

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

Eurofins Environment Testing Norway AS
Møllebakken 50
N-1538 Moss
NORWAY

Title : **Test report for order 12101867**
Test report number : **AR-21-FR-003190-01**

Project name : **EUNOMO00059617**
Client Reference Code: **EUNOMO-00283969**

Number of samples : **1**
Sample type: **coal**
Sample Taker: **Client**

Sample reception date : **2021-01-22**
Sample processing time : **2021-01-22 - 2021-02-04**

The test results solely refer 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 was generated automatically and is valid without signature. Proliferation may only be 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 17025:2018 DAkkS notification under the DAkkS German Accreditation System for Testing. The laboratory is according (D-PL-14081-01-00) accredited.

Bobritzsch-Hilbersdorf, 2021-02-04
If you have questions, please contact:
Sandro Kuttig
Phone +49 37312076531



| | |
|---------------------------|--------------------------|
| Description | Biokull |
| Customer Reference | 439-2021-01190582 |
| Sample number | 121006790 |

| Parameter | Lab | Accr. | Method | LOQ | Unit | |
|-----------|-----|-------|--------|-----|------|--|
|-----------|-----|-------|--------|-----|------|--|

Physico-chemical parameters from the original substance

| | | | | | | |
|--------------------------------------|--------|----------|---|-----|-------------------|--------------|
| Bulk density < 3 mm | FR | | in Anlehnung an VDLUFA-Methode A 13.2.1 | | kg/m ³ | 97 |
| specific surface (BET) | SND2/o | | DIN ISO 9277 | | m ² /g | 412.92 |
| Moisture | FR | RE000 FY | DIN 51718: 2002-06 | 0.1 | % (w/w) | 0.6 |
| pH in CaCl2 | FR | | DIN ISO 10390: 2005-12 | | | 9.7 |
| Conductivity | FR | | BGK III. C2: 2006-09 | 5 | μS/cm | 585 |
| Thermogravimetry TGA 950°C by N-Atm. | FR | | TGA 701 D4C | | | siehe Anlage |

Inorganic sum parameters from the original substance

| | | | | | | |
|------------------------------|----|----------|----------------------|-------|---------|-------|
| Total inorganic carbon (TIC) | FR | RE000 FY | DIN 51726: 2004-06 | 0.1 | % (w/w) | 0.2 |
| Total inorganic carbon (TIC) | FR | RE000 FY | DIN 51726: 2004-06 | 0.1 | % (w/w) | 0.2 |
| carbonate-CO2 | FR | RE000 FY | DIN 51726: 2004-06 | 0.4 | % (w/w) | 0.9 |
| carbonate-CO2 | FR | RE000 FY | DIN 51726: 2004-06 | 0.4 | % (w/w) | 0.9 |
| Ash content (550°C) | FR | RE000 FY | DIN 51719: 1997-07 | 0.1 | % (w/w) | 3.2 |
| Ash content (550°C) | FR | RE000 FY | DIN 51719: 1997-07 | 0.1 | % (w/w) | 3.2 |
| salt content | FR | | BGK III. C2: 2006-09 | 0.005 | g/kg | 3.09 |
| salt content | FR | | BGK III. C2: 2006-09 | 0.005 | g/l | 0.299 |

Elements from the original substance

| | | | | | | |
|----------------------|----|----------|----------------------|------|---------|--------|
| Carbon | FR | RE000 FY | DIN 51732: 2014-07 | 0.2 | % (w/w) | 94.2 |
| Carbon | FR | RE000 FY | DIN 51732: 2014-07 | 0.2 | % (w/w) | 94.8 |
| Hydrogen | FR | RE000 FY | DIN 51732: 2014-07 | 0.1 | % (w/w) | 0.7 |
| Hydrogen | FR | RE000 FY | DIN 51732: 2014-07 | 0.1 | % (w/w) | 0.7 |
| Total nitrogen | FR | RE000 FY | DIN 51732: 2014-07 | 0.05 | % (w/w) | 0.44 |
| Total nitrogen | FR | RE000 FY | DIN 51732: 2014-07 | 0.05 | % (w/w) | 0.45 |
| Sulphur (S), total | FR | RE000 FY | DIN 51724-3: 2012-07 | 0.03 | % (w/w) | < 0.03 |
| Sulphur (S), total | FR | RE000 FY | DIN 51724-3: 2012-07 | 0.03 | % (w/w) | < 0.03 |
| Oxygen | FR | RE000 FY | DIN 51733: 2016-04 | | % (w/w) | 1.8 |
| Oxygen | FR | RE000 FY | DIN 51733: 2016-04 | | % (w/w) | 1.8 |
| H/C ratio (molar) | FR | RE000 FY | berechnet | | | 0.09 |
| H/Corg ratio (molar) | FR | RE000 FY | berechnet | | | 0.09 |
| O/C ratio (molar) | FR | RE000 FY | berechnet | | | 0.014 |
| H/C ratio (molar) | FR | RE000 FY | berechnet | | | 0.09 |
| H/Corg ratio (molar) | FR | RE000 FY | berechnet | | | 0.09 |
| O/C ratio (molar) | FR | RE000 FY | berechnet | | | 0.014 |

