



Report No.: GZE161131-V

LM-79-08 Test Report

For

IKIO LED LIGHTING (Brand Name: IKIO)

8470 Allison Pointe Blvd, Suite 128
Indianapolis, IN 46250

Internal driver Lamp-style retrofit kits (UL Type B)

Model name(s): IK-T804-0022-DN-XXB-J

Representative (Tested) Model: IK-T804-0022-DN-30B-J
 IK-T804-0022-DN-35B-J
 IK-T804-0022-DN-40B-J
 IK-T804-0022-DN-50B-J

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

Test & Report By:

Jack Luo

Engineer: Jack Luo

Date: Nov.15,2016

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

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1.1 Product Information:

Organization Name	IKIO LED LIGHTING	
Brand Name	IKIO	
Model Number	IK-T804-0022-DN-XXB-J	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Internal driver Lamp-style retrofit kits (UL Type B)	
Rated Voltage / Frequency	100 ~ 277 Vac, 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	
Test Ballast	--	
Sample Number	GZE161131-V1,V2(3000K),V3(3500K), V4(4000K),V5(5000K)	
Lamp Length	1200	mm
Lamp Width	--	mm
Number of Units (modular products)	N/A	s

Photo



1.2 Test Specifications:

Date of Receipt	Nov.14, 2016
Date of Test	Nov.15, 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	2016-11-15	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-T804-0022-DN-30B-J		

Electrical Measurement for Bare-lamp:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE161131 -V1	120.0	60	0.1878	22.03	0.9776	14.98
	277.0	60	0.0879	21.93	0.9004	18.57
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

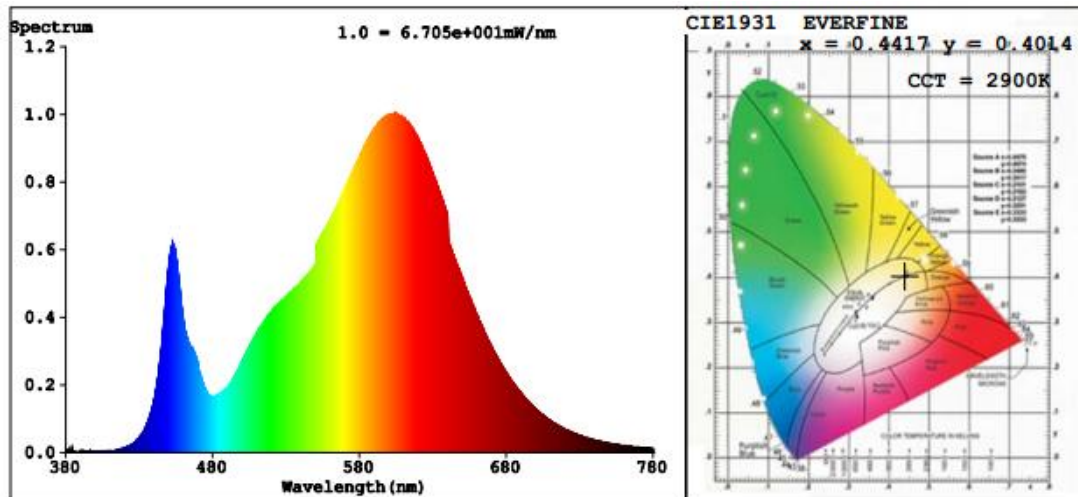
Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	78	R9	0
Frequency (Hz)	60	R2	90	R10	77
CCT (K)	2900	R3	95	R11	73
Duv	-0.0017	R4	75	R12	67
Chromaticity (x, y)	x=0.4417 y=0.4014	R5	78	R13	81
Chromaticity (u', v')	u'=0.2548 v'=0.5210	R6	87	R14	98
Color Rendering Index (CRI)	79.4	R7	79	R15	70
R9	0	R8	53	--	--

Photometric Measurement for Bare-lamp –Sphere-Spectroradiometer Method:

