



Report No.: GZE160712-C

LM-79-08 Test Report

For

P.Q.L., Inc.

(Brand Name: Superior Life®)

2285 Ward Avenue / Simi Valley, CA 93065

Retrofit Kits for Outdoor Pole/Arm-mounted Area and Roadway

Representative (Tested) Model: 83776
83783

Model Different: All construction and rating are the same, except CCT

Test & Report By:

Jack Luo

Engineer: Jack Luo

Date: July 15, 2016

Review By:

Tommy Liang

Manager: Tommy Liang

Note: This report does not imply product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

Laboratory: Standard-Tech Co. Ltd Testing Center
NVLAP CODE: 201011-0

Report Format Number STD/QR4909-A/2

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1.1 Product Information:

Organization Name	P.Q.L., Inc.	
Brand Name	Superior Life®	
Model Number	83776, 83783	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Retrofit Kits for Outdoor Pole/Arm-mounted Area and Roadway	
Rated Voltage / Frequency	100 -277Vac, 50/60 Hz	
Nominal Power	60W	
Rated Initial Lamp Lumen	--	
Declared CCT	4000K,5000K	
LED Manufacturer	Nichia Corporation	
LED Model	NF2L757GR	
Sample Number	GZE160712-C1(4000K), C2(5000K)	
Luminaire Aperture (for downlights)	--	in.
Luminaire Length	--	mm
Luminaires Width	--	mm
Number of Units (modular products)	N/A	s

Photo



1.2 Test Specifications:

Date of Receipt	July.10,2016
Date of Test	July.12,2016
Test item	<ol style="list-style-type: none"> 1. Total Luminous Flux 2. Luminous Distribution Intensity 3. Luminous Efficacy 4. Correlated Color Temperature 5. Color Rendering Index 6. Chromaticity Coordinate 7. Electrical Parameters
Reference Standard	<ol style="list-style-type: none"> 1. IES LM-79-2008 Electrical and Photometric Measurements of Solid-State Lighting Products 2. ANSI C78.377-2008 Specifications for the Chromaticity of Solid State Lighting Products 3. CIE 13.3-1995 Method of Measuring and Specifying Colour Rendering Properties of Light Sources 4. CIE 15-2004 Technical Report Colorimetry 5. IESNA LM-16-93 Practical Guide to Colorimetry of Light Source 6. IESNA TM-16-05 Technical Memorandum on Light Emitting Diode (LED) Sources and Systems
Reference Work Instruction	QD25

1.3 Test Methods

<p>1) Photometric and Light Distribution Measurement – Goniophotometer Method:</p> <p>Photometric parameters were measured using the goniophotometer and software. The ambient temperature shall be maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$, measured at a point not more than 1 m from the sample and at the same height as the sample. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at 1° vertical intervals and 22.5° horizontal intervals.</p>
<p>2) Chromaticity Measurement – Sphere-Spectroradiometer Method:</p> <p>Chromaticity parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral power distribution taken at 5 nm intervals over the range of 380 to 780 nm.</p>
<p>3) Electrical Measurements:</p> <p>Electrical parameters were measured using power meters incorporated in goniophotometer or sphere-spectroradiometer system. The ambient temperature surrounding the sample was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Voltage, frequency, current, power, power factor and total harmonic distortion were measured by and read from the power meter.</p>

2.1 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2016-07-12	Test Ambient:	25.2 ° C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	83776		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE160712-	120.0	60	0.4378	52.08	0.9913	5.81
C1	277.0	60	0.2076	51.84	0.9017	17.60
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

