

LM-79-08 Test Report

For

IKIO LED LIGHTING**(Brand Name: IKIO)**8470 Allison Pointe Blvd, Suite 128
Indianapolis, IN 46250**2x4 Luminaires for Ambient Lighting of Interior
Commercial Spaces**

Model name(s): IK-FP24-0075-DX-XX-J

Representative (Tested) Model: IK-FP24-0075-DX-30-J
IK-FP24-0075-DX-35-J
IK-FP24-0075-DX-40-J
IK-FP24-0075-DX-50-J

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

Test & Report By:

*Jack Luo*Engineer: Jack Luo
Date: Mar.13,2017

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

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

1.1 Product Information:

Organization Name	IKIO LED LIGHTING	
Brand Name	IKIO	
Model Number	IK-FP24-0075-DX-XX-J	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	2x4 Luminaires for Ambient Lighting of Interior Commercial Spaces	
Rated Voltage / Frequency	100~277 Vac, 50/60 Hz	
Nominal Power	75W	
Rated Initial Lamp Lumen	--	
Declared CCT	3000K,3500K,4000K,5000K	
LED Manufacturer	Dongguan Sino-win Opto-Electronic Technology Co.,Ltd.	
LED Model	ZT2835WOM1	
Sample Number	GZE170221-G1(3000K),G2(3500K), G3(4000K),G4(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	Mar.11, 2017
Date of Test	Mar.12, 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 $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$, 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	2017-03-12	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-FP24-0075-DX-30-J		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE170221	120.0	60	0.6466	77.19	0.9948	5.00
-G1	277.0	60	0.2906	76.71	0.9531	10.15
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

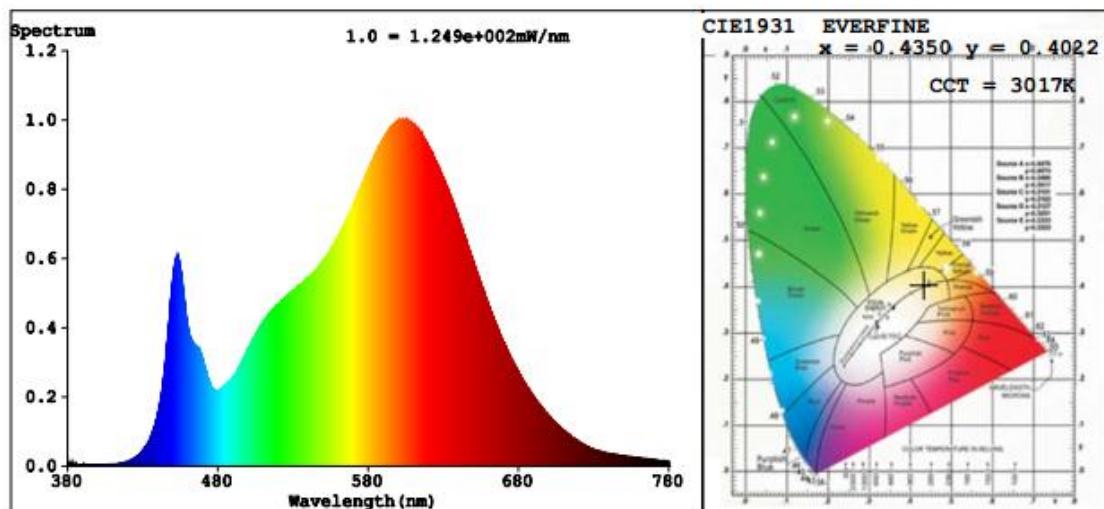
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	83	R9	12
Frequency (Hz)	60	R2	93	R10	85
CCT (K)	3017	R3	95	R11	82
Duv	-0.0005	R4	82	R12	73
Chromaticity (x, y)	x=0.4350 y=0.4022	R5	84	R13	86
Chromaticity (u', v')	u'=0.2501 v'=0.5204	R6	92	R14	98
Color Rendering Index (CRI)	84.1	R7	83	R15	76
R9	12	R8	61	--	--

Photometric Measurement –Sphere-Spectroradiometer Method:

