Solid recovered fuels - Methods for sampling (ISO 21645:2021)

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN ISO 21645:2021 sisaldab Euroopa standardi EN ISO 21645:2021 ingliskeelset teksti.	This Estonian standard EVS-EN ISO 21645:2021 consists of the English text of the European standard EN ISO 21645:2021.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation and Accreditation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 07.04.2021.	Date of Availability of the European standard is 07.04.2021.
Standard on kättesaadav Eesti Standardimis-ja Akrediteerimiskeskusest.	The standard is available from the Estonian Centre for Standardisation and Accreditation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 75.160.10

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 21645

April 2021

ICS 75.160.10

Supersedes EN 15442:2011

English Version

Solid recovered fuels - Methods for sampling (ISO 21645:2021)

Combustibles solides de récupération - Méthodes d'échantillonnage (ISO 21645:2021)

Feste Sekundärbrennstoffe - Verfahren zur Probenahme (ISO 21645:2021)

This European Standard was approved by CEN on 23 February 2021.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Ref. No. EN ISO 21645:2021 E

European foreword

This document (EN ISO 21645:2021) has been prepared by Technical Committee ISO/TC 300 "Solid recovered materials, including solid recovered fuels" in collaboration with Technical Committee CEN/TC 343 “Solid Recovered Fuels” the secretariat of which is held by SFS.

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 October 2021, and conflicting national standards shall be withdrawn at the latest by October 2021.

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

This document supersedes EN 15442:2011.

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, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 21645:2021 has been approved by CEN as EN ISO 21645:2021 without any modification.

Contents

Page

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 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 testing of solid recovered fuels (SRF) 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 SRF itself can be implemented.

This document is largely based on the work already done by CEN/TC 292 "*Characterization of waste*" (now integrated in CEN/TC 444 "Environmental characterization of solid matrices"), in particular EN 14899:2005[1] and CEN/TR 15310-1:2006[2].

The main characteristic that makes SRF samples significantly different from other kinds of waste is that SRFs are very often 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 14899:2005 and CEN/TR 15310-1:2006, Annex D are not applicable without amendment. The "shape factor" (f) is additionally needed in the statistical formula.

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:

— 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);

— 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.

Sampling of solid biofuels is described in ISO 18135[3].