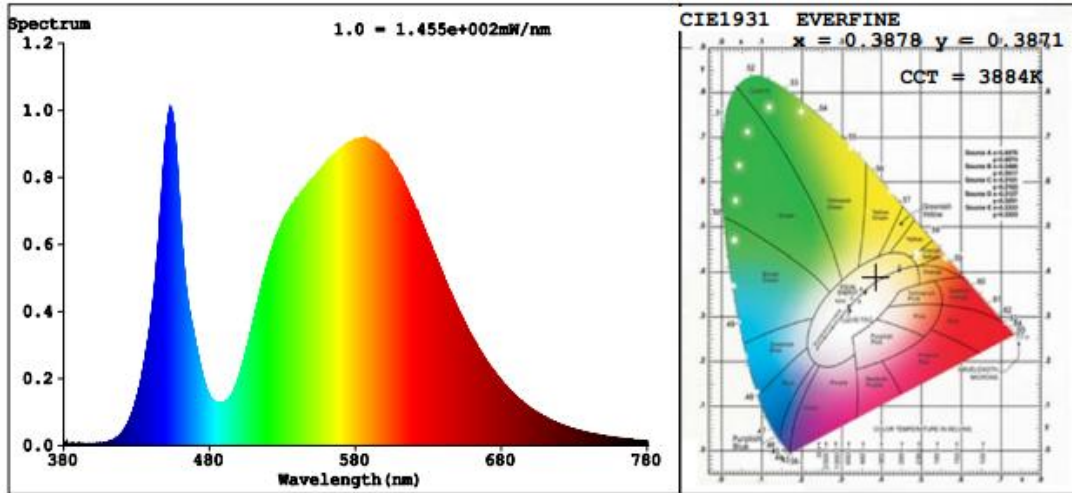
Chromaticity Measurement - Sphere-Spectroradiometer Method in Roadway Luminaire GE M250R2:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	70	R9	0
Frequency (Hz)	60	R2	80	R10	51
CCT (K)	3884	R3	87	R11	64
Duv	0.0027	R4	71	R12	37
Chromaticity (x, y)	x=0.3878 y=0.3871	R5	68	R13	72
Chromaticity (u', v')	u'=0.2258 v'=0.5071	R6	70	R14	92
Color Rendering Index (CRI)	72.9	R7	83	R15	65
R9	0	R8	54	--	--

Photometric Measurement – Goniophotometer Method in Roadway Luminaire GE M250R2:

Parameter	Result		DLC V4.0 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	7939.1	7979.7	5000~10000(-10%)	
Luminous Efficacy (lm/W)	152.44	153.93	Standard: >= 95(-3%)	Premium: >= 115(-3%)
Zonal lumens in the 0-90° zone (%)	99.9	--	>= 100(-1)	
Zonal lumens in the 80-90° zone (%)	0.3	--	<= 10(+3)	
Beam Angle (°)	113.8	--	--	
Center Beam Candle Power (cd)	3013	--	--	

Spectral Power Distribution & Chromaticity Diagram

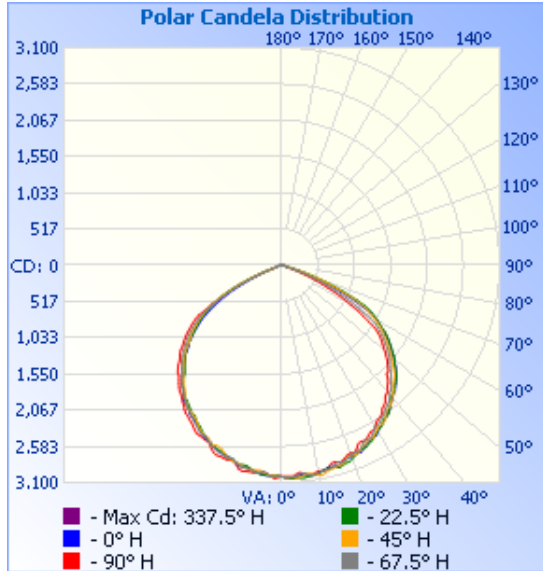


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	2,370.0	29.9%
0-40	3,919.7	49.4%
0-60	7,005.4	88.3%
60-90	920.7	11.6%
70-100	130.5	1.6%
90-120	2.3	0%
0-90	7,926.1	99.9%
90-180	11.9	0.1%
0-180	7,938.0	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	285.5	3.6%	90-100	0.3	0%
10-20	821.9	10.4%	100-110	0.5	0%
20-30	1,262.6	15.9%	110-120	1.5	0%
30-40	1,549.7	19.5%	120-130	2.3	0%
40-50	1,633.8	20.6%	130-140	2.3	0%
50-60	1,451.9	18.3%	140-150	2.0	0%
60-70	790.5	10.0%	150-160	1.6	0%
70-80	109.2	1.4%	160-170	1.0	0%
80-90	20.9	0.3%	170-180	0.4	0%

