TEST REPORT
BEA2023269a

Date of report:	2023-08-28
Client:	Ten Damme B.V.
Address:	Bolwerk 9, 7141 JM GROENLO, The Netherlands
Order:	Fuel testing according EN*plus*® certification program of wood pellets EN*plus*® ST.1001:2022
Order date:	2023-07-14
Receipt of samples:	2023-07-21; 2023-08-21
Sample(s):	Wood pellets
Testing period:	2023-07-21 – 2023-08-25
Sample details:	approx. 15 kg wood pellets in plastic bag; internal sample no.: BEA2023269

BEA2023269			**result**	
parameter EN*plus* ®	limit values A1	limit values A2	**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)	**13,6 ± 4,3**	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	-	-	**10,1**	% in mass (ar)
category L < 20%, 20%≤ M ≤ 30%, S > 30%	-	-	**L**	-
amount of pellets for length determination	≥ 100	≥ 100	**1 340**	piece(s)
moisture content	≤ 10,0	≤ 10,0	**6,2**	% in mass (ar)
ash content*	≤ 0,70	≤ 1,20	**0,34**	% in mass (db)
mechanical durability	≥ 98,0	≥ 97,5	**98,7**	% in mass (ar)
bulk density	600 ≤ BD ≤ 750	600 ≤ BD ≤ 750	**720**	kg/m³ (ar)
particle density	-	-	**1,33**	g/cm³ (ar)
coarse fines (3,15 ≤ CPF < 5,6 mm)	-	-	**0,4**	% in mass
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	**17,2**	MJ/kg (ar)
net calorific value $q_{P,net}$	≥ 4,6	≥ 4,6	**4,77**	kWh/kg (ar)
net calorific value $q_{P,net}$	-	-	**18,5**	MJ/kg (db)
net calorific value $q_{P,net}$	-	-	**5,13**	kWh/kg (db)
gross calorific value $q_{V,gr}$	-	-	**18,6**	MJ/kg (ar)
gross calorific value $q_{V,gr}$	-	-	**5,18**	kWh/kg (ar)
nitrogen content	≤ 0,3	≤ 0,5	**0,12**	% in mass (db)
sulphur content	≤ 0,04	≤ 0,04	**0,006**	% 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	**0,18**	mg/kg (db)
chromium	≤ 10	≤ 10	**< 1**	mg/kg (db)
copper	≤ 10	≤ 10	**2,0**	mg/kg (db)
lead	≤ 10	≤ 10	**5,0**	mg/kg (db)
mercury	≤ 0,1	≤ 0,1	**< 0,075**	mg/kg (db)
nickel	≤ 10	≤ 10	**< 1**	mg/kg (db)
zinc	≤ 100	≤ 100	**14**	mg/kg (db)
shrinking temperature SST	-	-	**1150**	°C
deformation temperature DT	≥ 1200	≥ 1100	**1310**	°C
hemisphere temperature HT	-	-	**1480**	°C
flow temperature FT	-	-	**1510**	°C

db… dry basis, ar… as received *… measured on the re-sample arrived on 2023-08-21

director in charge

Dr. Viktoria Horvath

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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, performed with proximate analyzer
mechanical durability	ISO 17831-1:2015
fines 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

Akkreditierung Austria A 0388 ISO/IEC 17025 T

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director in charge

Dr. Viktoria Horvath

Institut für Bioenergie GmbH Ingenieurbüro für technische Chemie