

Ultra Low Emission Bus Scheme Certificate

Customer:	Alexander Dennis Ltd.				
Customer Address:	Dennis Way, Guildford, Surrey, GU1 1AF				
Test Purpose:	ULEB Testing			DYNAMOMETER SETTINGS	
Vehicle Manufacturer:	Alexander Dennis Ltd.	Unladen weight (kg)	12060.0	Test Weight	14515 kg
Vehicle Type & Number:	ADL E400H, G445	Gross Weight (kg)	18000.0	F°	43.42 N
Engine:	Cummins/BAE Euro VI Hybrid	Seated Capacity	70	F ¹	11.3621 N/kmh
Transmission:	Automatic	Passenger Capacity	87	F ²	-0.00552 N/kmh ²
Euro VI certificate Y/N	Manufacturer Certified	GVW Check	OK	F ³	0.0006470 N/kmh ³

Declared fuel, properties and source plus carbon conversion factors

Net Heating Value: Diesel	36.00	MJ / Litre	Fuel Provider	UK market standard
Well-to-Tank Factor: Diesel	15.42	g CO _{2e} / MJ	WTT evidence	UK GHG reporting factors 2016
Well-to-Tank Factor: Electricity	143.50	g CO _{2e} / MJ	Fuel Type	UK Pump Diesel, UK Grid Electricity

Emissions and Energy consumption results from approved test facility - Average 3 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)*	Fuel Consumption (l/100 km)	Fuel used over phase/cycle (litres)
Outer London	0.002	0.017	0.120	N/A	664.7	0.000	0.053	25.10	1.608
Inner London	0.002	0.033	0.229	N/A	924.3	0.000	0.088	34.90	0.869
Rural	0.000	0.010	0.224	N/A	582.4	0.000	0.057	21.99	1.624
MLTB Average	0.002	0.022	0.151	N/A	736.9	0.000	0.064	27.82	2.748
UKBC Average	0.001	0.016	0.184	0.0029	667.1	0.000	0.060	25.18	4.101

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

Total measured energy consumed on vehicle (kWh)	N/A	Distance in Z.E. mode (km)	N/A	Usable Battery Capacity (kWh)	N/A
Measured grid energy during charging (kWh)*	N/A	Charging efficiency (%)	N/A	Max Theoretical Z.E. Range (km)	N/A

Total Tank-to-Wheel GHG CO₂ equivalent

Test Phase	CO ₂ (g/km)	CH ₄ (g/km x 25)*	N ₂ O (g/km x 298)*	Fuel TTW** GHG (CO ₂ Equivalent g/km)
Outer London	664.7	0.000	15.860	680.6
Inner London	924.3	0.000	26.076	950.4
Rural	582.4	0.000	16.862	599.2
MLTB Average	736.9	0.000	19.185	756.1
UKBC Average	667.1	0.000	17.877	684.9

Calculated total Well-to-Wheel GHG CO₂ 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)	Measured Fuel TTW** GHG Emissions (g CO _{2e} / km)	Total WTW*** GHG Emissions (g CO _{2e} / km)
Outer London	9.03	139.3	N/A	N/A	680.6	819.9
Inner London	12.56	193.7	N/A	N/A	950.4	1144.1
Rural	7.92	122.1	N/A	N/A	599.2	721.3
MLTB Average	10.02	154.5	N/A	N/A	756.1	910.6
UKBC Average	9.07	139.8	N/A	N/A	684.9	824.7

Data Generated by (On behalf of Test facility):	Date: 18.04.2018	Data Approved by:	Date: 18.04.2018
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Ultra Low Emission Bus Certificate Summary

GHG Well-to-Wheel	824.7	g CO _{2e} / km
Euro VI Average Diesel Equivalent	1299.5	g CO _{2e} / km
WTW GHG saving (compared with Euro VI diesel equivalent)	474.8	g CO _{2e} / km
% WTW GHG saving (compared with Euro VI diesel equivalent)	37%	g CO _{2e} / km
Zero Emission operating range (km)	N/A	km
WTW CO ₂ per passenger km (@ Max Pass Capacity)	9.5	g CO _{2e} /pass km
Approved as Ultra Low Emission Bus? (30% saving or more)	YES	

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

COMMENTS:
 Emission results marked in red are below detection levels.
 CO₂, N₂O and Fuel Consumption not adjusted for average NEC of -4.52% (Negative NEC signifies electrical energy harvested into the vehicle battery rather than being discharged).

Test Numbers: ML02017910 (12 April 2018), ML02017911 (12 April 2018), ML02017912 (12 April 2018).
 Certificate approved by: _____
 On behalf of Bus manufacturer

Certificate Approved by: _____
 On behalf of LowCVP/DfT