European Pellet Council

Handbook for the Certification of Wood Pellets for Heating Purposes

Based on EN 14961-2

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1 BACKGROUND AND GOAL

The goal of the following certification system for wood pellets is to secure the supply of wood pellets with clearly defined and consistent quality for heating purposes.

To guarantee the consistently high quality of the delivered wood pellets, not only the manufactured wood pellets, but also the processes that are necessary for their production and logistics will be certified in the scope of this system – as a result, aspects of a product certification will be combined with those of a system certification.

With the classes ENplus-A1 and ENplus-A2, as well as the class EN-B, three wood pellet qualities are defined that are primarily based on the specifications of the European standard EN 14961-2, "Solid biofuels – Fuel Specifications and Classes – Part 2: Wood pellets for non-industrial use"[1]).

The certification system contains the following essential points:

- Requirements for wood pellet production and quality assurance
- Requirements for the product (EN 14961-2)
- Requirements for labeling, logistics and intermediate storage
- Requirements for the delivery to end customers

Specifications for internal quality management guarantee that the set product requirements are maintained. Requirements for technical facilities, operation procedures and documentation are defined, which make the operation processes transparent and should lead to a rapid locating and solving of problems. The formulation of these specifications was carried out on the basis of the ISO 9001 and FprEN 15234-2.

The European Pellet Council (EPC) organized within the European Biomass Association (AEBIOM) has received the license rights to the ENplus System by a contract with the developer of the system, the German Pellet Institute (DEPI). It will pass on this right to national associations that will organize the introduction of ENplus into their respective countries or geographic areas.

The independence of the certification system will be guaranteed through the involvement of accredited certification organizations according to EN 45011. It is also possible to organize the ENplus certification as a group certification that is monitored

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[1] Non-industrial use means fuel intended to be used in smaller applications, such as in households and small commercial and public buildings.

by an accredited certification body. National associations responsible for managing ENplus will determine the system support organization (organizing group certification) and the certification body responsible for ENplus certification in their country and list these organizations on their website and the EPC website.

Inspection bodies and testing bodies verifying that producers or traders comply with the ENplus requirements have to be accepted and listed by the EPC.

2 NORMATIVE REFERENCES

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

EN14774-2, Solid biofuels – Determination of moisture content – Oven dry method – Part 2: Total moisture – Simplified procedure

EN 14775, Solid biofuels – Determination of ash content

FprEN 14778, Solid biofuels – Sampling

prEN 14780, Solid biofuels – Sample preparation

EN 14918, Solid biofuels – Determination of calorific value

EN 14961-1:2010, Solid biofuels – Fuel specification and classes – Part 1: General requirements

EN 14961-2:2011, Solid biofuels – Fuel specification and classes – Part 2: Wood pellets for non-industrial use

EN 15103, Solid biofuels – Determination of bulk density

FprEN15104, Solid biofuels – Determination of total content of carbon, hydrogen and nitrogen – Instrumental method

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

FprEN 15289 Solid biofuels – Determination of total content of sulphur and chlorine

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

prEN 15234-1, Solid biofuels – Fuel quality assurance – Part 1: General requirements

prEN 15234-2, Solid biofuels – Fuel quality assurance – Part 2: Wood pellets for non-industrial use

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

ISO/IEC 17025 (2005): General requirements for test- and calibration laboratories

EN ISO 9001 (2008): Quality Management Systems – Requirements

EN 14588, Solid biofuels – Terminology, definitions and description

EN ISO/IEC 17025, General criteria for the operation of various types of auditing organisations

ISO 3310 (2001): Test sieves — Technical requirements and testing

EN 45011, General requirements for organisations that operate product certification systems

CEN/TS 15370: Solid biofuels, method for the determination of ash melting behaviour

[National solid biofuel standards, storage standards or requirements for pellet production and use, which are not contradictive to EN-standards, can be added in the list of normative references].

3 DEFINITIONS OF TERMS

Other terms and descriptions related to pellets are listed in EN 14588.

3.1 Owner of License

The owner of the license for the ENplus trademark is the European Biomass Association AEBIOM. Responsible for the management of ENplus is the European Pellet Council (EPC) organized within the AEBIOM.

3.2 National Associations

National associations are organizations representing the interests of the pellet sector in their respective countries or geographic areas that have signed a license agreement with AEBIOM that enables them to pass the ENplus license on to qualifying enterprises.

3.3 Issuer of License

A producer or trader of pellets can receive the license to use the ENplus trademark from the national association responsible for the country in which the company operates or where the company's headquarters are. If such an association does not exist, the license can be obtained directly from AEBIOM. The European Pellet Council, represented by its general manager, manages all license-related issues on behalf of AEBIOM. If a national association is terminated or loses the ENplus license

rights, license users from this country receive their established license rights directly from AEBIOM without further delay unless conformity with ENplus requirements is not granted.

3.4 Certification Bodies

Certification bodies assure the independence of the certification system and monitor the procedures. They have to fulfill the requirements of the EN 45011 and be accredited by a member of the European Co-Operation for Accreditation (EA) or possess a mutual recognition agreement with the EA. National associations can choose to collaborate with specified certification bodies in their country or area.

The chosen national certification bodies have to be listed on the official web site of EPC www.pelletcouncil.eu .

3.5 System Support Organization

If a group certification is realized, a system support organization will manage the certification system. This organization is controlled by an independent, accredited certification body. The chosen system support organization and the certification body have to be listed on the official web site of EPC/ENplus.

3.6 Listed Inspection and Testing Bodies

Listed inspection bodies have to be accredited according to EN ISO 17020 or EN 45011, and are listed by the EPC on the official homepage of the EPC. The scope of accreditation needs to be accepted by EPC. Listed testing bodies have to be accredited according to EN ISO 17025 and testing standards specified in EN 14961-2. Testing bodies can cooperate if they are not accredited to all testing standards. Only listed inspection and testing bodies are accepted for certification within the ENplus system.

