BS EN 15234-5:2012

BSI Standards Publication

Solid biofuels — Fuel quality assurance

Part 5: Firewood for non-industrial use

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National foreword

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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.

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Foreword

This document (EN 15234-5:2012) 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of an identical text or by endorsement, at the latest by July 2012, and conflicting national standards shall be withdrawn at the latest by July 2012.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 firewood 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 firewood. Thereby:

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

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

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

Firewood is specified according to EN 14961-5, *Solid biofuels — Fuel specifications and classes — Part 5: Firewood 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 specification of firewood described in EN 14961-5 is fulfilled (quality assurance). This European Standard covers the raw material supply, 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 firewood produced from the woody biomasses stated in EN 14961-1:2010, Table 1 and EN 14961-5.

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 14961-5:2011, *Solid biofuels — Fuel specifications and classes — Part 5: Firewood 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 14961-5:2011 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
firewood
cut and split oven-ready fuelwood used in household wood burning appliances like stoves, fireplaces and central heating systems

NOTE Firewood usually has a uniform length, typically in a range of 150 mm to 1 000 mm.

3.2
impurities
material other than the raw material or fuel itself, such as soil, stones, metal, plastic, glass

3.3
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

D designation for diameter as received, D [cm][1)]

E designation for energy density as received, E_{ar} [kWh/m^3 loose or stacked volume or kWh/kg][1)]

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

M designation for moisture content as received on wet basis, M_{ar} [w-%][1)]

U designation for moisture content as received in dry basis, U_d [w-%][1)]

Q designation for net calorific value as received, $q_{p,net,ar}$ [MJ/kg or kWh/kg or MWh/t][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, system for traceability, etc.), timing and logistics (to provide biofuels in time and to agreed performances criteria).

Fuel quality assurance needs to be applied to the entire supply chain. As the supply chains for solid biofuels in the 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

Firewood for non-industrial use shall be specified with EN 14961-5. 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.

1) Designation symbols are used in combination with a number to specify property levels (see for example Table 1, EN 14961-5:2011).

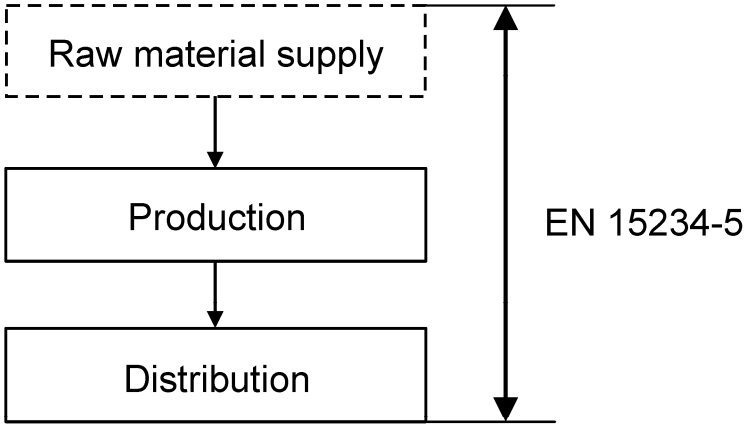

Figure 1 — Simplified example of a firewood supply chain

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 firewood 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 raw material supply, production and distribution processes (see 5.5, Figures 2 or 3)

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

Step 4: Define Critical Control Points for compliance with the fuel specification (see 5.5, Figures 2 or 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 firewood supply chain.

5.4 Fuel requirements for the final product (Step 1)

Firewood for non-industrial use are produced according to EN 14961-5.

NOTE The fuel specification is based on EN 14961-1:2010 general part, Table 7 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 are given in Figure 2 and Figure 3.

