

LM-79-08 Test Report

For

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

2280 Ward Ave. Simi Valley CA. 93065

Replacement Lamps (“Plug and Play”) (UL Type A)

Model name(s): 204620-11C

Remark: “C” refers to CCT as below: 1=3000K, 2=3500K, 3=4000K,
5=5000K.Representative (Tested) Model: 204620-111
204620-115

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

Test & Report By:

Garman Mo

Engineer: Garman Mo

Date: Oct.27,2017

Review By:

Tommy Liang

Manager: Tommy Liang

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

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

Tel: 8620-3229 0320

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

1.1 Product Information:

Organization Name	Revolution Lighting Technologies, Inc.	
Brand Name	Revolution Lighting Technologies	
Model Number	204620-11C	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Replacement Lamps (“Plug and Play”) (UL Type A)	
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	
Test Ballast	OSRAM SYLVANIA QTP 2x32T8/UNV ISN-SC	
Sample Number	GZE1709047-H-A1,A2(3000K),A3(5000K)	
Lamp Length	1200	mm
Lamp Width	--	mm
Number of Units (modular products)	N/A	s

Photo



1.2 Test Specifications:

Date of Receipt	Oct.17,2017
Date of Test	Oct.18,2017
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 $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$, 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 $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$. 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 $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$. 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	2017-10-18	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	204620-111, With ballast OSRAM SYLVANIA QTP 2x32T8/UNV ISN-SC		

Electrical Measurement for Bare-lamp:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE170904	120.0	60	0.1047	12.35	0.9827	6.05
7-H-A1	277.0	60	0.0486	12.45	0.9256	11.29
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

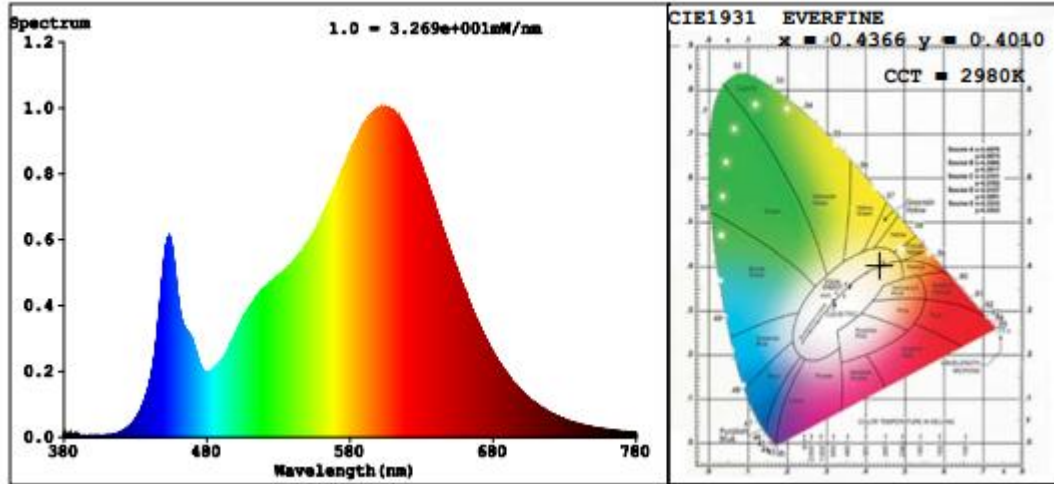
Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	6
Frequency (Hz)	60	R2	92	R10	82
CCT (K)	2980	R3	95	R11	79
Duv	-0.0012	R4	80	R12	72
Chromaticity (x, y)	x=0.4366 y=0.4010	R5	82	R13	84
Chromaticity (u', v')	u'=0.2517 v'=0.5201	R6	91	R14	98
Color Rendering Index (CRI)	82.5	R7	81	R15	74
R9	6	R8	58	--	--

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)	1686	1690	Bare Lamp: 1600(±10%)
Luminous Efficacy (lm/W)	136.54	135.71	Bare lamp: >= 110(-3%)
Most worst Luminous/Highest Watts	135.42		

Spectral Power Distribution & Chromaticity Diagram



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

Test date	2017-10-18	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	204620-111, With ballast OSRAM SYLVANIA QTP 2x32T8/UNV ISN-SC		

