

LM-79-08 Test Report

For

IKIO LED LIGHTING**(Brand Name: IKIO)**8470 Allison Pointe Blvd, Suite 128
Indianapolis, IN 46250**Internal Driver/Line Voltage Lamp-Style Retrofit
Kits (UL Type B)**

Model name(s): IK-T802-0010-DN-XXB-J

Representative (Tested) Model: IK-T802-0010-DN-30B-J

IK-T802-0010-DN-35B-J

IK-T802-0010-DN-40B-J

IK-T802-0010-DN-50B-J

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

Test & Report By:

Jack Luo

Engineer: Jack Luo

Date: Dec.20, 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-T802-0010-DN-XXB-J	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Internal Driver/Line Voltage Lamp-Style Retrofit Kits (UL Type B)	
Rated Voltage / Frequency	100-277 Vac, 50/60 Hz	
Nominal Power	10W	
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	GZE161062-AC1,AC2,AC3(3000K),AC4(3500K), AC5(4000K),AC6(5000K)	
Lamp Length	600	mm
Lamp Width	--	mm
Number of Units (modular products)	N/A	s

Photo

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1.2 Test Specifications:

Date of Receipt	Dec.20, 2016
Date of Test	Dec.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	2016-12-20	Test Ambient:	25.2 ° C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-T802-0010-DN-30B-J		

Electrical Measurement for Bare-lamp:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE161062	120.0	60	0.0790	9.163	0.9662	12.58
-AC1	277.0	60	0.0385	9.610	0.9017	20.18
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

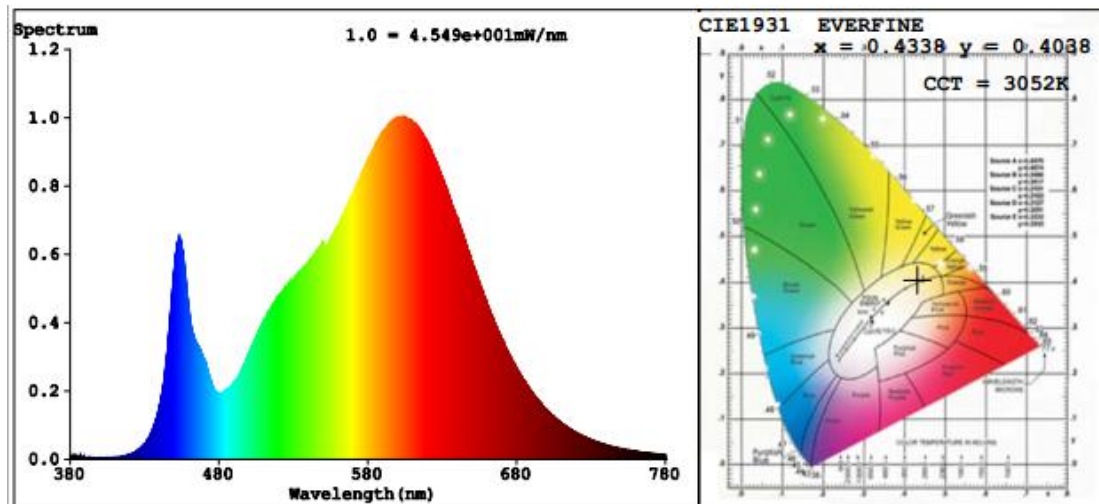
Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	8
Frequency (Hz)	60	R2	91	R10	79
CCT (K)	3052	R3	97	R11	80
Duv	0.0003	R4	80	R12	67
Chromaticity (x, y)	x=0.4338 y=0.4038	R5	81	R13	84
Chromaticity (u', v')	u'=0.2486 v'=0.5208	R6	89	R14	99
Color Rendering Index (CRI)	82.8	R7	83	R15	74
R9	8	R8	59	--	--

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)	1289	1289	Bare Lamp: >= 800(-10%)
Luminous Efficacy (lm/W)	140.67	134.13	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	2016-12-20	Test Ambient:	25.2 ° C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-T802-0010-DN-30B-J		

Electrical Measurement for 3-lamp in Lithonia 2PM3 9 cell 2x2 parabolic:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE161062-A	120.0	60	0.2368	27.49	0.9675	12.73
C1,AC2,AC3	277.0	60	0.1156	28.83	0.9005	20.51
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

