



Report No.: GZE160959-D

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-RL06IN-0030-XX-J

Representative (Tested) Model: IK-RL06IN-0030-30-J

IK-RL06IN-0030-35-J

IK-RL06IN-0030-40-J

IK-RL06IN-0030-50-J

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

Test & Report By:

Jack Luo

Engineer: Jack Luo

Date: Nov.03, 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-RL06IN-0030-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	30W	
Rated Initial Lamp Lumen	--	
Declared CCT	3000K,3500K,4000K,5000K	
LED Manufacturer	EVERLIGHT ELECTRONICS CO., LTD	
LED Model	67-21S Series (3000K)	
Sample Number	GZE160959-D1(3000K), D2(3500K), D3(4000K), D4(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	Nov.03, 2016
Date of Test	Nov.03, 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	2016-11-03	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-RL06IN-0030-30-J		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE160959-D1	120.0	60	0.2584	30.54	0.9850	8.71
	277.0	60	0.1207	29.95	0.8957	5.93
DLC Pass Criteria					$\geq 0.9(-3\%)$	$\leq 20(+5)$

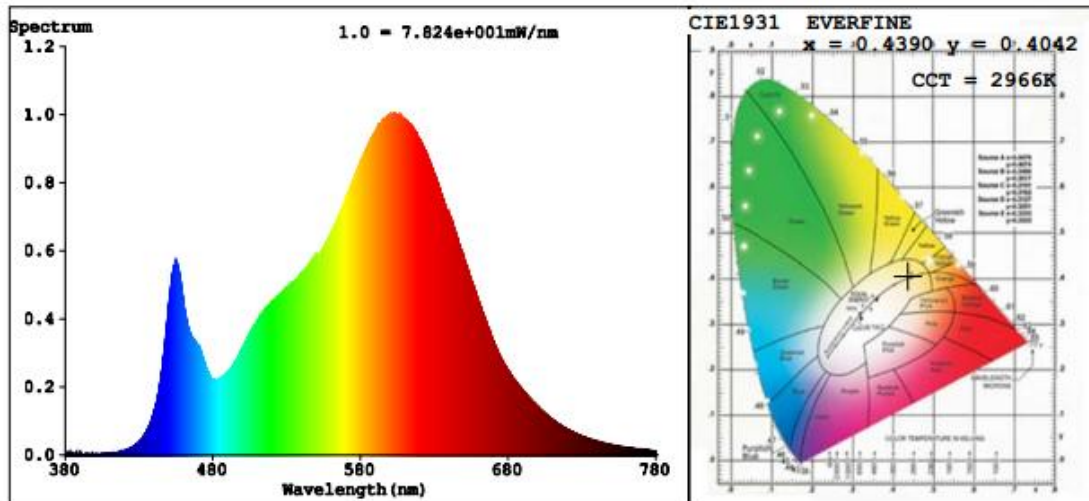
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	82	R9	8
Frequency (Hz)	60	R2	93	R10	84
CCT (K)	2966	R3	94	R11	80
Duv	-0.0002	R4	80	R12	72
Chromaticity (x, y)	x=0.4390 y=0.4042	R5	83	R13	85
Chromaticity (u', v')	u'=0.2519 v'=0.5218	R6	92	R14	98
Color Rendering Index (CRI)	83.0	R7	81	R15	74
R9	8	R8	58	--	--

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)	4157.9	4053.1	--	
Luminous Efficacy (lm/W)	136.15	135.33	Standard: $\geq 80(-3\%)$	Premium: $\geq 125(-3\%)$
Total Luminous (lm)/Length(ft)	693.0	675.5	≥ 100 lm/ft	
Zonal lumens in the 10-90° zone (%)	94.8	--	$\geq 95(-3)$	
Beam Angle (°)	124.7	--	--	
Center Beam Candle Power (cd)	1059	--	--	

