SLOVENSKI STANDARD
SIST EN 15415-1:2011

01-november-2011

Nadomešča:
SIST-TS CEN/TS 15415:2007

Trdna alternativna goriva - Ugotavljanje porazdelitve velikosti delcev - 1. del: Sejalna analiza za majhne delce

Solid recovered fuels - Determination of particle size distribution - Part 1: Screen method for small dimension particles

Feste Sekundärbrennstoffe - Bestimmung der Partikelgrößenverteilung - Part 1: Siebverfahren für kleine Partikel

Combustible solide de récupération - Détermination de la granulométrie - Partie 1 : Méthode de tamisage pour des particules fines

Ta slovenski standard je istoveten z: **EN 15415-1:2011**

ICS:

75.160.10	Trda goriva	Solid fuels

SIST EN 15415-1:2011 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 15415-1

September 2011

ICS 75.160.10

Supersedes CEN/TS 15415:2006

English Version

Solid recovered fuels - Determination of particle size distribution - Part 1: Screen method for small dimension particles

Combustibles solides de récupération - Détermination de la distribution granulométrique - Partie 1: Méthode de criblage pour des particules de petites dimensions

Feste Sekundärbrennstoffe - Bestimmung der Partikelgrößenverteilung - Teil 1: Siebverfahren für kleine Partikel

This European Standard was approved by CEN on 15 July 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

This document (EN 15415-1:2011) 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 March 2012, and conflicting national standards shall be withdrawn at the latest by March 2012.

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 supersedes CEN/TS 15415:2006.

EN 15415, *Solid recovered fuels — Determination of particle size distribution*, consists of the following parts:

— *Part 1: Screen method for small dimension particles;*

— *Part 2: Maximum projected length method (manual) for large dimension particles* (draft standard);

— *Part 3: Method by image analysis for large dimension particles* (draft standard).

This document differs from CEN/TS 15415:2006 mainly as follows:

a) large pieces with irregular shape definitely excluded from the scope;

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 the United Kingdom.

1 Scope

This European Standard specifies the determination of particle size distribution of solid recovered fuels by a machine or manual sieving method. It applies to particulate agglomerated and non-agglomerated fuels, such as fluff, pellets, briquettes, pulverised solid recovered fuels.

This sieving method is not applicable to large pieces with irregular shape such as the pieces of shredded tyres or of demolition wood. In the case, of large pieces of irregular shape, prEN 15415-2 and prEN 15415-3 are applicable.

NOTE 1 For fine particles < 1 mm (e.g. sludges), the use of other methods could give more representative results as e.g. an analysis with the laser diffraction method in accordance with ISO 13320.

NOTE 2 This European Standard is based on EN 15149-1 applicable to particle sizes less than 3,15 mm.

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

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

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

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*

3 Terms and definitions

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

4 Principle

A sample is subjected to sieving through horizontally oscillating sieves, sorting the particles in decreasing size classes either manually or by machine sieving. For particles less than 25 mm, only machine sieving is used, for particles greater than 25 mm, manual or machine sieving is applied.

5 Apparatus

5.1 Sieve

5.1.1 General

The sieve (e.g. the geometry of the apertures, the thickness of the sieve, hole distances) shall be in accordance with ISO 3310-1 and ISO 3310-2. The geometry of the apertures shall be either circular or square and shall be reported.

NOTE For terms regarding sieves and test sieving, see ISO 2395.

For a correct comparison of different sieve analysis, it is necessary to use the same type of sieve with the same geometry of the apertures for each analysis.

The frame of the sieve shall have a height that enables the sieve to contain the sample and allows for free movement of the sample during the sieving process.

5.1.2 Minimum sieve area

An appropriate number of either circular or rectangular certified test sieves is required for the test. For particles greater than 10 mm, an effective sieve area of 0,12 m^2 shall be observed. An effective sieve area of less than 0,12 m^2 and greater than 0,025 m^2 is adequate for materials with a nominal top size of less than 10 mm.

The geometry of the apertures, the thickness of the sieves, the hole distances and the diameter of the holes shall be in accordance with ISO 3310-1 and ISO 3310-2.

5.1.3 Number and size of the sieves

The number of sieves and the aperture sizes of the sieves shall be chosen according to the size specification of the sample material.

NOTE 1 For solid recovered fuels > 3,15 mm, it is recommended to use sieves with hole diameters of 3,15 mm, 6,3 mm, 12,5 mm, 25 mm, 50 mm, 100 mm and 125 mm, and for solid recovered fuels < 3,15 mm, it is recommended to use sieves with hole diameters of 200 µm, 400 µm, 800 µm, 1,6 mm and 3,15 mm.

NOTE 2 In order to obtain a complete characterisation of the size range of a sample, the number of sieves should be such that no more than 25 % of the gross sample mass will be retained on any given sieve. On the biggest and the smallest sieves no more than 5 % of the gross sample mass should be retained.