3.7 Certificate Holders

Certificate holders are companies that produce high quality wood pellets or trade them, and have committed themselves in a contract with the certification body or system support organization to observe the regulations of the ENplus certification system. They have been certified according to the rules of this handbook.

4 CERTIFICATION SYSTEM

4.1 Overview

The essential components of the certification program are:

- Inspection and confirmation of the conformance of the wood pellets to European standards, as well as the logistics system (up to the end customer's store), both in due consideration of the requirements in this manual.
- Specifications for the in-house quality management (certificate holder facilities and processes, employee qualifications, documentation duties, internal quality control).
- The execution of certification and external controls, license issuing and revoking, handling of complaints.

4.2 Certification of Production

The interested party files an application for certification. The system support organization/the certification body is responsible in the country where (the headquarters of) the applicant is located. The respective organization has to make a decision on the application within 2 months.

To be submitted are:

- Approval application
- Inspection contract with a listed inspection body
- Inspection and testing report of the initial inspection

If an application is filed in the year 2011, the report of an inspection according to DINplus will be accepted as an initial report. In addition, an analysis of the ash melting behavior that is not older than 3 months has to be submitted. Within 12 months after the licensure, the report of an initial inspection in accordance with this certification program has to be presented to the certification body.

4.2.1 Mandate for Production Control

The interested party enters into an inspection contract with an inspection body listed by the EPC and commissions it with the initial inspection of its production facilities.

4.2.2 Initial Inspection of Production

The inspection body conducts an initial inspection of the production site(s) of the interested party, where the following points are to be examined, respectively, to be verified by the interested party:

- Raw material: Classification of the origin and sources of solid biofuels in accordance with EN 14961-2 (Table 1, EN 14961-1). If the raw material does not exclusively originate from an affiliated sawmill, the suppliers and the origin of the raw material are to be specified according to EN 14961-1 Table 1.
- Type, exact description and quantity of additives[2] (e.g., pressing aids), if they are used.
- Type and suitability of the raw material storage.
- Production plant: Suitability of the technical facilities in order to be able to produce high quality wood pellets; especially facilities used for separating fines and extraneous material. Cleanliness of the plants.
- Type and suitability of the product storage.
- Quality management system (in accordance with Chapter 7): in-house manual and/or operating instructions, training records (external and internal), handling of claims and complaints, etc.
- Self-monitoring of production, suitability and condition of the testing devices, reference sample management.
- Product declaration (see Chapter 4.9); in addition, EN 15234-2 (product declaration) can be used.

At the initial inspection, the following tasks are to be carried out by the site auditor(s):

- Sampling from production/storage, description, respectively, photo documentation of the sampling points; the sampling has to be carried out in accordance with EN 14778.
- Inspection of the plant's own sampling for internal quality testing; if necessary, training in representative sampling, including suggestions for improvement (Note: the sampling for self-monitoring purposes does not need to be carried out in accordance with EN 14778). The suitable test procedure for self-monitoring is to be determined.

[2] **An** additive is a material which improves the quality of the fuel (e.g., combustion properties), reduces emissions or makes production more efficient.

- Examination of the production process and quality management documentation; these documents are to be treated confidentially by the inspection body and are not allowed to be passed on to third parties (exceptions are justified inquiries of the system support organization / the certification body).

The auditor is to be given access to all parts of the plant and all relevant documentation.

Moreover, the auditor has to pack and seal the drawn samples and manage their delivery to the testing laboratory.

The initial inspection report (including the laboratory results) is to be forwarded to the applicant and, in copy form, to the system support organization/the certification body.

If minor non-conformities are found during the inspection or laboratory test, the inspection body sets a commensurable deadline for corrective measures; the applicant has to prove that adequate corrective measures have been taken within the deadline.

When major non-conformities have occurred, a completely new audit has to be conducted after the defects have been corrected. Major non-conformities that can influence the production quality on a sustained basis are, e.g., inappropriate raw material or defective production and storage facilities. Major non-conformities can have a direct or indirect influence on the operating performance of equipment using the produced pellets.

4.2.3 Issuing of the Certificate

The certification body or the system support organization tests the conformance to the ENplus certification guidelines based on the information

- in the approval application
- in the inspection report of the inspection body (including the results of the laboratory test of pellets).

If the application is approved, the applicant is informed and receives a license contract and a request for submitting a down-payment of the license fee. When proof of the down payment of the license fee has been received and the signed contract has been returned, certification is carried out by sending the certification document with the identification number and the validity period of the certificate.

The company will be entered into a register with all other certificate holders, which is to be accordingly published on the websites of the national association and the EPC.

4.2.4 Surveillance Inspections

Each production facility is to be inspected annually by the inspection body in accordance with the requirements stated in 4.2.2. The monitoring inspection can be carried out unannounced. Improvements and changes in the certification system (for standards, quality management, etc.) are to be brought to the attention of the person responsible for quality management in the pelletizing plant by the supplier of the license (national association or the EPC).

When defects in or deviations from the ENplus regulations are found in the plant or in the laboratory test during the periodic inspection, the accredited testing center has to immediately inform the certificate holder. When minor deviations occur, the accredited testing center can set a reasonable grace period (a maximum, however, of 10 weeks), in which the certificate holder has to verify that corrective measures have been taken. The system support organization / the certification body does not need to be informed.

When major defects have occurred, the system support organization/the certification body has to be immediately informed by the testing center. The system support organization/the certification body is entitled to order a completely new monitoring inspection after the defects have been corrected. Major defects that can influence the production quality on a sustained basis are especially considered to be inappropriate raw material or defective production and storage facilities.

4.3 Certification of Trade

Each dealer in the supply chain has to be certified in accordance with the ENplus guidelines. Exempted are dealers trading only bagged pellets and dealers that sell to end consumers with physical delivery being executed by certified dealers. Freight forwarders and storage companies, which are active on behalf of companies certified according to the ENplus guidelines, do not have to be certified. However, the dealers have to register their delivery vehicles and storages with the system support organization / the certification body.