Parameter	Result		DLC V4.0 Pass Criteria
Test Voltage (V)	120.0	277.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	3030	3071	Bare Lamp: >= 1600(-10%)
Luminous Efficacy (lm/W)	137.54	140.07	Bare lamp: >= 110(-3%)

Spectral Power Distribution & Chromaticity Diagram



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2.2 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2016-11-15	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-T804-0022-DN-30B-J		

Electrical Measurement for 2-lamp in Lithonia 2PM3N 12 cell 2x4 parabolic:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE161131	120.0	60	0.3753	44.06	0.9783	15.47
-V1,V2	277.0	60	0.1758	43.85	0.9006	19.29
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

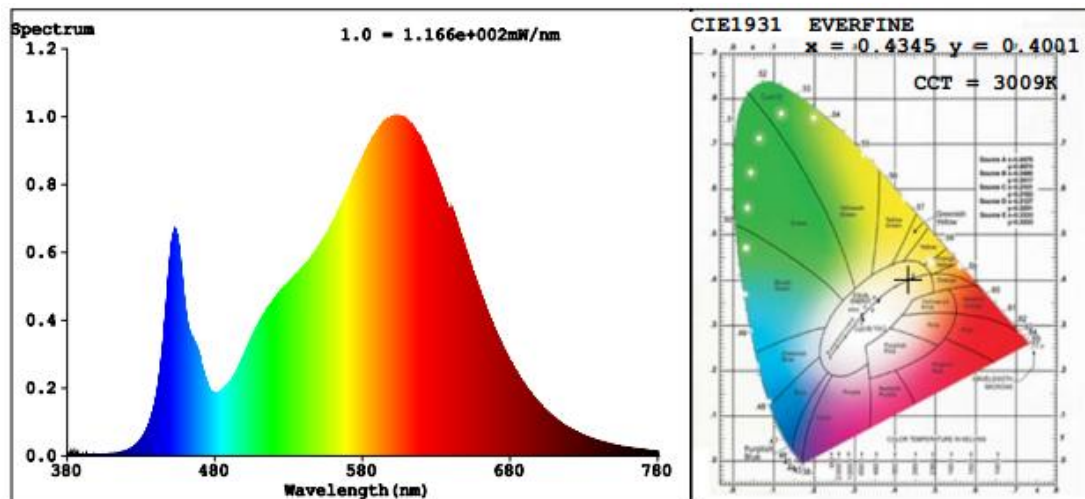
Chromaticity Measurement for 2-lamp in Lithonia 2PM3N 12 cell 2x4 parabolic - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	9
Frequency (Hz)	60	R2	91	R10	80
CCT (K)	3009	R3	96	R11	79
Duv	-0.0012	R4	80	R12	68
Chromaticity (x, y)	x=0.4345 y=0.4001	R5	81	R13	84
Chromaticity (u', v')	u'=0.2507 v'=0.5195	R6	89	R14	99
Color Rendering Index (CRI)	82.6	R7	82	R15	74
R9	9	R8	59	--	--

Photometric Measurement 2-lamp in Lithonia 2PM3N 12 cell 2x4 parabolic – Goniophotometer Method:

Parameter	Result		DLC V4.0 Pass Criteria
Test Voltage (V)	120.0	277.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	5306.1	5378.5	In luminaire (2 lamps): >= 3000(-10%)
Luminous Efficacy (lm/W)	120.43	122.66	In luminaire: >= 100(-3%)
Zonal lumens in the 0-60 ° zone (%)	89.7	--	>= 75(-3)
SC: 0-180 °(if applicable)	1.38	--	1.0-2.0(±0.1)
SC: 90-270 °(if applicable)	1.13	--	1.0-2.0(±0.1)
Beam Angle (°)	102.5	--	--
Center Beam Candle Power (cd)	2179	--	--

