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Trdna alternativna goriva - Določevanje mehanske trdnosti peletov

Solid recovered fuels - Determination of mechanical durability of pellets

Feste Sekundärbrennstoffe - Bestimmung der mechanischen Festigkeit von Pellets

Combustibles solides de récupération - Méthode de détermination de la résistance des granulés

Ta slovenski standard je istoveten z: CEN/TS 15639:2010

ICS:

75.160.10	Trda goriva	Solid fuels

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TECHNICAL SPECIFICATION

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CEN/TS 15639

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ICS 75.160.10

Supersedes CEN/TS 15639:2007

English Version

Solid recovered fuels - Determination of mechanical durability of pellets

Combustibles solides de récupération - Méthode de détermination de la résistance des granulés

Feste Sekundärbrennstoffe - Bestimmung der mechanischen Festigkeit von Pellets

This Technical Specification (CEN/TS) was approved by CEN on 12 June 2010 for provisional application.

The period of validity of this CEN/TS is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the CEN/TS can be converted into a European Standard.

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

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Contents

Foreword

This document (CEN/TS 15639:2010) has been prepared by Technical Committee CEN/TC 343 “Solid recovered fuels”, the secretariat of which is held by SFS.

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 15639:2007.

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

CEN/TS 15639:2007 was not converted into a European Standard as the test method specified in this document was not validated (see [1], [2]).

This document differs from CEN/TS 15639:2007 mainly as follows:

a) Specifications regarding the sieves to be used changed;

b) whole document editorially revised.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this Technical Specification: 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 document specifies a test method for the determination of mechanical durability of pellets. It is intended to be applied by persons and organisations that manufacture, plan, sell, erect or use machinery, equipment, tools and entire plants related to such pellets, and that are involved in producing, purchasing, selling and utilising pellets.

The method specified is not applicable to soft pellets.

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.

prEN 15357:2008, *Solid recovered fuels — Terminology, definitions and descriptions*

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

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

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 prEN 15357:2008 and the following apply.

3.1
mechanical durability
measure of resistance of densified fuels towards shocks and/or abrasion as a consequence of handling and transportation processes, characterized by pellets disintegration and fines formation

3.2
fines
particles with a diameter less than 1 mm

NOTE Fines characterize the potential of high dust emission.

3.3
soft pellet
pellet with a density less than 600 kg/m^3

4 Principle

The test sample is subjected to controlled shocks by collision of pellets against each others and against the walls of a defined rotating test chamber. The mechanical durability is calculated from the mass of sample remaining after separation of abraded and fine broken particles.

5 Apparatus

5.1 Pellet tester, consisting of a dust tight enclosure, made of rigid material, e.g. a steel plate, aluminium plate or plexiglass, with smooth and flat surfaces, dimensions of 300 mm × 300 mm × 125 mm; capable of rotations of (50 ± 2) min^{-1} about an axis perpendicular to and centred in the 300 mm sides, with a 230 mm long baffle affixed symmetrically to a diagonal of one 300 mm × 300 mm side of the pellet tester (see Figure 1 and Figure 2).

One leg of this formed angle baffle shall be extended 50 mm into the pellet tester and the other leg securely fastened to the back of the tester. A door may be placed in any side provided that is dustproof. Projections, such as rivets and screws, shall be kept to a minimum and well rounded.

