



bio-bean
elements

Coffee: a sustainable biomass solution

Matt Keniston
Head of Commercial

A close-up photograph of a person's hands, wearing a light blue shirt, holding a large amount of dark coffee grounds. The hands are positioned over a large, light-colored sack, likely made of burlap or a similar natural fiber, which is filled with coffee. The background is blurred, showing more sacks and what appears to be an industrial or processing environment. The lighting is soft and natural, highlighting the texture of the coffee grounds and the fabric of the sack.

We are the world's largest
recycler of coffee



The UK loves coffee and drinks 35 billion cups every year...



...creating half a million tonnes of waste coffee grounds annually...



...which typically are sent to landfill, incineration or AD...



...costing UK businesses £millions every year to dispose of spent grounds.



But we've developed a better solution.



Processing 7,000t of spent grounds per year, we transform them into a range of sustainable bio-products to benefit people and planet...



- ✔ Saving businesses money
- ✔ Diverting waste from landfill
- ✔ Saving on CO₂e emissions
- ✔ Displacing conventional alternatives



We recycle spent coffee grounds into...

- Natural flavour ingredients for food & bev industry
- Dried grounds as a raw material for plastics, inks and more
- Solid biomass fuels
 - Coffee Logs
 - coffee pellets





COFFEE LOGS™

- Compact fire logs for domestic wood burners and stoves
- Burn 20% hotter and longer than kiln-dried wood
- Stocked in Waitrose, Wickes, Morrisons, Ocado, B&Q, and independent garden centres

Coffee biomass pellets



High calorific value:
≥15% higher than
standard timber pellets



Low moisture content:
below 10%



Good durability



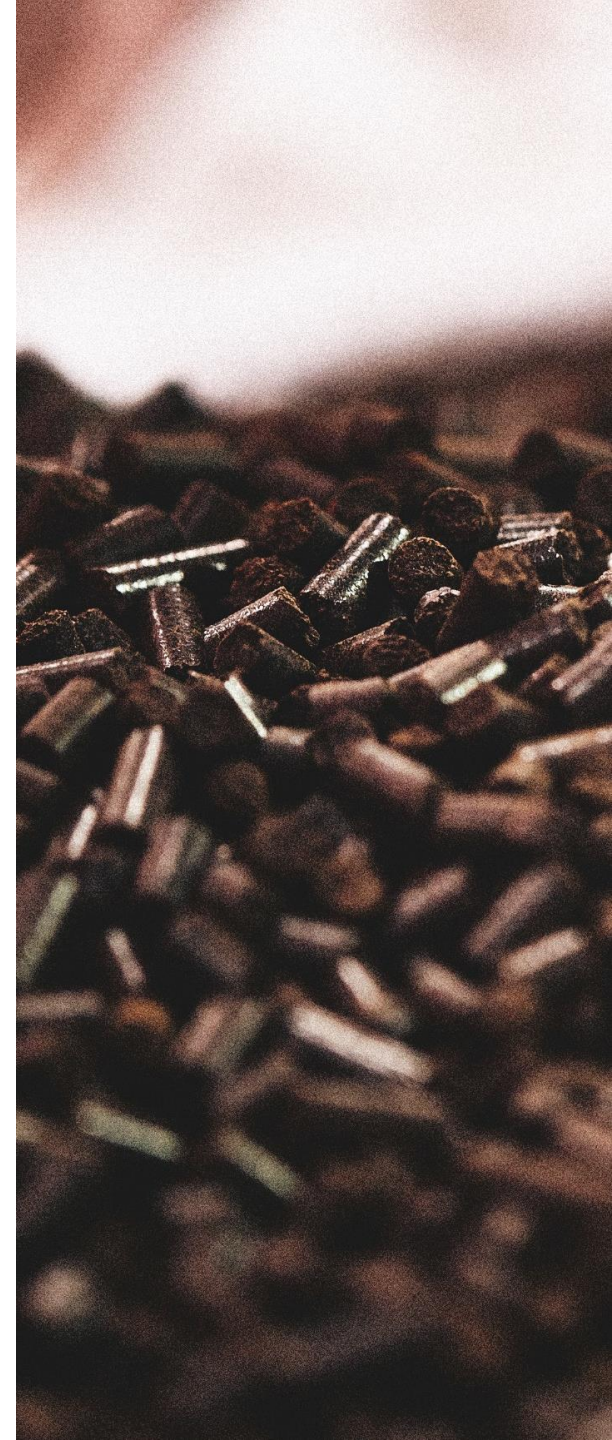
High bulk density



High ash melting point



1MW+ boilers





SFR accredited

bio-bean coffee pellets meet the sustainability criteria for claiming RHI, either through self reporting or through registration on the SFR portal





