

**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-MS04-0015-4-DY-XX-J

Representative (Tested) Model:

IK-MS04-0015-4-DY-30-J

IK-MS04-0015-4-DY-35-J

IK-MS04-0015-4-DY-40-J

IK-MS04-0015-4-DY-50-J

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

Test &amp; Report By:

*Jack Luo*

Engineer: Jack Luo

Date: Feb.07,2017

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-MS04-0015-4-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	60W	
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-Q1(3000K),Q2(3500K),Q3(4000K), Q4(5000K)	
Luminaire Aperture (for downlights)	--	in.
Luminaire Length	--	mm
Luminaires Width	--	mm
Number of Units (modular products)	N/A	s

**Photo**


**1.2 Test Specifications:**

Date of Receipt	Feb.16, 2017
Date of Test	Feb.18, 2017
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)*

<b>Test date</b>	2017-02-18	<b>Test Ambient:</b>	25.2 ° C
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	90
<b>Model Number</b>	IK-MS04-0015-4-DY-30-J		

**Electrical Measurement in Lithonia 2GT8 lensed 2x4:**

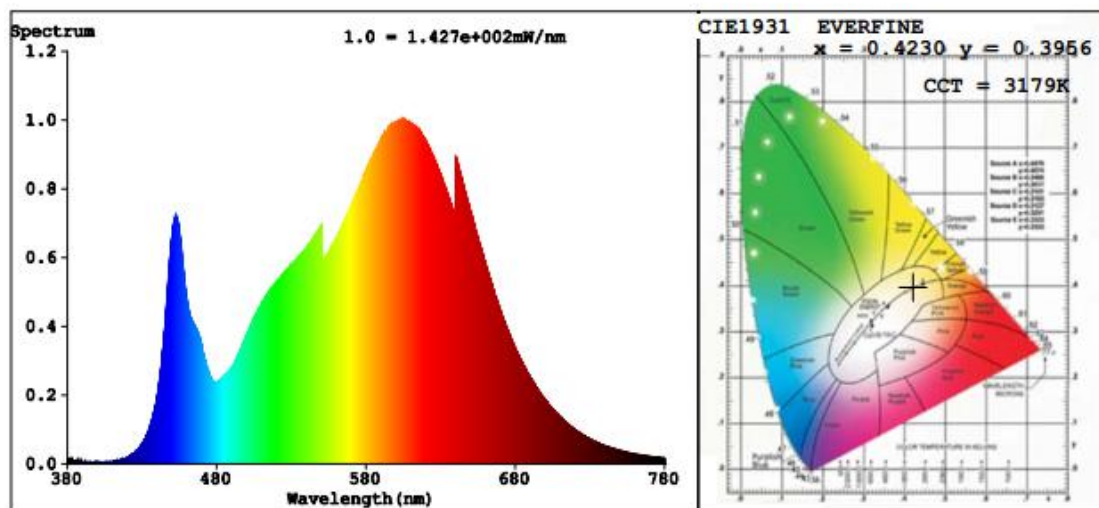
Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE171126-Q1	120.0	60	0.5063	60.26	0.9919	6.74
	277.0	60	0.2247	59.36	0.9536	17.58
<b>DLC Pass Criteria</b>					$\geq 0.9(-3\%)$	$\leq 20(+5)$

**Chromaticity Measurement in Lithonia 2GT8 lensed 2x4 -**  
**Sphere-Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	89	R9	34
Frequency (Hz)	60	R2	95	R10	88
CCT (K)	3179	R3	97	R11	89
Duv	-0.0013	R4	88	R12	75
Chromaticity (x, y)	x=0.4230 y=0.3956	R5	89	R13	91
Chromaticity (u', v')	u'=0.2452 v'=0.5159	R6	94	R14	99
Color Rendering Index (CRI)	88.8	R7	87	R15	83
R9	34	R8	71	--	--