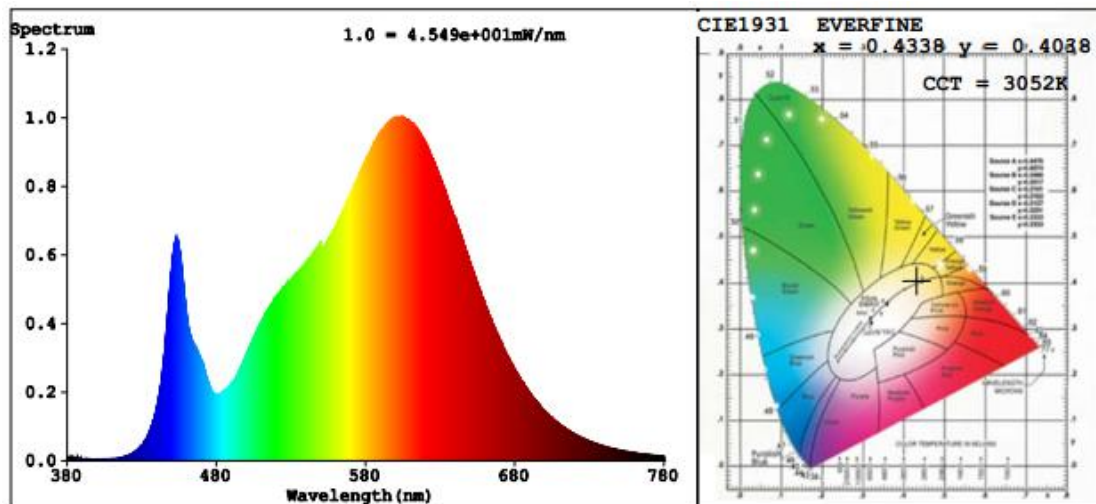
Chromaticity Measurement for 3-lamp in Lithonia 2PM3 9 cell 2x2 parabolic - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	8
Frequency (Hz)	60	R2	91	R10	79
CCT (K)	3052	R3	97	R11	80
Duv	0.0003	R4	80	R12	67
Chromaticity (x, y)	x=0.4338 y=0.4038	R5	81	R13	84
Chromaticity (u', v')	u'=0.2486 v'=0.5208	R6	89	R14	99
Color Rendering Index (CRI)	82.8	R7	83	R15	74
R9	8	R8	59	--	--

Photometric Measurement 3-lamp in Lithonia 2PM3 9 cell 2x2 parabolic – Goniophotometer Method:

Parameter	Result		DLC V4.0 Pass Criteria
Test Voltage (V)	120.0	277.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	3202.6	3204.5	In luminaire (3 lamps): >= 2000(-10%)
Luminous Efficacy (lm/W)	116.50	111.15	In luminaire: >= 100(-3%)
Zonal lumens in the 0-60° zone (%)	92.4	--	>= 75(-3)
SC: 0-180° (if applicable)	1.10	--	1.0-2.0(±0.1)
SC: 90-270° (if applicable)	1.17	--	1.0-2.0(±0.1)
Beam Angle (°)	93.0	--	--
Center Beam Candle Power (cd)	1553	--	--

