

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): 204111-111
204111-112
204111-113
204111-115

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

Representative (Tested) Model: 204111-111
204111-115

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

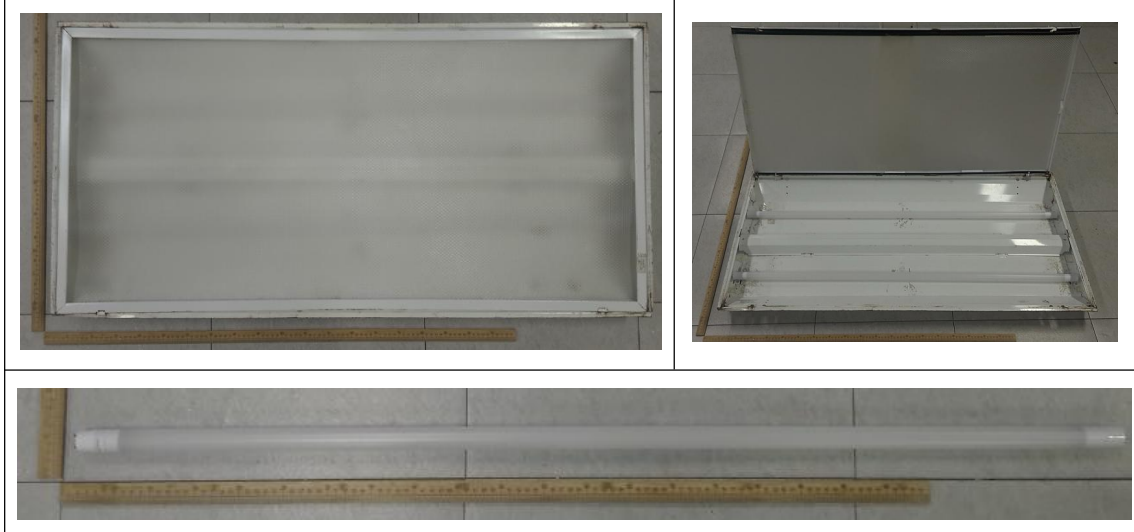
Address: Standard-Tech Building, No.6 Guanhong Road,Guangzhou Science City, Guangzhou 510663, China

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	204111-111 204111-112 204111-113 204111-115	
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	12W	
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-C1,C2(3000K),C3(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	204111-111, 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	0.1006	11.81	0.9786	19.21
4-C1	277.0	60	0.0464	12.00	0.9341	18.36
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

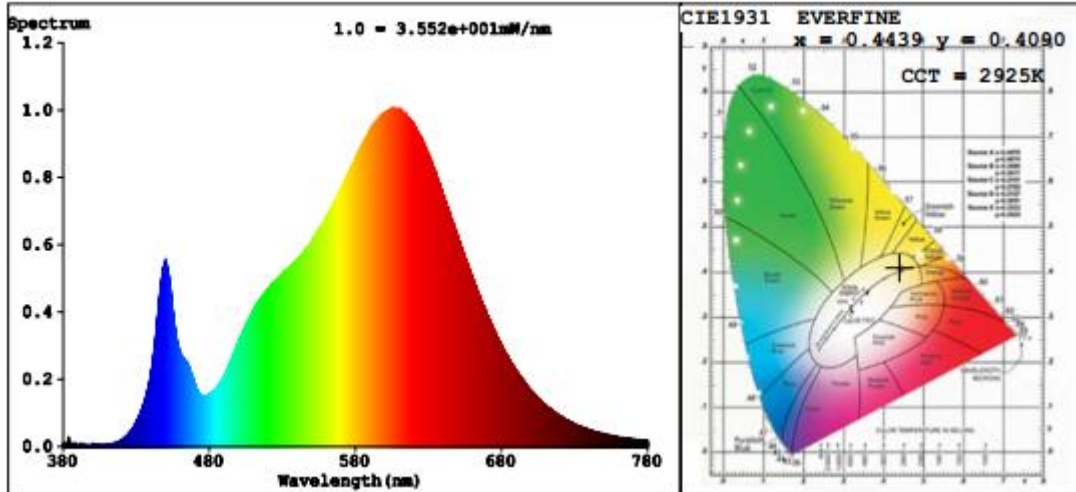
Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	82	R9	12
Frequency (Hz)	60	R2	90	R10	78
CCT (K)	2925	R3	97	R11	82
Duv	0.0010	R4	82	R12	70
Chromaticity (x, y)	x=0.4439 y=0.4090	R5	82	R13	84
Chromaticity (u', v')	u'=0.2530 v'=0.5243	R6	88	R14	99
Color Rendering Index (CRI)	83.6	R7	85	R15	75
R9	12	R8	62	--	--

