



Report No.: GZE160913-B

LM-79-08 Test Report

For

IKIO LED LIGHTING (Brand Name: IKIO)

8470 Allison Pointe Blvd, Suite 128
Indianapolis, IN 46250

Vertical Refrigerated Case Luminaires-center

Model name(s): IK-RL05IN-0022-XX-J

Representative (Tested) Model: IK-RL05IN-0022-30-J
IK-RL05IN-0022-35-J
IK-RL05IN-0022-40-J
IK-RL05IN-0022-50-J

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

Test & Report By:

Jack Luo

Engineer: Jack Luo
Date: Spet.26, 2016

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	IKIO LED LIGHTING	
Brand Name	IKIO	
Model Number	IK-RL05IN-0022-XX-J	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Vertical Refrigerated Case Luminaires-center	
Rated Voltage / Frequency	100 -277Vac, 50/60 Hz	
Nominal Power	22W	
Rated Initial Lamp Lumen	--	
Declared CCT	3000K,3500K,4000K,5000K	
LED Manufacturer	EVERLIGHT ELECTRONICS CO., LTD	
LED Model	67-21S Series (3000K)	
Sample Number	GZE160139-B1(3000K), B2(3500K), B3(4000K), B4(5000K)	
Luminaire Aperture (for downlights)	--	in.
Luminaire Length	--	mm
Luminaires Width	--	mm
Number of Units (modular products)	N/A	s
Photo		
		

1.2 Test Specifications:

Date of Receipt	Spet.20, 2016
Date of Test	Spet.20, 2016
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	2016-09-20	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-RL05IN-0022-30-J		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE160139-B1	120.0	60	0.1786	22.01	0.9931	7.96
	277.0	60	0.0782	21.93	0.9705	10.70
DLC Pass Criteria					$\geq 0.9(-3\%)$	$\leq 20(+5)$

Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	5
Frequency (Hz)	60	R2	93	R10	84
CCT (K)	2916	R3	93	R11	78
Duv	-0.0009	R4	79	R12	73
Chromaticity (x, y)	x=0.4417 y=0.4035	R5	82	R13	84
Chromaticity (u', v')	u'=0.2539 v'=0.5219	R6	92	R14	97
Color Rendering Index (CRI)	82.2	R7	80	R15	73
R9	5	R8	57	--	--

Photometric Measurement – Goniophotometer Method:

Parameter	Result		DLC V4.0 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	2884.7	2840.3	--	
Luminous Efficacy (lm/W)	131.06	129.52	Standard: $\geq 80(-3\%)$	Premium: $\geq 125(-3\%)$
Total Luminous (lm)/Length(ft)	576.9	568.1	≥ 375 lm/ft	
Zonal lumens in the 10-90° zone (%)	92	--	$\geq 95(-3)$	
Beam Angle (°)	122.7	--	--	
Center Beam Candle Power (cd)	695	--	--	

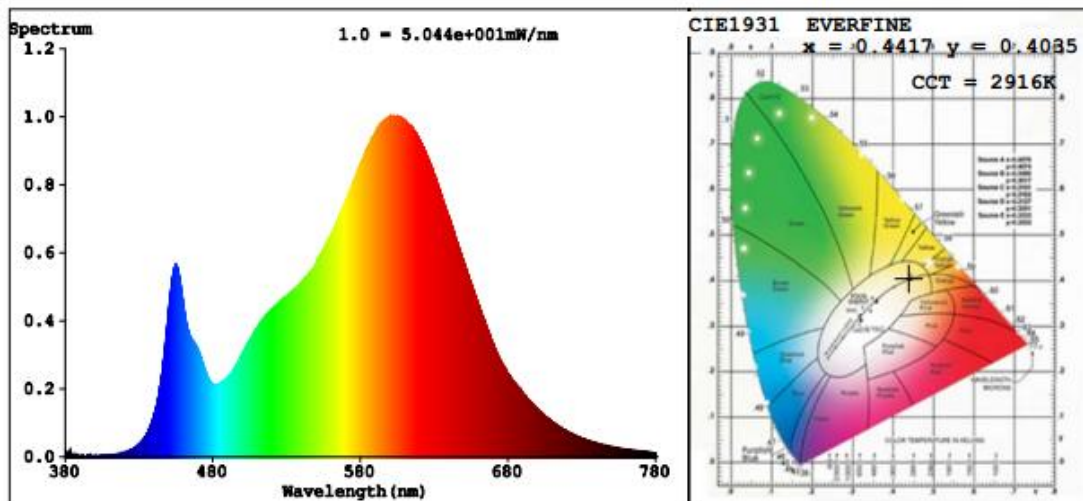
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Spectral Power Distribution & Chromaticity Diagram

