

## Ultra Low Emission Bus Scheme Certificate

Customer:	Alexander Dennis			<b>DYNAMOMETER SETTINGS</b>		
Customer Address:	Cameron House, Priorswood Place, East Pimbo, Skelmersdale, West Lancashire, WN8 9QB			Measured Kerb Weight (kg)	13308	
Test Purpose:	ULEB Bus Testing	Test Type:	UKBC	Equivalent test passengers	34	
Vehicle Manufacturer:	Alexander Dennis	Seated Capacity	68	Test Weight	15905	
Vehicle Type & Number:	ADL E400 EV J415	Passenger Capacity	83	F°	152.66	N
Engine:	Hub Motor	Declared Kerb Weight (kg)	13520	F <sup>1</sup>	11.3621	N/kmh
Transmission:	BYD-2912TZ-XY-A	Gross Vehicle Weight (kg)	19200	F <sup>2</sup>	-0.00552	N/kmh <sup>2</sup>
Euro VI certificate Y/N	N/A	GVW CHECK	OK	F <sup>3</sup>	0.000647	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	17.02	g CO <sub>2e</sub> / MJ	WTT evidence	UK GHG reporting factors 2020
Well-to-Tank Factor: Electricity	80.04	g CO <sub>2e</sub> / MJ	Fuel Type	UK Grid Electricity

### 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 <sub>2</sub> (g/km)	CH <sub>4</sub> (g/km)	N <sub>2</sub> O (g/km)	Energy Consumption (Kwh/km)	Energy Consumption (Kwh)	Energy used over phase/cycle (kWh/100km)
Outer Urban	0.000	0.000	0.000	0.00	0.0	0.000	0.000	1.464	9.450	185.363
Inner Urban	0.000	0.000	0.000	0.00	0.0	0.000	0.000	1.709	4.266	216.294
Rural	0.000	0.000	0.000	0.00	0.0	0.000	0.000	1.096	8.065	138.797
LBC Average	0.000	0.000	0.000	0.0000	0.0	0.000	0.000	1.533	13.716	194.012
<b>UKBC Average</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.0000</b>	<b>0.0</b>	<b>0.000</b>	<b>0.000</b>	<b>1.336</b>	<b>21.780</b>	<b>169.081</b>

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

Total measured energy consumed on vehicle (kWh)	87	Distance in Z.E. mode (km)	65	Usable Battery Capacity (kWh)	382
**Measured grid energy during charging (kWh)	N/A	Charging efficiency (%)	79%	Max Theoretical Z.E. Range (km)	286

### 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)
Outer Urban	0.0	0.000	0.000	0.0
Inner Urban	0.0	0.000	0.000	0.0
Rural	0.0	0.000	0.000	0.0
LBC Average	0.0	0.000	0.000	0.0
<b>UKBC Average</b>	<b>0.0</b>	<b>0.000</b>	<b>0.000</b>	<b>0.0</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>2e</sub> / km)	Electrical Energy (MJ / km)	Electricity WTT* GHG Emissions (g CO <sub>2e</sub> / km)	Measured Fuel TTW** GHG Emissions (g CO <sub>2e</sub> / km)	Total WTW*** GHG Emissions (g CO <sub>2e</sub> / km)
Outer Urban	N/A	N/A	6.67	534.11	0.0	534.1
Inner Urban	N/A	N/A	7.79	623.24	0.0	623.2
Rural	N/A	N/A	5.00	399.93	0.0	399.9
LBC Average	N/A	N/A	6.98	559.03	0.0	559.0
<b>UKBC Average</b>	<b>N/A</b>	<b>N/A</b>	<b>6.09</b>	<b>487.20</b>	<b>0.0</b>	<b>487.2</b>

Data Generated by (On behalf of Test facility): Date: 03/02/2020 Data Approved by: Date: 03/02/2020

### Ultra Low Emission Bus Certificate Summary

GHG Well-to-Wheel ***	657.7	g CO <sub>2e</sub> / km
Euro VI Average Diesel Equivalent	1287.1	g CO <sub>2e</sub> / km
WTW GHG saving (compared with Euro VI diesel equivalent)	629.4	g CO <sub>2e</sub> / km
% WTW GHG saving (compared with Euro VI diesel equivalent)	49%	g CO <sub>2e</sub> / km
Max Theoretical Zero Emission Operating Range (km)	286.0	km
WTW CO <sub>2</sub> per passenger km (@ Max Pass Capacity)	7.9	g CO <sub>2e</sub> /pass km
Approved as Ultra-Low Emission Bus? (30% saving or more)	<b>YES</b>	

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

COMMENTS: **Measured grid energy during charging could not be calculated as a result of the information/values displayed on the BYD charger unit produced an incorrect charge efficiency value. Charge efficiency value has been updated after more recent testing (ML02018952_54_55_56). *** Diesel Heater factor added to value (170.5 g CO <sub>2e</sub> / km), vehicle was not tested with the Diesel Heater. Factor added post testing, by Customer request	Cell	Lower Saloon	Upper Saloon	
	Target Temperatures ±2 (°C) :	10	17	17
	Average Temperatures across testing (°C)	9.20	12.97	13.70

**Test Numbers:** ML02018620 (18.03.2019), ML02018621 (18.03.2019), ML02018622 (18.03.2019), ML02018623 (18.03.2019)      WTT Factors Published: 19th June 2018

Certificate approved by: Matthew Lawrence	Certificate Approved by: Dan Hayes	Date: 01/03/2021
On behalf of Bus manufacturer: Alexander Dennis	On behalf of LowCVP/DfT: LowCVP	Date: 01/03/2021