4.3.1 Application Procedure

The interested party submits an application to the supplier of the license (the EPC or national association) for certification and declares himself/herself willing to observe the regulations of the certification system. The system support organization/the certification body makes a decision on the application within 2 months.

When a positive decision about the application is made, the applicant completes a contract with the system support organization/the certification body, which enables it, if necessary, to mandate an inspection by a listed testing center.

4.3.2 Issuing of the Certificate

On the basis of the information in the approval application, the system support organization/the certification body examines the conformance to the certification guidelines. If the application is approved, the applicant is informed. As soon as the proof of the down payment of the license fee to the national association or EPC has been received and the signed license contract has been returned, certification is carried out by sending the certification document with the identification number and the validity period of the certificate. In addition, the certificate holder will be entered into a register with all the other certificate holders, which will be published on the Internet site of the EPC and the national association (if applicable).

4.4 Objection Proceedings

Applicants and certificate holders can file a written objection to the system support organization/the certification body against the following decisions:

- Refusal of the requested certification
- Ordering of new monitoring inspections Ordering of extraordinary inspections (see 4.11)
- Ordering of more frequent inspections in the scope of internal controls
- Suspension and cancellation of the certificate / the license (see 4.5)
- Public mentioning of grievances (see 4.5).

The objection is only permissible when the applicant or certificate holder proves that the affected decision violates his/her own rights. A written decision on the objection will be made within two weeks by an objection committee to be set up by the national association/EPC. No persons who have definitively been affected by the objection decision can participate in the decision-making process.

4.5 Validity of the Certificate

The national association/EPC and the responsible certification body determine the duration of the validity of the certificate.

When conscious violations of the regulations of this certification system occur or when noticed non-conformities continue despite repeated demands to remedy these, the national association/EPC has to suspend the license to use the ENplus trademark for a limited period or terminate the seal usage contract and request the certification body to revoke the certificate. If the certificate holder has several locations, the license can be suspended for the location where the defects were assessed until they have been corrected. Wood pellets from other locations of the certificate holder can still be marketed as certified goods.

In the case that the license and the certificate are revoked, the former license holder can re-apply for certification and license after a one year.

In addition, the national association/EPC is authorized to publicize the grievances on the Internet in an appropriate manner and to name the affected certificate holder.

4.6 Major Changes

The certificate holder has to immediately report major changes to the system support organization/the certification body. Major changes are all changes of the technical equipment as well as the operation processes or the company structure and rules that have to be reported during the ENplus application process.

4.7 Use of the Certificate Seal

When the certificate is issued, the certificate holder acquires the right to use the certification seal for the corresponding quality class to label his/her products and to use for advertising purposes. The seal may be exclusively used in direct connection with the certified product, respectively, the certified service (transport, storage). Certificate holders who manufacture or trade certified and non-certified goods have to avoid the impression that the complete production and trade quantities are certified. The certification seal may only appear on invoices when these invoices are issued for ENplus-certified goods. Invoices for ENplus-certified and non-ENplus-certified wood pellets have to be separately issued.

The certification seal will be linked to the identification number of the certificate holder. Use of the seal without the combination with the identification number is only possible with the permission of the national association/EPC.

Dealers who are not certified in accordance with the ENplus guidelines and have no physical contact to ENplus-certified wood pellets are not allowed to use the certification seal. Trading with ENplus-labeled bagged pellets, however, is permissible without certification. In combination with the identification number of an ENplus-certified pre-supplier, the non-certified trader can declare the goods as ENplus on bill and on bill delivery in written form.

In the years 2011 and 2012, dealers can blend up to 30% DINplus-certified wood pellets with a minimum of 70% ENplus wood pellets and still declare their goods as ENplus-certified.

4.8 Labeling

Each sales unit of wood pellets certified according to this system has to be labeled with the following specifications:

- “Wood pellets,” with the corresponding quality class (ENplus-A1, ENplus-A2, EN-B)
- Certification seal (for packed material)

- Certificate identification number (see 4.10.1; for bagged wood pellets, the number of the producer or, optionally, the general number of a dealer has to be indicated)
- Mass (in kg or ton)
- Diameter (6 mm or 8 mm)
- Note: Store in dry conditions
- Note: Use only in approved and appropriate firing units
- For bulk wood pellets, the license plate number of the delivery vehicle has to be documented.

4.9 Interfaces

Every actor in the production and supply chain guarantees the certified wood pellet quality in his/her area of responsibility. When service providers are engaged, the contracting entity is responsible for adhering to the regulations of this certification scheme. The interface to the end consumer is the blow-in nozzle at the customer's storage.

4.10 Traceability

The tracking system serves as a self-control and quality assurance aid to find out where the failures in the supply chain occurred and to identify which batches are out of specification. Through the identification number and the analysis of the internal documentation of the involved actors, possible sources of quality defects can be traced through the supply chain. If necessary, the archived reference samples from the producer/supplier are to be analyzed by a testing body and, where appropriate, are to be compared with a sample taken at the complainant's.

4.10.1 Identification Number

Through a system of unique identification numbers, each delivery should be able to be traced back from the end customer, through the various links in the logistics chain, back to the producer. When applying for certification, the certificate holder agrees to the participation in this system. If a manufacturer operates several production facilities or if a dealer purchases wood pellets from multiple dealers or producers, the respective company can request a general number. This means that certified pellets from different sources can be mixed. However, the internal documentation system should allow the traceability of deliveries with quality problems and to identify the source of a problem by archived reference samples.

Non-certified dealers without their own storage capacities and transport vehicles have to work together with service providers certified according to this system.

Certified dealers can register storage capacities and vehicles from non-certified companies as their own.

If a wood pellet producer does contract pelletizing, he/she uses the individual identification number of each certified customer. The owner of the identification number has to register the contracted pellet producer as if he were his own production facility. In the case of bagged wood pellets, the identification number of the producer or the general number of the trader has to be indicated on the packaging.