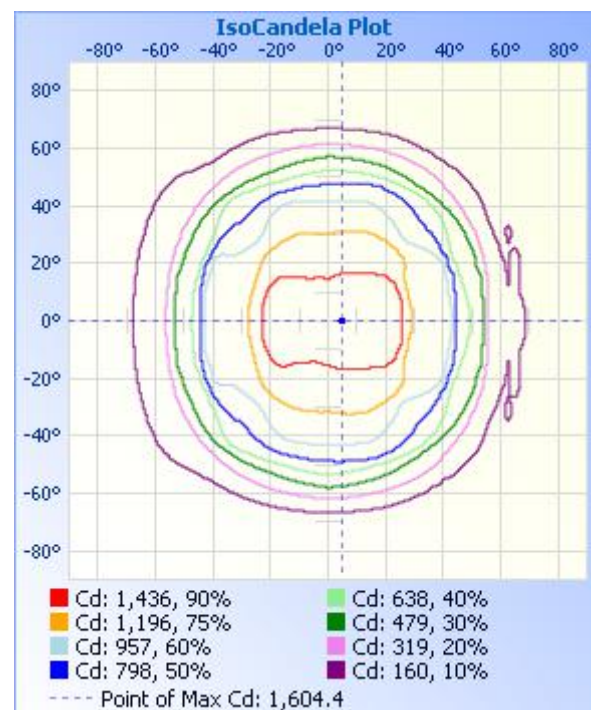
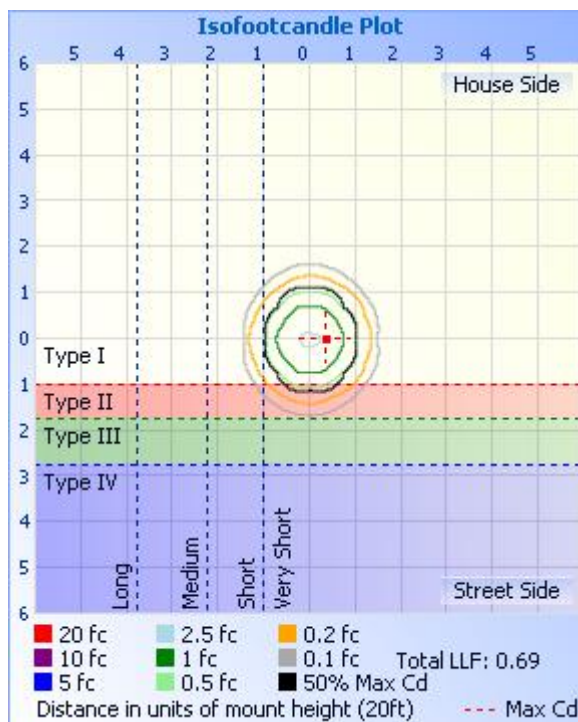
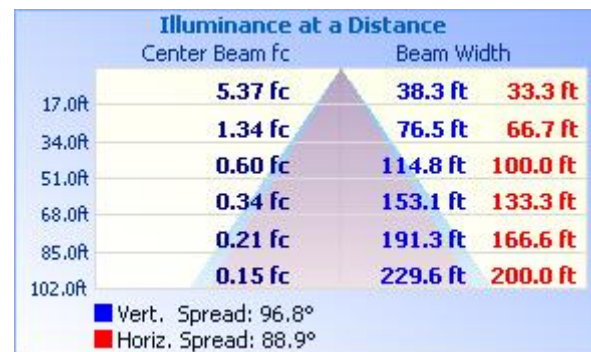
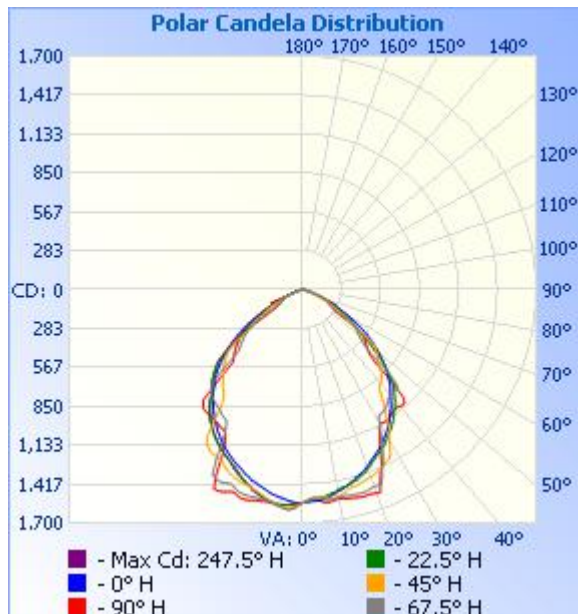
Spectral Power Distribution & Chromaticity Diagram



Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1,197.7	37.4%
0-40	1,887.5	58.9%
0-60	2,959.2	92.4%
60-90	240.1	7.5%
70-100	58.3	1.8%
90-120	0.3	0%
0-90	3,199.3	99.9%
90-180	2.8	0.1%
0-180	3,202.2	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	147.6	4.6%	90-100	0.0	0%
10-20	423.3	13.2%	100-110	0.0	0%
20-30	626.7	19.6%	110-120	0.3	0%
30-40	689.8	21.5%	120-130	0.7	0%
40-50	652.4	20.4%	130-140	0.7	0%
50-60	419.3	13.1%	140-150	0.5	0%
60-70	181.9	5.7%	150-160	0.4	0%
70-80	50.3	1.6%	160-170	0.2	0%
80-90	8.0	0.2%	170-180	0.1	0%

