

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): 15G214-11C

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

Representative (Tested) Model:

15G214-111

15G214-113

15G214-115

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

Test & Report By:

Biao Zhong

Engineer: Biao Zhong

Date: Apr. 19, 2018

Review By:

Univ Xie

Manager: Univ Xie

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

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

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	15G214-11C	
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	24W	
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-H1(3000K), H2(4000K), H3(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	15G214-111		

Electrical Measurement in Lithonia 2GT8 lensed 2x4:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE180307	120.0	60	0.1957	23.05	0.9814	10.74
0-H1	277.0	60	0.0950	23.42	0.8903	14.74
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

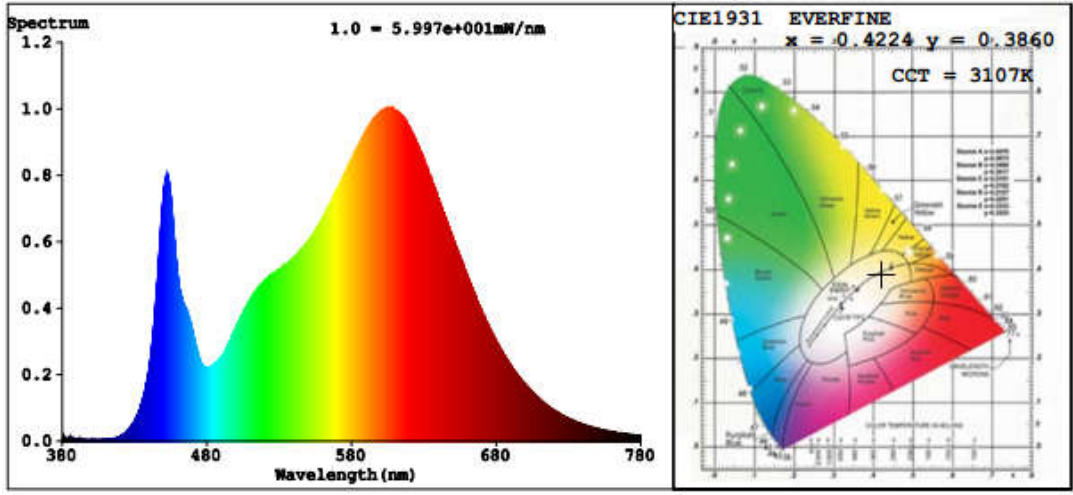
Chromaticity Measurement in Lithonia 2GT8 lensed 2x4- Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	86	R9	23
Frequency (Hz)	60	R2	95	R10	88
CCT (K)	3107	R3	95	R11	85
Duv	-0.0053	R4	84	R12	76
Chromaticity (x, y)	x=0.4224 y=0.3860	R5	87	R13	89
Chromaticity (u', v')	u'=0.2490 v'=0.5118	R6	93	R14	98
Color Rendering Index (CRI)	86.0	R7	83	R15	80
R9	23	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)	2972.3	2989.1	>=3000(-10%)	
Luminous Efficacy (lm/W)	128.95	127.63	Standard: >=	Premium: >=
Most Worst Luminous/Highest Watts	126.91		100(-3%)	125(-3%)
Zonal lumens in the 0-60° zone (%)	84.9	--	>= 75(-3)	
SC: 0-180° (if applicable)	1.27	--	1.0-2.0(±0.1)	
SC: 90-270° (if applicable)	1.21	--	1.0-2.0(±0.1)	
Beam Angle (°)	100.5	--	--	
Center Beam Candle Power (cd)	1196	--	--	

