

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): 15G313-11C

Remark: "C" denotes to CCT, may be
1,2,3,5. (1=3000K, 2=3500K, 3=4000K, 5=5000K).Representative (Tested) Model: 15G313-111
15G313-113
15G313-115

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-L

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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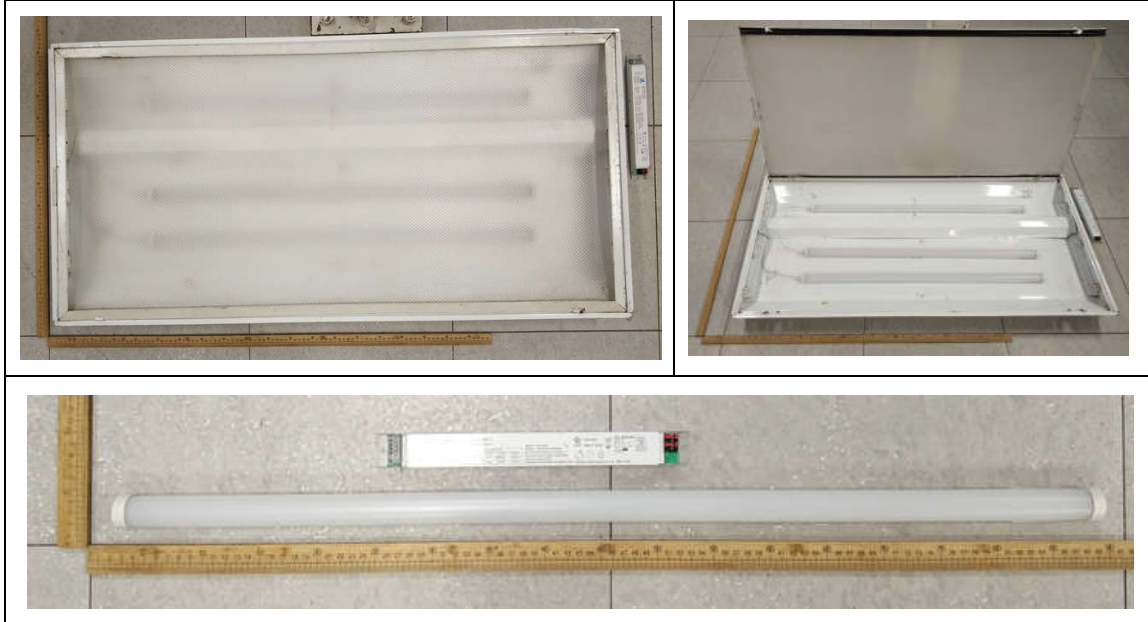
Fax: 8620-32290422

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

1.1 Product Information:

Organization Name	Revolution Lighting Technologies, Inc	
Brand Name	Revolution Lighting Technologies	
Model Number	15G313-11C	
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-L1(3000K), L2(4000K), L3(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	15G313-111		

Electrical Measurement in Lithonia 2GT8 lensed 2x4:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE180307	120.0	60	0.2793	32.99	0.9844	10.68
0-L1	277.0	60	0.1340	33.46	0.9013	13.34
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

