

**GREEN
BIO
FUELS**

GREEN D+

AN ULTRA LOW EMISSION
SUSTAINABLE FUEL FOR
DIESEL ENGINES

**FUELLING YOUR
GREEN CREDENTIALS**

INTRODUCTION

GBF is the leading supplier of advanced low emission and GHG saving fuels in the UK

Established in 2013 its principal product is GREEND+ an HVO paraffinic EN15940 fuel enhanced with GBF's proprietary additive that produces the lowest emission advanced fuel available in the market

The largest importer of HVO, and stockist in the UK, with multi terminal storage facilities.

Supplied to leading clients across multiple activities including in UK and Europe

- Commercial fleet operators
- Construction Companies involved in major infrastructure
- Agricultural businesses and contractors
- Marine operators on inland waterways
- Standby generation
- Data centres
- Mobile and temporary power



Sustainability cradle to grave auditing goals

ISCC certification.



Proof of Sustainability

Proof of Sustainability (PoS) for Biofuels and Bioliquids V4.5

For biofuels and biofuels according to the Renewable Energy Directive (RED) and the Fuel Quality Directive (FQD), both amended through Directive (EU) 2015/1513

Unique Number of Sustainability Declaration: EU-ISCC-Cert-DE119-44208798/SA-0006

Place and date of dispatch: Kookle Tankstrage Botlek 03/07/2020

Date of Issuance: 03/07/2020 www.iscc-system.com

Supplier	Recipient
Name: Green Biofuels Limited	Name: Vitrol S.A.
Address: Brook Street 42, WICKSB, London, United Kingdom	Address: K.P. van der Mandelbaan 130, 3062 MB Rotterdam, The Netherlands
Certification System: ISCC EU	Contract Number: 86240061

1. General Information

Type of Product: HVO – hydro-treated vegetable oil

Type of Raw Material: Used cooking oil (UCO)

Additional Information (optional): Used Cooking Oil (Mixed)

Country of Origin (of the raw material): United Kingdom 100%

Quantity: 615,389 m3/15°C m³ metric tons

Energy content (MJ): 21,059,226 MJ

2. Sustainability criteria of the biomass according to Article 17 RED:

The raw material complies with the sustainability criteria according to Art. 17 (3), (4) and (5) RED? Yes No

The raw material meets the definition of waste or residue according to the RED, i.e. it was not intentionally produced and not intentionally modified, or contaminated, or discarded, to meet the definition of waste or residue? Yes No

3. Greenhouse Gas (GHG) information

Total default value according to RED applied Yes No

$E = E_{ec} + E_{el} + E_p + E_{td} + E_u + E_{esca} - E_{ccs} - E_{ccr} - E_{ee}$ gCO2eq/MJ

GHG emission saving: **93.8%** (for biofuels 83.8 gCO2eq/MJ) **93.3%** (for heat production 77 gCO2eq/MJ)

93.3% (for electricity production 91 gCO2eq/MJ) **93.9%** (for cogeneration 85 gCO2eq/MJ)

If the GHG emission savings are below 60%:
The installation where the final biofuel or bioliquid was produced started physical production of biofuels or biofuels after 5 October 2015. Yes No
Voluntary: Date when the final biofuel producer started operation: 04/11/2011

This form is valid without signature. By issuing this PoS, the issuing party guarantees that all information made on this Proof of Sustainability is correct, in compliance with the requirements of ISCC and the RED, and that the biofuel or bioliquid has not already been used to fulfil a national quota obligation.

