



Report No.: GZE161131-U

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

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-U1,U2(3000K),U3(3500K), U4(4000K),U5(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 -U1	120.0	60	0.1887	22.08	0.9752	15.40
	277.0	60	0.0878	21.92	0.9014	18.66
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

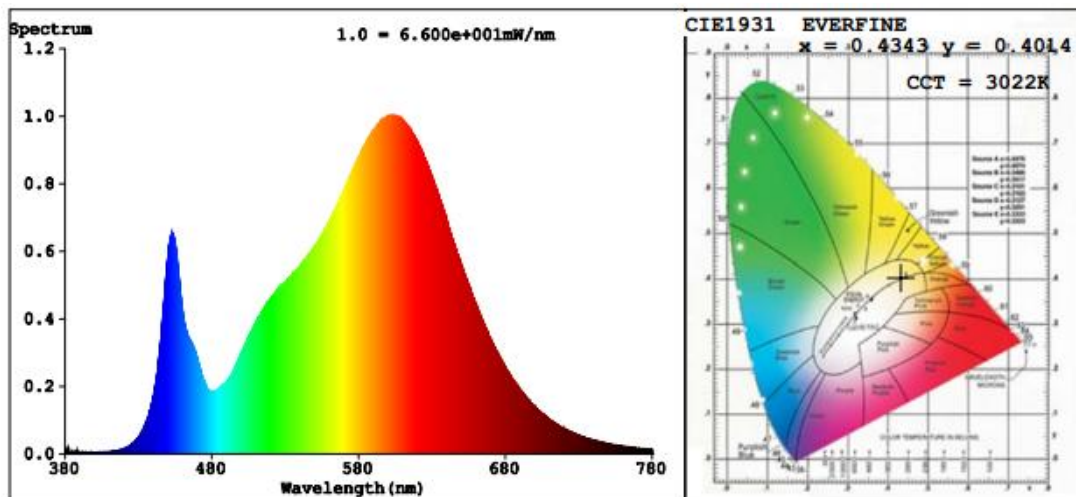
Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	80	R9	4
Frequency (Hz)	60	R2	91	R10	79
CCT (K)	3022	R3	96	R11	78
Duv	-0.0007	R4	79	R12	67
Chromaticity (x, y)	x=0.4343 y=0.4014	R5	80	R13	83
Chromaticity (u', v')	u'=0.2501 v'=0.5199	R6	88	R14	99
Color Rendering Index (CRI)	81.8	R7	82	R15	73
R9	4	R8	57	--	--

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)	3285	3297	Bare Lamp: >= 1600(-10%)
Luminous Efficacy (lm/W)	148.78	150.44	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	0.3776	44.16	0.9746	14.76
-U1,U2	277.0	60	0.1756	43.83	0.9009	19.39
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

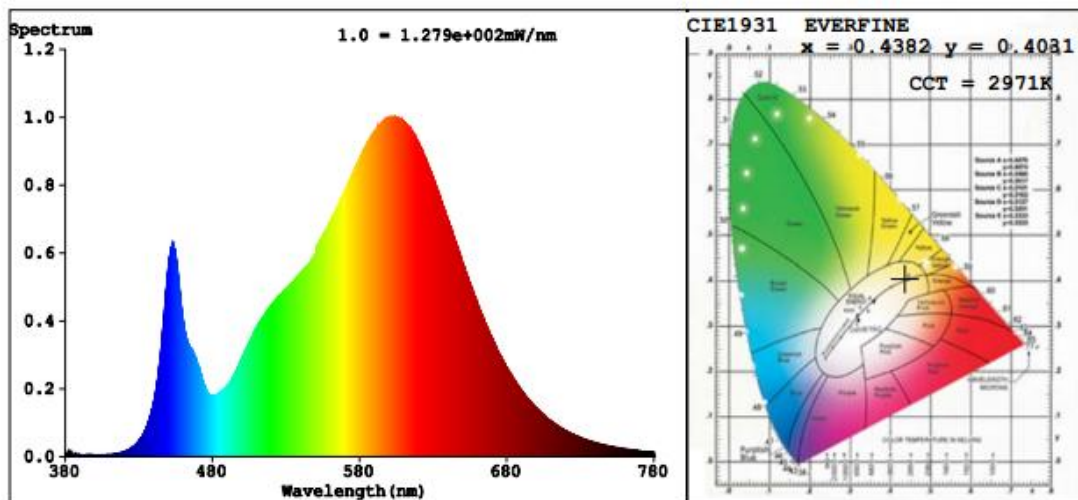
Chromaticity Measurement for 2-lamp in Lithonia 2PM3N 12 cell 2x4 parabolic - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	80	R9	3
Frequency (Hz)	60	R2	91	R10	78
CCT (K)	2971	R3	96	R11	76
Duv	-0.0005	R4	78	R12	67
Chromaticity (x, y)	x=0.4382 y=0.4031	R5	79	R13	82
Chromaticity (u', v')	u'=0.2518 v'=0.5212	R6	88	R14	98
Color Rendering Index (CRI)	81.2	R7	81	R15	72
R9	3	R8	57	--	--

