

LM-79-08 Test Report

For

LIGHT EFFICIENT DESIGN**(Brand Name: REMPHOS OR LIGHT EFFICIENT DESIGN)**

188 S. Northwest Highway Cary, IL 60013, USA

Direct Linear Ambient Luminaires

Model name(s):

RP-LBI-G1-2F-12W-XXK-[WC,W,C]-[Blank,OCN]-[BAA,Blank]

Remark: [WC,W,C] represents product function, WC represents power adjustable and color turnable, W represents power adjustable, C represents color turnable. [Blank,OCN] represent sensor option, OCN represents occupancy sensor and N can be a number 1 to 4 for sensor number, Blank represents without sensor. [BAA,Blank] where Blank represent NON-BAA, BAA represents BAA Section 1605 Compliant.

Representative (Tested) Model:

RP-LBI-G1-2F-12W-XXK-WC(0%,3500K)

RP-LBI-G1-2F-12W-XXK-WC(50%,4000K)

RP-LBI-G1-2F-12W-XXK-WC(100%,5000K)

Model Difference: All construction and rating are the same, except product function and sensor option.

Test & Report By:

Xeon Ren

Review By:

John Li

Engineer: Xeon Ren

Manager: John Li

Date: Nov.20,2018

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

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

1.1 Product Information:

Organization Name	LIGHT EFFICIENT DESIGN	
Brand Name	REMPHOS OR LIGHT EFFICIENT DESIGN	
Model Number	RP-LBI-G1-2F-12W-XXK-[WC,W,C]-[Blank,OCN] -[BAA,Blank]	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Direct Linear Ambient Luminaires	
Rated Voltage / Frequency	100-277 Vac, 50/60 Hz	
Nominal Power	12W	
Rated Initial Lamp Lumen	--	
Declared CCT	3500K,4000K,5000K	
LED Manufacturer	Hongli Zhihui Group Co., Ltd.	
LED Model	PU2835DW-S1-08-PCT-HR3	
Sample Number	JDE181007-E1	
Lamp Length	--	mm
Lamp Width	--	mm
Number of Units (modular products)	N/A	s
Photo		
		

1.2 Test Specifications:

Date of Receipt	Oct.25,2018
Date of Test	Oct.25,2018
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	2018-10-25	Test Ambient:	25.0 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	RP-LBI-G1-2F-12W-XXK-WC (0%,3500K)		

Electrical Measurement:

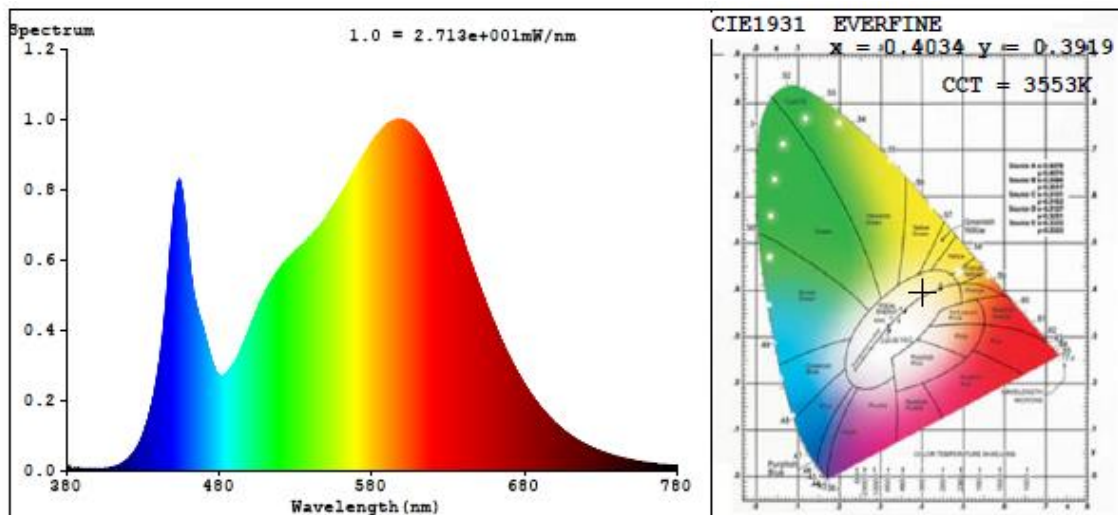
Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JDE181007-E1	120.0	60	0.1064	12.56	0.9835	7.73
	277.0	60	0.0502	12.69	0.9121	20.47
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	6
Frequency (Hz)	60	R2	91	R10	78
CCT (K)	3553	R3	96	R11	79
Duv	0.0010	R4	80	R12	65
Chromaticity (x, y)	x=0.4034 y=0.3919	R5	81	R13	84
Chromaticity (u', v')	u'=0.2339 v'=0.5115	R6	87	R14	98
Color Rendering Index (CRI)	82.8	R7	84	R15	74
R9	6	R8	61	--	--

