BS EN 15234-2:2012

BSI Standards Publication

Solid biofuels — Fuel quality assurance

Part 2: Wood pellets for non-industrial use

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National foreword

This British Standard is the UK implementation of EN 15234-2:2012.

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.

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

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Biocombustibles solides - Assurance qualité du combustible - Partie 2: Granulés de bois densifié à usage non industriel

Feste Biobrennstoffe - Qualitätssicherung von Brennstoffen - Teil 2: Holzpellets für nichtindustrielle Verwendung

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

Management Centre: Avenue Marnix 17, B-1000 Brussels

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Foreword

This document (EN 15234-2:2012) 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of an identical text or by endorsement, at the latest by July 2012, and conflicting national standards shall be withdrawn at the latest by July 2012.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.

The European Standard series EN 15234, *Solid biofuels — Fuel quality assurance* are provided as a general requirements and additional product standards. Additional product standards may extend this series over time.

EN 15234 consists of the following parts, under the general title *Solid biofuels — Fuel quality assurance*:

— *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*.

Although these product standards may be obtained separately, it should be recognized that they require an understanding of the standards based on and supporting EN 15234-1. It is recommended to obtain and use EN 15234-1 in conjunction with these standards.

NOTE In these product standards, non-industrial use means - use in smaller scale appliances, such as in households, in 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, Turkey and United Kingdom.

Introduction

The overall aim of this European Standard is to guarantee the wood pellet quality through the whole supply chain, from the origin to the delivery of the solid biofuel and provide adequate confidence that specified quality requirements are fulfilled.

The objective of this European Standard is to serve as a tool to enable the efficient trading of wood pellets. Thereby:

1) the end-user can find a pellet that corresponds to its needs;

2) the producer/supplier can produce a pellet with defined and consistent properties and describe the pellet to the customers.

Quality assurance measures should establish confidence in the pellet through systems that are simple to operate and do not cause undue bureaucracy.

Wood pellets are specified according to EN 14961-2, *Solid biofuels — Fuel specifications and classes — Part 2: Wood pellets for non-industrial use*.

1 Scope

This European Standard defines the procedures to fulfil the quality requirements (quality control) and describes measures to ensure adequate confidence that the wood pellet specification described in EN 14961-2 is fulfilled (quality assurance). This European Standard covers the production and delivery chain, from purchasing of raw materials to point of delivery to the end-user.

This European standard covers only quality assurance for wood pellets produced from the woody biomasses stated in EN 14961-1:2010, Table 1 and EN 14961-2.

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.

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

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

EN 14961-2:2011, *Solid biofuels — Fuel specifications and classes — Part 2: Wood pellets for non-industrial use*

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

NOTE In EN 14961-1:2010 there are listed Normative references of the European Standards for sampling and sample reduction and in EN 14961-2:2011 for determination of solid biofuel properties..

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 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 on 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
treatment with chemicals other than air, water or heat

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

3.4
impurities
material other than the raw material or fuel itself such as soil, stones, metal, plastic, glass

3.5
weather condition
temperature, humidity and precipitation, e.g. rain, snow

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]

L designation for length as received, L [mm][1)]

M designation for moisture content as received in 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)]

NOTE 1 MJ/kg equals 0,277 8 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.

5 Quality assurance and quality control measures

5.1 General

Quality assurance and control aim to provide confidence that a stable quality is continually achieved in accordance with the customer requirements. It means that specified requirements are fulfilled, but it does not necessarily mean a high quality but a steady and continually achieved quality in accordance with the customer´s requirements. The customer is the next operator in the supply chain. Customer requirements include not only the fuel quality, but also the quality of the company's performance, such as documentation (product declaration, labelling of packaging, etc.), timing and logistics (to provide biofuels in time and to agreed performances criteria).

1) Designation symbols are used in combination with a number to specify property levels (see for example Table 1, EN 14961-2:2011). 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.

Fuel quality assurance needs to be applied to the entire supply chain. As the supply chains for solid biofuels in most cases needs to be kept very simple, the same documents are often used for documentation of quality assurance and quality control measures.

