

Ultra Low Emission Bus Scheme Certificate

Customer:	Alexander Dennis	DYNAMOMETER SETTINGS	
Customer Address:	Dennis Way, Guildford, Surrey, GU1 1AF	Measured Kerb Weight (kg)	N/A
Test Purpose:	ULEB Testing	Test Type:	Certification
Vehicle Manufacturer:	Alexander Dennis	Seated Capacity	67
Vehicle Type & Number:	Alexander Dennis E400H, G445	Passenger Capacity	86
Engine:	Cummins ISB4.5 e6 VI	Declared Kerb Weight (kg)	12777
Transmission:	BAE Series ER Hybrid HD100	Gross Vehicle Weight (kg)	18750
Euro VI certificate Y/N	Manufacturer Certified	GVW CHECK	OK

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	17.23	g CO ₂ e / MJ	WTT evidence	UK GHG reporting factors 2019
Well-to-Tank Factor: Electricity	87.77	g CO ₂ e / 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)*	Energy Consumption (kWh/km)	Fuel Consumption (l/100 km)	Fuel used over phase/cycle (litres)
Outer Urban	0.001	0.001	0.294	N/A	1060.5	0.004	0.226	N/A	40.04	2.547
Inner Urban	0.003	0.006	0.015	N/A	0.0	0.000	0.000	1.244	0.00	0.000
Rural	0.000	0.000	0.409	N/A	620.4	0.001	0.137	N/A	23.42	1.724
LBC Average	0.002	0.002	0.216	N/A	765.3	0.000	0.163	N/A	28.90	2.547
UKBC Average	0.001	0.001	0.304	0.0111	699.4	0.002	0.152	N/A	26.40	4.270

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)	2.8	Usable Battery Capacity (kWh)	15
Measured grid energy during charging (kWh)*	N/A	Charging efficiency (%)	N/A	Max Theoretical Z.E. Range (km)	12.1

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 Urban	1060.5	0.099	67.420	1128.0
Inner Urban	0.0	0.000	0.043	0.0
Rural	620.4	0.024	40.913	661.4
LBC Average	765.3	0.000	48.679	814.0
UKBC Average	699.4	0.050	45.159	744.6

Calculated total Well-to-Wheel GHG CO₂ equivalent emissions over test

Test Phase	Fuel Energy (MJ / km)	Fuel WTT*GHG Emissions (g CO ₂ e / km)	Electrical Energy (MJ / km)	Electricity WTT* GHG Emissions (g CO ₂ e / km)	Measured Fuel TTW** GHG Emissions (g CO ₂ e / km)	Total WTW*** GHG Emissions (g CO ₂ e / km)
Outer Urban	14.41	248.4	N/A	N/A	1128.0	1376.4
Inner Urban	0.00	0.0	N/A	N/A	0.0	0.0
Rural	8.43	145.3	N/A	N/A	661.4	806.7
LBC Average	10.40	179.3	N/A	N/A	814.0	993.3
UKBC Average	9.51	163.8	N/A	N/A	744.6	908.4

Data Generated by (On behalf of Test facility):

Date: 23/06/2020

Data Approved by:

Date: 23/06/2020

Ultra Low Emission Bus Certificate Summary

GHG Well-to-Wheel	908.4	g CO ₂ e / km
Euro VI Average Diesel Equivalent	1315.9	g CO ₂ e / km
WTW GHG saving (compared with Euro VI diesel equivalent)	407.5	g CO ₂ e / km
% WTW GHG saving (compared with Euro VI diesel equivalent)	31%	g CO ₂ e / km
Max Theoretical Zero Emission Operating Range (km)	12.1	km
WTW CO ₂ per passenger km (@ Max Pass Capacity)	10.6	g CO ₂ e/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: * compound measured via Fourier Transfer Infra-Red (FTIR), Values in RED are below levels of detectability.	Cell	Lower Saloon	Upper Saloon
Phase 2 of each test conducted in EV Mode, Zero emissions for following distances: ML02019179: 2.66km, ML02019180: 2.97km, ML02019182: 2.78km During the phase, the following energy consumption was recorded (RESS: 600V): ML02019179: 1.179kWh/km, ML02019180: 1.177kWh/km, ML02019182: 1.375kWh/km	Average Temperatures:	9.45	18.15
Test Numbers: ML02019179 (22-Jun-20), ML02019180 (22-Jun-20), ML02019182 (23-Jun-20).	WTT Factors Published: 7th June 2019		

Certificate approved by: Dan Hyden
On behalf of Bus manufacturer 01/07/2020

Certificate Approved by: Daniel Hayes
On behalf of LowCVP/DJT 01.07.20