

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-T804-0015-DN-XXB-J

Representative (Tested) Model: IK-T804-0015-DN-30B-J
IK-T804-0015-DN-35B-J
IK-T804-0015-DN-40B-J
IK-T804-0015-DN-50B-J

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

Test & Report By:

Jack Luo

Engineer: Jack Luo

Date: Nov.22,2016

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**

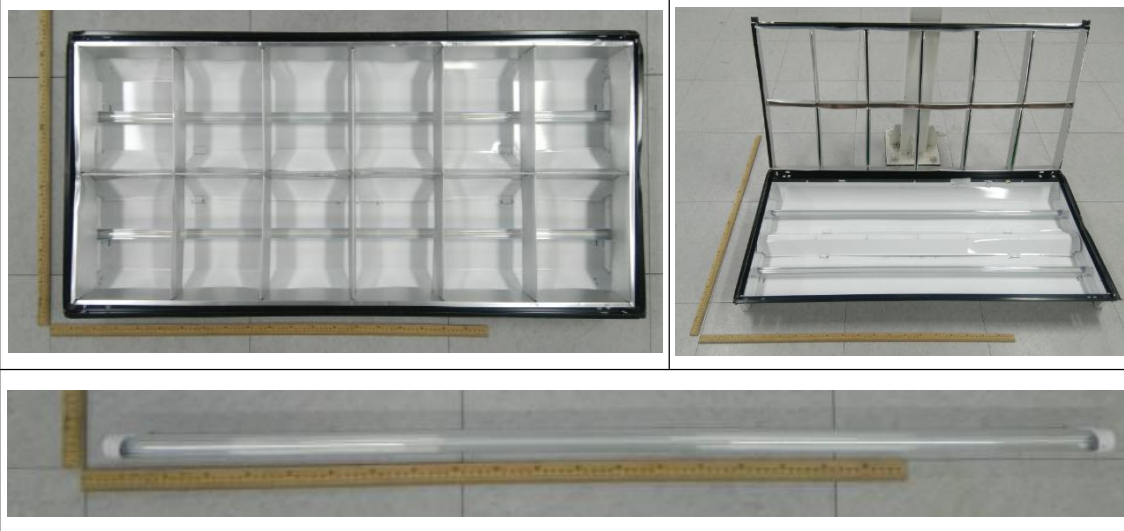
Report Format Number STD/QR4909-A/2

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-T804-0015-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	15W	
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-D1,D2(3000K),D3(3500K), D4(4000K),D5(5000K)	
Lamp Length	1200	mm
Lamp Width	--	mm
Number of Units (modular products)	N/A	s

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1.2 Test Specifications:

Date of Receipt	Nov.19, 2016
Date of Test	Nov.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	2016-11-20	Test Ambient:	25.2 ° C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-T804-0015-DN-30B-J		

Electrical Measurement for Bare-lamp:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE161162	120.0	60	0.1222	14.32	0.9769	18.45
-D1	277.0	60	0.0579	14.45	0.9014	22.89
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

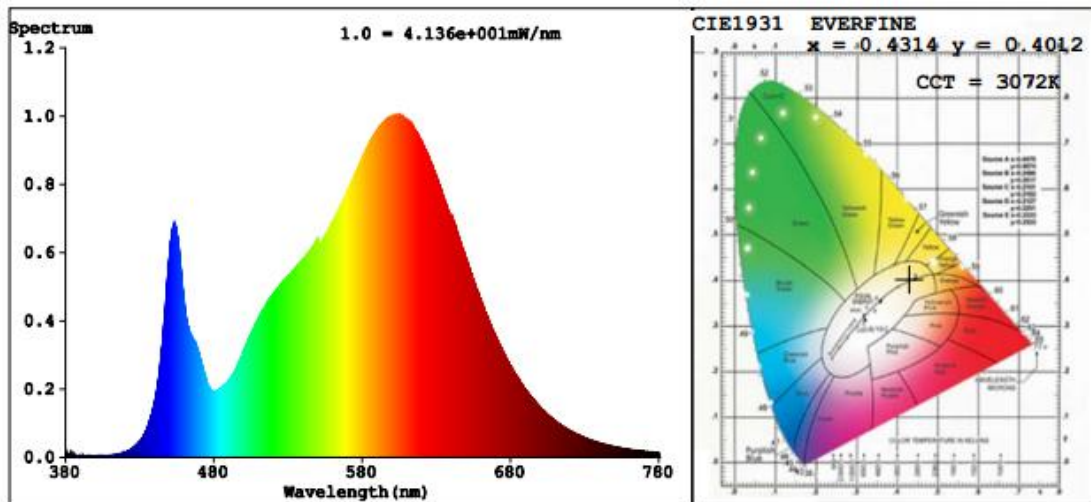
Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	82	R9	9
Frequency (Hz)	60	R2	92	R10	80
CCT (K)	3072	R3	96	R11	80
Duv	-0.0004	R4	80	R12	67
Chromaticity (x, y)	x=0.4314 y=0.4012	R5	81	R13	84
Chromaticity (u', v')	u'=0.2482 v'=0.5194	R6	89	R14	99
Color Rendering Index (CRI)	82.9	R7	83	R15	75
R9	9	R8	60	--	--

