



Report No.: GZE160816-A

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-MS04-002022-2-DY-XX-J

Representative (Tested) Model:

IK-MS04-002022-2-DY-30-J
IK-MS04-002022-2-DY-35-J
IK-MS04-002022-2-DY-40-J
IK-MS04-002022-2-DY-50-J

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

Test & Report By:

Jack Lao

Review By:

Tommy Liang

Engineer:

Date: Aug.10,2016

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-MS04-002022-2-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 -277Vac, 50/60 Hz	
Nominal Power	40W	
Rated Initial Lamp Lumen	--	
Declared CCT	3000K,3500K,4000K,5000K,	
LED Manufacturer	EVERLIGHT ELECTRONICS CO., LTD	
LED Model	67-21S Series (3000K)	
Sample Number	GZE160816-A1(3000K), A2(3500K), A3(4000K), A4(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	Aug.05, 2016
Date of Test	Aug.06, 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	2016-08-06	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-MS04-002022-2-DY-30-J		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE160816-	120.0	60	0.3219	38.36	0.9932	9.16
A1	277.0	60	0.1499	38.98	0.9386	13.13
DLC Pass Criteria					$\geq 0.9(-3\%)$	$\leq 20(+5)$

Chromaticity Measurement - Sphere-Spectroradiometer Method in Lithonia

2GT8 lensed 2x4:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	2
Frequency (Hz)	60	R2	94	R10	85
CCT (K)	2884	R3	92	R11	75
Duv	81.1	R4	77	R12	73
Chromaticity (x, y)	x=0.4413 y=0.3987	R5	81	R13	84
Chromaticity (u', v')	u'=0.2558 v'=0.5199	R6	92	R14	96
Color Rendering Index (CRI)	81.1	R7	78	R15	73
R9	2	R8	54	--	--

Photometric Measurement – Goniophotometer Method in Lithonia 2GT8 lensed

2x4:

Parameter	Result		DLC V4.0 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	4194.5	4321.7	$\geq 3000(-10\%)$	
Luminous Efficacy (lm/W)	109.35	110.87	Standard: $\geq 100(-3\%)$	Premium: $\geq 125(-3\%)$
Zonal lumens in the 0-60 °zone (%)	85.5	--	$\geq 75(-3)$	
SC: 0-180 °(if applicable)	1.26	--	1.0-2.0(± 0.1)	
SC: 90-270 °(if applicable)	1.20	--	1.0-2.0(± 0.1)	
Beam Angle (°)	97.8	--	--	
Center Beam Candle Power (cd)	1769	--	--	

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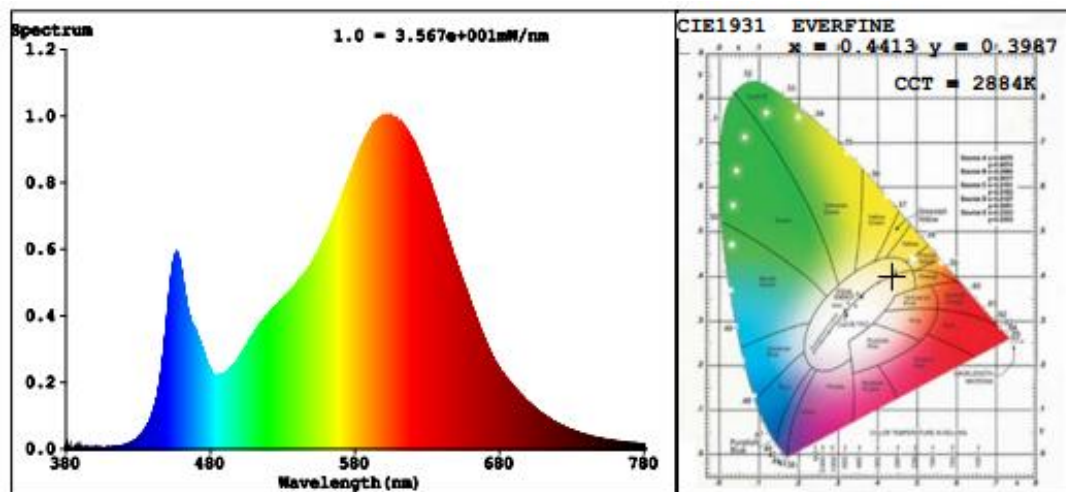
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Spectral Power Distribution & Chromaticity Diagram

