

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 2x2 Luminaires

Model name(s): 15G212-11C

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

Representative (Tested) Model: 15G212-111

15G212-113

15G212-115

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-F.

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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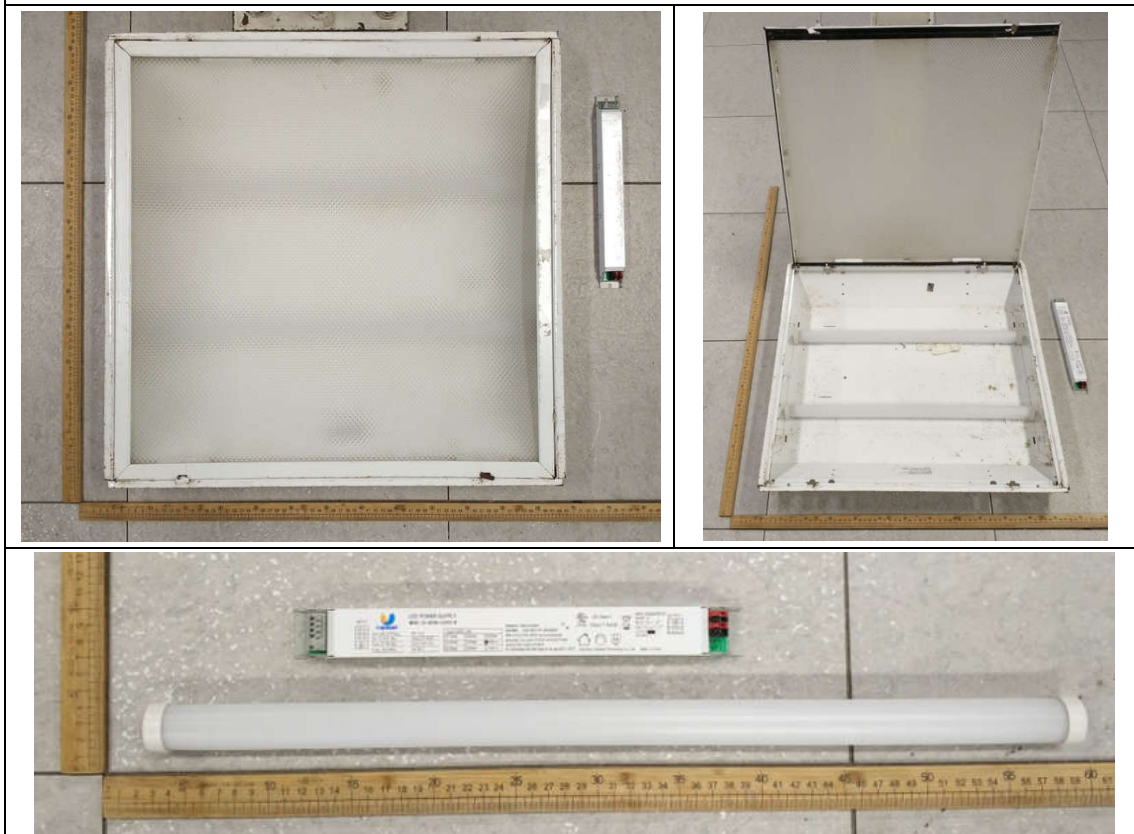
Fax: 8620-32290422

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

1.1 Product Information:

Organization Name	Revolution Lighting Technologies, Inc	
Brand Name	Revolution Lighting Technologies	
Model Number	15G212-11C	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Linear Retrofit Kits for 2x2 Luminaires	
Rated Voltage / Frequency	100 ~ 277 Vac, 50/60 Hz	
Nominal Power	20W	
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-F1(3000K), F2(4000K), F3(5000K)	
Lamp Length	--	mm
Lamp Width	--	mm
Number of Units (modular products)	N/A	s

Photo



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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	15G212-111		