Photometric Data



Illuminance at a Distance

	Center Beam fc	Beam Width	
17.0ft	10.42 fc	52.2 ft	51.6 ft
34.0ft	2.61 fc	104.4 ft	103.2 ft
51.0ft	1.16 fc	156.6 ft	154.8 ft
68.0ft	0.65 fc	208.7 ft	206.4 ft
85.0ft	0.42 fc	260.9 ft	258.0 ft
102.0ft	0.29 fc	313.1 ft	309.5 ft

■ Vert. Spread: 113.8°
■ Horiz. Spread: 113.2°

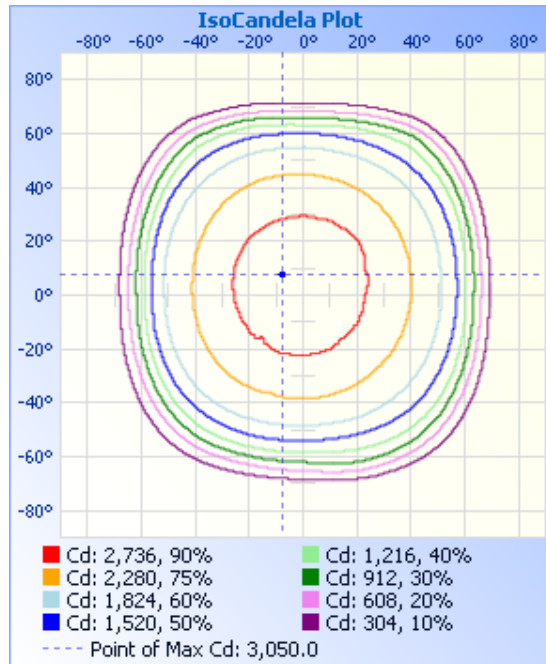
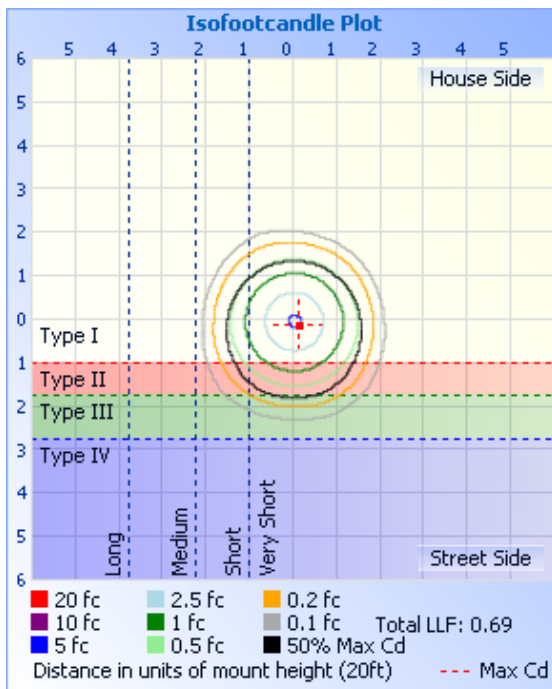


