

## **LM-79-08 Test Report**

For

# **REVOLUTION LIGHTING TECHNOLOGIES INC**

**(Brand Name: Revolution Lighting Technologies)**

2280 Ward Ave, Simi Valley, CA 93065

## **Integrated Retrofit Kits for 2x4 Luminaires**

Model name(s):

159310-111 159310-112

159310-113 159310-115

Remark: The last number stands for different CCT:

1=3000K,2=3500K,3=4000K,5=5000K

Representative (Tested) Model: 159310-111

159310-115

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

Test & Report By:

*Bill Luo*

Engineer: Bill Luo

Date: Apr.13,2018

Review By:

*Univ Xie*

Manager: Univ Xie

Note: 1.The results contained in this report pertain only to the tested samples.

2.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

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<http://www.standard-tech.com>

**1.1 Product Information:**

Organization Name	REVOLUTION LIGHTING TECHNOLOGIES INC	
Brand Name	Revolution Lighting Technologies	
Model Number	159310-111, 159310-112, 159310-113, 159310-115	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Integrated Retrofit Kits for 2x4 Luminaires	
Rated Voltage / Frequency	120-277Vac, 50/60Hz	
Nominal Power	29W	
Rated Initial Lamp Lumen	--	
Declared CCT	3000K,3500K,4000K,5000K	
LED Manufacturer	EVERLIGHT ELECTRONICS CO., LTD	
LED Model	67-21S/KK3C-H3030M41N42933Z6/2T(HN) 67-21S/KK3C-H5050N3P32933Z6/2T(HN)	
Sample Number	GZE1803077-H-A1(3000K), A2(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.01,2018
Date of Test	Apr.02,2018
Test item	<ol style="list-style-type: none"> <li>1. Total Luminous Flux</li> <li>2. Luminous Distribution Intensity</li> <li>3. Luminous Efficacy</li> <li>4. Correlated Color Temperature</li> <li>5. Color Rendering Index</li> <li>6. Chromaticity Coordinate</li> <li>7. Electrical Parameters</li> </ol>
Reference Standard	<ol style="list-style-type: none"> <li>1. IES LM-79-2008 Electrical and Photometric Measurements of Solid-State Lighting Products</li> <li>2. ANSI C78.377-2008 Specifications for the Chromaticity of Solid State Lighting Products</li> <li>3. CIE 13.3-1995 Method of Measuring and Specifying Colour Rendering Properties of Light Sources</li> <li>4. CIE 15-2004 Technical Report Colorimetry</li> <li>5. IESNA LM-16-93 Practical Guide to Colorimetry of Light Source</li> <li>6. IESNA TM-16-05 Technical Memorandum on Light Emitting Diode (LED) Sources and Systems</li> </ol>
Reference Work Instruction	QD25

**1.3 Test Methods**

<p><b>1) Photometric and Light Distribution Measurement – Goniophotometer Method:</b>                  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><b>2) Chromaticity Measurement – Sphere-Spectroradiometer Method:</b>                  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><b>3) Electrical Measurements:</b>                  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)

<b>Test date</b>	2018-04-02	<b>Test Ambient:</b>	25.2 °C
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	90
<b>Model Number</b>	159310-111		

**Electrical Measurement in Lithonia 2GT8 lensed 2x4:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE180307	120.0	60	0.2367	28.04	0.9871	11.55
7-H-A1	277.0	60	0.1136	28.16	0.8951	14.33
<b>DLC Pass Criteria</b>					>= 0.9(-3%)	<= 20(+5)