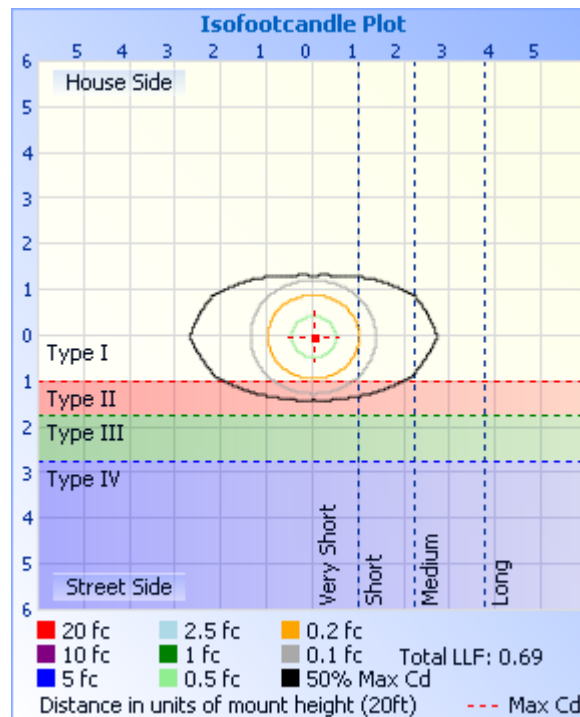
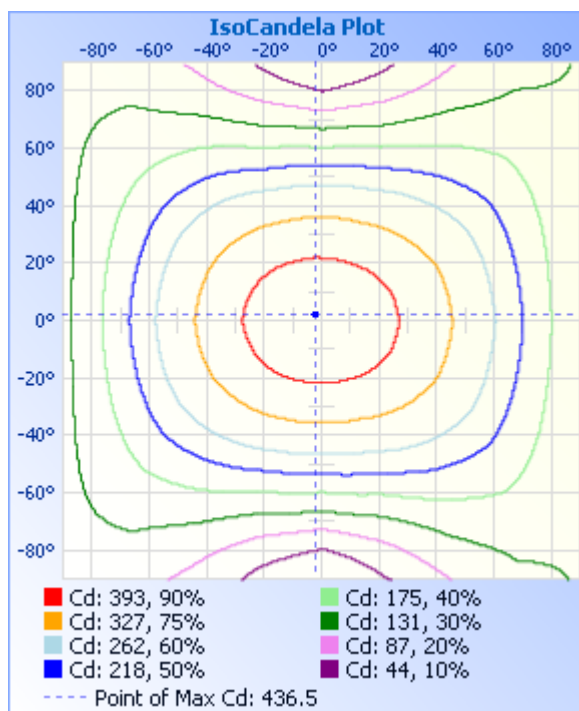
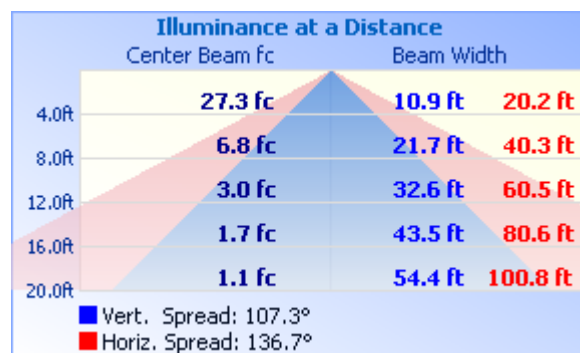
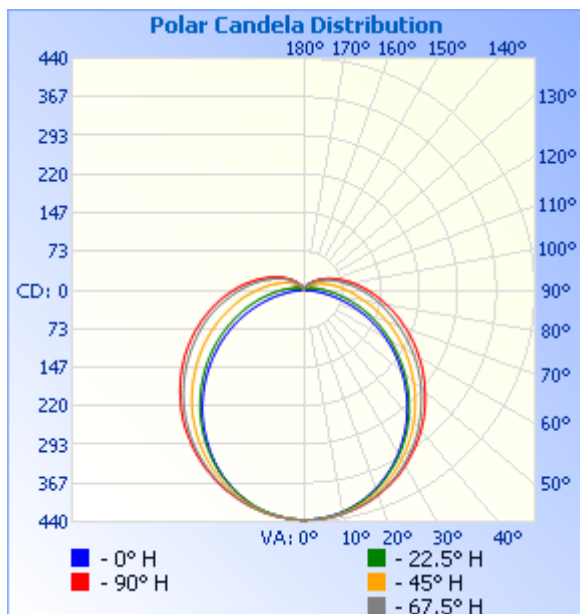
Photometric Measurement –Goniophotometer Method:

