
Bamboo charcoal —

**Part 1:
Generalities**

*Charbon de bambou —
Partie 1: Généralités*

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Foreword

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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. www.iso.org/directives

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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](#)

This document is prepared by Technical Committee ISO/TC 296, *Bamboo and Rattan*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

The use of bamboo for charcoal provides an effective means of improving the utilization of bamboo. Bamboo charcoal can be produced by a wide variety of traditional methods and modern technology. With the increase in the use of charcoal for household and industrial purposes, the need has arisen for specifications that establish a standard for classification and testing.

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Bamboo charcoal —

Part 1: Generalities

1 Scope

This document specifies the requirements and test methods for bamboo charcoal. It is applicable to the bamboo charcoal briquette.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

ISO 1953, *Hard coal — Size analysis by sieving*

ISO 18122, *Solid biofuels — Determination of ash content*

ISO 18123, *Solid biofuels — Determination of the content of volatile matter*

ISO 18134-3, *Solid biofuels — Determination of moisture content — Oven dry method — Part 3: Moisture in general analysis sample*

ISO 18135, *Solid biofuels — Sampling*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at <https://www.iso.org/obp>

— IEC Electropedia: available at <http://www.electropedia.org/>

3.1

bamboo charcoal

BC

black solid porous product made of carbonized bamboo

3.2

bamboo charcoal briquette

BCB

shaped, solid product of carbonized bamboo particles or charcoal made by compression or extrusion with or without a binder

3.3

tubular bamboo charcoal

TBC

bamboo charcoal (3.1) made of carbonized bamboo culm

**3.4
bamboo charcoal flakes**

BCF
flat, thin pieces of *bamboo charcoal* (3.1)

**3.5
bamboo charcoal granules**

BCG
minute quantity or fragment of *bamboo charcoal* (3.1)

**3.6
bamboo charcoal powder**

BCP
milled or pulverized charcoal with a typical particle size less than 1 mm

**3.7
moisture content**

MC
water in the fuel removable under specific conditions

**3.8
ash content**

AC
mass of inorganic residue remaining after combustion of *bamboo charcoal* (3.1) under specified conditions, typically expressed as a percentage of the mass of dry matter in fuel

**3.9
fixed carbon**

FC
remaining carbon after removal of water, ash and volatile matter

4 Classification

Bamboo charcoal could be classified into traditional bamboo charcoal and bamboo charcoal briquette, and the latter can be further subdivided into carbonized bamboo powder briquette (CBPB) and compressed bamboo charcoal powder briquette (BCPB), respectively, according to the production process.

NOTE 1 Bamboo charcoal briquettes can be produced through processes:

- a) Carbonization of bamboo powder briquette, and
- b) Compression of bamboo charcoal powder.

NOTE 2 The raw material for process a) can be compressed bamboo powder with or without other biomass powder blends and mixtures.

NOTE 3 The raw material for process b) can be bamboo charcoal powder with or without other fuel blends and mixtures.

Table 1 — Bamboo charcoal classification according to shape and size

C(s1)	TBC	BCF ^a	BCG ^b			BCP ^b
			I	II	III	
C(s2) mm	$L > D$	(30 to 50) (50 to 100)	1 to 3	3 to 10	10 to 20	≤1

Key
C(s1) = Classification according to shape
C(s2) = Classification according to size
TBC = Tubular bamboo charcoal
L = Length
D = Diameter
BCF = Bamboo charcoal flakes
BCG = Bamboo charcoal granules
BCP = Bamboo charcoal powder

NOTE This table illustrates the classification of bamboo charcoal.

^a Size (width × length) of (30 to 50) × (50 to 100) is mostly applied in current international trade. Size of bamboo charcoal flakes can also be provided in other specification upon request by supplier and purchaser.

^b BCP grade is decided by the size of the majority (80% and above) of the granules, i.e. minimum 80 % of bamboo charcoal granules with the size of 2 mm to 4 mm can be regarded as Grade II, otherwise, re-grading or reprocessing is required to reach the corresponding grade. See ISO 1953.

5 Requirements

5.1 Sensory inspection

The product shall appear black with no peculiar smell, contaminant and foreign matter.

5.2 Methods of measuring bamboo charcoal particle size

The bamboo charcoal particle size shall be measured in accordance with ISO 1953.

5.3 Requirements of physical and chemical properties for bamboo charcoal

Table 2 — Requirements for physical and chemical properties of bamboo charcoal

Item	Requirements					
	Bamboo charcoal			Bamboo charcoal briquette		
Grading	I	II	III	I	II	III
MC %	≤9,00	≤12,00	≤12,00	≤9,00	≤12,00	≤12,00

Key
BC = Bamboo charcoal
BCB = Bamboo charcoal briquette
MC = Moisture content
AC = Ash content
FC = Fixed carbon

NOTE The physical and chemical properties of bamboo charcoal can be tested to comply with all the requirements specified in this table.