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

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE170904	120.0	60	0.2438	24.70	0.9794	6.35
7-H-A1,A2	277.0	60	0.1126	24.90	0.9232	11.51
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	6
Frequency (Hz)	60	R2	92	R10	82
CCT (K)	2972	R3	95	R11	80
Duv	-0.0011	R4	80	R12	72
Chromaticity (x, y)	x=0.4373 y=0.4014	R5	82	R13	84
Chromaticity (u', v')	u'=0.2520 v'=0.5204	R6	91	R14	98
Color Rendering Index (CRI)	82.6	R7	81	R15	74
R9	6	R8	58	--	--

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)	2763.2	2765.1	In luminaire (2 lamps): 3000(±10%)
Luminous Efficacy (lm/W)	111.87	111.05	In luminaire: >= 100(-3%)
Most worst Luminous/Highest Watts	110.97		
Zonal lumens in the 0-60 ° zone (%)	84.5	--	>= 75(-3)
SC: 0-180 °(if applicable)	1.27	--	1.0-2.0(±0.1)
SC: 90-270 °(if applicable)	1.18	--	1.0-2.0(±0.1)
Beam Angle (°)	97.1	--	--
Center Beam Candle Power (cd)	1148	--	--

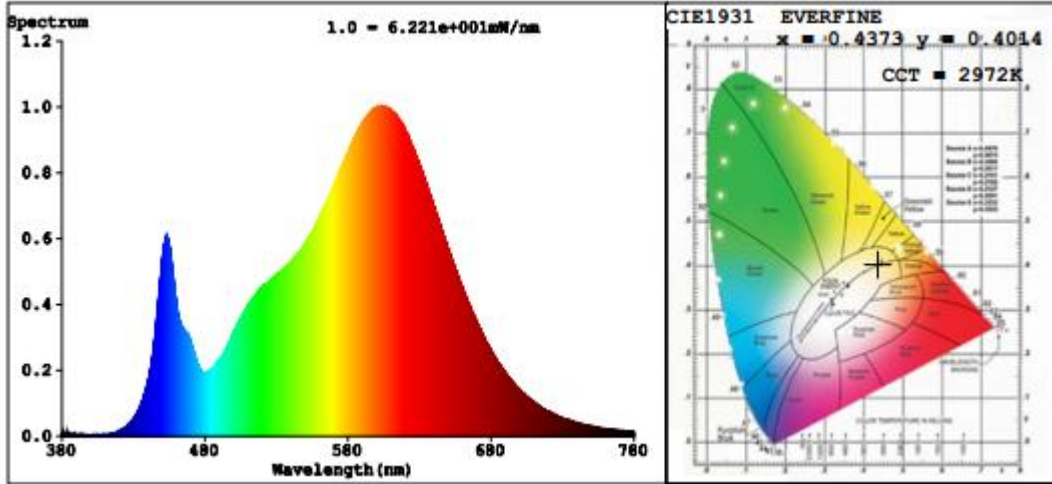
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Spectral Power Distribution & Chromaticity Diagram

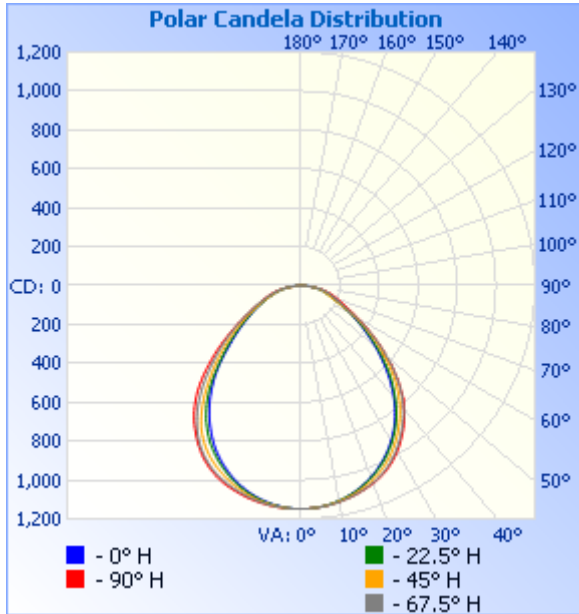


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	889.0	32.2%
0-40	1,437.5	52%
0-60	2,333.3	84.5%
60-90	429.6	15.5%
70-100	189.7	6.9%
90-120	0.0	0%
0-90	2,762.8	100%
90-180	0.0	0%
0-180	2,762.8	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	108.6	3.9%	90-100	0.0	0%
10-20	310.9	11.3%	100-110	0	0%
20-30	469.5	17.0%	110-120	0	0%
30-40	548.5	19.9%	120-130	0	0%
40-50	512.7	18.6%	130-140	0	0%
50-60	383.1	13.9%	140-150	0	0%
60-70	239.8	8.7%	150-160	0	0%
70-80	143.2	5.2%	160-170	0	0%
80-90	46.5	1.7%	170-180	0	0%