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)	5820.2	5842.1	In luminaire (2 lamps): >= 3000(-10%)
Luminous Efficacy (lm/W)	131.80	133.29	In luminaire: >= 100(-3%)
Zonal lumens in the 0-60 ° zone (%)	91.6	--	>= 75(-3)
SC: 0-180 °(if applicable)	1.43	--	1.0-2.0(±0.1)
SC: 90-270 °(if applicable)	1.19	--	1.0-2.0(±0.1)
Beam Angle (°)	103.5	--	--
Center Beam Candle Power (cd)	2403	--	--

Spectral Power Distribution & Chromaticity Diagram



Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1,879.3	32.3%
0-40	3,101.3	53.3%
0-60	5,329.0	91.6%
60-90	488.2	8.4%
70-100	127.3	2.2%
90-120	0.7	0%
0-90	5,817.2	100%
90-180	2.3	0%
0-180	5,819.5	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	227.3	3.9%	90-100	0.0	0%
10-20	653.0	11.2%	100-110	0.2	0%
20-30	999.0	17.2%	110-120	0.4	0%
30-40	1,222.0	21.0%	120-130	0.4	0%
40-50	1,287.2	22.1%	130-140	0.4	0%
50-60	940.4	16.2%	140-150	0.3	0%
60-70	361.0	6.2%	150-160	0.3	0%
70-80	108.3	1.9%	160-170	0.2	0%
80-90	18.9	0.3%	170-180	0.1	0%