NOTE When the customer is a supplier, a retailer or end user, the customer requirements are usually written in sales contracts.

Quality control is fundamentally about controlling the quality of a product or process to enable the delivery of the product or service within agreed parameters in the most efficient and cost effective way. The consequences of having good quality control will be a cost effective product and process.

Quality assurance on the other hand, is about reviewing the products and processes, primarily through data provided from the quality control records and using this data:

a) to provide confidence that products are produced within the required specification and processes are operated as they should be, and

b) to assure that over a longer term either consistency is being maintained (stability in process results) or that quality improvements are making the intended impact.

5.2 Traceability

Wood pellets for non-industrial use shall be specified with EN 14961-2. The origin and source of solid biofuel is specified by Table 1 in EN 14961-1:2010.

There are three parts in the supply chain, illustrated in Figure 1.

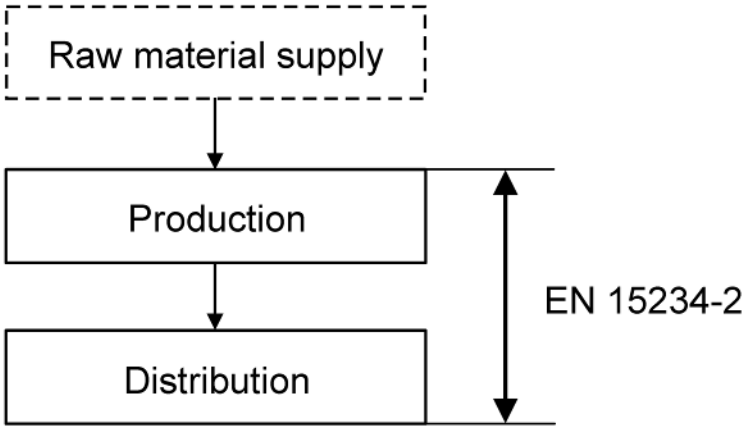


Figure 1 — Simplified example of a wood pellet supply chain

All operators in the supply chain are responsible for the traceability of the origin and source of the material delivered by them. The first operator is responsible for the documents being prepared the first time. The documents shall be available and provided on justified request throughout the entire supply chain according to EN 15234-1.

5.3 Production requirements

The methodology described below for quality assurance and quality control of the production shall be used, but shall be adjusted for the production requirements of the specific wood pellets production chain in question.

There are six consecutive steps that have to be followed by every stakeholder in the supply chain. The steps are described below. For examples of documentation, see informative Annex A.

— **Step 1:** Define fuel requirements for the final product (see 5.4)

— **Step 2:** Document the steps in the production and distribution processes (see 5.5, Figures 2 and 3)

— **Step 3:** Identify quality influencing factors including company performance (see 5.5, Figures 2 and 3)

— **Step 4:** Define Critical Control Points for compliance with the fuel specification (see 5.5, Figures 2 and 3)

— **Step 5:** Select appropriate measures to assure the quality of the product (see 5.6)

— **Step 6:** Establish routines of separate handling of nonconforming raw materials and solid biofuels (see 5.7)

The following information will give a general overview about documenting the requirements for the production in a wood pellets supply chain.