Parameter	Result		DLC V4.4 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	1615.7	1608.3	>=375 lm/ft(-10%)	
Luminous Efficacy (lm/W)	128.64	126.74	Standard: >= 105(-3%)	Premium: >= 130(-3%)
Most Worst Luminous/Highest Watts	126.74			
Zonal lumens in the 0-60 °zone (%)	62.3	--	>= 40%(-3%)	
Beam Angle (°)	122.1	--	--	
Center Beam Candle Power (cd)	436	--	--	

Spectral Power Distribution & Chromaticity Diagram

Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	338.8	21%
0-40	556.6	34.5%
0-60	1,006.0	62.3%
60-90	433.6	26.8%
70-100	314.3	19.5%
90-120	142.0	8.8%
0-90	1,439.6	89.1%
90-180	175.8	10.9%
0-180	1,615.4	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	41.3	2.6%	90-100	68.4	4.2%
10-20	118.2	7.3%	100-110	45.2	2.8%
20-30	179.4	11.1%	110-120	28.5	1.8%
30-40	217.8	13.5%	120-130	17.0	1.1%
40-50	230.5	14.3%	130-140	9.4	0.6%
50-60	218.8	13.5%	140-150	4.7	0.3%
60-70	187.7	11.6%	150-160	2.0	0.1%
70-80	144.8	9.0%	160-170	0.5	0%
80-90	101.1	6.3%	170-180	0.1	0%

Photometric Data


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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	436	436	436	436	436	436	436	436	436	436	436	436	436	436	436	436	
5	434	433	434	434	434	434	435	436	435	435	434	434	433	433	433	434	
10	429	428	428	427	427	428	430	431	431	431	428	426	427	426	427	428	
15	421	420	418	416	416	417	421	424	424	423	418	415	415	414	418	420	
20	410	409	405	400	401	403	409	413	414	411	405	400	398	399	405	409	
25	398	395	388	382	381	384	392	398	401	396	389	381	378	380	388	395	
30	382	379	369	360	359	362	372	382	386	379	368	358	355	358	369	379	
35	366	361	347	336	334	338	350	362	367	359	346	332	328	333	348	361	
40	347	341	324	310	306	311	326	340	347	338	320	304	299	306	325	342	
45	328	320	299	282	276	283	300	316	325	314	293	275	269	277	301	321	
50	307	297	273	253	245	252	273	292	301	290	265	244	237	247	275	298	
55	285	273	247	223	212	221	246	266	278	264	238	213	204	217	249	275	
60	263	249	221	192	179	190	219	241	253	239	211	182	171	187	223	252	
65	240	225	195	161	145	159	193	215	229	214	184	151	137	157	197	228	
70	217	202	170	131	110	130	167	190	205	189	158	120	103	128	172	206	
75	195	179	146	102	76.5	102	141	167	182	166	134	92.6	69.3	102	148	184	
80	173	157	123	75.8	45.1	77.0	118	148	160	144	112	68.0	38.8	77.4	127	161	
85	153	137	102	54.4	19.0	56.3	98.4	128	140	125	92.0	47.4	14.6	57.5	108	140	
90	133	118	84.2	38.0	6.24	40.6	81.9	110	122	107	75.1	32.6	3.05	41.5	88.2	121	
95	115	101	68.2	27.0	5.24	29.3	67.4	93.8	104	90.9	62.2	22.2	2.54	29.6	73.3	104	
100	98.7	85.1	56.1	19.5	4.67	21.5	55.3	79.5	89.2	77.1	49.7	15.6	2.44	21.9	60.4	88.7	
105	83.7	70.8	45.9	14.3	0.67	15.9	45.0	66.8	75.4	64.8	39.7	11.6	1.54	16.7	49.5	74.7	
110	70.4	60.1	37.1	11.1	0.67	12.0	36.3	55.6	63.0	53.5	31.8	9.01	1.04	13.1	40.2	62.4	
115	58.7	49.5	29.7	8.61	0.73	9.31	28.8	45.8	52.0	43.6	25.3	7.47	1.14	10.7	32.7	51.8	
120	48.2	40.5	23.5	6.85	0.67	7.38	23.1	37.1	42.6	35.2	20.2	6.22	1.14	9.09	26.3	42.2	
125	39.2	32.7	18.7	5.81	0.67	6.08	18.0	29.8	34.1	28.4	16.0	5.55	1.35	7.69	21.3	34.3	
130	31.3	26.1	15.1	5.03	0.67	5.15	14.4	23.6	26.9	22.4	12.8	4.77	1.40	6.75	16.9	27.2	
135	24.5	20.6	12.0	4.51	0.67	4.37	11.5	18.5	21.1	17.6	10.4	4.20	1.40	6.03	13.6	21.5	
140	19.0	16.0	9.71	3.84	0.83	3.80	9.16	14.5	16.2	13.9	8.45	2.64	1.40	5.19	10.8	16.7	
145	14.6	12.4	7.89	2.49	0.83	1.88	7.27	11.1	12.3	10.8	6.99	2.02	1.40	3.12	8.42	12.6	
150	11.1	9.59	6.43	1.92	0.83	1.30	5.75	8.54	9.32	8.32	5.74	1.66	1.35	2.23	6.62	9.40	
155	8.32	7.23	4.60	1.51	0.83	1.30	4.43	6.32	6.66	6.32	4.90	1.50	1.30	1.77	3.96	7.04	
160	5.97	5.45	2.30	1.35	0.93	1.30	1.58	4.53	4.69	4.34	1.72	1.45	1.30	1.77	2.00	4.65	
165	2.25	2.15	1.62	1.35	1.14	1.56	1.26	1.37	1.44	1.25	1.25	1.50	1.45	2.18	1.95	1.79	
170	1.50	1.36	1.41	1.45	1.40	1.56	1.26	1.26	1.39	1.20	1.20	1.56	1.61	2.03	1.89	1.68	
175	1.28	1.20	1.41	1.50	1.55	1.61	1.68	1.32	1.39	1.20	1.20	1.50	1.61	1.87	1.84	1.74	
180	1.18	1.20	1.41	1.50	1.66	1.61	1.68	1.32	1.39	1.20	1.20	1.40	1.55	1.66	1.63	1.68	