Spectral Power Distribution & Chromaticity Diagram



Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	936.9	31.5%
0-40	1,528.8	51.4%
0-60	2,522.8	84.9%
60-90	443.5	14.9%
70-100	192.7	6.5%
90-120	2.8	0.1%
0-90	2,966.3	99.8%
90-180	5.7	0.2%
0-180	2,972.0	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	%Total
0-10	113.3	3.8%	90-100	1.2	0%
10-20	325.9	11.0%	100-110	0.8	0%
20-30	497.8	16.7%	110-120	0.8	0%
30-40	591.8	19.9%	120-130	0.8	0%
40-50	567.4	19.1%	130-140	0.7	0%
50-60	426.7	14.4%	140-150	0.6	0%
60-70	251.9	8.5%	150-160	0.5	0%
70-80	143.1	4.8%	160-170	0.3	0%
80-90	48.4	1.6%	170-180	0.1	0%

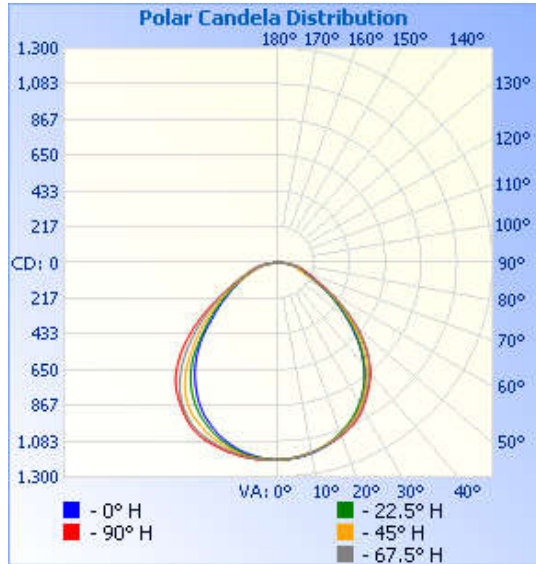
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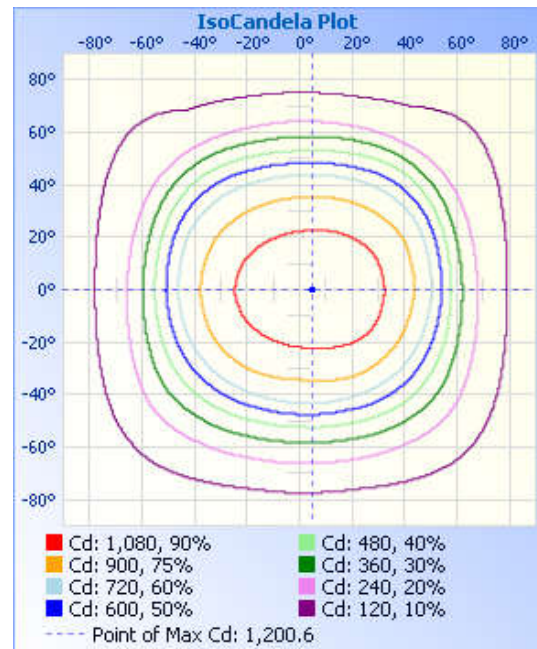
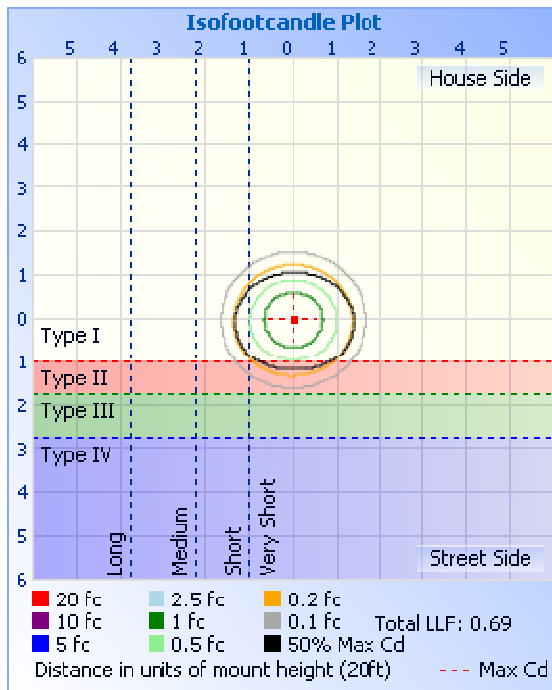
Photometric Data