Spectral Power Distribution & Chromaticity Diagram

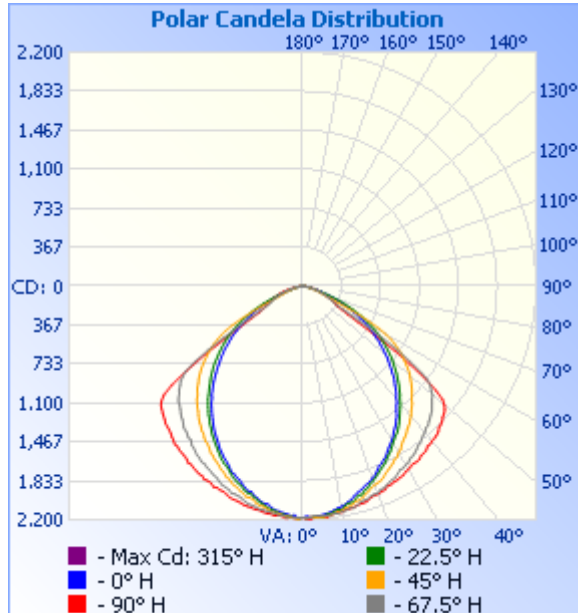


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1,664.8	31.4%
0-40	2,728.4	51.4%
0-60	4,761.4	89.7%
60-90	542.3	10.2%
70-100	147.7	2.8%
90-120	0.8	0%
0-90	5,303.7	100%
90-180	2.1	0%
0-180	5,305.9	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	205.8	3.9%	90-100	0.0	0%
10-20	582.5	11.0%	100-110	0.2	0%
20-30	876.6	16.5%	110-120	0.6	0%
30-40	1,063.5	20.0%	120-130	0.4	0%
40-50	1,124.8	21.2%	130-140	0.3	0%
50-60	908.2	17.1%	140-150	0.2	0%
60-70	394.7	7.4%	150-160	0.2	0%
70-80	126.8	2.4%	160-170	0.1	0%
80-90	20.8	0.4%	170-180	0.0	0%

Photometric Data



Illuminance at a Distance

	Center Beam fc	Beam Width	
17.0ft	7.54 fc	37.4 ft	48.6 ft
34.0ft	1.88 fc	74.8 ft	97.2 ft
51.0ft	0.84 fc	112.2 ft	145.9 ft
68.0ft	0.47 fc	149.6 ft	194.5 ft
85.0ft	0.30 fc	187.0 ft	243.1 ft
102.0ft	0.21 fc	224.4 ft	291.7 ft

