

Solid recovered fuels - Methods for sampling

This document is a preview generated by EVS

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 15442:2011 sisaldab Euroopa standardi EN 15442:2011 ingliskeelset teksti.

Standard on kinnitatud Eesti Standardikeskuse 31.03.2011 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.

Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on 09.03.2011.

Standard on kättesaadav Eesti standardiorganisatsioonist.

This Estonian standard EVS-EN 15442:2011 consists of the English text of the European standard EN 15442:2011.

This standard is ratified with the order of Estonian Centre for Standardisation dated 31.03.2011 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.

Date of Availability of the European standard text 09.03.2011.

The standard is available from Estonian standardisation organisation.

ICS 75.160.10

Standardite reprodutseerimis- ja levitamiseõigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonilisse süsteemi või edastamine ükskõik millises vormis või millisel teel on keelatud ilma Eesti Standardikeskuse poolt antud kirjaliku loata.

Kui Teil on küsimusi standardite autorikaitse kohta, palun võtke ühendust Eesti Standardikeskusega:
Aru 10 Tallinn 10317 Eesti; www.evs.ee; Telefon: 605 5050; E-post: info@evs.ee

Right to reproduce and distribute belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without permission in writing from Estonian Centre for Standardisation.

If you have any questions about standards copyright, please contact Estonian Centre for Standardisation:
Aru str 10 Tallinn 10317 Estonia; www.evs.ee; Phone: 605 5050; E-mail: info@evs.ee

English Version

Solid recovered fuels - Methods for sampling

Combustibles solides de récupération - Méthodes
d'échantillonnage

Feste Sekundärbrennstoffe - Verfahren zur Probenahme

This European Standard was approved by CEN on 22 January 2011.

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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.



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

Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Page

Foreword.....	4
Introduction	5
1 Scope	7
2 Normative references	7
3 Terms and definitions	7
4 Symbols and abbreviated terms	10
5 Principle.....	11
6 Development of a sampling plan.....	11
6.1 Principle.....	11
6.2 Definition of overall objectives.....	13
6.3 Definition of a lot and determining lot size	13
6.4 Determination of the sampling procedure	14
6.5 Determination of the number of increments	14
6.6 Determination of minimum sample size.....	15
6.7 Determination of the minimum increment size.....	15
6.8 Determination of the effective increment and sample sizes	15
6.9 Selection of distribution of increments over a lot.....	16
7 Implementation of the sampling plan	18
7.1 Steps before actual sampling.....	18
7.2 Steps during sampling	18
7.3 Steps after sampling	19
8 Handling and storage of samples	19
9 Precision	19
Annex A (normative) Procedure for the development of a sampling plan.....	20
A.1 Introduction	20
A.2 Principle.....	20
A.3 Procedure	20
Annex B (informative) Guideline for a sampling plan.....	23
B.1 Introduction	23
B.2 Form for the sampling plan	23
Annex C (normative) Sampling equipment and implements	28
C.1 Introduction	28
C.2 Principle.....	28
C.3 Selection of an apparatus	28
C.4 Examples for sampling from a moving conveyor or drop flow	28
C.5 Sampling frame	30
C.6 Sampling scoop	31
C.7 Mechanical probe.....	32
Annex D (normative) Determination of minimum sample size	34
D.1 Introduction	34
D.2 Principle.....	34
D.3 Determination of factors necessary for the minimum sample size.....	34
D.4 Calculation of the minimum sample size	36
D.5 Quick determination of minimum sample size	37

Annex E (normative) Determination of minimum increment size for sampling from material flows	39
E.1 Introduction.....	39
E.2 Principle.....	39
E.3 Determination of minimum increment size for mechanical sampling from a drop flow	39
E.4 Determination of minimum increment size for manual sampling from a drop flow	40
E.5 Determination of minimum increment size for sampling from a conveyor.....	41
Annex F (normative) Determination of minimum increment size for sampling from static lots or vehicles.....	43
F.1 Introduction.....	43
F.2 Principle.....	43
F.3 Procedure.....	43
Annex G (normative) Implementation of sampling plan from a material flow	44
G.1 Introduction.....	44
G.2 Principle.....	44
G.3 Procedure verification of sampling aspects.....	44
G.4 Procedure: Mechanical or manual sampling from the drop flow	44
G.5 Procedure: Mechanical sampling from a moving conveyor	46
G.6 Procedure: Manual sampling from a stationary conveyor.....	47
Annex H (normative) Implementation of the sampling plan from a static lot or vehicle	49
H.1 Introduction.....	49
H.2 Principle.....	49
H.3 Procedure.....	49
H.4 Implementation of sampling in locations chosen in a stratified random way	50
Annex I (normative) Minimum sample size required for analysis.....	51
I.1 Introduction.....	51
I.2 Principle.....	51
I.3 Procedure.....	51
Annex J (normative) Standard sampling plans for common situations	56
J.1 Introduction.....	56
J.2 Sampling of granular SRF <25 mm from a moving conveyor.....	56
J.3 Sampling of granular SRF <25 mm from a static lot.....	59
J.4 Sampling of granular SRF <25 mm from a vehicle	62
Annex K (informative) Additional information about precision	66
K.1 Introduction.....	66
K.2 Scope.....	66
K.3 Trueness.....	66
K.4 Repeatability and reproducibility.....	66
K.5 Robustness	67
Annex L (informative) Distribution of increments	69
L.1 Scope	69
L.2 Stratified sampling	69
L.3 Stratified random sampling.....	70
Bibliography.....	72

Foreword

This document (EN 15442:2011) has been prepared by 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 September 2011, and conflicting national standards shall be withdrawn at the latest by September 2011.

This document supersedes CEN/TS 15442:2006.

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 has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

This document is one of a series of European Standards dealing with solid recovered fuel.

