined quantity of fuel for which the quality is to be determined

Note 1 to entry: A lot may be divided into sub-lots.

[SOURCE: ISO 13909-1:2016, 3.16]

3.11
mechanical durability
measure of resistance of densified fuels from shocks and/or abrasion as a consequence of handling and transportation processes, characterized by pellets disintegration and fines formation

3.12
metallic aluminium
aluminium that could be extracted from solid recovered fuel by using a 0,75 M NaOH solution, after leaching with 0,14 M HNO3 solution

Note 1 to entry: This includes the metallic aluminium and some chemical forms of aluminium non-soluble in nitric acid but easily soluble in alkaline media.

3.13
moisture
water in a fuel

Note 1 to entry: See also total moisture.

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3.14
increment mass
dimension or mass of the increment that is taken from a lot in a single operation of the sampling device, from the point of view of preserving its representativeness

3.15
minimum sample mass
minimum sample mass or dimension of the sample required during sampling and sample preparation from the point of view of preserving its representativeness

Note 1 to entry: The minimum sample mass is equal to the increment mass multiplied by the number of increments, and is linked directly to the nominal top size.

3.16
nominal top size
d_{95}
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

3.17
particle density
density of a single particle in a solid fuel

3.18
particle size
size of the fuel particles as determined in a solid fuel

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

Note 2 to entry: See also particle size distribution.

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3.19
particle size distribution
proportions of various particle sizes in a solid fuel

3.20
producer
organization or unit responsible for the production of solid recovered fuel

Note 1 to entry: The producer can also be the supplier of the fuel.

3.21
precision
closeness of agreement between independent test/measurement results obtained under stipulated conditions

Note 1 to entry: Precision depends only on the distribution of random errors and does not relate to the true value or the specified value.

Note 2 to entry: The measure of precision is usually expressed in terms of imprecision and computed as a standard deviation of the test results or measurement results. Less precision is reflected by a larger standard deviation.

Note 3 to entry: Quantitative measures of precision depend critically on the stipulated conditions.

[SOURCE: ISO 3534-2:2006, 3.3.4[19] – modified: second sentence of Note 3 to entry was removed.]

3.22
random sampling
taking a sample at a random location within a specified range or from a specified lot such that every portion of the solid recovered fuel would have the same chance of being part of the sample

Note 1 to entry: A random location is determined by lot.

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3.23
sample
quantity of fuel, representative of a larger mass for which the quality is to be determined

3.24
sample preparation
actions taken to obtain representative analysis samples or test portions from the original sample

3.25
particle size reduction
reduction of the nominal top size of a sample or sub-sample

3.26
sampling
process of drawing or constituting a sample

3.27
sampling plan
predetermined procedure for the selection, withdrawal, preservation, transportation and preparation of the portions to be removed from a lot as a sample

3.28
sampling record
report which serves as a check list and provides the investigator with all necessary information about the sampling techniques applied at the site and any additional important information

[SOURCE: ISO 11074:2015, 4.4.26[20] – modified: part of definition was removed as irrelevant to this context]

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3.29
shape factor
factor that corrects the minimum sample mass if the particles in a lot have not a regular shape (e.g. spherical or cubic)

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3.30
solid recovered fuel
solid fuel derived from non-hazardous waste to be used for energy purposes and meeting the classification and specification requirements laid down in ISO/CD 21640

Note 1 to entry: A number of terms can be used to describe fuels from waste that might (but not always) qualify as solid recovered fuels. For example, refuse derived fuel, refuse derived paper and plastics densified fuel, waste derived fuel, shredded light fraction, sewage sludge, end of life wood, fuel composed of either municipal solid waste, industrial waste, commercial waste, construction and demolition waste, animal waste (e.g. meat and bone meal).

Note 2 to entry: This definition does not distinguish between valuable/commercial waste and non-valuable/non-commercial waste.

Note 3 to entry: The determination of whether a solid recovered fuel is hazardous or non-hazardous is determined through national laws and Directives or by categorisation of the fuel through the Annexes in the Basel Convention On The Control Of Transboundary Movements Of Hazardous Wastes And Their Disposal

Note 4 to entry: Typically recovered non-hazardous waste has gone through a process or procedure to enable it to be classified as being re-purposed for the use of energy conversion

3.31
specification
document stating requirements

[SOURCE: ISO 9000:2015, 3.8.7 – modified: example and notes were removed]

Note 1 to entry: See also specification of solid recovered fuels.

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3.32
specification of solid recovered fuels
specification for the properties characterising a solid recovered fuel

Note 1 to entry: A template for such specification is given in ISO/CD 21640.

3.33
static lot
lot that is not in motion during the sampling, or transported by a conveyor or alternative transport system

3.34
stratified sampling
sampling consisting of portions obtained from identified subparts (strata) of the parent population

3.35
stratified random sampling
sampling consisting of portions obtained from identified subparts (strata) of the parent population

Note 1 to entry: Within each stratum, the samples are taken randomly.

3.36
sub-lot
part of a lot for which a test result is required

3.37
sub-sample
portion of a sample

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Note 1 to entry: A sub-sample is obtained by procedures in which the items of interest are randomly distributed in part of equal or unequal size.

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Note 2 to entry: A sub-sample may be either a portion of the sample obtained by selection or division of the sample itself, or the final sample of a multistage sample preparation.

3.38
test portion
sub-sample of a laboratory or general analysis sample consisting of the quantity of material required for a single execution of a test method

Note 1 to entry: Note 1 to entry: The test portion can be taken from the laboratory sample directly if no preparation of sample is required (e.g. for Bulk Density determination or particle size distribution).

3.39
total moisture
moisture content
moisture in a fuel measured under specific conditions on as received basis

3.40
trueness
closeness of agreement between the expectation of a test result or a measurement result and a true value

Note 1 to entry: The measure of trueness is usually expressed in terms of bias.

Note 2 to entry: Trueness is sometimes referred to as “accuracy of the mean”. This usage is not recommended.

Note 3 to entry: In practice, the accepted reference value is substituted for the true value.

Note 4 to entry: The determination of the exact trueness for waste and from waste derived materials such as solid recovered fuels is by definition not possible.

[SOURCE: ISO 3534-2:2006, 3.3.3[19] – modified: Note 4 to entry was added]

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