Parameter	Result		DLC V4.0 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	9497.0	9344.4	>=3000(-10%)	
Luminous Efficacy (lm/W)	123.03	121.81	Standard: >= 105(-3%)	Premium: >= 125(-3%)
Zonal lumens in the 0-60 °zone (%)	78.2	--	>= 75(-3)	
SC: 0-180 °(if applicable)	1.26	--	--	
SC: 90-270 °(if applicable)	1.27	--	--	
Beam Angle (°)	114.2	--	--	
Center Beam Candle Power (cd)	3257	--	--	

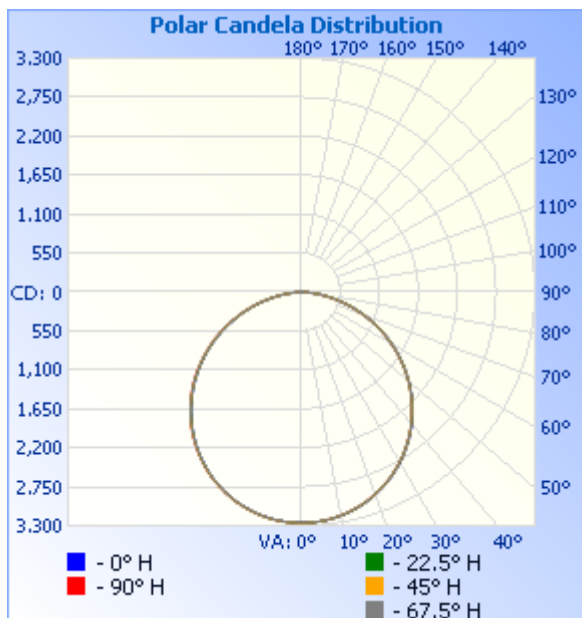
Spectral Power Distribution & Chromaticity Diagram



Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	2,540.1	26.7%
0-40	4,172.6	43.9%
0-60	7,426.3	78.2%
60-90	2,065.3	21.7%
70-100	876.8	9.2%
90-120	2.6	0%
0-90	9,491.6	100%
90-180	4.5	0%
0-180	9,496.1	100%

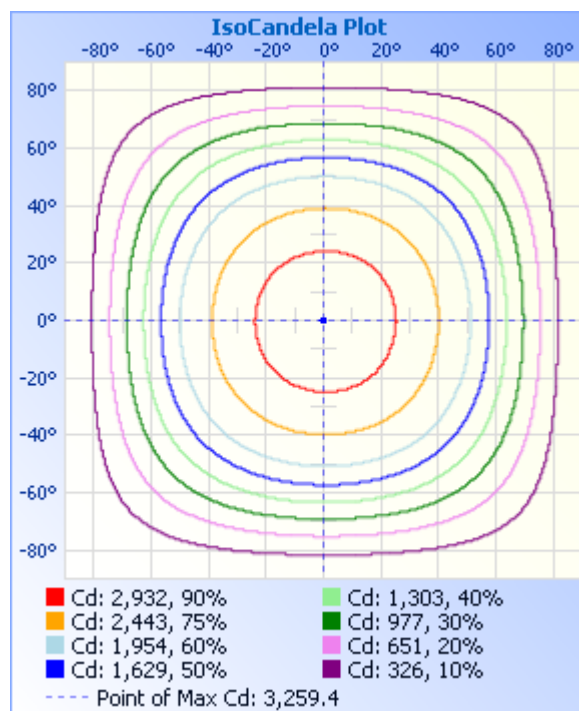
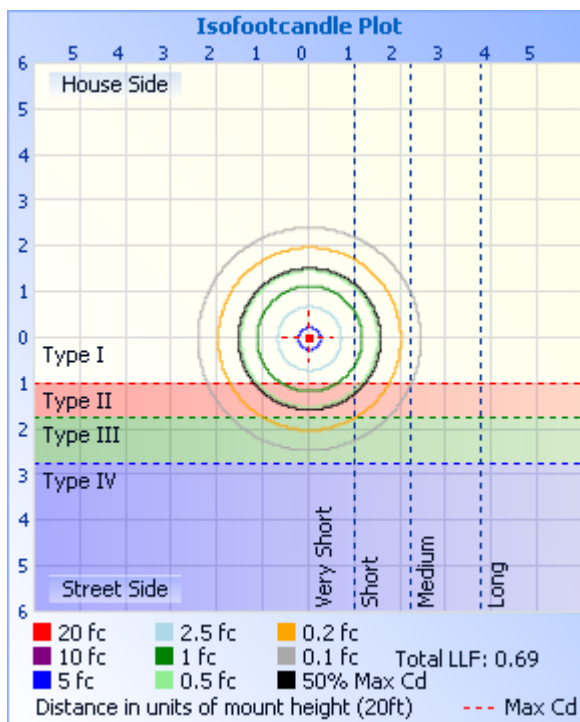
Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	308.3	3.2%	90-100	1.1	0%
10-20	885.0	9.3%	100-110	0.8	0%
20-30	1,346.8	14.2%	110-120	0.7	0%
30-40	1,632.5	17.2%	120-130	0.6	0%
40-50	1,704.0	17.9%	130-140	0.4	0%
50-60	1,549.6	16.3%	140-150	0.3	0%
60-70	1,189.6	12.5%	150-160	0.3	0%
70-80	688.2	7.2%	160-170	0.2	0%
80-90	187.5	2.0%	170-180	0.1	0%

