

**Audit and Test Report:**  
**BEA2014188**

**Date:** 2015-02-20

## Inspection according ENplus

**Client:** Sparrow d.o.o.  
Attn.: Mr. Igor Milekić  
Marina Marinovića 1  
37260 Varvarin  
Srbija - Serbia

**Subject:** Wood pellets production Sparrow;  
plant in **Varvarin**, Serbia

**Content:** Site Audit and pellet testing according to ENplus

**Order:** According to the inspection contract

**Date of audit  
and sampling:** 2014-12-11 by Dr. Martin Englisch

**Receipt of samples:** 2014-12-12

**Ref:** Eng

## 1 SCOPE OF WORK

Inspection of the wood pellet production plant especially of quality measures, evaluation of quality related documents and internal testing of product quality of wood pellets production according EN*plus* requirements. A sample of the production is to be taken and tested according EN 14961-2 for verification of pellet quality.

## 2 SCOPE OF APPLICATION

The test results given in this report have been obtained under the specific conditions of the individual tests. They shall serve as proof for the conformity of the sample(s) tested. The client is responsible for the conformity of products with EN*plus* regulations which will be assured when quality assurance measures according EN*plus* regulations are continuously applied.

## 3 INSPECTION AUDIT

The inspection audit was carried out according EN*plus* Handbook for the Certification of Wood Pellets for Heating Purposes (Version 2.0 from April 2013) on 2014-12-11 by Dr. Martin Englisch attended by Mr. Igor Milekić and Mr. Nemanja Aleksić (duration of audit approximately 4 hours).

Responsibilities in the factory are assigned clearly, a company organigram exists.

The responsibility in the company is divided as follows:

Contact person:	Mr. Igor Milekić
Director in charge:	Mr. Igor Milekić
Responsible for the production of pellets:	Mr. Nemanja Aleksić
Responsible for quality assurance:	Mr. Nemanja Aleksić

### 3.1 Products

Certified products	wood pellets EN 14961 – 2, class A2
ENplus ID-Number	To be assigned
Dimensions	6 mm
Delivery to end customer	No direct delivery of certified pellets to end customer, small amount of low quality pellets is sold to local customers, picked up at production plant
Produced amount	2014: 0 t (production started December 2014) 2015: goal 35.000 t
Storage capacity	up to 4.000 t in bagged pellets on pallets in 2 warehouses

### 3.2 Raw material

Origin of wood	100 % stemwood from local forests
Source raw material	100 % stemwood (1.1.3 acc. ISO 17225-2)
Raw material species	75 % beech 25 % spruce
Form of raw material	Roundwood, 3-6 m
Raw material storage	Outdoor storage on paved wood-yard
Control and documentation of raw material	All deliveries are checked visually
Suppliers	100 % Serbian National Forest (Srbijašume)
Sustainability of raw material	100% FSC certified
Other raw materials used (e.g. pressing aids)	No additives are used

### 3.3 Production process

Raw material preparation	Some raw material is manually cleaned, majority of logs is debarked and chipped
Drying	Material is dried with a directly fired drum drier
Separation of contaminants and impurities	Oversized particles and impurities are removed by sieves and stone traps. Metal separators are used
Pellet production	raw material is conditioned using water and is pelletized by 3 ring die press. Pellets are cooled in a counter current cooler.
Removal of fines	Fines are removed by 2 vibrating sieves with suitable size and sieve aperture, dust is removed by air separators.
Non complying pellets	A possibility for separation of low quality batches exists. Non-conforming pellets are filled in big bags and are sold to local customers at factory gate.
Documentation of failures, breakdowns and maintenance	A shift book exists containing all relevant information
Storage of pellets	Pellets are stored in bags on pallets only.
Sustainability declaration	The EPC sustainability declaration is completed and posted in the office of the company.
Carbon footprint of production	Carbon footprint of production will be calculated next year when sufficient data are available.

### 3.4 Quality control measures

The factory production control is carried out in accordance with the requirements of the regulations. Tests are done regular and are documented properly.

parameter	Test frequency	Test equipment
moisture	Every 2 hours	IR-dryer
bulk density	Every 2 hours	Bulk density container acc. EN 15103
durability	Every 2 hours	BEA Tumbler 1000
length	Every 2 hours	Visual, eventually with ruler
fineness	Every 2 hours	3,15 mm sieve

Instruments for quality control maintained properly, calibration and/or performance tests are done.