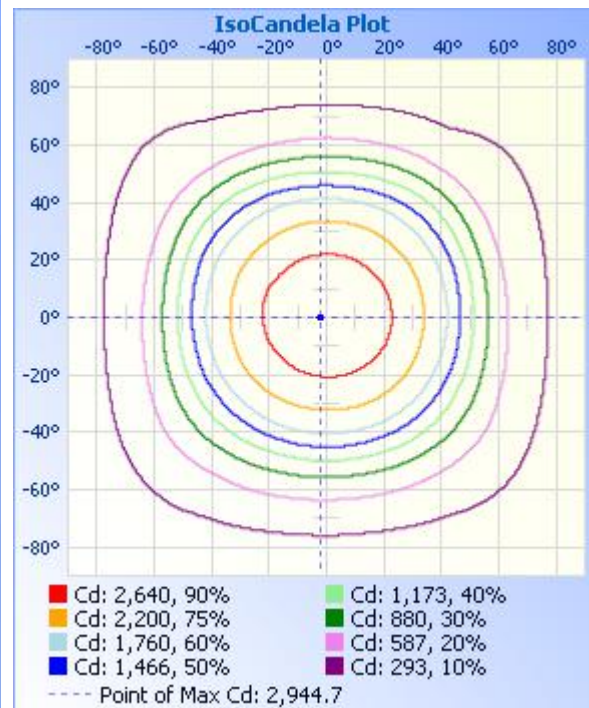
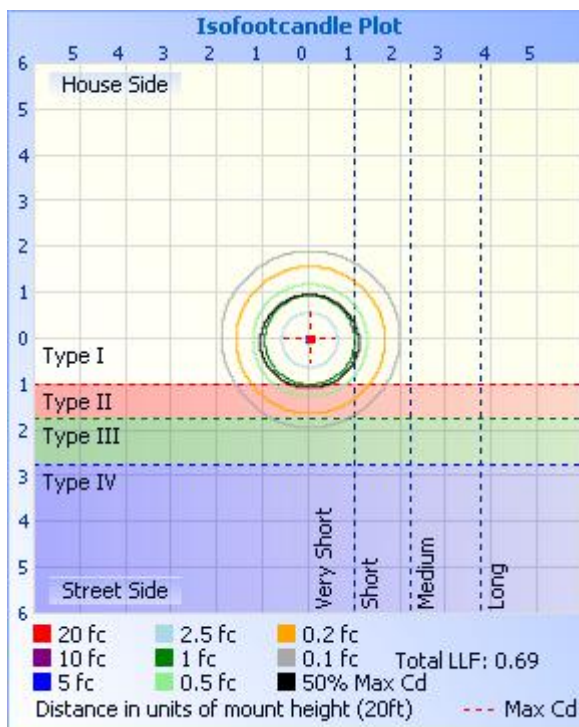
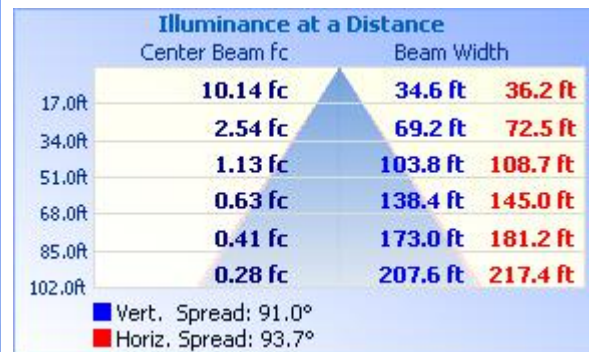
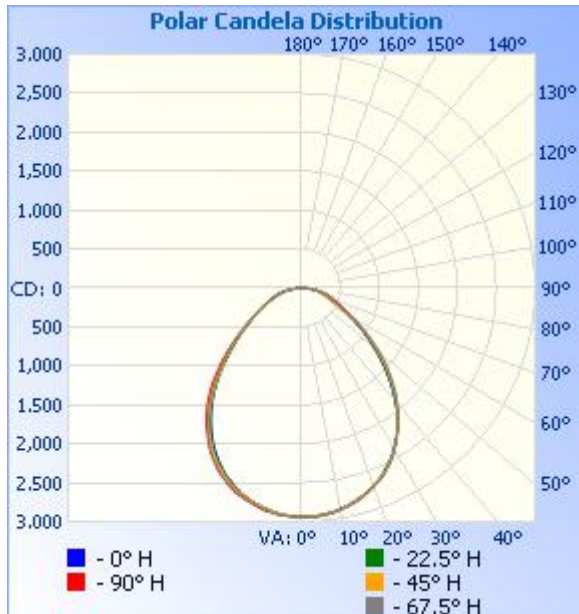
**Photometric Measurement in Lithonia 2GT8 lensed 2x4– Goniophotometer**  
**Method:**

