

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): 15G415-11C

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

Representative (Tested) Model:

15G415-111
15G415-113
15G415-115

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

Test & Report By:

Candice Liao

Engineer: Candice Liao

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-S.

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

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Tel: 8620-3229 0320

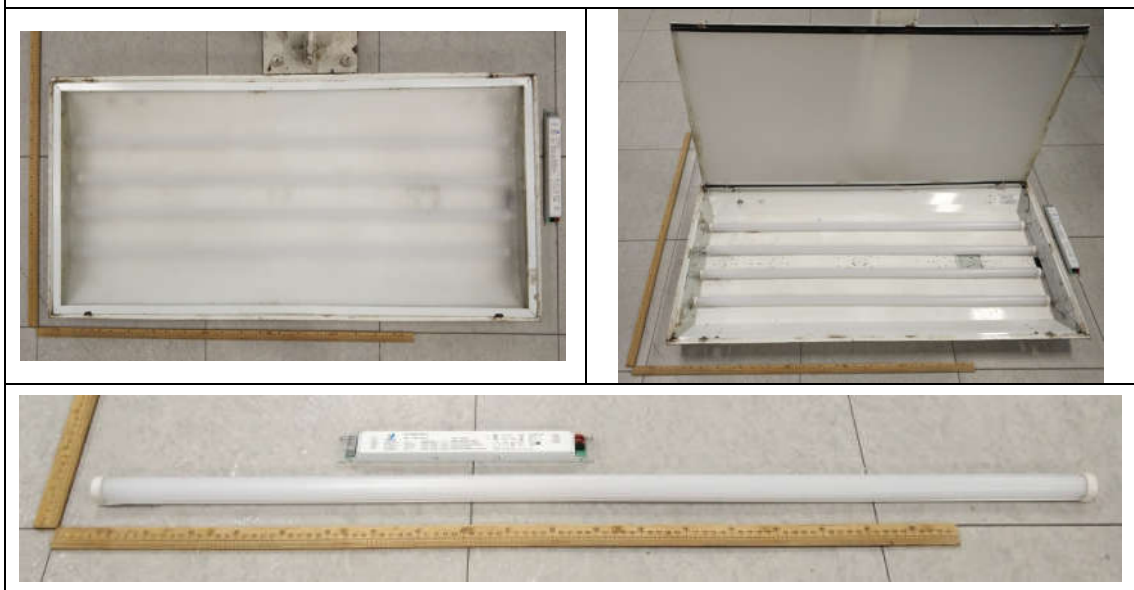
Fax: 8620-32290422

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1.1 Product Information:

Organization Name	Revolution Lighting Technologies, Inc	
Brand Name	Revolution Lighting Technologies	
Model Number	15G415-11C	
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	60W	
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-S1(3000K), S2(4000K), S3(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	15G415-111		

Electrical Measurement in Lithonia 2GT8 lensed 2x4:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE18030	120.0	60	0.4749	55.68	0.9771	11.80
70-S1	277.0	60	0.2182	54.43	0.9012	14.70
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

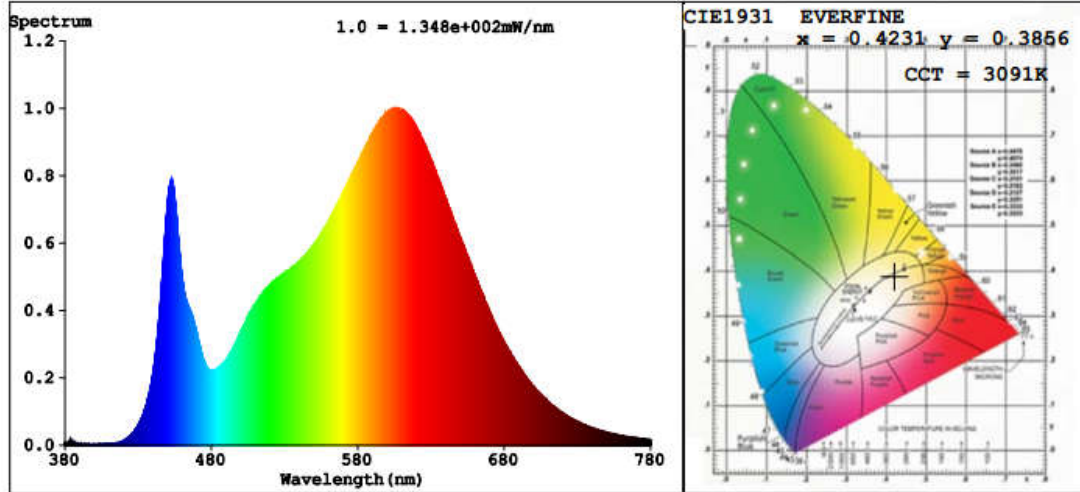
**Chromaticity Measurement in Lithonia 2GT8 lensed 2x4-
 Sphere-Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	87	R9	25
Frequency (Hz)	60	R2	95	R10	89
CCT (K)	3091	R3	94	R11	85
Duv	-0.0056	R4	84	R12	77
Chromaticity (x, y)	x=0.4231 y=0.3856	R5	87	R13	89
Chromaticity (u', v')	u'=0.2496 v'=0.5118	R6	93	R14	98
Color Rendering Index (CRI)	86.2	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)	7006.6	6761.4	>=3000(-10%)	
Luminous Efficacy (lm/W)	125.84	124.22	Standard: >=	Premium: >=
Most Worst Luminous/Highest Watts	121.43		100(-3%)	125(-3%)
Zonal lumens in the 0-60° zone (%)	84.4	--	>= 75(-3)	
SC: 0-180° (if applicable)	1.33	--	1.0-2.0(±0.1)	
SC: 90-270° (if applicable)	1.20	--	1.0-2.0(±0.1)	
Beam Angle (°)	100.2	--	--	
Center Beam Candle Power (cd)	2826	--	--	

