

EUROFINS Umwelt Ost GmbH · Niederlassung Freiberg  
Lindenstraße 11 · D-09627 Bobritzsch-Hilbersdorf

**Asociación Española de Valorización Energética de la Biomasa [AVEBIOM]  
c/ Panaderos 58, entreplanta  
47004 Valladolid  
SPANIEN**

Title: **Test report to order 11708047**  
Test report: **No. 1013581035**

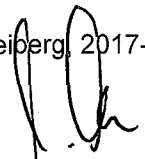
Project: **No. 1013581**  
Title of project: **full ENplus analysis**  
Number of samples: **1 sample**  
Sample type: **wood pellets**  
Sampler: **client**  
Receipt of samples: **2017-04-11**  
Test period: **2017-04-11 - 2017-04-25**

The test results refer solely to the analysed test specimen. Unless the sampling was done by our laboratory or in our sub-order the responsibility for the correctness of the sampling is disclaimed. This test report is only valid with signature and may only be further published completely and unchanged. Extracts or changes require the authorisation of the EUROFINS UMWELT in each individual case.

Our General Terms & Conditions of Sale (GTCS) are applicable, as far as no specific agreements do exist.  
The GTCS are available on <http://www.eurofins.de/umwelt/avb.aspx>.

Accredited test laboratory according to DIN EN ISO/IEC 17025 notification under the DAkkS German Accreditation System for Testing. The accreditation shall apply for the tests listed in the certificate.

Freiberg, 2017-04-26

  
Hr. Dr. U. Erler  
Prüfleitung  
03731 / 20 76 - 510

Niederlassung Freiberg  
Lindenstraße 11  
D-09627 Bobritzsch-Hilbersdorf  
Tel. +49 (0) 3731 2076 500  
Fax +49 (0) 3731 2076 555  
[info\\_freiberg@eurofins.de](mailto:info_freiberg@eurofins.de)

Hauptsitz:  
Löbstedter Straße 78  
D-07749 Jena  
[info\\_jena@eurofins.de](mailto:info_jena@eurofins.de)  
[www.eurofins-umwelt-ost.de](http://www.eurofins-umwelt-ost.de)



Geschäftsführer:  
Dr. Heinrich Ruholl, Dr. Benno Schneider,  
Axel Ulbricht  
Amtsgericht Jena HRB 202596  
USt.-ID.Nr.: DE 151 28 1997



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# Test report to order 11708047

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Project: full ENplus analysis

Analysis according to EN plus edition august 2015

Parameter	Unit	LOQ	limits			Sample designation	AVEBIOM-150 Pellets Asturias
			EN Plus-A1	EN Plus-A2	EN Plus-B	Lab-ID#	117029140
						Method	

## Quality characteristics

diameter, D	mm ar		6±1 or 8±1	6±1 or 8±1	6±1 or 8±1	DIN EN ISO 17829 (FR-JE02)	6,1
length, L	mm ar		3,15 ≤ L ≤ 40	3,15 ≤ L ≤ 40	3,15 ≤ L ≤ 40	DIN EN ISO 17829 (FR-JE02)	according
water content, M	% w/w ar		≤ 10	≤ 10	≤ 10	DIN EN ISO 18134-2 (FR-JE02)	6,0
ash content, A (550°C)	% w/w db	0,1	≤ 0,7	≤ 1,2	≤ 2,0	DIN EN ISO 18122 (FR-JE02)	0,43
mechanical durability, DU	% w/w ar		≥ 98,0	≥ 97,5	≥ 97,5	DIN EN ISO 17831-1 (FR-JE02)	99,0
fine portion, F (< 3,15 mm)	% w/w ar	0,1	≤ 1,0 <sup>1</sup> or ≤ 0,5 <sup>2</sup>	≤ 1,0 <sup>1</sup> or ≤ 0,5 <sup>2</sup>	≤ 1,0 <sup>1</sup> or ≤ 0,5 <sup>2</sup>	DIN EN ISO 18846 (FR-JE02)	0,4
bulk density, BD	kg/m <sup>3</sup> ar		600 ≤ BD ≤ 750	600 ≤ BD ≤ 750	600 ≤ BD ≤ 750	DIN EN ISO 17828 (FR-JE02)	660
net calorific value, Q (H u,p)	MJ/kg ar	0,2	≥ 16,5	≥ 16,5	≥ 16,5	DIN EN ISO 18125 (FR-JE02)	18,30
nitrogen total, N	% w/w db	0,05	≤ 0,3	≤ 0,5	≤ 1,0	DIN EN ISO 16948 (FR-JE02)	< 0,05
sulfur total, S	% w/w db	0,005	≤ 0,04	≤ 0,05	≤ 0,05	DIN EN ISO 16994 (FR-JE02)	0,006
chlorine total, Cl	% w/w db	0,005	≤ 0,02	≤ 0,02	≤ 0,03	DIN EN ISO 16994 (FR-JE02)	< 0,005

