

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
q 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

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-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-AD1,AD2,AD3(3000K),AD4(3500K), AD5(4000K),AD6(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	0.0791	9.177	0.9670	12.57
-AD1	277.0	60	0.0385	9.607	0.9001	19.77
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

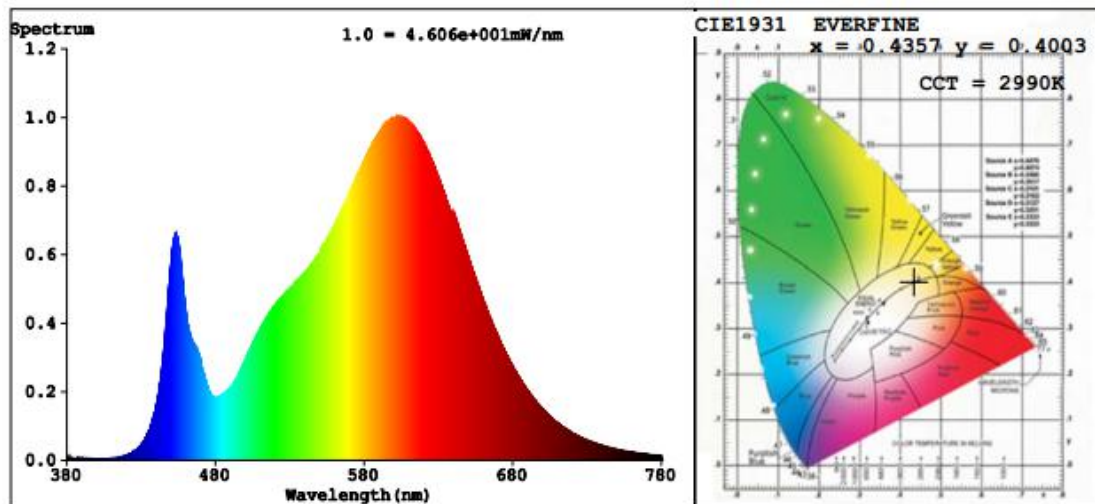
Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	7
Frequency (Hz)	60	R2	91	R10	80
CCT (K)	2990	R3	96	R11	78
Duv	-0.0013	R4	79	R12	68
Chromaticity (x, y)	x=0.4357 y=0.4003	R5	81	R13	83
Chromaticity (u', v')	u'=0.2514 v'=0.5197	R6	89	R14	99
Color Rendering Index (CRI)	82.1	R7	82	R15	74
R9	7	R8	58	--	--

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)	1204	1204	Bare Lamp: >= 800(-10%)
Luminous Efficacy (lm/W)	131.20	125.33	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	0.2374	27.53	0.9663	12.62
D1,AD2,AD3	277.0	60	0.1156	28.82	0.9003	20.22
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

