

Zero Emission Bus Certificate

Customer: Wrightbus					DYNAMOMETER SETTINGS		
Customer Address:	201 Galgorm Rd, Ballymena, County Antrim, BT42 1SA	Telematics Capability	Yes	Test Weight	14247	kg	
Test Purpose:	Zero Emission Bus Testing	Maximum Speed (km/h)	80 km/h	F ⁰	-538.26	N	
Vehicle Manufacturer:	Wrightbus	Seated Capacity	34	F ¹	-3.5633	N/kmh	
Vehicle Model Name:	GB Kite Electroliner AU383	Passenger Capacity	76	F ²	0.16733	N/kmh ²	
Powertrain Technology	Battery Electric	Declared Unladen Weight (kg)	12880	Equivalent test passengers	19	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	4.44	0.69	75.79
Inner Urban	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.21	0.89	98.04
Rural	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3.93	0.53	58.62
LBC Average	N/A	N/A	N/A	N/A	N/A	N/A	N/A	6.65	0.75	81.98
UK BUS Average	N/A	N/A	N/A	N/A	N/A	N/A	N/A	10.59	0.65	71.41

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

Test Charger Used	40kW	Total measured energy consumed on vehicle (kWh) ¹	107.00	Max ZE Range at 100% SOC (km)	573
Hydrogen Energy Over Test (kWh)	N/A	Measured grid energy during charging (kWh)	117.00	Max ZE Range at 80% SOC (km)	459
Hydrogen Delivered to Vehicle (kg)	N/A	Grid-to-Wheel efficiency (%) ²	91%	Test Distance Travelled (km)	154

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	2.73	198.22
Inner Urban	N/A	N/A	3.53	256.41
Rural	N/A	N/A	2.11	153.32
LBC Average	N/A	N/A	2.95	214.40
UK BUS Average	N/A	N/A	2.57	186.75

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	186.8 g CO ₂ e / km	Average Diesel GHG Emissions Equivalent	1196 g CO ₂ e / km
WTW CO ₂ per passenger km (@ Max Pass Capacity)	2.5 g CO ₂ e/pass km	WTW CO ₂ per passenger km (@ Max Pass Capacity)	15.7 g CO ₂ e/pass km
Overall Zero Emission Bus Performance			
WTW GHG saving	1009.2 g CO ₂ e / km	Maximum Theoretical Zero Emission Range (km)	573.2
% WTW GHG saving	84% g CO ₂ e / km	Vehicle Energy Consumption (kWh/ km)	0.65
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. Second cycle taken from 20241204_0913, both cycles taken from 20241204_1108, first cycle taken from 20241204_1404.

Heating Requirement	Cell	Lower Saloon	Upper Saloon
Target Temperatures ±2 (°C) :	10	17	17
Average Temperatures across testing (°C)	9.99	18.51	N/A

Test Numbers: 20241204_1108_2xUKBC, 20241204_1404_2xUKBC, 20241204_0913_2xUKBC

Certificate approved by:

On behalf of Bus manufacturer

Certificate Approved by:

On behalf of DfT / Zemo Partnership

Tim Griffen
22nd Jan 2025