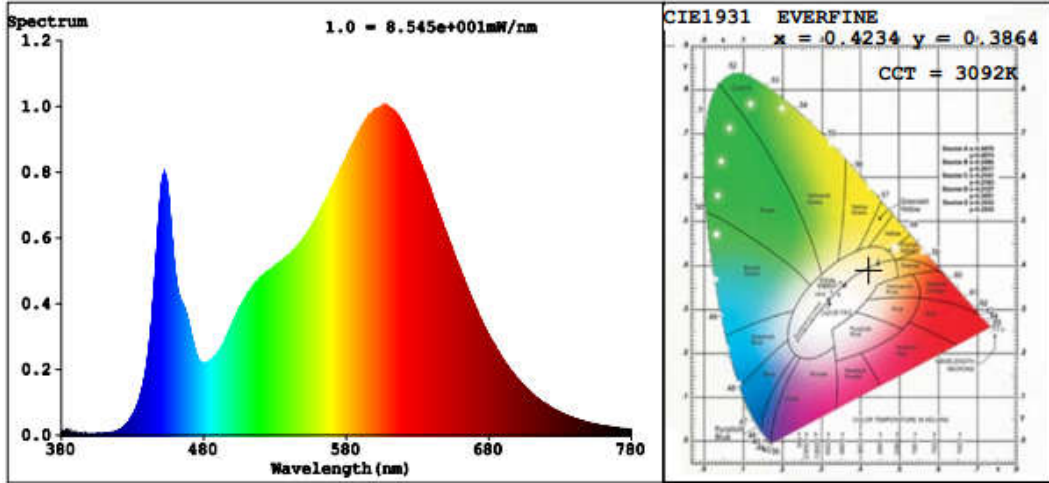
Chromaticity Measurement in Lithonia 2GT8 lensed 2x4- Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	87	R9	24
Frequency (Hz)	60	R2	95	R10	88
CCT (K)	3092	R3	95	R11	85
Duv	-0.0053	R4	84	R12	76
Chromaticity (x, y)	x=0.4234 y=0.3864	R5	87	R13	89
Chromaticity (u', v')	u'=0.2494 v'=0.5121	R6	93	R14	98
Color Rendering Index (CRI)	86.0	R7	83	R15	80
R9	24	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)	4247.2	4268.3	>=3000(-10%)	
Luminous Efficacy (lm/W)	128.74	127.56	Standard: >=	Premium: >=
Most Worst Luminous/Highest Watts	126.93		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)	1.22	--	1.0-2.0(±0.1)	
Beam Angle (°)	100.0	--	--	
Center Beam Candle Power (cd)	1725	--	--	

Spectral Power Distribution & Chromaticity Diagram

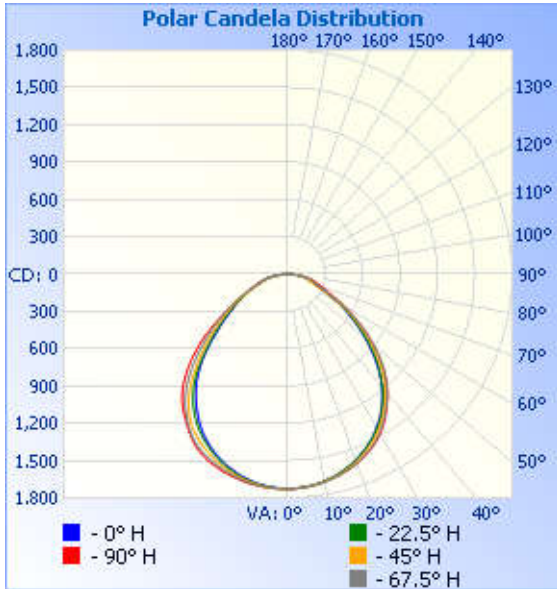


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1,344.7	31.7%
0-40	2,189.1	51.5%
0-60	3,603.6	84.9%
60-90	635.9	15%
70-100	277.0	6.5%
90-120	3.5	0.1%
0-90	4,239.6	99.8%
90-180	7.1	0.2%
0-180	4,246.7	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	163.3	3.8%	90-100	1.3	0%
10-20	468.8	11.0%	100-110	1.1	0%
20-30	712.6	16.8%	110-120	1.1	0%
30-40	844.4	19.9%	120-130	1.0	0%
40-50	807.3	19.0%	130-140	0.9	0%
50-60	607.3	14.3%	140-150	0.7	0%
60-70	360.2	8.5%	150-160	0.6	0%
70-80	205.4	4.8%	160-170	0.4	0%
80-90	70.3	1.7%	170-180	0.1	0%

