

<b>Report Number</b>	TRN-15170-4
<b>Customer</b>	G.E.M UK LTD
<b>Contact</b>	Gavin MacGregor
<b>Product Type</b>	Street Light
<b>Test Purpose</b>	UMS Energy Performance Test
<b>Sales Order Ref</b>	Q-LUX2014-2553
<b>Works Order Number</b>	WO-5514d
<b>Test Item Reference</b>	TI-4608
<b>LAB Test Method Reference</b>	TES-2012
<b>Test Standards</b>	LM-79-08 and UMS charge code process v4.0
<b>Lab Location Reference</b>	UMS
<b>Tested by</b>	Steve Hunt
<b>Date of Test</b>	23/06/2015
<b>Analysed by</b>	Steve Hunt
<b>Number of products tested</b>	5

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Signed:




Arc 80 Polycarbonate Bowl with LED Lamp

Date: 25/06/2015

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### Nomenclature

Lamp Orientation described below relates to the position in which a lamp is designed to operate for maximum performance and safety, these include:

- BD - Base Down (bulb is vertically positioned with the metal base at the bottom, glass up)
- BU - Base Up (bulb is vertically positioned with the metal base at the top, glass hanging down)
- HBD - Horizontal +15° to Base Down
- H45 - Horizontal to -45° only
- VBV - Vertical Base Up  $\pm 15^\circ$
- VBD - Vertical Base Down  $\pm 15^\circ$
- HBU - Base Up +/- 90° (bulb can be operated in a base up or horizontal position)
- HOR - Horizontal Burn (bulb is positioned with the metal base parallel to the ground)
- H75 - Horizontal +/- 75° (bulb should not be operated within 15° of vertical)
- U - Universal Burn (burn can be operated in any position)

### Test Conditions

Measurements were made with an ambient temperature of 30°C +/- 2°C. Measurements were taken only after sufficient time for thermal stabilisation has been allowed.

### Test Equipment

Yokogawa WT210 Power Analyzer. Kikusui PCR2000M Stable AC Power Supply  
with PC control and data recording



Full data control and recording  
using Labview software and full  
integration of the AC Stable Power  
Supply and Power Analyser

<b>Product Name</b>	Arc 80 Polycarbonate Bowl with LED Lamp
<b>Part/Serial Number</b>	See (Identifier) below
<b>Type of Product</b>	Street Light
<b>Base Type</b>	N/A
<b>Driver Type</b>	Mains
<b>Driver Model</b>	N/A
<b>Light Engine Model</b>	N/A
<b>Operating Orientation</b>	Base Up
<b>Test Orientation</b>	Base Up
<b>Ambient Temperature</b>	29.2°C
<b>Manufacturer</b>	G.E.M UK LTD
<b>Date of Manufacturer</b>	2015
<b>Thermal Management</b>	Passive
<b>Dimmable</b>	Yes
<b>Humidity</b>	<65% RH

Dimension	Sample	Luminous Opening
Diameter/Width	310 mm	240 mm
Length	620 mm	315 mm
Height/Depth	240 mm	60 mm