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)	2180	2190	Bare Lamp: >= 1600(-10%)
Luminous Efficacy (lm/W)	152.23	151.56	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	2016-11-20	Test Ambient:	25.2 ° C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-T804-0015-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 %
GZE161162	120.0	60	0.2449	28.64	0.9746	19.12
-D1,D2	277.0	60	0.1156	28.90	0.9024	23.25
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

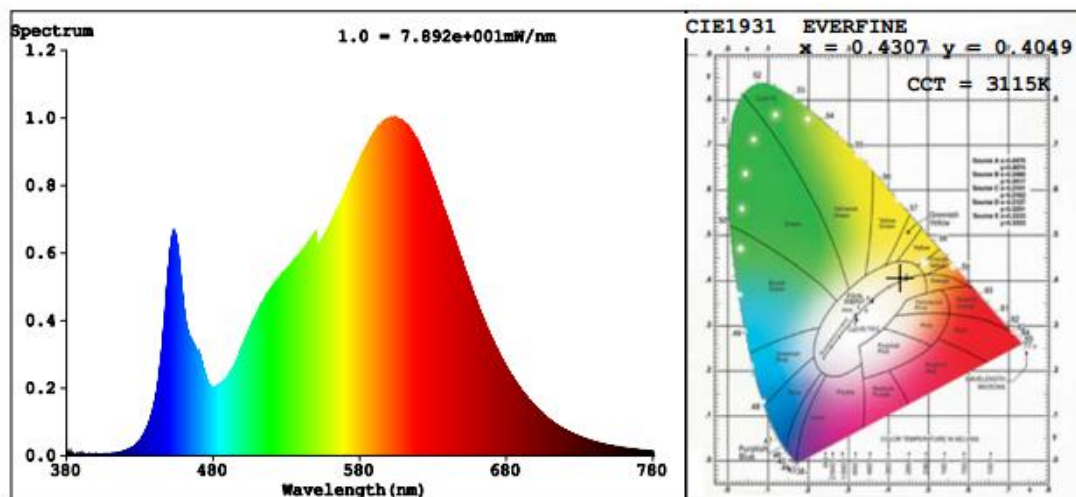
Chromaticity Measurement for 2-lamp in Lithonia 2PM3N 12 cell 2x4 parabolic - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	82	R9	9
Frequency (Hz)	60	R2	91	R10	79
CCT (K)	3115	R3	97	R11	81
Duv	0.0013	R4	82	R12	66
Chromaticity (x, y)	x=0.4307 y=0.4049	R5	82	R13	85
Chromaticity (u', v')	u'=0.2462 v'=0.5208	R6	89	R14	99
Color Rendering Index (CRI)	83.5	R7	84	R15	74
R9	9	R8	61	--	--

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)	3848.7	3865.0	In luminaire (2 lamps): >= 3000(-10%)
Luminous Efficacy (lm/W)	134.38	133.74	In luminaire: >= 100(-3%)
Zonal lumens in the 0-60° zone (%)	91.4	--	>= 75(-3)
SC: 0-180° (if applicable)	1.37	--	1.0-2.0(±0.1)
SC: 90-270° (if applicable)	1.19	--	1.0-2.0(±0.1)
Beam Angle (°)	104.5	--	--
Center Beam Candle Power (cd)	1585	--	--