■ Vert. Spread: 95.4°
■ Horiz. Spread: 110.1°

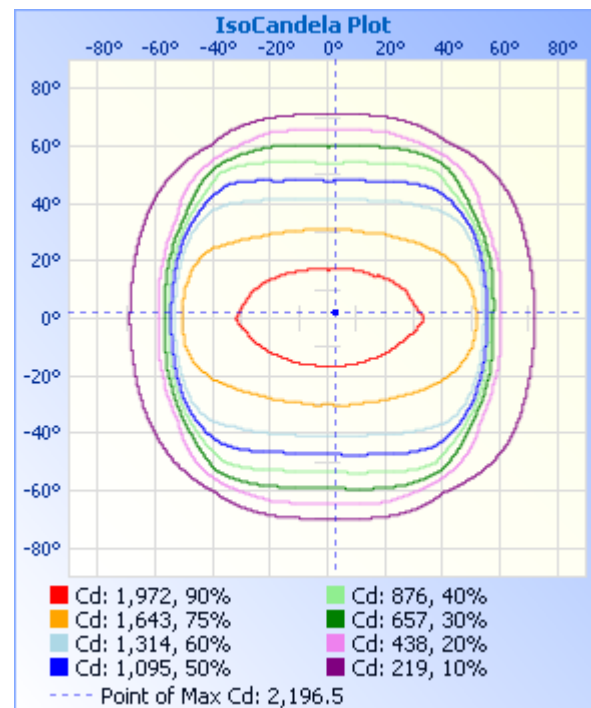
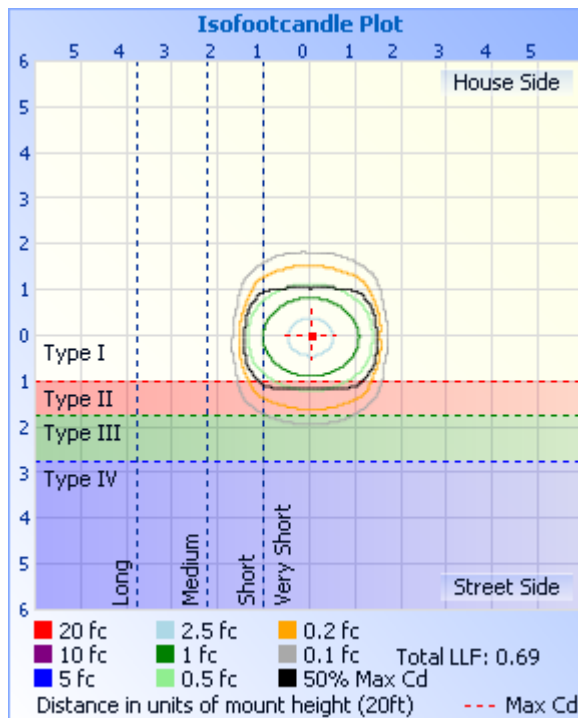