EN 15442, *Solid recovered fuels — Methods for sampling.*

EN 15443, *Solid recovered fuels — Methods for the preparation of the laboratory sample.*

EN 15413¹⁾, *Solid recovered fuels — Methods for the preparation of the test sample from the laboratory sample.*

This document differs from CEN/TS 15442:2006 mainly as follows:

- a) results of interlaboratory tests supplemented as an informative Annex F;
- b) whole document editorially revised.

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 United Kingdom.

¹⁾ To be published.

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 fulfill 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.

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

Standards for sampling of solid biofuels are available from Technical Committee CEN/TC 335 "Solid biofuels" CEN/TR 14589:2003, CEN/TR 15018:2005 and CEN/TR 15310:2006 for the sampling for the purpose of the characterization of waste are available from CEN/TC 292.

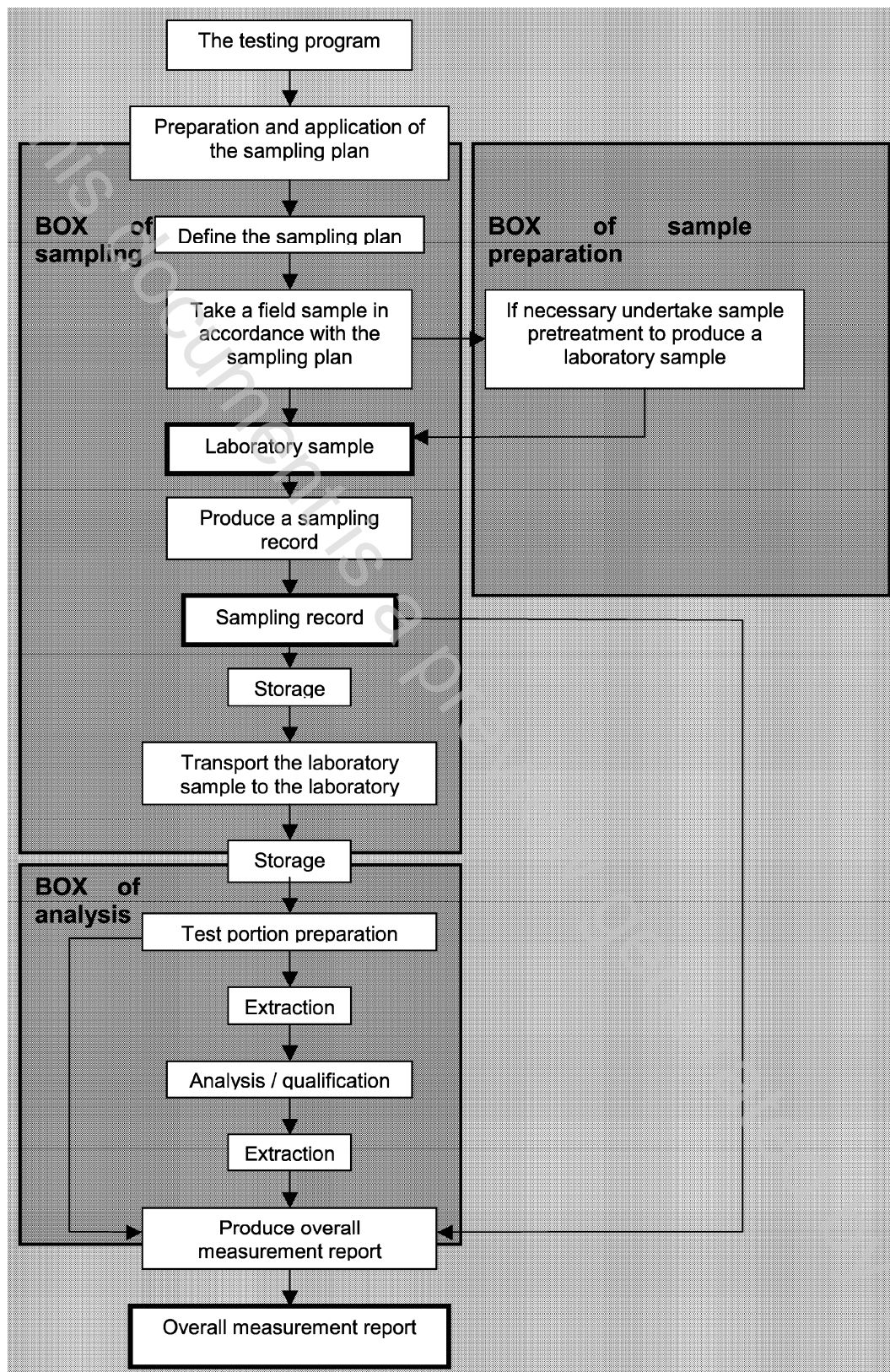


Figure 1 — Links between the essential elements of a testing program

1 Scope

This European Standard 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 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 15357:2011, *Solid recovered fuels — Terminology, definitions and descriptions*

CEN/TS 15401:2010, *Solid recovered fuels — Determination of bulk density*

EN 15413²⁾, *Solid recovered fuels — Methods for the preparation of the test sample from the laboratory sample*

EN 15415-1²⁾, *Solid recovered fuels — Determination of particle size distribution — Part 1: Screen method for small dimension particles*

EN 15443, *Solid recovered fuels — Methods for the preparation of the laboratory sample*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 15357:2011 and the following apply.

3.1

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 Adapted from Eurachem/Citac Guide CG 4 [26].

3.2

duplicate sample

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

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

NOTE 2 A duplicate sample is a replicate sample consisting of two portions.

NOTE 3 The replicate sample is usually used to estimate sample variability.

3.3

effective increment size

minimum sample size divided by the number of increments

²⁾ To be published.