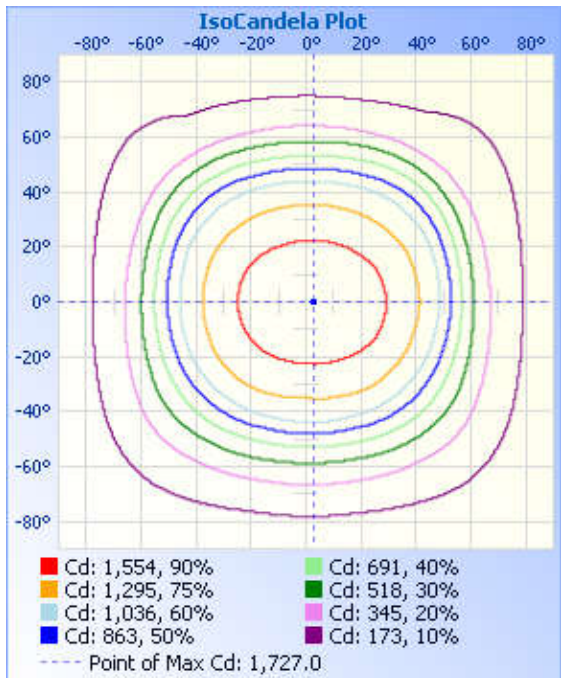
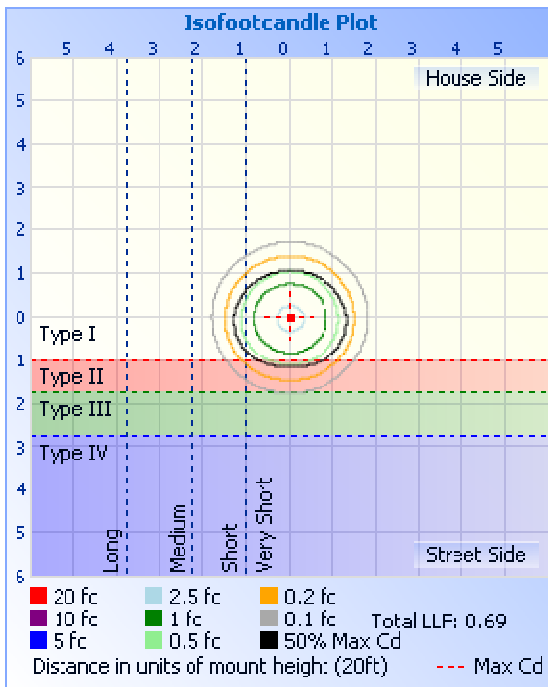
Photometric Data



Illuminance at a Distance

	Center Beam fc	Beam Width	
12.0ft	11.98 fc	26.9 ft	30.4 ft
24.0ft	2.99 fc	53.9 ft	60.8 ft
36.0ft	1.33 fc	80.8 ft	91.3 ft
48.0ft	0.75 fc	107.8 ft	121.7 ft
60.0ft	0.48 fc	134.7 ft	152.1 ft