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2.2 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2018-10-25	Test Ambient:	25.0 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	RP-LBI-G1-2F-12W-XXK-WC (50%, 4000K)		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JDE181007-E1	120.0	60	0.1061	12.52	0.9832	7.16
	277.0	60	0.0501	12.65	0.9118	19.83
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

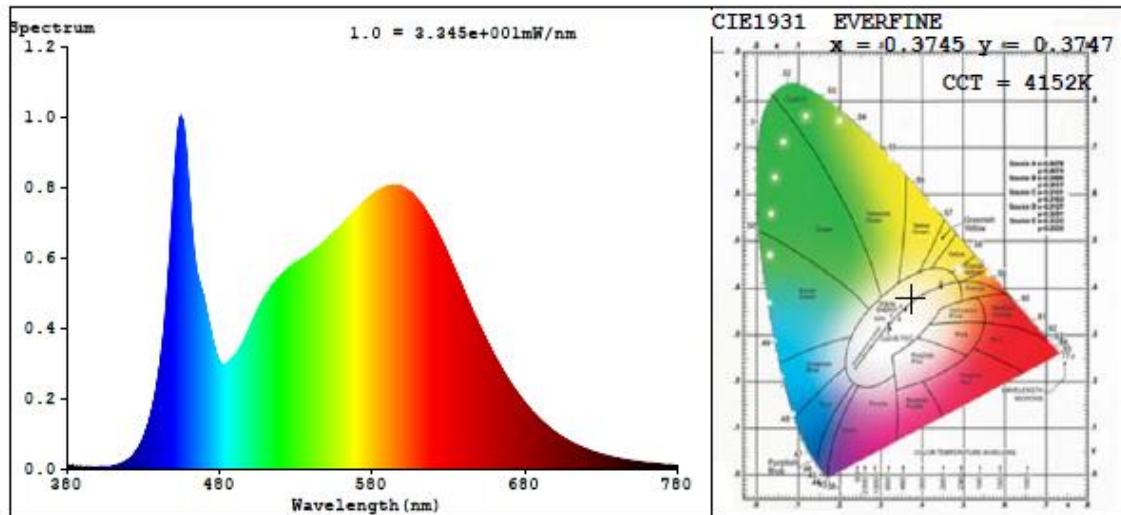
Chromaticity Measurement -Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	83	R9	13
Frequency (Hz)	60	R2	92	R10	80
CCT (K)	4152	R3	96	R11	80
Duv	0.0008	R4	81	R12	61
Chromaticity (x, y)	x=0.3745 y=0.3747	R5	83	R13	86
Chromaticity (u', v')	u'=0.2220 v'=0.4998	R6	88	R14	98
Color Rendering Index (CRI)	84.3	R7	86	R15	77
R9	13	R8	66	--	--