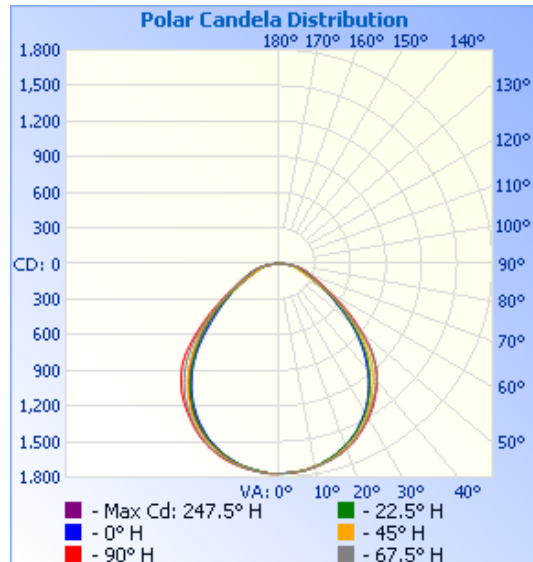


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1,367.9	32.6%
0-40	2,210.1	52.7%
0-60	3,583.7	85.5%
60-90	609.8	14.5%
70-100	271.9	6.5%
90-120	0.1	0%
0-90	4,193.5	100%
90-180	0.4	0%
0-180	4,193.9	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	167.3	4.0%	90-100	0.0	0%
10-20	479.2	11.4%	100-110	0.0	0%
20-30	721.4	17.2%	110-120	0.1	0%
30-40	842.2	20.1%	120-130	0.1	0%
40-50	799.4	19.1%	130-140	0.1	0%
50-60	574.1	13.7%	140-150	0.1	0%
60-70	337.9	8.1%	150-160	0.1	0%
70-80	202.4	4.8%	160-170	0.0	0%
80-90	69.5	1.7%	170-180	0.0	0%

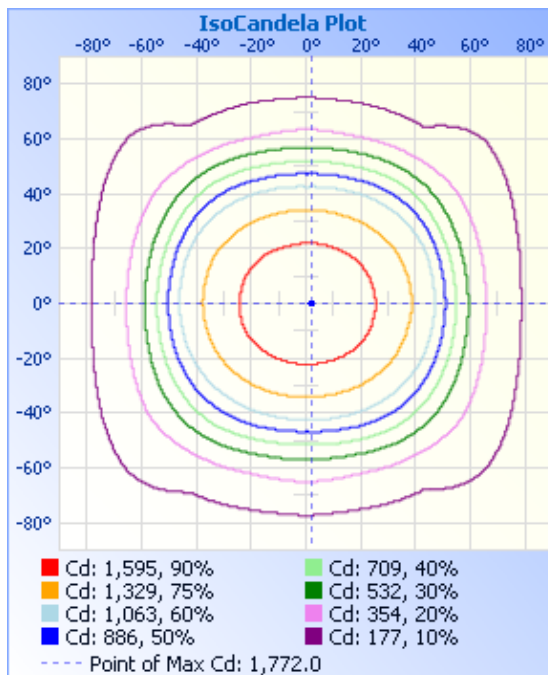
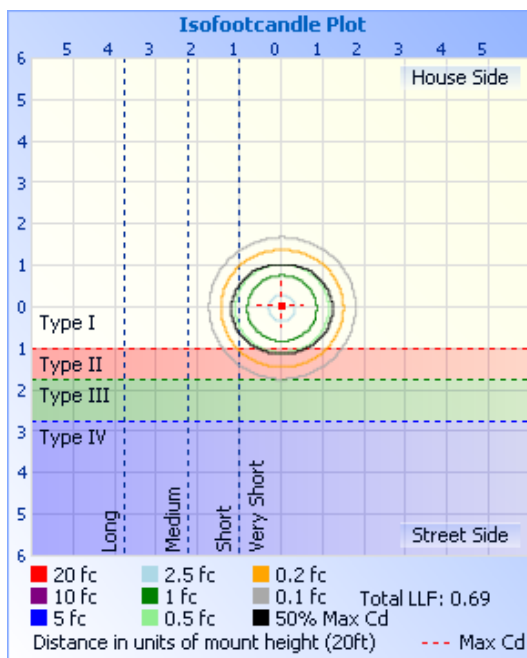
Photometric Data



