BS EN 14961-2:2011

BSI Standards Publication

Solid biofuels — Fuel specifications and classes

Part 2: Wood pellets for non-industrial use

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National foreword

This British Standard is the UK implementation of EN 14961-2:2011.

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.

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English Version

Solid biofuels - Fuel specifications and classes - Part 2: Wood pellets for non-industrial use

Biocombustibles solides - Classes et spécifications des combustibles - Partie 2: Granulés de bois densifié à usage non industriel

Feste Biobrennstoffe - Brennstoffspezifikationen und -klassen - Teil 2: Holzpellets für nichtindustrielle Verwendung

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Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Page

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Foreword

This document (EN 14961-2:2011) 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of an identical text or by endorsement, at the latest by December 2011, and conflicting national standards shall be withdrawn at the latest by December 2011.

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.

The European standard series EN 14961 *Solid biofuels — Fuel specifications and classes* are provided as general requirements and additional product standards. Additional product standards may extend this series over time.

EN 14961 consists of the following parts, under the title *Solid biofuels — Fuel specifications and classes*:

— *Part 1: General requirements*;

— *Part 2: Wood pellets for non-industrial use*;

— *Part 3: Wood briquettes for non-industrial use*;

— *Part 4: Wood chips for non-industrial use*;

— *Part 5: Firewood for non-industrial use*;

— *Part 6: Non woody pellets for non-industrial use (under development)*.

Although these product standards may be obtained separately, they require a general understanding of the standards based on and supporting EN 14961-1. It is recommended to obtain and use EN 14961-1 in conjunction with these standards.

NOTE In these product standards, non-industrial use - means fuel intended to be used in smaller appliances, such as in households and small commercial and public sector buildings.

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.

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Introduction

This European Standard for "Fuel Specifications and Classes — Part 2: Wood pellets for non-industrial use" has been produced by CEN/TC 335 Solid Biofuels Working group "Fuel Specifications, Classes and Quality Assurance".

The objective of this European Standard is to provide unambiguous and clear classification principles for solid biofuels, to serve as a tool to enable efficient trading of biofuels and to enable good understanding between seller and buyer as well as a tool for communication with equipment manufacturers. It will also facilitate authority permission procedures and reporting.

This European Standard is made to support the use of wood pellets in a non-industrial situation and specifically for the domestic/householder markets and smaller commercial boiler situations, where sensitivity to the fuel quality can cause major issues. These consumers need special consideration for the following reasons:

- small-scale equipment does not usually have advanced controls and flue gas cleaning;
- it is not generally managed by professional heating engineers;
- they are often located in living and populated districts.

NOTE Pellets produced according to this European Standard can be used in pellet stoves, which are tested according to EN 14785, pellet burners tested according to EN 15270 and pellet boilers or integrated-pellet burner systems tested according to EN 303-5 ($\leq$ 500 kW_{th}).

1 Scope

This European standard determines the fuel quality classes and specifications of wood pellets for non-industrial use. This European standard covers only wood pellets produced from the following raw materials (see EN 14961-1:2010, Table 1):

- 1.1 Forest, plantation and other virgin wood;
- 1.2 By-products and residues from wood processing industry;
- 1.3 Used wood.

NOTE 1 For the avoidance of doubt, demolition wood is not included in the scope of this European Standard. Demolition wood is "used wood arising from demolition of buildings or civil engineering installations" (EN 14588:2010, 4.52).

NOTE 2 Torrefied pellets are not included in the scope of this European Standard. Torrefaction is a mild pre-treatment of biomass at a temperature between 200 °C to 300 °C.

2 Normative references

The following referenced documents are indispensable for the application of this European Standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 14588:2010, *Solid biofuels — Terminology, definitions and descriptions*

EN 14774-1, *Solid biofuels — Determination of moisture content — Oven dry method — Part 1: Total moisture — Reference method*

EN 14774-2, *Solid biofuels — Determination of moisture content — Oven dry method — Part 2: Total moisture — Simplified procedure*

EN 14775, *Solid biofuels — Determination of ash content*

EN 14918, *Solid biofuels — Determination of calorific value*

EN 14961-1:2010, *Solid biofuels — Fuel specifications and classes — Part 1: General requirements*

EN 15103, *Solid biofuels — Determination of bulk density*

EN 15104, *Solid biofuels — Determination of total content of carbon, hydrogen and nitrogen — Instrumental methods*

EN 15149-1, *Solid biofuels — Determination of particle size distribution — Part 1: Oscillating screen method using sieve apertures of 1 mm and above*

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

EN 15289, *Solid biofuels — Determination of total content of sulphur and chlorine*

EN 15297, *Solid biofuels — Determination of minor elements — As, Cd, Co, Cr, Cu, Hg, Mn, Mo, Ni, Pb, Sb, V and Zn*

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prEN 16127*, Solid biofuels — Determination of length and diameter for pellets and cylindrical briquettes*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 14588:2010 and the following apply.