Test Item	Identifier
TI-4608A	1
TI-4608B	2
TI-4608C	3
TI-4608D	4
TI-4608E	5

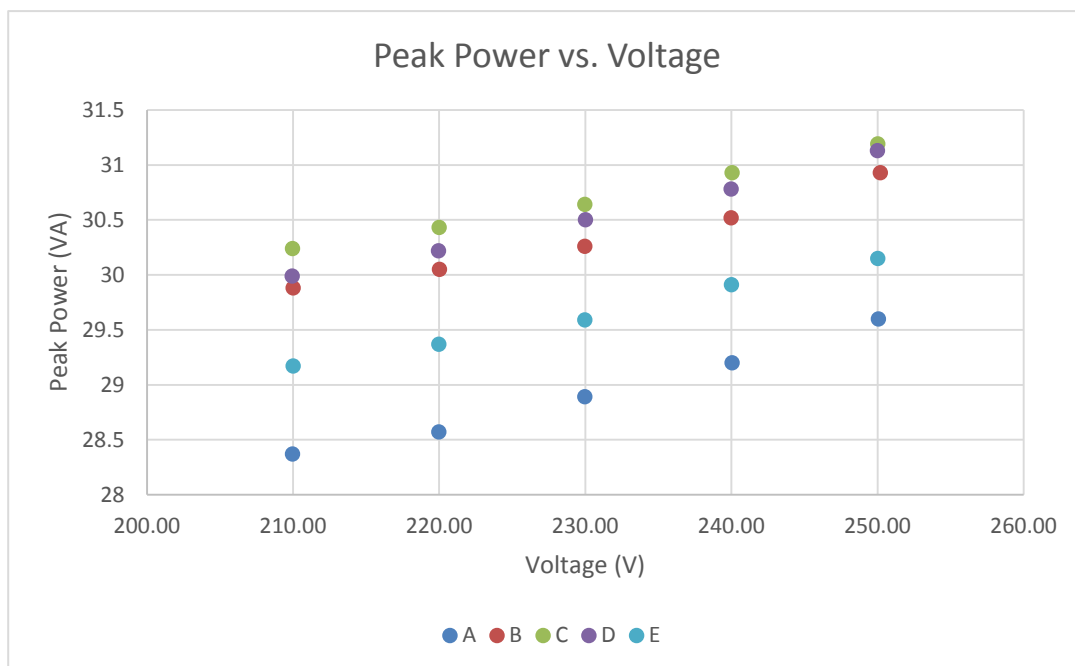
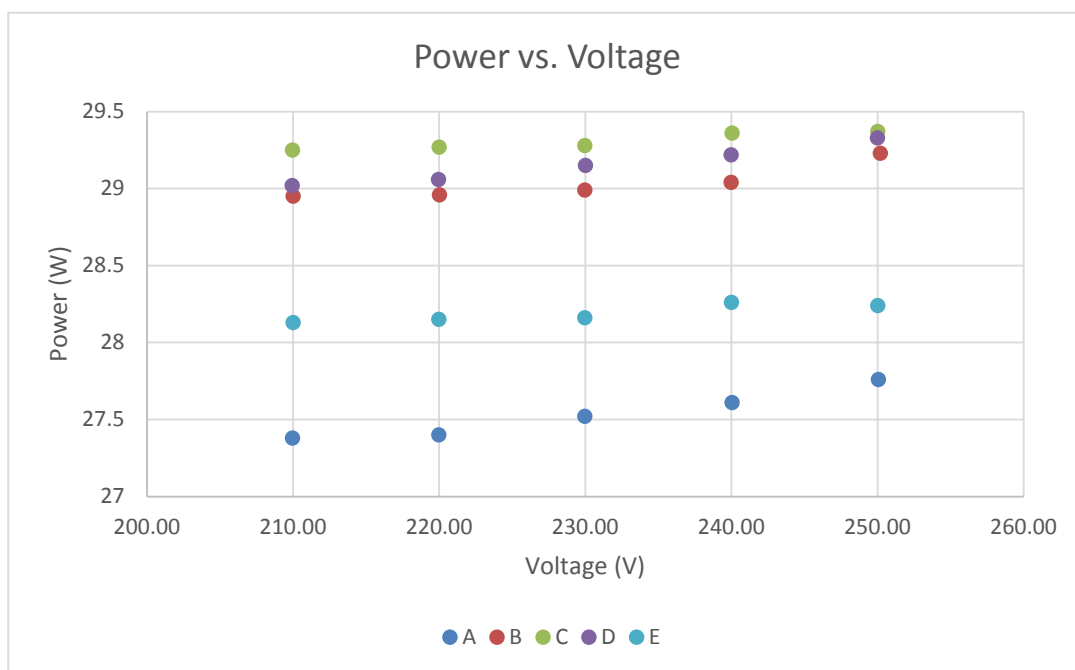
### Test Conditions

