

LM-79-08 Test Report

For

Revolution Lighting Technologies, Inc.**(Brand Name: Revolution Lighting Technologies)**

2280 Ward Ave. Simi Valley CA. 93065

**2x4 Luminaires for Ambient Lighting of Interior
Commercial Spaces**Model name(s): 153054-101
153054-102
153054-103
153054-105Remark: This is a multiple list report, the original report NO. is
GZE1704041-G.Representative (Tested) Model: 153054-101
153054-105

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

Test & Report By:

Garman Mo

Engineer: Garman Mo

Date: Apr.20,2017

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

Address: Standard-Tech Building, No.6 Guanhong Road, Guangzhou Science City, Guangzhou 510663, China

Tel: 8620-3229 0320 Fax: 8620-32290422 <http://www.standard-tech.com>

1.1 Product Information:

Organization Name	Revolution Lighting Technologies, Inc.	
Brand Name	Revolution Lighting Technologies	
Model Number	153054-101 153054-102 153054-103 153054-105	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	2x4 Luminaires for Ambient Lighting of Interior Commercial Spaces	
Rated Voltage / Frequency	100 -277Vac, 50/60 Hz	
Nominal Power	50W	
Rated Initial Lamp Lumen	--	
Declared CCT	3000K,3500K,4000K,5000K	
LED Manufacturer	EVERLIGHT ELECTRONICS CO., LTD	
LED Model	67-21S Series (3000K)	
Sample Number	GZE1704041-G1(3000K),G2(5000K)	
Luminaire Aperture (for downlights)	--	in.
Luminaire Length	--	mm
Luminaires Width	--	mm
Number of Units (modular products)	N/A	s

Photo



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1.2 Test Specifications:

Date of Receipt	Apr.17,2017
Date of Test	Apr.18,2017
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: Photometric parameters were measured using the goniophotometer and software. The ambient temperature shall be maintained at 25° C ± 1° 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: Chromaticity parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25° C ± 1° 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: Electrical parameters were measured using power meters incorporated in goniophotometer or sphere-spectroradiometer system. The ambient temperature surrounding the sample was maintained at 25° C ± 1° 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	2017-04-18	Test Ambient:	25.2 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	153054-101		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE170404	120.0	60	0.4381	48.72	0.9268	13.76
1-G1	277.0	60	0.1951	48.05	0.8893	18.94
DLC Pass Criteria					$\geq 0.9(-3\%)$	$\leq 20(+5)$

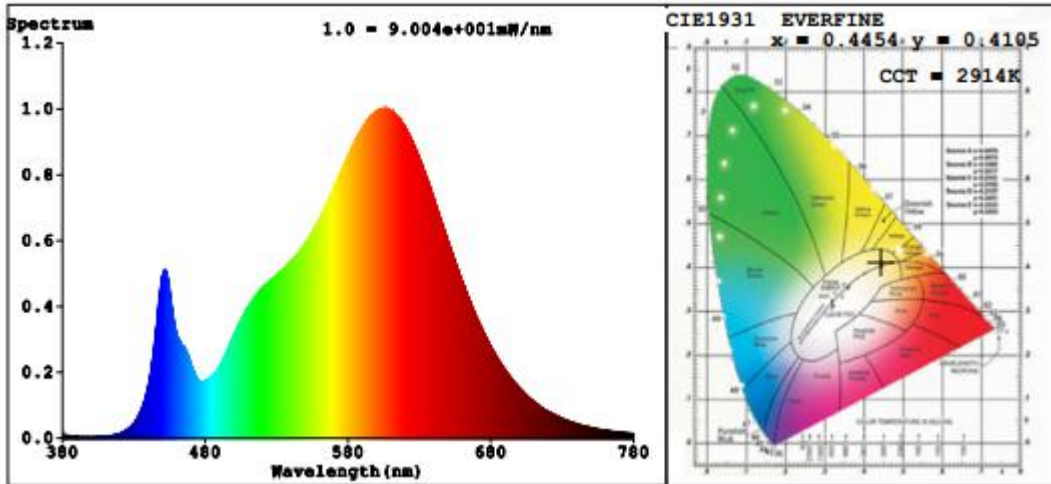
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	9
Frequency (Hz)	60	R2	91	R10	80
CCT (K)	2914	R3	97	R11	81
Duv	0.0014	R4	81	R12	71
Chromaticity (x, y)	x=0.4454 y=0.4105	R5	81	R13	84
Chromaticity (u', v')	u'=0.2533 v'=0.5251	R6	90	R14	99
Color Rendering Index (CRI)	83.1	R7	83	R15	74
R9	9	R8	59	--	--