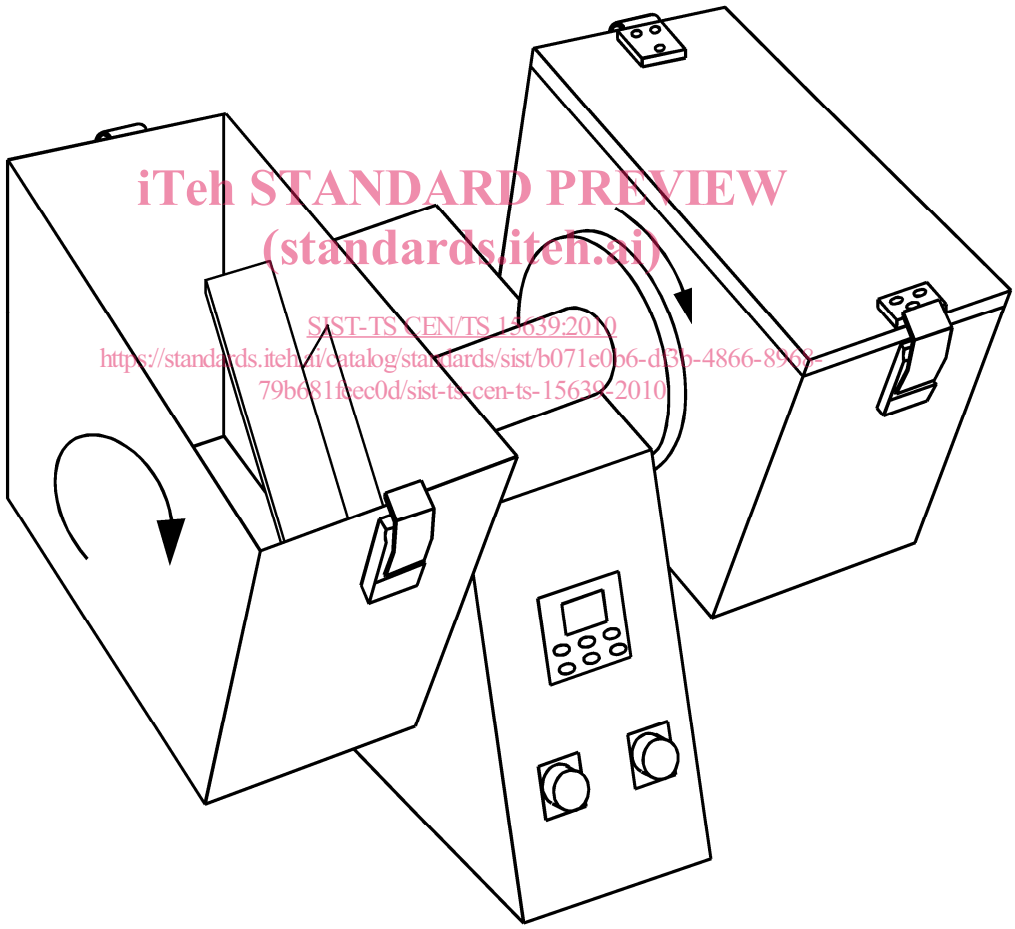
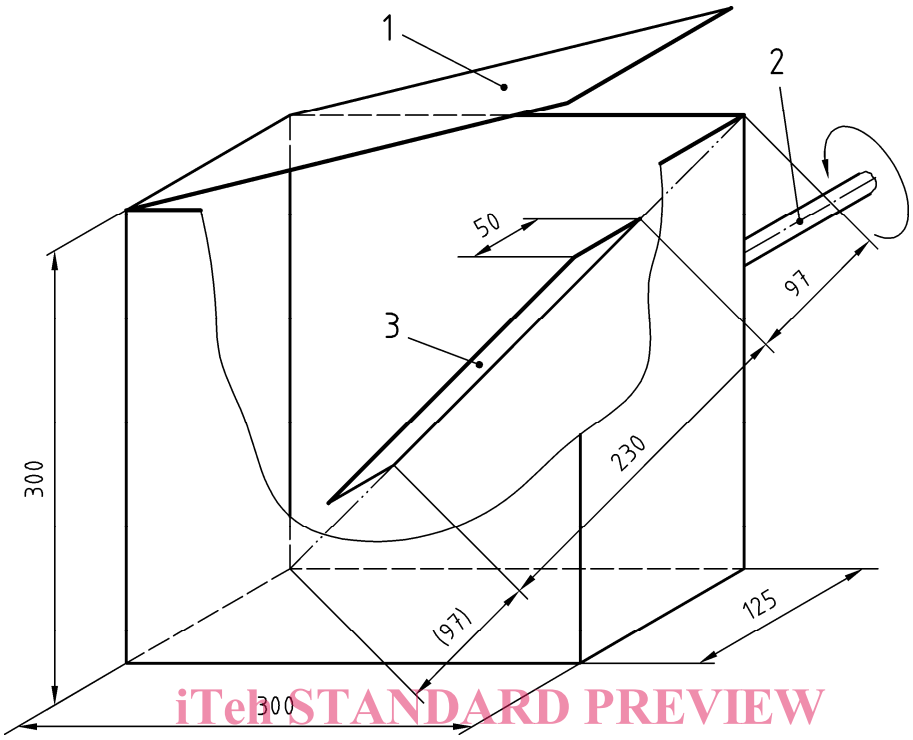


Figure 1 — Example of pellet tester with two boxes

Dimensions in millimetres



Key

1 filling door
2 drive shaft
3 baffle

Figure 2 — Structure of the main parts of the pellet tester

5.2 Two sieves, the first one a round hole sieve with hole sizes of 2/3 of the pellets diameter, and the second a 1 mm wire mesh sieve, suitable for manual screening in accordance with ISO 3310-2.

5.3 Balance, capable of weighing 2 kg and measuring the mass to the nearest 0,1 g.

6 Sampling and sample preparation

The sample shall be taken and prepared in accordance with prEN 15442 and prEN 15443; if necessary, it shall be divided into test portions using the coning and quartering method. The minimum size of the sample shall be 2,5 kg. The sample shall be divided into four equal portions in accordance with prEN 15443. Take one portion for the determination of the total moisture content in accordance with CEN/TS 15414-1 and CEN/TS 15414-2. Weigh two of the remaining sample portions and then separate the pellets carefully by manual sieving using the greater sieve (see 5.2).

NOTE Attention should be paid to the fact that rough treatment during sample reduction and screening can influence the result.

Weigh the remaining pellets and determine the initial portion of fines as mass fraction in percent.

7 Procedure

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

Take a test portion of (500 ± 10) g. Place the test portion of the sieved pellets weighed to the nearest 0,1 g in the pellet tester (5.1). Tumble the sample with 500 rotations of (50 ± 2) min^{-1}. After this number of rotations, the sample shall be removed and passed manually through the sieves (5.2). Weigh the sample remaining on the greater sieve and, if required, the mass of fines less than 1 mm to the nearest 0,1 g.

8 Calculations

Calculate the mechanical durability, D_p, of pellets, expressed as percent, using Equation (1):

$$D_p = \frac{m_{Ap}}{m_{Ep}} \times 100 \quad (1)$$

where

m_{Ep} is the mass of pre-sieved pellets before tumbling treatment, in grams;

m_{Ap} is the mass of sieved pellets after the tumbling treatment, in grams.

The result for each individual determination shall be calculated to two decimal places and the mean value of the individual results shall be calculated and rounded to the nearest 0,1 %. The mean value shall be recorded in the test report.

If required, calculate the mass fraction of fines, F_D, expressed as percent, using Equation (2):

$$F_D = \frac{m_f}{m_{Ep}} \times 100 \quad (2)$$

where

m_f is the mass of the fraction less than 1 mm.

The individual values of the mass fraction of fines, F_D, shall be calculated to two decimal places and the mean value of these shall be calculated and rounded to the nearest 0,1 %. The mean value shall be recorded in the test report.

9 Precision

The test method specified in this Technical Specification was not validated in the frame of the QUOVADIS project (see [2]).