

LM-79-08 Test Report

For

IKIO LED LIGHTING**(Brand Name: IKIO)**8470 Allison Pointe Blvd, Suite 128
Indianapolis, IN 46250**Linear Retrofit Kits for 2x4 Luminaires**

Model name(s):

IK-MS04-0015-1 DN-XX-J

Representative (Tested) Model:

IK-MS04-0015-1-DN-30-J

IK-MS04-0015-1-DN-50-J

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

Test & Report By:

Garmen Mo

Engineer: Garmen Mo

Date: 2017-01-26

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

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1.1 Product Information:

Organization Name	IKIO LED LIGHTING	
Brand Name	IKIO	
Model Number	IK-MS04-0015-1-DN-XX-J	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Linear Retrofit Kits for 2x4 Luminaires	
Rated Voltage / Frequency	100~277 Vac, 50/60 Hz	
Nominal Power	15W	
Rated Initial Lamp Lumen	--	
Declared CCT	3000K,3500K,4000K,5000K	
LED Manufacturer	DONGGUAN SINO-WIN OPTO-ELECTRONIC TECHNOLOGY CO LTD	
LED Model	ZT2835WOM1	
Sample Number	GZE171126-A1,A2(3000K),A3(3500K), A4(4000K),A5,A6(5000K)	
Lamp Length	1200	mm
Lamp Width	--	mm
Number of Units (modular products)	N/A	s

Photo

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1.2 Test Specifications:

Date of Receipt	2017-01-26
Date of Test	2017-01-26
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	2017-01-26	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-MS04-0015-1-DN-30-J		

Electrical Measurement for Bare-lamp:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE171126	120.0	60	0.1239	14.79	0.9951	6.9
-A1	277.0	60	0.0558	14.86	0.9614	8.6
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

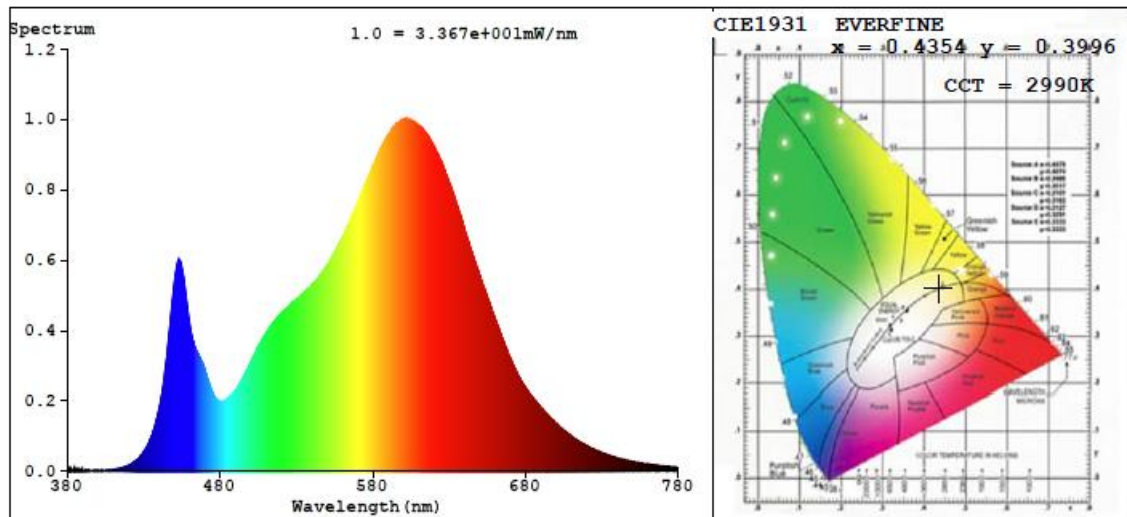
Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	4
Frequency (Hz)	60	R2	92	R10	82
CCT (K)	2990	R3	95	R11	79
Duv	-0.0016	R4	79	R12	72
Chromaticity (x, y)	x=0.4354 y=0.3996	R5	82	R13	84
Chromaticity (u', v')	u'=0.2515 v'=0.5194	R6	91	R14	98
Color Rendering Index (CRI)	82.1	R7	81	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)	1884	1896	Bare Lamp: >= 1600(-10%)
Luminous Efficacy (lm/W)	127.4	127.6	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	2017-01-26	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-MS04-0015-1-DN-30-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 %
GZE171126	120.0	60	0.2476	29.55	0.9944	6.8
-A1,A2	277.0	60	0.1131	30.15	0.9628	9.2
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

