

Zero Emission Bus Certificate

Customer: Wrightbus				DYNAMOMETER SETTINGS		
Customer Address:	201 Galgorm Rd, Ballymena, County Antrim, BT42 1SA	Telematics Capability	Yes	Test Weight	15011	kg
Test Purpose:	Zero Emission Bus Testing	Maximum Speed (km/h)	80 km/h	F ⁰	-648.91	N
Vehicle Manufacturer:	Wrightbus	Seated Capacity	44	F ¹	4.2810	N/kmh
Vehicle Model Name:	GB Kite Electroliner AU383	Passenger Capacity	88	F ²	0.07154	N/kmh ²
Powertrain Technology:	Battery Electric	Declared Unladen Weight (kg)	13440	Equivalent test passengers	22	passengers
Powertrain Configuration:	Direct Drive	Gross Weight (kg)	19500	Measured Unladen Weight	13437	kg
Zero Emission Heating:	Heat Pump	GVW Check	OK	Number of consecutive tests completed	4	Tests
Battery Specification		Charging and Refuelling Capability		Hydrogen Specification		
Battery Manufacturer	CATL	Plug Type	CCS2 & OppCharge	Fuel Cell Manufacturer	N/A	
Battery Chemistry	LFP	Max Charge Capability (kW)	Up to 150kW/360 kW	Fuel Cell Power Rating (kW)	N/A	
Battery Installed Capacity (kWh)	423	Charger Compatibility	DC	Hydrogen Storage Capacity (kg)	N/A	
Battery Usable Capacity (kWh)*	372	Charge time from 20-80% SOC**	2-4 hours	Hydrogen Storage Pressure (bar)	N/A	

* Recommended manufacturer guideline, subject to warranty

** Based on manufacturer estimate

Declared fuel, properties and source plus carbon conversion factors

Well-to-Tank Factor:	Electricity	72.65	g CO2e / MJ	Fuel Provider	UK market standard	WTT evidence	DBEIS Conversion 2022
Well-to-Tank Factor:	Hydrogen	N/A	g CO2e / MJ	Capacity of Tanker (kg)	N/A	Fuel Type / Pathway	UK Grid Electricity
Energy Density	Hydrogen	N/A	MJ / kg	Transport Distance of Hydrogen (km)	N/A	Energy Source	UK Grid

Emissions and Energy consumption results from approved test facility - Average 4 tests

Test Phase	HC (g/km)	CO (g/km)	NOx (g/km)	PM (g/km)	CO ₂ (g/km)	CH ₄ (g/km)*	N ₂ O (g/km)*	Total Energy Consumption (kWh)	Vehicle Energy Consumption (kWh/km)	Grid Electrical Energy Consumption (kWh/100km)
Outer Urban	N/A	N/A	N/A	N/A	N/A	N/A	N/A	4.53	0.70	74.04
Inner Urban	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.38	0.95	100.48
Rural	N/A	N/A	N/A	N/A	N/A	N/A	N/A	4.10	0.55	58.55
LBC Average	N/A	N/A	N/A	N/A	N/A	N/A	N/A	6.91	0.77	81.41
UK BUS Average	N/A	N/A	N/A	N/A	N/A	N/A	N/A	11.01	0.67	71.08

Zero Emissions (Z.E.) Range: Energy consumption and charging efficiency

Test Charger Used	40kW	Total measured energy consumed on vehicle (kWh) ¹	98.00	Max ZE Range at 100% SOC (km)	553
Hydrogen Energy Over Test (kWh)	N/A	Measured grid energy during charging (kWh)	103.00	Max ZE Range at 80% SOC (km)	443
Hydrogen Delivered to Vehicle (kg)	N/A	Grid-to-Wheel efficiency (%) ²	95%	Test Distance Travelled (km)	131

¹ Total measured energy may include energy used during the 23 minute warmup, this is needed for charge efficiency calculation.

² Grid to Wheel efficiency represents the total energy losses between the grid and the wheels of the bus.

Calculated total Well-to-Wheel GHG CO₂ equivalent emissions over test

Test Phase	Fuel Energy (MJ/km)	Fuel WTT*GHG Emissions (g CO ₂ e / km)	Electrical Energy (MJ / km)	Electricity WTT* GHG Emissions (g CO ₂ e / km)
Outer Urban	N/A	N/A	2.67	193.65
Inner Urban	N/A	N/A	3.62	262.78
Rural	N/A	N/A	2.11	153.13
LBC Average	N/A	N/A	2.93	212.93
UK BUS Average	N/A	N/A	2.56	185.90

Data Generated by (On behalf of Test facility): Date:

Data Approved by: Date:

Zero Emission Bus Certificate Summary

Test Vehicle		Average Euro VI Diesel Equivalent	
Greenhouse Gas Emissions: Well-to-Wheel	185.9 g CO ₂ e / km	Average Diesel GHG Emissions Equivalent	1309 g CO ₂ e / km
WTW CO ₂ per passenger km (@ Max Pass Capacity)	2.1 g CO ₂ e/pass km	WTW CO ₂ per passenger km (@ Max Pass Capacity)	14.9 g CO ₂ e/pass km
Overall Zero Emission Bus Performance			
WTW GHG saving	1123.1 g CO ₂ e / km	Maximum Theoretical Zero Emission Range (km)	553.2
% WTW GHG saving	86% g CO ₂ e / km	Vehicle Energy Consumption (kWh/ km)	0.67
Approved as Zero Emission Bus? (50% GHG saving or more)		YES	

* WTT : Well-to-Tank

** TTW : Tank-to-Wheel

*** WTW : Well-to Wheel

COMMENTS: UKBC cycles used are all consecutive. 3 Full UKBC cycles carried out prior to first test used for this certificate. A very small section of trace was missed in test 2 of 20241205_1122_2xUKBC due to driver error. Second cycle taken from 20241205_1122, both cycles taken from 20241205_1336, first cycle taken from 20241205_1536.

Test Numbers:	Heating Requirement			
	Cell	Lower Saloon	Upper Saloon	
	20241205_1336_2xUKBC, 20241205_1536_2xUKBC, 20241205_1122_2xUKBC	Target Temperatures ±2 (°C) : 10	17	17
	Average Temperatures across testing (°C)	10.00	18.70	N/A

Certificate approved by:
On behalf of Bus manufacturer
Brian Maybin
23.01.2025

Certificate Approved by:
On behalf of DfT / Zemo Partnership

Tim Griffen
22nd Jan 2025