Audit

GBF controlled tanks @ Stokholven Terminal

25th Match Start Date T105 T106

Parameters: Date Time: 25.03.2020 23:45:14 UOVI Weight: kg Only Active Allocation: Yes

Customer Product	Tank	Weight	Start Date	End Date
GREEN O+ (EN15942)	T105	235,455 kg	16.10.2019	
	T106	145,848 kg	16.10.2019	
Customer Product Total:		381,303 kg		
Customer Total:		381,303 kg		

Customer Bookstock Printed On: 30.09.2020 23:40:34

Parameters: Date Time: 30.09.2020 23:40:33 UOVI Weight: kg Only Active Allocation: Yes

Customer Product	Tank	Weight	Start Date	End Date
GREEN O+ (EN15942)	T0204	949,876 kg	21.04.2020	
	T0209	148,520 kg	21.04.2020	
	T105	4,898 kg	16.10.2019	
	T106	171,742 kg	16.10.2019	
Customer Product Total:		1,274,993 kg		
Customer Total:		1,274,993 kg		

GBF Internal Tank Transfer

GBF Molecule Provenance

Internal Tank Transfer

Customer Reference	Multiple Items	Value
22/04/2020 14:00	Sum of In V-Clad	278771
T0204	Sum of Out V-Clad	-277720
T105		0
T106		-277720
23/04/2020 14:18	Sum of In V-Clad	274987
T0204	Sum of Out V-Clad	-274987
T105		0
23/04/2020 14:30	Sum of In V-Clad	209224
T0204	Sum of Out V-Clad	-209224
23/04/2020 23:00	Sum of In V-Clad	0
T105	Sum of Out V-Clad	-276451
11/05/2020 22:30	Sum of In V-Clad	255664
T0208	Sum of Out V-Clad	-255664
T105		0
24/05/2020 13:00	Sum of In V-Clad	188861
T0208	Sum of Out V-Clad	-188861
T105		0
T106		-46224
10/09/2020 14:54	Sum of In V-Clad	269926
T105	Sum of Out V-Clad	-269926
Grand Total		1714773

Two way movement between Road and Master Store

The smart tanks measure ultimate energy release!

Green House Gas accounting methods

Published reports



Greenhouse gas (GHG) emissions: Green D+ fuel relative to diesel.

The saving in GHG CO₂ eq. emission when using Green D+ is summarised in the calculation below. One litre of Green D+ will reduce CO₂ e emissions by 2.82 kg/Litre of fuel:

Fuel	kg CO ₂ e/L
Diesel (B7)	3.16
Green D+	0.34
SAVING	
(GD+ instead of Diesel)	2.82

The rationale for these values is discussed below.

The whole life cycle analysis (well to wheel or well to wake) for greenhouse gas emissions is conveniently broken down into two parts:

- A. 'Well to Tank' (WTT) – also called 'Carbon intensity'. It refers to the expenditure of emissions associated with the production process (exploration, refining and transportation for fossil fuels, and cultivation, harvesting, processing and transportation for biofuels). The UK government calculator (<https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2019>) refers to this a 'Scope 3'.
- B. 'Tank to Wheel' or 'Tank to Wake' (TTW). This refers to the CO₂ emissions during combustion of the fuel. It also considers other greenhouse gases (chiefly CH₄ and N₂O) which may be generated in the combustion process. Hence the reference to CO₂ equivalent, 'CO₂ eq.' – N₂O and CH₄ are included as if they were CO₂ molecule using appropriate conversion factor. This is referred to a 'Scope 1' in the UK data.

A+ B = Well to Wheel or Well to Wake (WTW)

The calculation, both in the EU and UK publications are worked out using the units of measurements of 'kg CO₂ eq. / MJ'. These values can readily be converted to 'kg CO₂ eq. / litre' and 'kg CO₂ eq. kg'.

Table for GHG CO₂ eq. values in g CO₂ e/MJ

Fuel	WTT	TTW	WTW	EU 2015/652	EU RED II
Diesel (av.) [B7]	17.0196	71.0228	88.0424		
Diesel(100% mineral)	17.4001	74.6978	92.098		
Fuel Oil	15.0001	79.1229	94.123		
Gas Oil	17.4001	75.8617	93.2619		
Reference (Fossil Fuel)				94.1	94
Biodiesel (uco)	8.75	5.00797	13.76018		11.2 to 14.9
GD+ / HVO (uco)	8.75	1.02884	9.78105		11.9 to 16

Notes: The WTT, TTW and WTW are taken from UK data. The HVO values are estimated – the accord with actual data shown in recent EU directives. Uco stands for used cooking oil.