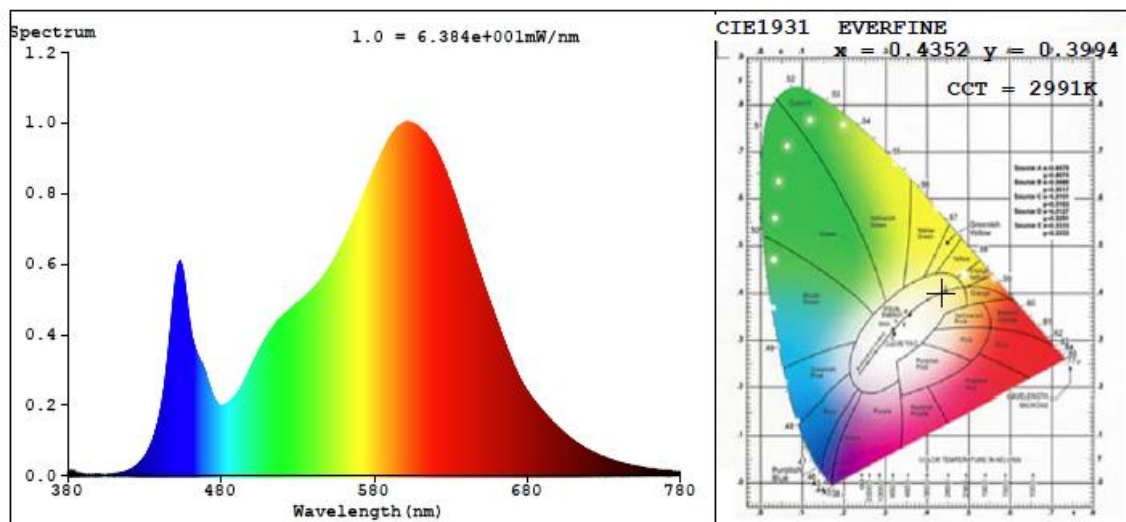
**Chromaticity Measurement for 2-lamp in Lithonia 2PM3N 12 cell 2x4 parabolic
- Sphere-Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	5
Frequency (Hz)	60	R2	92	R10	83
CCT (K)	2991	R3	95	R11	79
Duv	-0.0016	R4	80	R12	72
Chromaticity (x, y)	x=0.4352 y=0.3994	R5	82	R13	84
Chromaticity (u', v')	u'=0.2515 v'=0.5193	R6	91	R14	98
Color Rendering Index (CRI)	82.3	R7	81	R15	74
R9	5	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)	3261.5	3291.6	In luminaire (2 lamps): >= 3000(-10%)
Luminous Efficacy (lm/W)	110.37	109.17	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)	1.17	--	1.0-2.0(±0.1)
Beam Angle (°)	99.4	--	--
Center Beam Candle Power (cd)	1395	--	--