Can meet emissions standards when claiming RHI

Exova RHI emissions certificate results

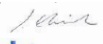

	PM	Nox
RHI emission limits	30 g/GJ	150 g/GJ
500 - 1,500kWp	1.5 g/GJ	82.5 g/GJ
1,500 - 2,500kWp	3.3 g/GJ	120 g/GJ
Both boilers connected to particulate cyclone and bag filter		

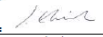


In order to credit any biomass boiler or stove applications received for the domestic or non-domestic Renewable Heat Incentive (RHI) schemes, Ofgem must be satisfied that a valid emissions certificate exists for the specific model in the application (or alternatively for the non-domestic RHI, an environmental permit for the site). This template incorporates all information required to demonstrate that the tested plant meets the air quality requirements of the RHI. It must be fully completed and issued by a testing laboratory in order to be a valid certificate.




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1. TEST HOUSE	
a) Name and address of the testing laboratory that has carried out the required tests and issued this certificate *	Exova Catalyst Ltd, Unit C6, Emery Court, The Embankment Business Park, Heaton Mersey, Stockport, SK4 3GL
*If different, include details of both	
b) Name and signature of the person authorised by the testing laboratory to issue the certificate	Signature:   Unit C6, Emery Court The Embankment Business Park Heaton Mersey, Stockport SK4 3GL T: 0161 432 3225 E: info@cat-env.com Company Registration No: SC070429
c) Date of issue of this certificate, together with certificate reference number for this certificate *Please see Note A	Date: 26/03/2018 Certificate reference number: CAT-4066 - Danstoker 2MW H2000
d) If the testing laboratory that has carried out the required tests is accredited to BS EN ISO/IEC 17025:2005, date of accreditation and accreditation number (if testing conducted on or after 24 September 2013, the testing laboratory must be BS EN ISO/IEC 17025:2005 accredited at the time of testing)	Date: 30/06/2009 Accreditation number: UKAS 4279

laboratory that issued this certificate	Testing Laboratory: Exova Catalyst, Unit 4a, Advick Park, Wath Upon Dearne, Rotherham, S63 5AB
in authorised by certificate	Certificate Issuer: Exova Catalyst, Unit C6 Emery Court, The Embankment Business Park, Heaton Mersey, Stockport, SK4 3GL
together with certificate	 Unit C6, Emery Court The Embankment Business Park Heaton Mersey, Stockport SK4 3GL T: 0161 432 3225 E: info@cat-env.com Company Registration No: SC070429 Signature:  Date: 19/07/2017 Certificate reference number: CR0-1230-A1-H1500-995-V1 Reference number of original test report on which this certificate is based:

SGS coffee pellet analysis

Parameter	Unit	LOQ	Method	Result	Limit ENplus® ¹			Lab ⁵
					A1	A2	B	
Average diameter	Millimeter		DIN EN ISO 17829	6	6 or 8 ± 1			B1
Average length	Millimeter		DIN EN ISO 17829	7,2	3,15 to 40			B1
Overlengths > 40 and ≤ 45 mm	w-% ar		DIN EN ISO 17829	not found	≤ 1			B1
Overlengths > 45 mm	w-% ar		DIN EN ISO 17829	not found	not allowed			B1
Moisture	w-% ar	0,1	DIN EN ISO 18134-2	10,1	≤ 10			B1
Ash (550°C)	w-% d	0,1	DIN EN ISO 18122	2,01	≤ 0,7	≤ 1,2	≤ 2,0	B1
Mechanical Durability	w-% ar	0,1	DIN EN ISO 17831-1	94,9	≥ 98,0	≥ 97,5		B1
Fines	w-% ar	0,1	DIN EN 15149-1 ⁴	1,3	≤ 1 (≤ 0,5) ²			B1
Net CV, const. p	MJ/kg ar	0,5	DIN EN 14918 ⁴	19,21	≥ 16,5			B1
Net CV, const. p	kWh/kg ar	0,14	DIN EN 14918 ⁴	5,336	≥ 4,6			B1
Bulk density	kg/m ³ ar	1	DIN EN ISO 17828	681	≥ 600 to ≤ 750			B1
Nitrogen	w-% d	0,1	DIN EN ISO 16948	2,31	≤ 0,3	≤ 0,5	≤ 1,0	B1
Sulphur total	w-% d	0,01	DIN EN ISO 16994	0,13	≤ 0,04	≤ 0,05		B1
Chlorine total	w-% d	0,01	DIN EN ISO 16994	0,041	≤ 0,02		≤ 0,03	B1
Shrinkage starting temperature SST	°C		DIN CEN/TS 15370-1 ³	830	-			B1
Deformation temperature DT	°C		DIN CEN/TS 15370-1 ³	1290	≥ 1200	≥ 1100		B1
Hemisphere temperature HT	°C		DIN CEN/TS 15370-1 ³	> 1500	-			B1
Flow temperature FT	°C		DIN CEN/TS 15370-1 ³	> 1500	-			B1
Arsenic	mg/kg d	1	DIN EN ISO 16968	< 0,5	≤ 1			B1
Cadmium	mg/kg d	0,3	DIN EN ISO 16968	< 0,3	≤ 0,5			B1
Chromium	mg/kg d	1	DIN EN ISO 16968	< 1	≤ 10			B1
Copper	mg/kg d	2	DIN EN ISO 16968	21	≤ 10			B1
Lead	mg/kg d	3	DIN EN ISO 16968	< 3	≤ 10			B1
Mercury	mg/kg d	0,05	DIN EN ISO 16968	< 0,05	≤ 0,1			B1
Nickel	mg/kg d	1	DIN EN ISO 16968	1	≤ 10			B1
Zinc	mg/kg d	1	DIN EN ISO 16968	20	≤ 100			B1