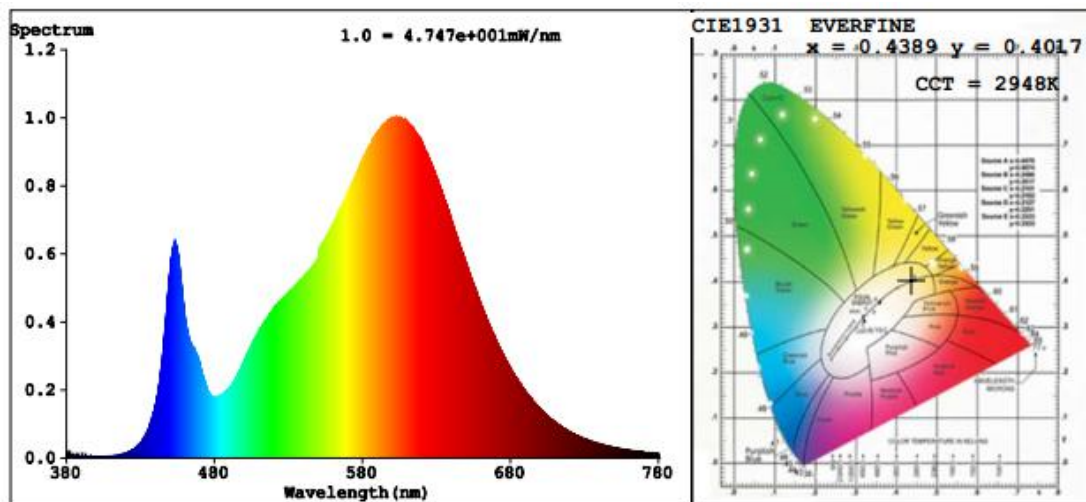
Chromaticity Measurement for 3-lamp in Lithonia 2PM3 9 cell 2x2 parabolic - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	80	R9	3
Frequency (Hz)	60	R2	91	R10	79
CCT (K)	2948	R3	95	R11	76
Duv	-0.0012	R4	78	R12	67
Chromaticity (x, y)	x=0.4389 y=0.4017	R5	80	R13	82
Chromaticity (u', v')	u'=0.2529 v'=0.5207	R6	88	R14	98
Color Rendering Index (CRI)	81.1	R7	81	R15	72
R9	3	R8	56	--	--

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)	2957.3	2957.0	In luminaire (3 lamps): >= 2000(-10%)
Luminous Efficacy (lm/W)	107.42	102.60	In luminaire: >= 100(-3%)
Zonal lumens in the 0-60° zone (%)	91.1	--	>= 75(-3)
SC: 0-180° (if applicable)	1.21	--	1.0-2.0(±0.1)
SC: 90-270° (if applicable)	1.13	--	1.0-2.0(±0.1)
Beam Angle (°)	95.0	--	--
Center Beam Candle Power (cd)	1363	--	--

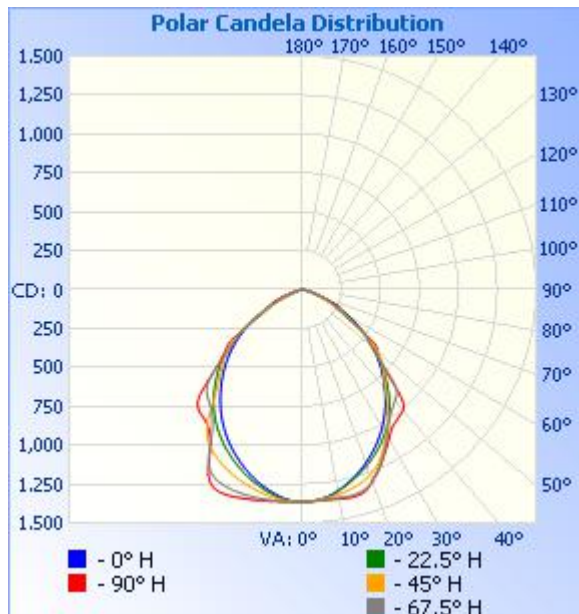
Spectral Power Distribution & Chromaticity Diagram



Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1,051.8	35.6%
0-40	1,674.0	56.6%
0-60	2,692.6	91.1%
60-90	261.6	8.8%
70-100	63.2	2.1%
90-120	0.5	0%
0-90	2,954.2	99.9%
90-180	2.6	0.1%
0-180	2,956.8	100%