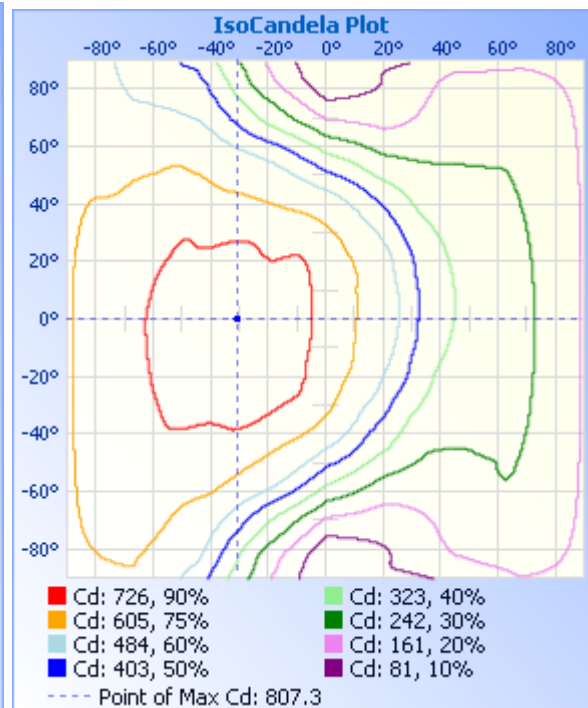
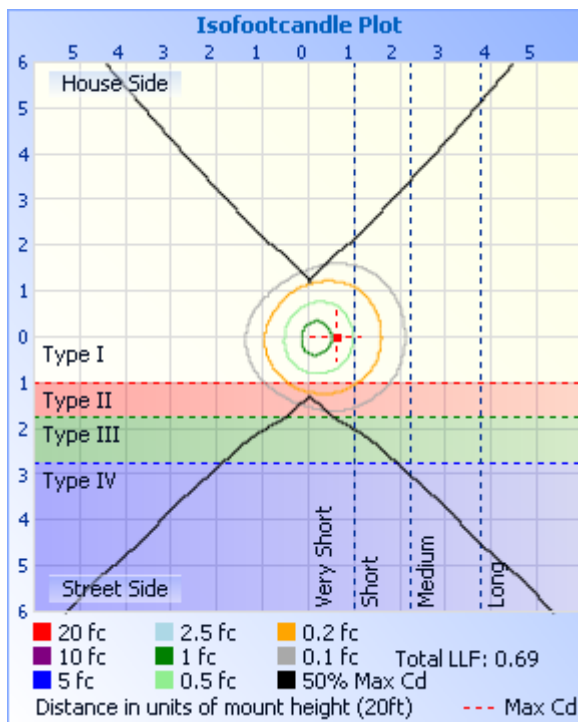
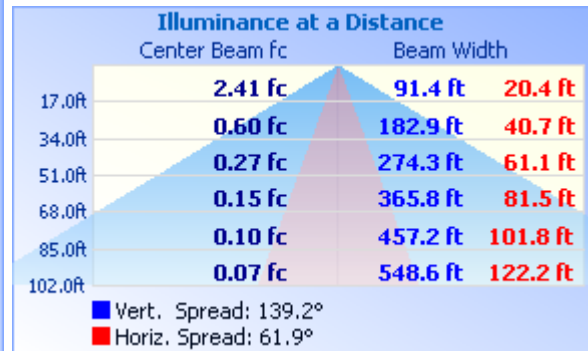
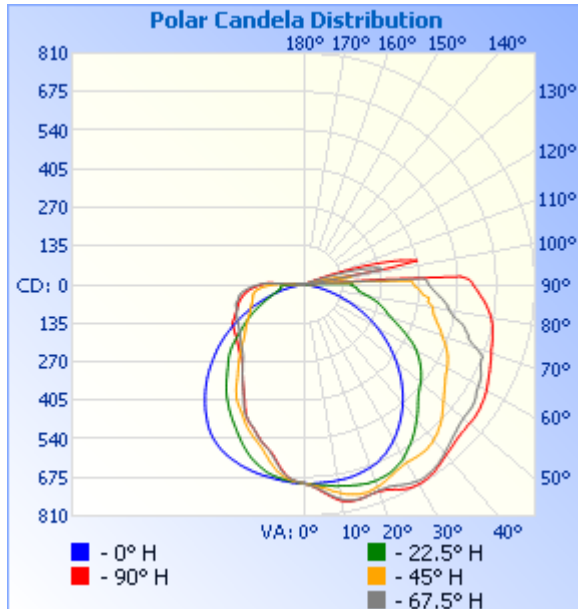


