

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): 15G414-11C

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

Representative (Tested) Model:

15G414-111
15G414-113
15G414-115

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

Test & Report By:

Candice Liao

Engineer: Candice Liao

Date: Apr.26,2018

Review By:

Univ Xie

Manager: Univ Xie

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

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

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	15G414-11C	
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	48W	
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-R1(3000K), R2(4000K), R3(5000K)	
Lamp Length	--	mm
Lamp Width	--	mm
Number of Units (modular products)	N/A	s

Photo



1.2 Test Specifications:

Date of Receipt	Apr.06,2018
Date of Test	Apr.08,2018
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

<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	2018-04-08	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	15G414-111		

Electrical Measurement in Lithonia 2GT8 lensed 2x4:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE18030	120.0	60	0.3718	43.86	0.9830	12.25
70-R1	277.0	60	0.1707	43.41	0.9179	11.60
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

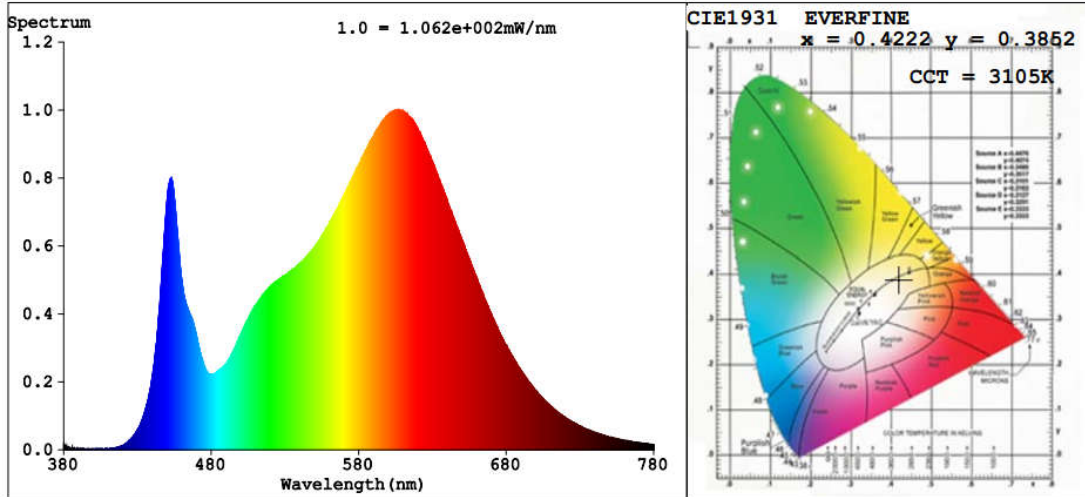
**Chromaticity Measurement in Lithonia 2GT8 lensed 2x4-
 Sphere-Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	87	R9	25
Frequency (Hz)	60	R2	95	R10	89
CCT (K)	3105	R3	95	R11	85
Duv	-0.0056	R4	85	R12	77
Chromaticity (x, y)	x=0.4222 y=0.3852	R5	88	R13	90
Chromaticity (u', v')	u'=0.2492 v'=0.5115	R6	93	R14	98
Color Rendering Index (CRI)	86.4	R7	83	R15	81
R9	25	R8	66	--	--

**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)	5510.7	5386.1	>=3000(-10%)	
Luminous Efficacy (lm/W)	125.64	124.08	Standard: >=	Premium: >=
Most Worst Luminous/Highest Watts	122.80		100(-3%)	125(-3%)
Zonal lumens in the 0-60° zone (%)	84.3	--	>= 75(-3)	
SC: 0-180° (if applicable)	1.29	--	1.0-2.0(±0.1)	
SC: 90-270° (if applicable)	1.20	--	1.0-2.0(±0.1)	
Beam Angle (°)	100.3	--	--	
Center Beam Candle Power (cd)	2214	--	--	

