

LM-79-08 Test Report

For

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

2280 Ward Ave. Simi Valley CA.93065

Linear Retrofit Kits for 2x4 Luminaires

Model name(s): 15G314-11C

Remark: "C" denotes to CCT, may be
1,2,3,5. (1=3000K, 2=3500K, 3=4000K, 5=5000K).

Representative (Tested) Model:

15G314-111

15G314-113

15G314-115

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

Test & Report By:

Biao Zhong

Engineer: Biao Zhong

Date: Apr.20,2018

Review By:

Univ Xie

Manager: Univ Xie

Remark: This is multiple listed report, the Project Number of the original report is GZE1803070-M

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

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1.1 Product Information:

Organization Name	Revolution Lighting Technologies, Inc	
Brand Name	Revolution Lighting Technologies	
Model Number	15G314-11C	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Linear Retrofit Kits for 2x4 Luminaires	
Rated Voltage / Frequency	100 ~ 277 Vac, 50/60 Hz	
Nominal Power	36W	
Rated Initial Lamp Lumen	--	
Declared CCT	3000K, 3500K, 4000K, 5000K	
LED Manufacturer	XUYU OPTOELECTRONIC (SHEN ZHEN) CO., LTD	
LED Model	XY-2835W3TJ-1C2B XY-2835W2JJ-1C2B XY-2835W1JJ-1C2B	
Sample Number	GZE1803070-M1(3000K), M2(4000K), M3(5000K)	
Lamp Length	--	mm
Lamp Width	--	mm
Number of Units (modular products)	N/A	s

Photo



1.2 Test Specifications:

Date of Receipt	Apr.05,2018
Date of Test	Apr.07,2018
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**1) Photometric and Light Distribution Measurement – Goniophotometer Method:**

Photometric parameters were measured using the goniophotometer and software. The ambient temperature shall be maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$, 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.

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 $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. 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.

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 $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. 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.

2.1 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2018-04-07	Test Ambient:	25.2 ° C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	15G314-111		

Electrical Measurement in Lithonia 2GT8 lensed 2x4:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE180307	120.0	60	0.2807	33.16	0.9845	10.94
0-M1	277.0	60	0.1345	33.61	0.9021	13.42
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

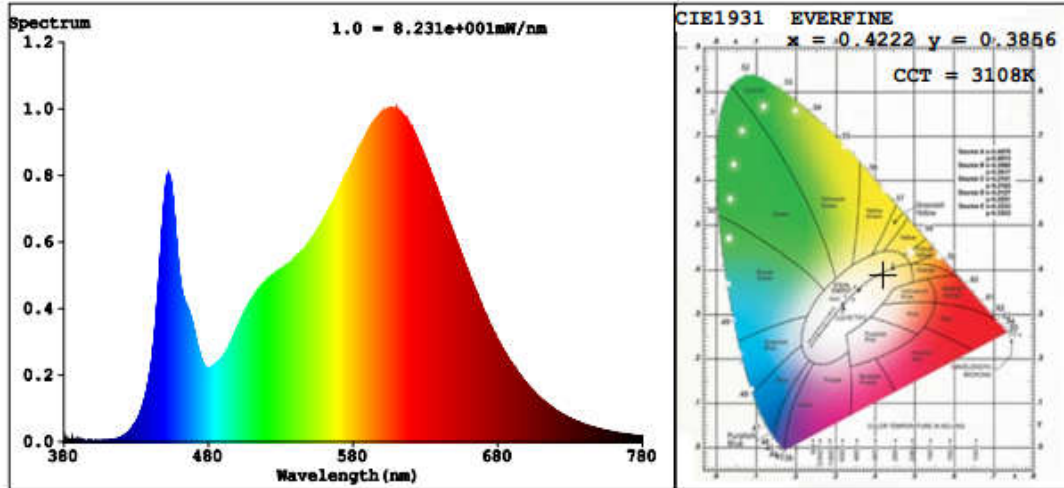
Chromaticity Measurement in Lithonia 2GT8 lensed 2x4- Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	87	R9	25
Frequency (Hz)	60	R2	95	R10	89
CCT (K)	3108	R3	95	R11	85
Duv	-0.0054	R4	85	R12	76
Chromaticity (x, y)	x=0.4222 y=0.3856	R5	87	R13	89
Chromaticity (u', v')	u'=0.2490 v'=0.5117	R6	93	R14	98
Color Rendering Index (CRI)	86.3	R7	83	R15	81
R9	25	R8	65	--	--