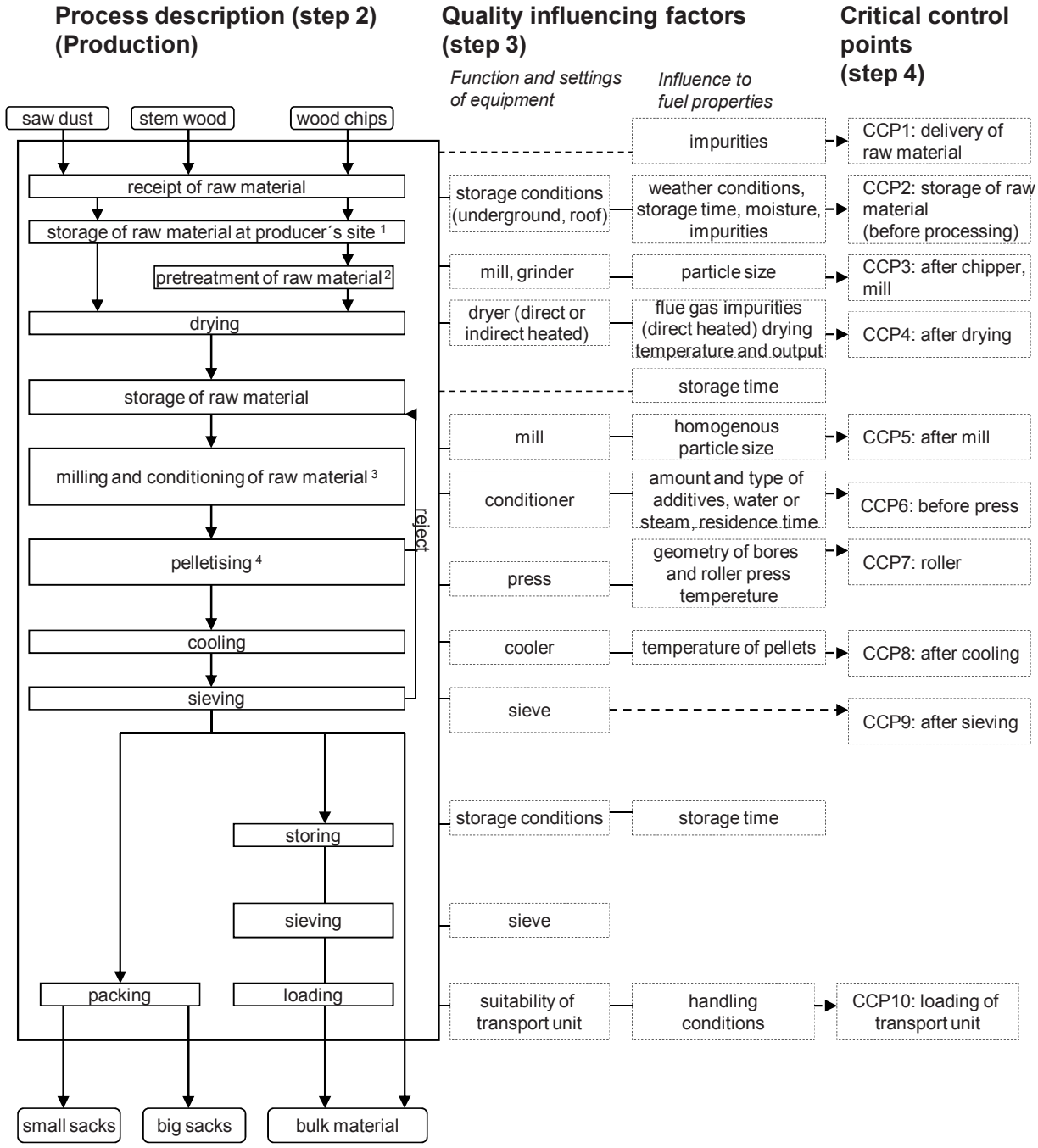
5.4 Fuel requirements for the final product (Step 1)

Wood pellets for non-industrial use are produced according to EN 14961-2.

NOTE The fuel specification is based on EN 14961-1:2010 general part, Table 4 in the case of individually made agreements.

5.5 Process description (Steps 2,3 and 4)

Examples of the process description with the corresponding quality influencing factors and critical control points (CCP) are given in Figure 2 and Figure 3.



