

LM-79-08 Test Report

For

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

2280 Ward Ave. Simi Valley CA. 93065

**1x4 Luminaires for Ambient Lighting of Interior
Commercial Spaces**Model name(s): 157053-101
157053-102
157053-103
157053-105Remark: This is a multiple list report, the original report NO. is
GZE1704041-H.Representative (Tested) Model: 157053-101
157053-105

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

Test & Report By:

Garman Mo

Engineer: Garman Mo

Date: Apr.25,2017

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	157053-101 157053-102 157053-103 157053-105	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	1x4 Luminaires for Ambient Lighting of Interior Commercial Spaces	
Rated Voltage / Frequency	100 -277Vac, 50/60 Hz	
Nominal Power	30W	
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-H1(3000K),H2(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	Apr.24,2017
Date of Test	Apr.25,2017
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	2017-04-25	Test Ambient:	25.2 ° C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	157053-101		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE170404	120.0	60	0.2500	29.45	0.9817	10.02
1-H1	277.0	60	0.1132	29.17	0.9303	13.95
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

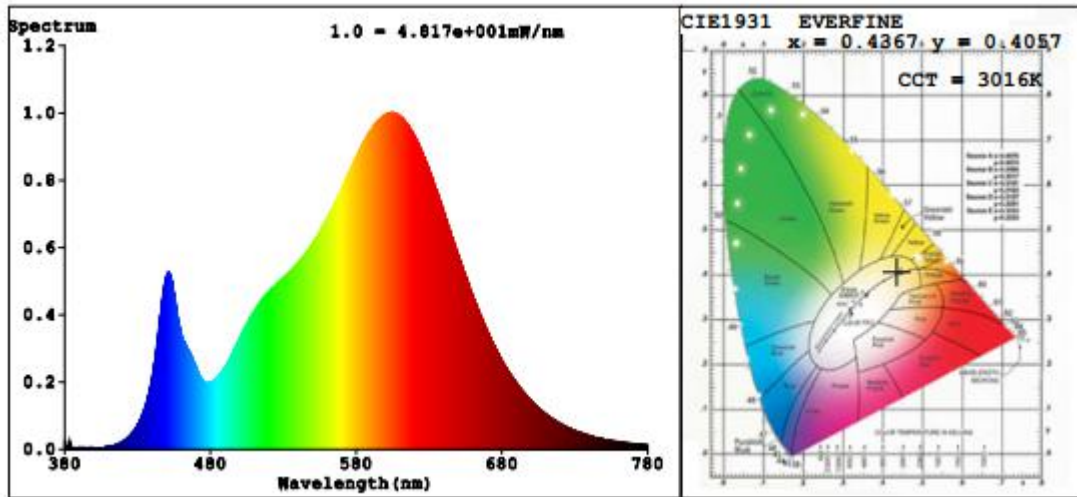
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	7
Frequency (Hz)	60	R2	91	R10	80
CCT (K)	3016	R3	96	R11	80
Duv	0.0007	R4	81	R12	72
Chromaticity (x, y)	x=0.4367 y=0.4057	R5	81	R13	84
Chromaticity (u', v')	u'=0.2498 v'=0.5220	R6	89	R14	99
Color Rendering Index (CRI)	82.9	R7	83	R15	74
R9	7	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)	3653.3	3652.0	>=1500(-10%)	
Luminous Efficacy (lm/W)	124.05	125.20	Standard: >= 100(-3%)	Premium: >= 125(-3%)
Zonal lumens in the 0-60° zone (%)	78.5	--	>=75(-3)	
SC: 0-180° (if applicable)	1.40	--	1.0-2.0(±0.1)	
SC: 90-270° (if applicable)	1.24	--	1.0-2.0(±0.1)	
Beam Angle (°)	111.3	--	--	
Center Beam Candle Power (cd)	1267	--	--	