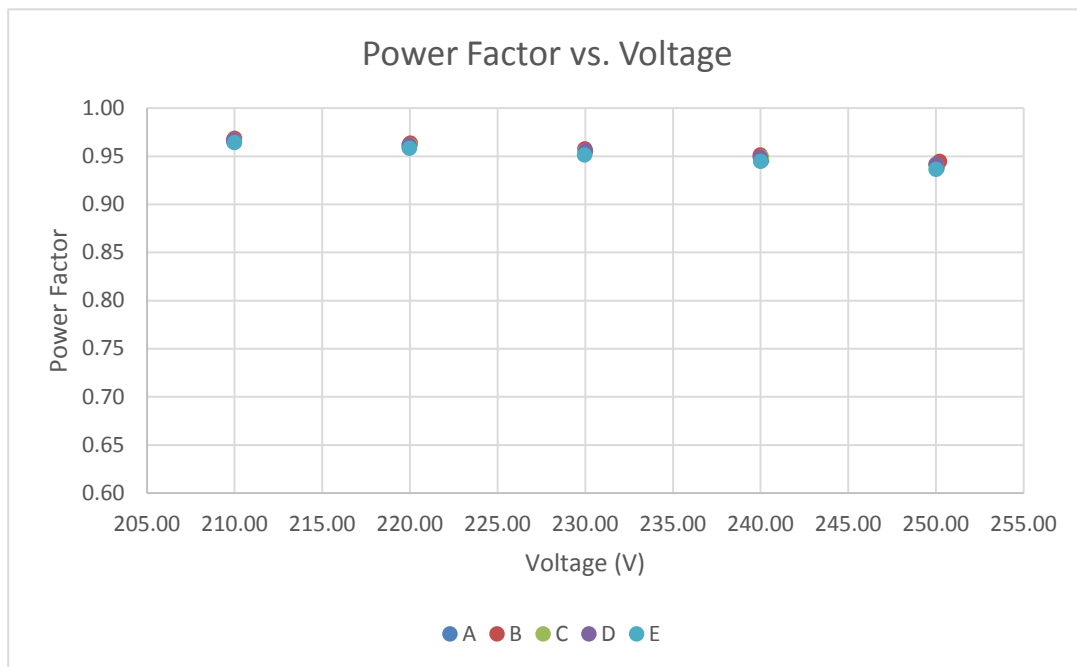
	Before Test	After Test
AC Supply Voltage (V)	249.99V	249.99V
AC Supply Frequency (Hz)	49.99Hz	49.99Hz
Voltage RMS Summation of the Harmonic Components (THD)	0.07%	0.07%

The test items were stabilised according to the electrical power stability of LM79-08. Stabilization is achieved when the difference in electrical power measurement is less than 0.5%. Each test item was stabilised at 250V.

### Test Results Summary

These are the summary graphs of the test results for all products tested. The raw results are on page 6 of this test report.





Power factors measured have a Leading phase angle and therefore the driver has capacitive properties.

### Measurement Uncertainty

Parameter	Uncertainty
Voltage (300 V, 50/60 Hz)	$\pm 0.061 \text{ V}_{\text{rms}}$
Current (200 mA, 50/60Hz)	$\pm 0.07 \text{ mA}_{\text{rms}}$
Current (0.5 A, 50/60Hz)	$\pm 0.16 \text{ mA}_{\text{rms}}$
Current (5 A, 50/60Hz)	$\pm 0.0016 \text{ A}_{\text{rms}}$
Power (300 V, 200 mA, 50/60 Hz)	$\pm 0.032 \text{ W}_{\text{rms}}$
Power (300 V, 0.5 A, 50/60 Hz)	$\pm 0.09 \text{ W}_{\text{rms}}$
Power (300 V, 5 A, 50/60 Hz)	$\pm 0.0009 \text{ kW}_{\text{rms}}$
Frequency (50/60 Hz)	$\pm 0.001 \text{ Hz}$
Power Factor	$\pm 0.0006 \text{ PF}$

Measurements of power of 0.50W or greater are made with an uncertainty of less than or equal to 2% at the 95% confidence level. Measurements of power less than 0.50W are made with an uncertainty of less than or equal to 0.01W at the 95% confidence level.