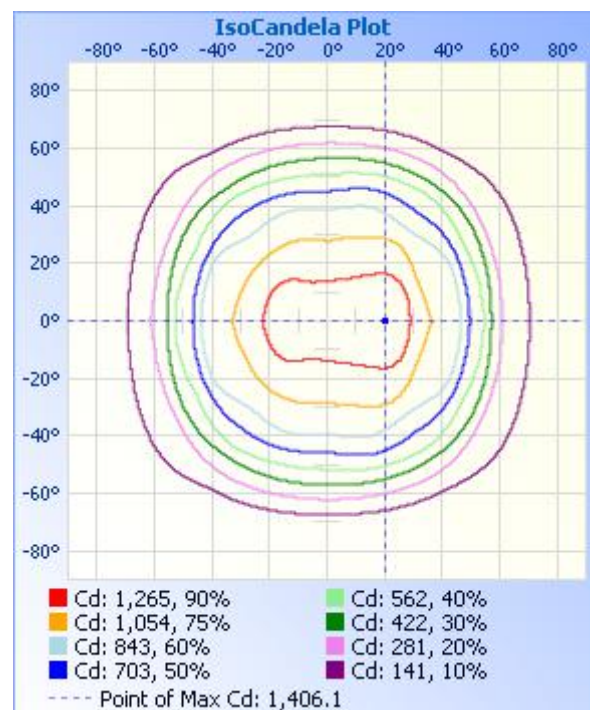
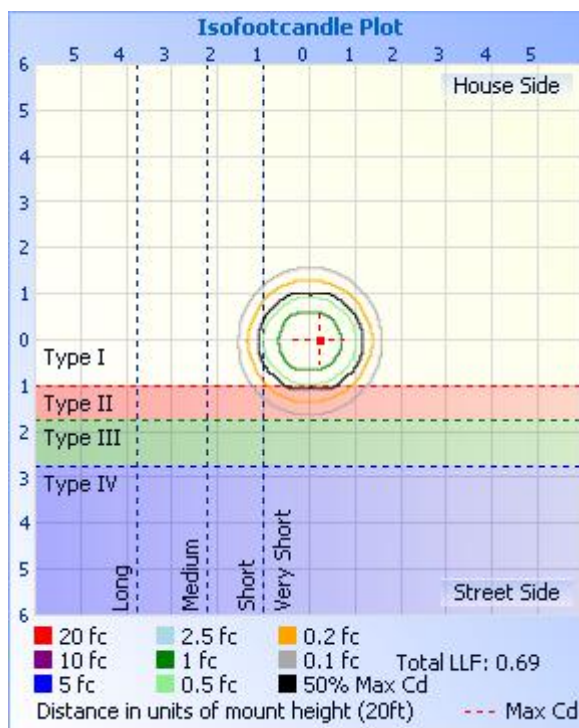
Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	128.9	4.4%	90-100	0.0	0%
10-20	370.2	12.5%	100-110	0.2	0%
20-30	552.7	18.7%	110-120	0.3	0%
30-40	622.2	21.0%	120-130	0.6	0%
40-50	593.8	20.1%	130-140	0.6	0%
50-60	424.8	14.4%	140-150	0.4	0%
60-70	198.4	6.7%	150-160	0.3	0%
70-80	55.2	1.9%	160-170	0.2	0%
80-90	7.9	0.3%	170-180	0.1	0%

Photometric Data


Illuminance at a Distance

	Center Beam fc	Beam Width	
17.0ft	4.72 fc	33.7 ft	38.0 ft
34.0ft	1.18 fc	67.4 ft	75.9 ft
51.0ft	0.52 fc	101.1 ft	113.9 ft
68.0ft	0.29 fc	134.7 ft	151.8 ft
85.0ft	0.19 fc	168.4 ft	189.8 ft
102.0ft	0.13 fc	202.1 ft	227.7 ft

