

**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- MS02-0010-4-  
DY-XX-J

Representative (Tested) Model:

IK-MS02-0010-4-DY-30-J

IK-MS02-0010-4-DY-35-J

IK-MS02-0010-4-DY-40-J

IK-MS02-0010-4-DY-50-J

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

Test &amp; 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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<http://www.standard-tech.com>

**1.1 Product Information:**

Organization Name	IKIO LED LIGHTING	
Brand Name	IKIO	
Model Number	IK-MS02-0010-4-DY-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	10W	
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	GZE172106-B1,B2,B6,B7(3000K),B3(3500K), B4(4000K),B5,B8,B9,B10(5000K)	
Lamp Length	1200	mm
Lamp Width	--	mm
Number of Units (modular products)	N/A	s

**Photo****Laboratory: Standard-Tech Co. Ltd Testing Center****NVLAP CODE: 201011-0**

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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"> <li>1. Total Luminous Flux</li> <li>2. Luminous Distribution Intensity</li> <li>3. Luminous Efficacy</li> <li>4. Correlated Color Temperature</li> <li>5. Color Rendering Index</li> <li>6. Chromaticity Coordinate</li> <li>7. Electrical Parameters</li> </ol>
Reference Standard	<ol style="list-style-type: none"> <li>1. IES LM-79-2008 Electrical and Photometric Measurements of Solid-State Lighting Products</li> <li>2. ANSI C78.377-2008 Specifications for the Chromaticity of Solid State Lighting Products</li> <li>3. CIE 13.3-1995 Method of Measuring and Specifying Colour Rendering Properties of Light Sources</li> <li>4. CIE 15-2004 Technical Report Colorimetry</li> <li>5. IESNA LM-16-93 Practical Guide to Colorimetry of Light Source</li> <li>6. IESNA TM-16-05 Technical Memorandum on Light Emitting Diode (LED) Sources and Systems</li> </ol>
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  $1^{\circ}$  vertical intervals and  $22.5^{\circ}$  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-MS02-0010-4-DY-30-J		

**Electrical Measurement for Bare-lamp:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE172106	120.0	60	0.0777	9.21	0.9884	8.6
-B1	277.0	60	0.0359	9.29	0.9354	10.5
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

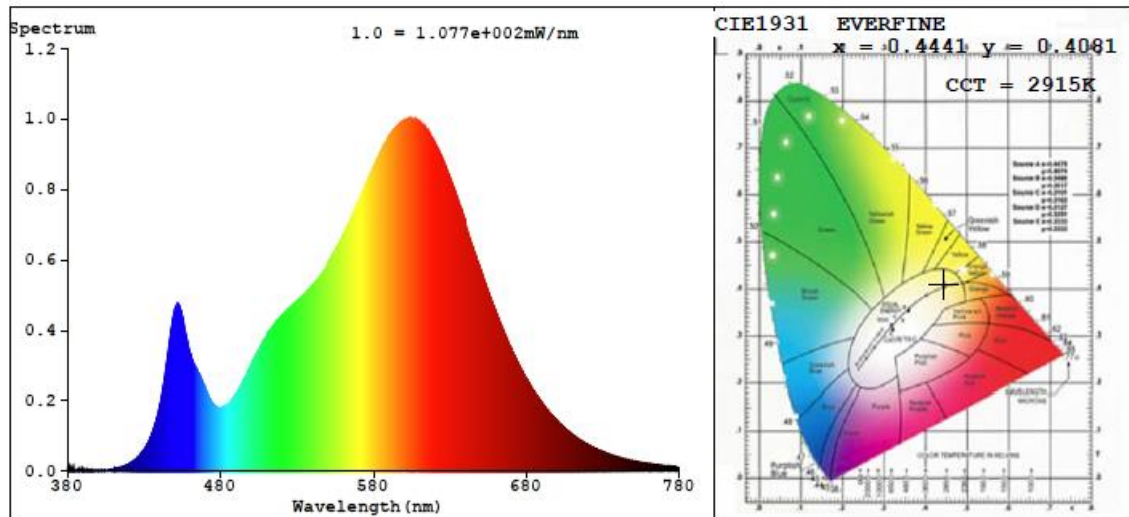
**Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	80	R9	3
Frequency (Hz)	60	R2	91	R10	79
CCT (K)	2915	R3	96	R11	78
Duv	0.0006	R4	79	R12	71
Chromaticity (x, y)	x=0.4441 y=0.4081	R5	80	R13	82
Chromaticity (u', v')	u'=0.2535 v'=0.5240	R6	89	R14	98
Color Rendering Index (CRI)	81.7	R7	82	R15	72
R9	3	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)	1220	1229	Bare Lamp: >= 1600(-10%)
Luminous Efficacy (lm/W)	132.46	132.29	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-MS02-0010-4-DY-30-J		