Tools created from empirical data

5080 litres				variable				
				constants				
				calculated values				
1. Aviation	jet fuel	2.53	kgCO ₂ e/L					
	GD+/HVO	0.34	kgCO ₂ e/L					
	Lon - Sydney		# passenger seats					
	16906		km					
One pass. Seat	Jet fuel		12.85 Tonnes CO ₂					
One pass. Seat	GD+/HVO		1.73 Tonnes CO ₂					
				saving:	11.13	tonnes of CO ₂		
2. Transport & non-road	Diesel (B7)	3.16	kg CO ₂ e/L					
	GD+/HVO	0.34	kg CO ₂ e/L					
	Diesel (B7)	16.05	kg CO ₂ e/L					
	GD+/HVO	1.73	kg CO ₂ e/L					
				saving:	14.33	tonnes of CO ₂ e		
3. Air Quality Road Transport	NOx	Saving g/L of GD+	0.154	0.069	g			
	PM	Saving g/L of GD+	0.007	0.007	g			
	PN	Saving g/L of GD+	4.50E+11	4.50E+11	#			
					saving:	782.3	350.5	g
						35.6	35.6	g
					2.29E+15	2.29E+15	#	
							Euro V [EGR]	Euro VI [SCR]
4. Air Quality Non-road	NOx	Saving g/L of GD+	3.323	2.215	g			
	PM	Saving g/L of GD+	0.509	0.509	g			
	CO	Saving g/L of GD+	5.83	5.83	g			
					Stage II	Stage IIIa		
					16,880.8	11,252.2	g	
				2,585.7	2,585.7	g		
				29,611.3	29,611.3	g		

Independent testing

Confidential



Evaluation of 110kVA Power Generator with and without SCR unit for compliance with NRRMM Retrofit Programme

Conclusions

- EA report indicates that the NO_x and NO₂ levels in the exhaust are too high (NO_x target of 0.4 g/kWh is exceeded with a value of 0.834 g/kWh, and NO₂ value of 0.409 g/kWh exceeds the target of 0.08g/kWh).
- The temperature profile for the runs of 11th and 12th November indicate that stability had not been achieved. The temperature was more erratic in the 12th November run than in the previous one. This is believed to be due a greater heat sink once the SCR

APM Report 20180322

Millbrook data of Refuse Collection Vehicle



Engine details:

Purpose: WYG Refuse Collection Vehicle HVO BioDiesel Fuel Testing - With Bin Lifts
 Vehicle No.: VU66 NNH
 Dennis Eagle Elite 2
 Engine: Volvo D8K – Renault DT18 Diesel
 Transmission: Allison MD3000 6 speed automatic

Fuels Tested: Three fuels were tested: diesel, HVO and Green D+

Table of results

Each cycle consisted of three phases: Urban collection, Rural Collection and Transfer. The overall results for the triplicate tests are shown below. These are then averaged. The averaged results were then plotted.

Date	Fuel	Units	HC g/km	CO g/km	NOx g/km	CO ₂ g/km	PM g/km	Fuel Cons L/100km	PN/km
24/01/2018	Diesel	test 1	0	0.136	1.805	2493.9	0.0115	94.18	7.57E+11
		test 2	0	0.111	1.852	2521.6	0.0098	95.23	2.56E+11
		test 3	0	0.13	1.859	2535.8	0.0069	95.77	2.30E+11
		Av	0	0.125	1.839	2517.1	0.0094	95.06	
29/01/2018	HVO	test 1	0.022	0.108	1.624	2475.1	0.0134	102.28	
		test 2	0.004	0.106	1.724	2466.8	0.0117	101.94	
		test 3	0.04	0.127	1.656	2461.4	0.0111	101.72	

WHAT IS GREEND+ : helping to explain the benefits


1 diesel vehicle has the same CO2e emission as 10 GREEND+ vehicles

How Many Trees?