[1] separate raw material storages (e.g. wood residues, freshwood with or without bark)
[2] debarking, chipping, milling or grinding (if necessary),
[3] and separation of impurities (stones, metals)
[4] adding of pressing aid and water or steam (if necessary), maturation bunker

Figure 2 — Example for the description of the production process with quality influencing factors and Critical Control Points

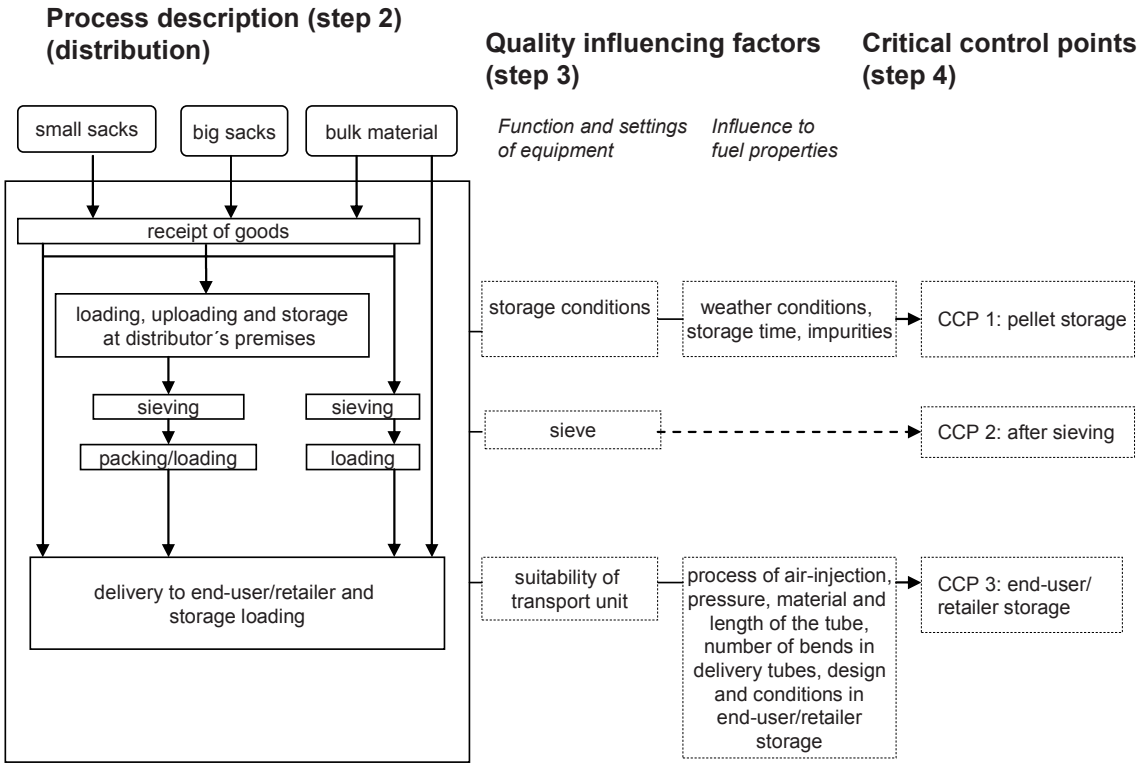


Figure 3 — Example for the description of the delivery chain with quality influencing factors and Critical Control Points

5.6 Measures to assure the quality of the product (Step 5)

5.6.1 Inspection of incoming raw material and other goods

- carry out visual or other sensory inspections of the delivered raw material,
- make a contract between supplier and producer with “terms of delivery” including fuel specifications and biofuel handling,
- document delivery declaration of the supplier e.g. with sustainability certification (PEFC, FSC, etc.[2)]).

5.6.2 Wood pellet production

- control of key properties after the raw material basis has changed,
- control regularly settings, function and condition of the equipment,
- repair or change equipment when necessary; some parts will require changing regularly according to their technical lifetime or the production control system,
- protect and control wood pellets from moisture from e.g. snow or rain or damp walls; also from condensation moisture through suitable storage,

2) PEFC: Programme for the Endorsement of Forest Certification, FSC: Forest Stewardship Council.