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)	4227.3	4242.0	>=3000(-10%)	
Luminous Efficacy (lm/W)	127.48	126.21	Standard: >=	Premium: >=
Most Worst Luminous/Highest Watts	125.78		100(-3%)	125(-3%)
Zonal lumens in the 0-60° zone (%)	85.1	--	>= 75(-3)	
SC: 0-180° (if applicable)	1.30	--	1.0-2.0(±0.1)	
SC: 90-270° (if applicable)	1.22	--	1.0-2.0(±0.1)	
Beam Angle (°)	99.2	--	--	
Center Beam Candle Power (cd)	1736	--	--	

Spectral Power Distribution & Chromaticity Diagram

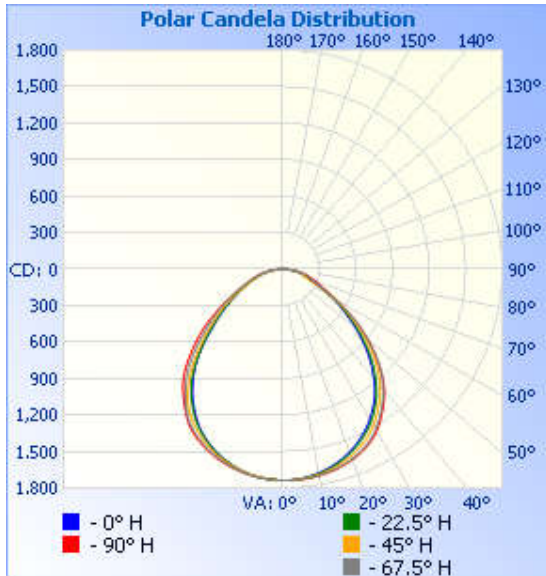


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1,354.9	32.1%
0-40	2,201.0	52.1%
0-60	3,596.2	85.1%
60-90	622.6	14.7%
70-100	270.4	6.4%
90-120	4.3	0.1%
0-90	4,218.8	99.8%
90-180	8.0	0.2%
0-180	4,226.8	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	%Total
0-10	164.4	3.9%	90-100	2.0	0%
10-20	472.5	11.2%	100-110	1.2	0%
20-30	717.9	17.0%	110-120	1.1	0%
30-40	846.1	20.0%	120-130	1.0	0%
40-50	799.3	18.9%	130-140	0.9	0%
50-60	595.8	14.1%	140-150	0.8	0%
60-70	354.1	8.4%	150-160	0.6	0%
70-80	201.3	4.8%	160-170	0.4	0%
80-90	67.2	1.6%	170-180	0.1	0%

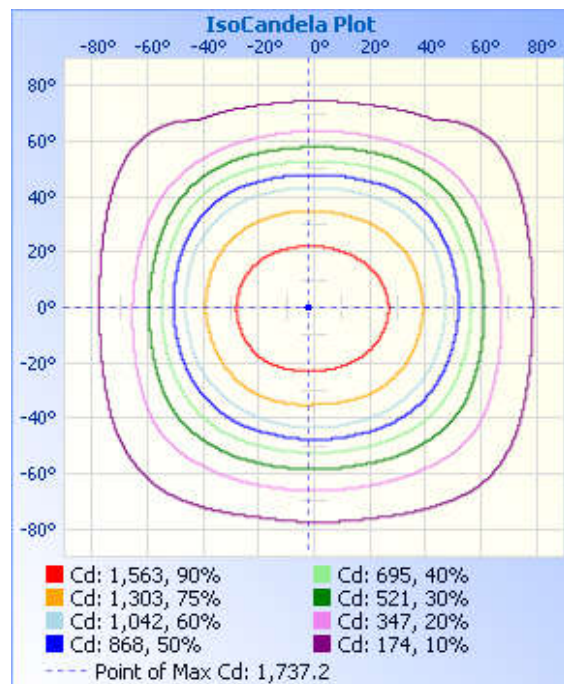
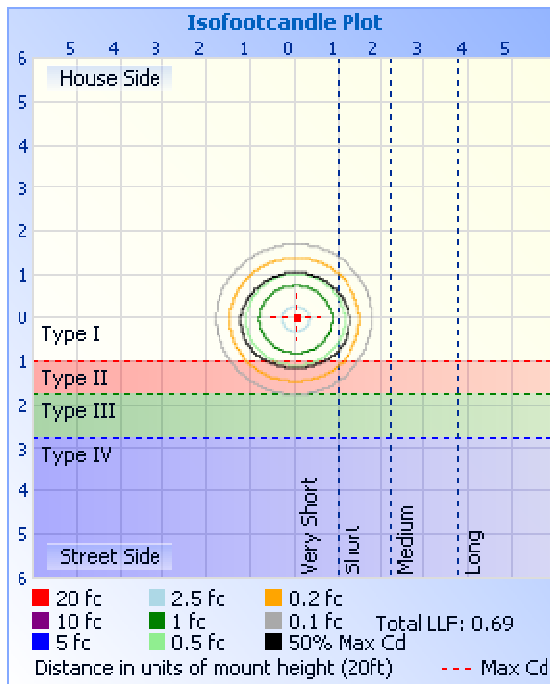
Photometric Data



