

LM-79-08 Test Report

For

Revolution Lighting Technologies, Inc. (Brand Name: Revolution Lighting Technologies)

2280 Ward Ave. Simi Valley CA. 93065

Internal Driver/Line Voltage Lamp-Style Retrofit Kits (UL Type B)

Model name(s): 204112-111
204112-112
204112-113
204112-115

Remark: This is a multiple list report, the original report NO. is
GZE1707084-E.

Representative (Tested) Model: 204112-111
204112-115

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

Test & Report By:

Garman Mo

Engineer: Garman Mo

Date: Jul.27,2017

Review By:

Tommy Liang

Manager: Tommy Liang

Note: 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	204112-111 204112-112 204112-113 204112-115	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Internal Driver/Line Voltage Lamp-Style Retrofit Kits (UL Type B)	
Rated Voltage / Frequency	120 ~ 277 Vac, 50/60 Hz	
Nominal Power	15W	
Rated Initial Lamp Lumen	--	
Declared CCT	3000K,3500K,4000K,5000K	
LED Manufacturer	EVERLIGHT ELECTRONICS CO., LTD	
LED Model	67-21S Series (3000K)	
Sample Number	GZE1707084-E1,E2(3000K),E3(5000K)	
Lamp Length	1200	mm
Lamp Width	--	mm
Number of Units (modular products)	N/A	s

Photo



1.2 Test Specifications:

Date of Receipt	Jul.21,2017
Date of Test	Jul.22,2017
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° 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.

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.

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.

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

Test date	2017-07-22	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	204112-111, Connected to line voltage		

Electrical Measurement for Bare-lamp:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE170708	120.0	60	0.1251	14.68	0.9781	20.76
4-E1	277.0	60	0.0567	14.98	0.9536	15.93
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

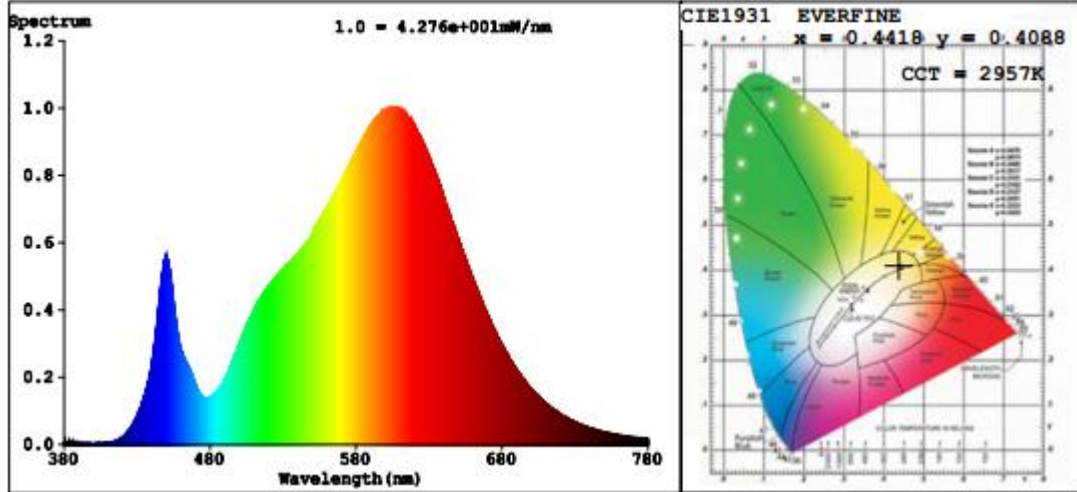
Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	80	R9	8
Frequency (Hz)	60	R2	89	R10	75
CCT (K)	2957	R3	97	R11	80
Duv	0.0012	R4	81	R12	66
Chromaticity (x, y)	x=0.4418 y=0.4088	R5	80	R13	82
Chromaticity (u', v')	u'=0.2517 v'=0.5240	R6	86	R14	98
Color Rendering Index (CRI)	82.1	R7	84	R15	73
R9	8	R8	60	--	--

Photometric Measurement for Bare-lamp –Sphere-Spectroradiometer Method:

Parameter	Result		DLC V4.2 Pass Criteria
Test Voltage (V)	120.0	277.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	2179	2191	Bare Lamp: 1600(±10%)
Luminous Efficacy (lm/W)	148.43	146.29	Bare lamp: >= 110(-3%)
Most worst Luminous/Highest Watts	145.46		

Spectral Power Distribution & Chromaticity Diagram



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2.2 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2017-07-22	Test Ambient:	25.2 ° C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	204112-111, Connected to line voltage		

Electrical Measurement for 2-lamp in Lithonia 2GT8 lensed 2x4:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE170708	120.0	60	0.2507	29.36	0.9758	21.27
4-E1,E2	277.0	60	0.1140	29.96	0.9490	16.40
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