- protect and control wood pellets from contamination with impurities (e.g. stones, soil and grain),
- store separately wood pellets of different quality (e.g. different classes described in EN 14961-2),
- the temperature of the pellets while loading shall not exceed 40°C,
- control production, conditions and adjustment of the equipment (e.g. power demand of presses, temperature of roller bearings, vibration of presses),
- determine the quality of the produced pellets regularly; in Table 1 the tests required, the place of sampling and the frequency are listed; the frequency of these checks is calculated by the following formula:

$$N = \frac{10}{days} * \sqrt{\frac{tonne}{10}}$$

where

N	number of sample in 24h
days	annual working days
tonne	annual quantity of pellets in tonnes

example N=10/220*√50 000/10 = 3 times per 24h

Table 1 – Regular analyses of wood pellet quality

Property	Place of control	Frequency
Mechanical Durability (DU)	Production line	See formula above
Moisture Content (M)	Production line	See formula above
Bulk density (BD)	Production line	At least once per shift
Length of pellets (L)	Production line	At least once per shift
Amount of Fines (F)	At factory gate	At least once per shift

- document all measures to assure the quality,
- install a system for complaint management.

5.6.3 Distribution

- control settings, function and condition of the distribution equipment regularly,
- protect and control regularly wood pellets from moisture from e.g. snow or rain or damp walls; also from condensation moisture through suitable storage;
- protect and control regularly wood pellets from contamination with impurities (e.g. stones, soil and grain),
- store pellets of different quality (e.g. different classes described in EN 14961-2) separately,
- the temperature of the pellets while loading shall not exceed 40°C,
- determine the quality of the pellets regularly,

- carry out moisture content analysis before delivery to the end user after a long period of intermediate storage,
- sieve of fines: amount of fines < 1% according to EN 14961-2 unless other agreements are met,
- check and state injection air and pressure during unloading in the supply protocol,
- take representative samples of pellets loaded onto delivery vehicle(s) for every day deliveries and retain for at least 6 months,
- document all measures to assure the quality,
- install a system for complaint management.

5.7 Routines for separate handling of nonconforming raw materials and solid biofuels (Step 6)

If raw materials or the produced wood pellets do not fulfil the requirements, these batches must be stored separately from those that do.

All necessary information has to be documented.

If nonconformity of the product is discovered at the premises of the consumer in connection with a delivery, a nonconformity report is generated and handling of the nonconforming lot is agreed with the consumer.

6 Product declaration of fuel quality and labelling

With the product declaration of fuel quality the producer or supplier confirms that the properties of the end-product are in accordance with the requirements of the EN 14961-2 according to EN 15234-1. Product declarations shall be issued for both wood pellets handled as bulk material and for packaged pellets, in any case for each delivery lot. For packaged wood pellets, the quality information given in the product declaration shall be labelled on the packaging. The supplier shall date the declaration and keep all relevant records for a minimum of one year after the delivery.

Examples for product declarations are given in informative Annex A.

Annex A
(informative)

Examples of product declarations

Table A.1 — Example of a template for the product declaration for wood pellets

	PRODUCT DECLARATION BASED ON EN 14961-2		
	Supplier	Name, contact information Number of contract	
	Amount of delivery	Agreed mass, volume or number of bags of the delivery (The supplier and end-user shall also agree upon the methods of weighing or volume determination.)	
	Origin:	According to Table 1 from EN 14961-1:2010 (select the level which is needed)	
	Country	Country/countries (or more detailed location if agreed)	
	Chemically treated raw material	No ☐ Yes, class B ☐	
	Traded Form	Pellets	
	Class	A1 or A2 or B	
Normative	**Specifications of properties according to EN 14961-2:2011**	Unit	Value[a]
	Diameter class, EN 16127	mm	
	Moisture, M EN 14774-1, EN 14774-2	as received, w-%	
	Ash, A EN 14775	w-% dry	
	Mechanical durability, DU EN 15210-1	as received, w-%	
	Fines, F [b] EN 15210-1 (hand sieving)	w-% as received	
	Additives	w-% dry	
	Net calorific value, Q EN 14918	as received, MJ/kg or kWh/kg	
	Bulk density, BD, EN 15103	kg/m^3	
	Nitrogen, N, EN 15104	w-% dry	
	Sulphur , S, EN 15289	w-% dry	
	Chlorine, Cl, EN 15289	w-% dry	
	Arsenic, As, EN 15297	mg/kg dry	
	Cadmium, Cd, EN 15297	mg/kg dry	
	Chromium, Cr, EN 15297	mg/kg dry	
	Copper, Cu, EN 15297	mg/kg dry	
	Lead, Pb, EN 15297	mg/kg dry	
	Mercury, Hg, EN 15297	mg/kg dry	
	Nickel, Ni, EN 15297	mg/kg dry	
	Zinc, Zn, EN 15297	mg/kg dry	
	Informative: Ash melting behaviour, CEN/TS 15370-1 (SST, DT, HT, FT [c])	^{o}C	
	Signature of assigned person	Place and date	