Spectral Power Distribution & Chromaticity Diagram

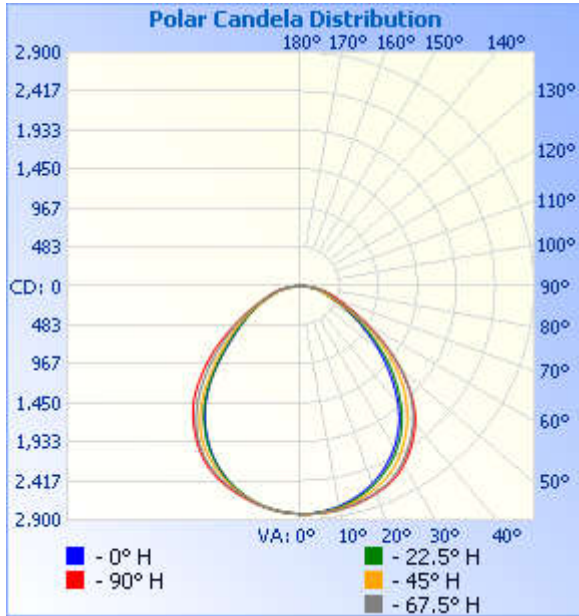


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	2,205.8	31.5%
0-40	3,589.6	51.2%
0-60	5,914.9	84.4%
60-90	1,072.4	15.3%
70-100	459.8	6.6%
90-120	9.5	0.1%
0-90	6,987.3	99.7%
90-180	18.4	0.3%
0-180	7,005.6	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	267.5	3.8%	90-100	3.6	0.1%
10-20	768.6	11.0%	100-110	3.1	0%
20-30	1,169.7	16.7%	110-120	2.9	0%
30-40	1,383.9	19.8%	120-130	2.6	0%
40-50	1,319.6	18.8%	130-140	2.2	0%
50-60	1,005.6	14.4%	140-150	1.7	0%
60-70	616.2	8.8%	150-160	1.3	0%
70-80	343.0	4.9%	160-170	0.8	0%
80-90	113.2	1.6%	170-180	0.3	0%