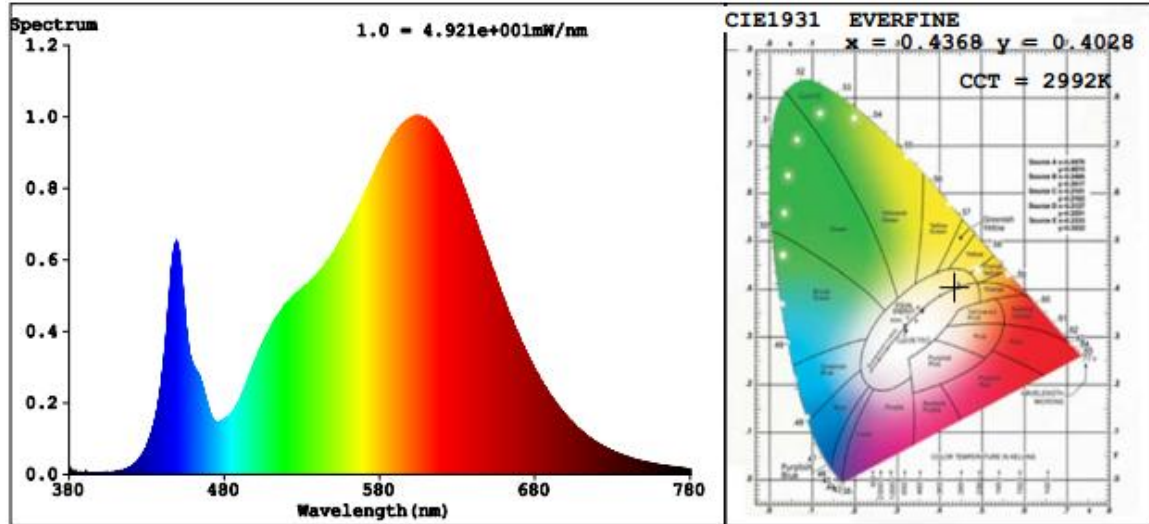
**Chromaticity Measurement in Lithonia 2GT8 lensed 2x4 - Sphere-Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	10
Frequency (Hz)	60	R2	90	R10	77
CCT (K)	2992	R3	97	R11	81
Duv	-0.0005	R4	82	R12	70
Chromaticity (x, y)	x=0.4368 y=0.4028	R5	81	R13	83
Chromaticity (u', v')	u'=0.2510 v'=0.5208	R6	88	R14	98
Color Rendering Index (CRI)	82.8	R7	84	R15	74
R9	10	R8	61	--	--

**Photometric Measurement in Lithonia 2GT8 lensed 2x4 – Goniophotometer Method:**

Parameter	Result		DLC V4.3 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60	--	
Total Luminous (lm)	3616.8	3593.8	>=3000(-10%)	
Luminous Efficacy (lm/W)	128.99	127.62	Standard: >=	Premium: >=
Most Worst Luminous/Highest Watts	127.62		100(-3%)	105(-3%)
Zonal lumens in the 0-60 °zone (%)	75.4	--	>= 75(-3)	
SC: 0-180 °(if applicable)	1.29	--	1.0-2.0(±0.1)	
SC: 90-270 °(if applicable)	1.24	--	1.0-2.0(±0.1)	
Beam Angle (°)	118.4	--	--	
Center Beam Candle Power (cd)	1197	--	--	

**Spectral Power Distribution & Chromaticity Diagram**

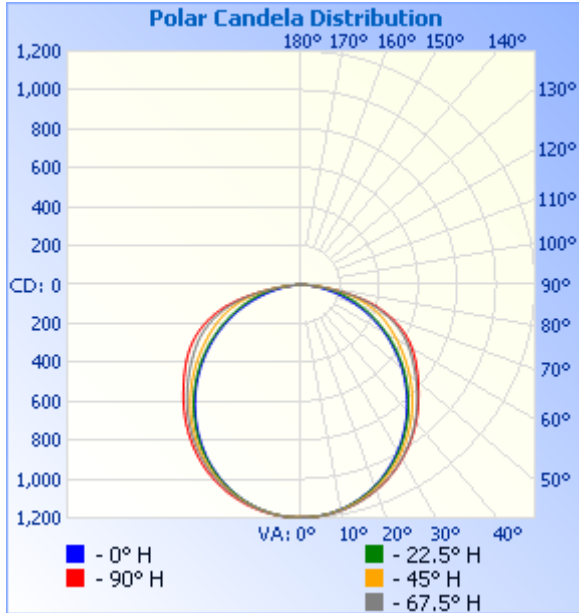


**Zonal Lumen Tabulation**

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	930.1	25.7%
0-40	1,524.9	42.2%
0-60	2,727.7	75.4%
60-90	873.2	24.1%
70-100	392.8	10.9%
90-120	8.1	0.2%
0-90	3,600.9	99.6%
90-180	15.5	0.4%
0-180	3,616.4	100%