Electrical Measurement in Lithonia 2GT8 lensed 2x2:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE180307	120.0	60	0.1680	19.76	0.9803	8.88
0-F1	277.0	60	0.0841	20.52	0.8810	14.14
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

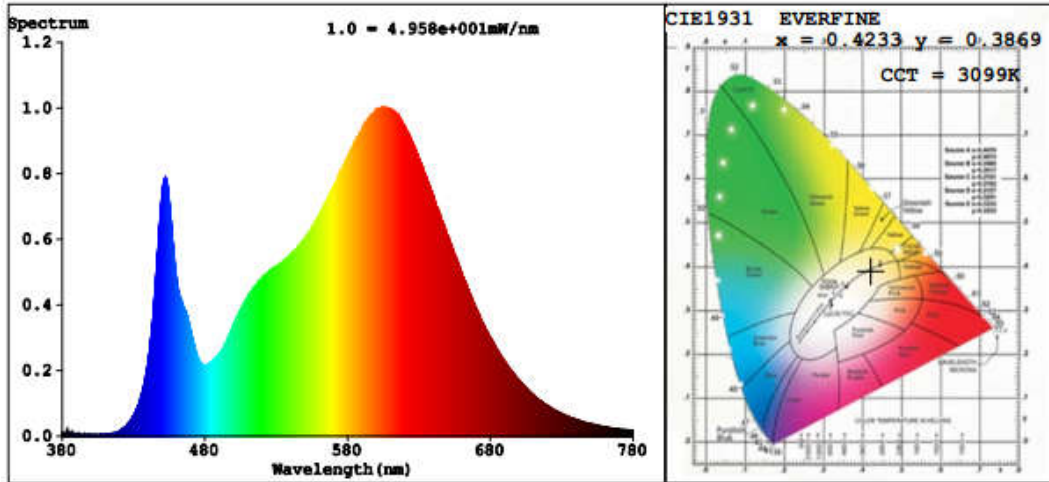
Chromaticity Measurement in Lithonia 2GT8 lensed 2x2- Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	86	R9	22
Frequency (Hz)	60	R2	95	R10	87
CCT (K)	3099	R3	95	R11	84
Duv	-0.0051	R4	84	R12	76
Chromaticity (x, y)	x=0.4233 y=0.3869	R5	86	R13	88
Chromaticity (u', v')	u'=0.2491 v'=0.5124	R6	93	R14	98
Color Rendering Index (CRI)	85.7	R7	83	R15	80
R9	22	R8	64	--	--

Photometric Measurement in Lithonia 2GT8 lensed 2x2- Goniophotometer Method:

Parameter	Result		DLC V4.3 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	2439.7	2516.0	>=2000(-10%)	
Luminous Efficacy (lm/W)	123.47	122.61	Standard: >= 100(-3%)	Premium: >= 125(-3%)
Zonal lumens in the 0-60° zone (%)	84.4	--	>= 75(-3)	
SC: 0-180° (if applicable)	1.31	--	1.0-2.0(±0.1)	
SC: 90-270° (if applicable)	1.14	--	1.0-2.0(±0.1)	
Beam Angle (°)	97.3	--	--	
Center Beam Candle Power (cd)	1016	--	--	