For bagged wood pellets, the number of the producer (or, alternatively, the general number of the dealer) will be printed on the packaging. In the case of complaints, the end consumer can turn to the national association.

If a delivery is made, the identification number of the companies active in the supply chain of this delivery is set together to a delivery identification number. This number will be indicated on the delivery note to retrace the route of the delivery, if necessary. If a batch-pure storage of consignments from different origins is not possible, the complete identification number of the batch begins with the number of the dealer who mixed the wood pellets (general number).

Each identification number has five characters which specify whether the respective certificate holder is a dealer or a producer and which country he/she comes from. The first two spaces indicate the country where the pellets are produced or where the headquarters of the pellet producer or trader are located. Country codes as specified by ISO 3166-1-alpha-2 are to be used. Companies that have certified with DEPI in 2010 can use numerical codes proposed in the German ENplus handbook until the end of 2014.

The interlinked five-digit specifiers will be separated from each other by a blank space.

The three numbers after the country code provide the number of the respective certificate holder in the country. The numbers 001 to 300 will be respectively assigned to producers, the numbers 301 to 999 to dealers.

The following example of a delivery identification number indicates that pellets were produced by the Austrian producer 012 and delivered by the German dealer 344.

A	T	0	1	2		D	E	3	4	4

4.10.2 Reference Samples

With each delivery of wood pellets to the end consumer, the certificate holder has to take a reference sample during the loading of the transport vehicle at the last

possible location for an eventual later inspection of the mechanical durability. At least 1.2 kg per day of the delivered quantity must be archived. Provided that more than 3 vehicles deliver pellets per day, the sample quantities can be reduced to at least 0.5 kg per vehicle and 1.5 kg per day (at least 3 vehicles have to be sampled throughout the day). The date, pellet quality, size of the batch and license plate number of the delivery vehicle are to be documented. The samples have to be archived for at least 9 months under proper conditions.

4.11 Regular and Extraordinary Audits

Pellet producers have to undergo one mandatory annual audit. In addition to that, extraordinary audits can be carried out upon demand by the certification organization, the system support organization or the national association, e.g., if significant numbers of complaints are received.

Traders are audited in the first year after certification and then at least once every five years. In addition, extraordinary audits can be carried out if quality concerns are raised.

If major non-conformities have occurred, the inspection body has to immediately inform the certificate holder and the system support organization/the certification body. In this case, the system support organization/the certification body is authorized to mandate a new inspection after the defects have been corrected. Major defects that can influence the production quality on a sustained basis are especially considered to be inappropriate raw material or defective production and storage facilities.

When conscious violations occur, the regulations stated in 4.5 are applicable.

4.12 Complaint Procedure

When customers or subordinate actors make complaints, the system support organization/the certification body or the national association will pursue these on the basis of the supply chain documented by the identification number. In the process, the in-house documentation of the involved actors will be inspected.

Complaints will be acknowledged if pellet storage rooms are designed properly to avoid damage to pellets during filling. Normative references for pellet storage rooms are to be considered, if available. National requirements for pellet storage rooms are to be specified by national associations that receive an ENplus license.

Furthermore, at least one of the following preconditions must be fulfilled:

- One sample, which was drawn in the presence of all involved parties (customer/ wood pellet dealer/ installer/ service technician), was examined by a listed testing body and does not conform to the chemical and physical characteristic values (see Chapter 9).
- The average fine material quantity[3] in the storage area exceeds 8%. The storage area was completely emptied at the time of the last filling; since then, a maximum of 20% of the wood pellets has been removed.

4.13 Schedule of Fees

The schedule of fees for using the ENplus brand is determined by the national associations.

The fees may consist of: enlisting fee, fee per produced/traded amount of pellets, marketing fee or other justification.

In addition, there will be costs for the auditing and testing of pellets that are to be settled directly between the inspection/testing body and the certificate holder.

If pellet producers sell their goods directly to end customers, they have to pay both the license fee for production and the license fee as traders. They also have to certify as a trader.

Dealers without their own vehicles and storage capacities who do not participate in the certification system can offer ENplus goods, provided that the identification number of the transport certificate holder or dealer executing the logistics is used. Further regulations are listed in 4.7.

5 PRODUCT QUALITY

In the scope of this system, three wood pellet qualities with different demands on the used raw material, as well as the wood pellet characteristics, will be certified. These essentially correspond to the classes of the EN 14961-2.

- ENplus-A1
- ENplus-A2

3 All particles < 3.15 mm.

- EN B

The relevant quality parameters, the corresponding threshold values, as well as the specifications for the raw materials to be used, are listed in Chapter 9.

ENplus and ENplus certification differs from EN 14961-2 in the following parts:

- raw material basis (no chemically treated wood is allowed in class B in EN certification) and
- ash melting behavior is mandatory (voluntary in EN 14961-2). Ash used for determining the ash deformation temperature (DT) is to be produced at 815 ^{o}C.

Wood pellets of the EN-B class cannot be sold as bagged pellets.

6 SUSTAINABILITY REQUIREMENTS

Certified producers have to document the origin of the raw material and inform the inspection body at the yearly audit regarding the share of raw material coming from certified sources (FSC, PEFC or equivalent systems). The inspection body integrates this information in the audit report.

In view of the importance of greenhouse gas mitigation, by January 2012 pellet producers must be able to state the amount of greenhouse gases emitted as a consequence of pellet production. Default values to be published by the EPC can be used for this purpose. Otherwise, an own analysis can be made based on the energy consumed by the pellet production plant. In this case, the annual inspection will include the verification of the stated CO_2 emissions per ton of produced pellets.

7 QUALITY MANAGEMENT

In this chapter, the guidelines for internal quality management are established. How these guidelines are implemented is largely left up to the certificate holders. Once the EN 15234-2 is established, the requirements of this standard will be integrated in the ENplus system. Until then, the FprEN 15234-1 serves as a guideline. Alternatively, a quality management system according to ISO 9001 can be set up.