Spectral Power Distribution & Chromaticity Diagram

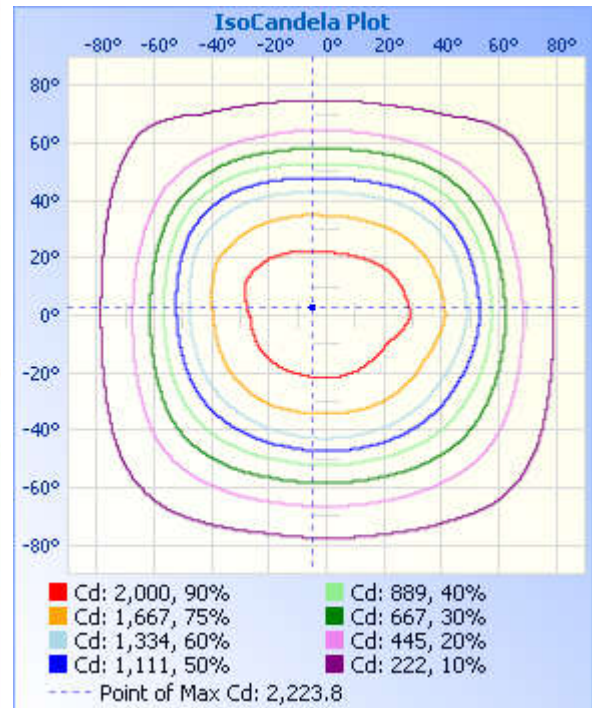
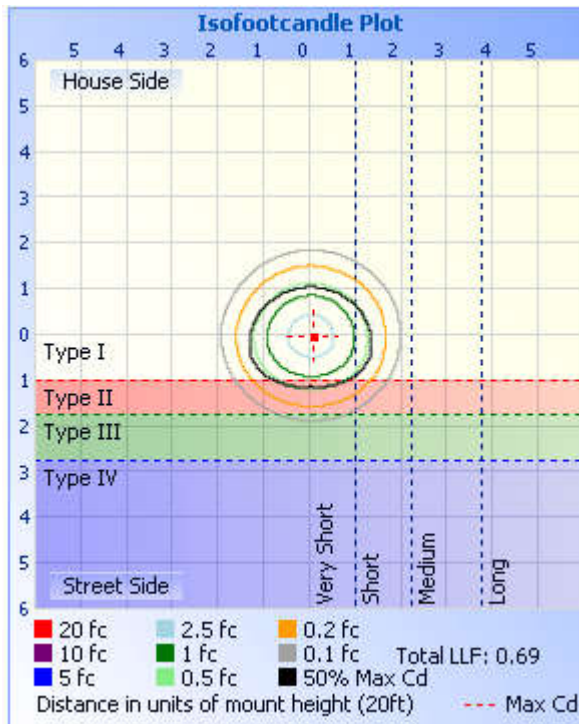
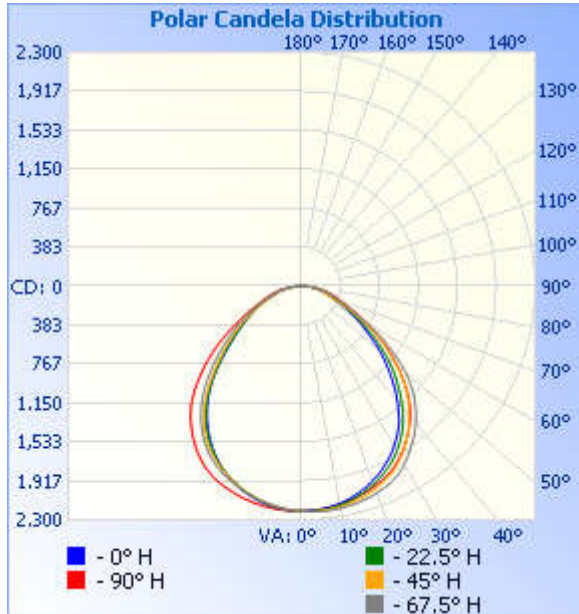