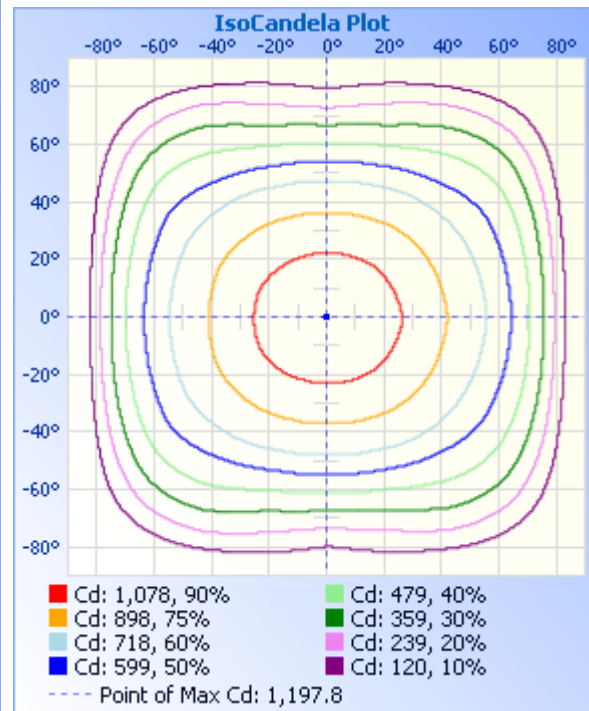
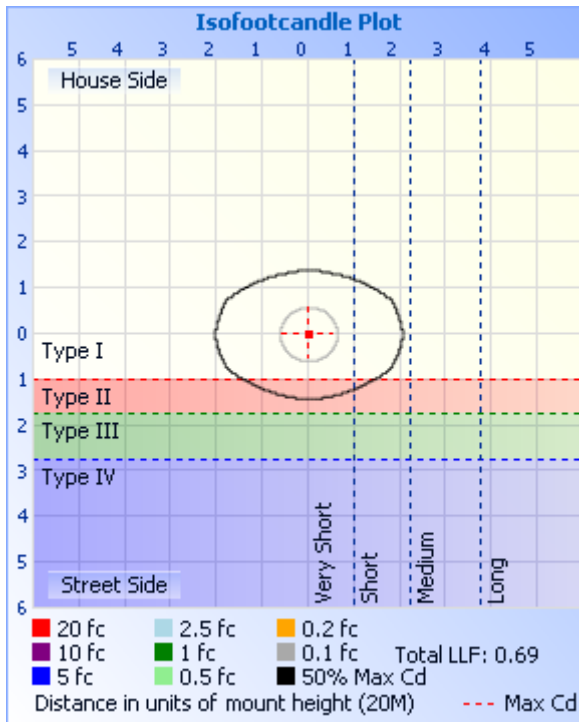
Lumens Per Zone					
Zone	Lumens	%Total	Zone	Lumens	%Total
0-10	113.3	3.1%	90-100	2.7	0.1%
10-20	324.6	9.0%	100-110	2.8	0.1%
20-30	492.3	13.6%	110-120	2.7	0.1%
30-40	594.7	16.4%	120-130	2.3	0.1%
40-50	622.0	17.2%	130-140	1.9	0.1%
50-60	580.8	16.1%	140-150	1.4	0%
60-70	483.2	13.4%	150-160	1.0	0%
70-80	314.6	8.7%	160-170	0.6	0%
80-90	75.4	2.1%	170-180	0.2	0%

**Photometric Data**



Illuminance at a Distance			
	Center Beam fc	Beam Width	
3.33M	<b>10.0 fc</b>	<b>9.30 M</b>	<b>13.70 M</b>
6.67M	<b>2.50 fc</b>	<b>18.59 M</b>	<b>27.39 M</b>
10.00M	<b>1.11 fc</b>	<b>27.89 M</b>	<b>41.10 M</b>
13.33M	<b>0.63 fc</b>	<b>37.18 M</b>	<b>54.79 M</b>
16.67M	<b>0.40 fc</b>	<b>46.48 M</b>	<b>68.49 M</b>
20.00M	<b>0.28 fc</b>	<b>55.78 M</b>	<b>82.19 M</b>

