

## Low Emission Bus Scheme Certificate

Customer:	Alexander Dennis Ltd				
Customer Address:	Plaxton, Cayton Low Road, Eastfield, Scarborough, YO11 3BY				
Test Purpose:	LEB Testing			DYNAMOMETER SETTINGS	
Vehicle Manufacturer:	ADL E400 Virtual Electric	Unladen weight (kg)	12350.0	Test Weight	15286 kg
Vehicle Type & Number:	SN65ZGS	Gross Weight (kg)	19500.0	F°	460.95 N
Engine:	Cummins ISB Euro VI	Seated Capacity	65	F <sup>1</sup>	-5.1260 N/kmh
Transmission:	BAE TB100 Hybrid Electric	Passenger Capacity	81	F <sup>2</sup>	0.41611 N/kmh <sup>2</sup>
Euro VI certificate Y/N	Manufacturer Certified	GVW CHECK	OK	F <sup>3</sup>	-0.025130 N/kmh <sup>3</sup>

### 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 <sub>2</sub> e / MJ	WTT evidence	UK GHG reporting factors 2016
Well-to-Tank Factor: Electricity	143.50	g CO <sub>2</sub> e / MJ	Fuel Type*	UK Pump Diesel, UK Grid Electricity inc. WTT + T&D

### 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 <sub>2</sub> (g/km)	CH <sub>4</sub> (g/km)*	N <sub>2</sub> O (g/km)*	Diesel Fuel Consumption (l/100 km)	Grid Energy Consumption (kWh/ 100 km)
Rural	0.000	0.002	0.008	N/A	310.7	0.000	0.019	11.73	89.1
Outer London	0.000	0.007	0.009	N/A	408.1	0.000	0.029	15.41	93.9
Inner London	0.000	0.011	0.021	N/A	412.6	0.000	0.034	15.58	110.7
MLTB Average	0.000	0.009	0.015	N/A	410.351	0.000	0.031	15.49	102.3
<b>LUB Average</b>	<b>0.000</b>	<b>0.006</b>	<b>0.010</b>	<b>0.00128</b>	<b>364.6</b>	<b>0.000</b>	<b>0.025</b>	<b>13.77</b>	<b>99.3</b>

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

Total measured energy consumed on vehicle (kWh)	46.32	Distance in Z.E. mode (km)	39.90	Usable Battery Capacity (kWh)	46.3
Measured grid energy during charging (kWh)	54.49	Charging efficiency (%)	85%	Max Theoretical Z.E. Range (km)	39.9

### Total Tank-to-Wheel GHG CO<sub>2</sub> equivalent

Test Phase	CO <sub>2</sub> (g/km)	CH <sub>4</sub> (g/km x 25)*	N <sub>2</sub> O (g/km x 298)*	Fuel TTW** GHG (CO <sub>2</sub> Equivalent g/km)
Rural	310.74	0.000	5.73	316.47
Outer London	408.12	0.000	8.64	416.75
Inner London	412.59	0.000	10.14	422.72
MLTB	410.35	0.000	9.39	419.74
<b>LUB Total Average</b>	<b>364.65</b>	<b>0.000</b>	<b>7.55</b>	<b>372.19</b>

### Calculated total Well-to-Wheel GHG CO<sub>2</sub> equivalent emissions over test

Test Phase	Fuel Energy (MJ / km)	Fuel WTT*GHG Emissions (g CO <sub>2</sub> e / km)	Electrical Energy (MJ / km)	Electricity WTT* GHG Emissions (g CO <sub>2</sub> e / km)	Measured Fuel TTW** GHG Emissions (g CO <sub>2</sub> e / km)	Total WTW*** GHG Emissions (g CO <sub>2</sub> e / km)
Rural	4.22	65.13	3.21	460.26	316.47	841.85
Outer London	5.55	85.53	3.38	485.05	416.75	987.34
Inner London	5.61	86.47	3.98	571.71	422.72	1080.91
MLTB	5.58	86.00	3.68	528.38	419.74	1034.13
<b>LUB Total Average</b>	<b>4.96</b>	<b>76.42</b>	<b>3.58</b>	<b>513.13</b>	<b>372.19</b>	<b>961.74</b>

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

GHG Well-to-Wheel	961.7	g CO <sub>2</sub> e / km
Euro V Average Diesel Equivalent	1243.0	g CO <sub>2</sub> e / km
WTW GHG saving (compared with Euro V diesel equivalent)	281.3	g CO <sub>2</sub> e / km
% WTW GHG saving (compared with Euro V diesel equivalent)	23%	g CO <sub>2</sub> e / km
Max Theoretical Zero Emission Operating Range (km)	39.9	km
WTW CO <sub>2</sub> per passenger km (@ Max Pass Capacity)	11.9	g CO <sub>2</sub> e/pass km
Approved as Low Emission Bus? (15% saving or more)	<b>YES</b>	

\* WTT : Well-to-Tank

\*\* TTW : Tank-to-Wheel

\*\*\* WTW : Well-to Wheel

COMMENTS: \* compound measured via Fourier Transfer Infra-Red (FTIR), Values in RED are below levels of detectability.

\*\* CO<sub>2</sub> & N<sub>2</sub>O results NOT adjusted for NEC, as interpolation not possible, LUB Tailpipe emissions and Fuel Usage modified using EV Range:4 x LUB ratio (1-39.9/63.4), MLTB Tailpipe Emissions set to zero, as in theory, 1-(39.9/36) <0.

\*\*\* Energy over 3 Full LUB cycles \*\*\*\*Calculated using energy used from test and assumed charging efficiency

Test Numbers: ML02015585 (09 May 2016), ML02015587 (09 May 2016), ML02015589 (09 May 2016). WTT Factors Published: 6th June 2016

Certificate approved by: On behalf of Bus manufacturer	Certificate Approved by: On behalf of LowCVP/DfT
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