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1,729.3	31.4%
0-40	2,815.1	51.1%
0-60	4,646.9	84.3%
60-90	847.8	15.4%
70-100	364.4	6.6%
90-120	8.0	0.1%
0-90	5,494.7	99.7%
90-180	15.2	0.3%
0-180	5,509.9	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	209.6	3.8%	90-100	3.3	0.1%
10-20	602.4	10.9%	100-110	2.3	0%
20-30	917.3	16.6%	110-120	2.4	0%
30-40	1,085.7	19.7%	120-130	2.2	0%
40-50	1,037.7	18.8%	130-140	1.8	0%
50-60	794.1	14.4%	140-150	1.4	0%
60-70	486.7	8.8%	150-160	1.0	0%
70-80	270.3	4.9%	160-170	0.6	0%
80-90	90.8	1.6%	170-180	0.2	0%

Photometric Data



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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	2214	2214	2214	2214	2214	2214	2214	2214	2214	2214	2214	2214	2214	2214	2214	2214	
5	2211	2210	2209	2206	2204	2210	2218	2224	2203	2201	2202	2202	2202	2196	2193	2190	
10	2194	2192	2184	2176	2171	2186	2203	2218	2179	2174	2172	2168	2167	2157	2154	2153	
15	2166	2158	2141	2126	2116	2141	2172	2199	2143	2135	2126	2112	2109	2097	2097	2102	
20	2124	2111	2081	2048	2041	2074	2121	2166	2096	2082	2062	2035	2027	2024	2024	2039	
25	2068	2046	2000	1954	1942	1987	2053	2116	2035	2018	1982	1937	1921	1925	1934	1963	
30	1978	1943	1890	1835	1820	1875	1950	2022	1940	1929	1883	1814	1785	1796	1825	1860	
35	1851	1806	1748	1685	1670	1731	1813	1894	1812	1797	1741	1662	1624	1640	1676	1714	
40	1701	1659	1584	1495	1465	1542	1650	1751	1663	1614	1532	1463	1433	1444	1474	1536	
45	1508	1475	1391	1287	1240	1330	1461	1574	1471	1396	1287	1217	1204	1206	1238	1319	
50	1264	1246	1164	1062	1015	1101	1231	1348	1238	1159	1050	978	957	966	1009	1087	
55	1008	977	920	833	793	864	978	1066	990	937	847	777	761	764	809	873	
60	754	714	670	618	600	639	719	781	746	735	662	611	605	599	628	682	
65	548	495	441	429	438	445	467	529	539	550	494	472	470	464	467	511	
70	397	340	285	293	315	307	299	363	392	388	356	348	355	344	337	367	
75	296	272	226	220	228	229	231	286	297	269	253	248	260	249	241	261	
80	199	198	172	156	161	160	178	211	203	182	168	165	176	167	163	178	
85	80.7	89.8	83.5	80.2	84.9	83.4	88.0	94.3	83.9	85.6	75.6	82.5	86.3	85.3	74.5	88.0	
90	1.67	1.74	1.88	2.11	2.15	2.15	2.06	1.99	9.32	1.15	12.3	3.91	21.0	4.09	12.2	8.26	
95	1.15	1.15	1.52	1.63	1.57	1.73	1.52	1.25	4.95	1.08	4.65	2.44	12.1	1.96	1.60	2.60	
100	1.22	1.29	1.57	1.76	1.46	1.70	1.48	1.39	1.87	1.87	1.86	2.06	4.75	1.92	1.99	1.91	
105	2.23	2.51	2.29	1.92	1.57	1.88	1.82	1.51	2.49	2.33	1.86	1.85	3.34	1.93	2.22	2.46	
110	2.62	2.73	2.36	1.92	1.78	2.32	2.40	2.34	2.73	2.45	2.50	1.49	1.92	1.81	2.30	2.64	
115	2.95	3.08	2.76	1.67	1.64	2.18	2.90	3.08	3.24	2.58	2.54	1.14	1.36	1.23	2.38	3.10	
120	3.31	3.38	2.82	1.47	1.50	2.05	3.26	3.47	3.38	2.72	2.43	1.17	1.36	1.23	2.41	3.26	
125	3.45	3.38	2.79	1.30	1.47	1.74	3.38	3.60	3.23	2.73	2.31	1.19	1.36	1.24	2.45	2.91	
130	3.24	3.16	2.68	1.27	1.45	1.52	3.11	3.73	2.88	2.64	2.20	1.42	1.50	1.38	2.32	2.86	
135	3.02	2.94	2.43	1.28	1.43	1.96	2.84	4.10	2.72	2.55	2.10	1.85	1.64	1.74	2.19	2.88	
140	2.92	2.86	1.85	1.42	1.71	2.29	2.57	4.27	2.69	2.25	1.59	1.92	1.81	2.00	1.89	2.91	
145	2.74	2.38	1.46	1.51	1.71	2.38	1.60	4.00	2.59	2.11	1.65	2.19	1.96	2.29	1.82	2.20	
150	2.37	1.87	1.39	1.69	1.73	2.47	2.55	1.98	2.42	2.07	1.81	2.37	2.21	2.50	2.30	1.99	
155	2.08	1.80	1.36	1.87	1.85	2.53	2.53	2.29	2.38	2.13	1.84	2.43	2.43	2.72	2.41	2.05	
160	2.04	1.73	1.82	1.94	2.55	2.60	2.51	2.36	2.34	2.36	1.87	2.42	2.45	2.79	2.62	2.13	
165	2.15	1.71	1.87	1.98	2.33	2.60	2.50	2.31	2.31	2.42	1.90	2.32	2.47	2.81	2.62	2.27	
170	2.16	1.68	1.92	2.13	2.43	2.60	2.48	2.26	2.27	2.33	1.81	2.19	2.49	2.80	2.62	2.35	
175	2.16	1.66	2.00	2.13	2.57	2.61	2.48	2.21	2.23	2.09	1.68	2.06	2.26	2.72	2.62	2.27	
180	2.09	1.65	2.00	2.20	2.64	2.61	2.26	1.98	1.94	2.01	1.65	1.99	2.21	2.68	2.62	2.27	