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

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	11
Frequency (Hz)	60	R2	89	R10	75
CCT (K)	2972	R3	96	R11	81
Duv	0.0015	R4	82	R12	67
Chromaticity (x, y)	x=0.4412 y=0.4093	R5	81	R13	83
Chromaticity (u', v')	u'=0.2511 v'=0.5241	R6	86	R14	98
Color Rendering Index (CRI)	82.7	R7	85	R15	74
R9	11	R8	61	--	--

Photometric Measurement 2-lamp in Lithonia 2GT8 lensed 2x4 –

Goniophotometer Method:

Parameter	Result		DLC V4.2 Pass Criteria
Test Voltage (V)	120.0	277.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	3525.3	3539.5	In luminaire (2 lamps): 3000(±10%)
Luminous Efficacy (lm/W)	120.07	118.14	In luminaire: >= 100(-3%)
Most worst Luminous/Highest Watts	117.67		
Zonal lumens in the 0-60° zone (%)	84.5	--	>= 75(-3)
SC: 0-180° (if applicable)	1.30	--	1.0-2.0(±0.1)
SC: 90-270° (if applicable)	1.20	--	1.0-2.0(±0.1)
Beam Angle (°)	98.3	--	--
Center Beam Candle Power (cd)	1450	--	--

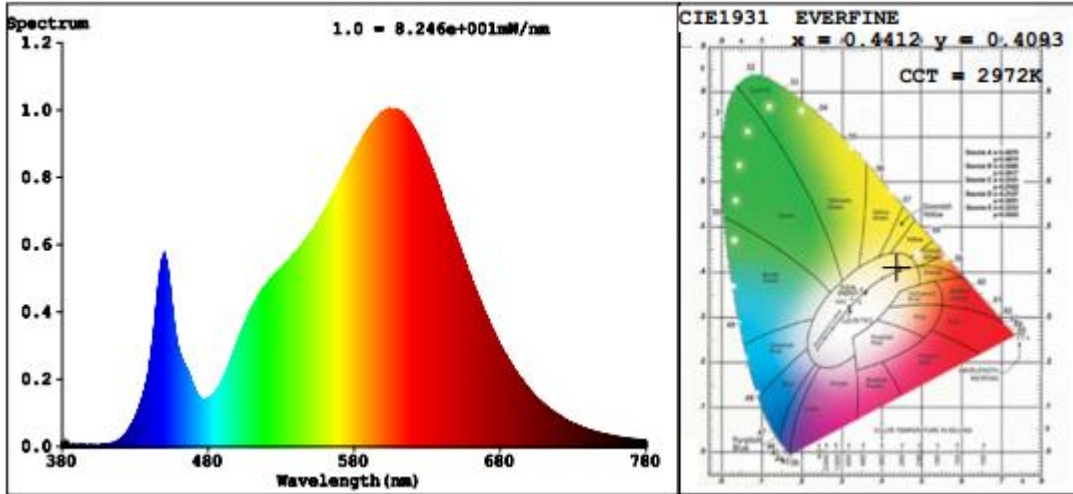
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Spectral Power Distribution & Chromaticity Diagram

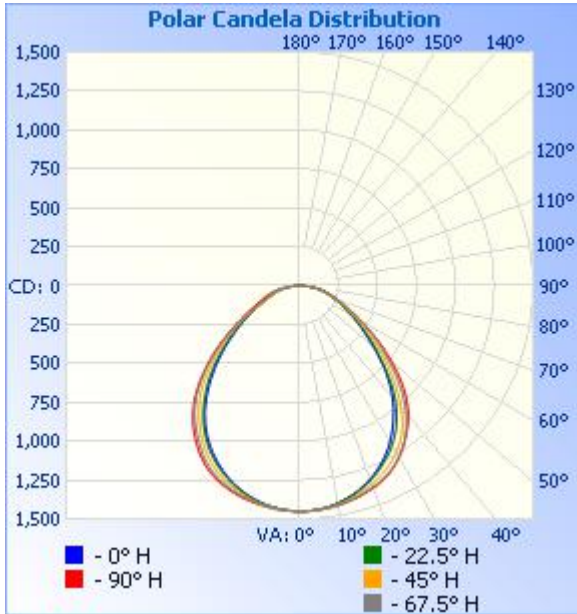


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1,127.1	32%
0-40	1,827.0	51.8%
0-60	2,978.0	84.5%
60-90	546.9	15.5%
70-100	241.1	6.8%
90-120	0.0	0%
0-90	3,524.9	100%
90-180	0.0	0%
0-180	3,524.9	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	137.2	3.9%	90-100	0.0	0%
10-20	393.5	11.2%	100-110	0	0%
20-30	596.4	16.9%	110-120	0	0%
30-40	699.9	19.9%	120-130	0	0%
40-50	658.3	18.7%	130-140	0	0%
50-60	492.7	14.0%	140-150	0	0%
60-70	305.8	8.7%	150-160	0.0	0%
70-80	181.7	5.2%	160-170	0.0	0%
80-90	59.4	1.7%	170-180	0	0%