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zon□	Lumens	% Luminaire
0-30	553.4	19.2%
0-40	919.7	31.9%
0-60	1,721.1	59.7%
60-90	998.3	34.6%
70-100	715.5	24.8%
90-120	161.2	5.6%
0-90	2,719.4	94.3%
90-180	165.0	5.7%
0-180	2,884.4	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	66.3	2.3%	90-100	97.5	3.4%
10-20	191.6	6.6%	100-110	57.9	2%
20-30	295.4	10.2%	110-120	5.8	0.2%
30-40	366.4	12.7%	120-130	1.9	0.1%
40-50	397.6	13.8%	130-140	0.9	0%
50-60	403.8	14.0%	140-150	0.5	0%
60-70	380.3	13.2%	150-160	0.3	0%
70-80	335.0	11.6%	160-170	0.1	0%
80-90	283.0	9.8%	170-180	0.0	0%

Photometric Data



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Table--1

UNIT: cd

C (DEG) γ (DEG)	0	23	45	68	90	113	135	158	180	203	225	248	270	293	315	338	
0	695	695	695	695	695	695	695	695	695	695	695	695	695	695	695	695	
5	672	679	684	691	696	704	712	723	726	723	712	698	691	687	681	674	
10	607	620	648	682	695	715	740	762	768	763	739	707	684	673	639	612	
15	568	580	600	660	691	726	760	776	776	772	759	718	678	646	585	569	
20	528	540	570	625	681	731	753	767	770	765	758	728	667	606	549	526	
25	483	506	533	584	661	724	734	775	791	773	745	733	651	559	506	489	
30	422	442	502	547	629	700	719	795	806	795	743	724	627	515	467	423	
35	374	394	446	507	587	661	720	791	799	793	761	703	587	470	406	373	
40	338	351	394	454	540	616	708	768	777	776	764	663	537	418	353	330	
45	320	328	347	406	486	567	680	744	761	757	748	616	481	372	307	308	
50	304	311	307	350	426	534	639	729	757	749	717	579	418	321	269	290	
55	293	294	280	288	362	500	604	727	754	750	687	541	353	260	245	274	
60	286	284	255	238	296	454	580	708	739	740	668	489	284	213	222	266	
65	267	264	237	185	227	387	554	685	719	719	636	414	213	164	205	259	
70	248	250	222	144	159	321	515	641	700	700	591	350	144	126	193	247	
75	234	239	212	113	96.9	280	480	584	684	683	551	305	82.1	98.7	184	244	
80	214	222	203	95.2	45.6	227	459	519	666	667	524	246	34.3	82.8	178	228	
85	187	195	181	91.6	13.3	190	422	479	633	634	492	212	7.79	81.5	155	203	
