

TEST REPORT

BEA2024142-2

Date of report: 2025-01-03

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Client: Gamauf d.o.o.

Address: Kolodvorska 27, 34543 Poljana, CROATIA

Order: Fuel testing according ENplus® certification program of wood pellets ENplus® ST.1001:2022

Order date: 2024-08-20

Receipt of samples: 2024-12-09

Sample(s): Wood pellets "HR011"



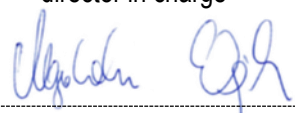

Testing period: 2024-12-09 – 2025-01-02

Sample details: 15kg pellets packed in A1 plastic bag and marked with internal sample no.: BEA2024142-3

parameter ENplus®	limit values A1	limit values A2	-3 result class A1	unit
diameter	6 ± 1, 8 ± 1	6 ± 1, 8 ± 1	6,1	mm (ar)
length (3,15 ≤ L ≤ 40 mm)	(3,15 ≤ L ≤ 40)	(3,15 ≤ L ≤ 40)	13,1 ± 4,8	mm (ar)
length (40 ≤ L ≤ 45 mm)	≤ 1	≤ 1	0	%in mass (ar)
length (> 45 mm)	0	0	0	piece(s)
share of pellets with a length < 10mm	-	-	17,4	%in mass (ar)
category L < 20% 20% ≤ M ≤ 30% S > 30%	-	-	L	-
amount of pellets for length determination	≥ 100	≥ 100	1 379	piece(s)
moisture content	≤ 10,0	≤ 10,0	8,1	%in mass (ar)
ash content	≤ 0,70	≤ 1,20	0,35	%in mass (db)
mechanical durability	≥ 98,0	≥ 97,5	99,0	%in mass (ar)
bulk density	600 ≤ BD ≤ 750	600 ≤ BD ≤ 750	650	kg/m ³ (ar)
particle density	-	-	1,27	g/cm ³ (ar)
coarse fines (3,15 ≤ CPF < 5,6 mm)	-	-	0,2	%in mass (ar)
fines content (< 3,15 mm), bulk	≤ 1	≤ 1	-	%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	17,3	MJ/kg (ar)
net calorific value q _{P,net}	≥ 4,6	≥ 4,6	4,80	kWh/kg (ar)
net calorific value q _{P,net}	-	-	19,0	MJ/kg (db)
net calorific value q _{P,net}	-	-	5,28	kWh/kg (db)
gross calorific value q _{v,gr}	-	-	18,8	MJ/kg (ar)
gross calorific value q _{v,gr}	-	-	5,22	kWh/kg (ar)
nitrogen content	≤ 0,3	≤ 0,5	0,05	%in mass (db)
sulphur content	≤ 0,04	≤ 0,04	<0,005	%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	0,20	mg/kg (db)
chromium	≤ 10	≤ 10	<1	mg/kg (db)
copper	≤ 10	≤ 10	<1	mg/kg (db)
lead	≤ 10	≤ 10	0,52	mg/kg (db)
mercury	≤ 0,1	≤ 0,1	<0,075	mg/kg (db)
nickel	≤ 10	≤ 10	<1	mg/kg (db)
zinc	≤ 100	≤ 100	10	mg/kg (db)
shrinking temperature SST	-	-	1060	°C
deformation temperature DT	≥ 1200	≥ 1100	1390	°C
hemisphere temperature HT	-	-	>1550	°C
flow temperature FT	-	-	>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	



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testing methods



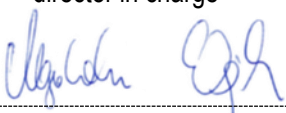

standard

diameter and length	ISO 17829:2015
moisture content	ISO 18134-2:2017
ash content	ISO 18122:2022
mechanical durability	ISO 17831-1:2015
finest 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

none

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