■ Vert. Spread: 108.7°  
■ Horiz. Spread: 128.1°



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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	1197	1197	1197	1197	1197	1197	1197	1197	1197	1197	1197	1197	1197	1197	1197	1197	
5	1193	1192	1192	1191	1191	1192	1192	1193	1193	1193	1193	1192	1192	1192	1192	1192	
10	1181	1176	1176	1174	1173	1174	1176	1179	1178	1180	1177	1175	1174	1175	1176	1178	
15	1159	1151	1150	1145	1142	1145	1149	1156	1156	1157	1151	1146	1145	1146	1150	1153	
20	1128	1117	1113	1104	1101	1105	1113	1124	1124	1126	1116	1106	1105	1106	1114	1119	
25	1088	1075	1067	1055	1049	1055	1067	1083	1084	1085	1070	1056	1054	1057	1068	1077	
30	1040	1023	1013	996	989	996	1012	1033	1036	1036	1016	997	992	998	1013	1025	
35	983	964	949	929	920	929	950	976	980	978	954	930	923	931	950	965	
40	921	899	879	855	844	855	881	911	918	914	885	855	846	856	880	899	
45	854	829	802	775	763	774	805	842	851	845	809	775	765	775	803	829	
50	787	758	721	691	677	690	726	771	784	775	730	690	677	689	722	756	
55	724	692	640	603	588	601	646	702	721	706	651	601	586	600	640	686	
60	660	627	562	513	494	510	567	636	658	641	573	511	492	507	559	619	
65	585	554	487	422	398	419	492	562	582	565	500	421	395	414	482	545	
70	492	467	407	335	300	330	414	472	489	473	418	334	297	324	402	458	
75	370	358	313	253	204	246	320	361	373	362	321	251	200	238	309	349	
80	208	209	199	167	115	164	209	214	210	210	204	164	110	156	195	204	
85	49.3	54.7	63.9	68.5	42.1	70.7	70.3	56.5	48.6	51.4	61.4	65.0	38.4	63.5	62.1	52.5	
90	3.48	4.16	3.83	2.82	1.56	1.92	3.31	3.65	2.72	3.30	2.77	1.71	1.35	1.94	3.09	3.53	
95	3.09	3.09	2.93	2.07	1.15	1.62	2.47	2.75	2.61	2.77	2.67	1.81	1.57	2.09	2.73	3.16	
100	3.09	3.04	2.83	2.07	1.30	1.68	2.36	2.64	2.77	2.93	2.67	1.81	2.14	2.09	2.94	3.22	
105	3.30	3.30	3.19	2.38	1.67	1.73	2.52	2.64	3.04	2.88	2.67	1.81	1.98	1.99	3.20	3.59	
110	3.68	3.52	3.30	2.59	1.62	1.73	2.57	3.01	3.30	2.88	2.67	1.81	1.88	1.88	3.25	3.59	
115	3.89	3.83	3.40	2.39	1.62	1.73	2.73	3.06	3.25	2.82	2.67	1.66	1.77	1.68	3.15	3.53	
120	4.16	3.84	3.40	2.02	1.26	1.52	2.73	3.11	2.98	2.77	2.51	1.66	1.62	1.73	2.94	3.32	
125	4.00	3.84	3.40	1.97	1.30	1.52	2.73	3.16	2.72	2.66	2.41	1.66	1.51	1.73	2.83	3.32	
130	3.89	3.68	3.35	1.97	1.77	1.52	2.73	2.90	2.61	2.50	2.35	1.66	1.72	1.62	2.68	3.32	
135	3.68	3.57	3.04	1.92	1.72	1.52	2.31	2.85	2.61	2.50	2.30	1.66	1.77	1.52	2.52	3.32	
140	3.68	3.47	2.77	1.77	1.62	1.26	2.15	2.64	2.56	2.45	2.41	1.60	1.93	1.26	2.47	2.90	
145	3.25	3.14	2.62	1.24	1.77	1.26	2.05	2.43	2.56	2.50	2.35	1.50	2.09	1.52	2.47	2.79	
150	3.09	3.04	2.62	1.19	1.46	1.36	2.05	2.48	2.50	2.50	2.15	1.66	2.40	1.99	2.36	2.69	
155	3.09	2.98	2.30	1.55	1.62	1.73	1.89	2.32	2.29	2.34	1.88	1.76	2.50	2.46	1.57	2.48	
160	2.78	2.46	1.37	1.92	1.77	2.14	1.63	1.90	1.76	1.76	1.67	1.81	2.40	2.56	2.10	1.58	
165	1.71	1.54	1.88	2.07	2.35	2.15	1.73	1.53	1.76	1.92	1.99	2.18	2.19	2.25	2.21	2.12	
170	2.13	2.45	2.41	2.33	2.35	2.35	2.36	1.85	2.35	2.40	2.30	2.49	2.56	2.62	2.52	2.58	
175	2.35	2.24	2.41	2.44	2.35	2.46	2.47	2.16	2.35	2.40	2.35	2.48	2.50	2.62	2.52	2.58	
180	2.45	2.34	2.30	2.44	2.40	2.46	2.47	2.53	2.66	2.40	2.35	2.28	2.50	2.41	2.47	2.48	

