

# TEST REPORT

## BEA2023204

Date of report: 2023-06-23

page 1 of 2

Client: Sparrow d.o.o.

Address: Marina Marinovica 1, 37260 Varvarin, SERBIA

Order: Fuel testing according ENplus® certification program of wood pellets (version 3.0, August 2015)

Order date: 2023-05-22

Receipt of samples: 2023-06-03

Samples: Wood pellets




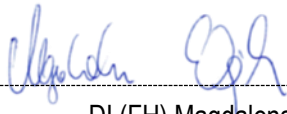
Testing period: 2023-06-03 – 2023-06-22

Sample details: 15kg pellets in plastic bag class A1 marked with the internal sample no. BEA2023204-1 and  
15kg pellets in plastic bag class A2 marked with the internal sample no. BEA2023204-2

BEA2023204 parameter ENplus®	limit values A1	limit values A2	result -1 A1 pellets	result -2 A2 pellets	unit
diameter	6 ± 1, 8 ± 1	6 ± 1, 8 ± 1	6	6	mm (ar)
length (3,15 ≤ L ≤ 40 mm)	(3,15 ≤ L ≤ 40)	(3,15 ≤ L ≤ 40)	14,5 ± 5,3	14,4 ± 5,9	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)
moisture content	≤ 10,0	≤ 10,0	5,8	5,9	%in mass (ar)
ash content	≤ 0,7	≤ 1,2	0,7	0,8	%in mass (db)
mechanical durability	≥ 98,0	≥ 97,5	98,5	98,9	%in mass (ar)
bulk density	600 ≤ BD ≤ 750	600 ≤ BD ≤ 750	670	670	kg/m <sup>3</sup> (ar)
finest content (< 3,15 mm), bulk	≤ 1	≤ 1	-	-	%in mass (ar)
finest content (< 3,15 mm), bags	≤ 0,5	≤ 0,5	0,2	0,2	%in mass (ar)
net calorific value q <sub>P,net</sub>	≥ 16,5	≥ 16,5	17,0	17,0	MJ/kg (ar)
net calorific value q <sub>P,net</sub>	≥ 4,6	≥ 4,6	4,74	4,72	kWh/kg (ar)
net calorific value q <sub>P,net</sub>	-	-	18,2	18,2	MJ/kg (db)
net calorific value q <sub>P,net</sub>	-	-	5,07	5,06	kWh/kg (db)
gross calorific value q <sub>V,gr</sub>	-	-	18,5	18,4	MJ/kg (ar)
gross calorific value q <sub>V,gr</sub>	-	-	5,14	5,12	kWh/kg (ar)
nitrogen content	≤ 0,3	≤ 0,5	0,10	0,09	%in mass (db)
sulphur content	≤ 0,04	≤ 0,04	0,011	0,008	%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	<0,1	<0,1	mg/kg (db)
chromium	≤ 10	≤ 10	<1	<1	mg/kg (db)
copper	≤ 10	≤ 10	1,1	1,3	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	< 5	< 5	mg/kg (db)
shrinking temperature SST	-	-	920	860	°C
deformation temperature DT	≥ 1200	≥ 1100	1500	1440	°C
hemisphere temperature HT	-	-	>1550	>1550	°C
flow temperature FT	-	-	>1550	>1550	°C

db... dry basis, ar... as received

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.

 	director in charge	
	 DI (FH) Magdalena Wojcik	

# TEST REPORT

## BEA2023204

<b>Date of report:</b>	2023-06-23	page 2 of 2
<b>Client:</b>	Sparrow d.o.o.	
<b>Address:</b>	Marina Marinovica 1, 37260 Varvarin, SERBIA	
<b>Order:</b>	Fuel testing according ENplus® certification program of wood pellets (version 3.0, August 2015)	
<b>Order date:</b>	2023-05-22	<b>Receipt of samples:</b> 2023-06-03
<b>Samples:</b>	Wood pellets	<b>Testing period:</b> 2023-06-03 – 2023-06-22
<b>Sample details:</b>	15kg pellets in plastic bag class A1 marked with the internal sample no. BEA2023204-1 and 15kg pellets in plastic bag class A2 marked with the internal sample no. BEA2023204-2	

### testing methods



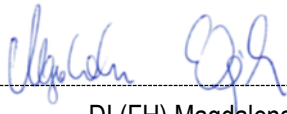

### standard

sample preparation	ISO 14780:2020
diameter and length	ISO 17829:2015
moisture content	ISO 18134-2:2017
ash content	ISO 18122:2015, performed with proximate analyzer
mechanical durability	ISO 17831-1:2015
finest 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

### remarks

none

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		director in charge  DI (FH) Magdalena Wojcik	
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