Photometric Measurement – Goniophotometer Method:

Parameter	Result		DLC V4.1 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	6184.8	6126.0	$\geq 3000(-10\%)$	
Luminous Efficacy (lm/W)	126.95	127.49	Standard: $\geq 100(-3\%)$	Premium: $\geq 125(-3\%)$
Zonal lumens in the 0-60° zone (%)	78.4	--	$\geq 75(-3)$	
SC: 0-180° (if applicable)	1.30	--	1.0-2.0(± 0.1)	
SC: 90-270° (if applicable)	1.25	--	1.0-2.0(± 0.1)	
Beam Angle (°)	113.0	--	--	
Center Beam Candle Power (cd)	2130	--	--	

Spectral Power Distribution & Chromaticity Diagram

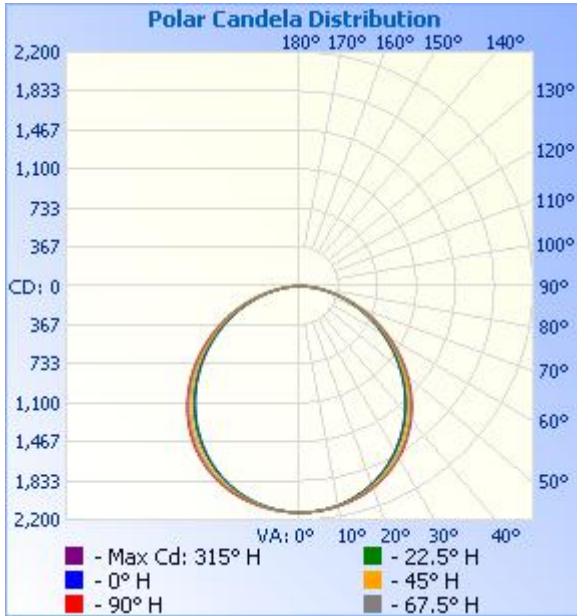


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1,668.9	27%
0-40	2,741.5	44.3%
0-60	4,849.7	78.4%
60-90	1,333.8	21.6%
70-100	574.6	9.3%
90-120	0.5	0%
0-90	6,183.5	100%
90-180	0.6	0%
0-180	6,184.1	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	201.8	3.3%	90-100	0.3	0%
10-20	580.8	9.4%	100-110	0.1	0%
20-30	886.3	14.3%	110-120	0.1	0%
30-40	1,072.6	17.3%	120-130	0.1	0%
40-50	1,110.6	18.0%	130-140	0.0	0%
50-60	997.6	16.1%	140-150	0.0	0%
60-70	759.4	12.3%	150-160	0.0	0%
70-80	446.0	7.2%	160-170	0.0	0%
80-90	128.3	2.1%	170-180	0.0	0%