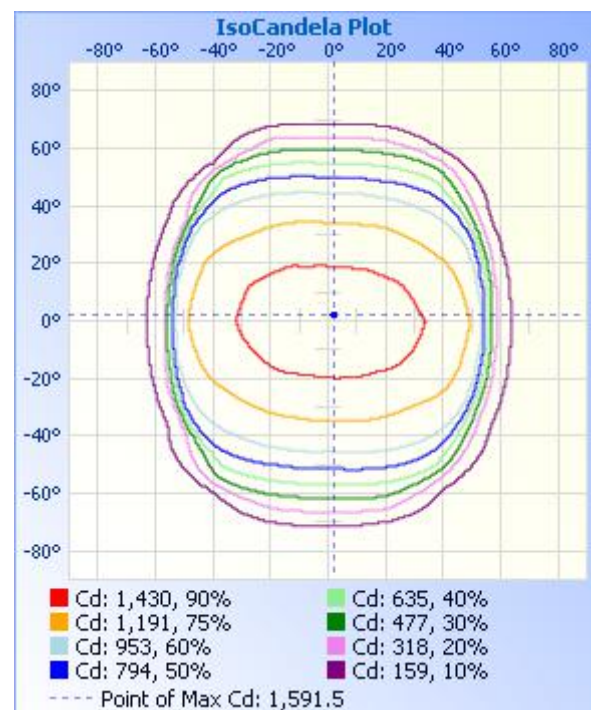
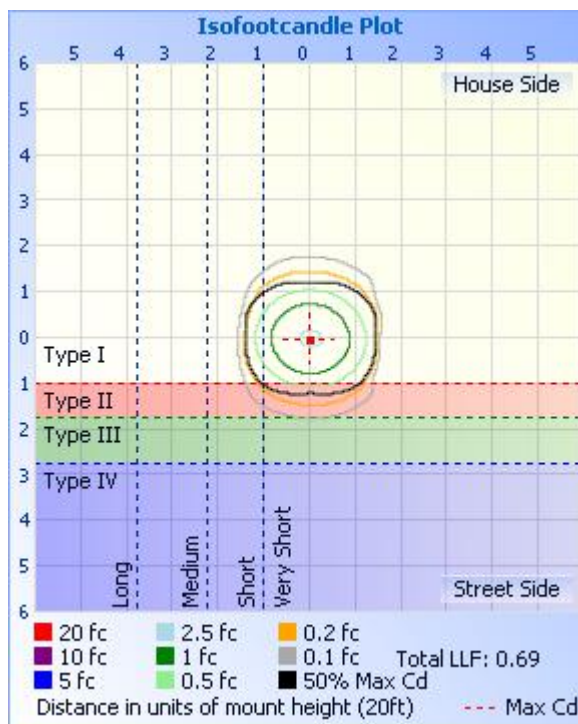
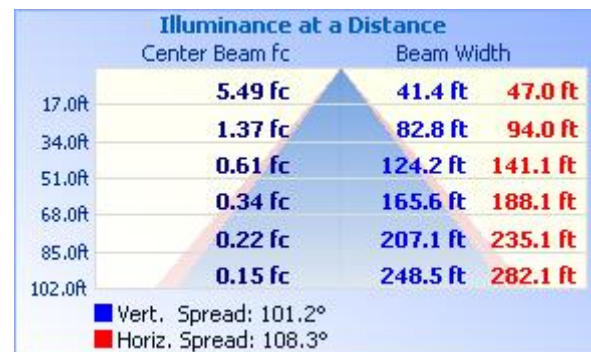
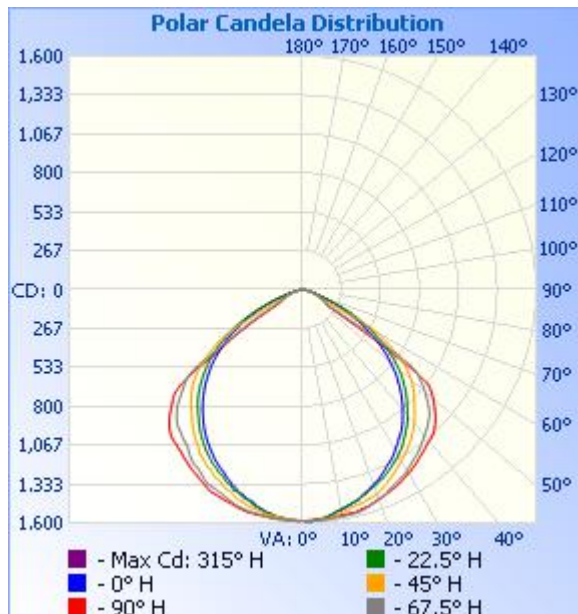
Spectral Power Distribution & Chromaticity Diagram



Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1,233.7	32.1%
0-40	2,034.2	52.9%
0-60	3,519.2	91.4%
60-90	328.5	8.5%
70-100	83.7	2.2%
90-120	0.1	0%
0-90	3,847.7	100%
90-180	0.5	0%
0-180	3,848.2	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	149.8	3.9%	90-100	0.0	0%
10-20	429.0	11.1%	100-110	0.0	0%
20-30	654.9	17.0%	110-120	0.1	0%
30-40	800.5	20.8%	120-130	0.1	0%
40-50	841.8	21.9%	130-140	0.1	0%
50-60	643.2	16.7%	140-150	0.0	0%
60-70	244.9	6.4%	150-160	0.0	0%
70-80	71.3	1.9%	160-170	0.0	0%
80-90	12.4	0.3%	170-180	0.0	0%

Photometric Data


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Table--1 UNIT: cd

γ (DEG) \ C (DEG)	0	23	45	68	90	113	135	158	180	203	225	248	270	293	315	338	
0	1585	1585	1585	1585	1585	1585	1585	1585	1585	1585	1585	1585	1585	1585	1585	1585	
5	1580	1587	1582	1578	1577	1578	1580	1585	1574	1573	1575	1574	1572	1571	1574	1581	
10	1572	1575	1549	1531	1532	1525	1552	1576	1568	1568	1544	1537	1535	1541	1554	1574	
15	1564	1553	1514	1488	1486	1489	1520	1570	1556	1551	1508	1479	1482	1486	1519	1557	
20	1541	1508	1471	1430	1420	1435	1490	1527	1529	1521	1466	1425	1420	1434	1468	1520	
25	1515	1466	1406	1365	1350	1379	1425	1478	1495	1465	1411	1350	1343	1373	1418	1487	
30	1461	1409	1341	1291	1270	1311	1353	1432	1452	1407	1332	1279	1264	1301	1352	1424	
35	1411	1332	1277	1204	1179	1222	1280	1371	1400	1342	1252	1192	1174	1215	1273	1359	
40	1365	1264	1172	1098	1066	1118	1190	1299	1351	1257	1160	1103	1069	1115	1179	1292	
45	1294	1185	1061	979	940	1003	1082	1229	1286	1180	1055	986	950	1010	1080	1222	
50	1161	1054	925	836	794	869	976	1098	1170	1058	934	851	819	878	973	1075	
55	623	838	779	681	633	707	809	906	682	888	804	707	670	731	804	726	
60	193	316	569	500	462	523	590	188	186	201	602	545	509	568	583	258	
65	143	137	259	309	285	332	138	141	146	140	302	365	348	378	205	142	
70	103	92.2	86.9	141	135	146	85.2	101	107	97.1	99.9	189	188	186	94.6	98.7	
75	68.7	57.3	47.1	61.4	65.7	55.6	49.7	66.7	73.8	62.9	54.0	82.8	88.1	72.8	54.4	64.3	
80	36.1	28.8	23.2	26.7	28.6	24.9	25.0	35.0	40.0	32.8	26.8	33.8	34.7	30.9	27.9	33.7	
85	12.5	9.70	7.89	8.04	8.26	7.45	8.16	11.4	13.4	10.6	8.66	9.41	10.2	9.60	9.78	11.6	
90	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	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	0.40	0.00	0.00	0.00	0.00	0.00	
110	0.00	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.61	0.00	0.00	0.00	0.05	0.05	
115	0.10	0.20	0.15	0.00	0.00	0.00	0.05	0.00	0.10	0.25	0.96	0.00	0.00	0.00	0.05	0.31	
120	0.20	0.20	0.15	0.00	0.00	0.00	0.10	0.30	0.10	0.20	1.21	0.00	0.00	0.00	0.00	0.20	
125	0.30	0.20	0.15	0.00	0.00	0.00	0.15	0.31	0.10	0.25	0.76	0.00	0.00	0.00	0.00	0.10	
130	0.25	0.30	0.00	0.00	0.00	0.00	0.10	0.31	0.10	0.30	0.40	0.00	0.00	0.00	0.00	0.15	
135	0.40	0.41	0.00	0.00	0.00	0.00	0.10	0.31	0.10	0.30	0.00	0.00	0.00	0.00	0.00	0.15	
140	0.40	0.31	0.00	0.00	0.00	0.00	0.00	0.31	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.00	
145	0.25	0.10	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.15	0.00	0.10	0.05	0.00	0.00	0.00	
150	0.30	0.05	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.10	0.00	0.20	0.10	0.10	0.00	0.00	
155	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.10	0.00	0.30	0.30	0.20	0.10	0.00	
160	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.10	0.00	0.30	0.40	0.30	0.20	0.05	
165	0.10	0.00	0.00	0.10	0.00	0.00	0.05	0.05	0.00	0.10	0.00	0.35	0.40	0.35	0.25	0.05	
170	0.10	0.00	0.05	0.20	0.40	0.30	0.05	0.05	0.00	0.10	0.00	0.35	0.35	0.35	0.25	0.05	
175	0.10	0.00	0.00	0.30	0.35	0.30	0.20	0.05	0.00	0.10	0.00	0.25	0.25	0.25	0.20	0.05	
180	0.10	0.00	0.00	0.30	0.25	0.20	0.00	0.00	0.00	0.10	0.00	0.00	0.30	0.20	0.20	0.05	

