

BS EN 16127:2012



BSI Standards Publication

# Solid biofuels — Determination of length and diameter of pellets

**bsi.**

...making excellence a habit.™

**National foreword**

This British Standard is the UK implementation of EN 16127:2012.

The UK participation in its preparation was entrusted to Technical Committee PTI/17, Solid biofuels.

A list of organizations represented on this committee can be obtained on request to its secretary.

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

© The British Standards Institution 2012  
Published by BSI Standards Limited 2012

ISBN 978 0 580 71512 9

ICS 75.160.10

**Compliance with a British Standard cannot confer immunity from legal obligations.**

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 March 2012.

**Amendments issued since publication**

Date	Text affected
------	---------------

---

EUROPEAN STANDARD

**EN 16127**

NORME EUROPÉENNE

EUROPÄISCHE NORM

February 2012

ICS 75.160.10

English Version

**Solid biofuels - Determination of length and diameter of pellets**Biocombustibles solides - Détermination de la distribution  
granulométrique des granulés et des briquettes cylindriquesFeste Biobrennstoffe - Bestimmung der Länge und des  
Durchmessers von Pellets

This European Standard was approved by CEN on 8 January 2012.

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, Turkey 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.....	3
Introduction .....	4
1 Scope .....	5
2 Normative references .....	5
3 Terms and definitions .....	5
4 Principle.....	5
5 Apparatus .....	6
5.1 Measuring caliper .....	6
5.2 Sample reduction equipment .....	6
5.3 Balance .....	6
6 Sample preparation .....	6
7 Procedure .....	7
7.1 General.....	7
7.2 Procedure A: Determination of share of oversized pellets .....	7
7.2.1 Weighing.....	7
7.2.2 Sorting by length .....	7
7.2.3 Weighing of the fractions.....	7
7.2.4 Measuring of pellet diameter .....	7
7.3 Procedure B: Determination of the average length of pellets.....	7
7.3.1 Measuring of individual pellet length .....	7
7.3.2 Measuring of pellet diameter .....	8
8 Calculations.....	8
8.1 Share of oversized pellets .....	8
8.2 Average length of pellets .....	8
9 Test report .....	8
10 Precision and bias .....	8
Bibliography .....	9

## Foreword

This document (EN 16127:2012) has been prepared by Technical Committee CEN/TC 335 “Solid biofuels”, the secretariat of which is held by SIS.

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 August 2012, and conflicting national standards shall be withdrawn at the latest by August 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 has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

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, Turkey and the United Kingdom.

## Introduction

Pellets with a length and diameter outside the specification can cause problems with transportation in screw conveyors and silo outlets. According to EN 14961-1, EN 14961-2 and FprEN 14961-6 measurements of length and diameter of pellets need to be performed. This document describes the measuring procedure.

## 1 Scope

This European Standard describes methods for the determination of diameter and length of pellets. Concerning the pellet length methods for both determination of the share of oversized pellets and for determination of the average length are included. It is intended for persons and organisations that manufacture, plan, sell, erect or use machinery, equipment, tools and entire plants related to fuel pellets, and to all persons and organisations involved in producing, purchasing, selling and utilising fuel pellets.

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 14588, *Solid biofuels — Terminology, definitions and descriptions*

EN 14778, *Solid biofuels — Sampling*

EN 14780, *Solid biofuels — Sample preparation*

EN 15210-1, *Solid biofuels — Determination of mechanical durability of pellets and briquettes — Part 1: Pellets*

## 3 Terms and definitions

For the purpose of this document, the terms and definitions given in EN 14588 apply.

## 4 Principle

The length and diameter of fuel pellets of a representative sample of fuel pellets are measured by using a caliper. The length of a pellet is always measured along the axis of the cylinder (Figures 1 and 2). The diameter is measured perpendicular to the axis.

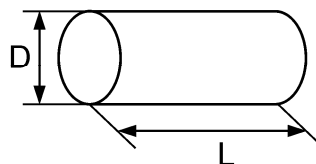


Figure 1 — Length and diameter of a pellet (*D* Diameter, *L* Length)