Photometric Data

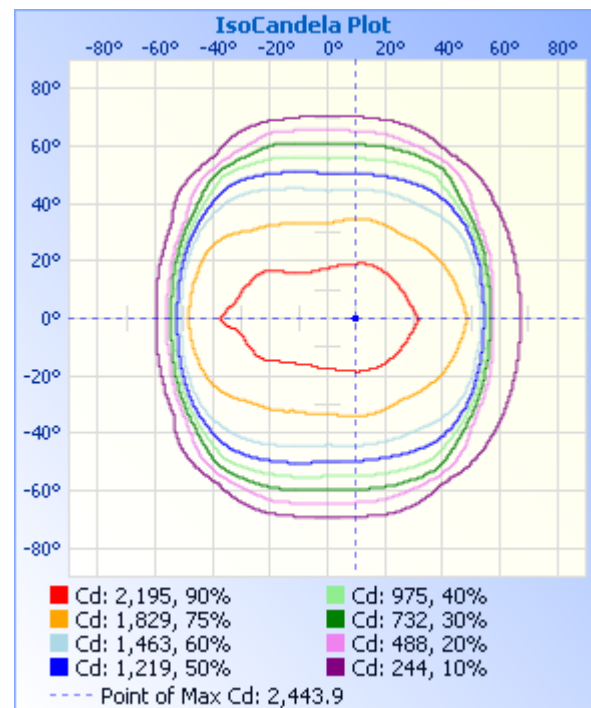
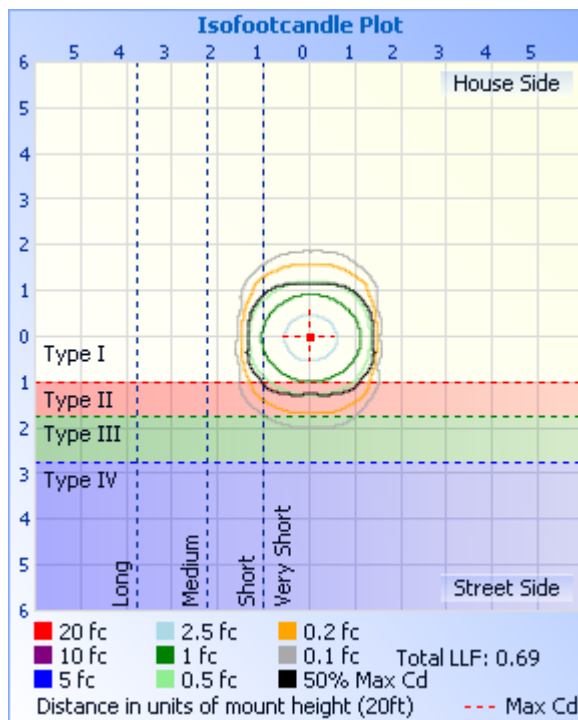
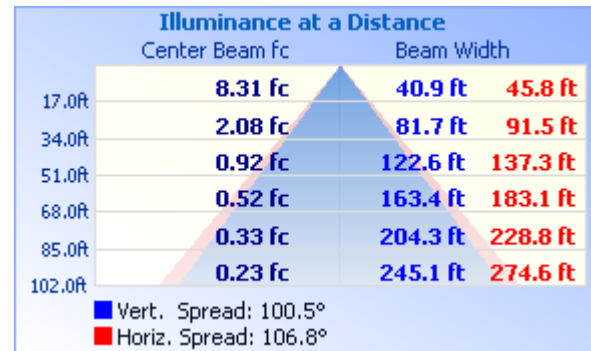
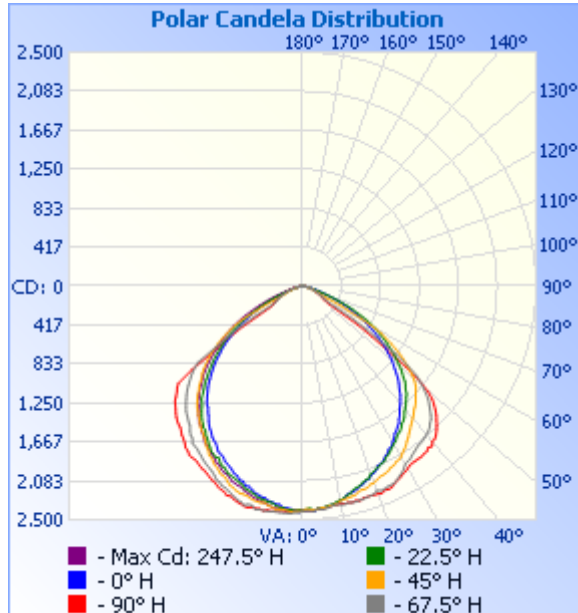