Spectral Power Distribution & Chromaticity Diagram

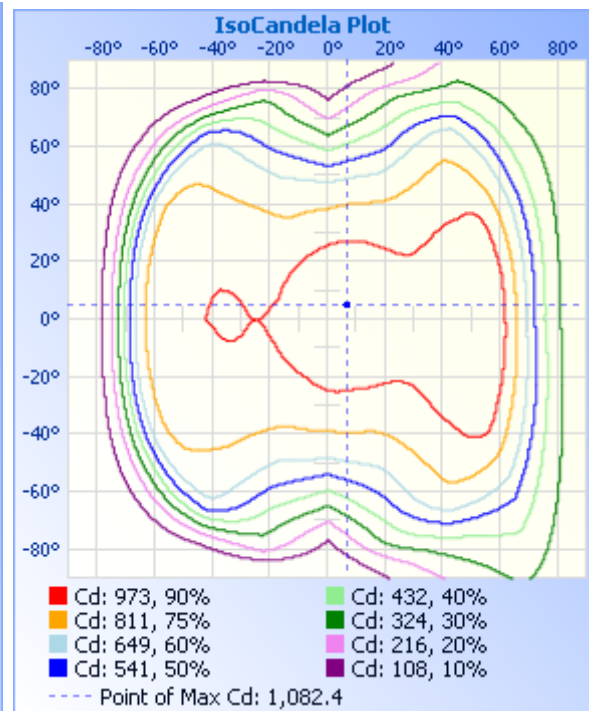
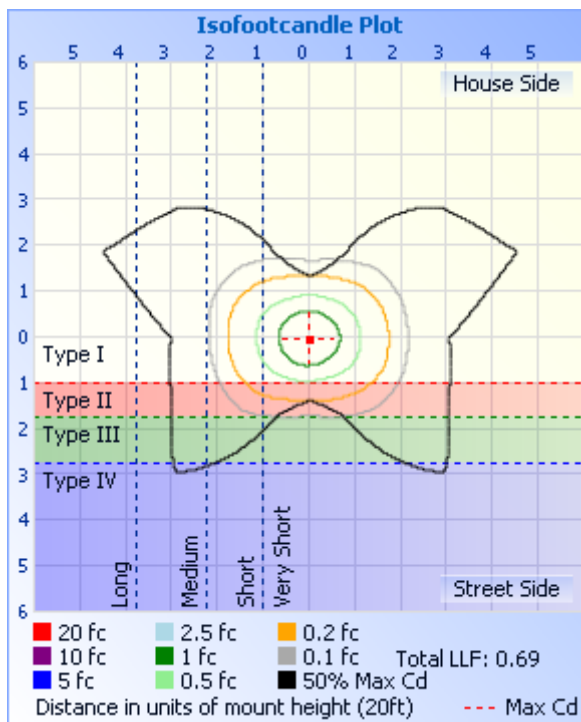
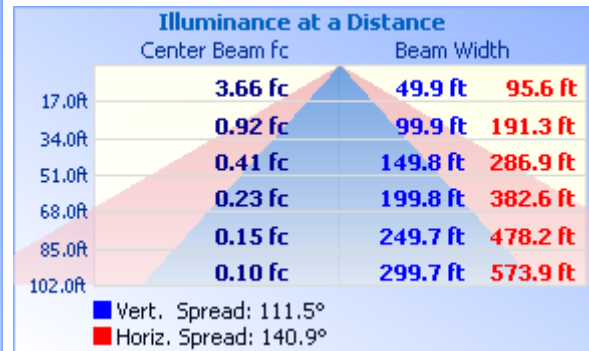
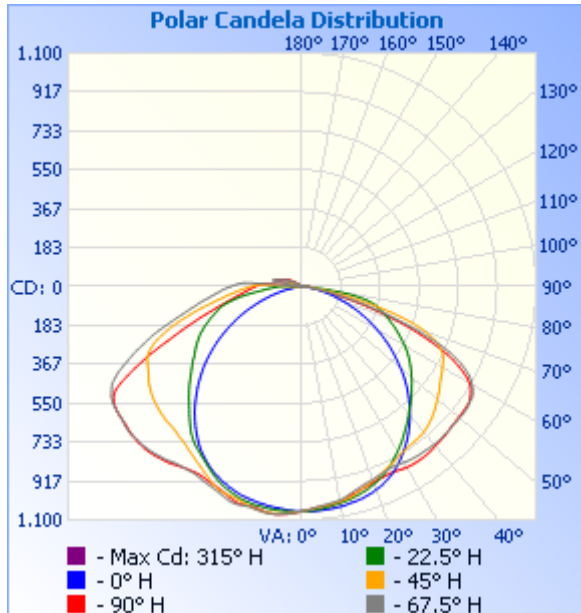


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	846.7	20.4%
0-40	1,429.9	34.4%
0-60	2,819.4	67.8%
60-90	1,220.2	29.4%
70-100	622.6	15%
90-120	104.3	2.5%
0-90	4,039.6	97.2%
90-180	116.5	2.8%
0-180	4,156.1	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	100.7	2.4%	90-100	52.2	1.3%
10-20	291.9	7.0%	100-110	32.9	0.8%
20-30	454.1	10.9%	110-120	19.2	0.5%
30-40	583.2	14.0%	120-130	6.2	0.2%
40-50	674.3	16.2%	130-140	2.4	0.1%
50-60	715.2	17.2%	140-150	1.8	0%
60-70	649.9	15.6%	150-160	1.0	0%
70-80	399.4	9.6%	160-170	0.6	0%
80-90	170.9	4.1%	170-180	0.2	0%