3.1
wood pellet
densified biofuel made from pulverised woody biomass with or without additives usually with a cylindrical form, random length and typically 5 mm to 40 mm, with broken ends

NOTE The raw material for wood pellets is woody biomass in accordance with Table 1 of EN 14961-1:2010. Pellets are usually manufactured in a die, with total moisture content usually less than 10 % of their mass wet basis.

3.2
additive
material which improves the quality of the fuel (e.g. combustion properties), reduces emissions or makes production more efficient.

3.3
chemical treatment
any treatment with chemicals other than air, water or heat (e.g. glue and paint)

NOTE Examples of chemical treatment are listed in informative Annex C of EN 14961-1:2010.

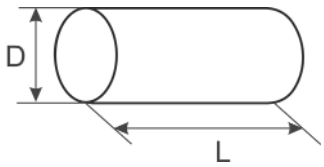
4 Symbols and abbreviations

The symbols and abbreviations used in this European Standard comply with the SI system of units as far as possible.

d	dry (dry basis)
ar	as received
w-%	weight-percentage
A	designation for ash content A_d [w-%, dry basis] [1)]
BD	designation for bulk density as received [kg/m^3] [1)]
D	designation for diameter as received, D [mm] [1)]
DU	designation for mechanical durability as received [w-%] [1)]
F	designation for amount of fines as received [w-%, particles less than 3,15 mm] [1)]
L	designation for length as received, L [mm] [1)]
M	designation for moisture content as received on wet basis, M_{ar} [w-%][1)]
Q	designation for net calorific value as received, $q_{p,net,ar}$ [MJ/kg or kWh/kg or MWh/t] at constant pressure [1)]

1) Designation symbols are used in combination with a number to specify property levels in Table 1. For designation of chemical properties chemical symbols like S (sulphur), Cl (chlorine), N (nitrogen) are used and the value is added at the end of the symbol.

NOTE 1 MJ/kg equals 0,2778 kWh/kg (1 kWh/kg equals 1 MWh/t and 1 MWh/t is 3,6 MJ/kg). 1 g/cm^3 equals 1 kg/dm^3.



Key

D Diameter

L Length

Figure 1 — Dimension of pellets

5 Specification of wood pellets for non-industrial use

The specification of the wood pellets is stated in accordance with Table 1. The sampling and analysis of the properties shall be carried out in accordance with the methods mentioned in the normative references.

Property class A1 and A2 represents virgin woods and chemically untreated wood residues. A1 represents fuels which are low in ash and nitrogen content, while class A2 has slightly higher ash, nitrogen and chlorine content. Property class B allows chemically treated industrial wood by-products and residues and used wood.

Chemically treated wood residues from wood processing and used wood are included in class B as long as they do not contain heavy metals or halogenated organic compounds as a result of treatment with wood preservatives or coating. In case of raw materials belonging to 1.2.2 and 1.3.2 (chemically treated wood) the actual origin of the raw material shall be closer described, e.g. 1.2.2, Residues from laminated wood production.

If the properties being specified are sufficiently known through information about the origin and handling (or preparation method combined with experience) then physical/chemical analysis may not be needed.

To ensure resources are used appropriately and the declaration is accurate, use the most appropriate measure below:

a) Using typical values, e.g. laid down in Annex B of EN 14961-1:2010, or obtained by experience;

b) Calculation of properties, e.g. by using typical values and considering documented specific values;

c) Carrying out of analysis:

   1) With simplified methods if available,

   2) With reference methods.

The responsibility of the producer or supplier to provide correct and accurate information is exactly the same whether laboratory analysis is performed or not. Typical values do not release the producer or supplier from providing accurate and reliable information.

To ensure the end-user receives pellets with a low level of fines, the amount of fines shall be ≤ 1% leaving the final point of loading for delivery to the end-user. i.e leaving the final storage point or the factory if delivering directly to the end-user. The amount of fines leaving the factory gate shall also be ≤ 1% (unless there is a different agreement between the producer and their customer), even when not going directly to the end-user.

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To ensure that the pellets maintain their quality, the handling and storage (including the equipments) shall be appropriate at different stages of supply or delivery chain ending to the end-users storage.

NOTE The fines requirement has been included to ensure small-scale users are protected from handling and combustion issues while operating their combustion plant/appliance.

The quality shall be given either in the product declaration (prEN 15234-2) or by a corresponding label on the package.