Table--1 UNIT: cd

C (DEG) γ (DEG)	0	23	45	68	90	113	135	158	180	203	225	248	270	293	315	338	
0	2403	2403	2403	2403	2403	2403	2403	2403	2403	2403	2403	2403	2403	2403	2403	2403	
5	2406	2408	2403	2397	2393	2380	2378	2401	2399	2376	2371	2387	2377	2383	2397	2434	
10	2439	2422	2404	2355	2329	2325	2331	2374	2359	2339	2322	2316	2303	2327	2349	2437	
15	2435	2415	2341	2288	2246	2231	2285	2371	2377	2333	2259	2233	2218	2258	2318	2422	
20	2380	2329	2286	2216	2146	2137	2239	2326	2365	2293	2209	2140	2134	2175	2269	2327	
25	2291	2241	2189	2111	2051	2069	2176	2325	2327	2246	2122	2015	2014	2087	2150	2233	
30	2213	2130	2064	2014	1926	1950	2107	2195	2252	2148	2064	1926	1902	1983	2021	2140	
35	2147	2045	1922	1891	1795	1843	1972	2120	2222	2060	1935	1806	1757	1849	1884	2055	
40	2025	1912	1795	1735	1628	1708	1835	2067	2162	1998	1771	1657	1595	1677	1742	1901	
45	1920	1778	1640	1556	1456	1559	1711	1941	2028	1867	1633	1498	1402	1486	1571	1767	
50	1759	1617	1427	1342	1252	1374	1560	1685	1751	1610	1460	1299	1187	1255	1384	1580	
55	996	1375	1215	1094	1024	1138	1275	957	724	986	1170	1043	948	1019	1138	1133	
60	345	356	925	850	785	888	874	263	243	249	777	764	686	747	835	330	
65	273	263	423	556	528	590	226	187	182	174	197	472	428	449	232	251	
70	200	185	169	289	282	278	131	127	128	117	112	193	198	208	144	179	
75	136	119	94.2	126	133	111	73.6	82.4	86.3	75.1	62.0	82.6	95.8	88.8	81.8	115	
80	66.8	59.4	47.3	53.8	54.4	46.6	39.2	45.0	48.7	39.6	32.0	36.4	41.5	39.4	40.7	57.3	
85	20.6	18.9	15.6	16.1	16.7	15.2	14.0	15.6	17.1	13.0	10.2	10.6	11.4	11.3	12.5	17.3	
90	0.00	0.00	0.00	0.01	0.01	0.01	0.00	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	0.15	0.00	0.05	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	0.10	0.41	0.15	0.46	0.00	0.00	
105	0.00	0.00	0.20	0.25	0.42	0.25	0.05	0.00	0.00	0.00	0.71	0.36	0.31	0.45	0.46	0.00	
110	0.00	0.20	0.41	0.20	0.44	0.42	0.45	0.00	0.31	0.56	1.12	0.31	0.30	0.37	0.48	0.46	
115	0.42	0.51	0.47	0.08	0.36	0.36	0.46	0.42	0.66	0.64	1.42	0.00	0.05	0.00	0.49	0.67	
120	0.66	0.71	0.42	0.00	0.21	0.00	0.57	0.51	0.66	0.66	1.55	0.00	0.05	0.00	0.51	0.71	
125	0.83	1.17	0.38	0.00	0.24	0.00	0.59	0.66	0.66	0.71	1.42	0.00	0.16	0.00	0.37	0.75	
130	0.85	1.10	0.34	0.00	0.35	0.00	0.61	0.63	0.66	0.78	1.07	0.10	0.26	0.16	0.32	0.82	
135	0.86	1.05	0.28	0.25	0.35	0.00	0.56	0.67	0.66	0.76	0.71	0.28	0.36	0.30	0.20	0.77	
140	0.86	1.02	0.14	0.41	0.36	0.05	0.26	0.64	0.66	0.72	0.25	0.41	0.56	0.44	0.20	0.67	
145	0.87	0.87	0.05	0.41	0.37	0.24	0.00	0.62	0.66	0.69	0.22	0.48	0.67	0.51	0.26	0.54	
150	0.84	0.76	0.05	0.43	0.40	0.36	0.00	0.56	0.63	0.66	0.26	0.55	0.83	0.81	0.48	0.51	
155	0.79	0.41	0.15	0.49	0.58	0.43	0.10	0.39	0.61	0.51	0.33	0.77	0.91	0.96	0.68	0.62	
160	0.71	0.25	0.35	0.66	0.65	0.56	0.37	0.32	0.58	0.51	0.71	0.87	1.01	1.04	0.97	0.68	
165	0.63	0.23	0.51	0.73	0.81	0.69	0.41	0.24	0.55	0.51	0.40	1.07	1.12	1.27	0.99	0.57	
170	0.60	0.20	0.51	0.81	1.18	0.76	0.46	0.26	0.52	0.51	0.38	0.71	1.27	1.35	1.01	0.67	
175	0.57	0.36	0.56	0.87	1.27	1.01	0.53	0.22	0.51	0.51	0.36	0.59	1.07	1.24	0.85	0.53	
180	0.56	0.41	0.56	0.97	0.96	0.91	0.61	0.26	0.51	0.56	0.36	0.56	0.81	1.01	0.81	0.51	