Parameter	Result		DLC V4.0 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	6530.4	6539.5	$\geq 3000(-10\%)$	
Luminous Efficacy (lm/W)	108.37	110.17	Standard: $\geq 100(-3\%)$	Premium: $\geq 125(-3\%)$
Zonal lumens in the 0-60° zone (%)	85.4	--	$\geq 75(-3)$	
SC: 0-180° (if applicable)	1.21	--	1.0-2.0( $\pm 0.1$ )	
SC: 90-270° (if applicable)	1.17	--	1.0-2.0( $\pm 0.1$ )	
Beam Angle (°)	92.3	--	--	
Center Beam Candle Power (cd)	2932	--	--	

**Spectral Power Distribution & Chromaticity Diagram**

**Zonal Lumen Tabulation**

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	2,233.0	34.2%
0-40	3,548.7	54.3%
0-60	5,576.2	85.4%
60-90	947.1	14.5%
70-100	426.7	6.5%
90-120	2.2	0%
0-90	6,523.3	99.9%
90-180	6.4	0.1%
0-180	6,529.7	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	277.2	4.2%	90-100	0.3	0%
10-20	788.1	12.1%	100-110	0.8	0%
20-30	1,167.8	17.9%	110-120	1.1	0%
30-40	1,315.6	20.1%	120-130	1.0	0%
40-50	1,178.2	18.0%	130-140	1.0	0%
50-60	849.3	13.0%	140-150	0.8	0%
60-70	520.7	8.0%	150-160	0.7	0%
70-80	317.6	4.9%	160-170	0.5	0%
80-90	108.8	1.7%	170-180	0.2	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	2932	2932	2932	2932	2932	2932	2932	2932	2932	2932	2932	2932	2932	2932	2932	2932	
5	2929	2927	2915	2928	2917	2929	2917	2930	2926	2917	2903	2919	2914	2916	2909	2922	
10	2887	2884	2874	2890	2877	2887	2882	2886	2872	2868	2852	2863	2856	2861	2854	2874	
15	2811	2810	2802	2808	2803	2808	2803	2823	2799	2791	2770	2775	2768	2779	2771	2799	
20	2707	2711	2699	2701	2702	2706	2695	2707	2699	2685	2657	2652	2644	2655	2667	2692	
25	2560	2560	2554	2559	2555	2557	2566	2576	2564	2547	2509	2494	2485	2498	2514	2548	
30	2367	2370	2363	2376	2372	2380	2381	2389	2383	2359	2318	2292	2282	2301	2315	2356	
35	2134	2140	2131	2145	2149	2145	2144	2166	2150	2113	2073	2045	2031	2048	2075	2104	
40	1863	1873	1862	1868	1868	1874	1889	1906	1897	1833	1780	1760	1752	1758	1773	1813	
45	1553	1564	1568	1559	1555	1570	1597	1630	1610	1538	1461	1440	1446	1437	1457	1502	
50	1226	1248	1259	1246	1246	1261	1291	1328	1309	1242	1174	1144	1140	1141	1166	1194	
55	928	934	959	956	957	964	992	1023	1017	978	918	893	889	885	900	928	
60	691	669	672	699	713	703	711	748	766	762	701	692	688	680	679	709	
65	519	476	451	490	515	486	478	531	572	578	525	532	530	515	507	542	
70	414	375	329	362	382	357	347	415	449	430	390	402	404	386	376	408	
75	327	305	270	281	289	279	291	334	354	314	291	298	305	290	282	305	
80	222	219	205	199	206	204	223	247	250	218	200	198	210	200	191	210	
85	85.2	92.1	89.5	105	106	108	114	126	114	114	96.1	101	102	100	79.6	92.0	
90	0.36	0.12	0.22	0.79	1.25	0.92	0.60	0.48	0.30	0.00	0.34	0.74	0.54	0.40	0.00	0.00	
95	0.00	0.00	0.05	0.30	0.49	0.45	0.15	0.15	0.10	0.00	0.30	0.94	0.64	0.40	0.00	0.00	
100	0.00	0.00	0.15	0.35	0.44	0.50	0.50	0.50	0.75	0.40	0.74	1.24	0.99	0.65	0.20	0.20	
105	0.34	0.10	0.39	0.54	0.69	0.69	0.69	0.70	0.90	0.79	1.43	1.24	1.09	0.69	0.50	0.45	
110	0.55	0.50	0.74	0.74	1.09	1.09	1.09	1.25	1.54	1.34	1.68	1.14	0.89	0.64	0.84	0.85	
115	1.04	1.04	1.04	0.79	0.89	1.04	1.43	1.45	1.74	1.54	2.17	0.64	0.59	0.64	1.09	1.20	
120	1.24	1.19	1.18	0.45	0.59	0.60	1.78	1.95	1.94	1.89	2.07	0.40	0.44	0.45	1.14	1.20	
125	1.24	1.19	1.23	0.40	0.59	0.60	1.78	2.30	2.09	1.93	1.82	0.35	0.44	0.40	1.19	1.30	
130	1.34	1.34	1.23	0.40	0.59	0.20	1.64	2.30	2.14	1.93	1.58	0.75	0.69	0.50	1.14	1.35	
135	1.49	1.34	1.18	0.94	0.59	0.84	1.64	2.15	2.14	1.93	1.48	1.14	0.89	0.94	1.14	1.35	
140	1.49	1.34	0.84	1.28	0.69	1.14	1.29	2.10	2.33	2.03	0.69	1.53	1.19	1.04	0.69	1.35	
145	1.49	1.24	0.69	1.38	0.79	1.19	0.45	2.10	2.28	1.98	0.84	1.73	1.39	1.64	0.02	1.30	
150	1.49	1.04	0.74	1.43	1.09	1.29	0.69	1.46	1.93	1.44	1.48	1.78	1.58	1.64	1.34	1.15	
155	1.24	0.89	1.18	1.38	1.28	1.29	0.84	1.60	1.84	1.98	1.48	1.93	1.83	1.69	1.73	1.30	
160	1.29	0.89	1.18	1.38	1.33	1.29	1.14	1.45	2.09	1.98	1.48	1.93	2.12	1.98	1.64	1.45	
165	1.49	0.89	1.23	1.53	1.43	1.39	1.19	1.45	2.04	1.93	1.38	2.03	2.17	1.94	1.89	1.45	
170	1.74	1.14	1.28	1.73	1.78	1.88	1.34	1.45	1.99	1.83	1.23	1.93	2.17	2.03	1.93	1.55	
175	1.64	1.14	1.43	1.83	1.98	1.98	1.44	1.45	1.59	1.44	1.08	1.63	1.97	1.88	1.73	1.44	
180	1.20	0.94	1.38	1.78	1.68	1.73	1.24	1.10	1.34	1.29	0.99	1.44	1.78	1.74	1.64	1.10	