■ Vert. Spread: 89.5°
■ Horiz. Spread: 96.3°



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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	1363	1363	1363	1363	1363	1363	1363	1363	1363	1363	1363	1363	1363	1363	1363	1363	
5	1367	1368	1361	1356	1352	1352	1353	1358	1361	1353	1351	1346	1348	1352	1358	1367	
10	1378	1371	1348	1324	1312	1314	1336	1357	1365	1351	1326	1303	1302	1316	1339	1369	
15	1392	1375	1322	1274	1254	1262	1309	1356	1369	1347	1296	1249	1245	1266	1311	1369	
20	1405	1369	1288	1216	1186	1203	1267	1307	1312	1299	1255	1188	1177	1208	1276	1362	
25	1385	1345	1244	1149	1109	1137	1188	1206	1213	1193	1187	1123	1101	1143	1233	1337	
30	1187	1216	1186	1074	1022	1061	1075	1088	1108	1075	1073	1050	1015	1070	1178	1199	
35	1064	1017	1085	989	925	969	951	982	1039	970	951	963	920	986	1069	1010	
40	1028	937	889	892	820	858	828	926	1006	912	829	858	816	887	871	937	
45	909	871	748	784	713	736	732	813	780	807	726	733	709	778	742	866	
50	672	654	655	663	597	605	636	586	631	583	630	603	593	652	649	641	
55	540	505	520	509	474	465	447	488	470	477	454	464	468	486	499	500	
60	291	292	330	350	342	331	313	280	296	268	302	324	331	327	317	284	
65	223	190	191	214	214	204	180	209	256	200	170	187	189	188	177	191	
70	143	123	93.4	97.6	97.1	89.9	92.0	118	134	115	84.4	76.1	78.0	78.6	88.5	123	
75	75.3	61.8	44.2	40.1	39.7	37.8	42.9	58.1	70.1	56.2	38.9	32.6	32.8	33.8	42.9	60.8	
80	34.0	27.3	19.9	17.0	16.2	16.3	19.4	25.6	31.7	24.5	17.2	14.0	13.4	14.5	19.0	26.6	
85	10.1	7.61	5.58	4.83	4.31	4.54	5.49	7.17	9.17	6.52	4.49	3.55	3.41	3.66	5.09	7.24	
90	0.00	0.00	0.00	0.00	0.01	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	0.01	0.20	0.00	0.00	0.00	0.00	0.00	0.00	
105	0.00	0.15	0.00	0.00	0.00	0.00	0.50	0.45	0.60	0.54	0.35	0.00	0.00	0.00	0.10	0.30	
110	0.30	0.35	0.10	0.00	0.00	0.00	0.40	0.15	0.35	0.35	0.70	0.05	0.00	0.00	0.40	0.45	
115	0.40	0.35	0.25	0.00	0.00	0.00	0.45	0.25	0.60	0.55	1.14	0.05	0.05	0.00	0.50	0.60	
120	0.45	0.54	0.40	0.00	0.00	0.00	0.50	0.40	0.75	0.80	1.24	0.35	0.06	0.40	0.50	0.70	
125	0.84	0.84	0.40	0.84	0.35	1.14	0.50	1.10	1.14	0.94	1.24	0.50	0.75	0.65	0.50	0.70	
130	1.04	0.94	0.40	0.55	0.55	0.84	0.55	1.09	0.94	0.79	1.14	0.59	0.79	0.65	0.50	0.70	
135	1.19	0.94	0.40	0.55	0.60	0.75	0.55	1.05	0.94	0.79	0.79	0.64	0.80	0.65	0.35	0.75	
140	1.19	1.04	0.25	0.55	0.65	0.75	0.50	1.05	0.99	0.84	0.35	0.64	0.70	0.65	0.15	0.74	
145	1.09	0.94	0.10	0.55	0.60	0.70	0.15	0.90	0.89	0.74	0.25	0.64	0.75	0.75	0.40	0.65	
150	0.95	0.85	0.05	0.55	0.70	0.65	0.00	0.85	0.84	0.74	0.30	0.64	0.75	0.79	0.45	0.35	
155	0.70	0.55	0.05	0.55	0.70	0.65	0.00	0.85	0.70	0.74	0.45	0.64	0.75	0.79	0.50	0.35	
160	0.60	0.45	0.20	0.55	0.70	0.60	0.29	0.80	0.70	0.74	0.70	0.59	0.75	0.79	0.65	0.30	
165	0.60	0.45	0.35	0.55	0.70	0.60	0.40	0.65	0.70	0.79	0.74	0.59	0.70	0.79	0.75	0.40	
170	0.75	0.50	0.45	0.79	0.74	0.74	0.40	0.60	0.70	0.79	0.74	0.55	1.24	1.24	1.04	0.50	
175	0.75	0.50	0.45	1.24	1.19	1.05	0.40	0.60	0.55	0.60	0.55	0.45	1.09	1.19	1.04	0.50	
180	0.50	0.50	0.45	0.99	1.19	0.94	0.40	0.50	0.55	0.60	0.50	0.45	1.14	1.19	0.94	0.45	