Spectral Power Distribution & Chromaticity Diagram

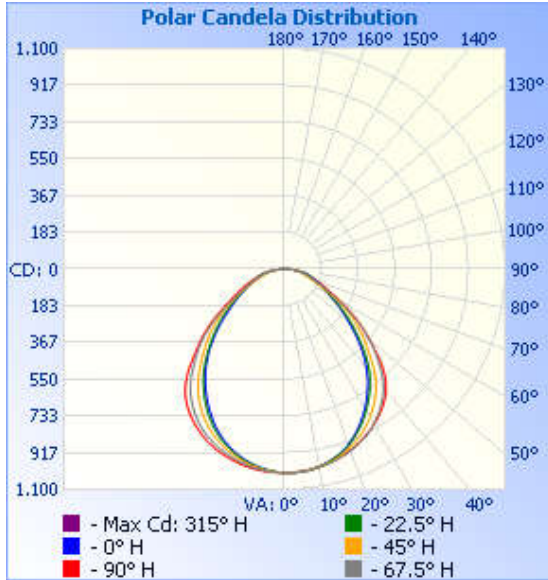


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	782.9	32.1%
0-40	1,264.7	51.8%
0-60	2,060.0	84.4%
60-90	370.3	15.2%
70-100	165.2	6.8%
90-120	4.1	0.2%
0-90	2,430.3	99.6%
90-180	9.1	0.4%
0-180	2,439.4	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	%Total
0-10	96.1	3.9%	90-100	1.4	0.1%
10-20	274.7	11.3%	100-110	1.3	0.1%
20-30	412.1	16.9%	110-120	1.5	0.1%
30-40	481.8	19.8%	120-130	1.5	0.1%
40-50	454.2	18.6%	130-140	1.3	0.1%
50-60	341.1	14.0%	140-150	1.0	0%
60-70	206.5	8.5%	150-160	0.7	0%
70-80	122.0	5.0%	160-170	0.4	0%
80-90	41.9	1.7%	170-180	0.1	0%

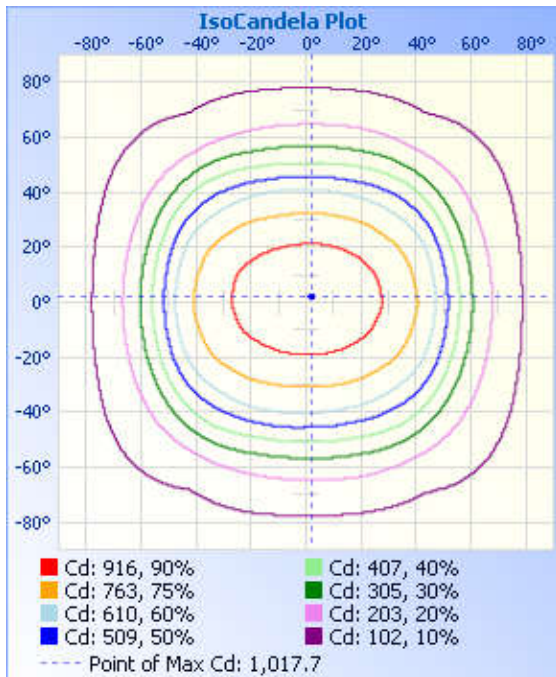
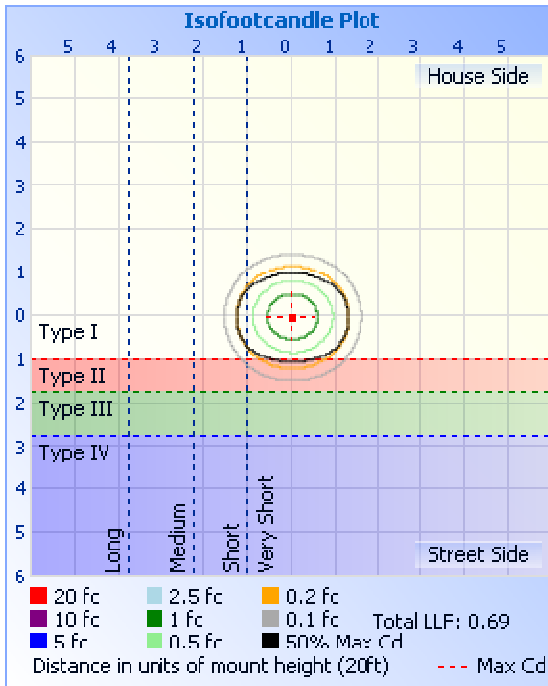
Photometric Data