**Electrical Measurement for 4-lamp in Lithonia 2PM3N 12 cell 2x4 parabolic:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE172106	120.0	60	0.3138	37.2	0.9875	8.9
-B1,B2,B6, B7	277.0	60	0.1417	36.65	0.9332	10.6
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

**Chromaticity Measurement for 4-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	6
Frequency (Hz)	60	R2	91	R10	81
CCT (K)	2926	R3	96	R11	79
Duv	0.0002	R4	80	R12	72
Chromaticity (x, y)	x=0.4426 y=0.4065	R5	81	R13	83
Chromaticity (u', v')	u'=0.2532 v'=0.5232	R6	90	R14	98
Color Rendering Index (CRI)	82.3	R7	82	R15	73
R9	6	R8	58	--	--

**Photometric Measurement 4-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)	4143.1	4134.8	In luminaire (2 lamps): >= 3000(-10%)
Luminous Efficacy (lm/W)	111.38	112.83	In luminaire: >= 100(-3%)
Zonal lumens in the 0-60 °zone (%)	89.2	--	>= 75(-3)
SC: 0-180 °(if applicable)	1.22	--	1.0-2.0(±0.1)
SC: 90-270 °(if applicable)	1.19	--	1.0-2.0(±0.1)
Beam Angle (°)	97.4	--	--
Center Beam Candle Power (cd)	1808	--	--

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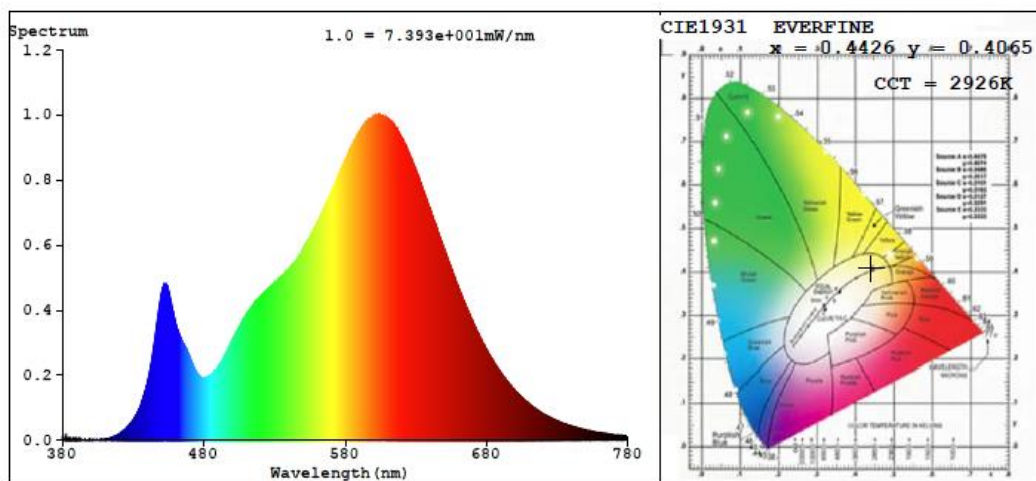
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## Spectral Power Distribution &amp; Chromaticity Diagram