Illuminance at a Distance

	Center Beam fc	Beam Width	
17.0ft	6.12 fc	36.6 ft	41.5 ft
34.0ft	1.53 fc	73.2 ft	83.0 ft
51.0ft	0.68 fc	109.8 ft	124.5 ft
68.0ft	0.38 fc	146.4 ft	166.0 ft
85.0ft	0.24 fc	183.0 ft	207.5 ft
102.0ft	0.17 fc	219.6 ft	248.9 ft

■ Vert. Spread: 94.2°
■ Horiz. Spread: 101.3°



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Table--1

UNIT: cd

C (DEG) T (DEG)	0	23	45	68	90	113	135	158	180	203	225	248	270	293	315	338	
0	1769	1769	1769	1769	1769	1769	1769	1769	1769	1769	1769	1769	1769	1769	1769	1769	
5	1760	1760	1760	1761	1760	1758	1761	1762	1762	1762	1758	1758	1759	1759	1762	1764	
10	1746	1743	1738	1738	1734	1733	1735	1742	1737	1738	1735	1732	1733	1732	1738	1742	
15	1714	1709	1698	1695	1692	1690	1700	1710	1704	1699	1692	1686	1686	1689	1700	1709	
20	1665	1661	1651	1634	1630	1628	1644	1658	1662	1655	1635	1624	1620	1628	1641	1661	
25	1598	1591	1571	1554	1550	1550	1570	1585	1590	1585	1562	1545	1531	1543	1568	1590	
30	1505	1495	1474	1451	1442	1450	1472	1494	1504	1493	1466	1438	1423	1438	1466	1492	
35	1409	1385	1355	1321	1314	1322	1356	1386	1400	1381	1339	1305	1292	1303	1340	1381	
40	1287	1274	1228	1177	1160	1177	1229	1279	1281	1241	1184	1147	1134	1148	1192	1245	
45	1137	1123	1059	1013	989	1015	1061	1119	1131	1069	1004	960	944	968	1015	1079	
50	915	900	859	817	800	814	861	906	921	879	823	775	737	781	834	873	
55	688	655	649	619	600	617	653	672	705	675	639	587	571	587	637	660	
60	494	466	454	441	447	439	464	480	510	500	469	435	445	432	462	489	
65	365	341	295	302	335	300	302	351	375	372	328	324	350	320	321	367	
70	280	266	197	223	253	223	203	273	288	290	229	243	272	241	222	287	
75	220	210	152	171	184	174	154	216	227	222	172	186	201	182	166	216	
80	152	148	122	122	136	125	125	156	160	152	131	129	141	126	126	147	
85	57.3	61.6	61.5	66.7	69.2	68.3	67.9	71.0	68.4	65.6	59.8	63.7	63.5	63.1	55.0	58.6	
90	0.06	0.01	0.04	0.10	0.17	0.27	0.06	0.18	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	0.05	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	0.11	0.05	0.16	0.00	0.00	0.00	0.00	0.05	
115	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.42	0.11	0.42	0.00	0.00	0.00	0.00	0.05	
120	0.11	0.16	0.00	0.00	0.00	0.00	0.00	0.05	0.37	0.11	0.48	0.00	0.00	0.00	0.00	0.00	
125	0.21	0.16	0.00	0.00	0.00	0.00	0.05	0.21	0.37	0.11	0.47	0.00	0.00	0.00	0.00	0.00	
130	0.21	0.21	0.00	0.00	0.00	0.00	0.05	0.27	0.37	0.05	0.05	0.00	0.00	0.00	0.00	0.00	
135	0.21	0.21	0.00	0.00	0.00	0.00	0.05	0.27	0.42	0.05	0.00	0.00	0.00	0.00	0.00	0.00	
140	0.21	0.26	0.00	0.00	0.00	0.00	0.00	0.27	0.42	0.05	0.00	0.00	0.16	0.00	0.00	0.00	
145	0.21	0.11	0.00	0.00	0.00	0.00	0.00	0.11	0.37	0.05	0.00	0.11	0.11	0.21	0.00	0.00	
150	0.21	0.05	0.00	0.00	0.00	0.00	0.00	0.16	0.37	0.05	0.00	0.16	0.32	0.37	0.05	0.00	
155	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.26	0.11	0.00	0.16	0.37	0.32	0.27	0.00	
160	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.32	0.26	0.00	0.21	0.53	0.42	0.37	0.11	
165	0.05	0.00	0.00	0.11	0.21	0.00	0.00	0.00	0.37	0.26	0.00	0.27	0.48	0.48	0.42	0.11	
170	0.05	0.00	0.00	0.26	0.37	0.21	0.05	0.00	0.26	0.32	0.00	0.31	0.48	0.37	0.37	0.11	
175	0.16	0.00	0.00	0.48	0.37	0.42	0.11	0.00	0.21	0.16	0.00	0.05	0.42	0.37	0.42	0.11	
180	0.16	0.00	0.00	0.42	0.37	0.42	0.11	0.00	0.26	0.16	0.00	0.00	0.32	0.37	0.42	0.11	