Spectral Power Distribution & Chromaticity Diagram



Zonal Lumen Tabulation

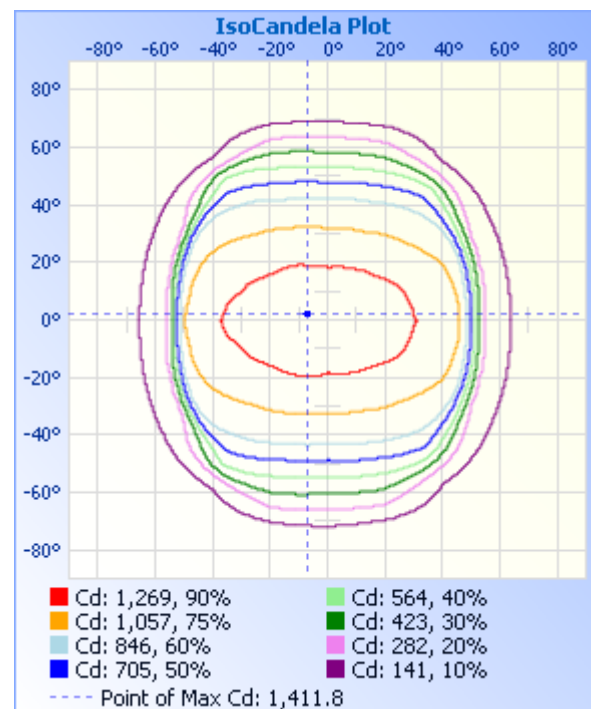
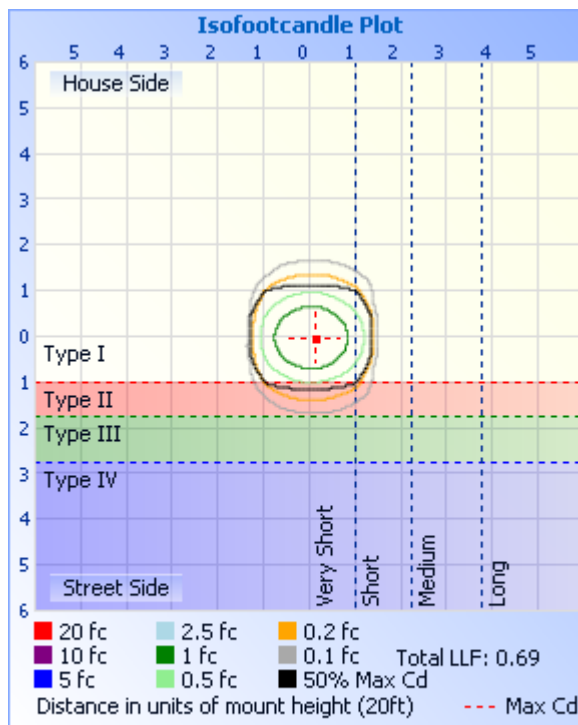
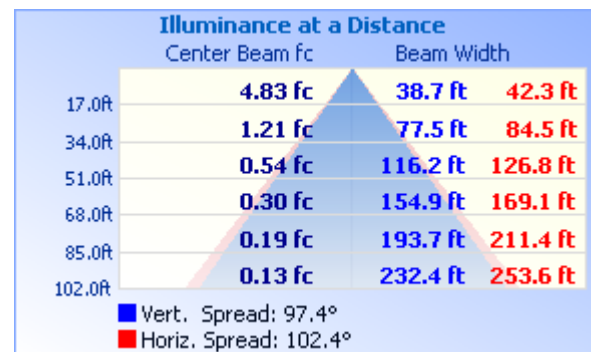
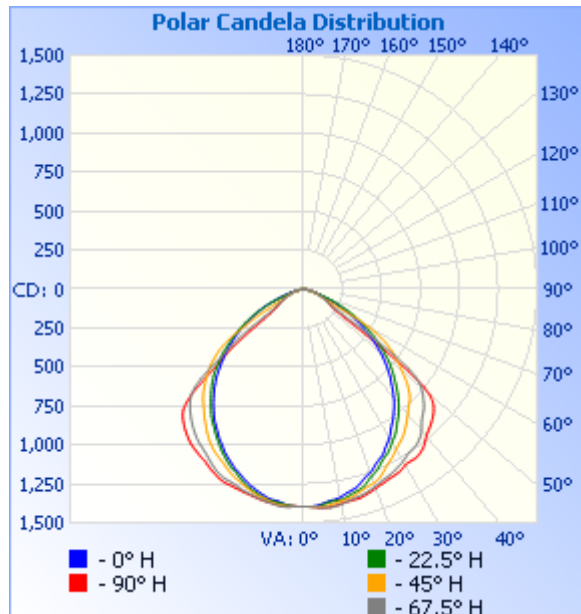
Zonal Lumen Summary

Zone	Lumens	% Luminaire
0-30	1,088.7	33.4%
0-40	1,789.0	54.9%
0-60	2,986.9	91.6%
60-90	274.1	8.4%
70-100	73.8	2.3%
90-120	0.0	0%
0-90	3,261.0	100%
90-180	0.0	0%
0-180	3,261.0	100%