Photometric Data


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Table--1 UNIT: ed

C (DEG) y (DEG)	0	23	45	68	90	113	135	158	180	203	225	248	270	293	315	338	
0	1553	1553	1553	1553	1553	1553	1553	1553	1553	1553	1553	1553	1553	1553	1553	1553	
5	1595	1594	1598	1577	1541	1519	1522	1527	1547	1532	1525	1511	1530	1572	1591	1598	
10	1567	1553	1553	1549	1489	1480	1527	1534	1547	1529	1522	1473	1487	1549	1541	1551	
15	1585	1560	1505	1485	1438	1446	1481	1541	1567	1522	1472	1432	1437	1482	1489	1553	
20	1567	1520	1472	1410	1371	1389	1450	1526	1578	1514	1440	1376	1367	1400	1456	1509	
25	1497	1519	1400	1330	1297	1313	1402	1387	1351	1376	1388	1302	1298	1331	1383	1512	
30	1170	1130	1351	1258	1212	1238	1259	1121	1129	1115	1291	1231	1216	1258	1352	1108	
35	1144	1063	1084	1169	1108	1152	1042	1053	1120	1039	1047	1147	1121	1169	1034	1060	
40	1126	1020	915	1048	994	1044	886	1000	1108	982	877	1035	1013	1036	904	1019	
45	710	892	824	930	877	906	795	966	749	948	796	910	897	929	810	828	
50	625	575	724	794	733	682	701	551	599	550	698	713	748	773	712	568	
55	319	465	436	527	572	478	419	456	424	446	449	486	576	504	420	457	
60	185	181	304	363	388	339	294	233	253	228	280	326	376	335	293	180	
65	172	139	134	212	230	206	147	202	254	193	140	174	196	181	128	142	
70	92.9	85.9	78.5	90.4	95.9	85.0	86.5	111	123	108	79.4	70.5	78.9	70.3	71.3	83.7	
75	54.4	47.0	37.3	37.7	41.5	39.2	43.7	59.1	69.6	57.3	39.8	33.6	34.6	31.6	34.7	46.3	
80	26.9	22.5	17.5	16.5	17.6	17.7	20.7	27.5	33.9	26.4	18.4	15.0	14.3	13.9	15.9	22.0	
85	8.39	6.59	5.23	5.02	5.24	5.44	6.35	8.31	10.7	7.59	5.14	4.04	3.70	3.66	4.34	6.18	
90	0.00	0.00	0.00	0.00	0.03	0.00	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	0.00	0.00	0.00	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	0.00	0.00	0.00	0.00	0.00	0.00	
105	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.00	
110	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.35	0.75	0.00	0.00	0.00	0.35	0.20	
115	0.20	0.25	0.20	0.00	0.00	0.00	0.20	0.00	0.60	0.60	1.24	0.00	0.15	0.00	0.55	0.55	
120	0.50	0.45	0.35	0.00	0.00	0.00	0.40	0.50	0.85	0.79	1.59	0.35	0.40	0.40	0.49	0.65	
125	0.75	0.89	0.40	1.33	0.69	1.63	0.40	1.09	0.9990	0.99	1.49	0.45	1.09	0.90	0.40	0.75	
130	1.25	1.09	0.45	0.79	0.94	1.04	0.50	0.89	1.05	0.84	1.24	0.64	1.09	1.04	0.40	0.70	
135	1.24	1.09	0.50	0.74	1.09	0.99	0.50	0.89	1.19	0.79	0.99	0.64	1.09	0.99	0.35	0.70	
140	1.15	0.99	0.30	0.74	1.24	1.04	0.45	0.84	1.05	0.94	0.50	0.74	0.94	0.94	0.30	0.70	
145	1.15	0.99	0.20	0.74	0.85	0.85	0.10	0.89	0.95	0.89	0.30	0.74	0.95	1.04	0.45	0.65	
150	1.15	0.94	0.10	0.74	1.14	0.84	0.00	0.75	0.95	0.89	0.25	0.79	1.09	1.14	0.60	0.60	
155	0.95	0.69	0.15	0.74	1.24	0.84	0.05	1.14	0.85	0.89	0.50	0.69	1.04	1.19	0.65	0.45	
160	0.90	0.69	0.50	0.74	1.09	0.75	0.20	1.09	0.85	0.89	0.75	0.59	0.99	1.14	0.84	0.40	
165	0.90	0.64	0.45	0.79	1.14	0.79	0.35	0.75	0.95	2.68	0.75	0.59	0.75	1.19	0.85	0.50	
170	0.90	0.64	0.50	1.09	1.14	0.94	0.60	0.74	1.05	0.94	0.75	0.59	1.39	1.54	1.24	0.60	
175	0.90	0.64	0.50	1.24	1.54	1.29	0.60	0.75	0.80	0.74	0.65	0.50	1.34	1.64	1.14	0.55	
180	0.70	0.64	0.50	1.34	1.54	1.09	0.60	0.65	0.80	0.69	0.65	0.50	1.19	1.54	1.19	0.60	