2.3 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2016-11-20	Test Ambient:	25.2 ° C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-T804-0015-DN-35B-J		

Electrical Measurement for Bare-lamp:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE161162	120.0	60	0.1211	14.16	0.9741	19.53
-D3	277.0	60	0.0573	14.31	0.9014	22.59
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

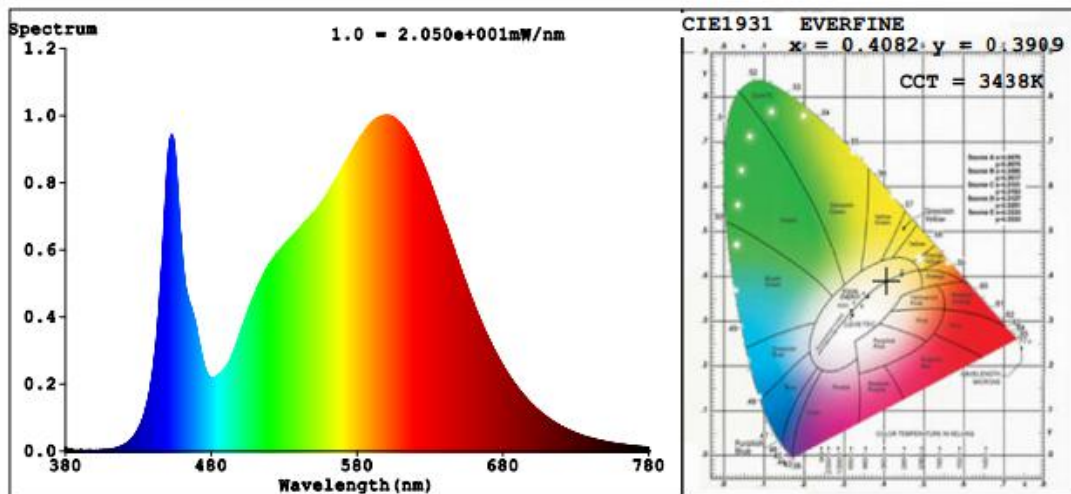
Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	82	R9	10
Frequency (Hz)	60	R2	90	R10	76
CCT (K)	3438	R3	96	R11	79
Duv	-0.0006	R4	81	R12	62
Chromaticity (x, y)	x=0.4082 y=0.3909	R5	81	R13	84
Chromaticity (u', v')	u'=0.2375 v'=0.5118	R6	86	R14	98
Color Rendering Index (CRI)	82.9	R7	85	R15	75
R9	10	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)	2192	2207	Bare Lamp: >= 1600(-10%)
Luminous Efficacy (lm/W)	154.80	154.23	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	2016-11-20	Test Ambient:	25.2 ° C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-T804-0015-DN-40B-J		

Electrical Measurement for Bare-lamp:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE161162	120.0	60	0.1244	14.53	0.9734	18.45
-D4	277.0	60	0.0586	14.65	0.9019	22.78
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