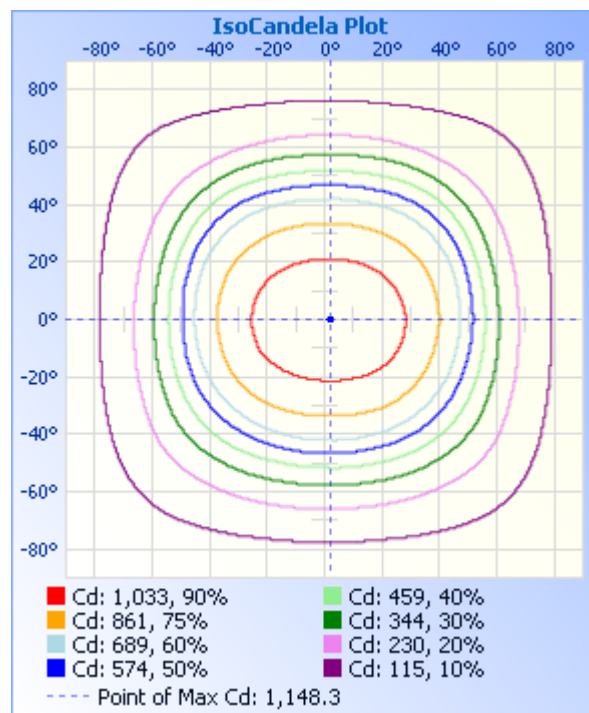
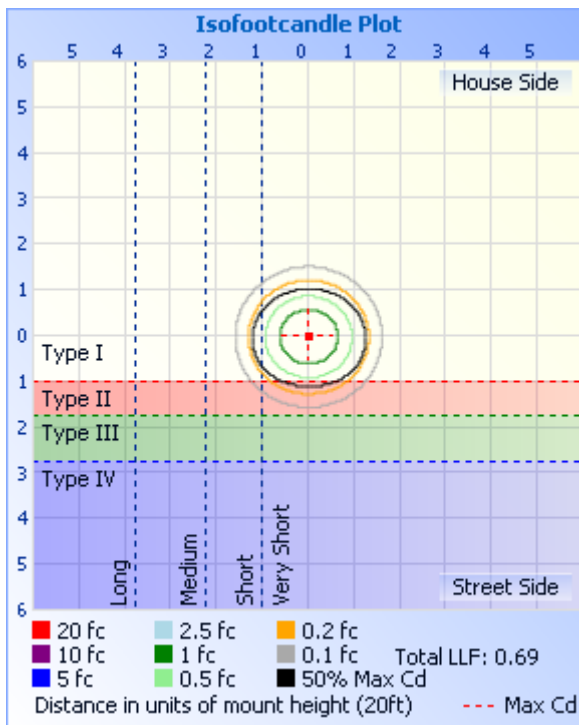
Photometric Data



Illuminance at a Distance

	Center Beam fc	Beam Width	
17.0ft	3.97 fc	36.2 ft	41.0 ft
34.0ft	0.99 fc	72.3 ft	82.0 ft
51.0ft	0.44 fc	108.5 ft	123.0 ft
68.0ft	0.25 fc	144.6 ft	164.0 ft
85.0ft	0.16 fc	180.8 ft	205.0 ft
102.0ft	0.11 fc	216.9 ft	245.9 ft