Table--1

UNIT: cd

C (DEG) Y (DEG)	0	23	45	68	90	113	135	158	180	203	225	248	270	293	315	338	
0	2179	2179	2179	2179	2179	2179	2179	2179	2179	2179	2179	2179	2179	2179	2179	2179	
5	2174	2188	2190	2179	2160	2182	2181	2169	2175	2182	2174	2162	2143	2157	2165	2164	
10	2157	2158	2138	2121	2106	2135	2143	2151	2159	2142	2124	2092	2078	2091	2107	2138	
15	2133	2127	2080	2039	2011	2038	2083	2105	2121	2102	2048	2008	1995	2012	2052	2098	
20	2088	2071	2005	1946	1923	1947	1989	2073	2082	2048	1962	1899	1882	1917	1965	2038	
25	2045	2014	1910	1842	1803	1838	1910	2006	2035	1968	1867	1789	1768	1802	1863	1969	
30	2005	1925	1800	1709	1677	1702	1808	1941	1993	1896	1753	1665	1633	1670	1761	1908	
35	1948	1841	1699	1568	1536	1583	1700	1873	1946	1822	1642	1525	1487	1529	1659	1823	
40	1894	1765	1579	1424	1371	1432	1590	1793	1899	1735	1516	1375	1331	1389	1532	1743	
45	1828	1661	1438	1270	1217	1277	1458	1708	1842	1632	1387	1206	1155	1227	1402	1631	
50	1745	1550	1294	1101	1037	1112	1321	1599	1744	1511	1237	1041	978	1058	1258	1521	
55	1133	1348	1126	926	849	936	1151	1237	1061	1198	1047	854	796	878	1082	1240	
60	430	537	906	738	665	749	908	451	386	432	806	652	595	676	838	454	
65	344	319	493	524	469	525	373	283	293	263	353	428	393	451	331	303	
70	252	227	197	297	276	290	180	193	207	175	150	201	199	222	170	217	
75	166	141	106	132	133	122	96.3	118	131	103	78.4	88.2	94.0	92.9	92.9	135	
80	77.5	67.0	51.7	54.8	54.0	50.7	47.0	55.7	63.1	49.0	38.2	38.0	40.3	40.3	44.1	63.8	
85	23.9	20.9	16.7	16.0	16.1	15.8	15.9	17.9	20.8	15.1	11.6	10.5	10.8	11.3	13.4	19.3	
90	0.00	0.00	0.01	0.03	0.00	0.02	0.03	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	0.10	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	0.15	0.25	0.00	0.41	0.05	0.00	
105	0.00	0.00	0.10	0.00	0.00	0.31	0.00	0.00	0.05	0.05	0.97	0.00	0.00	0.15	0.57	0.00	
110	0.05	0.46	0.87	0.00	0.00	0.21	1.02	0.35	0.47	0.82	0.97	0.00	0.00	0.05	0.81	0.77	
115	1.27	1.08	0.57	0.00	0.00	0.20	0.71	1.27	1.37	1.17	1.24	0.00	0.00	0.00	0.51	1.17	
120	0.91	0.97	0.53	0.00	0.00	0.00	0.64	0.90	0.71	0.89	1.34	0.00	0.00	0.00	0.51	0.99	
125	0.87	0.91	0.50	0.00	0.00	0.00	0.56	0.85	0.61	0.73	1.37	0.00	0.00	0.00	0.51	0.82	
130	0.83	0.85	0.47	0.00	0.00	0.00	0.49	0.80	0.61	0.75	1.12	0.00	0.00	0.00	0.41	0.77	
135	0.80	0.80	0.36	0.00	0.00	0.00	0.41	0.76	0.61	0.66	0.76	0.00	0.10	0.13	0.31	0.76	
140	0.77	0.74	0.10	0.00	0.00	0.00	0.21	0.71	0.61	0.64	0.30	0.20	0.18	0.20	0.24	0.49	
145	0.75	0.68	0.00	0.00	0.00	0.15	0.05	0.56	0.61	0.62	0.15	0.29	0.25	0.36	0.21	0.39	
150	0.71	0.51	0.00	0.00	0.05	0.24	0.00	0.48	0.61	0.59	0.30	0.36	0.42	0.41	0.38	0.36	
155	0.66	0.43	0.05	0.05	0.23	0.29	0.10	0.30	0.61	0.57	0.38	0.50	0.66	0.71	0.51	0.34	
160	0.62	0.35	0.05	0.27	0.30	0.41	0.46	0.28	0.61	0.55	0.47	0.55	0.59	0.77	0.72	0.37	
165	0.57	0.24	0.14	0.34	0.51	0.51	0.55	0.29	0.61	0.53	0.53	0.64	0.56	0.93	0.73	0.46	
170	0.58	0.18	0.29	0.39	0.71	0.58	0.53	0.30	0.61	0.52	0.48	0.58	0.54	0.89	0.75	0.46	
175	0.53	0.25	0.41	0.44	0.83	0.66	0.51	0.36	0.50	0.51	0.36	0.45	0.51	0.71	0.71	0.46	
180	0.51	0.36	0.46	0.46	0.91	0.66	0.46	0.36	0.46	0.51	0.31	0.36	0.46	0.71	0.66	0.46	

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2.3 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2016-11-15	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-T804-0022-DN-35B-J		

Electrical Measurement for Bare-lamp:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE161131 -V3	120.0	60	0.1878	21.99	0.9762	15.54
	277.0	60	0.0875	21.86	0.9022	19.19
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