| | |
|---------------------------|--------------------------|
| Description | Biokull |
| Customer Reference | 439-2021-01190582 |
| Sample number | 121006790 |

| Parameter | Lab | Accr. | Method | LOQ | Unit | |
|-----------|-----|-------|--------|-----|------|--|
|-----------|-----|-------|--------|-----|------|--|

Elements from the micro wave pressure digestion acc. to DIN 22022-1: 2014-07

| | | | | | | |
|----------------|----|-------------|--------------------------------------|------|-------|--------|
| Arsenic (As) | FR | RE000 FY | DIN EN ISO 17294-2 (E29): 2017-01 | 0.8 | mg/kg | < 0.8 |
| Lead (Pb) | FR | RE000 FY | DIN EN ISO 17294-2 (E29): 2017-01 | 2 | mg/kg | < 2 |
| Boron (B) | FR | RE000 FY | DIN EN ISO 17294-2 (E29): 2017-01 | 1 | mg/kg | 14 |
| Cadmium (Cd) | FR | RE000 FY | DIN EN ISO 17294-2 (E29): 2017-01 | 0.2 | mg/kg | < 0.2 |
| Chromium (Cr) | FR | RE000 FY | DIN EN ISO 17294-2 (E29): 2017-01 | 1 | mg/kg | 2 |
| Copper (Cu) | FR | RE000 FY | DIN EN ISO 17294-2 (E29): 2017-01 | 1 | mg/kg | 8 |
| Manganese (Mn) | FR | RE000 FY | DIN EN ISO 17294-2 (E29): 2017-01 | 1 | mg/kg | 540 |
| Nickel (Ni) | FR | RE000 FY | DIN EN ISO 17294-2 (E29): 2017-01 | 1 | mg/kg | 4 |
| Mercury (Hg) | FR | RE000 FY | DIN 22022-4: 2001-02 | 0.07 | mg/kg | < 0.07 |
| Zinc (Zn) | FR | RE000 FY | DIN EN ISO 17294-2 (E29): 2017-01 | 1 | mg/kg | 23 |

Elements fr. the borate dig. of ash 550°C acc. to DIN 51729-11: 1998-11 rel. ash

| | | | | | | |
|---|----|-------------|------------------------------------|-----|---------|------|
| Calcium as CaO | FR | RE000 FY | DIN EN ISO 11885 (E22): 2009-09 | 0.1 | % (w/w) | 34.4 |
| Iron as Fe ₂ O ₃ | FR | RE000 FY | DIN EN ISO 11885 (E22): 2009-09 | 0.1 | % (w/w) | 1.0 |
| Potassium as K ₂ O | FR | RE000 FY | DIN EN ISO 11885 (E22): 2009-09 | 0.1 | % (w/w) | 14.1 |
| Magnesium as MgO | FR | RE000 FY | DIN EN ISO 11885 (E22): 2009-09 | 0.1 | % (w/w) | 4.9 |
| Sodium as Na ₂ O | FR | RE000 FY | DIN EN ISO 11885 (E22): 2009-09 | 0.1 | % (w/w) | 1.3 |
| Phosphorus as P ₂ O ₅ | FR | RE000 FY | DIN EN ISO 11885 (E22): 2009-09 | 0.1 | % (w/w) | 2.8 |
| sulphur as SO ₃ | FR | RE000 FY | DIN EN ISO 11885 (E22): 2009-09 | 0.1 | % (w/w) | 1.1 |
| Silicon as SiO ₂ | FR | RE000 FY | DIN EN ISO 11885 (E22): 2009-09 | 0.1 | % (w/w) | 6.0 |