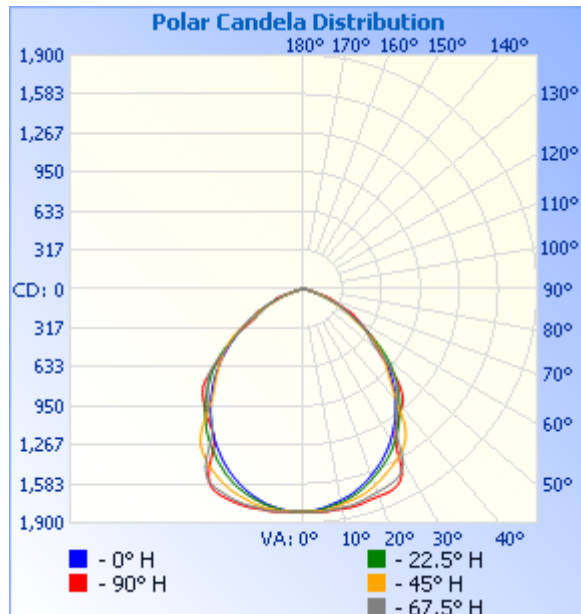
## Zonal Lumen Tabulation

## Zonal Lumen Summary

Zone	Lumens	% Luminaire
0-30	1,427.6	34.5%
0-40	2,277.3	55%
0-60	3,694.3	89.2%
60-90	445.5	10.8%
70-100	116.5	2.8%
90-120	1.0	0%
0-90	4,139.8	99.9%
90-180	2.7	0.1%
0-180	4,142.5	100%

## Lumens Per Zone

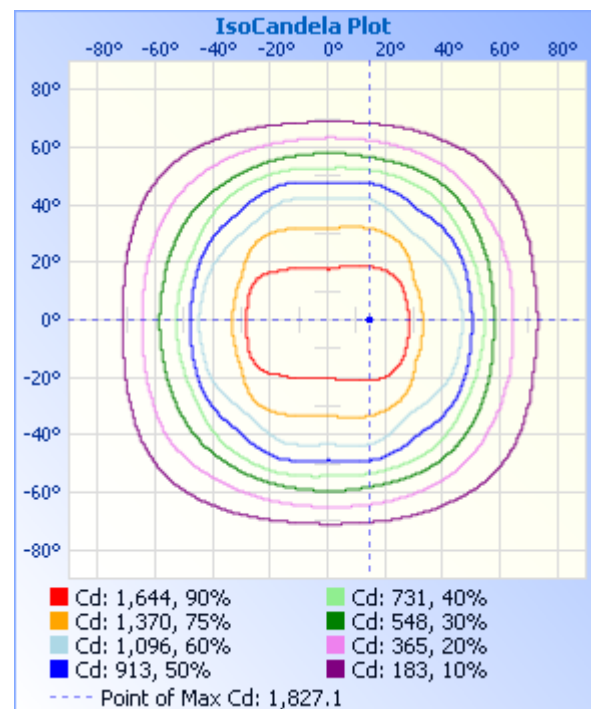
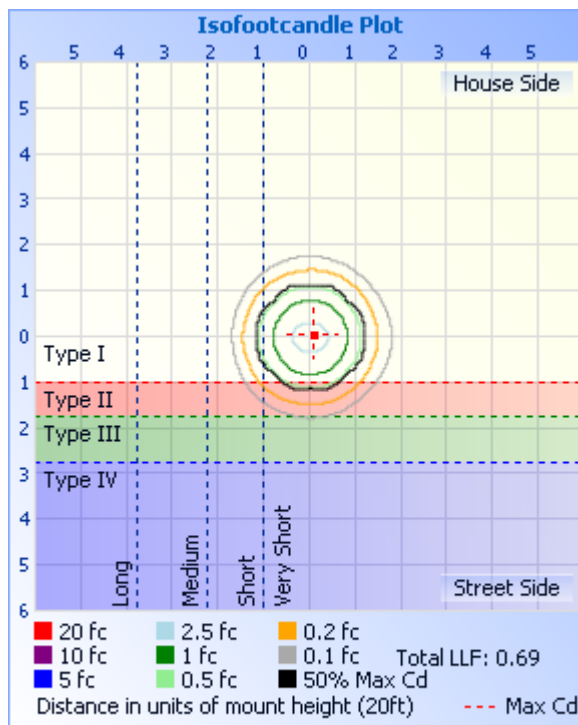
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	171.9	4.1%	90-100	0.0	0%
10-20	497.1	12.0%	100-110	0.4	0%
20-30	758.6	18.3%	110-120	0.6	0%
30-40	849.7	20.5%	120-130	0.4	0%
40-50	810.2	19.6%	130-140	0.5	0%
50-60	606.8	14.6%	140-150	0.3	0%
60-70	329.0	7.9%	150-160	0.3	0%
70-80	102.7	2.5%	160-170	0.2	0%
80-90	13.8	0.3%	170-180	0.0	0%