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2.3 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2016-12-20	Test Ambient:	25.2 ° C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-T802-0010-DN-35B-J		

Electrical Measurement for Bare-lamp:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE161062	120.0	60	0.0791	9.179	0.9668	13.05
-AC3	277.0	60	0.0389	9.704	0.9002	20.10
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

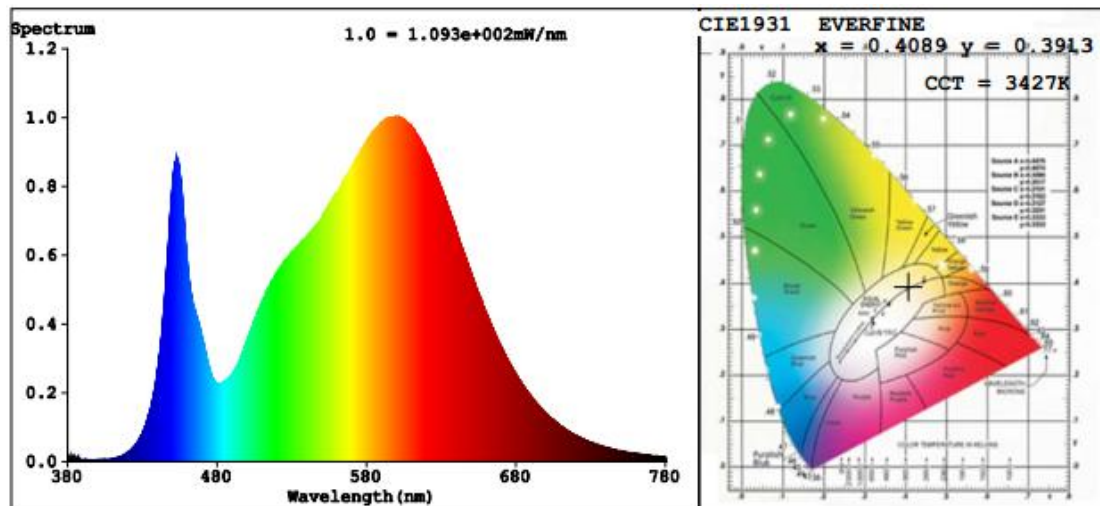
Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	80	R9	6
Frequency (Hz)	60	R2	90	R10	75
CCT (K)	3427	R3	96	R11	78
Duv	-0.0005	R4	80	R12	62
Chromaticity (x, y)	x=0.4089 y=0.3913	R5	80	R13	83
Chromaticity (u', v')	u'=0.2378 v'=0.5121	R6	86	R14	98
Color Rendering Index (CRI)	82.1	R7	84	R15	74
R9	6	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)	1310	1325	Bare Lamp: >= 800(-10%)
Luminous Efficacy (lm/W)	142.72	136.54	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	2016-12-20	Test Ambient:	25.2 ° C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-T802-0010-DN-40B-J		

Electrical Measurement for Bare-lamp:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE161062	120.0	60	0.0805	9.349	0.9674	13.09
-AC4	277.0	60	0.0394	9.830	0.9002	20.55
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