## Determination of minor elements

arsenic, As	mg/kg db	0,8	≤ 1	≤ 1	≤ 1	DIN EN ISO 16968 (FR-JE02)	< 0,8
lead, Pb	mg/kg db	2	≤ 10	≤ 10	≤ 10	DIN EN ISO 16968 (FR-JE02)	< 2
cadmium, Cd	mg/kg db	0,2	≤ 0,5	≤ 0,5	≤ 0,5	DIN EN ISO 16968 (FR-JE02)	< 0,2
chromium total, Cr	mg/kg db	1	≤ 10	≤ 10	≤ 10	DIN EN ISO 16968 (FR-JE02)	< 1
copper, Cu	mg/kg db	1	≤ 10	≤ 10	≤ 10	DIN EN ISO 16968 (FR-JE02)	2
nickel, Ni	mg/kg db	1	≤ 10	≤ 10	≤ 10	DIN EN ISO 16968 (FR-JE02)	< 1
mercury, Hg	mg/kg db	0,05	≤ 0,1	≤ 0,1	≤ 0,1	DIN EN ISO 16968 (FR-JE02)	< 0,05
zinc, Zn	mg/kg db	1	≤ 100	≤ 100	≤ 100	DIN EN ISO 16968 (FR-JE02)	10

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Project: full ENplus analysis

Analysis according to EN plus edition august 2015

Parameter	Unit	LOQ	limits			Sample designation	AVEBIOM-150 Pellets Asturias
			EN Plus-A1	EN Plus-A2	EN Plus-B	Lab-ID#	117029140
						Method	

## Ash melting behaviour (oxidizing atmosphere) on ash 815°C

shrinkage start temperature, SST	°C		can be given	can be given	can be given	DIN CEN/TS 15370-1 (FR-JE02)	1000
deformation temperature, DT	°C		≥ 1200	≥ 1100	≥ 1100	DIN CEN/TS 15370-1 (FR-JE02)	1300
hemisphere temperature, HT	°C		can be given	can be given	can be given	DIN CEN/TS 15370-1 (FR-JE02)	1390*
flow temperature, FT	°C		can be given	can be given	can be given	DIN CEN/TS 15370-1 (FR-JE02)	1430

comment:

additive: (limits: ≤ 1,8 % w/w during production + 0,2 % w/w after production - sort and amount must be specified)

Information given by the customer: no information

length: up to 1 % of pellets can be longer than 40mm. Maximum length for pellets is 45mm.

fine portion: 1) at the end of production or by loading vehicles for delivery to the customer  
2) for filling in pellet bags or big bags

mechanical durability: by loading for transport (vehicle, ship) after production

Hu,p: net calorific value at constant pressure

ar: as received

db: dry basis

\*: no definite hemisphere (hill-like form)

EUROFINS UMWELT is not liable for accuracy of the cited limits.

## Explanations on Locations and Accreditations

The parameters identified by FR have been performed by the laboratory EUROFINS Umwelt Ost GmbH (Bobritzsch-Hilbersdorf). The accreditation code JE02 identifies the parameters accredited according to DIN EN ISO/IEC 17025:2005 D-PL-14081-01-00.