[a] The value column can be used for stating the average (mean) value or minimum and maximum values.
[b] 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).
[c] All characteristic temperatures (shrinkage starting temperature (SST), deformation temperature (DT), hemisphere temperature (HT) and flow temperature (FT)) in oxidizing conditions should be stated.

Table A.2 — Example of template for a simplified product declaration

	PRODUCT DECLARATION BASED ON EN 14961-2	
	Supplier	Name, contact information Number of contract
	Amount of delivery	Agreed mass, volume or number of bags of the delivery. (The supplier and end-user shall also agree upon the methods of weighing or volume determination.)
	Origin	According to Table 1 from EN 14961-1:2010 (select the level which is needed)
	Country	Country/countries (or more detailed location if agreed)
	Chemically treated raw material	No ☐ Yes, class B ☐
	Diameter class	D06 ☐ D08 ☐
	Traded Form	Pellets
	Class	A1 or A2 or B

Table A.3 — Example of product declaration for A1 class pellets

	PRODUCT DECLARATION BASED ON EN 14961-2	
	Supplier	Holzpellets GmbH Number of contract: 12345
	Amount of delivery	4 tons
	Origin	1.2.1.2 Sawdust according to EN 14961-1 Norway spruce (PCAB according to EN 13556)
	Country	Germany, Hessen
	Chemically treated raw material	No ☒ Yes, class B ☐
	Diameter class	D06 ☒ D08 ☐
	Traded Form	Pellets
	Class	A1

Annex B
(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/CENELEC member.

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

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

Deviation	
Country **France**	**National Regulation** Rubrique 2910 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 use of solid biofuels as mentioned in this standard is possible only for heating boilers up to a nominal heat output of 100 kWth, which are thus potentially subject to ICPE Regulation (Classified installation for the protection of the environment regulation). In any cases, heating boilers categories remains subject to the criteria set out in ICPE Regulation, in particular according to the source of biofuels and its composition.
Introduction Last Paragraph **Clause 1** **Clause 2** **Clause 4** **Footnote** **Clause 5.2 1st paragraph** **Clause 5.4** **Clause 6**	All references to EN 14961-2 involve taking into account its A-Deviation, which is authorized only class 1.1.1, 1.1.3, 1.1.4, 1.1.6, 1.2.1 et 1.3.1 in Table 1 of EN 14961-1 and class A1 and A2 of EN 14961-2.
Annex A **Tables A.1, A.2 and A.3**	In accordance with "rubrique 2910" of ICPE Regulation, there is no mention on Class B products in declaration.

Bibliography

[1] EN 13556, *Round and sawn timber — Nomenclature of timbers used in Europe*

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

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

[4] EN 14775, *Solid biofuels — Determination of ash content*

[5] EN 14918, *Solid biofuels — Determination of calorific value*

[6] EN 15103, *Solid biofuels — Determination of bulk density*

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

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

[9] EN 15289, *Solid biofuels — Determination of total content of sulfur and chlorine*

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

[11] CEN/TS 15370-1, *Solid biofuels — Method for the determination of ash melting behaviour — Part 1: Characteristic temperatures method*

[12] EN 16127, *Solid biofuels — Determination of length and diameter of pellets*

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