Illuminance at a Distance

	Center Beam fc	Beam Width	
12.0ft	8.31 fc	26.6 ft	31.3 ft
24.0ft	2.08 fc	53.2 ft	62.5 ft
36.0ft	0.92 fc	79.9 ft	93.8 ft
48.0ft	0.52 fc	106.5 ft	125.0 ft
60.0ft	0.33 fc	133.1 ft	156.3 ft

■ Vert. Spread: 95.9°
 ■ Horiz. Spread: 105.0°



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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	1196	1196	1196	1196	1196	1196	1196	1196	1196	1196	1196	1196	1196	1196	1196	1196
5	1200	1200	1197	1196	1190	1187	1187	1185	1186	1184	1186	1188	1189	1192	1196	1197
10	1196	1198	1189	1182	1173	1169	1170	1167	1169	1163	1166	1167	1170	1179	1185	1191
15	1187	1189	1171	1158	1146	1140	1141	1145	1146	1139	1138	1135	1139	1152	1165	1179
20	1172	1173	1144	1123	1106	1100	1105	1114	1117	1107	1100	1091	1095	1112	1138	1160
25	1150	1145	1107	1078	1056	1049	1060	1075	1082	1072	1053	1037	1039	1064	1099	1136
30	1105	1095	1052	1017	991	985	998	1015	1023	1019	998	972	968	1002	1054	1092
35	1040	1028	981	942	911	906	922	941	950	942	917	888	880	922	981	1024
40	970	956	899	846	810	808	836	862	870	845	808	782	779	818	875	931
45	862	858	795	732	692	697	733	765	762	724	675	648	659	682	735	805
50	722	720	662	601	565	569	604	637	634	593	547	522	522	551	602	661
55	561	561	527	474	440	444	474	498	494	472	435	411	414	433	474	524
60	404	395	376	350	330	324	338	354	362	366	334	318	322	333	359	400
65	284	254	232	231	235	218	214	234	257	272	247	243	249	252	263	295
70	209	186	150	158	169	155	144	176	194	193	178	179	188	184	187	207
75	159	149	123	121	125	120	119	142	150	136	130	131	138	134	135	145
80	109	108	96.4	88.1	89.8	87.1	94.4	105	105	93.8	87.8	87.2	94.2	89.8	91.9	97.6
85	42.1	47.0	44.9	45.0	46.5	45.0	45.3	46.4	42.2	44.2	39.1	42.7	45.0	45.3	40.0	45.2
90	1.29	1.36	1.16	1.28	1.45	1.34	1.30	1.36	5.20	0.50	0.78	1.91	2.82	0.48	6.80	0.85
95	0.64	0.71	0.83	0.88	0.84	0.82	0.89	0.71	2.59	0.60	0.73	1.18	1.17	0.77	0.57	0.64
100	0.60	0.66	0.79	0.83	0.79	0.75	0.83	0.71	1.09	0.64	0.89	1.09	0.73	0.56	0.78	0.79
105	0.64	0.69	0.75	0.75	0.75	0.68	0.84	0.71	0.57	0.83	0.99	1.00	0.74	0.56	0.78	0.85
110	0.69	0.74	0.73	0.65	0.70	0.60	1.03	0.78	0.81	1.00	1.27	0.75	0.75	0.56	0.77	0.94
115	0.79	0.90	0.85	0.55	0.66	0.53	1.13	1.05	0.97	1.07	1.17	0.76	0.75	0.56	0.77	0.94
120	0.95	1.07	0.89	0.49	0.64	0.49	1.27	1.02	0.92	1.07	1.12	0.74	0.76	0.56	0.64	0.94
125	1.14	1.21	0.90	0.49	0.64	0.49	1.14	0.99	0.85	1.07	1.07	0.72	0.76	0.56	0.57	0.97
130	1.17	1.34	0.91	0.49	0.65	0.49	1.00	1.18	0.85	1.07	0.96	0.64	0.79	0.66	0.59	0.92
135	1.18	1.30	0.85	0.49	0.66	0.49	0.88	1.14	0.85	1.07	0.87	0.81	0.83	0.77	0.61	0.99
140	1.14	1.17	0.78	0.49	0.67	0.49	0.78	1.20	0.85	1.07	0.84	0.93	0.96	0.87	0.62	0.99
145	1.09	1.07	0.76	0.49	0.69	0.49	0.78	1.15	0.85	1.07	0.85	1.19	1.08	0.91	0.69	0.99
150	1.08	0.99	0.75	0.49	0.70	0.63	0.80	1.01	0.85	1.07	0.85	1.41	1.17	0.99	0.92	0.99
155	1.14	0.95	0.73	0.71	0.77	0.77	0.81	0.94	0.85	1.07	0.91	2.53	1.17	1.05	1.06	0.99
160	0.93	0.86	0.72	0.90	0.77	0.85	0.82	0.92	0.85	1.07	0.90	1.75	1.16	1.20	1.11	1.08
165	1.10	0.86	0.78	1.04	1.08	0.93	0.83	0.96	0.85	1.07	0.88	1.35	1.15	1.23	1.14	1.18
170	1.28	0.86	0.87	1.10	1.18	1.00	0.85	1.13	0.92	1.07	0.87	1.20	1.14	1.21	1.17	1.12
175	1.14	0.86	0.97	1.12	1.14	1.09	0.90	1.13	0.78	1.07	0.85	1.05	1.13	1.20	1.06	1.03
180	1.14	0.86	0.99	1.12	1.12	1.12	1.19	1.06	0.85	1.14	0.85	1.05	1.12	1.12	1.13	0.99

