



TEST REPORT

Fundación CARTIF. Laboratorio de Análisis y Ensayos

lae@cartif.es

Nº IE-LAE-I-30247-24

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CUSTOMER DATA				
CUSTOMER	BIOENERGY EUROPE European Pellet Council			
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CONTACT PERSON	Simon Lavergne	Ref. service /SE	LAE-ENP-23-065-SE-001-805	

Prepared by: Testing Responsible

Approved by: Technical director


ANTÍA BLANCO ARROYO

Date: 11/04/2024




ANABEL ELISA RUIZ LOREDO

Date: 11/04/2024

The stated expanded Uncertainty is based on a typical Uncertainty multiplied by a coverage factor $k = 2$, which for a normal distribution provides a confidence level of approximately 95%.
The RESULTS presented in this Test Report refer only to the samples tested. This Test Report may not be reproduced more than in its entirety, without the written authorization of the Analysis and Testing Laboratory of the CARTIF Foundation.





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SAMPLE DATA						
Sample Code ***	PELLET VIMASOL Project: MSP 2023 / Sample ID: PT 011	LAE Code	M-LAE-I-31675/23		Arrival date	11/12/2023
Type ***	Wood Pellets	Quantity of sample	15 kg	Container:	PLASTIC BAG	Start/ end test date 11/12/2023 11/04/2024
RESULTS						
Property	Method/Standard		Value	Uncertainty	Unit	
Total moisture	UNE-EN ISO 18134-1:2016		6,2	± 0,3	% m/m a.r.	
Ash	ISO 18122:2022		0,4	± 0,2	% m/m d.b.	
Bulk density	UNE-EN ISO 17828:2016		670	± 40	kg/m ³ s.r.	
Mechanical Durability	UNE-EN ISO 17831-1:2016		98,4	± 0,4	% m/m a.r.	
Fines contents	UNE-EN ISO 18846:2017		< 0,5	--	% m/m a.r.	
ELEMENTARY ANALYSIS						
Carbon	UNE-EN ISO 16948:2015 Instrumental method		51,2	± 3,5	% m/m d.b.	
Hydrogen			6,2	± 0,9	% m/m d.b.	
Nitrogen			< 0,15	--	% m/m d.b.	
Sulphur	UNE-EN ISO 16994:2017 Combustion method and ion chromatography		< 0,020	--	% m/m d.b.	
Chlorine			< 0,015	--	% m/m d.b.	
Oxygen *	Calculated		42,1	--	% m/m d.b.	
ENERGY ANALYSIS						
Gross calorific value (q _v)	UNE-EN ISO 18125:2018		> 21,0	--	MJ/kg d.b.	
Net calorific value (q _p)			19,8	± 0,4	MJ/kg d.b.	
			18,4	± 0,9	MJ/kg a.r.	
			5,1	± 0,3	kWh/kg a.r.	





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SAMPLE DATA						
Sample Code ***	PELLET VIMASOL Project: MSP 2023 / Sample ID: PT 011	LAE Code	M-LAE-I-31675/23		Arrival date	11/12/2023
Type ***	Wood Pellets	Quantity of sample	15 kg	Container:	PLASTIC BAG	Start/ end test date 11/12/2023 11/04/2024
RESULTS						
Property		Method/Standard		Value	Uncertainty	Unit
PELLETS SIZE						
Diameter	Class *	UNE-EN ISO 17829:2016	D06	--	--	
	Middle value		6,0	± 0,2	mm	
	Standard deviation		< 0,1	--	mm	
Length	Middle value		13,4	± 0,2	mm	
	Standard deviation		6,2	--	mm	
	L > 40 mm		n.d.	--	% m/m	
	L > 45 mm		n.d.	--	unid.	
ASH MELTING BEHAVIOUR (OXIDIZING ATMOSPHERE)						
Shrinkage temperature (SST)	CEN/TS 15370-1:2006 ISO 21404:2021	1.120	± 180	°C		
Deformation temperature (DT)		1.250	± 60	°C		
Hemisphere temperature (HT)		1.400	± 65	°C		
Fluid temperature (FT)		1.460	± 70	°C		





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OBSERVATIONS (M-LAE-I-31675/23)

a.r. as received

d.b. dry basis.

n.d. No detected.