7.1 Production

7.1.1 Technical Operating Equipment and Operation Processes

The production facilities must fulfill the following requirements:

- The certificate holder must have adequate technical equipment for the production, loading and possible packaging of wood pellets at its disposal. The functions and condition of this equipment must be regularly checked.
- When raw materials are received from new suppliers, their adequacy is to be checked (incoming goods inspection), e.g., through certification of the manufacturer or by an individual inspection (e.g., checking the ash and nitrogen content, the ash softening).
- Contaminations of the raw materials before pelletizing by substances such as soil, stones and grain, as well as contaminations of the manufactured pellets, must also be excluded. Manipulation areas, silos and conveyor equipment must be regularly checked for soiling and, if necessary, cleaned. This also applies to each loading of external vehicles, as far as it does not involve special vehicles for the exclusive transport of wood pellets.
- Before the loading of wood pellets for delivery to the user, a fully functional and regularly maintained facility for the separation of fine material has to be available. Wood pellets have to be sieved to a maximum of 1 w-% of fine material (other agreements with retailers can be bilaterally stipulated).
- The wood pellets must not absorb any water, e.g., through contact with condensed water, rain or snow. Condensate formation is to be excluded as far as possible.
- The blending of wood pellets of different quality (ENplus-A1, ENplus--A2, EN-plus B, non-certified wood pellets) must be precluded through the conscientious planning of operation procedures and the possibility of spatially divided storage.
- In the case of malfunctions in the production process, it must be checked which quantities of defective wood pellets had been produced up until the malfunction was noticed. These wood pellets are not allowed to be sold as certified pellets.
- After repair and maintenance work has been completed, the manufactured wood pellets must undergo an in-house quality inspection.

- All involved employees must receive annual training from the quality assurance representative concerning the required quality demands.
- The certificate holder must have the appropriate testing instruments and testing means, as well as the commensurate knowledge to inspect the manufactured pellets.

7.1.2 Reporting of Produced Quantities

On the second Friday of each month, the quantities of wood pellets of different qualities produced in the previous month must be reported for statistical use, based on provisions made by the national association or AEBIOM / EPC.

7.1.3 Quality Assurance Representative

Certificate holder management must appoint an experienced employee as a quality assurance representative. This person must ensure the orderly internal documentation and is responsible for archiving reference samples, as well as carrying out self-inspections, if necessary. The appointed employee must know the effects of different operating processes on the quality of the manufactured wood pellets and appropriately train the other employees for their areas. Moreover, he/she is the contact partner for his/her colleagues in the case of malfunctions in the production process. The quality assurance representative can delegate individual monitoring and documentation tasks to other employees. In this case, he/she has to brief the responsible employee and monitor the orderly execution of these tasks.

7.1.4 Internal Documentation

The quality assurance representative must ensure the orderly documentation and evaluation of operating processes that have an effect on the quality of the manufactured wood pellets. In detail, the documentation must encompass the following points:

- Raw materials and additives receiving (date, quantity and name of the supplier; for pressing aids: the type of material)
- Outgoing goods (date, quality category, quantity and name of the customer), the used vehicles or external forwarders, and the freight which was last transported by the vehicle - inasmuch as no special vehicle will be used for the exclusive transportation of the wood pellets - as well as a description of the respective reference samples
- The addition of pressing aids or other additives (type: data sheet with the chemical composition, as well as dosage)

- Manufacturing of certified and non-certified wood pellets (period, quality, quantity)
- Malfunctions of the production process (date, type of malfunction, measures taken to remedy the problem, quantity and disposition of the wood pellets that cannot be certified)
- More extensive repair and maintenance work that could lead to a change in the wood pellet quality (date, type of work performed)
- Employee training regarding the effect of the various production factors on the wood pellet quality (date, participants, contents)
- Areas of responsibility of the individual employees
- Self-inspection (documentation and evaluation of the results)
- Customer complaints (date, results of the findings, measures taken to remedy the defects, if necessary).

The documentation is always to be kept up-to-date and regularly presented to management. For this purpose, it is recommended to maintain a shift book. Discovered defects are to be immediately disclosed to the responsible employees and to be remedied.

7.1.5 Self-Inspections

The producer must regularly inspect the quality of the manufactured pellets to verify the fulfillment of the product requirements and to avoid the production of larger defective batches. The parameters in the following table have to be checked at least once a day. When reasonable doubts concerning the pellet quality exist, the accredited testing center can stipulate more frequent internal inspections in the scope of monitoring or extraordinary inspections.

The frequency of the checks can be calculated by the following formula (FprEN 15234-2):

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

N	number of sample in 24h
days	annual working days
ton	annual quantity of pellets in tons

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

Parameters that must be inspected in the scope of internal quality inspections are listed below.

Parameter	Point of the Test	Frequency
Bulk density (BD)	After production, before storage	At least once per shift
Moisture (M)	After production, before storage	At least once per shift
Mechanical durability (DU)	After production, before storage	At least once per shift
Length (L)	After production, before storage	At least once per shift
Fines (F)	At the last possible point before delivery	At least once per shift

The tests must be conducted according to the standards listed in EN 14961-2. As an alternative, equivalent procedures that are referable to EN standards can also be applied.

7.2 Trade

7.2.1 Technical Operating Equipment and Operation Processes

The following requirements must be fulfilled during storage and delivery to end customers:

- The certificate holder must have adequate technical equipment for the storage and/or transport of high quality wood pellets at his/her disposal. The functions and condition of this equipment must be regularly checked.
- Manipulation areas, silos and conveyor equipment must be regularly checked for soiling and, if necessary, cleaned. This also applies to the loading of external vehicles, as far as it does not involve special vehicles for the exclusive transport of premium pellets of the ENplus-A1 und ENplus-A2 classes. Responsibility for the inspection lies with the certificate holder who delivers the wood pellets. However, this can also be contractually regulated in a different manner.
- The wood pellets must not absorb any moisture, e.g., through contact with condensed water, rain or snow. Condensate formation is to be excluded as far as possible.