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

Test date	2018-04-08	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	15G414-113		

Electrical Measurement in Lithonia 2GT8 lensed 2x4:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE18030	120.0	60	0.3719	43.89	0.9834	12.62
70-R2	277.0	60	0.1714	43.46	0.9153	11.57
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

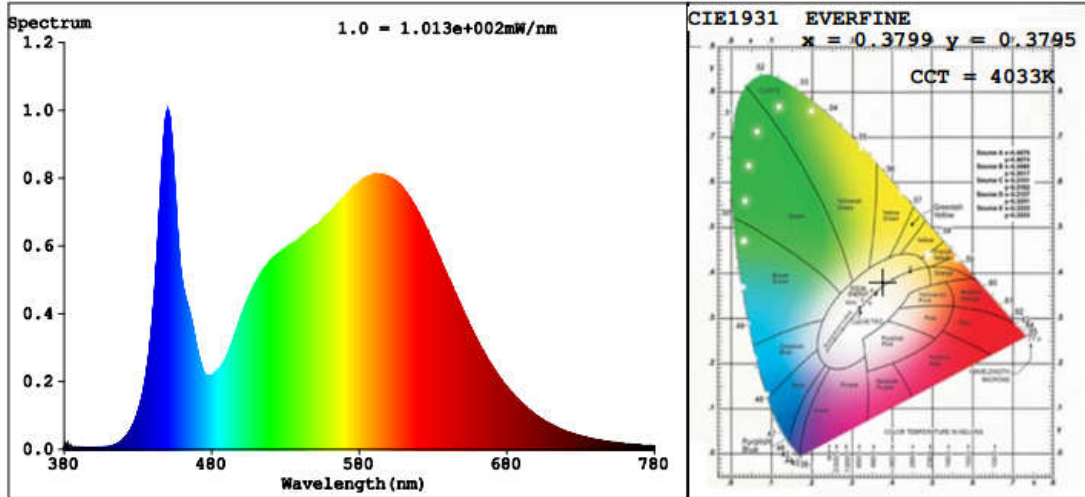
**Chromaticity Measurement in Lithonia 2GT8 lensed 2x4 -
 Sphere-Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	6
Frequency (Hz)	60	R2	88	R10	72
CCT (K)	4033	R3	94	R11	81
Duv	0.0014	R4	82	R12	60
Chromaticity (x, y)	x=0.3799 y=0.3795	R5	81	R13	82
Chromaticity (u', v')	u'=0.2237 v'=0.5027	R6	84	R14	97
Color Rendering Index (CRI)	82.5	R7	86	R15	74
R9	6	R8	64	--	--