Spectral Power Distribution & Chromaticity Diagram

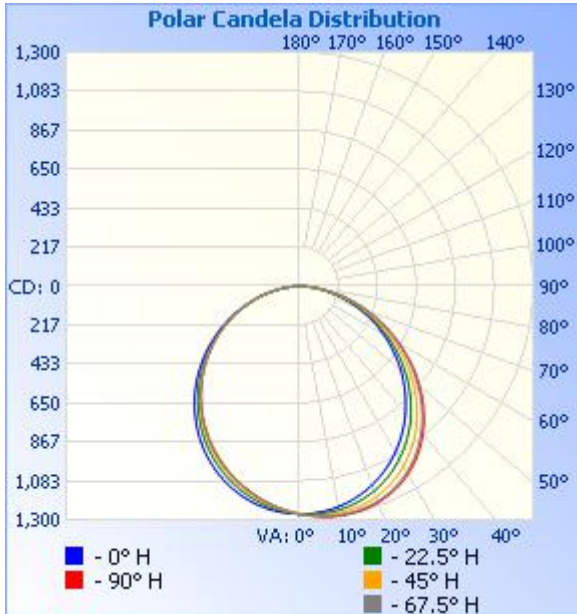


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	989.6	27.1%
0-40	1,623.2	44.4%
0-60	2,866.6	78.5%
60-90	786.0	21.5%
70-100	338.5	9.3%
90-120	0.0	0%
0-90	3,652.6	100%
90-180	0.4	0%
0-180	3,653.0	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	120.0	3.3%	90-100	0.0	0%
10-20	344.8	9.4%	100-110	0.0	0%
20-30	524.8	14.4%	110-120	0	0%
30-40	633.7	17.3%	120-130	0.0	0%
40-50	655.2	17.9%	130-140	0.0	0%
50-60	588.1	16.1%	140-150	0.1	0%
60-70	447.6	12.3%	150-160	0.1	0%
70-80	262.8	7.2%	160-170	0.1	0%
80-90	75.7	2.1%	170-180	0.0	0%

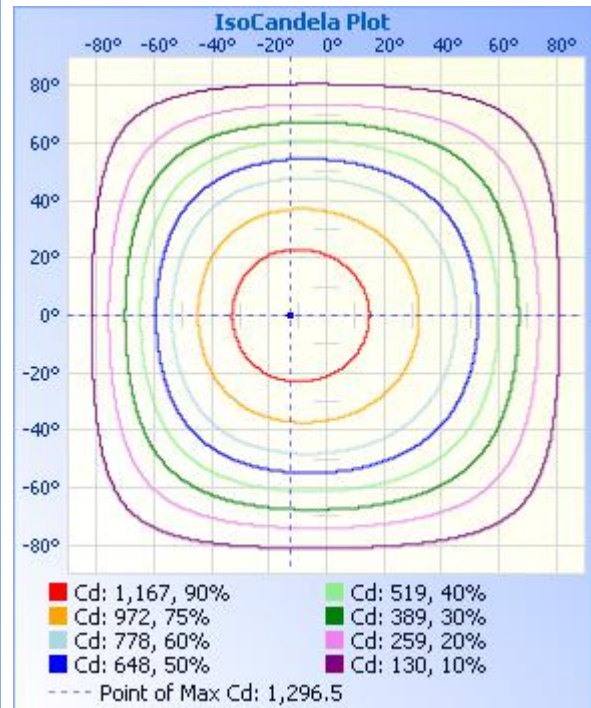
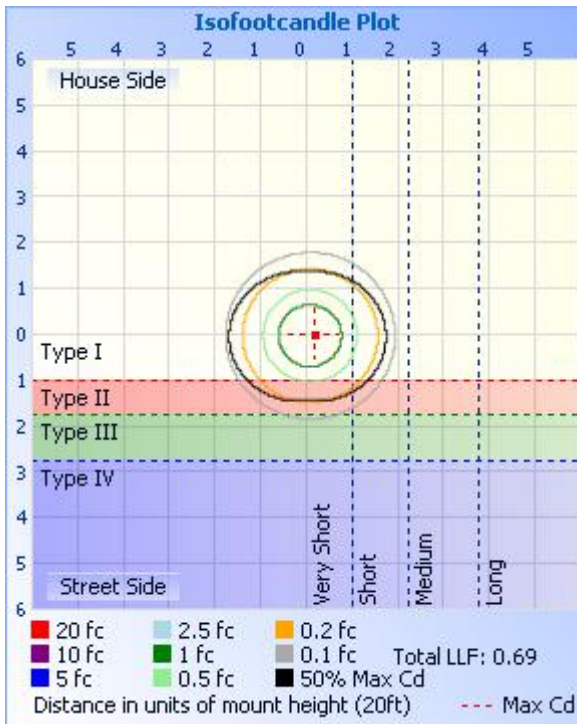
Photometric Data