- The mixing of wood pellets of different quality (ENplus-A1, ENplus-A2, EN-B, non-certified wood pellets) must be precluded through the conscientious planning of operation procedures and/or the possibility of spatially divided storage, respectively, of spatially divided transport.
- If wood pellets from the respective storage facility shall be delivered to end customers, the storage facility must be equipped with a facility to separate the fine material before filling the transport vehicle. After the separation process, the fine material must amount to a maximum of 1 w-%. Reloading from delivery truck or trailers without sieving is forbidden.
- The temperature of the loaded pellets must not exceed 40°C (FprEN 15234-2).
- During the loading process, the driver of the delivery vehicle must assure himself of the quality of the wood pellets by doing a visual inspection.
- Reference samples are to be taken when bulk wood pellets are delivered to the end customer (see 4.10.2).
- Silo vehicles for the transport to private customers must be equipped with a gauged on-board weighing system. Individual exemptions from this rule can be agreed between the national association and certificate holders for a maximum of 3 years. Such exemptions must be reported to the EPC, however, and can be lifted if repeated complaints from customers are received.
- The transport vehicle must be equipped with a low-abrasion blowing/suction feeding system – this means the delivery pipe should be coated to reduce friction and the connection between pipes should not contain sharp edges looking into the pellet flow.
- Silo vehicles must have a device to extract the supply air from the storage during delivery. National associations can accept other solutions that prevent dust from being blown into the building of the customer. The EPC must be informed about which other solutions will be accepted.
- When a delivery to end customers is made, the transport mechanisms and the store should be checked for irregularities (e.g., missing impact mats or unfavorable pipe angles). The filling level of the store must be estimated before the filling process. Obvious defects of the storage area or existing dust build-up are to be documented on the delivery note and are to be confirmed by the customer, if present.

- When a delivery to end customers is made, a checklist stating all relevant details for the quality of delivery (as proposed by the national association) has to be filled out.
- Drivers with contact to end customers must have an internal training course at least once a year.

7.2.2 Quality Assurance Representative

Certificate holder management must appoint an experienced employee as a quality assurance representative. This person must ensure the orderly internal documentation and is responsible for carrying out self-inspections, as well as for archiving reference samples. The appointed employee must know the effects of different operating processes on the quality of the traded wood pellets and train the other employees accordingly. Drivers who deliver wood pellets to end customers are furthermore responsible for customer contact and must be correspondingly instructed. The quality assurance representative can delegate individual monitoring and documentation tasks to other employees. In this case, he/she has to brief the responsible employee and monitor the orderly execution of these tasks. Additionally, the quality assurance representative has to participate in an external training course for quality assurance at least once.

7.2.3 Internal Documentation

The quality assurance representative must ensure the orderly documentation and evaluation of operating processes that have an effect on the quality of the traded wood pellets.

In detail, the documentation must encompass the following points:

- Materials received (date, wood pellet quality [ENplus-A1, ENplus-A2 or EN-B], quantity and name of the supplier)
- Outgoing goods (date, wood pellet quality [ENplus-A1, ENplus-A2 or EN-B], quantity, name of the customer, the store which the batch originates from, the used vehicles or external forwarders and the freight which was last transported by the vehicle, as well as a confirmation of the carried out cleaning of the vehicle - inasmuch as no special vehicle will be used for the exclusive transportation of the wood pellets)
- Problems during storage and transport (date, type of problem, effect on the wood pellet quality, measures taken to remedy the defects, quantity and disposition of the substandard wood pellets)

- Repair and maintenance work that can lead to a change in the wood pellet quality (date, type of work performed, either a confirmation that no irregularities could be determined during the visual inspection or of measures taken to remedy the defects, as well as the quantity and disposition of the substandard wood pellets)
- Self-inspections (documentation and evaluation of the results, see 7.2.4)
- Delivery to the end customer (quality of the wood pellets at loading, irregularities, as well as the estimated remainder of the stock; when a delivery is made with a silo vehicle, the blowing-in pressure and the hose lengths are to be documented)
- Areas of responsibility of the individual employees
- Employee training regarding the effect of the various operating processes on the wood pellet quality (date, participants, contents)
- Customer complaints (date, measures taken to remedy the defects).

7.2.4 Self-Inspections

The quality assurance representative is responsible for regularly inspecting the quality of the traded pellets to verify the fulfillment of the product requirements. The extent and type of the inspections are left up to him/her. However, the minimum requirement is a weekly visual inspection of the stored wood pellets, including the storage facilities. This can also be done based on reference samples (see 4.10.2).

The tests have to be carried out according to a previously determined inspection plan; the execution and the results are to be documented.

8 LISTED INSPECTION AND TESTING BODIES

EPC-listed inspection bodies are qualified organizations that audit the technical facilities and the internal quality management of pellet producers or traders. EPC-listed testing bodies are qualified laboratories that analyze pellet quality. They are listed on the EPC website www.pelletcouncil.eu .

8.1 Registration Requirements

A listed inspection body must be accredited according to EN ISO 17020 or EN 45011 with a scope accepted by EPC. Auditors must be listed by name and must have at least 2 years of experience in auditing pellet production plants. Experienced inspection experts in similar fields, e.g., the wood processing industry, are accepted if they are accompanied by a person who is experienced in pellet production. Auditors that do not fulfill these requirements need to complete a training course acknowledged as adequate by the EPC. Listed auditors must participate at least every second year in annual international auditors' workshops organized by the EPC.

Testing bodies must be accredited according to EN ISO 17025 and testing standards as specified in EN 14961-2. Testing bodies can cooperate to do complete tests according to these testing standards.

8.2 Application Procedure

Inspection bodies that intend to be listed make a formal application to the EPC that includes their accreditation or their application to receive an accreditation for temporary listing. In the application, the proposed auditors for pellet plants and pellet traders and their qualification have to be listed. There is an annual fee of 1000€ for being listed as an inspection body.