Photometric Data


Illuminance at a Distance

	Center Beam fc	Beam Width	
17.0ft	11.27 fc	52.4 ft	52.6 ft
34.0ft	2.82 fc	104.8 ft	105.2 ft
51.0ft	1.25 fc	157.2 ft	157.9 ft
68.0ft	0.70 fc	209.6 ft	210.5 ft
85.0ft	0.45 fc	262.0 ft	263.1 ft
102.0ft	0.31 fc	314.4 ft	315.7 ft

■ Vert. Spread: 114.1°
 ■ Horiz. Spread: 114.3°



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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	3258	3257	3255	3256	3257	3259	3259	3257	3258	3257	3255	3256	3257	3259	3259	3257	
5	3246	3246	3245	3244	3244	3245	3244	3243	3242	3240	3238	3241	3244	3247	3247	3245	
10	3207	3209	3207	3205	3204	3203	3201	3200	3199	3197	3196	3199	3203	3206	3207	3204	
15	3141	3144	3142	3139	3137	3134	3133	3131	3130	3128	3127	3131	3136	3139	3140	3137	
20	3049	3052	3049	3047	3043	3039	3037	3035	3034	3034	3033	3037	3042	3044	3046	3043	
25	2930	2934	2931	2928	2923	2919	2917	2914	2913	2914	2913	2918	2923	2925	2927	2924	
30	2787	2790	2788	2784	2779	2773	2772	2770	2768	2770	2768	2773	2778	2780	2784	2781	
35	2620	2623	2621	2617	2611	2605	2604	2601	2601	2602	2600	2605	2609	2612	2617	2614	
40	2433	2434	2432	2428	2422	2416	2415	2413	2412	2412	2410	2413	2417	2420	2427	2426	
45	2223	2224	2222	2218	2212	2206	2205	2203	2202	2201	2199	2200	2205	2209	2216	2216	
50	1995	1995	1993	1990	1984	1979	1978	1975	1974	1972	1969	1970	1974	1979	1986	1988	
55	1748	1749	1747	1744	1739	1735	1733	1730	1729	1727	1722	1723	1726	1732	1739	1741	
60	1487	1487	1487	1485	1481	1477	1475	1471	1469	1466	1461	1462	1465	1471	1478	1481	
65	1214	1215	1215	1214	1211	1207	1204	1201	1197	1193	1189	1190	1193	1198	1205	1209	
70	936	936	936	938	934	931	927	923	919	915	912	913	916	921	926	931	
75	656	654	660	662	660	658	652	642	642	639	636	639	642	647	651	654	
80	388	393	402	404	403	399	392	381	382	379	380	384	387	391	393	393	
85	161	166	172	178	177	173	166	159	157	155	157	160	162	165	163	163	