### Full Test Results

Test Item	Voltage (V)	Current (mA)	Electrical Power (W)	Ambient Temp (°C)	Peak Power (VA)	Power Factor	Leading / Lagging
A	250.05	118.36	27.76	29.18	29.60	0.938	Leading
B	250.19	123.62	29.23	29.17	30.93	0.945	Leading
C	250.00	124.78	29.37	29.17	31.19	0.942	Leading
D	249.99	124.53	29.33	29.18	31.13	0.942	Leading
E	250.00	120.60	28.24	29.18	30.15	0.937	Leading
A	240.04	121.63	27.61	29.24	29.20	0.946	Leading
B	239.98	127.17	29.04	29.23	30.52	0.952	Leading
C	240.04	128.86	29.36	29.25	30.93	0.949	Leading
D	239.98	128.26	29.22	29.25	30.78	0.949	Leading
E	239.99	124.64	28.26	29.26	29.91	0.945	Leading
A	229.96	125.64	27.52	29.29	28.89	0.952	Leading
B	229.96	131.61	28.99	29.31	30.26	0.958	Leading
C	229.96	133.23	29.28	29.32	30.64	0.956	Leading
D	230.01	132.59	29.15	29.30	30.50	0.956	Leading
E	229.95	128.69	28.16	29.32	29.59	0.952	Leading
A	219.96	129.87	27.40	29.36	28.57	0.959	Leading
B	220.01	136.57	28.96	29.35	30.05	0.964	Leading
C	220.00	138.32	29.27	29.34	30.43	0.962	Leading
D	219.95	137.38	29.06	29.38	30.22	0.962	Leading
E	219.96	133.53	28.15	29.35	29.37	0.959	Leading
A	209.95	135.13	27.38	29.39	28.37	0.965	Lagging
B	210.00	142.27	28.95	29.40	29.88	0.969	Leading
C	209.95	144.02	29.25	29.41	30.24	0.967	Leading
D	209.94	142.87	29.02	29.42	29.99	0.967	Leading
E	210.00	138.91	28.13	29.41	29.17	0.964	Leading

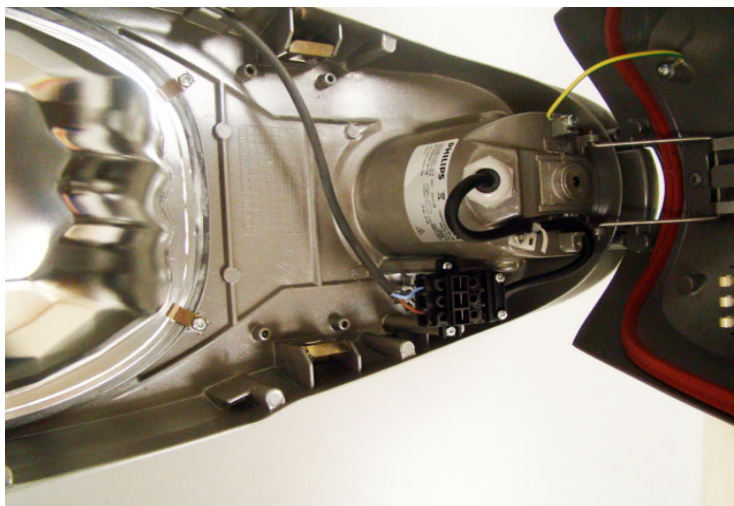
Ave data	229.99	130.92	28.64	29.30	30.02	0.95
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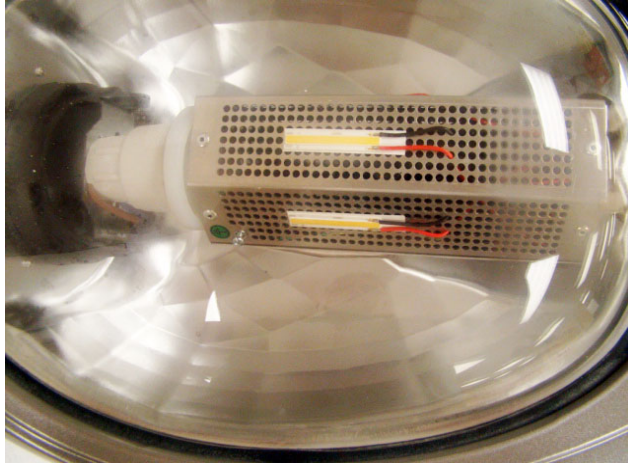
### Test Item Photographs