GHG (CO₂e) emissions per litre of fuel – in numbers

Fuel	kg CO ₂ e/L
Diesel (B7)	3.16
Green D+	0.34
SAVING (GD+ instead of Diesel)	2.82

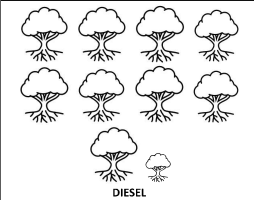
Note: 'CO₂ e' stands for CO₂ equivalent, where other GHG emissions (CH₄ and N₂O chiefly) are expressed as if they are CO₂.

 = ONE tree absorbs ~ 21.77 kg of CO₂ per annum.

How many litres of fuel produce CO₂e emissions equivalent to one tree's annual absorption of CO₂?

Diesel versus **Green D+**
6.9 Litres of diesel (21.77kg ÷ 3.14kgCO₂e/L)
64 Litres of GD+ (21.77kg ÷ 0.34kgCO₂e/L)

For every tree required to offset Green D+ fuel (64 litres) it is necessary to plant 9.4 trees if the same volume of diesel is used.



WHAT IS GREEND+ ?

- GREEND+ Is manufactured from sustainable, renewable feed-stocks
- GREEND+ Does not go off in tank or attract diesel bug
- GREEND+ Is odourless
- GREEND+ Doesn't cause smoke from the exhaust on start-up or change of load
- GREEND+ Produces noticeable noise reduction from engines.
- GREEND+ Reduces emissions compared to standard diesel

- Particulates by up to 85%
- Nitrogen Oxides by up to 30%
- Greenhouse Gases by up to 90%
- CO2e emissions by up to 96%



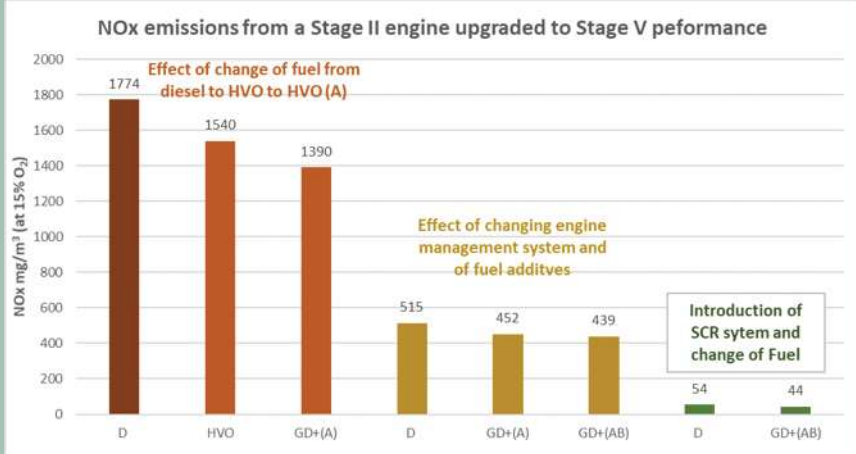
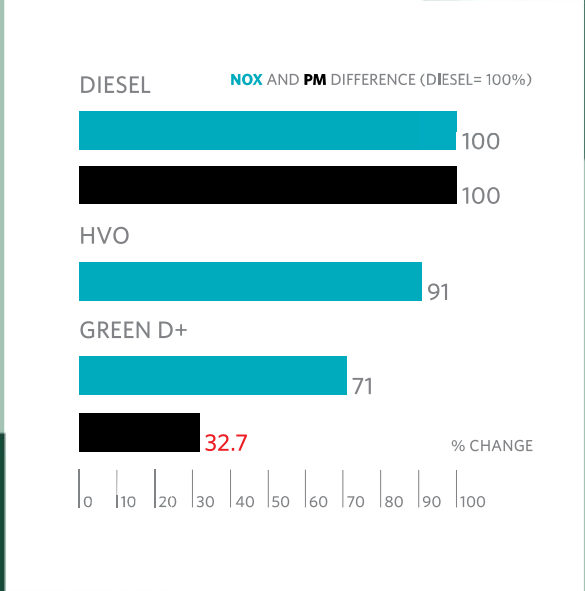
Diesel

GREEND+



DIESEL vs HVO vs GREEND+

How do we compare?