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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	15G214-113		

Electrical Measurement in Lithonia 2GT8 lensed 2x4:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE180307	120.0	60	0.1960	23.08	0.9813	10.76
0-H2	277.0	60	0.0951	23.44	0.8898	14.77
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

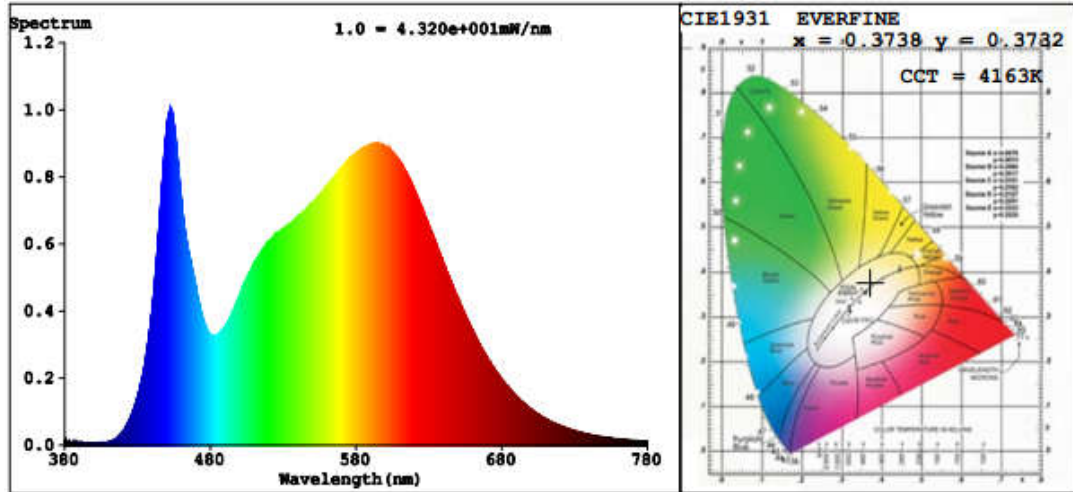
**Chromaticity Measurement in Lithonia 2GT8 lensed 2x4-
 Sphere-Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	82	R9	8
Frequency (Hz)	60	R2	91	R10	78
CCT (K)	4163	R3	96	R11	80
Duv	0.0004	R4	81	R12	63
Chromaticity (x, y)	x=0.3738 y=0.3732	R5	82	R13	84
Chromaticity (u', v')	u'=0.2221 v'=0.4990	R6	87	R14	98
Color Rendering Index (CRI)	83.5	R7	86	R15	76
R9	8	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)	3001	3019	>=3000(-10%)	
Luminous Efficacy (lm/W)	130.03	128.80	Standard: >=	Premium: >=
Most Worst Luminous/Highest Watts	128.03		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	15G214-115		