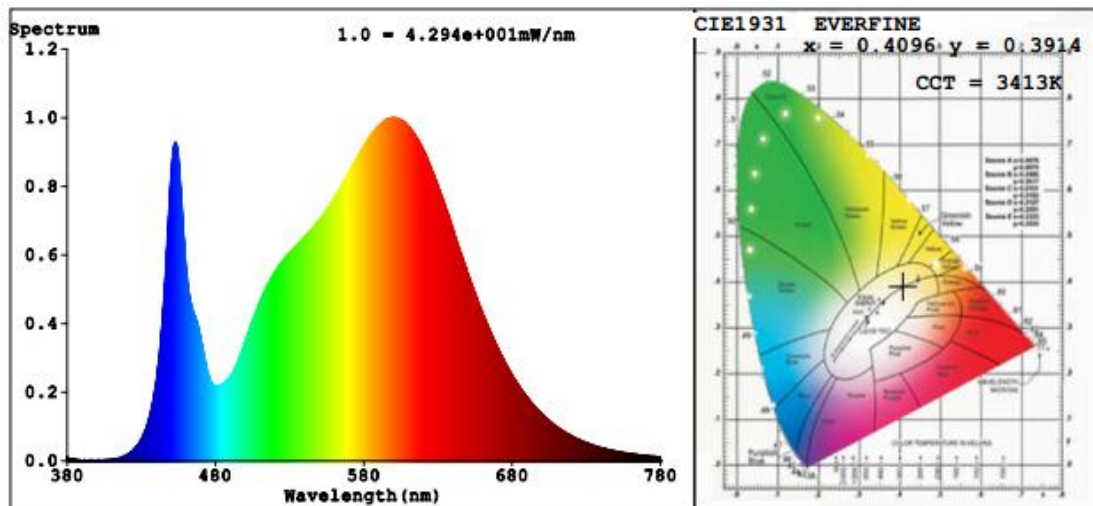
Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	9
Frequency (Hz)	60	R2	90	R10	77
CCT (K)	3413	R3	96	R11	79
Duv	-0.0006	R4	81	R12	62
Chromaticity (x, y)	x=0.4096 y=0.3914	R5	81	R13	84
Chromaticity (u', v')	u'=0.2382 v'=0.5122	R6	87	R14	98
Color Rendering Index (CRI)	82.8	R7	84	R15	75
R9	9	R8	62	--	--

Photometric Measurement for Bare-lamp –Sphere-Spectroradiometer Method:

Parameter	Result		DLC V4.0 Pass Criteria
Test Voltage (V)	120.0	277.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	3075	3124	Bare Lamp: >= 1600(-10%)
Luminous Efficacy (lm/W)	139.84	142.91	Bare lamp: >= 110(-3%)

Spectral Power Distribution & Chromaticity Diagram



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2.4 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2016-11-15	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-T804-0022-DN-40B-J		

Electrical Measurement for Bare-lamp:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE161131 -V4	120.0	60	0.1867	21.97	0.9805	15.16
	277.0	60	0.0878	21.91	0.9010	19.95
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

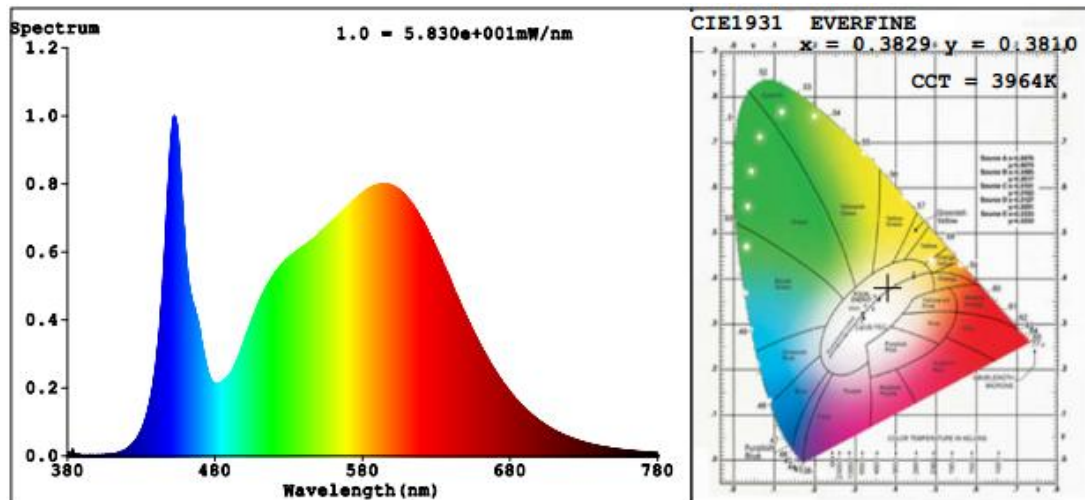
Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	8
Frequency (Hz)	60	R2	89	R10	72
CCT (K)	3964	R3	94	R11	79
Duv	0.0012	R4	81	R12	56
Chromaticity (x, y)	x=0.3829 y=0.3810	R5	80	R13	83
Chromaticity (u', v')	u'=0.2251 v'=0.5038	R6	84	R14	97
Color Rendering Index (CRI)	82.3	R7	86	R15	75
R9	8	R8	64	--	--