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2.2 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2016-08-06	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-MS04-002022-2-DY-35-J		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE160816-A2	120.0	60	0.3223	38.42	0.9935	9.27
	277.0	60	0.1500	39.01	0.9387	13.48
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

Chromaticity Measurement - Sphere-Spectroradiometer Method in Lithonia

2GT8 lensed 2x4:

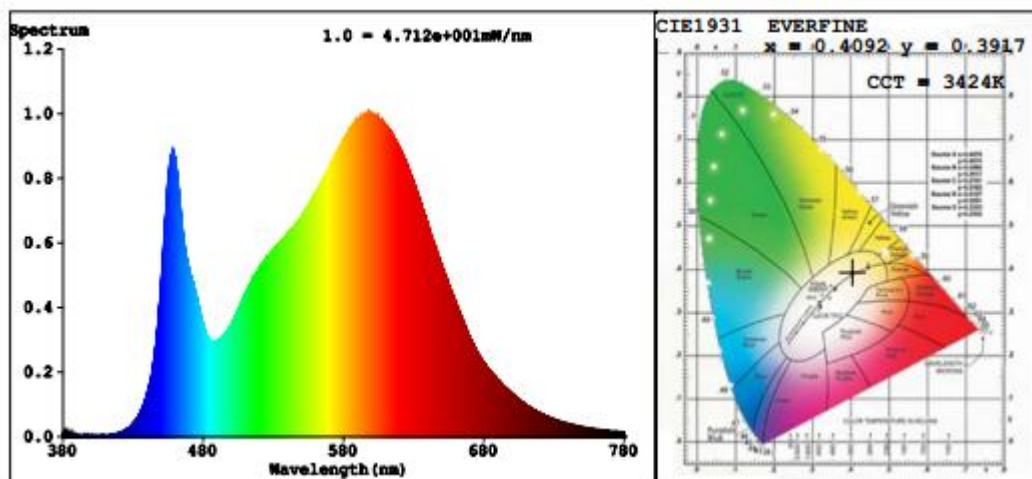
Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	82	R9	8
Frequency (Hz)	60	R2	94	R10	83
CCT (K)	3424	R3	94	R11	76
Duv	-0.0004	R4	78	R12	64
Chromaticity (x, y)	x=0.4092 y=0.3917	R5	81	R13	85
Chromaticity (u', v')	u'=0.2378 v'=0.5123	R6	90	R14	98
Color Rendering Index (CRI)	82.5	R7	81	R15	75
R9	8	R8	59	--	--

Photometric Measurement – Sphere-Spectroradiometer Method in Lithonia

2GT8 lensed 2x4:

Parameter	Result		DLC V4.0 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	4305	4406	>= 3000(-10%)	
Luminous Efficacy (lm/W)	112.05	112.95	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	2016-08-06	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-MS04-002022-2-DY-40-J		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE160816-	120.0	60	0.3223	38.39	0.9925	9.22
A3	277.0	60	0.1499	38.87	0.9364	13.53
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

Chromaticity Measurement - Sphere-Spectroradiometer Method in Lithonia

2GT8 lensed 2x4:

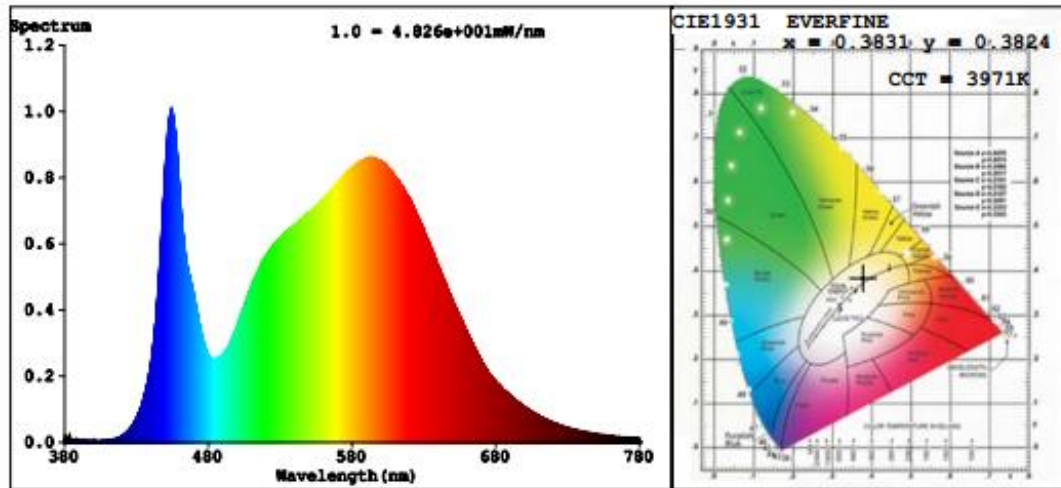
Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	80	R9	4
Frequency (Hz)	60	R2	89	R10	73
CCT (K)	3971	R3	95	R11	77
Duv	81.8	R4	79	R12	55
Chromaticity (x, y)	x=0.3831 y=0.3824	R5	79	R13	83
Chromaticity (u', v')	u'=0.2246 v'=0.5044	R6	84	R14	97
Color Rendering Index (CRI)	81.8	R7	85	R15	74
R9	4	R8	62	--	--

Photometric Measurement – Sphere-Spectroradiometer Method in Lithonia

2GT8 lensed 2x4:

Parameter	Result		DLC V4.0 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	4386	4475	>= 3000(-10%)	
Luminous Efficacy (lm/W)	114.25	115.13	Standard: >= 100(-3%)	Premium: >= 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	2016-08-06	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	IK-MS04-002022-2-DY-50-J		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE160816-	120.0	60	0.3244	38.65	0.9930	9.68
A4	277.0	60	0.1511	39.11	0.9342	13.35
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

Chromaticity Measurement - Sphere-Spectroradiometer Method in Lithonia

2GT8 lensed 2x4:

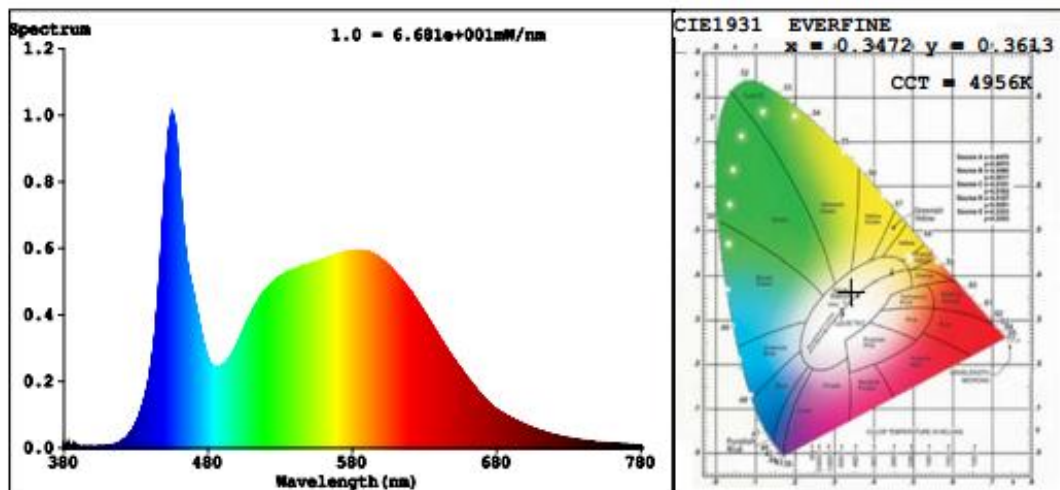
Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	80	R9	4
Frequency (Hz)	60	R2	89	R10	73
CCT (K)	4956	R3	94	R11	76
Duv	0.0040	R4	78	R12	51
Chromaticity (x, y)	x=0.3472 y=0.3613	R5	79	R13	83
Chromaticity (u', v')	u'=0.2091 v'=0.4896	R6	83	R14	97
Color Rendering Index (CRI)	81.8	R7	86	R15	74
R9	4	R8	65	--	--

Photometric Measurement – Sphere-Spectroradiometer Method in Lithonia

2GT8 lensed 2x4:

Parameter	Result		DLC V4.0 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	4523	4627	>= 3000(-10%)	
Luminous Efficacy (lm/W)	117.02	118.31	Standard: >= 100(-3%)	Premium: >= 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-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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