**Photometric Data**


**Illuminance at a Distance**

	Center Beam fc	Beam Width	
17.0ft	6.26 fc	38.0 ft	39.2 ft
34.0ft	1.56 fc	76.0 ft	78.4 ft
51.0ft	0.70 fc	113.9 ft	117.5 ft
68.0ft	0.39 fc	151.9 ft	156.7 ft
85.0ft	0.25 fc	189.9 ft	195.9 ft
102.0ft	0.17 fc	227.9 ft	235.1 ft

■ Vert. Spread: 96.3°  
■ Horiz. Spread: 98.1°



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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	1808	1808	1808	1808	1808	1808	1808	1808	1808	1808	1808	1808	1808	1808	1808	1808			
5	1815	1808	1799	1788	1787	1795	1807	1817	1817	1820	1816	1810	1803	1805	1808	1814			
10	1823	1813	1783	1756	1743	1761	1778	1804	1814	1810	1798	1787	1772	1780	1805	1822			
15	1827	1799	1748	1711	1687	1711	1746	1787	1809	1801	1767	1738	1712	1736	1775	1814			
20	1815	1773	1710	1648	1611	1639	1697	1755	1791	1774	1719	1665	1637	1675	1736	1792			
25	1776	1731	1644	1567	1524	1560	1629	1730	1774	1751	1650	1581	1545	1589	1675	1759			
30	1460	1557	1563	1471	1418	1465	1561	1620	1528	1644	1580	1480	1437	1491	1598	1579			
35	1334	1290	1430	1360	1296	1348	1447	1307	1327	1314	1469	1364	1313	1381	1461	1309			
40	1253	1193	1139	1228	1162	1214	1168	1182	1244	1196	1190	1230	1175	1245	1157	1215			
45	1162	1087	989	1077	1010	1070	977	1060	1104	1089	986	1083	1024	1095	1005	1109			
50	907	927	858	908	843	901	838	810	814	842	854	922	862	930	871	949			
55	714	658	711	691	667	677	657	638	687	646	689	726	692	704	727	673			
60	448	432	487	483	492	474	447	479	515	489	462	496	518	506	499	452			
65	336	336	308	324	322	316	313	344	364	368	325	341	356	354	332	350			
70	246	195	174	172	162	167	174	197	245	205	195	197	197	205	190	203			
75	81.1	86.8	76.3	75.1	75.6	72.5	72.4	77.8	83.6	86.2	84.2	95.4	101	94.1	87.0	93.2			
80	38.1	32.4	31.0	32.7	33.2	30.7	29.5	33.1	38.7	34.7	34.4	40.1	43.5	40.8	36.3	36.4			
85	12.7	10.3	9.20	9.71	9.11	8.08	8.05	9.61	11.5	9.88	9.55	11.3	12.9	12.5	11.4	11.9			
90	0.01	0.00	0.00	0.01	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	0.05	0.00	0.50	0.30	0.10	0.10	0.00	0.00			
105	0.00	0.00	0.00	0.00	0.00	0.20	1.09	0.70	0.84	0.99	1.44	0.30	0.10	0.05	1.29	0.01			
110	0.40	0.00	0.00	0.00	0.00	0.05	1.19	1.20	1.29	1.24	1.34	0.30	0.10	0.05	1.14	1.30			
115	0.89	0.25	0.05	0.00	0.00	0.00	0.94	1.35	1.24	1.19	0.94	0.00	0.00	0.00	0.89	1.25			
120	1.19	0.55	0.45	0.00	0.00	0.00	0.85	1.35	1.14	0.84	0.35	0.00	0.00	0.00	0.45	1.20			
125	1.34	1.14	0.45	0.00	0.00	0.00	1.04	1.25	0.60	0.40	0.20	0.00	0.00	0.00	0.25	1.00			
130	1.34	1.29	0.45	0.00	0.00	0.00	1.34	1.15	0.65	0.20	0.15	0.10	0.00	0.00	0.00	0.40			
135	1.19	1.44	1.09	0.79	0.00	0.49	1.59	1.40	0.95	0.25	0.25	0.40	0.15	0.00	0.00	0.05			
140	1.29	1.93	0.00	0.50	0.00	0.49	0.35	1.99	1.24	0.40	0.00	0.59	0.15	0.20	0.00	0.05			
145	1.29	0.81	0.00	0.64	0.00	0.60	0.00	1.35	1.29	0.35	0.00	0.59	0.25	0.35	0.00	0.00			
150	0.25	1.13	1.54	0.35	0.00	0.40	0.89	0.35	0.35	0.10	0.15	0.59	0.45	0.45	0.15	0.00			
155	0.99	1.99	1.53	0.35	0.00	0.54	0.95	1.34	1.19	0.60	0.35	0.59	0.64	0.45	0.30	0.15			
160	1.19	1.59	0.65	0.30	0.00	0.55	0.94	1.40	0.89	0.70	0.45	0.69	0.69	0.45	0.50	0.35			
165	0.94	1.04	0.10	0.45	0.05	0.55	0.55	0.80	0.75	0.70	0.45	0.84	0.69	0.50	0.55	0.45			
170	0.89	0.00	0.59	0.50	0.40	0.79	0.65	0.75	0.60	0.65	0.45	0.89	0.69	0.50	0.50	0.45			
175	0.65	0.19	0.60	0.50	0.49	0.74	0.69	0.40	0.40	0.35	0.44	3.45	0.64	0.50	0.35	0.25			
180	0.01	0.00	0.06	0.59	0.45	0.35	0.30	0.10	0.00	0.05	0.10	0.25	0.40	0.45	0.35	0.20			