Illuminance at a Distance

	Center Beam fc	Beam Width	
12.0ft	12.06 fc	26.5 ft	30.1 ft
24.0ft	3.01 fc	53.0 ft	60.2 ft
36.0ft	1.34 fc	79.5 ft	90.2 ft
48.0ft	0.75 fc	106.0 ft	120.3 ft
60.0ft	0.48 fc	132.5 ft	150.4 ft

■ Vert. Spread: 95.7°
■ Horiz. Spread: 102.8°



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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	1736	1736	1736	1736	1736	1736	1736	1736	1736	1736	1736	1736	1736	1736	1736	1736	
5	1727	1729	1727	1726	1727	1730	1732	1735	1735	1733	1733	1729	1727	1727	1725	1727	
10	1708	1709	1704	1699	1701	1707	1713	1723	1723	1718	1715	1706	1702	1701	1703	1707	
15	1679	1676	1666	1657	1659	1667	1683	1698	1703	1691	1681	1667	1661	1658	1664	1673	
20	1638	1632	1613	1597	1598	1610	1636	1660	1667	1654	1636	1613	1599	1599	1612	1631	
25	1583	1571	1542	1521	1522	1538	1571	1605	1616	1599	1576	1540	1521	1524	1546	1571	
30	1510	1489	1454	1424	1425	1444	1482	1521	1537	1523	1496	1447	1419	1428	1464	1498	
35	1399	1377	1341	1311	1308	1330	1370	1410	1423	1403	1380	1324	1291	1306	1355	1387	
40	1276	1252	1212	1168	1161	1185	1239	1281	1294	1249	1210	1165	1141	1157	1194	1239	
45	1120	1105	1060	1006	989	1018	1077	1120	1116	1065	1008	965	963	964	1006	1068	
50	930	921	881	825	805	831	883	921	917	864	818	778	763	775	817	872	
55	739	719	688	647	626	645	683	709	707	678	642	611	603	607	645	695	
60	550	532	502	474	467	468	481	499	514	521	487	471	469	468	491	538	
65	395	354	320	317	330	310	300	329	364	385	356	356	362	356	361	405	
70	293	254	210	219	237	217	202	250	277	273	256	260	272	263	261	293	
75	220	202	170	169	175	169	168	200	211	190	188	190	201	194	191	203	
80	149	142	131	122	125	120	130	141	142	129	122	126	137	130	129	135	
85	66.4	70.3	63.2	61.8	64.1	60.0	58.9	63.2	57.5	60.5	53.7	59.7	65.0	65.4	57.6	68.3	
90	1.59	1.31	1.67	1.76	1.63	1.74	1.51	1.45	1.10	1.10	1.14	1.22	15.6	3.74	2.35	0.75	
95	0.79	0.69	1.10	1.16	1.23	1.39	0.75	0.90	0.91	0.80	0.68	1.14	10.8	3.02	1.65	0.67	
100	0.69	0.70	0.99	1.16	1.20	1.28	0.82	0.69	0.82	0.62	0.96	1.08	6.02	2.30	0.96	0.76	
105	0.85	0.79	1.06	1.16	1.17	1.22	0.93	0.69	1.10	0.96	1.17	1.02	1.22	1.58	1.23	0.83	
110	0.98	1.03	1.09	1.16	1.14	1.16	1.04	0.89	1.31	1.10	1.19	0.97	1.08	1.09	1.18	1.22	
115	1.05	1.17	1.12	0.91	1.11	1.10	1.08	1.11	1.51	1.29	1.21	0.82	1.00	0.88	1.19	1.17	
120	1.13	1.23	1.15	0.88	1.02	0.86	1.12	1.22	1.59	1.44	1.22	0.82	0.95	0.91	1.21	1.17	
125	1.30	1.23	1.19	0.90	1.03	0.80	1.15	1.30	1.62	1.37	1.17	0.88	0.95	0.93	1.22	1.17	
130	1.31	1.22	1.21	0.92	1.05	0.81	1.16	1.30	1.59	1.37	1.13	0.93	1.08	1.05	1.02	1.17	
135	1.31	1.21	1.18	0.95	1.06	0.84	1.01	1.30	1.55	1.37	1.16	1.15	1.20	1.16	0.89	1.17	
140	1.56	1.19	1.06	1.00	1.08	0.90	0.91	1.26	1.52	1.37	1.12	1.29	1.42	1.33	0.77	1.17	
145	1.52	1.17	0.96	1.06	1.11	0.95	0.50	1.13	1.51	1.37	1.14	1.34	1.56	1.49	1.16	1.17	
150	1.49	1.17	1.09	1.11	1.15	1.03	0.64	1.12	1.51	1.37	1.16	1.35	1.70	1.63	1.39	1.17	
155	1.45	1.20	1.10	1.16	1.18	1.09	0.75	1.11	1.51	1.37	1.19	1.37	1.77	1.74	1.43	1.17	
160	1.38	1.11	1.10	1.21	1.20	1.17	0.88	1.07	1.51	1.37	1.21	1.38	1.79	1.83	1.50	1.04	
165	1.35	1.06	1.15	1.29	1.35	1.28	0.98	0.99	1.51	1.37	1.24	1.40	1.81	1.89	1.50	1.08	
170	1.36	1.08	1.28	1.47	1.62	1.35	1.22	1.05	1.51	1.37	1.28	1.41	1.83	1.94	1.50	1.12	
175	1.37	1.09	1.25	1.55	1.58	1.45	1.18	1.17	1.51	1.37	1.21	1.29	1.64	1.76	1.50	1.15	
180	1.37	1.10	1.23	1.56	1.56	1.43	1.16	1.17	1.51	1.37	1.10	1.22	1.56	1.56	1.43	1.17	