Illuminance at a Distance

	Center Beam fc	Beam Width	
17.0ft	4.38 fc	47.8 ft	50.6 ft
34.0ft	1.10 fc	95.5 ft	101.2 ft
51.0ft	0.49 fc	143.3 ft	151.8 ft
68.0ft	0.27 fc	191.1 ft	202.4 ft
85.0ft	0.18 fc	238.8 ft	252.9 ft
102.0ft	0.12 fc	286.6 ft	303.5 ft

■ Vert. Spread: 109.1°
 ■ Horiz. Spread: 112.2°



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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	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	
5	1240	1241	1246	1253	1262	1271	1279	1285	1286	1284	1277	1269	1260	1252	1245	1241	
10	1205	1208	1217	1228	1245	1264	1281	1292	1296	1290	1277	1260	1242	1226	1214	1207	
15	1163	1167	1177	1193	1217	1244	1270	1288	1294	1285	1264	1238	1213	1190	1174	1166	
20	1114	1119	1130	1149	1177	1212	1246	1272	1280	1266	1239	1205	1172	1145	1127	1117	
25	1059	1064	1075	1095	1127	1167	1208	1241	1251	1234	1200	1158	1120	1091	1071	1061	
30	997	1001	1012	1032	1066	1110	1156	1194	1206	1186	1146	1099	1059	1028	1008	1000	
35	928	932	943	961	996	1041	1090	1131	1145	1123	1080	1029	988	958	939	930	
40	854	857	867	884	917	962	1011	1054	1068	1045	1000	949	908	880	862	855	
45	774	776	785	800	831	873	921	963	977	955	910	861	823	796	781	775	
50	689	692	697	711	738	776	822	861	874	852	810	765	730	707	694	690	
55	600	602	607	618	641	675	715	751	762	743	704	663	634	613	604	601	
60	510	510	513	522	541	569	604	635	645	627	594	558	533	518	511	510	
65	417	416	418	424	440	462	490	516	524	510	481	452	432	420	416	417	
70	324	324	324	327	339	354	377	398	404	392	370	347	332	323	322	323	
75	233	233	232	233	240	251	268	282	287	279	262	245	234	229	230	232	
80	145	147	146	144	147	154	165	174	177	172	161	150	143	140	142	146	
85	65.6	67.3	65.7	63.9	64.0	66.2	70.7	74.5	77.0	74.0	68.0	62.7	60.5	60.3	63.1	66.1	
90	0.08	0.26	0.81	1.23	1.77	1.64	0.76	0.10	0.00	0.00	0.00	0.00	0.25	0.59	0.55	0.35	
95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	0.00	0.00	0.00	0.00	0.00	0.00	
105	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
110	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
115	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
120	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
125	0.00	0.00	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.15	0.00	0.00	
130	0.00	0.00	0.00	0.20	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.25	0.00	0.00	
135	0.00	0.00	0.00	0.20	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.35	0.00	0.31	0.00	0.00	
140	0.00	0.00	0.00	0.00	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.45	0.00	0.36	0.00	0.10	
145	0.00	0.00	0.00	0.20	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.50	0.00	0.30	0.26	0.20	
150	0.00	0.00	0.20	0.20	0.00	0.30	0.00	0.00	0.00	0.00	0.10	0.50	0.00	0.30	0.66	0.20	
155	0.00	0.00	0.46	0.30	0.00	0.30	0.46	0.00	0.00	0.00	0.15	0.50	0.00	0.00	0.61	0.41	
160	0.00	0.00	0.46	0.40	0.00	0.36	0.51	0.00	0.00	0.00	0.15	0.50	0.30	0.00	0.56	0.51	
165	0.00	0.00	0.51	0.40	0.00	0.46	0.51	0.00	0.05	0.00	0.20	0.50	0.36	0.00	0.56	0.66	
170	0.00	0.30	0.71	0.40	0.00	0.41	0.86	0.00	0.36	0.31	0.46	0.81	0.46	0.00	0.51	1.12	
175	0.35	0.46	0.76	0.50	0.05	0.41	1.12	0.36	0.36	0.31	0.46	0.81	0.30	0.00	0.41	1.22	
180	0.31	0.46	0.81	0.10	0.05	0.51	1.02	0.31	0.25	0.31	0.46	0.81	0.20	0.10	0.35	1.02	