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)	1762	1765	Bare Lamp: 1600(±10%)
Luminous Efficacy (lm/W)	149.17	147.06	Bare lamp: >= 110(-3%)
Most worst Luminous/Highest Watts	146.83		

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	204111-111, 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	0.2020	23.61	0.9738	19.93
4-C1,C2	277.0	60	0.0934	24.00	0.9278	19.03
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	82	R9	14
Frequency (Hz)	60	R2	91	R10	78
CCT (K)	2920	R3	97	R11	83
Duv	0.0011	R4	83	R12	71
Chromaticity (x, y)	x=0.4444 y=0.4092	R5	82	R13	84
Chromaticity (u', v')	u'=0.2531 v'=0.5245	R6	89	R14	99
Color Rendering Index (CRI)	83.9	R7	85	R15	75
R9	14	R8	62	--	--

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)	2834.1	2829.8	In luminaire (2 lamps): 3000(±10%)
Luminous Efficacy (lm/W)	120.04	117.91	In luminaire: >= 100(-3%)
Most worst Luminous/Highest Watts	117.91		
Zonal lumens in the 0-60° zone (%)	84.5	--	>= 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 (°)	98.4	--	--
Center Beam Candle Power (cd)	1165	--	--

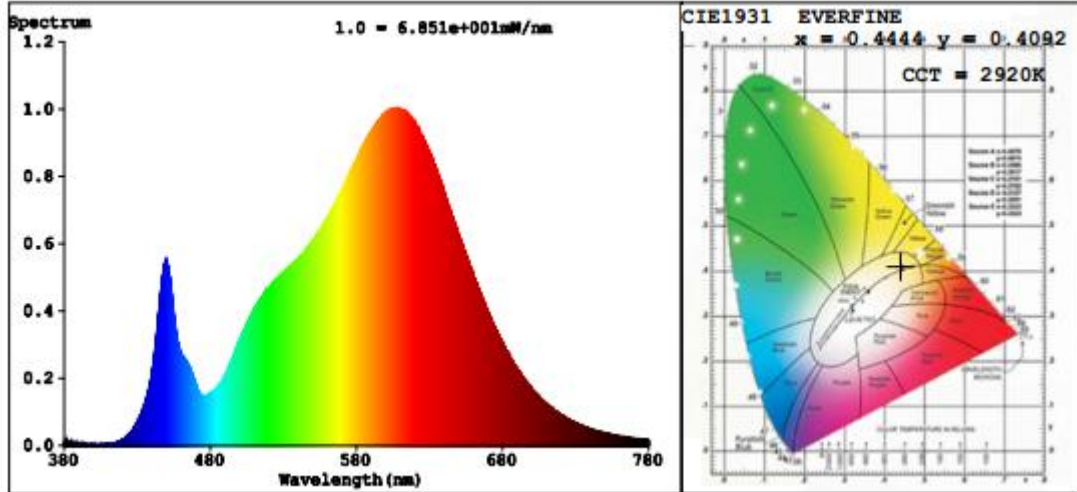
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Spectral Power Distribution & Chromaticity Diagram

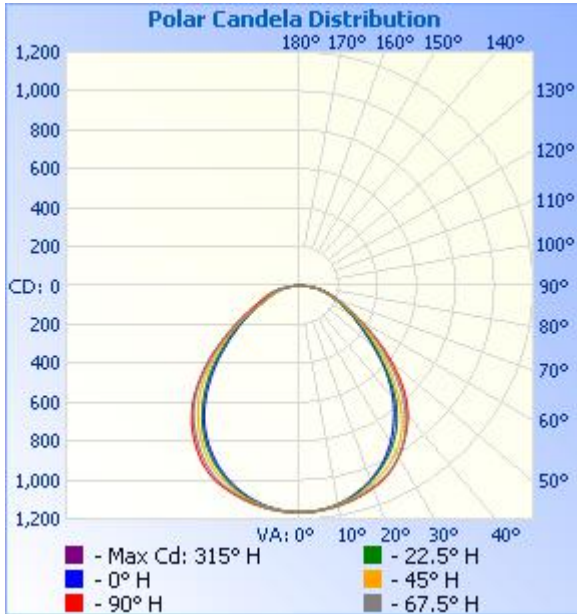


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	905.7	32%
0-40	1,468.3	51.8%
0-60	2,394.1	84.5%
60-90	439.6	15.5%
70-100	193.7	6.8%
90-120	0.0	0%
0-90	2,833.7	100%
90-180	0.0	0%
0-180	2,833.7	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	110.2	3.9%	90-100	0.0	0%
10-20	316.2	11.2%	100-110	0	0%
20-30	479.3	16.9%	110-120	0	0%
30-40	562.6	19.9%	120-130	0	0%
40-50	529.5	18.7%	130-140	0	0%
50-60	396.4	14.0%	140-150	0	0%
60-70	245.9	8.7%	150-160	0	0%
70-80	146.1	5.2%	160-170	0	0%
80-90	47.7	1.7%	170-180	0	0%