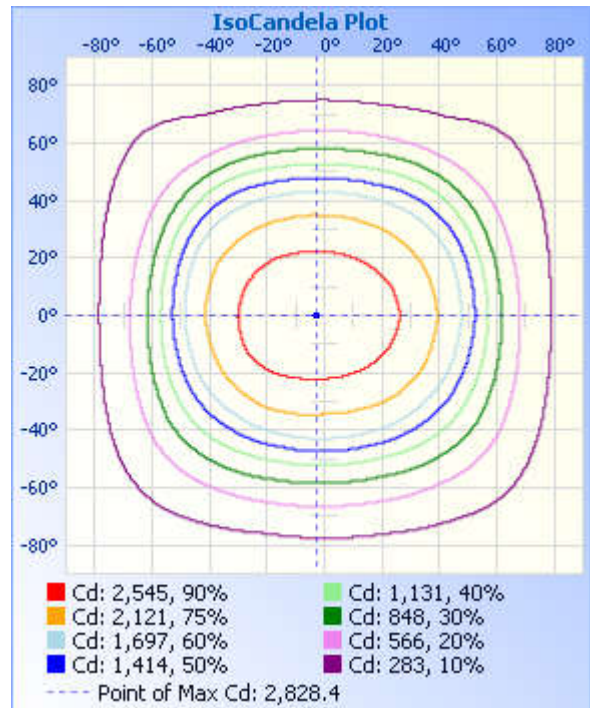
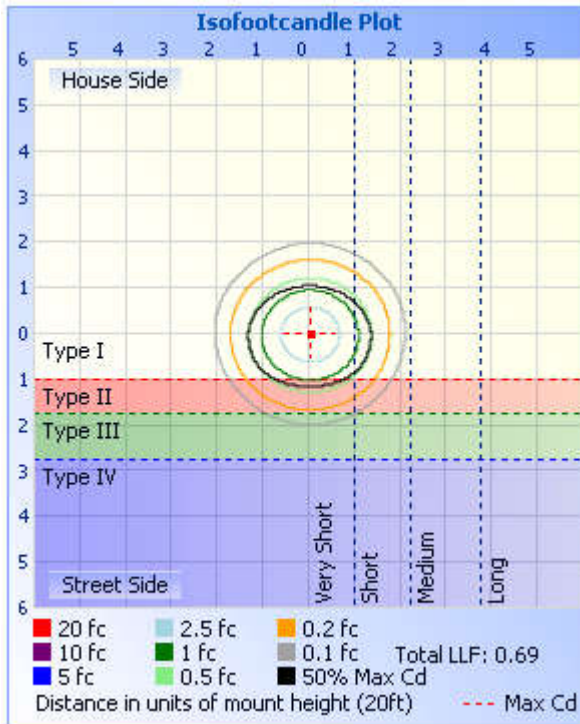
Photometric Data



Illuminance at a Distance

	Center Beam fc	Beam Width	
4.0ft	176.6 fc	8.7 ft	10.5 ft
8.0ft	44.2 fc	17.5 ft	21.0 ft
12.0ft	19.6 fc	26.2 ft	31.5 ft
16.0ft	11.0 fc	35.0 ft	42.0 ft
20.0ft	7.1 fc	43.7 ft	52.5 ft

