



NSAI
Standards

Irish Standard
I.S. EN ISO 21645:2021

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

I.S. EN ISO 21645:2021

Incorporating amendments/corrigenda/National Annexes issued since publication:

The National Standards Authority of Ireland (NSAI) produces the following categories of formal documents:

I.S. xxx: Irish Standard — national specification based on the consensus of an expert panel and subject to public consultation.

S.R. xxx: Standard Recommendation — recommendation based on the consensus of an expert panel and subject to public consultation.

SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

This document replaces/revises/consolidates the NSAI adoption of the document(s) indicated on the CEN/CENELEC cover/Foreword and the following National document(s):

NOTE: The date of any NSAI previous adoption may not match the date of its original CEN/CENELEC document.

This document is based on:

EN ISO 21645:2021

Published:

2021-04-07

This document was published under the authority of the NSAI and comes into effect on:

2021-04-25

ICS number:

75.160.10

NOTE: If blank see CEN/CENELEC cover page

NSAI
1 Swift Square,
Northwood, Santry
Dublin 9

T +353 1 807 3800
F +353 1 807 3838
E standards@nsai.ie
W NSAI.ie

Sales:
T +353 1 857 6730
F +353 1 857 6729
W standards.ie

Údarás um Chaighdeáin Náisiúnta na hÉireann

National Foreword

I.S. EN ISO 21645:2021 is the adopted Irish version of the European Document EN ISO 21645:2021, Solid recovered fuels - Methods for sampling (ISO 21645:2021)

This document does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

For relationships with other publications refer to the NSAI web store.

Compliance with this document does not of itself confer immunity from legal obligations.

In line with international standards practice the decimal point is shown as a comma (,) throughout this document.

This page is intentionally left blank

EUROPEAN STANDARD

EN ISO 21645

NORME EUROPÉENNE

EUROPÄISCHE NORM

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

EN ISO 21645:2021 (E)

Contents	Page
European foreword.....	3

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.

This page is intentionally left blank

**INTERNATIONAL
STANDARD**

**ISO
21645**

First edition
2021-03

**Solid recovered fuels — Methods for
sampling**

Combustibles solides de récupération — Méthodes d'échantillonnage



Reference number
ISO 21645:2021(E)

© ISO 2021

ISO 21645:2021(E)



COPYRIGHT PROTECTED DOCUMENT

© ISO 2021

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

	Page
Foreword	v
Introduction	vi
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 Symbols	7
5 Principle	8
6 Development of a sampling plan	8
6.1 Principle.....	8
6.2 Definition of overall objectives.....	9
6.3 Definition of a lot and determining lot size.....	9
6.3.1 General.....	9
6.3.2 Definition of a lot in case of sampling from a material flow.....	10
6.3.3 Definition of a lot in case of transport by a vehicle.....	10
6.3.4 Definition of a lot in case of transport by ship.....	10
6.3.5 Definition of a lot in case of sampling from a static lot.....	10
6.4 Determination of the sampling procedure.....	10
6.5 Determination of the number of increments.....	11
6.6 Determination of minimum sample mass.....	11
6.7 Determination of the minimum increment mass.....	11
6.7.1 Determination of minimum increment mass for material flows.....	11
6.7.2 Determination of the minimum increment mass for static lots, vehicles or ships.....	11
6.8 Determination of the planned increment and planned sample amounts.....	11
6.9 Selection of distribution of increments over a lot.....	12
6.9.1 General.....	12
6.9.2 Determination of the distribution of the increments when sampling from a material flow.....	12
6.9.3 Determination of the distribution of the increments when sampling from a vehicle(s).....	12
6.9.4 Implementation of sampling from a static lot.....	13
6.10 Sampling equipment and implements.....	14
7 Implementation of the sampling plan	14
7.1 Steps before actual sampling.....	14
7.2 Steps during sampling.....	14
7.3 Steps after sampling.....	14
8 Handling and storage of samples	15
9 Precision	15
Annex A (normative) Procedure for the development of a sampling plan	16
Annex B (normative) Sampling plan	19
Annex C (informative) Example of a sampling plan	23
Annex D (normative) Sampling equipment and implements	28
Annex E (normative) Determination of minimum sample mass	33
Annex F (normative) Determination of increment mass for sampling from material flows	38
Annex G (normative) Determination of increment mass for sampling from static lots, vehicles or ships	41
Annex H (normative) Implementation of sampling plan from a material flow	42

ISO 21645:2021(E)

Annex I (normative) Implementation of the sampling plan from a static lot or vehicle	46
Annex J (normative) Minimum sample mass required for analysis	48
Annex K (informative) Additional information about precision	51
Annex L (informative) Examples for stratified and stratified random sampling	54
Bibliography	56

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.