90	149	152	129	49.4	1.35	167	386	438	594	592	445	189	0.05	34.3	107	159	
95	4.41	3.31	16.9	7.01	0.55	17.1	30.5	22.8	16.1	88.5	110	54.5	0.39	2.32	8.53	11.2	
100	5.59	21.0	14.6	4.40	0.50	7.91	163	117	28.4	277	179	6.82	0.42	2.79	10.9	23.7	
105	9.43	9.10	9.18	3.50	0.44	5.39	43.7	209	316	246	41.5	4.06	0.33	1.84	6.36	9.72	
110	6.68	6.76	6.01	2.66	0.40	3.27	10.7	46.5	100.0	53.0	9.08	2.70	0.55	1.32	3.74	6.51	
115	5.37	5.32	4.04	2.09	0.42	2.16	6.43	9.70	9.86	9.69	5.24	2.09	0.54	0.95	2.36	4.34	
120	3.90	3.99	2.60	2.05	0.43	1.72	3.91	5.99	4.72	5.07	3.34	1.64	0.59	0.91	1.49	2.91	
125	2.94	2.83	2.31	2.95	0.45	1.60	2.16	3.82	2.70	3.29	2.19	1.50	0.66	0.87	1.34	1.69	
130	1.53	1.93	1.62	1.58	0.49	1.14	1.59	2.44	1.69	2.19	1.67	1.26	0.75	0.82	0.86	1.35	
135	1.45	1.73	1.21	1.19	0.54	0.67	1.29	1.80	1.24	1.38	1.39	0.96	0.83	0.63	0.70	1.00	
140	0.96	1.04	1.02	1.02	0.58	0.53	1.16	1.33	0.62	1.08	1.15	1.01	0.87	0.65	0.46	0.81	
145	0.71	0.94	0.82	0.97	0.63	0.69	1.03	1.27	0.56	0.98	0.84	0.79	0.90	0.67	0.50	0.70	
150	0.58	0.87	0.64	0.91	0.82	0.71	0.62	1.05	0.56	0.73	0.76	0.61	0.77	0.70	0.48	0.58	
155	0.45	0.69	0.62	0.88	0.82	0.71	0.21	0.62	0.56	0.63	0.33	0.55	0.60	0.72	0.41	0.42	
160	0.00	0.37	0.61	0.74	0.82	0.67	0.46	0.11	0.00	0.25	0.49	0.54	0.59	0.74	0.17	0.48	
165	0.00	0.34	0.60	0.66	0.82	0.65	0.61	0.53	0.11	0.28	0.50	0.53	0.58	0.94	0.56	0.55	
170	0.00	0.32	0.58	0.60	0.82	0.64	0.59	0.43	0.24	0.11	0.48	0.52	0.57	1.10	0.53	0.56	
175	0.00	0.30	0.58	0.58	0.95	0.64	0.57	0.32	0.28	0.00	0.29	0.51	0.55	1.21	0.56	0.58	
180	0.00	0.29	0.52	0.56	0.93	0.58	0.57	0.16	0.11	0.00	0.35	0.45	0.55	0.95	0.57	0.58	

2.2 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2016-09-20	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-RL05IN-0022-35-J		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE160139-B2	120.0	60	0.1870	22.25	0.9916	7.59
	277.0	60	0.0820	22.04	0.9709	10.83
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