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

Test date	2017-04-25	Test Ambient:	25.2 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	157053-105		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE170404	120.0	60	0.2568	30.04	0.9748	10.65
1-H2	277.0	60	0.1163	29.75	0.9236	14.57
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

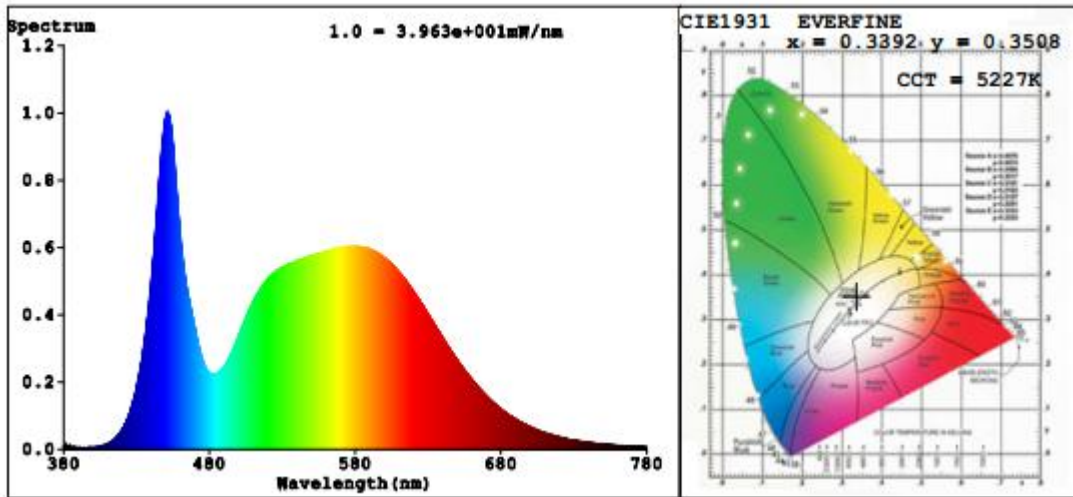
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	80	R9	3
Frequency (Hz)	60	R2	86	R10	66
CCT (K)	5227	R3	90	R11	81
Duv	0.0020	R4	82	R12	59
Chromaticity (x, y)	x=0.3392 y=0.3508	R5	81	R13	81
Chromaticity (u', v')	u'=0.2078 v'=0.4834	R6	81	R14	94
Color Rendering Index (CRI)	81.6	R7	86	R15	75
R9	3	R8	67	--	--

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)	3835	3833	>=1500(-10%)	
Luminous Efficacy (lm/W)	127.65	128.84	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)
157053-101	3000K	3653.3	29.45	124.05
157053-102	3500K	3699*1	29.60*2	124.97*3
157053-103	4000K	3744*1	29.60*2	126.49*3
157053-105	5000K	3835	29.75	127.65

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

$$3699 = (3835 - 3653.3) / 4 + 3653.3$$

$$3744 = (3835 - 3653.3) / 4 + 3699$$

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

$$29.60 = (29.45 + 29.75) / 2$$

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

$$124.97 = 3699 / 29.60$$

$$126.49 = 3744 / 29.60$$

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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