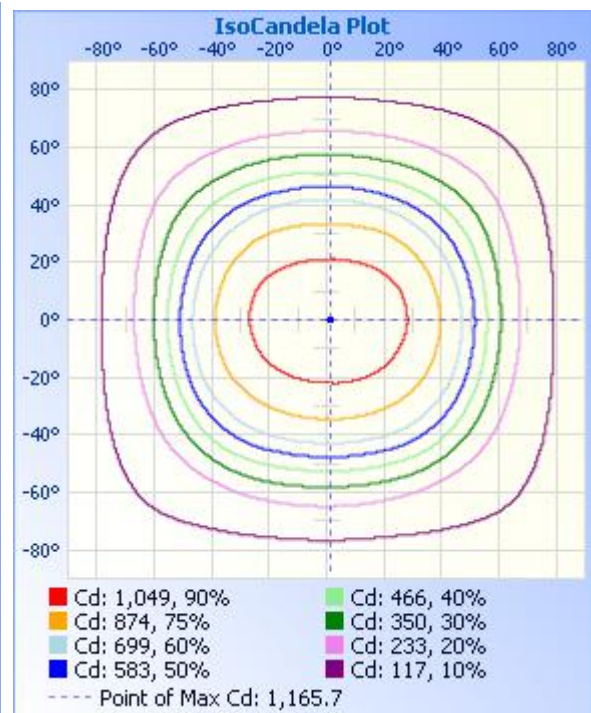
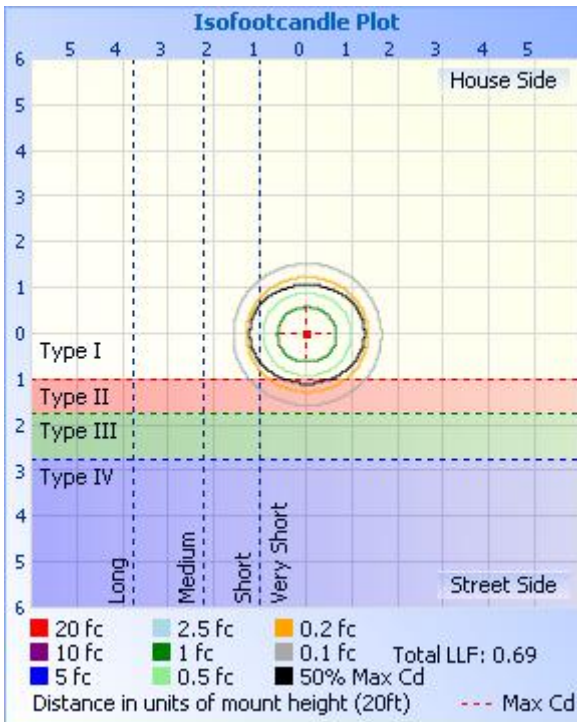
Photometric Data



Illuminance at a Distance

	Center Beam fc	Beam Width	
17.0ft	4.03 fc	36.5 ft	42.6 ft
34.0ft	1.01 fc	73.0 ft	85.1 ft
51.0ft	0.45 fc	109.5 ft	127.7 ft
68.0ft	0.25 fc	146.0 ft	170.2 ft
85.0ft	0.16 fc	182.5 ft	212.8 ft
102.0ft	0.11 fc	219.0 ft	255.4 ft