Lumens Per Zone

Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	132.6	4.1%	90-100	0	0%
10-20	379.8	11.6%	100-110	0	0%
20-30	576.3	17.7%	110-120	0.0	0%
30-40	700.3	21.5%	120-130	0.0	0%
40-50	719.4	22.1%	130-140	0	0%
50-60	478.5	14.7%	140-150	0	0%
60-70	200.3	6.1%	150-160	0	0%
70-80	64.3	2.0%	160-170	0.0	0%
80-90	9.5	0.3%	170-180	0	0%

Photometric Data



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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	1395	1395	1395	1395	1395	1395	1395	1395	1395	1395	1395	1395	1395	1395	1395	1395			
5	1399	1401	1396	1386	1382	1391	1399	1408	1407	1409	1400	1391	1385	1386	1395	1402			
10	1384	1382	1368	1369	1356	1373	1382	1402	1398	1398	1387	1375	1358	1371	1371	1384			
15	1364	1349	1337	1331	1316	1340	1354	1376	1389	1378	1352	1331	1308	1325	1335	1357			
20	1345	1323	1292	1263	1251	1277	1322	1346	1359	1350	1311	1273	1244	1258	1287	1326			
25	1321	1299	1232	1195	1186	1207	1256	1314	1333	1308	1248	1204	1174	1192	1227	1300			
30	1272	1239	1174	1116	1103	1136	1188	1276	1305	1270	1180	1124	1092	1110	1173	1237			
35	1238	1183	1097	1021	1005	1048	1126	1239	1294	1229	1112	1043	1003	1025	1091	1185			
40	1183	1111	996	927	899	950	1042	1179	1228	1169	1025	949	900	929	998	1118			
45	1095	1024	897	812	784	830	965	1092	1171	1082	956	834	791	826	907	1033			
50	653	780	772	691	655	711	830	988	1062	990	830	716	667	705	790	774			
55	236	306	611	543	517	575	692	553	329	612	705	595	541	569	633	303			
60	174	170	320	394	381	435	478	193	195	199	525	466	417	434	335	175			
65	127	122	124	250	252	282	146	143	150	145	172	322	293	291	138	127			
70	88.0	80.7	76.4	118	126	138	89.3	97.0	105	98.9	97.0	175	169	151	87.1	84.8			
75	56.5	52.4	40.0	48.2	58.7	54.6	49.2	58.0	66.7	59.8	52.9	76.3	84.7	67.9	47.5	56.0			
80	23.1	20.0	18.2	21.3	25.6	24.1	22.8	26.9	30.8	27.6	24.9	30.8	33.1	27.8	22.1	22.2			
85	7.20	5.95	5.19	5.89	6.78	6.60	6.70	8.12	9.52	8.14	7.11	8.09	8.37	7.35	6.60	6.74			
90	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			
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	0.00	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
115	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			
120	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			
125	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			
130	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			
135	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			
140	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			
145	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			
150	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			
155	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			
160	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			
165	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			
170	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			
175	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			
180	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			

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2.3 Electrical, Photometric and Chromaticity Measurements*(Refer to Work Instruction QD25)*

Test date	2017-01-26	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-MS04-0015-1-DN-30-J		

Electrical Measurement for Bare-lamp:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE171126	120.0	60	0.1223	14.61	0.9953	5.9
-A1	277.0	60	0.0553	14.70	0.9601	8.7
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