■ Vert. Spread: 95.1°
 ■ Horiz. Spread: 105.4°



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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	2826	2826	2826	2826	2826	2826	2826	2826	2826	2826	2826	2826	2826	2826	2826	2826	
5	2805	2808	2808	2809	2813	2819	2823	2827	2827	2823	2819	2814	2809	2807	2806	2805	
10	2769	2772	2766	2767	2770	2783	2798	2811	2813	2802	2792	2775	2765	2761	2762	2765	
15	2718	2717	2702	2698	2701	2721	2750	2778	2783	2765	2741	2708	2690	2685	2695	2707	
20	2652	2644	2616	2602	2605	2633	2680	2727	2738	2713	2670	2615	2585	2583	2605	2632	
25	2565	2549	2505	2477	2479	2516	2585	2653	2673	2642	2577	2493	2449	2452	2493	2539	
30	2439	2408	2356	2322	2322	2368	2448	2528	2561	2538	2457	2341	2275	2288	2355	2415	
35	2273	2229	2170	2129	2129	2180	2271	2364	2402	2371	2279	2149	2069	2088	2171	2241	
40	2079	2038	1959	1884	1881	1938	2060	2177	2212	2133	2007	1895	1825	1841	1915	2010	
45	1839	1806	1715	1619	1591	1670	1816	1941	1957	1846	1686	1576	1533	1536	1609	1733	
50	1538	1523	1432	1332	1300	1378	1523	1647	1642	1530	1376	1265	1219	1231	1311	1433	
55	1230	1195	1131	1044	1014	1079	1203	1289	1302	1232	1108	1005	969	975	1050	1150	
60	923	876	823	775	768	797	875	943	974	959	863	790	769	763	815	899	
65	676	610	544	539	559	554	568	639	698	713	641	608	597	591	607	675	
70	494	425	357	371	402	383	370	447	506	500	459	448	450	438	437	485	
75	369	339	284	279	291	288	289	355	381	345	324	317	330	317	312	339	
80	249	248	216	198	205	201	222	259	257	231	214	210	223	213	208	228	
85	99.5	111	103	101	108	104	107	115	103	106	93.6	104	108	107	92.5	105	
90	2.38	2.52	2.66	2.66	2.55	2.82	2.73	2.81	9.83	2.70	2.14	2.34	19.1	20.2	11.4	2.01	
95	1.80	1.66	2.13	2.21	1.92	1.93	1.93	1.80	3.08	2.27	2.12	2.20	10.0	5.68	2.21	2.07	
100	2.66	2.16	2.35	2.27	1.92	2.06	2.29	2.23	3.03	3.10	2.50	2.16	5.63	4.73	2.71	3.09	
105	3.38	3.38	3.05	2.35	2.13	2.15	2.73	3.24	3.32	3.29	2.57	2.22	3.23	3.79	2.86	3.45	
110	3.67	3.65	3.26	2.22	2.10	2.18	2.78	3.09	3.24	3.24	3.00	2.21	2.14	2.84	2.86	3.31	
115	3.67	3.81	3.56	2.09	2.08	2.21	3.21	3.38	3.52	3.41	3.26	1.70	1.85	2.02	2.89	3.34	
120	4.02	4.17	3.52	1.89	1.78	1.85	3.29	3.80	3.52	3.47	3.40	1.55	1.71	1.83	2.83	3.37	
125	4.11	4.34	3.48	1.85	1.80	1.73	3.33	3.75	3.52	3.53	3.35	1.56	1.71	1.64	2.70	3.41	
130	4.14	4.25	3.43	1.63	1.82	1.82	3.36	3.70	3.46	3.44	3.00	1.92	1.88	1.71	2.63	3.44	
135	4.16	4.67	3.28	1.63	1.84	2.01	3.00	3.60	3.40	3.29	2.71	2.27	2.06	2.28	2.57	3.47	
140	4.05	4.17	2.50	2.20	1.99	2.22	2.36	3.42	3.34	3.09	2.52	2.56	2.28	2.63	2.23	3.51	
145	3.96	3.67	2.00	2.23	2.10	2.28	2.16	3.09	3.20	2.95	2.33	2.98	2.70	2.84	2.36	2.87	
150	3.45	2.88	2.14	2.27	2.20	2.34	2.11	2.80	3.10	3.03	2.44	3.17	2.76	2.92	3.07	2.57	
155	2.80	2.63	2.24	2.36	2.30	2.60	2.29	2.51	3.02	3.13	2.48	3.33	2.73	2.99	3.19	2.80	
160	2.77	2.57	2.28	2.40	2.51	2.66	2.43	2.49	3.20	3.16	2.52	3.18	2.70	3.26	3.28	2.92	
165	2.75	2.58	2.32	2.55	2.79	2.78	2.55	2.48	3.13	3.32	2.55	3.17	0.04	3.35	3.32	3.17	
170	2.92	2.58	2.78	2.98	3.20	3.20	2.94	2.46	3.01	3.24	2.59	3.19	3.37	3.40	3.37	3.29	
175	3.04	2.59	3.14	3.40	3.37	3.53	3.14	2.45	2.80	2.95	2.63	2.95	3.27	3.46	3.41	3.18	
180	3.09	2.66	3.07	3.40	3.34	3.70	3.14	2.44	2.88	3.09	2.64	3.12	3.41	3.35	3.43	3.16	

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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	15G415-115		

Electrical Measurement in Lithonia 2GT8 lensed 2x4:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE18030	120.0	60	0.4776	56.07	0.9784	11.27
70-S2	277.0	60	0.2208	55.64	0.9098	14.54
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