Testing bodies that intend to be listed make a formal application to the EPC that includes their accreditation or their application for accreditation for temporary listing. There is an annual fee of 500€ for being listed as a testing body.

9 REQUIREMENTS FOR RAW MATERIALS

The types of wood indicated in Table 1 and culled from the EN 14961-1 standard are permitted to be used as raw material for the production of wood pellets. The use of chemically treated wood, which represents a deviation from this standard, is not allowed. Wood which was externally treated with wood preservatives against insect attack (e.g., lineatus) does not classify as chemically treated wood, as long as the

threshold values listed in Table 2 have been observed. If all chemical parameters of pellets are clearly within the limits, the use of chemically untreated wood is proven.

Table 1: Wood types that are permitted to be used for wood pellet production

ENplus-A1		ENplus-A2		EN-B	
1.1.3	Stem wood	1.1.1	Whole trees without roots	1.1	Forest, plantation and other virgin wood
1.2.1	Chemically untreated residues from the wood processing industry	1.1.3	Stem wood		
		1.1.4	Logging residues		
		1.2.1.5	Bark [1])	1.2.1	Chemically untreated by-products and residues from the wood processing industry
		1.2.1	Chemically untreated by-products and residues from the wood processing industry	1.3.1	Chemically untreated used wood[2])

[1]) From sawmill activities and cork residues.

[2]) Demolition wood is excluded. Demolition wood is used wood arising from demolition of buildings or civil engineering installations.

9.1 Requirements for Additives

Additives (e.g., pressing aids) used to improve fuel quality, to decrease emissions or to boost burning efficiency are allowed to make up a maximum 2% of the total mass. The type (material and trade name) and quantity (in max.-%) of the pressing aids and additives used have to be documented. Additives which are used after production, before delivery to end-user storages, also must be documented. Water and steam are not additives in terms of this regulation.

Only primary farming and foresting products which were not chemically altered can be used as pressing agents or additives to improve efficiency during production and delivery.

9.2 Requirements for Pellets

Pellet requirements have to comply with the requirements as stated in EN 14961-2. The testing procedures described in the listed standards are to be used during external inspections. While in EN 14961-2 the ash melting behavior is informative, for the certification of ENplus A1 pellets ash deformation temperature (DT) has to be larger or equal 1200 °C, for ENplus A2 und B it has to be larger or equal 1100 °C. Different than in the prEN 15370, the ash for the determination of ash melting behavior is to be generated at 815 °C and deformation temperature (DT) is to be stated.

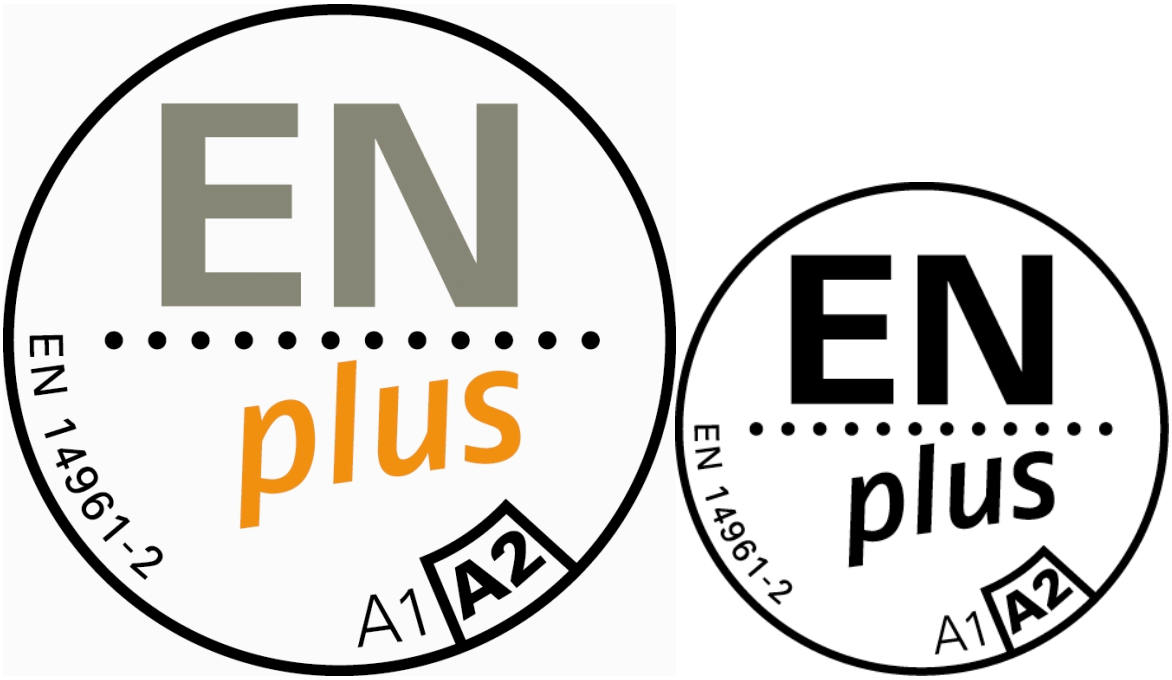
10 CERTIFICATION SEAL

Firstly, the seal has to feature a minimum height of 15 mm. The identification number of the certificate holder is an essential component of the certification seal and must be displayed close to the seal. Furthermore, the height of the identification number may not be any smaller than ten percent of the seal's height, but a minimum height of 1.5 mm (Arial font size of 10).

The seal must be displayed in one of the color variations or in monochrome specified here.

The certification seal has to be used only in addition with the identification number of the certificate holder. Using the seal without the identification number is possible only with written authorization of the system support organization/certification body.

Certification seal for wood pellets of the quality category ENplus-A1.



Certification seal for wood pellets of the quality category ENplus-A2.

Certification seal for wood pellets of the quality category EN-B.

Annex 1: Recommended Testing Methods for In-House Sampling and Quality Assurance

1 SAMPLING

The sampling and sample portioning for the tests in the scope of external inspections are conducted according to EN 14778 (Sampling) and EN 14780 (Sample preparation).