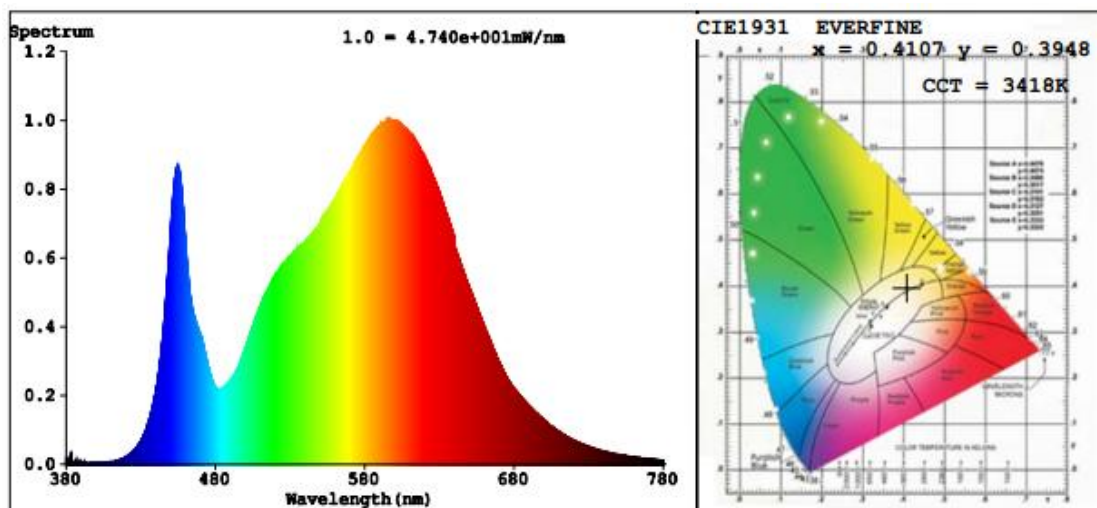
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	80	R9	2
Frequency (Hz)	60	R2	90	R10	75
CCT (K)	3418	R3	96	R11	77
Duv	0.0006	R4	79	R12	60
Chromaticity (x, y)	x=0.4107 y=0.3948	R5	79	R13	82
Chromaticity (u', v')	u'=0.2375 v'=0.5137	R6	86	R14	98
Color Rendering Index (CRI)	81.5	R7	83	R15	73
R9	2	R8	59	--	--

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)	2952	2910	--	
Luminous Efficacy (lm/W)	132.67	132.03	Standard: >= 80(-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	2016-09-20	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-RL05IN-0022-40-J		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE160139-B3	120.0	60	0.1859	22.13	0.9921	7.44
	277.0	60	0.0818	22.06	0.9731	10.51
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	79	R9	2
Frequency (Hz)	60	R2	89	R10	71
CCT (K)	4010	R3	95	R11	75
Duv	0.0034	R4	77	R12	51
Chromaticity (x, y)	x=0.3824 y=0.3854	R5	78	R13	82
Chromaticity (u', v')	u'=0.2230 v'=0.5056	R6	83	R14	97
Color Rendering Index (CRI)	81.0	R7	86	R15	73
R9	2	R8	62	--	--

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)	2976	2956	--	
Luminous Efficacy (lm/W)	134.48	134.00	Standard: >= 80(-3%)	Premium: >= 125(-3%)

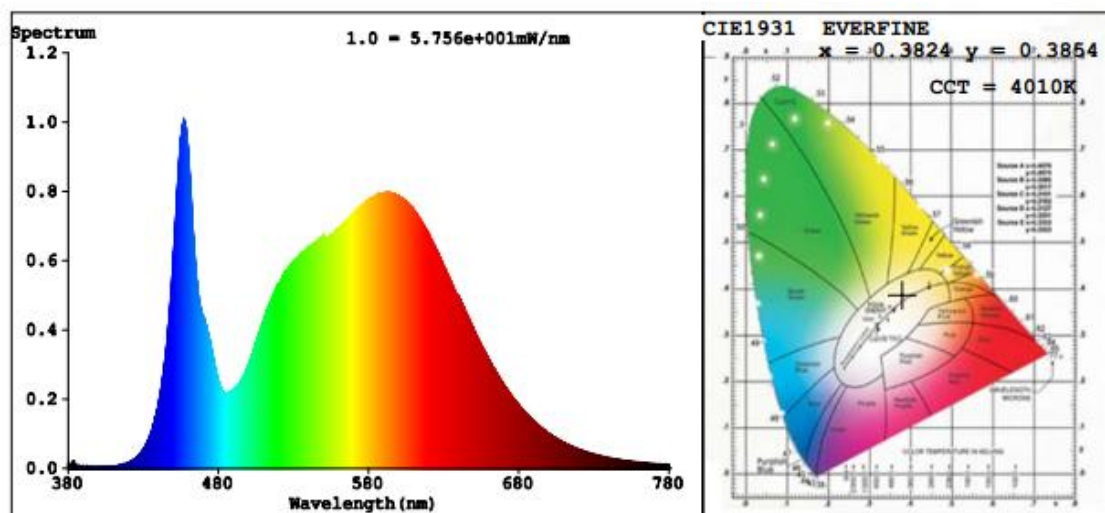
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2.4 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2016-09-20	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-RL05IN-0022-50-J		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE160139-B4	120.0	60	0.1870	22.25	0.9916	7.49
	277.0	60	0.0822	22.13	0.9715	10.17
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