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

<b>Test date</b>	2018-04-02	<b>Test Ambient:</b>	25.2 °C
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	90
<b>Model Number</b>	159310-115		

**Electrical Measurement in Lithonia 2GT8 lensed 2x4:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE180307	120.0	60	0.2426	28.76	0.9879	11.25
7-H-A2	277.0	60	0.1158	28.83	0.8991	14.13
<b>DLC Pass Criteria</b>					>= 0.9(-3%)	<= 20(+5)

**Chromaticity Measurement in Lithonia 2GT8 lensed 2x4 - Sphere-Spectroradiometer Method:**

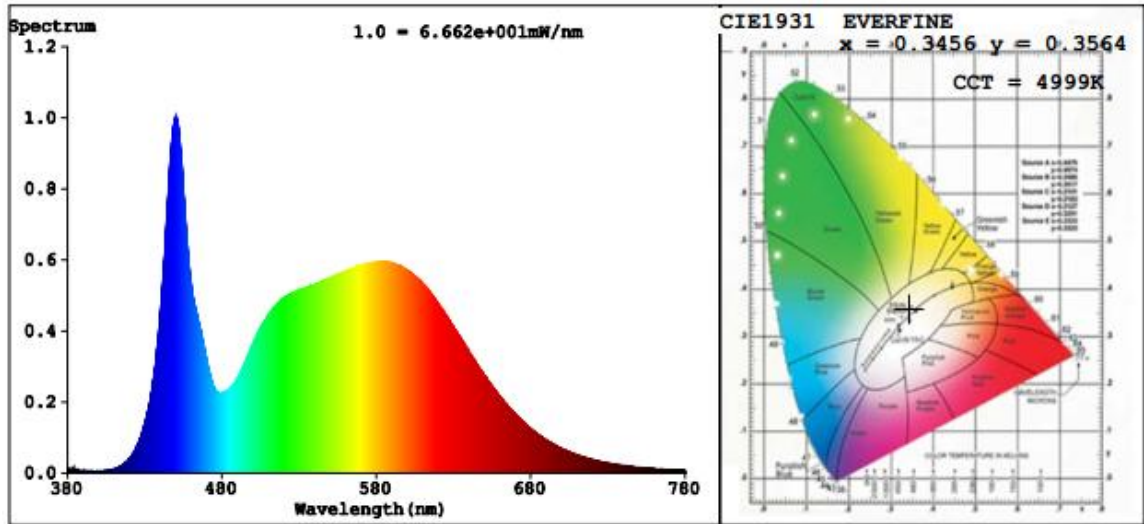
Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	8
Frequency (Hz)	60	R2	88	R10	71
CCT (K)	4999	R3	93	R11	81
Duv	0.0022	R4	82	R12	57
Chromaticity (x, y)	x=0.3456 y=0.3564	R5	81	R13	83
Chromaticity (u', v')	u'=0.2099 v'=0.4871	R6	83	R14	96
Color Rendering Index (CRI)	82.8	R7	88	R15	75
R9	8	R8	68	--	--