Elements fr. the borate digestion of ash 550°C acc. to DIN 51729-11:1998-11 (OS)

| | | | | | | |
|----------------|----|-------------|------------------------------------|-----|---------|-------|
| Calcium (Ca) | FR | RE000 FY | DIN EN ISO 11885 (E22): 2009-09 | 0.1 | % (w/w) | 0.8 |
| Iron (Fe) | FR | RE000 FY | DIN EN ISO 11885 (E22): 2009-09 | 0.1 | % (w/w) | < 0.1 |
| Potassium (K) | FR | RE000 FY | DIN EN ISO 11885 (E22): 2009-09 | 0.1 | % (w/w) | 0.4 |
| Magnesium (Mg) | FR | RE000 FY | DIN EN ISO 11885 (E22): 2009-09 | 0.1 | % (w/w) | < 0.1 |
| Sodium (Na) | FR | RE000 FY | DIN EN ISO 11885 (E22): 2009-09 | 0.1 | % (w/w) | < 0.1 |
| Phosphorus | FR | RE000 FY | DIN EN ISO 11885 (E22): 2009-09 | 0.1 | % (w/w) | < 0.1 |
| Sulphur (S) | FR | RE000 FY | DIN EN ISO 11885 (E22): 2009-09 | 0.1 | % (w/w) | < 0.1 |
| Silicon (Si) | FR | RE000 FY | DIN EN ISO 11885 (E22): 2009-09 | 0.1 | % (w/w) | < 0.1 |

Organic sum parameters from the original substance

| | | | | | | |
|------------------|----|-------------|-----------|--|---------|------|
| carbon (organic) | FR | RE000 FY | berechnet | | % (w/w) | 94.0 |
| carbon (organic) | FR | RE000 FY | berechnet | | % (w/w) | 94.6 |

| | |
|---------------------------|--------------------------|
| Description | Biokull |
| Customer Reference | 439-2021-01190582 |
| Sample number | 121006790 |

| Parameter | Lab | Accr. | Method | LOQ | Unit | |
|---|-----|-------------|----------------------|-----|-------|-------|
| PAH from the original substance after toluene extraction | | | | | | |
| Naphthalene | FR | RE000 FY | DIN EN 16181:2019-08 | 0.1 | mg/kg | 3.6 |
| Acenaphthylene | FR | RE000 FY | DIN EN 16181:2019-08 | 0.1 | mg/kg | 0.1 |
| Acenaphthene | FR | RE000 FY | DIN EN 16181:2019-08 | 0.1 | mg/kg | < 0.1 |
| Fluorene | FR | RE000 FY | DIN EN 16181:2019-08 | 0.1 | mg/kg | < 0.1 |
| Phenanthrene | FR | RE000 FY | DIN EN 16181:2019-08 | 0.1 | mg/kg | 0.8 |
| Anthracene | FR | RE000 FY | DIN EN 16181:2019-08 | 0.1 | mg/kg | 0.1 |
| Fluoranthene | FR | RE000 FY | DIN EN 16181:2019-08 | 0.1 | mg/kg | 0.3 |
| Pyrene | FR | RE000 FY | DIN EN 16181:2019-08 | 0.1 | mg/kg | 0.3 |
| Benz(a)anthracene | FR | RE000 FY | DIN EN 16181:2019-08 | 0.1 | mg/kg | < 0.1 |
| Chrysene | FR | RE000 FY | DIN EN 16181:2019-08 | 0.1 | mg/kg | 0.1 |
| Benzo(b)fluoranthene | FR | RE000 FY | DIN EN 16181:2019-08 | 0.1 | mg/kg | 0.1 |
| Benzo(k)fluoranthene | FR | RE000 FY | DIN EN 16181:2019-08 | 0.1 | mg/kg | < 0.1 |
| Benzo(a)pyrene | FR | RE000 FY | DIN EN 16181:2019-08 | 0.1 | mg/kg | 0.1 |
| Indeno(1,2,3-cd)pyrene | FR | RE000 FY | DIN EN 16181:2019-08 | 0.1 | mg/kg | < 0.1 |
| Dibenz(a,h)anthracene | FR | RE000 FY | DIN EN 16181:2019-08 | 0.1 | mg/kg | < 0.1 |
| Benzo(g,h,i)perylene | FR | RE000 FY | DIN EN 16181:2019-08 | 0.1 | mg/kg | < 0.1 |
| Total 16 EPA-PAH excl. LOQ | FR | RE000 FY | DIN EN 16181:2019-08 | | mg/kg | 5.5 |

Explanations

LOQ - Limit of quantification

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 RE000FY identifies the parameters accredited according to DIN EN ISO/IEC 17025:2018 DAkKS D-PL-14081-01-00 .

The parameters identified by SND2 have been performed by the laboratory Ruhr Lab GmbH (Gelsenkirchen).

/o - The analysis has been outsourced.