90	0.83	1.01	1.29	2.23	2.48	1.99	1.35	0.90	0.50	0.37	0.50	1.49	10.5	10.4	0.62	0.43	
95	0.06	0.12	0.43	1.09	1.24	1.00	0.40	0.12	0.25	0.06	0.50	1.43	1.55	2.92	0.62	0.06	
100	0.06	0.00	0.50	1.04	1.24	1.02	0.32	0.06	0.35	0.22	0.75	1.41	1.55	1.81	0.56	0.12	
105	0.31	0.12	0.67	0.99	1.58	1.08	0.50	0.43	0.62	0.44	0.89	1.12	1.39	1.42	0.75	0.50	
110	0.43	0.57	0.93	0.94	1.47	1.19	0.74	0.64	0.76	0.57	0.93	0.80	0.99	0.87	0.83	0.74	
115	0.56	0.77	1.03	0.73	1.36	0.92	0.83	0.73	0.78	0.59	0.97	0.25	0.62	0.49	0.79	0.56	
120	0.81	0.87	1.14	0.48	0.81	0.37	0.93	0.80	0.81	0.60	0.74	0.06	0.52	0.00	0.71	0.50	
125	0.85	0.95	1.12	0.46	0.70	0.34	0.96	0.97	0.84	0.62	0.56	0.12	0.44	0.12	0.63	0.50	
130	0.83	0.89	0.93	0.44	0.69	0.32	0.81	0.91	0.86	0.63	0.37	0.25	0.49	0.24	0.53	0.50	
135	0.80	0.79	0.50	0.51	0.70	0.26	0.52	0.85	0.87	0.64	0.25	0.43	0.68	0.44	0.25	0.50	
140	0.78	0.75	0.06	0.54	0.71	0.28	0.25	0.75	0.89	0.65	0.12	0.74	0.75	0.68	0.06	0.50	
145	0.76	0.44	0.00	0.57	0.72	0.29	0.00	0.50	0.90	0.66	0.12	0.76	1.03	0.93	0.22	0.49	
150	0.75	0.29	0.00	0.60	0.73	0.31	0.00	0.50	0.91	0.67	0.26	0.79	1.18	1.18	0.69	0.25	
155	0.56	0.19	0.22	0.68	0.74	0.62	0.00	0.30	0.92	0.68	0.30	0.82	1.40	1.43	1.01	0.31	
160	0.51	0.13	0.31	0.68	0.85	0.64	0.00	0.27	0.92	0.70	0.34	0.85	1.41	1.58	1.14	0.49	
165	0.53	0.00	0.68	0.87	0.93	0.81	0.24	0.29	0.90	0.74	0.49	0.89	1.37	1.65	1.21	0.51	
170	0.56	0.00	0.66	1.05	1.35	1.24	0.57	0.38	0.89	0.78	0.58	0.92	1.34	1.61	1.28	0.53	
175	0.65	0.12	0.63	1.36	1.61	1.28	0.62	0.56	0.87	0.75	0.31	0.62	1.30	1.49	1.18	0.55	
180	0.62	0.31	0.62	1.00	1.43	0.86	0.56	0.62	0.87	0.62	0.31	0.62	1.24	1.36	1.12	0.56	

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

Test date	2017-03-12	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-FP24-0075-DX-35-J		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE170221	120.0	60	0.6461	77.21	0.9958	5.36
-G2	277.0	60	0.2909	76.84	0.9536	10.53
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