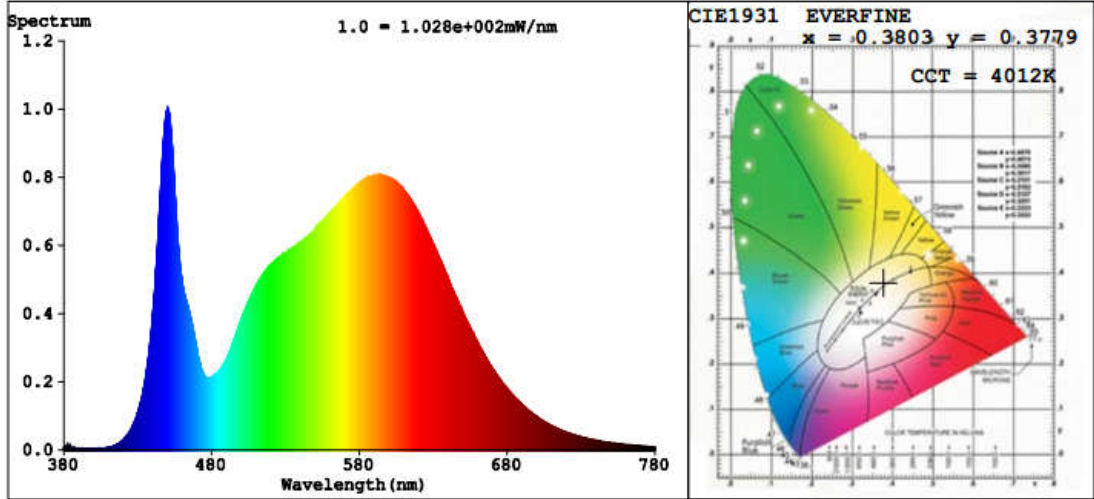
**Chromaticity Measurement in Lithonia 2GT8 lensed 2x4 -
 Sphere-Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	6
Frequency (Hz)	60	R2	88	R10	72
CCT (K)	4012	R3	94	R11	81
Duv	0.0006	R4	82	R12	60
Chromaticity (x, y)	x=0.3803 y=0.3779	R5	81	R13	82
Chromaticity (u', v')	u'=0.2246 v'=0.5020	R6	84	R14	97
Color Rendering Index (CRI)	82.4	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)	7071.5	6844.3	>=3000(-10%)	
Luminous Efficacy (lm/W)	126.12	126.01	Standard: >=	Premium: >=
Most Worst Luminous/Highest Watts	123.01		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	15G415-115		

Electrical Measurement in Lithonia 2GT8 lensed 2x4:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE18030	120.0	60	0.4811	56.48	0.9783	11.15
70-S3	277.0	60	0.2194	55.33	0.9104	14.34
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

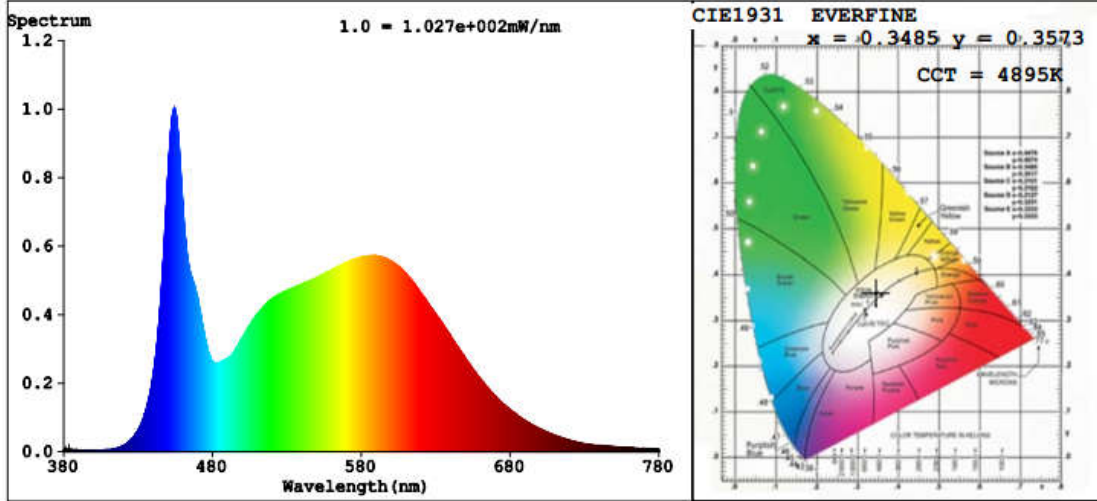
**Chromaticity Measurement in Lithonia 2GT8 lensed 2x4 -
 Sphere-Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	83	R9	13
Frequency (Hz)	60	R2	92	R10	80
CCT (K)	4895	R3	95	R11	79
Duv	0.0015	R4	80	R12	56
Chromaticity (x, y)	x=0.3485 y=0.3573	R5	82	R13	86
Chromaticity (u', v')	u'=0.2115 v'=0.4879	R6	87	R14	98
Color Rendering Index (CRI)	84.2	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)	7210.2	6994.3	>=3000(-10%)	
Luminous Efficacy (lm/W)	127.66	126.41	Standard: >=	Premium: >=
Most Worst Luminous/Highest Watts	123.84		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)
15G415-111	3000	7006.6	55.68	125.84
15G415-112	3500	7039.1 ^{*1}	55.87 ^{*2}	125.99 ^{*3}
15G415-113	4000	7071.5	56.07	126.12
15G415-115	5000	7210.2	56.48	127.66

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

$$7039.1 = (7071.5 - 7006.6) / 2 + 7006.6$$

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

$$55.87 = (55.68 + 56.07) / 2$$

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

$$125.99 = 7039.1 / 55.87$$

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

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