Electrical Measurement in Lithonia 2GT8 lensed 2x4:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE180307	120.0	60	0.1961	23.09	0.9812	10.78
0-H3	277.0	60	0.0952	23.48	0.8901	14.79
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

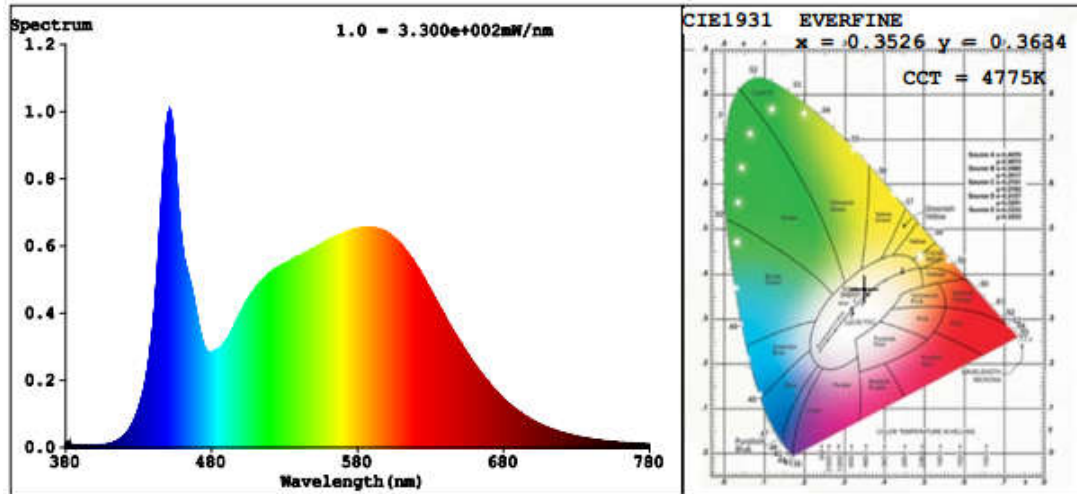
**Chromaticity Measurement in Lithonia 2GT8 lensed 2x4-
 Sphere-Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	82	R9	10
Frequency (Hz)	60	R2	90	R10	75
CCT (K)	4775	R3	95	R11	81
Duv	0.0029	R4	82	R12	59
Chromaticity (x, y)	x=0.3526 y=0.3634	R5	82	R13	84
Chromaticity (u', v')	u'=0.2119 v'=0.4914	R6	85	R14	97
Color Rendering Index (CRI)	83.8	R7	88	R15	76
R9	10	R8	67	--	--

**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)	3034	3052	>=3000(-10%)	
Luminous Efficacy (lm/W)	131.40	129.98	Standard: >=	Premium: >=
Most Worst Luminous/Highest Watts	129.22		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)
15G214-111	3000K	2972.3	23.05	128.95
15G214-112	3500K	2987 ^{*1}	23.07 ^{*2}	129.48 ^{*3}
15G214-113	4000K	3001	23.08	130.03
15G214-115	5000K	3034	23.09	131.4

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

$$2987 = (3001 - 2972.3) / 2 + 2972.3$$

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

$$23.07 = (23.05 + 23.08) / 2$$

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

$$129.48 = 2987 / 23.07$$

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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