

# TEST REPORT

## BEA2023407K



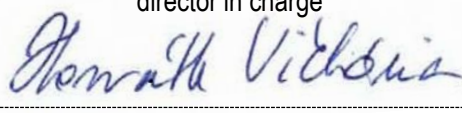

This report replaces the test report BEA2023407b from 2024-01-24.

|                        |   |   |
|------------------------|---|---|
| <b>Date of report:</b> | 2024-01-25  |   |
| <b>Client:</b>         | TAT-COM d.o.o.  |   |
| <b>Address:</b>        | Sitneši 53 <sup>a</sup> , 78 420 Srbac, BOSNIA AND HERZEGOVINA  |   |
| <b>Order:</b>          | Fuel testing according ENplus® certification program of wood pellets ENplus® ST.1001:2022   |   |
| <b>Order date:</b>     | 2023-10-24  | <b>Receipt of samples:</b> 2023-11-06; 2024-01-17 |
| <b>Sample(s):</b>      | Wood pellets  | <b>Testing period:</b> 2023-11-06 – 2024-01-24    |
| <b>Sample details:</b> | <b>15 kg pellets in plastic bag class A2, internal sample no.: BEA2023407; 15 kg pellets in plastic bag class A1; internal sample no.: BEA2023407-3</b> |   |

| BEA2023407<br>parameter ENplus®            | limit values A1 | limit values A2 | result<br>class A1 | unit                   |
|--|-----------------|-----------------|--------------------|------------------------|
| diameter                                   | 6 ± 1, 8 ± 1    | 6 ± 1, 8 ± 1    | 6,0                | mm (ar)                |
| length (3,15 ≤ L ≤ 40 mm)                  | (3,15 ≤ L ≤ 40) | (3,15 ≤ L ≤ 40) | 19,5 ± 6,7         | mm (ar)                |
| length (40 ≤ L ≤ 45 mm)*                   | ≤ 1             | ≤ 1             | 0,0                | % in mass (ar)         |
| length (> 45 mm)*                          | 0               | 0               | 0                  | piece(s)               |
| share of pellets with a length < 10mm      | -               | -               | 2,7                | % in mass (ar)         |
| category L < 20%, 20% ≤ M ≤ 30%, S > 30%   | -               | -               | L                  | -                      |
| amount of pellets for length determination | ≥ 100           | ≥ 100           | 888                | piece(s)               |
| moisture content                           | ≤ 10,0          | ≤ 10,0          | 4,9                | % in mass (ar)         |
| ash content*                               | ≤ 0,70          | ≤ 1,20          | 0,49               | % in mass (db)         |
| mechanical durability                      | ≥ 98,0          | ≥ 97,5          | 99,2               | % in mass (ar)         |
| bulk density                               | 600 ≤ BD ≤ 750  | 600 ≤ BD ≤ 750  | 680                | kg/m <sup>3</sup> (ar) |
| particle density                           | -               | -               | 1,29               | g/cm <sup>3</sup> (ar) |
| coarse fines (3,15 ≤ CPF < 5,6 mm)         | -               | -               | 0,0                | % in mass              |
| fines content (< 3,15 mm), bulk            | ≤ 1             | ≤ 1             | -                  | % in mass (ar)         |
| fines content (< 3,15 mm), bags            | ≤ 0,5           | ≤ 0,5           | 0,1                | % in mass (ar)         |
| net calorific value q <sub>P,net</sub>     | ≥ 16,5          | ≥ 16,5          | 17,2               | MJ/kg (ar)             |
| net calorific value q <sub>P,net</sub>     | ≥ 4,6           | ≥ 4,6           | 4,77               | kWh/kg (ar)            |
| net calorific value q <sub>P,net</sub>     | -               | -               | 18,2               | MJ/kg (db)             |
| net calorific value q <sub>P,net</sub>     | -               | -               | 5,05               | kWh/kg (db)            |
| gross calorific value q <sub>V,gr</sub>    | -               | -               | 18,6               | MJ/kg (ar)             |
| gross calorific value q <sub>V,gr</sub>    | -               | -               | 5,17               | kWh/kg (ar)            |
| nitrogen content                           | ≤ 0,3           | ≤ 0,5           | 0,12               | % in mass (db)         |
| sulphur content                            | ≤ 0,04          | ≤ 0,04          | 0,011              | % in mass (db)         |
| chlorine content                           | ≤ 0,02          | ≤ 0,02          | < 0,005            | % in mass (db)         |
| arsenic                                    | ≤ 1             | ≤ 1             | < 0,5              | mg/kg (db)             |
| cadmium                                    | ≤ 0,5           | ≤ 0,5           | < 0,1              | mg/kg (db)             |
| chromium                                   | ≤ 10            | ≤ 10            | < 1                | mg/kg (db)             |
| copper                                     | ≤ 10            | ≤ 10            | 1,6                | mg/kg (db)             |
| lead                                       | ≤ 10            | ≤ 10            | < 0,5              | mg/kg (db)             |
| mercury                                    | ≤ 0,1           | ≤ 0,1           | < 0,075            | mg/kg (db)             |
| nickel                                     | ≤ 10            | ≤ 10            | < 1                | mg/kg (db)             |
| zinc                                       | ≤ 100           | ≤ 100           | < 5                | mg/kg (db)             |
| shrinking temperature SST                  | -               | -               | 1050               | °C                     |
| deformation temperature DT                 | ≥ 1200          | ≥ 1100          | 1500               | °C                     |
| hemisphere temperature HT                  | -               | -               | < 1550             | °C                     |
| flow temperature FT                        | -               | -               | < 1550             | °C                     |