**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)	5553.4	5486.8	>=3000(-10%)	
Luminous Efficacy (lm/W)	126.53	126.25	Standard: >=	Premium: >=
Most Worst Luminous/Highest Watts	125.01		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	2018-04-08	Test Ambient:	25.2 ° C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	15G414-115		

Electrical Measurement in Lithonia 2GT8 lensed 2x4:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE18030	120.0	60	0.3711	43.93	0.9864	12.42
70-R3	277.0	60	0.1710	43.55	0.9193	11.75
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

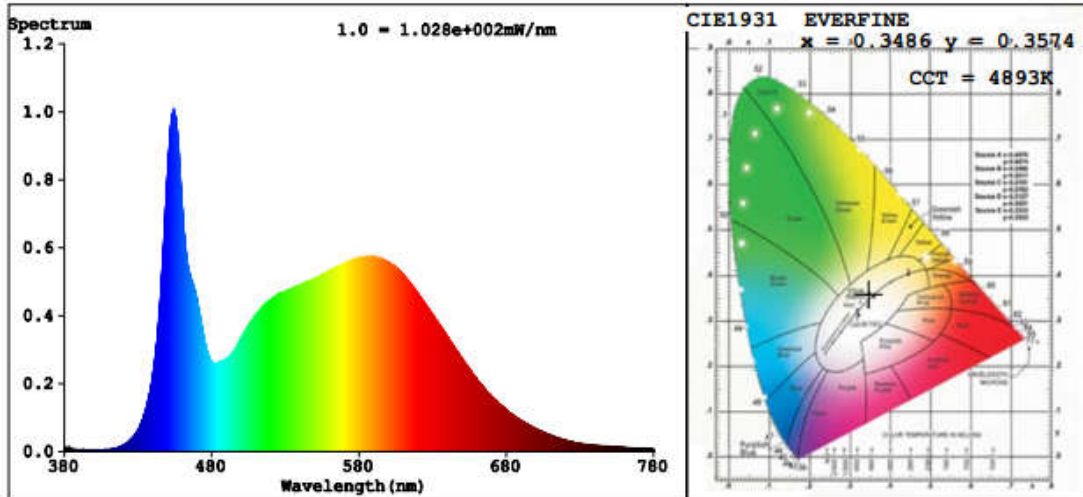
**Chromaticity Measurement in Lithonia 2GT8 lensed 2x4 -
 Sphere-Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	83	R9	13
Frequency (Hz)	60	R2	92	R10	80
CCT (K)	4893	R3	95	R11	79
Duv	0.0015	R4	80	R12	56
Chromaticity (x, y)	x=0.3486 y=0.3574	R5	82	R13	86
Chromaticity (u', v')	u'=0.2115 v'=0.4880	R6	87	R14	98
Color Rendering Index (CRI)	84.1	R7	86	R15	78
R9	13	R8	67	--	--

**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)	5600.2	5547.4	≥3000(-10%)	
Luminous Efficacy (lm/W)	127.48	127.38	Standard: ≥=	Premium: ≥=
Most Worst Luminous/Highest Watts	126.28		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)
15G414-111	3000	5510.7	43.86	125.64
15G414-112	3500	5532.1 ^{*1}	43.88 ^{*2}	126.07 ^{*3}
15G414-113	4000	5553.4	43.89	126.53
15G414-115	5000	5600.2	43.93	127.48

*1: This value is calculated and the calculation formula is as below:
 $5532.1 = (5553.4 - 5510.7) / 2 + 5510.7$

*2: This value is calculated and the calculation formula is as below:
 $43.88 = (43.86 + 43.89) / 2$

*3: This value is calculated and the calculation formula is as below:
 $126.07 = 5532.1 / 43.88$

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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