Photometric Data



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>

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	1059	1059	1059	1059	1059	1059	1059	1059	1059	1059	1059	1059	1059	1059	1059	1059	
5	1076	1078	1077	1067	1058	1050	1041	1037	1041	1040	1041	1045	1052	1061	1073	1076	
10	1073	1078	1082	1069	1052	1036	1028	1021	1030	1028	1028	1027	1041	1055	1075	1078	
15	1064	1064	1068	1064	1039	1017	1004	990	1001	998	1006	1007	1027	1045	1056	1068	
20	1042	1053	1051	1044	1017	990	973	968	981	974	975	981	1005	1020	1040	1058	
25	1019	1021	1033	1014	984	950	943	952	972	955	940	948	971	981	1013	1033	
30	1010	1003	988	967	931	898	917	956	984	954	912	906	925	933	969	1017	
35	1029	1003	955	913	866	840	902	966	987	959	893	857	861	889	934	1022	
40	1051	1021	930	857	789	782	892	969	977	948	885	798	786	823	910	1043	
45	1063	1032	915	778	703	728	867	967	968	934	869	731	701	753	899	1059	
50	1060	1032	902	697	608	673	830	965	961	919	837	661	612	689	886	1064	
55	1051	1017	882	625	511	618	792	959	957	912	802	599	515	630	867	1051	
60	1024	995	848	558	411	558	762	923	909	887	762	540	415	578	835	1037	
65	827	847	806	492	311	491	725	798	750	780	726	467	315	529	804	956	
70	603	652	731	427	215	428	616	529	486	549	634	397	219	468	724	795	
75	443	477	590	359	131	368	376	254	226	273	415	335	133	407	575	638	
80	335	355	435	281	65.3	254	136	83.8	81.1	95.1	160	252	64.6	310	424	507	
85	269	278	329	165	20.5	64.3	42.3	38.6	44.5	43.9	43.6	79.9	22.3	184	320	412	
90	222	230	253	99.8	0.53	18.9	27.6	27.4	33.2	32.6	28.2	17.4	0.51	114	244	339	
95	182	107	89.8	36.9	0.00	5.15	9.58	17.8	20.4	15.9	3.00	4.69	0.09	37.1	4.29	126	
100	0.09	2.26	69.1	8.81	0.00	4.95	14.7	5.67	4.44	2.49	9.24	1.92	0.14	27.9	88.8	5.91	
105	124	107	61.9	7.42	0.00	3.37	15.0	15.6	15.1	15.8	11.8	1.57	0.38	15.7	66.4	121	
110	101	89.2	47.9	3.93	0.00	2.78	8.37	12.2	11.3	11.6	6.19	0.97	0.55	5.60	47.6	89.7	
115	77.6	66.6	25.1	2.71	0.14	2.57	5.83	7.40	6.96	6.99	3.54	0.99	0.69	2.43	29.9	67.3	
120	50.8	36.5	9.40	2.27	0.10	2.44	4.99	6.40	5.64	5.48	2.92	1.01	1.04	2.34	15.0	41.2	
125	25.3	16.4	5.05	2.32	0.17	2.39	4.65	5.68	4.58	3.98	2.41	1.03	1.27	2.34	4.38	20.6	
130	10.1	7.21	4.34	2.44	0.60	2.43	4.31	4.75	3.53	3.65	2.40	0.78	1.43	2.35	3.46	7.31	
135	5.48	5.76	4.07	1.61	0.77	1.90	3.94	4.29	3.35	3.69	2.33	0.50	1.62	2.26	3.22	4.66	
140	4.59	4.96	3.65	2.61	0.77	1.43	3.50	4.02	2.86	3.74	2.01	1.27	1.64	1.80	3.13	4.02	
145	4.13	4.52	3.69	2.98	0.78	2.10	3.13	3.70	2.65	3.78	1.68	1.48	1.35	3.11	3.04	3.79	
150	3.53	4.17	1.69	2.62	1.05	2.10	2.87	3.38	2.38	3.70	1.36	1.74	1.03	2.59	1.27	3.56	
155	3.27	4.16	2.74	2.33	1.12	2.05	1.10	1.58	2.00	3.45	0.73	1.99	1.30	2.86	3.72	3.36	
160	0.09	0.81	3.72	2.42	1.29	2.02	1.86	0.46	0.00	0.18	1.00	2.05	1.98	2.94	3.12	3.47	
165	2.83	3.10	3.46	2.53	1.29	2.05	1.61	1.64	1.06	1.24	2.09	2.21	1.55	2.92	2.70	2.81	
170	2.56	2.57	2.75	3.05	1.55	2.10	1.66	1.46	0.97	0.77	2.11	2.45	1.64	2.88	3.46	2.83	
175	2.38	2.39	3.63	3.28	2.07	1.34	1.28	0.82	0.53	0.49	1.58	1.65	0.95	2.86	2.62	2.83	
180	0.00	1.87	2.21	1.85	2.33	0.60	0.60	0.09	0.00	0.18	1.36	1.57	1.91	2.36	1.77	1.54	