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 -U3	120.0	60	0.1868	21.90	0.9769	15.14
	277.0	60	0.0869	21.72	0.9023	19.60
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

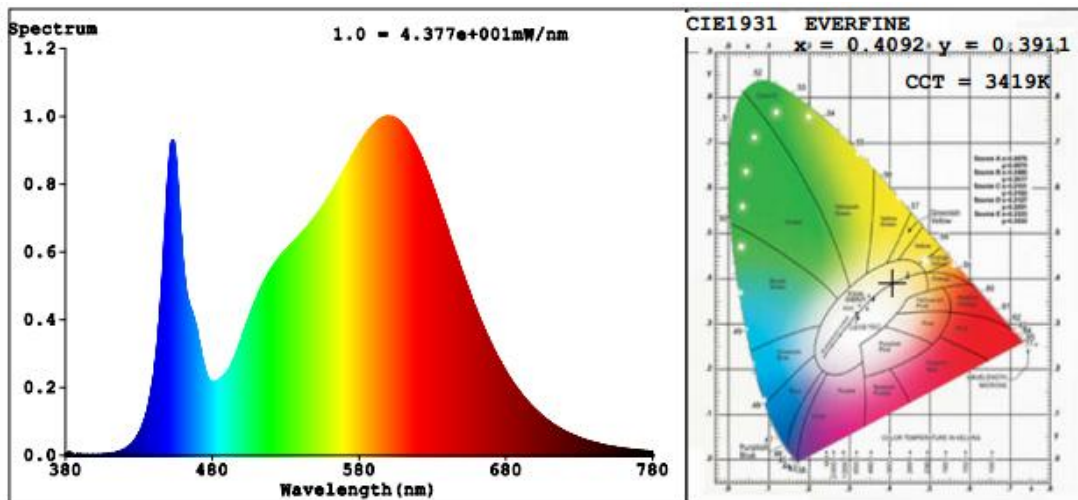
Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	8
Frequency (Hz)	60	R2	90	R10	76
CCT (K)	3419	R3	96	R11	79
Duv	-0.0007	R4	80	R12	62
Chromaticity (x, y)	x=0.4092 y=0.3911	R5	81	R13	83
Chromaticity (u', v')	u'=0.2381 v'=0.5120	R6	86	R14	98
Color Rendering Index (CRI)	82.5	R7	84	R15	75
R9	8	R8	61	--	--

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)	3317	3322	Bare Lamp: >= 1600(-10%)
Luminous Efficacy (lm/W)	151.46	152.95	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 -U4	120.0	60	0.1887	22.07	0.9744	15.31
	277.0	60	0.0881	21.95	0.8995	20.04
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

