
Solid recovered fuels — Sample preparation

Combustibles solides de récupération — Préparation des échantillons



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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 materials, including solid recovered fuels*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 343, *Solid recovered materials, including solid recovered fuels*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

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

Solid recovered fuels are a major source of renewable energy. International Standards facilitate the production, trade and use of solid recovered fuels. For sampling and sample preparation of solid recovered fuels, ISO 21645 and this document, respectively, can be used (in conjunction) by different types of organizations, including but not limited to:

- solid recovered fuel production and trading companies;
- energy companies;
- regulatory bodies;
- conformity assessment bodies;
- laboratories.

The sample preparation technique adopted depends on a combination of different characteristics of the material and circumstances encountered at the sampling location. The determining factors are:

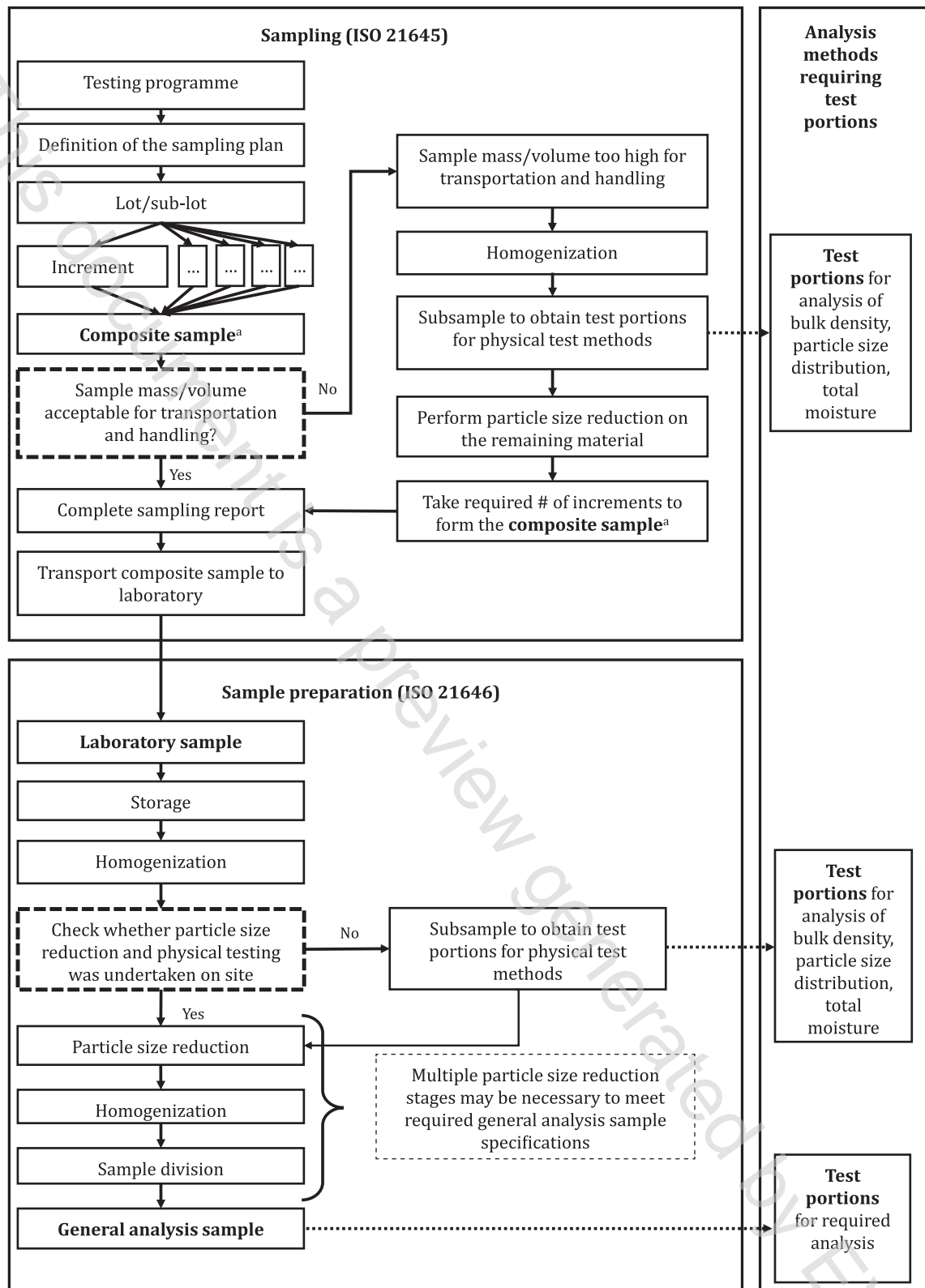
- the type of solid recovered fuel;
- the physical behaviour of the specific solid recovered fuel;
- the (expected) degree of heterogeneity (e.g. monostreams, mixed fuels, blended fuels).

In laboratory practice, different analytical procedures often need to be applied to the laboratory sample that has been taken according to the sampling plan. For this purpose, sub-sampling is applied in a way that the different test portions are representative of the laboratory sample with respect to the compounds of interest and the specific analytical procedures. The representativeness of the laboratory sample and of the test portions is of major importance to guarantee the quality and accuracy of analytical results. The representativeness of the laboratory sample is specified by the sampling plan.

This document is largely based on the work done by CEN/TC 343, *Solid recovered fuels*, and CEN/TC 292, *Characterization of waste* (now integrated in CEN/TC 444, *Environmental characterization of solid matrices*), and in particular EN 15002, which was developed for the majority of waste samples. Most of its concepts and specifications are also applicable to solid recovered fuel samples. However, the foundations of EN 15002 are not completely applicable to solid recovered fuel, as the nature of this material is substantially different and can lead to misrepresentation of the fuel quality.

The main characteristic that makes solid recovered fuel samples significantly different from other kinds of waste is that very often solid recovered fuels are solid, but neither 'granular' nor monolithic. It often happens that solid recovered fuel samples are fibrous-like materials, so that the statistical formula for sampling as defined in EN 15002 is not applicable. One additional term in the statistical formula is needed, namely the 'shape factor' (f).

This document is part of the testing programme for solid recovered fuels. This programme consists of various steps leading to the analysis sample for fuel quality testing as outlined in [Figure 1](#).



^a ISO 21645:2021, B.2, steps 5) and 6).

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

Solid recovered fuels — Sample preparation

1 Scope

This document specifies methods for sample preparation to ensure representativeness of the samples throughout the preparation procedures to produce general analysis samples. Suitable test portions can be taken from the laboratory or general analysis samples and used for analysis according to the specific requirements defined in the corresponding analytical procedures.

This document specifies the correct sample preparation sequence to be applied to:

- a) the composite sample, in order to produce a laboratory sample (taking into account large pieces of solid recovered fuel);
- b) each sub-sampling step throughout the testing programme;
- c) the laboratory sample, in order to obtain suitable test portions;
- d) ensure the representativeness of the test portions that have been taken according to the sample preparation plan, prior to physical analysis, chemical analysis or both (e.g. extractions, digestion, analytical determinations).

The methods specified in this document can be used for sample preparation, for example, when the samples are to be tested for bulk density, biomass content determination, mechanical durability, particle size distribution, moisture content, ash content, ash melting behaviour, calorific value, chemical composition, impurities and self-heating properties. 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 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 3310-1, *Test sieves — Technical requirements and testing — Part 1: Test sieves of metal wire cloth*

ISO 3310-2, *Test sieves — Technical requirements and testing — Part 2: Test sieves of perforated metal plate*

ISO 21637:2020, *Solid recovered fuels — Vocabulary*

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

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*

3 Terms and definitions

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