Zemo Partnership

Zero Emission Bus Certification ID: ZEB-CustomBus-Element2-2025

Approved Test facility UTAC

Zero Emission Bus Certificate

Customer:	Custom Bus Group Ltd			DYNAMOMETER SETTINGS		
Customer Address:	18-30 Vallance Street, 2760 St Marys, NSW, Australia	Telematics Capability	Yes	Test Weight	14737	kg
Test Purpose:	ZEB UKBC Testing	Maximum Speed (km/h)	80km/h	F°	-181.40	N
Vehicle Manufacturer	Custom Bus Group Ltd	Seated Capacity	43	F¹	-4.4980	N/kmh
Vehicle Model Name:	Element 2	Passenger Capacity	76	F²	0.22641	N/kmh ²
Powertrain Technolog	Battery Electric	Declared Unladen Weight (kg)	13200	Equivalent test passengers	21.5	passengers
Powetrain Configurati		Gross Weight (kg)	18000	Measured Unladen Weight	13275	kg
Zero Emission Heating	PTC Heating	GVW Check	OVER	mber of consecutive tests complete	4	Tests

Battery Specification		Charging and Refuelling Capability		Hydrogen Specification	
Battery Manufacturer	Forsee Power	Plug Type	ual CCS2/Oppcharg	Fuel Cell Manufacturer	N/A
Battery Chemistry	NMC	Max Charge Capability (kW)	128kW / 300kW	Fuel Cell Power Rating (kW)	N/A
Battery Installed Capacity (kWh)	383	Charger Compatibility	DC	Hydrogen Storage Capacity (kg)	N/A
Battery Usable Capacity (kWh)*	306	Charge time from 20-80% SOC**	1.8 - 2 hrs	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_2e / MJ**	*Fuel Provider*	**UK market standard**	*WTT evidence*	**DBEIS Conversion 2022**
Well-to-Tank Factor:	***Hydrogen***	**N/A**	**g CO_2e / 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_2O (g/km)*	Total Energy Consumption (kWh)	Vehicle Energy Consumption (kWh/km)	Grid Electrical Energy Consumption
Outer Urban	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5.98	0.92	103.70
Inner Urban	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.68	1.07	120.05
Rural	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5.18	0.70	78.96
LBC Average	N/A	N/A	N/A	N/A	N/A	N/A	N/A	8.66	0.96	108.27
UK BUS Average	N/A	N/A	N/A	N/A	N/A	N/A	N/A	13.84	0.84	95.05

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

Test Charger Used	40kW	Total measured energy consumed on vehicle (kWh)[1]	62.90	Max ZE Range at 100% SOC (km)	365
Hydrogen Energy Over Test (kWh)	N/A	Measured grid energy during charging (kWh)	70.80	Max ZE Range at 80% SOC (km)	292
Hydrogen Delivered to Vehicle (kg)	N/A	Grid-to-Wheel efficiency (%)[2]	89%	Test Distance Travelled (km)	72

[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	3.73	271.22
Inner Urban	N/A	N/A	4.32	313.97
Rural	N/A	N/A	2.84	206.51
LBC Average	N/A	N/A	3.90	283.17
UK BUS Average	N/A	N/A	3.42	248.60

Data Generated by (On behalf of Test facility): Iwan Mills *Date:* 20/01/2025

Data Approved by: L. Coleman *Date:* 20/01/2025

Zero Emission Bus Certificate Summary

Test Vehicle			*Average Euro VI Diesel Equivalent*		
Greenhouse Gas Emissions: Well-to-Wheel	**248.6**	**g CO_2e / km**	**Average Diesel GHG Emissions Equivalent**	**1196**	**g CO_2e / km**
WTW CO_2 per passenger km (@ Max Pass Capacity)	**3.3**	**g CO_2e/pass km**	**WTW CO_2 per passenger km (@ Max Pass Capacity)**	**15.7**	**g CO_2e/pass km**

Overall Zero Emission Bus Performance

WTW GHG saving	**947.3**	**g CO_2e / km**	**Maximum Theoretical Zero Emission Range (km)**	**364.7**
% WTW GHG saving	**79%**	**g CO_2e / km**	**Vehicle Energy Consumption (kWh/ km)**	**0.84**
Approved as Zero Emission Bus? (50% GHG saving or more)			***YES***	

** WTT : Well-to-Tank* *** TTW : Tank-to-Wheel* **** WTW : Well-to Wheel*

COMMENTS: Customer carried out a software change after the coastdown to change HVAC settings to 17 degrees as approved by procedure.

On last door close on fourth UKBC cycle, doors took 15 seconds longer to close than usual so acceleration didn't meet the trace.

Heating Requirement	Cell	Lower Saloon	Upper Saloon
Target Temperatures ±2 (°C) :	10	17	17
Average Temperatures across testing (°C)	10.01	17.00	n/a

Test Numbers: 20250116_1335_2xUKBC, 20250116_1028_2xUKBC

Certificate approved by:
On behalf of Bus manufacturer

Certificate Approved by:
On behalf of Zemo Partnership
A Thomson
Project Manager