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## 2.2 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2017-02-18	Test Ambient:	25.2 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	IK-MS04-0015-4-DY-35-J		

### Electrical Measurement in Lithonia 2GT8 lensed 2x4:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE171126-Q2	120.0	60	0.5086	60.45	0.9905	6.30
	277.0	60	0.2257	59.69	0.9547	17.20
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

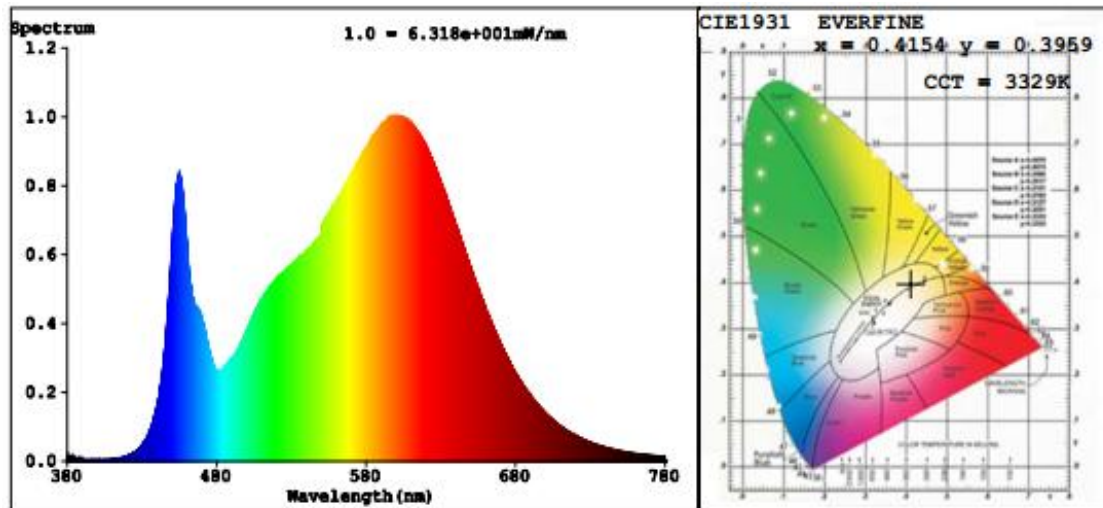
### Chromaticity Measurement in Lithonia 2GT8 lensed 2x4 - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	82	R9	11
Frequency (Hz)	60	R2	93	R10	82
CCT (K)	3329	R3	95	R11	79
Duv	0.0001	R4	80	R12	67
Chromaticity (x, y)	x=0.4154 y=0.3959	R5	82	R13	85
Chromaticity (u', v')	u'=0.2402 v'=0.5149	R6	90	R14	98
Color Rendering Index (CRI)	83.4	R7	83	R15	75
R9	11	R8	61	--	--