SGS Institut Fresenius GmbH Goerzallee 305A D-14187 Berlin GERMANY


SGS UK Ltd. ROSSMORE BUSINESS PARK ELLESMERE PORT CHES. SEN GREAT BRITAIN

Berlin, 07.06.2019

Your project: Bio bean
Your order no.: Simon Howard
Date of order: 06.05.2019

Testing period from 15.05.2019 until 07.06.2019
First sample no. 190523362
Sample entry 15.05.2019

I.V. Thomas Smyk
Customer Service



Test report 4331956
Order no. 4962975
Client no. 10007917

Dakks
Akreditierungsstelle
D-94111-00
D-94111-01
D-94111-02
D-94111-03
D-94111-04
D-94111-05
D-94111-06
D-94111-07
D-94111-08
D-94111-09

M. Thomas Smyk
Phone +49 3084718 - 238
Fax +49 3084718 - 299
E-mail thomas.smyk@sgs.com

Environment, Health and Safety

SGS Institut Fresenius GmbH
Goerzallee 305A
14187 Berlin

190523362
Bio Bean

Amount (ed) Amount (d) Amount (da1) Amount in ash Lab⁵

--	--	--	--	B1
--	--	--	--	B1
--	--	--	--	B1
--	--	--	--	B1

95,4 -- -- -- B1
4,6 -- -- -- B1
1,92 2,01 -- -- B1
1,68 1,76 -- -- B1

0,12 0,13 0,13 -- B1
0,039 0,041 0,042 -- B1
50,5 52,9 53,6 -- B1
6,84 7,17 7,30 -- B1
2,20 2,31 2,35 -- B1
34,1 35,7 36,3 -- B1

22,13 23,19 23,61 -- B1
20,54 21,64 22,03 -- B1
20,62 21,71 22,10 -- B1
5286 5339 5638 -- B1
4906 5168 5261 -- B1
4924 5186 5279 -- B1
6,148 6,442 6,557 -- B1
5,705 6,011 6,118 -- B1
5,727 6,031 6,139 -- B1
9515 9970 10149 -- B1
8830 9303 9469 -- B1
8864 9335 9502 -- B1

Net CV, const. p BTULb 210 DIN EN 14918 8257
Net CV, const. v BTULb 210 DIN EN 14918 8292 8864 9335 9502 -- B1

Selected minor elements:

Arsenic	mg/kg	0,5	DIN EN ISO 16968	< 0,4	< 0,5	< 0,5	< 0,5	--	B1
Cadmium	mg/kg	0,3	DIN EN ISO 16968	< 0,3	< 0,3	< 0,3	< 0,3	--	B1
Chromium	mg/kg	1	DIN EN ISO 16968	< 1	< 1	< 1	< 1	--	B1
Copper	mg/kg	2	DIN EN ISO 16968	19	20	21	21	--	B1
Lead	mg/kg	3	DIN EN ISO 16968	< 3	< 3	< 3	< 3	--	B1
Mercury	mg/kg	0,05	DIN EN ISO 16968	< 0,04	< 0,05	< 0,05	< 0,05	--	B1
Nickel	mg/kg	1	DIN EN ISO 16968	1	1	1	1	--	B1
Zinc	mg/kg	1	DIN EN ISO 16968	18	19	20	20	--	B1


Basic physical parameters:

Bulk density	kg/m ³	1	DIN EN ISO 17828	681	--	--	--	--	B1
Abrasion	w-%	0,1	DIN EN ISO 17831-1	5,1	--	--	--	--	B1