Millbrook independent test trial data



Fuel Delivery

GBF stores between 5m and 15m litres of fuel in the UK at any time.

- We operates from 4 bulk depots around the UK, to optimise delivery times, minimise mileage, and ensure business continuity.
- We use FORS accredited delivery contractors, to give complete geographic coverage and to ensure business continuity.
- Our delivery vehicles are directly fuelled with Green D+ or mass balanced to minimise CO2e emissions in our supply chain.
- All journeys recorded for audit purposes.
- Electronic Proof of Delivery to GBF and our client.

Physical GBF Storage Locations



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Other services: Smart Tanks

HYTEK FMO Dashboard - Reports - Total Report - TOTAL REPORT

Account No: 238242 Name: 00234 HONGKONG

Start Date: 01/10/2020 End Date: 30/11/2020 View: 00:00 Time: 23:59 Run Report

Record Count: 22 Transaction Count: 110 Total Litres: 1210.37 Total Cost: 4950.45

ID	SKU	NAME	UNIT	PRICE	QTY	AMOUNT	DATE	TIME	STATUS
14	3PL	BENTLEY MOTOR LTD	205.34	00 WHTE	0.28	56.64	14/11/20	14:47	
15	WDA 004 H01	CENALOGISTICS	210.28	00 WHTE	8.16	276.18	22/11/20	49	
1	EX MOBILE OPERATOR	210.28	00 WHTE	0.00	0.00	198.64	11/11/20	11	
26	LATA DVD	UNIVERSAL 1	11.50	00 RED	0.41	31.11	26/10/20		
27	LATA DVD	UNIVERSAL 1	11.50	00 RED	0.41	36.96	25/10/20		
18	MASTER	CENALOGISTICS	118.88	00 WHTE	0.00	0.00	19/11/20		
19	MASTER	CENALOGISTICS	118.88	00 WHTE	0.00	0.00	19/11/20		
20	MASTER	CENALOGISTICS	118.88	00 WHTE	0.00	0.00	19/11/20		
42	MASTER 2	CENALOGISTICS	14.00	00 WHTE	0.14	4.00	41/10/20		
32	MASTER SHURE	UNIVERSAL 1	100.00	00 RED	44.50	347.41	10/11/20		
8	OVERSEAS	PEAK SURFACING	1007.17	00 RED	474.17	349.71	20/11/20	24	
888	PEAK SURF	PEAK SURFACING	50.00	00 WHTE	0.00	0.00	14/11/20		

Stock Summary

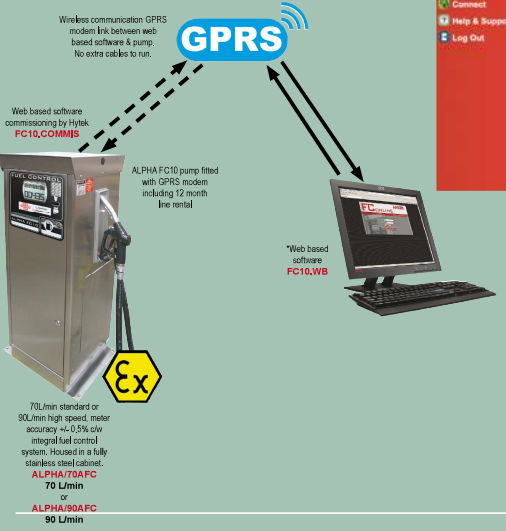
BENTLEY MOTOR LTD Tank 1 (08 WHITE)

Gauge Date: 12/11/2020
Gauge Time: 12:11
Fuel Level: 28789L
SW Capacity: 37000L
Usage: 8211L
Low Level: 7000L
Percentage: 78%