Illuminance at a Distance

	Center Beam fc	Beam Width	
12.0ft	7.06 fc	24.5 ft	30.3 ft
24.0ft	1.76 fc	49.0 ft	60.7 ft
36.0ft	0.78 fc	73.4 ft	91.0 ft
48.0ft	0.44 fc	97.9 ft	121.4 ft
60.0ft	0.28 fc	122.4 ft	151.7 ft

■ Vert. Spread: 91.1°
■ Horiz. Spread: 103.3°



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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	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016
5	1015	1015	1016	1016	1015	1015	1015	1014	1012	1011	1008	1006	1005	1007	1009	1011
10	1005	1005	1006	1003	1001	1001	1004	1005	1001	999	990	985	982	986	992	999
15	988	987	985	978	974	976	982	988	984	979	963	952	947	953	965	978
20	965	963	954	940	932	937	951	965	961	952	927	908	900	909	928	951
25	935	931	910	886	873	882	908	934	933	918	880	851	838	852	881	916
30	893	886	852	819	802	815	854	892	894	873	824	784	766	783	822	868
35	842	825	780	741	724	742	788	837	848	817	759	710	688	706	750	807
40	769	745	687	645	634	657	707	769	788	748	678	628	602	616	659	726
45	652	644	587	544	532	553	599	668	692	647	572	528	508	519	562	625
50	538	536	493	449	427	447	503	560	559	539	480	425	409	428	473	523
55	421	407	388	354	337	352	402	434	440	418	384	335	321	340	375	400
60	311	292	282	269	262	265	289	307	324	294	274	253	251	259	276	287
65	236	212	197	207	205	202	195	211	233	206	185	192	195	199	195	211
70	176	157	137	163	162	160	134	153	172	149	127	152	153	156	136	155
75	128	114	102	125	128	123	102	114	127	111	96.1	116	119	118	101	114
80	89.0	78.2	76.5	86.7	90.9	87.4	77.8	78.9	88.6	74.9	72.3	79.3	81.8	78.8	73.9	76.5
85	39.4	38.7	37.0	45.1	44.1	46.8	40.5	39.9	40.0	35.6	35.5	40.4	38.6	39.4	34.1	35.4
90	1.27	1.49	1.79	2.09	0.90	2.25	2.32	1.58	1.07	1.19	1.19	1.49	5.90	2.16	1.27	1.12
95	0.65	0.80	1.39	1.20	0.82	0.82	1.72	0.75	0.87	0.82	1.04	1.25	2.11	1.30	1.13	0.98
100	0.52	0.67	1.29	0.82	0.82	0.91	1.27	1.00	1.20	1.21	1.26	1.22	1.21	0.97	1.14	1.21
105	1.42	1.27	1.34	1.19	0.87	1.08	1.27	1.28	1.32	1.29	1.26	1.19	0.69	0.93	1.37	1.66
110	2.17	1.86	1.39	1.37	1.11	1.21	1.27	1.45	1.44	1.35	1.26	1.16	0.80	0.90	1.49	1.79
115	2.38	1.96	1.56	1.47	1.29	1.27	1.30	1.50	1.57	1.39	1.26	1.14	0.95	0.82	1.55	1.93
120	2.37	2.05	2.15	1.44	1.32	1.40	1.36	1.55	1.57	1.43	1.26	1.18	1.12	1.27	1.61	2.05
125	2.36	2.17	2.31	1.79	1.39	1.49	1.44	1.59	1.57	1.47	1.26	1.19	1.29	1.46	1.66	2.10
130	2.35	2.19	2.23	1.81	1.47	1.58	1.40	1.64	1.57	1.57	1.26	1.19	1.33	1.54	1.72	2.00
135	2.34	2.12	1.86	1.83	1.56	1.64	1.36	1.63	1.57	1.57	1.26	1.19	1.37	1.60	1.50	1.97
140	2.33	2.06	1.62	1.84	1.64	1.64	1.32	1.60	1.57	1.57	1.26	1.21	1.40	1.66	1.29	1.83
145	2.31	1.96	1.51	1.86	1.64	1.64	1.28	1.57	1.57	1.57	1.27	1.22	0.56	1.71	1.34	1.72
150	1.94	1.70	1.41	1.63	1.63	1.64	1.23	1.54	1.64	1.57	1.29	1.23	0.28	1.76	1.40	1.42
155	1.79	1.63	1.27	1.53	1.61	1.64	1.22	1.51	1.56	1.57	1.32	1.25	0.68	1.81	1.45	1.38
160	1.71	1.49	1.19	1.48	1.60	1.64	1.21	1.44	1.54	1.57	1.36	1.26	1.08	1.86	1.50	1.34
165	1.69	1.47	1.19	1.43	1.58	1.64	1.21	1.37	1.53	1.57	1.40	1.42	1.43	1.91	1.69	1.30
170	1.67	1.45	1.19	1.41	1.70	1.66	1.20	1.36	1.51	1.60	1.40	1.29	1.54	2.24	1.68	1.26
175	1.65	1.43	1.19	1.45	2.45	1.60	1.20	1.35	1.50	1.63	1.41	1.22	1.49	2.17	1.70	1.22
180	1.64	1.42	1.19	1.57	2.16	1.57	1.20	1.35	1.49	1.64	1.41	1.19	1.49	2.17	1.57	1.20

