

Audit and Test Report:
BEA2015177

Date: 2016-01-19

Inspection according *ENplus* and *DINplus*

Client: **Tunipellets SA**
Attn.: Mr. Dipl.Ing. Sofien Missaoui
N° 51 ZI Zriba 4
1152 Zaghuan
TUNISIA

Subject: Wood pellets production **Tunipellets SA**;
plant in Zriba, Tunisia

Content: **Site Audit 2015** and pellet testing according to *ENplus* and
DINplus
Initial Inspection

Order: According to the order from 2015-11-11

**Date of audit
and sampling:** 2015-12-09 by DI Philipp Koskarti

Receipt of samples: 2015-12-10 and 2016-01-18

Ref: Kos



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* and DIN*plus* requirements. A sample of the production is to be taken and tested according EN ISO 17225-2 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* and DIN*plus* regulations which will be assured when quality assurance measures according EN*plus* and DIN*plus* regulations are continuously applied.

3 INSPECTION AUDIT

The inspection audit was carried out according EN*plus* Handbook (in the currently version) and DIN*plus* certification system (version June 2015) on 2015-12-09 by DI Philipp Koskarti attended by Mr. Dipl.Ing. Sofien Missaoui, Mrs. Dipl.Ing. Ines Chaker and Mr. Nour Belhaj Khalifa (duration of audit approximately 6 hours).

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

The responsibility in the company is divided as follows:

Contact person:	Dipl.Ing. Sofien Missaoui
Plant manager	Dipl.Ing. Sofien Missaoui
Director in charge:	Mrs. Dipl.Ing. Ines Chaker
Quality manager:	Mr. Nour Belhaj Khalifa
Responsible for the production of pellets:	Mr. Nour Belhaj Khalifa
Responsible for quality assurance:	Mr. Nour Belhaj Khalifa

3.1 Products

Certified products	wood pellets EN ISO 17225-2, class A1
Dimensions	6mm
ENplus ID	Not yet certified
DINplus reg. no.	Not yet certified
Certification body for ENplus	HFA
Certification body for DINplus	DINCERTCO
Delivery to end customer*	Pellets are only sold in 15kg bags. There is no part load delivery to end user.
Brand names	Tunipellets
Production amount*	2015: ~2.000t / 2016: ~10.000t
Storage capacity	~200t bagged pellets on pallets

* according statement of client

3.2 Raw material

Origin of wood	100% purchase from external suppliers
Source raw material	100 % stemwood (1.1.3.4 acc. EN ISO 17225-1)
Raw material species	100 % pine
Form of raw material	Round wood, only from Tunisian state forest
Raw material storage	The raw material is stored outdoors on paved ground.
Control and documentation of raw material	All incoming material is listed in an electronic database including, supplier, hauler and impurities. A visual inspection is performed, weight and moisture is controlled. (raw material declaration available).
Suppliers	There is a continuously updated list of suppliers.

Sustainability of raw material	No certification, sustainability declaration available.
Other raw materials used (e.g. pressing aids)	No additives or binders are used.

3.3 Production process

Raw material preparation	De-barker, chipper and hammer mill
Drying	Raw material is dried by a drum drier using biomass fuel for the heat.
Separation of contaminants and impurities	Oversized particles and impurities are removed by sieves, stone traps and metal separators are used.
Pellet production	The dried raw material is grinded by a hammer mill and is pelletized by 3 ring die presses and cooled by a counter current cooler.
Removal of fines	Fines are removed by 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.
Documentation of failures, breakdowns and maintenance	A shift book exists containing all relevant information.
Storage of pellets	Pellets are directly packed in 15kg bags. Pellets are protected against moisture and contamination. Storage capacity: ~200t on pallets.
Form of dispatch	100% in 15kg bags
Carbon footprint of production	Carbon footprint of production was calculated by using the recommended excel-sheet form EPC. Emissions are 122g CO _{2-eq} ./kg pellets.

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	At least 2 / day	BEA Humimeter
Bulk density	At least 2 / day	BEA 5l stainless steel container

Mechanical durability	At least 2 / day	BEA Tumbler 1000+
Length	At least 2 / day	Caliper ruler
Fines	At least 2 / day	BEA 3,15mm sieve

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

3.5 Quality assurance

Quality management system	<p>There is full quality management system implemented, documents are available covering:</p> <ul style="list-style-type: none"> • Receipt of raw materials • Requirements for measuring and test equipment • Instruction of self inspection • Responsibilities • Customer complaint management • Training of staff
Documentation raw material	<p>All incoming raw materials are documented, data are collected electronically including date, amount and name of supplier. A list of suppliers exists.</p> <p>A declaration of sustainability is available.</p> <p>Since additives are not used, there is no documentation.</p>
Customer complaints	<p>Customer complaints are documented. Documentation contains date, reason and action to achieve customer satisfaction. 1 complaint concerning quality in 2015 (overlength), accepted.</p>
Documentation of outgoing goods	<p>Documentation of outgoing goods is done according to the requirements, except labelling.</p>
Check of temperature of outgoing goods	<p>Temperature of loaded pellets is checked regularly. Temperature is always ≤ 40 °C.</p>

3.6 Retain samples

Retain samples are taken although the whole production is bagged to 15kg bags and it is not requested according to the requirements.