**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-MS02-0010-4-DY-50-J		

**Electrical Measurement for Bare-lamp:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE172106	120.0	60	0.0784	9.32	0.9902	8.5
-B5	277.0	60	0.0357	9.21	0.9313	10.1
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

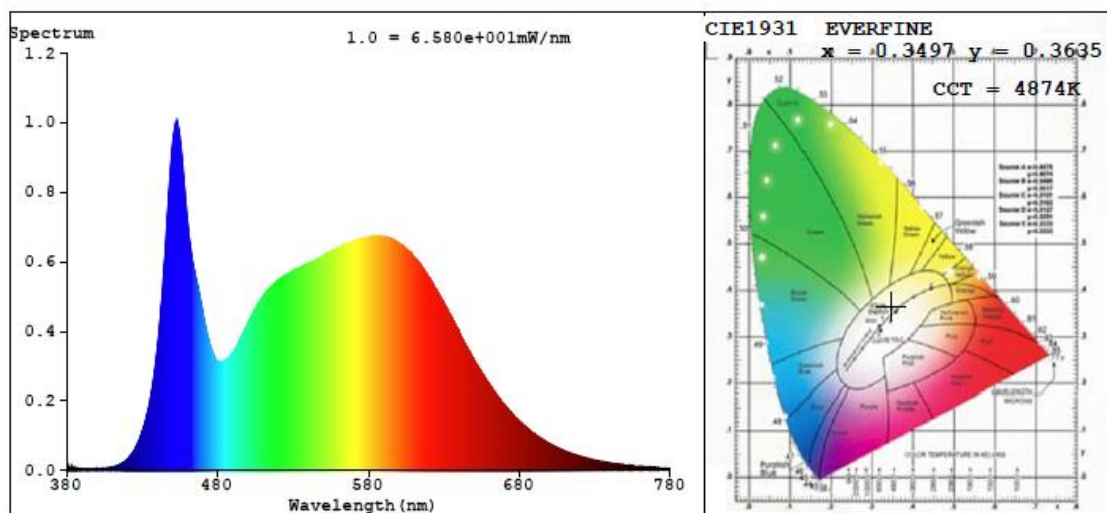
**Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	82	R9	10
Frequency (Hz)	60	R2	90	R10	77
CCT (K)	4874	R3	96	R11	80
Duv	0.0040	R4	81	R12	58
Chromaticity (x, y)	x=0.3497 y=0.3635	R5	82	R13	84
Chromaticity (u', v')	u'=0.2100 v'=0.4910	R6	86	R14	98
Color Rendering Index (CRI)	83.8	R7	87	R15	76
R9	10	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)	1252	1261	Bare Lamp: >= 1600(-10%)
Luminous Efficacy (lm/W)	134.3	136.9	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-MS02-0010-4-DY-50-J		