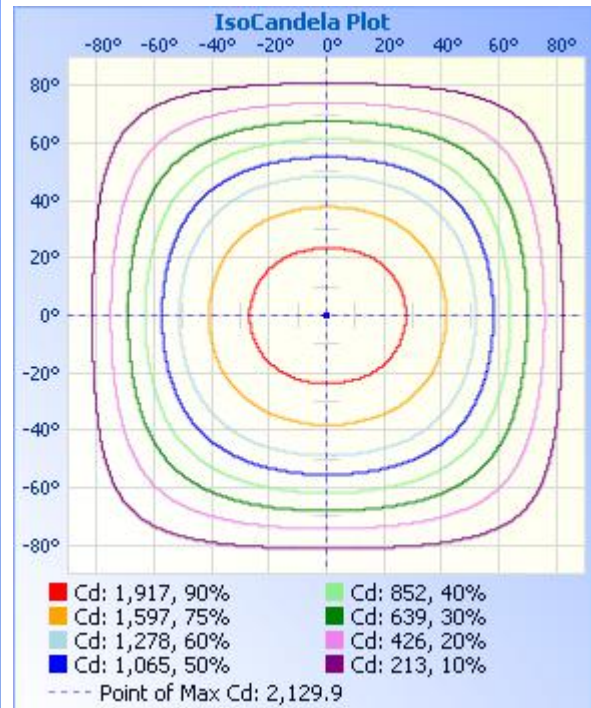
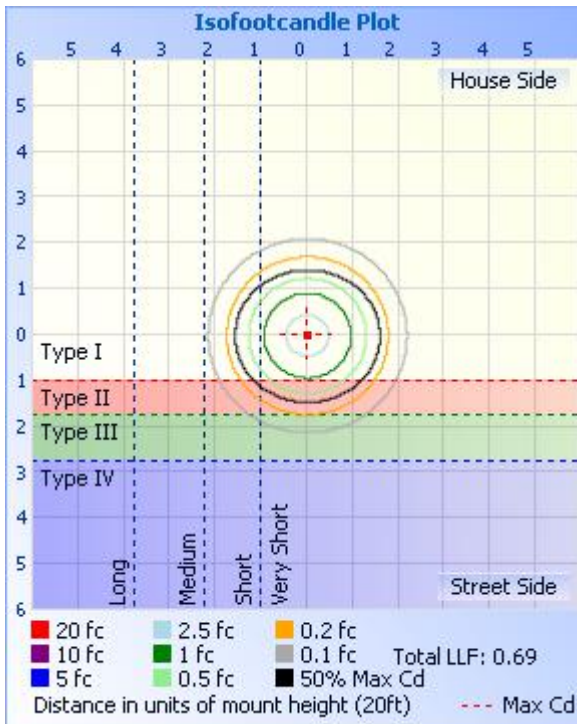
Photometric Data



Illuminance at a Distance

	Center Beam fc	Beam Width	
17.0ft	7.37 fc	49.0 ft	54.0 ft
34.0ft	1.84 fc	98.0 ft	107.9 ft
51.0ft	0.82 fc	147.1 ft	161.9 ft
68.0ft	0.46 fc	196.1 ft	215.9 ft
85.0ft	0.29 fc	245.1 ft	269.9 ft
102.0ft	0.20 fc	294.1 ft	323.8 ft