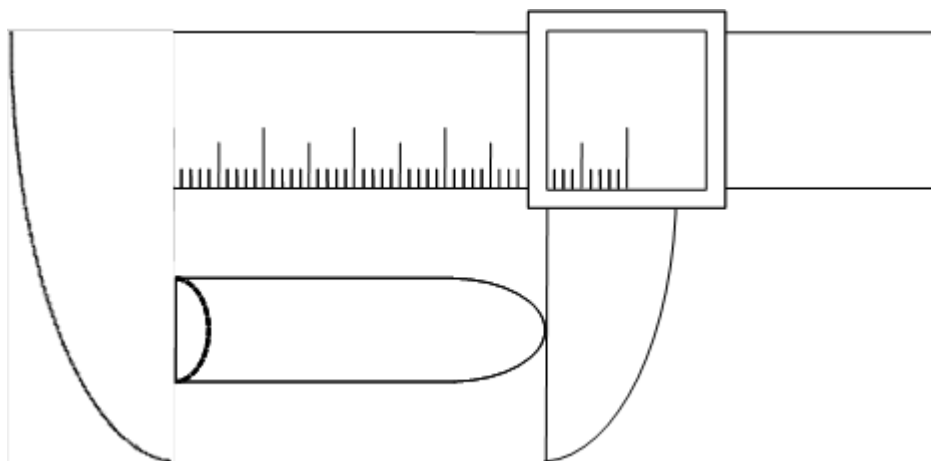


Figure 2 — Measuring the length of a pellet by use of a caliper

## 5 Apparatus

### 5.1 Measuring caliper

Use a caliper with a resolution of at least 0,1 mm for measuring of length and diameter.

### 5.2 Sample reduction equipment

If sample reduction equipment is used it shall be chosen in accordance with the requirements as specified in EN 14780.

### 5.3 Balance

The balance shall have a resolution of at least 0,01 g.

## 6 Sample preparation

The sample used for the measurement of length and diameter shall be taken according to EN 14778. From this sample a test portion is extracted by division according to EN 14780.

The test portion sizes shall be selected from Table 1.

Table 1 — Test portion size

Pellet diameter	Portion size
<6 mm	60 g to 80 g
6 mm to 8 mm	80 g to 100 g
8 mm to 10 mm	100 g to 150 g
10 mm to 12 mm	150 g to 200 g
12 mm to 25 mm	200 g to 600 g (minimum 50 pellets)

The test portion is sieved by hand using a sieve with hole diameters of 3,15 mm as described in EN 15210-1. The sieving procedure in EN 15210-1 shall be followed.



The sieving shall be done in a way that the fine particles are separated but the creation of new fine particles is avoided. This is usually achieved when the test portion is shaken in about five to ten circular movements on a sieve of 40 cm diameter. If other equipment is used, the procedure and the test portion size can be adjusted to achieve the same effect.

NOTE Attention is drawn to the fact that rough treatment during sample reduction and screening might influence the result.

## **7 Procedure**

### **7.1 General**

The procedure is divided into two parts; A and B.

Procedure A describes the method to determine the share of oversized pellets in compliance with quality requirements.

Procedure B describes the method to determine the average length of pellets.

Depending on the desired parameter, either both or only one of the two procedures is applied.

### **7.2 Procedure A: Determination of share of oversized pellets**

#### **7.2.1 Weighing**

Determine the mass of the test portion by weighing.

#### **7.2.2 Sorting by length**

Pellets with a length greater than the requirement are separated from the test portion by hand. Any measurement required may be made by the use of a caliper as shown in Figure 2.

NOTE Depending on the quality requirements there may be more than one pellet length to be considered in sorting.

#### **7.2.3 Weighing of the fractions**

Weigh the separated fraction(s) to the nearest 0,01 g and record the result.

#### **7.2.4 Measuring of pellet diameter**

In order to determine the diameter class, select a minimum number of 10 pellets randomly from the test portion and determine each pellet diameter by use of the caliper. Record each result.

### **7.3 Procedure B: Determination of the average length of pellets**

#### **7.3.1 Measuring of individual pellet length**

The total length of each pellet of the test portion is measured by using a caliper as shown in Figure 2. The result from each determination is recorded.

NOTE If the tests according to procedure A (7.2) have also been performed, the same test portion can be used for the determination according to procedure B.

### 7.3.2 Measuring of pellet diameter

In order to determine the diameter class select a minimum number of 10 pellets randomly from the test portion and determine each pellet diameter by use of the caliper. Record each result.

## 8 Calculations

### 8.1 Share of oversized pellets

Calculate the ratio of the mass of each class of oversized pellets as separated according to 7.2.2 towards the total mass of the test portion as determined in 7.2.1. Express the calculated ratio or several ratios in percent to the nearest 0,1 %.

Calculate the mean value of the recorded pellet diameters as determined in 7.2.4 and express the result to the nearest 0,1 mm.

### 8.2 Average length of pellets

Calculate the mean value of the recorded pellet lengths as determined in 7.3 and express the result to the nearest 0,1 mm.

Calculate the mean value of the recorded pellet diameters as determined in 7.3.2 and express the result to the nearest 0,1 mm.