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

Test date	2018-04-07	Test Ambient:	25.2 ° C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	15G314-113		

Electrical Measurement in Lithonia 2GT8 lensed 2x4:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE180307	120.0	60	0.2812	33.21	0.9841	11.05
0-M2	277.0	60	0.1352	33.75	0.9013	13.49
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

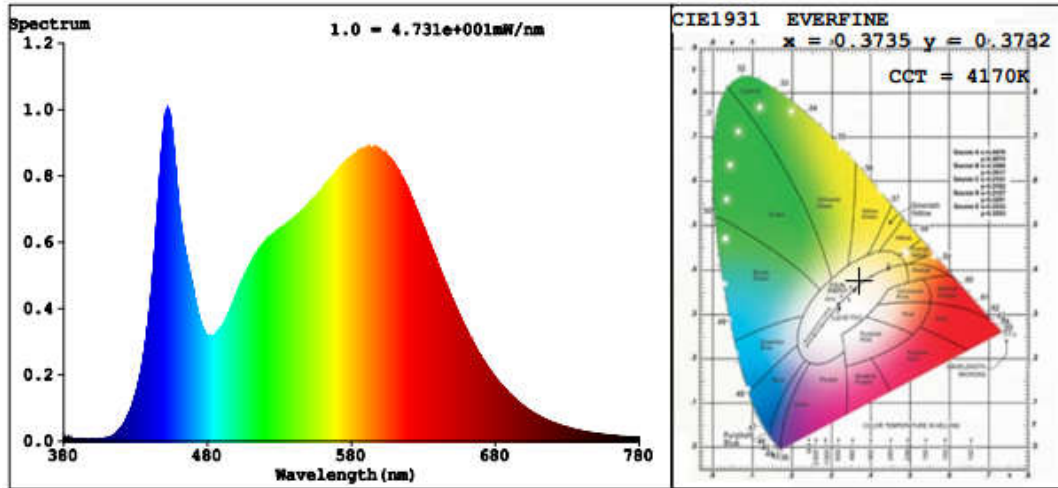
**Chromaticity Measurement in Lithonia 2GT8 lensed 2x4-
 Sphere-Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	82	R9	7
Frequency (Hz)	60	R2	91	R10	77
CCT (K)	4170	R3	96	R11	80
Duv	0.0004	R4	81	R12	63
Chromaticity (x, y)	x=0.3735 y=0.3732	R5	82	R13	84
Chromaticity (u', v')	u'=0.2219 v'=0.4990	R6	86	R14	98
Color Rendering Index (CRI)	83.4	R7	86	R15	75
R9	7	R8	64	--	--