■ Vert. Spread: 110.5°
 ■ Horiz. Spread: 115.6°



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Table--1 UNIT: cd

C (DEG) \ y (DEG)	0	23	45	68	90	113	135	158	180	203	225	248	270	293	315	338
0	2130	2130	2130	2130	2130	2130	2130	2130	2130	2130	2130	2130	2130	2130	2130	2130
5	2124	2125	2124	2123	2122	2121	2122	2123	2123	2122	2120	2119	2118	2119	2121	2122
10	2105	2106	2103	2097	2094	2095	2099	2103	2104	2100	2094	2090	2089	2091	2096	2101
15	2072	2072	2064	2053	2047	2050	2058	2067	2070	2064	2053	2044	2040	2044	2055	2065
20	2023	2022	2006	1990	1982	1986	2001	2015	2021	2012	1994	1979	1973	1978	1996	2013
25	1956	1952	1930	1908	1897	1904	1925	1946	1954	1942	1917	1896	1887	1895	1919	1942
30	1870	1863	1835	1808	1796	1804	1831	1857	1868	1853	1821	1795	1784	1794	1824	1853
35	1763	1754	1722	1691	1678	1687	1718	1748	1761	1745	1707	1677	1665	1676	1711	1745
40	1638	1627	1592	1559	1545	1556	1589	1622	1636	1616	1577	1544	1531	1543	1581	1618
45	1494	1482	1447	1414	1401	1411	1444	1478	1492	1471	1431	1397	1384	1398	1436	1474
50	1335	1323	1289	1258	1246	1256	1287	1319	1333	1312	1273	1241	1229	1242	1278	1316
55	1165	1154	1122	1094	1082	1092	1121	1150	1163	1142	1106	1076	1065	1078	1111	1147
60	986	977	950	923	913	922	948	974	985	965	933	907	896	908	939	971
65	804	797	773	750	741	749	771	794	802	786	758	734	726	736	763	791
70	622	617	597	579	571	577	595	614	622	607	584	564	557	565	588	613
75	444	438	426	412	405	410	425	436	444	433	414	399	392	400	419	438
80	273	271	265	256	251	254	263	269	277	269	256	244	239	244	258	272
85	119	120	117	113	110	111	115	117	122	117	109	102	99.9	103	110	120
90	0.77	1.07	1.75	3.13	4.55	4.64	3.39	2.07	1.28	0.59	0.69	1.54	2.22	2.80	2.60	2.21
95	0.00	0.00	0.00	0.15	0.20	0.10	0.00	0.00	0.00	0.00	0.00	0.51	0.51	0.41	0.00	0.00
100	0.00	0.00	0.00	0.15	0.20	0.10	0.00	0.00	0.00	0.00	0.00	0.41	0.51	0.41	0.05	0.00
105	0.00	0.00	0.00	0.15	0.36	0.20	0.00	0.00	0.00	0.00	0.10	0.41	0.36	0.35	0.15	0.00
110	0.00	0.00	0.00	0.20	0.41	0.20	0.05	0.00	0.00	0.00	0.10	0.00	0.30	0.05	0.10	0.00
115	0.00	0.05	0.25	0.10	0.41	0.20	0.15	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00
120	0.00	0.10	0.41	0.00	0.00	0.00	0.25	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
125	0.00	0.15	0.31	0.00	0.00	0.00	0.30	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
130	0.00	0.20	0.10	0.00	0.00	1.57	0.11	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
135	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.15	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00
140	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00
145	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.20	0.05	0.00	0.00
150	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.25	0.25	0.15	0.00
155	0.00	0.00	0.00	0.00	0.15	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.41	0.41	0.30	0.00
160	0.00	0.00	0.00	0.00	0.10	0.05	0.00	0.00	0.05	0.00	0.00	0.00	0.41	0.46	0.36	0.00
165	0.00	0.00	0.00	0.15	0.20	0.25	0.00	0.00	0.10	0.00	0.00	0.00	0.51	0.46	0.46	0.00
170	0.00	0.00	0.00	0.41	0.51	0.41	0.00	0.00	0.10	0.00	0.00	0.00	0.51	0.41	0.46	0.00
175	0.00	0.00	0.00	0.41	0.46	0.46	0.00	0.00	0.05	0.00	0.00	0.00	0.36	0.41	0.36	0.00
180	0.00	0.00	0.00	0.36	0.46	0.30	0.00	0.00	0.10	0.00	0.00	0.00	0.36	0.30	0.41	0.00

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2.2 Electrical, Photometric and Chromaticity Measurements
(Refer to Work Instruction QD25)

Test date	2017-04-18	Test Ambient:	25.2 ° C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	153054-105		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE170404	120.0	60	0.4437	49.18	0.9237	14.56
1-G2	277.0	60	0.1972	48.41	0.8861	19.74
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