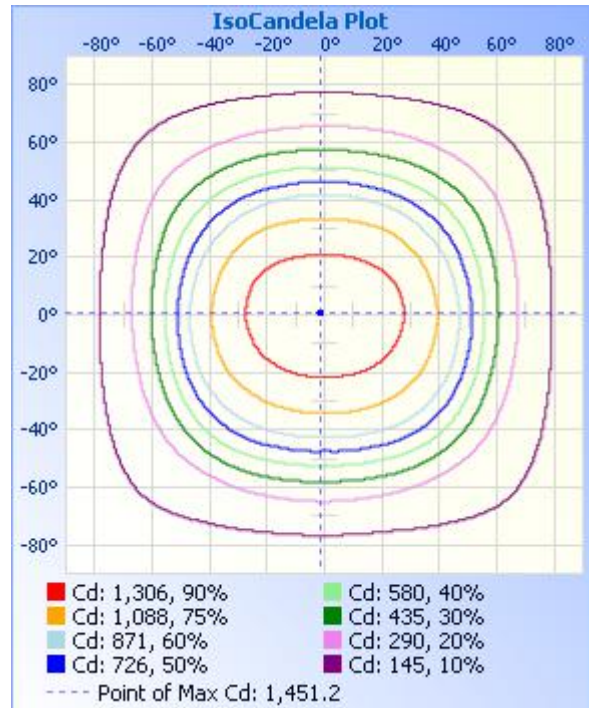
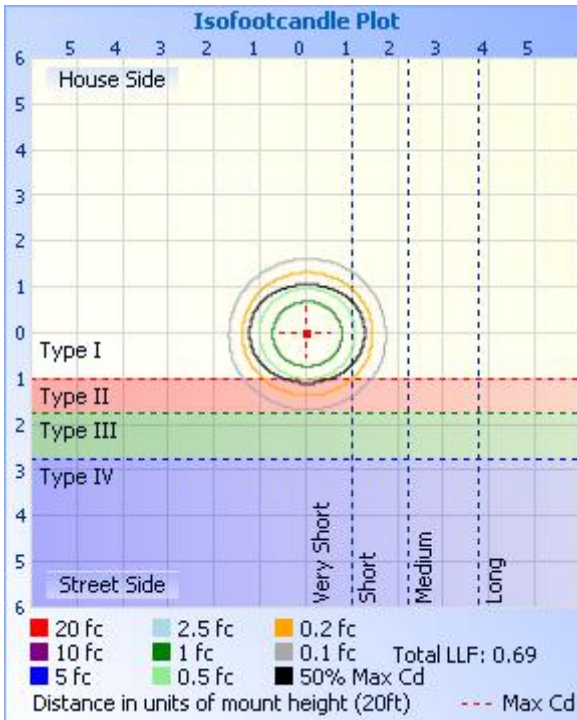
Photometric Data



Illuminance at a Distance

	Center Beam fc	Beam Width	
17.0ft	5.02 fc	36.4 ft	42.5 ft
34.0ft	1.25 fc	72.8 ft	84.9 ft
51.0ft	0.56 fc	109.3 ft	127.4 ft
68.0ft	0.31 fc	145.7 ft	169.9 ft
85.0ft	0.20 fc	182.1 ft	212.3 ft
102.0ft	0.14 fc	218.5 ft	254.8 ft