Table--1

UNIT: cd

C (DEG) γ (DEG)	0	23	45	68	90	113	135	158	180	203	225	248	270	293	315	338	
0	3013	3013	3013	3013	3013	3013	3013	3013	3013	3013	3013	3013	3013	3013	3013	3013	
5	2960	2971	2994	3036	3005	3039	3032	2984	2963	2980	3008	2999	3002	3000	2954	2952	
10	2982	2954	3004	3004	3009	3021	3038	3005	2981	2978	2967	2950	2927	2901	2938	2936	
15	2871	2897	2936	2932	2969	2988	2980	2927	2902	2887	2902	2838	2845	2844	2856	2840	
20	2841	2853	2848	2905	2899	2937	2888	2873	2853	2843	2769	2774	2778	2773	2730	2788	
25	2698	2722	2778	2819	2823	2855	2813	2763	2763	2713	2693	2676	2665	2646	2658	2667	
30	2584	2644	2703	2721	2734	2731	2710	2663	2662	2621	2557	2528	2516	2475	2495	2534	
35	2434	2483	2536	2586	2609	2620	2587	2549	2494	2463	2427	2382	2393	2353	2377	2389	
40	2275	2321	2370	2419	2455	2428	2445	2385	2345	2282	2270	2224	2215	2176	2172	2221	
45	2094	2146	2208	2253	2293	2305	2267	2199	2141	2095	2054	2010	1965	1959	1967	2009	
50	1878	1939	1995	2044	2087	2094	2045	1999	1921	1872	1808	1755	1736	1745	1733	1804	
55	1621	1696	1757	1801	1846	1856	1802	1745	1664	1569	1498	1474	1435	1461	1494	1547	
60	1228	1400	1474	1528	1556	1572	1534	1329	1140	1095	1098	1042	1049	1151	1195	1187	
65	695	874	1141	1114	1040	1178	1119	807	638	547	563	539	572	768	699	629	
70	203	337	558	522	452	565	529	309	171	141	165	155	171	232	200	163	
75	63.8	61.5	101	67.8	55.6	86.9	93.2	54.6	58.1	61.9	67.8	72.1	68.3	63.3	60.9	61.9	
80	45.2	42.6	38.9	35.9	34.4	32.9	35.8	37.4	40.4	39.5	39.8	41.7	41.8	40.5	39.4	42.0	
85	24.1	23.6	21.1	18.6	18.5	17.7	20.1	21.6	23.1	19.5	17.3	18.6	19.8	19.5	18.2	20.7	
90	0.01	0.05	0.07	0.06	0.62	0.63	0.39	0.09	0.00	0.00	0.00	0.00	3.89	0.00	0.00	0.00	
95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.45	4.37	0.31	0.00	0.00	
100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.50	0.99	0.63	0.13	0.00	
105	0.50	0.49	0.56	0.18	0.00	0.44	0.37	0.24	0.19	0.40	0.62	0.56	0.50	0.86	0.94	0.57	
110	1.37	1.31	0.88	0.69	0.69	0.75	0.82	0.93	0.76	0.94	0.95	0.94	1.02	1.19	1.26	1.19	
115	2.23	1.93	1.56	1.19	1.38	1.19	1.44	1.44	1.43	1.50	1.50	1.15	1.33	1.49	1.69	1.63	
120	2.63	2.43	2.31	1.99	1.85	1.50	1.94	4.67	1.81	1.81	1.82	1.71	1.69	1.89	2.32	1.94	
125	3.24	3.06	2.42	2.88	3.25	2.88	2.38	2.97	2.00	2.21	2.12	2.11	2.04	2.24	2.57	2.25	
130	3.49	3.74	2.49	3.44	3.44	3.38	2.57	2.76	2.49	2.35	2.27	2.50	2.32	2.70	2.64	2.70	
135	3.61	3.54	2.68	3.65	3.52	3.53	2.80	2.77	2.74	2.43	2.32	3.11	2.37	3.38	2.71	3.02	
140	3.61	3.33	2.75	3.69	3.33	3.56	2.71	2.79	2.99	2.96	2.39	3.35	2.41	3.38	2.78	3.44	
145	3.61	2.93	2.81	3.69	3.13	3.59	2.69	2.80	3.10	3.12	2.62	3.50	2.59	3.31	3.14	3.64	
150	3.61	2.93	3.56	3.69	3.50	3.62	2.88	2.91	3.37	3.18	3.13	3.65	2.70	3.13	4.08	3.76	
155	3.49	2.93	3.64	3.94	3.75	3.64	3.42	3.02	3.25	3.40	3.39	3.69	2.44	2.70	3.86	4.00	
160	3.30	2.96	3.74	4.10	3.85	3.67	3.63	3.15	3.30	3.37	3.56	3.74	2.94	2.70	3.83	4.05	
165	3.59	2.98	3.83	4.27	3.95	3.64	3.59	3.29	3.56	3.38	3.61	3.82	3.38	3.07	3.83	4.37	
170	3.92	3.43	4.50	4.44	4.04	4.45	4.33	3.44	4.42	4.37	3.90	4.26	4.20	4.26	4.47	4.62	
175	4.32	3.99	4.62	4.63	4.51	4.64	4.64	3.77	4.61	4.52	4.01	4.46	4.45	4.31	4.58	4.63	
180	4.06	4.24	4.62	4.50	4.45	4.58	4.76	3.81	4.30	4.12	4.06	4.50	4.32	4.39	4.39	4.56	

