Zemo Partnership | Zero Emission Bus Certification ID: ZEB-WRIGHTBUS-ELECTROLINER-340kWh-2025 | Approved Test facility UTAC

Zero Emission Bus Certificate

				DYNAMOMETER SETTINGS		
Customer:	**Wrightbus**					
Customer Address:	**201 Galgorm Rd, Ballymena, County Antrim, BT42 1SA**	*Telematics Capability*	Yes	Test Weight	15000	kg
Test Purpose:	**Zero Emission Bus Testing**	*Maximum Speed (km/h)*	80 km/h	F°	-647.44	N
Vehicle Manufacturer:	**Wrightbus**	*Seated Capacity*	64	F¹	-9.6042	N/kmh
Vehicle Model Name:	**Streetdeck Electroliner 340kWh**	*Passenger Capacity*	98	F²	0.27236	N/kmh ²
Powertrain Technology	**Battery Electric**	*Declared Unladen Weight (kg)*	12749	*Equivalent test passengers*	32	passengers
Powetrain Configuration	**Direct Drive**	*Gross Weight (kg)*	19500	*Measured Unladen Weight*	13268	kg
Zero Emission Heating	**Heat Pump**	*GVW Check*	**OK**	Number of conseuitve tests completed	4	Tests

Battery Specification		Charging and Refuelling Capability		Hydrogen Specification	
Battery Manufacturer	**Forsee Power**	**Plug Type**	**CCS2 & OppCharge**	**Fuel Cell Manufacturer**	**N/A**
Battery Chemistry	**NMC**	**Max Charge Capability (kW)**	**Up to 150kW/360 kW**	**Fuel Cell Power Rating (kW)**	**N/A**
Battery Installed Capacity (kWh)	**340**	**Charger Compatibility**	**DC**	**Hydrogen Storage Capacity (kg)**	**N/A**
Battery Usable Capacity (kWh)*	**272**	**Charge time from 20-80% SOC****	**2-6 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***	**120**	**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_2O (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	4.29	0.66	76.57
Inner Urban	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.35	0.93	107.72
Rural	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3.95	0.53	61.91
LBC Average	N/A	N/A	N/A	N/A	N/A	N/A	N/A	6.65	0.74	85.30
UK BUS Average	N/A	N/A	N/A	N/A	N/A	N/A	N/A	10.60	0.65	**74.76**

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

Test Charger Used	**40kW**	**Total measured energy consumed on vehicle (kWh)[1]**	**90.00**	**Max ZE Range at 100% SOC (km)**	**421**
Hydrogen Energy Over Test (kWh)	**N/A**	**Measured grid energy during charging (kWh)**	**104.00**	**Max ZE Range at 80% SOC (km)**	**337**
Hydrogen Delivered to Vehicle (kg)	**N/A**	**Grid-to-Wheel efficiency (%)[2]**	**86%**	**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 CO_2 equivalent emissions over test

Test Phase	Fuel Energy (MJ /km)	Fuel WTT*GHG Emissions (g CO_2e / km)	Electrical Energy (MJ / km)	Electricity WTT* GHG Emissions (g CO_2e / km)
Outer Urban	N/A	N/A	2.76	200.26
Inner Urban	N/A	N/A	3.88	281.73
Rural	N/A	N/A	2.23	161.92
LBC Average	N/A	N/A	3.07	223.09
UK BUS Average	N/A	N/A	2.69	195.54

Data Generated by (On behalf of Test facility): L. Coleman *Date:* 09/05/2025

Data Approved by: *Date:* 07/05/2025

Zero Emission Bus Certificate Summary

Test Vehicle			Average Euro VI Diesel Equivalent		
Greenhouse Gas Emissions: Well-to-Wheel	**195.5**	**g CO_2e / km**	**Average Diesel GHG Emissions Equivalent**	**1403.2**	**g CO_2e / km**
WTW CO_2 per passenger km (@ Max Pass Capacity)	**2.0**	**g CO_2e/pass km**	**WTW CO_2 per passenger km (@ Max Pass Capacity)**	**14.3**	**g CO_2e/pass km**

Overall Zero Emission Bus Performance

WTW GHG saving	**1207.6 g CO_2e / km**	**Maximum Theoretical Zero Emission Range (km)**	**421.1**
% WTW GHG saving	**86% g CO_2e / 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:
Street Parameters & Inertia supplied by Customer.
Amber Low Tyre Pressure light on throughout testing.
Driver Violation - 20250430 1432 (Test2), 1892 Seconds into test.

Heating Requirement	Cell	Lower Saloon	Upper Saloon
Target Temperatures ±2 (°C) :	**10**	**17**	**17**
Average Temperatures across testing (°C)	10.01	16.85	16.25

Test Numbers: 20250430_1049_2xUKBC(test2), 20250430_1432_2xUKBC(test1), 20250430_1432_2xUKBC(test2), 20250430_1628_2xUKBC(test1)

Certificate approved by: Brian Maybin
On behalf of Bus manufacturer 11/06/2025 Brian Maybin

Certificate Approved by: A Thomson
On behalf of DfT / Zemo Partnership
Alec Thomson
Programme & Operations Manager