

Simulated Zero Emission Bus Certificate

Customer:	Wrightbus		DYNAMOMETER SETTINGS		
Customer Address:	201 Galgorm Rd, Ballymena, County Antrim, BT42 1SA		Test Weight	15071	kg
Test Purpose:	Zero Emission Bus Testing		Maximum Speed (km/h)	80	km/h
Vehicle Manufacturer:	Wrightbus		Seated Capacity	74	
Vehicle Model Name:	Wrightbus NewPower Volvo B5TL		Passenger Capacity	87	
Powertrain Technology:	Battery Electric		Declared Unladen Weight (kg)	12480	
Powertrain Configuration:	Direct Drive		Gross Weight (kg)	18471	
Zero Emission Heating:	Heat Pump		GVW Check	OK	
			Equivalent test passengers	n/a	passengers
			Measured Unladen Weight	n/a	kg
			Number of consecutive tests completed	n/a	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 / 200 A	Fuel Cell Power Rating (kW)	N/A
Battery Installed Capacity (kWh)	308	Charger Compatibility	DC	Hydrogen Storage Capacity (kg)	N/A
Battery Usable Capacity (kWh)*	245	Charge time from 20-80% SOC**	1.4hrs	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 CO ₂ e / MJ	Fuel Provider	UK market standard	WTT evidence
Well-to-Tank Factor: Hydrogen	N/A	g CO ₂ e / MJ	Capacity of Tanker (kg)	N/A	Fuel Type / Pathway
Energy Density: Hydrogen	N/A	MJ / kg	Transport Distance of Hydrogen (km)	N/A	Energy Source
					DBEIS Conversion 2022
					UK Grid Electricity
					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	5.40	0.83	96.50
Inner Urban	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.70	1.07	124.40
Rural	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5.42	0.73	84.90
LBC Average	N/A	N/A	N/A	N/A	N/A	N/A	N/A	8.09	0.91	105.30
UK BUS Average	N/A	N/A	N/A	N/A	N/A	N/A	N/A	13.51	0.82	95.40

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

Test Charger Used	N/A	Total measured energy consumed on vehicle (kWh) ¹	N/A	Max ZE Range at 100% SOC (km)	299
Hydrogen Energy Over Test (kWh)	N/A	Measured grid energy during charging (kWh)	N/A	Max ZE Range at 80% SOC (km)	239
Hydrogen Delivered to Vehicle (kg)	N/A	Grid-to-Wheel efficiency (%) ²	86%	Test Distance Travelled (km)	N/A

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

Calculated total Well-to-Wheel GHG CO₂ equivalent emissions over test					Data Generated by (On behalf of Test facility):	Date:
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)	SIMULATED	
Outer Urban	N/A	N/A	3.47	252.39	Data Approved by: _____ Date: _____	
Inner Urban	N/A	N/A	4.48	325.36		
Rural	N/A	N/A	3.06	222.05		
LBC Average	N/A	N/A	3.79	275.40		
UK BUS Average	N/A	N/A	3.43	249.51		

Zero Emission Bus Certificate Summary

Test Vehicle		Average Euro VI Diesel Equivalent			
Greenhouse Gas Emissions: Well-to-Wheel	249.5	g CO ₂ e / km	Average Diesel GHG Emissions Equivalent	1300	g CO ₂ e / km
WTW CO ₂ per passenger km (@ Max Pass Capacity)	2.9	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	1050.0	g CO ₂ e / km	Maximum Theoretical Zero Emission Range (km)	298.8
% WTW GHG saving	81%	g CO ₂ e / km	Vehicle Energy Consumption (kWh/ km)	0.8

Approved as Zero Emission Bus? (50% GHG saving or more)


YES

* WTT : Well-to-Tank

** TTW : Tank-to-Wheel

*** WTW : Well-to Wheel

COMMENTS: Certificate generated Feb 2025 using simulated data from fully-validated multi-physics simulation tool. Simulated certificate valid until 31/08/25 - following receipt of purchase order number for physical chassis dynamometer test. Results to be replaced with valid UKBC tests. Certificate will become invalid. Charger efficiency based on existing certified Wrightbus StreetDeck Electroliner BEV 340kWh and 454kWh.	Heating Requirement	Cell	Lower Saloon	Upper Saloon
	Target Temperatures ±2 (°C) :	10	17	17
	Average Temperatures across testing (°C)	n/a	n/a	n/a

Test Numbers:	SIMULATED		
Certificate approved by:	Dr Andy Harris Head of Research & Data Analytics Wrightbus	Certificate Approved by:	Alec Thomson Programme & Operations Manager Zemo Partnership
On behalf of Bus manufacturer		On behalf of DfT / Zemo Partnership	