Table 1 — Specification of wood pellets for non-industrial use

	Property class /Analysis method	**Unit**	**A1**	**A2**	**B**
Normative	Origin and source EN 14961-1		1.1.3 Stemwood 1.2.1 Chemically untreated wood residues	1.1.1 Whole trees without roots 1.1.3 Stemwood 1.1.4 Logging residues 1.2.1.5 Bark (from industry operations) 1.2.1 Chemically untreated wood residues	1.1 Forest, plantation and other virgin wood 1.2 By-products and residues from wood processing industry 1.3 Used wood
	Diameter, D [a] and Length L, [b] prEN 16127 According to Figure 1	mm	D06, 6 ± 1; 3,15 ≤ L ≤ 40 D08, 8 ± 1; 3,15 ≤ L ≤ 40	D06, 6 ± 1; 3,15 ≤ L ≤ 40 D08, 8 ± 1; 3,15 ≤ L ≤ 40	D06 6 ± 1; 3,15 ≤ L ≤ 40 D08 8 ± 1; 3,15 ≤ L ≤ 40
	Moisture, M, EN 14774-1, EN 14774-2	as received, w-% wet basis	M10 ≤ 10	M10 ≤ 10	M10 ≤ 10
	Ash, A, EN 14775	w-% dry	A0.7 ≤ 0,7	A1.5 ≤ 1,5	A3.0 ≤ 3,0
	Mechanical durability, DU, EN 15210-1	as received, w-%	DU97.5 ≥ 97,5	DU97.5 ≥ 97,5	DU96.5 ≥ 96,5
	Fines at factory gate in bulk transport (at the time of loading) and in small (up to 20 kg) and large sacks (at time of packing or when delivering to end-user), F, EN 15210-1	w-% as received	F1.0 ≤ 1,0	F1.0 ≤ 1,0	F1.0 ≤ 1,0
	Additives [c]	w-% dry	≤ 2 w-% Type and amount to be stated	≤ 2 w-% Type and amount to be stated	≤ 2 w-% Type and amount to be stated
	Net calorific value, Q, EN 14918	as received, MJ/kg or kWh/kg	Q16.5, 16,5≤Q≤19 or Q4.6, 4,6≤Q≤5,3	Q16.3, 16,3≤Q≤19 or Q4.5, 4,5≤Q≤5,3	Q16.0, 16,0≤Q≤19 or Q4.4, 4,4≤Q≤5,3
	Bulk density, BD, EN 15103	kg/m^3	BD600 ≥ 600	BD600 ≥ 600	BD600 ≥ 600
	Nitrogen, N, EN 15104	w-% dry	N0.3 ≤ 0,3	N0.5 ≤ 0,5	N1.0 ≤ 1,0
	Sulphur , S, EN 15289	w-% dry	S0.03 ≤ 0,03	S0.03 ≤ 0,03	S0.04 ≤ 0,04
	Chlorine, Cl, EN 15289	w-% dry	Cl0.02 ≤ 0,02	Cl0.02 ≤ 0,02	Cl0.03 ≤ 0,03
	Arsenic, As, EN 15297	mg/kg dry	≤ 1	≤ 1	≤ 1
	Cadmium, Cd, EN 15297	mg/kg dry	≤ 0,5	≤ 0,5	≤ 0,5
	Chromium, Cr, EN 15297	mg/kg dry	≤ 10	≤ 10	≤ 10
	Copper, Cu, EN 15297	mg/kg dry	≤ 10	≤ 10	≤ 10
	Lead, Pb, EN 15297	mg/kg dry	≤ 10	≤ 10	≤ 10
	Mercury, Hg, EN 15297	mg/kg dry	≤ 0,1	≤ 0,1	≤ 0,1
	Nickel, Ni, EN 15297	mg/kg dry	≤ 10	≤ 10	≤ 10
	Zinc, Zn, EN 15297	mg/kg dry	≤ 100	≤ 100	≤ 100
	Informative: Ash melting behaviour [d], prEN 15370	°C	Should be stated	Should be stated	Should be stated

[a]	Actual diameter of pellets to be stated.
[b]	Amount of pellets longer than 40 mm can be 1 w-%. Maximum length shall be < 45 mm.
[c]	Type of additives to aid production, delivery or combustion (e.g. pressing aids, slagging inhibitors or any other additives like starch, corn flour, potato flour, vegetable oil,…). Also additives which are used after production, before unloading to end-user storages, shall be stated similarly (type and amount)..
[d]	All characteristic temperatures (shrinkage starting temperature (SST), deformation temperature (DT), hemisphere temperature (HT) and flow temperature (FT) in oxidizing conditions should be stated.

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Annex A
(informative)

A–deviations

A- deviation: National deviation due to regulations, the alteration of which is for the time being outside the competence of the CEN member.

This European Standard does not fall under any Directive of the EU.

In the relevant CEN countries these A- deviations are valid instead of the provisions of the European Standard until they have been removed.