ISO 21645:2021(E)

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].

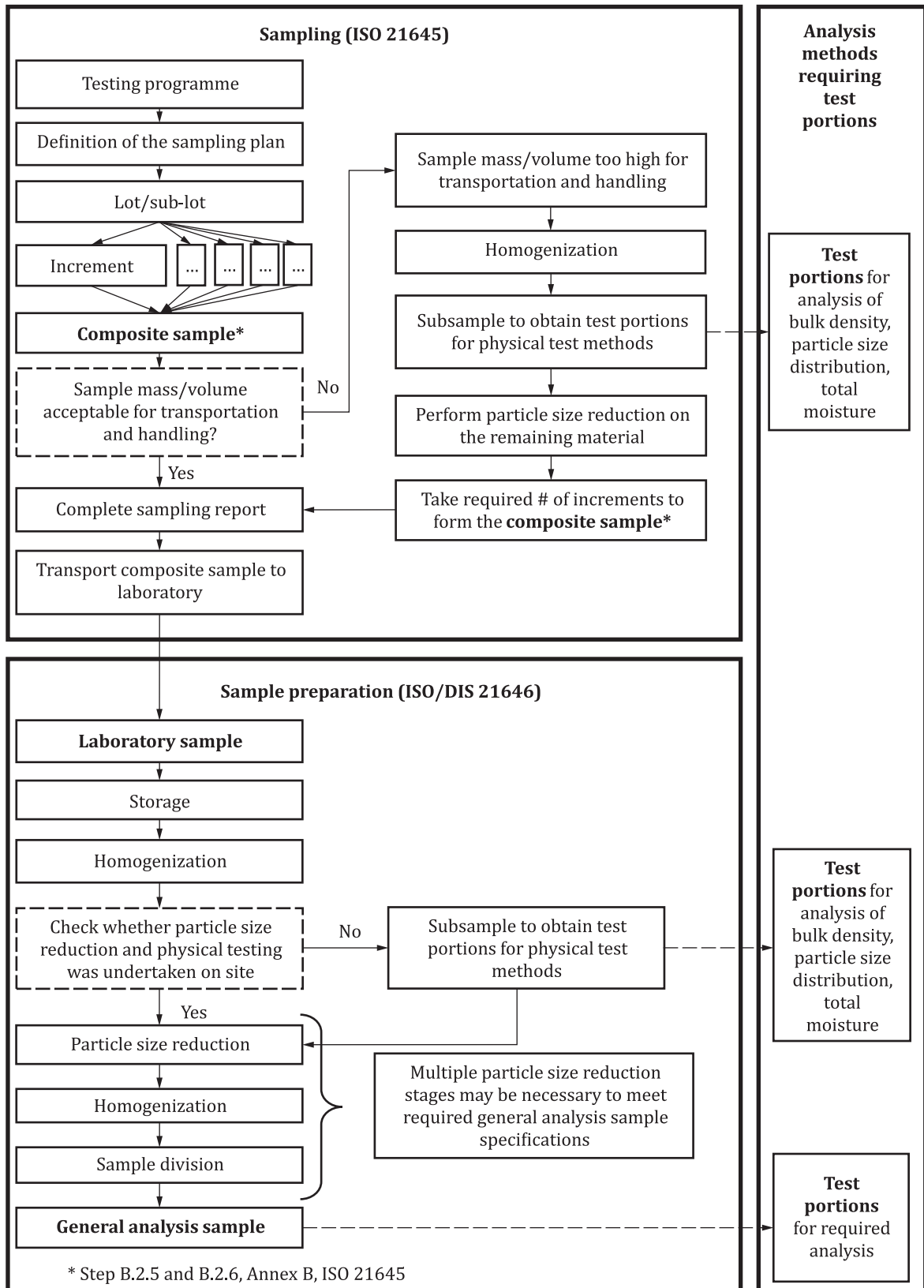


Figure 1 — Links between the essential elements of a testing program

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.

This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

-
- [Looking for additional Standards? Visit Intertek Inform Infostore](#)
 - [Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation](#)
-