### Photometric Measurement in Lithonia 2GT8 lensed 2x4 - Sphere-Spectroradiometer Method:

Parameter	Result		DLC V4.0 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	6681	6726	>=3000(-10%)	
Luminous Efficacy (lm/W)	110.52	112.68	Standard: >= 100(-3%)	Premium: >= 125(-3%)

**Spectral Power Distribution & Chromaticity Diagram**



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### 2.3 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2017-02-18	Test Ambient:	25.2 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	IK-MS04-0015-4-DY-40-J		

#### Electrical Measurement in Lithonia 2GT8 lensed 2x4:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE171126-Q3	120.0	60	0.5052	60.22	0.9932	7.01
	277.0	60	0.2246	59.24	0.9522	17.36
DLC Pass Criteria					$\geq 0.9(-3\%)$	$\leq 20(+5)$

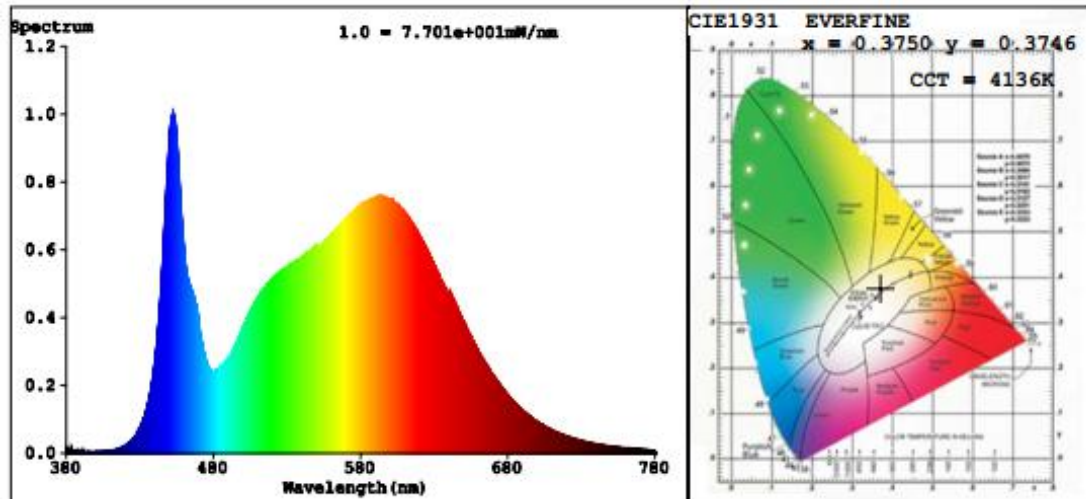
#### Chromaticity Measurement in Lithonia 2GT8 lensed 2x4 - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	82	R9	10
Frequency (Hz)	60	R2	91	R10	77
CCT (K)	4136	R3	96	R11	81
Duv	0.0006	R4	82	R12	59
Chromaticity (x, y)	x=0.3750 y=0.3746	R5	82	R13	85
Chromaticity (u', v')	u'=0.2224 v'=0.4998	R6	86	R14	98
Color Rendering Index (CRI)	83.6	R7	86	R15	76
R9	10	R8	65	--	--

#### Photometric Measurement in Lithonia 2GT8 lensed 2x4-- Sphere-Spectroradiometer Method:

Parameter	Result		DLC V4.0 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	6757	6797	$\geq 3000(-10\%)$	
Luminous Efficacy (lm/W)	112.21	114.74	Standard: $\geq 100(-3\%)$	Premium: $\geq 125(-3\%)$

