

Eurofins Umwelt Ost GmbH - Lindenstraße 11
Gewerbegebiet Freiberg Ost - D-09627 - Bobritzsch-Hilbersdorf

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

Title : **Test report for order 11800143**

Test report number : **AR-18-FR-000587-01**

Project name : **ENplus analysis**

Number of samples : **1**

Sample type : **wood pellets**

Sample Taker: **Client**

Sample reception date : **2018-01-02**

Sample processing time : **2018-01-02 - 2018-01-12**

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.

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Accredited test laboratory according to DIN EN ISO/IEC 17025 notification under the DAkkS German Accreditation System for Testing. The laboratory is according (D-PL-14081-01-00) accredited.

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Digitally signed 12.01.2018

Dr. Ulrich Erler
Prüfleitung



| Parameter | Lab | Accr. | Method | Limit values | | | | | | Description | | AVEBIOM 193 NATURPELLET | |
|---|-----|-------|---------------------------------|---------------------|-----------------|---------------------|-----------------|---------------------|----------------|---------------|-------------------|----------------------------|--------|
| | | | | ENplus A1 ar | ENplus A1 db | ENplus A2 ar | ENplus A2 db | ENplus B ar | ENplus B db | Sample number | | 118000628 | |
| | | | | LOQ | Unit | ar | db | | | | | | |
| Quality characteristics | | | | | | | | | | | | | |
| Length | FR | | DIN EN ISO 17829 | | | | | | | | | according | - |
| Diameter | FR | | DIN EN ISO 17829 | 1) | | 1) | | 1) | | | mm | 6,0 | - |
| Moisture | FR | JE02 | DIN EN ISO 18134-2 | 10 | | 10 | | 10 | | 0,1 | % (w/w) | 5,7 | - |
| Ash content (550°C) | FR | JE02 | DIN EN ISO 18122 | | 0,7 | | 1,2 | | 2 | 0,1 | % (w/w) | 0,5 | 0,5 |
| Durability | FR | JE02 | DIN EN ISO 17831-1 | ≥ 98 | | ≥ 97,5 | | ≥ 97,5 | | | % (w/w) | 99,1 | - |
| Fine portion < 3,15 mm | FR | JE02 | DIN EN ISO 18846 | 1 ²⁾ | | 1 ²⁾ | | 1 ²⁾ | | 0,1 | % (w/w) | 0,2 | - |
| Bulk density | FR | JE02 | DIN EN ISO 17828 | | | | | | | | kg/m ³ | 678 | - |
| Gross calorific value (qV,gr) | FR | JE02 | DIN EN ISO 18125 | | | | | | | 200 | kJ/kg | 19600 | 20800 |
| Net calorific value (qp,net) | FR | JE02 | berechnet nach DIN EN ISO 18125 | ≥ 4,6 ³⁾ | | ≥ 4,6 ³⁾ | | ≥ 4,6 ³⁾ | | 0,06 | kWh/kg | 5,06 | 5,41 |
| Carbon | FR | JE02 | DIN EN ISO 16948 | | | | | | | 0,2 | % (w/w) | 48,4 | 51,3 |
| Nitrogen | FR | JE02 | DIN EN ISO 16948 | | 0,3 | | 0,5 | | 1 | 0,05 | % (w/w) | < 0,05 | < 0,05 |
| Hydrogen | FR | JE02 | DIN EN ISO 16948 | | | | | | | 0,1 | % (w/w) | 5,7 | 6,0 |
| Oxygen | FR | JE02 | DIN EN ISO 16993, berechnet | | | | | | | | % (w/w) | 39,8 | 42,1 |
| Sulphur | FR | JE02 | DIN EN ISO 16994 | | 0,04 | | 0,05 | | 0,05 | 0,005 | % (w/w) | 0,029 | 0,031 |
| Chlorine | FR | JE02 | DIN EN ISO 16994 | | 0,02 | | 0,02 | | 0,03 | 0,005 | % (w/w) | 0,018 | 0,019 |
| Minor elements acc. DIN EN ISO 16968 | | | | | | | | | | | | | |
| Arsenic (As) | FR | JE02 | DIN EN ISO 17294-2 | | 1 | | 1 | | 1 | 0,8 | mg/kg | - | < 0,8 |
| Lead (Pb) | FR | JE02 | DIN EN ISO 17294-2 | | 10 | | 10 | | 10 | 2 | mg/kg | - | < 2 |
| Cadmium (Cd) | FR | JE02 | DIN EN ISO 17294-2 | | 0,5 | | 0,5 | | 0,5 | 0,2 | mg/kg | - | < 0,2 |
| Chromium (Cr) | FR | JE02 | DIN EN ISO 17294-2 | | 10 | | 10 | | 10 | 1 | mg/kg | - | < 1 |
| Copper (Cu) | FR | JE02 | DIN EN ISO 17294-2 | | 10 | | 10 | | 10 | 1 | mg/kg | - | < 1 |
| Nickel (Ni) | FR | JE02 | DIN EN ISO 17294-2 | | 10 | | 10 | | 10 | 1 | mg/kg | - | < 1 |
| Mercury (Hg) | FR | JE02 | DIN EN ISO 12846 | | 0,1 | | 0,1 | | 0,1 | 0,05 | mg/kg | - | < 0,05 |
| Zinc (Zn) | FR | JE02 | DIN EN ISO 17294-2 | | 100 | | 100 | | 100 | 1 | mg/kg | - | 7 |

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|--|-----|-------|-----------------------|-----------------|-----------------|-----------------|-----------------|----------------|----------------|---------------|------|----------------------------|--------|
| | | | | ENplus A1 ar | ENplus A1 db | ENplus A2 ar | ENplus A2 db | ENplus B ar | ENplus B db | Sample number | | 118000628 | |
| | | | | | | | | | | LOQ | Unit | ar | db |
| Ash melting behaviour (ox. atmo.) 815°C | | | | | | | | | | | | | |
| Shrinkage start temp SST | FR | JE02 | analog CEN/TS 15370-1 | | 4) | | 4) | | 4) | | °C | - | 1000 |
| Deformation temp DT | FR | JE02 | analog CEN/TS 15370-1 | | ≥ 1200 | | ≥ 1100 | | ≥ 1100 | | °C | - | > 1500 |
| Hemisphere temp HT | FR | JE02 | analog CEN/TS 15370-1 | | 4) | | 4) | | 4) | | °C | - | > 1500 |
| Flow temp FT | FR | JE02 | analog CEN/TS 15370-1 | | 4) | | 4) | | 4) | | °C | - | > 1500 |

Explanations

LOQ - Limit of quantification

ar - as received

db - dry basis

Lab - Abbreviation of the performing laboratory

Accr. - Abbreviation of the accreditation of the performing laboratory

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 .

Explanations regarding Limits

Analysis performed according to EN plus (wood pellets) - edition August 2015.

¹⁾ D06 or D08 pellets +/- 1mm

²⁾ at the end of production or by loading vehicles for delivery to the customer (<=0,5 for filling in pellet bags or big bags)

³⁾ qp,net: net calorific value at constant pressure

⁴⁾ should be given

EUROFINS UMWELT assumes no responsibility for the legal liability of the cited limits.