■ Vert. Spread: 93.9°
 ■ Horiz. Spread: 102.6°



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Table--1 UNIT: cd

C (DEG) \ y (DEG)	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5
0	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450
5	1446	1445	1443	1442	1443	1442	1445	1446	1447	1445	1443	1442	1441	1441	1444	1444
10	1432	1430	1425	1421	1419	1421	1428	1432	1433	1430	1423	1419	1416	1418	1426	1428
15	1411	1405	1393	1382	1379	1384	1398	1408	1412	1405	1390	1382	1376	1381	1393	1404
20	1380	1372	1350	1331	1324	1332	1358	1377	1383	1373	1349	1331	1321	1329	1351	1369
25	1337	1329	1296	1264	1252	1267	1306	1336	1342	1326	1291	1264	1251	1263	1293	1320
30	1267	1260	1226	1181	1160	1186	1240	1273	1277	1255	1216	1180	1165	1180	1214	1246
35	1175	1163	1127	1076	1051	1084	1145	1183	1188	1163	1119	1079	1060	1078	1116	1152
40	1066	1036	988	946	926	957	1012	1062	1086	1062	1008	953	930	952	1006	1048
45	926	881	823	786	783	799	851	912	950	929	872	814	785	812	868	912
50	761	722	672	635	626	647	696	749	783	768	717	661	636	659	710	750
55	591	574	534	503	497	513	551	595	612	596	566	521	496	514	553	579
60	441	445	411	394	390	400	423	459	453	434	410	392	379	382	398	420
65	324	334	309	306	305	308	318	346	333	301	275	277	280	270	269	295
70	250	245	229	232	236	231	236	254	254	227	197	204	210	200	196	228
75	193	177	170	171	177	172	174	181	191	178	158	156	158	154	160	180
80	131	120	115	115	122	118	117	123	130	125	114	108	109	107	117	129
85	50.9	55.8	53.0	59.6	61.5	60.5	52.3	57.3	52.3	53.8	48.4	52.4	52.9	52.4	51.6	55.2
90	0.00	0.00	0.01	0.03	0.04	0.08	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
105	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
110	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
115	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
120	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
125	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
130	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
135	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
140	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
145	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
150	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
155	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
160	0.00	0.00	0.00	0.00	2.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
165	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
170	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
175	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
180	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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

Test date	2017-07-22	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	204112-115, Connected to line voltage		

Electrical Measurement for Bare-lamp:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE170708	120.0	60	0.1276	14.91	0.9735	21.38
4-E3	277.0	60	0.0580	15.24	0.9484	16.57
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

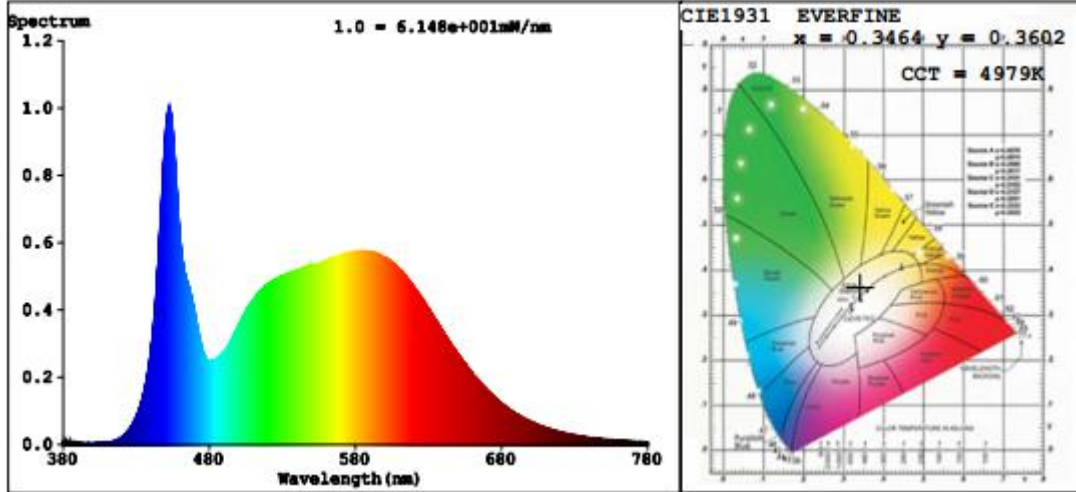
Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	82	R9	10
Frequency (Hz)	60	R2	90	R10	75
CCT (K)	4979	R3	95	R11	80
Duv	0.0037	R4	81	R12	55
Chromaticity (x, y)	x=0.3464 y=0.3602	R5	81	R13	84
Chromaticity (u', v')	u'=0.2090 v'=0.4890	R6	85	R14	97
Color Rendering Index (CRI)	83.6	R7	88	R15	76
R9	10	R8	67	--	--

Photometric Measurement for Bare-lamp –Sphere-Spectroradiometer Method:

Parameter	Result		DLC V4.2 Pass Criteria
Test Voltage (V)	120.0	277.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	2284	2302	Bare Lamp: 1600(±10%)
Luminous Efficacy (lm/W)	153.19	151.05	Bare lamp: >= 110(-3%)
Most worst Luminous/Highest Watts	149.87		

Spectral Power Distribution & Chromaticity Diagram



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2.3 Performance Assessment:

Model name	CCT(K)	Total Luminous (lm)	Power (W)	Luminous Efficacy (lm/W)
204112-111	3000K	2179	14.68	148.43
204112-112	3500K	2205 ^{*1}	14.80 ^{*2}	148.99 ^{*3}
204112-113	4000K	2232 ^{*1}	14.80 ^{*2}	150.81 ^{*3}
204112-115	5000K	2284	14.91	153.19

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

$$2205 = (2284 - 2179) / 4 + 2179$$

$$2232 = (2284 - 2179) / 4 + 2205$$

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

$$14.80 = (14.68 + 14.91) / 2$$

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

$$148.99 = 2205 / 14.80$$

$$150.81 = 2232 / 14.80$$

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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