Photometric Measurement for Bare-lamp –Sphere-Spectroradiometer Method:

Parameter	Result		DLC V4.0 Pass Criteria
Test Voltage (V)	120.0	277.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	3111	3156	Bare Lamp: >= 1600(-10%)
Luminous Efficacy (lm/W)	141.60	144.04	Bare lamp: >= 110(-3%)

Spectral Power Distribution & Chromaticity Diagram



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2.5 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2016-11-15	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-T804-0022-DN-50B-J		

Electrical Measurement for Bare-lamp:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE161131	120.0	60	0.1897	22.27	0.9780	15.94
-V5	277.0	60	0.0887	22.16	0.9016	19.61
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

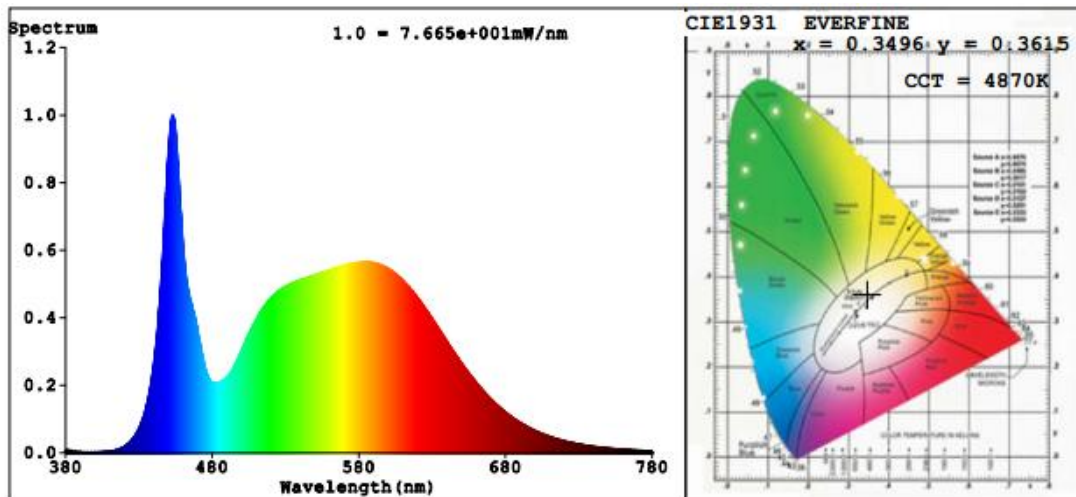
Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	8
Frequency (Hz)	60	R2	88	R10	71
CCT (K)	4870	R3	93	R11	79
Duv	0.0031	R4	80	R12	51
Chromaticity (x, y)	x=0.3496 y=0.3615	R5	80	R13	83
Chromaticity (u', v')	u'=0.2107 v'=0.4901	R6	82	R14	96
Color Rendering Index (CRI)	82.4	R7	88	R15	75
R9	8	R8	67	--	--

Photometric Measurement for Bare-lamp –Sphere-Spectroradiometer Method:

Parameter	Result		DLC V4.0 Pass Criteria
Test Voltage (V)	120.0	277.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	3188	3219	Bare Lamp: >= 1600(-10%)
Luminous Efficacy (lm/W)	143.15	145.26	Bare lamp: >= 110(-3%)

Spectral Power Distribution & Chromaticity Diagram



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

Report Format Number STD/QR4909-A/2

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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 *******