**Photometric Measurement in Lithonia 2GT8 lensed 2x4 – Goniophotometer Method:**

Parameter	Result		DLC V4.3 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60	--	
Total Luminous (lm)	3724.0	3700.5	>=3000(-10%)	
Luminous Efficacy (lm/W)	129.49	128.36	Standard: >=	Premium: >=
Most Worst Luminous/Highest Watts	128.36		100(-3%)	105(-3%)
Zonal lumens in the 0-60 °zone (%)	75.4	--	>= 75(-3)	
SC: 0-180 °(if applicable)	1.28	--	1.0-2.0(±0.1)	
SC: 90-270 °(if applicable)	1.23	--	1.0-2.0(±0.1)	
Beam Angle (°)	118.5	--	--	
Center Beam Candle Power (cd)	1231	--	--	



**Spectral Power Distribution & Chromaticity Diagram**

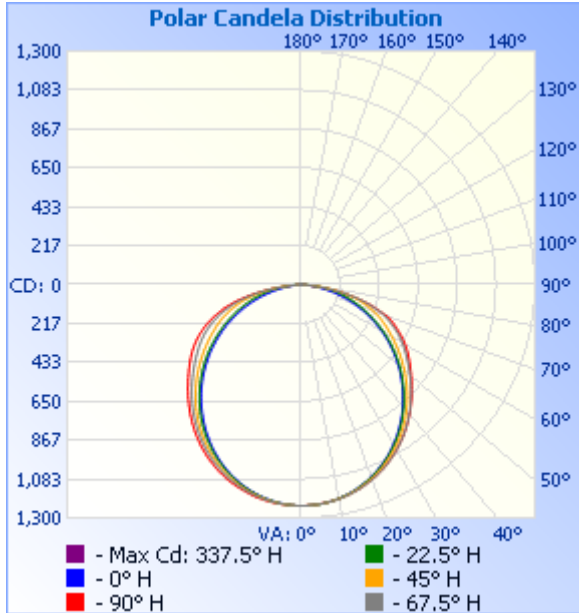


**Zonal Lumen Tabulation**

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	956.8	25.7%
0-40	1,569.3	42.1%
0-60	2,809.4	75.4%
60-90	899.6	24.2%
70-100	404.0	10.8%
90-120	7.7	0.2%
0-90	3,709.0	99.6%
90-180	14.6	0.4%
0-180	3,723.6	100%

Lumens Per Zone					
Zone	Lumens	%Total	Zone	Lumens	%Total
0-10	116.5	3.1%	90-100	2.6	0.1%
10-20	333.8	9.0%	100-110	2.6	0.1%
20-30	506.5	13.6%	110-120	2.5	0.1%
30-40	612.5	16.4%	120-130	2.1	0.1%
40-50	641.1	17.2%	130-140	1.8	0%
50-60	599.0	16.1%	140-150	1.3	0%
60-70	498.2	13.4%	150-160	1.0	0%
70-80	323.0	8.7%	160-170	0.5	0%
80-90	78.4	2.1%	170-180	0.2	0%

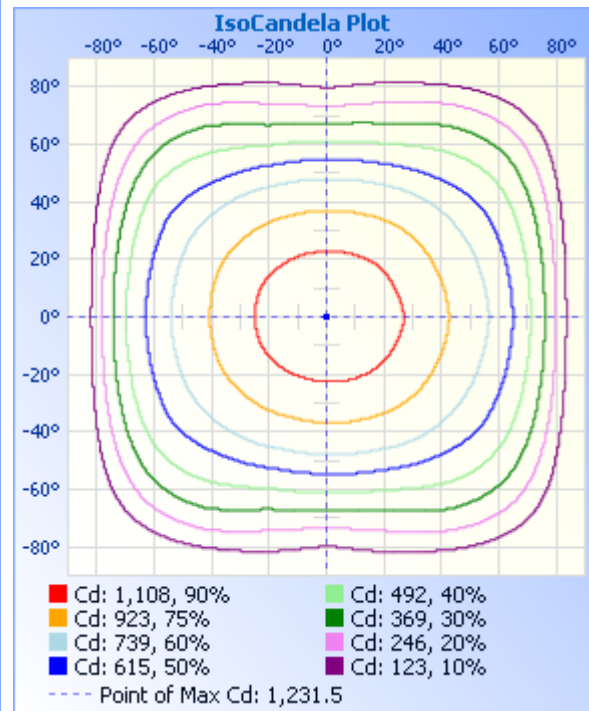
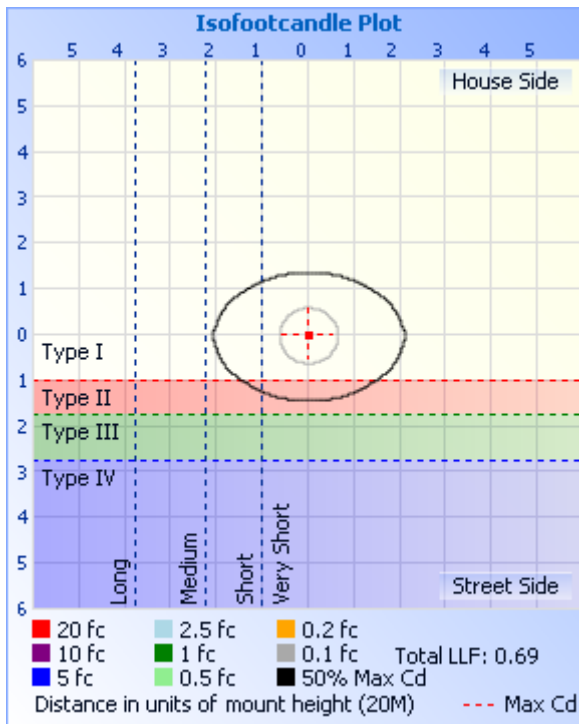
**Photometric Data**