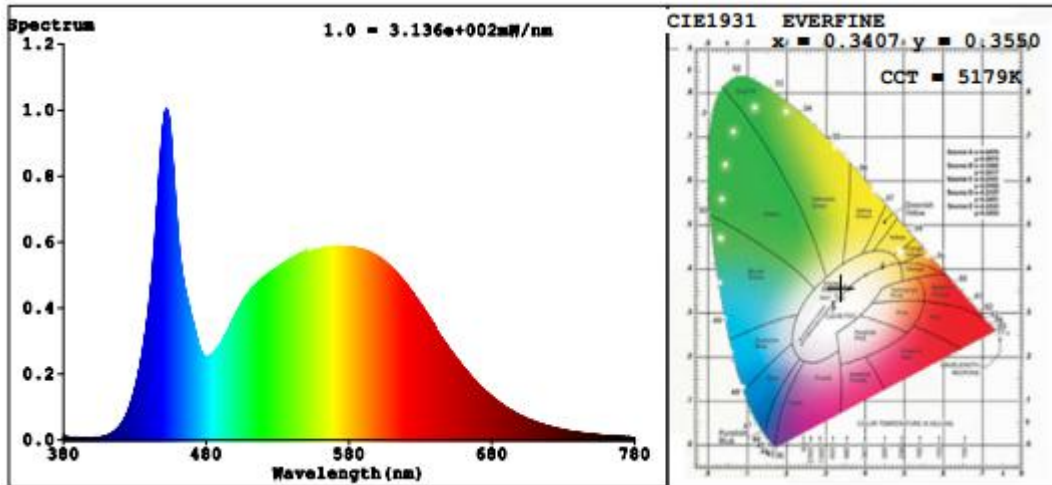
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	11
Frequency (Hz)	60	R2	88	R10	71
CCT (K)	5179	R3	92	R11	82
Duv	0.0035	R4	83	R12	62
Chromaticity (x, y)	x=0.3407 y=0.3550	R5	82	R13	83
Chromaticity (u', v')	u'=0.2072 v'=0.4856	R6	84	R14	96
Color Rendering Index (CRI)	83.4	R7	88	R15	76
R9	11	R8	69	--	--

Photometric Measurement – Sphere-Spectroradiometer Method:

Parameter	Result		DLC V4.1 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	6403	6329	>=3000(-10%)	
Luminous Efficacy (lm/W)	130.20	130.74	Standard: >= 100(-3%)	Premium: >= 125(-3%)

Spectral Power Distribution & Chromaticity Diagram



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2.3 Performance Assessment:

Model name	CCT(K)	Total Luminous (lm)	Power (W)	Luminous Efficacy (lm/W)
153054-101	3000K	6184.8	48.72	126.95
153054-102	3500K	6239* ¹	48.95* ²	127.46* ³
153054-103	4000K	6294* ¹	48.95* ²	128.58* ³
153054-105	5000K	6403	49.18	130.20

*1: This value is calculated and the calculation formula is as below:

$$6239 = (6403 - 6184.8) / 4 + 6184.8$$

$$6294 = (6403 - 6184.8) / 4 + 6239$$

*2: This value is calculated and the calculation formula is as below:

$$48.95 = (48.72 + 49.18) / 2$$

*3: This value is calculated and the calculation formula is as below:

$$127.46 = 6239 / 48.95$$

$$128.58 = 6294 / 48.95$$

3. Test Equipment

Equipment ID	Equipment Name	Last Calibration Date	Next Calibration Date
ST-R-331	2 meter Integrating Sphere	2016-07-01	2017-06-30
ST-R-327	Spectral analysis system HAAS-2000	2016-07-01	2017-06-30
D204	Standard Lamp	2016-07-12	2017-07-11
PF2010	Power Meter for Integrating Sphere	2016-07-01	2017-06-30
GO-R5000	Goniophotometer system	2016-07-01	2017-06-30
D908S	Standard Lamp	2016-07-12	2017-07-11
PF210	Power Meter for Goniophotometer	2016-07-07	2017-07-06

Expand Uncertainty:
Photometric Measurement (Sphere):2.04%, k=2
Chromaticity Measurement(Sphere):28.8K, k=2
Photometric Measurement(Goniophotometer):2.36%, k=2

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

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