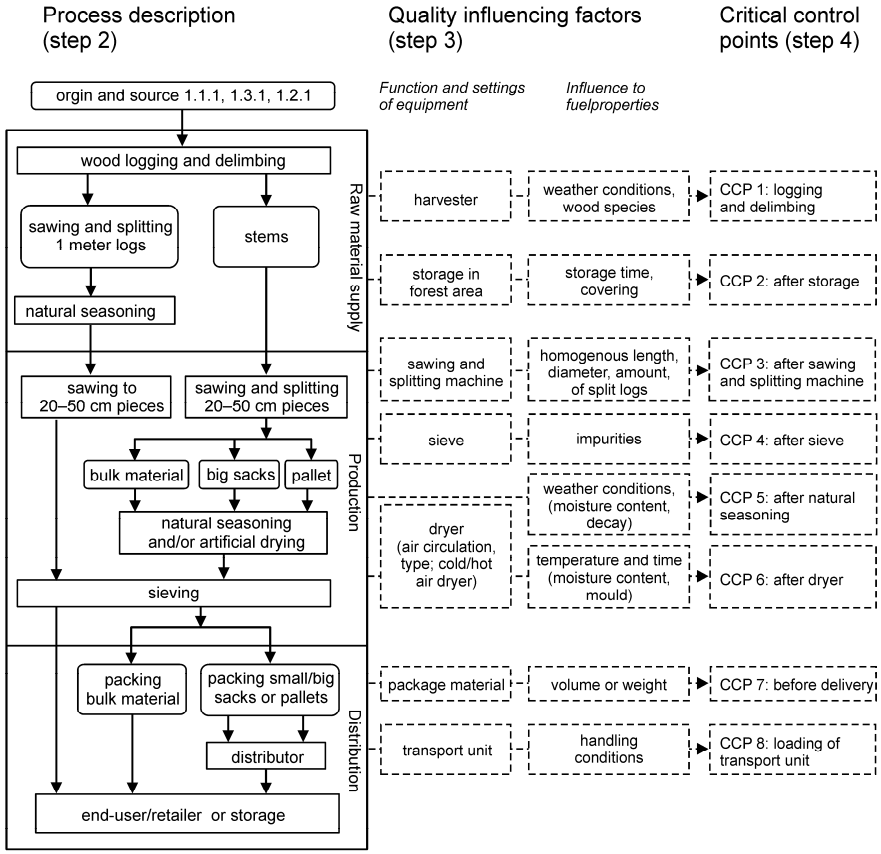

Figure 2 — Example for the description of the production process and the distribution chain with influencing factors and Critical Control Points for firewood based on 1 metre logs

EXAMPLE 1 The producer of firewood himself transports the logs wood from the nearby forest, saws and splits it into L100 pieces and bundles each to 1 m³ on wet basis. The producer stores it for natural seasoning on a clean and solid ground and protected against rain. After natural seasoning within 12 months the L100 splits will be sawn according to clients' requirements into sizes of L20, L25, L33 or L50, sieved while loading and delivered by the producer or the firewood is collected by the end-user. The delivered volume is related to the wet basis and the natural seasoned volume can be estimated (Figure 2).

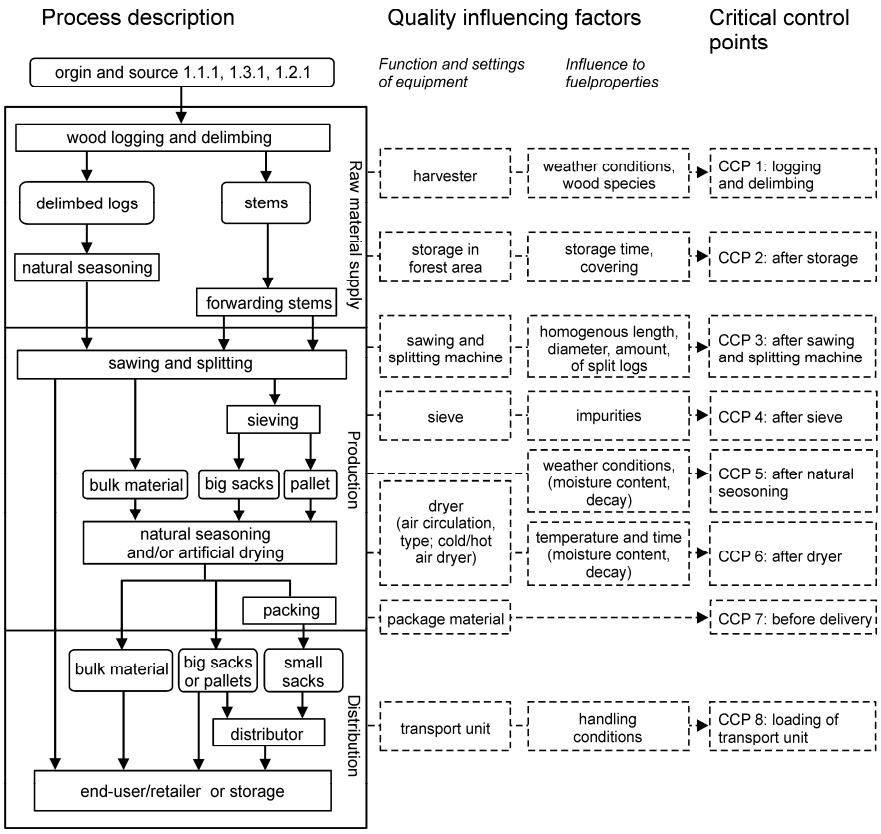

Figure 3 — Example for the description of the production process and the distribution chain with influencing factors and Critical Control Points for firewood

EXAMPLE 2 Trees are cut and delimbed partly into stems by a harvester or manually. Stems are forwarded to road-side or transported directly to a firewood producer. Stems are chopped and split to required length (L20, L25, L33 or L50), sticks and impurities are sieved. Chopped and split firewood is seasoned or artificially dried as bulk material, in sacks which are placed on a pallet with volume of 1,4 - 1,5 m^3 bulk; or in special firewood sacks with volume of 1,0 – 1,5 m^3 bulk. Producer delivers final product to end-user or end-user collets for firewood sacks (Figure 3).