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>

2.2 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2016-11-03	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-RL06IN-0030-35-J		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE160959-D2	120.0	60	0.2570	30.37	0.9848	8.36
	277.0	60	0.1199	29.84	0.8987	5.82
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

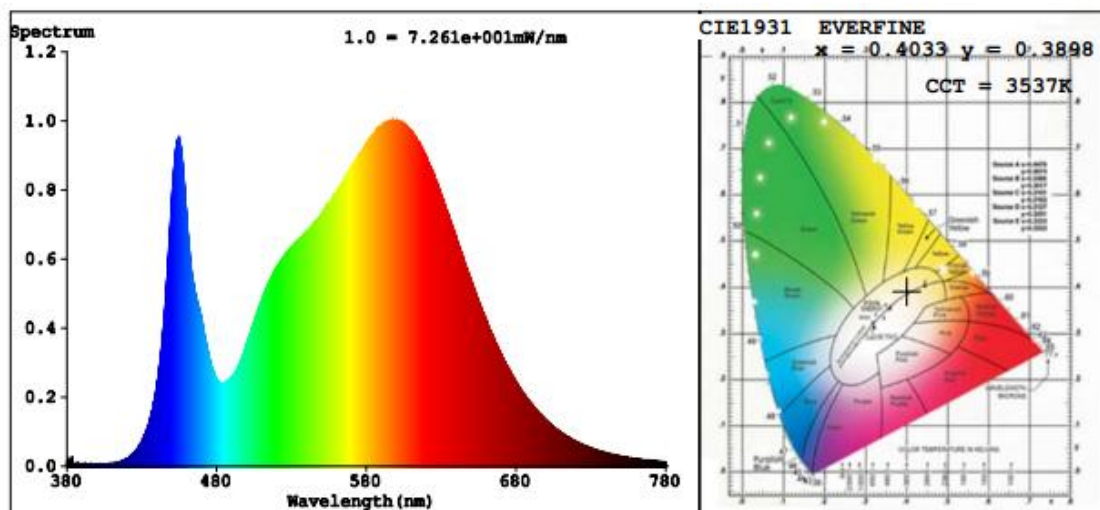
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	7
Frequency (Hz)	60	R2	90	R10	76
CCT (K)	3537	R3	96	R11	78
Duv	0.0000	R4	80	R12	60
Chromaticity (x, y)	x=0.4033 y=0.3898	R5	80	R13	83
Chromaticity (u', v')	u'=0.2348 v'=0.5106	R6	86	R14	98
Color Rendering Index (CRI)	82.4	R7	84	R15	75
R9	7	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)	4213	4103	--	
Luminous Efficacy (lm/W)	138.72	137.50	Standard: >= 80(-3%)	Premium: >= 125(-3%)

Spectral Power Distribution & Chromaticity Diagram



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>

2.3 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2016-11-03	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-RL06IN-0030-40-J		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE160959-D3	120.0	60	0.2574	30.44	0.9855	8.47
	277.0	60	0.1201	29.92	0.8993	5.92
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	1
Frequency (Hz)	60	R2	89	R10	71
CCT (K)	3983	R3	94	R11	74
Duv	0.0027	R4	77	R12	51
Chromaticity (x, y)	x=0.3831 y=0.3841	R5	78	R13	82
Chromaticity (u', v')	u'=0.2239 v'=0.5052	R6	83	R14	97
Color Rendering Index (CRI)	80.8	R7	85	R15	73
R9	1	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)	4302	4197	--	
Luminous Efficacy (lm/W)	141.33	140.27	Standard: >= 80(-3%)	Premium: >= 125(-3%)