NOTE 3 For further resolution in the size distribution and for avoiding any overloading of one fraction, the addition of sieves in accordance with ISO 565 (sieve mesh scale R 20) to the sieve set is also recommended.

5.2 Collecting pan

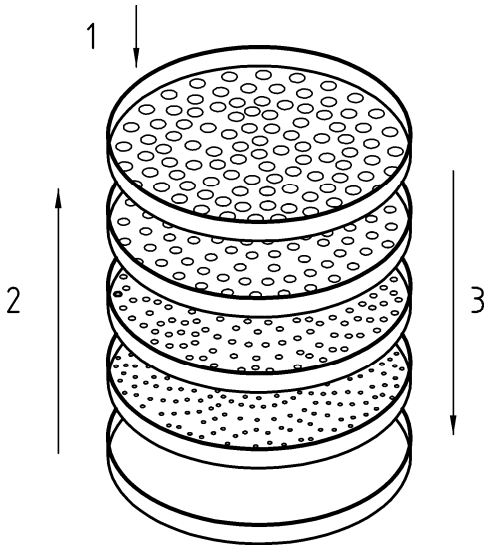
An adequate number of collecting pans is required for weighing the size classes.

5.3 Flat brush

A flat brush is required for cleaning the sieves, especially in case of fine grade solid recovered fuels.

5.4 Mechanical oscillating equipment

If a mechanical device is used, the shaking operation shall be horizontally oscillating (one or two dimensional), using an appropriate stroke-frequency according to the type of material. The principle of a mechanical oscillator is shown in Figure 1.



Key

1 material addition
2 increasing hole diameters
3 material flow direction

Figure 1 — Principle of a mechanical oscillator

5.5 Balance

A balance capable of measuring the mass of the sample to be sieved to the nearest 0,1 g shall be used.

6 Sampling and sample preparation

The sample shall be taken in accordance with EN 15442 and prepared in accordance with EN 15443.

The minimum mass of the test sample shall be:

— 1 kg for fine grade solid recovered fuels with a nominal top size, d_{95}, less than 25 mm;

— 2 kg for solid recovered fuels with a nominal top size, d_{95}, from 25 mm to 150 mm;

— 5 kg for solid recovered fuels with a nominal top size, d_{95}, greater than 150 mm.

Sieve the sample raw or air-dried. If the moisture content of the sample is greater than 20 %, air-drying is recommended for preventing the particles from sticking together or losing moisture during the sieving process. Air-drying shall be performed in accordance with CEN/TS 15414-2.

Determine the moisture content of the material to be sieved on a separate sub-sample following the procedure given in CEN/TS 15414-2. The moisture content shall be determined and reported concurrently with the particle size distribution determination.

NOTE Air-drying as specified in CEN/TS 15414-2 is performed by bringing the sample into equilibrium with the humidity of the surrounding atmosphere.

7 Procedure

7.1 General

Depending on the size of the sieves, the test sample shall be divided into several sub-samples to avoid overloaded sieves. The sub-samples shall be processed in sequential sieving operations.

NOTE 1 Generally, it is recommended to perform a pre-test, especially if there is no experience with the type of fuel. The required minimum sieving time should be determined for each equipment and type of fuel in a pre-test.

NOTE 2 Losing any particles when determining individual mass differences during a pre-test should be avoided.

Continue the sieving operation until the mass changes between two sequential sieves do not exceed a maximum of 0,3 % of the total sample mass per one minute time of sieving operation.

NOTE 3 Attention should be paid to the fact that an excessive sieving time which is significantly longer than the minimum sieving time can cause a modification of the particle size distribution (e.g. abrasion causes a higher portion of the fine fraction).

7.2 Manual sieving

Place the sieve over a collecting pan starting with the sieve with the largest aperture size. Weigh the sample to the nearest 0,1 g. Spread the sample (sub-sample) in an even layer and start sieving. When shaking, apply a vertical as well as horizontal action in order to allow all small particles to pass through the openings until no more material will pass.

Collect the particles passing through the sieve in the collecting pan. Spread the contents in the collecting pan in an even layer on the subsequent sieve and repeat the operation. Weigh the retained net material on each sieve and in the collecting pan to the nearest 0,1 g after sieving with the sieve with the smallest aperture size. In the case that a particle sticks in a sieving hole, it shall be removed and added to the fraction which has remained on the sieve (as if it did not pass the hole).

All particles greater than 100 mm (maximum dimension) shall be manually classified into one or more fractions regardless from which sieve or collecting pan they are collected. In this case, the size is defined as maximum length of the particle.

Record the mass of each fraction in a scheme, see Table 1[1)] for an example.

1) The user of Table 1 is allowed to copy it.