EXAMPLE 3 Trees are cut and delimbed into stems in forest. Stems are forwarded to storage place, where they are partly delimbed, split and seasoned. Seasoned stems are chopped and split if necessary into length ordered by end-user. Producer delivers firewood to end-user or end-user collets for firewood sacks or bulk material (Figure 3).

NOTE Species and origin of raw material as well as location where raw material is harvested can influence chemical composition and parameters of firewood. Appreciable differences with regard to e.g. heavy metals accumulating in the bark, occur all over Europe. This has to be taken into consideration when illustrating a supply or rather production chain and its respective design.

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 inspection of cut stems and protection from contamination with impurities (e.g. stones, soil),
- carry out visual inspection of wood species, origin, source (e.g. according to loading documents) and quality (e.g. time of felling and storing in the forest) of transported delimbed or undelimbed stems,
- check delimbing (important especially for birch wood),

- document delivery declaration of the supplier e.g. with sustainability certification (PEFC, FSC, etc.[2)]).

5.6.2 Firewood production

- control harvesting time and select of harvesting method (manual or harvester, delimbing or without delimbing) and weather conditions during harvesting,
- control settings, function and condition of the equipment regularly,
- repair and change equipment when necessary; some parts will require changing regularly according to their technical lifetime or the production control system,
- inspect visually insect damage and decay of oven ready firewood after sawing and splitting,
- inspect visually mould after natural seasoning and/or dryer (type of dryer: hot or cold air dryer, air circulation between firewood pieces, moisture stabilisation after drying),
- control the key properties (length, diameter and moisture) after natural seasoning or dryer by a routine of visual inspection for decay, mould, insect-damage, impurities; all measures to assure the quality shall be documented,
- determine the quality of the produced firewood (length, diameter and moisture) regularly by a routine of sampling and testing; the frequencies of testing can be greatly reduced if there is evidence of continuous compliance with specifications with no significant changes; this especially applies when the supplier and the process are always the same.

NOTE Moisture content is measured by a suitable and practical method referable to EN 14774-2. Measuring moisture content can be carried out by e.g. hand-held rapid moisture meter (resistance). Before measurement firewood should be split and measured 5 cm from each end and in the middle of the split surface with sufficient contact [3]. It is recommended that at least 5 samples are taken from each 2 m^3 batch. The sum of the three values of each piece of firewood divided by the number of measurements will lead to a mean estimated value.

5.6.3 Distribution

- control settings, function and condition of the equipment regularly,
- protect oven ready firewood from moisture e.g. snow or rain or damp walls; also from condensation moisture, through a suitable storage,
- carry out moisture content analysis before delivery to the end user after a long period of intermediate storage,
- measure volume or weight while loading or packing and/or delivering,
- test the volume of the transport vehicle or container and the bulk density of the fuel to define delivery volume,
- document all measures to assure the quality,
- install a system for complaint management.

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

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

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

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 EN 14961-5 according to EN 15234-1. Product declarations shall be issued for firewood handled loose, stacked, bundled, packaged or as bulk material, in any case for each delivery lot. Information given in the product declaration shall be labelled on packaged firewood or otherwise delivered with bill or contract. 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 firewood

	PRODUCT DECLARATION BASED ON EN 14961-5		
	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)	
	Traded Form	Firewood	
	Property class	A1 or A2 or B	
	Wood species		
Normative	**Specification of properties according to EN 14961-5:2011**	**Unit**	**Value** [a]
	Diameter D	cm	
	Length L	cm	
	Moisture M	w-% wet basis	
	Moisture U	w-% dry basis	
	Volume or Weight	Loose m^3/kg or stacked m^3/kg kg	
	Proportion of split volume	% of pieces	
	The cut-off surface		
	Decay		
Informative	Energy density E	kWh/ loose m^3 or kWh/stacked m^3 or kWh/kg	
	Drying	Natural seasoning or thermal drying	
	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.

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

	PRODUCT DECLARATION BASED ON EN 14961-5	
	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)
	Traded Form	Firewood
	Class	A1 or A2 or B
	Length	33 cm

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

	PRODUCT DECLARATION BASED ON EN 14961-5	
	Supplier	Firewood-Company Number of contract: 12345
	Amount of delivery	50 m³ loose
	Origin	1.1.3 Stemwood according EN 14961-1 Beech (FASY according EN 13556)
	Country	Germany, Laubach
	Traded Form	Firewood
	Class	A1 ☒ A2 ☐ B ☐
	Length	33 cm

Bibliography

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

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

[3] *Heise, K. E., Krämer, G., 2007:* Richtlinie zur Messung und Bestimmung der Brennholzfeuchte. IBT-Krämer Institut für Brennholztechnik (Herausgeber). 1. Auflage 2007. [Guideline of measuring and determining moisture content of firewood. Institute of firewood-technology IBT-Krämer (Editor). 2. 8 p.

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