Zemo Partnership | **Zero Emission Bus Certification ID:** | **ZEB-EQUIPMAKE-VERSA-EV-2024** | Approved Test facility | UTAC

Zero Emission Bus Certificate

Customer:	**Equipmake**			**DYNAMOMETER SETTINGS**		
Customer Address:	**UNIT 7, SNETTERTON BUSINESS PARK, NR16 2JU**	*Telematics Capability*	Yes	Test Weight	9622	kg
Test Purpose:	**Zero Emission Bus Testing (ZEVRAS)**	*Maximum Speed (km/h)*	80 km/h	F°	-41.75	N
Vehicle Manufacturer:	**Equipmake**	*Seated Capacity*	36	F^1	2.3981	N/kmh
Vehicle Model Name:	**Versa V1110 EV Repower**	*Passenger Capacity*	58	F^2	0.12332	N/kmh ²
Powertrain Technology	**Battery Electric**	*Declared Unladen Weight (kg)*	8300	*Equivalent test passengers*	18	passengers
Powetrain Configuration	**Direct Drive**	*Gross Weight (kg)*	12480	*Measured Unladen Weight*	8390	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	**LG Energy Solution**	Plug Type	**CCS2**	Fuel Cell Manufacturer	**N/A**
Battery Chemistry	**Lithium-ion NCM**	Max Charge Capability (kW)	**Up to 116kW**	Fuel Cell Power Rating (kW)	**N/A**
Battery Installed Capacity (kWh)	**274**	Charger Compatibility	**DC**	Hydrogen Storage Capacity (kg)	**N/A**
Battery Usable Capacity (kWh)*	**219**	Charge time from 20-80% SOC**	**1-2 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_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	5.37	0.84	99.35
Inner Urban	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.22	0.90	106.94
Rural	N/A	N/A	N/A	N/A	N/A	N/A	N/A	4.03	0.55	65.20
LBC Average	N/A	N/A	N/A	N/A	N/A	N/A	N/A	7.59	0.86	101.46
UK BUS Average	N/A	N/A	N/A	N/A	N/A	N/A	N/A	11.62	0.72	**85.07**

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

Test Charger Used	**40kW**	**Total measured energy consumed on vehicle (kWh)[1]**	**53.46**	**Max ZE Range at 100% SOC (km)**	**305**
Hydrogen Energy Over Test (kWh)	**N/A**	**Measured grid energy during charging (kWh)**	**63.30**	**Max ZE Range at 80% SOC (km)**	**244**
Hydrogen Delivered to Vehicle (kg)	**N/A**	**Grid-to-Wheel efficiency (%)[2]**	**84%**	**Test Distance Travelled (km)**	**71**

[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 equvialent 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	3.58	259.85
Inner Urban	N/A	N/A	3.85	279.70
Rural	N/A	N/A	2.35	170.53
LBC Average	N/A	N/A	3.65	265.37
UK BUS Average	N/A	N/A	3.06	222.48

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	**222.5**	**g CO2e / km**	**Average Diesel GHG Emissions Equivalent**	**1026**	**g CO2e / km**
WTW CO2 per passenger km (@ Max Pass Capacity)	**3.8**	**g CO2e/pass km**	**WTW CO2 per passenger km (@ Max Pass Capacity)**	**17.7**	**g CO2e/pass km**

Overall Zero Emission Bus Performance

WTW GHG saving	**803.9**	**g CO2e / km**	**Maximum Theoretical Zero Emission Range (km)**	**304.8**
% WTW GHG saving	**78%**	**g CO2e / km**	**Vehicle Energy Consumption (kWh/ km)**	**0.72**
Approved as Zero Emission Bus? (50% GHG saving or more)			***YES***	

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

COMMENTS: Outer London Cycle carried out as warmup prior to testing.

Heating Requirement	**Cell**	**Lower Saloon**	**Upper Saloon**
Target Temperatures ±2 (°C) :	**10**	**17**	**17**
Average Temperatures across testing (°C)	10.00	16.79	N/A

Test Numbers: 20240913_1356_2xUKBC, 20240913_1631_2xUKBC

Certificate approved by:
On behalf of Bus manufacturer
S. ELLERBY
Stephen Ellerby
28.10.2024

Certificate Approved by:
On behalf of DfT / Zemo Partnership
Tim Griffen
28.10.2024