■ Vert. Spread: 96.6°
 ■ Horiz. Spread: 103.5°



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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	1725	1725	1725	1725	1725	1725	1725	1725	1725	1725	1725	1725	1725	1725	1725	1725
5	1724	1724	1721	1718	1716	1715	1716	1717	1716	1713	1714	1713	1716	1717	1720	1722
10	1711	1713	1702	1695	1690	1688	1693	1696	1693	1690	1690	1687	1690	1694	1699	1706
15	1689	1686	1668	1656	1648	1648	1657	1664	1662	1654	1652	1645	1645	1654	1666	1679
20	1655	1650	1622	1602	1590	1592	1605	1619	1618	1608	1600	1586	1584	1595	1619	1642
25	1610	1598	1558	1533	1516	1519	1537	1555	1559	1549	1535	1512	1506	1524	1558	1593
30	1535	1516	1474	1444	1423	1428	1448	1472	1479	1474	1453	1421	1406	1433	1484	1522
35	1431	1411	1367	1334	1312	1317	1340	1362	1368	1363	1347	1303	1284	1320	1380	1414
40	1322	1301	1249	1198	1172	1179	1215	1239	1242	1218	1186	1156	1142	1175	1228	1280
45	1164	1159	1103	1039	1004	1017	1061	1091	1085	1050	998	962	969	985	1033	1101
50	970	963	918	856	822	835	879	911	898	861	812	776	769	794	847	902
55	749	754	730	674	641	651	685	711	713	680	643	613	607	623	668	715
60	543	533	521	499	478	476	494	522	528	530	491	475	475	481	508	547
65	383	347	321	327	335	317	312	340	373	398	363	360	368	367	372	406
70	289	258	211	223	241	223	208	249	279	282	263	264	278	270	266	289
75	221	208	174	172	178	173	169	202	214	197	191	194	207	200	193	203
80	153	151	138	126	129	124	134	146	147	135	129	133	145	137	135	139
85	61.7	67.9	66.3	65.7	66.5	64.2	62.6	67.2	61.9	66.9	59.0	65.0	69.7	71.0	62.5	68.1
90	1.25	1.19	1.25	1.71	1.58	1.64	1.38	1.26	1.01	0.99	1.25	10.2	2.59	2.87	0.98	0.79
95	0.73	0.60	0.88	1.05	1.19	1.11	0.92	0.75	0.82	0.66	0.92	3.18	1.24	1.39	0.97	0.76
100	0.62	0.66	0.75	1.08	1.12	1.07	0.89	0.77	0.73	0.67	0.99	2.51	1.11	1.05	1.12	0.86
105	0.68	0.66	0.99	1.10	1.07	0.99	1.08	0.84	1.07	0.80	1.20	1.84	1.03	1.05	1.14	1.01
110	0.85	0.99	1.12	1.11	1.02	0.91	1.18	1.08	1.29	1.11	1.25	1.18	0.93	1.05	1.15	1.19
115	1.04	0.99	1.19	1.11	0.97	0.83	1.26	1.20	1.45	1.32	1.29	1.04	0.84	0.73	1.17	1.12
120	1.14	1.07	1.17	0.71	0.92	0.81	1.32	1.29	1.45	1.32	1.34	0.78	0.84	0.78	1.17	1.12
125	1.28	1.12	1.15	0.65	0.87	0.82	1.35	1.45	1.45	1.32	1.29	0.74	0.89	0.84	1.10	1.12
130	1.38	1.16	1.13	0.65	0.85	0.84	1.30	1.44	1.45	1.32	1.25	0.79	1.00	0.89	1.04	1.12
135	1.36	1.17	1.08	0.65	0.93	0.85	1.18	1.43	1.45	1.32	1.19	0.98	1.08	0.98	0.99	1.12
140	1.34	1.18	0.86	0.71	0.98	0.91	1.05	1.42	1.45	1.32	1.02	1.11	1.18	1.16	1.01	1.12
145	1.32	1.18	0.76	0.92	1.02	0.98	0.87	1.40	1.45	1.32	0.90	1.19	1.38	1.31	1.05	1.12
150	1.30	1.19	0.82	1.06	1.06	1.18	0.90	1.39	1.45	1.32	0.99	1.25	1.51	1.44	1.45	1.12
155	1.28	1.19	0.87	1.10	1.10	1.20	0.92	1.29	1.45	1.32	0.92	1.25	1.52	1.65	1.45	1.14
160	1.26	1.11	0.91	1.14	1.24	1.22	1.05	1.13	1.45	1.32	0.99	1.25	1.54	1.68	1.48	1.24
165	1.31	1.01	0.95	1.24	1.24	1.24	1.06	1.02	1.45	1.32	1.07	1.24	1.55	1.69	1.51	1.24
170	1.28	1.04	0.99	1.36	1.40	1.31	1.08	1.04	1.45	1.37	1.13	1.18	1.56	1.65	1.54	1.22
175	1.26	1.19	1.09	1.32	1.43	1.64	1.11	1.05	1.45	1.29	1.17	1.13	1.37	1.44	1.57	1.20
180	1.25	1.19	1.12	1.31	1.44	1.64	1.12	1.06	1.38	1.26	1.18	1.11	1.31	1.44	1.71	1.12

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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	15G313-113		

Electrical Measurement in Lithonia 2GT8 lensed 2x4:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE180307	120.0	60	0.2800	33.07	0.9843	10.69
0-L2	277.0	60	0.1338	33.39	0.9012	13.38
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

