

## Low Emission Bus Scheme Certificate

Customer:	Volvo Bus Corporation				
Customer Address:	Wedgnoek Lane, Warwick, CV345YA				
Test Purpose:	LEB certificate for Volvo 7900 Plug-in Electric Hybrid			<b>DYNAMOMETER SETTINGS</b>	
Vehicle Manufacturer:	Volvo	Unladen weight (kg)	12550.0	INERTIA	13706 kg
Vehicle Type & Number:	7900 Plug-In Electric Hybrid	Gross Weight (kg)	18000.0	F°	104.00 N
Engine:	Euro VI	Passenger Capacity	80	F <sup>1</sup>	1.4810 N/kmh
Transmission:	Hybrid		OK	F <sup>2</sup>	0.1476 N/kmh <sup>2</sup>
Euro VI certificate Y/N	Manufacturer Certified				
Net Heating Energy Diesel - (MJ/Litre)	36.0		Fuel Provider:	N/A	
Well-to Tank Factor Diesel : (g CO <sub>2</sub> e/MJ)	15.4		WTT evidence	DECC Carbon Emission Factors	
Well-to-Tank Factor UK Grid: (g CO <sub>2</sub> e/MJ)	143.5		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)	NO <sub>x</sub> (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	0.00	0.05	0.46	0.004	530.03	0.000	0.064	20.06	3.2
Outer London	0.00	0.02	0.03	0.002	82.02	0.000	0.016	3.13	87.3
Inner London	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.00	109.7
MLTB Average	0.00	0.02	0.02	0.0016	59.04	0.000	0.012	2.25	93.6
<b>LUB Average</b>	0.00	0.03	0.22	0.0027	270.39	0.000	0.035	10.24	<b>53.0</b>

### 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)*	Diesel TTW** GHG (CO <sub>2</sub> Equivalent g/km)
Rural	530.03	0.000	19.09	549.12
Outer London	82.02	0.000	4.87	86.89
Inner London	0.00	0.000	0.00	0.00
MLTB	59.04	0.000	3.51	62.54
<b>LUB Total Average</b>	<b>270.39</b>	<b>0.000</b>	<b>10.50</b>	<b>280.89</b>

### Electric Range: Energy consumption and charge efficiency

Total measured energy consumed on vehicle (kWh)	8.52	Distance covered km	8.06
Measured grid energy during charging (kWh)*	9.03	Charging efficiency	94.30

Test Phase	Diesel Fuel used over (litres/km)	Total Diesel Fuel Energy (MJ/km)	Calculated Diesel WTT** GHG Emissions (CO <sub>2</sub> Equivalent g/km)	Measured Diesel TTW** GHG Emissions (CO <sub>2</sub> Equivalent g/km)	Calculated Electricity WTT** GHG Emissions (CO <sub>2</sub> Equivalent g/km)	Total WTW*** GHG Emissions (CO <sub>2</sub> Equivalent g/km)
Rural	0.201	7.22	111.34	549.12	16.52	676.98
Inner London	0.031	1.13	17.38	86.89	450.92	555.19
Outer London	0.000	0.00	0.00	0.00	566.77	566.77
MLTB	0.023	0.81	12.51	62.54	483.37	558.43
<b>LUB Total Average</b>	<b>0.102</b>	3.69	56.86	280.89	273.87	611.62

Data Generated by (On behalf of Test facility):	Veikko Karvonen	Data Approved by:	16 January 2016
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### Low Emission Bus Certificate Summary

GHG Well-to-Wheel	611.6	g CO <sub>2</sub> e / km
Euro V Average Diesel Equivalent	1233.6	g CO <sub>2</sub> e / km
WTW GHG saving (compared with Euro V diesel equivalent)	622.0	g CO <sub>2</sub> e / km
% WTW GHG saving (compared with Euro V diesel equivalent)	50%	g CO <sub>2</sub> e / km
Zero Emission operating range (km)	8.1	km
WTW CO <sub>2</sub> per passenger km (@ Max Pass Capacity)	7.6	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

<b>COMMENTS:</b>	
Emission results marked in red are below detection levels and reported as zero. Inner London part has been driven fully with electric motor and emissions are reported as zero. Updated 6 June 2016 with latest DECC carbon emission factors.	
Test Numbers:	15R424-426 (27.11), 15R427-429 (27.11), 15R430-432 (27.11).
Certificate approved by: On behalf of Bus manufacturer	Certificate Approved by: On behalf of LowCVP/DfT