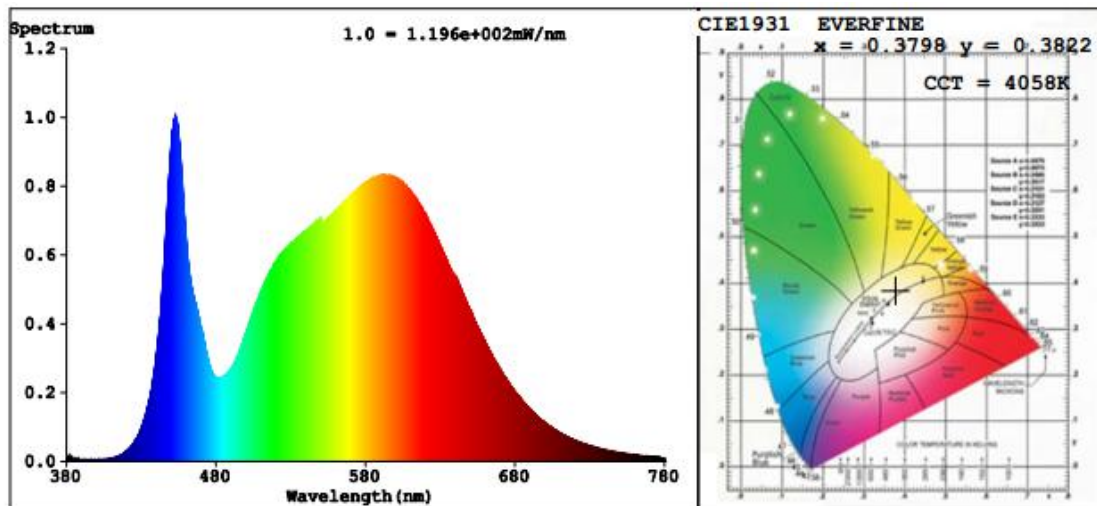
Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	8
Frequency (Hz)	60	R2	88	R10	72
CCT (K)	4058	R3	94	R11	79
Duv	0.0027	R4	81	R12	56
Chromaticity (x, y)	x=0.3798 y=0.3822	R5	80	R13	83
Chromaticity (u', v')	u'=0.2225 v'=0.5039	R6	83	R14	97
Color Rendering Index (CRI)	82.4	R7	87	R15	75
R9	8	R8	65	--	--

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)	1354	1361	Bare Lamp: >= 800(-10%)
Luminous Efficacy (lm/W)	144.83	138.45	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	2016-12-20	Test Ambient:	25.2 ° C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-T802-0010-DN-50B-J		

Electrical Measurement for Bare-lamp:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE161062	120.0	60	0.0795	9.215	0.9657	13.13
-AC5	277.0	60	0.0392	9.783	0.9010	20.55
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

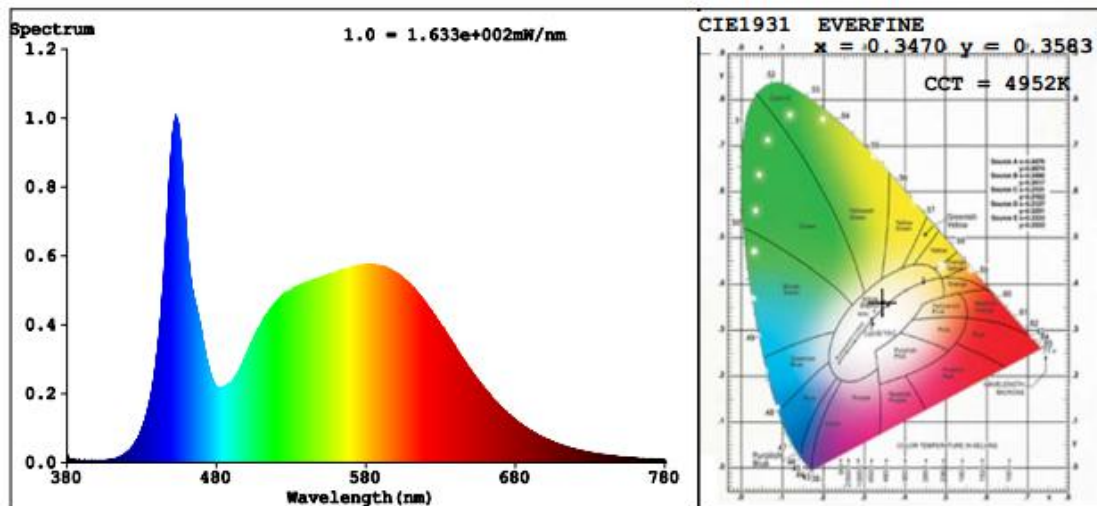
Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	80	R9	7
Frequency (Hz)	60	R2	88	R10	71
CCT (K)	4952	R3	93	R11	78
Duv	0.0026	R4	80	R12	52
Chromaticity (x, y)	x=0.3470 y=0.3583	R5	80	R13	83
Chromaticity (u', v')	u'=0.2101 v'=0.4882	R6	82	R14	96
Color Rendering Index (CRI)	82.3	R7	88	R15	75
R9	7	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)	1350	1373	Bare Lamp: >= 800(-10%)
Luminous Efficacy (lm/W)	146.50	140.35	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%			

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

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