Photometric Measurement –Sphere-Spectroradiometer Method:

Parameter	Result		DLC V4.4 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	1653	1645	>=375 lm/ft(-10%)	
Luminous Efficacy (lm/W)	132.03	130.04	Standard: >=	Premium: >=
Most Worst Luminous/Highest Watts	130.04		105(-3%)	130(-3%)

Spectral Power Distribution & Chromaticity Diagram



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

Test date	2018-10-25	Test Ambient:	25.0 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	RP-LBI-G1-2F-12W-XXK-WC (100%, 5000K)		

Electrical Measurement:

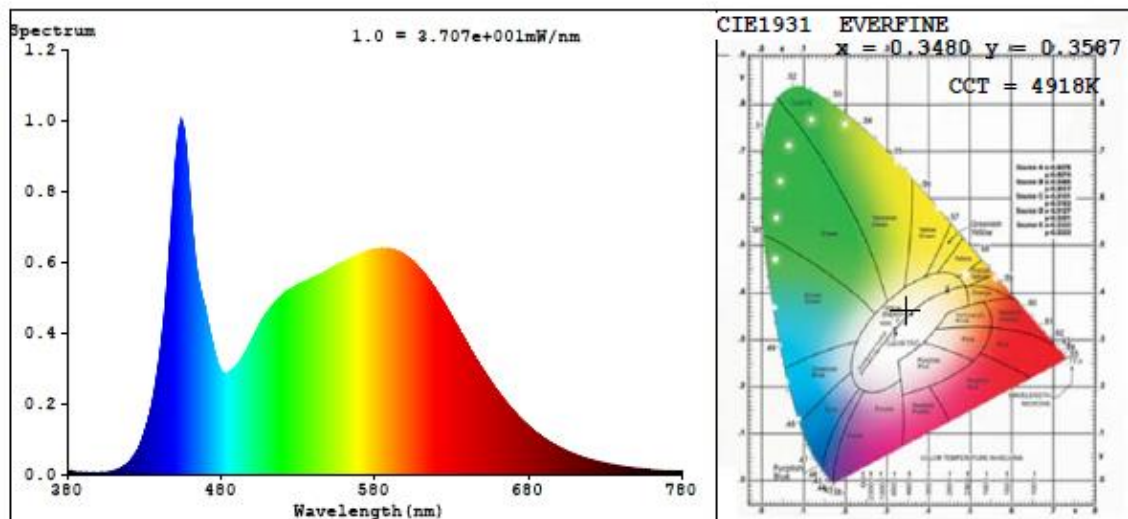
Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JDE181007-E1	120.0	60	0.1070	12.63	0.9833	7.52
	277.0	60	0.0505	12.76	0.9119	19.94
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

Chromaticity Measurement -Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	82	R9	10
Frequency (Hz)	60	R2	91	R10	77
CCT (K)	4918	R3	95	R11	80
Duv	0.0024	R4	81	R12	58
Chromaticity (x, y)	x=0.3480 y=0.3587	R5	82	R13	85
Chromaticity (u', v')	u'=0.2106 v'=0.4885	R6	86	R14	98
Color Rendering Index (CRI)	83.8	R7	87	R15	76
R9	10	R8	67	--	--

Photometric Measurement –Sphere-Spectroradiometer Method:

Parameter	Result		DLC V4.4 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	1716	1708	>=375 lm/ft(-10%)	
Luminous Efficacy (lm/W)	135.87	133.86	Standard: >=	Premium: >=
Most Worst Luminous/Highest Watts	133.86		105(-3%)	130(-3%)

Spectral Power Distribution & Chromaticity Diagram

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3. Test Equipment

Equipment ID	Equipment Name	Last Calibration Date	Next Calibration Date
ST-R-331	2 meter Integrating Sphere	2018-07-02	2019-06-01
ST-R-327	Spectral analysis system HAAS-2000	2018-07-02	2019-07-01
ST-R-332	Standard Lamp	2018-07-04	2019-07-03
ST-R-333	Power Meter for Integrating Sphere	2018-06-28	2019-06-27
ST-R-355	Goniophotometer system	2018-07-01	2019-06-30
ST-R-359	Standard Lamp	2018-07-04	2019-07-03
ST-R-358	Power Meter for Goniophotometer	2018-06-28	2019-06-27
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 *******