As the procedures listed in the respective standards are very extensive, a simplified procedure for drawing samples for in-house analyses will be described in the following. Single samples (increments) should, if possible, be taken from the moving material, as the quality of the total batch can be best indicated in this way. During sample partitioning for the individual analyses, it should also be made certain that the respective subsamples represent the quality of the total batch. The subsamples should be taken with a small sampling scoop in order to assure that the fine material quantity can also be tested.

(A) From moving material

At least five individual samples, with a mass of 4 kg per sample, will be taken. Attention should be paid that at least 20 kg of material passes through the sampling point between the individual sampling procedures. The individual samples will be thoroughly mixed and compiled into a cone. This will subsequently be pressed flat and divided into four equally large parts by a vertically inserted scoop. The process is to be so often repeated until the required sample size for the respective test is approximately achieved. Care must be taken to assure that all subsamples possess the same consistency.

(B) From static material

At least five individual samples, with a mass of 4 kg per sample, are to be taken at different points of the filling process. With bagged wood pellets, an individual sample will be respectively taken from one bag. The individual samples will be thoroughly mixed and compiled into a cone. This will subsequently be pressed flat and divided into four equally large parts by a vertically inserted scoop. The process is to be so often repeated until the required sample size for the respective test is approximately achieved. Care must be taken to assure that all subsamples possess the same consistency.

2 FINE MATERIAL AMOUNT (F) AND MECHANICAL DURABILITY (DU)

The mass will be determined by taking a sample of approximately 1.2 kg. Subsequently, the amount of fine material will be separated with a 3.15 mm-

sieve according to ISO 3310-1. When the sieving is done manually according to EN 15210-1, care must be taken that, on one hand, all fine particles are separated and, on the other hand, that no new fine material forms through the mechanical strain. This can be achieved by shaking the sample in 5 to 10 circular motions using a sieve with a diameter of 40 cm. Then the sieved particles will be weighed.

The fine material amount (F) will be calculated as follows:

$$F = \frac{m_A}{m_E} * 100$$

m_E - mass of the sample before sieving [g]

m_A - mass of the sieved particles [g]

The subsequent determination of the mechanical durability is done on the basis of EN 15210-1. Firstly, two subsamples drawn from the sieved pellets, with a mass of (500 ± 10) g respectively, are formed and weighed. They are successively put into the testing chamber of the measuring device, which rotates at (50 ± 2) revolutions per minute. After 500 rotations, the drum is to be emptied and the fine material is to be sieved again. Afterwards, the remaining wood pellets will be weighed and the mechanical durability will be determined using the following formula:

$$DU = \frac{m_A}{m_E} * 100$$

DU - mechanical durability [%]

m_E - mass of the pre-sieved wood pellets before the handling process [g]

m_A - mass of the sieved wood pellets after the handling process [g]

An average value will be generated from the results of the testing of both subsamples.

An alternative procedure:

As an alternative, the mechanical durability can be determined according to the following testing instruction with the Ligno-Tester.

The fines must be separated before determination of abrasion by manually passing according to EN 15210-1 through a sieve with 3.15 mm according to ISO 3310-1.

100 g ± 0.5 g pellets are weighed and treated in the Ligno-Tester for 60 seconds at 70 mbar by the flow of air. At the end, the pellets are weighed out and the abrasion in % is calculated.

The mean value is calculated from the results of 5 determinations. The dust filter of the Ligno-Tester[1)] must be changed, at latest, after every third determination.

$$AR = \frac{mE - mA}{mE} \bullet 100$$

AR…..abrasion in w-%

mE….mass of pellets before treatment in g

mA….mass of pellets after treatment in g

Mechanical durability is 100 % - AR.

The abrasion can also be determined by other methods giving equal results.

Note: On account of the expected divergence from the determination, a divergence of the mean value from the threshold value of an abrasion of up to 0.2 % must be accepted.

3 BULK DENSITY (BD)

The determination of the bulk density follows on the basis of EN 15103.

Wood pellets will be poured from a height of 200 to 300 mm into a measuring cylinder, with a volume of five liters and a defined diameter-height ratio, until the cylinder is full and a debris cone has formed. Subsequently, the cylinder will be dropped three times from a height of 150 mm onto a hard surface in order to consolidate the wood pellets. After excess material has been removed by striking a straight edge along the top and larger cavities have been filled, the mass of the wood pellets in the cylinder is determined.

The bulk density (BD) will be calculated using the following formula:

$$BD = \frac{(m_2 - m_1)}{V}$$

BD - bulk density

m_1 - mass of the empty container [kg]

m_2 - mass of the full container [kg]

V - net volume of the measuring cylinder [m³]

Afterwards, the sample material is poured out and mixed with the remaining wood pellets before the procedure is repeated. An average value will be generated from the results of both measurements.

4 MOISTURE CONTENT (M)

The determination of the moisture content follows on the basis of EN 14774-2.

First, the mass of the empty drying dish will be determined (accuracy: 0.1 g). Subsequently, the dish will be filled with at least 300 grams of wood pellets and re-weighed. The sample will then be dried in a drying chamber (oven) at (105 ± 2) °C until constant mass has been achieved. After the mass has been determined within 15 seconds of removing it from the drying chamber (weighing as hot), the moisture content will be calculated using the following formula:

$$M = \left[\frac{(m_2 - m_3)}{(m_2 - m_1)} * 100 \right]$$

M - moisture content as received [w-%]

m_1 - mass of the empty drying pan [g]

m_2 - mass of the drying pan and sample before drying [g]

m_3 - mass of the drying pan and sample after drying [g]

FURTHER ANNEXES CAN BE ADDED BY NATIONAL ASSOCIATIONS, E.G., SPECIFYING REQUIREMENTS FOR DELIVERY NOTES, COMPLAINT DATA MANAGEMENT, CONFIRMATION OF PRIOR FREIGHT AND TRUCK CLEANING, ETC.