

## Ultra Low Emission Bus Scheme Certificate

Customer:	CAETANOBUS, S.A.			<b>DYNAMOMETER SETTINGS</b>	
Customer Address:	4431-901 Vila Nova de Gaia			Measured Kerb Weight (kg)	13195
Test Purpose:	ULEB Testing			Equivalent test passengers	16.25
Vehicle Manufacturer:	CAETANOBUS	Seated Capacity	31	Test Weight	14375
Vehicle Type & Number:	Caetano e.CityGold	Passenger Capacity	65	F°	346.64 N
Engine:	Siemens	Declared Kerb Weight (kg)	13530	F <sup>1</sup>	-10.2804 N/kmh
Transmission:	Elbe Direct drive transmission	Gross Vehicle Weight (kg)	17950	F <sup>2</sup>	0.52000 N/kmh <sup>2</sup>
Euro VI certificate Y/N	Manufacturer Certified	GVW CHECK	OK	F <sup>3</sup>	-0.0043670 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 6 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 London	0.000	0.000	0.000	0.00	0.0	0.000	0.000	1.02	6.53	133.860
Inner London	0.000	0.000	0.000	0.00	0.0	0.000	0.000	1.20	2.98	157.885
Rural	0.000	0.000	0.000	0.00	0.0	0.000	0.000	0.76	5.64	100.252
LBC Average	0.000	0.000	0.000	0.00000	0.0	0.000	0.000	1.07	9.51	140.565
UKBC Average	0.000	0.000	0.000	0.0000	0.0	0.000	0.000	0.93	15.15	122.269

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

Total measured energy consumed on vehicle (kWh)	91	Distance in Z.E. mode (km)	98	Usable Battery Capacity (kWh)	350
Measured grid energy during charging (kWh)*	119	Charging efficiency (%)	76%	Max Theoretical Z.E. Range (km)	376

### 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 London	0.0	0.000	0.000	0.0
Inner London	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
UKBC Average	0.0	0.000	0.000	0.0

### 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 London	N/A	N/A	4.82	385.69	0.0	385.7
Inner London	N/A	N/A	5.68	454.91	0.0	454.9
Rural	N/A	N/A	3.61	288.86	0.0	288.9
LBC Average	N/A	N/A	5.06	405.01	0.0	405.0
UKBC Average	N/A	N/A	4.40	352.29	0.0	352.3

Data Generated by (On behalf of Test facility):	Date: 29/06/2020	Data Approved by:	Date: 29/06/2020
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### Ultra Low Emission Bus Certificate Summary

GHG Well-to-Wheel	352.3	g CO <sub>2e</sub> / km
Euro VI Average Diesel Equivalent	1114.1	g CO <sub>2e</sub> / km
WTW GHG saving (compared with Euro VI diesel equivalent)	761.9	g CO <sub>2e</sub> / km
% WTW GHG saving (compared with Euro VI diesel equivalent)	68%	g CO <sub>2e</sub> / km
Max Theoretical Zero Emission Operating Range (km)	376.0	km
WTW CO <sub>2</sub> per passenger km (@ Max Pass Capacity)	5.4	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

WTT Factors Published: 7th June 2019

Comments:	Cell	Lower Saloon	Upper Saloon
	Target Temperatures ±2 (°C) :	10	17
	Average Temperatures across testing (°C)	9.52	16.12
			N/A

**Test Numbers:** ML02019187 (24-Jun-20), ML02019188 (24-Jun-20), ML02019189 (24-Jun-20), ML02019190 (24-Jun-20), ML02019192 (25-Jun-20), ML02019193 (25-Jun-20).

Certificate approved by:	Certificate Approved by: Daniel Hayes
On behalf of Bus manufacturer	On behalf of LowCVP/DfT 24.07.20