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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	0.0811	9.398	0.9661	12.91
-AD3	277.0	60	0.0384	9.586	0.9008	19.88
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

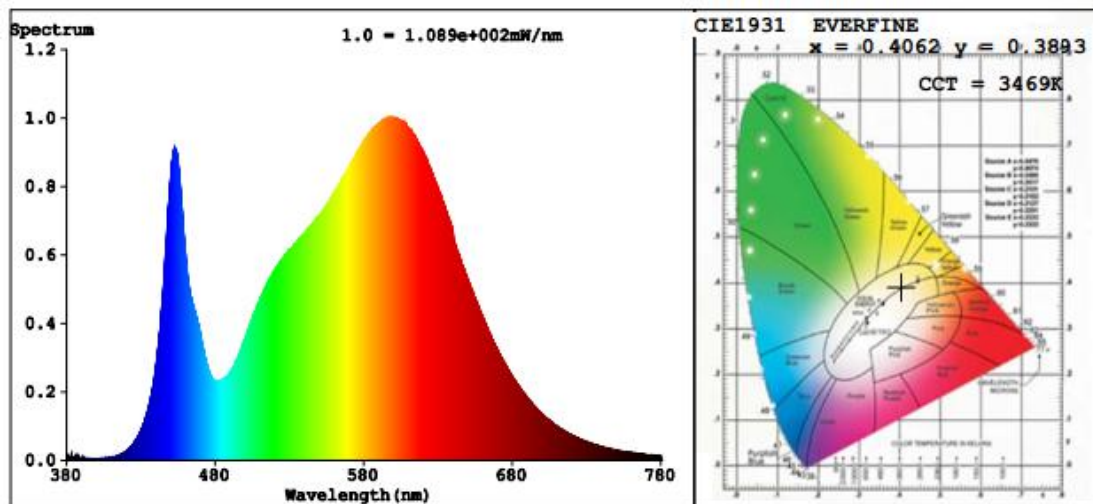
Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	6
Frequency (Hz)	60	R2	90	R10	76
CCT (K)	3469	R3	96	R11	78
Duv	-0.0008	R4	80	R12	62
Chromaticity (x, y)	x=0.4062 y=0.3893	R5	80	R13	83
Chromaticity (u', v')	u'=0.2369 v'=0.5108	R6	86	R14	98
Color Rendering Index (CRI)	82.2	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)	1255	1222	Bare Lamp: >= 800(-10%)
Luminous Efficacy (lm/W)	133.54	127.48	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	0.0806	9.364	0.9676	12.86
-AD4	277.0	60	0.0389	9.708	0.9002	19.89
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