## 9 Test report

The test report shall include at least the following information:

- identification of the laboratory and the testing date;
- identification of the product or sample tested (see EN 14780); and same for the following;
- a reference to this document;
- any deviation from this document;
- conditions and observations, e.g. unusual occurrences during the test procedure, which may affect the result;
- the results of the calculated mean pellet diameter;
- for procedure A: Calculated weight percentage of the class(es) of oversized pellets;
- for procedure B: Calculated average length of pellets.

## 10 Precision and bias

Due to the unavailability of test results for repeatability and reproducibility, no precision data can be given for the present method.

## Bibliography

- [1] EN 14961-1:2010, *Solid biofuels — Fuel specifications and classes — Part 1: General requirements*
- [2] EN 14961-2:2011, *Solid biofuels — Fuel specifications and classes — Part 2: Wood pellets for non-industrial use*
- [3] EN 14961-6, *Solid biofuels — Fuel specifications and classes — Part 6: Non-woody pellets for non-industrial use*
- [4] EN 15234-1:2011, *Solid biofuels — Fuel quality assurance — Part 1: General requirements*





# British Standards Institution (BSI)

BSI is the national body responsible for preparing British Standards and other standards-related publications, information and services.

BSI is incorporated by Royal Charter. British Standards and other standardization products are published by BSI Standards Limited.

## About us

We bring together business, industry, government, consumers, innovators and others to shape their combined experience and expertise into standards-based solutions.

The knowledge embodied in our standards has been carefully assembled in a dependable format and refined through our open consultation process. Organizations of all sizes and across all sectors choose standards to help them achieve their goals.

## Information on standards

We can provide you with the knowledge that your organization needs to succeed. Find out more about British Standards by visiting our website at [bsigroup.com/standards](http://bsigroup.com/standards) or contacting our Customer Services team or Knowledge Centre.

## Buying standards

You can buy and download PDF versions of BSI publications, including British and adopted European and international standards, through our website at [bsigroup.com/shop](http://bsigroup.com/shop), where hard copies can also be purchased.

If you need international and foreign standards from other Standards Development Organizations, hard copies can be ordered from our Customer Services team.

## Subscriptions

Our range of subscription services are designed to make using standards easier for you. For further information on our subscription products go to [bsigroup.com/subscriptions](http://bsigroup.com/subscriptions).

With **British Standards Online (BSOL)** you'll have instant access to over 55,000 British and adopted European and international standards from your desktop. It's available 24/7 and is refreshed daily so you'll always be up to date.

You can keep in touch with standards developments and receive substantial discounts on the purchase price of standards, both in single copy and subscription format, by becoming a **BSI Subscribing Member**.

**PLUS** is an updating service exclusive to BSI Subscribing Members. You will automatically receive the latest hard copy of your standards when they're revised or replaced.

To find out more about becoming a BSI Subscribing Member and the benefits of membership, please visit [bsigroup.com/shop](http://bsigroup.com/shop).

With a **Multi-User Network Licence (MUNL)** you are able to host standards publications on your intranet. Licences can cover as few or as many users as you wish. With updates supplied as soon as they're available, you can be sure your documentation is current. For further information, email [bsmusales@bsigroup.com](mailto:bsmusales@bsigroup.com).

## BSI Group Headquarters

389 Chiswick High Road London W4 4AL UK

## Revisions

Our British Standards and other publications are updated by amendment or revision.

We continually improve the quality of our products and services to benefit your business. If you find an inaccuracy or ambiguity within a British Standard or other BSI publication please inform the Knowledge Centre.

## Copyright

All the data, software and documentation set out in all British Standards and other BSI publications are the property of and copyrighted by BSI, or some person or entity that owns copyright in the information used (such as the international standardization bodies) and has formally licensed such information to BSI for commercial publication and use. Except as permitted under the Copyright, Designs and Patents Act 1988 no extract may be reproduced, stored in a retrieval system or transmitted in any form or by any means – electronic, photocopying, recording or otherwise – without prior written permission from BSI. Details and advice can be obtained from the Copyright & Licensing Department.

## Useful Contacts:

### Customer Services

**Tel:** +44 845 086 9001

**Email (orders):** [orders@bsigroup.com](mailto:orders@bsigroup.com)

**Email (enquiries):** [cservices@bsigroup.com](mailto:cservices@bsigroup.com)

### Subscriptions

**Tel:** +44 845 086 9001

**Email:** [subscriptions@bsigroup.com](mailto:subscriptions@bsigroup.com)

### Knowledge Centre

**Tel:** +44 20 8996 7004

**Email:** [knowledgecentre@bsigroup.com](mailto:knowledgecentre@bsigroup.com)

### Copyright & Licensing

**Tel:** +44 20 8996 7070

**Email:** [copyright@bsigroup.com](mailto:copyright@bsigroup.com)



...making excellence a habit.™