Temperature: 21.24°C

Service Messages

Transactions



GREEN D+ AN ULTRA LOW EMISSION SUSTAINABLE FUEL FOR DIESEL ENGINES

WHERE IS GREEND+

GBF

- Largest importer of HVO into the UK
- 4 Key storage hubs
- Dedicated team on Advanced Fuels
- Transparent operational practices
- Supplying UK leading brands

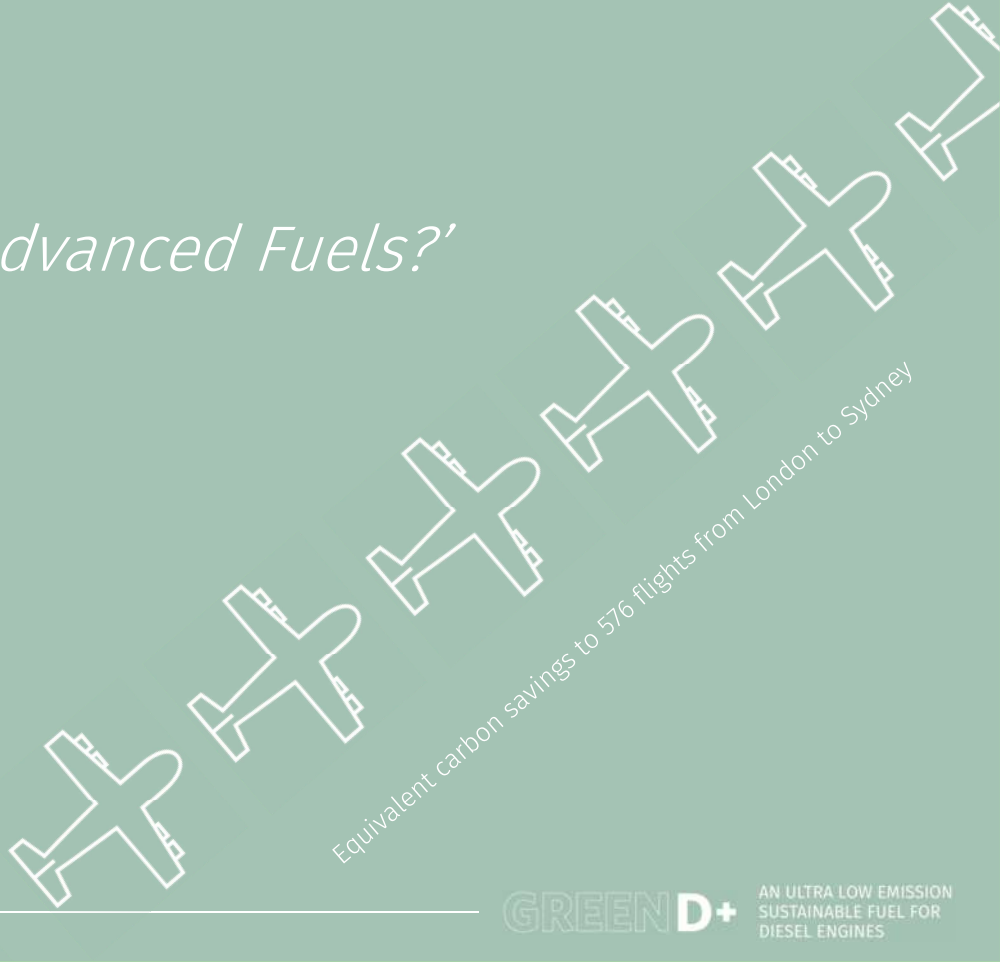


Instead of

'why should we adopt Advanced Fuels?'

the question should be

'why don't we?'



Equivalent carbon savings to 576 flights from London to Sydney

**GREEN
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42 BROOK STREET
LONDON W1K 5DP

AN ULTRA LOW EMISSION SUSTAINABLE FUEL FOR DIESEL ENGINES

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