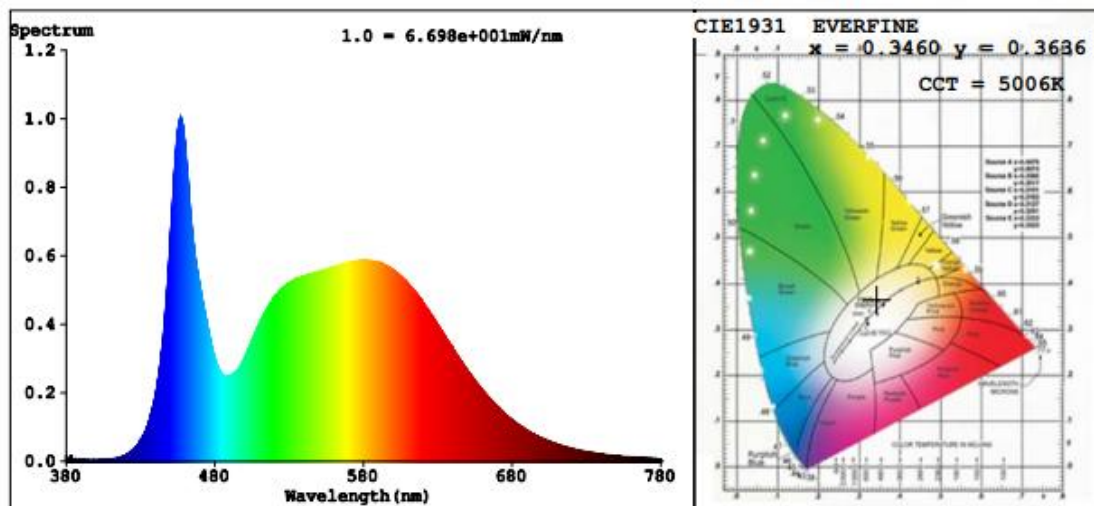
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	80	R9	2
Frequency (Hz)	60	R2	90	R10	74
CCT (K)	5006	R3	94	R11	76
Duv	0.0056	R4	78	R12	55
Chromaticity (x, y)	x=0.3460 y=0.3636	R5	79	R13	83
Chromaticity (u', v')	u'=0.2075 v'=0.4905	R6	85	R14	97
Color Rendering Index (CRI)	81.8	R7	85	R15	74
R9	2	R8	64	--	--

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)	3048	3015	--	
Luminous Efficacy (lm/W)	136.99	136.24	Standard: >= 80(-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-336	2 meter Integrating Sphere	2016-07-01	2017-06-30
ST-R-331	Spectral analysis system HAAS-2000	2016-07-01	2017-06-30
D204	Standard Lamp	2016-07-01	2017-06-30
PF2010	Power Meter for Integrating Sphere	2016-07-01	2017-06-30
EE-09	Goniophotometer system	2016-07-01	2017-06-30
D908S	Standard Lamp	2016-07-01	2017-06-30
PF210	Power Meter for Goniophotometer	2016-07-01	2017-06-30
ST-R-181A	Temperature Tester	2016-07-01	2017-06-30
Uncertainty: Photometric Measurement (Sphere):1.74% Chromaticity Measurement(Sphere):14.3K Photometric Measurement(Goniophotometer):1.62%			

******* END OF REPORT *******