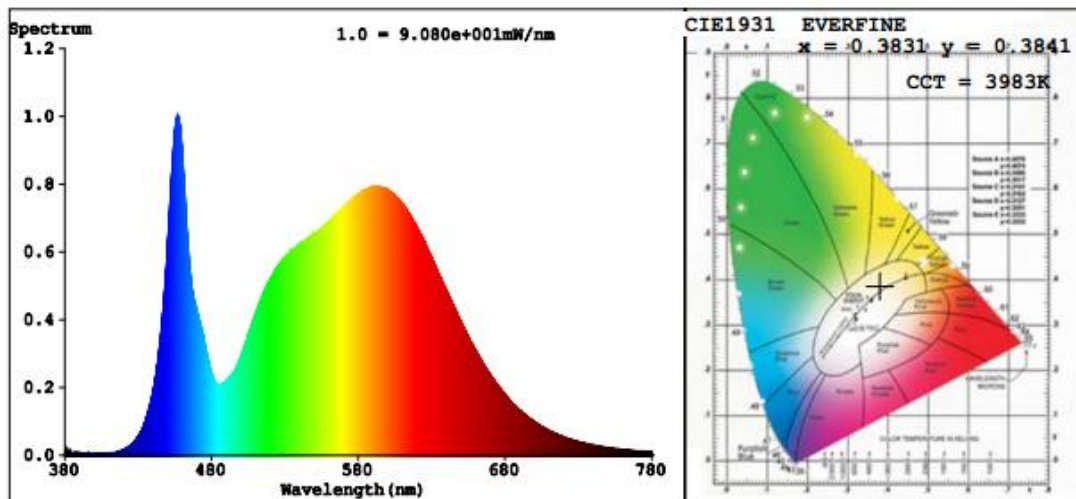
Laboratory: Standard-Tech Co. Ltd Testing Center
NVLAP CODE: 201011-0

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>

Spectral Power Distribution & Chromaticity Diagram



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>

2.4 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2016-11-03	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-RL06IN-0030-50-J		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE160959-D4	120.0	60	0.2578	30.51	0.9863	8.63
	277.0	60	0.1203	29.99	0.9002	5.44
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

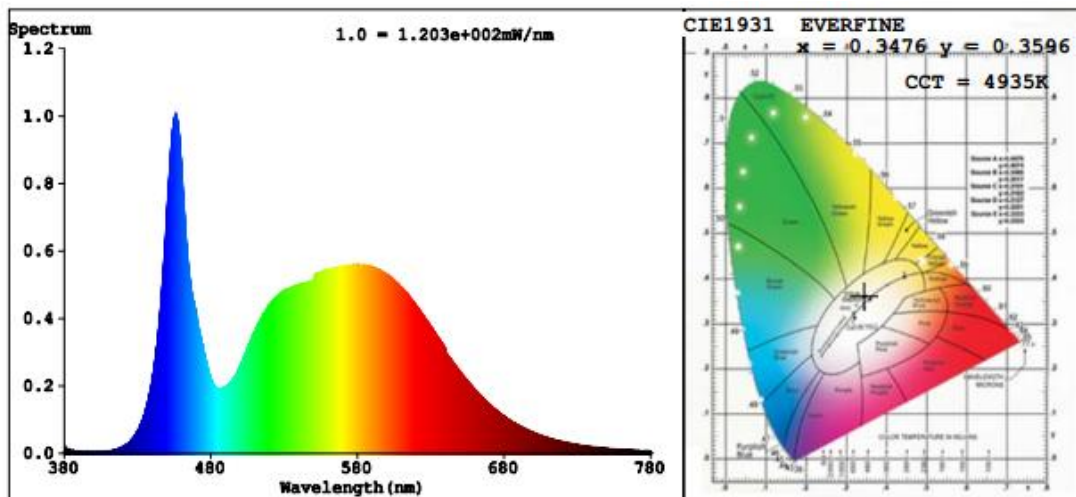
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	79	R9	0
Frequency (Hz)	60	R2	88	R10	69
CCT (K)	4935	R3	93	R11	74
Duv	0.0030	R4	76	R12	47
Chromaticity (x, y)	x=0.3476 y=0.3596	R5	77	R13	81
Chromaticity (u', v')	u'=0.2100 v'=0.4889	R6	81	R14	96
Color Rendering Index (CRI)	80.5	R7	86	R15	73
R9	0	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)	4344	3653	--	
Luminous Efficacy (lm/W)	142.38	121.81	Standard: >= 80(-3%)	Premium: >= 125(-3%)

Spectral Power Distribution & Chromaticity Diagram



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>

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 *******