# TEST REPORT
# BEA2024063

Institut für Bioenergie



**Date of report:** 2024-07-10

**Client:** Kurzemes granulas SIA

**Address:** 22 Kustes dambis, LV 3601 Ventspils, LATVIA

**Order:** Fuel testing according EN*plus*® certification program of wood pellets EN*plus*® ST.1001:2022

**Order date:** 2024-04-22 **Receipt of samples:** 2024-06-14

**Sample(s):** Wood pellets **Testing period:** 2024-06-14 – 2024-07-10

**Sample details:** 2 kg pellets class A1 in plastic bag signed with internal sample no.: BEA2024063-1 and 2 kg pellets class A2 in plastic bag signed with internal sample no: BEA2024063-2

| **BEA2024063** | | | **-1** | **-2** | |
|---|---|---|---|---|---|
| parameter EN*plus* ® | limit values A1 | limit values A2 | **pellets A1** | **pellets A2** | unit |
| diameter* | 6 ± 1, 8 ± 1 | 6 ± 1, 8 ± 1 | **6,2** | **6,1** | mm (ar) |
| length (3,15 ≤ L ≥ 40 mm)* | (3,15 ≤ L ≤ 40) | (3,15 ≤ L ≤ 40) | **12,6 ± 5,2** | **12,1 ± 5,2** | mm (ar) |
| length (40 ≤ L ≤ 45 mm)* | ≤ 1 | ≤ 1 | **0,0** | **0,0** | % in mass (ar) |
| length ( > 45 mm)* | 0 | 0 | **0** | **0** | piece(s) |
| share of pellets with a length < 10mm* | - | - | **15,9** | **22,3** | % in mass (ar) |
| category L < 20%, 20%≤ M ≤ 30%, S > 30%* | - | - | **L** | **M** | - |
| moisture content* | ≤ 10,0 | ≤ 10,0 | **5,2** | **6,3** | % in mass (ar) |
| ash content* | ≤ 0,70 | ≤ 1,20 | **0,33** | **0,89** | % in mass (db) |
| mechanical durability* | ≥ 98,0 | ≥ 97,5 | **98,8** | **98,1** | % in mass (ar) |
| bulk density* | 600 ≤ BD ≤ 750 | 600 ≤ BD ≤ 750 | **680** | **680** | kg/m³ (ar) |
| particle density* | - | - | **1,31** | **1,31** | g/cm³ (ar) |
| coarse fines (3,15 ≤ CPF < 5,6 mm)* | - | - | **0,1** | **<0,1** | % in mass |
| fines content (< 3,15 mm), bulk* | ≤ 1 | ≤ 1 | **-** | **0,2** | % in mass (ar) |
| fines content (< 3,15 mm), bags* | ≤ 0,5 | ≤ 0,5 | **0,2** | **-** | % in mass (ar) |
| net calorific value $q_{P,net}$* | ≥ 16,5 | ≥ 16,5 | **18,1** | **17,5** | MJ/kg (ar) |
| net calorific value qP,net* | ≥ 4,6 | ≥ 4,6 | **5,02** | **4,87** | kWh/kg (ar) |
| net calorific value qP,net* | - | - | **19,2** | **18,9** | MJ/kg (db) |
| net calorific value qP,net* | - | - | **5,33** | **5,24** | kWh/kg (db) |
| gross calorific value $q_{V,gr}$* | - | - | **19,5** | **18,9** | MJ/kg (ar) |
| gross calorific value $q_{V,gr}$* | - | - | **5,41** | **5,26** | kWh/kg (ar) |
| nitrogen content* | ≤ 0,3 | ≤ 0,5 | **0,09** | **0,12** | % in mass (db) |
| sulphur content | ≤ 0,04 | ≤ 0,04 | **<0,005** | **0,007** | % in mass (db) |
| chlorine content | ≤ 0,02 | ≤ 0,02 | **<0,005** | **<0,005** | % in mass (db) |
| arsenic | ≤ 1 | ≤ 1 | **<0,5** | **<0,5** | mg/kg (db) |
| cadmium | ≤ 0,5 | ≤ 0,5 | **0,13** | **0,14** | mg/kg (db) |
| chromium | ≤ 10 | ≤ 10 | **<1** | **<1** | mg/kg (db) |
| copper | ≤ 10 | ≤ 10 | **<1** | **1,8** | mg/kg (db) |
| lead | ≤ 10 | ≤ 10 | **<0,5** | **<0,5** | mg/kg (db) |
| mercury | ≤ 0,1 | ≤ 0,1 | **<0,075** | **<0,075** | mg/kg (db) |
| nickel | ≤ 10 | ≤ 10 | **<1** | **<1** | mg/kg (db) |
| zinc | ≤ 100 | ≤ 100 | **8,5** | **20** | mg/kg (db) |
| shrinking temperature SST | - | - | **1110** | **1180** | °C |
| deformation temperature DT | ≥ 1200 | ≥ 1100 | **1450** | **1290** | °C |
| hemisphere temperature HT | - | - | **>1550** | **1350** | °C |
| flow temperature FT | - | - | **>1550** | **1360** | °C |

db… dry basis, ar… as received, *… in cooperation with accredited subcontractors within his scope



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director in charge

Eva Füssl-Föger

Institut für Bioenergie GmbH

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| | |
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| **testing methods** | **standard** |
|---|---|
| sample preparation | ISO 14780:2020 |
| diameter and length | ISO 17829:2015 |
| moisture content | ISO 18134-2:2017 |
| ash content | ISO 18122:2022 |
| mechanical durability | ISO 17831-1:2015 |
| fines content < 3,15 mm | ISO 5370:2023 |
| 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 17294-2:2023 |
| ash melting behaviour | ISO 21404:2020, ash preparation at 815°C, oxidizing atmosphere |
| coarse pellets fines 3,15 < CPF < 5,6 mm | ISO 5370:2023 |
| particle density | ISO 18847:2017 |

**remarks**

Subcontractor received 15,1 kg 6mm pellets in labeled bag EN*plus*® A1 from bagging line signed with internal sample no.: BEA2024063A and 10,2 kg pellets in plastic bag class EN*plus*® A2 from storage signed with internal sample no.: BEA2024063B.



director in charge

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