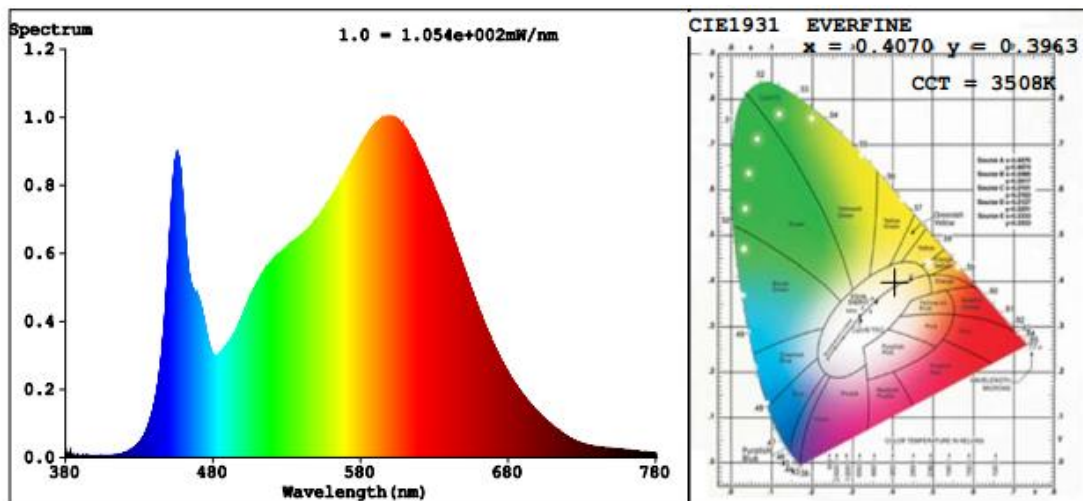
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	83	R9	12
Frequency (Hz)	60	R2	93	R10	83
CCT (K)	3508	R3	96	R11	81
Duv	0.0021	R4	81	R12	65
Chromaticity (x, y)	x=0.4070 y=0.3963	R5	83	R13	86
Chromaticity (u', v')	u'=0.2345 v'=0.5138	R6	91	R14	98
Color Rendering Index (CRI)	84.2	R7	84	R15	76
R9	12	R8	63	--	--

Photometric Measurement –Sphere-Spectroradiometer Method:

Parameter	Result		DLC V4.0 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	9673	9546	>=3000(-10%)	
Luminous Efficacy (lm/W)	125.28	124.23	Standard: >= 105(-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	2017-03-12	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-FP24-0075-DX-40-J		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE170221	120.0	60	0.6460	77.16	0.9953	5.12
-G3	277.0	60	0.2905	76.70	0.9531	10.41
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

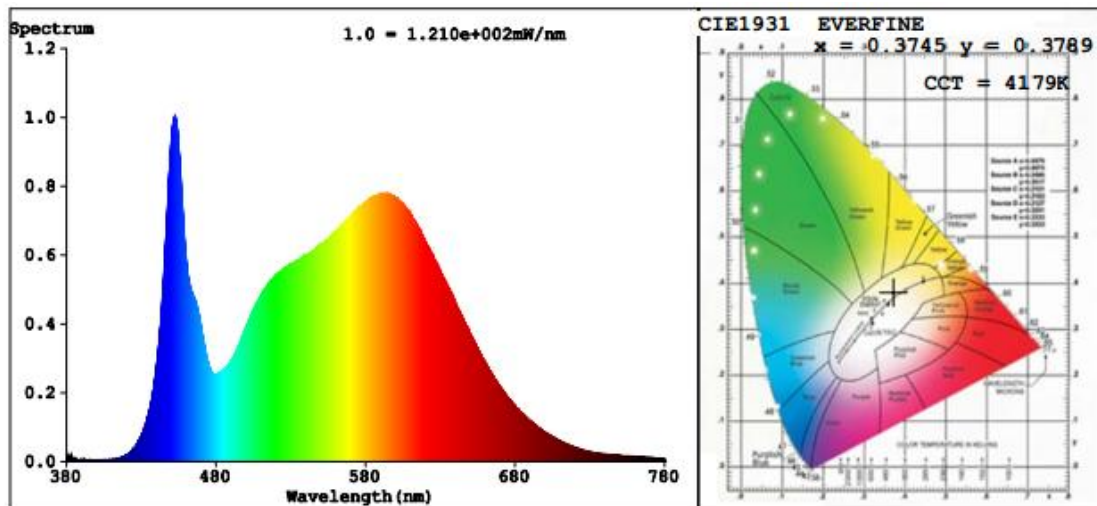
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	80	R9	2
Frequency (Hz)	60	R2	90	R10	75
CCT (K)	4179	R3	96	R11	79
Duv	0.0028	R4	80	R12	58
Chromaticity (x, y)	x=0.3745 y=0.3789	R5	80	R13	83
Chromaticity (u', v')	u'=0.2204 v'=0.5016	R6	85	R14	98
Color Rendering Index (CRI)	82.5	R7	86	R15	73
R9	2	R8	63	--	--