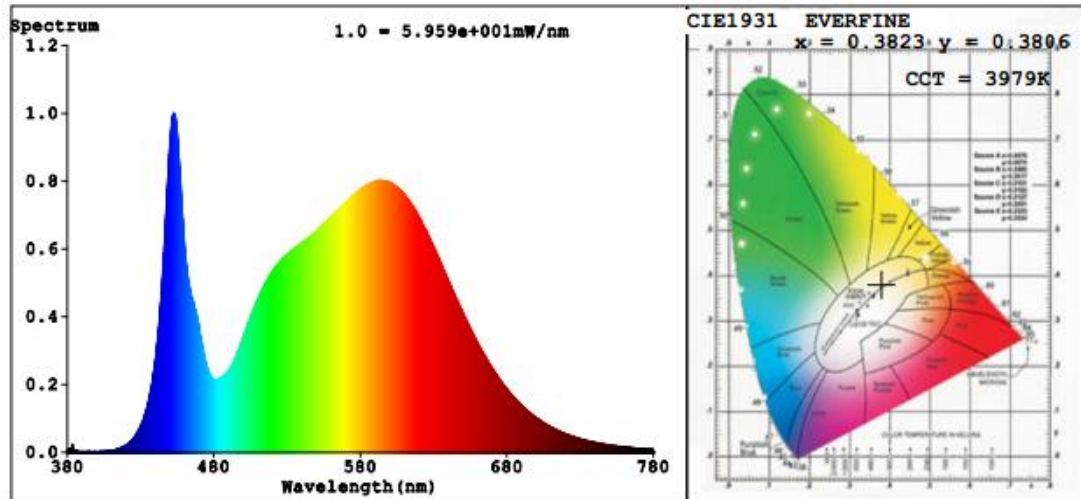
Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	80	R9	7
Frequency (Hz)	60	R2	89	R10	72
CCT (K)	3979	R3	94	R11	79
Duv	0.0012	R4	80	R12	56
Chromaticity (x, y)	x=0.3823 y=0.3806	R5	80	R13	83
Chromaticity (u', v')	u'=0.2248 v'=0.5035	R6	84	R14	97
Color Rendering Index (CRI)	82.2	R7	86	R15	75
R9	7	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)	3401	3413	Bare Lamp: >= 1600(-10%)
Luminous Efficacy (lm/W)	154.10	155.49	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	0.1875	21.98	0.9771	15.22
-U5	277.0	60	0.0874	21.85	0.9029	19.42
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

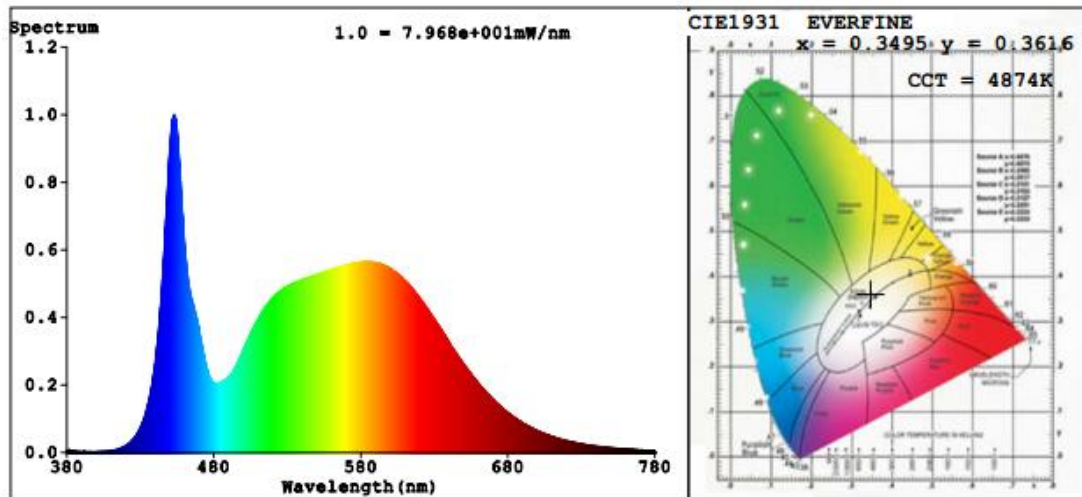
Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	80	R9	6
Frequency (Hz)	60	R2	88	R10	71
CCT (K)	4874	R3	93	R11	78
Duv	0.0032	R4	80	R12	51
Chromaticity (x, y)	x=0.3495 y=0.3616	R5	79	R13	82
Chromaticity (u', v')	u'=0.2105 v'=0.4901	R6	82	R14	96
Color Rendering Index (CRI)	82.1	R7	88	R15	75
R9	6	R8	66	--	--

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)	3423	3417	Bare Lamp: >= 1600(-10%)
Luminous Efficacy (lm/W)	155.73	156.38	Bare lamp: >= 110(-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%			

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