**Illuminance at a Distance**

	Center Beam fc	Beam Width	
3.33M	10.3 fc	9.35 M	13.68 M
6.67M	2.57 fc	18.69 M	27.36 M
10.00M	1.14 fc	28.04 M	41.04 M
13.33M	0.64 fc	37.38 M	54.71 M
16.67M	0.41 fc	46.73 M	68.40 M
20.00M	0.29 fc	56.08 M	82.08 M

■ Vert. Spread: 109.0°  
 ■ Horiz. Spread: 128.0°



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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	1231	1231	1231	1231	1231	1231	1231	1231	1231	1231	1231	1231	1231	1231	1231	1231	
5	1227	1227	1227	1227	1226	1227	1226	1227	1225	1226	1224	1223	1224	1224	1226	1226	
10	1215	1213	1213	1211	1209	1210	1211	1212	1210	1210	1206	1203	1204	1205	1209	1211	
15	1193	1189	1189	1183	1180	1181	1184	1188	1187	1185	1177	1171	1172	1176	1182	1187	
20	1163	1156	1153	1144	1139	1142	1147	1155	1154	1150	1139	1129	1130	1135	1145	1153	
25	1124	1113	1108	1095	1088	1091	1101	1113	1111	1107	1091	1076	1076	1083	1098	1109	
30	1075	1062	1053	1036	1027	1032	1045	1062	1062	1054	1034	1015	1013	1021	1042	1058	
35	1019	1002	990	969	957	964	982	1003	1003	994	969	946	942	955	978	998	
40	955	935	919	893	879	887	910	936	938	927	897	869	864	879	907	931	
45	888	864	841	811	795	805	833	864	869	854	818	786	780	796	829	859	
50	820	791	759	724	708	717	750	790	799	781	736	699	691	709	748	786	
55	755	720	675	634	614	626	667	718	734	710	654	608	598	618	665	715	
60	689	653	593	540	518	531	585	650	668	642	575	515	501	524	584	646	
65	609	577	513	446	418	437	507	573	589	565	500	422	401	430	506	569	
70	512	484	428	354	317	345	426	487	502	478	418	333	300	339	422	477	
75	390	374	329	266	217	258	333	361	361	351	321	249	201	251	322	366	
80	232	229	214	176	123	172	208	207	200	198	194	161	109	164	207	224	
85	60.7	65.9	75.0	75.7	45.5	73.6	70.0	55.1	46.7	47.9	55.9	60.4	37.2	66.7	70.1	62.5	
90	2.91	3.73	3.63	2.72	1.58	2.48	3.59	4.22	3.15	3.55	3.08	1.71	1.25	1.68	2.41	2.74	
95	2.35	2.65	2.67	1.98	1.04	1.68	2.68	3.11	2.99	2.97	2.56	1.71	1.62	1.83	2.10	2.37	
100	2.30	2.55	2.56	1.97	1.30	1.78	2.52	2.95	3.21	3.13	2.67	1.76	1.93	1.83	2.31	2.43	
105	2.35	2.60	2.77	2.39	1.67	1.83	2.78	3.21	3.52	3.34	2.82	1.76	1.77	1.73	2.57	2.58	
110	2.72	2.86	3.14	2.49	1.67	1.83	2.89	3.37	3.52	3.34	2.82	1.66	1.72	1.67	2.47	2.58	
115	2.94	3.02	3.19	2.34	1.67	1.83	3.20	3.32	3.53	3.34	2.82	1.66	1.61	1.36	2.36	2.42	
120	2.94	3.02	3.19	1.71	1.36	1.62	3.36	3.37	3.47	3.29	2.72	1.61	1.30	1.52	2.00	2.42	