UNE-EN ISO 18134-1. Drying atmosphere: Air.

CEN/TS 15370-1:2006 ISO 21404. Temperature preparation of ash: 815°C

UNE-EN ISO 17828:2016. Volume of the container used: 5 L.

UNE-EN ISO 17831-1. Mechanical durability. 2 replicas have been made.

Replica 1: 98,3%

Replica 2: 98,5%

** UNE-EN ISO 18846. Fines Content (% m/m a.r.): 0,4%*

** UNE-EN ISO 16948. Nitrogen Content (% m/m d.b.): 0,11%*

** UNE-EN ISO 16994. Sulfur Content (% m/m d.b.): 0,010%*

** UNE-EN ISO 16994. Chlorine Content (% m/m d.b.): 0,007%*

** UNE-EN ISO 18125:2018: Gross calorific value (MJ/kg d.b.): 21,2 MJ/kg*

UNE-EN ISO 17829.

Pellets Diameter: standard deviation calculated with 10 measurements

Pellets length: standard deviation calculated with 76 measurements

OBSERVACIONES (M-LAE-I-31675/23)

Evaluation of the quality of the sample according to requirements ENplus® (Manual ENplus, ST1001 2022)¹ *

PROPERTY	VALUE	UNCERTAINTY	UNIT	Specifications			Classification
				A1	A2	B	
Diameter	6,0	± 0,2	mm	6 (±1) u 8 (±1)			A1
Length	13,4	± 0,2	mm	3,15 ≤ L ≤ 40			A1
Total moisture	6,2	± 0,3	% m/m	≤ 10			A1
Ash	0,4	± 0,2	% m/m	≤ 0,7	≤ 1,2	≤ 2,0	A1
Mechanical Durability	98,4	± 0,4	% m/m	≥ 98,0	≥ 97,5		A1
Fines (< 3,15 mm)	< 0,5	--	% m/m	≤ 1,0 ² (≤ 0,5 ³)			A1
Net calorific value	5,1	± 0,3	kWh/kg s.r.	≥ 4,6			A1
Bulk density	670	± 40	kg/m ³	600 ≤ DA ≤ 750			A1
Nitrogen	< 0,15	--	% m/m	≤ 0,3	≤ 0,5	≤ 1,0	A1
Sulphur	< 0,020	--	% m/m	≤ 0,04	≤ 0,05		A1
Chlorine	< 0,015	--	% m/m	≤ 0,02		≤ 0,03	A1
Ash Deformation temperatura (DT)	1.250	± 60	°C	≥ 1.200	≥ 1.100		A1

¹ The test results and statement of compliance with the specification in this report refer only to the test sample. The ENplus® classification has been carried out without taking into account the measurement uncertainty, following instructions from the control and certification entities and may have a specific risk of false acceptance maximum of 50%.

² Bulk Pellets

³ Pellets in bag or closed bag.

ENERGY ANALYSIS.

PCSV ($q_{v,gr,ar}$): Higher Calorific Value corrected at constant volume

PCIV ($q_{v,gr,m}$): Lower Calorific Value at constant

PCSP ($q_{p,gr,d}$): Superior Calorific Value at constant pressure

PCIP ($q_{v,net,m}$): Lower Heating Value at constant

* Valores estimados de poderes caloríficos expresados en unidades de kcal/kg.

ENERGY ANALYSIS	Dry basis (moisture = 0%)	Wet basis (moisture = 6,2%)	Units
PCSV	5.052	4.738	kcal/kg
PCIV	4.748	4.418	kcal/kg
PCSP	5.053	4.738	kcal/kg
PCIP	4.731	4.400	kcal/kg

Sample tested



*** "Identification provided by the client" and the laboratory is not responsible for said information. The results obtained only apply to samples analyzed as received.