### 3.5 Quality assurance

Quality management system	<p>Quality management is in place and based on SOP's which cover:</p> <ul style="list-style-type: none"> <li>• Responsibilities are clearly assigned, organigram exists</li> <li>• Inspection procedure incoming logs</li> <li>• Customer complaint management</li> <li>• Procedure for self-inspection</li> <li>• Requirements for lab equipment calibration and maintenance</li> </ul>
Documentation raw material	Is done accordingly
Customer complaints	Customer complaint management system is currently built up, no complaints since there were no pellets sold until now.
Documentation of outgoing goods	Documentation of outgoing goods state of the art.

### 3.6 Retain samples

Retain samples pellets	One 15 kg bag is kept as retain sample per day
Retain sample labelling	Bag is labelled with production date
Storage for retain samples	OK

### **3.7 Labelling**

Labelling will be implemented after certification.

## **4 SAMPLING**

Samples were taken following the principles of EN 14778.

A sample was taken from the flat store. The sample was sent to the auditor's lab.

## **5 TESTS**

Testing took place in December 2014. The tests were carried out in cooperation with a subcontractor (metals).

## 6 PELLET LAB ANALYSIS RESULTS

Sample 2014188	Standard	unit	Pellets	Limit values according ENplus	
				Class A1	Class A2
mechanical durability	EN15210-1	[%]	97,8	≥ 97,5	≥ 97,5
bulk density	EN 15103	[kg/m³]	636	≥ 600	≥ 600
moisture content	EN 14774-2	[%]	6,1	≤ 10	≤ 10
ash content 550°C(db)	EN 14775	[%]	0,84	≤ 0,7	≤ 1,5
net calorific value (ar)	EN 14918	[MJ/kg]	17,3	16,5≤Hu≤19	16,3≤Hu≤19
Sulphur content (db)	EN 15289	[%]	<0,01	≤ 0,03	≤ 0,03
Chlorine content (db)	EN 15289	[%]	<0,01	≤ 0,02	≤ 0,02
Nitrogen content (db)	EN 15104	[%]	0,09	≤ 0,30	≤ 0,50
pressing aid / additives	-	[%]	none	≤ 2	≤ 2
<b>dimensions</b>					
finest (< 3,15 mm)	EN 15149	[%]	0,26	≤ 1	≤ 1
length (3,15 ≤ L ≤ 40 mm)	EN 16127	[%]	98,9	> 98	> 98
length (40 ≤ L ≤ 45 mm)	EN 16127	[%]	0,8	≤ 1	≤ 1
length (> 45 mm)	EN 16127	[amount]	0	0	0
diameter	EN 16127	[mm]	6	6 ± 1	6 ± 1
<b>heavy metals</b>					
Chromium (db)	EN 15297	[mg/kg]	<1	≤ 10	≤ 10
Copper (db)	EN 15297	[mg/kg]	1,6	≤ 10	≤ 10
Zinc (db)	EN 15297	[mg/kg]	<10	≤ 100	≤ 100
Lead (db)	EN 15297	[mg/kg]	<2	≤ 10	≤ 10
Mercury (db)	EN 15297	[mg/kg]	<0,1	≤ 0,1	≤ 0,1
Cadmium (db)	EN 15297	[mg/kg]	<0,2	≤ 0,5	≤ 0,5
Arsenic (db)	EN 15297	[mg/kg]	<1	≤ 1	≤ 1
Nickel (db)	EN 15297	[mg/kg]	<1	≤ 10	≤ 10
<b>ash melting behaviour</b>					
shrinking temperature SST	CEN/TS 15370-1	[°C]	1110	-	-
deformation temperature DT	CEN/TS 15370-1	[°C]	1370	≥ 1200	≥ 1100
hemisphere temperature HT	CEN/TS 15370-1	[°C]	1500	-	-
flow temperature FT	CEN/TS 15370-1	[°C]	1510	-	-

## 7 SUMMARY

The pellet production of **Sparrow** plant in **Varvarin, Serbia** is complying with all requirements of ENplus, quality A2.

### Recommendation for improvements till next audit

- CO<sub>2</sub> emissions declaration
- Education of staff (education register)
- Labelling of documents and bags according ENplus regulations

This inspection report no. **BEA2014188** comprises 8 pages and 0 appendix(es).

EPC-listed Auditor in charge



Dipl.-Ing. Dr. Martin Englisch