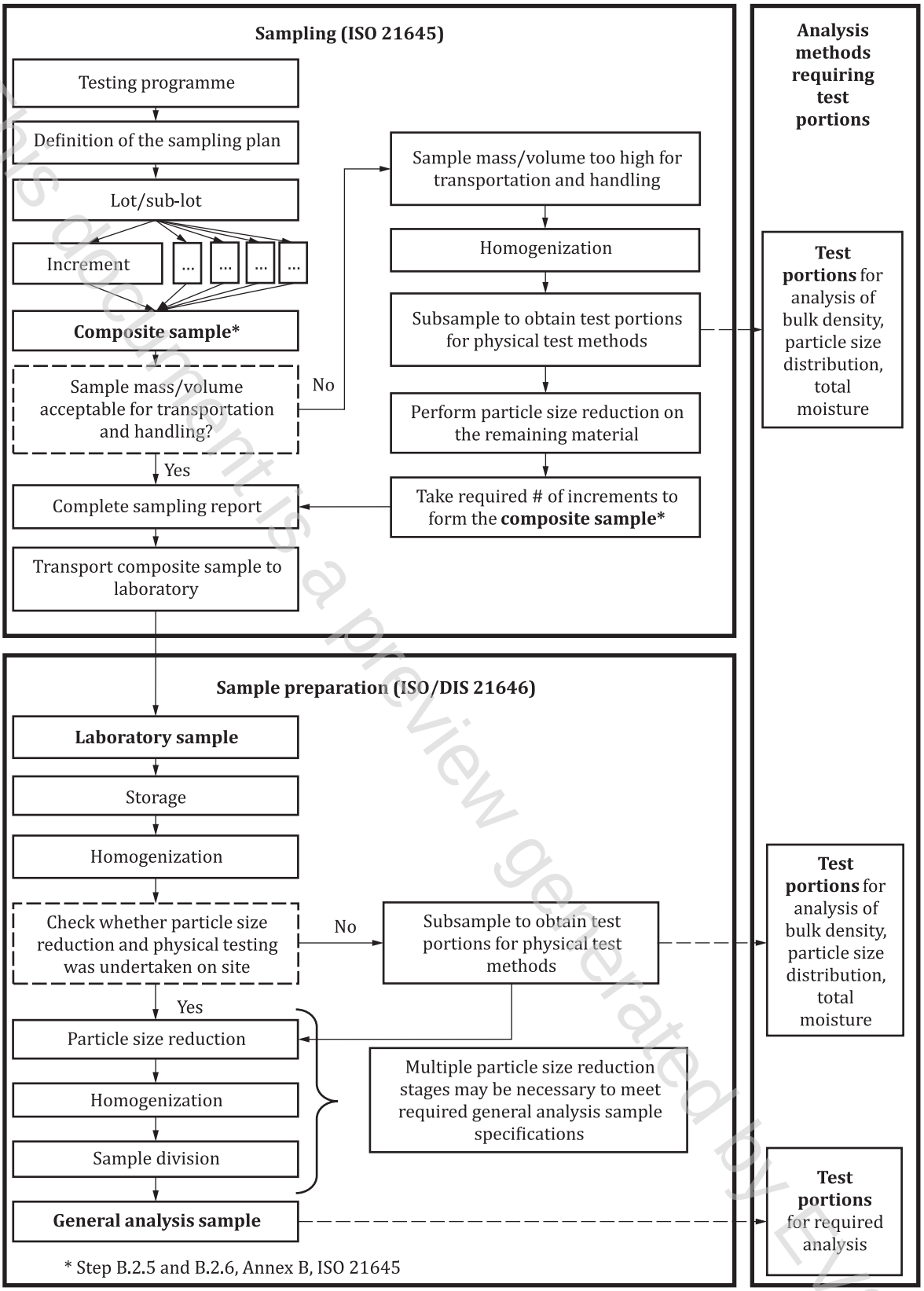

Figure 1 — Links between the essential elements of a testing program

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

ISO 21640:—[1)], *Solid recovered fuels — Specifications and classes*

ISO 21644, *Solid recovered fuels — Methods for the determination of biomass content*

ISO 21654, *Solid recovered fuels — Determination of calorific value*

ISO 21656, *Solid recovered fuels — Determination of ash content*

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

ISO 21663, *Solid recovered fuels — Methods for the determination of carbon (C), hydrogen (H) and nitrogen (N) content*

ISO 22167, *Solid recovered fuels — Determination of the content of volatile matter*

EN 15408, *Solid recovered fuels — Method for the determination of sulphur (S), chlorine (Cl), fluorine (F) and bromine (Br) content*

EN 15410, *Solid recovered fuels — Method for the determination of the content of major elements (Al, Ca, Fe, K, Mg, Na, P, Si, Ti)*

EN 15411, *Solid recovered fuels — Methods for the determination of the content of trace elements (As, Ba, Be, Cd, Co, Cr, Cu, Hg, Mo, Mn, Ni, Pb, Sb, Se, Tl, V and Zn)*

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

EN 15415-2, *Solid recovered fuels — Determination of particle size distribution — Part 2: Maximum projected length method (manual) for large dimension particles*

EN 15415-3, *Solid recovered fuels — Determination of particle size distribution — Part 3: Method by image analysis for large dimension particles*

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

CEN/TR 15404, *Solid recovered fuels — Methods for the determination of ash melting behaviour by using characteristic temperatures*

1) Under preparation. Stage at the time of publication ISO/FDIS 21640.

CEN/TS 15405, *Solid recovered fuels —Determination of density of pellets and briquettes*

CEN/TS 15406, *Solid recovered fuels —Determination of bridging properties of bulk material*

CEN/TS 15412, *Solid recovered fuels — Methods for the determination of metallic aluminum*

CEN/TS 15414-1, *Solid recovered fuels — Determination of moisture content using the oven dry method — Part 1: Determination of total moisture by a reference method*

CEN/TS 15414-2, *Solid recovered fuels — Determination of moisture content using the oven dry method — Part 2: Determination of total moisture by a simplified method*

CEN/TS 15639, *Solid recovered fuels — Determination of mechanical durability of pellets*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 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* (3.28) of n results divided by the mean of that sample

Note 1 to entry: The coefficient of variation is frequently stated as a percentage.

Note 2 to entry: Adapted from Eurachem/Citac Guide CG 4[4].

3.2
composite sample mass
amount of *sample* (3.28) taken from a *lot* (3.11) or a *sub-lot* (3.40) consisting of all the *increments* (3.9)

3.3
distribution factor
correction factor for the *particle size distribution* (3.20) of the material to be sampled

[SOURCE: ISO 21637:2020, 3.17]

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

[SOURCE: ISO 21637:2020, 3.18]

3.5
duplicate sample
two *samples* (3.28) taken under comparable conditions

Note 1 to entry: This selection may be accomplished by taking units adjacent in time or space.

Note 2 to entry: The replicate sample is usually used to estimate sample variability.

[SOURCE: ISO 21637:2020, 3.23, modified – Note 2 to entry has been added.]

3.6
general analysis sample
sub-sample (3.41) of a *laboratory sample* (3.10) having a nominal top size of 1 mm or less and used for a number of chemical and physical analyses