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**Solid Biofuels — Determination of  
length and diameter of pellets**

*Biocombustibles solides — Détermination de la longueur et du  
diamètre des granulés*

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# Contents

	Page
Foreword.....	iv
Introduction.....	v
<b>1 Scope.....</b>	<b>1</b>
<b>2 Normative references.....</b>	<b>1</b>
<b>3 Terms and definitions.....</b>	<b>1</b>
<b>4 Principle.....</b>	<b>1</b>
<b>5 Apparatus.....</b>	<b>2</b>
<b>6 Sample preparation.....</b>	<b>2</b>
<b>7 Procedure.....</b>	<b>3</b>
7.1 Determination of pellet diameter class.....	3
7.2 Measuring of individual pellet length.....	3
7.3 Determination share of oversize length of pellets.....	3
7.3.1 Weighing.....	3
7.3.2 Sorting by length.....	3
7.3.3 Weighing of fractions by length.....	3
<b>8 Calculation.....</b>	<b>4</b>
8.1 Pellet diameter class.....	4
8.2 Share of oversize pellets.....	4
8.3 Average pellet length.....	4
<b>9 Performance characteristics.....</b>	<b>4</b>
<b>10 Test report.....</b>	<b>4</b>

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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](http://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](http://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 on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

The committee responsible for this document is ISO/TC 238, *Solid biofuels*.

## Introduction

Pellets with a length and diameter outside the specification can cause problems with transportation in screw conveyors, silo outlets, and burner feeding systems. ISO 17225-1, ISO 17225-2, ISO 17225-6, and ISO 17225-8 stipulate dimensions of pellets. This International Standard describes procedures for determination the diameter classification according to ISO 17225-2 as well as the length and diameter of pellets.

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# Solid Biofuels — Determination of length and diameter of pellets

## 1 Scope

This International Standard specifies the methods for the determination of diameter and length of pellets. Concerning the pellet length methods for both determination of the proportion of oversized pellets and for determination of the average length are included.

## 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.

ISO 16559, *Solid biofuels — Terminology, definitions and descriptions*

ISO 17225-1, *Solid biofuels — Fuel specifications and classes — Part 1: General requirements*

ISO 17225-2, *Solid biofuels — Fuel specifications and classes — Part 2: Graded wood pellets*

ISO 17225-6, *Solid biofuels — Fuel specifications and classes — Part 6: Graded non-woody pellets*

ISO 17225-8<sup>1)</sup>, *Solid biofuels — Fuel specifications and classes — Part 8: Thermally treated and densified biomass fuels*

EN 14778:2011, *Solid biofuels — Sampling*

EN 14780:2011, *Solid biofuels — Sample preparation*

ISO 18846<sup>2)</sup>, *Solid Biofuels — Determination of fines content in quantities of pellets*

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

## 3 Terms and definitions

For the purpose of this document, the following terms and definitions given in ISO 16559 apply

### 3.1

#### test sample

original sample sent to the laboratory for analysis

### 3.2

#### test portion

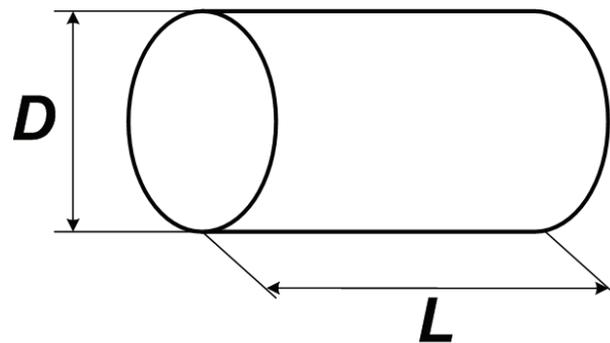
sample extracted from the test sample and used during the analysis

## 4 Principle

The length and diameter of fuel pellets of a representative test sample shall be measured by means of a caliper. The length of a pellet shall be measured along the axis of the cylinder. The diameter shall be measured perpendicular to the axis (see [Figures 1](#) and [2](#)).

1) In preparation.

2) To be published.