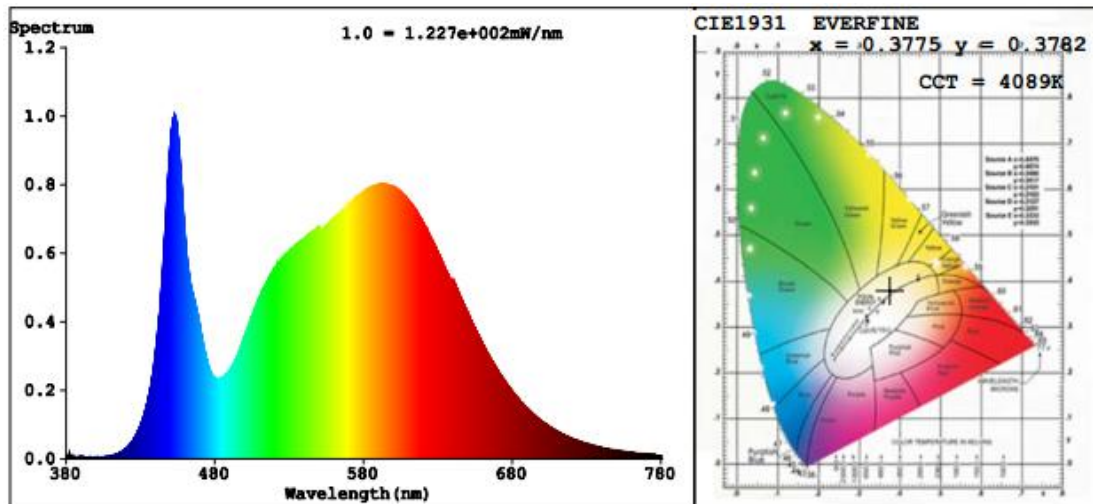
Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	10
Frequency (Hz)	60	R2	89	R10	72
CCT (K)	4089	R3	94	R11	79
Duv	0.0015	R4	81	R12	56
Chromaticity (x, y)	x=0.3775 y=0.3782	R5	80	R13	83
Chromaticity (u', v')	u'=0.2226 v'=0.5018	R6	84	R14	97
Color Rendering Index (CRI)	82.7	R7	87	R15	75
R9	10	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)	1271	1258	Bare Lamp: >= 800(-10%)
Luminous Efficacy (lm/W)	135.73	129.58	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	0.0794	9.205	0.9666	12.26
-AD5	277.0	60	0.0387	9.669	0.9013	19.82
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

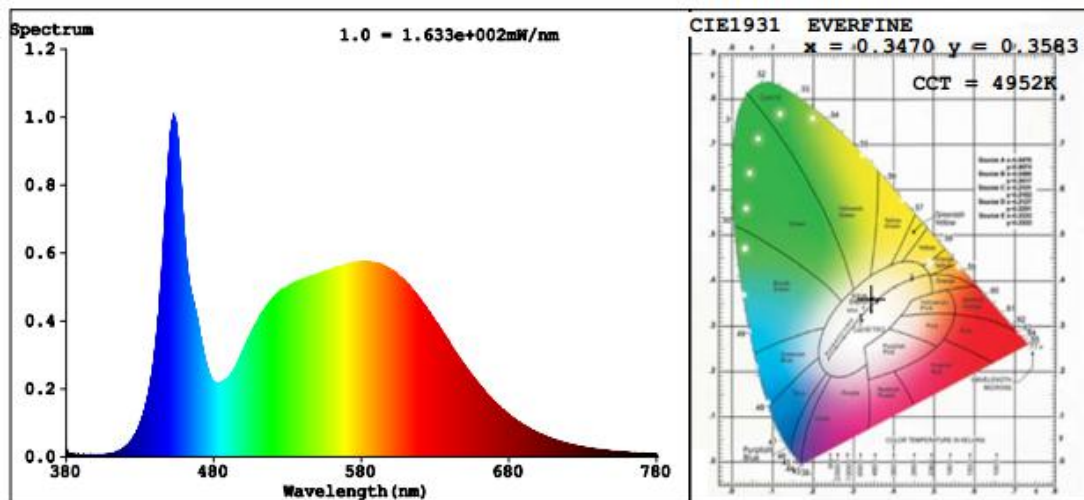
Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

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)	1257	1263	Bare Lamp: >= 800(-10%)
Luminous Efficacy (lm/W)	136.56	130.62	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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