2.2 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2016-07-12	Test Ambient:	25.2 ° C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	83783		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE160712-	120.0	60	0.4416	52.59	0.9925	5.72
C1	277.0	60	0.2085	52.03	0.9008	17.95
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

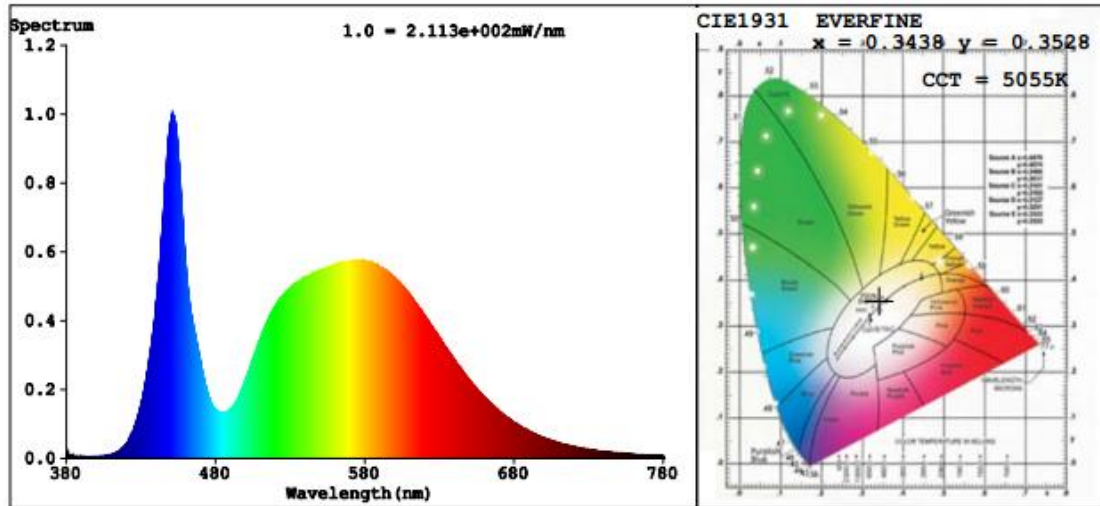
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	74	R9	0
Frequency (Hz)	60	R2	81	R10	54
CCT (K)	5055	R3	85	R11	73
Duv	0.0011	R4	76	R12	48
Chromaticity (x, y)	x=0.3438 y=0.3528	R5	76	R13	75
Chromaticity (u', v')	u'=0.2100 v'=0.4851	R6	74	R14	92
Color Rendering Index (CRI)	76.1	R7	83	R15	69
R9	0	R8	61	--	--

Photometric Measurement – Sphere-Spectroradiometer Method:

Parameter	Result		DLC V4.0 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	8162	8109	5000~10000(-10%)	
Luminous Efficacy (lm/W)	155.21	155.85	Standard: >= 95(-3%)	Premium: >= 115(-3%)

Spectral Power Distribution & Chromaticity Diagram



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3. Test Equipment

Equipment ID	Equipment Name	Last Calibration Date	Next Calibration Date
ST-R-336	2 meter Integrating Sphere	2016-07-01	2017-06-30
ST-R-331	Spectral analysis system HAAS-2000	2016-07-01	2017-06-30
D204	Standard Lamp	2016-07-01	2017-06-30
PF2010	Power Meter for Integrating Sphere	2016-07-01	2017-06-30
EE-09	Goniophotometer system	2016-07-01	2017-06-30
D908S	Standard Lamp	2016-07-01	2017-06-30
PF210	Power Meter for Goniophotometer	2016-07-01	2017-06-30
ST-R-181A	Temperature Tester	2016-07-01	2017-06-30

Uncertainty:
Photometric Measurement (Sphere):1.74%
Chromaticity Measurement(Sphere):14.3K
Photometric Measurement(Goniophotometer):1.62%

******* END OF REPORT *******