db... dry basis, ar... as received, \*... tested on resample no. BEA2023407-3 received 2024-01-17

The test results apply only to the samples investigated. As a rule, they are not the only criteria for assessing the raw material or product in question and its suitability for a specific purpose of application. Test Reports may only be made available to third parties, either free of charge or against payment, if the full wording is given and if the author is expressly named. Unless otherwise indicated, at client's request neither the measurement uncertainty was stated, nor were decision rules agreed. The General Terms and Conditions of BEA Institut für Bioenergie GmbH shall apply as amended.

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|---|--|---|
|   | director in charge<br> |  |
|   | Dr. Viktoria Horvath   |   |

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| <b>Sample details:</b> | <b>15 kg pellets in plastic bag class A2, internal sample no.: BEA2023407;</b> 15 kg pellets in plastic bag class A1;<br>internal sample no.: BEA2023407-3 |   |

### testing methods



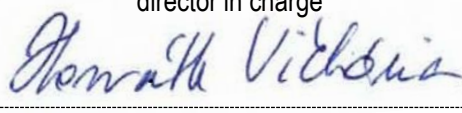

### standard

|  |  |
|--|--|
| sample preparation                         | ISO 14780:2020   |
| diameter and length                        | ISO 17829:2015   |
| moisture content                           | ISO 18134-2:2017   |
| ash content                                | ISO 18122:2023, performed with proximate analyzer              |
| mechanical durability                      | ISO 17831-1:2015   |
| finer content < 3,15 mm                    | ISO 18846:2016   |
| net calorific value /gross calorific value | ISO 18125:2017   |
| bulk density                               | ISO 17828:2015   |
| carbon, hydrogen, nitrogen content         | ISO 16948:2015   |
| chlorine, sulphur content                  | ISO 16994:2016, quantification according to ISO 10304-1:2007   |
| minor elements                             | ISO 16968:2015, quantification according to ISO 17294-2:2016   |
| ash melting behaviour                      | ISO 21404:2020, ash preparation at 815°C, oxidizing atmosphere |
| coarse pellets fines 3,15 < CPF < 5,6 mm   | ISO 18846:2016: / ISO 5370:2023 non accredited method          |
| particle density                           | ISO 18847:2017   |

### remarks

none

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| <br>Akkreditierung Austria<br>0388<br>ISO/IEC 17025 T | <br>ilac | director in charge<br><br>Dr. Viktoria Horvath | <br>Institut für Bioenergie GmbH<br>Ingenieurbüro für technische Chemie |
|--|---|--|--|



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