France	**National Regulation** Rubrique 2910 A de la nomenclature ICPE (Installations classées pour la protection de l'environnement) – Décret n° 2010-419 du 28 avril 2010 modifiant la nomenclature des installations classées The French regulation allows only the burning of biomass in virgin state in installations as specified in "rubrique 2910 A" of ICPE Regulation (Classified installation for the protection of the environment regulation). All chemically treated wood are considering as wastes and can not be burning without specific conditions and an authorisation from National authorities.
Subclause 1.2 and 1.3	The standard leaves the possibility to burn chemically treated wood in "non industrial situation and specifically for the domestic/householder markets and smaller commercial boiler situations", while the introduction focuses on the need to reinforced consumer's safety (i.e. "where sensitivity to the fuel quality can cause major issues"). Only classes 1.1.1, 1.1.3, 1.1.4, 1.1.6, 1.2.1 and 1.3.1 for raw material in Table 1 of EN 14961-1 and then Classes A1 and A2 in Table 1 of EN 14961-2 are authorized.
Clause 5 **2nd paragraph** **last sentence** **and 3rd paragraph**	French regulation prohibits the burn of Class B products as defined in both paragraph.
Table 1 **Class B products**	French regulation prohibits the burn of Class B products as defined in the 6th column.

Italy	**National Regulation**
EN 14961-2 conflicts with the Italian law that has stricter limits concerning the allowed biomasses intended to be used for energy purposes, thus it is necessary to include the following deviation. Clause 1 Scope This European standard determines the fuel quality classes and specifications of wood pellets for non-industrial use. This European standard covers only wood pellets produced from the following raw materials (see EN 14961–1, Table 1): 1.1 Forest, plantation and other virgin wood 1.2.1 By-products and residues from wood processing industry - Chemically untreated wood residues 1.3.1 Used wood - Chemically untreated wood NOTE For the avoidance of doubt, chemically treated biomass is not included in the scope of this European Standard as well as demolition wood. Demolition wood is “used wood arising from demolition of buildings or civil engineering installations” (EN14588). Clause 5 Specification of wood pellets for non-industrial use 2nd paragraph is modified as follows, where the last sentence is deleted: Property class A1 and A2 represents virgin woods and chemically untreated wood residues. A1 represents fuels which are low in ash, nitrogen, chlorine content and ash melting behaviour, while class A2 has slightly higher ash, nitrogen, chlorine content and ash melting behaviour. Property class B allows chemically treated industrial wood by-products and residues and used wood. 3rd paragraph is deleted: Chemically treated wood residues from wood processing and used wood are included in class B as long as they do not contain heavy metals or halogenated organic compounds as a result of treatment with wood preservatives or coating. In case of raw materials belonging to 1.2.2 and 1.3.2 (chemically treated wood) the actual origin of the raw material shall be closer described, e.g. 1.2.2, Residues from laminated wood production. Table 1 – 2nd row 6th column (B class) Origin and source shall be consistent with the scope as defined in this deviation	Decreto legislativo n. 152 del 3 aprile 2006 "Norme in materia ambientale" (G.U. Serie generale n. 88 – 14/4/2006) (Legislative Decree n. 152 -3 April 2006 - “Regulation on environmental matter” - G.U. General n. 88 – 14/4/2006) Parte 5, Allegato X, Parte 2, Sezione 4 (Part 5, Annex X, Part 2, Section 4) Concerning the biomasses, and the relevant treatments, for energy purposes the decree allows only the use of: 1. Typology and origin Vegetable material from forestry activity, forest maintenance and pruning (mainly compiles to class 1.1 in EN 14961-1) Vegetable material produced by exclusively mechanical processes on: untreated wood made by bark, sawdust, chips, …. (omissis) not contaminated by pollutants (mainly compiles to class 1.2.1 in EN 14961-1)

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Bibliography

[1] EN 303-5, *Heating boilers — Part 5: Heating boilers for solid fuels, hand and automatically stocked, nominal heat output of up to 300 kW — Terminology, requirements, testing and marking*

[2] prEN 14778, *Solid Biofuels — Sampling*

[3] prEN 14780, *Solid biofuels — Sample preparation*

[4] EN 14785, *Residential space heating appliances fired by wood pellets — Requirements and test methods*

[5] EN 15105, *Solid biofuels — Determination of the water soluble content of chloride, sodium and potassium*

[6] EN 15234-1, *Solid biofuels — Fuel quality assurance — Part 1: General requirements*

[7] EN 15270, *Pellet burners for small heating boilers — Definitions, requirements, testing, marking*

[8] prEN 15234-2, *Solid biofuels — Fuel quality assurance — Part 2: Wood pellets for non-industrial use*

[9] prEN 15370, *Solid biofuels — Determination of ash melting behaviour*

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