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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	15G212-113		

Electrical Measurement in Lithonia 2GT8 lensed 2x2:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE180307	120.0	60	0.1682	19.78	0.9798	8.91
0-F2	277.0	60	0.0844	20.59	0.8806	14.18
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

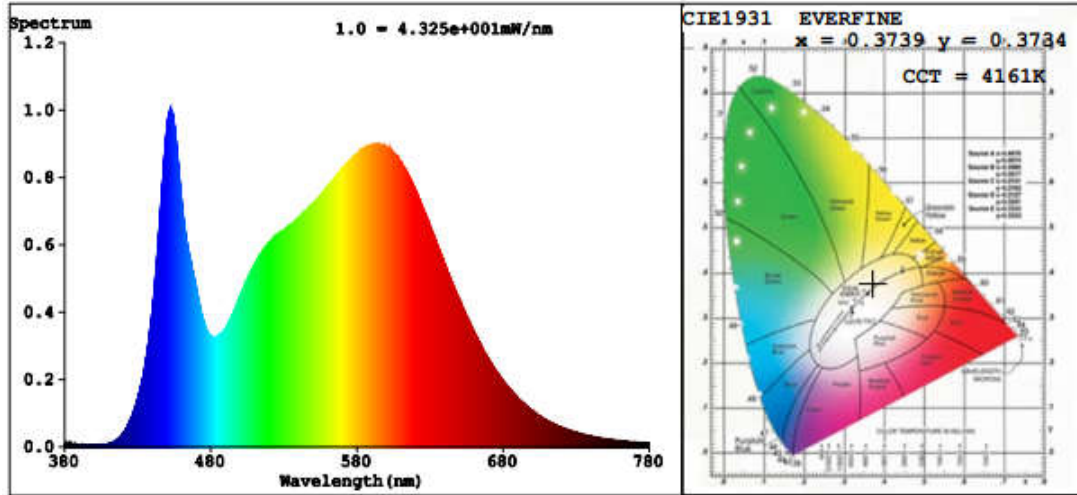
**Chromaticity Measurement in Lithonia 2GT8 lensed 2x2-
 Sphere-Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	82	R9	8
Frequency (Hz)	60	R2	91	R10	77
CCT (K)	4161	R3	96	R11	80
Duv	0.0004	R4	81	R12	63
Chromaticity (x, y)	x=0.3739 y=0.3734	R5	82	R13	84
Chromaticity (u', v')	u'=0.2221 v'=0.4991	R6	87	R14	98
Color Rendering Index (CRI)	83.5	R7	86	R15	76
R9	8	R8	64	--	--