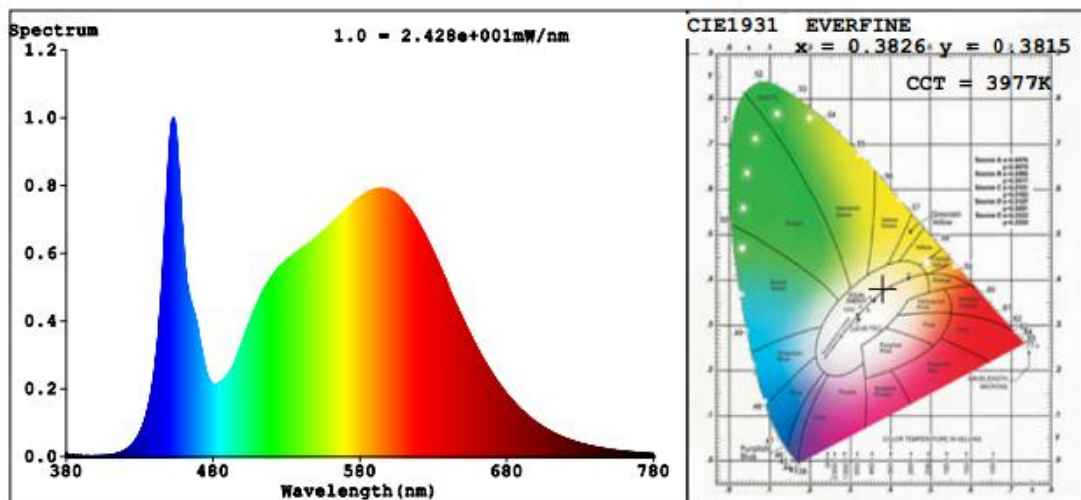
Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	8
Frequency (Hz)	60	R2	89	R10	73
CCT (K)	3977	R3	94	R11	79
Duv	0.0016	R4	81	R12	56
Chromaticity (x, y)	x=0.3826 y=0.3815	R5	80	R13	83
Chromaticity (u', v')	u'=0.2246 v'=0.5040	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)	2286	2296	Bare Lamp: >= 1600(-10%)
Luminous Efficacy (lm/W)	157.33	156.72	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	2016-11-20	Test Ambient:	25.2 ° C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-T804-0015-DN-50B-J		

Electrical Measurement for Bare-lamp:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE161162	120.0	60	0.1231	14.39	0.9736	18.51
-D5	277.0	60	0.0577	14.45	0.9030	22.59
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

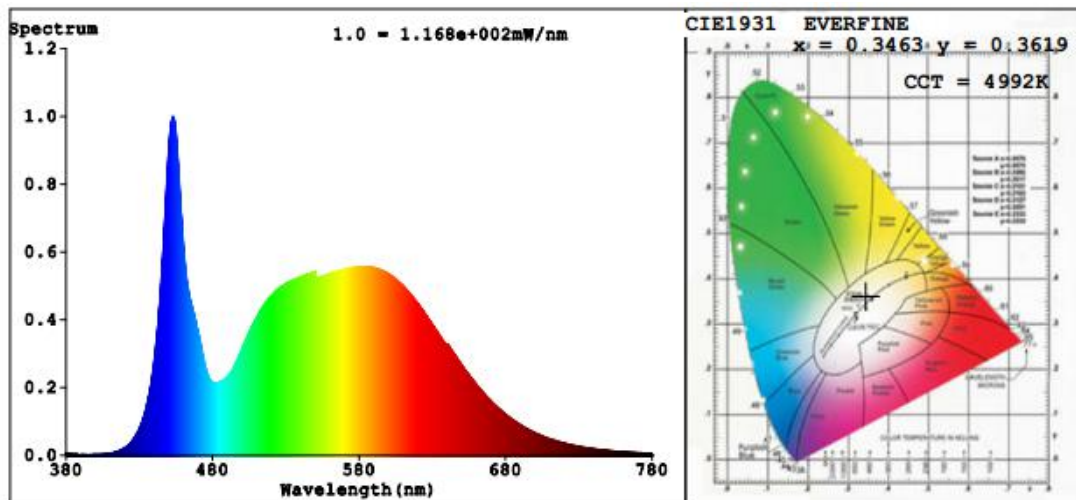
Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	80	R9	7
Frequency (Hz)	60	R2	88	R10	70
CCT (K)	4992	R3	93	R11	79
Duv	0.0046	R4	80	R12	51
Chromaticity (x, y)	x=0.3463 y=0.3619	R5	80	R13	82
Chromaticity (u', v')	u'=0.2083 v'=0.4898	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)	2273	2275	Bare Lamp: >= 1600(-10%)
Luminous Efficacy (lm/W)	157.96	157.44	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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