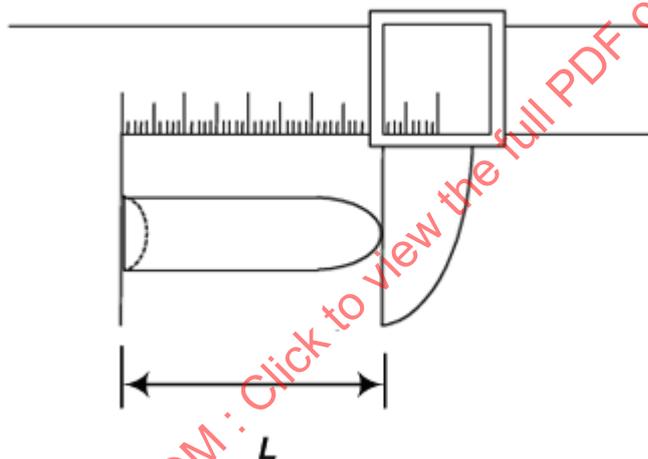


**Key**

$D$  diameter of a pellet

$L$  length of a pellet

**Figure 1 — Length and diameter of a pellet**



**Figure 2 — Measuring the length between the mid-point of the convex and concave cross section of a pellet by means of a caliper.**

## 5 Apparatus

5.1 **Measuring caliper**, shall have a resolution of at least 0,1 mm for measuring length and diameter.

5.2 **Balance**, shall be capable of reading to the nearest 0,01 g.

5.3 **Sieve**, shall have round holes of a diameter at 3,15 mm in accordance with ISO 3310-2.

## 6 Sample preparation

The test sample for determination of length and diameter shall be obtained in accordance with EN 14778 and a test portion shall be extracted in accordance with EN 14780. The test sample shall be divided into two test portions, one consisting of 10 pellets and the other consisting of a minimum mass in accordance with [Table 1](#). The pellets shall be randomly selected.

Table 1 — Test portion size

Pellet size class	Estimated minimum test portion
≤6 mm	30 g - 40 g
>8 mm	40 g - 50 g
>10 mm	50 g - 70 g
>12 mm	70 g - 120 g
>25 mm	0 g - 500 g (minimum 50 pellets)

Both test portions shall be sieved in accordance with ISO 18846 using a sieve with punched round holes 3,15 mm in diameter in accordance with ISO 3310-2.

NOTE Rough handling during sample reduction and sieving could alter the surface of the pellets and thereby influence the result.

## 7 Procedure

### 7.1 Determination of pellet diameter class

In order to determine the diameter class for the test portion with 10 pellets, the diameter of each pellet shall be measured by means of a caliper (see 5.1). Record the result of each measurement. The average of the diameter measurements closest to the class defined in ISO 17225-2 determines the pellet diameter class.

### 7.2 Measuring of individual pellet length

Measure the length in mm of each pellet in the test portion with 40 - 50 pellets (see Clause 6) by means of a caliper (see 5.1). Record the result of each measurement.

### 7.3 Determination share of oversize length of pellets

#### 7.3.1 Weighing

Determine the mass of the sieved test portion with 40 - 50 pellets by weighing to the nearest 0,01 g.

#### 7.3.2 Sorting by length

Separate all pellets in the test portion with 40 - 50 pellets by means of a caliper (see 5.1) all pellets longer than the maximum length specified by ISO 17225-1, ISO 17225-2, ISO 17225-6, and ISO 17225-8.

NOTE Depending on the quality requirements, there can be more than one pellet length to be considered when sorting. Example: Concerning a D08 wood pellet, ISO 17225-2, Table 1 specifies  $3,15 \text{ mm} \leq L \leq 40 \text{ mm}$ . Comment c in ISO 17225-2, Table 1 states:

“Amount of pellets longer than 40 mm can be 1 w-%. Maximum length shall be <45 mm. Pellets are longer than 3,15 mm, if they stay on a round-hole sieve of 3,15 mm. (For the) amount of pellets shorter than 10 mm, (the) w-% (is) recommended to be stated”.

#### 7.3.3 Weighing of fractions by length

Weigh the mass of the pellets separated in 7.3.2 to the nearest 0,01 g and record the result.