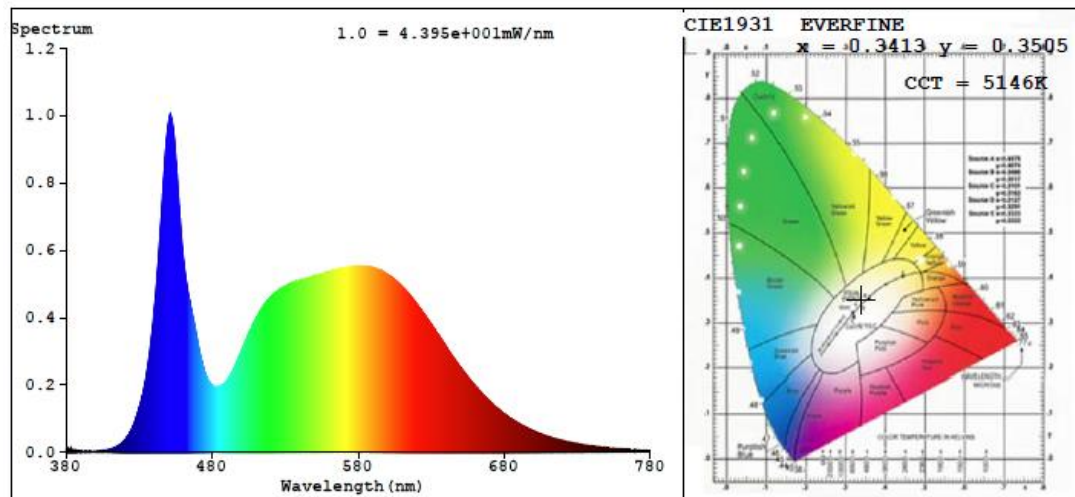
Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	7
Frequency (Hz)	60	R2	87	R10	68
CCT (K)	5146	R3	90	R11	81
Duv	0.0010	R4	82	R12	58
Chromaticity (x, y)	x=0.3413 y=0.3505	R5	81	R13	82
Chromaticity (u', v')	u'=0.2093 v'=0.4835	R6	81	R14	94
Color Rendering Index (CRI)	82.1	R7	87	R15	76
R9	7	R8	68	--	--

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)	1910	1917	Bare Lamp: >= 1600(-10%)
Luminous Efficacy (lm/W)	130.7	130.4	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	2017-01-26	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-MS04-0015-1-DN-50-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 %
GZE171126	120.0	60	0.2464	29.43	0.9953	7.1
-A5,A6	277.0	60	0.1135	30.18	0.9598	8.6
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

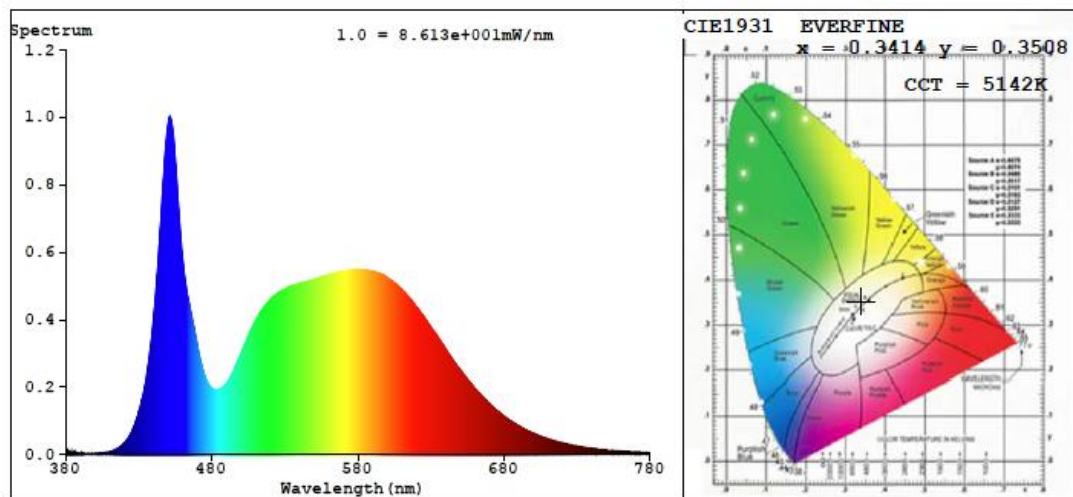
**Chromaticity Measurement for 2-lamp in Lithonia 2PM3N 12 cell 2x4 parabolic
- Sphere-Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	7
Frequency (Hz)	60	R2	87	R10	68
CCT (K)	5142	R3	90	R11	81
Duv	0.0011	R4	82	R12	58
Chromaticity (x, y)	x=0.3414 y=0.3508	R5	81	R13	82
Chromaticity (u', v')	u'=0.2092 v'=0.4837	R6	81	R14	94
Color Rendering Index (CRI)	82.2	R7	87	R15	76
R9	7	R8	68	--	--

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

Parameter	Result		DLC V4.0 Pass Criteria
Test Voltage (V)	120.0	277.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	3329	3345	Bare Lamp: >= 1600(-10%)
Luminous Efficacy (lm/W)	113.1	110.8	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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