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

Parameter	Result		DLC V4.3Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	4273	4288	>=3000(-10%)	
Luminous Efficacy (lm/W)	128.67	127.05	Standard: >=	Premium: >=
Most Worst Luminous/Highest Watts	126.61		100(-3%)	125(-3%)

Spectral Power Distribution & Chromaticity Diagram



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2.3 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2018-04-07	Test Ambient:	25.2 ° C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	15G314-115		

Electrical Measurement in Lithonia 2GT8 lensed 2x4:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE180307	120.0	60	0.2815	33.24	0.9839	11.07
0-M3	277.0	60	0.1354	33.78	0.9008	13.58
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

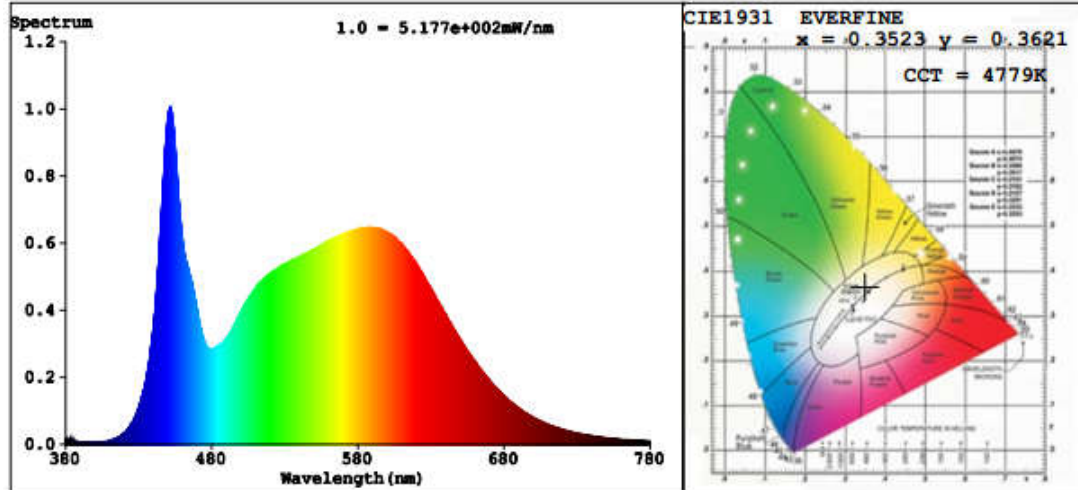
**Chromaticity Measurement in Lithonia 2GT8 lensed 2x4-
 Sphere-Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	82	R9	12
Frequency (Hz)	60	R2	90	R10	77
CCT (K)	4779	R3	95	R11	81
Duv	0.0024	R4	82	R12	59
Chromaticity (x, y)	x=0.3523 y=0.3621	R5	82	R13	85
Chromaticity (u', v')	u'=0.2122 v'=0.4908	R6	86	R14	98
Color Rendering Index (CRI)	84.2	R7	88	R15	77
R9	12	R8	68	--	--

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

Parameter	Result		DLC V4.3Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	4326	4341	>=3000(-10%)	
Luminous Efficacy (lm/W)	130.14	128.51	Standard: >=	Premium: >=
Most Worst Luminous/Highest Watts	128.06		100(-3%)	125(-3%)

Spectral Power Distribution & Chromaticity Diagram



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2.4 Performance Assessment:

Model name	CCT(K)	Total Luminous (lm)	Power (W)	Luminous Efficacy (lm/W)
15G314-111	3000K	4227.3	33.16	127.48
15G314-112	3500K	4250 ^{*1}	33.19 ^{*2}	128.05 ^{*3}
15G314-113	4000K	4273	33.21	128.67
15G314-115	5000K	4326	33.24	130.14

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

$$4250 = (4273 - 4227.3) / 2 + 4227.3$$

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

$$33.19 = (33.16 + 33.21) / 2$$

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

$$128.05 = 4250 / 33.19$$

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 *******

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