**Electrical Measurement for 4-lamp in Lithonia 2PM3N 12 cell 2x4 parabolic:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE172106	120.0	60	0.3165	37.62	0.9905	9.2
-B5,B8,B9, B10	277.0	60	0.1428	36.78	0.9298	11.6
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

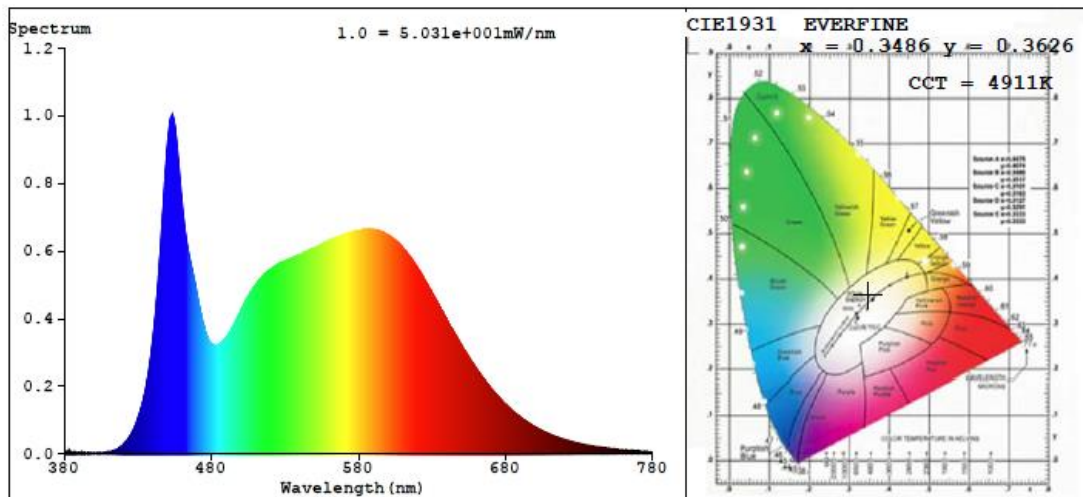
**Chromaticity Measurement for 4-lamp in Lithonia 2PM3N 12 cell 2x4 parabolic  
- Sphere-Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	83	R9	13
Frequency (Hz)	60	R2	91	R10	78
CCT (K)	4911	R3	96	R11	81
Duv	0.0040	R4	81	R12	58
Chromaticity (x, y)	x=0.3486 y=0.3626	R5	82	R13	85
Chromaticity (u', v')	u'=0.2096 v'=0.4904	R6	87	R14	98
Color Rendering Index (CRI)	84.4	R7	88	R15	77
R9	13	R8	68	--	--

**Photometric Measurement for 4-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)	4278	4252	Bare Lamp: >= 1600(-10%)
Luminous Efficacy (lm/W)	113.7	115.6	Bare lamp: >= 110(-3%)

**Spectral Power Distribution & Chromaticity Diagram**



**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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**NVLAP CODE: 201011-0**

Report Format Number STD/QR4909-A/2

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