Photometric Measurement –Sphere-Spectroradiometer Method:

Parameter	Result		DLC V4.0 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	9805	9713	>=3000(-10%)	
Luminous Efficacy (lm/W)	127.07	126.64	Standard: >= 105(-3%)	Premium: >= 125(-3%)

Spectral Power Distribution & Chromaticity Diagram



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

Test date	2017-03-12	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-FP24-0075-DX-50-J		

Electrical Measurement:

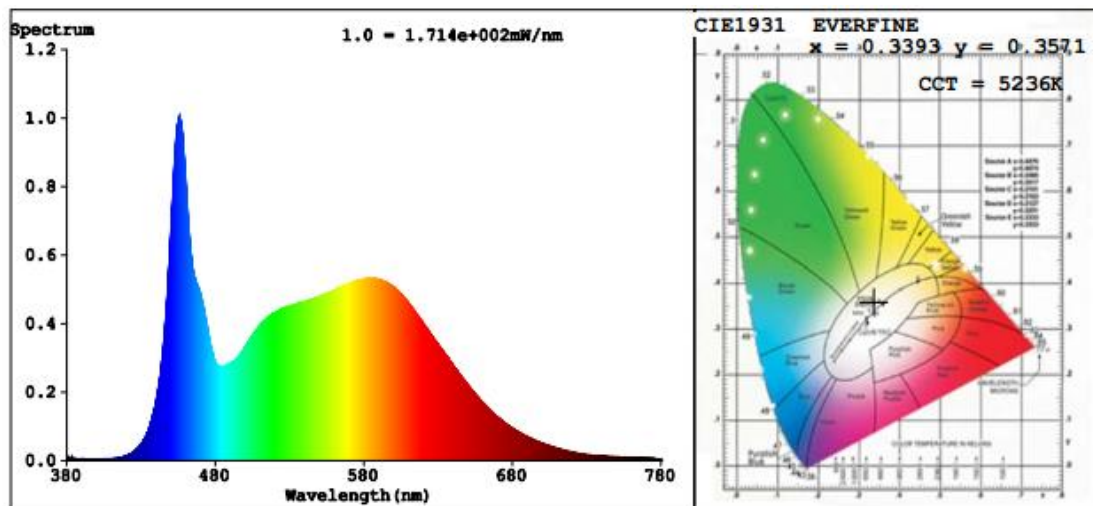
Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE170221	120.0	60	0.6460	77.30	0.9972	5.41
-G4	277.0	60	0.2908	76.86	0.9541	10.46
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	0
Frequency (Hz)	60	R2	92	R10	81
CCT (K)	5236	R3	94	R11	78
Duv	0.0051	R4	78	R12	59
Chromaticity (x, y)	x=0.3393 y=0.3571	R5	81	R13	85
Chromaticity (u', v')	u'=0.2055 v'=0.4865	R6	88	R14	97
Color Rendering Index (CRI)	82.7	R7	84	R15	74
R9	0	R8	63	--	--

Photometric Measurement –Sphere-Spectroradiometer Method:

Parameter	Result		DLC V4.0 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	9922	9770	>=3000(-10%)	
Luminous Efficacy (lm/W)	128.36	127.11	Standard: >= 105(-3%)	Premium: >= 125(-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	2016-07-01	2017-06-30
ST-R-327	Spectral analysis system HAAS-2000	2016-07-01	2017-06-30
D204	Standard Lamp	2016-07-12	2017-07-11
PF2010	Power Meter for Integrating Sphere	2016-07-01	2017-06-30
GO-R5000	Goniophotometer system	2016-07-01	2017-06-30
D908S	Standard Lamp	2016-07-12	2017-07-11
PF210	Power Meter for Goniophotometer	2016-07-07	2017-07-06
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 *******