3.7 Labelling

The requirements concerning the labelling will be met as soon as the certification process is finished.

4 SAMPLING

Samples were taken following the principles of EN 14778.

One 15kg bag was taken from the storage. The bag was signed by the auditor and was taken by the auditor to the auditor's lab. Two additional samples were delivered by a parcel service on 18.01.2016.

5 TESTS

Testing took place from December 2015 to January 2016. The tests were carried out according EN ISO 17225-2 in cooperation with a subcontractor (heavy metals).

6 PELLET LAB ANALYSIS RESULTS

Sample 2015177			Pellets	Limit values Class A1	
	Standard	unit		ENplus	DINplus
mechanical durability	ISO 17831-1	[%]	98,8	≥ 98,0	≥ 97,5
bulk density (ar)	ISO 17828	[kg/m³]	611	750≥BD≥600	750≥BD≥600
moisture content	ISO 18134-2	[%]	8,8	≤ 10	≤ 10
ash content 550°C (db)	ISO 18122	[%]	0,7	≤ 0,7	≤ 0,7
net calorific value (ar)	EN 14918	[MJ/kg]	16,8	≥ 16,5	≥ 16,5
net calorific value (ar)	EN 14918	[kWh/kg]	4,7	≥ 4,6	≥ 4,6
Sulphur content (db)	ISO 16994	[%]	0,009	≤ 0,04	≤ 0,04
Chlorine content (db)	ISO 16994	[%]	0,018	≤ 0,02	≤ 0,02
Nitrogen content (db)	ISO 16948	[%]	0,13	≤ 0,30	≤ 0,30
pressing aid / additives	-	[%]	0	≤ 2	≤ 2
dimensions					
finer (< 3,15 mm)	EN 15149	[%]	0,7	≤ 0,5* / ≤ 1	≤ 0,5* / ≤ 1
length (3,15 ≤ L ≤ 40 mm)	ISO 17829	[%]	98,4	> 98,5* / >98	> 98,5* / >98
length (40 ≤ L ≤ 45 mm)	ISO 17829	[%]	0,9	≤ 1	≤ 1
length (> 45 mm)	ISO 17829	[amount]	0	0	0
diameter	ISO 17829	[mm]	6	6 or 8 ± 1	6 or 8 ± 1
heavy metals					
Chromium (db)	ISO 16968	[mg/kg]	< 1	≤ 10	≤ 10
Copper (db)	ISO 16968	[mg/kg]	< 1	≤ 10	≤ 10
Zinc (db)	ISO 16968	[mg/kg]	< 10	≤ 100	≤ 100
Lead (db)	ISO 16968	[mg/kg]	< 2	≤ 10	≤ 10
Mercury (db)	ISO 16968	[mg/kg]	< 0,05	≤ 0,1	≤ 0,1
Cadmium (db)	ISO 16968	[mg/kg]	< 0,2	≤ 0,5	≤ 0,5
Arsenic (db)	ISO 16968	[mg/kg]	< 1	≤ 1	≤ 1
Nickel (db)	ISO 16968	[mg/kg]	< 1	≤ 10	≤ 10
ash melting behaviour (ash preparation at 815°C)					
shrinking temperature SST	CEN/TS 15370-1	[°C]	1120	-	-
deformation temperature DT	CEN/TS 15370-1	[°C]	1250	≥ 1200	≥ 1200
hemisphere temperature HT	CEN/TS 15370-1	[°C]	1410	-	-
flow temperature FT	CEN/TS 15370-1	[°C]	1420	-	-

* for bags or sealed big bags

ar...as received

db...dry basis

7 SUMMARY

The pellet production of **Tunipellets SA** in Zriba (TUNISIA) is complying with all requirements of DIN*plus* certification system (version June 2015) and

EN*plus*, quality A1.



Deviations from 2014:

- ◆ None, initial inspection in 2015.

Type A and B non-conformities:

- ◆ None.

Type C non-conformities:

- ◆ The requirements concerning the labelling (especially the ID-number) will be met as soon as the certification process is finished. Bag label design will be send for approval to EPC.

Recommendations for improvements till next audit 2016:

- ◆ Installation of ash content measurement within the factory production control.

This inspection report no. **BEA2015177** comprises 7 pages and 0 appendix(es).

EPC-listed Auditor in Charge