Table 2 (continued)

Item	Requirements					
	Bamboo charcoal			Bamboo charcoal briquette		
Grading	I	II	III	I	II	III
AC %	≤4,50	≤6,50	≤8,50	≤4,50	≤7,50	≤10,50
FC %	≥85,00	≥75,00	≥65,00	≥85,00	≥75,00	≥65,00

Key
 BC = Bamboo charcoal
 BCB = Bamboo charcoal briquette
 MC = Moisture content
 AC = Ash content
 FC = Fixed carbon
 NOTE The physical and chemical properties of bamboo charcoal can be tested to comply with all the requirements specified in this table.

6 Sampling

Sampling of bamboo charcoal shall be in accordance with ISO 18135. The sample for analysis shall be randomly chosen from a lot of bulk products with a minimum weight of no less than 1,0 kg.

7 Analytical methods

7.1 Visual inspection procedure

Put 0,1 kg of bamboo charcoal on a white piece of paper, then observe and decide the sample by sense of sight.

7.2 Determination of moisture content

Moisture content shall be determined in accordance with ISO 18134-3.

7.3 Determination of ash content

Ash content shall be determined in accordance with ISO 18122.

7.4 Determination of fixed carbon

Fixed carbon is the remaining carbon after removal of moisture, ash, and volatile matter from the dry bamboo charcoal or briquette, expressed in percentages.

Fixed carbon shall be calculated in compliance with [Formula \(1\)](#):

$$C = 100 \% - (A+V) \quad (1)$$

where

- C* is fixed carbon expressed in percentages;
- A* is ash content expressed in percentages;
- V* is volatile matter expressed in percentages.

The volatile matter shall be determined in accordance with ISO 18123. All results shall be calculated to two decimal places and the mean value shall be rounded to the nearest 0,01 % for reporting.

8 Marking and labelling

8.1 The following information shall appear on the face of the containers:

- a) name and address of the manufacturer;
- b) executive standard;
- c) the date of production and batch identification;
- d) the net mass; and
- e) grade of the bamboo charcoal

8.2 A product's use instructions shall be printed on the back of containers. The information shall include the name of product, method of usage, storage and usage precautions.

9 Packaging, transport and storage

9.1 During transportation, the packaged products shall be handled with care to avoid moisture, sunlight and damage of bamboo charcoal and bamboo charcoal packages.

9.2 The products shall be stored in a dry, cool place (ambient temperature) away from sunlight, moisture and ignition.

9.3 For additional information on packaging, transport, and storage, please refer to [Annex A](#).

Annex A (informative)

Packaging, transport and storage

A.1 Intermediate storage is necessary when large amounts of bamboo charcoal shall await transportation because of irregular availability of transport, such as road or rail trucks or poor road conditions in remote areas.

A.2 The following requirements should be observed when laying out an intermediate storage station:

- a) It shall be sufficiently large to accept the quantity of charcoal to be stored under abnormal conditions, e.g. during a prolonged rainy season, or a period of scarcity of railway transportation.
- b) The storage house should be divided into sections, of approximately 2 000 m³ each, separated by walls.
- c) It shall be covered and shall have sufficient facilities for easy and fast handling of the charcoal on its arrival and departure.
- d) Unloading into the storing house can be done from the outside through wooden or metallic chutes and loading of railway cars and trucks through manually operated wooden or metallic trapdoors.
- e) Trucks should not be allowed inside the storehouse because of fire hazards from internal combustion engines and smoking by truck drivers.
- f) Conveyor belts may also be used but mechanization should be minimized because it is expensive.
- g) height of the heaped charcoal should be less than six metres to avoid spontaneous ignition.
- h) Incoming charcoal should be dropped as little as possible (two metres maximum) to reduce formation of fines.
- i) The charcoal should be unloaded onto a naturally formed slope of charcoal and handling should be reduced to a minimum as each movement produces some fines.
- j) The building shall be well ventilated and open on all sides to give rapid and easy access in case of fire. It should have no intermediate columns across the roof span.
- k) The building structure may be of brick, concrete or steel. The roof should preferably be galvanized sheet but asbestos may be used.
- l) The floor may be brick, stone, and concrete or even rammed earth.
- m) Water pipes with hose connections should be available at different points but, in case of fire, the best method of saving the charcoal is to push the unburnt charcoal out of the building with tractors equipped with shovel blades.
- n) Avoid moisture, sunlight, and damage to bamboo charcoal and briquette, and the packages during transportation.
- o) Store the products in dry and cool (ambient temperature) place.