Luminaire - Enclosure with retrofit self driven LED Lamp



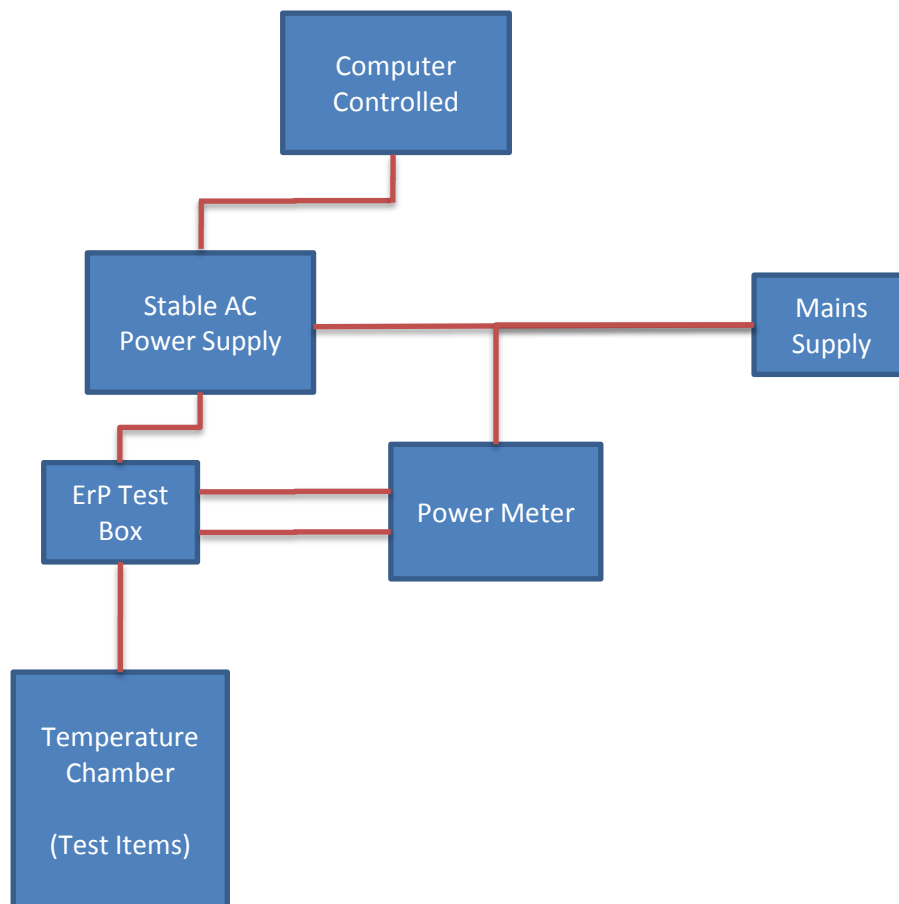
Driverless enclosure for retrofit LED Lamp



LED Retrofit Lamp with inbuilt driver



#### Appendix 1: Test item set-up



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