**Spectral Power Distribution & Chromaticity Diagram**



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

Test date	2017-02-18	Test Ambient:	25.2 ° C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	IK-MS04-0015-4-DY-50-J		

**Electrical Measurement in Lithonia 2GT8 lensed 2x4:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE171126-Q4	120.0	60	0.5075	60.49	0.9933	7.05
	277.0	60	0.2255	59.58	0.9540	17.32
DLC Pass Criteria					$\geq 0.9(-3\%)$	$\leq 20(+5)$

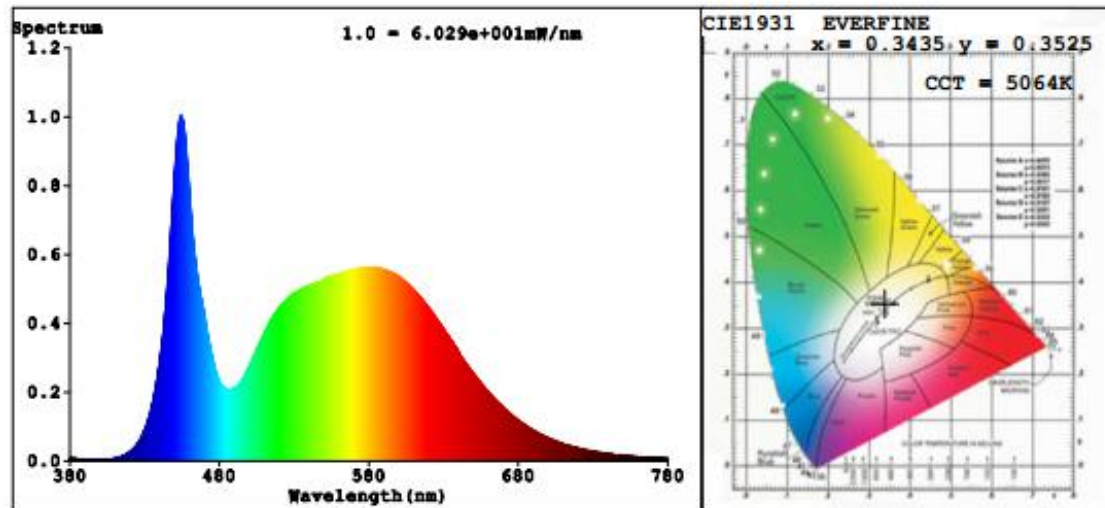
**Chromaticity Measurement in Lithonia 2GT8 lensed 2x4 -  
Sphere-Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	6
Frequency (Hz)	60	R2	88	R10	71
CCT (K)	5064	R3	92	R11	78
Duv	0.0011	R4	80	R12	56
Chromaticity (x, y)	x=0.3435 y=0.3525	R5	81	R13	83
Chromaticity (u', v')	u'=0.2100 v'=0.4848	R6	83	R14	96
Color Rendering Index (CRI)	82.1	R7	86	R15	76
R9	6	R8	66	--	--

**Photometric Measurement in Lithonia 2GT8 lensed 2x4--  
Sphere-Spectroradiometer Method:**

Parameter	Result		DLC V4.0 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	6866	6908	$\geq 3000(-10\%)$	
Luminous Efficacy (lm/W)	113.51	115.94	Standard: $\geq 100(-3\%)$	Premium: $\geq 125(-3\%)$

**Spectral Power Distribution & Chromaticity Diagram**



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**3. Test Equipment**

Equipment ID	Equipment Name	Last Calibration Date	Next Calibration Date
ST-R-331	2 meter Integrating Sphere	2016-07-01	2017-06-30
ST-R-327	Spectral analysis system HAAS-2000	2016-07-01	2017-06-30
D204	Standard Lamp	2016-07-12	2017-07-11
PF2010	Power Meter for Integrating Sphere	2016-07-01	2017-06-30
GO-R5000	Goniophotometer system	2016-07-01	2017-06-30
D908S	Standard Lamp	2016-07-12	2017-07-11
PF210	Power Meter for Goniophotometer	2016-07-07	2017-07-06
Expand Uncertainty: Photometric Measurement (Sphere):2.04%, k=2 Chromaticity Measurement(Sphere):28.8K, k=2 Photometric Measurement(Goniophotometer):2.36%, k=2			

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