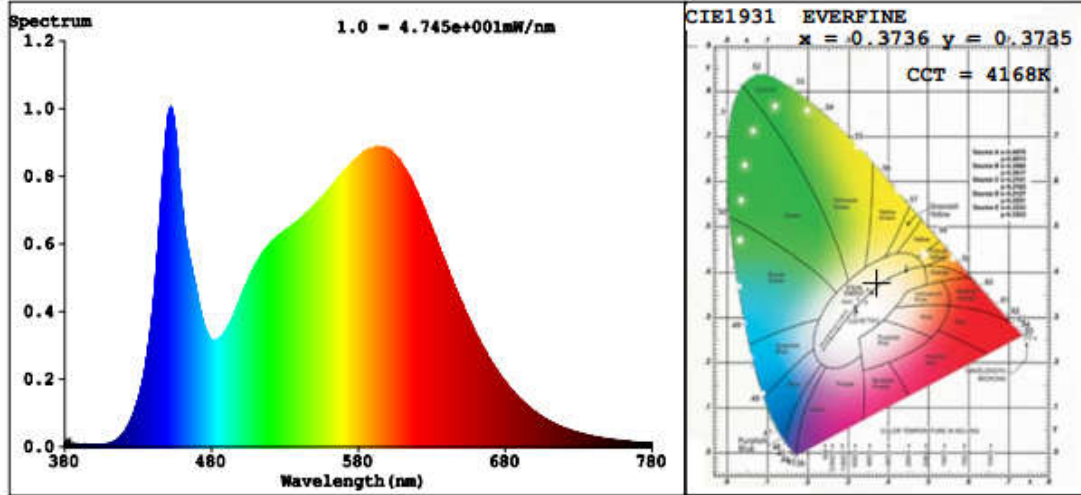
Chromaticity Measurement in Lithonia 2GT8 lensed 2x4-Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	82	R9	7
Frequency (Hz)	60	R2	90	R10	77
CCT (K)	4168	R3	96	R11	80
Duv	0.0005	R4	81	R12	63
Chromaticity (x, y)	x=0.3736 y=0.3735	R5	82	R13	84
Chromaticity (u', v')	u'=0.2219 v'=0.4991	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 V4.3 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	4296	4317	>=3000(-10%)	
Luminous Efficacy (lm/W)	129.91	129.29	Standard: >=	Premium: >=
Most Worst Luminous/Highest Watts	128.66		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	15G313-115		

Electrical Measurement in Lithonia 2GT8 lensed 2x4:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE180307	120.0	60	0.2803	33.11	0.9842	10.70
0-L3	277.0	60	0.1343	33.52	0.9010	13.37
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

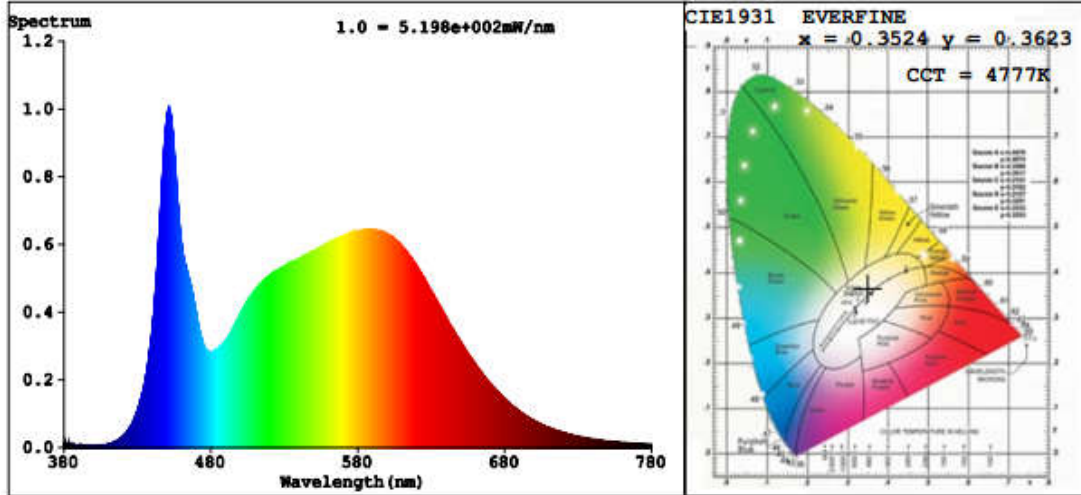
Chromaticity Measurement in Lithonia 2GT8 lensed 2x4-Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	82	R9	12
Frequency (Hz)	60	R2	90	R10	76
CCT (K)	4777	R3	95	R11	81
Duv	0.0025	R4	82	R12	59
Chromaticity (x, y)	x=0.3524 y=0.3623	R5	82	R13	85
Chromaticity (u', v')	u'=0.2122 v'=0.4909	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 V4.3 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	4348	4369	>=3000(-10%)	
Luminous Efficacy (lm/W)	131.32	130.34	Standard: >=	Premium: >=
Most Worst Luminous/Highest Watts	129.71		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)
15G313-111	3000K	4247.2	32.99	128.74
15G313-112	3500K	4272 ^{*1}	33.03 ^{*2}	129.34 ^{*3}
15G313-113	4000K	4296	33.07	129.91
15G313-115	5000K	4348	33.11	131.32

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

$$4272 = (4296 - 4247.2) / 2 + 4247.2$$

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

$$33.03 = (33.07 + 32.99) / 2$$

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

$$129.34 = 4272 / 33.03$$

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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