Page 1 of 3

I.V. Oliver Sommer
Customer Service
I.V. Oliver Sommer

Michaela Scurdov-Betrnie
Customer Service



Test report 4331956
Order no. 4962975

190523362
Bio Bean

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Cadmium	mg/kg	0,3	DIN EN ISO 16968	< 0,3	< 0,3	< 0,3	< 0,3	--	B1
Chromium	mg/kg	1	DIN EN ISO 16968	< 1	< 1	< 1	< 1	--	B1
Copper	mg/kg	2	DIN EN ISO 16968	19	20	21	21	--	B1
Lead	mg/kg	3	DIN EN ISO 16968	< 3	< 3	< 3	< 3	--	B1
Mercury	mg/kg	0,05	DIN EN ISO 16968	< 0,04	< 0,05	< 0,05	< 0,05	--	B1
Nickel	mg/kg	1	DIN EN ISO 16968	1	1	1	1	--	B1
Zinc	mg/kg	1	DIN EN ISO 16968	18	19	20	20	--	B1

Basic physical parameters:

Bulk density	kg/m ³	1	DIN EN ISO 17828	681	--	--	--	--	B1
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Page 3 of 3
07.06.2019

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Cadmium	mg/kg	0,3	DIN EN ISO 16968	< 0,3	< 0,3	< 0,3	< 0,3	--	B1
Chromium	mg/kg	1	DIN EN ISO 16968	< 1	< 1	< 1	< 1	--	B1
Copper	mg/kg	2	DIN EN ISO 16968	19	20	21	21	--	B1
Lead	mg/kg	3	DIN EN ISO 16968	< 3	< 3	< 3	< 3	--	B1
Mercury	mg/kg	0,05	DIN EN ISO 16968	< 0,04	< 0,05	< 0,05	< 0,05	--	B1
Nickel	mg/kg	1	DIN EN ISO 16968	1	1	1	1	--	B1
Zinc	mg/kg	1	DIN EN ISO 16968	18	19	20	20	--	B1

Basic physical parameters:

Bulk density	kg/m ³	1	DIN EN ISO 17828	681	--	--	--	--	B1
Abrasion	w-%	0,1	DIN EN ISO 17831-1	5,1	--	--	--	--	B1

Page 3 of 3
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Chromium	mg/kg	1	DIN EN ISO 16968	< 1	< 1	< 1	< 1	--	B1
Copper	mg/kg	2	DIN EN ISO 16968	19	20	21	21	--	B1
Lead	mg/kg	3	DIN EN ISO 16968	< 3	< 3	< 3	< 3	--	B1
Mercury	mg/kg	0,05	DIN EN ISO 16968	< 0,04	< 0,05	< 0,05	< 0,05	--	B1
Nickel	mg/kg	1	DIN EN ISO 16968	1	1	1	1	--	B1
Zinc	mg/kg	1	DIN EN ISO 16968	18	19	20	20	--	B1

Basic physical parameters:

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Lead	mg/kg	3	DIN EN ISO 16968	< 3	< 3	< 3	< 3	--	B1
Mercury	mg/kg	0,05	DIN EN ISO 16968	< 0,04	< 0,05	< 0,05	< 0,05	--	B1
Nickel	mg/kg	1	DIN EN ISO 16968	1	1	1	1	--	B1
Zinc	mg/kg	1	DIN EN ISO 16968	18	19	20	20	--	B1

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Bulk density	kg/m ³	1	DIN EN ISO 17828	681	--	--	--	--	B1
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Chromium	mg/kg	1	DIN EN ISO 16968	< 1	< 1	< 1	< 1	--	B1
Copper	mg/kg	2	DIN EN ISO 16968	19	20	21	21	--	B1
Lead	mg/kg	3	DIN EN ISO 16968	< 3	< 3	< 3	< 3	--	B1
Mercury	mg/kg	0,05	DIN EN ISO 16968	< 0,04	<				

Case Study, FY 19/20

- bio-bean supplied 858 tonnes of coffee pellets to UK glasshouses & food manufacturers
- Almost 4 million kWh produced
- Under 3p per kWh
- Less storage room required
- Fewer truck movements
- Consistent fuel
- Improved CO₂e savings over landfill & AD

*858t x net cv 5,336 x 85% boiler efficiency = 3,891,544 kWhrs



Impact & Sustainability



Sustainable fuel



Saves on greenhouse
gas emissions



Diverts spent coffee
grounds from landfill



Ensures maximum value
from material typically
discarded as waste



Contributes to the
circular economy

Powered by coffee