125	2.94	3.08	3.03	1.71	1.30	1.73	3.26	3.37	3.31	3.23	2.51	1.66	1.41	1.20	1.94	2.42	
130	2.94	2.86	2.98	1.71	1.46	1.73	3.10	3.37	3.25	2.81	2.46	1.77	1.46	1.15	1.89	2.27	
135	2.72	2.86	2.67	1.76	1.57	1.68	2.89	3.27	3.15	2.76	2.46	1.76	1.61	1.10	1.89	2.16	
140	2.72	2.81	2.51	1.25	1.57	1.78	2.47	3.21	2.94	2.71	2.46	1.76	1.62	1.15	1.89	2.11	
145	2.46	2.49	2.41	1.14	1.72	1.41	2.26	2.85	2.72	2.60	2.46	1.71	1.88	1.47	1.89	2.11	
150	2.51	2.55	2.35	1.45	1.73	1.20	2.31	2.85	2.67	2.49	2.51	1.61	2.09	1.68	1.57	1.84	
155	2.56	2.44	1.52	1.87	1.77	1.62	2.31	2.74	2.56	2.49	2.35	1.35	2.19	2.15	1.48	1.67	
160	1.66	1.59	1.57	1.97	1.88	1.83	1.47	2.48	2.46	2.39	2.04	1.40	2.09	2.25	1.84	1.37	
165	1.23	1.70	1.99	2.02	2.24	2.36	1.47	1.37	1.50	1.54	1.36	2.13	2.14	2.09	2.10	2.32	
170	1.97	1.96	2.40	2.23	2.61	2.36	2.05	1.79	2.30	2.18	1.94	2.28	2.35	2.30	2.31	2.27	
175	1.98	2.28	2.46	2.44	2.61	2.41	2.42	2.37	2.24	2.23	2.30	2.28	2.30	2.30	2.31	2.27	
180	2.29	2.44	2.46	2.54	2.61	2.41	2.42	2.06	2.40	2.28	2.46	2.44	2.45	2.41	2.42	2.32	

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

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**2.3 Performance Assessment:**

Model name	CCT(K)	Total Luminous (lm)	Power (W)	Luminous Efficacy (lm/W)
159310-111	3000K	3616.8	28.04	128.99
159310-112	3500K	3667 <sup>*3</sup>	28.40 <sup>*2</sup>	129.12 <sup>*1</sup>
159310-113	4000K	3670 <sup>*3</sup>	28.40 <sup>*2</sup>	129.24 <sup>*1</sup>
159310-115	5000K	3724.0	28.76	129.49

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

$$129.12 = (129.49 - 128.99) / 4 * 1 + 128.99$$

$$129.24 = (129.49 - 128.99) / 4 * 2 + 128.99$$

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

$$28.40 = (28.04 + 28.76) / 2$$

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

$$3667 = 129.12 * 28.40$$

$$3670 = 129.24 * 28.40$$

**3. Test Equipment**

Equipment ID	Equipment Name	Last Calibration Date	Next Calibration Date
ST-R-331	2 meter Integrating Sphere	2017-07-01	2018-06-30
ST-R-327	Spectral analysis system HAAS-2000	2017-07-01	2018-06-30
D204	Standard Lamp	2017-07-12	2018-07-11
PF2010	Power Meter for Integrating Sphere	2017-07-01	2018-06-30
GO-R5000	Goniophotometer system	2017-07-01	2018-06-30
D908S	Standard Lamp	2017-07-12	2018-07-11
PF210	Power Meter for Goniophotometer	2017-07-07	2018-07-06

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 \*\*\*\*\***