**Photometric Measurement in Lithonia 2GT8 lensed
 2x2–Sphere-Spectroradiometer Method:**

Parameter	Result		DLC V4.3 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	2465	2542	>=2000(-10%)	
Luminous Efficacy (lm/W)	124.62	123.46	Standard: >= 100(-3%)	Premium: >= 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	15G212-115		

Electrical Measurement in Lithonia 2GT8 lensed 2x2:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE180307	120.0	60	0.1686	19.82	0.9797	8.93
0-F3	277.0	60	0.0846	20.61	0.8794	14.23
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

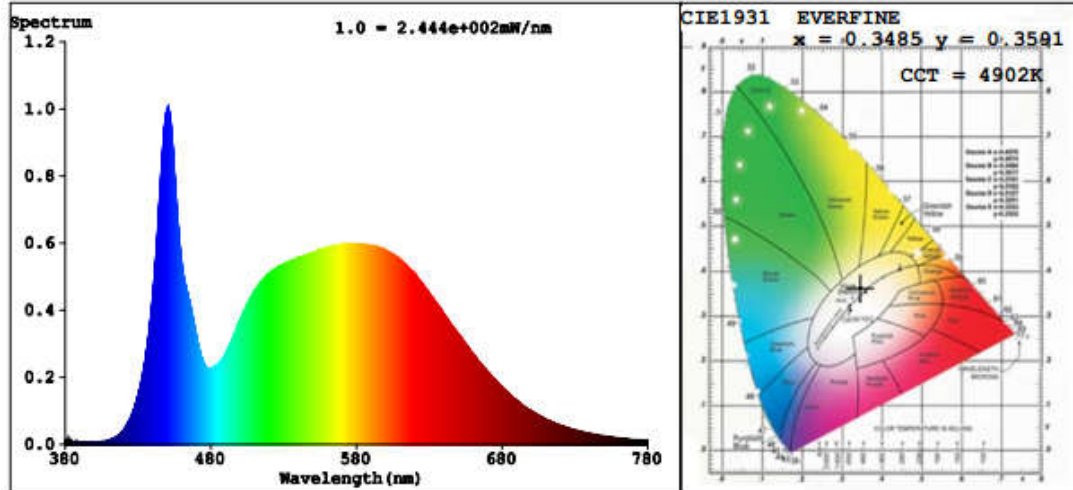
**Chromaticity Measurement in Lithonia 2GT8 lensed 2x2-
 Sphere-Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	83	R9	22
Frequency (Hz)	60	R2	88	R10	72
CCT (K)	4902	R3	92	R11	83
Duv	0.0024	R4	84	R12	58
Chromaticity (x, y)	x=0.3485 y=0.3591	R5	83	R13	84
Chromaticity (u', v')	u'=0.2108 v'=0.4888	R6	83	R14	96
Color Rendering Index (CRI)	84.4	R7	90	R15	79
R9	22	R8	73	--	--

**Photometric Measurement in Lithonia 2GT8 lensed
 2x2–Sphere-Spectroradiometer Method:**

Parameter	Result		DLC V4.3 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	2497	2575	>=2000(-10%)	
Luminous Efficacy (lm/W)	125.98	124.94	Standard: >= 100(-3%)	Premium: >= 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)
15G212-111	3000K	2439.7	19.76	123.47
15G212-112	3500K	2452 ^{*1}	19.77 ^{*2}	124.03 ^{*3}
15G212-113	4000K	2465	19.78	124.62
15G212-115	5000K	2497	19.82	125.98

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

$$2452 = (2465 - 2439.7) / 2 + 2439.7$$

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

$$19.77 = (19.76 + 19.78) / 2$$

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

$$124.03 = 2452 / 19.77$$

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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