■ Vert. Spread: 93.5°
■ Horiz. Spread: 100.7°



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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	1148	1148	1148	1148	1148	1148	1148	1148	1148	1148	1148	1148	1148	1148	1148	1148	
5	1146	1146	1144	1143	1142	1141	1142	1142	1142	1141	1140	1141	1141	1142	1143	1145	
10	1136	1135	1131	1126	1123	1123	1125	1129	1128	1127	1122	1121	1121	1125	1129	1134	
15	1120	1117	1106	1097	1091	1093	1100	1108	1108	1104	1095	1089	1088	1094	1104	1114	
20	1097	1091	1072	1056	1047	1050	1064	1078	1081	1074	1058	1045	1042	1052	1070	1088	
25	1063	1052	1027	1002	991	997	1017	1036	1042	1035	1012	990	984	998	1027	1053	
30	1011	995	966	937	922	930	953	976	985	978	953	922	910	932	971	1000	
35	940	922	889	856	839	849	875	901	911	900	871	837	821	849	894	927	
40	854	840	801	757	738	750	786	817	819	796	758	731	721	746	784	827	
45	744	732	693	647	623	640	678	708	710	674	630	604	607	617	656	705	
50	609	604	570	527	506	520	555	581	550	553	514	488	484	500	536	575	
55	474	467	450	416	396	408	433	449	452	439	408	387	384	395	423	457	
60	353	341	326	315	303	306	314	329	340	340	315	304	302	309	324	353	
65	262	240	222	224	225	218	216	234	252	257	237	236	236	239	243	267	
70	201	182	160	165	169	162	158	180	196	190	177	178	182	180	181	198	
75	152	143	127	126	128	127	127	142	150	138	131	131	136	133	135	143	
80	102	100	93.1	88.3	88.6	87.3	93.2	100	102	93.3	87.6	87.5	91.8	89.9	90.0	96.2	
85	40.3	43.5	41.3	44.6	45.2	44.1	42.2	43.6	40.7	42.4	38.2	42.8	44.4	44.5	38.9	43.9	
90	0.00	0.00	0.02	0.09	0.01	0.09	0.01	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	

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

Test date	2017-10-18	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	204620-115, With ballast OSRAM SYLVANIA QTP 2x32T8/UNV ISN-SC		

Electrical Measurement for Bare-lamp:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE170904	120.0	60	0.1050	12.30	0.9765	6.89
7-H-A3	277.0	60	0.0486	12.39	0.9203	11.90
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

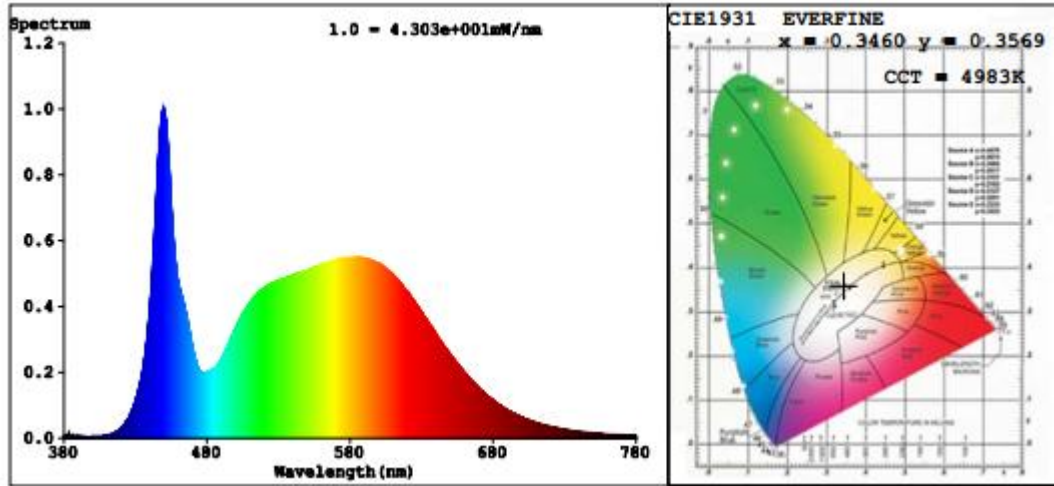
Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	8
Frequency (Hz)	60	R2	87	R10	70
CCT (K)	4983	R3	92	R11	81
Duv	0.0023	R4	82	R12	56
Chromaticity (x, y)	x=0.3460 y=0.3569	R5	81	R13	82
Chromaticity (u', v')	u'=0.2100 v'=0.4874	R6	82	R14	96
Color Rendering Index (CRI)	82.6	R7	88	R15	75
R9	8	R8	68	--	--

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)	1719	1722	Bare Lamp: 1600(±10%)
Luminous Efficacy (lm/W)	139.76	138.97	Bare lamp: >= 110(-3%)
Most worst Luminous/Highest Watts	138.74		

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)
204620-111	3000K	1686	12.35	136.54
204620-112	3500K	1694 ^{*1}	12.33 ^{*2}	137.39 ^{*3}
204620-113	4000K	1703 ^{*1}	12.33 ^{*2}	138.12 ^{*3}
204620-115	5000K	1719	12.30	139.76

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

$$1694 = (1719 - 1686) / 4 + 1686$$

$$1703 = (1719 - 1686) / 4 + 1694$$

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

$$12.33 = (12.35 + 12.30) / 2$$

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

$$137.39 = 1694 / 12.33$$

$$138.12 = 1703 / 12.33$$

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 *******