■ Vert. Spread: 94.1°
■ Horiz. Spread: 102.8°



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Table--1 UNIT: cd

C(DEG) γ (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	1165	1165	1165	1165	1165	1165	1165	1165	1165	1165	1165	1165	1165	1165	1165	1165
5	1163	1160	1161	1160	1159	1159	1159	1161	1161	1158	1159	1158	1159	1159	1160	1162
10	1152	1149	1146	1143	1140	1141	1144	1149	1149	1146	1143	1140	1139	1142	1145	1149
15	1135	1131	1122	1113	1108	1112	1120	1128	1130	1126	1117	1110	1107	1112	1121	1130
20	1111	1105	1088	1071	1064	1070	1086	1102	1106	1098	1082	1068	1063	1072	1087	1104
25	1078	1071	1045	1018	1007	1017	1044	1068	1071	1060	1037	1015	1007	1020	1042	1065
30	1023	1017	990	951	934	952	990	1016	1018	1001	974	949	939	953	980	1005
35	950	940	912	868	845	871	914	943	946	928	897	868	855	871	901	931
40	863	838	800	764	746	768	807	846	864	847	808	766	750	769	812	849
45	750	713	667	635	631	640	679	726	756	741	699	654	634	657	702	739
50	618	585	544	513	504	519	556	596	624	613	575	531	513	533	574	608
55	480	466	432	406	400	412	440	474	487	476	454	419	400	416	448	470
60	357	360	333	318	314	321	337	366	362	347	329	315	305	309	322	339
65	262	270	250	247	245	248	254	277	266	241	221	222	225	218	217	238
70	201	197	185	186	189	186	188	204	203	182	158	163	169	161	157	183
75	155	142	137	138	142	139	139	146	154	143	127	125	127	124	128	145
80	105	96.4	92.9	92.3	97.9	95.0	94.2	99.0	105	101	92.1	86.6	87.0	86.0	94.0	104
85	40.7	44.6	42.4	47.4	49.4	48.8	42.5	46.4	42.4	43.7	39.4	41.8	42.2	41.5	41.3	44.0
90	0.00	0.00	0.01	0.05	0.14	0.07	0.02	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	0.00	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

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	204111-115, 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	0.1018	11.92	0.9753	19.48
4-C3	277.0	60	0.0470	12.11	0.9305	18.60
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

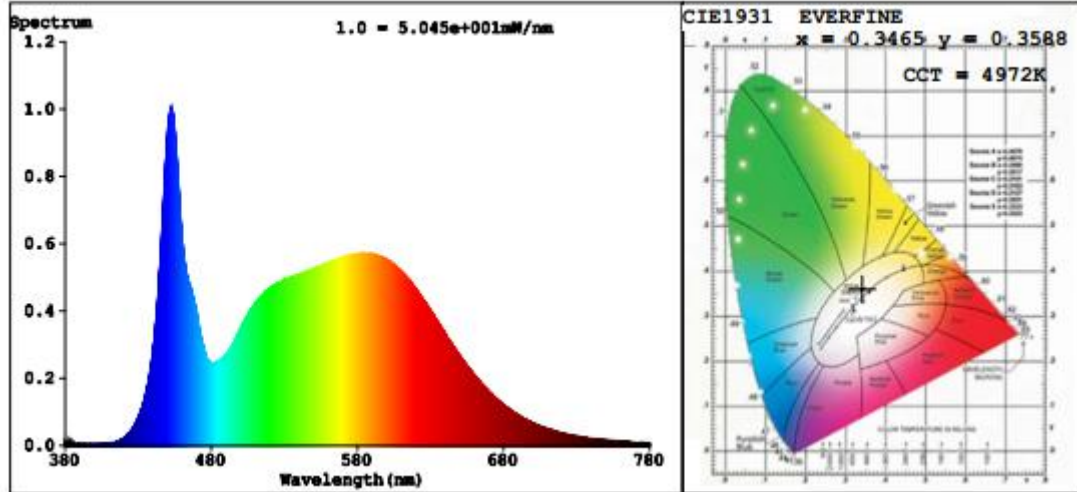
Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	82	R9	10
Frequency (Hz)	60	R2	90	R10	75
CCT (K)	4972	R3	95	R11	80
Duv	0.0030	R4	81	R12	55
Chromaticity (x, y)	x=0.3465 y=0.3588	R5	81	R13	84
Chromaticity (u', v')	u'=0.2096 v'=0.4884	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)	1834	1838	Bare Lamp: 1600(±10%)
Luminous Efficacy (lm/W)	153.83	151.75	Bare lamp: >= 110(-3%)
Most worst Luminous/Highest Watts	151.45		

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)
204111-111	3000K	1762	11.81	149.17
204111-112	3500K	1780 ^{*1}	11.87 ^{*2}	149.96 ^{*3}
204111-113	4000K	1798 ^{*1}	11.87 ^{*2}	151.47 ^{*3}
204111-115	5000K	1834	11.92	153.83

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

$$1780 = (1834 - 1762) / 4 + 1762$$

$$1798 = (1834 - 1762) / 4 + 1780$$

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

$$11.87 = (11.81 + 11.92) / 2$$

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

$$149.96 = 1780 / 11.87$$

$$151.47 = 1798 / 11.87$$

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 *****

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