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Solid biofuels - Methods for the determination of moisture content - Oven dry method - Part 3: Moisture in general analysis sample

Feste Biobrennstoffe - Verfahren zur Bestimmung des Wassergehaltes - Verfahren der Ofentrocknung - Teil 3: Wassergehalt in gewöhnlichen Analyseproben

Biocombustilbles solides - Détermination de l'humidité - Méthode par séchage a l'étuve - Partie 3: Humidité de l'échantillon pour analyse générale

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Solid biofuels - Methods for the determination of moisture content - Oven dry method - Part 3: Moisture in general analysis sample

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Foreword

This document (CEN/TS 14774-3:2004) has been prepared by Technical Committee CEN/TC 335 “Solid Biofuels”, the secretariat of which is held by SIS.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this CEN Technical Specification : Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Introduction

CEN/TS 14774-3:2004 consists of the following parts under the general title *Solid Biofuels – Methods for the determination of moisture content – Oven dry methods.*

Part 1 Total moisture – Reference method

Part 2 Total moisture – Simplified method

Part 3 Moisture in general analysis sample

1 Scope

This document describes the method of determining the moisture in the analysis sample by drying the sample in an oven. It is intended to be used for general analysis samples according to prCEN/TS 14780. The method described in this document is applicable to all solid biofuels.

NOTE The term moisture content when used with biomass materials can be misleading since untreated biomass frequently contains varying amounts of volatile compounds (extractives) which may evaporate when determining the moisture content of the general analyses sample by oven drying.

Since biofuels in small particle size are very hygroscopic, their moisture content will vary with change of humidity of the atmosphere and therefore, the moisture of the analyses sample should always be determined simultaneously when portions are weighed out for other analytical determinations, for example calorific value, carbon, nitrogen.

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.

CEN/TS 14588:2003, *Solid Biofuels – Terminology, definitions and description*

prCEN/TS 14779, *Solid Biofuels – Methods for preparing sampling plans and sampling certificates*

prCEN/TS 14780, *Solid Biofuels - Methods of sample reduction*

ISO 331, *Coal – Determination of moisture in the analysis sample – Direct gravimetric method*

3 Terms and definitions

For the purpose of this document, the terms and definitions given in CEN/TS 14588:2003 apply.

NOTE In this method the moisture content should be reported on an as analysed basis.

4 Principle

The analysis sample of biofuel is dried at a temperature of (105 ± 2) °C and the percentage moisture calculated from the loss in mass of the test sample.

NOTE The analysis sample can be dried in air atmosphere or in nitrogen atmosphere. If the sample material is susceptible to oxidation (at 105 °C), drying in nitrogen atmosphere is to be preferred and detailed in ISO 331. The used drying atmosphere should be reported in accordance with Clause 10.

5 Apparatus

5.1 Drying oven, capable of being controlled (manufacturers specification) at a temperature within the rage of (105 ± 2) °C and in which for air the atmosphere changes between 3 and 5 times per hour. The air velocity should be such that the sample particles are not dislodged from their weighing dish. The use of nitrogen atmosphere is detailed in ISO 331.

5.2 Weighing dish, of glass or corrosion- and temperature resistant material, with a well fitting lid and of such a size that the sample layer does not exceed 0,2 g/cm^2.

5.3 Balance, having sufficient accuracy to weigh the sample within ± 0,1 mg.

5.4 Dessicator, to avoid absorption of moisture from the atmosphere to the sample.

6 Sample preparation

6.1 The sample used for the determination is the general analysis test sample with a particle size of 1 mm or less, prepared according to prCEN/TS 14780.

6.2 Before commencing the determination, mix the analysis sample, preferably by mechanical means.

7 Procedure

A minimum of two determinations shall be carried out on the test sample.

7.1 Dry an empty weighing dish with its lid at (105 ± 2) °C until constant in mass and cool it to room temperature in a dessicator.

Note Several dishes can be handled at the same time.

7.2 Weigh the weighing dish with its lid to the nearest 0,1 mg.

7.3 Add minimum 1 g of the analysis sample into the weighing dish in an even layer and weigh the weighing dish with its lid plus sample to the nearest 0,1 mg.

7.4 Heat the uncovered dish and its lid together with the sample at (105 ± 2) °C until constant in mass. Constancy in mass is defined as a change not exceeding 1 mg in mass during a further period of heating at (105 ± 2) °C over a period of 60 min. The drying time required is normally between 2 – 3 hours.

7.5 Replace the lid while the dish is still in the oven. Transfer the dish and its contents to a dessicator. Let it cool to room temperature.

7.6 Weigh the dish and its lid with the sample to the nearest 0,1 mg. Since small particle size biofuels are very hygroscopic its important to weigh rapidly once the sample is cooled.